Invenergy

California Ridge
Wind Energy Project

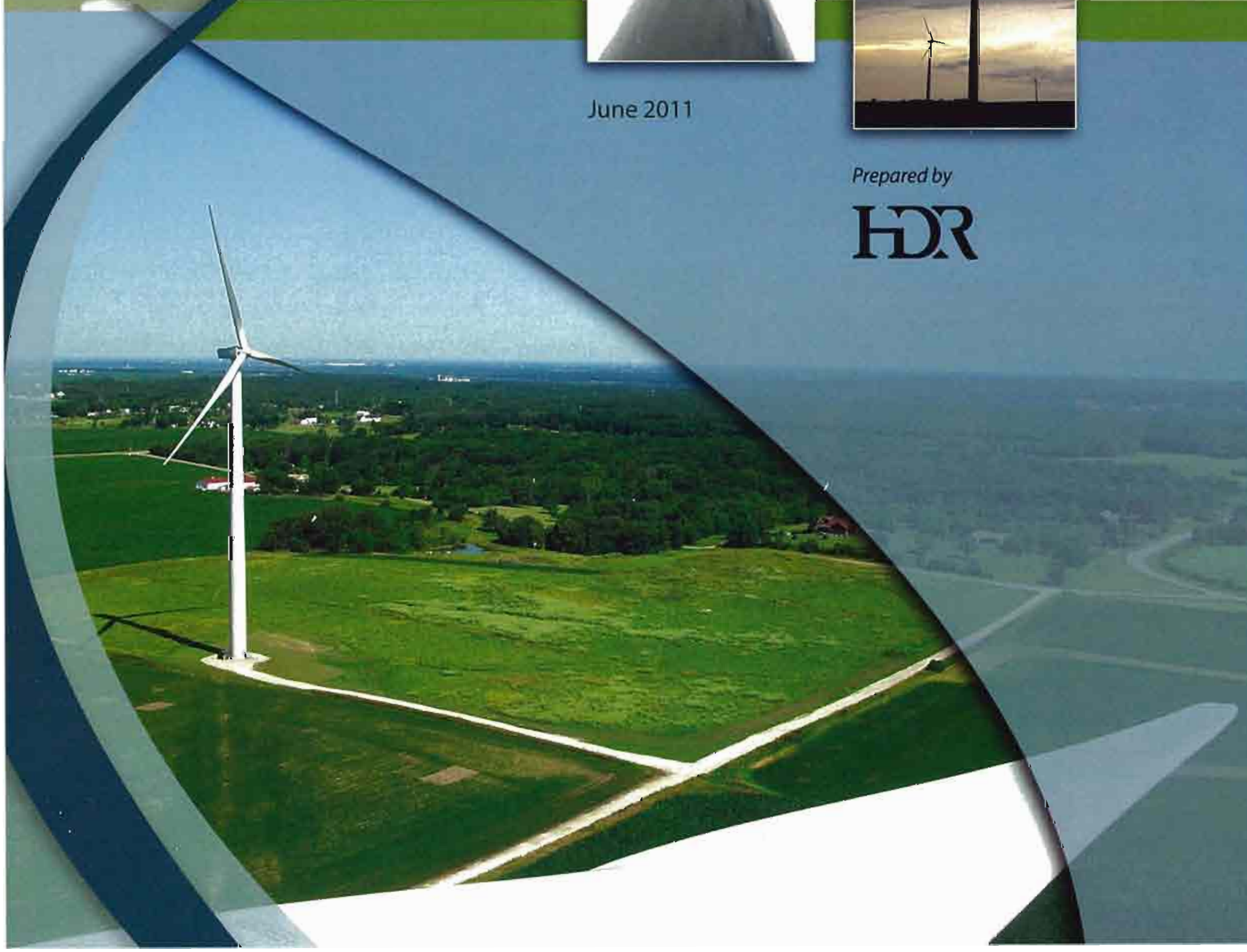
Champaign County
Special Use Permit Application

Champaign County, Illinois

June 2011

Prepared by

HDR



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PREPARED FOR

Invenergy

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PREPARED BY

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July 2011

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1.0 INTRODUCTION

1.1 PROJECT SUMMARY

California Ridge Wind Energy LLC (California Ridge), a wholly owned subsidiary of Invenergy Wind LLC (together with its subsidiaries, Invenergy), submits this application for a Special Use Permit (Application) to construct the California Ridge Wind Energy Project (Project). The Project is located in Vermilion and Champaign counties, Illinois (Figure 1-1 and Figure 1-2), in the townships of Pilot, Ogden, and Compromise. This Application is for the Champaign County portion of the Project. The Project will be approximately 214 megawatts (MW) in size, consisting of up to 134 wind turbines of the 1.6-100 MW model manufactured by General Electric (GE). An anticipated 166 MW will be in Vermilion County and 48 MW in Champaign County. Currently, 30 turbines are planned for Champaign County.

The purpose of this Application is to assure that any structures—and equipment connected to such structures—used in the development and productions of wind generated electricity in Champaign County are safe and effective. It is also to facilitate economic opportunities for local residents. The Project area was selected based on wind resources, compliance with zoning requirements, land use, and proximity to existing transmission infrastructure. The Champaign County Ordinance (Ordinance) is designed to govern the permitting and building of 10 MW, or greater, wind energy conversion systems and substations that generate electricity to be sold to wholesale or retail markets. The Ordinance is not intended to preempt other applicable state and federal laws and regulations.

Invenergy is a leading clean energy company focused on the development, ownership, operation, and management of large-scale electricity generation assets in the North American and European markets. Invenergy's electric generation assets primarily include large scale wind energy, solar, and clean, natural-gas fueled electric generating facilities.

Founded in 2001, Invenergy has a superior track record in the energy industry and a highly experienced management team. The members of Invenergy's senior management team have an average of approximately 20 years experience in diverse areas of the energy market including development, engineering, construction, finance, operations, asset management, and energy trading and contracting.

Invenergy is headquartered in Chicago, Illinois, and has North American regional offices in Austin, Denver, Washington D.C., and Toronto. Table 1-1 lists Invenergy's completed wind projects and those currently under construction.

Table 1-1
Invenergy's Completed Wind Projects and Projects Under Construction

Wind Project	Location	Status	Size of Facility
Bishop Hill II	Illinois	Under Contract	68.0 MW
Conestogo	Ontario	Under Contract	88.5 MW
Darlowo	Poland	Under Contract	250.0 MW
Gratiot	Michigan	In Construction	200.0 MW
Bishop Hill	Illinois	In Construction	200.0 MW
White Oak[5]	Illinois	In Construction	150.0 MW
Le Plateau	Quebec	In Construction	138.5 MW
Vantage	Washington	Operating	90.0 MW
Beech Ridge	West Virginia	Operating	100.5 MW
Raleigh	Ontario	Operating	78.0 MW
Grand Ridge II , III & IV	Illinois	Operating	111.0 MW
Sheldon	New York	Operating	112.5 MW
Turkey Track	Texas	Operating	169.5 MW
McAdoo	Texas	Operating	150.0 MW
Ashtabula [4]	North Dakota	Operating	48.0 MW
Willow Creek	Oregon	Operating	72.0 MW
Grand Ridge I	Illinois	Operating	99.0 MW
Stanton	Texas	Operating	120.0 MW
Camp Springs I & II	Texas	Operating	250.5 MW
Forward I & II	Wisconsin	Operating	129.0 MW
Logan [1]	Colorado	Operating	201.0 MW
Victory [2]	Iowa	Operating	99.0 MW
Centennial [3]	Oklahoma	Operating	120.0 MW
Judith Gap	Montana	Operating	135.0 MW
Wolverine Creek	Idaho	Operating	64.5 MW
Spring Canyon	Colorado	Operating	60.0 MW
Tymien	Poland	Operating	50.0 MW
Buffalo Mountain	Tennessee	Operating	27.0 MW

Notes:
(1) Sold to FPL
(2) Sold to MidAmerican Energy
(3) Sold to Oklahoma Gas & Electric
(4) Sold to Otter Tail Corporation
(5) Sold to NextEra

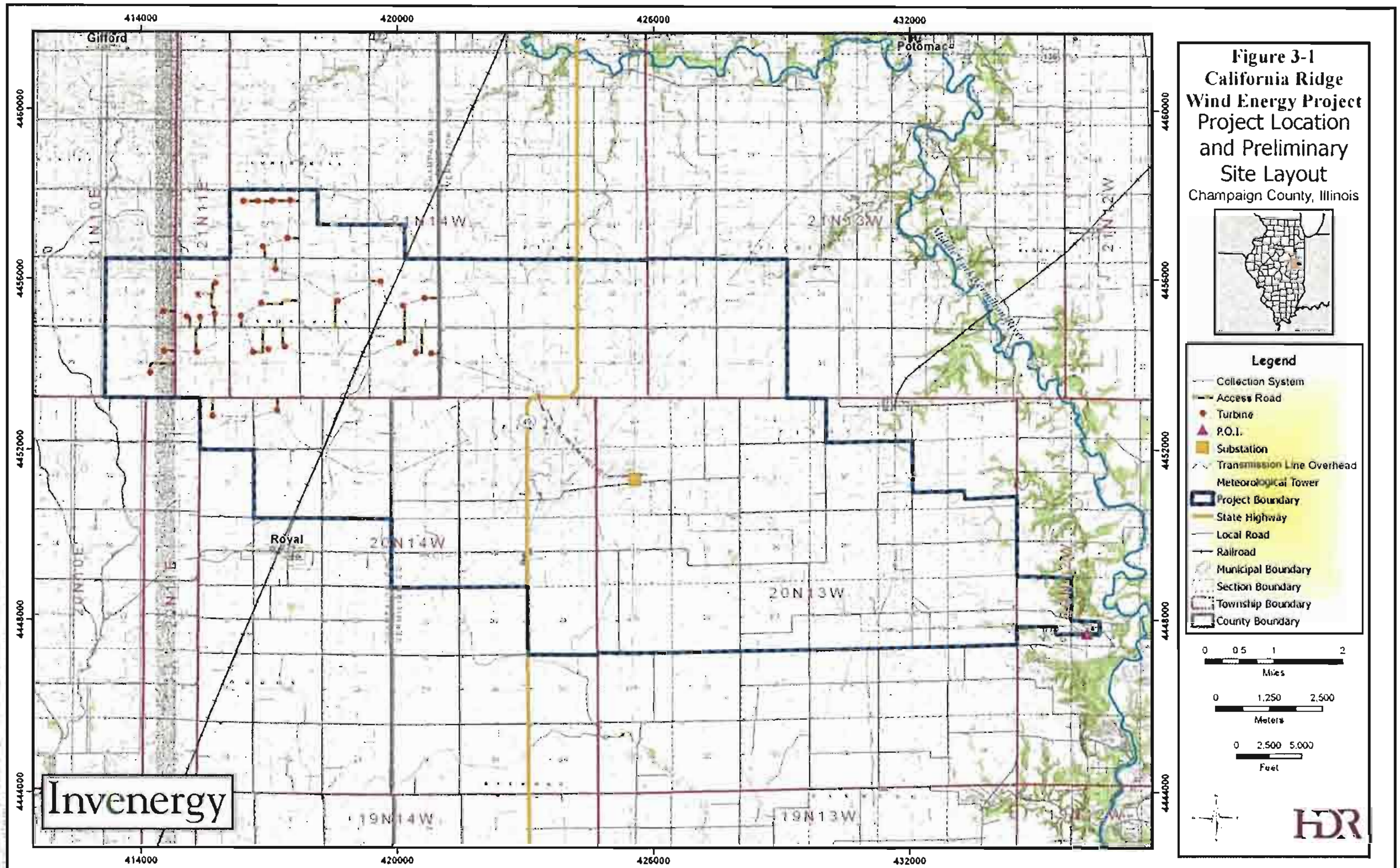
Figure 3-1
California Ridge
Wind Energy Project
Project Location
and Preliminary
Site Layout
Champaign County, Illinois
Legend
Collection System
Access Road
Turbine
P.O.I.
Substation
Transmission Line Overhead
Meteorological Tower
Project Boundary
State Highway
Local Road
Railroad
Municipal Boundary
Section Boundary
Township Boundary
County Boundary
Miles
Meters
Feet
Gifford
Potomac
Royal
21N14W
21N13W
20N14W
20N13W
19N14W
19N13W
414000
420000
426000
432000
4460000
4456000
4452000
4448000
4444000
Invenergy
HDR

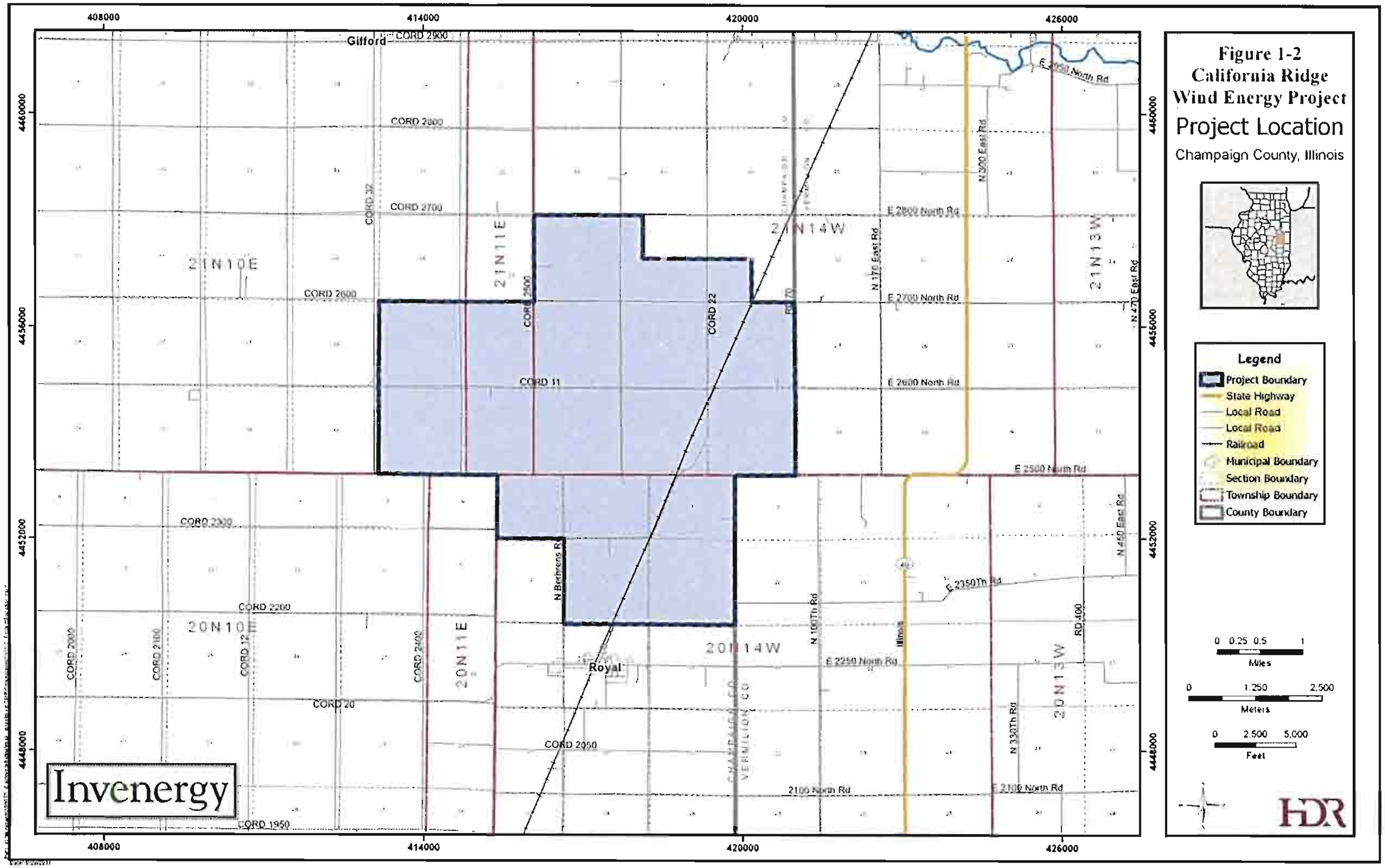
Figure 1-2
California Ridge
Wind Energy Project
Project Location
Champaign County, Illinois
Legend
Project Boundary
State Highway
Local Road
Local Road
Railroad
Municipal Boundary
Section Boundary
Township Boundary
County Boundary
Miles
Meters
Feet
Gilford
Royal
21N10E
21N11E
21N14W
21N13W
20N10E
20N11E
20N14W
20N13W
CORD 2900
CORD 2800
CORD 2700
CORD 2600
CORD 11
CORD 22
CORD 2300
CORD 2200
CORD 2050
CORD 1950
E 2800 North Rd
E 2700 North Rd
E 2600 North Rd
E 2500 North Rd
E 2250 North Rd
2100 North Rd
E 2100 North Rd
N 170 East Rd
N 300 East Rd
N 450 East Rd
N 330Th Rd
N 100Th Rd
N Behrens Rd
408000
414000
420000
426000
4460000
4456000
4452000
4448000
Invenergy
HDR

1.2 Applicant Information

One special-purpose Delaware limited liability company was created in order to develop, permit, finance, construct, own, and operate the Project. Contact information for each company is:

Invenergy Wind LLC
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Suite 1900
Chicago, IL 60606
Phone: (312) 224-1400
Fax: (312) 224-1444

California Ridge Wind Energy LLC
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Fax: (312) 224-1444

1.3 Project Contacts

Invenergy and California Ridge's Project contacts are:

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2.0 ORDINANCE COMPLIANCE CHECKLIST

Table 2-1 lists certain requirements of the Champaign County zoning ordinance pertaining to wind power facilities and special uses and where this information can be found within the Application.

Table 2-1
Ordinance Requirements for Champaign County Zoning Ordinance

Wind Energy Structure Ordinance	Location in Document
Section 6.1.4 Wind Farm County Board Special Use Permit.	
A. General Standard Conditions	3.1
1. Minimum land areas to include in the SUP:	
a. within 1.10 times wind tower height	Section 3.4
b. exceed noise ordinance	Appendix C
c. exceed Shadow Flicker ordinance	Section 5.3 Appendix G
d. 40' wide area for new access roads or driveways	Section 4-2.3
e. wind farm accessory structures, 40' wide area for underground cable, substations, transformers, and switching stations	Section 3.4
f. 1.50 times wind tower height except 1,320' from ROW of public street.	Section 3.4
g. 1,320' of ROW + 1,000' from tower except land in compliance with C.5	Section 3.4,
2. Land not to be included in Wind Farm	
a. < 1.5 mile from municipality zoning	Section 3.4
b. < 1 mile from Conservation Recreation zoning.	Section 3.4
c. leased or under easement of underground gas storage	NA
B. Minimum Lot Standard Conditions	4.1.1
1. No minimum lot standard conditions	NA
C. Minimum Standard Conditions for Separations for Wind Farm Towers from adjacent Uses and Structures	Section 3.4
1. 1,000' from Participating Dwelling	Section 3.4
2. 1,200' from Non-Participating Dwelling	Section 3.4
3. 1.10 x tower height from structures or adjacent property with waiver of non-participating	Section 3.4
4. 1.10 x tower height from adjacent property line of participating	Section 3.4
5. 1.50 x tower height to ROW of non-participating or 1.10 x tower height to ROW of participating	Section 3.4, Section 5.9.3
6. 1.50 x tower height to non-participating property	Section 3.4
7. 1.10 x tower height gas or hazardous liquid pipeline	NA
8. Private wavier for any distance lesser than the minimum stated in this ordinance.	NA
9. 1,200' from wellhead or above ground fixture that is accessory to a gas or hazardous liquid pipeline	NA

Wind Energy Structure Ordinance	Location in Document
10. 1,600' from any liquefied natural gas storage, liquefied petroleum gas storage or gasoline and volatile oils storage exceeding 10,000 gallons.	NA
11. 3,500' from restricted landing area or residential airport.	Section 3.4
D. Standard Conditions for Design and Installation of Wind Farm Towers	
1. Design Safety Certification	
a. Towers to abide by ANSI and submit certificates of design by Underwriters Laboratories (UL), *Det Norske Veritas* (DNV), *Germanischer* Lloyd Wind energy (GL) or equivalent third party	Section 4.1.1
b. Foundation and tower design is certified by an Illinois Professional Engineer or Illinois licensed Structural Engineer.	Section 4.1.2
2. Controls and Breaks	Section 4.1.1
a. redundant breaking system including aerodynamic over speed controls and manual brakes	Section 4.1.1
b. fail safe mode for mechanical brakes	Section 4.1.1
c. stall regulation not considered a sufficient breaking system for over speed protection	NA
3. Electrical Components comply with state and national codes and international standards (ANSI and IEC).	Section 4.1.1
4. Tower must be monopole construction	Section 4.1.1
5. Tower and blade- < 500'	Section 3.3
6. Tower and components painted white/gray or non-reflective, unobtrusive color	Section 4.1.1
7. Comply with FAA requirements, which must be explained in the application	Section 5.4.3, 5.3.1 & 5.9.1
8. Warnings	
a. warning sign concerning voltage at the base of transformers and substations	Section 3.3
b. visible, reflective, colored objects s/a flags or tape shall be placed on guy wires up to 15'	Section 3.2
9. Towers must have anti climbing design or devise.	Section 4.1.1
E. Standard Conditions to Mitigate Damage to Farmland	
1. underground electrical at min. depth of 4' below ground and 1' from drain tile (DT)	Appendix I; Drainage Report
2. Protection of drainage tile	
a. locate all DT before construction of staging areas, access roads, electrical lines, towers, and substations	Appendix I Drainage Report
b. all DT shall be flagged prior to construction	Appendix I Drainage Report
c. DT crossings – tile should be replaced as per Champaign County Storm Water Management Policy (CCSWMP)	Appendix I Drainage Report

Wind Energy Structure Ordinance	Location in Document
d. if DT needs relocating must be done by CCSWMP	Appendix I Drainage Report
e. CCSWMP must be certified by Illinois Professional Engineer. Written approval by drainage district will be received prior to backfilling. As-built drawings shall be provided to drainage district and zoning admin.	Appendix I Drainage Report
f. damaged DT shall be flagged until repairs are completed.	Appendix I Drainage Report
g. exposed DT shall be screened or protected	Appendix I Drainage Report
h. permanent repairs to DT within 14 days or temp repair if conditions are poor.	Appendix I Drainage Report
i. damaged DT repaired to prior condition	Appendix I Drainage Report
j. all failed repairs are the applicants responsibility to fix.	Appendix I Drainage Report
3. All soil conservation practices restored to prior construction	Appendix I Drainage Report
4. Top Soil replacement	
a. Top 12" striped and stored in windrow	Appendix I Drainage Report
b. (missing in ordinance)	Appendix I Drainage Report
c. Subsoil stored in separate windrow	Appendix I Drainage Report
d. Backfilling shall be replaced by stockpiled subsoil first then top soil	Appendix I Drainage Report
e. Top soil must settle to original depth and contour	Appendix I Drainage Report
5. Mitigation of soil compaction and rutting	
a. Applicant not responsible for mitigation if exempted by wind farm lease	Appendix I Drainage Report
b. Applicant shall mitigate soil compaction and rutting areas	Appendix I Drainage Report
6. Land leveling	
a. Applicant not responsible for leveling if exempted by wind farm lease	Appendix I Drainage Report
b. Applicant shall level all disturbed land as follows	Appendix I Drainage Report
1. after trenching – restore to original elevation and contour	Appendix I Drainage Report
2. restore settling up to one year after construction	Appendix I Drainage Report
F. Standard Conditions for Use of Public Streets	
1. Prior to public hearing close, Applicant shall enter into a Roadway Upgrade and Maintenance agreement with the following minimum conditions:	
a. Applicant shall conduct pre-wind farm construction baseline survey.	Section 4.2.1 & Appendix H
(1) Videotape if necessary	Appendix H
(2) Pay County to hire consultant	Appendix H
(3) Pay to strengthen street structures	Appendix H

Wind Energy Structure Ordinance	Location in Document
b. (says same thing as F.1.a.2 and F.1.a.3)	Appendix H
c. Applicant shall pay other necessary improvements	Appendix H
d. Applicant shall obtain necessary approvals for road improvement.	Appendix H
e. Applicant shall apply for access permits and required plans	Appendix H
f. Applicant shall erect permanent makers indicating underground cabling.	Appendix H
g. Install marker tape in any cable trench	Appendix H
h. Member of the JULIE system	Appendix H
i. Directional bore all county highways	Appendix H
j. Provide widening for turnout locations	Appendix H
k. Pay for temporary street improvements	Appendix H
l. Notify street maintenance of oversized moves or crane crossings	Appendix H
m. Provide copy of overweight and oversized permit	Appendix H
n. Transport towers and equipment to minimize traffic impact.	Appendix H
o. Construction traffic shall minimize impacts on emergency response, mail, school, and agricultural traffic.	Appendix H
p. Notify street maintenance authority with reasonable time to obtain closure approval	Appendix H
q. Provide signs indicating road closure and work zones	Appendix H
r. Establish escrow account and irrevocable letter of credit for all upgrades/repairs	Appendix H
s. Notify relevant parties of temporary street closures	Appendix H
t. Obtain easements necessary to fulfill obligations	Appendix H
u. Design all street upgrades with IDOT Bureau of Local Roads and Streets Manual, 2005 edition	Appendix H
v. Provide written notice to proceed to relevant street authority by December 31st for the following year	Appendix H
w. Provide dust control and grading	Appendix H
x. Conduct post-wind farm construction baseline survey	Appendix H
y. Pay for repair cost to all roads damaged by project	Appendix H
z. Construction traffic use only routes designated in the approved Transportation Impact Analysis	Appendix H
aa. Provide liability insurance to cover required road construction activities	Appendix H
bb. Pay for the present worth costs of life determined by the pavement management surveys and reports	Appendix H
cc. Provisions for expiration date on the agreement	Appendix H

Wind Energy Structure Ordinance	Location in Document
dd. Other required conditions.	Appendix H
2. Permit shall not be granted until Transportation Impact Analysis has been approved	
a. Identify all streets to be used during construction as well as # of loads, per axle weight of each load, and type of equipment used for transport	Appendix H
b. Access road culverts and bridges affected, with recommendations as to actions and estimated cost to replace	Appendix H
c. Anticipated street repair and costs pre and post construction	Appendix H
d. Reimburse County, Township, municipality, where relevant, for all engineering fees and third party consultant involved with the Transportation Impact Analysis.	Appendix H
G. Standard Conditions for Coordination with Local Fire Protection District	
1. Submit site plan to local fire protection district	Section 5.6.2
2. upon request, develop Emergency Response Plan	Sections 5.6.2
3. Actions stated in G1. & G2. do not alleviate the need to comply with all other applicable fire laws and regulations.	Section 5.6.1 & 5.6.2
H. Standard Conditions to Mitigate Electromagnetic Interference	
1. provide microwave transmission providers and emergency service providers and local emergency service providers a project summary and site plan	Sections 5.5.1 & 5.7
2. Applicant shall mitigate any interference	Section 5.5.1
3. Applicant shall respond to complaints regarding communication interference	Section 5.5.1
4. Applicant shall respond to complaints regarding TV broadcast interference	Section 5.5.1
I. Standard Conditions for Allowable Noise Level	
1. Shall comply to Illinois Pollution Control Board (IPCB) regulations	Section 5.2
2. Submit manufacturer's sound level and other relevant data for noise analysis.	Table 5-4
3. Shall demonstrate compliance with noise requirements	Section 5.2 & Appendix C
4. Map of noise contours and residences within 1500' of any wind tower	Appendix C
5. State noise model construction and algorithms	Appendix C
6. Zoning Administrator shall take appropriate action as necessary to investigate noise complaints by the following:	
a. hire noise consultant	N/A

Wind Energy Structure Ordinance	Location in Document
b. Wind Farm Owner to cooperate with noise consultant including shutting down turbines to document ambient noise levels	N/A
c. Any violations will be corrected by Wind Farm Owner	N/A
d. Wind Farm Owner shall reimburse County the cost of noise consultant	N/A
J. Standard Conditions for Endangered Species Consultation – Applicant shall apply for consultation with the Endangered Species Program of the IDNR and shall supply a copy of the Agency Action Report.	Section 5.9.4, Section 5.9.7
K. Standard Conditions for Historic and Archaeological Resources Review –Applicant shall apply for consultation with the State Historic Preservation Office of the IDNR and provide copy of the Agency Action Report.	Section 5.10.1
L. Standard Conditions for Acceptable Wildlife Impacts	
1. Wind Farm will avoid and mitigate the impacts to wildlife to a sustainable level of mortality	Section 5.9.6
a. avoid known bird and bat migration, daily flyways and hibernacula flight paths between bat colonies and feeding areas.	Section 5.9.4; Table 5-11
b. site Wind Farm that will achieve a level of mortality to birds and bates that will protect sustainability of populations.	Table 5-5
2. Qualified professional – preconstruction risk assessment	
a. Literature review	Appendix D
b. Mapping of vegetation, land cover, habitat, quality	Appendix F
c. Field exam	Appendix D
d. Literature review of avian and bat mortality field results	Appendix D
e. If risk assessment indicates low risk – no further surveys.	Appendix D
f. If risk assessment indicates high risk – annual survey may be needed to address issues.	Appendix D
g. Surveys may include threatened and endangered (T&E) or sensitive-status species	Appendix E
h. survey results shall be used to design siting and mitigation measures to lower risk of mortality.	Appendix E
3. Qualified professional – post-construction mortality monitoring	
a. At least two years of site-specific mortality monitoring; spring and fall migration	Section 5.8.5
b. Inclusion of study protocols/degree of precision of study	Section 5.8.5
c. Report submitted to Environment and Land Use Committee	Section 5.8.5

Wind Energy Structure Ordinance	Location in Document
d. If mortality does not threaten population – no further monitoring required	Section 5.8.5
e. If legitimate mortality –continue monitoring or the ELUC may require tower shut down until resolved	Section 5.8.5
M. Standard Conditions for Shadow Flicker	
1. Show summer and winter locations of flicker with a duration of 30 hours or more per year	Appendix G
2. Flicker that exceeds 30 hours per year shall be mitigated	Section 5.3
N. Standard Condition for Liability Insurance	
1. Liability insurance of $5 mil/occurrence and $5 mil in aggregate. Increase annually for inflation.	Section 4.3.3
2. General liability policy shall ID landowners in SUP as additional insured	Section 4.3.3
O. Operational Standard Conditions	
1. Maintenance	Section 4.3.5
a. Annual O&M reports shall be submitted to the Environment and Land Use Committee annually	Section 4.3.5
b. Physical modifications that changes the wind farm will require a new SUP. Third party needs consultation	Section 4.3.5
2. Materials Handling, Storage and Disposal	Section 5.4.2
a. Solid waste will be removed in accordance to regulations.	Section 5.4.2
b. Hazardous waste will be handled according to regulations.	Section 5.4.2 & 5.7
P. Standard Conditions for Decommissioning Plan and Reclamation Agreement	
1. Signed site reclamation agreement	Forthcoming
2. Reclamation agreement shall include provisions for repairs to streets during reclamation	Appendix B
3. Site Reclamation agreement also requires	
a. Bankruptcy notification within ten days of proceeding	Appendix B
b. Any successor to the wind farm shall abide to the rules of the SUP.	Appendix B
c. Governing Body shall have access rights to the wind farm property for purposes of inspection	Appendix B
d. Decommissioning and reclamation is governed by Illinois Law	Appendix B
e. Indemnification clause that indemnifies the County with any liability	Appendix B
f. Standard severability provision	Appendix B
4. Amount of irrevocable letter of credit	
a. Credit shall be 210% of engineers cost estimate	Appendix B

Wind Energy Structure Ordinance	Location in Document
b. Gradually pay down the value of the irrevocable letter of credit by placing cash deposits in escrow account over the first 13 years of the Project life.	Appendix B
(1) Mutually acceptable financial institution at which escrow shall be established.	Appendix B
(2) Governing Body will be the beneficiary of escrow for the purpose of reclamation.	Appendix B
(3) Establish County as owner of record	Appendix B
(4) Annual deposits to escrow over 12 years and update letter of credit	Appendix B
(5) Escrow and letter of credit will be updated to reflect inflation.	Appendix B
i. Cost is increased by documented rates of inflation	Appendix B
ii. Life span shall assume a minimum rate of inflation to be 3% per year.	Appendix B
(6) Interest accrued shall go to Wind Farm Owner	Appendix B
(7) Funding at time of decommissioning, a new irrevocable letter of credit and release of escrow may occur	Appendix B
5. Zoning administrator may draw on funds for the following reasons:	
a. Turbine is not running for 6 months	Appendix B
b. Owner declares turbine to be obsolete for tax purposes	Appendix B
6. Site Reclamation Agreement and irrevocable letter of credit and escrow account must be submitted to Zoning Administrator prior to SUP approval.	NA
Q. Complaint Hotline	
1. Number shall be established prior to construction and during SUP term	Section 4.2.5
2. Number shall be publicized and posted at the O&M and construction marshalling yard.	Section 4.2.5
3. Line shall be manned during normal business hours and answering recording service during non-business hours	Section 4.2.5
4. Each complaint logged with callers name , address and reason for the call	Section 4.2.5
5. All calls shall be recorded and saved for a minimum of two years	Section 4.2.5
6. Number shall be given to the Zoning Administrator each month	Section 4.2.5
7. Applicant and Owner shall take necessary action to resolve all legitimate complaints	Section 4.2.5
R. Standard Condition for Expiration of Wind Farm County Board Special Use Permit	Section 4.3.2
S. Application Requirements	

Wind Energy Structure Ordinance	Location in Document
1. Additional information	
a. Wind Farm project summary	Section 1.1
(1) general description of project indicating generating capacity, equipment manufacture, type, type of wind turbines, number of wind turbines, name plate generating capacity of each turbine, the max height, and the max diameter of turbine rotors.	Section 3.3
(2) Specific proposed turbine and landowner location	Section 3.3, Figure 3-2
(3) Specific proposed location of all tax parcels required by SUP	Figure 3-5 & Appendix M
(4) Description of Applicant	Section 1.1
b. Name, address, phone numbers, and other contact information of Applicant	Sections 1.2 & 1.3
c. Site plan for the installation of all wind farm towers	Section 3.3
(1) Planned location of towers, structures, property lines, required setbacks, public access roads and turnout locations, substation(s), electrical cabling, ancillary equipment, third-party transmission lines, O&M facilities, and layout of all structures.	Section 3.1 & Figure 3-1 & Figure 3-2
(2) Project area proposed in SUP	Figure 1-2
(3) Setbacks from non-participating dwellings dimensioned on site plan,	Figure 3-5
(d) All other reports, certifications, studies, and approvals	Appendices A-J
2. Applicant shall notify County of any changes while permit is pending.	Section 3.3

Table 2-1 is only a general guide. Due to the overlapping nature of ordinance factors, relevant and important information is often included in other related sections of the Application. By including these tables, California Ridge does not limit or narrow the parts of the Application that demonstrate compliance with the zoning ordinance. This Application, as a whole, demonstrates that the Project complies with the Champaign County zoning ordinance requirements.

3.0 PROJECT DESCRIPTION

3.1 PROJECT LOCATION

The Project is located in Vermilion and Champaign counties, Illinois, in the townships of Pilot, Ogden, and Compromise (Figure 1-1 and Figure 1-2). This Special Use Application is for the Champaign County portion of the California Ridge Site, which will consist of up to 30 wind turbines located in the Project area. Figure 3-1, Figure 3-2, and Table 3-1 include the townships, ranges, and sections of the Project area.

The Project area in Champaign County encompasses approximately 10,193 acres north of the village of Royal, Illinois, and south of the villages of Gifford and Potomac, Illinois. The Project area covers an area larger than that where turbines are planned to be sited. The Applicant is seeking a Special Use Permit from Champaign County only for those particular parcels hosting wind power facilities (as defined below) and included in this Application (Appendix M). Current plans are to place the turbines on agricultural lands throughout portions of the site. The preliminary locations of the turbines, access roads, transformers, switchyards, power lines, communication lines (including supervisory control and data acquisition (SCADA) software and hardware), interconnection points with transmission lines, and other ancillary facilities or structures, and substation routing (wind power facilities) are shown in Figure 3-1 and Figure 3-2. The final wind power facilities layouts will be submitted to Champaign County in the Zoning Use Permit. Layouts will include a legal description and coordinates for the location of each tower and the substation, and the location of property lines of adjoining property owners (including, in the case of leased property, the location of property lines of property owners adjoining the landlord's property).

Table 3-1
Sections within Project Area

County	Township	Range	Section(s)
Champaign County	21N	10E	24-25, 36
	21N	11E	30, 31
	21N	14W	19-21, 28-33
	20N	14W	4-9

Only a portion of the Project area will actually host wind power facilities. The land occupied by the Project for Champaign County will be less than 0.30 percent of the Project area, assuming 30 turbines and associated access roads are constructed. It is anticipated that the area of direct land use for the turbines and access roads will be approximately 16.5 acres. This assumes an average of approximately 0.55 acres of land for each turbine and associated 16-foot wide access road. Refer to Section 5.0 for a detailed description of the environmental setting and impacts.

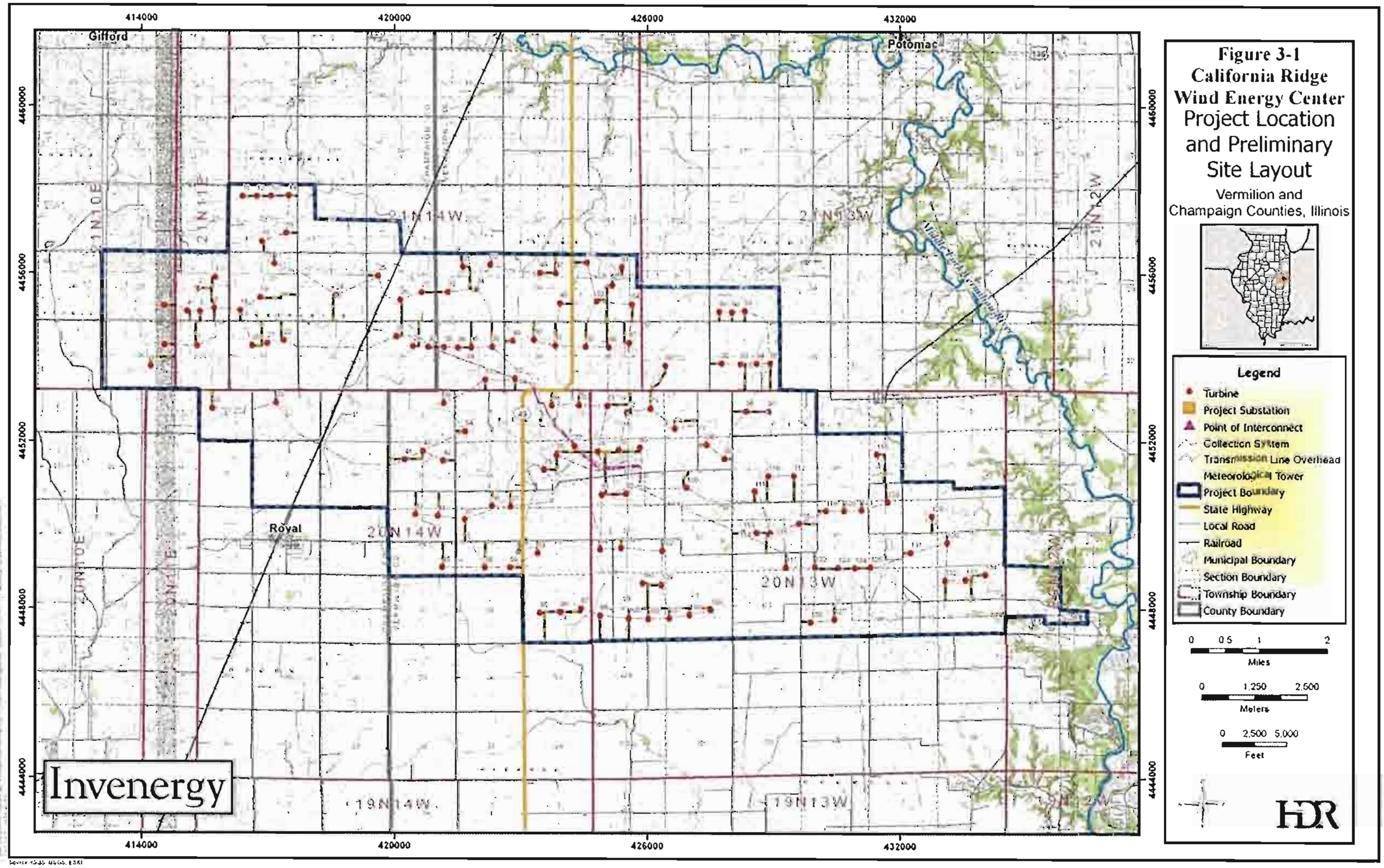
Figure 3-1
California Ridge Wind Energy Center
Project Location and Preliminary Site Layout
Vermilion and Champaign Counties, Illinois
Legend
Turbine
Project Substation
Point of Interconnect
Collection System
Transmission Line Overhead
Meteorological Tower
Project Boundary
State Highway
Local Road
Railroad
Municipal Boundary
Section Boundary
Township Boundary
County Boundary
0 0.5 1 2
Miles
0 1,250 2,500
Meters
0 2,500 5,000
Feet
HDR
Invenergy
Gifford
Potomac
Royal
21N14W
21N13W
20N14W
20N13W
19N14W
19N13W
414000
420000
426000
432000
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4456000
4452000
4448000
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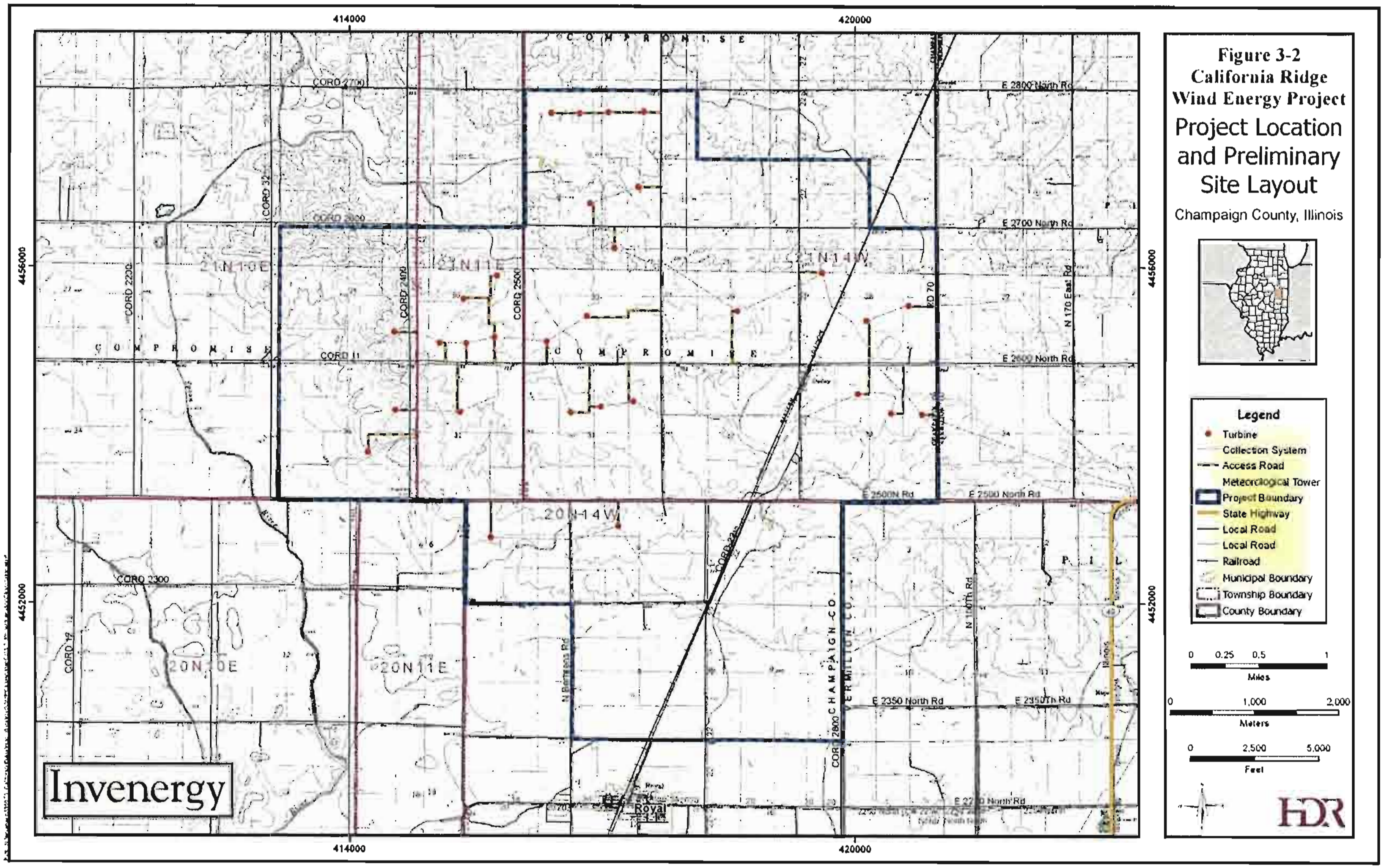


Figure 3-2
California Ridge
Wind Energy Project
Project Location
and Preliminary
Site Layout
Champaign County, Illinois
Legend
Turbine
Collection System
Access Road
Meteorological Tower
Project Boundary
State Highway
Local Road
Local Road
Railroad
Municipal Boundary
Township Boundary
County Boundary
0 0.25 0.5 1
Miles
0 1,000 2,000
Meters
0 2,500 5,000
Feet
HDR
Invenergy
414000
420000
4456000
4452000
COMPROMISE
21N10E
21N11E
21N14W
20N14W
20N10E
20N11E
E 2800 North Rd
E 2700 North Rd
E 2600 North Rd
E 2500 North Rd
E 2350 North Rd
CORD 2700
CORD 2600
CORD 2300
CORD 11
CORD 2200
CORD 2400
CORD 2500
CHAMPAIGN CO
VERMILION CO
Royal

3.2 GENERAL WIND RESOURCES

California Ridge has relied upon a number of sources of information to determine the wind resource in the Project area. These include publicly available wind resource maps, elevation data, data from nearby airports, and weather monitoring stations.

In addition, California Ridge has contracted with an independent wind resource assessment company, DNV Global Energy Concepts Inc. (DNV-GEC), to collect, quality control, validate, summarize, and transmit data for four 50- to 60-meter (164- to 197-foot) meteorological towers located within the Project area to obtain project-specific wind data. The four meteorological towers were installed between October 2008 and July 2009. The towers are manufactured by NRG Systems, Inc. The meteorological towers are temporary and will be removed when construction is complete. The site-specific wind data has confirmed that there is a sufficient wind resource to support a project of this type.

In addition to the wind power facilities discussed previously, California Ridge may site one or more permanent meteorological towers within the Project area to collect data during operation (towers are likely to be free-standing). If the tower is not freestanding, warning indicators, such as flags, reflectors, or tape, will be placed on the anchor point of any guy wires and along the guy wires up to a height of 15 feet from the ground.

3.3 FACILITY SITE PLAN

The facility will include wind turbines, access roads, transformers, communication and electric power collection cables, substation, permanent meteorological stations, overhead generation lead lines, other interconnection points with transmission lines, the O&M building, and any ancillary facilities or structures. Collectively, these are called the wind power facilities. The Project's substation, overhead generation lead line and the O & M facilities will be located in Vermilion County. The point of interconnection (POI) will be within an Ameren Corporation-owned (Ameren) existing switchyard and will be located in Vermilion County.

The Project will consist of 134 GE 1.6-100 MW turbines, of which 30 are anticipated to be built in Champaign County. This turbine model has a 100-meter (328-foot) hub height. A rotor diameter of 100 meter (328 foot) will be used (Figure 4-1). Each tower will be secured by a concrete foundation. The foundation design will be based on the soil conditions and will be stamped by a professional engineer. Each turbine will have an associated transformer that will display the proper voltage warning signs.

Each wind turbine will be accessible via all-weather access roads connecting to public roads. The access roads will be approximately 4.9 meters (16 feet) wide and low profile to allow cross-travel by farm equipment. California Ridge will work closely with the landowners in locating access roads to minimize land use disruptions to the extent possible. California Ridge is also currently negotiating road agreements for the Project with the Champaign County engineers and two township road commissioners for Compromise and Ogden Townships. Consideration will be given to locating access roads to minimize impact on current or future row crop agriculture and any environmentally sensitive areas.

A control panel inside the base of each turbine tower will house communication and electronic circuitry. A step-up transformer will be installed at the base of each turbine to raise the voltage from

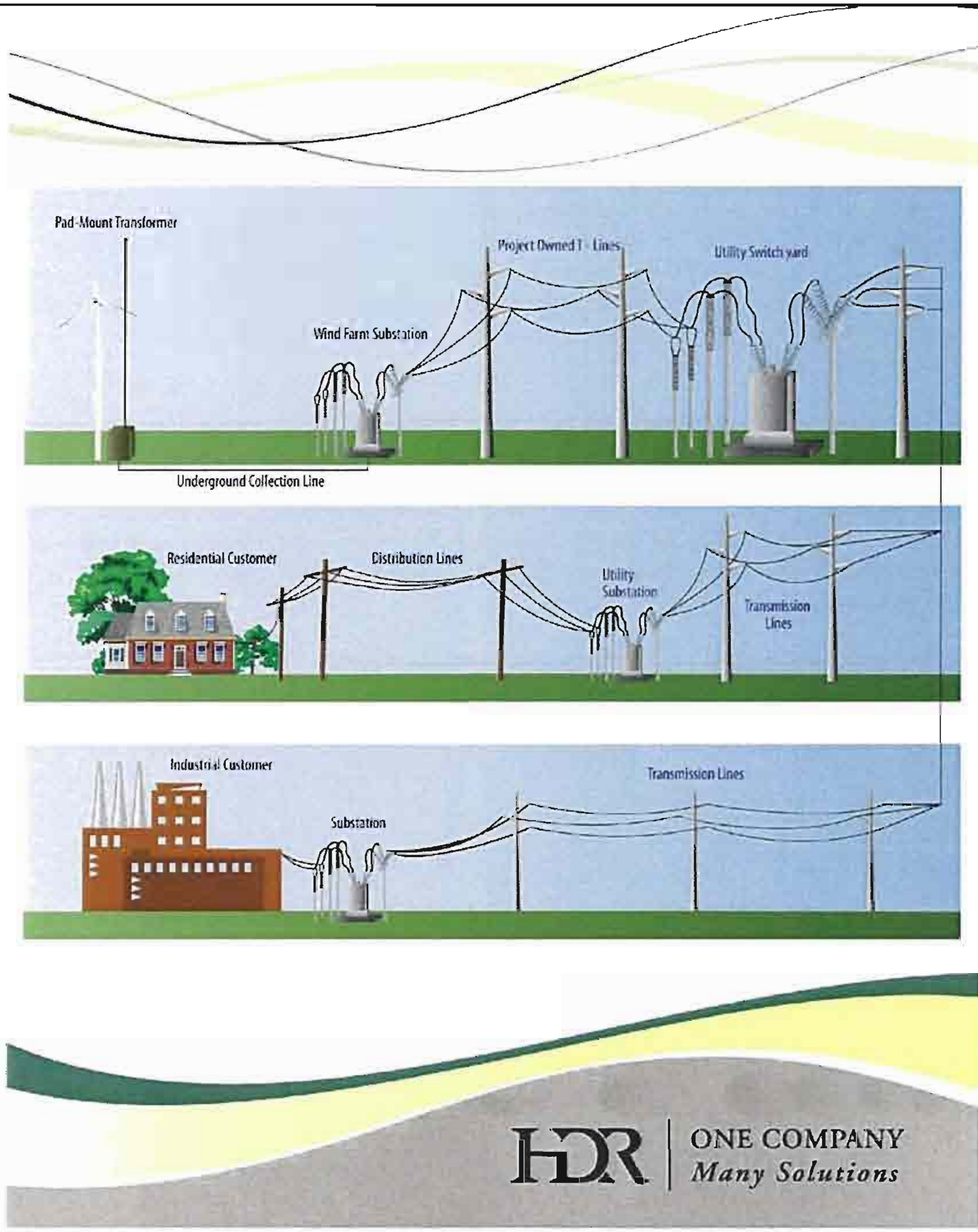
575 or 690 volts (V) to collection line voltage (34.5 kV). Power will be run through an underground collection system at a minimum depth of 4 feet to the Project feeder system that will feed power to a project 34.5/138 kV substation. Both power and communication cables will be buried in trenches on private property at a minimum depth of 4 feet.

The collection system and communication cable lengths are minimized by installing underground cables the shortest distance from turbine to turbine. The feeder system will deliver the power to the Project 34.5/138 kV substation. The substation will include a step-up transformer that raises the voltage again, from 34.5 kV to 138 kV. An overhead 138 kV generation lead line (approximately 9 miles long, constructed in Vermilion County and owned by California Ridge) will move the power to the Ameren interconnection switchyard from the Project substation. The Ameren interconnection switchyard is the point where the energy generated by the Project connects to Ameren's transmission system.

The Project 34.5/138 kV substation will conform to industry standards and will be owned by California Ridge. The Ameren switchyard will conform to Ameren's specifications.

The location of the Project 34.5/138 kV substation, Ameren switchyard, and Project transmission line are shown on Figure 3-1 and Figure 3-2. Figure 3-3 is a conceptual diagram of the path of energy from the wind farm to energy users. Figure 3-4 shows the typical wind farm facility layout in Champaign County.

The Project O&M facility will be constructed in Vermilion County. The O&M building will be approximately 7,000 square feet, and will house all the necessary equipment to operate and maintain all phases of the Project.



Invenergy

Figure 3-3
Path of Energy Diagram
California Ridge
Wind Energy Project
Champaign County, Illinois

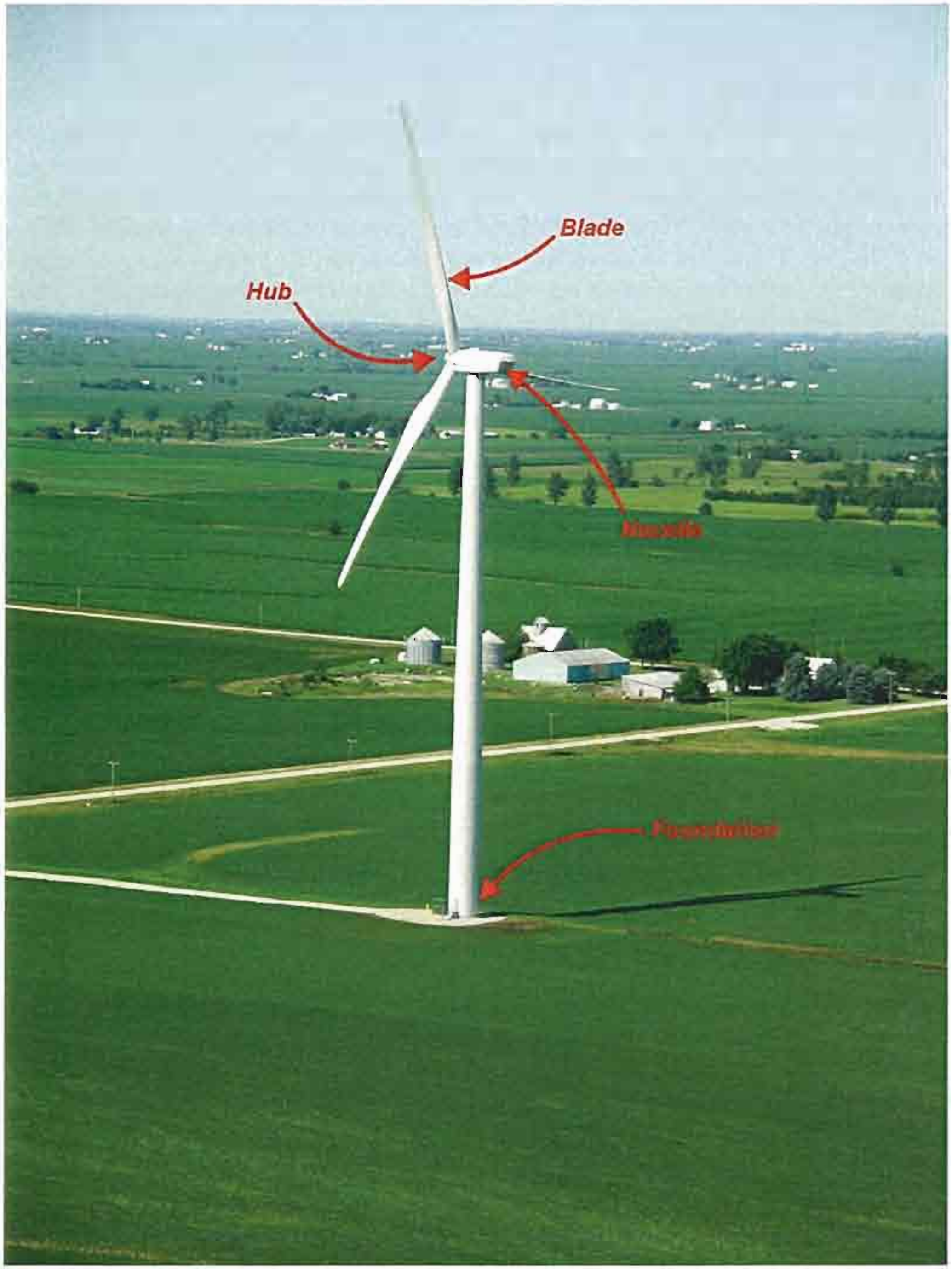


Figure 3-4
Typical Wind Farm Facility Layout
California Ridge
Wind Energy Project
Champaign County, Illinois

California Ridge will own and operate the Project. California Ridge expects to select one or more third-party contractors to perform all engineering, procurement, turbine and tower erection, and construction of the wind farm.

3.4 FACILITY SITING

California Ridge will develop a final site layout that optimizes wind resources while minimizing the impact on land resources and any sensitive areas that may potentially be located within the areas that would be approved through the Special Use Permit. California Ridge requests that the Champaign County Board grant the participating parcels listed in Appendix M the Special Use described in Ordinance No. 848. These final locations will be provided in the Champaign County Zoning Use Permit Application before construction begins and will adhere to the same requirements under Ordinance No. 848. The wind power facilities shown in Figure 3 1 and Figure 3 2 are preliminary and are subject to location adjustments based on final micrositing with landowners. These wind power facilities have been through a number of engineering iterations that have considered the issues relevant to this permit as well as issues relevant to the Champaign County Zoning Use Permit Application.

The wind power facilities will be sited on agricultural land. The topography of the site, wind resource assessment and the selected turbine technology will dictate turbine spacing. A description of turbine technology is presented in Section 4.1.

California Ridge will use equipment with a rotor diameter of 100 meters (328 feet). Tower heights will be 100 meters (328 feet). Total height of the turbine will be 150 meters (492 feet). In compliance with Champaign County wind energy structure ordinance, and unless an applicable waiver of setbacks is granted, the minimum turbine setbacks will be as follows:

- Non-participating residences or buildings........1,200 feet
- Participating residences or buildings........1,000 feet
- Participating residences or buildings or adjacent property with private waver........1.1 times the total tower height (541 feet)
- Non-participating property lines........1.5 times the total tower height (738 feet)
- Public roads (from right of way)........1.5 times the total tower height (738 feet)
- Public roads (from right of way) within project........1.1 times the total tower height (541 feet)
- Other structures........1.5 times the total tower height (738 feet)
- Conservation Recreation Zoning........1 mile setback
- Incorporated municipality with zoning........1.5 mile setback

A map showing these wind turbine setback requirements for the Project is included as Figure 3-5. The distance from such setback lines to the foundation at the base of each tower will conform to the applicable setback requirements set forth in section 6.1.4A , B and C of Ordinance No. 848.

Section 9.1.11.D of the Champaign County Zoning Ordinance, as amended (the "Zoning Ordinance"), provides that:

> Any other provision of this ordinance notwithstanding, the BOARD or GOVERNING BODY, in granting any SPECIAL USE, may waive upon application any standard or requirement for the specific SPECIAL USE enumerated in Section 6.1.3 Schedule of Requirements and Standard Conditions, to the extent

> that they exceed the minimum standards of the DISTRICT, except for any state or federal regulation incorporated by reference, upon finding that such waiver is in accordance with the general purpose and intent of this ordinance, and will not be injurious to the neighborhood or to the public health, safety and welfare.

In accordance with that provision, California Ridge hereby requests that the Champaign County Board (the "Board") waive the requirement of §6.1.4.A.1.(e) of Champaign County Ordinance No. 848 (the "Wind Farm Ordinance"), which requires that:

> All necessary WIND FARM ACCESSORY STRUCTURES including electrical distribution lines, transformers, common switching stations, and substations not under the ownership of a PUBLICLY REGULATED UTILITY. For purposes of determining the minimum area of the special use permit, underground cable installations shall be provided a minimum 40 feet wide area.

This application for a waiver of the above requirement is based on several factors:

During construction, California Ridge will encounter field conditions which occasionally require re-routing of collections systems amongst a property. Landowner's drain tile, wetlands, conservation reserve program land and other items, which will not be known until immediately before construction or during construction, will require adjustment and relocation of underground cable installations. Authorizing California Ridge to relocate and adjust the location of underground cables will allow adjustments up until and during construction to ensure field conditions and landowner concerns are accounted for in the final wind farm design and construction.

For all of these reasons, California Ridge requests that the Board grant it a waiver from the requirements of §6.1.4.A.1.(e) of the Wind Farm Ordinance and proposes that the location dictated for special use related to underground cables is provided following construction with the submittal of as-built drawings at which time, the location of special use is permanently established.

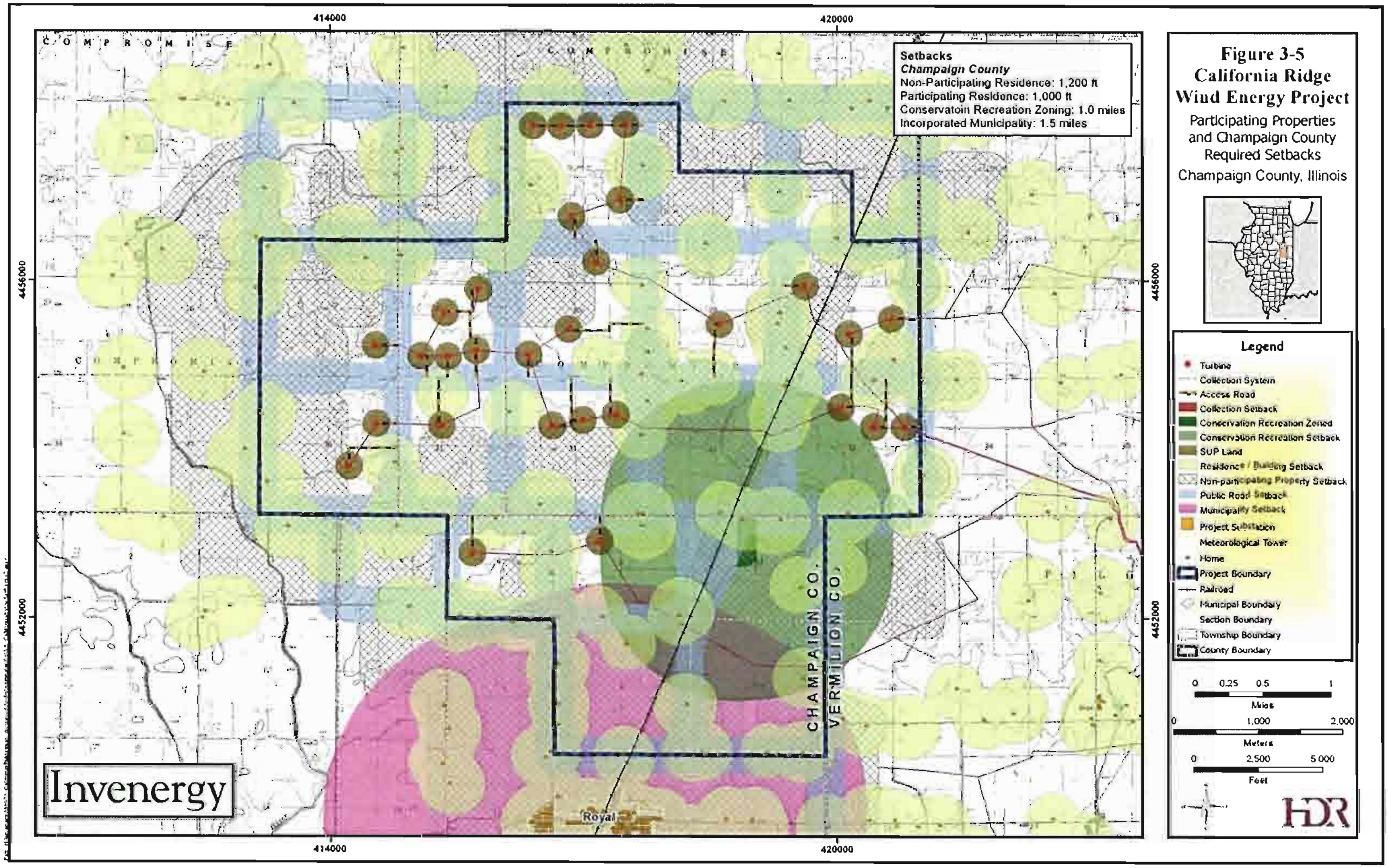


Figure 3-5
California Ridge Wind Energy Project
Participating Properties and Champaign County Required Setbacks
Champaign County, Illinois

3.5 Land Rights

3.5.1 Zoning Compliance

3.5.2 Ordinance Compliance

California Ridge will site its turbines to comply with Champaign County Ordinance No. 848 (Ordinance) in the participating parcels referenced in Appendix M. In Section 2, Table 2-1, California Ridge has outlined the requirements of the Ordinance and the section or reference within this Application that identifies how California Ridge will comply with the particular requirements.

The Project is in accordance with the general purpose and intent of the county Ordinance. As indicated in the Ordinance, Champaign County anticipates that the Project area will remain agricultural and has not designated it for development.

This Application will demonstrate that the Project satisfies each of the standards in the Ordinance. The California Ridge wind farm will be a valuable addition to Champaign County infrastructure.

3.5.3 Landowner and Development Rights

California Ridge has obtained wind rights and easements for a 214.4 MW project. Land rights will encompass the proposed wind power facilities, including, but not limited to, wind easements, wind turbines, access, and generation lead lines. Figure 3-5 shows the properties where California Ridge has obtained wind rights and easements and the setbacks as required in the Zoning Ordinance of the County of Champaign, Illinois. Appendix M references the participating parcels that are under contract with California Ridge, which this application requests granting of Special Use. Appendix M also contains the list of parcels which are within 250 feet of the participating parcels, including those which are participating.

California Ridge has worked extensively with local landowners, government officials, and other affected parties in the Project siting and development process. The Project will be constructed on approximately 62 separate parcels of farmland within Ogden and Compromise townships. California Ridge has entered into easement agreements with more than 90 Project participants for a term of up to 35 years. All of the land included in the Project is privately-owned.

4.0 PROJECT DEVELOPMENT

4.1 WIND POWER TECHNOLOGY

The Project will use wind energy to generate electricity. As the wind passes over the blades of a wind turbine, it creates lift and causes the rotor to turn. The blades are connected by a hub and main shaft to a system of gears, which are connected to a generator housed in the nacelle. The electricity is delivered from the generator to a transformer at the base of the turbine where voltage is stepped-up for connection to the project collection system. Wind-powered electric generation is entirely dependent on the availability of wind at a specific location. The energy generated is proportional to the cube of the wind velocity. In other words, a doubling of the wind speed will result in roughly an eightfold increase in power.

4.1.1 DESCRIPTION OF WIND TURBINES

California Ridge will be using 134 GE 1.6-100 turbines in the Project area. Of these, 30 will be in Champaign County. The remaining turbines will be in Vermilion County. The turbine model being considered for the Project is a three-bladed, upwind, horizontal-axis wind turbine (Figure 4-1). The turbine rotor and nacelle are mounted on top of a tubular tower. The machine employs active yaw control (designed to steer the machine with respect to the wind direction), active blade pitch control (designed to regulate turbine rotor speed), and a generator/power electronic converter system from the speed variable drive train concept. A detailed description of turbine design is included in the brochures found in Appendix A. All electrical turbine components shall conform to applicable local, state, and national codes, and relevant national and international standards (e.g. ANSI and International Electrical Commission).

Section 9.1.11.D of the Champaign County Zoning Ordinance, as amended (the "Zoning Ordinance"), provides that:

> Any other provision of this ordinance notwithstanding, the BOARD or GOVERNING BODY, in granting any SPECIAL USE, may waive upon application any standard or requirement for the specific SPECIAL USE enumerated in Section 6.1.3 Schedule of Requirements and Standard Conditions, to the extent that they exceed the minimum standards of the DISTRICT, except for any state or federal regulation incorporated by reference, upon finding that such waiver is in accordance with the general purpose and intent of this ordinance, and will not be injurious to the neighborhood or to the public health, safety and welfare.

In accordance with that provision, California Ridge hereby requests that the Champaign County Board (the "Board") waive the requirement of §6.1.4.D.9. of Champaign County Ordinance No. 848 (the "Wind Farm Ordinance"), which requires that:

> All WIND FARM TOWERS must be protected from unauthorized climbing by devices such as fences at least six feet high with locking portals or anti-climbing devices 12 feet vertically from the base of the WIND FARM TOWER.

This application for a waiver of the above requirement is based on several factors:

The GE 1.6-100 turbines submitted in this permit application are freestanding, monopole tubular steel towers with a diameter of approximately 15 feet. Each tower would consist of five sections manufactured from steel plates. All surfaces are sandblasted and multiple layers of coating are applied for protection against corrosion. Access to the turbine is through a lockable steel door at the base of the tower. Rather than having a steel lattice structure, these wind turbines have a smooth, solid steel structure. Requiring anti-climbing devices and fences on a monopole tubular structure which is only accessible through a lockable steel door is both duplicative and unnecessary.

For all of these reasons, California Ridge requests that the Board grant it a waiver from the requirements of §6.1.4.D.9 of the Wind Farm Ordinance.

California Ridge will comply with all applicable county, state, and federal regulatory requirements, as well as applicable and appropriate industry standards. California Ridge will submit documentation from the turbine manufacturer demonstrating that the turbines used in the Project are manufactured in compliance with such standards. The turbines will be new and will not be experimental or prototype equipment. California Ridge will submit a final site layout prior to requesting building permits when equipment is selected and wind site optimization and micrositing are completed.

Rotor

The rotor consists of three blades mounted to a rotor hub. The rotor blades are constructed of fiberglass and epoxy or polyester resin. The hub is attached to the nacelle, which houses the gearbox, generator, brake, cooling system, and other electrical and mechanical systems. The Project will use a 100-meter (328-foot) rotor diameter with a rotor swept area of 7,853 square meters (84,539 square feet). All turbine rotors will rotate in the same direction.

The electrically actuated individual blade pitch systems act as the main braking system for the wind turbine. Braking under normal operating conditions is accomplished by feathering the blades out of the wind. Any single feathered rotor blade is designed to slow the rotor, and each rotor blade has its own back-up battery bank to provide power to the electric drive in the event of a grid line loss.

The turbine is also equipped with a mechanical brake located at the output (high-speed) shaft of the gearbox. This brake is only applied immediately on certain emergency-stops (E-stops). This brake also prevents rotation of the machinery as required by certain service activities.

Tower

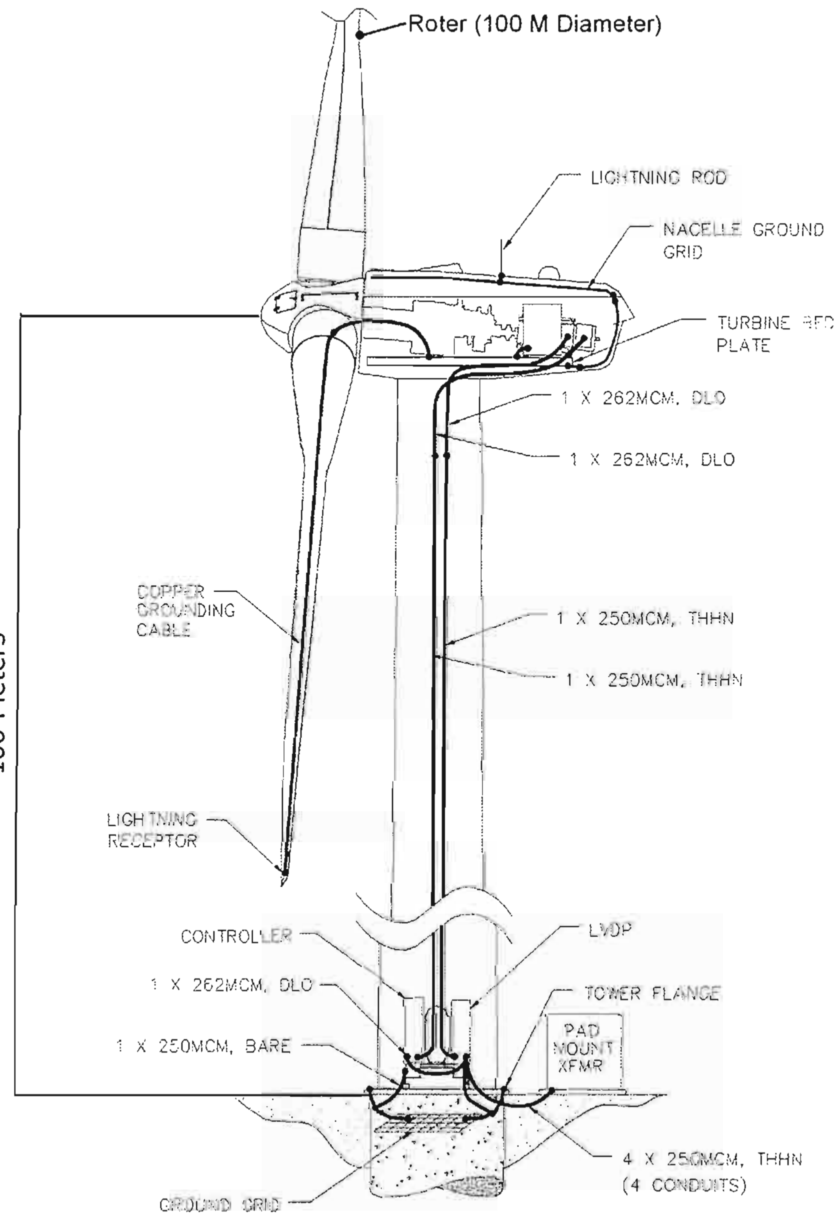
The tower is a self-supporting, tubular steel tower, white in color, with a hub height of 100 meters (328 feet). The nacelle is mounted on the turbine towers, which consist of five sections manufactured from steel plates. All welds are made in automatically controlled power welding machines and are ultrasonically inspected during manufacturing per American National Standards Institute specifications. All surfaces are sandblasted and multi-layer coated for protection against corrosion. The tower has no external flanges or ladders and is designed so that it cannot be climbed from the outside. Access to the turbine is through a lockable steel door at the base of the tower. No appurtenances will be connected to any tower except in accordance with the county zoning ordinance.

Foundation Design

Each freestanding tubular wind tower will be connected by anchor bolts to an underground concrete foundation. Geotechnical surveys and turbine tower load specifications will dictate final design parameters of the foundations. The foundation design will be engineered for the turbine type, site soils, and subsurface conditions at each turbine location. A common foundation design is a spread-footing type foundation which is typically an octagon approximately 18 to 19 meters (59 to 62 feet) in diameter with an approximate 1-meter (3- to 4-foot) pedestal, rebar, and anchor bolts. Figure 4-2 shows a typical wind turbine foundation that may be used for California Ridge, depending on ground-water conditions.

4.1.2 ENGINEER'S CERTIFICATE

Certified wind turbine tower and foundation design drawings and calculations, stamped by a professional engineer registered in the State of Illinois, will be provided to Champaign County following the granting of the permit approval. This detailed design typically occurs during the project design phase, usually several months prior to the beginning of construction. This foundation design takes into account the loadings for the specific turbine being used, in conjunction with site-specific geotechnical and soil conditions and requirements.



Note: Referenec Image from Technical Documentation, Wind Turbine Generator Systems, GE 1.5MW.

Invenergy HDR

Figure 4-1
Typical Wind Turbine Generator
California Ridge
Wind Energy Project
Champaign County, Illinois

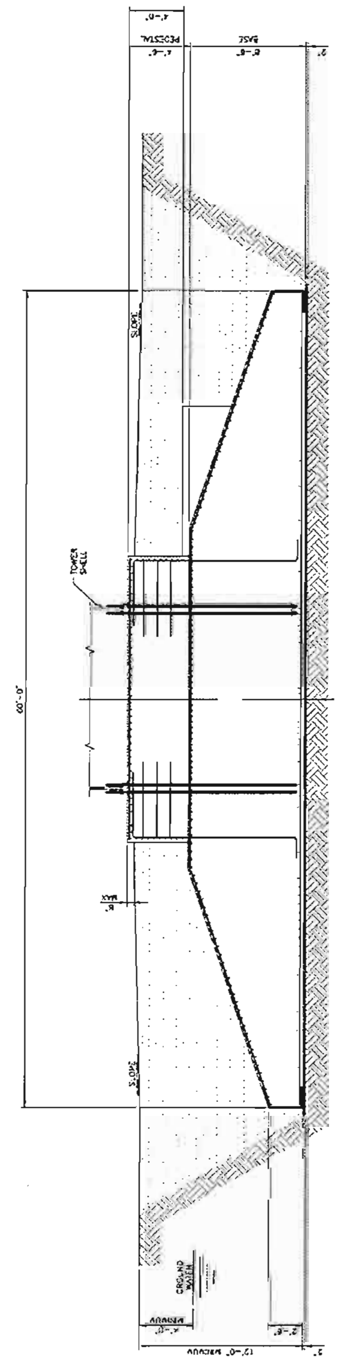


Figure 4-2
Typical Wind Turbine Foundation
California Ridge
Wind Energy Project
Champaign County, Illinois

Invenergy HDR

4.2 Wind Farm Construction

4.2.1 Construction Activities

Several activities must be completed prior to the proposed commercial operation date. The majority of the activities relate to equipment ordering lead-time, as well as design and construction of the facility. Preconstruction, construction, and post-construction activities for the Project include:

- Ordering all necessary components, including wind turbine generators, foundation materials, electrical cable, and transformers
- Final turbine micrositing
- Complete ALTA survey to establish locations of structures and roadways
- Soil borings, testing, and analysis for proper foundation design and materials
- Complete construction of access roads, to be used for construction and maintenance
- Installation of tower foundations
- Installation of underground cables
- Design and construction of Project substation
- Tower placement and wind turbine setting
- Commissioning of wind turbines
- Commencement of commercial operation

Access roads will be built adjacent to the towers, allowing access both during and after construction. The roads will be approximately 4.9 meters (16 feet) wide and have gravel as cover, adequate to support the size and weight of maintenance vehicles. The specific turbine placement will determine the amount of roadway that will be constructed for this Project.

During the construction phase, several types of light, medium, and heavy-duty construction vehicles will travel to and from the site. Private vehicles will also be used by construction personnel. At this time, California Ridge estimates that there will be 75 large truck trips per day and up to 200 small-vehicle (pickups and automobiles) trips per day in the area during peak construction periods. Of the 75 large truck trips, approximately 20 are expected to be wind turbine component deliveries. The balance is made up of concrete, aggregate, and miscellaneous delivery trucks. Construction is expected to take between 9 and 12 months with the peak construction period lasting 4 to 6 months. These numbers are currently being refined as part of a Traffic Impact Analysis that California Ridge is preparing as part of the proposed Roadway Use and Repair Agreement between California Ridge, the County Engineer, and the Township Road Commissioners. The peak volume will occur when the majority of the foundation and tower assembly is taking place. At the completion of each construction phase, this equipment will be removed from the site or reduced in number. Figure 4-3 shows the planned township and county roads expected to be used during Project construction. The Road Use Plan is being finalized with the County Engineer and the Township Road Commissioners.

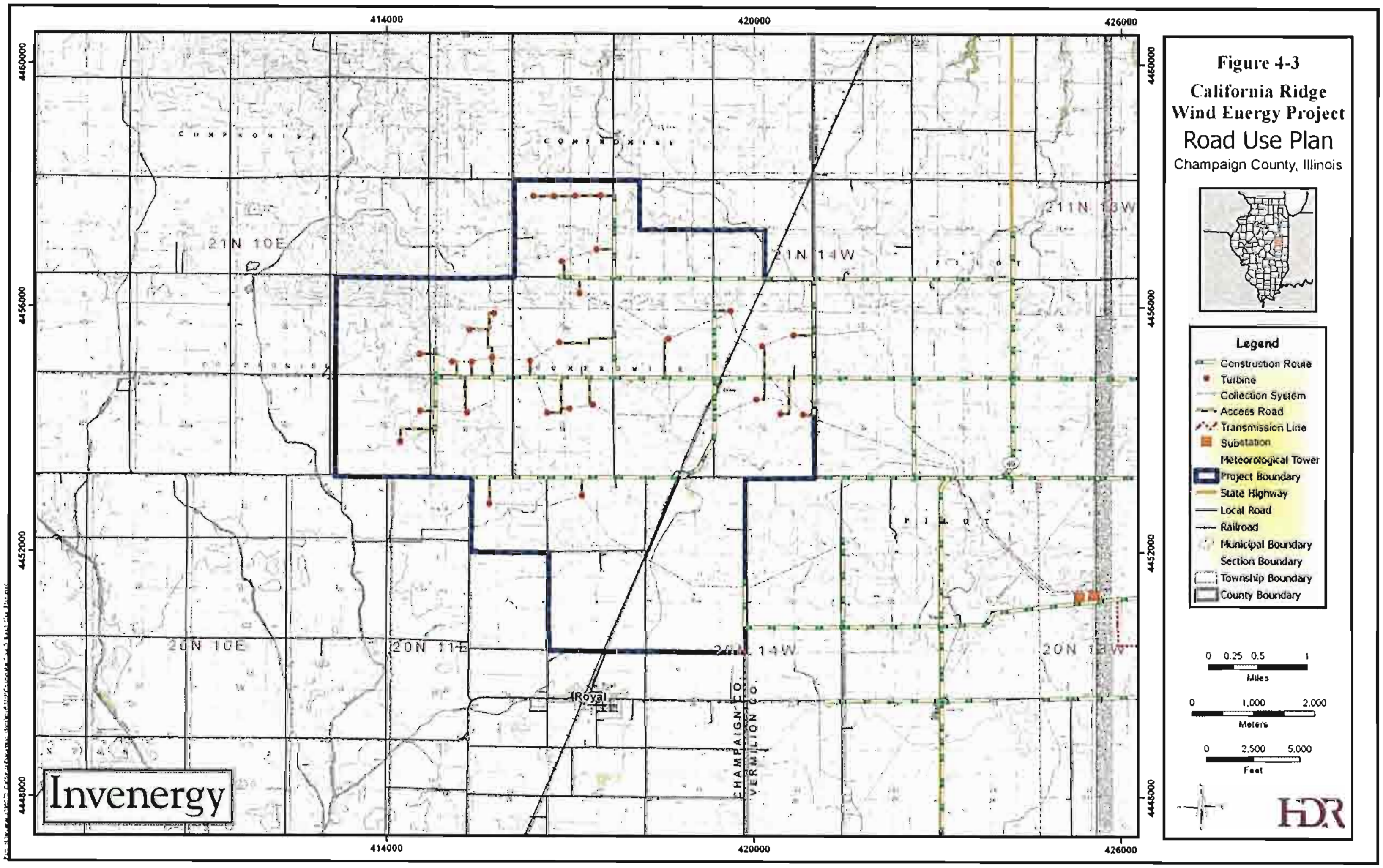


Figure 4-3
California Ridge Wind Energy Project
Road Use Plan
Champaign County, Illinois
Legend
Construction Route
Turbine
Collection System
Access Road
Transmission Line
Substation
Meteorological Tower
Project Boundary
State Highway
Local Road
Railroad
Municipal Boundary
Section Boundary
Township Boundary
County Boundary
0 0.25 0.5 1
Miles
0 1,000 2,000
Meters
0 2,500 5,000
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414000
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4460000
4456000
4452000
4448000
21N 10E
21N 14W
21N 13W
20N 10E
20N 11E
20N 14W
20N 13W
Royal
CHAMPAIGN CO.
VERMILION CO.

4.2.2 Civil Works

Completion of the Project will require various types of civil works and physical improvements to the land. These civil works include:

- Improvement of existing county and township roads at no cost to Champaign County or Ogden and Compromise townships, to deliver materials and components to the Project area
- Improvement of existing access roads to the Project area
- Construction of roads adjacent to the wind turbine strings to allow construction and continued servicing of the wind turbines
- Clearing and grading for wind turbine tower foundation installations
- Trenching for underground cabling to connect the individual wind turbines.

Any improvements to existing access roads will consist of re-grading and filling of the gravel surface to allow access during inclement weather. No asphalt or other paving is anticipated for access roads. Access road routing is being designed in consultation with each landowner and will be completed in accordance with local building requirements. Access roads will be located to facilitate both construction (cranes) and continued operation and maintenance. Siting roads in areas with unstable soil or wetland areas will be avoided.

All roads will include appropriate drainage and culverts while still allowing for the crossing of farm equipment. The roads will be approximately 4.9 meters (16 feet) wide and will be covered with road base designed to allow passage under inclement weather conditions. Once construction is completed, the roads will be re-graded, filled, and dressed as needed.

Temporary disturbances during construction of the Project include crane pads at each turbine site, temporary travel roads for the cranes, and temporary turning radii at certain county and township road intersections, temporary laydown areas around each turbine, trenching for the underground electrical collection system, and storage/stockpile areas. Construction of the GE turbine will include temporary impacts of approximately an additional 12 feet of roadway on either side of the permanent roadway (40-foot total width), a 40-foot by 120-foot gravel crane pad extending from the roadway to the turbine foundation, which will be graded to a minimum of 1 percent, and a 150-foot diameter rotor laydown area centered around the turbine foundation which will be graded to a minimum of 5 percent.

4.2.3 Commissioning

The Project will be commissioned after completion of the construction phase. The Project will undergo detailed inspection and commissioning procedures. Inspection and commissioning occurs for each component of the wind turbines, as well as the communication system, meteorological system, high voltage collection and feeder system, and the SCADA system.

4.2.4 Complaint Hotline

Prior to beginning construction, California Ridge will establish a telephone number hotline for the general public to call with any questions, comments, or complaints. The hotline will be available throughout the entire term of the County Board Special Use Permit and any extension. The telephone number will be publicized and posted at the O&M facility. The hotline will be manned during usual business hours. All complaints will be logged with the caller's name, address, and reason for calling. All calls will be recorded and those recordings will be kept for a minimum of two years. California Ridge will take all necessary measures to resolve all legitimate complaints. A copy of the telephone number hotline shall be provided to the Zoning Administrator on a monthly basis.

4.3 PROJECT SCHEDULE

4.3.1 LAND ACQUISITION

California Ridge will be responsible for all land acquisition, and will obtain the necessary easements from landowners. All required land easements for the Project, including all necessary access easements and utility easements, will be obtained prior to construction..

4.3.2 PERMITS

California Ridge will be responsible for undertaking all required review, and will obtain all permits and licenses that are required following issuance of the Champaign County Special Use Permit. California Ridge anticipates that the Special Use Permit will expire in 10 years from time of Special Use Permit approval if no Zoning Use Permit is granted as per section 6.1.4 R of the Champaign County Zoning Ordinance; provided, however, such ten (10) year period shall be extended by any time periods necessary to resolve (i) any third party appeals of such County Board approval or (ii) any litigation that enjoins or otherwise effectively prevents California Ridge from completing construction under the Champaign County Special Use Permit. Copies of permits and licenses for the Project from federal, state, county, and municipal agencies can be supplied to Champaign County if required.

4.3.3 CONSTRUCTION ACTIVITIES

The California Ridge construction contractors will be responsible for completing all Project construction, including roads, wind turbine assembly and erection, electrical, and communications work. The construction will take approximately 9 to 12 months to complete, and is planned to begin in fall 2011. California Ridge shall maintain a current general liability policy covering bodily injury and property damage with limits of at least $5 million per occurrence and $5 million in the aggregate. The same shall apply to all contractors and subcontractors during the construction process. The general liability policy shall identify landowners in the Special Use Permit as additional insured. Proof of such insurance shall be kept current and on file at the County Board office.

4.3.4 EXPECTED COMMERCIAL OPERATION DATE

California Ridge anticipates that the Project will begin commercial operation prior to the end of December 2012.

4.3.5 OPERATION AND MAINTENANCE

California Ridge will be responsible for the operation and maintenance (O&M) of the wind farm. Invenergy Services will perform the O&M services at the time of operation. California Ridge will provide reports of annual inspections by qualified wind power professionals to the Champaign County Environmental and Land Use Committee.

California Ridge will control, monitor, operate, and maintain the Project by means of the SCADA system. In addition to regularly scheduled on-site visits, the wind farm may be monitored via computer. Any physical modification to the wind turbine that alters the mechanical load, mechanical load path, or major electrical components shall be recertified by the Champaign County Zoning Ordinance. Authorization for modification will be granted by the Champaign County

Environmental and Land Use Committee and a relevant third party certifying entity in accordance with the Champaign County Zoning Ordinance subparagraph 6.1.4.D.1 (a).

4.3.6 Decommissioning and Restoration

California Ridge has a contractual obligation to the landowners to remove the wind turbines and foundations per the decommissioning plan when the wind easements expire. At the end of the Project's useful life, California Ridge expects to explore alternatives to decommissioning the Project. One such option may be to retrofit the turbines and power system with upgrades based on new technology.

In accordance with Champaign County's wind ordinance, California Ridge has prepared a decommissioning plan to be used in the event it removes the wind facilities (Appendix B), which provides for decommissioning within 6 months of the end of the Project's life or abandonment. The decommissioning plan states how the facility will be decommissioned, provides the structural engineer's estimate of the cost of decommissioning, and describes the financial resources that are available to pay for decommissioning.

In summary, the decommissioning plan states that California Ridge will be responsible for all costs to decommission the Project. Based on estimated costs of decommissioning and the salvage value of decommissioned equipment—which is the estimate used by a structural engineer—the salvage value of the wind farm will be less than the cost of decommissioning. Per industry standards, decommissioning costs are estimated to be approximately $98,000 per turbine in current dollars. The current scrap steel price is approximately $380 per ton, based on the June 2011 *steelonthenet.com* report. Given that market values fluctuate and the price of steel historically has shifted from $106 to $455 per ton, turbine salvage values can range between $40,688 and $174,785. However, internal turbine components and generators can also be salvaged for resale and reuse. Therefore, the salvage or resale value of each turbine is estimated to be $180,785. This does offset the anticipated decommissioning costs.

California Ridge's easement agreements with each landowner provide that the foundations (down to three feet) and wind turbines be removed at the end of their useful life. The easement agreement includes a provision that, in the event that the Project is unable to meet its obligations to decommission the wind turbines and foundations, a decommissioning fund will be established during the fifteenth year of the Project, and will be held in escrow for the benefit of landowners. Any decommissioning security requirement by the county that exceeds these terms will be implemented and will supersede these terms.

Site decommissioning and restoration will involve removal of towers, turbine generators, transformers, foundations, buildings, and ancillary equipment up to a depth of 3 feet below grade. All access roads will be removed unless the affected landowner provides written notice that the road or portions of the road shall be retained. Additionally, any disturbed surface shall be graded, reseeded, and restored as nearly as possible to its preconstruction condition.

5.0 ENVIRONMENTAL ANALYSIS

5.1 DESCRIPTION OF THE ENVIRONMENTAL SETTING

The Project is located in an area that is predominantly rural with an agricultural-based economy. Corn and soybeans are the predominant crops. The landscape in the Project area is relatively flat with gently rolling hills.

5.2 NOISE

Section IX of the Ordinance requires that noise levels from each WECS or WECS Project be in compliance with applicable Illinois Pollution Control Board (IPCB) regulations. IPCB regulations (Illinois Rules Title 35: Environmental Protection, Subtitle H: Noise, Chapter I: Pollution Control Board, Part 901 – Sound Emissions Standards and Limitations for Property Line Noise Sources) limit maximum allowable noise emissions. Table 5-1 presents the maximum allowable noise emissions of a Class C (commercial and industrial) land use to a Class A (residential) land use.

Table 5-1
Allowable Octave Band Sound Pressure Levels (dB) of Sound Emitted to any Receiving Class A Land from Class C Land

Time of Day	Octave Band (dB)								
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Daytime	75	74	69	64	58	52	47	43	40
Nighttime	69	67	62	54	47	41	36	32	32

The most stringent IPCB limitations apply to noise emitted to receiving properties that contain residential uses. The analysis results described below demonstrate that noise from a GE 1.6-100 wind turbine does not exceed the noise limits in Title 35 of the Illinois Rules. California Ridge will comply with the IPCB noise regulations. California Ridge hereby certifies such compliance.

5.2.1 DESCRIPTION OF RESOURCES

In May 2009, HDR measured existing noise levels at two locations in the Project area within Champaign County for 24 hour periods. HDR selected monitoring locations by reviewing digital aerial photographs of the Project area and identifying areas where the ambient acoustical environment appeared to be representative of the Project area (see Appendix A in Appendix C).

The noise monitoring data represent the ambient acoustic environment of rural, agricultural areas in the Project area that were generally expected to have quiet ambient daytime and nighttime noise levels. However, existing noise levels at all monitoring sites exceed nighttime maximum allowable noise limits in a total of seven octave bands (125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz). Existing ambient noise levels (L_{eq}) ranged from 34 to 62 dBA. Daytime background noise levels were dominated by vehicular traffic and natural sources. Nighttime background noise levels were generally dominated by natural sources. Details of the noise monitoring are included in Appendix C.

5.2.2 INVENERGY CALIFORNIA RIDGE NOISE ANALYSIS

Project-related noise was evaluated using the Cadna-A model. Modeling results were combined with monitoring data, and compared with maximum allowable noise levels under Illinois Rules. The monitoring, modeling, and compliance determinations were applied on a spectral basis, i.e. to each of the eight frequency octave bands that comprise the applicable Illinois regulation (Illinois Rules Title 35: Environmental Protection, Subtitle H: Noise, Chapter I: Pollution Control Board, Part 901 – Sound Emissions Standards and Limitations for Property Line Noise Sources). The conclusions of this analysis are summarized below (see Appendix C, Invenergy California Ridge Noise Analysis, for full report).

5.2.3 IMPACTS

Operation Noise

When in motion, wind turbines emit a perceptible sound. Sound is generated from the wind turbine at points near the hub or nacelle (100 meters [328 feet] above the ground), and at the blade tip during blade rotation. Therefore, for modeling purposes, the noise source could be considered to be spherical. The noise level varies with the speed of the turbine, environmental conditions, and the distance of the listener from the turbine.

GE published sound power emission levels for their GE 1.6-100 turbine, as shown in Table 5-2. This data is representative of the sound power levels from the GE 1.6-100 turbines expected to be used for this Project. Noise emissions for maximum operating conditions were evaluated based on spectral noise emissions at 14 m/s, which is modeled at the hub height.

Table 5-2
Sound Power Emissions from GE 1.6 GE 1.6-100 xle MW Turbine

Model number	Octave Band Sound Power (dB)								
	31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
GE 1.6-100 Turbine	82.5	92.2	95.9	95.2	95.5	99.9	99.3	90.5	71.6

General Electric's sound power levels were based on the results in which a GE 1.6-100 turbine was tested at a 14 m/s (31 mile/hour) wind speed(at the hub height), the wind speed that produces the loudest manufacturer stated noise level. Therefore turbine noise emission levels produce a conservative analysis and overestimate turbine noise levels during lower wind conditions. Newer generation turbines, such as the GE 1.6-100, use variable speed rotors that produce lower levels of aerodynamic noise at low wind speeds, as opposed to previous generations' constant-speed designs, which generate the same amount of noise regardless of wind speed. Given this, older designs tend to be more audible during low wind conditions. This conservative modeling ensures that turbine noise levels are not under-predicted.

Cadna-A, an acoustical analysis software package designed for evaluating environmental noise from stationary and mobile sources, was used to evaluate Project-related noise. Cadna-A is a three-dimensional noise model based on ISO 9613, "Attenuation of Sound during Propagation Outdoors," adopted by the International Standards Organization (ISO) in 1996. This standard provides a widely accepted engineering method for calculating outdoor environmental noise levels from sources of known sound emission.

California Ridge modeled the noise levels from the GE 1.6-100 turbines. Using turbine noise emissions data provided by GE. The modeled noise levels are representative of the levels from the

GE 1.6-100 turbines expected to be used for the Project. A total of 553 receptors (at residences) were modeled for the Project area. A total of 260 receptors identified within Champaign County were modeled for the project. Of these receptors, none were shown to be above noise levels specified by IPCB regulations.

A total of 134 wind turbine generators (the noise sources), each having a hub height of 100 meters were evaluated using Cadna-A. Project-related noise levels were calculated at 553 residences (the noise receivers) within one mile of the Project area. The digital terrain model reproduced the physical terrain of the Project area, encompassing approximately 10,193 acres in Champaign County. Coordinates for the turbine and residence locations, as well as the terrain contours, were obtained from the geographic information system (GIS) database created for this Project. Modeling results were compared with maximum allowable noise levels under Illinois Rules. The monitoring, modeling, and compliance determinations were applied on a spectral basis, that is, to each of the eight frequency octave bands that comprise the applicable IPCB regulations. A summary of the results of this analysis are below and the report is attached as Appendix C. In summary:

- Existing ambient noise levels (L_{eq}) were measured within the Project area and ranged from 34 to 62 dBA.
- Existing noise levels exceed daytime maximum allowable noise limits in a total of four octave bands (500 Hz, 1 kHz, 2 kHz, and 4 kHz).
- Existing noise levels at all monitoring sites exceed nighttime maximum allowable noise limits in a total of eight octave bands (63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz).
- Daytime analysis results indicate that noise from 134 wind turbines are at least 7 dB below the maximum allowable noise limit in all octave bands at all noise-sensitive receivers within 1 mile of the Project area.
- Nighttime analysis results indicate that noise from 134 wind turbines are at least 1 dB below the maximum allowable noise limit in all octave bands at all noise-sensitive receivers within 1 mile of the Project area.

5.2.4 MITIGATION MEASURES

Due to technological advancements in design, noise levels for today's generation of wind turbines are lower than that of their predecessors, especially at high wind speeds. Furthermore, the character of noise produced is more broadband in nature and largely absent of tones or impulsive qualities. In any event, any noise generated by during Project operation will be in compliance with IPCB limits.

5.3 SHADOW FLICKER

As wind turbine blades rotate, they can cast a shadow on the ground and objects below. A strobe effect can occur where the shadow of the rotating blades cause rapid changes in light intensity. These rapid changes in light intensity can be troublesome when they affect a sensitive receptor, such as the windows of residences. Shadow flicker can occur if a turbine is located near a home and the home is in a position where the moving blade shadow is cast upon the residence. Obstacles, such as trees or buildings, between the wind turbine and a potential shadow flicker receptor can reduce or eliminate the effects. Changes in elevation can either reduce or increase the effects.

No shadow flicker occurs on overcast days, or when the turbine rotor and blades are not rotating, such as when winds are calm. Because the wind turbine is designed to turn and face into the wind, shadow flicker is less pronounced when the wind direction is perpendicular to the direction of the wind turbine, as viewed from the receptor. By contrast, the shadow flicker is more pronounced during sunlight hours when the wind blows from a direction near parallel with a line between the wind turbine and the receptor.

The rate of changes in light intensity is a function of the rotational speed and the number of blades on the rotor. This rate, or "blade pass frequency," is measured in cycles per second, or Hz. Each complete change in light intensity, from the beginning of one shadow to the beginning of the next shadow, is considered one cycle.

California Ridge proposes to use wind turbines having three blades that are designed to operate at between 10 and 20 rpm. For this range of rotational speeds, the blade pass frequency would range from 0.5 to 1.0 cycle per second.

Areas most likely to experience shadow flicker would be those to the east and the west of the turbine tower locations. The number of hours per year during which shadow flicker could occur decreases as distance from the turbine increases, even for residences that are located to the east and west of the turbines. There are three reasons why this is so:

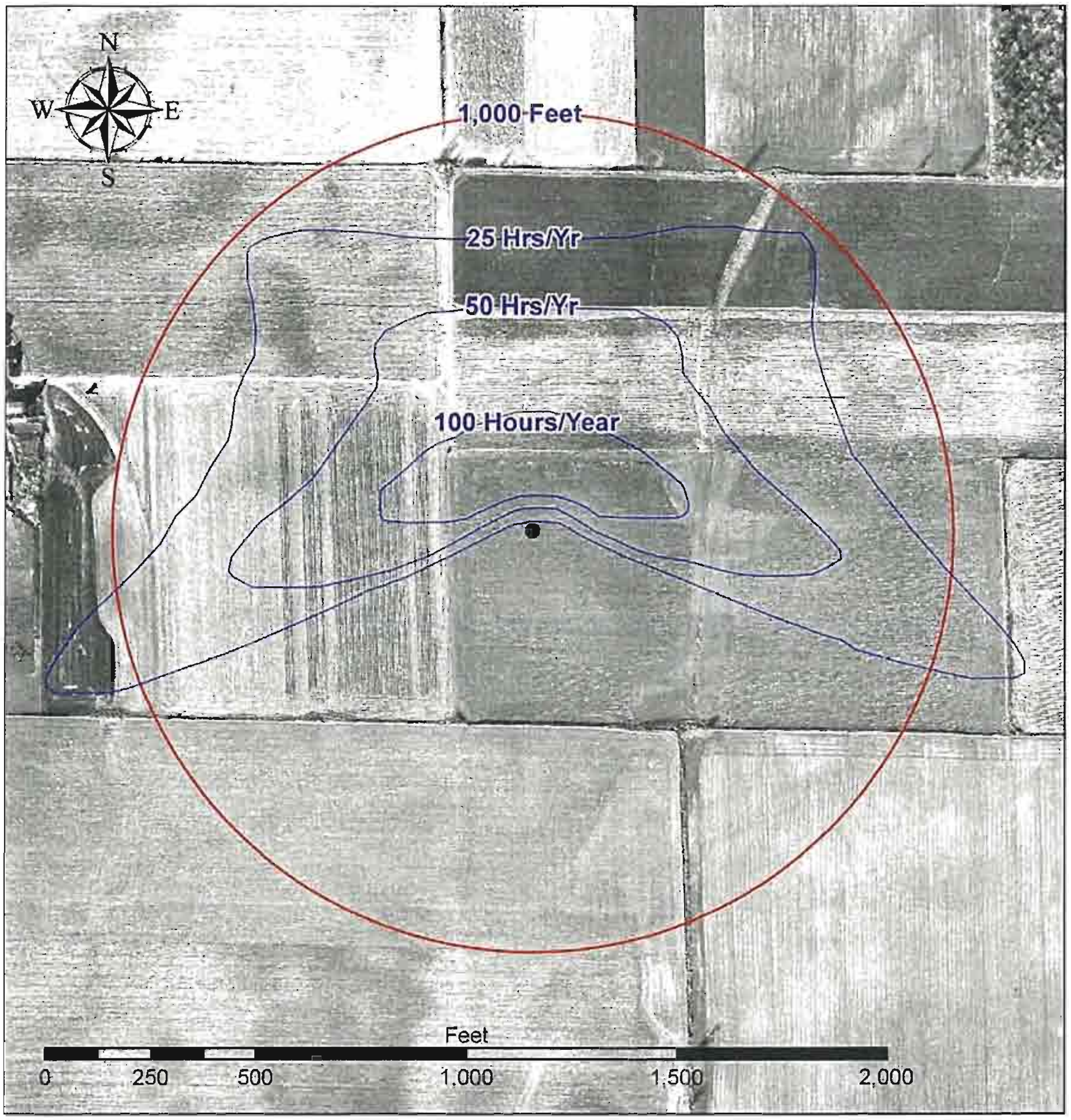
- As the season passes from winter to summer, the shadow angles at sunrise and sunset move from north to south. Since this angle changes, a residence further from the turbine would most likely experience shadow flicker only during a few days per year.
- As the sun rises or sets, the turbine shadow length changes rapidly, so that a residence farther from the turbine location would experience shadow flicker for only a short time during the day.
- A discernable shadow forms or dissipates within 15 to 45 minutes of sunrise or sunset, depending on sky conditions.

Figure 5-1 illustrates the shadow effect in the Project Area. Appendix G shows the results of a shadow flicker analysis of the current project layout.

The expected hours of shadow flicker per year were calculated for 333 receptors in the vicinity of California Ridge Wind Farm Project. The results of the shadow flicker modeling show that the impacts on nearby receptors are expected to be minor, with all homes experiencing less than 30 hours of shadow flicker during the summer and winter months. The majority of flicker will occur during work hours when residents are not as likely to be at home.

It should also be noted that the shadow flicker modeling software package employs several conservative assumptions. The model assumed that all receptors have a direct in-line view of incoming shadow flicker ("Green House" mode), when in reality, windows will not always be facing the sun when shadow flicker is expected to occur. The model did not consider the effects of screening (such as trees or buildings), distance to turbine, and other factors that will influence shadow intensity. As a result, the actual impact of shadow flicker on the receptors will likely be less than that suggested by these results and so shadow flicker is not expected to be a significant environmental concern at this site.

Figure 5-1 Shadow Effect Likely Hours per Year of Shadow Flicker



5.3.1 MITIGATION MEASURES

As part of the final micrositing, turbines will be sited to reduce the effect of shadow flicker on nearby residences.

5.4 PUBLIC SERVICES AND INFRASTRUCTURE

5.4.1 DESCRIPTION OF RESOURCES

The Project is located in a lightly populated, rural area in east-central Illinois. There is an established transportation and utility network that provides access and necessary services to the light industry, small villages, homesteads, and farms existing near the Project area. No villages, towns, or cities are located within the Project area. The Village of Royal is located within 1 mile of the Project area, but no turbines are located within 1.5 miles of the village. The villages of Ogden, Royal, and Gifford are located within 5 miles the Project area.

While many of the surrounding municipalities provide water and sanitary services within their boundaries, these services are unavailable within the Project area. Fire protection in the Project area is provided by volunteer fire protection districts in Fithian, Ogden/Royal, and Oakwood. Once the layout is finalized, California Ridge will meet with each of the volunteer fire protection districts that serve the Project area to discuss the Project's health and safety matters and provide them with a copy of the site plan.

The larger surrounding cities provide police, fire, and emergency medical services for other villages in the Project area. The townships affected by the Project have limited public infrastructure services, which is typical of most townships. Homes typically use private septic systems and water wells for their household needs.

The Chicago and Eastern Illinois railroad runs diagonally from northeast to southwest through the eastern portion of the Champaign County portion of the Project. See Figure 3-1 and Figure 3-2.

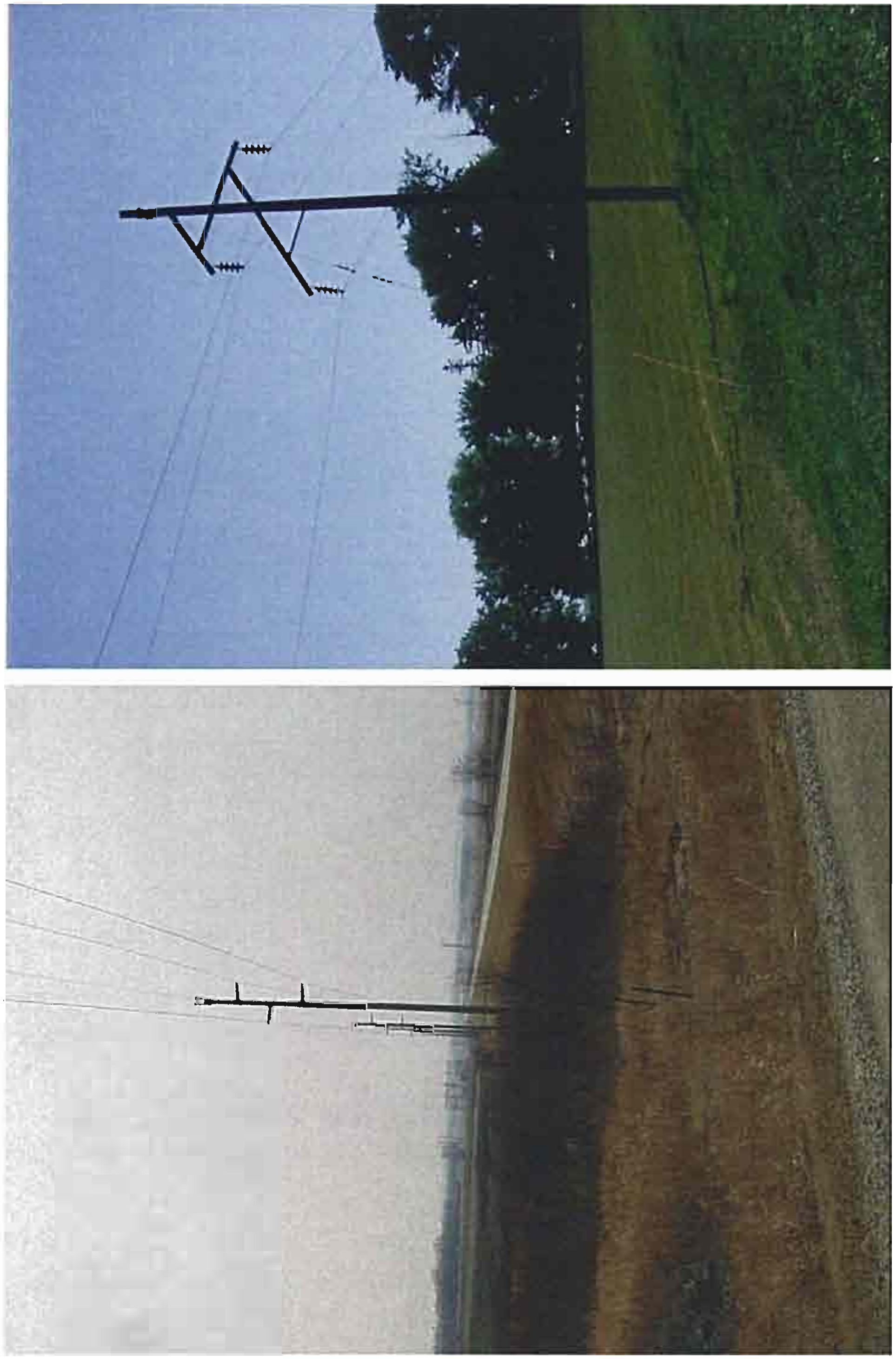
Electrical Service

The primary utility corridors running through the Project area are local distribution lines. Several high voltage transmission lines run generally north/south and west from the Dynegy Power Station, located in Vermilion County, in the southeast corner of the Project area (Figure 5-2). The proposed overhead transmission line will be located in Vermilion County.

5.4.2 MATERIALS HANDLING, STORAGE, AND DISPOSAL

Solid waste generated on site related to the construction, operation and maintenance of the facility will be removed from the site promptly and disposed of in accordance with all federal, state, and local laws. Additionally, all hazardous materials related to the construction, operation, and maintenance of the facility will be handled, stored, transported and disposed of in accordance will all applicable local, state, and federal laws.

Refer to Section 5.9 for information regarding hazardous materials.



Wishbone

Horizontal Line Post

Figure 5-2
Typical 138 kV Transmission Line Structures
California Ridge
Wind Energy Project
Champaign County, Illinois

Invenergy HDR

5.4.3 Roads

County and township roads that run coincident with section lines characterize the majority of the existing roadway infrastructure in and around the Project area. State Highway 49 runs north/south through the middle of the Project area. The existing traffic volumes on the area's roadways are documented in Table 5-3. For purposes of comparison, the functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day, or average daily traffic (ADT). The highest existing ADT in or near the Project area is along State Route 49, which carries 1,650 ADT. California Ridge is currently in negotiations to finalize a comprehensive Roadway Use and Repair Agreement (Appendix H) with the county engineers and township road commissioners in the Project area. The Roadway Use and Repair Agreement will ensure that California Ridge modifies county and township roads as needed to accommodate construction equipment, and repairs any damage to those roads and is a requirement for Project construction activities.

Table 5-3
Existing Daily Traffic Levels

Roadway Intersection Description Champaign County, Illinois	Existing Average Annual Daily Traffic
Along State Route 49	
Between Interstate 74 and US Route 136	1,650
Along Penfield Road	
Between Hensley Road and County Road 2500 N	950
Along County Road 2500 N	
Between State Route 49 and Country Road 2400 E	175
Along County Road 2700 N	
Between State Route 49 and County Road 2500 E	75

Source: Illinois Department of Transportation, NAVTEQ 2009

5.4.4 Sewer and Water

The Project will comply with all septic and well regulations required by the County Health Department and the Illinois Department of Public Health. The Project will not include the installation of a septic system, except at the O&M facility, which will be located in Vermilion County. The contractor will supply portable sanitary facilities for site personnel during construction. Once commercial operation begins, there will be no need for permanent sanitary facilities, except at the O&M facility.

The Project does not include the installation of any wells, except at the O&M facility. As noted below, if it is necessary to abandon any existing wells, they will be capped as required by applicable regulations.

5.4.5 Impacts

The Project is expected to have a minimal effect on the existing infrastructure. The following is a brief description of impacts that may occur during the construction and operation of the Project.

- **Railroad.** Construction of the Project is not anticipated to affect the use of the Chicago and Eastern Illinois railroad. California Ridge will coordinate with the railroad owner/operator to obtain any easements required to cross the railroad and to ensure that the collection system and access roads do not interfere with the railroad.

- **Electrical Service.** Construction of the Project will add up to 134 wind turbine generators, a pad-mounted transformer at the base of each turbine, an underground electrical collection system (34.5 kV), and a Project substation (138 kV/34.5 kV) which will be located in Vermilion County. At the Project substation, the electric voltage will be stepped up to 138 kV, and travel to the POI where it will enter the high voltage grid. Additionally, a new breaker will be installed at the existing substation in the Ameren substation near the Vermilion Power Plant.

- **Roads.** Constructing the Project will require the addition of gravel access roads connecting each turbine to local roads. Construction will also require upgrade of certain township and county roads, at no cost to the county or townships, to meet the expected material loads and equipment delivery needs. In addition, during operation of the Project, the access roads will be used by O&M crews while inspecting and servicing the wind turbines. The access roads may be between towers, offset as necessary to allow for adequate crane access. The roads will be approximately 4.9 meters (16 feet) wide and low profile to allow cross-travel by farm equipment. California Ridge will work closely with the landowners to locate these access roads to minimize land-use disruptions to the extent possible. Additionally, California Ridge is working to establish a Roadway Use and Repair Agreement (Appendix H) with the township road commissioners and county engineers to ensure county and township roads are repaired if they are damaged during construction.

  California Ridge estimates that there will be 75 large truck trips per day and up to 200 small-vehicle (pickup and automobile) trips per day in the area during peak construction periods. The maximum construction workforce is expected to generate approximately 275 additional vehicle trips per day. Using any combination of county highways and roads throughout the Project area, the traffic impacts are considered negligible. The traffic projections for construction will not significantly impact public health and safety because the local roads are designed to carry more than 275 additional trips per day.

  Truck access to the Project area is generally provided by State Highway 49 and other various state and county routes. Specific additional truck routes will be dictated by the location required for delivery. Additional operating permits will be issued by the county for over-sized truck movements.

- **Water Supply.** Construction and operation of the Project will not significantly affect the water supply. The installation or abandonment of any wells is not required for the Project, with the exception of one well that will likely be installed at the O&M facility. However, in the event wells are abandoned, they will be capped as required by applicable regulations. In the event a temporary concrete batch plant is located within the Project area, a separate permit will be required from the applicable county. At this time, California Ridge is not requesting a permit for a well to serve a concrete batch plant. The Project will not require appropriation of surface water or dewatering. It is likely that the Project will require a single domestic-sized well for the O&M facility, which will be located in Vermilion County.

- **Telephone and Fiber Optic.** Construction and operation of the Project will not negatively affect the telephone and/or fiber optic service to the Project area. The Illinois Joint Utility Locating Information for Excavators system, known as J.U.L.I.E., will be contacted prior to construction to locate and avoid underground facilities. To the extent Project facilities cross or otherwise affect existing telephone or fiber optic lines or equipment, California Ridge will enter into agreements with service providers to avoid interference with their facilities.

5.4.6 MITIGATION MEASURES

Construction and operation of the Project will be in accordance with all applicable federal and state permits and laws, as well as industry construction and operation standards. California Ridge will enter into a comprehensive Roadway Use and Repair Agreement with Champaign County and townships for construction of the Project. The Roadway Use and Repair Agreement will ensure that California Ridge modifies county and township roads as needed to accommodate construction equipment, and repairs any damage to those roads resulting from Project construction activities. Due to the minor impacts expected to the existing infrastructure during Project construction and operation, extensive mitigation measures are not anticipated.

California Ridge will develop a project-specific Environmental Health and Safety Manual (EHS Manual) that conforms to federal Occupational Safety and Health Administration (OSHA) regulations.

During construction of the Project, contractors are required to develop their own Emergency Response Plans and training programs for their employees. In addition to the EHS Manual, California Ridge will develop a separate Project Emergency Response Plan which will specify how to respond to a host of emergency situations. Employees will be trained to respond to emergency situations and this training will be offered to the local fire districts. California Ridge is also working directly with each of the four volunteer fire protection districts to determine if additional training, equipment, or funding is needed to enable them to respond to emergency situations on the wind farm.

5.5 TELEVISION, RADIO, AND TELECOMMUNICATIONS INTERFERENCE

This section assesses the potential for interference with various types of communication, including telecommunications and broadcast communication. California Ridge contracted with Comsearch, a communications consultant, to evaluate the potential effect of the Project on existing nonfederal government microwave telecom systems.

5.5.1 DESCRIPTION OF RESOURCES

Microwave Paths

California Ridge hired Comsearch to identify microwave telecom systems that traverse the Project area. Using Wind Power GeoPlanner software, the firm made a geographical representation of registered fixed microwave paths in the 900 megahertz (MHz) to 23 gigahertz (GHz) frequency band range.

Because microwave communication is a line-of-sight technology, any interference with microwave telecom signals can be avoided by locating wind turbines outside of the microwave communications profile. Comsearch calculated a Worst Case Fresnel Zone (WCFZ) for each of the microwave paths in the area. The middle of the path is where the widest (the worst case) Fresnel Zone appears. The affected paths were then overlaid on topographic base maps for the Project area.

The report shows that there is one microwave path that intersects the Project boundary in Champaign County. There are eight total microwave paths within approximately five miles of the entire Project area. These are shown on Figure 5-3. Because federal law does not permit interference with registered or licensed microwave pathways, California Ridge will position the turbines outside the existing WCFZ to avoid any interference. Some typical size relationships are provided below:

- Microwave antenna height is 25 meters-plus (82 feet) and antennas are typically located on water towers, television towers, building roofs, and shared commercial towers.
- The width of the WCFZ for 2.1 GHz is approximately 37 meters (121 feet).
- The width of the WCFZ for 6.7 GHz is approximately 16 meters (52 feet).
- The width of the Project area is approximately 23,400 meters (14 miles).

Television

California Ridge has committed to resolve television interference problems by improving the affected antenna, changing the antenna location, or installing relays to re-transmit and boost the affected signal. Installing satellite television is another option. Television reception issues will be dealt with on a case-by-case basis by working with any affected residents to identify the best solution.

California Ridge will work with local broadcasters to address any complaint that occurs after construction of the Project. As stated previously, California Ridge will resolve any issues with television reception on a case-by-case basis.

Cellular and Two-way Radio

There is no evidence that wind turbines interfere with individual cell phones or two-way radio communication. In fact, turbine maintenance personnel often use cell and radio equipment in the performance of their work. The turbines are not likely to introduce problems with two-way radio if the towers are not adjacent to the microwave transmitting and/or receiving antennas. In some areas, cell phone antennas are installed on turbine towers.

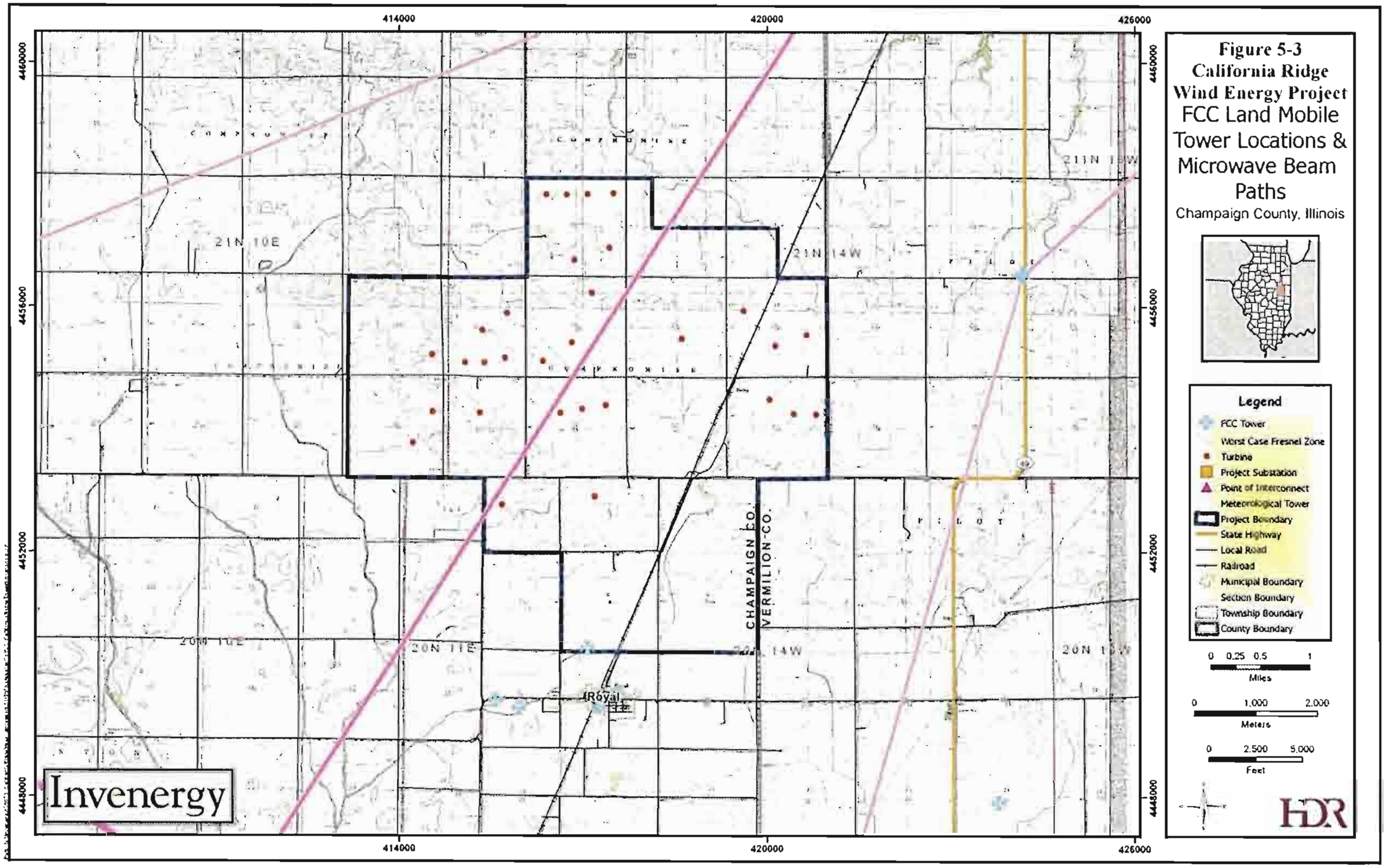


Figure 5-3
California Ridge
Wind Energy Project
FCC Land Mobile
Tower Locations &
Microwave Beam
Paths
Champaign County, Illinois
Legend
FCC Tower
Worst Case Fresnel Zone
Turbine
Project Substation
Point of Interconnect
Meteorological Tower
Project Boundary
State Highway
Local Road
Railroad
Municipal Boundary
Section Boundary
Township Boundary
County Boundary
0 0.25 0.5 1
Miles
0 1,000 2,000
Meters
0 2,500 5,000
Feet
HDR
Invenergy
414000
420000
426000
4460000
4456000
4452000
4448000
21N 10E
21N 14W
21N 13W
20N 10E
20N 11E
20N 14W
20N 13W
CHAMPAIGN CO.
VERMILION CO.
Royal

Wireless Internet

Wireless communication has become an indispensable tool for providing data communications in a variety of industries. Point-to-multipoint links are frequently used to connect a central tower or "master" site to a group of subscriber devices. A common application of this arrangement is broadband internet service. Point-to-point (PTP) wireless links typically connect one or more towers or connect a tower to a network operation center, which provides access to fiber-optic or other communications media. PTP links are found in a wide range of sectors, from public safety to telecommunications to utilities. Wireless system reliability and performance is strongly affected by the strength of an incoming signal. To maximize signal strength, links are usually designed with a clear line-of-sight between antennae.

Some of the new wireless Internet providers choose not to register with the Federal Communications Commission (FCC) and they may be at risk. Non-FCC registered service providers may need to provide some additional information about their microwave network to the Project staff to minimize potential interference with their signal paths.

There is one registered FCC land mobile tower located within the Champaign County Project area. Four additional FCC land mobile towers are located outside the Project area near Royal, and a telecommunication/microwave tower is located just north of the Project boundary along Highway 49 (Figure 5-3).

5.5.2 Mitigation Measures

California Ridge will work with any affected landowners within the Project area to remedy any recognized degradation due to the Project, if any, in their television, radio, or broadband wireless internet service that may result from the Project.

California Ridge has submitted the Project location to the National Telecommunications and Information Administration (NTIA) and they have confirmed that no federal agencies identified any concerns regarding blockage of their radio frequency transmissions. All turbine locations have also been submitted to the FAA to verify that their locations will have determinations of no effect

5.6 Public Health and Safety

5.6.1 Air Traffic

The closest public airport is Schmidt Airport, located approximately 3.2 miles west of the Project area. This airport has one runway approximately 2,190 ft in length. Additionally, Rantoul National Aviation Center is 8 miles away. and the University of Illinois-Willard Airport, which is south of Champaign-Urbana, is more than 15 miles southwest of the Project boundary.

Mitigation Measures

California Ridge will light the turbines and meteorological towers to comply with the newest FAA advisory circular (AC70/7460-1K) recommendations for wind turbines approved February 1, 2007. This requires that simultaneously flashing red or white lights be used on turbines at the ends of strings as well as lights approximately every half a mile within strings. The placement of the lights will depend upon the final approval from the FAA.

5.6.2 Fire Prevention and Mitigation

The Project will adhere to applicable electrical codes and standards. Fire protection in the Project area is primarily provided by volunteer fire protection districts, including the Fithian, Ogden/Royal, Oakwood, and Bluegrass districts. Training to handle emergency situations if they arise at the site will be provided to the construction crews by experienced contractors. Local fire and ambulance crews will be called to the site to provide emergency medical services. Turbine access roads will increase emergency access to the Project area. All wind turbines have lightning protection and grounding.

California Ridge has met with each of the four volunteer fire protection districts that serve the Project Area to discuss health and safety matters. During construction of the Project, contractors are required to develop their own Emergency Response Plans and training programs for their employees. In addition to the EHS Manual, California Ridge will develop a separate Project Emergency Response Plan which will specify how to respond to a host of emergency situations. Employees will be trained to respond to emergency situations and this training will be offered to the local fire districts.

During operation, the Project will not present a risk of fire. The minimum amount of vegetation will be removed from the vicinity of electrical gear and connections to allow for the safe operation of all electrical equipment associated with the site, while at the same time minimizing the loss of vegetation. The turbines, towers, and other equipment are for the most part metal, and are not easily combustible. All wind turbines will be properly protected from lightning and will be electrically grounded.

5.7 Hazardous Materials

5.7.1 Description of Resources

California Ridge is not aware of any significant hazardous waste sites within the Project area. The land is primarily rural and used for agriculture. Potential hazardous materials within the Project area will be associated with agricultural activities, and include petroleum products (fuels and lubricants), pesticides, and herbicides. Older farmsteads may also have lead-based paint, asbestos shingles, and Polychlorinated Biphenyls (PCBs) in transformers. Trash and farm equipment dumps are also potential hazards in rural settings.

There will be three types of fluids used in the operation of the wind turbines that are petroleum products. These fluids are necessary for the operation of each turbine and include:

- Gear box oil – synthetic or mineral depending on application (approximately 300 liters)
- Hydraulic fluid
- Gear grease

These fluids will be managed and, if disposal is necessary, disposed of in compliance with the requirements of applicable laws and regulations, including Illinois Administrative Code Title 35, Parts 700-739.

5.7.2 Impacts

California Ridge will conduct a Phase I Environmental Site Assessment prior to construction to locate and avoid hazardous waste sites.

All fluids will be contained within the wind turbine structure. There should be no leakage and no need to dispose of fluids (except in the rare case of contamination) over the life of the turbine.

5.7.3 Mitigation Measures

Because there are no proposed impacts to hazardous waste sites, no mitigation measures are necessary. If any wastes, fluids, or pollutants are generated during any phase of Project operation, they will be handled, processed, treated, stored, and disposed of in accordance with Illinois Administrative Code Title 35, Parts 700-739.

5.8 Surface Water, Floodplain, and Wetland Resources

5.8.1 Surface Water and Floodplain Resources

Surface water and floodplain resources for the Project area were identified by reviewing U.S. Geological Survey topographic maps (1996), Illinois Regulation of Public Waters (Appendix A of 17 IL Adm. Code Ch I Sec. 3704) (2005), Illinois Critical Resource Waters Map (2000), and Flood Insurance Rate Maps produced by the Federal Emergency Management Agency (FEMA 1985). The major surface waters located in the vicinity of the Project area are Spoon River, Buck Creek, Knights Branch, Collison Branch, and Feather Creek. These are all tributaries to the Middle Fork Vermilion River which is east of the Project area. A number of unnamed intermittent streams flow to the aforementioned major surface waters.

The IDNR Regulation of Public Waters (Sec. 3704) Appendix A identified no public waters within the Project area or within Champaign County.

A review of FEMA floodplain maps indicates that there is a 100-year floodway within the Project area. The 100-year floodway is located in Section 36 of Compromise Township near the Spoon River, near the edge of the Project boundary. No Project facilities are planned near this floodplain and it will be avoided.

5.8.2 Impacts

Construction of the wind turbines, access roads, electrical collection system, and the Project substation will disturb land within the Project area. The wind turbines and ancillary facilities will be built on uplands, which will avoid the surface water features and designated floodplains typically located in the lower positions on the landscape. Access roads will be built to avoid or minimize impacts on waters and wetlands. In particular, all surface waters and tributaries to the Middle Fork of the Vermilion River will be avoided. Underground cabling will be directionally bored under surface water resources and wetlands to minimize potential erosion or sedimentation effects to the river.

In a letter dated December 4th, the IDNR stated that erosion from the Project has the potential to affect the Middle Fork and its tributaries through siltation and sedimentation, while disruption of field tile system may temporarily or permanently adversely modify the prevailing thermal regime in feeder stream habitats essential to Middle Fork fish, reptiles, amphibians, and mussels, including many state-listed endangered or threatened species, several of which are unique to the Vermilion River system in Illinois.

5.8.3 Mitigation Measures

California Ridge will consult with the appropriate agencies prior to construction to verify that federal and state permits are not required. Access roads constructed adjacent to or crossing surface waters will be designed in a manner to allow unrestricted flow from the upper portions of the watershed to the lower portion of the watershed. An NPDES permit application and SWPPP will be prepared by California Ridge for the Project and submitted to the Illinois Environmental Protection Agency prior to the construction of the wind turbines and access roads. Erosion control practices will be implemented as part of the SWPPP to prevent indirect impacts to the steams in the vicinity of the Project area.

5.8.4 Wetlands

Description of Resources

Wetlands near the Project area were identified by reviewing National Wetland Inventory (NWI) maps (Figure 5-4). California Ridge conducted a field inspection for wetlands and will perform wetland delineations (if deemed necessary) prior to construction. If wetlands are located in the Project area, they would typically be depressional landscape features or floodplain wetlands adjacent to unnamed intermittent streams. These wetlands will be avoided during construction. Access roads will be sited away from wetlands, underground cables will be bored underneath wetlands, and turbines will not be sited in wetlands.

The site has been tiled and drained for agriculture; therefore, very few depressional and flow-through wetlands remain within the identified hydric soil areas. The NWI wetland types and their acreage for the Project area are presented in Table 5-4 and shown in Figure 5-4.

Table 5-4
NWI Wetland Types and Acreages in Project Area

Cowardin Classification	Number of Wetlands	Acres[1]
Palustrine Emergent Wet Meadow - Temporarily Flooded Farmed (PEMAf)	2	5.5
Palustrine Emergent Wet Meadow – Seasonally Flooded (PEMC)	5	2.5
Palustrine Emergent Temporarily Flooded (PEMA)	3	1.4
Palustrine Unconsolidated Bottom Semipermanently Flooded (PUBF)	2	0.3

[1] *Wetland acreage is calculated using U.S. Fish and Wildlife Service NWI data.*

All of the wetlands located within the site are associated with palustrine systems. Wetlands within the Project area are located in small, isolated basins or are associated with intermittent streams.

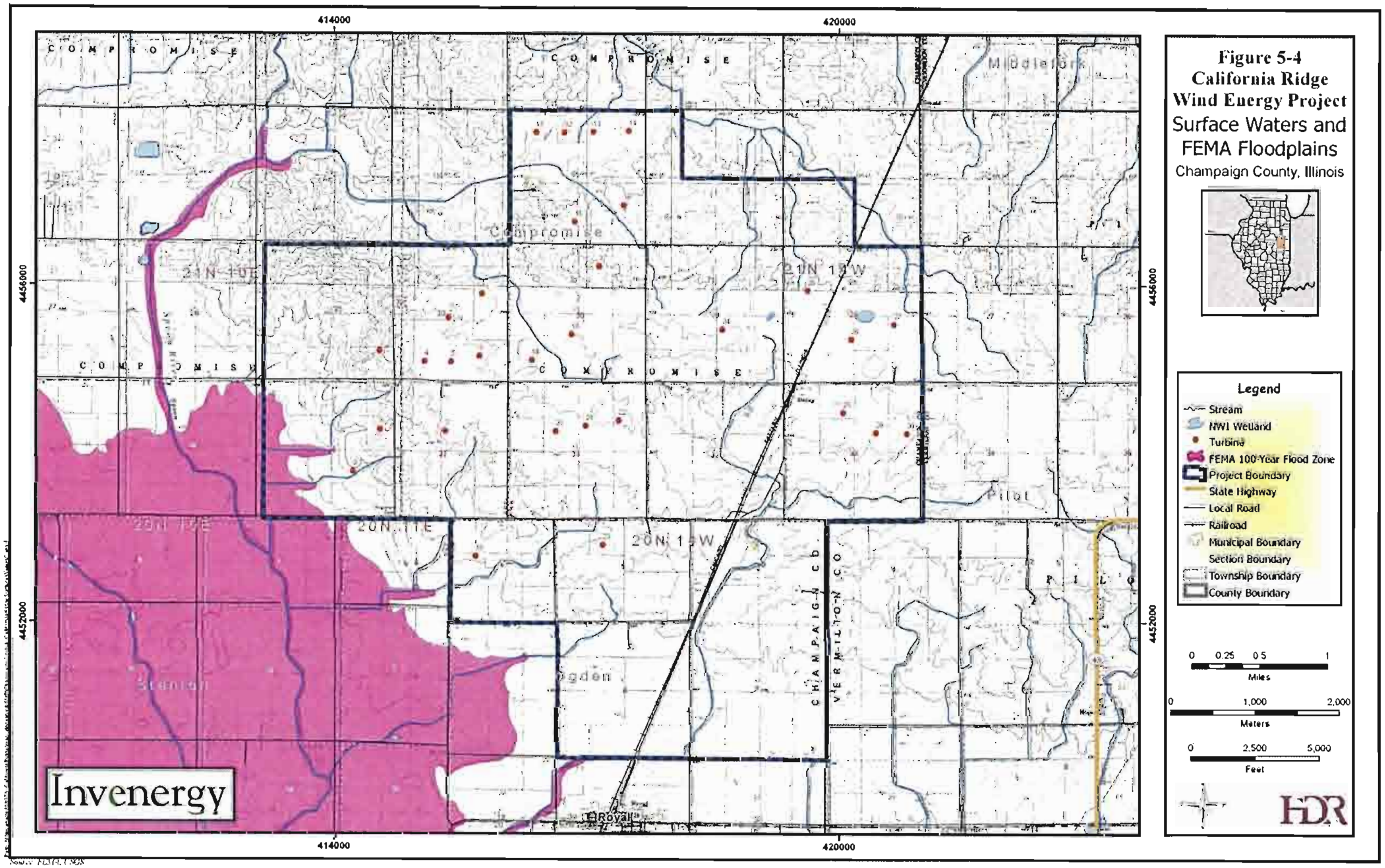


Figure 5-4
California Ridge
Wind Energy Project
Surface Waters and
FEMA Floodplains
Champaign County, Illinois
Legend
Stream
NWI Wetland
Turbine
FEMA 100 Year Flood Zone
Project Boundary
State Highway
Local Road
Railroad
Municipal Boundary
Section Boundary
Township Boundary
County Boundary
Miles
Meters
Feet
COMPROMISE
Compromise
Middlefork
Pilot
Ogden
Royal
Stanton
21N 10E
21N 14W
20N 11E
20N 14W
CHAMPAIGN CO
VERMILION CO
414000
420000
4456000
4452000
Invenergy
HDR

5.8.5 Impacts

Wind turbines will be constructed on upland areas, which will avoid wetlands typically located in the lower positions of the landscape. Access roads and supporting facilities will be designed to minimize impacts to wetlands.

5.8.6 Mitigation Measures

Wetlands will be avoided during the construction phase of the Project. If wetland impacts cannot be avoided, California Ridge will submit a Section 404 and Section 401 Certification under the joint application process to the U.S. Army Corps of Engineers (USACE) and the state prior to construction. In addition, the IDNR requires Project review under the Interagency Wetlands Policy Act for wetland impacts. USACE submitted an e-mail on March 30, 2009 with the following comment: "Before USACE can make a determination on the project, additional data of the project will be needed." California Ridge is planning to conduct a wetland survey prior to construction and will coordinate with USACE as required.

5.9 Natural Resources

5.9.1 Vegetation

Description of Resources

In accordance with the requirements of the Champaign County Special Use Permit application, Invenergy will submit the final layout of the wind farm and applicable fees to the Champaign County Soil and Water Conservation District (SWCD). In return, the SWCD will generate a Natural Resource Inventory Report. The report will identify any areas of concern or locations pertaining to natural resources which should be avoided. Champaign SWCD will coordinate with Invenergy during the micro-siting process in order to avoid potential areas of concern prior to final site layout and submittal of the Natural Resource Inventory Report.

The Project is located in the Illinois/Indiana Prairies and Glaciated Wabash Lowlands Level IV Ecoregions (Woods et al., 2006). Historically, the vegetation of the region was bluestem prairie with pockets of oak-hickory forest in the Illinois/Indiana Prairies area. The Glaciated Wabash Lowlands occur in the eastern edge of the Project area. Historically, the vegetation of this region was beech-maple forests in ravines flanking the Vermilion River. Presently, the landscape has been converted to farmland and is now dominated by agricultural practices. Original wetland areas were frequently ditched and drained to improve agricultural production.

Based on a review of aerial photographs and Champaign County land cover data, the majority of the land area within the Project area is agricultural. Table 5-5 identifies current land cover in the Project area. Unmowed grassland or CRP is the next most common cover type, with small amounts of pasture, shelterbelts, savannah, mowed grassland, woodlot, and railroad verge making up the remainder of the Project area.

Table 5-5
Land Cover within Project Area

Land Cover	Percent of Project Area
Cultivated Land (row crops, small grain, hay,	90.0
Developed Land	1.6
Woodlot	0.1
Unmowed	2.8
Mowed	2.4
Savannah	<0.1
Shelterbelts (shrubs and trees)	0.7
railroad	0.8

5.9.2 IMPACTS

The amount of vegetation that will be removed as a result of the proposed Project will be determined when the final site layout is completed. The proposed Project will require approximately 16.5 acres of land for the turbines, access roads, and collection lines for Champaign County.

Wind turbines require an uninterrupted airflow. The turbines will be constructed away from forests and groves to maximize turbine output and reduce tree removal. Construction will not impact farmsteads. In some instances, tree removal may be required.

5.9.3 MITIGATION MEASURES

California Ridge proposes the following measures to be used to avoid or minimize impacts on area vegetation during Project construction, subsequent development, and operation:

- California Ridge will conduct preconstruction surveys of all proposed Project facility locations to identify wetland resources and special vegetative communities of concern. As feasible, California Ridge will locate turbines and access roads to avoid or minimize impacts on wetlands and native prairie areas.
- California Ridge will avoid disturbing wetlands during construction and operation of the Project.
- California Ridge will minimize impacts on existing trees and shrubs.
- California Ridge will use BMPs during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion. BMPs may include containing excavated material, protecting exposed soil and stabilizing restored material, re-vegetating non-cropland and range areas with wildlife conservation species, and wherever feasible, planting native tallgrass prairie species in cooperation with landowners.

5.9.4 WILDLIFE

Information about existing wildlife resources in the Project area was obtained from a variety of sources including published literature, field guides, public data sets, and a meeting held with Keith Shank, Illinois Department of Natural Resources (IDNR) on March 23, 2009. HDR requested written information concerning biological resources at the site from the IDNR and the U.S. Fish and Wildlife Services (USFWS). A letter dated May 14, 2009 was received from the USFWS (Appendix J). A letter dated December 4, 2009 was received from the IDNR (Appendix J). In addition, California Ridge completed bat and avian risk assessments and wildlife baseline studies for the Project area.

Section 9.1.11.D of the Champaign County Zoning Ordinance, as amended (the "Zoning Ordinance"), provides that:

> Any other provision of this ordinance notwithstanding, the BOARD or GOVERNING BODY, in granting any SPECIAL USE, may waive upon application any standard or requirement for the specific SPECIAL USE enumerated in Section 6.1.3 Schedule of Requirements and Standard Conditions, to the extent that they exceed the minimum standards of the DISTRICT, except for any state or federal regulation incorporated by reference, upon finding that such waiver is in accordance with the general purpose and intent of this ordinance, and will not be injurious to the neighborhood or to the public health, safety and welfare.

In accordance with that provision, California Ridge hereby requests that the Champaign County Board (the "Board") waive the requirement of §6.1.4.J. of the Champaign County Ordinance No. 848 (the "Wind Farm Ordinance"), which requires that:

> The Applicant shall apply for consultation with the Endangered Species Program of the Illinois Department of Natural Resources. The Application shall include a copy of the Agency Action Report from the Endangered Species Program of the Illinois Department of Natural Resources.

This application for a waiver of the above requirement is based on the following factor:

As required at the beginning of §6.1.4.J., California Ridge consulted with the Illinois Department of Natural Resources and a letter dated December 4th, 2009 was received from the IDNR (Appendix J). In this letter, Keith Shank of the IDNR stated that "The Department's consultation process for this proposal is terminated."

For this reason, California Ridge requests that the Board grant it a waiver from the requirements of §6.1.4.J. of the Wind Farm Ordinance.

This section (5.9.4 Wildlife) covers general wildlife species within the Project area. For information about federal and state wildlife species considered to be threatened or endangered or of special concern, refer to Section 5.9.7. Recommendations from the USFWS are summarized in Table 5-5.

Description of Resources

The Middle Fork of the Vermilion River, designated as a National Wild and Scenic River, is located more than five miles east of the Project area and the Spoon River is located one tenth of a mile west of the Project area. No Illinois Natural Area Inventory (INAI) sites occur within the Project area boundary, but an INAI site within five miles of the Project area includes the Spoon River (0.1 mile west). The dominance of agricultural land in the Project area dictates the types and numbers of species that are likely to occur.

Wildlife in the Project area consists of birds, mammals, fish, reptiles, amphibians, and insects, both resident and migratory, which use the Project area habitat for forage, breeding, and/or shelter. The available habitat in the Project area is primarily agricultural row crops with adjacent roadside ditches. Trees include windbreaks, shelterbelts, and wooded riparian areas, which are primarily located along the Middle Fork of the Vermilion River. Species present in the Project vicinity are associated with agricultural fields, pasture grasslands, wetlands, and forested areas.

Breeding birds common to the largely agricultural setting include killdeer, horned lark, vesper sparrow, red-winged blackbird, and the eastern meadowlark. Woodland bird species would include hawks, doves, cuckoos, woodpeckers, flycatchers, vireos, corvids, swallows, chickadees, wrens, thrushes, and finches. The Middle Fork of the Vermilion River hosts breeding populations of Canada geese and mallards, with small populations of wood duck, blue-winged teal, hooded merganser, grebe, and green heron. Upland game birds in the region include ring-necked pheasant and, less frequently, the bobwhite quail. Raptor species expected in agricultural areas include red-tailed hawk, American kestrel, great-horned owl, and eastern screech-owl.

The mammal population in the area includes white-tailed deer, coyote, fox, rabbit, squirrel, raccoon, other related rodents, and bats. These species use the food and cover available from agricultural fields, grasslands, farm woodlots, wetland areas, and wooded areas. Grassland areas and woody vegetation are also habitat for a variety of small mammals, including house and deer mice, and prairie and meadow voles.

Several bat species may occur within the Project area, but populations are likely limited by the dominance of row crops and the small amount of suitable tree species. Bats are dependent on forested areas for roosting as well as navigation. Bat species that occur in the region and that may be present in the Project area include hoary bat, eastern red bat, eastern pipistrelle, big brown bat, silver-haired bat, little brown bat, northern long-eared bat, Indiana bat, and the evening bat (See Table 5-7 and Appendix D).

There are many species of fish found in Champaign County. Many of them, including several state-listed threatened and endangered species, are expected to be more common within the Middle Fork of the Vermilion River and the potential exists for these species to occur in tributaries to the river within the Project area.

5.9.5 Impacts

The impact of the Project on wildlife is expected to be minimal. Measurable impacts will generally include a small reduction in the available habitat that some wildlife use for forage or cover. Operation of the wind farm will not change the existing land use. The Project will not affect the water quality entering creeks or tributaries of the Middle Fork of the Vermilion River and will not impact their fish populations. Erosion control practices will be implemented to minimize indirect impacts.

Based on studies of existing wind power projects in the U.S. and Europe, the greatest potential for wildlife impacts is related to avian and bat species. In a letter dated May 14, 2009 (Appendix J), the USFWS provided comments on the Project and noted that the agency is concerned about potential impacts to migratory birds and bats.

A biological screening report for the California Ridge Wind Power Project was completed by Western EcoSystems Technology (WEST), which addressed potential impacts to avian species (Appendix E). To determine the type of species and numbers of birds likely to be present within the

Project area, WEST conducted a site visit in March 2009 to examine topography, habitat, and birds present within the area. The biological screening report concluded that, given the habitat in the Project area (primarily flat agricultural fields without defined topographic edges), there is average to low potential for raptors (nesting or general use), avian migratory pathways, or federal or state-listed species to occur.

One potentially unique feature of the proposed project is its proximity to the Middle Fork of the Vermilion River. Several state listed species occur along the river and associated forested areas, and some potential exists for birds and bats to use the Middle Fork of the Vermilion River as a migration corridor. Potential bird and bat use in the Project area may be influenced by the distance to the Middle Fork of the Vermilion River, with areas near the river having a higher potential for bird and bat use. However, because proposed activities will avoid these areas, fatality rates and other impacts are likely to be similar to those documented in other Midwest wind farms in similar cropland habitat. Therefore, risk to birds from turbines constructed within the expansion area is not likely to be biologically significant.

Preconstruction avian surveys were performed by WEST in the Project area from March 12, 2009 through February 15, 2010 (Wildlife Baseline Studies – Appendix F). Surveys were conducted weekly during the spring and fall migration seasons and monthly during the winter, to estimate the seasonal, spatial, and temporal use of the Project area by birds, particularly raptors. No surveys were conducted during the summer. Forty-eight species, and a total of 5,325 individual bird observations comprised of 1,469 separate groups were observed during all fixed-point surveys. Overall, bird use was higher during the spring and fall than during the winter. Raptor passage rates at the Project area were similar to those recorded at other Midwest sites.

Given the relatively low numbers of birds and bird species detected, the moderate raptor use rate, and the placement of turbines away from the Middle Fork of the Vermilion River and associated native habitats, WEST anticipates that avian mortality rates are likely to be at the low end of the known range of Midwestern wind projects.

There are no records of federally threatened or endangered bats in or within 5 miles of the proposed Project area. A Chiropteran Risk Assessment was completed by BHE Environmental, Inc. (Appendix D) for the California Ridge Wind Power Project in Vermilion and Champaign counties to determine potential impacts on bat species. The BHE report concluded that risk to bats is expected to be low, based on a lack of suitable forested habitat within the Project area.

Preconstruction acoustic surveys of bat activity within the Project area were conducted by BHE Environmental, Inc. (BHE) from August 5 to November 4, 2009 (Appendix L). Surveys designed to detect ultrasonic bat calls within the Project area were implemented in accordance with methods, goals, and objectives established in coordination with the IDNR. Ultrasonic detectors (Anabat II with CF ZCAIM) were mounted on three meteorological towers within the Project area to assess bat activity during the fall migration period. These acoustic bat surveys indicated a moderate level of bat activity within the Project area.

The lack of forested habitat and open water within the Project area may reduce risk to bats, as most bat species in Illinois prefer forests and bodies of open water for foraging and migration stopover roosting habitat. Bats migrating through the vicinity of the Project area may prefer the Middle Fork and Salt Fork Vermilion Rivers and associated forests compared to the open landscape within the

Project area. The Project has been sited to avoid high-quality bat habitat all together. California Ridge has used the best science available to incorporate avoidance, minimization, and mitigation strategies into the siting, design, and operation strategies for this Project, in an attempt to reduce bat risk at the Project area to the best of our current understanding.

California Ridge's risk assessments and preconstruction surveys of avian and bat species within the Project area indicates that there is limited potential for species protected under the federal Endangered Species Act to occur in the project area due to the preponderance of tilled agriculture. There is potential for several state-listed species to occur at some time throughout the year on the site, primarily within non-tilled areas and streams. WEST's preconstruction survey documented four sensitive avian species, as discussed below. Although the site contains relatively low diversity, there are localized shelterbelts, grassland, hayfields, and wetland habitat, and there is potential for state-listed species to occur in these areas. Refer to Section 5.9.7 for further information on potential impacts to threatened and endangered avian and bat species.

Post-construction avian and bat mortality monitoring will be conducted beginning in the first year of Project operations to help California Ridge monitor actual mortality rates of birds and bats at the facility. Monitoring will also help determine the effectiveness of avoidance, minimization, and mitigation measures in reducing mortality at the facility. Post-construction monitoring will be conducted by consultants for no less than the first year of Project operation, as recommended by the IDNR and USFWS during consultation, and repeated once every three years by trained California Ridge staff as a part of routine facility inspections. Survey monitoring periods or intervals may be adjusted to include the second year of operation if deemed necessary following initial post-construction monitoring results or additional agency coordination.

Bird and bat mortality studies will be conducted in the Project area to record mortalities at the facility and develop an estimate of fatality rates for each taxon at the facility. Bird and bat mortality monitoring efforts will be conducted according to USFWS guidelines and will include searcher efficiency and carcass removal trials. Baseline mortality studies will be conducted during the spring (4 weeks) and fall (10 weeks) seasons of the first year of Project operation. Searches will be conducted weekly at 30 of the 134 turbines during the spring, and at 14 of the 134 turbines during the fall. Curtailment study searches, described below, will be conducted daily at the other 16 study turbines during the fall. Follow-up mortality studies will be conducted for 10 weeks during the fall every three years of Project operation. Fatality estimates will be determined using a fatality estimator which corrects for searcher efficiency and carcass removal biases. Fatality estimates will be expressed both in terms of fatalities/turbine/season and year, and in terms of fatalities/megawatt/season and year and accompanied by precision and variance estimates to facilitate comparison with other studies. Fatality rates may also be compared to weather data collected within the Project area. Survey monitoring periods or intervals may be adjusted if deemed necessary following initial postconstruction monitoring results or additional agency coordination.

Search plots measuring 256 x 256 ft (78 x 78 m) will be established at the base of each sampled turbine. This plot size will exceed one-half the maximum turbine rotor height of the California Ridge turbines (246 ft [75 m]). This should minimize the number of fatalities or injured birds or bats which land or move outside of the search plots and thereby reduce the number of bird or bat carcasses that would be undetected, causing underestimation of overall fatality.

A written report on avian and bat mortality will be submitted to the Environment and Land Use Committee at the end of the first two years of operation that reflects the mortality rate estimates with consideration of items such as scavengers, predators, and searcher efficiency. If California Ridge's mortality level proves it will not threaten the population of protected species, such as the Indiana bat, no further consultation with the Environment and Land Use Committee on mortality will be performed. If the mortality level proves to threaten the population of protected species, California Ridge will perform additional postconstruction monitoring with input from the Environment and Land Use Committee.

5.9.6 Mitigation Measures

To help avoid potential impacts on fish and wildlife in the Project area during construction and operation, California Ridge will:

- Conduct a preconstruction inventory of existing biological resources, native prairie, and wetlands in the Project area
- Conduct one year of preconstruction avian point count surveys to document bird species within the Project area (point counts were conducted from March 2009 through February 2010)
- Conduct preconstruction bat surveys within the Project area to document relative abundance of bat species (preconstruction acoustic surveys were conducted from August 2009 through November 2009)
- Minimize wetland disturbance through avoidance or special construction methods during Project construction
- Minimize the amount of tree and shrub removal required during construction and operation
- Use towers with a monopole tubular design to minimize potential perching
- Minimize turbine lighting to the extent allowed by the FAA;. California Ridge anticipates installing synchronized red strobe lights (no steady-burning red or white lights)
- As part of the Project's compliance with the Migratory Bird Treaty Act, all habitats directly impacted by construction activities during the breeding season will be surveyed for nests by a trained biologist prior to construction.
- Turbines are located to avoid: (1) known bat hibernation, breeding, and maternity/nursery colonies, migration corridors, and flight paths between colonies and feeding areas, (2) areas or features of the landscape known to attract raptors, (3) habitat known to be occupied by prairie grouse, and (4) potential avian mortality, as practicable.
- Despite being categorized as a site with low risk to bats, California Ridge still plans to implement additional mitigation measures to further mitigate impacts on bat species at its project. Operational mitigation measures will be implemented to reduce the impact on bat species. Curtailment of turbines during the primary bat migration period and times when bat species are the most active will be implemented and actively managed during operation of the project. California Ridge will test the effectiveness of this operational protocol by comparing bat fatality rates at curtailed turbines vs. fully operational turbines during a curtailment study conducted in the first year of operation. The cut-in speed, schedule, and treatment turbines for curtailment actions will be re-evaluated following the curtailment study and may be revised as part of the Project's adaptive management process.
- Post-construction monitoring of the turbines during operation to verify mitigation measures are meeting expectations and goals for project. If adjustment is needed to meet goals for the project, modification of mitigation measures will occur.

California Ridge will continue to consult with the USFWS regarding necessary steps to avoid or minimize impacts on migratory birds. In their comment letter, the USFWS outlined several siting and design recommendations for minimizing impacts to migrating birds and bats:

Table 5-6
USFWS Recommendations

USFWS Recommendation	Notes/Comments
Avoid siting turbines on major bird migration corridors or in areas where birds are highly concentrated unless mortality risk is low.	California Ridge conducted field surveys to identify sensitive flight paths that should be avoided during siting of turbine locations. In addition pre- and post construction surveys were conducted. Turbines have been sited to avoid major migration corridors
Site turbines to avoid areas or features of the landscape known to attract raptors.	The project area does not contain cliffs or ridge passes, which are typical landscapes that attract raptors. Highest probability of raptor usage would be associated with the Middle Fork of the Vermilion River. The results of the preconstruction surveys were used in siting turbines as appropriate to avoid raptors.
Avoid placing turbines near bat hibernation and breeding colonies, in migration corridors, and in flight paths between colonies and feeding areas.	As shown in Appendix D, the Project area does not contain suitable forested habitat for bats, nor does it contain documented hibernacula or known caves that could be used as hibernacula.
Avoid siting turbines in habitats of any species of wildlife, fish, or plant protected under the Endangered Species Act.	Refer to Section 5.14.3.
Configure turbines to minimize mortality.	The results of the pre-construction surveys showed no major flight paths that should be avoided during siting of the turbine locations.
Where the height of the rotor-swept area produces a high risk to wildlife, adjust tower height where feasible to reduce strikes.	California Ridge conducted preconstruction field surveys to identify flight paths ; no major corridors were identified and no tower height adjustments are proposed
Post construction monitoring should be conducted for impacts on wildlife.	California Ridge will conduct postconstruction monitoring in consultation with USFWS and IDNR and California Ridge's avian specialist.

5.9.7 Threatened and Endangered Species

Federal and State of Illinois regulations provide for the protection of endangered and threatened species. In essence, these regulations require that projects not affect the continued existence of any endangered or threatened species or adversely affect their habitats, and that corrective action be taken if adverse impacts could potentially occur. To ensure compliance with these regulations, the USFWS and the IDNR were consulted regarding the presence of protected species or habitats in the vicinity of the Project.

Seven federally listed endangered or threatened species potentially occur in the Project area. The federally listed species include the whooping crane, Indiana bat, eastern prairie fringed orchid, prairie bush clover, Mead's milkweed, rough pigtoe mussel and clubshell mussel. The whooping crane population in the Project vicinity is an experimental population intended to extend the population and diversity of the species. This population is not listed under the federal Endangered Species Act (unlike the western population, which is federally listed), and is not state listed. Rather, it is protected under the Migratory Bird Treaty Act. As of August 9, 2007, the bald eagle is no longer included on the federal list of threatened and endangered species; however, it remains protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. The INAI lists eight sites within 15 miles of the Project area: the Middle Fork of the Vermilion River, Salt Fork of the Vermilion River, the Spoon River, and Barnhart Prairie Restoration Nature Preserve, Edgewood Farm land and Water Reserve, Brownfield Woods, Trelease Woods, Pellville Cemetery. Based on a review of federal- and state-protected species lists and observations during the preconstruction survey, 56 endangered, threatened, or special status species are known to occur in Champaign County (IDNR, 2009).

As stated above, a biological screening report was conducted by WEST for the Project (Appendix E). The summary of results is discussed in Section 5.14.2 in the Impacts discussion. The biological screening report indicated that there is not a high potential for federally listed avian, wildlife, or plant species within the Project area. The study did indicate that the Middle Fork Vermilion River, approximately 6.7 miles east of the Project boundary, does have relatively high potential to provide habitat for state-listed species. WEST's preconstruction avian point count surveys recorded four sensitive species. Three upland sandpipers (*Bartramia longicauda)*, a state-endangered species, and a federal species of concern were observed within the Project area. Ten northern harriers (*Circus cyaneus*) and one osprey (*Pandion haliaetus*), also both Illinois state-endangered species, were recorded during fixed-point surveys. In addition, 283 American golden plovers (*Pluvialis dominica*) were observed in eight groups. While this species is not federally listed, it is a species of concern on the federal priority species lists.

The chiropteran risk analysis study commissioned for the Project is included as Appendix D. The Project area is within the range of only one federally listed bat, the endangered Indiana bat (*Myotis sodalis*). The closest Indiana bat hibernaculum in Illinois is 98.5 miles away and the closest maternity colony recorded is approximately 10 miles from the Project area. Indiana bats are not likely to be roosting, foraging, or migrating within the Project area, due to the poor habitat conditions. Indiana bats may use the Middle Fork of the Vermilion River and Salt Fork Vermilion River that are within 1 mile of the eastern boundary of the Project area in Vermilion County, but are unlikely to use the Project site because of its poor habitat quality, and therefore are not at risk. California Ridge conducted a detailed micro-siting analysis for the specific purpose of reducing potential impacts on Indiana bats, based on discussions with USFWS. An analysis of suitable habitat within 2.5 miles of the Vermilion River was conducted, and turbines were set back at least 1,000 feet from identified habitat with connectivity to the river. Because the portion of the Project within Champaign County is more than 2.5 miles from the Vermilion River, no analysis was done because the likelihood of Indiana bats was determined to be so low.

A list of threatened or endangered species that potentially could occur in the Project area that were identified during consultations, research, or during the biological screening report or chiropteran risk assessment or preconstruction surveys is included in Table 5-7.

Table 5-7
Endangered and Threatened Species Potentially Occurring in the Vicinity of the California Ridge Wind Energy Project

Species	Status		Habitat	Comments/Notes
	Federal	State		
Birds				
Henslow's Sparrow *Ammodramus henslowii*		T	Large flat fields with no woody plants, and with tall, dense grass, a dense litter layer, and standing dead vegetation.	Potentially present in winter or migration, but suitable nesting habitat is limited.
Upland Sandpiper *Bartramia longicauda*		E	Native Prairie and other dry grasslands, including airports and some croplands.	Possible summer resident and migrant. Three were observed in preconstruction survey
Northern Harrier *Circus cyaneus*		E	Open wetlands, meadows, pastures, prairies, grasslands, croplands, and riparian woodlands	Potentially present in winter or migration, but suitable nesting habitat is limited. Ten observed during preconstruction surveys
Least Bittern *Ixobrychus exilis*		T	Freshwater or brackish marshes with tall emergent vegetation.	Possible during the breeding season or migration.
Loggerhead Shrike *Lanius ludovicianus*		T	Open fields, with some brush/thicket and trees.	May occur as a summer resident and spring migrant.
Black-Billed Cuckoo *Coccyzus erythropthalmus*		T	Interior thickets of forest tracts.	Some potential to occur in forested areas along streams and rivers.
Barn Owl *Tyto alba*		E	Larger tree cavities and in barns or abandoned buildings, sometimes within city limits.	Some potential for birds to occur in trees and buildings.
Short-eared Owl *Asio flammeus*		E	Open country including prairie, meadows, tundra, moorlands, marshes, savanna, and open woodland.	Potentially present in winter or migration, but suitable nesting habitat is limited.
Whooping Crane *Grus americanus*	Experimental Population Otherwise E	N/A Experimental Population Otherwise E	May utilize wetland areas, lakes, and small farm ponds for roost sites during migration, and may feed in crop fields.	Some potential occurs for birds to occur in wetland areas or ponds during migration.

Species	Status		Habitat	Comments/Notes
	Federal	State		
Bald Eagle *Haliaeetus leucocephalus*		T	Breeds in forested areas near large bodies of water & winters in coastal areas, along large rivers, and large unfrozen lakes.	Unlikely to breed within the site, but may fly through the project area.
Osprey *Pandion haliaetus*		E	Typically found in close association with water resources such as lakes and rivers	Considered an uncommon migrant and occasional summer resident in Illinois, and open water resources are limited in Project. One individual was documented in preconstruction surveys.
American Golden Plover *Pluvialis dominica*		N/A	May utilize shortgrass areas, soybean stubble, or bare ground with standing water during migration and feeding.	Some potential for birds to occur in cropped or grassy areas during migration. 283 (in 8 groups) were observed during preconstruction surveys
Mammals				
Indiana Bat *Myotis sodalis*	E	E	Winter in mines or caves with cool, stable temperature. Females and young are found under the loose bark of large trees.	Not likely to roost, forage, or migrate within Project planning area due to poor habitat conditions
Franklin's Ground Squirrel *Spermophilus franklinii*		T	Tallgrass prairies at the border between grassy areas and woody vegetation.	Possibly occurs in grassy areas such as roadside edges.
Reptiles & Amphibians				
Silvery Salamander *Ambystoma platineum*		E	Deciduous and coniferous forests. Moist woodlands with sandy soils.	Possible in forested areas.
Mudpuppy *Necturus maculosus*		T	Cold, clear rivers, creeks, streams, lakes and ponds and prefers woody debris for habitat.	Some potential to occur in streams in project area.
Blanding's Turtle *Emydoidea blandingii*		T	Shallow weedy ponds, marshes, swamps, and lake inlets and coves. Prefer slow-moving, shallow water and plenty of vegetation.	Potential to occur within wetland habitats.

Species	Status		Habitat	Comments/Notes
	Federal	State		
Smooth Softshell Turtle *Apalone mutica*		E	Larger streams and rivers with sandy substrates and sand bars.	Unlikely to occur due to lack of large streams and rivers.
Ornate Box Turtle *Terrapene ornate*		T	Open grassland areas with sandy soils.	Potential to occur in open areas on site.
Kirtland's Snake *Clonophis kirtlandi*		N/A	Downed woody debris in woody wetland habitats such as flood plain forest, marsh, and wet prairie.	Potential to occur in the site near woody wetlands.
Four-toed Salamander *Hemidactylium scutatum*		T	Suitable breeding wetlands within or adjacent to mature forests. Prefer forests with dense canopy cover, an abundance of downed woody debris, vernal pools, ponds, bogs, shallow marshes, or other fishless bodies of water. Wooded wetlands such as seepage swamps or cedar swamps are ideal.	Unlikely to occur in site due to lack of habitat.
Fish				
Eastern Sand Darter *Ammocrypta pellucidum*		T	Medium to large rivers with extensive areas of sandy substrate. Clear, slightly turbid water is ideal.	Unlikely to occur due to lack of medium and large rivers.
Pallid Shiner *Hybopsis amnis*		E	Sandy and silty pools of medium to large rivers.	Unlikely to occur due to lack of medium and large rivers.
Gravel Chub *Erimystax x-punctatus*		T	Gravel riffles and runs of creeks and small to larger rivers.	Some potential to occur in streams in project area.
Bluebreast Darter *Etheostoma camurum*		E	Fast, rocky riffles of small to medium rivers. Eggs are buried in the substrate.	Some potential to occur in streams in the project area
Iowa Darter *Etheostoma exile*		T	Vegetated lakes, pools of headwaters, creeks, and small to medium rivers. Eggs are attached to the substrate unguarded.	Some potential to occur in streams in project area.

Species	Status		Habitat	Comments/Notes
	Federal	State		
Bigeye Chub *Hybopsis amblops*		E	Sandy or silty sand substrates in areas of little or moderate current in larger creeks and small to medium rivers.	Some potential to occur in streams in project area.
River Redhorse *Moxostoma carinatum*		T	Rocky pools and swift runs of small to larger rivers. Also found in impoundments.	Some potential to occur in streams in project area.
River Chub *Nocomis micropogon*		E	Rocky runs and flowing pools of small to medium rivers.	Some potential to occur in streams in project area.
Bigeye Shiner *Notropis boops*		E	Flowing, usually clear and rocky pools of creeks and small to medium rivers. Often round near emergent vegetation along the stream margin.	Some potential to occur in streams in project area.
Northern Madtom *Noturus stigmosus*		E	Mixed sand and rock riffles and runs with debris in small to large, often swift rivers.	Unlikely to occur, possibly extirpated.
Invertebrates				
Slippershell *Alasmidonta viridis*		T	Creeks and small rivers. Needs fairly good quality water and prefers to be buried in sand and gravel.	Some potential exists to occur in streams in project area.
Purple Wartyback *Cyclonaias tuberculata*		T	Rivers where definite riverine conditions with a stronger current exist.	Some potential exists to occur in streams in project area.
Spike *Elliptio dilatata*		T	Small to large streams and occasionally lakes. Prefers sand-gravel or mud-gravel substrate.	Some potential exists to occur in streams in project area.
Wavy-rayed Lampmussel *Lampsilis fasciola*		E	Rarely found in smaller, upstream creeks or in downstream areas of large rivers. Usually found in riffles and rapid waters.	Some potential exists to occur in streams in project area.
Little Spectaclecase *Villosa lienosa*		T	Small to medium streams in sand or gravel substrate.	Some potential exists to occur in streams in project area.
Clubshell *Pleurobema clava*	E	E	Streams and small rivers, in well oxygenated riffles with coarse sand and gavel and little silt.	Unlikely to occur on site due to lack of stream size.

Species	Status		Habitat	Comments/Notes
	Federal	State		
Riffleshell *Epioblasma torulosa*		X	Medium to large streams with sand or gravel substrate.	Unlikely to occur on site due to lack of stream size.
Rough Pigtoe mussel *Pleurobema plenum*	E		Medium to large rivers with sand or gravel substrate	Unlikely to occur on site doe to lack of stream size.
Kidneyshell *Ptychobranchus fasciolaris*		E	Small to medium rivers, usually in areas with good flow. Usually inhabits sand and/or gravel.	Unlikely to occur on site due to lack of habitat and stream size.
Rabbitsfoot *Quadrula cylindrica*		E	Medium to large rivers in mixed sand and gravel.	Unlikely to occur within the site; only known occurrences are in Wabash and Massac counties.
Purple Lilliput *Toxolasma lividus*		E	Fast-flowing small streams and medium sized rivers. Sand and gravel substrates.	Some potential exists to occur in streams in project area.
Rainbow *Villosa iris*		E	Cool, clear, upper reaches of small to medium streams. Sandy mud, coarse sand, or gravel in areas near faster currents.	Some potential exists to occur in streams in project area.
Salamander Mussel *Simpsonaias ambigua*		E	Under rocks and debris, only species with a non-fish glochidial host (the Mudpuppy).	Some potential exists to occur in streams in the project area.
Swamp Metalmark *Calephelis muticum*		E	Bogs, marshes, swamps, and wet meadows.	Unlikely to occur due to lack of habitat.
Plants				
Sangamon Phlox *Phlox pilosa ssp. Sangamonensis*		E	Found in scrub shrub, shrub, and forb/herb areas.	Some potential exists for presence in site.
Ear-leafed Foxglove *Tomanthera auriculata*		T	Moderate moisture areas, prairies, and open woods.	Unlikely to occur, last known occurrence was 1933.
Mead's Milkweed *Asclepias meadii*	T	E	Tallgrass prairies or unplowed native prairie hay meadows that have well-drained or dry-mesic soils.	Unlikely to occur on-site due to lack of native prairie.
Rayed bean *Villosa fabalis*		E	Small headwater creeks but also in large rivers. Gravel and sand substrates	Associated with vegetation in and adjacent to riffles and shoals.

Species	Status		Habitat	Comments/Notes
	Federal	State		
Eastern prairie fringed orchid *Platanthera leucophaea*	T		Mesic to wet prairies and native grasslands.	Very low probability of occurrence due to lack of suitable habitat.
Prairie bush clover *Lespedeza leptostachya*	T		Dry to mesic prairies and native grasslands with gravelly soil.	Very low probability of occurrence due to lack of suitable habitat.
Brome-like Sedge *Carex bromoides*		T	Wet, seepy areas; wet woodlands, fens, and shaded areas.	Some potential exists for presence on site.
Fibrous-rooted Sedge *Carex communis*		T	Woodlands that are at least seasonally wet and in seepy areas on hillsides.	Some potential exists for presence on site.
Drooping Sedge *Carex prasina*		T	Rich, mesic deciduous forests, often along streams or in seepage areas, or in moist, low ground associated with springs or fens.	Some potential exists for presence on site.
Willdenow's Sedge *Carex willdenowii*		T	Woodland hilltops, ridges and prefers well-drained soils.	Some potential exists for presence on site.
Queen-of-the-Prairie *Filipendula rubra*		E	Moist black soil prairies, most sand prairies, moist meadows along rivers in woodland areas, shrubby fens, and wet areas in or around seeps and springs.	Unlikely due to lack of suitable habitat present on the site.
Wolf's Bluegrass *Poa wolfii*		E	Forests/upland forests, wetlands, border of lakes, also found on rocky bluffs and cliffs.	Unlikely to occur on site.
Royal Catchfly *Silene regia*		E	Mesic black soil prairies, openings in upland forests, savannas, scrubby barrens, and open areas along roadsides and railroads.	Possible in the site.

Status
E = Endangered
T = Threatened
X = Extirpated

Mammals

Two federally or state-listed mammals potentially occur in the Project area; the Franklin's ground squirrel and the Indiana bat.

Franklin's ground squirrel

The Franklin's ground squirrel is a small species of ground squirrel that historically occurred in tallgrass prairie habitats throughout the Midwest. The species experienced declines as a result of conversion of native habitats to cropland, and was listed as threatened under the Illinois Endangered Species Act in 2004. The species is currently limited to the edges of forests, roadsides, and railroads, and other edge habitats. The Project and biological screening report evaluation area contain some suitable habitat for this species along roadways, and in some planted grassland habitats. Some potential exists for this species to occur within the site.

<u>Impacts and Mitigation</u>

Because this species requires well-drained ground it does not appear that there are areas of suitable habitat within the project footprint, but transport of turbine components often requires rebuilding or repairing roadways some distance from the destination. Some potential exists for this species to occur within the site along railroads and highways. If present, this species habitat can be threatened through the crushing and collapse of its burrows by heavy construction equipment. Shadow flicker cast in its territory by operating turbines may also be detrimental. Invenergy will work with the IDNR to resolve any potential issues if they arise.

Indiana Bat

The Indiana bat is a federally endangered bat that potentially occurs throughout much of Illinois. To better understand the potential for the Project to impact the Indiana bat and other bats found in the area, California Ridge contracted the preparation of a chiropteran risk assessment (Table 5-7). Included below is a summary of the results of this risk assessment.

In winter (mid-November through March), Indiana bats hibernate in caves and mines. The closest Indiana bat hibernaculum in Illinois is 98.5 miles away from the Project area, and the closest maternity colony recorded is approximately 10 miles away. There are no records of Indiana bats within 5 miles of the proposed Project Area.

For the remainder of the year, Indiana bats roost in trees and forage along small stream corridors with well-developed riparian woodlands or within upland forests. Forested areas along the Middle Fork and Salt Fork of the Vermilion River occur within 1 mile east of the Project Area and the closest known colonies are along this river within 10 miles of the site. Bats from these colonies are likely to forage along the Middle Fork and among the trees surrounding the river; however, no contiguous forested corridors connect the Middle Fork of the Vermilion River to waterways in the Project Area. Although bats along the Middle Fork may venture into the open fields, most tend to remain along forested waterways as insects are more abundant and trees provide protection from aerial predators.

As part of coordination with the USFWS, an analysis for suitable Indiana Bat habitat was conducted. Within 2.5 miles of the Vermilion River, turbines have been setback at least 1,000 feet from suitable habitat with connectivity to the river. Because the portion of the Project area within Champaign County is greater than 2.5 miles from the Vermilion River, the likelihood of Indiana bats in this area of the Project is considered to be extremely low.

Impacts and Mitigation

Because the Project area is primarily void of trees and composed of open fields/agricultural land, the area is generally not suitable for foraging or roosting bats. Given that limited potential habitat is available and that California Ridge will avoid tree clearing to the maximum extent practicable, construction of the Project will not likely adversely affect the Indiana bat. Operation of the Project will also not likely adversely affect the Indiana bat. Indiana bats, even if present in the Project area, generally travel and forage at heights below the rotor swept area. As such, the chance of collisions between Indiana bats and turbine blades during the summer is low.

California Ridge is proposing the following mitigation, which is expected to offset the already low risk to the Indiana bat down to discountable levels.

- California Ridge will contribute to a conservation project designed in coordination with USFWS and the Illinois Department of Natural Resources (IDNR) that will contribute to the recovery of the listed species. Invenergy will fund and facilitate a spring emergence and migration project to evaluate the movement of reproductive female Indiana bats from Blackball mine to their maternity sites.
- California Ridge plans to implement additional measures to further mitigate impacts on bat species at its Project. Operational mitigation measures will be implemented to reduce the impact on bat species. Curtailment of turbines during the primary bat migration period and at times when bat species are the most active will be implemented and actively managed during Project operation. California Ridge will test the effectiveness of this operational protocol at reducing bat fatalities by conducting a curtailment study during the first year of operation.

Birds

Based on the analysis presented in the California Ridge Biological Screening Report (Appendix E) and the IDNR's most recent threatened and endangered species list, twelve federal or state-listed endangered, threatened, or protected birds may occur in the Champaign County portion of the Project area; the whooping crane, bald eagle, osprey, short-eared owl, Henslow's sparrow, loggerhead shrike, upland sandpiper, northern harrier, and least bittern. The most recent species added the IDNR's list includes; the barn owl, Black-billed cuckoo, and the American golden plover.

Whooping Crane

The Eastern Migratory Population (EMP) of whooping cranes was reintroduced to the Midwest in 2001, and has some potential to occur in the Project Area during migration. As birds become established and the population increases, the potential exists for birds to stop virtually anywhere in Illinois between their summer and winter areas. Whooping cranes were observed along the Middle Fork of the Vermilion River in Vermilion County during 2005. Based on past use of areas near the Project area, and the location of the ultra-light led migration, some potential exists for whooping cranes to use the project area during migration. This population is listed as "experimental and non-essential" under the Endangered Species Act, but is still protected under the Migratory Bird Treaty Act.

Bald Eagle

The bald eagle nests in mature trees located adjacent to or near large, fish-bearing waters. The bald eagle is a state threatened species in Illinois. Some potential exists for the bald eagle to nest along the

Middle Fork of the Vermilion River, and to occasionally fly through the project area. The site lacks breeding habitat for this species.

Osprey

The osprey nests in mature trees located adjacent to or near open waters, and is state endangered. Some potential exists for the osprey to nest along the Middle Fork of the Vermilion River, and to occasionally fly through the project area, as documented in WEST's preconstruction survey. The site lacks breeding habitat for this species.

American Golden Plover

The American golden plover breeds in the Arctic tundra and migrates south for the winter. Areas in Illinois provide important spring migration staging areas. Daytime habitat may include short grass, soybean stubble, corn stubble, or areas of bare ground with standing water or moisture. There is some potential for birds to occur in these areas of the Project area during the spring migration period, as documented in WEST's preconstruction survey.

Short-eared Owl

The short-eared owl may potentially be observed in the area during migration or in the winter, but is unlikely to nest in the Project area due to a lack of hayfields and grasslands.

Barn Owl

The barn owl nests is larger tree cavities and in barns or abandoned buildings, sometimes within the city limits. A breeding record exists for Champaign County, about four miles northwest of Rantoul. The barn owl hunts in open woodlands and grasslands. Some potential exists for the barn owl to occur in wooded or grassland areas in the project area.

Henslow's Sparrow

Henslow's sparrow breeds primarily in weedy grasslands of the east-central U.S. Historically, this species would breed in tallgrass prairie; however, today it is restricted to large, flat, neglected, weedy fields, wet meadows, and salt marsh edges. Potential breeding habitat for this species within the Project area is limited because of the lack of large grassland areas (250 acres or greater). Some potential exists for the species to breed within a few large blocks of planted grasslands, and the species likely migrates through the area in spring and fall. However, since the Henslow's sparrow spends most of its time hidden in vegetation, there is little threat that individuals of this species that occur in the area would collide with turbines or turbine blades during operation of the Project.

Loggerhead Shrike

Populations of loggerhead shrike in central Illinois are rare and migratory. Loggerhead shrikes generally breed in grassland areas with hedgerows or scattered trees and shrubs, and prefer hay fields and pastures to row crops (INHS, 2009). Although the potential exists for the species to occur on the site, nesting habitat is limited due to the rare nature of hedgerows, shrubs, or trees and a preponderance of row crops such as corn. The potential exists for the species to nest on the site near hedgerows, and the potential exists for the species to occasionally move through the area during migration.

Upland Sandpiper

The upland sandpiper is uncommon during migration and an uncommon-to-rare summer resident in Illinois (INHS, 2009). Upland sandpipers are predominantly found in flat open country such as in grassland or prairie habitats – including but not exclusively farmland (cultivated or pasture) or golf courses. Upland sandpipers have been recorded in low numbers along the Dailey Breeding Bird Survey (BBS) route[1], which runs through the site, although the exact locations of the upland sandpiper records along the route are not known (Patuxent Wildlife Research Center, 2007). There has been one confirmed breeding pair of upland sandpiper in Champaign County. There is the potential for upland sandpipers to breed within the site during the summer, with higher numbers occurring during spring and fall migration, as documented in WEST's preconstruction survey.

Northern Harrier

Northern harriers have a small, scattered breeding range throughout Illinois; however, possible breeding sites have been located in Champaign County. The Project area contains limited amounts of grassland and wetlands that could serve as potential nesting habitat. Although breeding habitat for the species is limited at the site, the species is likely to occur during migration and the winter, as documented in WEST's preconstruction survey. Because northern harriers often hunt close to the ground, the risk of collision with turbine blades is considered lower for this species compared to other raptors.

Black-billed Cuckoo

The black-billed cuckoo nests in interior thickets of forested tracts and feeds heavily on caterpillars. There is potential for this species to occur along streams and rivers in the Project area.

Least Bittern

The least bittern's summer distribution occurs in the Midwest from Michigan south to Texas, west to eastern New Mexico, and east along the Atlantic shoreline. It is listed as a state-threatened species in Illinois. It is an uncommon migrant and a summer resident that will use shallow freshwater lakes and marshes with tall dense emergent vegetation, especially those with cattails. They are very secretive and more often heard than seen. They eat fish and insects that they capture by quickly jabbing their long bills and impaling their prey. Least bitterns are not adequately sampled during breeding bird surveys because they are rare and secretive, but the collected data does indicate a scattered breeding distribution in Illinois. The least bittern has been documented in northeastern Champaign County. A limited potential exists for this species to breed within wetlands in the project area.

<u>Impacts and Mitigation</u>

California Ridge is continuing to consult with the USFWS regarding necessary steps to avoid or minimize impacts on federally or state-listed endangered or threatened birds. California Ridge is conducting pre- and postconstruction field surveys for the project. If any sensitive flight paths or

[1] The North American Breeding Bird Survey (BBS) is a cooperative effort between the U.S. Geologic Survey's Patuxent Wildlife Research Center and the Canadian Wildlife Service's National Wildlife Research Centre to monitor the status and trends of North American bird populations. Following rigorous protocol, BBS data are collected by thousands of dedicated participants along thousands of randomly established roadside routes throughout the continent. Professional BBS coordinators and data managers compile these population data and trend analyses for the general public.

sensitive habitats are identified during the surveys, California Ridge will work with the USFWS to come up with appropriate minimization and mitigation measures, including:

- As part of the Project's compliance with the MBTA, all habitats directly impacted by construction activities during the breeding season will be surveyed for nests by a trained biologist prior to construction. Particular attention will be given to detecting upland sandpiper (Bartramia longicauda), barn owl (Tyto alba), and loggerhead shrike (Lanius ludovicianus) nests, as recommended by the IDNR for these protected species.
- The Project has been sited in a previously disturbed landscape and to avoid critical habitats for sensitive species.
- California Ridge will coordinate annually with the Whooping Crane Eastern Partnership to track the passage of Whooping Cranes through the Project vicinity.
- Project facilities have been located to avoid: (1) documented locations of any species of wildlife, fish, or plant protected under the federal Endangered Species Act, (2) known local bird migration pathways and daily movement flyways, (3) areas where birds are highly concentrated, and (4) areas with a high incidence of fog, mist, low cloud ceilings, and low visibility.

Reptiles and Amphibians

There are five state-listed threatened species and two endangered species that potentially occur in Champaign County; the Blanding's turtle, the ornate box turtle, mudpuppy, Kirtland's snake, and four-toed salamander are threatened, and the silvery salamander and the smooth softshell turtle are endangered. The Kirtland's snake is neither endangered or threatened but is experiencing population decline.

Blanding's Turtle

The Blanding's turtle is associated with shallow ponds, marshes, creeks, or wetland habitats. Based on site visits, a review of aerial photographs, NWI maps, and USGS land cover data, there are limited areas of these types of aquatic/wetland habitats within the Project area. The potential for occurrence of the Blanding's turtle is greatest within 1.5 miles of the Middle Fork of the Vermilion River, although this species may occur throughout the site where suitable aquatic habitat is present.

Ornate Box Turtle

The ornate box turtle can be found in open grassland areas and hibernates underground from late September to early April. It appears to be more common in sandy soils, however, it is not restricted to them. The preferred habitat of the ornate box turtle may not be present in the project area but little is known of their distribution. If one is happened upon during project construction, it is unlawful to move or capture it without first obtaining an Incidental Take Authorization from the IDNR.

Smooth Softshell Turtle

The smooth softshell turtle inhabits larger streams and rivers in segments with sandy substrates and sand bars. This species is potentially present in all reaches of the Vermilion River system. Erosion and siltation pose an indirect threat to this species habitat.

Four-toed Salamander

The four-toed salamander is present in riparian forests, woodland vernal pools, and is sometimes found more than 1,000 feet from the nearest wetlands, beneath forest floor litter and detritus where sufficient moisture is available. It is unlikely that this species occurs within the project footprint; however, good water quality remains important.

Silvery Salamander

The silvery salamander is associated with deciduous and coniferous-forested habitats with moist woodlands and sandy soils. A majority (more than 90 percent) of the habitat in the Project area is cultivated agricultural lands; there are limited forested habitats available to this species. The likelihood of this species occurring on the site is low, but possible within forested areas, especially near the Middle Fork of the Vermilion River.

Mudpuppy

The mudpuppy is never found in terrestrial habitats but inhabits clear rivers, creeks, streams, lakes, and ponds. It conceals itself under rocks or woody debris during the day and feeds actively at night. The mudpuppy is the only known glochidial host of the state-listed endangered salamander mussel (*Simpsonias ambigua*). The mudpuppy's decline may be a factor in the disappearance of the salamander mussel. Siltation and sedimentation can be tolerated by the mudpuppy as long as clear gravelly headwaters remain available for reproduction. Any planned in-stream work may require an Incidental Take Authorization from the IDNR.

Kirtland's Snake

The Kirkland's snake occurs statewide in Illinois and is usually found in open wetlands, such as wet prairies, and can also occur in openings or along the edges of forested wetlands and floodplains. This species has also occurred near more urbanized areas such as parks, cemeteries, and vacant lots. There is potential habitat for this species in the Project area near wetlands.

<u>Impacts and Mitigation</u>

Given the rarity of these reptiles and amphibians, and the limited availability of suitable habitat, it is unlikely they will be encountered or adversely affected during construction of the Project. The habitats potentially occupied by these species will be avoided during siting of the Project facilities. For example, wind turbines and ancillary facilities will be built on uplands, which will avoid the surface water features typically located in the lower positions on the landscape. Access roads will be built to avoid impacts on waterbodies. Underground cabling will be directionally bored under wetlands and streams, avoiding impacts.

Fish

Ten state-listed endangered or threatened fish occur in Champaign County. Many of these species are expected to be more common within the Middle Fork of the Vermilion River, and the potential exists for these species to occur in tributaries to the river within the project area.

Impacts and Mitigation

This type of habitat will be avoided during siting of the Project Facilities. For example, wind turbines and ancillary facilities will be built on uplands, which will avoid the surface water features typically located in the lower positions on the landscape. Access roads will be built to avoid impacts on waterbodies. Underground cabling will be directionally bored under wetlands and streams, avoiding impacts.

Invertebrates

Fourteen federally or state-listed endangered or threatened invertebrates potentially occur in Champaign County, including thirteen mussels and one butterfly. Mussels live in lakes, streams, and rivers; therefore, the potential exists for these species to occur within the Middle Fork of the Vermilion River and its tributaries, including streams within the Project area. However, some streams in the project area may have hard clay bottoms, which limit the potential for mollusks to occur (K. Shank, IDNR, pers. comm.).

Impacts and Mitigation

Protected mollusk species typically occur in streams with clean water and rocky or sandy substrates. Some potential exists for protected mussels to occur in streams in the project area with suitable substrates. The swamp metalmark prefers bogs, marshes, swamps, and wet meadows for habitat. This type of habitat will be avoided during siting of the Project facilities.

Plants

Twelve federal or state-listed endangered or threatened plants potentially occur in Champaign County. These species are generally associated with native grassland (tallgrass prairie), wetland, or wooded habitats. A review of aerial photographs, USGS land-cover data, and field visits to the Project area indicate that the area is dominated by cropland (approximately 90 percent). The cropland is largely vast fields of corn and soybeans, where the majority of sensitive plants are unlikely to occur. During the March 26, 2009 meeting the IDNR did not express concern over natural communities in the site; however, they did express concerns about the potential impacts of the presence of a wind energy facility on the surrounding Illinois Natural Areas Inventory (INAI) sites along the Middle Fork of the Vermilion River.

Impacts and Mitigation

Siting of Project facilities will generally avoid areas potentially occupied by many of the protected plants found within Champaign County (e.g., wetlands, wooded areas). Additionally, California Ridge will conduct field surveys to identify areas of native habitat potentially occupied by protected species at all proposed Project facility locations (e.g., turbine sites, access roads, and cable routes) prior to construction. As feasible, areas of native habitats, wetlands, and wooded areas that could provide habitat to protected plants will be avoided. Construction and operation of the Project is not likely to adversely affect federally or state-listed endangered or threatened plants.

5.10 CULTURAL AND ARCHAEOLOGICAL RESOURCES

5.10.1 DESCRIPTION OF RESOURCES

California Ridge initiated consultation with the Illinois Historic Preservation Agency (IHPA) to request input on the Project's potential to affect cultural resources (structural and archaeological). The consultation resulted in IHPA requesting a Phase I archaeological survey and architectural survey of the project area. Invenergy will conduct both surveys and results will be submitted to the IHPA as requested.

A Phase I archaeological reconnaissance survey will be completed to locate, identify, and record any archaeological resources identified. A literature search will be initiated to locate previously identified historic properties within the Project area. Previously recorded sites that fall within the potential impact area for turbine and related facility construction will be revisited to assess current conditions.

An architectural inventory of all structures within the Project Area will be conducted. Each structure will be assessed for historical significance and will be photographed and recorded on inventory forms to be submitted to the Illinois State Historical Preservation Agency (IHPA). A recommendation will be made for each structure as to its eligibility for the National Register of Historic Places.

The archaeological survey will be conducted within the probable impact footprint of turbines, access roads, and electrical layout within, at a minimum, the high probability areas established by the IHPA. If sites are found, official site forms will be filled out and submitted to the IHPA. Artifacts will be submitted to the Illinois State Museum for permanent storage if not returned to the landowner. A recommendation will be made for each site found as to its eligibility for the National Register of Historic Places. Both the architectural and archaeological surveys will be conducted according to the Illinois Historic Preservation Agency guidelines.

5.10.2 Impacts

Construction and operation of a wind energy facility could directly affect cultural resources, if present. Construction within turbine footprints, cable trenches, and access roads could directly impact buried cultural resources. In addition, construction of turbines may indirectly affect the viewshed integrity from existing historic standing structures.

California Ridge will continue to consult with the IHPA to determine the potential for the Project to affect known and as yet unidentified historic properties. It is anticipated that architectural and archaeological surveys will be completed. These surveys will be conducted prior to construction.

5.10.3 Mitigation Measures

A targeted archaeological survey is expected to be conducted to determine the presence or absence of previously unrecorded archaeological resources in those areas that the IHPA determines have a high potential for buried resources and that will be impacted by construction of wind turbines, cable trenches, access roads, and borrow areas. All identified cultural resources will be assessed for integrity and eligibility for listing on the National Register of Historic Places (NRHP). All archaeological investigations will meet or exceed the U.S. Department of the Interior's Standards and Guidelines for Archaeology and Historic Preservation. Architectural resources will be evaluated for their integrity and eligibility for the NRHP.

Any cultural resources found to be potentially eligible for nomination to the NRHP will be avoided, if possible.

6.0 AGENCY AND PUBLIC OUTREACH

Throughout the course of project development several agency personnel and public entities were contacted for the project. Below is a summary of the contacts made for the project. Formal agency consultation letters and responses are included as Appendix J.

6.1 FEDERAL CONTACTS

- **U.S. Fish and Wildlife Service (USFWS)**: Contacted to consult on avian issues and federal threatened and endangered species.
- **U.S. Army Corps of Engineers (USACE)**: Contacted to comment on potential effects to waters of the U.S.
- **U.S. National Park Service**: Contacted to comment on potential effects to scenic waters of the U.S.

6.2 STATE CONTACTS

- **Illinois Department of Natural Resources (IDNR):** Keith Shank, Impact Assessment Section, Division of Ecosystems and Environment, was contacted to provide an environmental review of the project.
- **Illinois State Historic Preservation Agency (ISHPA)**: Contacted to consult on potential impacts to archaeological and historic resources in the Project area.
- **Illinois Emergency Management Agency:** Met with representatives March 30, 2007.

6.3 NON-GOVERNMENT ORGANIZATIONS

6.4 LOCAL/BUSINESS CONTACTS

- **Champaign County:**
  - April 12, 2011, meeting with Champaign highway engineer (Jeff Blue) and Vermilion highway engineer (Doug Staske)
  - Met with Vermilion and Champaign County Emergency Management Agency (Mike Jobst) March 30, 2007
  - Soil and Water Conservation District (Bruce Stickers of Champaign and Cindy Johnston of Vermilion) April 29, 2009
- **City Council:** Meeting, May 2, 2007
- **Townships:**
  - Pilot Township: April 12, 2011, Roy Knight, Highway Commissioner
  - Compromise Township: April 12, 2011, Marvin Johnson, Highway Commissioner
  - Compromise Township: April 12, 2011, Greg Frerichs, Highway Commissioner
- **Fire Departments:**
  - Fithian Fire Protection District - Fire Chief (Phil Hoshauer)
  - Ogden/Royal Fire Protection District - Fire Chief (Denver Phelps)
  - Oakwood Fire Protection District - Fire Chief (Tony Frye)
  - Bluegrass Fire Protection District - Fire Chief (Gary Hawker)
- **Ameren:** Met with representatives March 30, 2007

7.0 REFERENCES

BHE Environmental, Inc. 2009. *Chiropteran Risk Assessment: Proposed California Ridge Wind Energy Generation Facility, Champaign and Vermilion Counties, Illinois*. Tech. Cincinnati: Print.

Durstewitz, Michael. 2003. On-Site Cold Climate Problems. Institut fur Solare Energieversorgungstechnik e.V (ISET). Kassel, Germany.

Federal Emergency Management Agency (FEMA). 1985. Flood Insurance Rate Maps. Illinois Natural Resources Geospatial Data Clearinghouse. http://www.isgs.uiuc.edu/nsdihome/. Accessed August 2006.

General Electric Company. 2011. *1.6 MW Series Wind Turbine*. GE Energy, Web. Accessed 2011. <http://www.ge-energy.com/products_and_services/products/wind_turbines/ge_1.6_100_wind_turbine.jsp >.

Good, Rhett E., and Western EcoSystems Technology, Inc. 2009. *Wildlife Baseline Study Plan for the Proposed California Ridge Wind Resource Area, Champaign and Vermilion Counties, Illinois*. Tech. Bloomington: West EcoSystems Technologies. Print

Herzog, B.L.. B.J. Stiff, C.A. Chenoweth, K.L. Warner, J.B. Sievering, C. Avery. 1994. Buried Bedrock Surface of Illinois: Illinois State Geological Survey Map, Scale 1:500,000.

Illinois Critical Resource Waters, Department of Natural Resources. 2000. http://www.dnr. state.il.us/wetlands/GIS/criticalwaters.htm. Accessed August 2009.

Illinois Department of Natural Resources. 2009. *Middle Fork River - Illinois National Scenic River; East-Central Region*. Web. <http://www.dnr.state.il.us/lands/landmgt/parks/r3/natlriv.htm>.

Illinois Department of Transportation, NAVTEQ. 2009. Getting Around Illinois. Accessed 2009. <http://www.gettingaroundillinois.com/default.aspx#>.

Illinois Power Agency Act (IPA) or Illinois Public Act 095-0481. People of Illinois, represented in the General Assembly, 28 Aug. 2007. Web. Accessed 2009. <http://www.ilga.gov/legislation/publicacts/95/PDF/095-0481.pdf>.

Illinois Regulation of Public Waters. 2005. Appendix A of 17 IL Adm. Code Ch I Sec. 3704. May 2005. http://dnr.state.il.us/owr/resman/Downloads/3704RULE.pdf. Accessed 2009.

Illinois State Geological Survey. 2009. Water and Related Wells in Illinois. http://ablation.isgs.uiuc.edu/website/ilwater/viewer.htm. Accessed 2009.

Illinois State Water Survey. 2009. Private Well Database. http://www.sws.uiuc.edu/data/gwdb. Accessed 2009.

Illinois Natural Heritage Database & IDNR. 2009. *Illinois Threatened and Endangered Species by County*, Web, 1 Nov. 2009. <http://dnr.state.il.us/conservation/naturalheritage/pdfs/et_list_by_co_aug2009.pdf>.

Illinois Natural History Survey. 2009. *Loggerhead Shrike*. Web. 2009 <http://www.inhs.uiuc.edu/animals_plants/birds/ifwis/birds/loggerhead-shrike.html>.

Illinois Natural History Survey. 2009. *Upland Sandpiper*. Web. 2009. <http://www.inhs.illinois.edu/resources/virtualbird/species/upland-sandpiper.html>.

Middle Fork Citizens Organization. 2002. *Value of the Middle Fork River Valley*. Web. Accessed 23 Jan. 2009. <http://www.middleforkriver.org/>.

National Wild and Scenic Rivers. National Wild and Scenic Rivers System, U.S. Department of the Interior, National Farm Service, National Forest Service, and U.S. Fish and Wildlife Service, 1 Jan. 2007. Web. 2009. <http://www.rivers.gov/>.

National Climatic Data Center. 2009. *Storm Events for Illinois*. Web. Accessed 2009. <http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms>.

Steelonthenet.com. 2011. Web. Accessed June 2011. <www.steelonthenet.com>.

U.S. Department of Agriculture. 1999. Soil Taxonomy: A basic system of soil classification for making and interpreting soil surveys. Agricultural Handbook, 436, SCS.

U.S. Fish and Wildlife Service. 2009. *Northern Riffleshell.*, 29 July 2009. Web. <http://www.fws.gov/midwest/endangered/clams/n-riffleshell.html>.

USGS - Patuxent Wildlife Research Center. 2007. *North American Breeding Bird Survey Route - Dailey*. Web. 2009. <http://www.mbr-pwrc.usgs.gov/cgi-bin/rtena226.pl?34033>.

U.S.G.S. Topographic Map. 1996. 1:24 k Digital Raster Graphic. Reston, VA. Illinois Natural Resources Geospatial Data Clearinghouse. Accessed 2009. http://www.isgs.uiuc.edu/nsdihome/.

Village of Rantoul Community Website. 2009. Rantoul National Aviation Center (TIP) Information Sheet with Diagram. 2009. http://village.rantoul.il.us/development/airport/index.html.

Wilman, H.B., J.C. Frye, J.A. Simon, K.E. Clegg, D.H. Swann, E. Atherton, C. Collinson, J. Lineback, and T. C. Buschbach. 1967. Geologic Map of Illinois. Illinois State Geological Survey, Scale 1:500,000.

Woods, Alan J., James M. Omernik, Charles C. Pederson, and Brian C. Moran. 2006. *Level III and IV Ecoregions of Illinois*. Tech. no. EPA/600/R-06/104. Environmental Protection Agency, Sept. 2006. Web. 2009. <http://www.epa.gov/wed/pages/publications/authored/EPA600R-0610%20Ecoregions%20of%20Illinois%20Woods.pdf>.

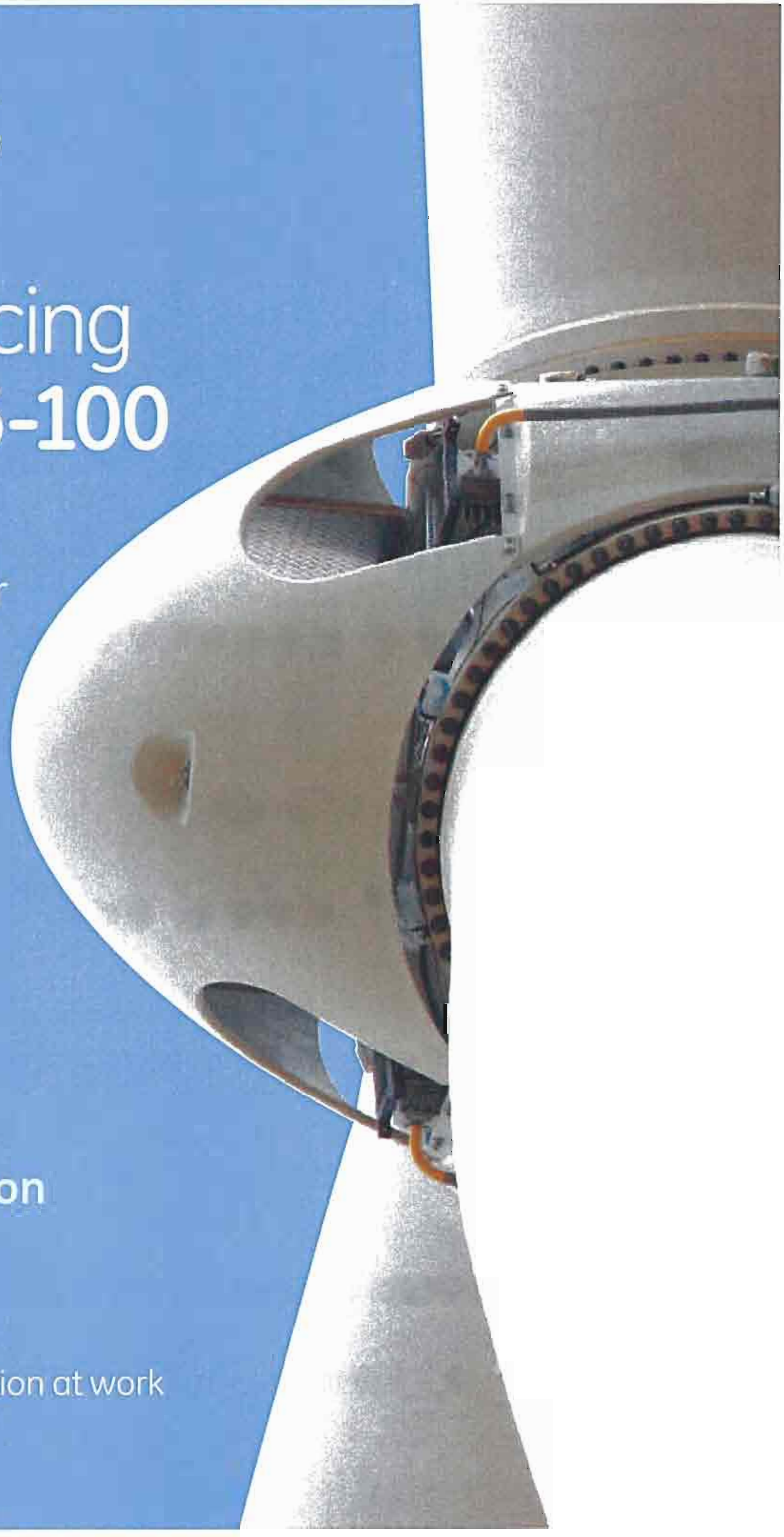
World Health Organization. 2007. *Electromagnetic Fields and Public Health*. Web. Accessed June 2009. <http://www.who.int/mediacentre/factsheets/fs322/en/>

APPENDIX A

GE Power & Water
Renewable Energy

Introducing GE's **1.6-100**

Best-in-class
capacity factor



a product of
ecomagination

imagination at work

Introducing GE's **1.6-100**

Product evolution. It's one of the things GE does best. Especially when it comes to the next generation of wind turbines. Building on a strong power generation heritage spanning more than a century, our onshore wind turbines deliver proven performance, availability and reliability—creating more value for our customers.

As one of the world's leading wind turbine suppliers, GE Energy's current product portfolio includes wind turbines with rated capacities ranging from 1.5 MW–4.1 MW and support services extending from development assistance to operation and maintenance.

GE's 1.6-100 Wind Turbine

GE's 1.6-100 wind turbine offers a 47% increase in swept area when compared to the 1.6-82.5 turbine, resulting in 19% increase in Annual Energy Production (AEP) at 7.5 m/s. This increase in blade swept area allows greater energy capture and improved project economics for wind developers. GE's 1.6-100 turbine has a 53% gross capacity factor, at 7.5 m/s; a class leading performance. GE's proprietary 48.7 meter blade uses the same proven aerodynamic shape as the blades found on the 2.5-100 turbine, but with the use of carbon fiber the weight is significantly reduced from the original blade predecessor.

GE's stringent design procedures result in a turbine designed for high performance, reliability and availability. The use of the rotor from the proven GE 2.5-100 turbine and selected component modifications provide increased annual production with the same reliable performance as the 1.5 MW series turbine.

Available in 80 meter and 100 meter tower heights, these sizes provide flexible options for Class III wind sites, allowing for higher energy capture in lower wind speed environments.

Building Upon the Proven 1.5 MW and 2.5 MW Platforms

The evolution of GE's 1.5 MW turbine design began with the 1.5i turbine introduced in 1996. The 65 meter rotor was increased to 70.5 meters in the 1.5s then to 77 meters in the 1.5sle turbine which was introduced in 2004. Building on the exceptional performance and reliability of the 1.5sle, GE introduced the 1.5xle with its 82.5 meter diameter in 2005. Subsequent improvements in design led to the 1.6-82.5 turbine, introduced in 2008. Ongoing investment in the industry workhorse resulted in the introduction of GE's 1.6-100 wind turbine with a 100 meter rotor. This product evolution ensures increased capacity factor while increasing AEP by 19%.

Incremental changes to the 1.6-100 resulted in a significant performance increase. These enhancements include greater blade length, use of carbon fiber, Low Noise Trailing Edge (LNTE) and gearbox improvements resulting in an increase in AEP, high capacity factor, and controlled sound performance.

GE's new, Low Noise Trailing Edge serrations are employed on this turbine to enable tailored sound as a function of wind speed for a smaller sound footprint and optimized park layout to increase AEP. Testing has shown this design for the blade enables improved turbine acoustic performance. Designed with high reliability to ensure continued operation in the field, GE's 1.6-100 can provide excellent availability comparable with the 1.5 MW series units operating in the field today.

Technical Description

GE's 1.6-100 wind turbine is a three-blade, upwind, horizontal axis wind turbine with a rotor diameter of 100 meters. The turbine rotor and nacelle are mounted on top of a tubular steel tower providing hub heights of 80 meters and 100 meters. The machine uses active yaw control to keep the blades pointed into the wind. The turbine is designed to operate at a variable speed and uses a doubly fed asynchronous generator with a partial power converter system.

Specifications:

1.6-100 Wind Turbine:

- Designed to IEC 61400-1
  — TC III: 7.5 m/s average wind speed; B turbulence intensity
- Standard and cold weather extreme options
- Standard tower corrosion protection; C2 internal and C3 external with optional C4 internal and C5 external available
- Rotational direction: Clockwise viewed from an upwind location
- Speed regulation: Electric drive pitch control with battery backup
- Aerodynamic brake: Full feathering of blade pitch

Features and Benefits

- Higher AEP than its 1.6 predecessors
- Highest capacity factor in its class
- Designed to meet or exceed the 1.5 MW platform's historic high availability
- Grid friendly options are available
  — Enhanced Reactive Power, Voltage Ride Thru, Power Factor Control
- Wind Farm Control System; WindSCADA*
- Sharing of components with family products
- GE proprietary 48.7 meter blade
- Ultra-quiet power production Low Noise Trailing Edge serrations as an acoustic enhancement for the 1.6-100
- Available in both 50 Hz and 60 Hz versions for global suitability

Construction

Towers: tubular steel sections provide variable hub heights from 80 meters to 100 meters

Blades: GE 48.7 meter blades with Low Noise Trailing Edge serrations

- Providing high energy capture with low sound emission
- Carbon spar caps within blades reduce weight, which reduces turbine loads

Drivetrain components: GE's 1.6-100 uses proven design gearboxes, mainshaft and generators with appropriate improvements to enable the larger rotor diameter on the 1.6 MW machine

Enhanced Controls Technology

The 1.6-100 wind turbine employs two enhanced control features:

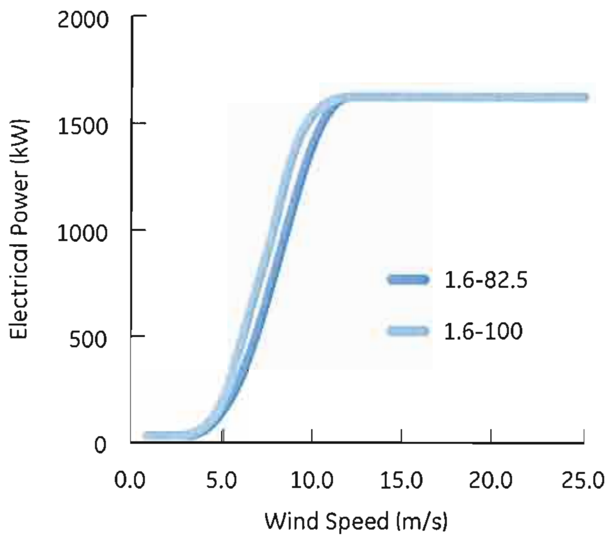
- GE's patented Advanced Loads Control reduces loads on turbine components by measuring stresses and individually adjusting blade pitch
- Controls developed by GE Global Research minimize loads including at near rated wind speeds to improve Annual Energy Production (AEP)

Condition Based Monitoring

GE's Condition Based Monitoring (CBM) and SCADA Anomaly Detection Services, a complementary suite of advanced condition monitoring solutions, proactively detect impending drive train and whole-turbine issues enabling increased availability and decreased maintenance expenses. Built upon half a century of power generation drivetrain and data anomaly monitoring experience, this service solution is available as an option on new GE Units and as an upgrade.

1.6-100 Specifications

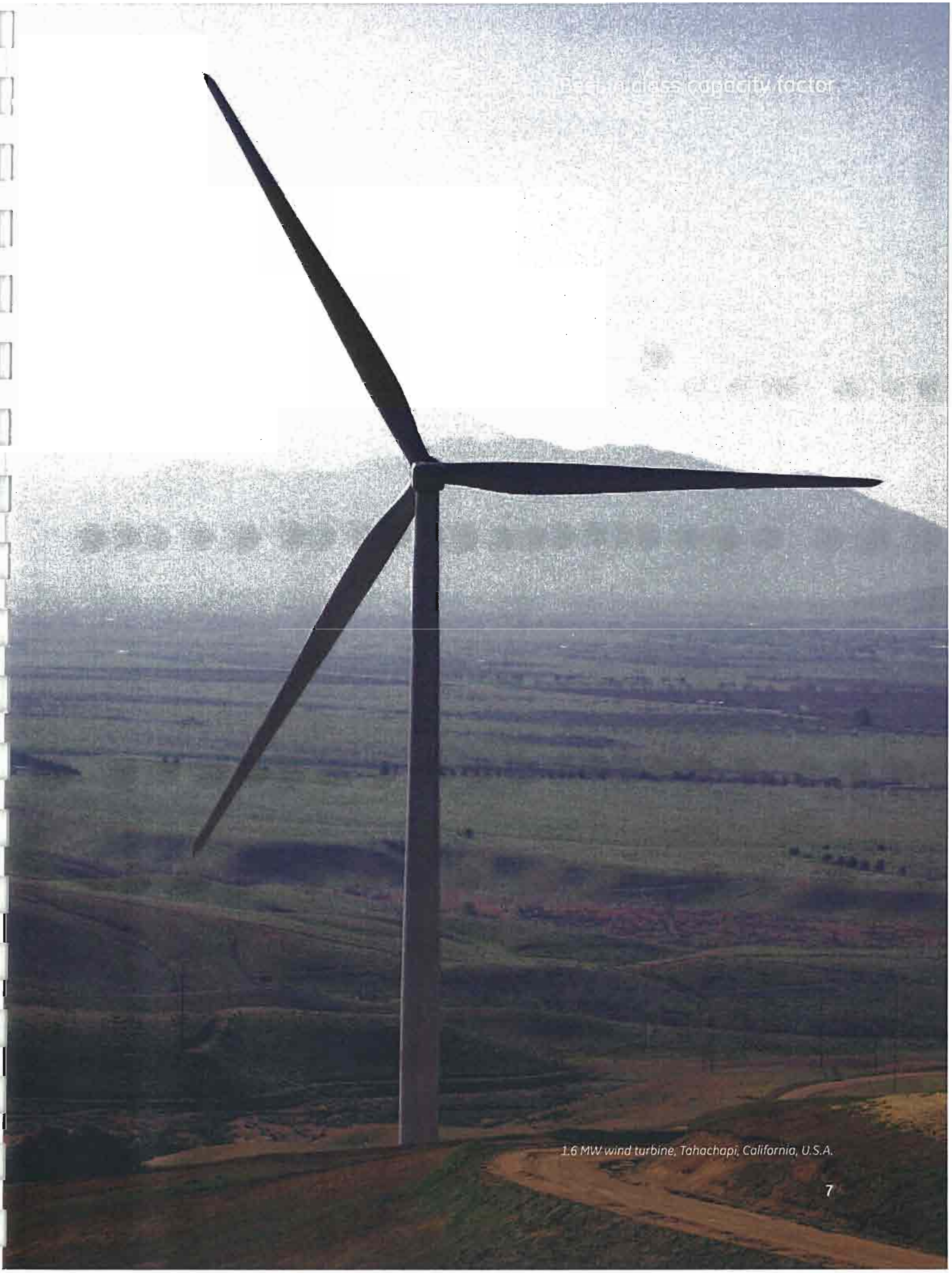
Power Curve Improvement



Highest capacity factor in its class

- **Value.** Best in Class Capacity Factor, 52% @ 7.5 m/s
- **Reliability.** GE fleet at 98%+ availability
- **Experience.** 16,500+ fleet, most 100 meter+ rotors, 1.5 million operating hours
- **Finance-ability.** Evolutionary design using "proven technology" from GE 1.5 MW and 2.5 MW platforms

[illegible] class capacity factor



1.6 MW wind turbine, Tahachapi, California, U.S.A.

Powering the world...responsibly.

For more information please visit www.ge-energy.com/wind.

APPENDIX B

June 2011

CALIFORNIA RIDGE WIND ENERGY PROJECT DECOMMISSIONING REPORT

CHAMPAIGN COUNTY, ILLINOIS

Invenergy

Prepared for:

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c/o Invenergy Wind LLC
One South Wacker Drive
Suite 1900
Chicago, IL 60606

Prepared by

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701 Xenia Avenue South
Minneapolis, MN 55416

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FIGURES

CALIFORNIA RIDGE WIND ENERGY

SYSTEM DESCRIPTION

The California Ridge Wind Energy, LLC (Project), is proposed to be a 200 Megawatt (MW) wind energy conversion system in Vermilion and Champaign counties, located north of the town of Royal and south of the cities of Gifford and Potomac, Illinois. The proposed wind farm will consist of the following primary components:

Item	Number	Unit measure
Wind Turbines	134	Each
Wind Turbine Foundations	134	Each
Step-Up Transformers	134	Each
Access Roads	198,026	Lineal Foot (estimate)
Medium Voltage Cable	425,937	Lineal Foot (estimate)
Note: The exact number of turbines and lengths of access roads and medium voltage cables may change prior to construction. The lengths provided here are based on a May 2011 layout. California Ridge Wind Energy will provide as-built plans to the counties following construction.		

DECOMMISSIONING SEQUENCE

In the event the Project requires decommissioning and removal, the following sequence for removal of the components will be used:

- Remove Rotors and Turbines
- Remove Towers and Internals
- Remove Collection Step-Up Transformers
- Partial Remove Wind Turbine Foundations
- Remove Access Roads

After removal of all equipment and materials the area will be regraded and topsoil will be restored.

WIND TURBINES

WIND TURBINE TECHNICAL DATA

The Project will use 134 GE 1.6-100 50/60 Hz (690 Volt electric power) Wind Turbines manufactured by General Electric for a system generating capacity of approximately 214 MW (figure 1). The towers are painted monopole tubular steel, white in color, with a hub height of 100 meters (328 feet). The project will use 100 meter (328 foot) diameter rotors. Each turbine and rotor will reach a total height of 150 meter (492 feet) above ground surface.

Properly maintained wind turbines have a minimum life of 20 years (Ton van de Wekken 2007). At the end of the project life, depending on market conditions and project viability, the wind turbines may be "re-powered" with new nacelles, towers, and/or blades. Alternatively, the wind turbines may be decommissioned and removed. The major components of the wind turbines (the tower, the nacelle, and blades) are modular items that allow for ease of construction and disassembly during decommissioning or replacement. Each tower is made up of approximately 253 tons of painted steel which is potentially salvageable. The nacelle has an overall unit weight of approximately 40 tons and is constructed of a combination of salvageable steel and various other materials. Portions of the components within the nacelle and generators can also be salvaged for scrap.

METALS SALVAGE

Based on the construction details presented for the GE 1.6-100 turbine and associated tower and components, it was assumed that the tower and nacelle will yield approximately 80% salvageable materials. Since the hub assembly and bed plate are of manufactured steel, it is anticipated that the hub assembly will yield 100 percent salvageable metallic materials. Copper estimates were derived from manufacturers' cable descriptions, from the down tower cabling and internal wiring. Since the rotor/blades are constructed of predominantly non-metallic materials (fiberglass reinforced epoxy and carbon fibers), no salvage value for the rotor blades was used to develop the decommissioning cost estimate.

The current market value of steel, based on *Steelonthenet.com* (June 2011), is approximately $380 per ton. Assuming only the steel from each turbine assembly and tower will be salvaged the salvage value of each turbine and tower assembly is estimated to be approximately $124,465 each. Turbine salvage values could range from $40,688 to $174,652 given that market values fluctuate and the price of steel historically has shifted from $106 to $455 per ton.

The market value of copper has fluctuated dramatically this past year. As of December 2009, the price is approximately $4.14 per pound ($8,280 per ton). Therefore, estimated salvage value for copper is approximately $53,820 per turbine. The total value for both copper and steel would be approximately $180,785 per turbine. The table below summarizes the potential salvage value per turbine.

Item	Unit	Price/unit	Price per Turbine
Tower (80% steel)	252.95 Ton	$380	$76,897
Nacelle (80% steel)	27.6 Ton	$380	$8,390
Hub (100% steel) and bed plate	101.1 Ton	$380	$38,418
Anchor Bolts	2.0 Ton	$380	$760
Total Steel price			**$124,465**
Copper	6.5 Ton	$8,280	$53,820
Transformers	1 each	$2,500	$2,500
Grand Total			**$180,785**

The estimated 2011 cost of erecting a turbine tower, hub, blades, and nacelle is approximately $98,000. Therefore, the dismantling costs will be approximately $98,000 per turbine location in 2011 costs. When the cost to transport the salvage unit is included, the total cost of dismantling the turbines and removing them from the site will be approximately $129,000 per turbine. The removal costs are summarized in the conclusions of this report. The remainder of this report addresses the decommissioning costs for the surface and subsurface components.

WIND TURBINE TRANSFORMERS

Wind Turbine Transformer Design/Decommissioning

Each turbine step-up transformer sits adjacent to the turbine and is approximately 6 feet high and 6 feet wide. Each transformer will be disconnected, removed from site, and disposed of according to environmental and other regulatory conditions current at the time of the decommissioning. Salvers have indicated that they would remove the transformers for a $2,500 credit per turbine. After decommissioning activities, the transformer pad areas will be scarified, as necessary and in consultation with the landowner, and the land restored as near as practicable to its original condition with native seed and soils.

WIND TURBINE FOUNDATIONS

Wind Turbine Spread Foundation Design/Decommissioning

Each octagonal spread foundation pedestal and base is required by Vermilion County to be removed to a depth of 36 inches below the proposed final ground surface. The upper 54 inches of the turbine foundation will be removed by a jack hammer mounted on a bobcat or excavator. Complete off-site removal for demolition and disposal of the removed portions of the foundations is required per the lease agreement between the Project and the landowners hosting turbines. For the purpose of this report, the cost of removal and disposal off site is used to estimate the decommissioning costs of the foundations.

There is essentially no salvage value to the turbine foundations. The spread footing foundation design will consist of a solid reinforced concrete circular pedestal with dimensions of approximately 17 feet diameter, and an overall pedestal height of approximately 4 feet, 6 inches. Below the foundation pedestal is the foundation base section, an estimated octagonal geometry that is approximately 60 feet across the flat sides of the octagon, with an overall base thickness of 8 feet, 6 inches. The base sits on the supporting sub-grade approximately 12 feet below finish grade. A typical spread footing design is shown in Figure 2. The removal and disposal of the foundations are estimated as follows:

Activity	Cost	Unit
Mobilization and Excavation - Assume 1 Foundation per Day	$2,500	per Foundation
Concrete Demolition - Assume 1/2 of a Foundation Pedestal per Day	$10,000	per Foundation
Disposal/Backfill - Assume 1 Foundation per Day	$3,500	per Foundation
Subtotal	$16,000	per Foundation
Total Estimated Cost for 134 Foundation Removals	**$2,144,000**	**Total**

ACCESS ROADS

Typical Access Road Construction Details

For the purposes of this report, the total length of access roads for the Project has been estimated at 198,026 linear feet, or 37.5 miles. The typical access road detail is included as Figure 3. The final access roads to each turbine will be approximately 16 feet wide with enlarged areas at the turbine sites and at intersections with connecting public roads. The existing soils will be excavated, shaped, and graded to match the typical contour of the land adjacent to the access road and compacted prior to construction of the roads. The construction of the access roads may consist of a geotextile fabric placed on a prepared subgrade with 6 inches of aggregate base (pit run gravel) and 6 inches of aggregate surface course Type B (CA-6), resulting in the estimated quantities as shown below:

Item	Number	Unit
Geotextile Fabric	352,046	Square Yards
Aggregate Base Course	58,674	Cubic Yards
Aggregate Surface Course	58,674	Cubic Yards

Access Road Decommissioning and Public Street Repair

Access road decommissioning will involve the removal and transportation of the aggregate materials from the site to a nearby site where the aggregate can be processed for salvage. It is possible that the local townships or farmers may accept this material without processing to use on their local roads; however, for the purpose of this report it is assumed that the materials will be removed and hauled to a reprocessing site within 25 miles of the wind farm site. Any public streets damaged due to the reclamation process shall be repaired.

The decommissioning will also involve the removal and proper disposal of the geotextile fabric. It is assumed that during excavation of the aggregate a large portion of the geotextile will be "picked up" and sorted out of the aggregate at the aggregate reprocessing site. Geotextile fabric that is remaining, or large pieces that can readily be removed from the excavated aggregate, will be disposed of off site at a landfill.

In determining salvage value for the road materials, it was assumed that 75 percent of the aggregate surface course can ultimately be salvaged for future use as aggregate base course. It was also assumed that 50 percent of the aggregate base course could be reused as aggregate base course and that the remaining materials would be viable for general fill in non-structural fill areas. The geotextile fabric would not be suitable for use after removal so was not considered to have a salvage value. The following salvage values are used for the road materials assuming they will be picked up and hauled from the process site by others:

Removal Items	Cost	Unit
Reprocessed Aggregate to be used as Base Course	$5.30	per Cubic Yard
Remaining Aggregate to be used as Fill	$1.60	per Cubic Yard

The only scenario that could offer a lower cost for removal and salvage of the aggregate would be disposal at a nearby site that needed inert fill. There are no known sites in the area. Therefore, the decommissioning cost of the roads is based upon removal and salvage of the aggregate for use as base course or inert fill within a 25-mile radius of the wind farm site. The estimated costs for access road decommissioning would be as follows:

Removal Items	Quantity	Cost	Salvage	Net Cost
Geotextile Fabric (Square Yards)	352,046	$176,023	-	$176,023
Aggregate Base Course (Cubic Yards) (Reprocessed as Aggregate Base Course)	29,337	$357,914	$155,487	$202,427
Aggregate Base Course (Cubic Yards) (Reprocessed as Fill)	29,337	$357,914	$46,939	$310,974
Aggregate Surface Course (Cubic Yards) (Reprocessed as Aggregate Base Course)	44,006	$536,870	$233,231	$303,640
Aggregate Surface Course (Cubic Yards) (Reprocessed as general fill in non-structural fill areas)	14,669	$178,957	$23,470	$155,487
Totals		$1,607,678	$459,127	$1,148,551

CRANE PADS

Crane pads will be approximately 60 feet by 40 feet and consist of compacted native material and approximately 1 foot of base fill. Crane pad aggregate will be removed and pad areas will be filled and scarified after decommissioning activities. The restoration will be performed in consultation with the landowner and pad sites will be restored as near as practicable to their original condition with native seed and soils. The estimated costs for crane pad decommissioning would be as follows:

Removal Items	Quantity	Cost	Salvage	Net Cost
Geotextile Fabric (Square Yards)	35,733	$17,867	-	$17,867
Aggregate Base Course (Cubic Yards) (Reprocessed as Aggregate Base Course)	2,978	$36,329	$15,782	$20,547
Aggregate Base Course (Cubic Yards) (Reprocessed as Fill)	2,978	$36,329	$4,764	$31,564
Aggregate Surface Course (Cubic Yards) (Reprocessed as Aggregate Base Course)	5,956	$72,658	$31,564	$41,093
Aggregate Surface Course (Cubic Yards) (Reprocessed as general fill in non-structural fill areas)	1,489	$18,164	$2,382	$15,782
Totals		$181,347	$54,493	$126,853

Cables

Cable Wire and Trench Typical Installation

All cable trenches will be a minimum of 48 inches below the ground surface. In all cable locations outside of access roads, the trenches are backfilled with on-site earthen materials with at least 6 inches of topsoil. At roads, the cables will be in conduits which are a minimum of 48 inches below the final surface. The estimated total medium voltage cable length is 425,937 lineal feet.

Cable Wire and Trench Decommissioning

Since the cables will be located well below the ground surface and will not impose an obstacle to farm activities, physical removal of the cables is not considered to be required to restore the former use of the ground.

Earthwork and Topsoil Restoration

Once all of the aboveground improvements are removed, the remaining work to complete Project decommissioning will consist of shaping and grading of the areas to as near as practicable to their original contour prior to construction of the turbine sites and access roads.

It is estimated that approximately 64,630 cubic yards of earthwork and topsoil will be necessary for restoration. Based upon the typical cost for this type of work within the Vermilion and Champaign county area, and the assumption that earth and topsoil can be found within 25 miles of the wind farm site, the following estimate of decommissioning cost for earthwork and topsoil restoration is provided:

Item	Quantity (Cubic Yards)	Cost per Cubic Yard	Total Cost
Earth Fill (cubic yards) (access roads, crane pad and foundation pedestal areas)	64,630	$10.60	$685,078
Topsoil (cubic yards) and seed planting	64,630	$10.60	$685,078

SUMMARY OF DECOMMISSION COSTS

The following is a summary of the total estimated costs for Project decommissioning. This estimate was developed using the various cost resources listed below:

- R.S. Means
- HDR Historical Data
- Vendor Quotes
- Current/Historic Commodity Prices
- Estimator Judgment

Salvage Value	
Turbine Component Salvage Value (134 Turbines x $180,785)	$24,225,217
Decommissioning Costs	
Turbine Removal (134 x $129,000)	$17,286,000
Turbine Foundation Removal	$2,144,000
Access Roadway Removal	$1,148,551
Crane Pad Removal	$126,853
Cable Removal	$0
Earthwork and Topsoil	$1,370,154
Subtotal	**$22,075,559**
Salvage Less Decommissioning	**$2,149,658**
Net Salvage Value per Turbine (134 Total)	**$16,042**

The estimated total decommissioning costs of the Project can be completely recovered by the salvage and resale value of the turbine components. These values are based on estimated 2011 costs and do not assume any inflation costs or market fluctuations.

FINANCIAL ASSURANCE

To ensure accuracy in the material quantities outline above, HDR recommends that this report and the final engineering drawings be reviewed by our office prior to operation of the Project to verify final material quantities.

For Champaign County, financial assurances shall be 210% of an independent professional engineer's cost estimate to complete the decommissioning, or less, if specifically authorized by the County Board. The form of financial assurance will be a letter of credit. California Ridge Wind Energy LLC shall gradually pay down the value of the irrevocable letter of credit by placing cash deposits in an escrow account over the first 13 years of the Project operation as described by Champaign County Ordinance No. 848, Section 6.1.4.P. During the lifespan of the wind farm the amount of the irrevocable letter of credit shall be increased as necessary to reflect actual rates of inflation. The financial assurance will further provide that the terms of the Decommissioning Plan be binding upon California Ridge Wind Energy LLC and any successors, assigns, or heirs; and that the County will have access to the site, pursuant to reasonable notice, to effect or complete the decommissioning, if required. In order to provide funding for decommissioning at the time of decommissioning, California Ridge Wind Energy LLC may exchange a new irrevocable letter of credit in an amount equal to the amount in the escrow account in exchange for the Governing Body agreeing to a release of the full amount of the escrow account. California Ridge Wind Energy LLC shall comply with Champaign County Zoning Ordinance No. 848, 6.1.4 P Standard Condition for Decommissioning Plan and Site Reclamation Agreement

CONCLUSION

I certify that this report is an accurate representation of the anticipated decommissioning costs (or salvage value) at this preliminary stage of development and was prepared in accordance with industry standards of care for engineering evaluations of this type and contains no intentional false statements or misrepresentations.

Signed: Matt Redington, PE, Project Manager

Signed: James W. Booty, PE, Senior Project Engineer

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Illinois.

Matthew Redington

Date 6/27/11 **Reg. No.** 062.062441

LICENSED PROFESSIONAL ENGINEER
JAMES W. BOOTY
PE 18773
IOWA

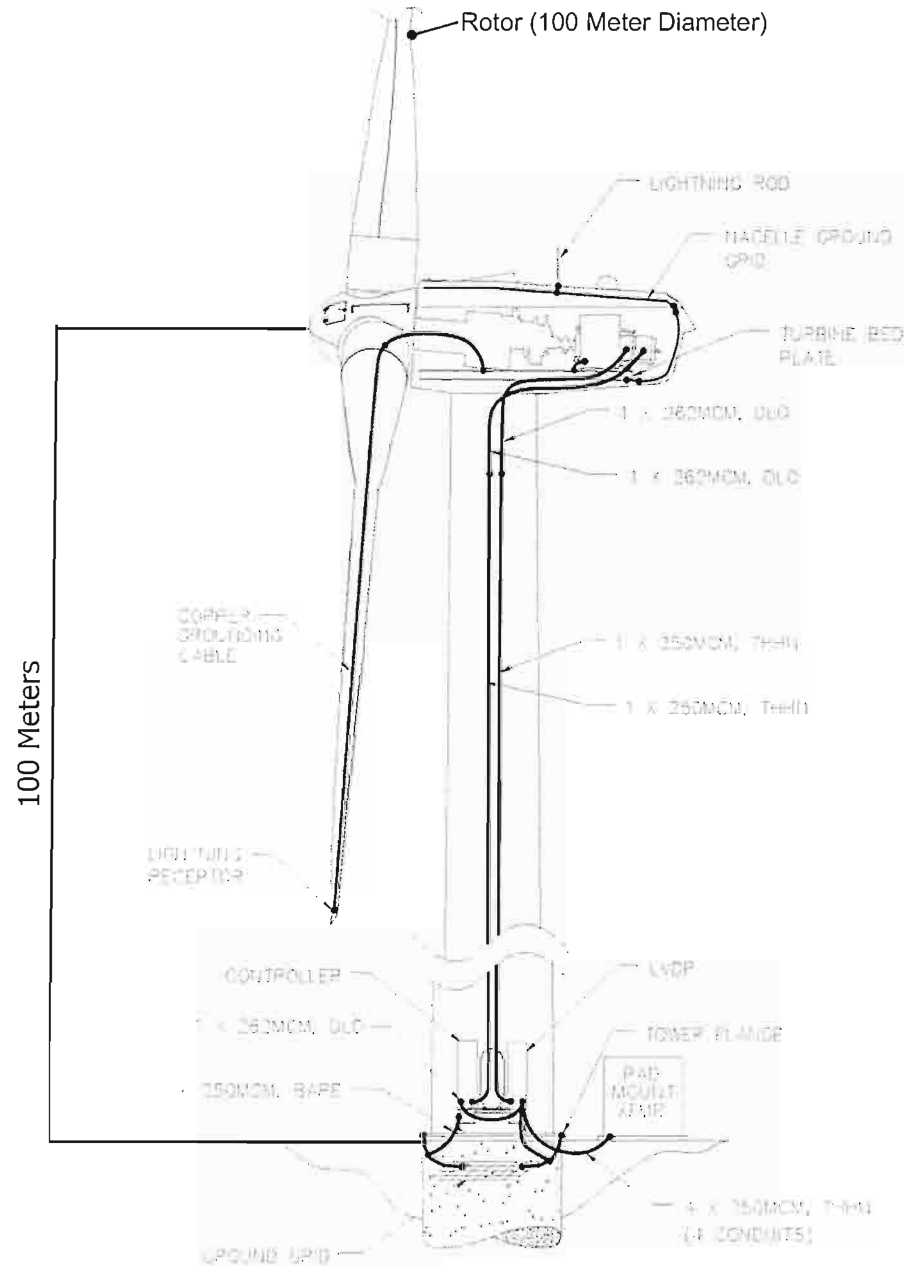
REFERENCES

GE Energy Commercial Documentation Wind Turbine Generator Systems 1.6-100 – 50 & 60 Hz, Weights and Dimensions; 2010 (1.6-100 xxHz_GD_all Comp_ContrDocWSDxxx00.doc)

Ton van de Wekken, KEMA Nederland B.V. 2007. *Distribution Generation and Renewables*. Wind Farm Case Study.

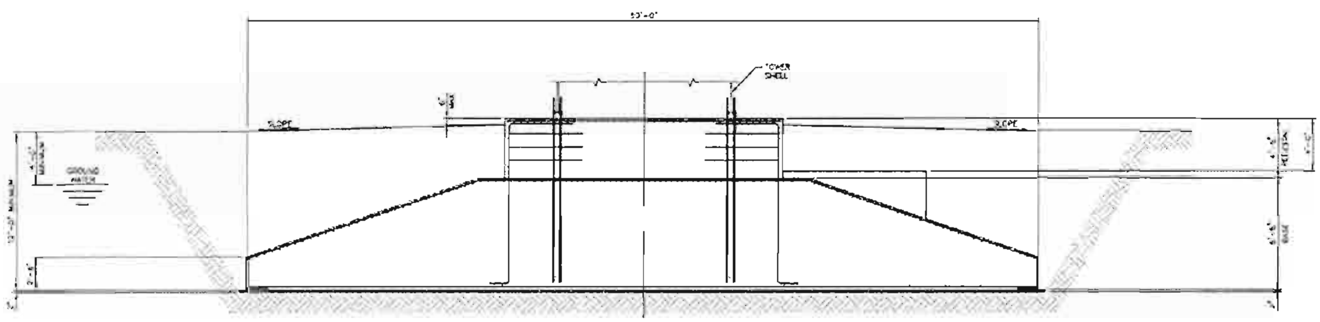
Steelmaking Commodity Prices, World steel raw materials & energy prices. Steelonthe net.com, accessed June 6, 2011.
http://www.steelonthenet.com/commodity_prices.html

FIGURE 1
INVENERGY WIND LLC
CALIFORNIA RIDGE DECOMMISSIONING PLAN
TYPICAL WIND TURBINE GENERATOR



Note: Referenec Image from Technical Documentation, Wind Turbine Generator Systems, GE.

FIGURE 2
INVENERGY WIND LLC
CALIFORNIA RIDGE DECOMMISSIONING PLAN
TYPICAL FOUNDATION SECTION



TYPICAL FOUNDATION SECTION

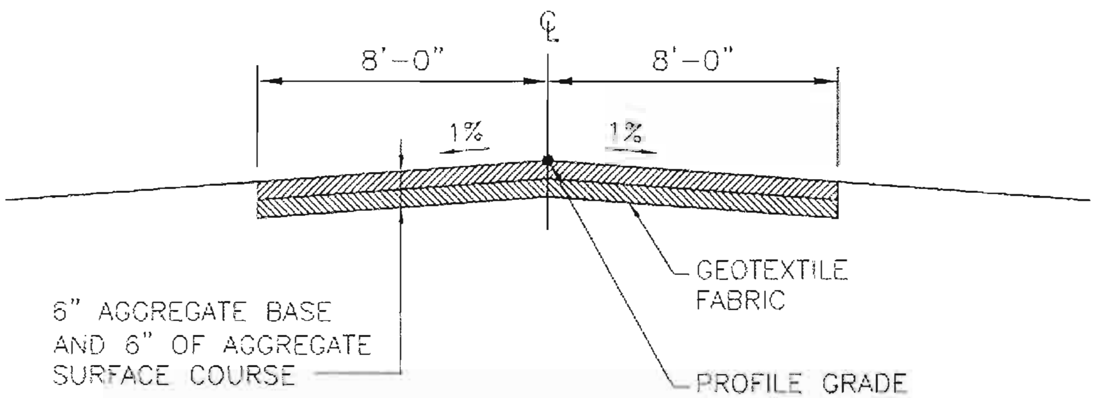
SCALE: NONE

1
SK-1

HDR

Invenergy

FIGURE 3
INVENERGY WIND LLC
CALIFORNIA RIDGE DECOMMISSIONING PLAN
TYPICAL ACCESS ROAD SECTION



TYPICAL ACCESS ROAD– SECTION A

SCALE: NONE

1
SK-2

APPENDIX C

California Ridge Wind Energy Project
Sound Analysis Report

Executive Summary

California Ridge Energy LLC, a wholly owned subsidiary of Invenergy Wind LLC (together with its subsidiaries, Invenergy), is proposing to construct up to 134 wind turbine generators (WTG), using the 1.6 MW GE 1.6-100, manufactured by General Electric (GE) as part of the California Ridge Wind Energy Project (Project). The Project is located in Vermilion and Champaign counties, Illinois, in the townships of Pilot, Ogden, and Compromise. Of the 134 proposed wind turbine generators, 30 are anticipated to be located within Champaign County. This report addresses project-related sound from all proposed turbines in both Vermillion and Champaign counties.

HDR Engineering, Inc. (HDR) performed a sound analysis in support of the proposed Project. HDR collected 24-hour ambient sound measurements at two locations within the Champaign County portion of the Project that are representative of the Project area. HDR modeled 134 wind turbine generators in the evaluation of Project-related sound using the Cadna-A model. The Cadna-A model is widely used throughout the environmental acoustics community and is an appropriate tool for this Project; its use was enhanced by the inclusion of site-specific terrain. Modeling results were compared with maximum allowable sound emissions under Illinois rules to determine compliance at all noise-sensitive receivers within 1 mile of the Project area. The monitoring, modeling, and compliance determinations were applied on a spectral basis and evaluated based on sound emissions limits as stated in Illinois Rules Title 35: Environmental Protection, Subtitle H: Noise, Chapter I: Pollution Control Board, Part 901 – Sound Emissions Standards and Limitations for Property Line Noise Sources.

Results of the sound analysis are as follows:

- Existing ambient sound levels were measured within the Project area and ranged from 34 to 62 dBA on an hourly equivalent (L_{eq}) basis.
- Existing ambient sound levels in Champaign County exceed daytime maximum allowable noise limits in a total of four octave bands (500 Hz,1 kHz, 2 kHz, and 4 kHz).
- Existing ambient sound levels at Champaign County monitoring sites exceed nighttime maximum allowable noise limits in eight of the nine octave bands (63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, and 8 kHz).

- Daytime analysis results indicate that sound from 134 wind turbines is at least 7 dB below the maximum allowable noise limit in all octave bands at all noise-sensitive receivers within the Champaign County portion of the Project area.
- Nighttime analysis results indicate that sound from 134 wind turbines is at least 1 dB below the maximum allowable noise limit in all octave bands at all noise-sensitive receivers within the Champaign County portion of the Project area.

HDR's analysis concludes that Project-related sound levels, as modeled from 134 GE 1.6-100 wind turbines in Vermillion and Champaign counties, will comply with Illinois Rules Title 35: Environmental Protection, Subtitle H: Noise, Chapter I: Pollution Control Board, Part 901 – Sound Emissions Standards and Limitations for Property Line Noise Sources.

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Appendices

1.0 Introduction

California Ridge Energy LLC, a wholly owned subsidiary of Invenergy Wind LLC (together with its subsidiaries, Invenergy), is proposing to construct up to 134 wind turbine generators (WTG), using the 1.6 MW GE 1.6-100, manufactured by General Electric (GE) as part of the California Ridge Wind Energy Project (Project). The Project is located in Vermilion and Champaign counties, Illinois, in the townships of Pilot, Ogden, and Compromise. Of the 134 proposed wind turbine generators, 30 are anticipated to be located within Champaign County. This report addresses project-related sound from all proposed turbines in both Vermillion and Champaign counties.

HDR Engineering, Inc. (HDR) performed a sound analysis in support of the proposed Project. HDR collected 24-hour ambient sound measurements at two locations in Champaign County that are representative of the Project area. HDR evaluated Project-related sound using the Cadna-A model. The Cadna-A model is widely used to assess sound from wind turbines and is an appropriate tool for this Project; its use was enhanced by the inclusion of site-specific terrain. Modeling results were compared with maximum allowable sound emissions under Illinois rules to determine compliance at all noise-sensitive receivers within the Champaign County portion of the Project area. The monitoring, modeling, and compliance determinations were performed on a spectral basis, i.e. each of the nine frequency octave bands that comprise the applicable Illinois regulation (Illinois Rules Title 35: Environmental Protection, Subtitle H: Noise, Chapter I: Pollution Control Board, Part 901 – Sound Emissions Standards and Limitations for Property Line Noise Sources).

2.0 Fundamentals of Environmental Acoustics

Noise is defined as unwanted sound. Sound is made up of tiny fluctuations in air pressure. Sound, within the range of human hearing, can vary in intensity by over one million units. Therefore, a logarithmic scale, known as the decibel scale (dB), is used to quantify sound intensity and to compress the scale to a more manageable range.

Sound is characterized by both its amplitude (how loud it is) and frequency (or pitch). The human ear does not hear all frequencies equally. In fact the human hearing organs of the inner ear deemphasize very low and very high frequencies. The A-weighted scale (dBA) is used to reflect the selective sensitivity of human hearing at moderate sound levels, approximately 40 dBA. This scale puts more weight on the range of frequencies that the average human ear perceives, and less weight on those frequencies we do not hear as well. The human range of hearing extends from approximately 3 dBA to around 140 dBA. Table 1 shows a range of typical sound levels from common activities.

Table 1
Common Sound Sources and Levels

Sound Pressure Level (dBA)	Typical Sources
120	Jet aircraft takeoff at 100 feet
110	Same aircraft at 400 feet
90	Motorcycle at 25 feet Gas lawn mower at 3 feet
80	Garbage disposal
70	City street corner
60	Conversational speech
50	Typical office
40	Living room (without TV)
30	Quiet bedroom at night

Source: Environmental Impact Analysis Handbook, ed. by Rau and Wooten, 1980.

Using the decibel scale, sound levels from two or more sound sources cannot be arithmetically added together to determine the overall sound level. Rather, the combination of two sounds at the same level yields an increase of 3 dB. On average, a 3-dB change in the A-weighted sound level is generally considered a noticeable change in loudness, whereas a 5-dB increase is clearly noticeable. A 10-dB change is perceived by most people as a doubling or halving of the perceived loudness.

The sounds that we hear are a combination of many different pitches. These different pitches represent different frequencies and it is possible to use a frequency analyzer to separate sound into its different frequency components, low to high. The frequency ranges used within this analysis are called octave bands; frequency is measured in Hertz (Hz), or cycles per second. Data that has been sorted into these octave bands is called spectral data.

Environmental sound is often expressed as a sound level occurring over a stated period of time, typically one hour. When the acoustic energy is averaged over the stated period of time, the resulting equivalent sound level represents the energy-based average sound level. This is called the equivalent level, or L_{eq}. Therefore, the L_{eq} represents a constant sound that, over the specified period, has the same acoustic energy as the time-varying sound.

3.0 Existing Ambient Sound Levels

HDR measured existing ambient sound levels in the Project area. HDR selected monitoring locations by reviewing digital aerial photographs of the Project area and identifying areas whose ambient acoustical environment appeared to be representative of the Project area. Therefore, the monitoring data represents the ambient acoustic environment of rural, agricultural areas in the Project area that were generally expected to have quiet ambient daytime and nighttime sound levels. The sound monitoring locations are shown in Appendix A.

HDR performed two 24-hour measurements in the Champaign County portion of the Project area. A sound level meter (SLM) was used to collect noise monitoring data every hour for a continuous 24-hour period. Each hour, the SLM stored unweighted spectral (in whole-octave bands) hourly L_{eq}, minimum sound level, maximum sound level, L_{10}, L_{50}, and L_{90} values. The SLM also stored broadband, A-weighted, hourly sound levels. 24-hour noise measurements were performed during the week of May 4, 2009. The Champaign County sound measurement locations are listed in Table 2.

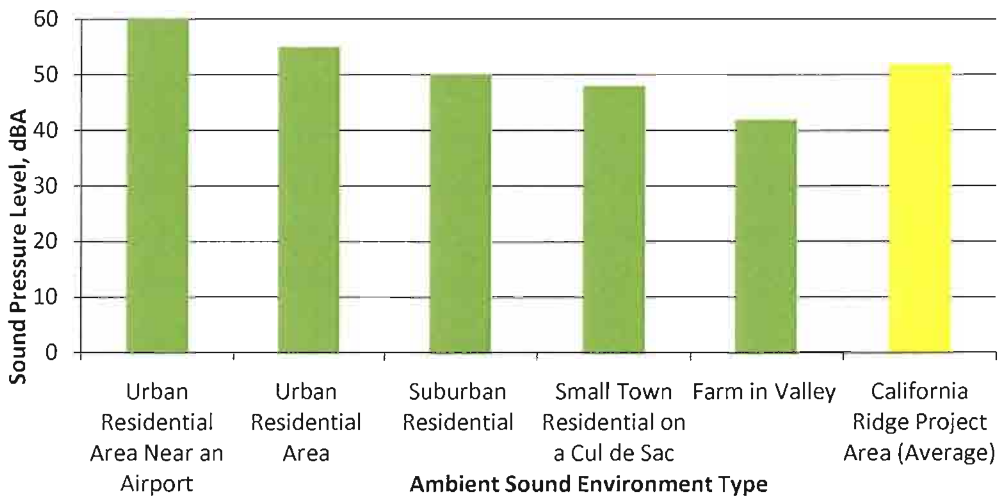
Table 2
Measurement Locations

Measurement Location	County	Measurement Period
ML1	Champaign	05/04/09-05/05/09
ML2	Champaign	05/04/09-05/05/09

The ambient acoustic environment in the Project area is dominated by sound from wind and vehicular traffic, with additional contributions from agriculture-related activities. Existing ambient sound levels were measured within the Project area and ranged from 34 to 62 dBA, on an L_{eq} basis. Daytime ambient sound levels were dominated by vehicular traffic and natural sources. Nighttime ambient sound levels were generally dominated by natural sources.

Figure 1 presents typical daytime sound levels, as stated in the *Handbook of Noise Control* by Cyril Harris, for various residential areas.

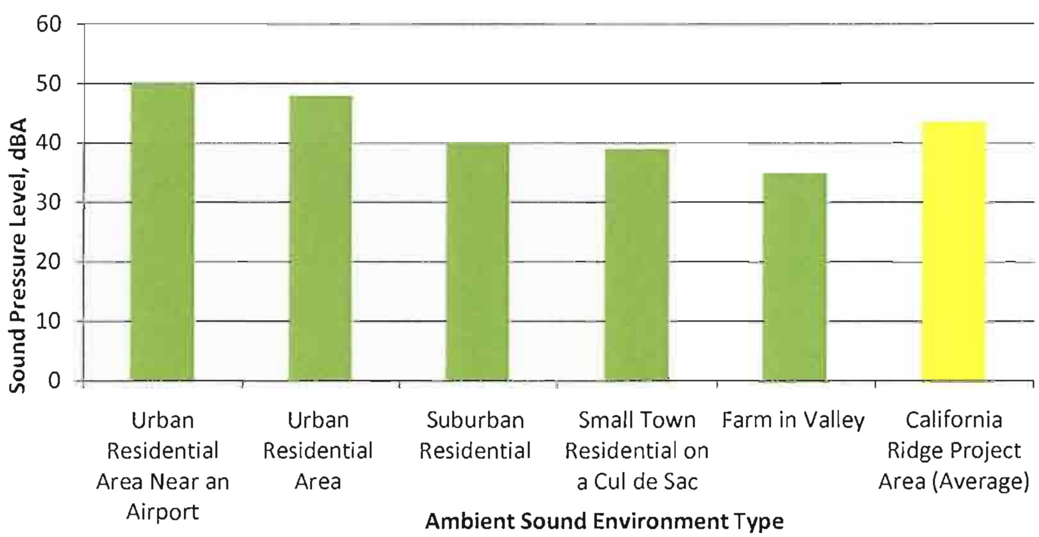
Figure 1
Average Daytime Sound Levels



As demonstrated in Figure 1, the outdoor ambient sound levels throughout the Project Area are comparable to a suburban residential area during daytime sound level surveys. Measured daytime sound levels for the Project Area averaged 52 dBA on an hourly, L_{eq} basis. Elevated sound levels occurred in areas near truck haul routes.

Figure 2 presents typical nighttime sound levels for various residential areas in comparison to measured sound levels in the California Ridge project area.

Figure 2
Average Nighttime Sound Levels



As demonstrated in Figure 2, the outdoor ambient sound levels throughout the Project Area during nighttime are also comparable to a suburban residential area sound level survey. Measured nighttime sound levels for the Project Area averaged 44 dBA on an hourly, L_{eq} basis. This is approximately 8dB lower than daytime hours, which is typical of diurnal sound patterns.

Table 3 summarizes the number of hours in which measured ambient sound levels exceeded the Illinois Pollution Control Board (IPCB) maximum allowable sound level limits.

Table 3
Existing Sound Levels and IPCB Limits

Monitoring Location	Number of Hours Exceeding IPCB Sound Limits		
	Daytime	Nighttime	Total
ML1	13.0	8.0	21.0
ML2	4.0	2.0	6.0
Average	8.5	5.0	13.5

As shown in Table 3, daytime and nighttime monitoring data exceeds the maximum allowable sound level limits defined in Illinois Rules Title 35: Environmental Protection, Subtitle H: Noise, Chapter I: Pollution Control Board, Part 901 – Sound Emissions Standards and Limitations for Property Line Noise Sources. Daytime sound levels exceed IPCB limits in four octave bands, the 500 Hz, 1 kHz, 2 kHz, and 4 kHz octave bands. Nighttime monitoring data shows existing sound levels exceeding sound limits in eight of the nine octave bands, all bands excluding 31.5 Hz.

HDR's monitoring results show that existing ambient sound levels in the Project area exceed three or more of the Illinois Environmental Protection Agency (IEPA) spectral noise limits during both the daytime and the nighttime. This is consistent with noise monitoring data HDR collected in other rural areas of Illinois with high quality wind resources..

Appendix B presents detailed sound monitoring results.

4.0 Project-Related Sound Levels

Wind turbine sound emissions data were provided by General Electric, the turbine manufacturer. Table 4 presents the spectral sound power level (SWL) data provided by General Electric. Manufacturer's data consists of octave band sound emissions data measured at ground level with corresponding wind speeds measured at a height of 10 meters and corresponding wind speeds at hub height.

Table 4
Spectral Sound Emissions Data – GE 1.6-100

Turbine	Octave Band SWL (dBA)								
	31.5	63	125	250	500	1 k	2 k	4 k	8 k
GE 1.6-100 Wind Turbine	82.5	92.2	95.9	95.2	95.5	99.9	99.3	90.5	71.6

HDR used Cadna-A, an acoustical analysis software package designed for evaluating environmental sound from stationary and mobile sources, to evaluate Project-related sound. Cadna-A is a three-dimensional sound model based on International Standards Organization (ISO) 9613, "Attenuation of Sound during Propagation Outdoors," adopted by ISO in 1996. This standard provides a widely accepted engineering method for the calculation of outdoor environmental sound levels from sources of known sound emission.

General Electric's sound power levels were based on the results where a GE 1.6-100 turbine was tested at a 14 meters/second (31 miles/hour) wind speed, the wind speed that produces the loudest turbine sound level. Therefore, turbine sound emission levels are maximized within the model. Use of this data is a conservative analysis and overestimates turbine sound levels during lower wind conditions. Newer generation turbines, such as the GE 1.6-100, use variable speed rotors which produce lower levels of aerodynamic sound at low wind speeds, as opposed to previous generation constant-speed designs, which generate the same amount of sound regardless of wind speed. Given this, older designs tend to be more audible during low wind conditions. This conservative modeling minimizes the chance that turbine sound levels are under-predicted at receptors.

HDR modeled the 134 wind turbine generators located in Champaign and Vermillion counties. Project-related sound levels were calculated at 260 residences (the noise-sensitive receptors) in the Champaign County portion of the Project area. The entire digital terrain model reproduced the physical terrain of the area encompassing approximately 33,532 acres. Coordinates for the turbine and residence locations, as well as the terrain contours, were obtained from the geographic information system (GIS) database created for this Project.

5.0 Analysis Results

The operational conditions in the model were not differentiated for the time of day. The model result, therefore, is the project-related noise for an hour at any time of the day. The receptor—or home—with the highest modeled project-related sound level was selected for analysis.

Table 5 summarizes the daytime sound analysis. The daytime sound analysis compares Cadna-A results with the maximum allowable daytime sound emissions per octave band to determine compliance with applicable Illinois sound limits at Class A land uses, such as residences.

Table 5
Summary of Daytime Sound Analysis

Data Type	Octave Band (dB)								
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Cadna-A Modeling Results	68	64	53	43	38	40	34	15	0[1]
Maximum allowable daytime sound level	75	74	69	64	58	52	47	43	40
Δ Maximum allowable daytime sound level versus maximum predicted Project related sound levels	-7	-10	-16	-21	-20	-12	-13	-28	-40

[1]*Negative sound levels have been rounded to 0 dB*

Daytime sound analysis results in Table 5, above, indicate that noise from 134 wind turbines are at least 7 dB below the maximum allowable sound limit in all octave bands at all noise-sensitive receivers included in this analysis. Existing daytime ambient sound levels within the Project Area exceed the maximum Project-related sound levels in all nine octave bands. Existing sound levels exceed project-related sound levels by at least 9 dB in all octave bands.

Table 6 summarizes the nighttime sound analysis. The daytime sound analysis compares Cadna-A results with the maximum allowable nighttime noise level per octave band to determine compliance with applicable Illinois sound regulations.

Table 6
Summary of Nighttime Sound Analysis

Data Type	Octave Band (dB)								
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Cadna-A Modeling Results	68	64	53	43	38	40	34	15	0[1]
Maximum allowable nighttime sound levels	69	67	62	54	47	41	36	32	32
Δ Maximum allowable nighttime sound levels versus maximum predicted Project related sound levels	-1	-3	-9	-11	-9	-1	-2	-17	-32

[1]*Negative sound levels have been rounded to 0 dB*

Nighttime sound analysis results in Table 6, above, indicate that sound from 134 wind turbines meets the maximum allowable sound limit in all octave bands at all noise-sensitive receivers within 1 mile of the Project Area. Predicted project-related sound levels are anticipated to be at least 1 dB below

IPCB nighttime sound emissions limits. Existing nighttime ambient sound levels within the Project Area exceed the maximum Project-related sound levels in six of the nine octave bands.

The highest overall predicted wind turbine noise level, expressed as an hourly average noise level (L_{eq}) is 45 dBA. When the IEPA daytime and nighttime sound limits are converted to a single, A-weighted Leq value, those limits are 51 dBA and 61 dBA, respectively. These values are 6 and 16 dBA higher than predicted turbine sound levels.

Sound contours depicting Project-related sound on an overall hourly L_{eq} basis are presented in Appendix A. Appendix C shows raw Cadna-A modeling results.

6.0 Discussion of Operational Noise

As modeled, the loudest predicted turbine sound level at a receptor within Champaign County is 45 dBA This is a relatively low level of outdoor sound and is comparable to a quiet living room, a quiet bedroom, a soft whisper at 5 feet, or an operating refrigerator (with closed door).

Predicted wind turbine sound levels can be related to more familiar sources in the Project area. For example, a food blender or garbage disposal at 3 feet (85 dBA), a diesel truck driving 50 mph at 50 feet (85 dBA), a vacuum cleaner at 10 feet (70 dBA), normal speech at 3 feet (60-65 dBA), heavy traffic at 300 feet (60 dBA), and background sound levels in a theatre or large conference room (35 dBA).

Due to technological advancements, (i.e., upwind versus downwind rotor placement, low-noise gearboxes, insulated nacelles, pitch-control rotors, vibration-isolated mechanical equipment, and variable-speed operation) sound levels for today's generation of wind turbines are lower than that of their predecessors.

Furthermore, the character of sound produced is more broadband in nature, and therefore largely absent of tones (whines, whirrs, buzzes, or hums) as well as impulsive (or thumping) qualities.

Portions of HDR's analysis produce overestimates of project-related sound levels during turbine operation. One element of conservatism in the acoustical modeling includes basing turbine noise emissions on a wind speed of 14 meters/second for each turbine, the maximum operating condition. Additionally, the Cadna-A modeling done for this project did not use project-specific meteorological data (wind rose). By eliminating wind rose data, the Cadna-A conservatively calculates sound levels at all receptors by assuming efficient downwind propagation from all directions all the time. These conservative additions result in predicted sound levels in excess of sound levels likely to be generated during turbine operation.

With the conservative additions, the analysis indicates that the majority of locations would experience turbine sound levels of less than 40 dBA (outdoors). This level is sufficiently low to minimize or eliminate any potential for sleep interference or indoor/outdoor speech interference, as defined by the US Environmental Protection Agency (EPA). Furthermore, these average hourly levels are compatible with parameters for acceptable levels of noise within residential land uses established by the EPA guidelines and the State of Illinois' requirements – per Title 35, Chapter I, Part 901.

7.0 Construction Noise

Activities associated with construction of access roads and foundations, excavation for and assembly of turbines, and equipment deliveries are likely to be the loudest sources of construction sound. Like most major projects, construction activities increase outdoor sound levels for a limited period of time. Sound levels would vary widely, depending on the phase of construction and specific tasks being performed. Construction would primarily occur over the course of a daytime shift during normal working hours, although it is possible that extensions of the basic workday, or moderate amounts of evening or weekend work would occur. However, increases in ambient sound associated with construction activities would typically take place only during weekday daytime hours from 7 a.m. to 10 p.m., so there would be little if any construction noise at night.

The average individual is likely to tolerate sound associated with construction, given its temporary nature, and the fact that the majority of construction will take place during daytime hours, (i.e., when acceptance of noise is higher, and the risk of sleep disturbance and interference with relaxation activities is low). While construction sound emissions will be discernable at some locations, they are not expected to increase ambient noise levels significantly for any appreciable period of time.

8.0 Conclusions

Analysis results indicate the following:

- The sound analysis was conducted in accordance with the accepted environmental impact assessment practices in the industry.
- Existing ambient sound levels were measured within the Champaign County portion of the Project area and ranged from 34 to 62 dBA, on an L_{eq} basis.
- Existing sound levels at Champaign County monitoring sites exceed daytime maximum allowable noise limits in a total of four octave bands (500 Hz, 1 kHz, 2 kHz, and 4 kHz).

- Existing sound levels at Champaign County monitoring sites exceed nighttime maximum allowable noise limits in a total of eight octave bands (63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, and 8 kHz).
- Daytime analysis results indicate that sound emissions from 134 wind turbines are at least 7 dB below the maximum allowable noise limit in all octave bands at all noise-sensitive receivers within the Champaign County portion of the Project area.
- Nighttime analysis results indicate that sound emissions from 134 wind turbines is at least 1 dB below the maximum allowable noise limit in all octave bands at all noise-sensitive receivers within the Champaign County portion of the Project area.
- Due to technological advancements in design, sound levels for today's generation of wind turbines are lower than that of their predecessors, especially at wind speeds lower than 31 mph. Furthermore, the character of sound produced is more broadband in nature and largely absent of tones or impulsive qualities.
- Wind turbine sound levels in the Project area are sufficiently low as to minimize or eliminate any potential for sleep interference or indoor/outdoor speech interference as defined by the EPA. These average hourly noise levels are compatible with guidelines established by the EPA for acceptable levels of noise within residential land uses and with Illinois Law Title 35, Chapter I, Part 901.
- While construction sound will be discernable at some locations, it is not expected to increase ambient sound levels significantly for any appreciable period of time. Construction would occur primarily during weekday daytime hours; there would be little or no construction sound at night.

HDR's analysis concludes that overall, A-weighted sound levels as modeled from 134 GE 1.6-100 wind turbines will be consistent with levels that are considered to be within a tolerance of safety for human health and welfare, and at or below ambient environmental noise levels existing on-site today.

Appendix A
Project Monitoring Locations and Predicted Sound Contours

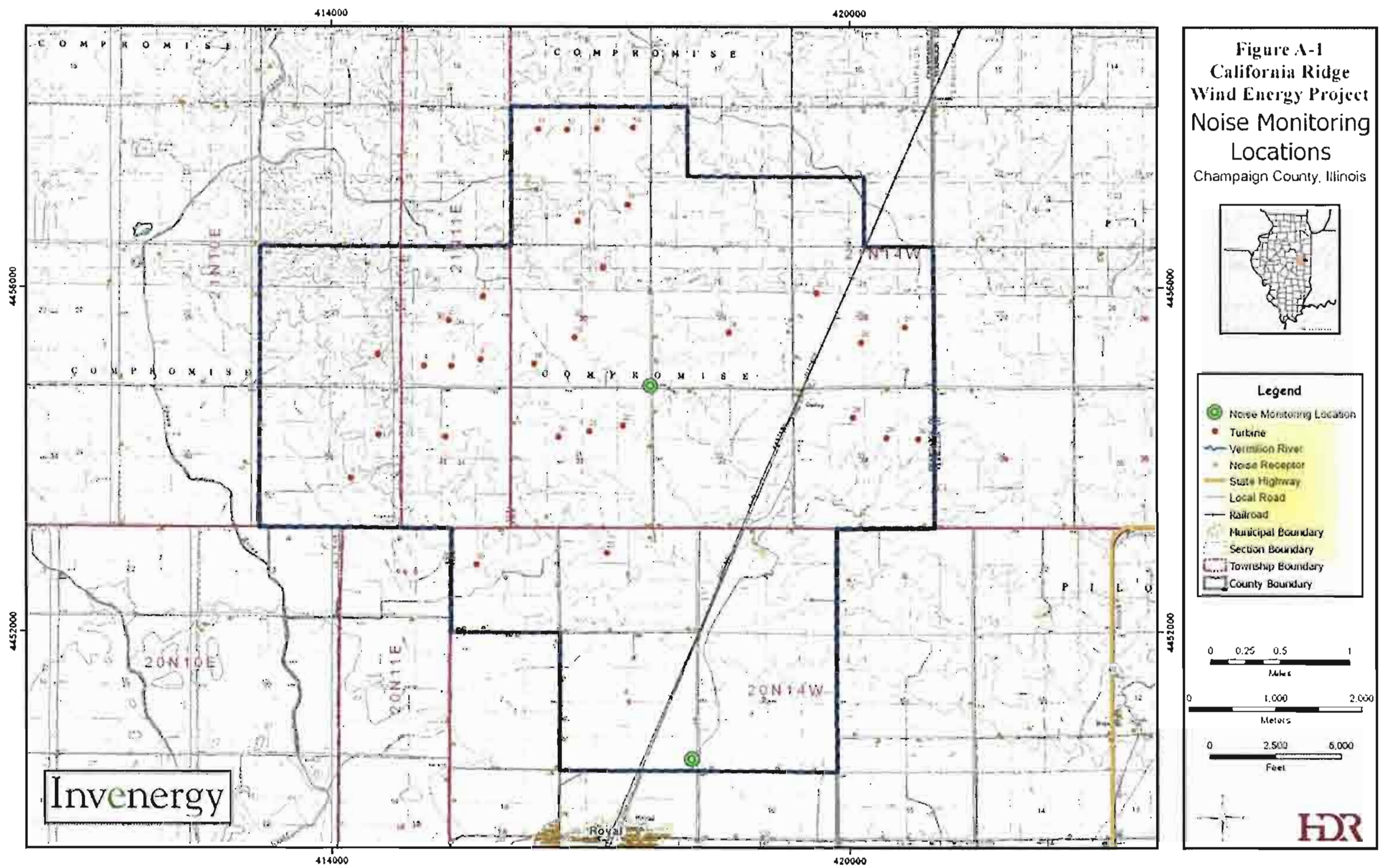


Figure A-1
California Ridge
Wind Energy Project
Noise Monitoring
Locations
Champaign County, Illinois
Legend
Noise Monitoring Location
Turbine
Vermilion River
Noise Receptor
State Highway
Local Road
Railroad
Municipal Boundary
Section Boundary
Township Boundary
County Boundary
Miles
Meters
Feet
COMPROMISE
21N10E
21N11E
21N14W
20N10E
20N11E
20N14W
Royal
414000
420000
4458000
4452000
Invenergy
HDR

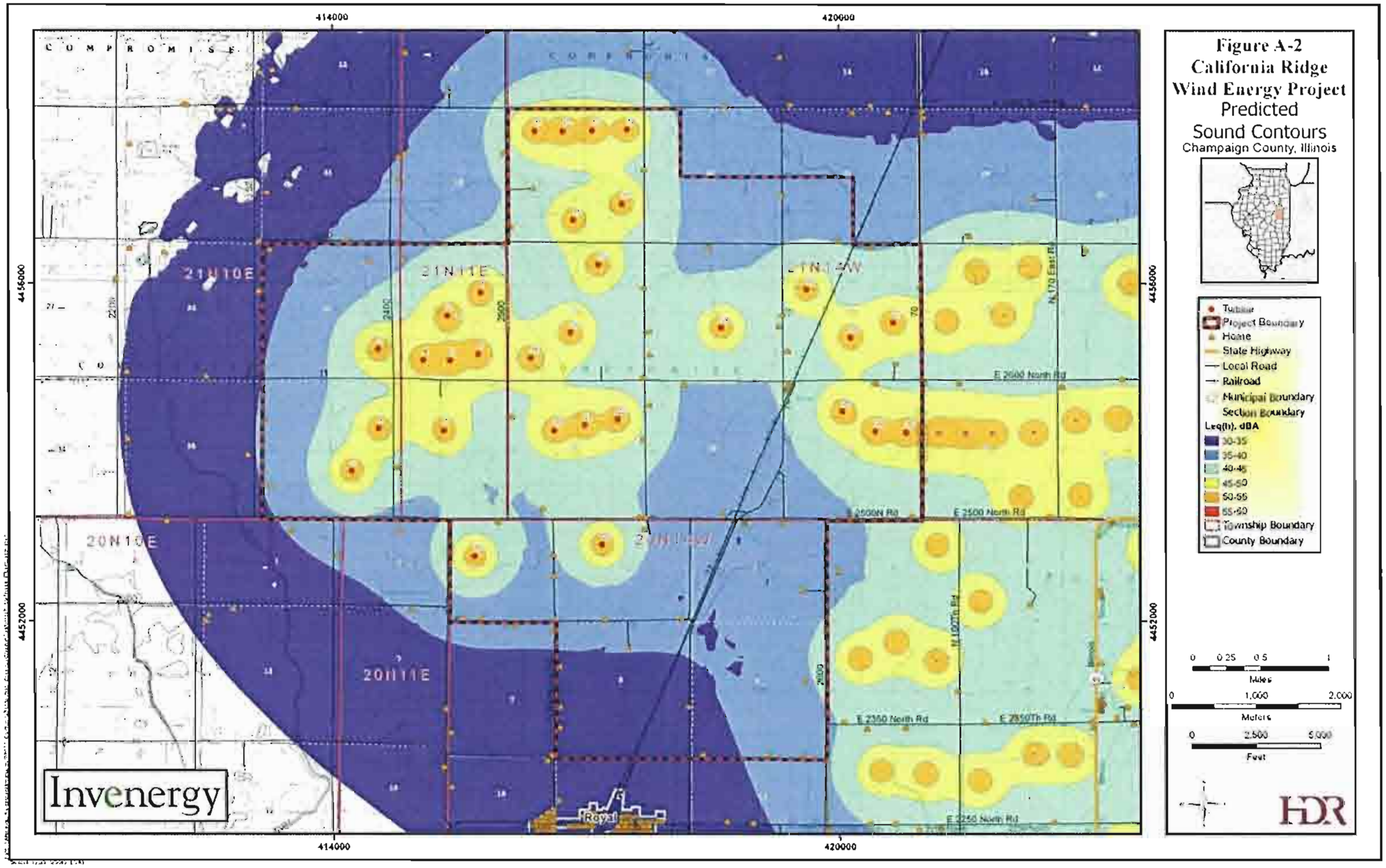


Figure A-2
California Ridge
Wind Energy Project
Predicted
Sound Contours
Champaign County, Illinois
Invenergy
HDR

Appendix B
Detailed Sound Monitoring Data

Existing Ambient Sound Levels

HDR measured existing ambient sound levels in the Project area. HDR selected monitoring locations by reviewing digital aerial photographs of the Project area and identifying areas whose ambient acoustical environment appeared to be representative of the Project area. Therefore, the monitoring data represent the ambient acoustic environment of rural, agricultural areas in the Project area that were generally expected to have quiet ambient daytime and nighttime sound levels. The sound monitoring locations are shown in Appendix A.

HDR performed two 24-hour measurements in the Champaign County portion of the Project area. A sound level meter (SLM) was used to collect noise monitoring data every hour for a continuous 24-hour period. Each hour, the SLM stored unweighted spectral (in whole-octave bands) hourly L_{eq}, minimum sound level, maximum sound level, L_{10}, L_{50}, and L_{90} values. The SLM also stored broadband, A-weighted hourly sound levels. 24-hour noise measurements were performed during the week of May 4th 2009. The Champaign County sound measurement locations are listed in Table B-1.

Table B-1
Measurement Locations

Measurement Location	County	Measurement Period
ML1	Champaign	05/04/09-05/05/09
ML2	Champaign	05/04/09-05/05/09

The ambient acoustic environment in the Project area is dominated by sound from wind and vehicular traffic, with additional contributions from agriculture-related activities. Existing ambient sound levels were measured within the Project area and ranged from 34 to 62 dBA, on an L_{eq} basis. Daytime ambient sound levels were dominated by vehicular traffic and natural sources Nighttime ambient sound levels were generally dominated by natural sources.

Monitoring Location 1 (ML1)

Monitoring location 1 (ML1) was located in Compromise township in Champaign County. Sound surveys at ML1 were performed in the front yard of a residence. The primary sound sources at this location were vehicular traffic and agricultural activities.

Table B-2 summarizes the hourly measurements performed at ML1.

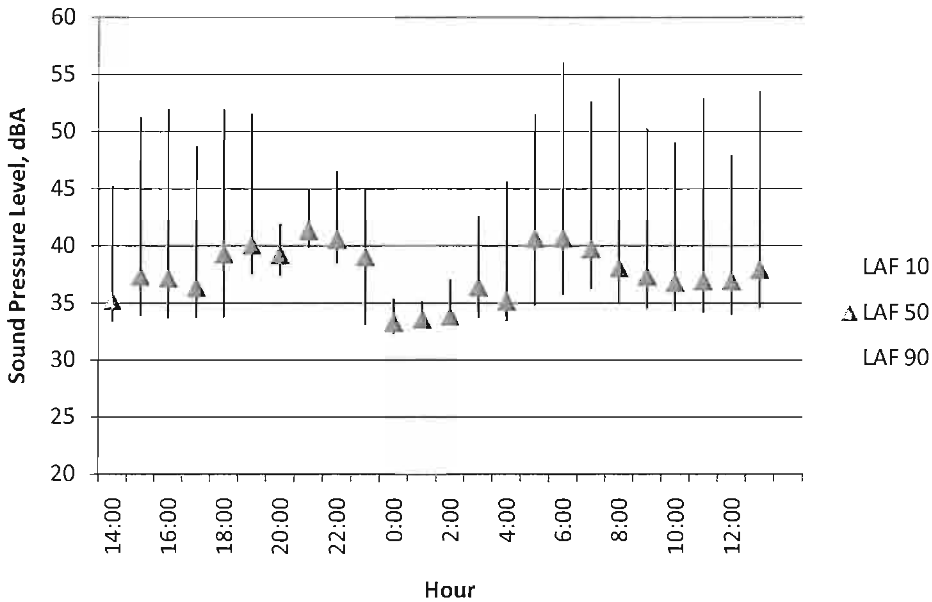
Table B-2
ML1 – Hourly Summary

Hour	Date (day-month-year)	Time (hh:mm:ss)	Duration (hh:mm:ss)	L_{eq} (dBA)
1	4-May-09	14:00:00	1:00:00	58.4
2	4-May-09	15:00:00	1:00:00	59.3
3	4-May-09	16:00:00	1:00:00	58.4
4	4-May-09	17:00:00	1:00:00	56.5
5	4-May-09	18:00:00	1:00:00	56.2
6	4-May-09	19:00:00	1:00:00	55.1
7	4-May-09	20:00:00	1:00:00	50.6
8	4-May-09	21:00:00	1:00:00	52.7
9	4-May-09	22:00:00	1:00:00	51
10	4-May-09	23:00:00	1:00:00	47.2
11	5-May-09	0:00:00	1:00:00	45.2
12	5-May-09	1:00:00	1:00:00	44.4
13	5-May-09	2:00:00	1:00:00	34.8
14	5-May-09	3:00:00	1:00:00	44.2
15	5-May-09	4:00:00	1:00:00	45
16	5-May-09	5:00:00	1:00:00	53.8
17	5-May-09	6:00:00	1:00:00	61.1
18	5-May-09	7:00:00	1:00:00	59.2
19	5-May-09	8:00:00	1:00:00	61.6
20	5-May-09	9:00:00	1:00:00	59.7
21	5-May-09	10:00:00	1:00:00	61.5
22	5-May-09	11:00:00	1:00:00	61.9
23	5-May-09	12:00:00	1:00:00	60.2
24	5-May-09	13:00:00	1:00:00	61.4

Hourly sound levels at ML1 varied from 35 to 62 dBA on an hourly L_{eq} basis. Examination of the table reveals that the highest hourly L_{eq} value (the loudest hour) occurred from 11:00 a.m. to 12:00 p.m.. Generally daytime sound levels were 10 dB louder than nighttime sound levels due to the presence of anthropogenic sound. Evening sound levels during the early morning hours were elevated due to increased traffic activity.

Figure B- 1 depicts the distribution of sound on an hourly basis. The top of each line represent the loudest 10% of the hour and the bottom of the line represents the quietest 10% of the hour. The triangle represents the median sound level.

Figure B- 1
ML1 - Sound Distribution



Median sound levels at ML1 ranged from 33 to 41 dBA dependant on the hour. There was a wide range of sound levels at ML1during daytime and nighttime hours. The wide variation in sound level during an hour indicates the presence of short duration or periodic loud events.. On average sound levels varied 15 dB between the L_{10} and L_{90} during daytime hours. This indicates the presence of intermittent loud events such as infrequent truck passbys.

Monitoring Location 2 (ML2)

Monitoring location 2 (ML2) was located in Ogden Township near 2700 E Road and 2200 North Road. Sound surveys at ML2 were performed between May 4, 2009 and May 5, 2009. The sound level meter was placed across the street from residences and work sheds.The primary sound sources at this location were vehicular traffic and agriculture related activities.

Table B-3 summarizes the hourly measurements performed at ML2.

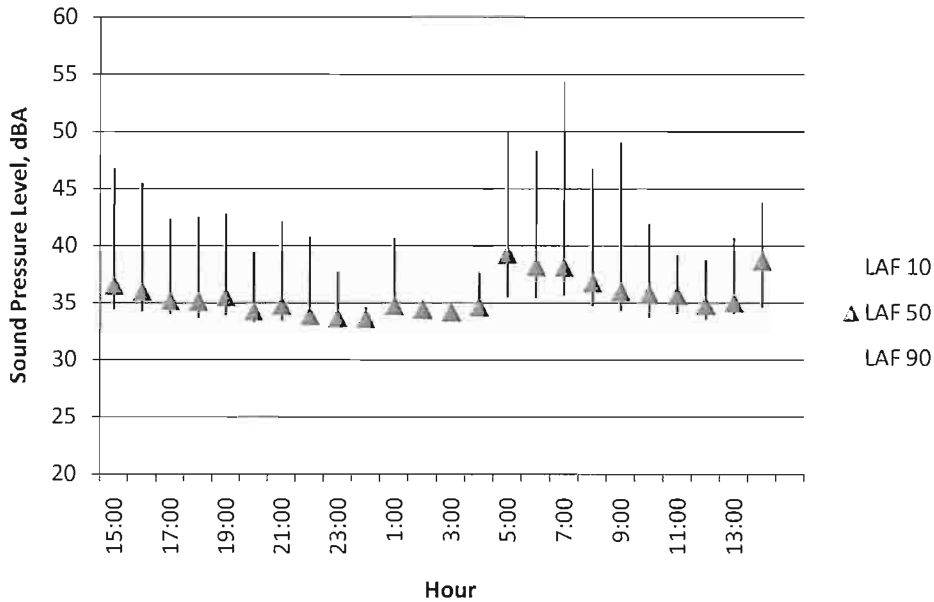
Table B-3
ML2 – Hourly Summary

Hour	Date (day-month-year)	Time (hh:mm:ss)	Duration (hh:mm:ss)	Leq (dBA)
1	4-May-09	15:00:00	1:00:00	45.5
2	4-May-09	16:00:00	1:00:00	54.9
3	4-May-09	17:00:00	1:00:00	44.7
4	4-May-09	18:00:00	1:00:00	45.2
5	4-May-09	19:00:00	1:00:00	44.3
6	4-May-09	20:00:00	1:00:00	43.8
7	4-May-09	21:00:00	1:00:00	47.4
8	4-May-09	22:00:00	1:00:00	41.3
9	4-May-09	23:00:00	1:00:00	39.0
10	5-May-09	0:00:00	1:00:00	34.1
11	5-May-09	1:00:00	1:00:00	44.0
12	5-May-09	2:00:00	1:00:00	34.2
13	5-May-09	3:00:00	1:00:00	34.1
14	5-May-09	4:00:00	1:00:00	36.8
15	5-May-09	5:00:00	1:00:00	48.8
16	5-May-09	6:00:00	1:00:00	46.4
17	5-May-09	7:00:00	1:00:00	56.4
18	5-May-09	8:00:00	1:00:00	45.0
19	5-May-09	9:00:00	1:00:00	44.8
20	5-May-09	10:00:00	1:00:00	45.7
21	5-May-09	11:00:00	1:00:00	40.1
22	5-May-09	12:00:00	1:00:00	41.5
23	5-May-09	13:00:00	1:00:00	43.1
24	5-May-09	14:00:00	1:00:00	43.5

Hourly sound levels at ML2 varied from 34 to 56 dBA on an hourly L_{eq} basis. Examination of the table reveals that the highest hourly L_{eq} value (the loudest hour) occurred from 7:00 a.m. to 8:00 a.m. Sound levels during evening hours may be lower than depicted due to internal instrumentation noise.

Figure B-2 depicts the distribution of sound on an hourly basis for monitoring location2.

Figure B-2
ML2 - Sound Distribution

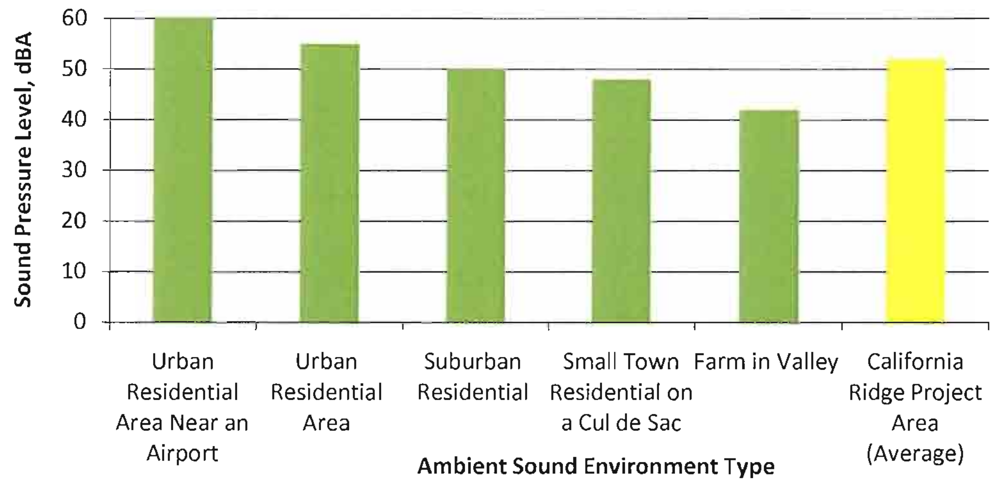


Median sound levels at ML2 ranged from 34 to 39 dBA dependant on the hour. Median sound levels at ML2 were consistent and hourly average sound levels were driven by intermittent events, such as traffic. As shown in Figure B-2, peak sound levels occurred during daytime and early morning rush hours. Sound levels during nighttime hours were fairly consistent with the L_{10} and L_{90} varying by 6 decibels on average.

Results

Results of the ambient sound monitoring indicate that sound levels found in the California Ridge project area are typical of those found in rural agricultural communities with high quality wind resources. Figure B-3 presents typical daytime sound levels, as stated in the *Handbook of Noise Control* by Cyril Harris, for various residential areas.

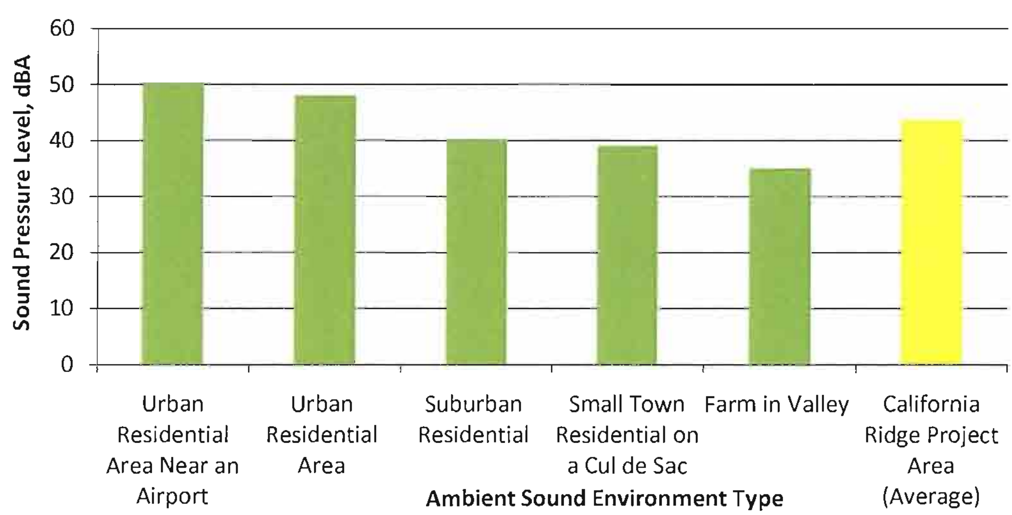
Figure B-3
Average Daytime Sound Levels



As demonstrated in Figure B-3 the outdoor ambient sound levels throughout the Project Area are comparable to a suburban residential area during daytime sound level surveys. Measured daytime sound levels for the Project Area averaged 52 dBA on an hourly, L_{eq} basis. Elevated sound levels occurred in areas near truck haul routes.

Figure B-4 presents typical nighttime sound levels for various residential areas in comparison to measured sound levels in the California Ridge project area.

Figure B-4
Average Nighttime Sound Levels



As demonstrated in Figure B-4, the outdoor ambient sound levels throughout the Project Area are also comparable to a suburban residential area during nighttime sound level surveys. Measured nighttime sound levels for the Project Area averaged 44 dBA on an hourly, L_{eq} basis. This is approximately 8 dB lower than daytime hours, which is typical of diurnal sound patterns.

Table B-4 presents spectral monitoring data for the loudest daytime hours (from the 24 hour period at each measurement location), and compares it with maximum allowable sound levels.

Table B-4
Daytime Spectral Ambient Sound Monitoring Data

Data Type	Leq	1/1 Octave Band (dB)							
	dBA	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
ML1 Loudest Daytime Hour	62	68	64	61	60	58	53	46	37
ML2 Loudest Daytime Hour	56	58	54	48	50	53	47	47	52
Maximum Allowable Daytime Sound Level		74	69	64	58	52	47	43	40

Note: bold font indicates exceedance

As shown in Table B-4, daytime monitoring data in exceeds the maximum allowable daytime sound levels in the 500 Hz, 1 kHz, 2 kHz, and 4 kHz octave bands.

Table B-5 presents spectral monitoring data for the loudest nighttime hours (from the 24 hour period at each measurement location), and compares it with maximum allowable sound levels.

Table B-5
Nighttime Spectral Ambient Sound Monitoring Data

Data Type	Leq	1/1 Octave Band (dB)							
	dBA	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
ML1 Loudest Nighttime Hour	61	67	67	58	56	58	53	44	35
ML2 Loudest Nighttime Hour	49	56	48	43	47	42	42	39	32
Maximum Allowable Nighttime Sound Level		67	62	54	47	41	36	32	32

Note: bold font indicates exceedance

As shown in Table B-5, monitoring data in exceed the maximum allowable nighttime noise levels in eight octave bands, the 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, and 8 kHz octave bands.

HDR's monitoring results show that existing ambient sound levels in the Project area exceed three or more of the IEPA spectral noise limits during both the daytime and the nighttime. This is consistent with noise monitoring data HDR collected in other rural areas of Illinois with high quality wind resources.

Appendix C
Cadna-A Modeling Results

Table C-1
Cadna-A Modeling Results

Receptor #	Hourly Leq (dB)									
	Overall dBA	Octave Band (Hertz)								
		31.5	63	125	250	500	1000	2000	4000	8000
C_1	31	58.2	54.1	41.2	29	21.3	18.7	0	0	0
C_10	32.4	59.6	55.5	42.7	30.4	22.5	19.4	0	0	0
C_2	30.8	56	52.2	41.6	30.3	23.2	21.5	5.8	0	0
C_3	31.1	56.3	52.5	41.9	30.5	23.4	21.9	6.6	0	0
C_4	31.2	58.3	54.2	41.4	29.3	21.8	19.7	2.1	0	0
C_5	33.3	59.6	55.6	43.2	31.7	25	24.2	10.6	0	0
C_6	32.7	59.2	55.2	42.8	31.2	24.3	23.2	8.7	0	0
C_7	34	59.7	55.8	43.9	32.7	26.3	25.9	13.6	0	0
C_8	31.8	58.1	54.1	42	30.4	23.3	21.9	6.6	0	0
C_9	32.2	59.4	55.3	42.4	30.2	22.4	19.6	1.2	0	0
C_R0002	43.1	65.3	61.7	51.5	41.1	36.3	38.3	32.9	11.4	0
C_R0003	35.6	60.6	56.7	44.9	34.2	28.3	28.9	20	0	0
C_R0004	34.5	59.9	56	44.1	33.2	27	27	16.2	0	0
C_R0005	35.5	60.5	56.6	45	34.3	28.3	28.6	18.2	0	0
C_R0006	32.5	58.8	54.8	42.5	31.1	24.3	23	7.6	0	0
C_R0007	33.1	58.3	54.5	43.3	32.5	26	25.2	11.6	0	0
C_R0008	32.7	58.1	54.3	42.9	31.9	25.4	24.3	9.5	0	0
C_R0009	32.1	57.7	53.9	42.4	31.3	24.5	23.1	7.2	0	0
C_R0010	36	61.3	57.4	45.7	34.9	28.9	28.8	17.1	0	0
C_R0011	37.9	62.3	58.5	47.1	36.7	31.1	31.7	22.2	0	0
C_R0012	39.4	63.3	59.6	48.4	38.1	32.7	33.7	25.3	0	0
C_R0013	43.6	66.5	62.8	52.1	41.9	36.9	38.6	32.3	8.6	0
C_R0014	41.6	64.8	61.1	50.3	40.1	34.9	36.3	29	3.6	0
C_R0015	40.9	64.1	60.5	49.7	39.6	34.3	35.5	27.7	0	0
C_R0016	42.3	65.3	61.6	50.9	40.6	35.6	37.2	30.8	5.9	0
C_R0017	42.4	65.1	61.4	50.9	40.4	35.4	37.3	31.9	11.6	0
C_R0018	43.6	66	62.4	52	41.5	36.6	38.6	33.3	12.2	0
C_R0019	38.9	62.2	58.5	47.7	37.4	32.1	33.5	26.6	0.4	0
C_R0020	37.5	62	58.2	46.6	36.1	30.5	31.5	23.1	0	0

Receptor #	Hourly Leq (dB)									
	Overall dBA	Octave Band (Hertz)								
		31.5	63	125	250	500	1000	2000	4000	8000
C_R0021	39	63.7	59.9	48.4	37.8	32	32.5	23.1	0	0
C_R0022	41.4	64.9	61.2	50.3	39.9	34.6	35.9	28.8	4.2	0
C_R0023	40.6	64.5	60.8	49.7	39.3	33.8	34.8	26.5	0	0
C_R0024	40.6	64.3	60.6	49.6	39.3	33.9	34.9	26.7	0	0
C_R0026	43.2	65.9	62.2	51.8	41.1	36.1	37.9	32.8	13.8	0
C_R0027	43.6	66.1	62.4	52.1	41.4	36.4	38.4	33.7	15.3	0
C_R0028	40.4	64.2	60.4	49.3	38.7	33.3	34.7	28.7	6.7	0
C_R0029	40	64	60.2	49	38.6	33.2	34.3	26.4	0	0
C_R0030	40	64.3	60.5	49.2	38.7	33.1	33.9	25.8	0	0
C_R0031	41	65	61.2	50	39.6	34.1	35.2	27.6	0.1	0
C_R0032	40.8	64.9	61.2	49.9	39.5	33.9	34.9	27.3	0	0
C_R0033	41.4	65.1	61.3	50.3	39.9	34.6	35.8	28.7	1.2	0
C_R0034	42.2	65.6	61.9	51	40.5	35.3	36.8	30.8	7.9	0
C_R0035	43.1	66	62.3	51.8	41.1	36.1	37.9	32.7	12.9	0
C_R0036	36.9	62.3	58.5	46.7	35.8	29.5	29.2	17.8	0	0
C_R0037	39.8	64.1	60.3	49	38.4	32.8	33.7	26.4	0.7	0
C_R0038	39.8	64.3	60.5	49	38.5	32.8	33.7	25.3	0	0
C_R0039	36.1	61.7	57.8	45.8	34.8	28.5	28.3	17.3	0	0
C_R0040	33.9	59.9	56	44.3	33	26	24.3	7.9	0	0
C_R0041	34.4	61	57	44.7	33	25.7	23.5	6	0	0
C_R0042	37	62.7	58.9	47	36	29.4	28.5	15	0	0
C_R0043	39.7	64.3	60.6	49.1	38.6	32.7	33.2	23.4	0	0
C_R0044	43.2	66.3	62.6	51.9	41.4	36.2	37.8	31.9	11.6	0
C_R0045	44.6	67.4	63.7	53.1	42.7	37.7	39.5	33.6	10.9	0
C_R0046	44.9	67.6	63.9	53.4	43	38	39.9	34.3	11.9	0
C_R0047	28.6	54.7	50.8	39.4	27.7	20.1	17.2	0	0	0
C_R0048	32.1	58.6	54.7	42.3	30.7	23.5	21.4	3.1	0	0
C_R0049	35	60.6	56.8	44.9	33.9	27.6	26.9	12.9	0	0
C_R0050	35	60.4	56.6	44.9	34	27.7	27.1	13.5	0	0
C_R0051	35.6	61.1	57.2	45.4	34.5	28.3	27.8	14.3	0	0
C_R0052	35.7	61	57.1	45.2	34.4	28.4	28.5	18.3	0	0

Receptor #	Hourly Leq (dB)									
	Overall dBA	Octave Band (Hertz)								
		31.5	63	125	250	500	1000	2000	4000	8000
C_R0053	33.7	60.4	56.4	43.9	32.1	24.8	22.7	5.8	0	0
C_R0054	34.1	60.7	56.7	44.4	32.7	25.3	23	4.7	0	0
C_R0192	39.9	63.9	60.2	49	38.3	32.8	34	27.6	4.4	0
C_R0255	34	60.3	56.4	44.4	32.9	25.6	23.5	5.6	0	0
C_R0279	31.5	56.7	52.9	41.8	30.9	24.2	23.1	8.4	0	0
C_R0292	30.1	57.7	53.5	40.3	27.8	19.6	15.7	0	0	0
C_R0293	30.3	57.8	53.6	40.5	28.1	20	16.2	0	0	0
C_R0294	30.3	57.8	53.6	40.5	28.1	20	16.2	0	0	0
C_R0295	30.5	57.9	53.7	40.7	28.3	20.3	16.7	0	0	0
C_R0296	31.4	58.4	54.4	41.7	29.7	22.1	19.3	0	0	0
C_R0316	28.9	56.8	52.5	39	26.1	17.3	12.3	0	0	0
C_R0317	29.1	56.6	52.5	39.4	26.8	18.3	13.7	0	0	0
C_R0318	29	56.4	52.3	39.4	26.8	18.4	13.9	0	0	0
C_R0326	29.6	57.1	53	39.8	27.3	19.1	15.2	0	0	0
C_R0327	29.5	57.1	52.9	39.7	27.2	18.9	15.1	0	0	0
C_R0339	30.1	57.5	53.3	40.3	28	20.1	17	0	0	0
C_R0354	29.9	57.4	53.2	40	27.4	19.4	16.2	0	0	0
C_R0364	30.2	57.6	53.4	40.3	27.9	20.1	17.1	0	0	0
C_R0506	44	66.7	63.1	52.5	42	37	38.8	33.3	11.7	0
C_R0990	35.3	60.6	56.6	44.8	33.9	27.9	28.4	19.3	0	0
C_R0991	30.5	57.9	53.8	40.6	28.3	20.4	17.7	0	0	0
C_R0992	30.7	58	53.8	40.8	28.7	21.1	18.7	1	0	0
C_R1018	30.4	57.8	53.7	40.5	28.1	20.2	17.3	0	0	0
C_R1021	37.7	62.9	59	47.2	36.3	30.3	30.7	21.9	0	0
C_R1022	35.9	61.9	58	45.8	34.5	27.9	27.3	15.6	0	0
C_R1023	33.6	60.1	56.2	44	32.3	24.8	22.6	5.8	0	0
C_R1024	34.4	61.1	57.1	44.6	32.8	25.4	23.1	6.1	0	0
C_R1025	32.3	59.6	55.6	42.6	30.2	22	18.6	0	0	0
C_R1026	32.9	60	55.9	43.1	31	23.1	20.4	3.2	0	0
C_R1027	33.3	60.2	56.2	43.5	31.5	24	21.8	6.2	0	0
C_R1028	32.2	59.6	55.5	42.5	30	21.8	18.3	0	0	0

Receptor #	Hourly Leq (dB)									
	Overall dBA	Octave Band (Hertz)								
		31.5	63	125	250	500	1000	2000	4000	8000
C_R1029	34.4	60.8	56.8	44.4	32.9	25.9	24.9	12.5	0	0
C_R1030	35.8	61.4	57.5	45.5	34.4	28	28	18.2	0	0
C_R1031	35.2	61.4	57.4	45.2	33.7	26.9	26	14.8	0	0
C_R1032	36.5	61.8	57.9	46.1	35.1	28.9	29.3	21.2	0	0
C_R1033	36.3	61.7	57.8	45.9	34.9	28.7	29	19.8	0	0
C_R1034	36.3	61.5	57.7	45.7	34.8	28.7	29.2	20.6	0	0
C_R1035	37	61.7	57.8	46.2	35.4	29.6	30.7	23.8	0	0
C_R1036	37.2	61.6	57.8	46.4	35.6	29.9	31	24.1	0	0
C_R1037	35.6	60.9	57	45.1	34.1	28.1	28.4	19.5	0	0
C_R1038	41	63.5	59.9	49.7	39.3	34.2	35.9	30.3	9.8	0
C_R1039	38.4	62.4	58.7	47.4	37.1	31.6	32.6	24.4	0	0
C_R1040	40.4	64.1	60.3	49.3	38.6	33.2	34.7	29.1	7.8	0
C_R1041	38.4	61.6	57.9	47.4	37	31.7	33	26.3	0.7	0
C_R1042	39.9	63.4	59.7	48.8	38.3	32.9	34.4	28.2	4.8	0
C_R1043	35.7	61.8	57.9	45.8	34.4	27.6	26.5	14.6	0	0
C_R1044	37.8	62.9	59.1	47.6	36.8	30.6	30.5	20.2	0	0
C_R1045	39.2	63.7	59.9	48.4	37.7	31.9	32.9	25.7	0	0
C_R1046	36.9	61.5	57.8	47.1	36.5	30.1	29.3	16.2	0	0
C_R1047	33.7	60.5	56.5	43.8	31.9	24.5	22.7	7.3	0	0
C_R1048	34.5	61	57	44.6	32.9	25.7	24.3	10.4	0	0
C_R1049	33.8	60.6	56.6	44	32.1	24.6	22.5	6.5	0	0
C_R1050	32.9	60.1	56	43.2	30.9	22.9	19.8	0.7	0	0
C_R1051	32.6	59.9	55.9	42.9	30.5	22.3	18.7	0	0	0
C_R1052	32.3	59.7	55.6	42.7	30.1	21.7	17.7	0	0	0
C_R1053	32.2	59.6	55.5	42.5	29.9	21.5	17.4	0	0	0
C_R1054	32.2	59.6	55.5	42.5	29.9	21.5	17.4	0	0	0
C_R1055	32	59.5	55.4	42.3	29.7	21.1	16.8	0	0	0
C_R1056	31.8	59.3	55.2	42.2	29.5	20.8	16.4	0	0	0
C_R1057	31.8	59.3	55.2	42.2	29.5	20.8	16.3	0	0	0
C_R1058	31.1	58.9	54.7	41.4	28.4	19.4	14.3	0	0	0
C_R1059	31.2	58.9	54.7	41.4	28.5	19.5	14.6	0	0	0

Receptor #	Hourly Leq (dB)									
	Overall dBA	Octave Band (Hertz)								
		31.5	63	125	250	500	1000	2000	4000	8000
C_R1060	31.6	59.2	55	41.9	29.1	20.3	15.7	0	0	0
C_R1061	31.7	59.3	55.2	42	29.3	20.7	16.3	0	0	0
C_R1062	31.8	59.4	55.3	42.1	29.4	20.7	16.2	0	0	0
C_R1063	31.9	59.4	55.3	42.2	29.5	20.9	16.4	0	0	0
C_R1064	31.4	59.1	54.9	41.6	28.7	19.7	14.6	0	0	0
C_R1065	31.6	59.2	55.1	41.9	29.1	20.3	15.8	0	0	0
C_R1066	32.8	60	55.9	43.1	30.8	22.8	20	1.8	0	0
C_R1067	33.4	60.3	56.3	43.6	31.6	24	21.9	5.7	0	0
C_R1068	32	59.2	55.1	42.1	29.8	21.9	19.3	2.5	0	0
C_R1069	31.3	58.8	54.6	41.5	28.8	20.4	16.8	0	0	0
C_R1070	31	58.7	54.5	41.2	28.4	19.7	15.6	0	0	0
C_R1071	35.8	61	57.1	45.3	34.5	28.6	29	19.8	0	0
C_R1072	36.9	62.7	58.8	47	35.9	29.3	28.2	13.8	0	0
C_R1073	31.3	59	54.8	41.5	28.6	19.8	14.9	0	0	0
C_R1074	31.3	59	54.8	41.6	28.7	19.8	14.9	0	0	0
C_R1075	31.3	59	54.9	41.6	28.7	19.8	15	0	0	0
C_R1076	31.4	59	54.9	41.7	28.8	19.9	15.1	0	0	0
C_R1077	31.4	59.1	54.9	41.7	28.8	20	15.1	0	0	0
C_R1078	31.4	59.1	54.9	41.7	28.8	20	15.2	0	0	0
C_R1079	31.5	59.1	55	41.8	28.9	20.1	15.4	0	0	0
C_R1080	31.5	59.1	55	41.7	28.9	20.1	15.3	0	0	0
C_R1081	31.4	59.1	54.9	41.7	28.9	20	15.3	0	0	0
C_R1082	31.4	59	54.9	41.7	28.8	20	15.2	0	0	0
C_R1083	31.4	59	54.9	41.7	28.8	19.9	15.2	0	0	0
C_R1084	31.5	59.1	55	41.8	28.9	20.1	15.5	0	0	0
C_R1085	31.5	59.1	55	41.8	29	20.2	15.5	0	0	0
C_R1086	31.5	59.1	55	41.8	29	20.2	15.6	0	0	0
C_R1087	31.2	58.9	54.8	41.5	28.5	19.6	14.7	0	0	0
C_R1088	31.2	58.9	54.8	41.5	28.6	19.6	14.7	0	0	0
C_R1089	31.3	59	54.8	41.5	28.6	19.7	14.7	0	0	0
C_R1090	31.3	59	54.8	41.6	28.6	19.7	14.8	0	0	0

Receptor #	Hourly Leq (dB)									
	Overall dBA	Octave Band (Hertz)								
		31.5	63	125	250	500	1000	2000	4000	8000
C_R1091	31.3	59	54.9	41.6	28.7	19.8	14.8	0	0	0
C_R1092	31.3	59	54.9	41.6	28.7	19.8	14.9	0	0	0
C_R1093	31.4	59	54.9	41.6	28.7	19.9	15	0	0	0
C_R1094	31.2	58.9	54.8	41.4	28.5	19.5	14.5	0	0	0
C_R1095	31.2	58.9	54.8	41.5	28.5	19.6	14.6	0	0	0
C_R1096	31.3	58.9	54.8	41.5	28.6	19.6	14.6	0	0	0
C_R1097	31.3	59	54.8	41.5	28.6	19.7	14.7	0	0	0
C_R1098	31.3	59	54.8	41.6	28.6	19.7	14.7	0	0	0
C_R1099	31.3	59	54.9	41.6	28.7	19.8	14.8	0	0	0
C_R1100	31.2	58.9	54.7	41.4	28.5	19.5	14.4	0	0	0
C_R1101	31.2	58.9	54.8	41.5	28.5	19.5	14.4	0	0	0
C_R1102	31.2	58.9	54.8	41.5	28.5	19.5	14.5	0	0	0
C_R1103	31.3	59	54.8	41.5	28.6	19.6	14.6	0	0	0
C_R1104	31.5	59.1	55	41.8	29	20.1	15.3	0	0	0
C_R1105	31.5	59.2	55	41.8	29	20.2	15.4	0	0	0
C_R1106	31.6	59.2	55.1	41.9	29	20.2	15.4	0	0	0
C_R1107	31.6	59.2	55.1	41.9	29	20.2	15.4	0	0	0
C_R1108	31.6	59.2	55.1	41.9	29.1	20.3	15.5	0	0	0
C_R1109	31.6	59.2	55.1	41.9	29.1	20.3	15.6	0	0	0
C_R1110	31.7	59.2	55.1	41.9	29.1	20.4	15.6	0	0	0
C_R1111	31.7	59.3	55.1	42	29.2	20.4	15.7	0	0	0
C_R1112	31.7	59.3	55.2	42	29.2	20.5	15.8	0	0	0
C_R1113	31.7	59.3	55.2	42	29.3	20.5	15.8	0	0	0
C_R1114	31.8	59.3	55.2	42.1	29.3	20.5	15.9	0	0	0
C_R1115	31.8	59.3	55.2	42.1	29.3	20.7	16.1	0	0	0
C_R1116	31.9	59.4	55.3	42.2	29.5	20.9	16.4	0	0	0
C_R1117	31.9	59.4	55.3	42.2	29.5	20.8	16.3	0	0	0
C_R1118	31.9	59.4	55.3	42.2	29.5	20.9	16.5	0	0	0
C_R1119	31.8	59.3	55.2	42.1	29.3	20.6	16	0	0	0
C_R1120	31.8	59.3	55.2	42.1	29.3	20.6	16.1	0	0	0
C_R1121	31.8	59.4	55.3	42.1	29.4	20.7	16.1	0	0	0

Receptor #	Hourly Leq (dB)									
	Overall dBA	Octave Band (Hertz)								
		31.5	63	125	250	500	1000	2000	4000	8000
C_R1122	31.8	59.4	55.3	42.1	29.4	20.7	16.2	0	0	0
C_R1123	32.6	59.9	55.8	42.9	30.5	22.2	18.5	0	0	0
C_R1124	32.6	59.9	55.8	42.9	30.4	22.1	18.4	0	0	0
C_R1125	32.5	59.9	55.8	42.9	30.4	22.1	18.4	0	0	0
C_R1126	32.5	59.8	55.8	42.8	30.3	22	18.3	0	0	0
C_R1127	32.5	59.8	55.7	42.8	30.3	22	18.1	0	0	0
C_R1128	32.4	59.8	55.7	42.7	30.2	21.9	18	0	0	0
C_R1129	32.4	59.8	55.7	42.7	30.2	21.8	17.9	0	0	0
C_R1130	32.4	59.7	55.7	42.7	30.1	21.7	17.8	0	0	0
C_R1131	32.3	59.7	55.6	42.7	30.1	21.7	17.7	0	0	0
C_R1132	32.3	59.7	55.6	42.6	30	21.6	17.5	0	0	0
C_R1133	32.1	59.5	55.4	42.5	29.9	21.5	17.3	0	0	0
C_R1134	32.3	59.7	55.6	42.6	30	21.6	17.6	0	0	0
C_R1135	32.3	59.7	55.6	42.6	30.1	21.7	17.7	0	0	0
C_R1136	32.4	59.7	55.7	42.7	30.1	21.7	17.8	0	0	0
C_R1137	32.4	59.8	55.7	42.7	30.2	21.8	17.9	0	0	0
C_R1138	32.3	59.7	55.6	42.6	30	21.6	17.5	0	0	0
C_R1139	32.3	59.7	55.6	42.6	30.1	21.6	17.6	0	0	0
C_R1140	32.3	59.7	55.6	42.6	30.1	21.7	17.7	0	0	0
C_R1141	32.4	59.7	55.7	42.7	30.1	21.7	17.8	0	0	0
C_R1142	32.1	59.5	55.4	42.5	29.9	21.5	17.4	0	0	0
C_R1143	32.2	59.5	55.5	42.6	30	21.5	17.5	0	0	0
C_R1144	32.3	59.7	55.6	42.6	30	21.6	17.6	0	0	0
C_R1145	32.3	59.7	55.6	42.6	30.1	21.7	17.7	0	0	0
C_R1146	32.1	59.5	55.4	42.5	29.9	21.4	17.3	0	0	0
C_R1147	32.3	59.7	55.6	42.6	30	21.5	17.5	0	0	0
C_R1148	32	59.4	55.3	42.3	29.7	21.1	16.9	0	0	0
C_R1149	32	59.4	55.3	42.4	29.8	21.2	17	0	0	0
C_R1150	32.1	59.4	55.4	42.4	29.8	21.3	17.1	0	0	0
C_R1151	31.9	59.3	55.2	42.2	29.5	20.9	16.5	0	0	0
C_R1152	31.9	59.3	55.3	42.2	29.6	21	16.6	0	0	0

Receptor #	Hourly Leq (dB)									
	Overall dBA	Octave Band (Hertz)								
		31.5	63	125	250	500	1000	2000	4000	8000
C_R1153	31.9	59.4	55.3	42.3	29.6	21	16.7	0	0	0
C_R1154	32	59.4	55.3	42.3	29.7	21.2	16.9	0	0	0
C_R1155	31.8	59.1	55.1	42.2	29.7	21.2	17.1	0	0	0
C_R1156	31.9	59	55	42.5	29.8	21.3	17.2	0	0	0
C_R1157	32.2	59.6	55.5	42.5	29.9	21.4	17.3	0	0	0
C_R1158	31.9	59.4	55.3	42.3	29.6	21	16.7	0	0	0
C_R1159	32	59.4	55.3	42.3	29.7	21.1	16.9	0	0	0
C_R1160	31.8	59.3	55.2	42.2	29.5	20.9	16.4	0	0	0
C_R1161	31.9	59.3	55.2	42.2	29.6	20.9	16.5	0	0	0
C_R1162	31.9	59.4	55.3	42.2	29.5	20.9	16.4	0	0	0
C_R1163	31.9	59.4	55.3	42.2	29.5	20.9	16.5	0	0	0
C_R1164	31.9	59.3	55.3	42.2	29.6	20.9	16.5	0	0	0
C_R1165	31.9	59.4	55.3	42.3	29.6	21	16.6	0	0	0
C_R1166	31.9	59.4	55.3	42.3	29.7	21.1	16.7	0	0	0
C_R1167	32	59.4	55.3	42.3	29.7	21.1	16.8	0	0	0
C_R1168	32	59.4	55.3	42.3	29.7	21.1	16.8	0	0	0
C_R1169	32	59.4	55.3	42.4	29.7	21.2	16.9	0	0	0
C_R1170	32	59.4	55.4	42.4	29.8	21.2	17	0	0	0
C_R1171	32	59.4	55.3	42.3	29.7	21.1	16.8	0	0	0
C_R1172	32	59.4	55.3	42.3	29.7	21.2	16.9	0	0	0
C_R1173	32	59.4	55.3	42.3	29.7	21.2	16.9	0	0	0
C_R1174	32	59.4	55.4	42.4	29.8	21.3	17	0	0	0
C_R1175	32.1	59.5	55.4	42.4	29.8	21.3	17.1	0	0	0
C_R1176	32.1	59.5	55.4	42.5	29.9	21.4	17.3	0	0	0
C_R1177	32.1	59.5	55.4	42.5	29.9	21.5	17.4	0	0	0
C_R1178	32.1	59.5	55.4	42.4	29.9	21.4	17.2	0	0	0
C_R1179	32.1	59.5	55.4	42.4	29.9	21.4	17.2	0	0	0
C_R1180	32	59.4	55.4	42.4	29.8	21.3	17	0	0	0
C_R1181	32.1	59.5	55.4	42.4	29.9	21.3	17.1	0	0	0
C_R1182	32.1	59.5	55.4	42.4	29.9	21.4	17.2	0	0	0
C_R1183	32.2	59.7	55.6	42.5	30	21.5	17.3	0	0	0

Receptor #	Hourly Leq (dB)									
	Overall dBA	Octave Band (Hertz)								
		31.5	63	125	250	500	1000	2000	4000	8000
C_R1184	32.2	59.7	55.6	42.6	30	21.5	17.4	0	0	0
C_R1185	32.3	59.7	55.6	42.6	30	21.6	17.5	0	0	0
C_R1186	32.2	59.7	55.6	42.6	30	21.5	17.4	0	0	0
C_R1187	32.2	59.6	55.6	42.5	30	21.5	17.3	0	0	0
C_R1188	32.1	59.5	55.4	42.5	29.9	21.4	17.2	0	0	0
C_R1189	31.9	59.4	55.3	42.3	29.7	21.1	16.7	0	0	0
C_R1190	32	59.5	55.4	42.3	29.6	21	16.6	0	0	0
C_R1191	32	59.5	55.4	42.3	29.7	21.1	16.7	0	0	0
C_R1192	31.9	59.4	55.3	42.2	29.5	20.9	16.4	0	0	0
C_R1193	32	59.5	55.4	42.3	29.6	21.1	17.1	0	0	0
C_R1194	33.2	60.2	56.2	43.4	31.2	23.5	21.1	4	0	0
C_R1319	31.1	58.3	54.2	41.2	29.1	21.6	19.4	2.3	0	0
C_R1320	32.4	59.4	55.4	42.6	30.5	23	21	6	0	0
C_R1322	41.6	64.8	61.1	50.4	40.1	34.9	36.2	29.6	5.7	0

Negative sound levels are represented as 0 dB

APPENDIX D

CONTAINS SENSITIVE BIOLOGICAL DATA – NOT FOR PUBLIC DISTRIBUTION OR DISCLOSURE

PN 1664.019-001 April 2009

CHIROPTERAN RISK ASSESSMENT: PROPOSED CALIFORNIA RIDGE WIND ENERGY GENERATION FACILITY CHAMPAIGN AND VERMILION COUNTIES, ILLINOIS

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1.0 INTRODUCTION

Invenergy Wind LLC of Chicago, Illinois, proposes construction of the California Ridge wholesale wind energy generation facility in Champaign and Vermilion counties, Illinois (Figure 1). The general location of the California Ridge facility ("Project planning area") spans 15.95 mi^2 (41.32 km^2) of eastern Champaign County and 35.96 mi^2 (93.13 km^2) of western Vermilion County. Towns near the Project planning area include Rantoul, Gifford, Potomac, Muncie, Fithian, Royal, Ogden, Oakwood, and Saint Joseph, Illinois (Figure 2). The project planning area is approximately 0.25 percent forested, with forested areas restricted to small isolated woodlots and trees along farm drains and perennial streams. The closest heavily forested areas are along the Middle Fork and Salt Fork Vermilion River floodplains located less than 1 mile east and approximately 4 miles south of the planning area. Land use within the Project planning area is primarily agricultural (Figure 2).

The Project planning area represents the maximum area considered for placement of turbines and facility infrastructure. The actual area occupied by the turbines and access roads that will comprise the facility will be a very small percentage of the Project planning area.

The California Ridge facility will consist of approximately 80-133 wind turbines, depending on final turbine model selection, located in strings or arrays within the Project planning area. Wind turbine models under consideration are the GE model 1.5sle and the GE 2.5xl. This risk assessment is applicable to both models.

The GE model 1.5sle will have a nameplate generating capacity of 1.5 megawatts (MW), yielding a total nameplate project capacity of 199.5 MW. The proposed hub height is about 262 ft (80 m) above ground level (agl) and rotors will be approximately 126 ft (38.5 m) long. With the rotor tip in the 12 o'clock position, the wind turbines will reach a maximum height of approximately 390 ft (119 m) agl. At the 6 o'clock position, the rotor tip will be approximately 138 ft (42 m) agl. The turbine rotor will turn at a maximum operating speed of 20.4 revolutions per minute (rpm). The turbines have a nominal "cut-in speed" of 7.9 miles per hour (mph; 3.5 meters per second [m/s]). That is, winds of 3.5 m/s contain sufficient energy to support the generation of electric power by the turbine. At wind speeds below 3.5 m/s, as measured by an anemometer atop each nacelle, the turbine's "primary brake" is applied (i.e., the turbine blades are feathered by orienting the primary surface of each blade parallel to the wind direction). With the primary brake applied, the blades will not rotate around the hub, or will rotate very slowly (less than 1 rpm). Control systems allow the cut-in wind speed to be set independently at each turbine. Wind speeds above 3.5 m/s will result in blade speeds of 1 to 20.4 rpm, depending upon wind speeds. If wind speeds at an operating (spinning) turbine drop below the cut-in speed, the primary brake is applied and the blades come to a stop within approximately one minute.

The GE model 2.5 xl will have a nameplate generating capacity of 2.5 megawatts (MW), yielding a total nameplate project capacity of 200 MW. The proposed hub height is about 328 ft (100 m) above ground level (agl) and rotors will be approximately 164 ft (50 m) long. With the rotor tip in the 12 o'clock position, the wind turbines will reach a maximum height of approximately 492 ft (150 m) agl. At the 6 o'clock position, the rotor tip will be approximately 138 ft (50 m) agl. The turbines have a nominal "cut-in speed" of 7.9 miles per hour (mph; 3.5 meters per second [m/s]). Operation and braking systems are the same as the 1.5sle unit.

BHE assumes turbines will be lit with red strobe-like or incandescent flashing lights. Lighting will be limited to the minimum number required by the Federal Aviation Administration (FAA) for aircraft safety.

Based on other sites using the same turbine model, BHE assumes each turbine tower will be set upon a concrete pad with an aboveground diameter of approximately 15 ft (4.5 m). Nominally, crops and other vegetation within approximately 180 ft (55 m) of each tower site will be cleared, yielding a maximum of 133, 2.34-acre openings (311 acres of clearing for tower sites). The total cleared area required for erection of turbines will be approximately 0.49 mi^2 (1.26 km^2), or approximately 0.94 percent of the total Project planning area. A 2.5 MW turbine array would require only 80 units so 40% less land would be disturbed. As tree cover is extremely sparse within the planning area and most land use is cropland, little or no tree removal is expected to be necessary for construction of turbines or access roads.

Interactions between wind turbines and wildlife, particularly flying animals such as birds and bats, are a known and documented occurrence. Utility-scale wind turbines can directly and indirectly affect bats that occur in or migrate through the wind energy generation facility. Collisions between bats and other aerial manmade structures are well documented. Numerous impacts with television towers, other communication towers, large buildings, power lines, and fences have been reported (Terres 1956, Timm 1989, Martin et al. 2005). In some cases, bat collisions with wind turbine blades appear to occur at higher rates. At this time, such cases of higher fatality rates appear to be limited to sites located on forested Appalachian ridgelines (e.g., the Meyersdale, Pennsylvania, Mountaineer, West Virginia, and Buffalo Mountain, Tennessee wind energy generation facilities discussed later in this document; Arnett et al. 2008; Fiedler et al. 2007).

In evaluating the risk of bat mortality at this site, which is located on primarily flat, agricultural land, it is useful to consider mortalities at other operating utility-scale wind energy generation facilities in the Midwestern United States. Bat mortality studies with statistical corrections for searcher efficiency and scavenger removal have been completed at the following wind development sites in the midwestern United States. (Figure 3):

- 54.5 MW (33 turbines) Crescent Ridge wind power project, Bureau County, Illinois; located approximately 119 mi (191 km) northwest of the California Ridge Project planning area;
- 80.1 MW (89 turbines) Top of Iowa wind power development site, Worth County, Iowa; located approximately 354 mi (569 km) northwest of the Project planning area;
- 20.5 MW (31 turbines) wind power development site near Lincoln, Kewaunee County, Wisconsin; located approximately 295 mi (474 km) north of the Project planning area; and
- 236 MW (354 turbines) Buffalo Ridge wind power development site, Lincoln and Pipestone counties, Minnesota; located approximately 512 mi (824 km) northwest of the Project planning area.

This report documents design and site attributes of the proposed California Ridge wind energy generation facility, evaluates the avenues by which bats may be affected by the California Ridge facility, and provides a review of information pertaining to bat mortality at existing wind energy generation facilities. Based upon these data, and upon information provided by state wildlife agencies and the U.S. Fish and Wildlife Service (USFWS), we qualitatively estimate the risk of effects to bats posed by the California Ridge facility.

2.0 DESCRIPTION OF THE PROJECT AREA

2.1 REGIONAL CONDITIONS

The following text describes the ecological region in which the proposed California Ridge wind energy generation facility (the "Project") occurs. This description is useful in understanding the nature and important ecological aspects of the area.

The Project lies within the Prairie Parkland (Temperate) Ecological Province of the United States (USFS 1994). Within this Province, the Project is located in Ecoregion Section 251G—Central Loess Plains (Figure 4). Of all the wind energy generation facilities at which bat mortality studies have been completed, only one (Crescent Ridge, Bureau County, Illinois) is within this same Ecoregion Section. Ecological aspects of Crescent Ridge, Top of Iowa, Lincoln, and Buffalo Ridge (four midwestern operating wind energy generation facilities at which bat mortality studies have been completed) are shown in Table 1 for comparison. These wind energy generation facilities occupy areas dominated by agriculture and cropland comparable to the California Ridge Project planning area.

Ecoregion Section 251G comprises part of the Central Lowlands and Great Plains geomorphic provinces and is characterized by dissected loess plains with gently rolling smooth, and irregular plains mantled by loess. Section 251G is predominantly Quaternary glacial till, lacustrine, and fluvial deposits, with local windblown dune sand and loess (USFS 1994).

The natural vegetation of Section 251G-Central Loess Plains was bluestem prairie with northern floodplain forest along major drainages. Most of the land in Section 251G is now highly productive farmland, with approximately 60 percent in crops and 25 percent used for grazing (USFS 1994). Land use in Champaign and Vermilion counties is almost exclusively cropland (NRCS 2006, Appendix A).

Precipitation averages 25 to 35 in (630 to 900 mm) per year. Mean annual temperature is approximately 46 to 57°F (8 to 14°C). The growing season ranges from 150 to 190 days (USFS 1994).

Approximately 4.6 percent of Champaign and Vermilion counties are tree-covered (3.7 percent timberland, 0.9 percent non-forested land with trees) (Raile and Leatherberry 1988).

2.2 SITE-SPECIFIC CONDITIONS

BHE visited the site December 30, 2008, and representative portions were photographed (Appendix A). Topography in the Project planning area is nearly flat, and land use is primarily agricultural (predominantly corn and soybeans). Project area views, from horizon to horizon, are nearly entirely farmland, with small groups of trees, tree lines, or partially treed, narrow riparian strips sometimes visible. Wooded habitat is very uncommon, and occurs primarily along fencerows, farm drains, small streams, and small isolated woodlots. The area surrounding the Project planning area is similar, with nearly 100 percent of the landscape dedicated to row crop production. Many of the watercourses are ditched, or occur in gullies where they are isolated from their floodplains. Active tillage therefore extends in many cases nearly to the water's edge.

Other than the Vermilion River east of the Project planning area, the planning area lacks significant land features such as ridgelines, river corridors, or forested expanses that may be used as landmarks by migrating bats. The quality of bat habitat at the site is low.

2.3 BATS

Fourteen species of bats have been documented in Illinois. Except for the gray bat (*Myotis grisescens*), the southeastern myotis (*M. austroriparius*), the eastern small-footed bat (*M. leibii*), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), and the Mexican free-tailed bat (*Tadarida brasiliensis*), each of the remaining nine species has potential to occur on the Project area (Table 2).

The USFWS lists the gray bat as occurring in Alexander, Hardin, Jackson, Johnson, Pike, Pope, and Pulaski counties, Illinois (USFWS 2008a), well south of the Project area assessed in this document. With the exception of Pike County (over 100 miles west southwest of Champaign and Vermilion counties), all records are more than 150 miles south in the southern tip of the state.

The southeastern myotis ranges from Indiana and Illinois south along the Mississippi River and around the southeastern coastal plain to North Carolina. The range of this species includes only the southernmost tip of Illinois.

Some range maps for the eastern small-footed bat include the southern third of the state (Best and Jennings 1997). To date, there is only a single record of two individuals in Illinois (Pope County), over 100 miles south of the area addressed in this document (Steffen et al. 2006).

The Rafinesque's big-eared bat ranges through the southeastern United States, from southern Virginia south and west to eastern Texas and northward along the Mississippi River valley to southern Indiana. The range of this species includes only the southern-most portion of Illinois.

While these four species are considered to be residents of the State of Illinois, the ranges of these species are restricted to the southern portion of the state. Therefore, these species are not considered further in this Risk Assessment.

There are historical records of the Mexican free-tailed bat in Illinois. However, the Illinois Department of Natural Resources (IDNR) regards these records as an anomaly and this agency does not consider the species to be a resident or likely occurrence in the state (Joe Kath, IDNR, pers. comm.). The Mexican free-tailed bat is therefore not considered further in this Risk Assessment.

The other nine bat species that occur in Illinois include year-round residents as well as species present only during certain seasons (Table 2). The Indiana bat (*M. sodalis*) is federally listed as endangered. The remaining eight species are not federally listed, are not proposed for listing, and are not candidates for federal listing. The Indiana bat is listed as endangered by the State of Illinois. None of the other bat species potentially present at the Project area is listed by the State of Illinois. Descriptions of each species potentially present at the Project area are provided below.

2.3.1 Indiana Bat (*Myotis sodalis*)

The Indiana bat was listed by the federal government as endangered on March 11, 1967 and is listed as endangered by the Illinois Endangered Species Protection Board. Populations across the species range (as recorded from hibernacula counts) have declined since the late 1950s. Recent estimates place the total species population at approximately 468,000 (USFWS 2008b). A principal cause of decline is destruction of hibernacula from collapse, flooding, or vandalism by humans. Suspected contributing factors include loss of suitable summer habitat and contamination by pesticides (USFWS 2007). A recovery plan for Indiana bats was developed in 1983 (USFWS 1983) and revised in 1999 (USFWS 1999) and in 2007 (USFWS 2007).

In winter (mid-November through March), Indiana bats hibernate in caves and abandoned underground mines. For the remainder of the year, Indiana bats roost in trees (Barbour and Davis 1969). In April and again in August-September, Indiana bats migrate between winter and summer habitat. Some individuals may travel 300 to 357 mi (483 to 575 km) between summer and winter roosts (USFWS 2007, Winhold and Kurta 2006). Others, particularly males, may roost in trees near hibernacula in summer. In Pennsylvania and New York, radiotelemetry studies indicate Indiana bats migrate between 10 and 60 mi (16 and 97 km) (USFWS 2007). Migrating bats have been documented traveling along power line and pipeline rights-of-way, along highways, hedgerows, tree lines, and along stream courses (Murray and Kurta 2004, Johnson and Strickland 2003, USFWS 2007, Verboom and Huitema 1997). Limited recovery records of banded Indiana bats from the Midwest indicate females and some males migrate north in the spring upon emergence from hibernation (USFWS 2007).

In spring, Indiana bats migrate from hibernacula to forested habitats. Upon emergence from hibernation, Indiana bats are active near the hibernaculum during a period called staging. Spring staging may occur from approximately mid-April through early May. During staging, Indiana bats emerging from hibernation roost in trees, and forage near their hibernacula. In Missouri, staging male and female Indiana bats traveled between 1.2 and 6.4 mi (1.9 and 10.3 km) from their hibernaculum nightly (Rommé et al. 2002). Females typically leave caves before males (Humphrey 1978, LaVal and LaVal 1980). Following mid-May emergence from hibernation, a single radio-tracked male followed for two weeks traveled 10 mi (16 km) in western Virginia (Hobson and Holland 1995).

Indiana bats typically arrive in summer habitat (primarily upland and riparian forests) in early to mid-May. This species roosts under exfoliating bark or in cavities of trees. Pregnant females form maternity colonies that may contain up to 100 or more adult bats (USFWS 2007). Male Indiana bats tend to roost singly or in small all-male groups (USFWS 2007). Males may occur in summer anywhere throughout the range of the species, including near hibernacula (Whitaker and Brack 2002).

Adults of this species feed exclusively on flying insects. Indiana bats forage most frequently in upland and riparian forests, but they also may forage along wooded edges between forests and croplands, and over fallow fields (Brack 1983, LaVal and LaVal 1980). They frequently use open space over streams as travel corridors.

In August, Indiana bats begin to leave summer habitat and migrate back to hibernacula. Autumn swarming occurs from approximately mid-August through September. During swarming, numerous bats fly in and out of cave entrances from dusk to dawn, while relatively few roost in caves during the day (Cope and Humphrey 1977). Indiana bats periodically use tree roosts during fall swarming (Menzel et al. 2001). In Missouri, swarming Indiana bats traveled up to 4 mi (6.4 km) from roost sites (Rommé et al. 2002). In Kentucky, male Indiana bats radio tracked during October traveled up to 1.7 mi (2.7 km) from their roost sites. Kiser and Elliot (1996) found males roosted in trees between 0.5 and 1.5 mi (0.8 and 2.4 km) from the hibernaculum.

The Indiana bat has potential to occur in Illinois year-round (Figure 5; Appendix B). The USFWS assumes the Indiana bat may occur in every county in Illinois (USFWS 2008a). Most counties in Illinois with records of Indiana bats only have summer records. Those few with summer and winter records are located along the major rivers. Blackball Mine, designated as Indiana bat Critical Habitat on September 24, 1976, is the closest known Indiana bat hibernaculum in Illinois, located near the Illinois River in the Pecumsaugan Creek-Blackball Mines Nature Preserve in LaSalle County (Figure 5; USFWS 2008c). The mine is a Priority II Indiana bat hibernaculum based upon the prioritization scheme outlined in the 2007 Indiana Bat Recovery Plan (USFWS 2007). The USFWS and IDNR conducted the most recent census in the hibernaculum in February 2007, during which 2,513 Indiana bats were observed (Joe Kath, pers. comm.). This hibernaculum has been surveyed every other year since 1987. During the course of these surveys, the number of Indiana bats observed has increased from 291 to 2,513 individuals.

A search of the Illinois Natural Heritage Database in January 2009 revealed that no federal Threatened, Endangered or Candidate bat species have been documented within the Project planning area (Figure 6). Though there are no records of Indiana bats in or within 5 miles of the Project planning area, there is Indiana bat habitat present along the Salt Fork Vermilion River to the south of the Project planning area and the IDNR has summer records of the Indiana bat in southern Ford County, the county approximately 8 miles north of the project area. The Illinois Natural History Survey (INHS) has records of Indiana bats in Vermilion County (Joyce Hofmann, pers. comm.), and maternity colonies have been recorded along the upper Sangamon River, upper Middle Fork Vermilion River, and Little Vermilion River (Kieninger, pers. comm.; Shank, pers. comm.). The closest known colonies are 10-16 mi (16-26 km) northeast and south of the project area (Kieninger, pers. comm.; Table 2).

It is helpful to augment existing capture data with records of the Illinois Department of Public Health (IDPH). Bats submitted to the health department for rabies testing are turned over to an expert for identification. While not all of the individuals submitted for testing are identified to species, many are, making these records a useful addition to species distribution information. IDPH does not have records of Indiana bats for Champaign or Vermilion counties.

2.3.2 Northern Long-Eared Bat (*M. septentrionalis*)

The northern long-eared bat ranges from southern Canada and the central and eastern United States through northern Florida (Appendix B). The northern long-eared bat is migratory (Table 2; Whitaker and Hamilton 1998). In winter (October/November through March/April), this species hibernates in caves and mines. It may hibernate in caves occupied by several other species. Northern long-eared bats occasionally emerge from hibernation and have been observed in flight during winter (Whitaker and Hamilton 1998).

In summer, this species typically roosts in trees (under exfoliating bark or in crevices and hollows) and in manmade structures (Harvey 1992, Foster and Kurta 1999). Foster and Kurta (1999) identified northern long-eared bats roosting singly or in small groups that averaged 17 individuals. This species forages along forested hillsides and ridges, often through dense vegetation (Harvey et al. 1999).

The northern long-eared bat has been documented in both Champaign and Vermilion counties (Joyce Hofmann, pers. comm.; Table 2).

2.3.3 Little Brown Bat (*M. lucifugus*)

The little brown bat is abundant throughout forested areas of the United States as far north as Alaska (Appendix B).

This species often forms nursery colonies in buildings, attics, and other manmade structures (Harvey et al. 1999). These colonies are often close to a lake or stream. Males are likely solitary in the summer months (Harvey et al. 1999). In late August and early September, little brown bats prepare for hibernation, and may swarm at the entrance of caves or mines (Whitaker and Hamilton 1998). Migration between summer and winter roosts may be short distances or several hundred miles (Fenton and Barclay 1980, Whitaker and Hamilton 1998). The timing of migration and hibernation depends upon local weather conditions, with northern populations hibernating from September to early May, and southern populations hibernating from November to March (Fenton and Barclay 1980). Little brown bats typically hibernate in caves and mines, and hibernacula are typically not used as summer roosts (Harvey et al. 1999, Whitaker and Hamilton 1998).

Little brown bats often forage over water where their diet consists of aquatic insects, including mosquitoes, mayflies, midges, and caddisflies. Foraging also occurs over forest trails, cliff faces, meadows, and farmland where they consume a wide variety of insects (Harvey et al. 1999).

The little brown bat has been documented in both Champaign and Vermilion counties (Joyce Hofmann, pers. comm.; Table 2).

2.3.4 Eastern Pipistrelle (*Perimyotis [Pipistrellus] subflavus*)

The eastern pipistrelle occurs in the eastern United States, and ranges throughout Illinois (Appendix B, Barbour and Davis 1969). This species appears abundant throughout its range. Summer and winter ranges are identical. In summer, eastern pipistrelles have been found roosting in foliage and, rarely, in buildings. They may roost singly or in colonies of up to 30 bats (Barbour and Davis 1969). In winter, eastern pipistrelles hibernate in mines, quarries, caves, and rock crevices.

The eastern pipistrelle has been captured in Vermilion County and has been submitted to the IDPH from Champaign County (Joyce Hofmann, pers. comm.; Table 2).

2.3.5 Big Brown Bat (*Eptesicus fuscus*)

The big brown bat is common throughout its range (Appendix C) from Alaska and Canada to Mexico and South America. Big brown bats do not migrate; there appears to be no difference in range from summer to winter (Table 2; Barbour and Davis 1969). They roost in rock crevices, expansion joints of bridges and dams, hollow trees, and manmade structures. Maternity colonies containing several hundred individuals have been recorded from attics, barns, and other buildings (Harvey 1992). The northern long-eared bat has been documented in both Champaign and Vermilion counties (Joyce Hofmann, pers. comm.; Table 2).

The big brown bat has been documented in both Champaign and Vermilion counties (Joyce Hofmann, pers. comm.; Table 2).

2.3.6 Eastern Red Bat (*Lasiurus borealis*)

The eastern red bat occurs from southern Canada, throughout the United States, to Mexico and Central America (Appendix C, Barbour and Davis 1969). It is common in the Midwest and central states, including Illinois (Harvey 1992, Whitaker and Hamilton 1998). Eastern red bats are migratory; however, migration patterns are poorly understood. In winter, eastern red bats may hibernate in tree foliage for short periods, but arouse and forage during warm winter nights.

Like most lasiurids, *L. borealis* typically roosts in tree foliage. Individual eastern red bats may use several roost sites. Eastern red bats hang from branches or leaf petioles and are camouflaged by leaves. Adults are solitary, but females and young roost together until young become volant.

The red bat has been documented in both Champaign and Vermilion counties (Joyce Hofmann, pers. comm.; Table 2).

2.3.7 Hoary Bat (*L. cinereus*)

The hoary bat is widespread throughout the United States, but in eastern regions, the species' distribution varies seasonally (Appendix C, Whitaker and Hamilton 1998). Breeding individuals are known from Canada south to Arkansas, Louisiana, and Georgia (Barbour and Davis 1969). The range of the hoary bat includes Illinois (Harvey et al. 1999).

It appears that the sexes are separate during summer, with females inhabiting the northeast region (Cryan 2003, Whitaker and Hamilton 1998). Reproductive females are found in the northeast as far south as Pennsylvania and Indiana (Whitaker and Hamilton 1998). Female hoary bats give birth between mid-May and early July (Cryan 2003).

In August, this species moves south to winter habitat in southeastern and southwestern states, the Caribbean, and Central and South America (Cryan 2003, Whitaker and Hamilton 1998). In the eastern United States, hoary bats winter in northern Florida and southern Georgia, Alabama, Louisiana, and South Carolina (Whitaker and Hamilton 1998). Hoary bats apparently migrate in groups, with large numbers passing through an area over several nights in spring and fall (Whitaker and Hamilton 1998, Zinn and Baker 1979). Females precede males in spring migration. In the north, some may hibernate rather than migrate (Whitaker 1980). Hoary bats migrate north from March through April (Whitaker and Hamilton 1998).

Hoary bats roost in foliage of deciduous or coniferous trees (Barbour and Davis 1969). The species generally is solitary except during migration and when young accompany females (Mumford and Whitaker 1982).

The hoary bat has been documented in both Champaign and Vermilion counties (Joyce Hofmann, pers. comm.; Table 2).

2.3.8 Silver-Haired Bat (*Lasionycteris noctivagans*)

The silver-haired bat is common in forested areas throughout much of North America, although it is characterized as a northern species (Appendix C, Whitaker and Hamilton 1998). This species typically is found in parts of its range containing stands of coniferous or mixed coniferous and deciduous forests (Whitaker and Hamilton 1998).

Silver-haired bats commonly roost in tree cavities, often switching roosts during the maternity season. Silver-haired bats typically are solitary, but may congregate in small maternity colonies usually numbering fewer than 10 individuals (Whitaker and Hamilton 1998).

Females are thought to migrate farther than males, and it is possible males remain in winter habitat year-round (Whitaker and Hamilton 1998). During migration, silver-haired bats have been found roosting in trees along a ridge (Whitaker and Hamilton 1998). Typical winter roosts for this species include trees, buildings, wood piles, and rock crevices (Harvey et al. 1999). Whitaker and Hamilton (1998) depict the species' winter range as extending as far north as the southern tip of Illinois. Occasionally silver-haired bats will hibernate in caves or mines, especially in northern regions of their range.

Silver-haired bats roost in forested areas and feed predominantly in openings such as small clearings and along roadways or streams (Whitaker and Hamilton 1998). The silver-haired bat typically leaves the roost and begins to forage relatively late, with major foraging activity peaks 3, and 7 to 8 hours after sunset (Kunz 1973).

The silver-haired bat has been submitted to the IDPH from both Champaign and Vermilion counties (Joyce Hofmann, pers. comm.; Table 2).

2.3.9 Evening Bat (*Nycticeius humeralis*)

The evening bat occurs throughout the eastern United States, including almost the entire state of Illinois (Appendix C), and is abundant throughout its range. Evening bats are known to form large maternity colonies, often including up to several hundred individuals. These maternity colonies are generally formed in hollow trees, behind loose bark, or occasionally in buildings and attics. The evening bat is considered a true forest bat and is almost never observed in caves. Little is known about the migration patterns of this species; however, evening bats have been shown to put on high amounts of fat in the fall, a possible indication of a long migration. Banded evening bats have been found up to 340 mi (547 km) south of their initial banding sites. It is believed that evening bats remain active during the winter.

The evening bat has been documented in both Champaign and Vermilion counties (Joyce Hofmann, pers. comm.; Table 2).

3.0 POTENTIAL EFFECTS TO BATS

Construction and operation of wind energy facilities present potential concerns regarding direct and indirect effects upon bats through three primary avenues:

- Bats may be directly affected by colliding with moving turbine blades.
- Construction of the turbines and associated appurtenances may degrade habitat quality through the removal of trees causing indirect effects.
- Bats may also be indirectly affected through displacement by operating turbines.

The USFWS issued the *Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines* (USFWS 2003) to address the potential impacts to wildlife from wind power projects. An appendix to the guidelines outlines a protocol designed to provide a framework for the initial steps in investigating a site. The protocol was originally developed to assess sites in Montana but has been modified to apply nationwide (USFWS 2003). The protocol uses a

Potential Impact Index (PII), which is an initial assessment of the suitability of a proposed site. The PII relies on the comparison of the proposed site with a high quality reference site that is located within the same geographic area as the proposed site. Habitat degradation at the reference site would result in the maximum negative impact on wildlife (including bats).

The PII Score is separated into three checklists: Physical Attribute checklist, Species Occurrence and Status checklist, and the Ecological Attractiveness checklist (USFWS 2003).

1. The Physical Attribute Checklist considers topographic, meteorological, and site characteristics that may influence bird and bat occurrence and movements.

2. The Species Occurrence and Status Checklist includes all federally endangered, threatened and candidate species; all state endangered, threatened, and species of management concern; birds of conservation concern; birds of high recreational or other value; and any other species of concern listed by State Natural Heritage Programs.

3. The Ecological Attractiveness Checklist evaluates the presences and influence of features and conditions that may draw birds and bats to the site or vicinity.

As this risk assessment addresses potential impacts to bats, BHE did not consider or evaluate presence of, or potential impacts to birds. Therefore, the information necessary to determine a PII score was not generated as part of this desktop assessment, and a PII score was not determined. Based upon habitat conditions at the California Ridge project planning area, the PII score would be low. This qualitative assessment is based on the land cover and attributes of the Project planning area and an overall lack of suitable habitat for wildlife species whose ranges overlap the area.

3.1 BAT MORTALITY AT WIND ENERGY GENERATION FACILITIES

Much of the information available regarding mortality caused by collisions with moving turbine blades is contained in technical reports completed for wind site owners/developers, is unpublished, and is often difficult to obtain. Anecdotal information can be found in numerous studies intended to address avian impacts, although these data have a bias in that study methods were not designed to detect bat mortality.

A report published in winter 2008 summarized 21 studies of bat mortality at 19 wind energy generation facilities across the United States and one Canadian Province. The 21 studies include five in the Pacific Northwest, one in the Rocky Mountains, three in Alberta, Canada, three in the Midwest, one in south-central United States, and six in the eastern states (Arnett et al. 2008). Average mortality in these 21 studies ranged from 0.1 to 69.6 bat fatalities per turbine per year. Methods used in these studies varied; mortality estimates were adjusted in many cases for the biases presented by searcher efficiency and removal of carcasses by scavengers during mortality monitoring studies. A majority of studies (13 of 21) used bird carcasses as surrogates for bats while conducting searcher efficiency trials and calculating scavenging rates (Arnett et al. 2008). Bat mortality has been recorded both anecdotally and in ongoing studies at other wind energy generation facilities as well.

Documented bat fatalities at North American wind energy generation facilities have been generally highest in the east (Appalachian Mountains), moderate in the Midwest, and lowest in the western states. In most cases, documented mortality was low - less than five bats per turbine per year. Nationwide, more than 93 percent of fatalities documented in the U.S. as of winter 2006 (Arnett et al. 2008) have been of six species, with hoary bats accounting for nearly one-half of all mortality:

- hoary bat (40.7 percent),
- eastern red bat (21.2 percent),
- silver-haired bat (15.4 percent),
- eastern pipistrelle (8.0 percent),
- little brown bat (6.0 percent), and
- big brown bat (2.4 percent).

"Tree bats" (hoary bats, silver-haired bats and eastern red bats) typically roost in trees during summer months and often migrate long distances to southern winter habitat. These migratory bats accounted for the great majority of mortality. Bats that roost (winter and/or summer) in caves, sometimes referred to as "cave bats," comprised the remainder.

Although mortality has been documented in all months when bats are not hibernating, a significant majority of mortality has been documented in mid-July through mid-October during the post-maternity dispersal from summer habitat to winter habitat. At the Buffalo Mountain Windfarm in Tennessee, 70 percent of all bat fatalities occurred between August 1 and September 15 (Fiedler 2004). At Crescent Ridge, 20 of 21 bat fatalities were found in September and October. Overall, mortality appears highest between approximately July 15 and September 15. However, at the Summerview facility in Alberta, Canada, 6 percent of the 272 silver-haired bat fatalities occurred in May and June, suggesting that some mortality does occur during the spring migration period. These findings were supported in Tennessee, where 84 percent of the 19 silver-haired bat fatalities occurred between mid-April and early June (Arnett et al. 2008). Mortality is very low during the summer maternity period, even when substantial numbers of bats are present at or near wind energy generation facilities (Arnett et al. 2008). In a study in Minnesota at the Buffalo Ridge Wind Power Development, researchers found bat activity as measured by ultrasound detectors during summer was not correlated with bat mortality (Johnson et al. 2003a).

To date only one study has attempted to correlate the timing of fatalities between sites. Kerns et al. (2005) conducted simultaneous fatality searches from August 1 to September 13, 2004 at the Mountaineer and Meyersdale facilities in West Virginia, and Pennsylvania, respectively. The timing of all fatalities, while periodic and highly variable during the study was highly correlated between the two sites. Additionally, the timing of hoary and eastern red bat fatalities were positively correlated for the two sites (Kerns et al. 2005).

The sites at which the highest mortality has been documented occur at approximately 2,760 ft (840 m) above mean sea level (msl; Meyersdale, Pennsylvania), 3,363 ft (1,025 m) above msl (Mountaineer, West Virginia), and 3,314 ft (1,010 m) above msl (Buffalo Mountain, Tennessee). All three sites are on forested Appalachian Mountain ridgelines. At this time, the greatest risk of bat mortalities is expected at sites on forested Appalachian Mountain ridgelines.

The presence of FAA-approved lighting on towers has been the subject of speculation regarding bat mortality. Studies completed in 2003 at the Mountaineer site (Kerns and

Kerlinger 2004), in 2004 at the Mountaineer and Meyersdale sites (Arnett 2005), and in 2005 at the Buffalo Mountain site (Fiedler et al. 2007) found no significant difference in mortality at unlit towers and at towers lit by L-864-type flashing red strobe-like or incandescent lights. Similar results were documented at the Vansycle Ridge site in Oregon (Erickson et al. 2000), in northern Wisconsin (Howe et al. 2002), the Stateline project (Erickson et al. 2003a), the Nine Canyon project in Washington State (Erickson et al. 2003b), the Klondike facility in Oregon (Johnson et al. 2003b), the Summerview project in Alberta (Brown and Hamilton 2006), and the Maple Ridge project in New York (Jain et al. 2007). It also appears that mortality does not vary among the types of lighting used on wind turbines. At the Top of Iowa project, all turbines are lit with FAA lighting: 46 with non-pulsating red beacons, 37 with pulsating red beacons, and six with a combination of flashing white beacons and non-flashing red beacons. Jain (2005) found no significant difference in bat mortality among these towers.

Many of the nine species of bats with potential to be present during some portion of the year at the California Ridge Project planning area have been fatalities at one or more operating wind energy generation facilities. No fatalities of federally listed bat species have been documented at wind energy generation facilities in the U.S. Based upon results of mortality monitoring completed to date, hoary bats, silver-haired bats, and eastern red bats account for the majority of bat fatalities. These species accounted for approximately 77 percent of the mortality in turbine searches conducted through the end of 2006 (summary of mortality studies contained in Arnett et al. 2008). At the three project sites in the Midwest that were included in Arnett et al. (2008), these species accounted for 84.5 percent of the mortality observed. A study conducted in Bureau County, Illinois, had similar results: all of the bat carcasses recovered during mortality studies were hoary bats, silver-haired bats, or eastern red bats (Kerlinger et al. 2007). Based on these findings, we expect these three species to account for a majority of the mortality associated with the proposed California Ridge project. Little information exists upon which to base conclusions regarding the biological significance of bat mortality at wind energy generation facilities, because total population estimates do not exist for any of the bat species known to have experienced mortality at wind energy generation facilities.

Reasonably accurate population estimates exist for the federally endangered Indiana bat, one of the most uncommon North American species. Although neither this species nor any other federally listed bat species has been identified during bat mortality studies at wind energy generation facilities, we mention the size of the population of this species for context. In 2007, there were an estimated 468,184 Indiana bats in existence (USFWS 2008b). Populations of species that have experienced fatalities at wind energy generation facilities are much more common than this listed species, and may be an order of magnitude (or more) higher.

3.2 BAT COLLISION MORTALITY

Specific pre-construction techniques/protocols that accurately predict risk of chiropteran mortality at wind sites do not exist. Post-construction mortality monitoring remains the best source for these data. Therefore, comparison of the California Ridge Project area to nearby similar sites with known mortality is a useful approach.

As discussed above, the highest levels of bat mortality documented to date have occurred at three wind energy generation facilities located in West Virginia (Mountaineer), Pennsylvania (Meyersdale), and Tennessee (Buffalo Mountain). These sites are mountainous with elevated topography (i.e., ridgelines), elevation (i.e., 2,760 to 3,363 ft [840 to 1,025 m] above msl), and geographic location (i.e., eastern U.S.), and are markedly dissimilar to the proposed Project site described herein. Wind energy generation facilities with lower mortality are more similar to the California Ridge Project planning area (e.g., the Lincoln site in Wisconsin; the Buffalo Ridge site in Minnesota; or the Top of Iowa site in Iowa) are located in Midwestern states, are located on flat terrain, and have been constructed in agricultural areas or other non-forested sites (e.g., short grass prairie/sagebrush, pasture; Table 1). As discussed in Section 2.0, the California Ridge Project planning area described herein is nearly devoid of tree cover (Appendix A, Figure 2). Wooded land in all of Champaign and Vermilion counties totals only 4.6 percent (Raile and Leatherberry 1988).

Based upon published and unpublished information available at this time, similarities in the projects discussed in Table 1, and anticipated similarity in the behavior of bats at these sites, it is likely that mortality resulting from the Project will be most similar to that at the Crescent Ridge site in Illinois, Top of Iowa site in Iowa, the Lincoln site in Wisconsin, and the Buffalo Ridge site in Minnesota. Annual mortality estimates based upon post-construction monitoring studies was 8.04 bats per turbine per year at Top of Iowa; 4.26 bats per turbine per year at Lincoln; and 1.32 bats per turbine per year at Buffalo Ridge. Post-construction studies at Top of Iowa, Lincoln, and Buffalo Ridge, were all multi-year studies encompassing spring through fall (approximately mid-March through mid-November for each).

Mortality studies at Crescent Ridge were conducted from August through November 2005, March through May 2006, and August 2006, and the total estimate of bat mortality during the whole of the survey was approximately 9 bats per turbine (Kerlinger et al. 2007). Mortality at the Crescent Ridge facility in Illinois was highly seasonal: almost all (20 out of 21) documented bat fatalities occurred in late fall (September and October). A single bat carcass was documented in August, and no bat fatalities were documented in spring. No monitoring was completed in either year during the months of June or July, when it is reasonable to expect some mortality to take place; thus the extrapolated estimate of 9 bat fatalities per turbine may not be as accurate an estimate of annual mortality as might be found in a study that included June and July.

The California Ridge Project is not proximate to an Indiana bat hibernaculum. The nearest known hibernaculum in Illinois is Blackball Mine in LaSalle County, where at last count (February 2007), 2,513 Indiana bats were observed (Figures 5 and 6). The center of the California Ridge Project planning area is approximately 98.5 miles (158.5 km) from the Blackball Mine hibernaculum. Hibernacula have also been recorded in Greene and Monroe counties, Indiana. The county borders are 82 (131.9 km) and 89 (143.2) miles respectively from the center of the Project planning area.

It is reasonable to expect that the direction of flight of Indiana bats, and of other species of bats utilizing the Blackball Mine hibernaculum, is not random. These movements are likely concentrated along the only forested areas in the vicinity: the Illinois River that runs east-west approximately 1 mile south of the hibernaculum, the Little Vermillion River to the north of the hibernaculum, the Vermillion River to the southeast of the hibernaculum, and the Fox River to the northeast of the hibernaculum. No contiguous forested tracts link the California Ridge Project planning area to these forested corridors, or to the hibernaculum. The Middle Fork Vermilion River runs north-south near the Project planning area but forest cover along the river is discontinuous, with large stretches where there are no trees. No other major waterways cross the Project planning area, and the many smaller waterways that do cross the Project planning area have minimal vegetative cover, and pass repeatedly through developed areas, minimizing their utility as bat travel corridors or foraging areas. Murray and Kurta (2004) found that Indiana bats will choose to travel along forested corridors as opposed to non-forested corridors, even if the distance traveled is greater. This suggests that all of the waterways crossing the Project planning are minimally suitable as travel corridors for Indiana bats. Thus no effects to Indiana bats during spring and fall migration to and from the Blackball Mine hibernaculum are expected.

The IDNR reports summer records of Indiana bats in Ford County captured around the Sangamon River north and west of, and the Middle Fork of the Vermillion River north and east of the Project planning area. The Illinois Natural Heritage Database has no records of Indiana bats in the Project planning area. However, the Middle Fork of the Vermillion River, at its closest point, is less than 1 mi away from the eastern edge of the Project planning area, and the closest known colonies are along this river within 10 mi (16 km) from the planning area. Bats from these colonies are likely to forage along the Middle Fork and among the trees surrounding the river. No contiguous forested corridors connect the Middle Fork of the Vermillion River to waterways in the Project planning area. Though bats along the Middle Fork may venture out into the open fields, most tend to remain along forested waterways as insects are more abundant and trees provide protection from aerial predators.

It is unlikely that male, female, and juvenile Indiana bats will occupy the Project planning area during summer. Habitat conditions in the Project planning area, which is nearly devoid of trees and is composed largely of open fields/agricultural land, are less than suitable for foraging or roosting bats. Indiana bats, even if present, are likely to be very rare at the California Ridge Project area during summer, and are likely to be active at heights largely below the rotor-swept area. As such, the chance of collisions between Indiana bats and turbine blades during the summer is extremely low. Studies completed to date have documented very low mortality during spring and summer months, even when concurrent mist net surveys and/or ultrasound acoustic detection devices indicate the presence of substantial numbers of bats (Arnett et al. 2008). No effects to Indiana bats during summer are expected.

Furthermore, other bat species that may experience mortality at the California Ridge Project area are widely dispersed in the U.S. and only a very small minority of each species' population will forage in, roost in, travel through, or migrate over the California Ridge Project area. For example, if the range-wide population of hoary bats is assumed to be 5,130,000 (10 times the population of Indiana bats), and if hoary bats comprise 50 percent of expected mortality (0.5 x ~2,343 = 1,172), then annual fatalities of hoary bats would equate to 2 one-hundredths of 1 percent (0.02 percent) of the species' population.

3.3 HABITAT DEGRADATION

The landscape within the Project planning area is dominated by agriculture and tree cover is sparse. Construction of the Project in this agricultural area will have little to no effect upon habitat features important to bats, because few, if any, of these characteristics exist within the thoroughly disturbed and degraded habitat within the Project planning area, e.g. forested area, suitable roost trees, roost structures (e.g., barns), available prey, or other habitat attributes in this area of thoroughly disturbed and degraded habitat.

The USFWS is routinely consulted regarding potential impacts to the Indiana bat associated with a wide variety of projects. Their concerns commonly focus upon habitat modifications near hibernacula and maternity sites, and modification of proximate forested habitat. Where such habitat modifications occur, the USFWS often recommends project-specific consultation and avoidance/conservation measures. However, the California Ridge Project planning area is almost devoid of trees (Appendix A, Figure 2). Furthermore, tree clearing during construction is unlikely.

3.4 DISTURBANCE AND DISPLACEMENT OF BATS

Speculations have been made concerning the potential disturbance of bats by operating wind energy generation facilities, and the potential for resulting displacement of bats from otherwise suitable habitat. Data do not exist to dismiss the risk of such disturbance or displacement, but preliminary information now available supports the conclusion that wind turbines and their blades do not substantially disturb/displace bats. In 2004 at the Mountaineer and Meyersdale wind energy generation facility sites, bats were commonly observed foraging in forest openings at turbine sites. Thermal imaging equipment was used to investigate bat behavior near wind towers. Bats landed on towers, foraged near rotating blades, pursued rotating blades, and flew in patterns that appeared to indicate purposeful collision avoidance (Horn et al. 2008). The presence of bats near operating turbines was also documented at the Buffalo Ridge site in Minnesota (Johnson et al. 2003a), and the Buffalo Mountain site in Tennessee (Fiedler 2004). Based upon the best available information it appears operating turbines do not significantly disturb or displace bats, and this should especially be the case at the California Ridge Project planning area because of the lack of roosting and foraging habitat.

3.5 CHIROPTERAN RISK ASSESSMENT SUMMARY

A summary of the important points of this chiropteran risk assessment for the proposed California Ridge wind energy generation facility in Champaign and Vermilion counties, Illinois, is listed below.

- There are no records of federally threatened or endangered bats in or within 5 miles of the proposed Project planning area.
- Risk to bats is expected to be low.
- The Project planning area is within the range of only one federally listed bat: the endangered Indiana bat (*Myotis sodalis*).
- The closest Indiana bat hibernaculum in Illinois is 98.5 miles away and the closest maternity colony recorded is approximately 10 miles away from the Project planning area.
- Indiana bats are not likely to be roosting, foraging, or migrating within the Project planning area, due to the poor habitat conditions. Indiana bats in are likely to use the Middle Fork and Salt Fork Vermilion Rivers that are 1 mile away from the planning area and not at risk.
- Habitat loss is expected to be low considering the Project planning area is nearly 100 percent agricultural and only about 0.94 percent of the area will be cleared for construction.

4.0 LITERATURE CITED

Arnett, E.B. (ed). 2005. Relationships between bats and wind turbines in Pennsylvania and West Virginia: an assessment of bat fatality search protocols, patterns of fatality, and behavioral interactions with wind turbines. A final report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas.

Arnett, E.B., W.K. Brown, W.P. Erickson, J.K. Fiedler, B.L. Hamilton, T.H. Henry, A. Jain, G. D. Johnson, J. Kerns, R.R. Koford, C.P. Nicholson, T.J. O'Connell, M.D. Piorkowski, and R.D. Tankersley, Jr. 2008. Patterns of bat fatalities at wind energy facilities in North America. Journal of Wildlife Management 72:62-78.

Barbour, R.W. and W.H. Davis. 1969. Bats of America. University Press Kentucky, Lexington. 286 pp.

Best, T.L. and J.B. Jennings. 1997. *Myotis leibii*. Mammalian Species 547:1-6.

Brack, V., Jr. 1983. The nonhibernating ecology of bats in Indiana with emphasis on the endangered Indiana bat, *Myotis sodalis*. Unpublished Ph.D. dissertation, Purdue University, West Lafayette, Indiana. 280 pp.

Brown W.K. and B.L. Hamilton. 2006. Monitoring of bird and bat collisions with wind turbines at the Summerview Wind Power Project, Alberta, 2005-2006. Report for Windelectric, Inc., Calgary, Alberta, Canada. http://www.batcon.org/windliterature. Accessed February 5, 2008.

Cope J. and S. Humphrey. 1977. Spring and autumn swarming behavior in the Indiana bat, *Myotis sodalis*. Journal of Mammalogy 58(1):93-95.

Cryan, P.M. 2003. Seasonal distribution of migratory tree bats (*Lasiurus* and *Lasionycteris*) in North America. Journal of Mammalogy 84(2):579-593.

Erickson, W., G. Johnson, M. Strickland and K. Kronner. 2000. Avian and bat mortality associated with the Vansycle Wind Project, Umatilla County, Oregon: 1999 study year. Unpublished technical report prepared for Umatilla County Department of Resource Services and Development, Pendleton, Oregon.

Erickson, W., J. Jeffrey, K. Kronner and K. Bay. 2003a. Stateline Wind Project wildlife monitoring report, results for the period July 2001 - December 2002. Unpublished technical report prepared for FPL Energy, Oregon Office of Energy, and Stateline Technical Advisory Committee.

Erickson, W., K. Kronner and B. Gritski. 2003b. Nine Canyon Wind Power Project avian and bat monitoring report, September 2002 - August 2003. Unpublished technical report prepared for Nine Canyon Technical Advisory Committee and Energy Northwest.

Fenton, M.B. and R. Barclay. 1980. *Myotis lucifugus*. Mammalian Species 142:1-8.

Fiedler, J.K. 2004. Assessment of bat mortality and activity at Buffalo Mountain Windfarm, Eastern Tennessee. M.S. Thesis. University of Tennessee, Knoxville.

Fiedler, J.K., T.H. Henry, R.D. Tankersley, and C.P. Nicholson. 2007. Results of Bat and Bird Mortality at the Expanded Buffalo Mountain Windfarm, 2005. Tennessee Valley Authority, Knoxville, Tennessee.

Foster, R.W. and A. Kurta. 1999. Roosting ecology of the northern bat (*Myotis septentrionalis*) and comparisons with the endangered Indiana bat (*Myotis sodalis*). Journal of Mammalogy 80:659-672.

Harvey, M.J. 1992. Bats of the Eastern United States. Arkansas Game and Fish Commission. 46 pp.

Harvey, M.J., J.S. Altenbach and T.L. Best. 1999. Bats of the United States. Arkansas Game and Fish Commission. 64 pp.

Hobson C. and J. Holland. 1995. Post-hibernation movement and foraging habitat of a male Indiana bat, *Myotis sodalis* (Chiroptera: Vespertilionidae), in western Virginia. Brimleyana 23:95-101.

Horn, J.W., E.B. Arnett and T.H. Kunz. 2008. Behavioral responses of bats to operating wind turbines. Journal of Wildlife Management 71:123-132.

Howe, R., W. Evans and A. Wolf. 2002. Effects of wind turbines on birds and bats in northeastern Wisconsin. Unpublished technical report prepared for the Wisconsin Public Service Corporation and Madison Gas and Electric Company. University of Wisconsin, Green Bay.

Humphrey, S.R. 1978. Status, winter habitat, and management of the endangered Indiana bat, *Myotis sodalis*. Florida Scientist 41:65-76.

Jain, A.A. 2005. Bird and bat behavior and mortality at a northern Iowa windfarm. Unpublished Master's Thesis. Iowa State University, Ames.

Jain, A.A., P. Kerlinger, R. Curry and L. Slobodnik. 2007. Annual report for the Maple Ridge Wind Power Project post-construction bird and bat fatality study - 2006. Report prepared for PPM Energy and Horizon Energy. Curry and Kerlinger LLC, Cape May Point, New Jersey.

Johnson, G. and M.D. Strickland. 2003. Biological assessment for the federally endangered Indiana bat (*Myotis sodalis*) and Virginia big-eared bat (*Corynorhinus townsendii virginianus*). Unpublished report prepared for NedPower Mount Storm LLC. Chantilly, Virginia.

Johnson, G., W. Erickson, M. Strickland, M. Shepherd, D. Shepherd and S. Saparro. 2003a. Mortality of bats at a large-scale wind power development at Buffalo Ridge, Minnesota. The American Midland Naturalist 150:332-342.

Johnson, G., W. Erickson, J. White and R. McKinney. 2003b. Avian and bat mortality during the first year of operation at the Klondike Phase I Wind Project, Sherman County, Oregon. Draft report prepared for Northwestern wind power, Goldendale, Washington.

Kerlinger, P., R. Curry, A. Hasch and J. Guarnaccia. 2007. Migratory bird and bat study conducted at Crescent Ridge Wind Power Project, Bureau County, Illinois: September 2005 - August 2006. Unpublished report submitted to Orrick, Herrington and Sutcliffe, LLP, May 2007.

Kerns, J. and P. Kerlinger. 2004. A study of bird and bat collision fatalities at the Mountaineer Wind Energy Center, Tucker County, West Virginia: Annual report for 2003. Unpublished technical report prepared for FPL Energy and the BWEC Technical Committee.

Kerns, J., W.P. Erickson, and E.B. Arnett. 2005. Bat and bird fatality at wind energy facilities in Pennsylvania and West Virginia. Pages 24-95 *in* E. B. Arnett, ed. Relationships between bats and wind turbines in Pennsylvania and West Virginia: an assessment of bat fatality search protocols, patterns of fatalities, and behavioral interactions with wind turbines. A final report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International, Austin, Texas.

Kiser, J.D. and C.L. Elliott. 1996. Foraging habitat, food habits, and roost tree characteristics of the Indiana bat (*Myotis sodalis*) during autumn in Jackson County, Kentucky. A Report submitted to the Nongame Program Kentucky Department of Fish and Wildlife Resources.

Kunz, T.H. 1973. Resource utilization: temporal and spatial components of bat activity in central Iowa. Journal of Mammalogy 54(1):14-32.

LaVal, R. and M.L. LaVal. 1980. Ecological studies and management of Missouri bats, with emphasis on cave-dwelling species. Missouri Department of Conservation, Terrestrial Series 8:1-52.

Martin, C.O., R.F. Lance, and C.H. Bucciantini. 2005. Collisions with aircraft and use of culverts under runways by bats at U.S. Naval Air Station Meridian, Meridian, Mississippi. Bat Research News 46:51-54.

Menzel, M., J. Menzel, T. Carter, M.W. Ford and J. Edwards. 2001. A Review of Forest Habitat Relationships of the Indiana Bat. Newtown Square, Pennsylvania: USDA Forest Service, Northeastern Research Station. General Technical Report NE-284.

Mumford, R.E. and J.O. Whitaker, Jr. 1982. Mammals of Indiana. Indiana University Press, Bloomington. 537 pp.

Murray, S.W. and A. Kurta. 2004. Nocturnal activity of the endangered Indiana bat (*Myotis sodalis*). Journal of Zoology, London 262:197-206.

Raile G.K. and E.C. Leatherberry. 1988. Illinois Forest Resource. U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota. 113 pp.

Rommé R., A. Henry, R. King, T. Glueck and K. Tyrell. 2002. Home range near hibernacula in spring and autumn *in*: Kurta A. and J. Kennedy (eds.). The Indiana Bat: Biology and Management of an Endangered Species. Bat Conservation International, Austin, Texas. p 153-158.

Steffen, B., T.L. York Osborne, T.C. Carter, and G.A. Feldhamer. 2006. The first record of the eastern small-footed Myotis (*Myotis leibii*) in Illinois. Transactions of the Illinois State Academy of Science 99:87-89.

Terres, J.K. 1956. Migration records of the red bat, *Lasiurus borealis*. Journal of Mammalogy 37:442.

Timm, R.M. 1989. Migration and molt patterns of red bats, *Lasiurus borealis* (Chiroptera: Vespertilionidae), in Illinois. Bulletin of the Chicago Academy of Science 14:1-7.

U.S. Department of Agriculture - Natural Resources Conservation Service (NRCS). 2006. USDA Agrigulture Handbook. http://soils.usda.gov/. Accessed February 5, 2008.

U.S. Fish and Wildlife Service (USFWS). 2003. Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines. http://www.fws.gov/habitatconservation/wind.pdf. Accessed February 19, 2009.

U.S. Fish and Wildlife Service (USFWS). 2007. Indiana bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. Region 3 U.S. Fish and Wildlife Service, Ft. Snelling, Minnesota.

U.S. Fish and Wildlife Service (USFWS). 2008a. Endangered Species: County distribution of federally endangered, threatened, proposed and candidate species. http://www.fws.gov/midwest/endangered/lists/illinois-spp.html. Accessed February 6, 2008.

U.S. Fish and Wildlife Service (USFWS). 2008b. Indiana bat revised 2007 population estimates. http://www.fws.gov/midwest/endangered/mammals/inba/index.html. Accessed January 9, 2009.

U.S. Fish and Wildlife Service (USFWS). 2008c. Endangered Species in the Upper Midwest: endangered, threatened, proposed, and candidate species. http://www.fws.gov/midwest/endangered/lists/e_th_pr.html. Accessed February 6, 2008.

U.S. Forest Service (USFS). 1994. Ecological Subregions of the United States. U.S. Department of Agriculture, Washington, DC. http://www.fs.fed.us/land/pubs/ecoregions/index.html. Accessed January 28, 2009.

Verboom, B. and H. Huitema. 1997. The importance of linear landscape elements for the pipistrelle *Pipistrellus pipistrellus* and the serotine bat *Eptesicus serotinus*. Landscape Ecology 12(2):117-125.

Whitaker, J.O., Jr. 1980. The Audubon Society Field Guide to North American Mammals. Alfred A. Knopf, New York. 745 pp.

Whitaker, J.O., Jr. and W.J. Hamilton, Jr. 1998. Mammals of the Eastern United States. Third edition. Cornell University Press, Ithaca, New York. 583 pp.

Whitaker, J.O., Jr. and V. Brack, Jr. 2002. Distribution and summer ecology in Indiana. Pp. 48-54 *in* A. Kurta and J. Kennedy (eds.), The Indiana Bat: Biology and Management of an Endangered Species. Bat Conservation International, Austin, Texas.

Winhold, L. and A. Kurta. 2006. Aspects of migration by the endangered Indiana bat, *Myotis sodalis*. Bat Research News 47(1):1-6.

Zinn, T.L. and W.W. Baker. 1979. Seasonal migration of the hoary bat, *Lasiurus cinereus*, through Florida. Journal of Mammalogy 60(3):634-635.

TABLES

Table 1. Attributes of the California Ridge Project area as compared to other Midwestern wind energy generation facilities where post-construction studies of bat mortality have been conducted.

Feature	California Ridge (Champaign and Vermilion Cos., IL)	California Ridge (Champaign and Vermilion Cos., IL)	Crescent Ridge (Bureau Co., IL)	Lincoln (Kewaunee Co., WI)	Buffalo Ridge (Lincoln and Pipestone Cos., MN)	Top of Iowa (Worth Co., IA)
Ecoregion (Section)	Central Loess Plains Section	Central Loess Plains Section	Central Loess Plains Section	Northern Great Lakes Section	North-Central Glaciated Plains Section	Minnesota and Northeastern Iowa Morainal, Oak Savannah Section and North-Central Glaciated Plains Section
Position	Towers to be placed in open agricultural areas	Towers to be placed in open agricultural areas	Towers located in agricultural areas	Towers located on ridges of glacial till approximately 30-60 m (98-197 ft) above the surrounding lowlands	Towers located on ridge consisting of terminal moraines and stream dissected lands	Towers located in agricultural areas surrounded by grasslands and wetlands
Approximate average elevation (above msl)	209-239 m (686-775 ft)	209-239 m (686-775 ft)	274 m (900 ft)	240-270 m (787-886 ft)	546-610 m (1,791-2001 ft)	366-396 m (1,200 - 1,300 ft)
Vegetative cover	Primarily corn and soybeans	Primarily corn and soybeans	Primarily corn and soybeans	Pasture and agricultural land	Primarily corn, soybeans, pastures, and grasslands	Primarily cropland
No. of turbines	133 (1.5 MW)	80 (2.5 MW)	33 (1.65 MW)	31 (0.66-MW)	354 (0.75-MW)	89 (0.90-MW)

Table 1. Attributes of the California Ridge Project area as compared to other Midwestern wind energy generation facilities where post-construction studies of bat mortality have been conducted.

Feature	California Ridge (Champaign and Vermilion Cos., IL)	California Ridge (Champaign and Vermilion Cos., IL)	Crescent Ridge (Bureau Co., IL)	Lincoln (Kewaunee Co., WI)	Buffalo Ridge (Lincoln and Pipestone Cos., MN)	Top of Iowa (Worth Co., IA)
Turbine string(s)	Data not available	Data not available	Irregular array along 9-mile ridge, installed in 2 phases.	14 WPS turbines in 3 rows within 1.5 km of one another; 17 MGE turbines in 2 irregular clusters approximately 3.5 km apart	Phase 1: 10 turbine strings each with 3 - 20 turbines spaced at 91-183 m (298-600 ft) intervals (73 turbines total) Phase 2: 26 turbine strings each with 2 - 12 turbines spaced at 100-200 m (328-656 ft) intervals (143 turbines total) Phase 3: 36 turbine strings each with 2-13 turbines spaced at 250-500 m (820-1640 ft) intervals (138 turbines total)	89 turbines spread across 865 ha in an irregular array
Hub height	80 m (262 ft)	100 m (328 ft)	78 m (256 ft)	65 m (213 ft)	Phase 1: 36 m (118 ft) Phase 2 and 3: 50 m (164 ft)	72 m (237 ft)
Rotor diameter	77 m (252 ft)	100 m (328 ft)	82 m (269 ft)	47 m (154 ft)	Phase 1: 33 m (108 ft) Phase 2 and 3: 46 and 48 m (151-157 ft)	52 m (171 ft)
Max. rotor height	119 m (390 ft)	150 m (492 ft)	119 m (390 ft)	89 m (292 ft)	Phase 1: 53 m (174 ft) Phase 2 and 3: 74 m (243 ft) or 73 m (240 ft)	98 m (322 ft)
Min. rotor height	42 m (138 ft)	50 m (164 ft)	37 m (121 ft)	42 m (138 ft)	Phase 1: 19.5 m (70 ft) Phase 2 & 3: 26 m (85 ft) or 27 m (88 ft)	46 m (151 ft)

Table 1. Attributes of the California Ridge Project area as compared to other Midwestern wind energy generation facilities where post-construction studies of bat mortality have been conducted.

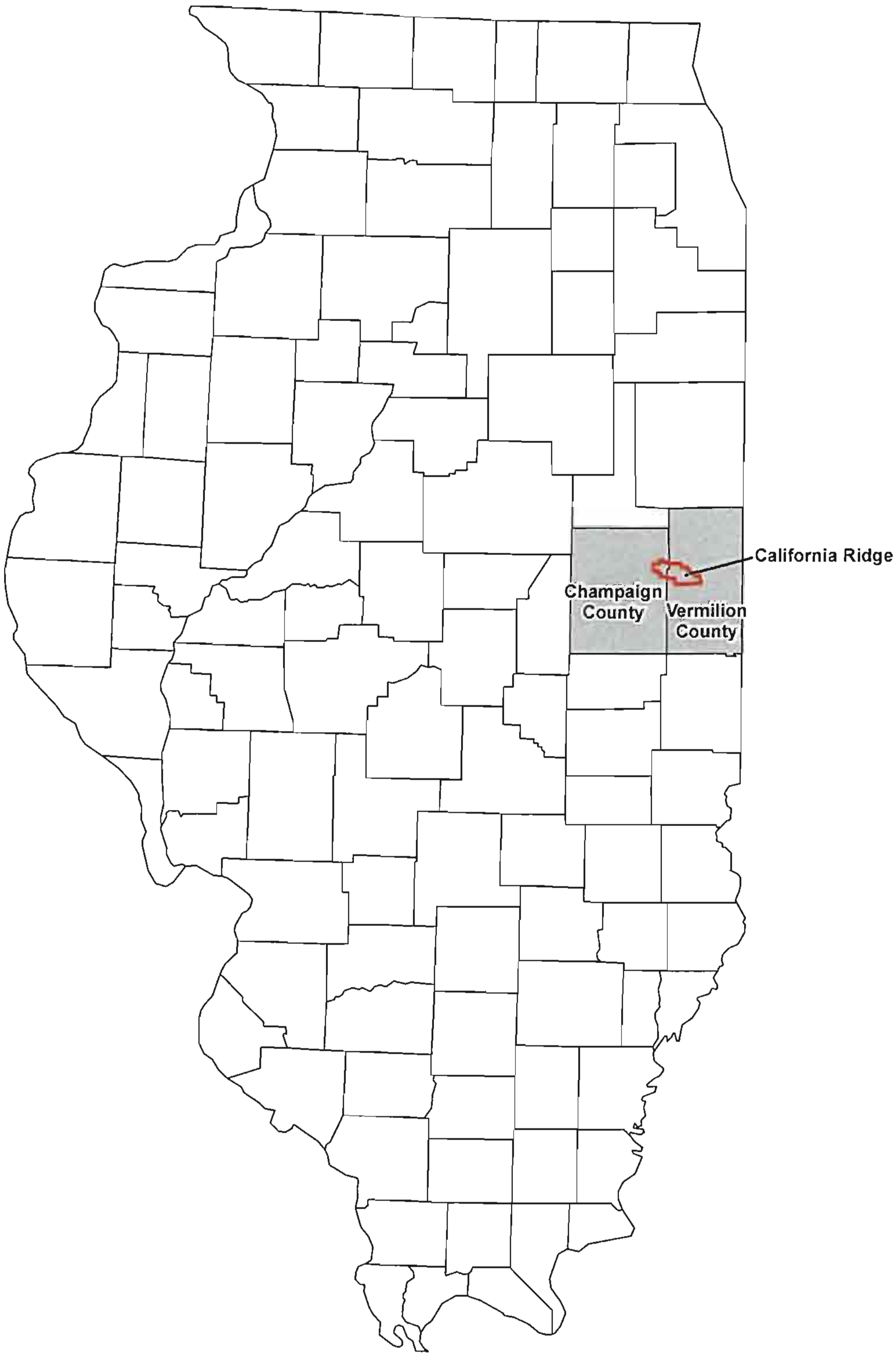
Feature	California Ridge (Champaign and Vermilion Cos., IL)	California Ridge (Champaign and Vermilion Cos., IL)	Crescent Ridge (Bureau Co., IL)	Lincoln (Kewaunee Co., WI)	Buffalo Ridge (Lincoln and Pipestone Cos., MN)	Top of Iowa (Worth Co., IA)
Rotor swept area	4,654 m^2/turbine 618,982 m^2 total	7,854 m^2/ turbine 628,320 m^2 total	5,281 m^2/turbine 174,273 m^2 total	1,735 m^2/turbine 53,785 m^2 total	Phase 1: 855 m^2 per turbine; 62,437 m^2 total Phase 2: 1,735 m^2 average per turbine; 248,105 m^2 total Phase 3: 1,735 m^2 average per turbine; 239,430 m^2 total	2,124 m^2/turbine 189,036 m^2 total
Operating rotor rpm	20.4	Unavailable	14.4	28.5	Phase 1: 14 to 50 Phase 2 and 3: 16 to 30	15 or 22
Turbine cut in speed	3.5 m/s (7.9 mph)	3.5 m/s (7.9 mph)	3.5 m/s (7.9 mph)	4.0 m/s (8.9 mph)	Phase 1: 4.0 m/s (9 mph) Phase 2 and 3: 3.6 m/s (8 mph)	Data not available
Lighting	Per FAA regulations	Per FAA regulations	10 of 33 turbines lighted	Data not available	Phase 1: no lighting Phase 2: 6 turbines lighted Phase 3: 69 turbines lighted	46 of 89 towers lighted
Bat species in the region (bats listed for all sites other than California Ridge are those species detected in mortality searches. Percent of total detected mortality is indicated).	Hoary bat Eastern red bat Eastern pipistrelle Big brown bat Silver-haired bat Little brown bat N. long-eared bat Indiana bat Evening bat	Hoary bat Eastern red bat Eastern pipistrelle Big brown bat Silver-haired bat Little brown bat N. long-eared bat Indiana bat Evening bat	Hoary bat (38.1%) Silver-haired bat (28.6%) Eastern red bat (28.6%)	Eastern red bat (37.5%) Hoary bat (34.7%) Silver-haired bat (18.1%) Myotis spp. (8.3%) Big brown bat (1.4%)	Hoary bat (67%) Eastern red bat (17%) Silver-haired bat (3%) Big brown bat (3%) Eastern pipistrelle (2%) Little brown bat (2%)	Hoary bat (28%) Eastern red bat (23.5%) Little brown bat (23.5%) Silver-haired bat (11.8%) Big brown bat (10.5%) Eastern pipistrelle (2.6%)

Table 2. Bats potentially present within the proposed California Ridge Planning Area during summer, winter, and spring/fall migration.

Species	Status	Potential Seasonal Presence within the California Ridge Project Planning Area[1]			Identified in Champaign County[2]	Identified in Vermilion County[2]
		Summer	Winter	Migration		
Indiana bat (*Myotis sodalis*)	Federal: endangered IL: endangered	Yes	No	Yes	No	Yes
Northern long-eared bat (*Myotis septentrionalis*)	None	Yes	No	Yes	Yes	Yes
Little brown bat (*Myotis lucifugus*)	None	Yes	No	Yes	Yes	Yes
Eastern pipistrelle (*Perimyotis subflavus*)	None	Yes	No	Yes	Yes	Yes
Big brown bat (*Eptesicus fuscus*)	None	Yes	Yes	Yes[3]	Yes	Yes
Eastern red bat (*Lasiurus borealis*)	None	Yes	No	Yes	Yes	Yes
Hoary bat (*Lasiurus cinereus*)	None	Yes	No	Yes	Yes	Yes
Silver-haired bat (*Lasionycteris noctivagans*)	None	Yes	No	Yes	Yes	Yes
Evening bat (*Nycticeius humeralis*)	None	Yes	No	Yes	Yes	Yes

[1]Based upon species range maps and natural history.
[2]Data obtained from the Illinois Natural History Survey (known bat captures documented) and the Illinois Department of Public Health and the Illinois Department of Agriculture (records of bat submitted to laboratories for rabies testing). Absence of records in the county likely reflects lack of surveys rather than absence of the species
[3]Species is not migratory, and may be present during spring and fall.

FIGURES



N W E S	Figure 1. Overview of the proposed planning area for the California Ridge wind energy generation facility, Champaign and Vermilion counties, Illinois.	BHE ENVIRONMENTAL
	Project No. 1664.019	January 2009

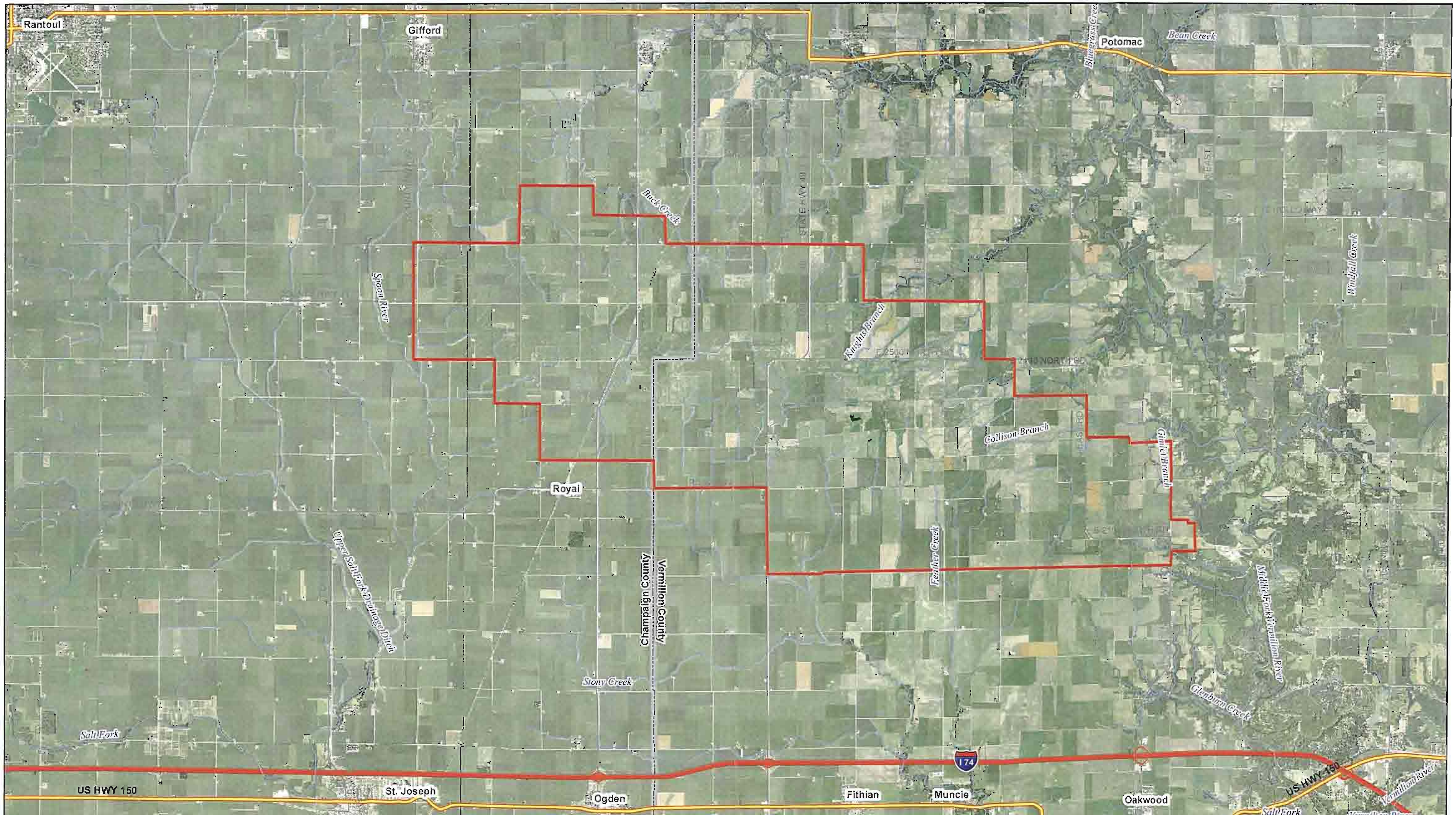


Figure 2. Aerial view of the proposed planning area for the California Ridge wind energy generation facility, Champaign and Vermilion counties, Illinois.

January 2009	Project No. 1664.019	Miles 1 0 1 2	Base Map: USDA NAIP Aerial Imagery (2006)

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APPENDIX A

Photographs of the California Ridge Project Planning Area

Photo 1. Typical agricultural land use 5 miles north of Muncie.

Photo 2. Typical agricultural drain 7.2 miles north of Muncie. Drains into Collison Branch of the Middle Fork Vermilion River.

Photo 3. Typical degraded, channeled/grassy watercourse 7.2 miles north of Muncie. Drains into Collison Branch of the Middle Fork Vermilion River.

Photo 4. Typical agricultural land use 6.5 miles north of Muncie.

Photo 5. Pond 6 miles north of Muncie.

Photo 6. Typical degraded, channeled/grassy watercourse 5 miles north of Muncie. Drains into Feather Creek.

Photo 7. Trees along stream 5 miles north of Fithian.

Photo 8. Typical agricultural drain 5 miles north of Fithian. Drains into Stony Creek.

Photo 9. Stream 4.8 miles north-northwest of Fithian. Drains into Stony Creek.

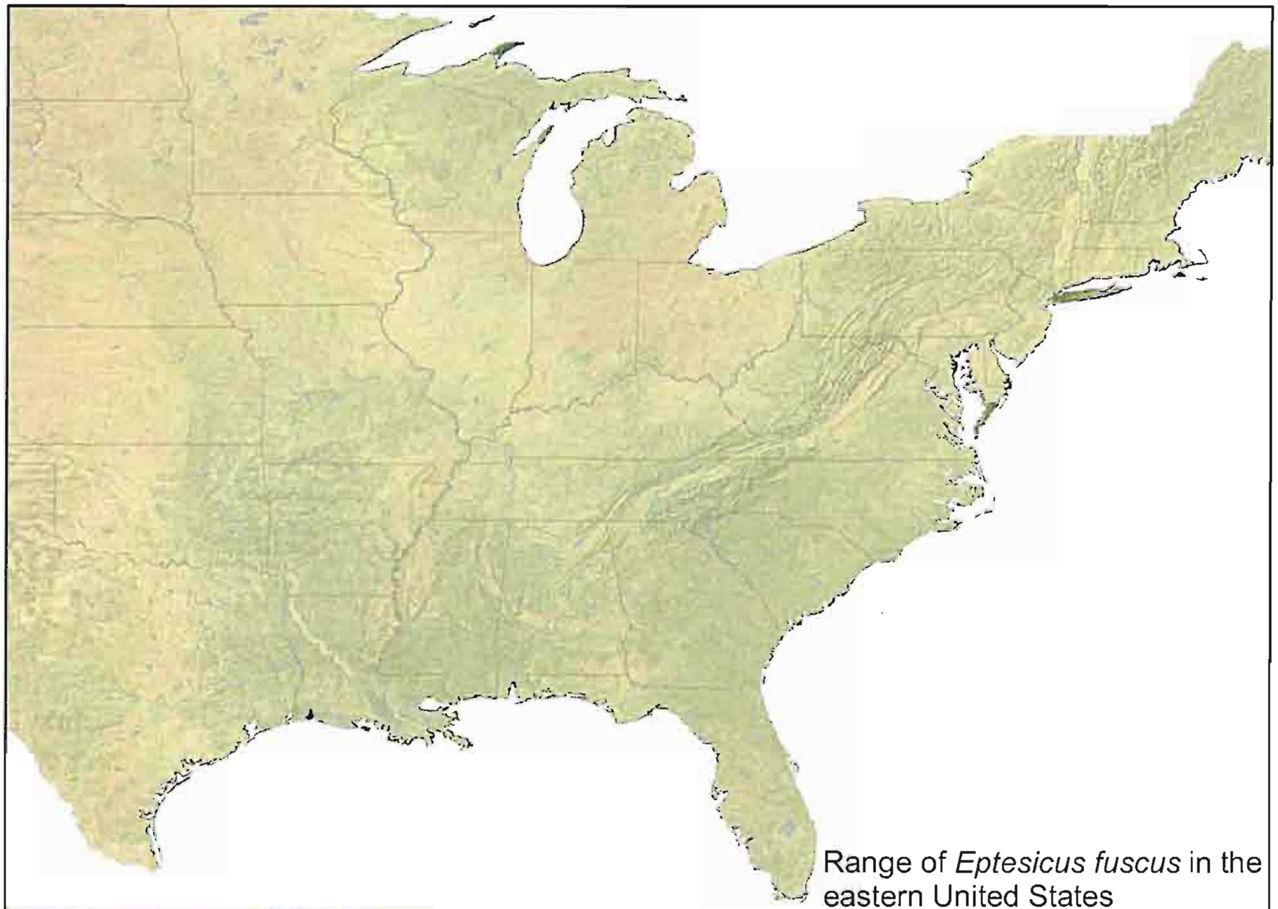
Photo 10. Typical degraded, channeled/grassy watercourse 6.8 miles north of Fithian.

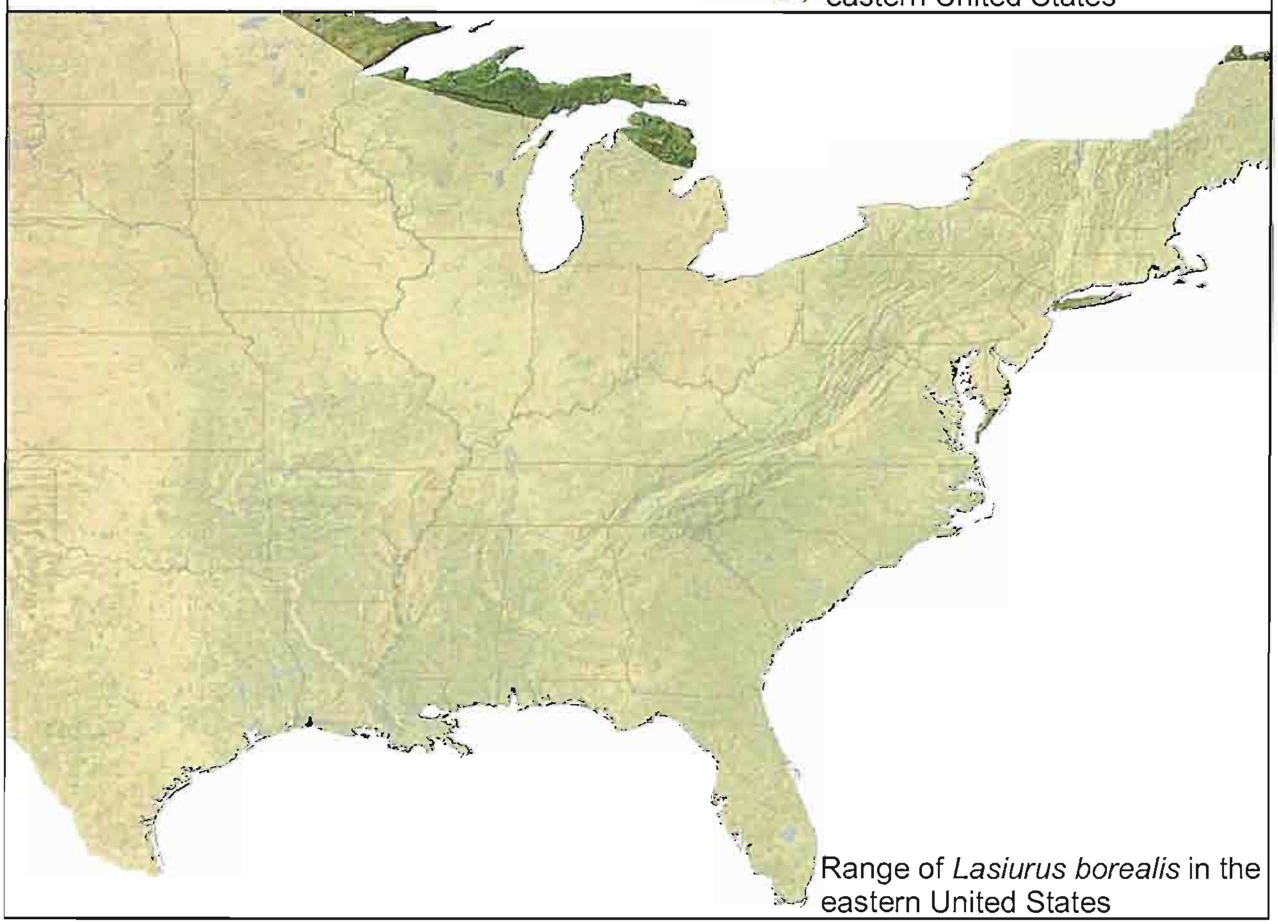
Photo 11. Trees surrounding a farmhouse 2 miles northeast of Royal.

Photo 12. Typical agricultural land use 2 miles northeast of Royal.

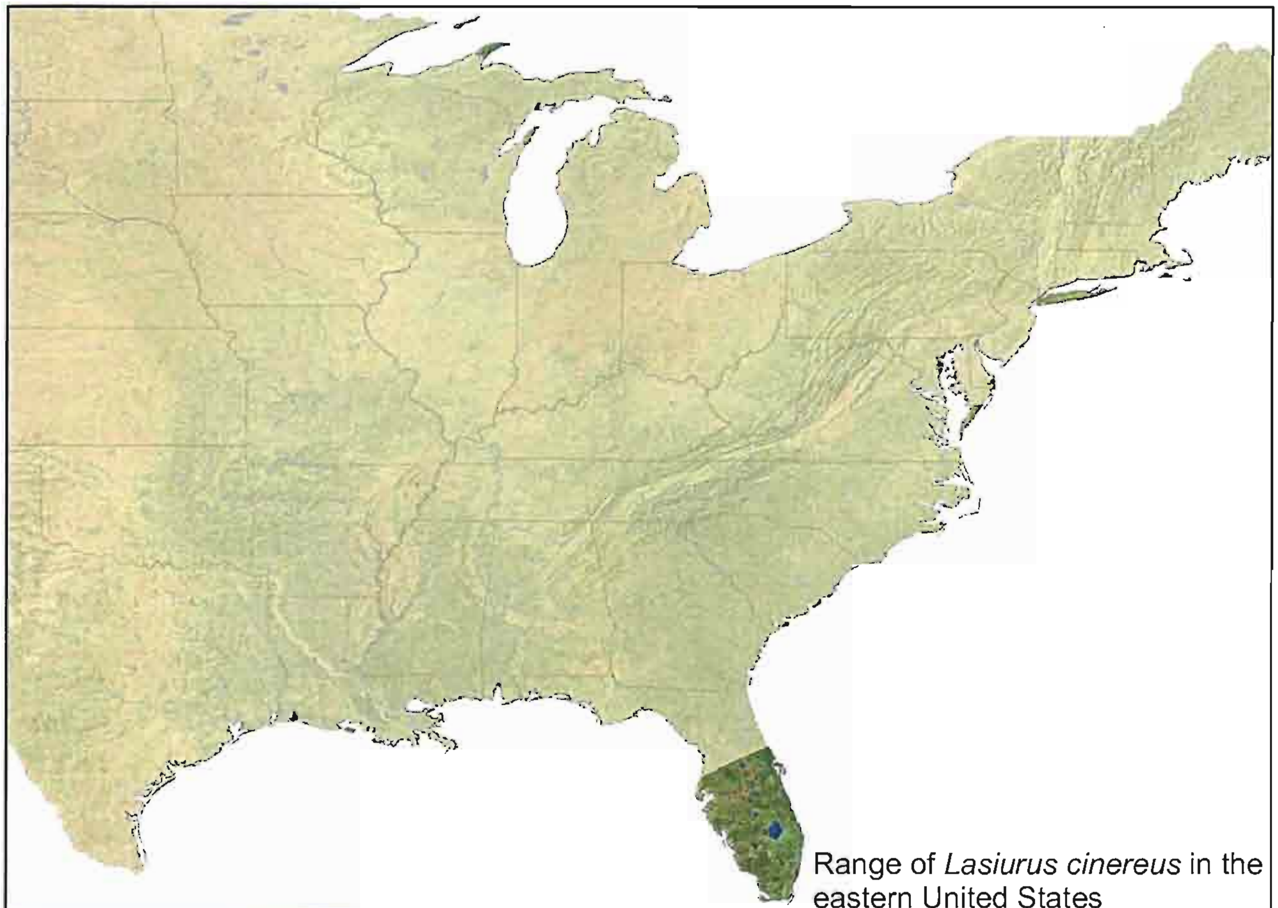
APPENDIX B

Bats of the California Ridge Project Planning Area:
Range Maps

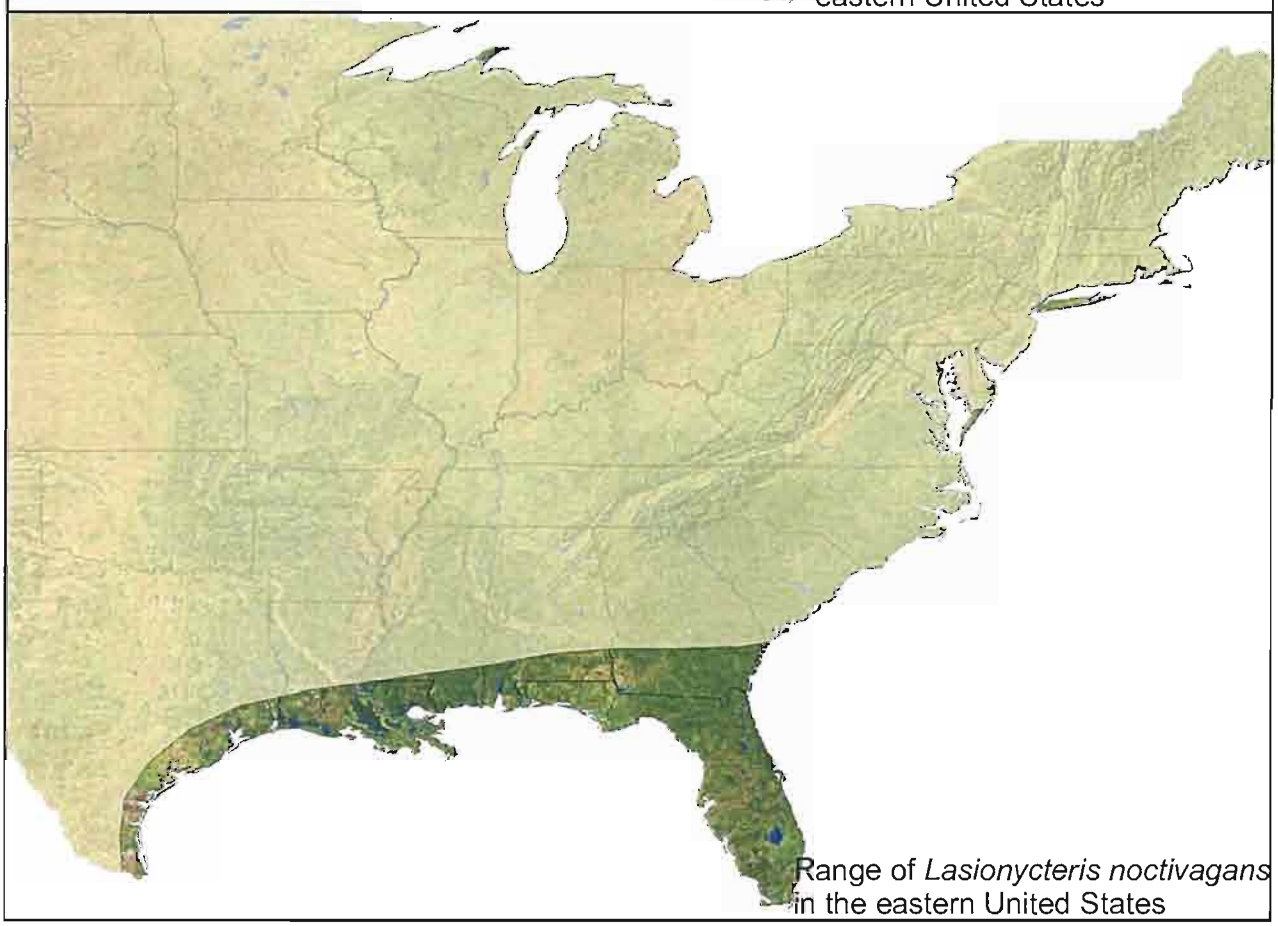




Bat Range data obtained from - http://www.natureserve.org/getData/mammalMaps.jsp (06/21/2005)

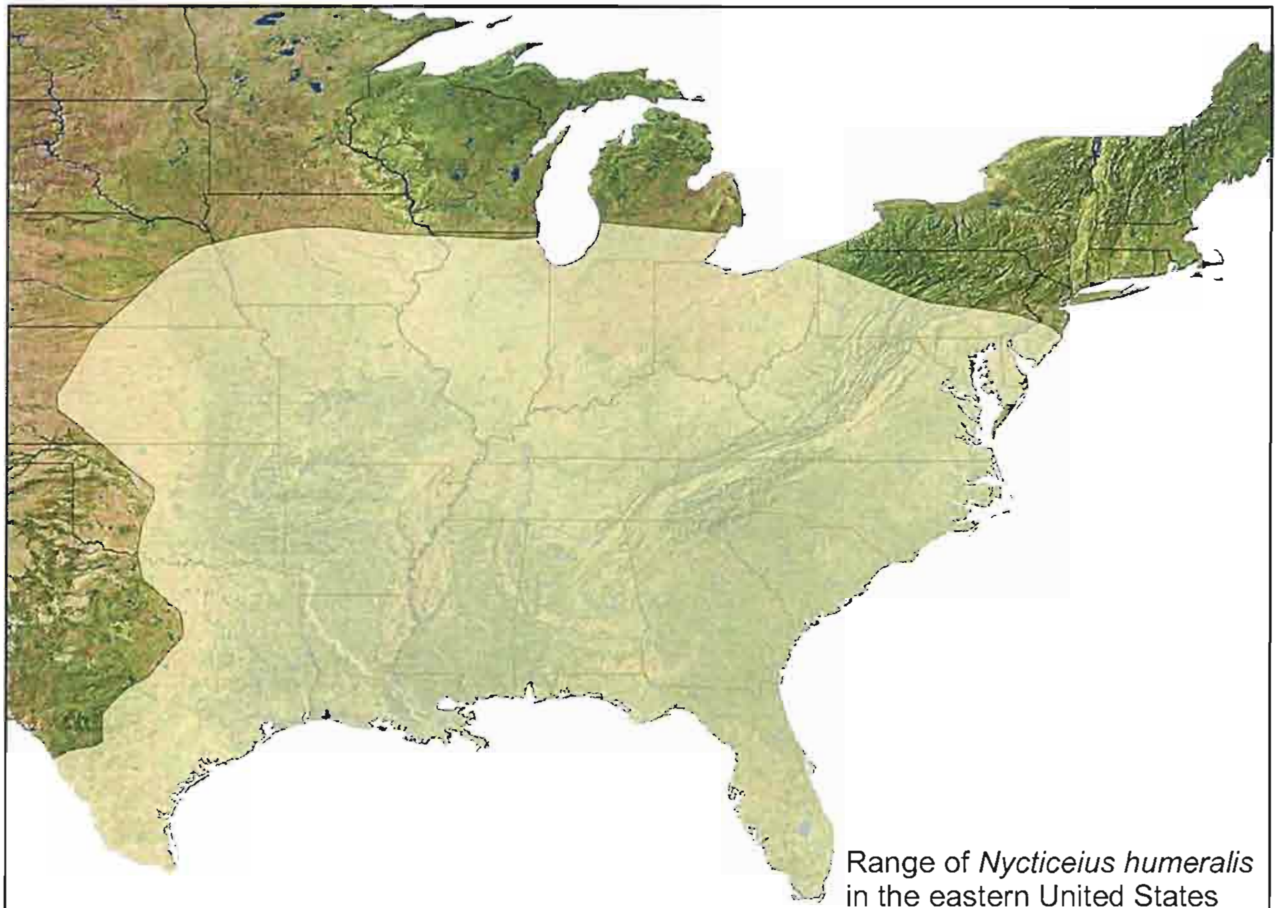


Range of *Lasiurus cinereus* in the eastern United States

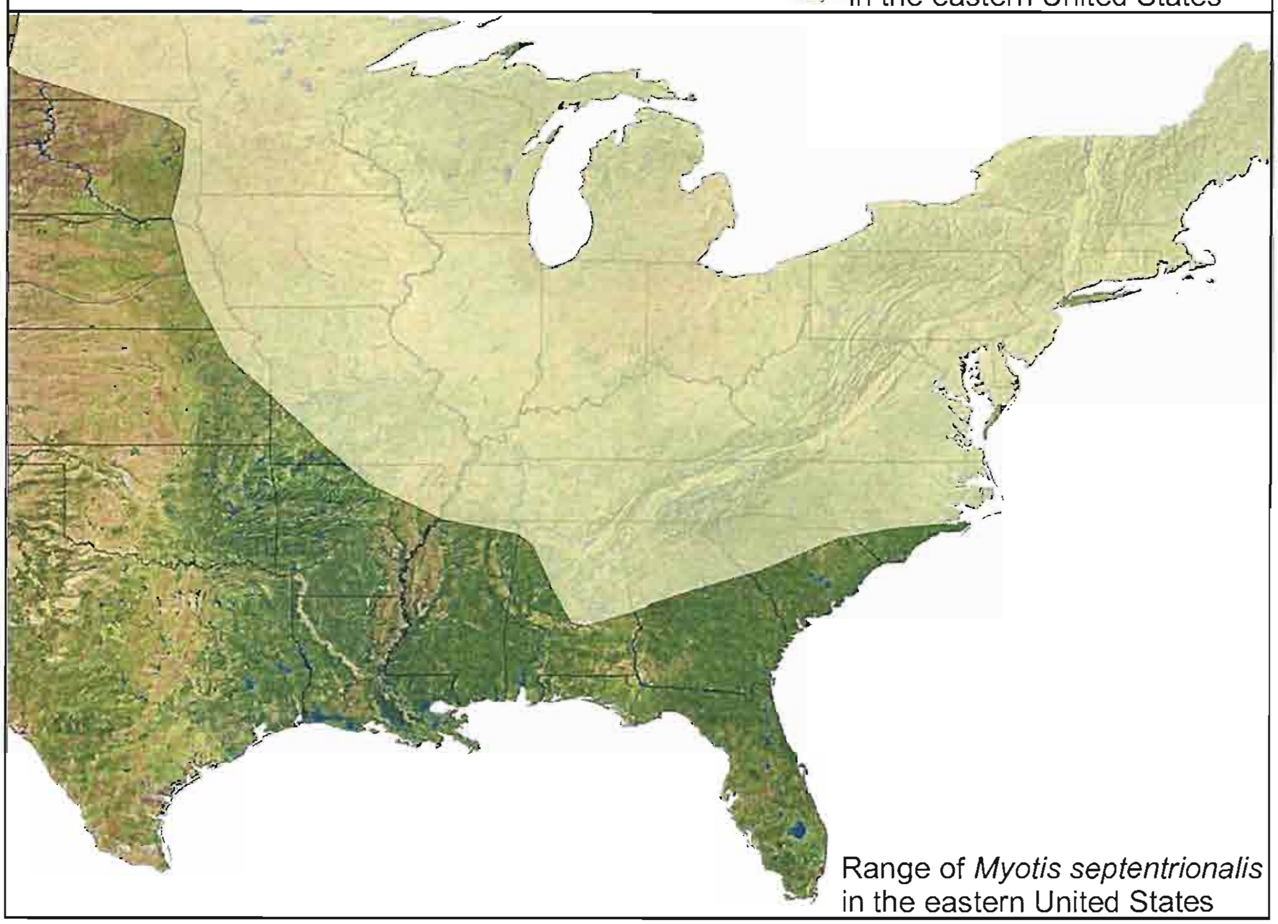


Range of *Lasionycteris noctivagans* in the eastern United States

Bat Range data obtained from - http://www.natureserve.org/getData/mammalMaps.jsp (06/21/2005)

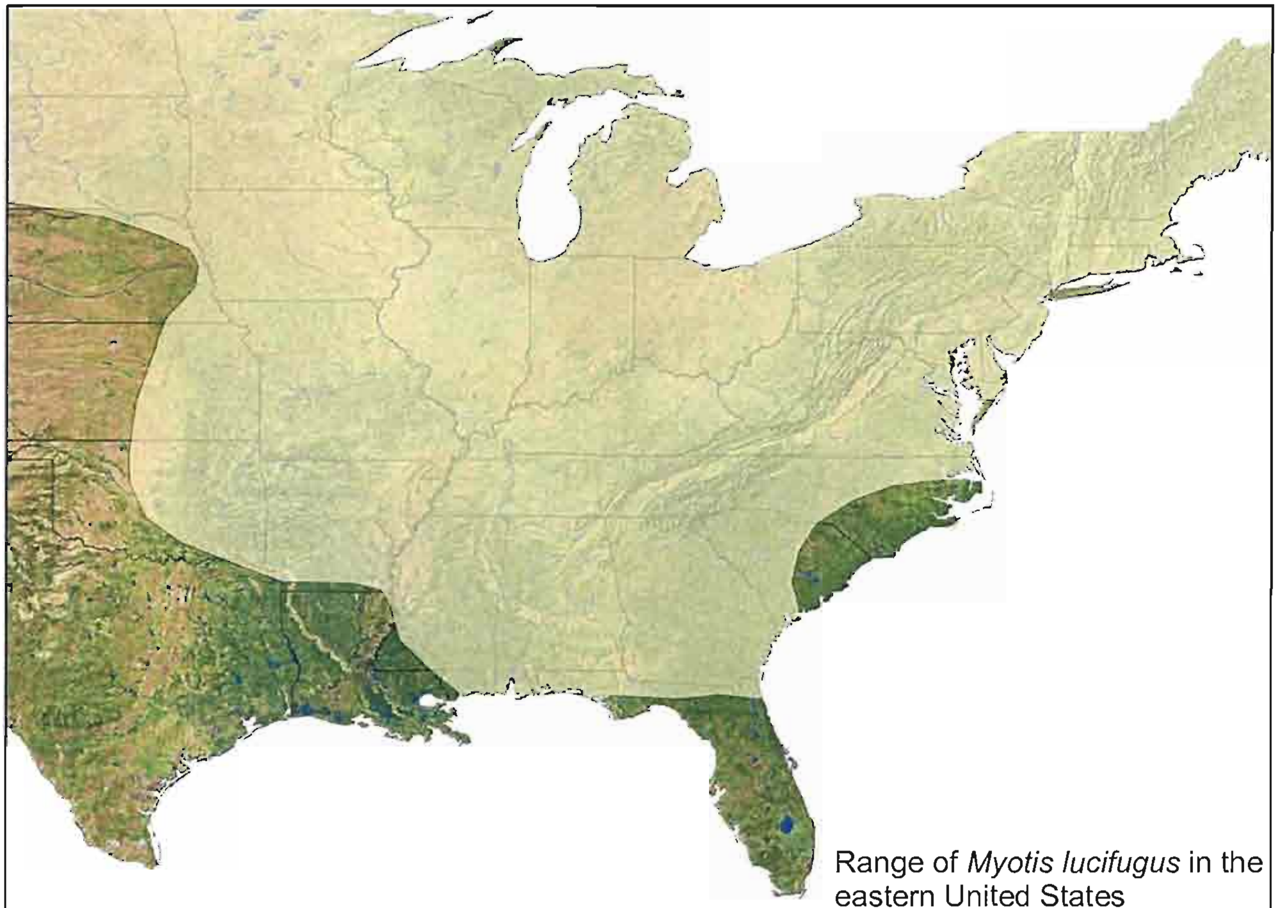


Range of *Nycticeius humeralis* in the eastern United States

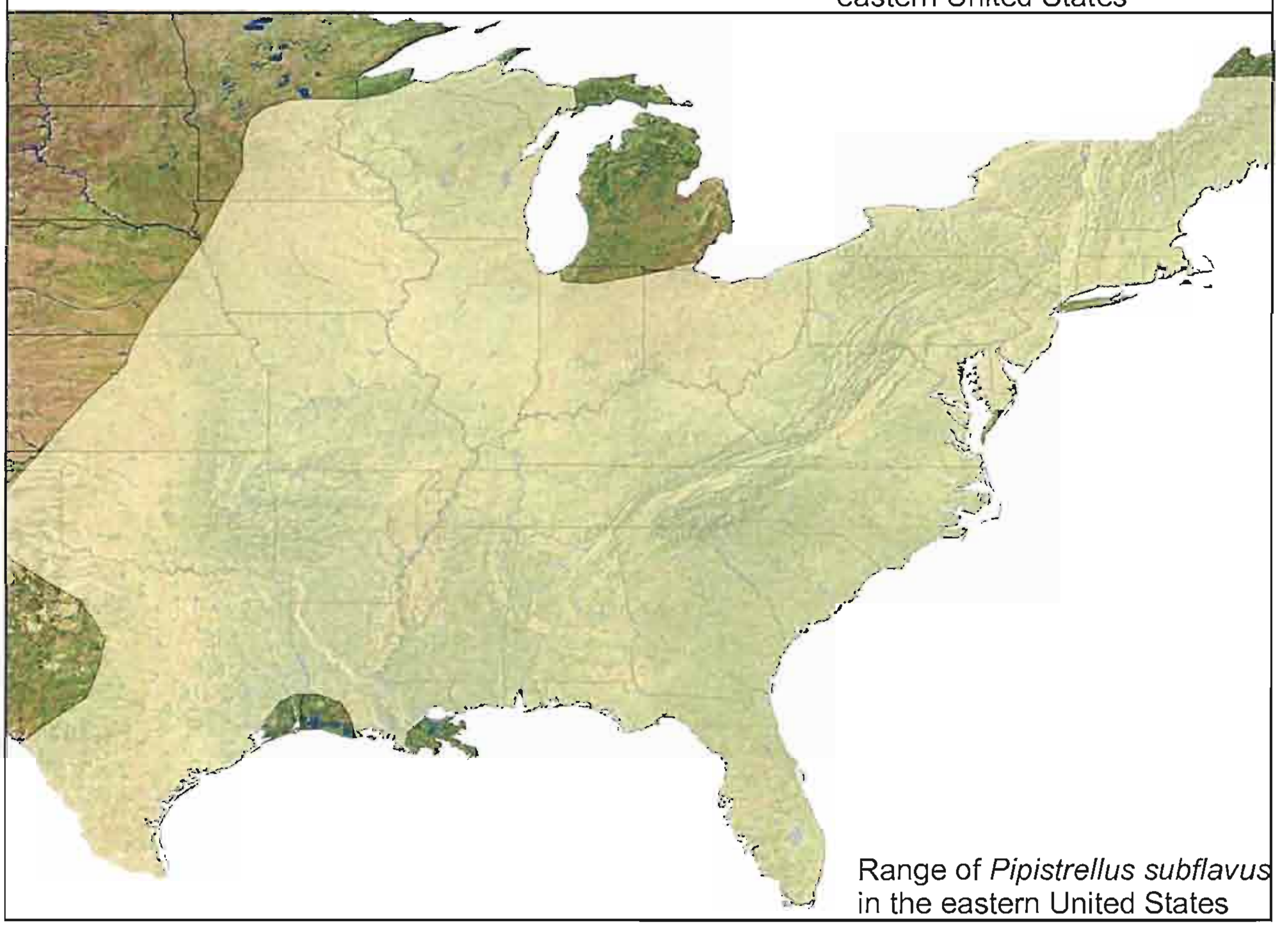


Range of *Myotis septentrionalis* in the eastern United States

Bat Range data obtained from - http://www.natureserve.org/getData/mammalMaps.jsp (06/21/2005)



Range of *Myotis lucifugus* in the eastern United States



Range of *Pipistrellus subflavus* in the eastern United States

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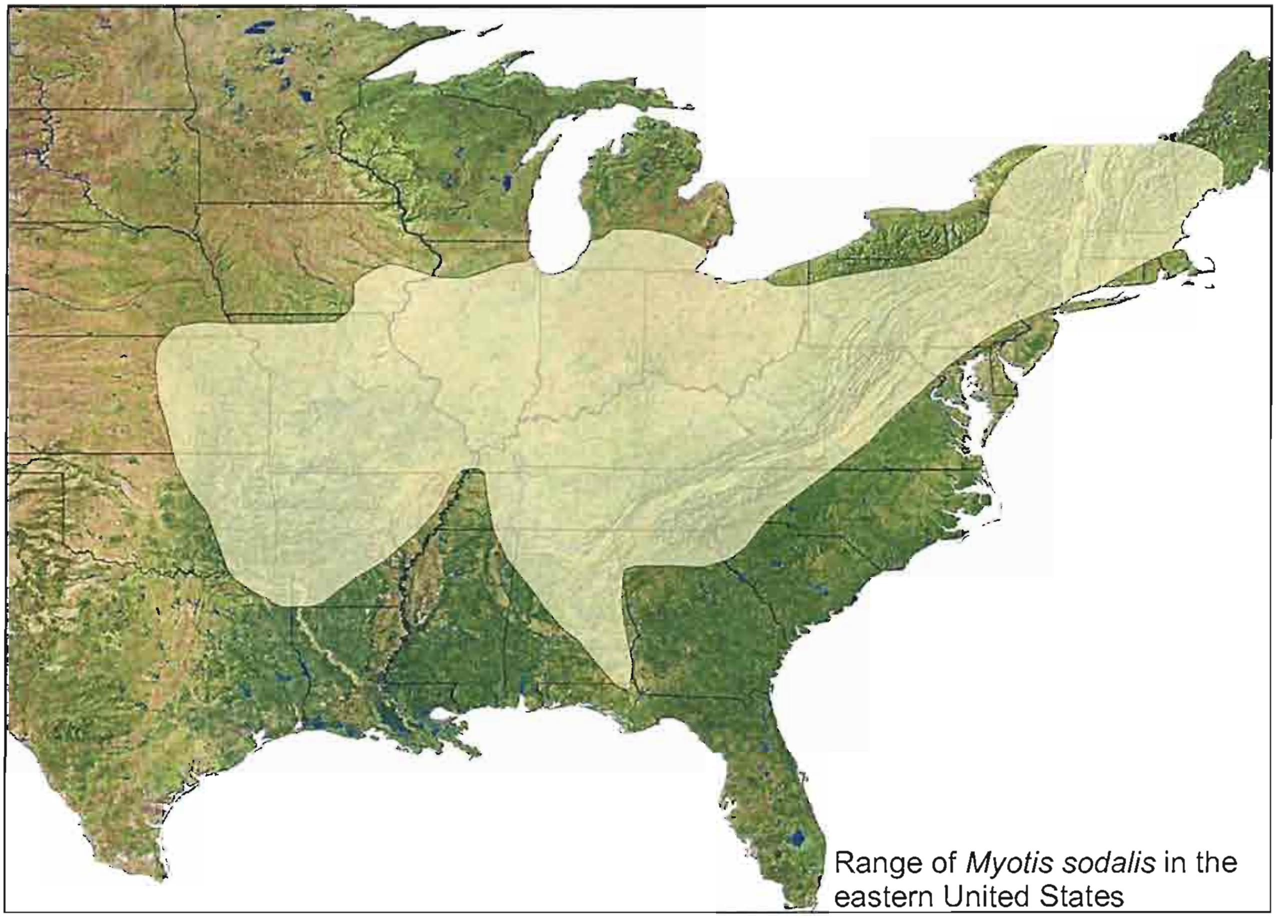
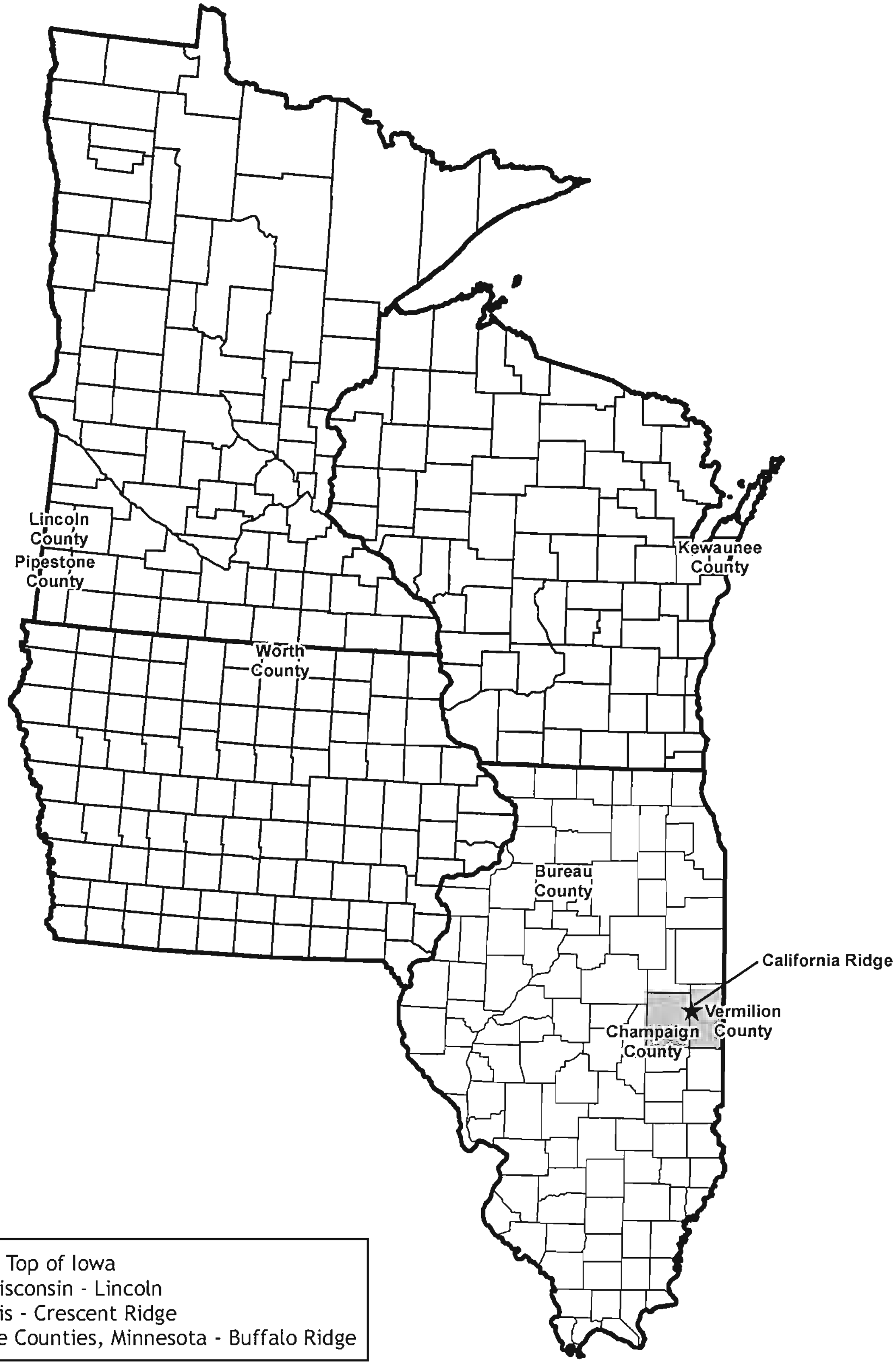


Range of *Myotis sodalis* in the eastern United States

Bat Range data obtained from - http://www.natureserve.org/getData/mammalMaps.jsp (06/21/2005)



Worth County, Iowa - Top of Iowa
Kewaunee County, Wisconsin - Lincoln
Bureau County, Illinois - Crescent Ridge
Lincoln and Pipestone Counties, Minnesota - Buffalo Ridge

N W E S

Figure 3. Nearby wind energy generation facilities at which bat mortality studies have been completed.

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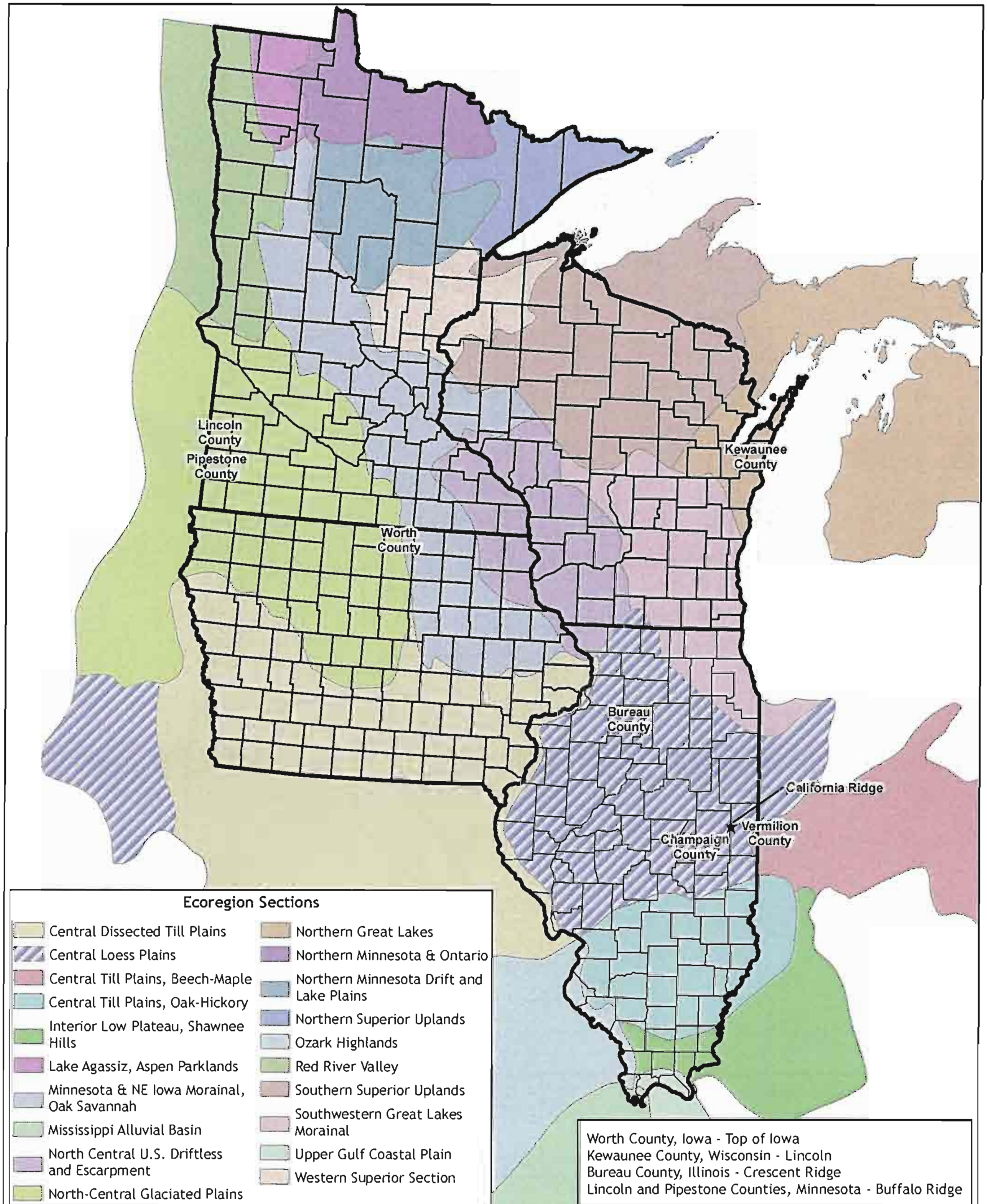

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Figure 4. Ecoregion Sections at California Ridge and other nearby wind energy generation facilities.

Project No. 1664.019

January 2009

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Figure 5. Counties in which the Indiana bat (*Myotis sodalis*) occurs near the proposed planning area for the California Ridge wind energy generation facility, Champaign and Vermilion counties, Illinois.

Project No. 1664.019	January 2009

BHE ENVIRONMENTAL

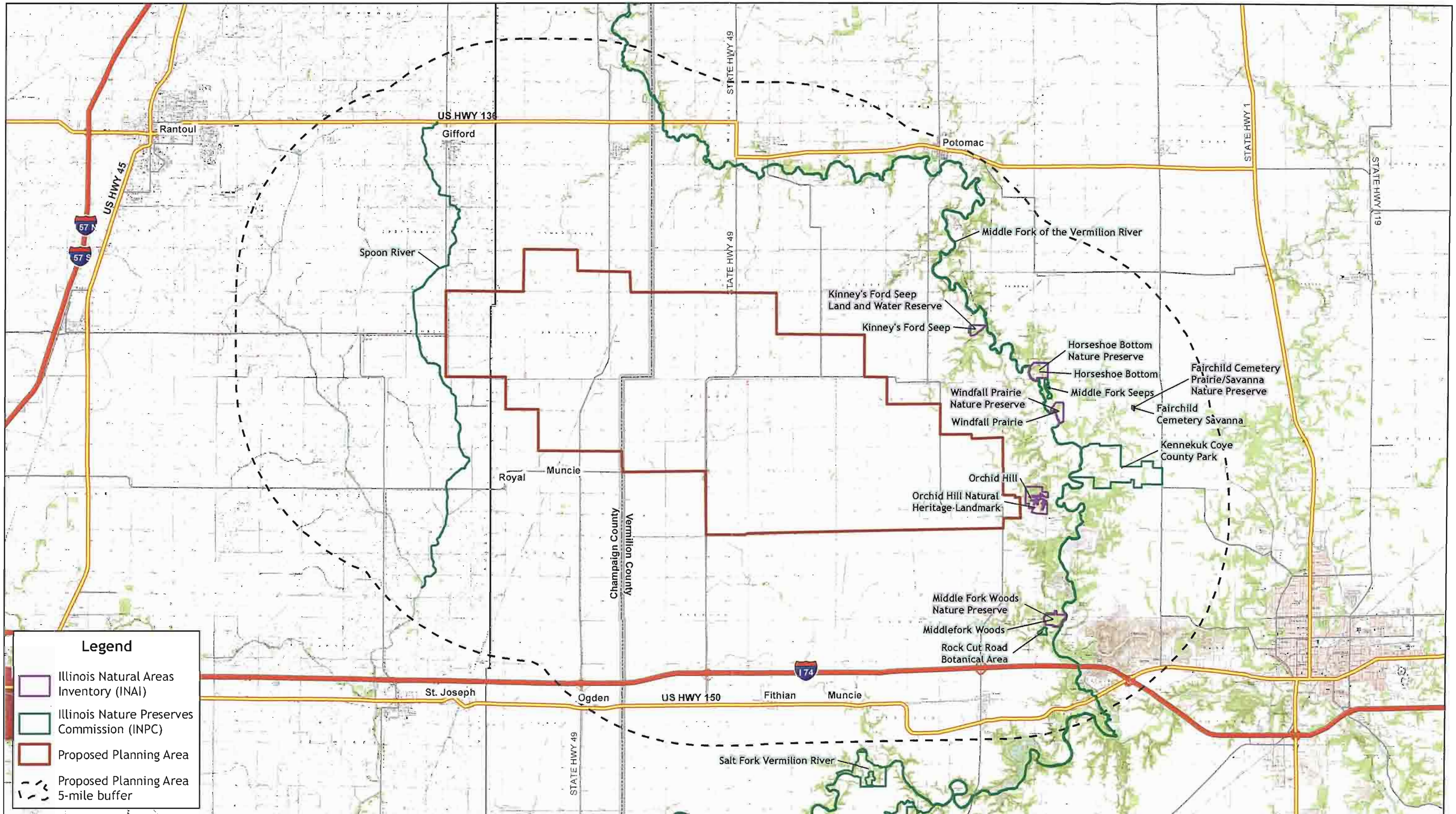

Figure 6. Illinois Natural Heritage Database results within 5 miles of the proposed planning area for the California Ridge wind energy generation facility, Champaign and Vermilion counties, Illinois.

January 2009	Project No. 1664.019	Miles 2 0 2 4	Base Map: USGS 7.5 Minute Topographic Maps Gifford, Penfield, Flatville, Royal, Collison quads, Illinois

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APPENDIX E

Biological Screening Report for the California Ridge Wind Resource Area, Champaign and Vermilion Counties, Illinois

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Executive Summary

At the request of HDR Engineering and Invenergy LLC, Western EcoSystems Technology Inc. prepared a Biological Screening Report for the proposed California Ridge Wind-Energy Facility (the "Site"), focused on birds, habitat, and threatened or endangered species. Bats were not addressed in this report. Biological resources within the Site and a two mile buffer (known as the Evaluation Area) were evaluated through a search of existing data and a Site visit. Several sources of available data were used to identify biological resources within the Site, including published literature, field guides, public data sets, and a meeting held with Keith Shank, Illinois Department of Natural Resources on March 26, 2009. Written requests for information concerning biological resources were sent to the Illinois Department of Natural Resources and the U.S. Fish and Wildlife Service by HDR Engineering. A draft response from Keith Shank of Illinois Department of Natural Resources has been received and his comments are incorporated. No response from the U.S. Fish and Wildlife Service has been received to date.

The California Ridge Wind Resource Area is approximately 33,530 acres in size, and is located in Champaign and Vermilion Counties, Illinois. Most of the Site falls within the Central Corn Belt Plains Ecoregion, which encompasses a large portion of central Illinois. Much of the region was originally dominated by tall-grass prairie and had scattered groves of trees and marshes occurring on level uplands. Today, most of the area has been cleared to make way for highly productive farms producing corn, soybeans and livestock. The Site is located within the Vermilion River watershed, and the Middle Fork of the Vermilion River is located just east of the Site boundary. The Middle Fork of the Vermilion River is one of the few, relatively intact rivers in Illinois, and has been designated a "National Scenic" River under the National Wild and Scenic Rivers Act.

Tilled agriculture dominates the Site, and the overall pattern of land cover and topography is relatively consistent within the Site. Habitat diversity is much greater just east of the Site boundary along the Middle Fork of the Vermilion River, where floodplain forests, wetlands, grasslands and pastures are more common. The Illinois Department of Natural Resources has identified several Illinois Natural Inventory Areas and Illinois Nature and Preserve Commission lands within 10 miles of the Site, most of which are located along the Middle Fork of the Vermilion River.

Much of the Site is located on flat cropland, which is generally recommended by the U.S. Fish and Wildlife Service as the ideal location for wind projects. The flat agricultural fields that the Site is located on lack defined topographic edges. One potentially unique feature of the proposed Site is the proximity to the Middle Fork of the Vermilion River. Several state listed species occur along the river and associated forested areas, and some potential exists for birds and bats to utilize the Middle Fork of the Vermilion River as a migration corridor. Potential bird and bat use in the Site may be influenced by the distance to the Middle Fork of the Vermilion River, with areas near the river having a higher potential for bird and bat use.

There is limited potential for species protected under the federal Endangered Species Act to occur in the project area due to the preponderance of tilled agriculture. The whooping crane has some potential to occur during migration, and a new ultra-light led migration route occurs in central Illinois. This population is listed as "experimental and non-essential" under the Endangered Species Act, but is still protected under the Migratory Bird Treaty Act. There is also potential for several state listed species to occur at some time throughout the year on the Site, primarily within non-tilled areas. Although the Site contains relatively low diversity, there are localized shelterbelts, grassland, hayfields and wetland habitat, and there is potential for state listed species to occur in these areas.

Should the proposed Site be developed, wildlife baseline studies can be conducted prior to construction that can help predict potential project impacts, and can provide information for siting turbines to minimize impacts to wildlife, if warranted. Baseline studies can also help to determine if bird and bat use is influenced by distance to the Vermilion River. The types and extent of baseline surveys will depend on the locations of proposed turbines and infrastructure, and the concerns expressed by wildlife agencies and county officials.

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INRODUCTION AND METHODS

When exploring prospective wind power sites, knowledge of wildlife and other biological resource issues helps the wind industry identify potential ecological problems early in the development process. At the request of HDR Engineering and Invenergy, Western EcoSystems Technology Inc. (WEST) has prepared a biological screening report for the proposed California Ridge Wind-Energy Facility (the 'Site'), located in Champaign and Vermilion Counties, Illinois (Figure 1). The purpose of this report is to describe biological resources present within and surrounding the proposed Site, and to compare site characteristics with those at other wind-energy facilities where post-construction wildlife studies are publicly available. The area evaluated for potential biological resources includes the proposed Site and a two mile buffer (Evaluation Area). This report focuses on birds, sensitive and protected species, wetlands and land cover.

Biological resources within the project and Evaluation Areas were evaluated through a search of existing data, a site visit and results from preliminary wildlife studies. Several sources of available data were used to identify biological resources within the Site, including published literature, field guides, public data sets, and a meeting held with Keith Shank, Illinois Department of Natural Resources (IDNR) on March 26, 2009. HDR Engineering requested written information concerning biological resources at the Site from the IDNR and the U.S. Fish and Wildlife Service (USFWS). A response from Keith Shank regarding the concerns of IDNR has been received and those concerns are addressed (Appendix B); no response from USFWS has been received to date. The Site and Evaluation Areas were visited on March 5-6, 2009 by a biologist from WEST Inc. (See Appendix A for photographs). All wildlife species observed during the site visit were recorded (Table 1). Additional visits to the site were made during the course of regular fixed-point count bird surveys between March 9 – September 30, 2009.

Table 1. Wildlife species observed during site visit on March 5-6, 2009.

Birds			
Canada goose	*Branta canadensis*	European starling	*Sturnus vulgaris*
Red-tailed hawk	*Buteo jamaicensis*	Lapland longspur	*Calcarius lapponicus*
Rock dove	*Columba livia*	Killdeer	*Charadrius vociferus*
Mourning dove	*Zenaida macroura*	House sparrow	*Passer domesticus*
American robin	*Turdus migratorius*	Red-winged blackbird	*Agelaius phoeniceus*
Horned lark	*Eremophila alpestris*	Eastern meadowlark	*Sturnella magna*
Turkey vulture	*Cathartes aura*		
Mammals			
Raccoon	*Procyon lotor*		
Gray Squirrel	*Sciurus carolinensis*		
Fox squirrel	*Sciurus niger*		

ENVIRONMETAL SETTING

The California Ridge Wind Resource Area is approximately 33,530 acres in size, and is located in Champaign and Vermilion Counties, Illinois (Figure 1). The Site falls within the Central Corn Belt Plains Ecoregion, which encompasses a large portion of central Illinois (USEPA 2008). The Central Corn Belt Plains Ecoregion is composed of vast glaciated plains. Much of the region was originally dominated by tall-grass prairie and had scattered groves of trees and marshes occurring on level uplands. Today, most of the area has been cleared to make way for highly productive farms producing corn, soybeans and livestock. Approximately the eastern 1/6 of the CRWRA falls within the Interior River Valleys and Hills Ecoregion of Illinois. This area in Illinois is restricted to areas surrounding the Middle Fork of the Vermilion River in Vermilion County. The Interior River Valleys and Hills Ecoregion is comprised of old till plains, hills, forested river bluffs, major rivers, and valleys containing levees, oxbow lakes, islands, and scattered sand sheets and dunes. Almost all of the level upland areas have been cleared for cropland and pastureland, but forests remain in steep ravines.

The project is located within the Vermilion River watershed, and the Middle Fork of the Vermilion River is located approximately 400 m east of the project boundary. The closest turbine proposed in the project area is located approximately 1.5 miles west of the Middle Fork of the Vermilion River (J. Veazi, Invenergy, pers. comm.). The Middle Fork of the Vermilion River is one of the few intact rivers in Illinois, and has been designated a "National Scenic" River under the National Wild and Scenic Rivers Act.

Tilled agriculture dominates the Site, and the overall pattern of land cover (Figure 2) and topography (Figure 3) is relatively consistent within the Site. Habitat diversity is much greater just east of the project boundary along the Middle Fork of the Vermilion River, where floodplain forests, wetlands, grasslands and pastures are more common. According to the IDNR, there are 18 state lands, nature preserves, land & water resources and Illinois Natural Area Inventory (INAI) sites located within 10 miles of the Site. Most are located along the Middle Fork of the Vermilion River, and outside of the project area. The Dynegy coal-fired power plant is located in the far eastern portion of the project.

Soils in the Site are highly productive, and support corn and soybean production. Elevations in the Site range from approximately 200 - 250 meters (m) above sea level (Figure 4).

Land cover

According to the National Land Cover Dataset (2001; Table 2; Figure 2), the dominant cover type within the Site is cultivated cropland (corn and soybeans), comprising 92.7% (31,089 acres) of the total land area. Developed areas are the second most common cover type, comprising 5.4% (1,821 acres) of the site. Pasture/hay covers 1.21% of the Site (403 acres) and the remaining area is comprised of small amounts of forested wetlands, barren land, open water, and grassland (Table 2). The Evaluation Area contains greater amounts of forested areas, pastures and grasslands, and fewer croplands, due to the presence of forested areas along the Middle Fork of the Vermilion River.

Table 2. Land use/habitat types present within the project and Evaluation Areas. Data were obtained from USGS land cover data compiled from satellite imagery (2001).

	Site		Evaluation Area	
Cover Type	**Acreage**	**% Composition**	**Acreage**	**% Composition**
Open Water	8.44	0.03	402.93	0.45
Developed, Open Spaee	1,506.87	4.49	4,100.41	4.54
Developed, Low Intensity	282.60	0.84	730.93	0.81
Developed, Medium Intensity	24.82	0.07	80.01	0.09
Developed, High Intensity	7.27	0.02	24.68	0.03
Deciduous Forest	205.38	0.61	6,711.96	7.43
Grassland	1.02	<0.01	258.47	0.29
Pasture/Hay	403.12	1.20	1,958.79	2.17
Crops	31,089.30	92.72	75,853.60	84.00
Woody Wetlands	1.33	<0.01	184.14	0.20
Total	**33,530.15**	**100**	**90,305.93**	**100**

Special Status Plant Species and Natural Communities

The Illinois Natural Heritage Inventory (INHI) has records on the IDNR website of plant species that are threatened or endangered on the state level in Champaign and Vermilion Counties. The INHI has records of ear-leafed foxglove (*Tomanthera auriculata*; state threatened) listed in Champaign County, and brome-like sedge (*Carex bromoides*; state threatened), fibrous-rooted sedge (*Carex communis*; state threatened), drooping sedge (*Carex prasina*; state threatened), queen-of-the-prairie (*Filipendula rubra*; state endangered) and Wolf's bluegrass (*Poa wolfii*; state endangered) in Vermilion County.

One Illinois Natural Heritage Landmark, Orchid Hill, is present along the eastern edge of the Site boundary with a small portion included in the project area (Figure 3). This area is private land that is enrolled in the natural heritage landmark program. The area is designated as a landmark due to an unusually high plant and orchid diversity in the area; although no state listed plant species are known to occur at the landmark site. Several Illinois Nature Preserves and Inventory sites are located outside of the Site along the Middle Fork of the Vermilion River (K. Shank, IDNR, pers. comm.).

Correspondence from IDNR indicates that there are 18 state lands, nature preserves, land & water resources and Illinois Natural Area Inventory (INAI) sites located within 10 miles of the proposed wind-energy facility. Major concerns brought forward by IDNR include direct impacts, turbine visibility, shadow 'flicker', and known presence of federal- or state-listed species (Table 3; Appendix B). Direct impacts include activities that directly alter any of these natural areas, specifically siltation and sedimentation into tributaries of the Vermilion River that could affect water quality (K. Shank, IDNR, pers. comm.). The primary concerns of IDNR are how the presence of the turbines will affect the aesthetics of the natural settings and the potential of the shadow 'flicker' to affect viewing in these natural areas and the affect the 'flicker' has on local fauna. Concerns also include the presence of federal- or state-listed species and the potential impacts to each of these species are addressed in the sensitive species section (K. Shank, IDNR, pers. comm.).

Wetlands and Riparian Areas

Broad-scale information concerning wetlands is based on data from the USFWS National Wetlands Inventory (NWI), (USFWS 2004; Table 3; Figure 5), land cover mapping (Table 2; Figure 2), aerial photography (Figure 6), and the site visit. Formal wetland delineations have not been completed. A very small percentage of the Site is classified as wetland (Table 3); based on NWI data only 44.83 acres (<0.001%) of the total area is comprised of wetland habitat. The Evaluation Area contains more acreage of wetland habitat than the Site. Based on NWI data, the Evaluation Area has 950 acres (0.01%) of wetland. The increase in wetland acres can be mainly attributed to the presence of wetlands and open water associated with the Middle Fork of the Vermilion River. Although wetlands and other waters of the U.S. occur in the area, they occupy a small percentage of the Site and are restricted to localized corridors. Small, ephemeral areas of water in croplands may be more common in the Site during wet spring and fall seasons. While many of these areas may not regulated by the U.S. Army Corps of Engineers, they may provide stopover habitat for shorebirds in the spring.

Table 3. Wetland types present within the project and Evaluation Areas. Data were obtained from USFWS National Wetlands Inventory (USFWS 2004).

	Site		Evaluation Area	
Wetland Type	**Acreage**	**% Composition**	**Acreage**	**% Composition**
Emergent Wetland	14.36	32.0	60.37	6.35
Forested/Shrub Wetland	23.92	53.4	450.39	47.40
Pond	6.51	14.5	70.55	7.43
Lake	0.05	0.1	304.71	32.07
Other	0	0	0.10	0.01
Riverine	0	0	64.07	6.74
Total	**44.83**	**100**	**950.19**	**100**

Vegetation Summary and Conclusions

It is difficult to determine the presence of rare or endangered plants within an area without surveys at appropriate times of the year. Most of the land use within the Site is cultivated cropland (corn and soybean) where the majority of sensitive plants are unlikely to occur. One potential exception is the Orchid Hill Natural Heritage Landmark, located near the Dynegy coal-fired power plant. During the March 26, 2009 meeting the IDNR did not express concern over natural communities in the Site; however, they did express concern about the potential impacts of the presence of a wind-energy facility on the surrounding Illinois Natural Areas Inventory (INAI) sites along the Middle Fork of the Vermilion River (Appendix B). Some potential also exists for rare plants to occur along the railroad right-of-way within the project area, where some native prairie species may be present.

WILDLIFE

Raptors species likely to occur in the area

Scattered small shelterbelts and riparian areas within the Site and Evaluation Areas provide potential nesting habitats for generalist raptors such as red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), great-horned owl (*Bubo virginianus*), and eastern screech-owl (*Otus asio*). Northern harrier (*Circus cyaneus*) has been documented nesting within a few miles of the Site and may occur in the Site while hunting or performing courtship displays, however, it is likely more common during migration and as a winter resident (K. Shank, IDNR, pers. comm.). Short-eared owl (*Asio flammeus*) may potentially be observed in the Site during migration or the winter, but are unlikely to nest at the project due to a lack of grasslands in the Site. Rough-legged hawk (*Buteo lagopus*), red-tailed hawk, northern harrier, and great-horned owl are likely present during the spring and fall migration, and during winter. Fifteen raptor species including Cooper's hawk (*Accipter cooperii*) and sharp-shinned hawk (*Accipter striatus*) are likely migrants throughout the region. Other species, such as osprey (*Pandion haliaetus*) and bald eagle (*Haliaeetus leucocephalus*) may breed along the Middle Fork of the Vermilion River, and occasionally fly over the Site. Red-tailed hawks and American kestrels are expected to be the most common raptor species throughout the year on the Site, while northern harriers may be more common during migration and the winter.

Potential for raptor migration in the area

Several factors influence the migratory pathways of raptors; the most significant of which is geography. Two geographical features primarily used by raptors during migration are ridgelines and the shorelines of large bodies of water. Updrafts formed as the wind hits the ridges, and thermals created over land make for energy-efficient travel over long distances (Liguori 2005). It is for this reason that raptors may follow corridors or pathways, for example along prominent ridges with defined edges, during migration. The proposed project is located on a relatively broad and shallow ridge; however, the ridge is not defined well enough to provide updrafts needed to concentrate migrating raptors. The Middle Fork of the Vermilion River, located east of the project, contains more defined topography and is orientated north-south. Migrating raptors may more heavily use areas along the Middle Fork of the Vermilion River compared to the Site. Areas within the Site near the river may receive higher rates of use by migrating raptors. During recent studies along the Illinois River, waterfowl departed from the course of river and traveled cross-country, indicating that species that follow the Vermilion River can divert from the river's course (K. Shank, IDNR, pers. comm.).

Raptor migration through the Site likely occurs in a broad band fashion. Information compiled by Region 3 of the USFWS indicates that during spring and fall, raptors will likely migrate over the Site as they travel across central Illinois to and from migration routes that follow the shoreline of the Great Lakes (Figures 7 and 8).

Potential raptor nesting habitat

Potential nesting substrate for above ground nesting species was present in the form of living and dead trees. Farmsteads observed during the site visit usually had trees rows or woodlots associated with them. Woodlots in the Site are composed of deciduous trees and rarely exceed a few acres in size. Grasslands were relatively rare in the area, and ground-nesting raptors, such as the state endangered northern harrier or short-eared owl, are expected to be rare breeders or absent. Overall, suitable nesting habitat within and surrounding the Site is limited, and high densities of nesting raptors are not expected to occur. Raptor nesting densities are expected to be higher along forested areas associated with the Middle Fork of the Vermilion River.

Areas of potentially high prey density

Studies indicate that raptor mortality at wind-energy facilities (especially Altamont Pass WRA, California [APWRA]) may be in part due to behavioral differences between species, increasing the susceptibility of some for collision with turbines. Orloff and Flannery (1992, 1996) suggested that high golden eagle (*Aquila chrysaetos*) mortality at APWRA was in part due to the apparently high densities of ground squirrels (*Spermophilus beecheyi*) in the area (Thelander and Smallwood 2007). Continued research at the site revealed that the degree of aggregation of pocket gopher (*Thomomys bottae*) burrows around the turbines was positively correlated to red-tailed hawk fatality rates (Smallwood et al. 2001, Thelander et al. 2003, Thelander and Smallwood 2007). In addition, features providing cover for cottontails (*Sylvilagus auduboni*) appeared to be associated with areas where golden eagles were killed.

Types of prey species present within the Site are likely to be rodent species associated with agricultural fields and woodland edges, such as mice, voles, and shrews. These species may also occur in forest clearings or along the edges of roads and may be attractive to raptors such as red-tailed hawks. Prey densities and prey availability of species such as deer mice (*Peromyscus maniculatus*) may be high in agricultural fields immediately after harvest as mice forage on leftover grain. Songbirds are also prey for a number of raptor species and may utilize vegetation along the creeks and cropland edges, as well as grassland areas in the summer. Overall, prey densities are expected to be low within the much of the Site based on the large amount of tilled agriculture present.

Avian Migration

Most species of birds are protected by the Migratory Bird Treaty Act. Many species of songbirds migrate at night and may collide with tall man-made structures, though no large mortality events on the same scale as those seen at communication towers have been documented at wind-energy facilities in North America (NWCC 2004). It is generally assumed that nocturnal migrating passerines move in broad fronts rather than along specific topographical features (Gauthreaux et al. 2003, NRC 2007) within inland areas. Large numbers of songbirds have collided with lighted communication towers and buildings when foggy conditions and spring or fall migration coincide. Birds appear to become confused by the lights during foggy or low ceiling conditions, flying circles around lighted structures until they become exhausted or collide with the structure (Erickson et al. 2001). Most collisions at communication towers are attributed to the guy wires on these structures, which wind turbines do not have. Additionally, the large mortality events observed at communication towers occurred at structures greater than 150 m in height (Erickson et al. 2001), likely because most birds migrate at elevations of 270 m or higher (Young et al. 2004). Modern wind turbines are well below 270 m in height. Marine radar surveys conducted at many sites proposed for wind power development help to assess the risk of wind turbines to nocturnal migrants (Young and Erickson 2006). Variation in passage rate was greater across studies but trends by season and region were similar. The range of spring mean passage rates across sites in the north-east was 110 to 409 targets per km per hour (targets/km/hr) with a mean of 281 targets/km/hr. For the fall, the range was from 170 to 380 with a mean of 202 targets/km/hr. For studies in the northeast where target altitude was calculated using the vertical sampling method, the mean altitude of targets was approximately 409 m above ground level in the spring and 446 m in the fall. For this reason, migrating songbirds and other species are likely more at risk of turbine collision when ascending and descending from stopover habitats.

The Site does contain some areas of suitable stopover habitat for songbirds in the form of occasional shelterbelts and small woodlots, although these areas are limited. Waterfowl and shorebirds may utilize open water areas and croplands as stopover habitat during migration. The proposed Site generally lacks topographic features that would funnel birds during migration. Migrating birds are more likely to utilize the Middle Fork of the Vermilion River and the associated forested areas as stopover sites during migration. Areas of the project located near the river have some potential to receive higher use by migrating birds.

The average overall bird fatality rate at wind-energy facilities in the U.S. is 2.3 bird fatalities per turbine per year or 1 bird fatalities per MW per year (NWCC 2004). Avian mortality has been monitored at four other wind-energy facilities in the upper Midwest, including Worth County, Iowa (Koford et al. 2005), Buffalo Ridge, Minnesota (Osborn et al. 2000, Johnson et al. 2000, 2002), Bureau County, Illinois (Kerlinger et al. 2007) and Kewaunee County, Wisconsin (Howe et al. 2002). Total avian mortality at these four projects has averaged 1.7 fatalities per megawatt per year (Table 4), with most of the fatalities (80%) being songbirds (Table 5).

Table 4. Avian and bat mortality associated with other wind farms in the Midwest.

	Per Megawatt Mortality Estimates		
Location	**Birds**	**Bats**	**Source**
Worth County, IA	0.7	8.9	Koford et al. 2005
Buffalo Ridge, MN	4	2.1	Johnson et al. 2002, 2003, 2004
Kewaunee County, WI	2	6.5	Howe et al. 2002
Bureau County, IL	0.6	1.9	Kerlinger et al. 2007
Mean	**1.7**	**4.9**	

Table 5. Composition of identified avian fatalities at existing wind farms in the upper Midwest (Iowa, Wisconsin, Minnesota, Illinois)

Avian group	Number of fatalities	Proportion of fatalities
Song birds	68	80
Waterfowl	5	5.9
Waterbirds	6	7.1
Shorebirds	1	1.2
Upland gamebirds	3	5

Raptors	2	2.4
Total	**85**	**100**

Within Illinois, the USFWS and the IDNR have also expressed concern over the potential impacts of wind-energy development on the American golden-plover (*Pluvialis dominica*) and Smith's longspur (*Calcarius pictus*).

American Golden-Plover

The American golden-plover, a USFWS species of concern, breeds on the high arctic tundra of Alaska and Canada and winters in the grasslands of central and northern South America, making one of the longest migratory journeys of any shorebird. American golden-plover arrive in west-central Indiana and central Illinois in late March and early April, within former tall grass prairie habitats. This area was historically a favored staging habitat for the plovers, and they can still be found in sizable congregations in many areas of central Illinois and northwest Indiana, although their overall distribution during migration is not well defined. Although much of this area is now an agricultural landscape, the American golden-plover still finds these fields acceptable as migratory feeding and resting grounds. The USFWS and IDNR have expressed concern over the potential impacts of wind turbines to migrating golden plovers. According to 25 years of Spring Bird Count data, American golden-plover congregate in high numbers in Champaign and Vermilion counties; however, the locations of congregations tend to vary from year. A trend indicates that American golden-plover have been stopping farther south than historical records indicate which increases the possibility of them occurring in the Site (K. Shank, IDNR, pers. comm.).

Smith's Longspur

Less is known about distributions of migrating Smith's longspurs in Illinois. Smith's longspur is considered a species of concern by the USFWS. This breeder of the far north and winter resident of the southeast U.S. is most readily observed in central Illinois during migration as it passes through Illinois beginning in February (Devore et al. 2004) through April. Typically, longspurs migrate in flocks of ten to twenty. The highest concentration of stopover sites for Smith's longspur may be in Ford and Livingston Counties, but further research is needed (Keith Shank, IDNR, pers. comm.). The IDNR and USWFS have expressed concern over the potential effects of wind projects to Smith's longspur populations in Illinois (K. Shank, IDNR, pers. comm.). Some potential exists for the Smith's longspur to occur within the Site during migration.

Breeding Birds

Important Bird Areas

Songbirds (order Passeriformes) are by far the most abundant bird group in most terrestrial ecosystems and are the most often reported as fatalities at wind power facilities (NRC 2007). The Audubon Society lists Important Bird Areas (IBA's) that are sites providing essential habitat for one or more species of bird (www.audubon.org/bird/iba/). These include sites for breeding, wintering and/or migrating birds and can range from a few, to thousands of acres in size. There are no registered IBA's in Champaign or Vermilion Counties.

USFWS Birds of Conservation Concern

The USFWS lists 34 species as birds of conservation concern within the Eastern Tall Grass Prairie Bird Conservation Region (USFWS 2002). These species do not receive special protection unless they are also listed by the USFWS under the Endangered Species Act or by the IDNR; but have been identified as vulnerable to population declines in the region by the USFWS. Most of these species do not occupy corn and soybean fields, habitat typical of that found within the Site. Rather, they occur in grassland and wetland habitats. Some potential exists for these species to breed within native habitats or planted grasslands in the Site. Additionally, a number of these species may migrate through, or overwinter in, the Site, although the extent is difficult to predict.

USGS Breeding Bird Survey

The Dailey US Geological Survey (USGS) Breeding Bird Survey (BBS) route runs east/west through the Site (Figure 9). Each BBS route is 24.5 mi (39.4 km) long, and all birds seen or heard are tallied for a three-minute period every half mile (0.8 km) along the route. There has been a total of 105 breeding bird species observed along this route since 1968, including the following raptors: turkey vulture, northern harrier, red-tailed hawk, American kestrel and great horned owl (http://www.pwrc.usgs.gov/bbsapps/index.cfm). In 2005, 1,982 individuals comprising 63 species were observed on the Dailey BBS route (http://www.pwrc.usgs.gov/bbsapps/index.cfm). The most abundant breeding birds observed were red-winged blackbird (*Agelaius phoeniceus*), common grackle (*Quiscalus quiscula*), European starling (*Sturnus vulgaris*), American robin (*Turdus migratorius*), mourning dove (*Zenaida macroura*), horned lark (*Eremophila alpestris*), and house sparrow (*Passer domesticus*). These species are common to the region and can be found in tilled agricultural landscapes. No species listed as federally endangered or threatened by the USFWS have been recorded on this route. A few records of state-listed species were recorded along this route between 1968 – 2005, including the upland sandpiper (*Bartramia longicauda*), loggerhead shrike (*Lanius ludovicianus*), and northern harrier. Eleven species designated by the USFWS as birds of conservation concern within the Eastern Tall Grass Prairie region were observed along the Dailey route between 1968 and 2005.

Indirect effects

The presence of wind turbines may alter the landscape so that wildlife habitat use patterns are altered, thereby displacing wildlife away from the project facilities. One of the common concerns includes the potential displacement of breeding songbirds from grassland habitats where wind turbines are located. IDNR has expressed concern over the potential displacement impacts to breeding populations of these species; however, only one study has been completed to date in the Midwest focusing on displacement of bird species. A winter waterfowl displacement study was completed at the Grand Ridge Wind-Energy Facility (GRWEF; Derby et al. 2009), where three species were examined, mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), and common goldeneye (*Bucephala clangula*). The results of the survey show that upon completion of the GRWEF, wintering waterfowl near La Salle Lake continued to utilize corn fields for feeding where turbines were located (Derby et al. 2009).

Endangered Species

Federal Listed Species

There are two plant and one mussel species listed as federally threatened, endangered or candidate by USFWS with the potential to occur within Champaign and Vermilion Counties, Illinois (USFWS 2009; Table 6). The only federally listed species known to occur in Vermilion County is the clubshell mussel (*Pleurobema clava*) in the Middle Fork of the Vermilion River, approximately 400 m to the east of the Site. The northern riffleshell (*Epioblasma torulosa rangiana*) has been extirpated from the Middle Fork of the Vermilion River. No federal listed bird species have been reported as occurring within these counties, although the experimental, non-essential population of whooping crane may migrate through the area. Species with potential to occur within the project are discussed further below.

Table 6. Federally listed species with known or potential occurrence in Champaign and Vermilion Counties, Illinois.

Species	Status*	Habitat	Potential for Occurrence
Birds			
Whooping Crane *Grus americanus*	X	Breeds in Wisconsin, and winters in Florida. May utilize wetland areas, lakes, and small farm ponds for roost sites during migration, and may feed in crop fields.	Some potential occurs for birds to occur in wetland areas or ponds during migration.
Plants			
Eastern Prairie Fringed Orchid *Platanthera leucophaea*	FT	Mesic to wet prairies and native grasslands.	Possibly occurs along railroad verge..
Prairie Bush Clover *Lespedeza leptostachya*	FT	Dry to mesic prairies and native grasslands with gravelly soil.	Possibly occurs along railroad verge.
Mollusks			
Clubshell Mussel *Pleurobema clava*	FE	Small to medium sized rivers with sandy or gravel bottoms	Some potential exists for this species to occur if streams in the project have suitable substrates.
Northern Riffleshell Mussel *Epioblasma torulosa rangiana*	EX	Medium to large rivers in gravel.	None; extirpated but being re-introduced in future.

*FE=Federal Endangered; FT=Federal Threatened; C=Candidate; EX=extirpated, X=Experimental, Non-essential Population. Results from U.S. Fish and Wildlife Service (USFWS 2008a).

Whooping crane

The Eastern Migratory Population (EMP) of whooping cranes was reintroduced to the Midwest in 2001. The birds were taught to migrate between breeding grounds in Wisconsin and wintering grounds in Florida by leading imprinted birds along the migration route with an ultra light aircraft. This effort has continued to build the flock to a population (November 25, 2008) of 91 birds (69 adults, 22 juveniles; Stehn 2008). Whooping cranes in the EMP migrate from their summering area in the Necedah National Wildlife Refuge (NNWR) in central Wisconsin to their wintering grounds in the Chassahowitzka National Wildlife Refuge (CNWR), a 12,500 hectare salt marsh on the Gulf Coast of Florida (CWS and USFWS 2007). The ultra light route was altered in 2008 and now passes over central Illinois (Figure 10).

As birds become established and the population increases, the potential exists for whooping cranes to stopover virtually anywhere in Illinois between their summer and winter areas. Whooping cranes were observed along the Middle Fork of the Vermilion River in Vermilion County during 2005 (Kienbaum 2008; WDNR 2009). Correspondence from IDNR indicates that during November 2008 two whooping cranes rested along the upper East Branch of the Vermilion River in Ford County and a single whooping crane lingered near Danville until the end of June 2008 during spring migration (K. Shank, IDNR, pers. comm.). Based on past use of areas near the Site, and the new location of the ultra-light led migration, some potential exists for whooping cranes to utilize the Site during migration. Corn and soybean fields may be used as feeding areas within the Site, while farm ponds, wetlands, and streams may be used as roosting areas.

The EMP is listed as a non-essential, experimental population under the Endangered Species Act. This designation relaxes the restrictions of the Endangered Species Act and lessens possible conflicts between people and whooping crane conservation. Within the rule establishing the EMP as non-essential and experimental (USDOI FR 3773), the USFWS stated "We do not expect this rule to have potential takings implication under Executive Order 12630 because it would exempt individuals or corporations from prosecution for take that is accidental and incidental to an otherwise lawful activity." The flock is still fully covered under the Migratory Bird Treaty Act.

Federally Threatened Plants

The eastern prairie fringed orchid and prairie bush clover, federally threatened species, may occur along the railroad verge that runs northeast out of the town of Royal in Champaign County. Some native plant species were observed in this area, including big bluestem (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*), and native prairie remnants may be present. Both federally threatened species associate with mesic prairie and other native grasslands. These species prefer habitats that are disturbed periodically and contain prairie remnants, which frequently in Illinois include railroad verges (INHS 2008).

Clubshell Mussel

The clubshell mussel is a federally- and state-endangered species in Illinois. The species occurs within streams and small to medium sized rivers. The species is typically found buried in streams with sand and fine gravel. The species is typically not found in streams with mud bottoms (Natureserve 2009). The clubshell mussel has been documented as occurring in the Salt Fork, Middle Fork and North Fork of the Vermilion River (K. Shank, IDNR, pers. comm.). The USFWS and IDNR began enhancing the existing clubshell mussel population in the Vermilion River in 2009. Streams in the western portion of the Site may have hard clay bottoms and limited potential to support mussel populations (K. Shank, IDNR, pers. comm.). Some potential exists for the clubshell mussel to occur in streams in the Site if stream substrates have sandy or fine gravel substrates and USFWS and IDNR are planning to augment the existing clubshell population (K. Shank, IDNR. pers. comm.).

Northern Riffleshell

The northern riffleshell historically occurred in many Ohio River watersheds in_Pennsylvania, West Virginia, Ohio, Indiana, Illinois, Kentucky, Tennessee and Alabama (USFWS 1998). Currently, extant populations are only found in Ohio, Indiana, Kentucky, West Virginia and Pennsylvania. The northern riffleshell has not been reported alive in Illinois in over 70 years (USFWS 2008b); however, USFWS and IDNR have plans to re-introduce the extirpated riffleshell into the Vermilion River (K. Shank, IDNR. pers. comm.).

State Threatened or Endangered Species

The IDNR's Illinois Natural Heritage Data Center (ILHDC) lists 42 plant and animal species as state-endangered, threatened, or rare that are known to occur in Champaign and Vermilion counties as of December 22, 2008 (http://dnr.state.il.us/espb/08/et_county_dec2008.pdf; Table 7). Species with the potential to occur in the Site are addressed further below. It should be noted that observation records from ILHDC are not the result of comprehensive county surveys, and therefore should only be used as a general guide. These data do not exclude species that may be present in other years or in nearby counties.

Table 7. State-listed species occurring within Champaign and Vermilion Counties

Species	Status	Habitat	Potential for Occurrence
Plants			
Brome-like Sedge *Carex bromoides*	ST	Usually associated with wetlands or with poor soils.	Some potential exists for presence on Site.
Drooping Sedge *Carex prasina*	ST	Usually associated with wetlands or poor soils.	Some potential exists for presence on Site.
Ear-leafed Foxglove *Tomanthera auriculata*	ST	Mesic to wet-mesic tallgrass prairie and prairie-like glades, barrens, and openings; extant occurrcnces are associated with degraded prairie pastures, formerly cultivated fields, roadsides and floodplains.	May occur along railroad verge.
Fibrous-rooted Sedge *Carex communis*	ST	Usually associated with wetlands or poor soils.	Some potential exists for presence on Site.
Mead's Milkweed *Asclepias meadii*	SE	Dry, native prairies.	May occur along railroad verge.
Queen-of-the-prairie *Filipendula rubra*	SE	Grows mainly in fens, calcium rich peat producing wetlands; clones may also be found in wet woodlands and grassland seeps.	Possibly occurs in woodlots associated with waterbodies or along the railroad verge.
Royal Catchfly *Silene regia*	SE	Habitats include mesic black soil prairies, openings in upland forests, savannas, scrubby barrens, and open areas along roadsides and railroads.	Possible in the Site.
Sangamon Phlox *Phlox pilosa ssp. sangamonensis*	SE	Mesic black soil prairies, rocky open forests, Bur Oak savannas, sandy Black Oak savannas, limestone glades, thickcts, abandoned fields, and prairie remnants along railroads.	Some potential exists for presence in Site.

Species	Status	Habitat	Potential for Occurrence
Wolf's Bluegrass *Poa wolfii*	SE	Woods along streams, rocky wooded slopes, and prairie patches.	Possibly occurs in wooded riparian areas and along railroad verge.
Wildenow's Sedge *Carex willdenowii*	ST	Wetland habitats.	Some potential exists for presence on Site.
Birds			
Bald Eagle *Haliaeetus leucocephalus*	ST	Isolated and undisturbed areas usually near large rivers or lakes.	Unlikely to breed within the Site, but may fly through the Site.
Barn Owl *Tyto alba*	SE	Found in primarily open habitats: grasslands, deserts, marshes, and agricultural fields.	Some potential to occur, however, this species is more common in southern Illinois.
Black-billed Cuckoo *Coccyzus erythropthalmus*	CT	Interior thickets of forest.	Unlikely to breed within the site, but may occur during migration.
Henslow's Sparrow *Ammodramus henslowii*	ST	Restricted to damp, grassy meadows with old matted vegetation and a variety of weeds and other groundcover.	Potentially present in winter or migration, but suitable nesting habitat is limited.
Least Bittern *Ixobrychus exilis*	ST	Shallow freshwater lakes and/or marshes with tall and dense emergent vegetation, especially cattails.	Possible during the breeding season or migration.
Loggerhead Shrike *Lanius ludovicianus*	ST	Requires open land with scattered trees. Prefers areas with short vegetation such as pasture, lawns and freshly plowed fields.	May occur as a summer resident, spring migrant, or year-round resident.
Northern Harrier *Circus cyaneus*	SE	Occurs in open grassland and marshes.	Potentially present in winter or migration, but suitable nesting habitat is limited.
Short-eared Owl *Asio flammeus*	SE	Large tracts of native grassland habitats and on marshes and prairies.	Potentially present in winter or migration, but suitable nesting habitat is limited.
Upland Sandpiper *Bartramia longicauda*	SE	Requires large grasslands for nesting.	Possible summer resident and migrant.
Mammal			
Franklin's Ground Squirrel *Spermophilus franklinii*	ST	Colonial species. Occurs in mixed height, fallow grassland vegetation such as un-mowed fields, road and railway verges.	Possibly occurs in grassy areas such as roadside edges.
Fish			
Bigeye Chub *Hydropsis amblops*	SE	Inhabits sandy/silty creeks to small-medium rivers with little to moderate current.	Some potential to occur in streams in Site.
Bigeye Shiner *Notropis boops*	SE	Small-medium rivers that are clear and rocky with emergent vegetation.	Some potential to occur in streams in Site.
Bluebreast Darter *Etheostoma camurum*	SE	Rocky pools and swift runs of small-medium rivers of the Middle Fork and tributaries	Some potential to occur in streams in Site.
Eastern Sand Darter *Ammocrypta pellucidum*	ST	Inhabits sand runs of medium to large rivers.	Some potential to occur in streams in Site.
Gravel Chub *Erimystax x-punctatus*	ST	Gravel riffles and runs of small to large rivers.	Some potential to occur in streams in Site.

Species	Status	Habitat	Potential for Occurrence
Iowa Darter *Etheostoma exile*	ST	Vegetated lakes, pools of headwaters, creeks & small-medium rivers.	Some potential to occur in streams in Site.
Northern Madtom *Noturus stigmosus*	SE	Mixed sand and rock riffles and runs with debris in small-large, often swift rivers.	Unlikely to occur, possibly extirpated.
Pallid Shiner *Hybopsis amnis*	SE	Inhabits sandy and silty pools of medium to large rivers.	Unlikely to occur due to lack of medium and large rivers.
River Chub *Nocomis micropogon*	SE	Rocky runs and flowing pools of small-medium rivers.	Some potential to occur in streams in Site.
River Redhorse *Moxostoma carinatum*	ST	Rocky pools and swift runs of small-medium rivers.	Some potential to occur in streams in Site.
Reptile			
Blanding's Turtle *Emydoidea blandingii*	ST	Quiet waters in marshes, prairie wetlands, wet sedge meadows, and shallow, vegetated portions of lakes.	Potential to occur within wetland habitats.
Ornate Box Turtle *Terrapene ornata*	CT	Open grasslands with sandy soils.	Potential to occur in grassland areas.
Smooth Softshell Turtle *Apalone mutica*	CE	Larger stream and rivers with sandy substrates and sand bars.	Potentially in all open reaches of the Vermilion River system.
Amphibians			
Four-toed Salamander *Hemidactylium scutatum*	ST	Boggy pools or spring-fed ravines in undisturbed or mature deciduous forests. Several localities are second-growth woods in soggy soil below dams of man-made lakes.	May occur in wooded wetlands.
Mudpuppy *Necturus maculosus*	CT	Clear rivers, creeks, streams, lakes and ponds.	Stony Creek and throughout the Vermilion River system.
Silvery Salamander *Ambystoma platineum*	SE	Vicinity of two shallow vernal ponds in a mesic oak-sugar maple-beech forest in Vermilion County.	Possible in forested areas.
Insects			
Swamp Metalmark *Calephilis muticum*	SE	Wet-mesic tallgrass prairie and barrens, usually occurring in very open grassland along stream corridors.	Unlikely to occur due to lack of habitat.
Mollusks			
Clubshell *Pleurobema clava*	SE	Medium to large rivers in gravel or mixed gravel and sand.	Some potential exists for this species to occur if streams in the project have suitable substrates.
Kidneyshell *Ptychobranchus fasciolaris*	SE	Medium-large streams in gravel.	Some potential exists to occur in streams in Site.
Little Spectaclecase *Villosa lienosa*	ST	Small-medium streams with mud, sand or gravel.	Some potential exists to occur in streams in Site.
Purple Lilliput *Toxolasma lividus*	SE	Headwaters of small to medium sized rivers.	Some potential exists to occur in streams in Site.
Purple Wartyback *Cyclonaias tuberculata*	ST	Small-large streams with sand and gravel.	Some potential exists to occur in streams in Site.
Rabbitsfoot *Quadrula cylindrica*	SE	Medium-large streams in sand and gravel.	Some potential exists to occur in streams in Site.
Rainbow	SE	Small-medium streams in sand and	Some potential exists to occur in

Species	Status	Habitat	Potential for Occurrence
Villosa iris		gravel.	streams in Site.
Salamander Mussel *Simpsonaias ambigua*	SE	Medium to large rivers on mud or gravel bars and under flat slabs or stones.	Occurs in the Middle Fork and in Stony Creek.
Slippershell *Alasmidonta viridis*	ST	Found in creeks and headwaters of large streams in sand, mud or fine gravel.	Some potential exists to occur in streams in Site.
Spike *Elliptio dilatata*	ST	Small streams to large river in mud, sand or gravel.	Some potential exists to occur in streams in Site.
Wavy-rayed Lampmussel *Lampsilis fasciola*	SE	Occurs in small to medium sized shallow tributaries of the Ohio River, in and near riffles, with good current.	Some potential exists to occur in streams in Site.

SE=state endangered; ST=state threatened; CT=candidate threatened species; CE=candidate endangered species

Sangamon Phlox

Sangamon phlox is a state-endangered species in Illinois. It occurs occasionally in most of Illinois, but is uncommon or absent in west central and southeastern Illinois. Habitats include moist to mesic black soil prairies, rocky open forests, bur oak savannas, sandy black oak savannas, limestone glades, thickets, abandoned fields, and prairie remnants along railroads. Sangamon Phlox appears to benefit from the removal of excess debris by wildfires occurring during early spring or the fall (http://www.illinoiswildflowers.info/prairie/plant_index.htm#prairie_phlox, accessed on August 28 2008). Some potential exists for this species to occur within abandoned fields or along railroads in the Site.

Various Sedge Species

Records for protected sedge species are present within the counties that overlap the Site. Some potential exists for these species to occur within wetland areas within the Site. Many species require examination of the spikelets with a hand lens or greater magnification for proper identification. The potential exists for protected sedge species to occur within wetlands in the Site.

Royal Catchfly

Royal catchfly occurs in widely scattered counties in Illinois, primarily in areas near Chicago, East St. Louis, and some counties in southeastern Illinois. It is a rare plant that has endangered status in Illinois. Habitats include mesic black soil prairies, openings in upland forests, savannas, scrubby barrens, and open areas along roadsides and railroads. Because this forb is showy and available through the nursery trade, it has been introduced elsewhere around the state in prairie restorations and flower gardens. Some potential exists for this species to occur along railroads in the Site.

Ear-leafed Foxglove

Ear-leafed foxglove is a state-threatened plant that prefers mesic to wet-mesic tallgrass prairie and prairie-like glades, barrens, and openings; extant occurrences are associated with degraded prairie pastures, formerly cultivated fields, roadsides and floodplains. This plant is found in both high quality habitats and somewhat disturbed areas. It is intolerant of frequent mowing or grazing. The most suitable habitat for ear-leafed foxglove is the railroad verge that runs northeast out of Rantoul in Champaign County.

Mead's Milkweed
Mead's milkweed is a state-endangered plant that prefers mesic to dry native prairies. It formerly occurred throughout the eastern tallgrass prairie region of the central United States, from Kansas through Missouri and Illinois and north to southern Iowa and northwest Indiana. The most suitable habitat for Mead's milkweed is the railroad verge that runs northeast out of Rantoul in Champaign County.

Queen-of-the-prairie
Queen-of-the-prairie, a state-endangered species, grows mainly in fens, calcium rich peat producing wetlands; clones may also be found in wet woodlands and grassland seeps. The most suitable habitat for this species would occur in wooded wetlands that are adjacent to riparian areas or next to waterbodies and along the railroad verge.

Wolf's Bluegrass
Wolf's bluegrass is a state-endangered species that occurs in woods along streams, rocky wooded slopes, and prairie patches. The most suitable habitat for this species occurs along riparian wooded corridors and along the railroad verge.

Bald Eagle
The bald eagle nests in mature trees located adjacent to or near large, fish bearing waters. Bald eagles are generally found near open, fish bearing waters during the winter. The bald eagle is a state threatened species in Illinois. Some potential exists for the bald eagle to nest along the Middle Fork of the Vermilion River, and to occasionally fly through the Site. The project lacks breeding habitat for this species.

A bald eagle nest has been documented for several years on the North Fork of the Vermilion River, approximately seven miles east of the Site (K. Shank, IDNR, pers. comm.). IDNR indicates that Illinois has experienced a significant increase in nesting bald eagles, and that nesting is occurring on smaller tributaries of larger rivers; nesting will likely increase along the North Fork, Middle Fork, and Salt Fork of the Vermilion River.

Illinois currently has an abundant population of wintering bald eagles, and while nesting and hunting territory is unlikely to be affected by the proposed wind-energy facility, there may be risk of collision of migrating bald eagle (K. Shank, IDNR, pers. comm.).

Barn Owl
The barn owl is listed as a state-endangered species in Illinois by the IDNR. It is an uncommon year-round resident of southern Illinois and rare in northern portions of the state. It nests in a variety of natural and man-made cavities including trees, cliffs, riverbanks, barn lofts, haystacks and nest boxes (Marti et al. 2005). It is primarily found in open habitats such as grasslands, marshes and agricultural fields, but can also be found metropolitan areas. The barn owl's diet consists mainly of small mammals, but it will also prey on birds, reptiles, amphibians and arthropods. One probable nesting site has been documented in Vermilion County (Kleen et al.

2004). The potential exists for the species to breed in abandoned structures and other suitable cavities present on the Site.

Black-billed Cuckoo
The black-billed cuckoo is a secretive woodland bird that nests in forest edges, thickets, and groves of trees (Kleen et al. 2004). It is a common summer resident in northern Illinois, but is less common in the southern portion of the state. There have been seven confirmed nesting black-billed cuckoos in Vermilion County and several probable cases of nesting in Champaign County (Kleen et al. 2004). Suitable habitat for nesting black-billed cuckoos occurs along streams and rivers in Vermilion and Champaign counties (K. Shank, IDNR, pers. comm.). This species is not directly threatened by wind turbine construction; however, may be exposed to collision during migration.

Henslow's Sparrow
Henslow's sparrow is a state-threatened species in Illinois that breeds primarily in weedy grasslands of the east-central U.S. Historically, this species would breed in tall grass prairie; however, today it is restricted to large, flat, neglected, weedy fields, wet meadows and saltmarsh edges. It is uncommon during migration and an uncommon to rare summer resident in Illinois (Kleen et al. 2004). It is occasionally found in dry and cultivated uplands, though may favor moist lowland habitat with herbaceous ground cover and widely scattered shrubs. It feeds mainly on insects in the summer and forages in grasses usually 2 ft or taller. Territory sizes are usually between one and three acres and they are rarely encountered in grasslands less than 250 acres in size (Herkert 1994). Two confirmed cases of breeding Henslow's sparrow have been documented in Vermilion County (Kleen et al. 2004). Potential breeding habitat for this species is limited within the Site to a few large blocks of planted grasslands. Some potential exists for the species to breed within these grassland habitats in the Site, and the species likely migrates through the area in spring and fall. IDNR indicates that breeding populations of Henslow's sparrow have been documented north of the Site and may exist within the Site where suitable habitat occurs.

Least Bittern
The least bittern's summer distribution occurs in the Midwest from Michigan south to Texas, west to eastern New Mexico and east along the Atlantic shoreline. It is listed as a state-threatened species in Illinois. It is an uncommon migrant and a summer resident that will utilize shallow freshwater lakes and marshes with tall dense emergent vegetation, especially those with cattails. They are very secretive and more often heard rather than seen. They eat fish and insects that they capture by quickly jabbing their long bills and impaling their prey. Least bitterns are not adequately sampled during breeding bird surveys because it is rare and secretive but the collected data does indicate a scattered breeding distribution in Illinois. Least bitterns have been documented in Kennekuk Cove County Park in Vermilion County, and from wetlands near the Middle Fork in northeastern Champaign County (K. Shank, IDNR, pers. comm.). A limited potential exists for this species to nest or stopover during migration within wetlands in the Site.

Loggerhead Shrike

The loggerhead shrike is listed as a state-threatened species by the state of Illinois. Populations of loggerhead shrike in central Illinois are rare and migratory. Resident populations of the species occur in the southern portion of the state (Bohlen 1978, Bowles et al. 1981). Loggerhead shrikes generally breed in grassland areas with hedgerows or scattered trees and shrubs, but may also breed within towns and cities. Loggerhead shrikes may occur within agricultural areas, but prefer hay fields and pastures to row crops (Graber et al. 1973, Bowles et al. 1981). This species avoids dense deciduous woods as nesting sites, however, woodlots may be important habitat in periods of cold or snow cover and they have been known to nest in a number of tree species (including oak, elm and cottonwood) at heights of 4 to 30 ft. Shelterbelts, fencelines and hedgerows adjacent to agricultural land could provide breeding and foraging grounds for summer residents within the Site. Grassland edges and pastures could also be utilized by residents and as stopover habitat for migrants travelling through the Site. Records of one confirmed breeding pair, one probable pair and one possible pair of loggerhead shrike exist in Champaign County. The confirmed pair was located along the Champaign/Vermilion County border (Kleen et al. 2004). Although the potential exists for the species to occur on the Site, nesting habitat for this species is limited due to the rare nature of hedgerows, shrubs or trees and preponderance of row crops such as corn. The potential exists for the species to nest on the Site near hedgerows, and the potential exists for the species to occasionally move through the area during migration.

Northern Harrier

The northern harrier is listed as a state-endangered species in Illinois, primarily due to the conversion of native grassland and wetlands to tilled agriculture (INRIN 2005). Nesting northern harriers occur at higher densities in relatively large areas of grassland or wetlands; however, they may also nest within hayfields (MacWhirter and Bildstein 1996). The Site does contain limited amounts of grassland and wetlands that could serve as potential nesting habitat. Although breeding habitat for the species is limited at the Site, the species is likely to occur in the Site during migration and the winter. Because northern harriers often hunt close to the ground, risk of collision with turbine blades is considered lower for this species compared to other raptor species. IDNR has expressed concern over the increased exposure of northern harrier to turbine collision while hunting and during aerial courtship displays. Northern harriers have a small, scattered breeding range throughout Illinois, however, three confirmed breeding pairs have been observed in Vermilion County, and possible breeding sites have been located in Champaign County (Kleen et al. 2004). The IDNR has one record of a northern harrier within the Site (K. Shank, IDNR, pers. comm.).

Short-eared Owl

The state-endangered short-eared owl inhabits open areas and requires large grasslands, marshes, and wetlands with small rodent populations (Kleen et al. 2004). Short-eared owls nest on the ground in grasslands and populations have been declining due to the elimination of grassland habitat. This species is considered a rare breeder in Illinois, but has been documented breeding within Vermilion County (Kleen et al. 2004).

Upland Sandpiper

The status of the upland sandpiper is state-endangered in Illinois. It is uncommon during migration and an uncommon to rare summer resident in Illinois (Kleen et al. 2004). Upland sandpipers are predominantly found in flat open country such as in grassland or prairie habitats -

including but not exclusively farmland (cultivated or pasture) or golf courses. The species has also been documented as breeding within grass-lined water strips and roadsides in Illinois (K. Shank, IDNR, pers. comm.). Upland sandpipers have been recorded in low numbers along the Dailey BBS route, which runs through the Site, although the exact locations of the upland sandpiper records along the route are not known. There has been one confirmed breeding pair of upland sandpiper in Vermilion County and one confirmed pair in Champaign County (Kleen et al. 2004) and this species likely occurs as a migrant (K. Shank, IDNR, pers. comm.). There is the potential for upland sandpipers to breed within the Site during the summer, and the potential exists for upland sandpipers to occur during spring and fall migration.

The greatest risk to upland sandpiper at the Site is during aerial courtship displays when birds would pass through the rotor-swept area. Also, the sensitivity of upland sandpiper to tall, vertical structures and the shadow 'flicker' have not been quantified (K. Shank, IDNR, pers. comm.).

Franklin's Ground Squirrel

The Franklin's ground squirrel is a small species of ground squirrel that historically occurred in tall-grass prairie habitats throughout the Midwest. The species experienced declines as a result of conversion of native habitats to cropland, and was listed as threatened under the Illinois Endangered Species Act in 2004. The species is currently limited to the edges of forests, roadside, railroads, and other edge habitats. The Site and Evaluation Areas contain some suitable habitat for this species along roadways, a railroad right-of-way and in some planted grassland habitats. Some potential exists for this species to occur within the Site.

Blanding's Turtle

The Blanding's turtle is listed as threatened under the Illinois endangered species act. The Blanding's turtle generally occurs north of the Illinois River within aquatic habitats, such as wetlands, rivers, lakes and ditches (Phillips et al. 1999). The Blanding's turtle may move long distances over land, compared to other species. Males have been documented as moving up to 1.5 miles during the breeding season, and females have been documented as moving up to ¾ mile to nest in upland areas with well drained soils. If natural areas are not available, Blanding's turtles may nest within yards, gardens, or plowed fields (Hardin 1997). Some potential exists for this species to occur along creeks, streams, ponds and wetlands in the project area, and to nest within plowed fields. The potential for occurrence is greatest within 1.5 miles of the Middle Fork of the Vermilion River, although this species may occur throughout the site where suitable aquatic habitat is present (K. Shank, IDNR, pers. comm.).

Ornate Box Turtle

The ornate box turtle is found in open grassland areas and hibernates underground from late September through early April. This species is commonly, but not exclusively, found in sandy soils. Suitable habitat for the ornate box turtle is unlikely to occur within the Site; however, since the current distribution of this species is unclear, its presence within the Site cannot be ruled out (K. Shank, IDNR, pers. comm.). Ornate box turtle may also cross tilled agriculture fields as indicated by scarring on the carapace of some ornate box turtle in northern Illinois (K. Shank, IDNR, pers. comm.). IDNR expresses concern for potential road-kills of ornate box turtles, and suggests all project workers be educated on its appearance and habits, and any suspected ornate box turtle sightings be reported to the IDNR (K. Shank, IDNR, pers. comm.).

Smooth Softshell Turtle

The smooth softshell turtle is an aquatic species that inhabits larger streams and rivers and requires sandy substrates and sand bars. Smooth softshell turtles have been documented in Vermilion County and may be present in all reaches of the Vermilion River system (K. Shank, IDNR, pers. comm.). The only concern for direct impacts to this species would be if bridges are upgraded or reconstructed for transportation of wind turbine components.

Mudpuppy

The mudpuppy is a nocturnal aquatic species of salamander that inhabits clear rivers, creeks, streams, lakes and ponds. The mudpuppy typically conceals itself during the day under rocks or woody debris. The Vermilion River is considered one of the last "strongholds" for this species in Illinois, and the mudpuppy has the potential to occur throughout the river (K. Shank, IDNR, pers. comm.). This species is thought to occur within Stony Creek, and has been reported in the Middle Fork of the Vermilion River. Potential impacts to this species may occur through direct stream modifications from road or bridge upgrades within the Site.

Silvery Salamander

This is a state-endangered species in Illinois and is only known to occur within forested areas along the Middle Fork of the Vermilion River (K. Shank, IDNR, pers. comm.). It is thought to have originated through hybridization and backcrossing between *Ambystoma laterale* and *A. jeffersonianum* thousands of years ago (ILNHS 2008). During February and March rains, the subterranean adults migrate to ponds and breed. They use smallmouth salamander sperm to activate egg development. Jelly-covered masses of 2-50 eggs are attached to sticks or left loose on pond bottom. Mortality of developing embryos is sometimes as high as 80%. Adults feed on beetles, centipedes, slugs, worms, and other invertebrates (ILNHS 2008). The likelihood of this species occurring on the Site is low, but possible within forested areas, especially near the Middle Fork of the Vermilion River. Direct impacts to forested areas along streams feeding the Middle Fork may have the greatest potential to impact this species (K. Shank, IDNR, pers. comm.).

Four-toed Salamander

Four-toed salamander is a state-threatened species that prefers boggy pools or spring-fed ravines in undisturbed or mature deciduous forests. Several localities are second-growth woods in soggy soil below dams of man-made lakes (Phillips et al. 1999). This species has the greatest possibility being found in forested areas that are associated with streams or waterbodies.

Protected fish species

Several small fish species have some potential to occur within the Site. Many of these species are expected to be more common within the Middle Fork of the Vermilion River. However, some of the streams within the Site are tributaries to the river, and the potential exists for these species to occur within streams in the Site. These fish species all require clear, high quality waterways to breed and are present in the Middle Fork of the Vermilion, Salt Fork of the Vermilion, and Stony Creek. It is unlikely that these species would ascend the smaller tributaries located in the Site and the main threat to these species is degradation of habitat through siltation, sedimentation, and chemical pollution downstream (K. Shank, IDNR, pers. comm.).

Mollusks

There are several species of mussel that may occur in the Site. The Middle Fork of the Vermilion River and its tributaries has the greatest potential for mussels (K. Shank, IDNR, pers. comm.). Tributaries within the Site with the potential for sensitive species of mussel include Stony Creek, Feather Creek, Knight's Branch, Cattle Branch, and Buck Creek. All of these tributaries lead to the Middle Fork of the Vermilion River, approximately 1-5 miles away. The headwaters of these streams may support slippershell, and little spectaclecase, while farther down the stream wavy-rayed lampmussel, rainbow, purple wartyback, kidneyshell, rabbitsfoot and purple lilliput may occur. The salamander mussel is a state-endangered species that is being evaluated for federal protection and has been documented at seven locations in Vermilion County, most specifically Stony Creek in the Site (K. Shank, IDNR, pers. comm.). Some potential exists for protected mussel species to occur in streams in the Site with suitable substrates.

SUMMARY AND NEXT STEPS

Table 8 summarizes the potential for wildlife issues at the proposed wind-energy facility. Much of the Site is located on flat cropland, which is generally recommended by the USFWS as the ideal location for wind projects. The flat agricultural fields that the Site is located on lack defined topographic edges. One potentially unique feature of the proposed project is the proximity to the Middle Fork of the Vermilion River. Several state listed species occur along the river and associated forested areas, and some potential exists for birds and bats to utilize the Middle Fork of the Vermilion River as a migration corridor. Potential bird and bat use in the Site may be influenced by the distance to the Middle Fork of the Vermilion River, with areas near the river having a higher potential for bird and bat use.

There is limited potential for species protected under the federal Endangered Species Act to occur in the Site due to the preponderance of tilled agriculture. The whooping crane has some potential to occur during migration, and a new ultra-light led migration route occurs in central Illinois. This population is listed as "experimental and non-essential" under the Endangered Species Act, but is still protected under the Migratory Bird Treaty Act. There is also potential for several state listed species to occur at some time throughout the year on the Site, primarily within non-tilled areas and streams. Although the Site contains relatively low diversity, there are localized shelterbelts, grassland, hayfields and wetland habitat, and there is potential for state listed species to occur in these areas.

A limited amount of potential raptor nesting habitat is available within the Site, mainly within small riparian corridors, small woodlots, and shelterbelts. Adult raptors often fly in close proximity to nest sites during the breeding season while attending young and delivering prey. After young raptors fledge, fledglings often spend greater amounts of time flying and roosting near nest locations until they become capable flyers and hunters. If an active raptor nest is located near a turbine location, adult and recently fledged young may be at increased risk of collision with turbines due to their increased use of areas near nest sites. Additionally, construction activities near active nests during the breeding season may potentially result in raptors abandoning nest sites.

Should the proposed project be developed, wildlife baseline studies can be conducted prior to construction that can help predict potential project impacts, and can provide information for siting turbines to minimize impacts to wildlife, if warranted. Baseline studies can also help to determine if bird and bat use is influenced by distance to the river. The types and extent of baseline surveys will depend on the locations of proposed turbines and infrastructure, and the concerns expressed by wildlife agencies and county officials.

Table 8. Summary of the potential for wildlife conflicts in the proposed wind development area.[1]

Issue	VH	H	M	L	Notes
Potential for raptor nest sites			✓		Potential raptor nesting habitat is limited, but present within shelterbelts and forested areas.
Raptor flight potential			✓		The general lack of stark topography of Site decreases the potential for concentrated raptor use. Use may be higher near the Middle Fork of the Vermilion River.
Potential for migratory pathway			✓		Birds, including raptors, likely migrate through region but topography should not funnel use to Site. Use may be higher near the Middle Fork of the Vermilion River.
Potential for raptor prey species				✓	Vast majority of Site is tilled agriculture; presence of large rodent colonies unlikely.
Potential for federal protected species to occur			✓		There is potential for the whooping crane to migrate through Site, and other species have potential to occur.
Potential for state issues		✓			State listed species may occur in or near the Site at some time of the year. Several state listed species occur along the Middle Fork of the Vermilion River, and the river may serve as a migration corridor for bird and bat species.
Uniqueness of habitat at wind plant			✓		Most of the Site is not unique to surrounding landscape.
Potential for rare plants to occur			✓		Paucity of native habitat limits potential for rare plants to occur on Site. The one potential exception is Orchid Hill, located near the power plant.

VH = Very High, H = High, M = Medium, and L = Low

[1] Summarized for the Site as a whole but the habitat of the Site varies throughout in its ability to support species of concern

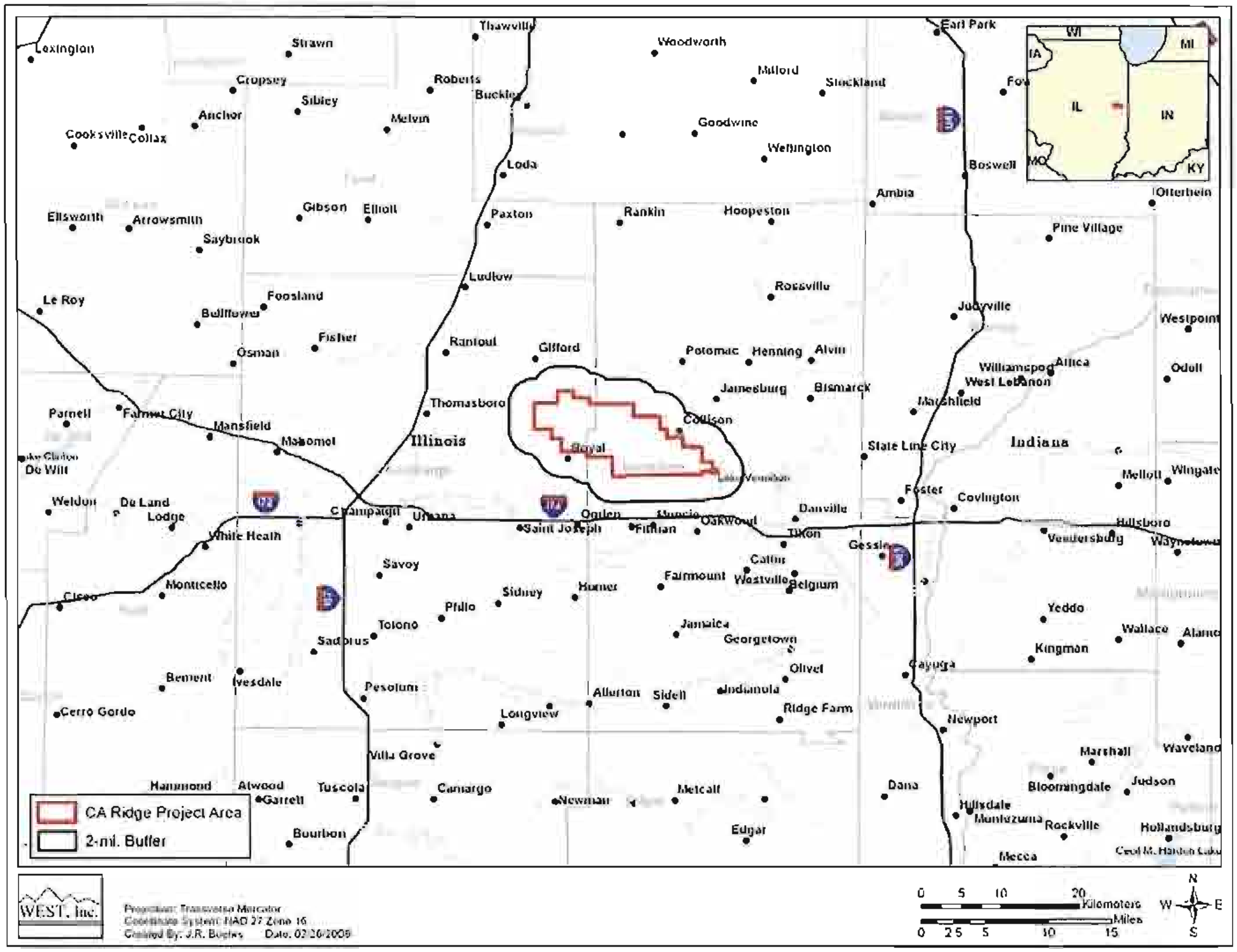


Figure 1. Site location map of the California Ridge Wind Resource Area.

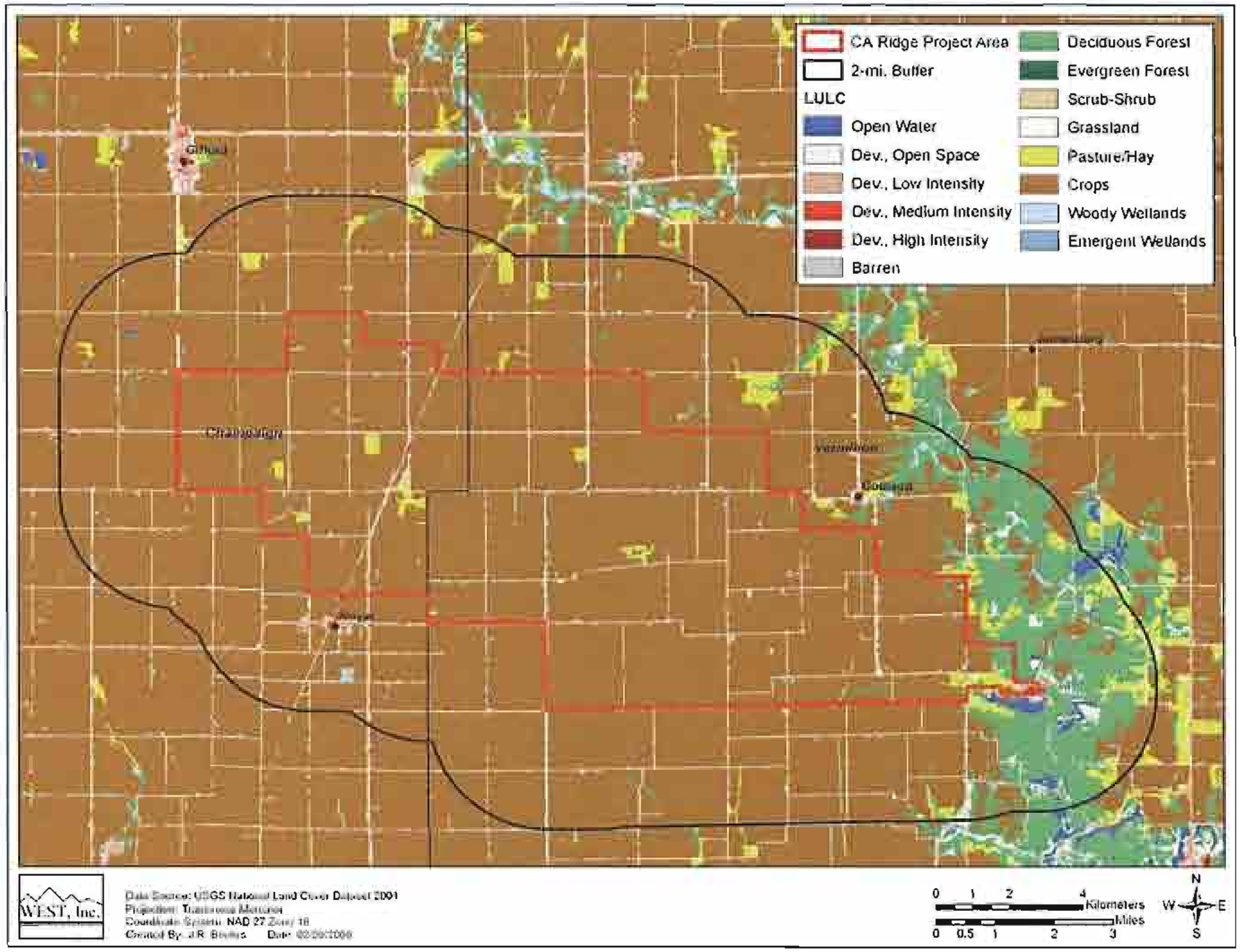


Figure 2. Land cover types within project and Evaluation Areas.

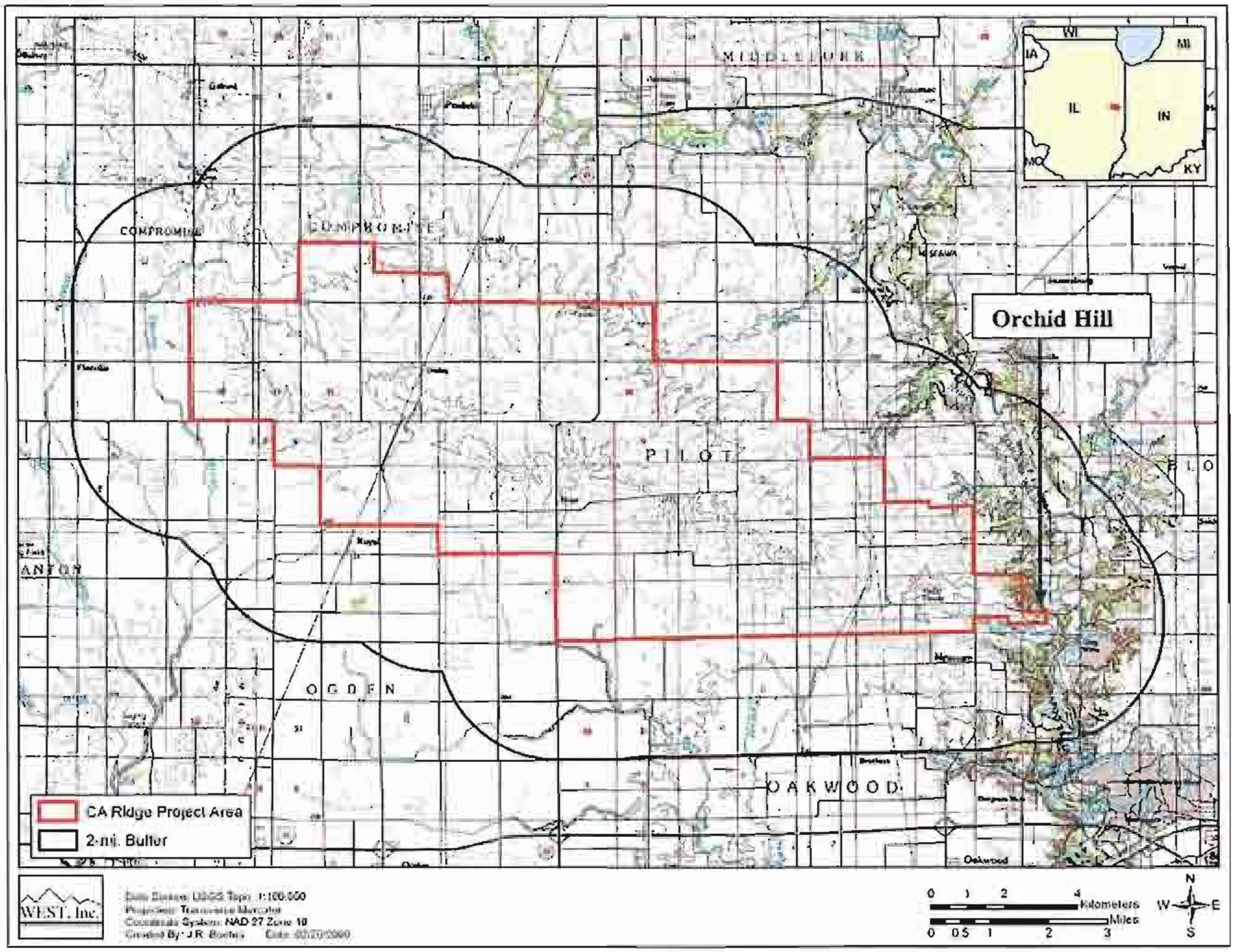


Figure 3. Topographic map of project and Evaluation Area (2-mile buffer).

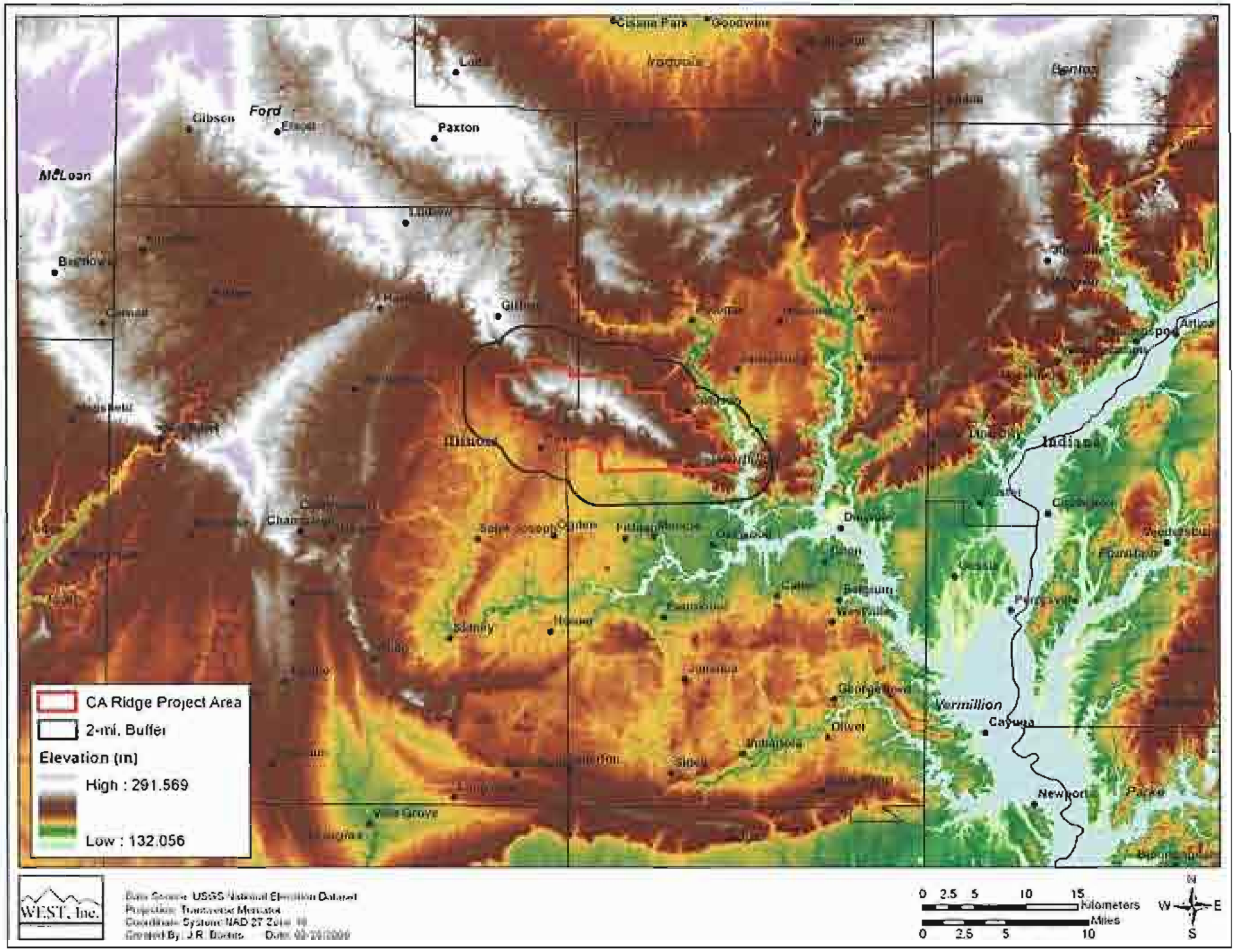


Figure 4. Digital elevation model of project and Evaluation Area.

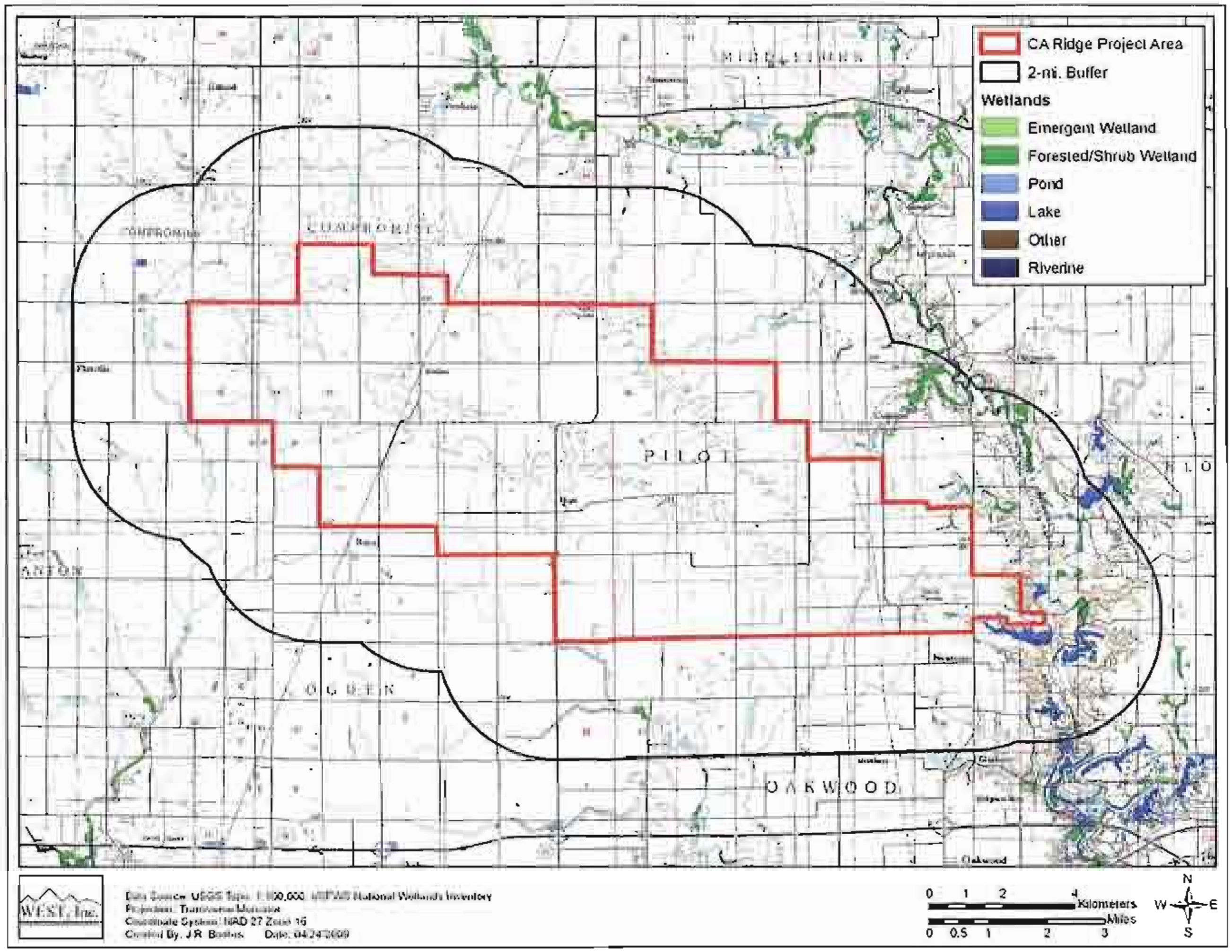


Figure 5. National Wetlands Inventory map of project and Evaluation Area.

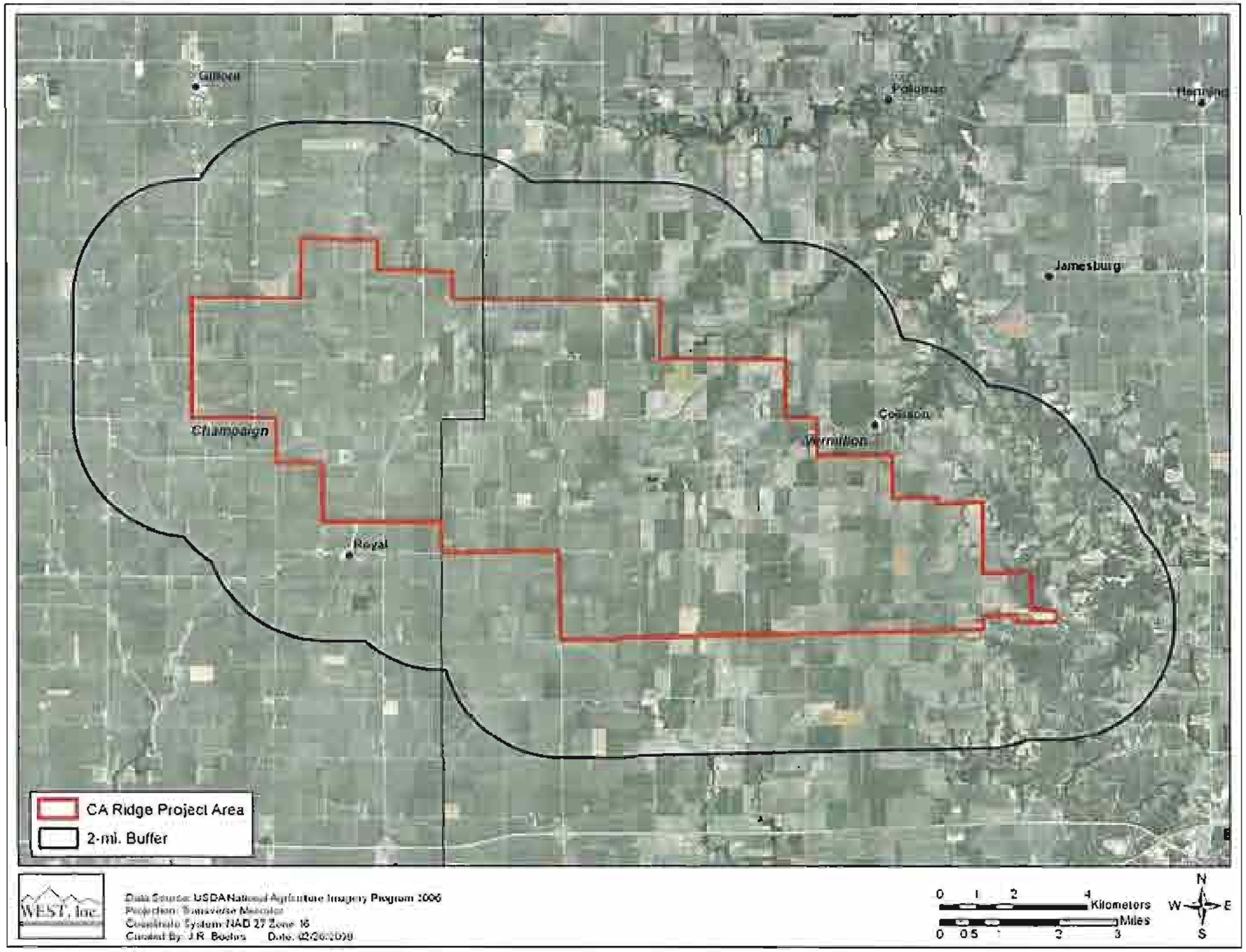
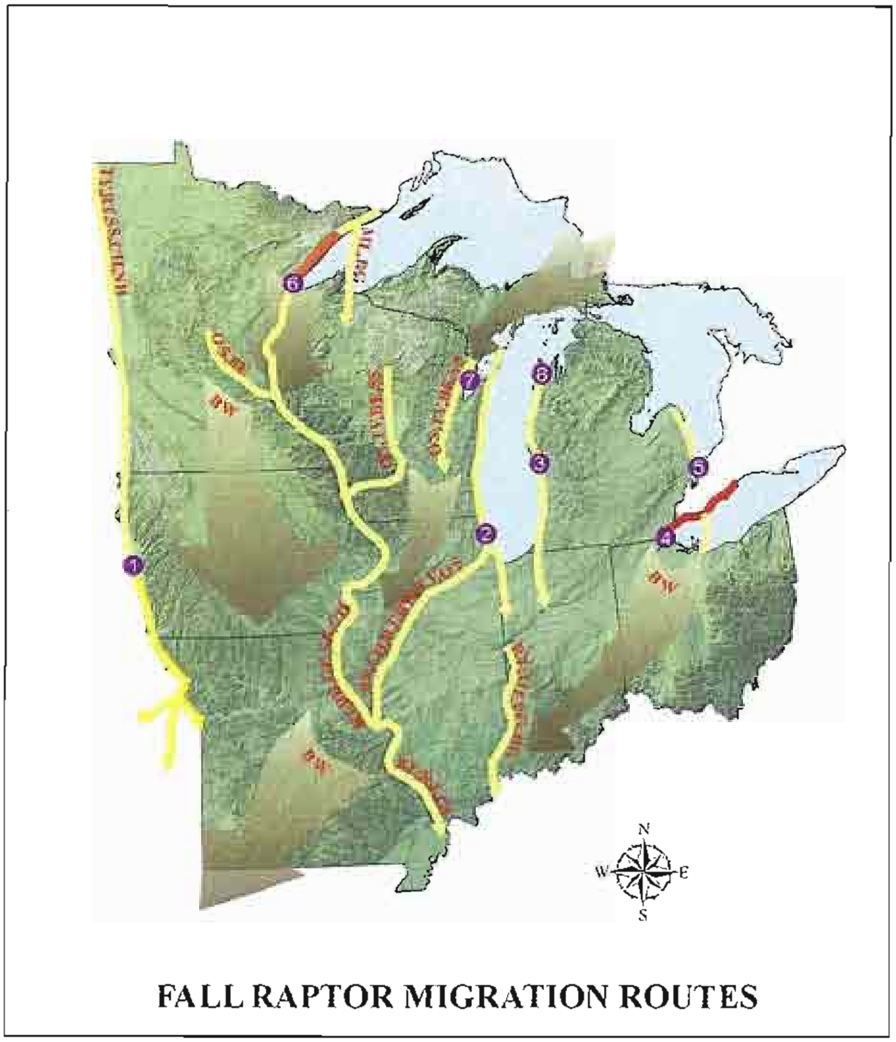


Figure 6. Aerial photo of project and Evaluation Area.



SYMBOL	COMMON NAME
AK	American Kestrel
BE	Bald Eagle
BO	Boreal Owl
BW	Broadwing
CH	Cooper's Hawk
GE	Golden Eagle
LEO	Long-eared Owl
ML	Merlin
NG	Northern Goshawk
NH	Northern Harrier
NSWO	Northern Saw-whet Owl
OS	Osprey
PG	Pregrine Falcon
RL	Rough-legged Hawk
RS	Red-shouldered Hawk
RT	Red-tailed Hawk
SEO	Short-eared Owl
SS	Sharp-shinned Hawk
TV	Turkey Vulture

Major Raptor Migration Observation Sites

1. Hitchcock Nature Area (CH,RT,SS,TV,SW,NH)
2. Illinois Dunes State Park (ML,NH,PG,SEO)
3. Muskegon State Park (SS,RL,RT)
4. Lake Erie Metropark (TV,OS,BE,NH,SS,CH,RT, RL,GE,AK,ML,PG)
5. Port Huron (PG,ML)
6. Hawk Ridge, Duluth (TV,OS,BE,NH,SS,BW,NG, RT,RL,AK,ML,PG,BO,NSWO,LEO)
7. Little Suamico (SS,BW,NSWO)
8. Sleeping Bear Dunes NL (RL,RT,SS)

Legend
Number of Birds

- 2,500 - 25,000
- 25,000 - 50,000
- 50,000 - 100,000
- >100,000

Figure 7. Location of fall raptor migration routes identified by Region 3 of the USFWS.

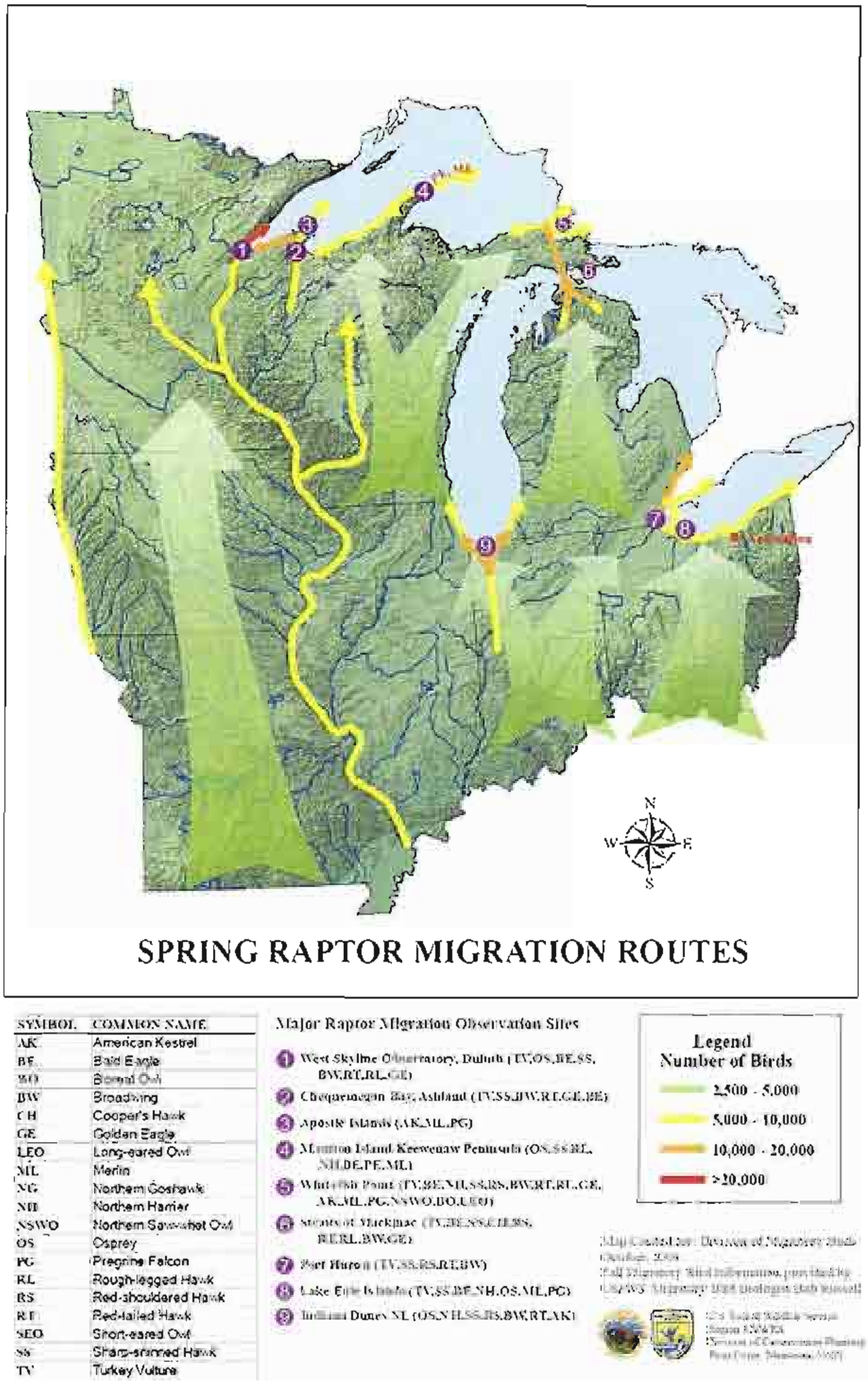


Figure 8. Location of spring raptor migration routes identified by Region 3 of the USFWS.

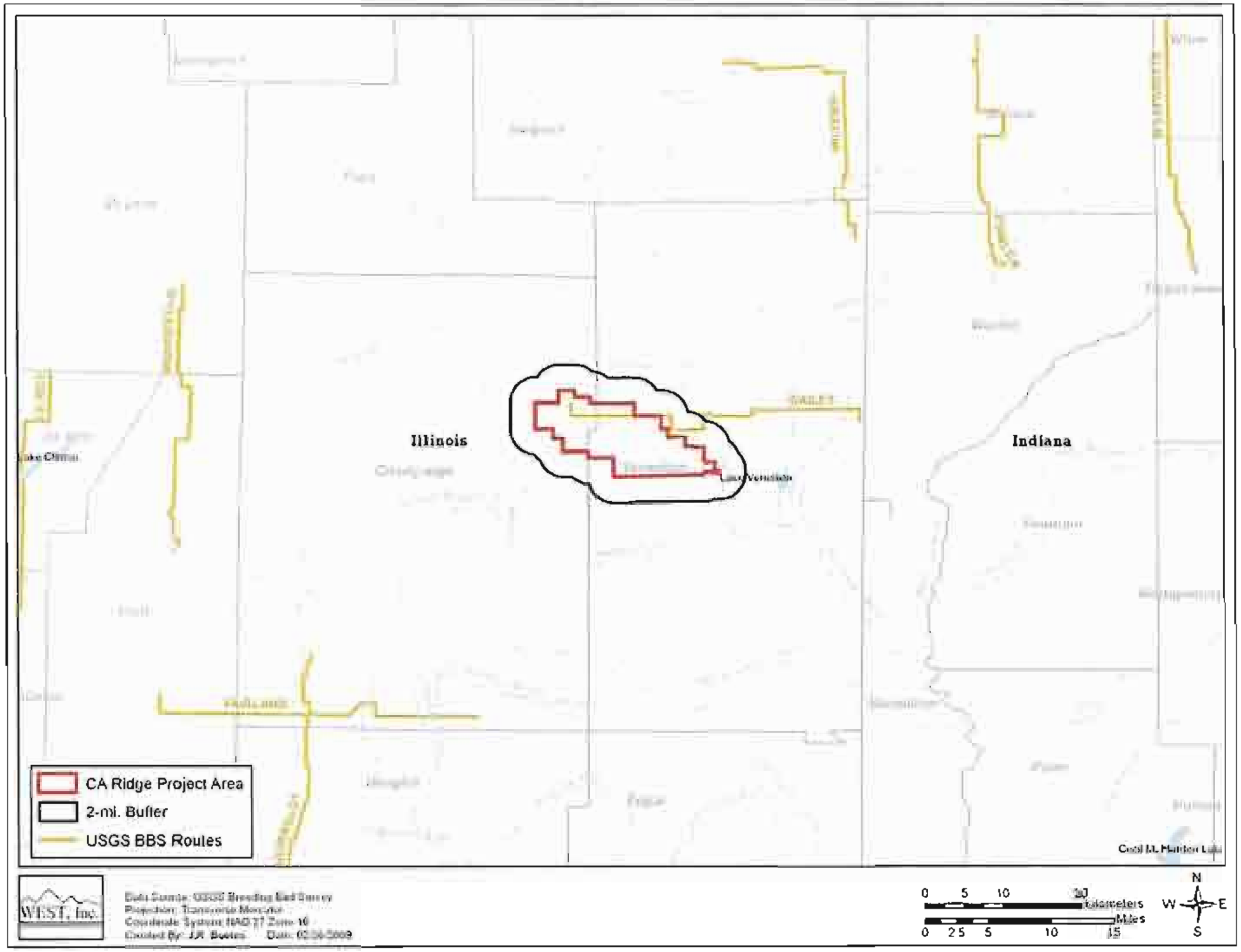


Figure 9. Closest USGS Breeding Bird Survey Routes to Site.

Figure 10. Past (yellow) and current (blue) migration path of the EMP of whooping cranes.

LITERATURE CITED

Bohlen, H. 1978. An Annotated Check-List of the Birds of Illinois. Illinois State Museum, Popular Science Series IX:156.

Bowles, M.L., V.E. Diersing, J.E. Ebinger, and H.G. Schultz, eds. 1981. Endangered and Threatened Vertebrate Animals and Vascular Plants of Illinois. Illinois Department of Conservation, Springfield, and Natural Land Institute, Rockford. p. 189.

Derby, C., K. Bay, J. Ritzert. 2009. Bird use monitoring Grand Ridge Wind Resource Area La Salle, County, Illinois. March 2008 – February 2009. Technical report prepared for Grand Ridge Energy, LLC.

Erickson, W.P., G.D. Johnson, M.D. Strickland, D.P. Young, K.J. Sernka, and R.E. Good. 2001. Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States. National Wind Coordinating Committee (NWCC) Resource Document. August 2001.

Gauthreaux, S.A. Jr. C.G. Belser, and D. van Blaricom. 2003. Using a network of WSR 88-D weather surveillance radars to define patterns of bird migration at large spatial scales. Pp. 335-346 In Avian Migration, P. Berthold, E. Gwinner, and E. Sonnenschein, eds. Berlin: Springer.

Graber, R.R., J.W. Graber, and E.L. Kirk. 1973. Illinois Birds: Laniidae. University of Illinois Natural History Survey, Illinois. Biological Notes No. 83, ed.

Hardin, J.H. 1997. Amphibians and Reptiles of the Great Lakes Region. University of Michigan Press, Ann Arbor.

Hoffmeister, D.F. 2002. Mammals of Illinois. Urbana: Univ. Illinois Press.

Herkert, J.R. 1994. Status and habitat selection of the Henslow's Sparrow in Illinois. Wilson Bulletin 106(1):35-45.

Illinois Natural History Survey (INHS). Accessed on December 1, 2008. http://www.inhs.illinois.edu/~kenr/prairieformation.html

Johnson, G.D. 2005. A Review of Bat Mortality at Wind-Energy Developments in the United States. Bat Research News 46(2): 45-49.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd and D.A. Shepherd. 2000. Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-year study. Technical report prepared by WEST, Inc. for Northern States Power Co., Minneapolis, MN. 212pp.

Johnson, G.D., W. P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2002. Collision mortality of local and migrant birds at a large-scale wind power development on Buffalo Ridge, Minnesota. Wildlife Society Bulletin 30:879-887.

Kienbaum, B.D. 2008. Whooping Crane State Coordinator. Wisconsin Department of Natural Resources (WDNR), Madison, Wisconsin. Personal communication.

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

Kerns, J., W.P. Erickson, and E.B. Arnett. 2005. Bat and Bird fatality at wind energy facilities in Pennsylvania and West Virginia. Pp. 24-95 in E.B. Arnett, technical editor, Relationships between bats and wind turbines in Pennsylvania and West Virginia: an assessment of bat fatality search protocols, patterns of fatality, and behavioral interactions with wind turbines. A final report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas, USA.

Kleen, V.M., L. Cordle, and R.A. Montgomery. 2004. The Illinois Breeding Bird Atlas. Illinois Natural History Survey Special Publication No. 26. xviii + 459 pp.

Koford, R., A. Jain, G. Zenner and A. Hancock. 2005. Avian mortality associated with the Top of Iowa Wind Farm: Progress Report, Calendar Year 2004. Iowa Cooperative Fish and Wildlife Research Unit, Iowa State University, Ames, Iowa. 12pp.

Liguori, J. 2005. Hawks From Every Angle: How to identify raptors in flight. Princeton University Press, Princeton, New Jersey.

National Research Council (NRC). 2007. Environmental Impacts of Wind-Energy Projects. National Wind Coordinating Committee (NWCC) 2004, 2006 Available online at: [http://www.nationalwind.org/publications/default.htm].

National Wind Coordinating Committee (NWCC) 2004. Wind Turbine Interactions with Birds and Bats: A summary of Research Results and Remaining Questions. Fact Sheet, Second Edition.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: April 3, 2009).

Orloff, S. and A. Flannery. 1992. Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991. Final Report. P700-92-001. Prepared for Planning Department of Alameda, Contra Costa and Solano Counties and the California Energy Commission, Sacramento, CA, by BioSystems Analysis, Inc., Tiburon, CA. March 1992.

Orloff, S. and A. Flannery. 1996. A Continued Examination of Avian Mortality in the Altamont Pass Wind Resource Area. Consultant Report. P700-96-004CN. Prepared for California Energy Commission, Sacramento, CA, by BioSystems Analysis, Inc., Tiburon, CA. August 1996.

Osborn, R.G., K.F. Higgins, R.E. Usgaard, C.D. Dieter, and R.G. Neiger. 2000. Bird mortality associated with wind turbines at the Buffalo Ridge Wind Resource Area, Minnesota. American Midland Naturalist 143:41-52.

Phillips, C.A., R.A. Brandon and E.O. Moll. 1999. Field Guide to Amphibians and Reptiles of Illinois. Illinois Natural History Survey, Manual 8.

Smallwood, K.S., L. Rugge, S. Hoover, M.L. Morrison and C.G. Thelander. 2001. Intra- and inter-turbine string comparison of fatalities to animal burrow densities at Altamont Pass. In Schwartz S.S. ed, Proceedings of the National Avian-Wind Power Planning Meeting IV. RESOLVE, Inc. Washington D.C. pp. 23-37

Stehn, T. 2008. Whooping Crane Recovery Activities November 2007 – September 2008. U.S. Fish and Wildlife Service.

Thelander, C.G. and K.S. Smallwood. 2007. The Altamont Pass Wind Resource Area's effects on birds: A case history. In Birds and Windfarms: Risk assessment and mitigation, M.J. de Lucas, G.F.E. Janss and M. Ferrer eds. Quercus, Madrid, Spain

Thelander, C.G., K.S. Smallwood and L. Rugge. 2003. Bird risk behaviors and fatalities at the Altamont Wind Resource Area. Report by BioResource Consultants to the National Renewable Energy Laboratory, Golden, Colorado.

U.S. Department of the Interior Federal Register. 2001. Endangered and Threatened Wildlife and Plants; Establishment of a Nonessential Experimental Population of Whooping Cranes in the Eastern United States. Vol. 66, No. 123. Pp. 33903 – 33917.

U.S. Environmental Protection Agency (USEPA). 2008. Level III and IV Ecoregions of Illinois. U.S. Environmental Protection Agency, Corvallis, OR.

U.S. Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. 99 pp. [http://migratorybirds.fws.gov/reports/bcc2002.pdf].

U.S. Fish and Wildlife Service (USFWS). 2004. Wetlands Geodatabase. National Wetlands Inventory. Division of Habitat and Resource Conservation. Available on line at [http://wetlandsfws.er.usgs.gov/nwi/].

U.S. Fish and Wildlife Service (USFWS). 2008a. Endangered Species in Illinois. USFWS, Midwest Region, Ecological Services. http://www.fws.gov/midwest/endangered/lists/illinois-cty.html.

U.S. Fish and Wildlife Service (USFWS). 2008b. Clubshell and northern riffleshell mussels. Draft environmental assessment. Augmentation and reintroduction plan for the clubshell (*Pleurobema clava*) and northern riffleshell (*Epioblasma torulosa rangiana*) in Illinois. http://www.fws.gov/midwest/endangered/clams/clmu_riffDrftEAilAugmJuly2008.html

Wisconsin Department of Natural Resources (WDNR). 2009. Migratory Whooping Crane Reintroduction, 2009 Update. Available at:http://dnr.wi.gov/org/land/er/birds/wcrane/wcrane2009.htm

Young, Jr., D.P. and W.P. Erickson. 2006. Wildlife issue solutions: What have marine radar surveys taught us about avian risk assessment? Paper presented to Wildlife Workgroup Research Meeting VI, NWCC, November 14-16, 2006, San Antonio, TX.

Young, Jr., D.P, D. Strickland, W. P. Erickson, K. J. Bay, R. Canterbury, T. Mabee, B. Cooper, and J. Plissner. 2004. Baseline Avian Studies Mount Storm Wind Power Project, Grant County, West Virginia, May 2003 - March 2004. Technical report prepared for: NedPower Mount Storm, LLC. 141 pp.

Appendix A: Photos taken during the site visit on March 5-6, 2009

Photo I: The proposed project is dominated by corn and soybean fields.

Photo II: The proposed project is dominated by corn and soybean fields.

Photo III: A few pastures are present within the Site.

Photo IV: One railroad is present within the Site running north/south. Railroad right-of-ways may contain some areas of native prairie.

Photo V: Some former cropland has been planted with grasses, and is managed by Pheasants Forever. These areas provide potentially suitable habitat for some state-listed species.

Photo VI: Forested areas are sparse in the Site and usually less than 20 acres in size.

Photo VII: Some streams in the Site are relatively untouched, and may provide suitable habitat for state-listed fish and mussel species.

Appendix B: Correspondence from IDNR

APPENDIX F

Wildlife Baseline Studies for the California Ridge Wind Farm Champaign and Vermilion Counties, Illinois

Final Report
March 12, 2009 – February 15, 2010

Prepared for:

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Prepared by:

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October 27, 2010

WEST Inc. Environmental & Statistical Consultants

NATURAL RESOURCES ◆ SCIENTIFIC SOLUTIONS

EXECUTIVE SUMMARY

Invenergy LLC has proposed a wind-energy facility, referred to as the California Ridge Wind Farm (CRWF), in Champaign and Vermilion Counties, Illinois. Invenergy LLC contracted Western EcoSystems Technology, Inc. (WEST) to conduct wildlife and landcover surveys in the proposed California Ridge Wind Farm (CRWF) to estimate the impacts of project construction and operations on wildlife. The following document contains results for fixed-point bird use surveys, incidental wildlife observations, and land cover surveys conducted within the California Ridge Wind Farm from March 12, 2009, to February 15, 2010. Acoustic bat surveys were also conducted at the CRWF, and the results were presented in a separate final report.

The principal objectives of the study were to: 1) provide site-specific bird resource and use data that would be valuable in estimating potential impacts from the proposed CRWF; 2) provide information that could be used in project planning and design of the facility to minimize impacts to birds; and 3) recommend further studies or potential mitigation measures, if warranted.

Fixed-point bird use surveys were conducted weekly during spring and fall and monthly during winter from March 2009 through February 2010 to estimate the seasonal, spatial, and temporal use of the CRWF by birds, particularly raptors. No surveys were conducted during summer. Fixed-point surveys were carried out during 24 visits to 15 points established throughout the CRWF. Forty-eight unique bird species were identified during 360 20-minute fixed-point surveys.

Waterbirds were only observed in the spring and great blue heron was the only waterbird species observed. Use by this species was 0.04 birds/plot 20-minute survey. Waterfowl use was highest during the winter (0.15 birds/plot/20-minute survey), primarily comprised of Canada geese; use by waterfowl during the spring and fall was lower (0.05 birds/plot/20-minute survey or less). Shorebirds had higher use in spring (2.37 birds/plot/20-minute survey) than in fall (1.62), and were not observed during winter surveys. Raptor use was relatively even between seasons, ranging from 0.20 birds/plot/20-minute survey in the fall to 0.15 in the winter. Red-tailed hawk and American kestrel were the most commonly observed raptor species in the CRWF. Vulture use was consistent in the fall and spring (0.16 and 0.13 birds/plot/20-minute survey, respectively) and vultures were not observed in the winter. Upland gamebirds had relatively low use in the spring (0.09 birds/plot/20-minute survey) and were not observed in the fall or winter. Use by large corvids was relatively low in all three seasons, ranging from 0.07 to 0.03 birds/plot/20-minute survey. Passerine use ranged from 4.58 birds/plot/20-minute survey in the winter to 10.52 in the fall. The focus for small birds was within a 100-meter view shed, small bird use is not directly comparable to use by large birds, which were analyzed from an 800-meter viewshed.

For all large birds combined, use was highest at point 11, with 14.1 birds/20-minute survey, and ranged from 0.58 to 3.96 birds/20-minute survey at all other points. Mean use at point 11 was comprised primarily of shorebirds (11.4 birds/20-minute survey), particularly killdeer and American golden plover. Shorebird use at other points ranged from 0.17 to 3.50 birds/20-minute survey. Waterbird use was recorded at four points with use ranging from 0.04 to 0.12 birds/20-minute survey while waterfowl were observed at six points with use ranging from 0.04 to 0.29 birds/20-minute survey. Raptor use was highest at point five (0.54 birds/20-minute survey), and was comprised primarily of use by buteos (0.38 birds/20-minute survey). Use by raptors at the other points ranged from zero at point 15 to 0.33 at points three and 14. Vulture use was evenly

distributed among points, with use ranging from 0.04 to 0.21 birds/20-minute survey, while upland gamebird use ranged from zero to 0.17 birds/20-minute survey. Passerine use, limited to within 100 meters of the point, was highest at points five and 11, with 17.6 and 21.1 birds/20-minute survey, respectively. Use by passerines ranged from 3.08 to 13.6 birds/20-minute survey at the remaining points.No obvious flyways or concentration areas were observed. No strong association with topographic features within the study area was noted for raptors or other large birds.

A total of 265 single or groups of large birds totaling 802 individuals were observed flying within the 800-meter plot during fixed-point bird use surveys. 10.8% of flying large birds were observed within the typical rotor-swept height for potential collision with turbines that could be used at the CRWF. Most large birds (88.2%) were observed flying below the likely rotor-swept height and about 1% of large birds were observed flying above the rotor-swept height. Vultures and waterbirds were observed within the rotor-swept height more often than other large bird species (52.4% and 42.9%, respectively). Just over 17% of flying raptors were observed within the rotor-swept height, but red-tailed hawk was the only raptor species observed within the rotor-swept height. A total of 2,712 passerines and other small birds in 684 groups were recorded flying within 100 meters of the plot in the proposed CRWF. Small birds were not observed flying within the rotor-swept height during fixed-point surveys.

The objectives of the land cover surveys were to identify the vegetation types that may be directly impacted by development of the CRWF and characterize habitat suitability of the study area for federal- or state-listed sensitive species. A landcover map was developed by delineating general vegetation types (e.g., cultivated and non-cultivated areas) on aerial maps, and verified in the field. Land cover surveys were carried out within the CRWF during March 2009. The land cover surveys showed the CRWF was dominated by cultivated agriculture, including 90.2% cultivated agriculture (corn and soybeans), 2.7% unmowed grassland, 2.1% mowed grassland, 1.5% developed, and 3.5% woodlot, shelterbelts (tree and shrubs), pasture , hayfields, savannah, railroad verge, and open water.

The objective of incidental wildlife observations was to record wildlife observed outside of the standardized surveys. One red-tailed hawk carcass was observed hanging from a power line and five live bird species were recorded as incidental observations at the CRWF. All bird species recorded incidentally were also observed during fixed-point bird use surveys. The most abundant bird species recorded as an incidental observation were red-tailed hawk (18 live birds in 17 groups) and American kestrel (17 individuals). Three mammal species were also recorded incidentally, with white-tailed deer being the most commonly observed species (19 individuals).

The USFWS interim guidelines for wind-energy development suggest that wind-energy projects should be sited within previously altered habitats. The proposed project is dominated by tilled and un-tilled agriculture, and developed areas, which comprise 92.1 % of the area. Invenergy has committed to placing turbines within tilled and untilled agricultural areas, and avoiding placing turbines within pasture and grassland habitats. The area with the highest diversity of landcover in the region is located along the Middle Fork of the Vermillion River, which is located outside of the CRWF. The results of bird studies at CRWF area show raptor use rates were lower than observed at other wind-energy facilities, likely due to the dominance of tilled agriculture. Fatality rates of birds are expected to be similar to those observed at other wind-energy facilities in the Midwest, based on data collected during this study, dominance of relatively flat tilled agriculture in the CRWF, placement of wind turbines within agricultural areas, and placement of turbines away from the Middle Fork of the Vermillion River.

Three bird species listed as endangered under the Illinois endangered species act were observed within the project area. These species include northern harrier, upland sandpiper and osprey. The American golden plover, listed as a federal priority shorebird species (USFWS 2004), was also observed within the project area. Northern harriers, upland sandpipers, and osprey occurred at relatively low densities during the migration periods and the winter, and risks of collisions are considered low during these seasons based on their low abundance. However, American golden plover in comparison were observed in higher numbers during migration, although existing studies have suggested the species is not especially vulnerable to turbine collisions. Some potential exists for nesting populations of northern harrier and upland sandpiper and other state-listed species to occur within the CRWF, although large numbers are not expected based on the preponderance of tilled agriculture. Landcover data collected during this study can be utilized to identify locations where turbines or infrastructure may be located within or near potential habitat for state-listed species, and to determine if further surveys or mitigation measures are warranted.

STUDY PARTICIPANTS

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Rhett Good	Project Manager, Wildlife Biologist
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Elizabeth Baumgartner	Report Compiler
Andrea Palochak	Technical Editor
Jason Ritzert	Field Supervisor
Chris Rea	Field Technician
Kariane Heidebrecht	Field Technician

REPORT REFERENCE

Good, R., S. Simon, J. Ritzert, K. Bay, S. Nomani, and E. Baumgartner. 2010. Wildlife Baseline Studies for the California Ridge Wind Farm, Champaign and Vermilion Counties, Illinois. Final Report: March 12, 2009 – February 15, 2010. Prepared for Invenergy, LLC. Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana.

ACKNOWLEDGEMENTS

A number of individuals from different organizations were instrumental in the completion of the project. Protocols were reviewed by Heidi Woebber of the USFWS and Keith Shank of the IDNR. Jeff Veazie and Greg Leuchtman of Invenergy served as project managers for Invenergy. All the landowners in the project deserve recognition for their support and cooperation in allowing safe, secure, and trouble-free property access.

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INTRODUCTION

Invenergy LLC (Invenergy) has proposed a wind-energy facility in Champaign and Vermilion Counties, Illinois (Figures 1 and 2). Invenergy contracted Western EcoSystems Technology, Inc. (WEST) to conduct wildlife and landcover surveys in the California Ridge Wind Farm (CRWF) to estimate the impacts of wind-energy facility construction and operations on wildlife.

The principal objectives of the study were to: 1) provide site-specific bird resource and use data that would be valuable in estimating potential impacts from the proposed CRWF; 2) provide information that could be used in project planning and design of the facility to minimize impacts to birds; and 3) recommend further studies or potential mitigation measures, if warranted. The protocols for baseline studies are similar to those used at other wind-energy facilities across the nation and follow the guidance of the National Wind Coordinating Collaborative (NWCC; Anderson et al. 1999). These protocols have been developed based on WEST's experience studying wildlife at proposed wind-energy facilities throughout the United States and were designed to help predict potential impacts to bird species, particularly raptors.

Baseline surveys, conducted from March 12, 2009, through February 15, 2010, at the CRWF consisted of fixed-point bird use surveys, incidental wildlife observations, and land cover surveys. In addition to site-specific data, this report presents existing information and results of studies conducted at other wind-energy facilities. The ability to estimate potential bird mortality at the proposed CRWF is greatly enhanced by operational monitoring data collected at existing facilities. Standardized data on fixed-point surveys were collected at several wind-energy facilities in association with standardized post-construction (operational) monitoring, allowing comparisons of bird use with bird mortality. Where possible, comparisons with regional and local studies were made.

STUDY AREA

The CRWF is located in Champaign and Vermilion Counties in eastern Illinois, between the towns of Royal and Collision (Figure 1). The proposed wind-energy facility falls within the Central Corn Belt Plains Ecoregion, which encompasses a large portion of central Illinois (Woods et al. 2007). The Central Corn Belt Plains Ecoregion is composed of vast glaciated plains. Much of the region was originally dominated by tall-grass prairie and had scattered groves of trees and marshes occurring on level uplands. Today, most of the area has been cleared to make way for highly productive farms producing corn (*Zea mays*), soybeans (*Glycine max*), and livestock. The CRWF is located within the Vermilion River watershed, and the Middle Fork of the Vermilion River is located just east of the boundary of the wind resource area. The proposed CRWF lies directly west of Middle Fork State Fish and Wildlife Area and northwest of Kickapoo State Park. The CRWF has a flat to rolling topography, and is dominated by cultivated agriculture. Elevations within the study area range between approximately 200 and 250 feet (ft; 61 to 76 meters [m]) above sea level (Figure 1).

The vast majority (90.6%) of the roughly 33,500-acre (52.34-square mile [mi^2]) area is composed of cropland (Table 1). Corn and soybean are to be the most common crops, although a few hay fields are also present.

The proposed project will involve the construction and operation of 200 MW, or approximately 133 modern wind turbines. A rotor-swept height (RSH) for potential collision with a turbine blade of 35 to 130 m (115 to 427 ft) above ground level (AGL) was used for the purpose of the analyses.

METHODS

Surveys at the CRWF consisted of the following components: 1) fixed-point bird use surveys, 2) incidental wildlife observations, and 3) land cover surveys.

Fixed-Point Bird Use Surveys

The objective of the fixed-point bird use surveys was to estimate the seasonal and spatial use of the CRWF by birds, particularly raptors (defined here as kites, accipiters, buteos, harriers, eagles, falcons, and owls). Fixed-point surveys (variable circular plots) were conducted using methods described by Reynolds et al. (1980).

Survey Plots

Fifteen points (approximately one point count every 3 – 4 square miles) of the CRWF (Figure 4). Each survey plot was an 800-m (2,625-ft) radius circle centered on the point.

Survey Methods

All species of birds observed during the 20-minute (min) fixed-point bird use surveys were recorded. A unique number was assigned to each observation.

The date, start, and end time of the survey period, and weather information such as temperature, wind speed, wind direction, cloud cover, and precipitation were recorded for each survey. Species or best possible identification, number of individuals, sex and age class (if possible), distance from plot center when first observed, closest distance, altitude above ground, activity (behavior), and habitat(s) were recorded for each observation. The behavior of each bird observed and the vegetation type in which or over which the bird occurred were recorded based on the point of first observation. Approximate flight height and distance from plot center at first observation were recorded to the nearest 5-m (16-ft) interval. Other information recorded about the observation included whether or not the observation was auditory only and the 10-min interval of the 20-min survey in which it was first observed.

Locations of raptors, other large birds, and species of concern seen during fixed-point bird use surveys were recorded on field maps by unique observation number. Flight paths and perched locations were digitized using ArcGIS 9.3 software. Comments were recorded in the comments section of the data sheet. Unusual animal observations were recorded on the incidental datasheets.

Observation Schedule

Fixed-point bird use surveys were conducted from March 12, 2009, through February 15, 2010. Surveys were conducted approximately once per week during the spring (March 1 to May 31) and fall (September 1 to October 31), and once per month during winter (November 1 to February 28). Surveys were carried out during daylight hours and survey periods varied to approximately cover all daylight hours during a season.

Incidental Wildlife Observations

The objective of incidental wildlife observations was to record wildlife seen outside of the standardized surveys. All raptors, unusual or unique birds, sensitive species, mammals, reptiles, and amphibians were recorded in a similar fashion to standardized surveys. The observation number, date, time, species, number of individuals, sex and age class, distance from observer, activity, height above ground (for bird species), habitat, and, in the case of sensitive species, the location was recorded by collecting Universal Transverse Mercator (UTM) coordinates using a hand-held Global Positioning System (GPS) unit.

Land Cover Surveys

The objective of the land cover surveys was to identify potential habitat for state or federally listed species, and to identify potentially important wildlife habitat. A landcover map was developed by delineating general vegetation types (e.g., cultivated and non-cultivated areas) on aerial maps (USDA National Agriculture Imagery Program [NAIP] maps). Landcover types and boundaries were verified in the field during March of 2009 (Table 2). The mapped boundaries of each vegetation type were then digitized using ArcView™ software.

Statistical Analysis

Quality Assurance and Quality Control

Quality assurance and quality control (QA/QC) measures were implemented at all stages of the study, including in the field, during data entry and analysis, and report writing. Following field surveys, observers were responsible for inspecting data forms for completeness, accuracy, and legibility. A sample of records from an electronic database was compared to the raw data forms and any errors detected were corrected. Irregular codes or data suspected as questionable were discussed with the observer and/or project manager. Errors, omissions, or problems identified in later stages of analysis were traced back to the raw data forms and appropriate changes in all steps were made.

Data Compilation and Storage

A Microsoft® ACCESS database was developed to store, to organize, and to retrieve survey data. Data were keyed into the electronic database using a pre-defined format to facilitate subsequent QA/QC and data analysis. All data forms, field notebooks, and electronic data files were retained for reference.

Fixed-Point Bird Use Surveys

<u>Species Richness</u>
Species lists (with the number of observations and the number of groups) were generated by season, and included all observations of birds detected regardless of their distance from the observer. Species richness was (i.e., number of species/plot/20-min survey) compared among seasons for fixed-point bird use surveys.

<u>Bird Use, Composition, and Frequency of Occurrence</u>
For the standardized fixed-point bird use estimates, only observations of large birds detected within the 2,625 ft (800 m) radius plot were used in the analysis. For small birds only observations within a 328 ft (100 m) radius were used. Estimates of mean bird use (i.e., number of birds/plot/20-min survey) were used to compare differences between bird types, seasons, survey points, and other wind-energy facilities. Mean use was calculated by determining the number of birds seen within each 800-m plot (or 100-m plot for small birds) for each given visit and then averaged by the number of plots surveyed during that visit. A second averaging occurred across the number of visits during the season and/or entire study period. A visit was defined as the required length of time to survey all of the plots once within the study area.

Percent composition was calculated as the proportion of the overall mean use for a particular bird type or species, and the frequency of occurrence was calculated as the percent of surveys in which a particular bird type or species was observed. Frequency of occurrence and percent composition provide relative measures of species use of the proposed CRWF. For example, a particular species might have relatively high use estimates for the study area based on just a few observations of large groups. However, the frequency of occurrence would indicate that the species only occurred during a few of the surveys and therefore may be less likely to be affected by the wind-energy facility or the transmission corridor.

Bird Flight Height and Behavior

The initial recorded flight height was used to calculate potential risk to bird species and to estimate the percentages of birds flying within the likely rotor-swept height (RSH) for potential collision with turbine blades 35 to 130 m (115 to 427 ft) above ground level (AGL), which is the blade height of typical turbines that could be used at the CRWF.

Bird Exposure Index

A relative index of collision exposure (R) was calculated for bird species observed during the fixed-point bird use surveys using the following formula:

$$R = A^*P_f^*P_t$$

Where A equals mean relative use for species *i* (large bird observations within 800 m of the observer or 100 m for small bird observations) averaged across all surveys, P_f equals the proportion of all observations of species *i* where activity was recorded as flying (an index to the approximate percentage of time species *i* spends flying during the daylight period), and P_t equals the proportion of all initial flight height observations of species *i* within the likely RSH.

Spatial Use

Data were analyzed by comparing use among plots. Mapped flight path were qualitatively compared to study area characteristics such as topographic features. The objective of mapping observed bird locations and flight paths was to look for areas of concentrated use by raptors and other large birds and/or consistent flight patterns within the CRWF.

RESULTS

Surveys were conducted at the CRWF from March 12, 2009, through February 15, 2010. Forty-eight bird species and three mammal species were identified during all surveys completed at the CRWF. Results of the fixed-point bird use surveys, incidental wildlife observations, and land cover surveys, and the specific numbers of unique species for each survey type are discussed in the sections below.

Fixed-Point Bird Use Surveys

A total of 360 20-minute (min) fixed-point bird use surveys were conducted during 24 visits to the CRWF: 180 surveys were conducted in spring, 120 in fall, and 60 in winter (Table 3). Two different view sheds were utilized when calculating the different statistics; species richness, use, percent composition, percent frequency, and exposure index; 800 m for large birds and 100 m for small birds.

Species Richness

Forty-eight unique species were observed during all fixed-point bird use surveys, with an average species richness of 0.67 large bird species/800-m plot/20-min survey and 1.66 small bird species/100-m plot/20-min survey (Table 3). The total number of unique species was greater in the spring (45 species) and fall (30) than in the winter (12; Table 3). Species richness was greatest in the spring for both large and small birds (1.20 birds/800-m plot/20-min survey and 3.32 birds/100-m plot/20-min survey, respectively), followed by the fall (0.68 birds/800-m plot/20-min survey and 1.33 birds/100-m plot/20-min survey, respectively) and winter (0.27 birds/800-m plot/20-min survey and 0.55 birds/100-m plot/20-min survey, respectively; Table 3).

A total of 5,325 individual bird observations within 1,469 separate groups were recorded during the fixed-point surveys (Table 4). Regardless of bird size, passerines made up the greatest number of observations, comprising about 75% of all bird observations (Table 4). Three passerine species (6.3% of all species) composed 44.0% of all observations: European starling (*Sturnus vulgaris*), brown-headed cowbird (*Molothrus ater*), and red-winged blackbird (*Agelaius phoeniceus*). All other passerine species and the large bird types comprised less than 10% of the total observations for each species individually or for the large bird types, except for shorebirds which comprised 11.7% of all bird observations for all shorebird species combined (Table 4). The most abundant large bird species observed were Canada goose (*Branta canadensis*; 367 individuals in eight groups) and killdeer (*Charadrius vociferus*; 333 individuals in 119 groups). Sixty-five individual raptors were recorded within the CRWF, representing six species (Table 4).

Bird Use, Composition, and Frequency of Occurrence by Season

Mean bird use, percent composition, and frequency of occurrence were calculated by season (Tables 5a and 5b). Overall, use by large bird species was higher during the spring and fall (3.40 and 2.43 birds/800-m plot/20-min survey, respectively) than in the winter (1.05; Table 5a). Small bird use followed a similar pattern, with higher use in the fall and spring (10.53 and 9.10 birds/100-m plot/20-min survey, respectively) than in the winter (4.58; Table 5b).

<u>Waterbirds</u>
Great blue heron (*Ardea herodias*) was the only waterbird species observed, and use by this species was 0.04 birds/plot 20-min survey in spring (Table 5a). Waterbirds were not recorded in the fall or winter. Great blue herons comprised 1.1% of large bird use in the spring and were observed during 3.3% of the spring surveys (Table 5a).

<u>Waterfowl</u>
Waterfowl had the highest use in the winter (0.15 birds/plot/20-min survey), compared to other seasons (spring: 0.05; fall: <0.01; Table 5a). Canada goose was the only waterfowl species observed in the fall or winter, and comprised approximately 80% of waterfowl use in spring (Table 5a). Mallards (*Anas platyrhynchos*) accounted for the remaining spring waterfowl use. Waterfowl comprised 14.3% of large bird use in the winter and waterfowl comprised less than 2% percent of large bird use in the other seasons. Waterfowl were observed during 5% or less of surveys in any season (Table 5a).

<u>Shorebirds</u>
Shorebirds had higher use in the spring (2.37 birds/plot/20-min survey) than in the fall (1.62), and were not observed during winter surveys (Table 5a). About 66% of spring shorebird use was due to use by American golden-plover (*Pluvialis dominica*), but this species was observed during less than 3.3% of spring surveys, indicating a few large groups were observed (Table

5a). Shorebirds comprised 69.6% of overall large bird use in the spring and 66.8% of large bird use in the fall. Shorebirds were observed during 51.7% of the spring surveys compared to only 18.3% in the fall (Table 5a).

Raptors

Raptor use was fairly uniform among seasons, with 0.20 birds/plot/20-min survey in the fall, 0.18 in the spring, and 0.15 in the winter (Table 5a). Red-tailed hawks (*Buteo jamaicensis*) was the most commonly observed raptor species in the spring and winter (0.09 and 0.12 birds/plot/20-min survey, respectively), while American kestrels (*Falco sparverius*) had slightly higher use in the fall (0.08 birds/plot/20-min survey for American kestrels compared to 0.07 for red-tailed hawks; Table 5a). In the winter, raptors comprised 14.3% of the large bird use, compared to 8.2% in the fall and 5.2% in the spring. Raptors were observed during 15.0% of the fall surveys, 13.9% of the spring surveys, and during 11.7% of the winter surveys (Table 5a).

Vultures

Turkey vulture (*Cathartes aura*) was the only vulture species observed at the CRWF, and vulture use was similar in the fall and spring (0.16 and 0.13 birds/plot/20-min survey, respectively), and vultures were not observed in the winter. Turkey vultures comprised less than 7% of large bird use in either season in which they were observed. Turkey vultures were observed during 14.2% of the fall surveys and 8.9% of the spring surveys (Table 5a).

Upland Gamebirds

Upland gamebirds had relatively low use in the spring (0.09 birds/plot/20-min survey) and were not observed in the fall or winter (Table 5a). Nearly all upland gamebird use was attributed to ring-necked pheasant (*Phasianus colchicus*). Upland gamebirds comprised less than 3% of the overall large bird use in the spring and were observed during 8.9% of the spring surveys (Table 5a).

Doves/Pigeons

Dove/pigeon use was similar in the spring (0.48 birds/plot/20-min survey) and fall (0.40 birds/plot/20-min survey), but use was higher during the winter (0.72 birds/plot/20-min survey, Table 5a). Mourning dove (*Zenaida macroura)* had the highest use in the spring and winter (0.47 and 0.52 birds/plot/20-min survey, respectively), while rock pigeon (*Columba livia)* had higher use in the winter (0.20 birds/plot/20-min survey) than in spring (0.01 birds/plot/20-min survey), and was not observed during the fall surveys (Table 5a). Doves/pigeons were observed during 18.3% of the fall surveys, 23.3% of the spring surveys, and during 6.7% of the winter surveys (Table 5a).

Large Corvids

American crow (*Corvus brachyrhynchos*) was the only large corvid observed, and use by this species was relatively low in all three seasons (spring: 0.07; fall: 0.04; winter: 0.03 birds/plot/20-min survey; Table 5a). In any of the three seasons, American crow comprised less than 4% of the overall large bird use and was observed during less than 4% of the surveys (Table 5a).

Passerines

A 100-m viewshed was used for small birds, thus small bird data are not directly comparable to the large bird data as the analysis for large birds utilized an 800-m viewshed. Passerine use was much higher in the fall and spring (10.52 and 9.08 birds/plot/20-min survey, respectively) than in the winter (4.58; Table 5b). European starling had the highest use by any one species in the fall (5.47 birds/plot/20-min survey) and winter (3.30). In the spring, three species had markedly higher use: common grackle (*Quiscalus quiscula*; 1.78 birds/plot/20-min survey), brown-headed cowbird (1.69), and red-winged blackbird (1.62). Passerines were observed during 94.4% of the spring surveys, 78.3% of the fall surveys, and during 45.0% of surveys in the winter (Table 5b).

Bird Flight Height and Behavior

Flight height characteristics were estimated for both bird types and species (Tables 5 and 6). For large bird species, 265 single birds or groups of birds totaling 802 individuals were observed flying within the 800-m plot (Table 6). A total of 10.8% of large birds were observed flying within the RSH, 88.2% were observed flying below the RSH, and about 1% of large birds were observed flying above the RSH (Table 6). Most (70.2%) f flying raptors were observed below the RSH, 17.5% were within the RSH, and 12.3% were above the RSH (Table 6). Vultures had the highest percentage of flying birds within the RSH (52.4%), followed by waterbirds with 42.9%. Raptors had the fourth highest percentage of birds within the RSH; buteos were the only raptor subtype recorded flying within the RSH (35.7%; Table 5). The majority of flying shorebirds (90.2%) and waterfowl (81.8%) were observed below the RSH. Doves/pigeons and large corvids were only observed below the RSH, and upland gamebirds were not observed in flight (Table 6). A total of 2,712 passerines and other small birds were observed flying in 684 groups within the 100-m plot; all small bird species were observed below the RSH (Table 6).

One large bird species had at least 20 groups observed flying, red-tailed hawk. This species was observed flying within the likely RSH during a portion of the initial observations (Table 7a). Of all passerine and small bird species, nine species had at least 20 groups observed flying, but none of these small bird species were observed flying within the RSH (Table 7b).

Bird Exposure Index

A relative exposure index was calculated for each bird species based on initial flight height observations and use estimates (Tables 7a and 7b). This index is only based on initial flight height observations and use estimates, and does not account for other possible collision risk factors (e.g. foraging or courtship behavior). American golden-plover had a higher exposure index than any other species (0.09), compared to an exposure index of 0.04 or less for all other large bird species. The only raptor species with an exposure index was red-tailed hawk (0.03; Table 7a). No small bird species were observed within the RSH (Table 7b).

Spatial Use

Large bird use was higher at point 11 (14.1 birds/20-min survey) compared to use at the remaining points, where use ranged from 0.58 to 3.96 birds/20-min survey (Figure 5). The higher mean use estimate for point 11 was largely due to higher shorebird use at this point (11.4 birds/20-min survey; Figure 5). Shorebird use at the other points ranged from 0.17 to 3.50 birds/20-min survey. Waterbirds within 800-m of the point were recorded at only four points (one, seven, 12, and 14) and use ranged from 0.04 to 0.12 birds/20-min survey. Waterfowl were observed at six points (one, four, eight, 11, 12, and 14), with use ranging from 0.04 to 0.29 birds/20-min survey. Raptor use ranged from 0.00 to 0.54 birds/20-min survey. Vulture use was evenly distributed among points with use ranging from 0.04 to 0.21 birds/20-min survey. Upland gamebird use ranged from zero to 0.17 birds/20-min survey. Large corvid use was also relatively low and similar among points, with use ranging from zero to 0.21 birds/20-min survey. Passerine use, focused within 100 m of the point, was highest at points five and 11 (17.6 and 21.1 birds/20-min survey, respectively), where the majority of passerine use was comprised of European starling, red-winged blackbird, brown-headed cowbird, and and common grackle. Passerine use ranged from 3.08 to 13.6 at the remaining points (Figure 5).

Flight paths for waterbirds, waterfowl, shorebirds, raptors, and vultures were digitized and mapped (Figures 6a-e). No obvious flyways or concentration areas were observed.

Sensitive Species Observations

Four sensitive species were recorded during fixed-point bird use surveys (Table 8). Three upland sandpipers (*Bartramia longicauda*), a state endangered species (IDNR 2009) and a federal species of concern (USFWS 2008), were observed within the CRWF. Ten northern harriers (*Circus cyaneus*) and one osprey (*Pandion haliaetus*), also both Illinois state-endangered species (IDNR 2009), were recorded during fixed-point surveys. In addition, 283 American golden-plovers were observed in eight groups. While this species is not federally listed, it is a species of concern on the federal priority species lists (USFWS 2004). These tallies may represent repeated observations of the same individual in some cases.

Incidental Wildlife Observations

Five bird species were recorded as incidental observations at the CRWF, totaling 49 birds within 44 separate groups during the study (Table 9). Three mammal species were also observed incidentally at the CRWF.

Bird Observations

The most commonly recorded incidental species were red-tailed hawk and American kestrel (19 and 18 individuals, respectively; Table 9). All bird species recorded incidentally were also observed during fixed-point bird use surveys within the CRWF. One adult red-tailed hawk carcass was also observed hanging from a power line on September 12, 2009, suggesting the hawk was electrocuted by the power line (Table 9).

Mammal Observations

Nineteen white-tailed deer (*Odocoileus virginianus*) in six groups were observed incidentally at the CRWF (Table 9). Five thirteen-lined ground squirrels (*Spermophilus tridecemlineatus*) and one coyote (*Canis latrans*) were also recorded as incidental observations (Table 9).

Sensitive Species Observations

Seven northern harriers, a state endangered species (IDNR 2009), were recorded as incidental wildlife observations within the CRWF (Tables 8 and 9). This tally may represent repeated observations of the same individual in some cases.

Land Cover Surveys

The CRWF is dominated by cultivated agriculture in the form of corn and soybeans, comprising 90.2% of the CRWF. Other landcover types included, unmowed grassland, mowed grassland, developed land, woodlot, shelterbelts (tree and shrubs), pasture, hayfields, savannah, railroad verge, and open water (Table 1, Figure 3). Descriptions of each habitat type can be found in Table 2. One natural area declared by the IDNR exists within the southeast portion of the CRWF, the Orchid Hill Natural-Heritage Landmark (INPC 2010).

DISCUSSION AND IMPACT ASSESSMENT

Potential Impacts

Impacts to wildlife resources from wind-energy facilities can be direct or indirect. Direct impacts are considered to be the potential for fatalities from construction and operation of the proposed wind-energy facility. Indirect impacts include the potential to displace, either temporarily or permanently, wildlife during construction of or during the operational period of a wind-energy facility.

Project construction could affect birds through loss of habitat, potential fatalities from construction equipment, and disturbance/displacement effects from construction activities. Impacts from the decommissioning of the facility are anticipated to be similar to construction in terms of noise, disturbance, and equipment. Potential mortality from construction equipment is expected to be very low. Equipment used in wind facility construction generally moves at slow rates or is stationary for long periods (e.g., cranes). The risk of direct mortality to birds from construction is most likely potential destruction of a nest for ground- and shrub-nesting species during initial site clearing. Impacts from the construction of the proposed CRWF to wildlife are are expected to be low based on the preponderance of tilled agriculture within the study area, but could result in impacts to individual state-listed species if construction occurs within occupied non-tilled areas during the breeding season.

The USFWS and the IDNR have expressed concern over the potential operation of wind-energy facilities to cause fatalities or displacement impacts to birds and bats (IDNR 2007, USFWS 2003). The study described in this report was designed to help address these concerns. Discussion of the potential impacts to bats was presented in a separate final report prepared by BHE Environmental.

Direct Impacts

Data collected during this study show that the potential for collisions to occur is not equal between groups of diurnally active birds. Bird types or species that were observed flying more often within heights similar to proposes turbines include raptors, waterbirds, waterfowl, shorebirds, and turkey vultures. Passerines have also been shown to be found as fatalities at other wind-energy facilities, and are discussed below.

Raptor Use and Exposure Risk

Typically, wind-energy facilities that have shown the highest raptor fatality rates have also shown the highest raptor use rates. A regression analysis of raptor use and raptor collision mortality for 13 new-generation wind-energy facilities where similar methods were used to obtain raptor use estimates showed a significant (R^2 = 69.9%) correlation between raptor use and raptor collision mortality (Figure 7). Overall raptor use at the CRWF was relatively low compared to wind-energy facilities where raptor use is considered high (Figure 8), ranking fifth lowest relative to raptor use observed at 39 other wind-energy facilities that implemented similar protocols to the present study and had data for three or four different seasons.

Exposure indices analysis may also provide insight into which species might be the most likely turbine casualties; however, the index only considers relative probability of exposure based on abundance, proportion of observations flying, and proportion of flight height of each species within the RSH for turbines likely to be used at the wind-energy facility. This analysis is based on observations of birds during the surveys and does not take into consideration behavior (e.g., foraging; courtship; habitat selection; the ability to detect and avoid turbines) that may vary among species and influence likelihood for turbine collision. For these reasons, the exposure index is only a relative index among species observed during the surveys and within the CRWF. Actual risk for some species may be lower or higher than indicated by these data. At the CRWF, the raptor species that had the highest exposure index was red-tailed hawk, which is a raptor species common to the Midwest (Table 7a).

The data collected at the CRWF indicate few raptors utilized the study area during the study period. Overall mean raptor use at the CRWF is similar to raptor use reported from four other wind-energy facilities in the Midwest and Illinois (Table 11). To date, relatively few raptor fatalities have been reported at wind-energy facilities in the Midwest located within landscapes dominated by tilled agriculture. A total of eight raptors (including three incidental finds) were recorded as fatalities at studies of six wind-energy facilities located in tilled agriculture landscapes in Wisconsin (three facilities), Minnesota, Iowa, and Illinois (Howe et al. 2002, Johnson et al. 2002b, Jain 2005, Kerlinger et al. 2007, BHE Environmental 2009, Gruver et al. 2009; Table 12). Raptor fatality rates at the CRWF are expected to be similar to those observed at other Midwest wind-energy facilities.

Non-Raptor Use and Exposure Risk

Waterfowl/Waterbirds/Shorebirds

Collectively, waterbird and waterfowl use was relatively low at the CRWF comprising approximately 7.1% of overall species observations. Shorebird use was noticeably higher at approximately 11.7% of all species observations, with use being comprised primarily of killdeer and American golden plover. Potential impacts to American golden plover are discussed under Threatened, Endangered, and Sensitive Species. Potential impacts to other shorebird, waterfowl, and waterbird species are discussed below.

Wind-energy facilities with year-round use by water-dependent species have shown the highest mortality, although the levels of waterfowl, waterbird, and shorebird mortality appear insignificant compared to the use of the facilities by these groups. Of bird carcasses reported at US wind-engery facilities prior to 2007, waterbirds comprised about 1%, waterfowl comprised about 2%, and shorebirds comprised less than 1% (NRC 2007). At the Klondike wind-energy facility in Oregon, only two Canada goose fatalities were documented (Johnson et al. 2003), even though 43 groups totaling 4,845 individual Canada geese were observed during pre-construction surveys (Johnson et al. 2002a). Canada goose account for approximately 6.9% of all bird species observations at the CWRF and were observed flying within the RSH approximately 22% of the time. The recently constructed Top of Iowa wind-energy facility is located in cropland between three Wildlife Management Areas (WMAs) with historically high bird use, including migrant and resident waterfowl. During a recent study, approximately one million goose-use days and 120,000 duck-use days were recorded in the WMAs during the fall and early winter, and no waterfowl fatalities were documented during concurrent and standardized wind-energy facility fatality studies (Jain 2005). Similar findings were observed at the Buffalo Ridge wind-energy facility in southwestern Minnesota (Johnson et al. 2002b), which is located in an area with relatively high waterfowl and waterbird use and some shorebird use. Snow geese (*Chen caerulescens*), Canada geese, and mallards were the most common waterfowl observed. Three of the 55 fatalities observed during the fatality monitoring studies were waterfowl (i.e., one blue-winged teal [*Anas discors*] and two mallards). Two American coots (*Fulica americana*), one grebe, and one shorebird fatality were also found (Johnson et al. 2002b). Based on previous studies at other wind-energy facilities and a relatively low exposure index calculated during this study, water-dependent species do not seem especially vulnerable to turbine collisions and significant impacts are not likely.

Vultures

Despite the fact that turkey vulture are commonly observed near wind-energy facilities, turkey vultures are rarely observed as fatalities at most wind-energy facilities (Erickson et al. 2001a). One notable exception is the Buffalo Gap wind-energy facility in Texas (Tierney 2007), where higher rates of turkey vulture fatalities were observed compared to other wind-energy facilities. The landscape at Buffalo Gap wind-energy facility differs greatly from the CRWF and is dominated by dense thickets of Ashe's juniper (*Juniperus ashei)*, post oak (*Quercus stellata)*, and mesquite (*Prosopsis glandulosa)*, with small inclusions of grassland and dryland agricultural fields. A total of 33 groups consisting of 42 individuals of turkey vulture were observed flying during surveys in the CRWF. Based on flight height data, turkey vultures were recorded within the RSH more than any other species of bird, and some potential exists for turkey vulture fatalities to occur at the CRWF.

Passerines

All of the passerine species observed during the study were recorded as flying below the potential RSH of turbines, indicating that most passerine species have a relatively low risk of collision during daylight hours. Many passerine species migrate at night, and at heights greater than observed during this study, and have some risk of collision with turbines. Passerines (primarily perching birds) have been the most abundant bird fatality at wind-energy facilities outside California (Erickson et al. 2001a, 2002b), often comprising more than 80% of bird fatalities. Both migrant and resident passerine fatalities have been observed. Given that passerines made up a large proportion of the birds observed during the baseline study (approximately 75%; Table 3), passerines would be expected to make up the largest proportion of fatalities at the CRWF.

While some risk of collisions exists, most passerine species typically migrate at heights greater than the heights of turbines, except during periods of inclement weather (NRC 2007). Passerines may be more vulnerable to turbine collisions when ascending or descending from stopover habitats during migration. Typically, small forest fragments are not considered high-quality nesting habitat due to their size and abundance of edge habitat, which is associated with higher incidence of nest predation and parasitism (Askins et al. 1987, Robinson et al. 1995, Brawn and Robinson 1996). However, forest fragments do receive higher levels of use during migration as stopover habitat (Packett and Dunning 2009). Small forest patches and grassland areas within CRWF likely receive higher levels of use by small birds stopping over during migration than the tilled agriculture areas. Migrating small birds and other species may be more at risk of turbine collision when ascending and descending from these stopover habitats, especially if turbines are placed near forest or grassland areas. Woodlots and grasslands are relatively rare within the CRWF.

While this may indicate some risk of collision from turbines placed near suitable stopover habitat, to date, overall fatality rates for birds (including nocturnal migrants) at wind-energy facilities have been relatively low in the Midwest at facilities located in landscapes similar to the CRWF. The range of overall bird fatality estimates at five Midwest wind-energy facilities that were studied using comparable methods in similar habitats have ranged from 0.6 to 7.17 bird fatalities per MW per year (Howe et al. 2002, Johnson et al. 2002b, Jain 2005, Kerlinger et al. 2007, BHE Environmental 2009, Gruver et al. 2009; Table 12).

Indirect Impacts

The UFSWS (2003) has expressed concern over the potential of wind turbines located in grassland habitats to displace grassland birds. Habitats documented in the CRWF that may be utilized by grassland and passerine birds for nesting (unmowed grassland, mowed grassland, pasture, railroad verge, and shrub/grassland) are rare, and comprise 2344 acres (3.66 mi^2; 7.0%) of the CRWF. Many of these areas are not contiguous and occur as isolated areas within the CRWF. The USFWS interim guidelines for wind development (USFWS 2003) suggest that projects located in previously altered habitats such as the CRWF are more suitable for wind development that projects located within native grasslands. Invenergy has committed to placing all turbines within tilled and untilled agriculture, thus greatly reducing the potential for grassland birds to be displaced from nesting habitats.

Threatened, Endangered, and Sensitive Species

Three state and/or federal endangered species and one USFWS priority shorebird species were observed during surveys within the CRWF (Table 8). These species include American golden plover (USFWS priority shorebird species [USFWS 2004]), northern harrier (state-endangered [IDNR 2009]), upland sandpiper (state endangered [IDNR 2009] and a federal species of concern [USFWS 2008]), and osprey (state endangered [IDNR 2009]). All of these bird species are also further protected under the Migratory Bird Treaty Act (MBTA 1918).

Three upland sandpipers observed within three groups were recorded during the fixed-point bird surveys during the spring at the CRWF. The CRWF contains potential nesting sites for the upland sandpiper in the form of hayfields, mowed grassland, buffer strips in crop fields, and unmowed grasslands.

Upland sandpipers may nest within small grass buffer strips in tilled agricultural fields, some of which may be located near a turbine within an adjacent agricultural field. Upland sandpipers may also nest within no-till soybean fields, and some turbines are likely located within no-till soybean fields. The nesting habitat preferences of the upland sandpiper may result in birds nesting close to turbine locations. The typical flight pattern of the upland sandpiper does not include regular flights within proposed blade heights, however; upland sandpiper aerial courtship displays may involve flights near blade height. The effects of an operational wind-energy facility on breeding upland sandpipers have not been well studied. We are only aware of one published study of wind-energy facilities where upland sandpipers were present. Johnson et al. (2000a) conducted a fatality monitoring and grassland songbird displacement study at the Buffalo Ridge wind-energy facility in Minnesota. Upland sandpiper use of the facility during operation was similar to use measured prior to construction, and no upland sandpiper fatalities were documented at Buffalo Ridge.

Upland sandpipers may be impacted by the construction phase of the CRWF if construction takes place during the breeding season in occupied nesting habitat. If construction takes place outside of the breeding season, or within areas not occupied by active upland sandpiper nests, no direct impacts from construction to nesting upland sandpiper would occur, although the potential is reduced due to the placement of wind turbines in tilled agriculture. The potential for operation of the facility to affect upland sandpipers is more difficult to assess, given the lack of projects operating and monitored of projects within areas occupied by upland sandpipers. The flight habits of the upland sandpiper, and the results of Johnson et al. (2000a) suggest that upland sandpipers are not be especially vulnerable to collisions with wind turbines. The results of Johnson et al. (2000a) also suggest that upland sandpipers may not be displaced by wind turbines. While the presence of upland sandpipers during the breeding season results in some potential for the species to be found as a collision fatality, the results of Johnson et al. (2000a), and flight behavior of the species suggest the risk of collision is low.

A total of 17 individual northern harriers in 17 groups were observed within the CRWF (10 individual in 10 groups during fixed-point use bird surveys [spring, fall, and winter] and seven individuals in seven groups as incidental observations).

There were no northern harriers observed flying within the RSH during the fixed-point bird use surveys. The hunting habits of northern harriers typically involve low, coursing flights over grassland habitats (MacWhirter and Bildstein 1996), which likely decreases the potential for this species to collide with a wind turbine. Northern harriers may fly higher and within the potential RSH when conducting aerial courtship displays, and this species may occasionally fly within the RSH during migration. However, the data collected at the CRWF and other wind-energy facilities (Smallwood et al. 2009, Johnson et al. 2000b, Kerlinger 2002) indicates that northern harriers spend the majority of their time flying below blade height. Northern harriers have been documented as fatalities at other wind-energy facilities (Erickson et al. 2001a), and the potential exists for northern harriers to be found as fatalities at the CRWF, particularly during migration. However, the overall level northern harrier fatalities are typically comparatively low when compared to their relative abundance at other wind-energy facilities (Erickson et al. 2001a).

Northern harriers require large undisturbed wetlands, pastures, old fields, marshes, and upland habitats for breeding. The INHS Breeding Bird Atlas (INHS 2009) lists three confirmed and one possible breeding record in Vermilion County and three possible breeding records in Champaign County, Illinois. Some potential nesting habitat for northern harriers is present within some of the larger patches of pasture and savannah landcover types. Research regarding northern harrier response to wind turbines is limited, and has showed mixed results. In Europe, hen harriers (*Circus cyaneus*) appeared to be displaced by construction activities as well as operational facilities (Madders and Whitfield 2006, Pearce-Higgins et al. 2009). Madders and Whitfield (2006) found harriers nesting 200 – 300 m (656 – 984 ft) from an operational wind turbine, and Pearce-Higgins et al. (2009) found foraging northern harriers to be less abundant within 250-m (820-ft) of operating turbines compared to control areas. The CRWF is comprised of approximately 4.0% of habitats that northern harrier may find suitable for nesting (unmowed grassland, native grassland, railroad verge, pasture and savannah), which may reduce the likelihood of northern harriers nesting in the CRWF.

A total of 283 individual American golden-plovers observed in eight groups were observed in the spring during the fixed-point bird use surveys at the CRWF. American golden-plovers may utilize soybean fields east-central Illinois as stopover habitat during the spring migration. The site is comprised of approximately 90% agricultural lands. In a relatively small area in west-central Indiana (Benton and White Counties), Braile (1999) estimated that the number of migrant American golden-plover foraging during stopovers, largely associated with agricultural lands, ranged from 42,000 to 84,000 individuals, which is a substantial fraction of the world's population. Studies conducted at the Fowler Ridge Wind Farm in Benton County, Indiana on American golden-plover revealed that no American golden-plovers were found as fatalities during a concurrent fatality study in the spring of 2009, indicating that the species may not be at risk of turbine collisions (Johnson et al. 2009c, presentation at The Wildlife Society).

The USFWS and the IDNR have expressed concern over the potential of wind-energy facilities in central Illinois to displace American golden-plovers from areas used during spring migration. This region is commonly used by staging American golden-plovers during spring migration as it historically had large concentrations of staging American golden-plovers. Johnson et al. (2009c) recorded no observations of plovers within 400-m of turbines in Indiana; however, lower amounts of soybean fields were present near turbines, which is the preferred foraging habitat for American golden-plovers. Johnson et al. (2009c) suggested that farmers rotate crop types between corn and soybean on a regular basis, and that additional years of study were needed before strong conclusions regarding American golden-plover responses to wind turbines could be made. If American golden-plovers avoid areas near turbines during spring migration, potential fatality rates for the species may be reduced. American golden-plovers utilize soybean fields for foraging in Indiana and Illinois during migration. While American golden-plovers have some potential to be displaced by wind turbines, the potential for displacement from wind turbines to impact any species is of greater concern when preferred habitats are limited or rare. The data collected during this study do not indicate that the CRWF is utilized as heavily as other well known American golden-plover stopover areas, such as Union Township in Benton County, Indiana. It is unlikely that potential displacement from soybean fields in the CRWF would have a large impact on American golden-plover populations considering the abundance of soybean fields in Illinois.

One osprey was recorded during the fixed-point use bird surveys at the CRWF during the spring. This species is typically found in close association to water resources such as lakes and rivers, as their diet primarily made up of fish (Poole et al. 2002). There are no records of breeding osprey located within Vermilion or Champaign Counties, Illinois, and this species is considered an uncommon migrant and occasional summer resident. While some potential exists for ospreys to collide with turbines at any wind-energy facility in Illinois during migration, the risk is considered low for the CRWF based on the low observed use of the site.

There is one Illinois Natural Heritage Landmark located within the site, Orchid Hill (INPC 2010), which is largely known for its diversity of orchids. There are no known state listed plant species that occur within the Orchid Hill site.

Avian point count surveys at CRWF were conducted during the spring and fall migration, and winter periods. Surveys were not conducted during the summer due to preponderance of tilled agriculture, which limited the amount of potential nesting habitat and summer use for most birds. However; some areas of grassland and shelterbelts were identified during the landcover mapping efforts that have some potential to support breeding populations of species protected under the Illinois Endangered Species Act. Bird species identified by the Illinois Department of Natural Resources as potentially nesting within the CRWF include the barn owl (*Tyto alba*), short-eared owl (*Asio flammeus*), and loggerhead shrike (*Lanius ludovicianus*). These species, as well as other state-listed species such as the least bittern (*Ixobrychus exilis*), and black-billed cuckoo (*Coccyzus erythropthalmus*) also have some potential to migrate through the project area, although none were observed utilizing the project area during avian point count surveys, and abundances are expected to be low. The experimental, non-essential population eastern migratory population of the whooping crane (*Grus americana*) may also occur within most areas of Illinois during migration.

Other non-avian species protected by the Illinois Endangered Species Act were identified by the Illinois Department of Natural Resources as having varying potential to occur within the CRWF. These species included the following which could occur in wetland or aquatic habitats: Blanding's turtle (*Emydoidea blandingii*), smooth softshell turtle (*Apalone mutica*), River redhorse (*Moxostoma carinatum*), Eastern sand darter (*Ammocrypta pellucidum*), Bigeye chub (*Hybopsis amblops*), Clubshell (*Pleurobema clava*), riffleshell (*Epioblasma torulosa*), slippershell (*Alasmidonta viridis*), little spectaclecase (*Villosa lienosa*), wavy-rayed lampmussel (*Lampsilis fasciola*), rainbow (*Villosa lienosa*), purple wartyback (*Cyclonaias tuberculata*), kidneyshell (*Ptychobranchus fasciolaris*), rabbitsfoot (*Quadrula cylindrica*), purple Lilliput (*Toxolasma lividus*), salamander mussel (*Simpsonaias ambigua*), and mudpuppy (*Necturus maculosus*). One amphibian species, the silvery salamander (*Ambystoma platineum*) was identified by the

IDNR as having some potential to occur along woodlands connected to the Middle Fork of the Vermillion River. The ornate box-turtle (*Terrapene ornata*) was identified by the IDNR as potentially occurring within open grasslands and agricultural fields. Mammals identified by the IDNR included bat species (addressed in a separate report), and the Franklin's ground squirrel (*Spermophilus franklinii*), which may occur along the right-of-ways of railroads and highways, or other grassland landcover types. The USFWS identified the following plant species as having some potential to occur within native prairie remnants in the CRWF: prairie bush clover (*Lespedeza leptostachya*) and eastern prairie fringed orchid (*Platanthera leucophaea*). Native prairie remnants were not observed from public roads during the landcover mapping effort. The only landcover type that could contain any native prairie remnants was the railroad verge.

CONCLUSION

The USFWS interim guidelines for wind-energy development suggest that wind-energy projects should be sited within previously altered habitats (USFWS 2003). The proposed project is dominated by tilled and un-tilled agriculture, and developed areas, which comprise 92.1 % of the area. Invenergy has committed to placing turbines within tilled and untilled agricultural areas, and avoiding placing turbines within pasture and grassland habitats. The area with the highest diversity of landcover in the region is located along the Middle Fork of the Vermillion River, which is located outside of the CRWF. The results of bird studies at CRWF area show raptor use rates during the spring, fall and winter were lower than observed at other wind-energy facilities, likely due to the dominance of tilled agriculture. Fatality rates of birds are expected to be similar to those observed at other wind-energy facilities in the Midwest, based on data collected during this study, dominance of relatively flat tilled agriculture in the CRWF, placement of wind turbines within agricultural areas, and placement of turbines away from the Middle Fork of the Vermillion River.

Three bird species listed as endangered under the Illinois endangered species act were observed within the project area (IDNR 2009). These species include northern harrier, upland sandpiper (also federal species of concern; USFWS 2008), and osprey. The American golden plover, listed as a federal priority shorebird species (USFWS 2004), was also observed within the project area. Northern harriers, upland sandpipers, and osprey occurred at relatively low densities during the migration periods and the winter, and risks of collisions are considered low during these seasons based on their low abundance. However, American golden plover in comparison were observed in higher numbers during migration, although existing studies have suggested the species is not especially vulnerable to turbine collisions. Some potential exists for nesting populations of northern harrier, upland sandpiper and other state-listed species to occur within the CRWF, although large numbers are not expected based on the preponderance of tilled agriculture. Landcover data collected during this study can be utilized to identify locations where turbines or infrastructure may be located within or near potential habitat for state-listed species, and to determine if further surveys or mitigation measures are warranted.

REFERENCES

Anderson, R., M. Morrison, K. Sinclair, and D. Strickland. 1999. Studying Wind Energy/Bird Interactions: A Guidance Document. Metrics and Methods for Determining or Monitoring Potential Impacts on Birds at Existing and Proposed Wind Energy Sites. Prepared for the Avian Subcommittee and National Wind Coordinating Collaborative (NWCC). December 1999. National Wind Coordinating Committee/RESOLVE. Washington, D.C. 87 pp.

Askins, R.A., M.J. Philbrick, and D.S. Sugeno. 1987. Relationship between Regional Abundance of Forest and the Composition of Forest Bird Communities. Biological Conservation 39: 129-152.

BHE Environmental, Inc. (BHE),. 2009. Habitat Assessment, Wildlife Survey and Autumn Raptor Migration Survey for Proposed Hardin County North Wind Farm, Ohio. Prepared for JW Great Lakes Wind, LLC, Cleveland, Ohio. Prepared by BHE Environmental, Inc., Cincinatti, Ohio. June 2009.

Braile, T.M. 1999. Migration Studies of Shorebirds in West-Central Indiana. M.S. Thesis. Purdue University, Lafayette, Indiana.

Brawn, J.D. and S.K. Robinson. 1996. Source-Sink Population Dynamics May Complicate the Interpretation of Long-Term Census Data. Ecology 77: 3-12.

Brown, W.K. and B.L. Hamilton. 2006. Monitoring of Bird and Bat Collisions with Wind Turbines at the Summerview Wind Power Project, Alberta: 2005-2006. Prepared for Vision Quest Windelectric, Calgary, Alberta by TAEM Ltd., Calgary, Alberta, and BLH Environmental Services, Pincher Creek, Alberta. September 2006. http://www.batsandwind.org/pdf/Brown2006.pdf

Bureau of Land Management (BLM). 2006. Final Environmental Impact Statement for the Proposed Cotterel Wind Power Project and Proposed Resource Management Plan Amendment. FES 06-07. US Department of the Interior (USDOI), BLM, Twin Falls District, Burley Field Office, Cassia County, Idaho. March 2006.

Chatfield, A., W. Erickson, and K. Bay. 2009. Avian and Bat Fatality Study, Dillon Wind-Energy Facility, Riverside County, California. Final Report: March 26, 2008 - March 26, 2009. Prepared for Iberdrola Renewables, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. June 3, 2009.

Derby, C., K. Bay, and J. Ritzert. 2009. Bird Use Monitoring, Grand Ridge Wind Resource Area, La Salle County, Illinois. Year One Final Report, March 2008 - February 2009. Prepared for Grand Ridge Energy LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 29, 2009.

Derby, C., A. Dahl, W. Erickson, K. Bay, and J. Hoban. 2007. Post-Construction Monitoring Report for Avian and Bat Mortality at the NPPD Ainsworth Wind Farm. Unpublished report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, for the Nebraska Public Power District.

Ecology and Environment. 2009. Application for Certificate of Environmental Compatibility and Public Need to Site a Wind Powered Electric Generation Facility, Richland and Crawford Counties, Ohio. Prepared for Black Fork Wind LLC, Denver, Colorado by Ecology and Environment, Lancaster, New York. August 2009. http://dis.puc.state.oh.us/CaseRecord.aspx?CaseNo=09-0546

Enk, T., K. Bay, M. Sonnenberg, J. Baker, M. Kesterke, J. Boehrs, and A. Palochak. 2010. Biglow Canyon Wind Farm Phase I Post-Construction Avian and Bat Monitoring Second Annual Report, Sherman County, Oregon. January 26, 2009 - December 11, 2009. Prepared for Portland General Electric Company, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc.(WEST) Cheyenne, Wyoming, and Walla Walla, Washington. April 2010.

Erickson, W.P., J. Jeffrey, D.P. Young, Jr., K. Bay, R. Good, K. Sernka, and K. Kronner. 2003a. Wildlife Baseline Study for the Kittitas Valley Wind Project: Summary of Results from 2002 Wildlife Surveys. Final Report February 2002– November 2002. Prepared for Zilkha Renewable Energy, Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. January 2003.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2003b. Stateline Wind Project Wildlife Monitoring Annual Report, Results for the Period July 2001 - December 2002. Technical report submitted to FPL Energy, the Oregon Office of Energy, and the Stateline Technical Advisory Committee. Western EcoSystems Technology, Inc., Cheyenne, Wyoming. May 2003.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Final Report: July 2001 - December 2003. Technical report for and peer-reviewed by FPL Energy, Stateline Technical Advisory Committee, and the Oregon Energy Facility Siting Council, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Walla Walla, Washington, and Northwest Wildlife Consultants (NWC), Pendleton, Oregon. December 2004. http://www.west-inc.com

Erickson, W.P., J. Jeffrey, and V.K. Poulton. 2008. Avian and Bat Monitoring: Year 1 Report. Puget Sound Energy Wild Horse Wind Project, Kittitas County, Washington. Prepared for Puget Sound Energy, Ellensburg, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. January 2008.

Erickson, W.P., G.D. Johnson, K. Bay, and K. Kronner. 2002a. Ecological Baseline Study for the Zintel Canyon Wind Project. Final Report April 2001 – June 2002. Technical report prepared for Energy Northwest. Prepared for Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. June 2002.

Erickson, W.P., G.D. Johnson, D.P. Young, Jr., D. Strickland, R. Good, M. Bourassa, K. Bay, and K. Sernka. 2002b. Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments. Technical report prepared for Bonneville Power Administration, Portland, Oregon by WEST, Inc., Cheyenne, Wyoming. December 2002. http://www.bpa.gov/Power/pgc/wind/Avian_and_Bat_Study_12-2002.pdf

Erickson, W.P., G.D. Johnson, M.D. Strickland, and K. Kronner. 2000. Avian and Bat Mortality Associated with the Vansycle Wind Project, Umatilla County, Oregon: 1999 Study Year. Technical report prepared by WEST, Inc. for Umatilla County Department of Resource Services and Development, Pendleton, Oregon. 21pp. http://www.west-inc.com/reports/vansyclereportnet.pdf

Erickson, W.P., G.D. Johnson, M.D. Strickland, D.P. Young, Jr., K.J. Sernka, and R.E. Good. 2001a. Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Bird Collision Mortality in the United States. National Wind Coordinating Collaborative (NWCC) Publication and Resource Document. Prepared for the NWCC by WEST, Inc., Cheyenne, Wyoming. August 2001. http://www.west-inc.com

Erickson, W.P., K. Kronner, and B. Gritski. 2003c. Nine Canyon Wind Power Project Avian and Bat Monitoring Report. September 2002 – August 2003. Prepared for the Nine Canyon Technical Advisory Committee and Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants (NWC), Pendleton, Oregon. October 2003. http://www.west-inc.com/reports/nine_canyon_monitoring_final.pdf

Erickson, W.P., E. Lack, M. Bourassa, K. Sernka, and K. Kronner. 2001b. Wildlife Baseline Study for the Nine Canyon Wind Project, Final Report May 2000-October 2001 Technical report prepared for Energy Northwest, Richland, Washington.

Erickson, W.P., D.P. Young, G. Johnson, J. Jeffrey, K. Bay, R. Good, and H. Sawyer. 2003d. Wildlife Baseline Study for the Wild Horse Wind Project. Summary of Results from 2002-2003 Wildlife Surveys May 10, 2002- May 22, 2003. Draft report prepared for Zilkha Renewable Energy, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. November 2003.

Fiedler, J.K., T.H. Henry, R.D. Tankersley, and C.P. Nicholson. 2007. Results of Bat and Bird Mortality Monitoring at the Expanded Buffalo Mountain Windfarm, 2005. Tennessee Valley Authority, Knoxville, Tennessee. https://www.tva.gov/environment/bmw_report/results.pdf

Gritski, B., S. Downes, and K. Kronner. 2009. Klondike III (Phase 1) Wind Power Project Wildlife Monitoring Year One Summary, October 2007-October 2008. Prepared for Iberdrola Renewables, Portland, Oregon. Prepared by Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. April 3, 2009.

Gritski, B., K. Kronner, and S. Downes. 2008. Leaning Juniper Wind Power Project, 2006 – 2008. Wildlife Monitoring Final Report. Prepared for PacifiCorp Energy, Portland, Oregon. Prepared by Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. December 30, 2008.

Gruver, J., M. Sonnenburg, K. Bay, and W. Erickson. 2009. Post-Construction Bat and Bird Fatality Study at the Blue Sky Green Field Wind Energy Center, Fond Du Lac County, Wisconsin July 21 - October 31, 2008 and March 15 - June 4, 2009. Unpublished report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. December 17, 2009.

Howe, R.W., W. Evans, and A.T. Wolf. 2002. Effects of Wind Turbines on Birds and Bats in Northeastern Wisconsin. Prepared by University of Wisconsin-Green Bay, for Wisconsin Public Service Corporation and Madison Gas and Electric Company, Madison, Wisconsin. November 21, 2002. 104 pp.

Illinois Department of Natural Resources (IDNR). 2007. The Possible Effects of Wind Energy on Illinois Birds and Bats. Available online at: http://dnr.state.il.us/publications/pdf/00000544.pdf

Illinois Department of Natural Resources (IDNR). 2009. Illinois Threatened and Endangered Species. Illinois Endangered Species Protection Board (ESPB), IDNR. Updated quarterly. IDNR online at: http://dnr.state.il.us; Illinois ESPB online at: http://dnr.state.il.us/espb/; Checklist as of October 30, 2009. Checklist of Endangered and threatened Plants and Animals of Illinois available online at: http://dnr.state.il.us/ESPB/2009%20Checklist%20FINAL%20for%20webpage%20October%2009a.pdf

Illinois Natural History Survey (INHS). 2009. Breeding Bird Atlas. Online. Information from the Illinois Breeding Bird Atlas. Kleen, V.M., L. Cordle, and R.A. Montgomery. 2004. The Illinois Breeding Bird Atlas. http://www.inhs.illinois.edu/animals_plants/birds/breeding.php

Illinois Nature Preserves Commission (INPC). 2010. Protected Areas in Illinois by County. February 2010. http://www.dnr.state.il.us/lands/landmgt/parks/r3/natlriv.htm

Jain, A. 2005. Bird and Bat Behavior and Mortality at a Northern Iowa Windfarm. M.S. Thesis. Iowa State University, Ames, Iowa.

Jain, A., P. Kerlinger, R. Curry, and L. Slobodnik. 2007. Annual Report for the Maple Ridge Wind Power Project: Post-Construction Bird and Bat Fatality Study – 2006. Final Report. Prepared for PPM Energy and Horizon Energy and Technical Advisory Committee (TAC) for the Maple Ridge Project Study.

Jain, A., P. Kerlinger, R. Curry, and L. Slobodnik. 2008. Annual Report for the Maple Ridge Wind Power Project: Post-Construction Bird and Bat Fatality Study - 2007. Final report prepared for PPM Energy and Horizon Energy and Technical Advisory Committee (TAC) for the Maple Ridge Project Study.

Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, A. Fuerst, and C. Hansen. 2009a. Annual Report for the Noble Ellenburg Windpark, LLC, Postconstruction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC by Curry and Kerlinger, LLC. April 13, 2009.

Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, J. Histed, and J. Meacham. 2009b. Annual Report for the Noble Clinton Windpark, LLC, Postconstruction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC by Curry and Kerlinger, LLC. April 13, 2009.

Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, J. Quant, and D. Pursell. 2009c. Annual Report for the Noble Bliss Windpark, LLC, Postconstruction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC by Curry and Kerlinger, LLC. April 13, 2009.

Jain, A., P. Kerlinger, L. Slobodnik, R. Curry, A. Fuerst, and A. Harte. 2010a. Annual Report for the Noble Bliss Windpark, LLC: Postconstruction Bird and Bat Fatality Study - 2009. Prepared for Noble Environmental Power, LLC. Prepared by Curry and Kerlinger, LLC, Cape May, New Jersey. March 9, 2010.

Jain, A., P. Kerlinger, L. Slobodnik, R. Curry, and K. Russell. 2010b. Annual Report for the Noble Clinton Windpark, LLC: Postconstruction Bird and Bat Fatality Study - 2009. Prepared for Noble Environmental Power, LLC. Prepared by Curry and Kerlinger, LLC, Cape May, New Jersey. March 9, 2010.

Jain, A., P. Kerlinger, L. Slobodnik, R. Curry, and K. Russell. 2010c. Annual Report for the Noble Ellenburg Windpark, LLC: Postconstruction Bird and Bat Fatality Study - 2009. Prepared for Noble Environmental Power, LLC. Prepared by Curry and Kerlinger, LLC, Cape May, New Jersey. March 14, 2010.

Jeffrey, J.D., K. Bay, W.P. Erickson, M. Sonneberg, J. Baker, M. Kesterke, J. Boehrs, and A. Palochak. 2009. Portland General Electric Biglow Canyon Wind Farm Phase I Post-Construction Avian and Bat Monitoring First Annual Report, Sherman County, Oregon. January 2008 - December 2008. Technical report prepared for Portland General Electric Company, Portland, Oregon. Prepared by Western EcoSystems Technology (WEST) Inc., Cheyenne, Wyoming, and Walla Walla, Washington. April 29, 2009.

Jeffrey, J.D., W.P. Erickson, K.J. Bay, V.K. Poulton, W.L. Tidhar, and J.E. Baker. 2008. Wildlife Baseline Studies for the Golden Hills Wind Resource Area, Sherman County, Oregon. Final Report May 2006 – October 2007. Prepared for BP Alternative Energy North America Inc., Houston, Texas, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D. 2004. Analysis of Potential Wildlife and Habitat Impacts from the Klondike II Project, Sherman County, Oregon. Technical report prepared by WEST, Inc., for CH2MHILL and PPM Energy.

Johnson, G.D., K. Bay, and J. Eddy. 2009a. Wildlife Baseline Studies for the Dunlap Ranch Wind Resource Area, Carbon and Albany Counties, Wyoming. June 4, 2008 - May 27, 2009. Prepared for CH2MHILL, Englewood, Colorado. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D., K. Bay, and J. Eddy. 2009b. Wildlife Baseline Studies for the High Plains Wind Resource Area, Carbon and Albany Counties, Wyoming. Prepared for CH2MHILL. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D., K. Bay, J. Eddy, and T. Rintz. 2008a. Wildlife Baseline Studies for the Glenrock Wind Resource Area, Converse County, Wyoming. Prepared for CH2MHILL. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D., J. Eddy, K. Bay, and A. Chatfield. 2008b. Wildlife Baseline Studies for the Seven Mile Hill Wind Resource Area, Carbon County, Wyoming: April 30 - November 15, 2007. Prepared for CH2MHILL, Englewood, Colorado. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D. and W.P. Erickson. 2004. Analysis of Potential Wildlife/Wind Plant Interactions, Bighorn Site, Klickitat County, Washington. Prepared for CH2MHILL, Portland, Oregon by WEST, Inc., Cheyenne, Wyoming. August 2004.

Johnson, G.D., W.P. Erickson, K. Bay, and K. Kronner. 2002a. Baseline Ecological Studies for the Klondike Wind Project, Sherman County, Oregon. Final report prepared for Northwestern Wind Power, Goldendale, Washington, by Western EcoSystems Technology, Inc. (WEST) Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. May 29, 2002.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, and D.A. Shepherd. 2000a. Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-Year Study. Final report prepared for Northern States Power Company, Minneapolis, Minnesota, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. September 22, 2000. 212 pp. http://www.west-inc.com

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2002b. Collision Mortality of Local and Migrant Birds at a Large-Scale Wind-Power Development on Buffalo Ridge, Minnesota. Wildlife Society Bulletin 30(3): 879-887.

Johnson, G.D., W.P. Erickson, and J. White. 2003. Avian and Bat Mortality During the First Year of Operation at the Klondike Phase I Wind Project, Sherman County, Oregon. March 2003. Technical report prepared for Northwestern Wind Power, Goldendale, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. http://www.west-inc.com

Johnson, G.D., R.E. Good, M. Carder, D. Tidhar, and K. Bay. 2009c. American Golden Plover Response to Wind Turbines in Benton County, Indiana. Presentation given at the Midwest Wildlife Society Meeting, Springfield, Illinois. December 8, 2009.

Johnson, G.D., J. Jeffrey, J. Baker, and K. Bay. 2007. Baseline Avian Studies for the Windy Flats Wind Energy Project, Klickitat County, Washington. Prepared for Windy Point Partners, LLC., by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. May 29, 2007.

Johnson, G.D., D.P. Young, W.P. Erickson, C.E. Derby, M.D. Strickland, and R.E. Good. 2000b. Wildlife Monitoring Studies, SeaWest Windpower Plant, Carbon County, Wyoming, 1995-1999. Final report prepared for SeaWest Energy Corporation, San Diego, California, and the Bureau of Land Management, Rawlins, Wyoming, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. August 9, 2000. http://www.west-inc.com and http://www.west-inc.com/reports/fcr_final_baseline.pdf

Kerlinger, P. 2002. An Assessment of the Impacts of Green Mountain Power Corporation's Wind Power Facility on Breeding and Migrating Birds in Searsburg, Vermont: July 1996-July 1998. NREL/SR-500-28591. Prepared for Vermont Public Service, Montpelier, Vermont. US Department of Energy, National Renewable Energy Laboratory, Golden, Colorado. March 2002. 95 pp. http://www.nrel.gov/docs/fy02osti/28591.pdf

Kerlinger, P., L. Culp, and R. Curry. 2005. Post-Construction Avian Monitoring Study for the High Winds Wind Power Project, Solano County, California. Year One Report. Prepared for High Winds, LLC and FPL Energy.

Kerlinger, P., R. Curry, L. Culp, A. Jain, C. Wilkerson, B. Fischer, and A. Hasch. 2006. Post-Construction Avian and Bat Fatality Monitoring for the High Winds Wind Power Project, Solano County, California: Two Year Report. Prepared for High Winds LLC, FPL Energy by Curry and Kerlinger, LLC. April 2006.

Kerlinger, P., R. Curry, A. Hasch, and J. Guarnaccia. 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.

Kronner, K., B. Gritski, J. Baker, V. Marr, G.D. Johnson, and K.Bay. 2005. Wildlife Baseline Study for the Leaning Juniper Wind Power Project, Gilliam County, Oregon. Prepared for PPM Energy, Portland, Oregon and CH2MHILL, Portland, Oregon by NWC, Pendleton, Oregon, and WEST, Inc., Cheyenne, Wyoming. November 3, 2005.

Kronner, K., B. Gritski, and S. Downes. 2008. Big Horn Wind Power Project Wildlife Fatality Monitoring Study: 2006–2007. Final report prepared for PPM Energy and the Big Horn Wind Project Technical Advisory Committee by Northwest Wildlife Consultants, Inc. (NWC), Mid-Columbia Field Office, Goldendale, Washington. June 1, 2008.

MacWhirter, R.B. and K.L. Bildstein. 1996. Northern Harrier (*Circus cyaneus*). *In*: The Birds of North America, No. 210. Poole, A. and F. Gill, eds. The Academy of Natural Sciences, Philadelphia, Pennsylvania, and The American Ornithologists' Union, Washington, D.C. 32 pp.

Madders, M. and D.P. Whitfield. 2006. Upland Raptors and the Assessment of Wind Farm Impacts. Ibis 148: 43-56.

Migratory Bird Treaty Act (MBTA). 1918. 16 United States Code § 703-712. July 13, 1918.

National Research Council (NRC). 2007. Environmental Impacts of Wind-Energy Projects. National Academies Press. Washington, D.C. www.nap.edu

Nicholson, C.P. 2003. Buffalo Mountain Windfarm Bird and Bat Mortality Monitoring Report: October 2001 - September 2002. Tennessee Valley Authority, Knoxville, Tennessee. February 2003.

Nicholson, C.P., J. R.D. Tankersley, J.K. Fiedler, and N.S. Nicholas. 2005. Assessment and Prediction of Bird and Bat Mortality at Wind Energy Facilities in the Southeastern United States. Final Report. Tennessee Valley Authority, Knoxville, Tennessee.

Northwest Wildlife Consultants, Inc. (NWC) and Western Ecosystems Technology, Inc. (WEST). 2004. Ecological Baseline Studies for the Roosevelt Wind Project, Klickitat County, Washington. Final Report. Prepared by NWC, Pendleton, Oregon, and WEST, Inc., Cheyenne, Wyoming. September 2004.

Northwest Wildlife Consultants, Inc. (NWC) and Western Ecosystems Technology, Inc. (WEST). 2005. Ecological Baseline Studies and Wildlife Impact Assessment for the White Creek Wind Power Project, Klickitat County, Washington. Prepared for Last Mile Electric Cooperative, Goldendale, Washington, by Northwest Wildlife Consultants, Inc., Goldendale, Washington, and Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. January 12, 2005.

Northwest Wildlife Consultants, Inc. (NWC) and Western EcoSystems Technology, Inc. (WEST). 2007. Avian and Bat Monitoring Report for the Klondike II Wind Power Project. Sherman County, Oregon. Prepared for PPM Energy, Portland, Oregon. Managed and conducted by NWC, Pendleton, Oregon. Analysis conducted by WEST, Cheyenne, Wyoming. July 17, 2007.

O'Neal, B. and M. Alessi. 2008. The Plover Project: Key Stopovers, Regional Abundance, and Habitat Associations of American Golden-Plovers in the Grand Prairie Region. Unpublished report available from the Illinois Department of Natural Resources (IDNR).

Packett, D.L. and J.B. Dunning, Jr. 2009. Stopover Habitat Selection by Migrant Landbirds in a Fragmented Forest-Agricultural Landscape. Auk 126(3): 579-589.

Pearce-Higgins, J.W., L. Stephen, R.H.W. Langston, I.P. Bainbridge, and R. Bullman. 2009. The Distribution of Breeding Birds around Upland Wind Farms. Journal of Applied Ecology 46(6): 1323 - 1331.

Poole, A.F., R.O. Bierregaard, and M.S. Martell. 2002. Osprey (*Pandion haliaetus*). Poole, A., ed. The Birds of North America Online. Cornell Laboratory of Ornithology. Ithaca, New York. Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/683

Reynolds, R.T., J.M. Scott, and R.A. Nussbaum. 1980. A Variable Circular-Plot Method for Estimating Bird Numbers. Condor 82(3): 309-313.

Robinson, S.K., F.R. Thompson III, T.M. Donovan, D.R. Whitehead, and J. Faaborg. 1995. Regional Forest Fragmentation and the Nesting Success of Migratory Birds. Science 267: 1987-1990.

Smallwood, K.S., L. Rugge, and M.L. Morrison. 2009. Influence of Behavior on Bird Mortality in Wind Energy Developments. Journal of Wildlife Management 73(7): 1082–1098.

Stantec Consulting, Inc. (Stantec). 2009. Spring, Summer, and Fall 2008 Bird and Bat Survey Report for the Buckeye Wind Facility, Ohio. Prepared for EverPowerWind Holdings, Inc., by Stantec Consulting, formerly Woodlot Alternatives, Inc., Topsham, Maine. February 2009.

Stantec Consulting Ltd. (Stantec Ltd.). 2010. Wolfe Island Ecopower Centre Post-Construction Followup Plan. Bird and Bat Resources Monitoring Report No. 2: July - December 2009. File No. 160960494. Prepared for TransAlta Corporation's wholly owned subsidiary, Canadian Renewable Energy Corporation. Prepared by Stantec Ltd., Guelph, Ontario. May 2010.

Tierney, R. 2007. Buffalo Gap I Wind Farm Avian Mortality Study: February 2006-January 2007. Final Survey Report. Prepared for AES SeaWest, Inc. TRC, Albuquerque, New Mexico.TRC Report No. 110766-C-01. May 2007.

TRC Environmental Corporation. 2008. Post-Construction Avian and Bat Fatality Monitoring and Grassland Bird Displacement Surveys at the Judith Gap Wind Energy Project, Wheatland County, Montana. Prepared for Judith Gap Energy, LLC, Chicago, Illinois. TRC Environmental Corporation, Laramie, Wyoming. TRC Project 51883-01 (112416). January 2008. http://www.newwest.net/pdfs/AvianBatFatalityMonitoring.pdf

URS, W.P. Erickson, and L. Sharp. 2005. Phase 1 and Phase 1A Avian Mortality Monitoring Report for 2004-2005 for the SMUD Solano Wind Project. Prepared for Sacramento Municipal Utility District (SMUD), Sacramento, California. Co-Authors: Wally Erickson, Western EcoSystems Technology, Inc. (WEST) and Lynn Sharp, Environmental Consultant. August 2005.

URS Corporation. 2010a. Final Marengo I Wind Project Year One Avian Mortality Monitoring Report. Prepared for PacifiCorp, Salt Lake City, Utah. Prepared by URS Corporation, Seattle, Washington. March 22, 2010.

URS Corporation. 2010b. Final Marengo II Wind Project Year One Avian Mortality Monitoring Report. Prepared for PacifiCorp, Salt Lake City, Utah. Prepared by URS Corporation, Seattle, Washington. March 22, 2010.

URS Corporation, Western EcoSystems Technology, Inc. (WEST), and Northwest Wildlife Consultants, Inc. (NWC). 2001. Avian Baseline Study for the Stateline Project. Prepared for FPL Energy Vansycle, LLC, Juno Beach, Florida.

US Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP). 2006. NAIP Imagery and Status Maps.

US Fish and Wildlife Service (USFWS). 2003. Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines. May 13, 2003. USFWS. Washington, D.C. http://www.fws.gov/habitatconservation/wind.pdf

US Fish and Wildlife Service (USFWS). 2004. List of High Priority Shorebird Species/Populations. US Shorebird Conservation Plan. August 2004.

US Fish and Wildlife Service (USFWS). 2008. Birds of Conservation Concern 2008. December 2008. Division of Migratory Bird Management. Arlington, Virginia. http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf

Western Ecosystems Technology, Inc. (WEST). 2005a. Ecological Baseline Study at the Elkhorn Wind Power Project. Exhibit A. Final report prepared for Zilkha Renewable Energy, LLC., Portland, Oregon, by WEST, Cheyenne, Wyoming. June 2005.

Western EcoSystems Technology, Inc. (WEST). 2005b. Ecological Baseline Study for the Proposed Reardon Wind Project, Lincoln County, Washington. Draft Final Report. Prepared for Energy Northwest, Richland, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. June 2005.

Western EcoSystems Technology, Inc. (WEST). 2005c. Wildlife and Habitat Baseline Study for the Proposed Biglow Canyon Wind Power Project, Sherman County, Oregon. March 2004 - August 2005. Prepared for Orion Energy LLC., Oakland, California. October, 2005. WEST. Cheyenne, Wyoming.

Western EcoSystems Technology, Inc. (WEST). 2006. Diablo Winds Wildlife Monitoring Progress Report, March 2005 - February 2006. Technical report submitted to FPL Energy and Alameda County California. WEST. Cheyenne, Wyoming.

Western EcoSystems Technology, Inc. (WEST). 2007. Wildlife and Habitat Baseline Study for the Vantage Wind Power Project, Kittitas County, Washington. Draft report prepared for Invenergy by Western EcoSystems Technology, Inc. (WEST), Cheyenne Wyoming and Walla Walla, Washington. June 2007.

Western EcoSystems Technology, Inc. (WEST). 2008. Diablo Winds Wildlife Monitoring Progress Report: March 2005 – February 2007. Prepared by WEST, Cheyenne, Wyoming. August 2008.

Western EcoSystems Technology, Inc. (WEST) and Colorado Plateau Research Station (CPRS). 2006. Avian Studies for the Proposed Sunshine Wind Park, Coconino County, Arizona. Prepared for Sunshine Arizona Wind Energy, LLC., Flagstaff, Arizona, by WEST, Cheyenne, Wyoming, and the CPRS, Northern Arizona University, Flagstaff, Arizona. May 2006.

Woods, A.J., J.M. Omernik, C.L. Pederson, B.C. Moran, and others. 2007. Ecoregions of Illinois. (Color poster with map, descriptive text, summary tables, and photographs.) US Geological Survey (USGS) map. Last updated October 2, 2007. USGS, Reston, Virginia. US Environmental Protection Agency (USEPA). http://www.epa.gov/wed/pages/ecoregions/il_eco.htm

Woodward-Clyde International-Americas, (WCIA) and Western EcoSystems Technology, Inc. (WEST). 1997. Avian Baseline Study for the Vansycle Ridge Project - Vansycle Ridge, Oregon and Wildlife Mortality Studies, Vansycle Wind Project, Washington. Prepared for Esi Vansycle Partners, L.P., North Palm Beach, Florida.

Young, D.P. Jr., W.P. Erickson, K. Bay, J. Jeffrey, E.G. Lack, R.E. Good, and H.H. Sawyer. 2003a. Baseline Avian Studies for the Proposed Hopkins Ridge Wind Project, Columbia County, Washington. Final Report, March 2002 - March 2003. Prepared for RES North America, LLC., Portland, Oregon, by Western EcoSystems Technology, Inc.(WEST), Cheyenne, Wyoming. April 30, 2003.

Young, D.P. Jr., W.P. Erickson, K. Bay, J. Jeffrey, E.G. Lack, and H.H. Sawyer. 2003b. Baseline Avian Studies for the Proposed Desert Claim Wind Power Project, Kittitas County, Washington. Final Report. Prepared for Desert Claim Wind Power, LLC, Ellensburg, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 2003.

Young, D.P. Jr., W.P. Erickson, K. Bay, S. Nomani, and W. Tidhar. 2009. Mount Storm Wind Energy Facility, Phase 1 Post-Construction Avian and Bat Monitoring, July - October 2008. Prepared for NedPower Mount Storm, LLC, Houston, Texas, by Western EcoSystems Technology (WEST), Inc., Cheyenne, Wyoming.

Young, D.P. Jr., W.P. Erickson, R.E. Good, M.D. Strickland, and G.D. Johnson. 2003c. Avian and Bat Mortality Associated with the Initial Phase of the Foote Creek Rim Windpower Project, Carbon County, Wyoming, Final Report, November 1998 - June 2002. Prepared for Pacificorp, Inc. Portland, Oregon, SeaWest Windpower Inc. San Diego, California, and Bureau of Land Management, Rawlins District Office, Rawlins, Wyoming.

Young, D.P. Jr., W.P. Erickson, J. Jeffrey, K. Bay, R.E. Good, and E.G. Lack. 2003d. Avian and Sensitive Species Baseline Study Plan and Final Report. Eurus Combine Hills Turbine Ranch, Umatilla County, Oregon. Technical report prepared for Eurus Energy America Corporation, San Diego, California and Aeropower Services, Inc., Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. March 10, 2003.

Young, D.P. Jr., W.P. Erickson, J. Jeffrey, and V.K. Poulton. 2007a. Puget Sound Energy Hopkins Ridge Wind Project Phase 1 Post-Construction Avian and Bat Monitoring First Annual Report, January - December 2006. Technical report for Puget Sound Energy, Dayton, Washington and Hopkins Ridge Wind Project Technical Advisory Committee, Columbia County, Washington. Western EcoSystems Technology, Inc. (WEST) Cheyenne, Wyoming, and Walla Walla, Washington. 25 pp.

Young, D.P. Jr., J. Jeffrey, W.P. Erickson, K. Bay, and V.K. Poulton. 2006. Eurus Combine Hills Turbine Ranch. Phase 1 Post Construction Wildlife Monitoring First Annual Report. Technical report prepared for Eurus Energy America Corporation, San Diego, California, and the Combine Hills Technical Advisory Committee, Umatilla County, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon.

Young, D.P. Jr., G.D. Johnson, V.K. Poulton, and K. Bay. 2007b. Ecological Baseline Studies for the Hatchet Ridge Wind Energy Project, Shasta County, California. Prepared for Hatchet Ridge Wind, LLC, Portland, Oregon by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. August 31, 2007. http://www.co.shasta.ca.us/Departments/Resourcemgmt/drm/Hatchet%20Ridge/DEIR/App_C-1.pdf

Young, D.P. Jr., V.K. Poulton, and K. Bay. 2007c. Ecological Baseline Studies Report. Proposed Dry Lake Wind Project, Navajo County, Arizona. Prepared for PPM Energy, Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 1, 2007.

Table 1. The land cover types, coverage, and composition within the California Ridge Wind Farm, based on land cover surveys conducted by WEST in March of 2009.

Habitat	Acres	% Composition
Agriculture (Corn/Soybeans)	30,246.60	90.2
Agriculture (Hay Fields)	117.34	0.4
Developed	509.22	1.5
Mowed Grassland	690.72	2.1
Open Water	9.84	<0.1
Pasture	236.61	0.7
Railroad Verge	84.27	0.3
Savannah	103.87	0.3
Shelterbelt (Shrubs)	72.51	0.2
Shelterbelt (Trees)	266.40	0.8
Unmowed Grassland	890.10	2.7
Woodlot	296.11	0.9
Total	**33,523.58**	**100**

Table 2. Descriptions of habitats mapped at the California Ridge Wind Farm by Western EcoSystems Technology, Inc.

Habitat	Habitat Description
Tilled Agriculture	Areas with planted crops (typically soybean [*Glycine max*], corn [*Zea mays*]).
Un-Tilled Agriculture	Area with untilled agriculture (hay or alfalfa [*Medicago sativa*]).
Developed	House, barn, building, city, major highways.
Abandoned Structure	Dilapidated structure.
Pasture	Areas with planted grasses used for livestock grazing.
Mowed Non-native Grassland	Areas regularly mowed that are dominated by non-native grasses such as fescues (*Festuca* spp.).
Unmowed Non-native Grassland	Areas that have not been mowed that are dominated by non-native grasses such as fescues.
Illinois Natural Heritage Landmark	Natural area designated and administered by the Illinois Department of Naturual Resources (Orchid Hill).
Savannah	Unmowed non-native planted grassland with interspersed trees/shrubs.
Woodlot	Areas with a group of deciduous trees present (does not include areas smaller than one acre [43,560 ft^2]).
Shelterbelt with deciduous trees	Rows between properties or crop fields that consist of mature deciduous trees.
Shelterbelt with shrubs/grass	Barriers of shrubs or grass between agriculture fields.
Railroad verge	Active railroad track that has a verge on both sides consisting of grasses, shrubs, and/or trees.
Open water	Ponds or lakes.

Table 3. Summary of species richness (species/plot[a]/20-minute survey) and sample size, by season and overall, during fixed-point bird use surveys at the California Ridge Wind Farm from March 12, 2009 – February 15, 2010.

Season	Number of Visits	# Surveys Conducted	# Unique Species	Species Richness Large Birds	Species Richness Small Birds

Spring	12	180	45	1.20	3.32
Fall	8	120	30	0.68	1.33
Winter	4	60	12	0.27	0.55
Overall	**24**	**360**	**48**	**0.67**	**1.66**

[a] 800-m radius for large birds and 100-m radius for small birds.

Table 4. Total number of individuals (obs) and groups (grps) for each bird type, raptor subtype, and species[a], by season and overall, during fixed-point bird use surveys at the California Ridge Wind Farm from March 12, 2009 – February 15, 2010.

		Spring		Fall		Winter		Total	
Species/Type	Scientific Name	# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs
Waterbirds		**6**	**7**	**0**	**0**	**0**	**0**	**6**	**7**
great blue heron	*Ardea herodias*	6	7	0	0	0	0	6	7
Waterfowl		**3**	**9**	**1**	**1**	**5**	**359**	**9**	**369**
Canada goose	*Branta canadensis*	2	7	1	1	5	359	8	367
mallard	*Anas platyrhynchos*	1	2	0	0	0	0	1	2
Shorebirds		**110**	**426**	**22**	**195**	**0**	**0**	**132**	**621**
American golden-plover	*Pluvialis dominica*	8	283	0	0	0	0	8	283
killdeer	*Charadrius vociferus*	97	138	22	195	0	0	119	333
upland sandpiper	*Bartramia longicauda*	3	3	0	0	0	0	3	3
Wilson's snipe	*Gallinago delicata*	2	2	0	0	0	0	2	2
Raptors		**28**	**32**	**19**	**24**	**7**	**9**	**54**	**65**
Accipiters		*0*	*0*	*2*	*2*	*1*	*1*	*3*	*3*
sharp-shinned hawk	*Accipiter striatus*	0	0	2	2	1	1	3	3
Buteos		*15*	*18*	*7*	*8*	*5*	*7*	*27*	*33*
red-tailed hawk	*Buteo jamaicensis*	14	17	7	8	5	7	26	32
rough-legged hawk	*Buteo lagopus*	1	1	0	0	0	0	1	1
Northern Harrier		*5*	*5*	*4*	*4*	*1*	*1*	*10*	*10*
northern harrier	*Circus cyaneus*	5	5	4	4	1	1	10	10
Falcons		*7*	*8*	*6*	*10*	*0*	*0*	*13*	*18*
American kestrel	*Falco sparverius*	7	8	6	10	0	0	13	18
Other Raptors		*1*	*1*	*0*	*0*	*0*	*0*	*1*	*1*
osprey	*Pandion haliaetus*	1	1	0	0	0	0	1	1
Vultures		**16**	**23**	**17**	**19**	**0**	**0**	**33**	**42**
turkey vulture	*Cathartes aura*	16	23	17	19	0	0	33	42
Upland Gamebirds		**16**	**17**	**0**	**0**	**0**	**0**	**16**	**17**
northern bobwhite	*Colinus virginianus*	1	1	0	0	0	0	1	1
ring-necked pheasant	*Phasianus colchicus*	15	16	0	0	0	0	15	16

Table 4. Total number of individuals (obs) and groups (grps) for each bird type, raptor subtype, and species[a], by season and overall, during fixed-point bird use surveys at the California Ridge Wind Farm from March 12, 2009 – February 15, 2010.

		Spring		Fall		Winter		Total	
Species/Type	Scientific Name	# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs
Doves/Pigeons		**53**	**86**	**22**	**48**	**4**	**43**	**79**	**177**
mourning dove	*Zenaida macroura*	52	84	22	48	3	31	77	163
rock pigeon	*Columba livia*	1	2	0	0	1	12	2	14
Large Corvids		**7**	**12**	**1**	**5**	**2**	**2**	**10**	**19**
American crow	*Corvus brachyrhynchos*	7	12	1	5	2	2	10	19
Passerines		**906**	**2,184**	**182**	**1,513**	**37**	**305**	**1,125**	**4,002**
American goldfinch	*Carduelis tristis*	18	26	20	38	0	0	38	64
American robin	*Turdus migratorius*	94	182	30	68	0	0	124	250
barn swallow	*Hirundo rustica*	40	71	7	37	0	0	47	108
blue jay	*Cyanocitta cristata*	1	2	3	7	0	0	4	9
brown-headed cowbird	*Molothrus ater*	119	411	9	200	0	0	128	611
brown thrasher	*Toxostoma rufum*	3	3	1	1	0	0	4	4
cedar waxwing	*Bombycilla cedrorum*	1	2	0	0	0	0	1	2
chipping sparrow	*Spizella passerina*	14	15	1	1	0	0	15	16
cliff swallow	*Petrochelidon pyrrhonota*	0	0	3	14	0	0	3	14
common grackle	*Quiscalus quiscula*	120	387	7	30	0	0	127	417
common yellowthroat	*Geothlypis trichas*	7	9	0	0	0	0	7	9
dickcissel	*Spiza americana*	10	17	1	2	0	0	11	19
eastern kingbird	*Tyrannus tyrannus*	6	8	0	0	0	0	6	8
eastern meadowlark	*Sturnella magna*	105	131	10	13	0	0	115	144
European starling	*Sturnus vulgaris*	48	168	34	780	10	228	92	1,176
gray catbird	*Dumetella carolinensis*	2	2	0	0	0	0	2	2
horned lark	*Eremophila alpestris*	87	123	18	44	20	46	125	213
house finch	*Carpodacus mexicanus*	2	3	0	0	0	0	2	3
house sparrow	*Passer domesticus*	17	47	4	11	1	1	22	59
indigo bunting	*Passerina cyanea*	5	5	0	0	0	0	5	5
Lapland longspur	*Calcarius lapponicus*	16	105	0	0	5	20	21	125
northern cardinal	*Cardinalis cardinalis*	8	9	1	1	0	0	9	10
purple martin	*Progne subis*	0	0	1	30	0	0	1	30
red-winged blackbird	*Agelaius phoeniceus*	140	402	11	143	1	10	152	555

Table 4. Total number of individuals (obs) and groups (grps) for each bird type, raptor subtype, and species[a], by season and overall, during fixed-point bird use surveys at the California Ridge Wind Farm from March 12, 2009 – February 15, 2010.

		Spring		Fall		Winter		Total	
Species/Type	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
song sparrow	*Melospiza melodia*	16	21	0	0	0	0	16	21
tree swallow	*Tachycineta bicolor*	7	12	13	84	0	0	20	96
unidentified sparrow		0	0	1	2	0	0	1	2
unidentified warbler		0	0	1	1	0	0	1	1
vesper sparrow	*Pooecetes gramineus*	20	23	6	6	0	0	26	29
Other Birds		**4**	**4**	**1**	**2**	**0**	**0**	**5**	**6**
chimney swift	*Chaetura pelagica*	2	2	0	0	0	0	2	2
northern flicker	*Colaptes auratus*	2	2	1	2	0	0	3	4
Overall		**1,149**	**2,800**	**265**	**1,807**	**55**	**718**	**1,469**	**5,325**

[a] Regardless of distance from observer.

Table 5a. Mean bird use (number of birds/plot/20-minute survey), percent of total composition (%), and frequency of occurrence (%) for each large bird type, raptor subtype, and species by season during fixed-point bird use surveys at the California Ridge Wind Farm from March 12, 2009 – February 15, 2010.

	Use			% Composition			% Frequency		
Species/Type	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter
Waterbirds	**0.04**	**0**	**0**	**1.1**	**0**	**0**	**3.3**	**0**	**0**
great blue heron	0.04	0	0	1.1	0	0	3.3	0	0
Waterfowl	**0.05**	**<0.01**	**0.15**	**1.5**	**0.3**	**14.3**	**1.7**	**0.8**	**5.0**
Canada goose	0.04	<0.01	0.15	1.1	0.3	14.3	1.1	0.8	5.0
mallard	0.01	0	0	0.3	0	0	0.6	0	0
Shorebirds	**2.37**	**1.62**	**0**	**69.6**	**66.8**	**0**	**51.7**	**18.3**	**0**
American golden-plover	1.57	0	0	46.2	0	0	3.3	0	0
killdeer	0.77	1.62	0	22.5	66.8	0	48.3	18.3	0
upland sandpiper	0.02	0	0	0.5	0	0	1.7	0	0
Wilson's snipe	0.01	0	0	0.3	0	0	1.1	0	0
Raptors	**0.18**	**0.20**	**0.15**	**5.2**	**8.2**	**14.3**	**13.9**	**15.0**	**11.7**
Accipiters	*0*	*0.02*	*0.02*	*0*	*0.7*	*1.6*	*0*	*1.7*	*1.7*
sharp-shinned hawk	0	0.02	0.02	0	0.7	1.6	0	1.7	1.7
Buteos	*0.10*	*0.07*	*0.12*	*2.9*	*2.7*	*11.1*	*7.8*	*5.8*	*8.3*
red-tailed hawk	0.09	0.07	0.12	2.8	2.7	11.1	7.2	5.8	8.3
rough-legged hawk	<0.01	0	0	0.2	0	0	0.6	0	0
Northern Harrier	*0.03*	*0.03*	*0.02*	*0.8*	*1.4*	*1.6*	*2.8*	*3.3*	*1.7*
northern harrier	0.03	0.03	0.02	0.8	1.4	1.6	2.8	3.3	1.7
Falcons	*0.04*	*0.08*	*0*	*1.3*	*3.4*	*0*	*3.9*	*5.0*	*0*
American kestrel	0.04	0.08	0	1.3	3.4	0	3.9	5.0	0
Other Raptors	*<0.01*	*0*	*0*	*0.2*	*0*	*0*	*0.6*	*0*	*0*
osprey	<0.01	0	0	0.2	0	0	0.6	0	0
Vultures	**0.13**	**0.16**	**0**	**3.8**	**6.5**	**0**	**8.9**	**14.2**	**0**
turkey vulture	0.13	0.16	0	3.8	6.5	0	8.9	14.2	0
Upland Gamebirds	**0.09**	**0**	**0**	**2.8**	**0**	**0**	**8.9**	**0**	**0**
northern bobwhite	<0.01	0	0	0.2	0	0	0.6	0	0
ring-necked pheasant	0.09	0	0	2.6	0	0	8.3	0	0

Table 5a. Mean bird use (number of birds/plot/20-minute survey), percent of total composition (%), and frequency of occurrence (%) for each large bird type, raptor subtype, and species by season during fixed-point bird use surveys at the California Ridge Wind Farm from March 12, 2009 – February 15, 2010.

	Use			% Composition			% Frequency		
Species/Type	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter
Doves/Pigeons	**0.48**	**0.40**	**0.72**	**14.1**	**16.4**	**68.3**	**23.3**	**18.3**	**6.7**
mourning dove	0.47	0.40	0.52	13.7	16.4	49.2	23.3	18.3	5.0
rock pigeon	0.01	0	0.20	0.3	0	19.0	0.6	0	1.7
Large Corvids	**0.07**	**0.04**	**0.03**	**2.0**	**1.7**	**3.2**	**3.9**	**0.8**	**3.3**
American crow	0.07	0.04	0.03	2.0	1.7	3.2	3.9	0.8	3.3
Overall	**3.40**	**2.43**	**1.05**	**100**	**100**	**100**			

Table 5b. Mean bird use (number of birds/100-meter plot/20-minute survey), percent of total composition (%), and frequency of occurrence (%) for each small bird type and species by season during fixed-point bird use surveys at the California Ridge Wind Farm from March 12, 2009 – February 15, 2010.

	Use			% Composition			% Frequency		
Species/Type	**Spring**	**Fall**	**Winter**	**Spring**	**Fall**	**Winter**	**Spring**	**Fall**	**Winter**
Passerines	**9.08**	**10.52**	**4.58**	**99.8**	**99.8**	**100**	**94.4**	**78.3**	**45.0**
American goldfinch	0.11	0.32	0	1.2	3.0	0	6.7	16.7	0
American robin	0.78	0.52	0	8.5	4.9	0	33.9	22.5	0
barn swallow	0.34	0.22	0	3.8	2.1	0	19.4	5.0	0
blue jay	0	<0.01	0	0	<0.1	0	0	0.8	0
brown-headed cowbird	1.69	1.67	0	18.6	15.8	0	47.2	7.5	0
brown thrasher	0	<0.01	0	0	<0.1	0	0	0.8	0
cedar waxwing	0.01	0	0	0.1	0	0	0.6	0	0
chipping sparrow	0.04	<0.01	0	0.4	<0.1	0	3.3	0.8	0
cliff swallow	0	0.12	0	0	1.1	0	0	2.5	0
common grackle	1.78	0.22	0	19.5	2.1	0	41.7	5.0	0
common yellowthroat	0.03	0	0	0.3	0	0	2.2	0	0
dickcissel	0.06	0.02	0	0.6	0.2	0	2.8	0.8	0
eastern kingbird	0.04	0	0	0.5	0	0	3.3	0	0
eastern meadowlark	0.31	0.05	0	3.4	0.5	0	24.4	4.2	0
European starling	0.68	5.47	3.30	7.4	52.0	72.0	20.0	22.5	11.7
gray catbird	0.01	0	0	0.1	0	0	1.1	0	0
horned lark	0.51	0.37	0.77	5.6	3.5	16.7	32.2	15.0	31.7
house finch	0.02	0	0	0.2	0	0	1.1	0	0
house sparrow	0.26	0.09	0.02	2.9	0.9	0.4	8.9	3.3	1.7
indigo bunting	0.03	0	0	0.3	0	0	2.8	0	0
Lapland longspur	0.49	0	0.33	5.4	0	7.3	7.2	0	8.3
northern cardinal	0.05	<0.01	0	0.5	<0.1	0	4.4	0.8	0
purple martin	0	0.25	0	0	2.4	0	0	0.8	0
red-winged blackbird	1.62	0.43	0.17	17.8	4.1	3.6	48.9	6.7	1.7
song sparrow	0.09	0	0	1.0	0	0	6.1	0	0
tree swallow	0.04	0.66	0	0.5	6.2	0	3.3	10.0	0
unidentified sparrow	0	0.02	0	0	0.2	0	0	0.8	0
unidentified warbler	0	<0.01	0	0	<0.1	0	0	0.8	0
vesper sparrow	0.10	0.05	0	1.1	0.5	0	8.3	5.0	0

Table 5b. Mean bird use (number of birds/100-meter plot/20-minute survey), percent of total composition (%), and frequency of occurrence (%) for each small bird type and species by season during fixed-point bird use surveys at the California Ridge Wind Farm from March 12, 2009 – February 15, 2010.

	Use			% Composition			% Frequency		
Species/Type	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter
Other Birds	**0.02**	**0.02**	**0**	**0.2**	**0.2**	**0**	**1.7**	**0.8**	**0**
chimney swift	<0.01	0	0	<0.1	0	0	0.6	0	0
northern flicker	0.01	0.02	0	0.1	0.2	0	1.1	0.8	0
Overall	**9.10**	**10.53**	**4.58**	**100**	**100**	**100**			

Table 6. Flight height characteristics by bird type and raptor subtype during fixed-point bird use surveys at the California Ridge Wind Farm from March 12, 2009 – February 15, 2010. Large bird observations were limited to within 800 m and small birds were limited to within 100 m.

Bird Type	# Groups Flying	# Obs Flying	Mean Flight Height (m)	% Obs Flying	% within Flight Height Categories 0 - 35 m	35 - 130 m[a]	> 130 m
Waterbirds	6	7	31.83	100	57.1	42.9	0
Waterfowl	5	11	32.20	57.9	81.8	18.2	0
Shorebirds	99	509	5.97	82.0	90.2	9.8	0
Raptors	46	57	31.22	87.7	70.2	17.5	12.3
Accipiters	*3*	*3*	*12.00*	*100*	*100*	*0*	*0*
Buteos	*22*	*28*	*58.05*	*84.8*	*39.3*	*35.7*	*25.0*
Northern Harrier	*10*	*10*	*2.40*	*100*	*100*	*0*	*0*
Falcons	*10*	*15*	*6.90*	*83.3*	*100*	*0*	*0*
Other Raptors	*1*	*1*	*30.00*	*100*	*100*	*0*	*0*
Vultures	33	42	51.09	100	45.2	52.4	2.4
Upland Gamebirds	0	0	0	0	0	0	0
Doves/Pigeons	68	160	6.53	90.4	100	0	0
Large Corvids	8	16	7.62	84.2	100	0	0
Large Birds Overall	**265**	**802**	**17.25**	**82.9**	**88.2**	**10.8**	**1.0**
Passerines	680	2,707	5.06	85.3	100	0	0
Other Birds	4	5	12.50	100	100	0	0
Small Birds Overall	**684**	**2,712**	**5.10**	**85.4**	**100**	**0**	**0**

[a] The likely "rotor-swept height" for potential collision with a turbine blade, or 35 to 130 m (115 to 427 ft) above ground level.

Table 7a. Relative exposure index and flight characteristics for large bird species during fixed-point bird use surveys at the California Ridge Wind Farm from March 12, 2009 – February 15, 2010.

Species	# Groups Flying	Overall Mean Use	% Flying	% Flying within RSH[a] based on Initial obs	Exposure Index	% Within RSH at Anytime
American golden-plover	8	0.53	100	17.7	0.09	17.7
turkey vulture	33	0.08	100	52.4	0.04	61.9
red-tailed hawk	21	0.10	84.4	37.0	0.03	51.9
Canada goose	4	0.08	52.9	22.2	<0.01	22.2
great blue heron	6	0.01	100	42.9	<0.01	42.9
killdeer	89	0.62	67.3	0	0	0
mourning dove	66	0.47	89.6	0	0	0
rock pigeon	2	0.09	100	0	0	0
American crow	8	0.05	84.2	0	0	0
American kestrel	10	0.03	83.3	0	0	0
ring-necked pheasant	0	0.03	0	0	0	0
northern harrier	10	0.02	100	0	0	0
sharp-shinned hawk	3	0.01	100	0	0	0
upland sandpiper	0	<0.01	0	0	0	0
Wilson's snipe	2	<0.01	100	0	0	0
mallard	1	<0.01	100	0	0	0
rough-legged hawk	1	<0.01	100	0	0	0
osprey	1	<0.01	100	0	0	100
northern bobwhite	0	<0.01	0	0	0	0

[a] RSH: The likely "rotor-swept height" for potential collision with a turbine blade, or 35 to 130 m (115 to 427 ft) above ground level (AGL).

Table 7b. Relative exposure index and flight characteristics for small bird species during fixed-point bird use surveys at the California Ridge Wind Farm from March 12, 2009 – February 15, 2010.

Species	# Groups Flying	Overall Mean Use	% Flying	% Flying within RSH[a] based on Initial obs	Exposure Index	% Within RSH at Anytime
European starling	68	2.90	82.8	0	0	0
brown-headed cowbird	99	0.94	95.8	0	0	0
red-winged blackbird	104	0.72	90.7	0	0	0
common grackle	108	0.65	98.6	0	0	0
horned lark	61	0.59	70.7	0	0	0
American robin	68	0.38	77.2	0	0	0
Lapland longspur	16	0.31	92.6	0	0	0
barn swallow	42	0.17	100	0	0	0
tree swallow	17	0.16	82.8	0	0	0
eastern meadowlark	24	0.12	51.6	0	0	0
house sparrow	15	0.12	69.5	0	0	0
American goldfinch	21	0.11	79.3	0	0	0
purple martin	1	0.06	100	0	0	0
vesper sparrow	9	0.04	41.7	0	0	0
song sparrow	3	0.03	25.0	0	0	0
cliff swallow	3	0.03	100	0	0	0
dickcissel	2	0.02	41.7	0	0	0
northern cardinal	4	0.02	50.0	0	0	0
eastern kingbird	6	0.01	100	0	0	0
chipping sparrow	2	0.01	37.5	0	0	0
indigo bunting	3	<0.01	60.0	0	0	0
common yellowthroat	0	<0.01	0	0	0	0
northern flicker	3	<0.01	100	0	0	0
house finch	2	<0.01	100	0	0	0
gray catbird	0	<0.01	0	0	0	0
cedar waxwing	0	<0.01	0	0	0	0

Table 7b. Relative exposure index and flight characteristics for small bird species during fixed-point bird use surveys at the California Ridge Wind Farm from March 12, 2009 – February 15, 2010.

Species	# Groups Flying	Overall Mean Use	% Flying	% Flying within RSH[a] based on Initial obs	Exposure Index	% Within RSH at Anytime
unidentified sparrow	1	<0.01	100	0	0	0
chimney swift	1	<0.01	100	0	0	0
unidentified warbler	0	<0.01	0	0	0	0
brown thrasher	0	<0.01	0	0	0	0
blue jay	1	<0.01	100	0	0	0

[a] RSH: The likely "rotor-swept height" for potential collision with a turbine blade, or 35 to 130 m (115 to 427 ft) above ground level (AGL).

Table 8. Summary of sensitive species observed at the California Ridge Wind Farm during fixed-point bird use surveys (FP) and as incidental wildlife observations (Inc.) from March 12, 2009 – February 15, 2010.

			FP		Inc.		Total	
Species	**Scientific Name**	**Status**	**# of grps**	**# of obs**	**# of grps**	**# of obs**	**# of grps**	**# of obs**
American golden-plover	*Pluvialis dominica*	FPS	8	283	0	0	**8**	**283**
northern harrier	*Circus cyaneus*	SE	10	10	7	7	**17**	**17**
upland sandpiper	*Bartramia longicauda*	SE/FSOC	3	3	0	0	**3**	**3**
osprey	*Pandion haliaetus*	SE	1	1	0	0	**1**	**1**
Total	**4 species**		**22**	**297**	**7**	**7**	**29**	**304**

FSOC = federal species of concern (USFWS 2008); FPS = USFWS priority shorebird species (USFWS 2004); SE = state endangered. (IDNR 2009)

Table 9. Incidental wildlife observed while conducting all surveys at the California Ridge Wind Farm from March 12, 2009 – February 15, 2010.

Species	Scientific Name	# grps	# obs
red-tailed hawk	*Buteo jamaicensis*	18	19
American kestrel	*Falco sparverius*	13	17
northern harrier	*Circus cyaneus*	7	7
turkey vulture	*Cathartes aura*	5	5
great blue heron	*Ardea herodias*	2	2
Bird Subtotal	**5 species**	**44**	**49**
white-tailed deer	*Odocoileus virginianus*	6	19
thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*	5	5
coyote	*Canis latrans*	1	1
Mammal Subtotal	**3 species**	**12**	**25**

Table 10. Comparison of raptor use estimates and raptor mortality at wind-energy facilities in North America and the California Ridge Wind Farm.

Wind-Energy Facility	Use Estimate[a]	Raptor Mortality[b]	No. of Turbines	Total MW
California Ridge, IL	0.17			
Midwest				
NPPD Ainsworth, NE		0.06	36	59.4
Wolfe Island, Ont.		0.04	86	197.8
Buffalo Ridge, MN	0.64	0.02	281	210.75
Blue Sky Green Field, WI		0	88	145
Western				
Diablo Winds, CA	2.16	0.87	31	20
SMUD, CA		0.53		15
High Winds, CA	2.34	0.39	90	162
Leaning Juniper, OR	0.52	0.21	67	100.5
Big Horn, WA	0.51	0.15	133	199.5
Hopkins Ridge, WA	0.70	0.14	83	150
Klondike II, OR	0.50	0.11	50	75
Stateline, OR/WA (2002)	0.23	0.09	454	300
Stateline, OR/WA (2003)	0.21	0.09	454	300
Wild Horse, WA	0.29	0.09	127	229
Klondike III, OR		0.06	122	375
Zintel, WA	0.43	0.05	38	50
Nine Canyon, WA		0.05	37	48
Marengo II, WA		0.05	39	70.2
Biglow Canyon I, WA (2009)		0.04	76	125.4
Biglow Canyon I, WA (2008)		0.03	76	125.4
Combine Hills, OR	0.75	0	41	41
Vansycle, OR	0.66	0	38	24.9
Klondike, OR	0.50	0	16	24
Marengo I, WA		0	78	140.4
Dillon, CA		0	45	45
Northeastern				
Noble Ellenburg, NY (2009)		0.49	54	80
Noble Ellensburg, NY (2008)		0.32	54	80
Noble Clinton, NY (2008)		0.29	67	100.5
Maple Ridge, NY (2007)		0.25	195	321.75
Noble Clinton, NY (2009)		0.24	67	100
Noble Bliss, NY (2008)		0.19	67	100
Noble Bliss, NY (2009)		0.18	67	100
Maple Ridge, NY (2006)		0.04	120	198
Buffalo Mountain, TN (2006)		0	18	29
Buffalo Mountain, TN (2000-2003)		0	3	1.98
Mount Storm, WV (2008)		0	82	164

Table 10. Comparison of raptor use estimates and raptor mortality at wind-energy facilities in North America and the California Ridge Wind Farm.

Wind-Energy Facility	Use Estimate[a]	Raptor Mortality[b]	No. of Turbines	Total MW
Southern Plains				
Buffalo Gap, TX		0.10	67	134
Rocky Mountains				
Summerview, Alb. (2005/2006)		0.11	39	70.2
Judith Gap, MT		0.09	90	135
Foote Creek Rim, WY (Phase I; 1999)		0.08	69	41.4
Foote Creek Rim, WY (Phase I; 2000)		0.05	69	41.4
Foote Creek Rim, WY (Phase I; 2001/2002)		0	69	41.4

[a] number of raptors/plot/20-min survey
[b] number of fatalities/MW/year
Data from the following sources:

Facility	Use Estimate	Mortality Estimate	Facility	Use Estimate	Mortality Estimate
NPPD Ainsworth, NE		Derby et al. 2007	Vansycle, OR	WCIA and WEST 1997	Erickson et al. 2000
Wolfe Island, Ont.		Stantec Ltd. 2010	Klondike, OR	Johnson et al. 2002a	Johnson et al. 2003
Buffalo Ridge, MN	Erickson et al. 2002b	Erickson et al. 2002b	Marengo I, WA		URS Corporation 2010a
Blue Sky Green Field, WI		Gruver et al. 2009	Dillon, CA		Chatfield et al. 2009
Diablo Winds, CA	WEST 2006	WEST 2008	Noble Ellensburg, NY (09)		Jain et al. 2010c
SMUD, CA		URS et al. 2005	Noble Ellensburg, NY (08)		Jain et al. 2009a
High Winds, CA	Kerlinger et al. 2005	Kerlinger et al. 2006	Noble Clinton, NY (08)		Jain et al. 2009b
Leaning Juniper, OR	Kronner et al. 2005	Gritski et al. 2008	Maple Ridge, NY (07)		Jain et al. 2008
Big Horn, WA	Johnson and Erickson 2004	Kronner et al. 2008	Noble Clinton, NY (09)		Jain et al. 2010b
Hopkins Ridge, WA	Young et al. 2003a	Young et al. 2007a	Noble Bliss, NY (08)		Jain et al. 2009c
Klondike II, OR	Johnson 2004	NWC and WEST 2007	Noble Bliss, NY (09)		Jain et al. 2010a
Stateline, OR/WA (02)	Erickson et al. 2002b	Erickson et al. 2004	Maple Ridge, NY (06)		Jain et al. 2007
Stateline, OR/WA (03)	Erickson et al. 2003b	Erickson et al. 2004	Buffalo Mountain, TN (06)		Fiedler et al. 2007
Wild Horse, CA	Erickson et al. 2003d	Erickson et al. 2008	Buffalo Mountain, TN (00-03)		Nicholson 2003, 2005
Klondike III, OR		Gritski et al. 2009	Mount Storm, WV (08)		Young et al. 2009
Zintel, WA	Erickson et al. 2002a	Erickson et al. 2008	Buffalo Gap, TX		Tierney 2007
Nine Canyon, WA	Erickson et al. 2001b	Erickson et al. 2003c	Summerview, Alb. (05/06)		Brown and Hamilton 2006
Marengo II, WA		URS Corporation 2010b	Judith Gap, MT		TRC 2008
Biglow Canyon I, WA (09)		Enk et al. 2010	Foote Creek Rim, WY (Phase I; 99)		Young et al. 2003c
Biglow Canyon I, WA (08)		Jeffrey et al. 2009	Foote Creek Rim, WY (Phase I; 00)		Young et al. 2003c
Combine Hills, OR	Young et al. 2003d	Young et al. 2006	Foote Creek Rim, WY (Phase I; 01/02)		Young et al. 2003c

Table 11. Comparison of seasonal raptor use at other wind-energy facilities in the Midwestern region to the California Ridge Wind Farm.

Site	Raptor Use (# raptors/20-min survey)				Reference
	Fall	Winter	Spring	Summer	
California Ridge, IL	0.20	0.15	0.18	-	This study
Buffalo Ridge, MN	0.78	0.22	0.64	0.60	Johnson et al. 2000a
Black Fork, OH	0.13	-	0.26	-	Ecology and Environment 2009
Grand Ridge, IL	0.20	0.10	0.32	-	Derby et al. 2009
Buckeye Wind, OH	0.11	-	0.20	-	Stantec 2009

Table 12. Avian mortality associated with other wind-energy facilities in the Midwestern region.

Location	Per Megawatt Mortality Estimates	Source
Top of Iowa, IA	0.7	Jain 2005
Buffalo Ridge, MN	3.4	Johnson et al. 2000a, 2002b
Crescent Ridge, IL	0.6	Kerlinger et al. 2007
Kewaunee County, WI	2.0	Howe et al. 2002
Cedar Ridge, WI	6.55	BHE Environmental 2009
Blue Sky Green Field, WI	7.17	Gruver et al. 2009
Mean	**3.5**	

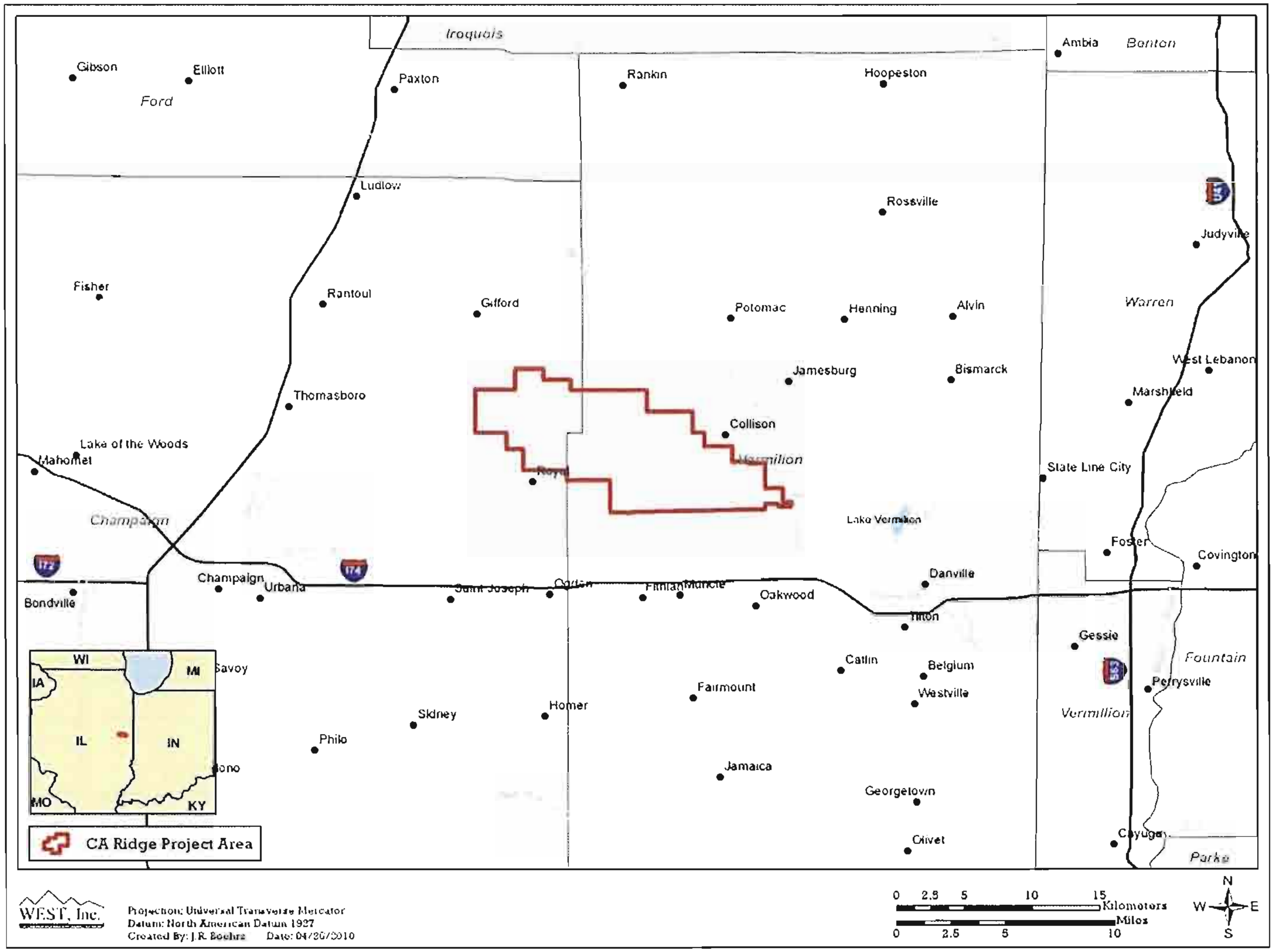


Figure 1. Location of the California Ridge Wind Farm.

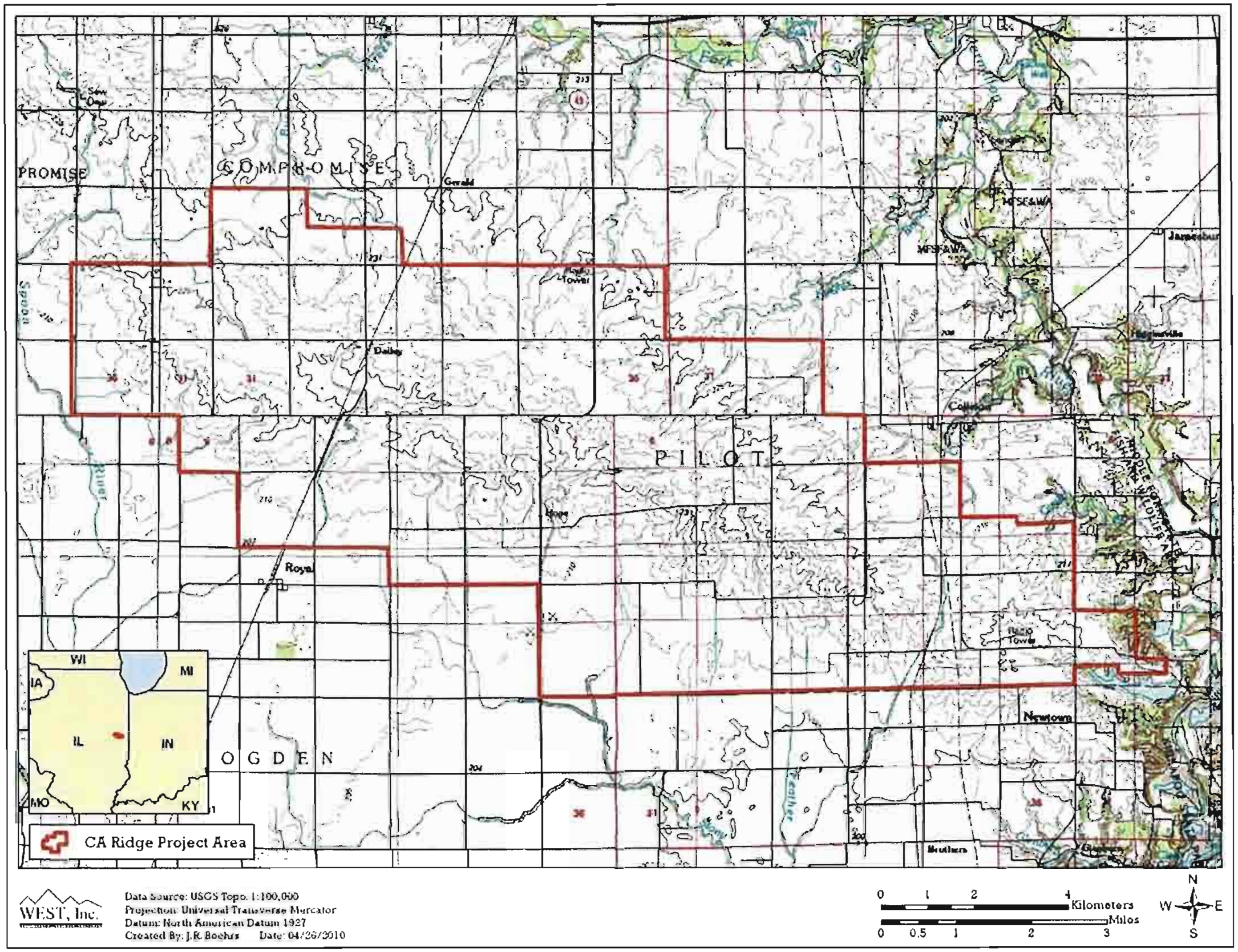


Figure 2. Overview of the California Ridge Wind Farm.

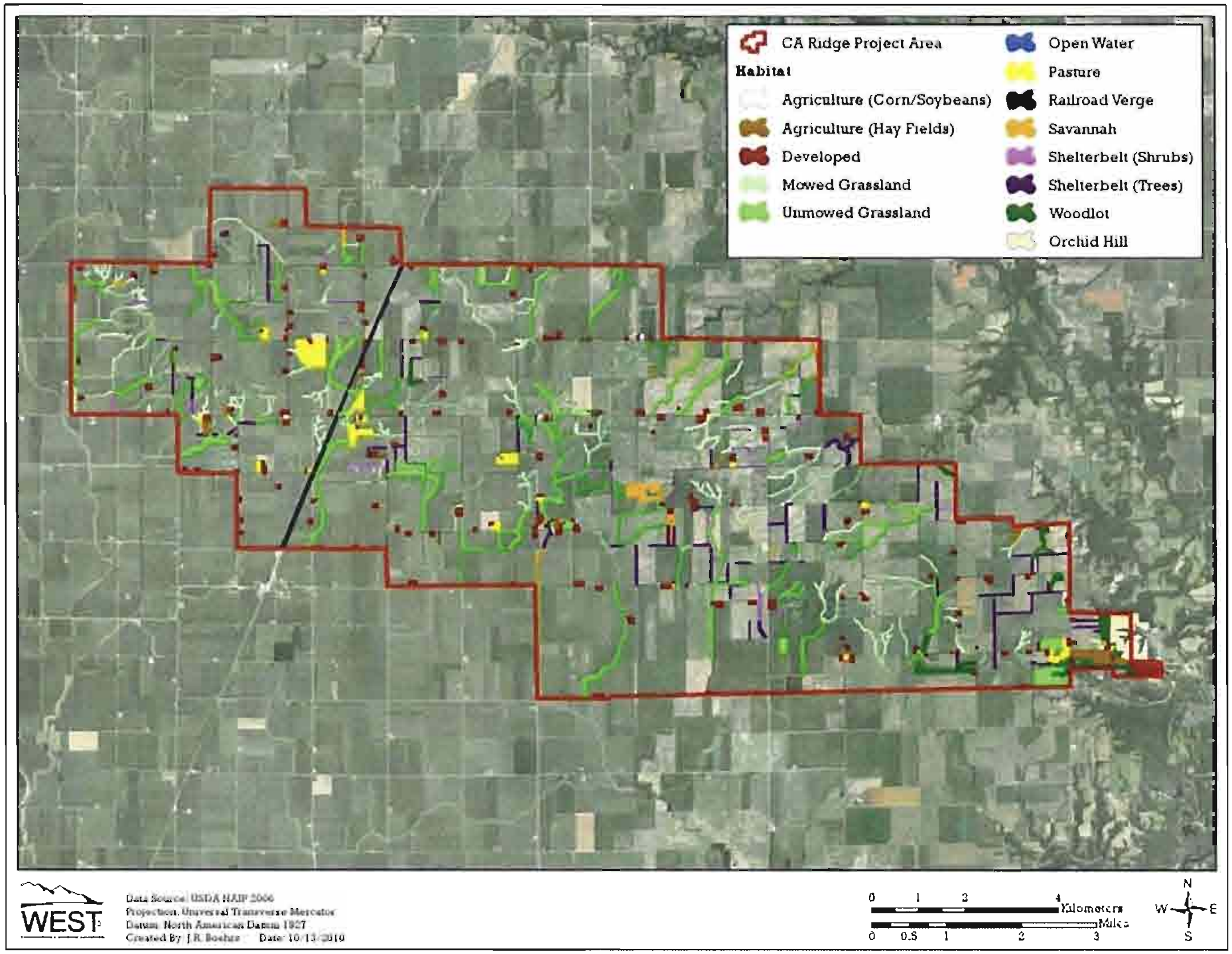


Figure 3. Habitat map of the California Ridge Wind Resource Area.

Figure 3. Habitat map of the California Ridge Wind Farm.

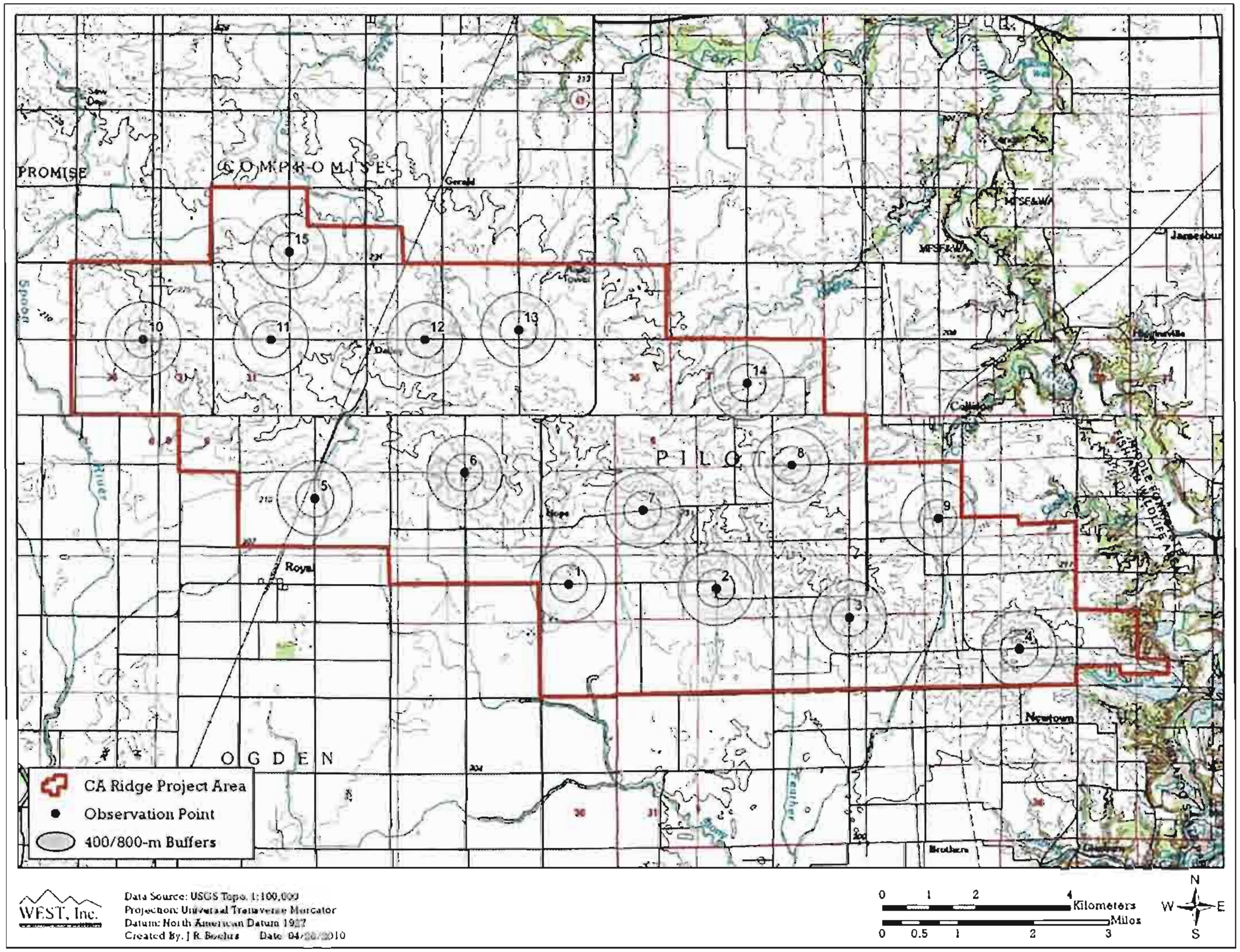
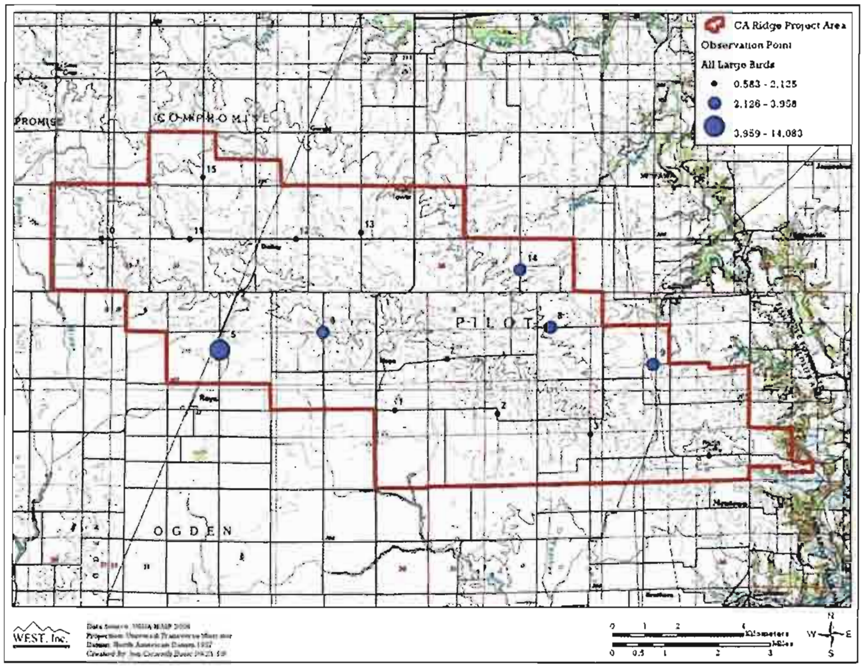


Figure 4. Fixed-point bird use survey points at the California Ridge Wind Farm.



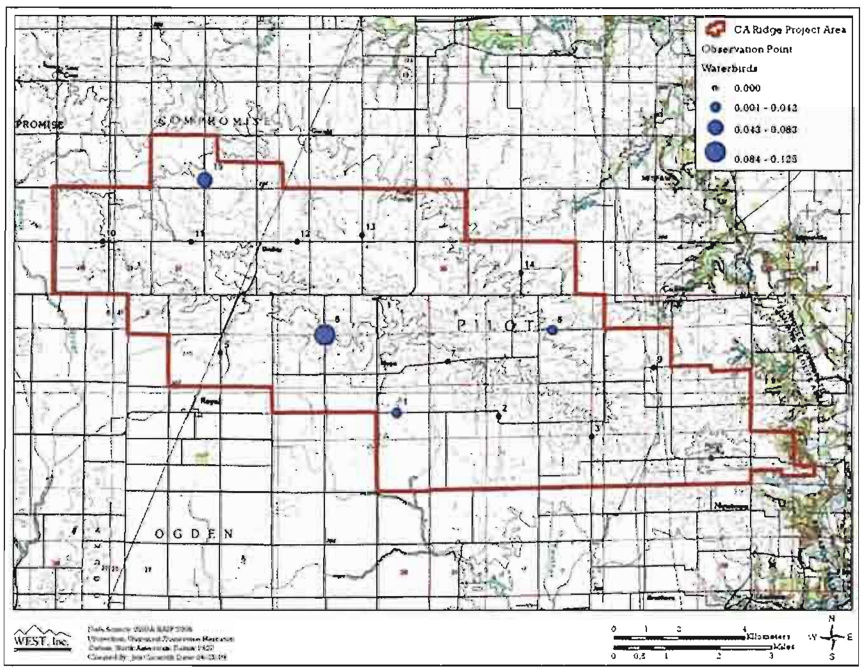
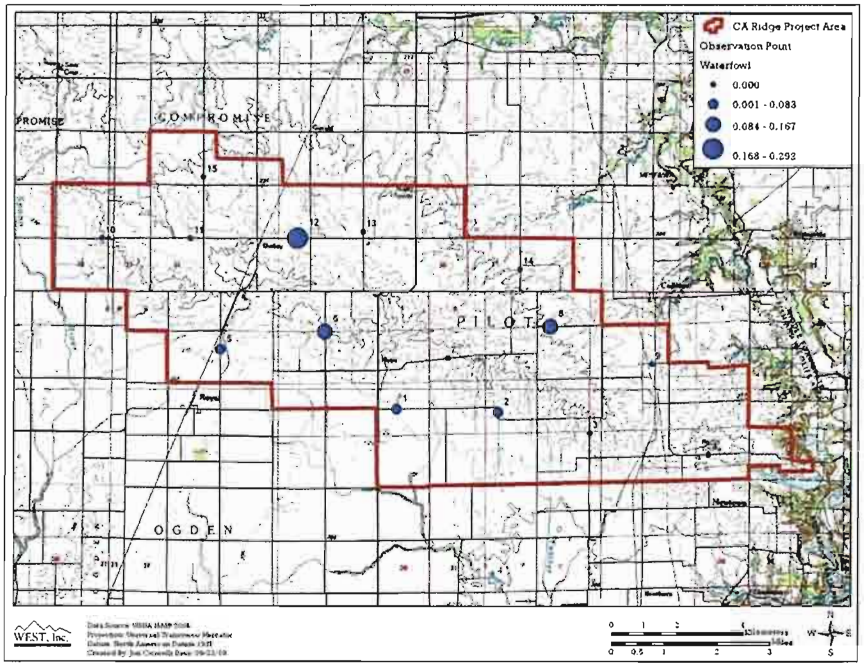


Figure 5. Mean use (number of birds/20-minute survey) at each fixed-point bird use survey point for all birds, major bird types, and raptor subtypes at the California Ridge Wind Farm.



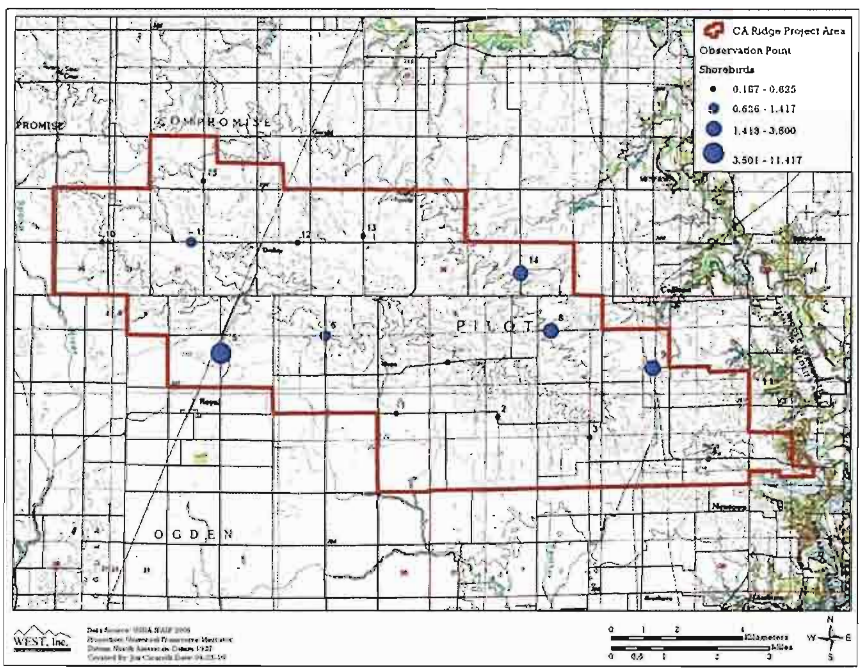
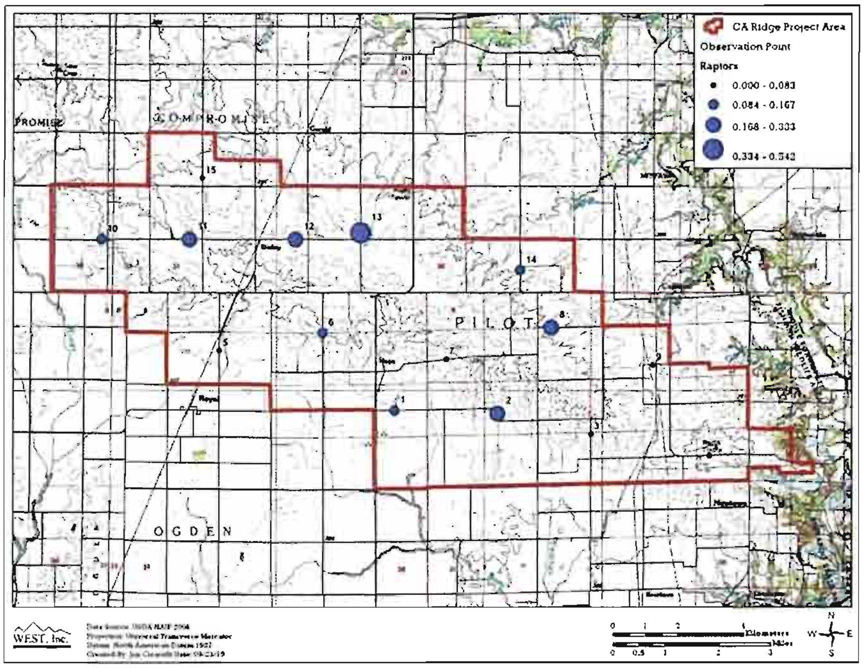


Figure 5 (*continued*). Mean use (number of birds/20-minute survey) at each fixed-point bird use survey point for all birds, major bird types, and raptor subtypes at the California Ridge Wind Farm.



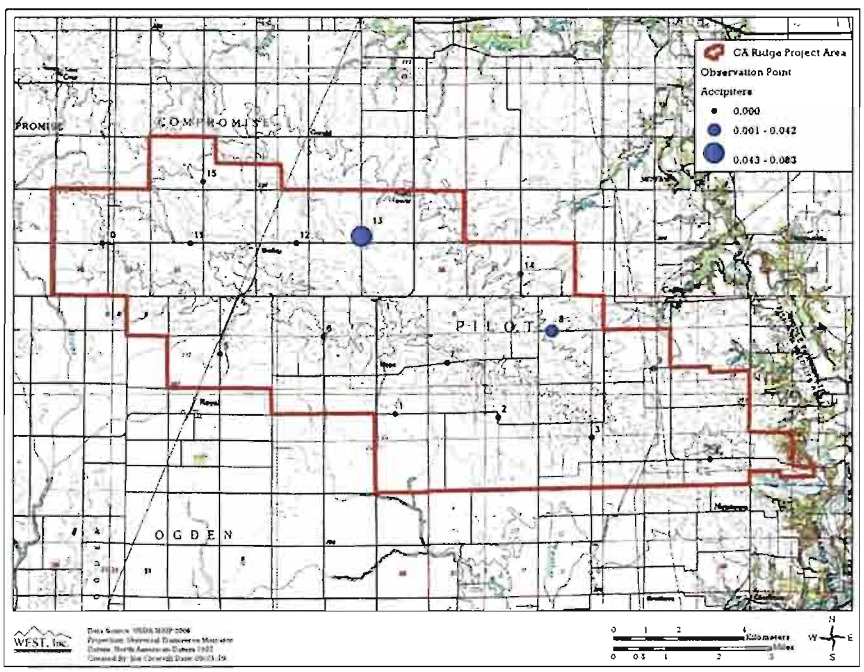


Figure 5 (*continued*). Mean use (number of birds/20-minute survey) at each fixed-point bird use survey point for all birds, major bird types, and raptor subtypes at the California Ridge Wind Farm.

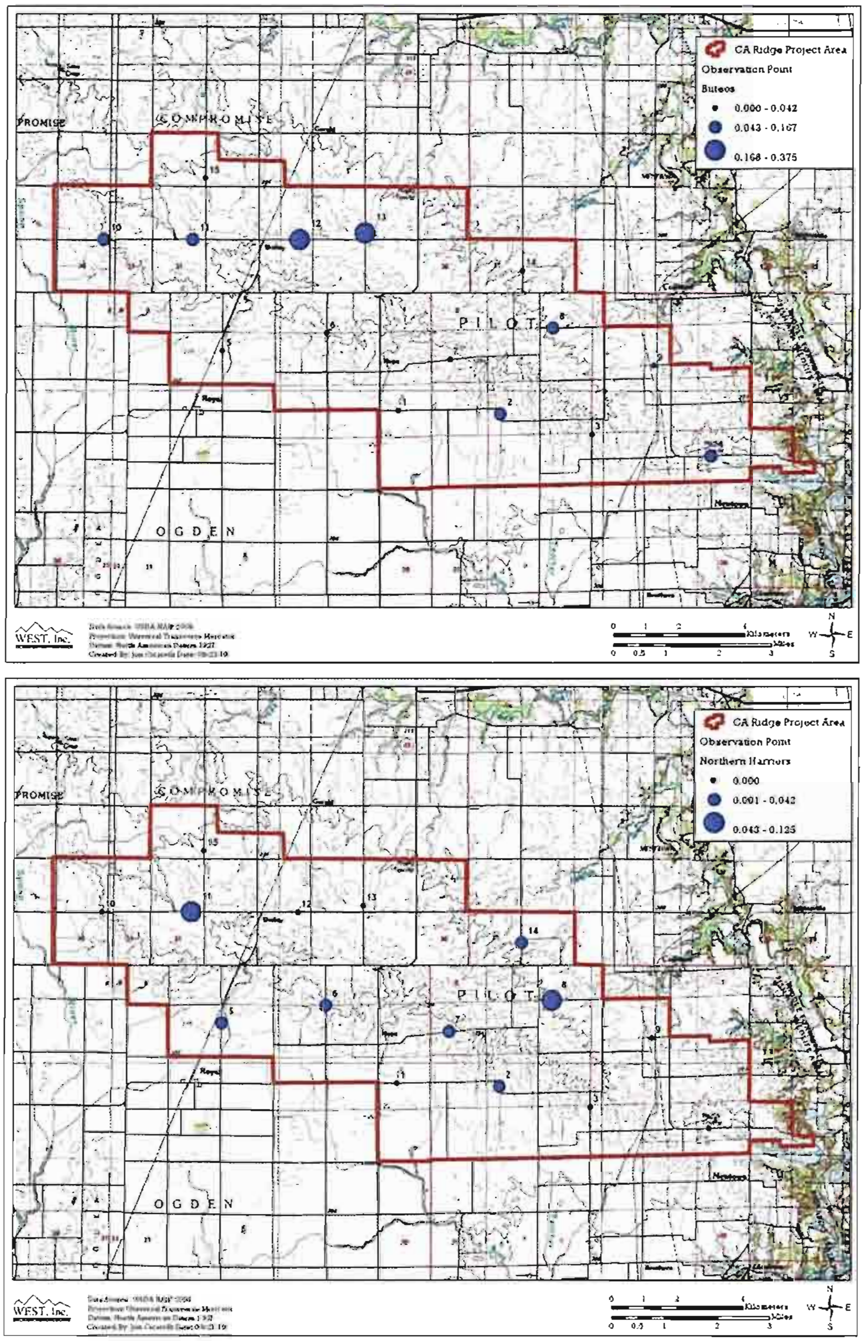
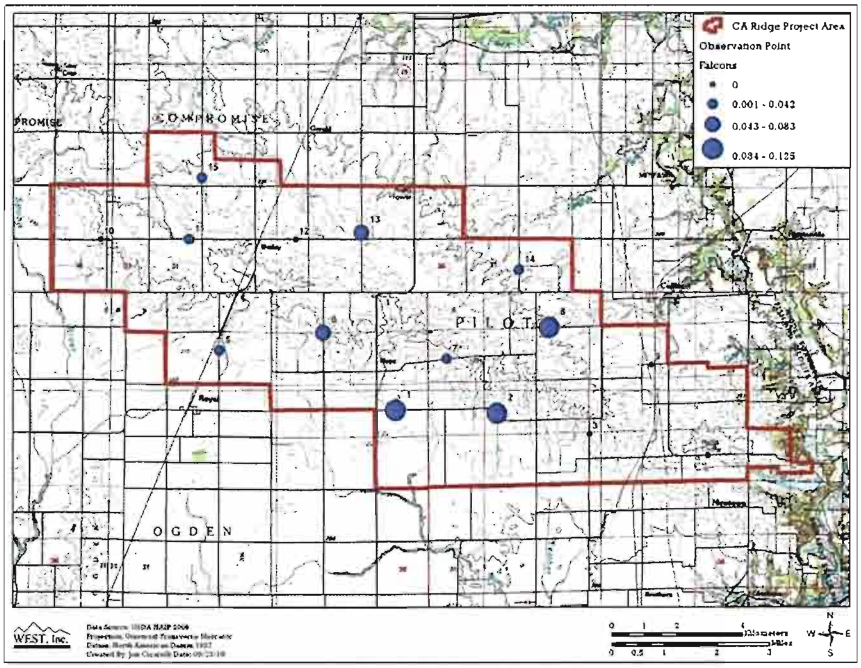


Figure 5 (*continued*). Mean use (number of birds/20-minute survey) at each fixed-point bird use survey point for all birds, major bird types, and raptor subtypes at the California Ridge Wind Farm.



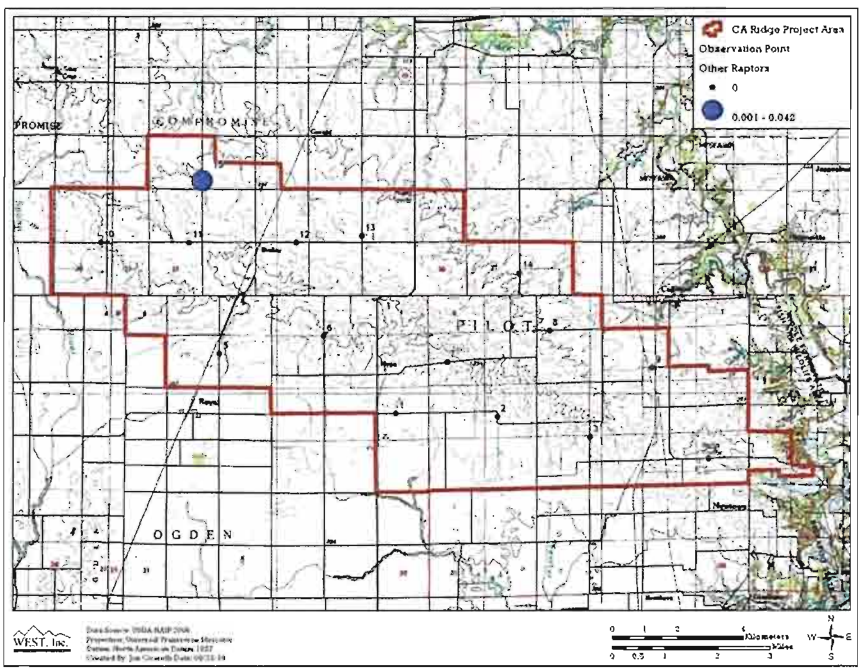
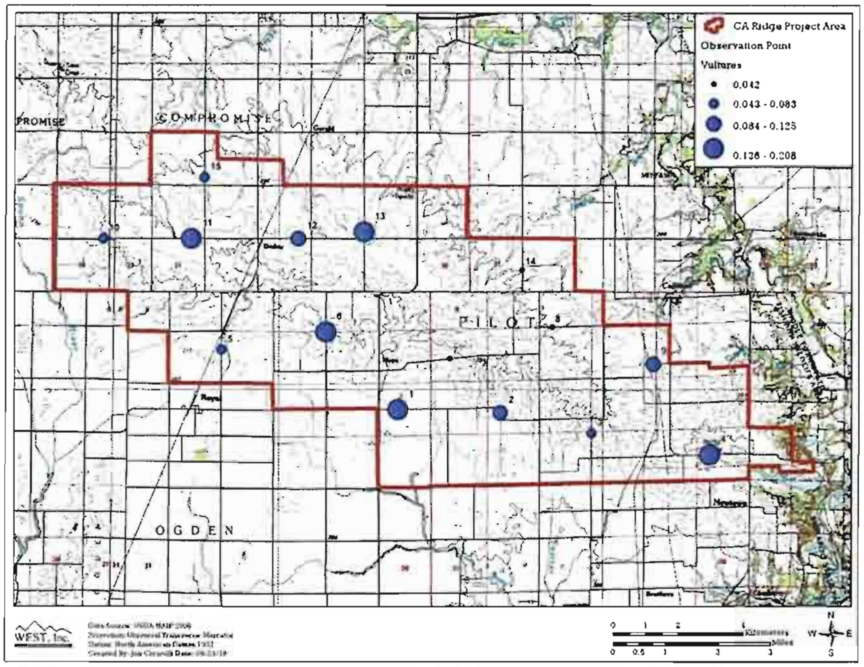


Figure 5 (*continued*). Mean use (number of birds/20-minute survey) at each fixed-point bird use survey point for all birds, major bird types, and raptor subtypes at the California Ridge Wind Farm.



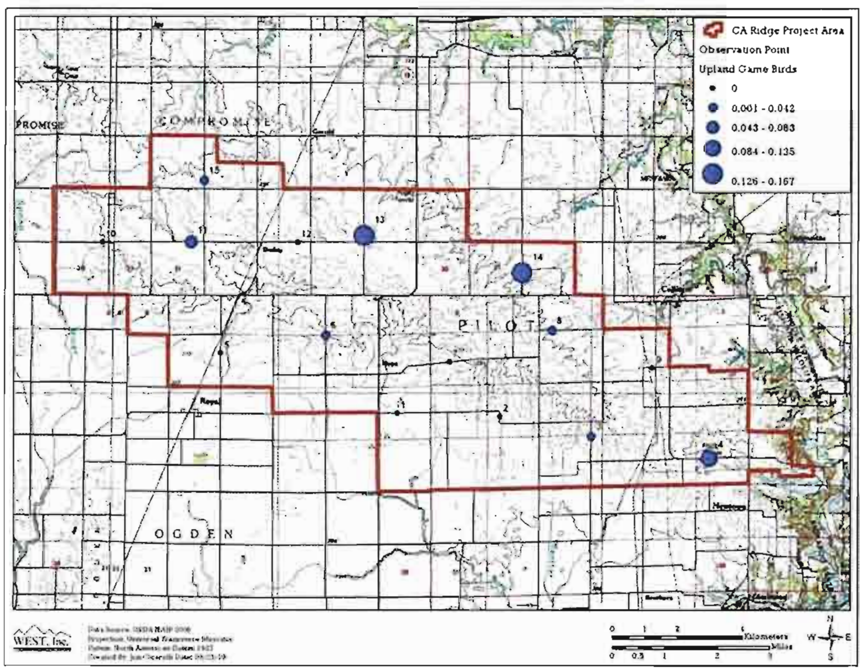


Figure 5 (*continued*). Mean use (number of birds/20-minute survey) at each fixed-point bird use survey point for all birds, major bird types, and raptor subtypes at the California Ridge Wind Farm.

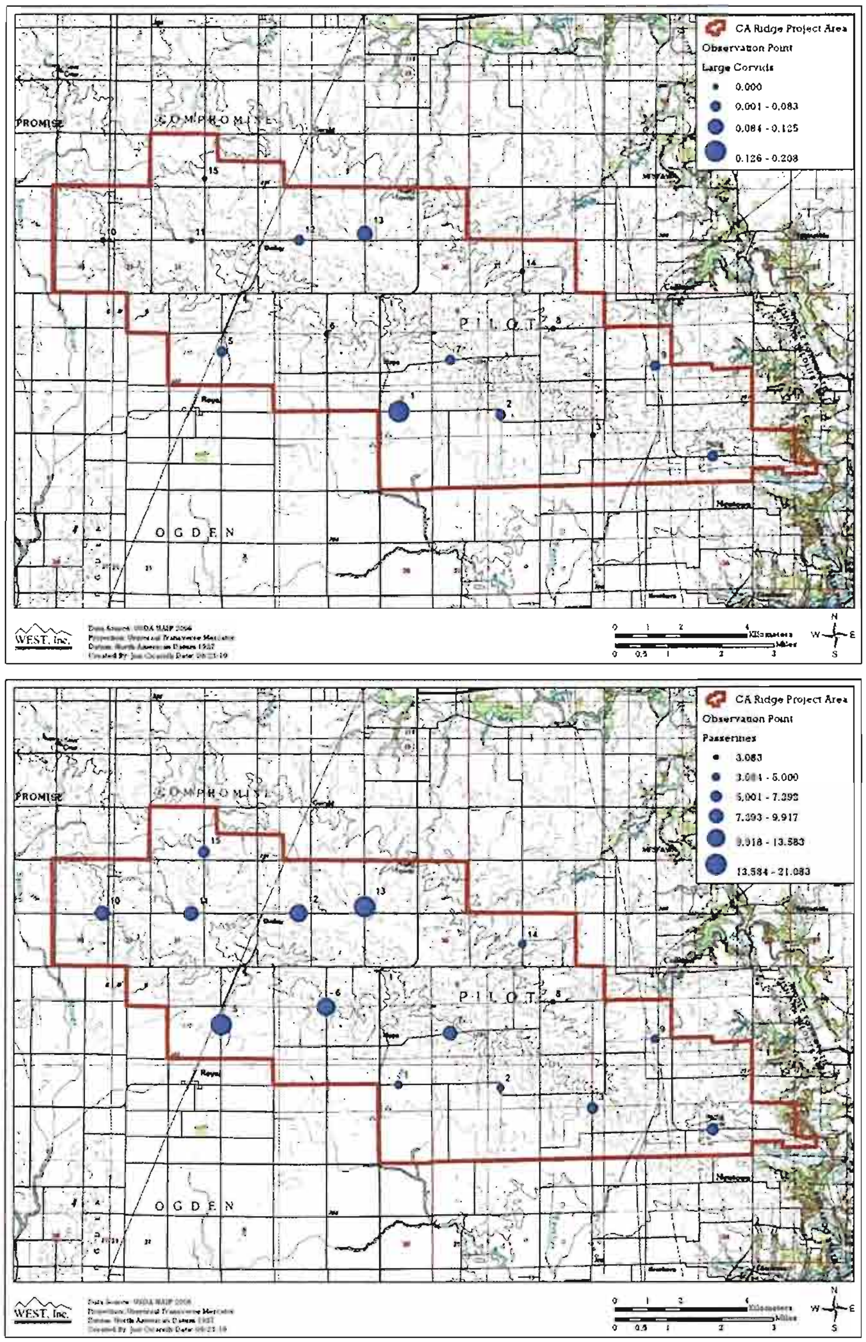


Figure 5 (*continued*). Mean use (number of birds/20-minute survey) at each fixed-point bird use survey point for all birds, major bird types, and raptor subtypes at the California Ridge Wind Farm. Observations of passerines and other small birds were focused within 100-meter viewsheds.

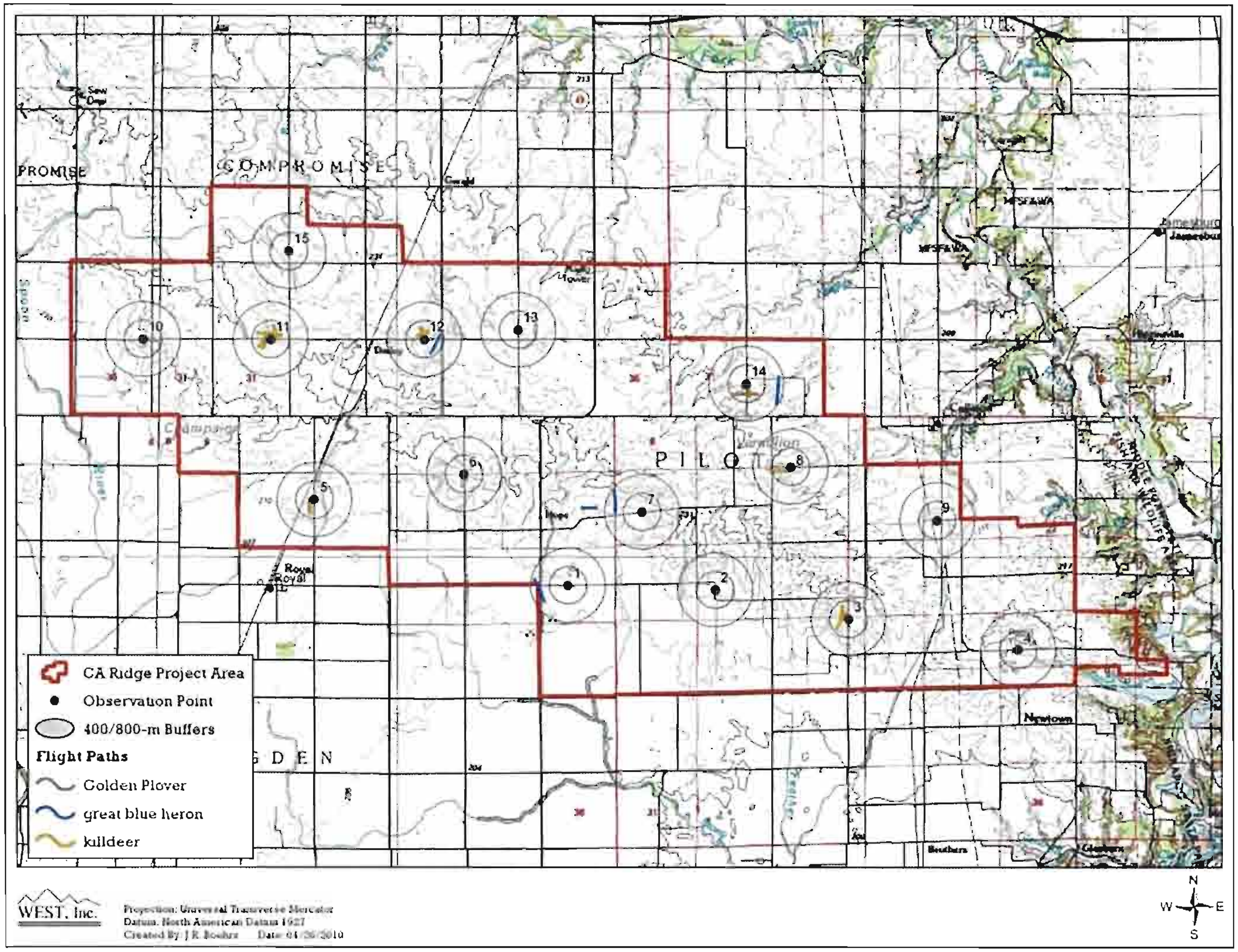


Figure 6a. Spatial use by flight paths of waterbirds and shorebirds at the California Ridge Wind Farm.

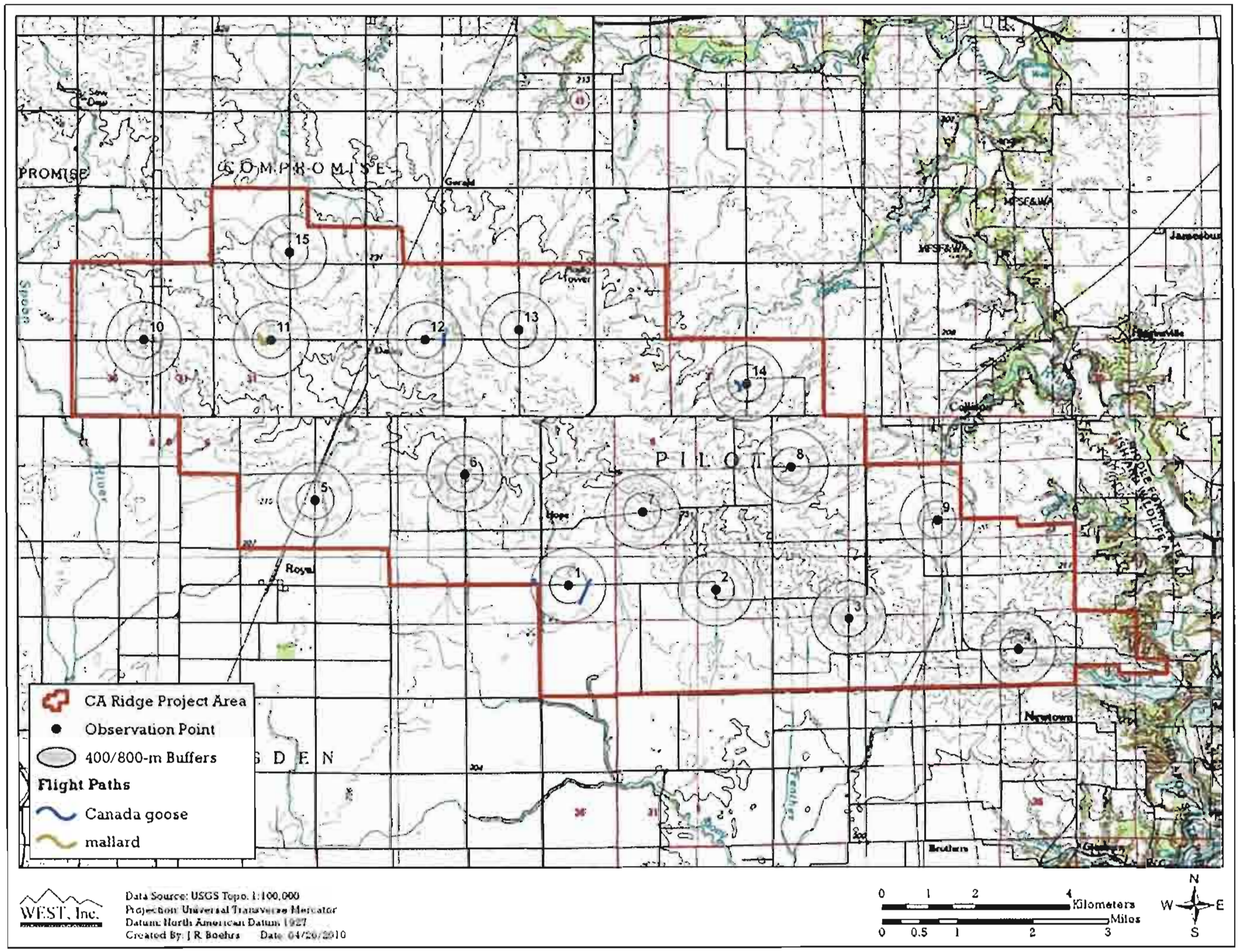


Figure 6b. Spatial use by flight paths of waterfowl at the California Ridge Wind Farm.

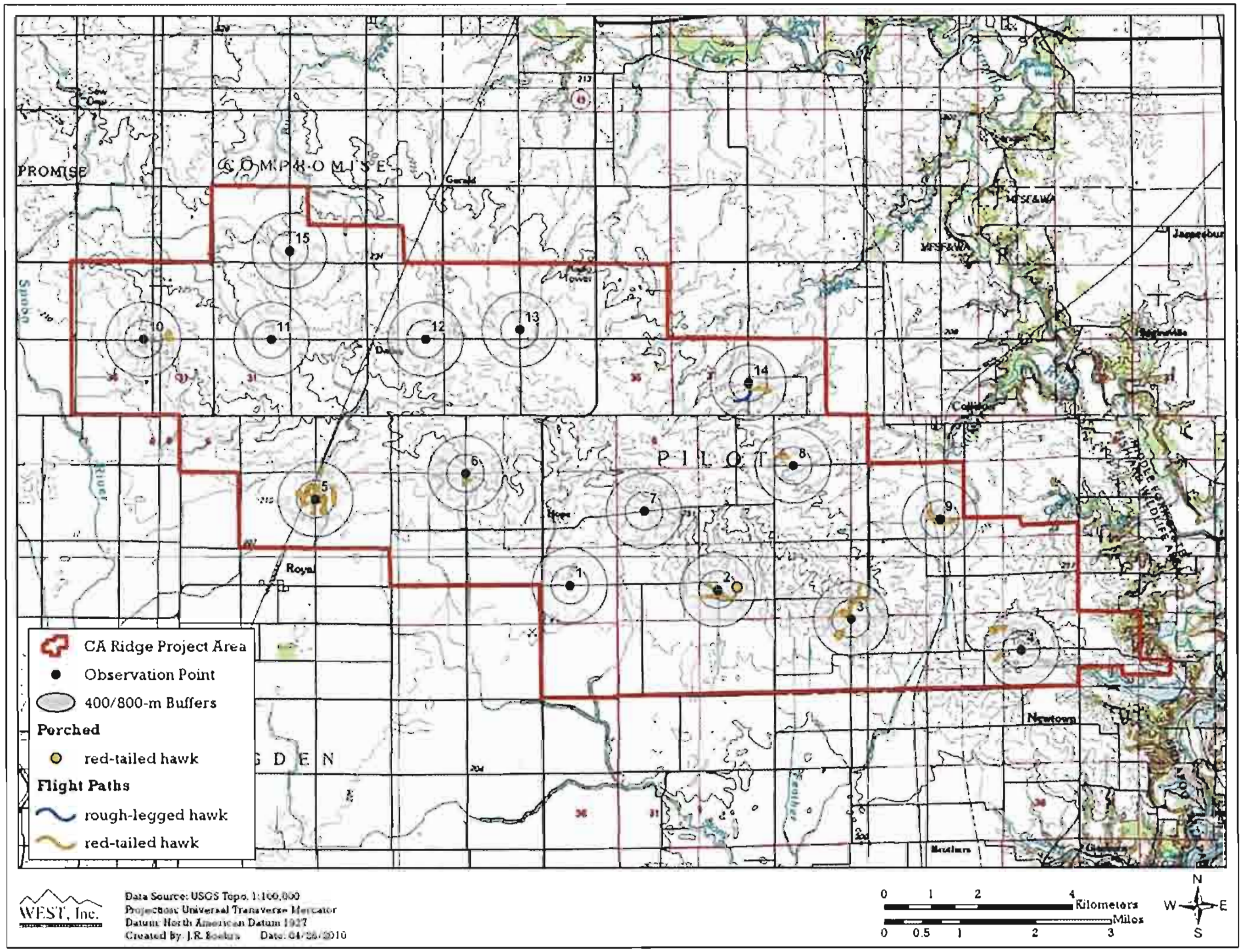


Figure 6c. Spatial use by flight paths of buteos at the California Ridge Wind Farm.

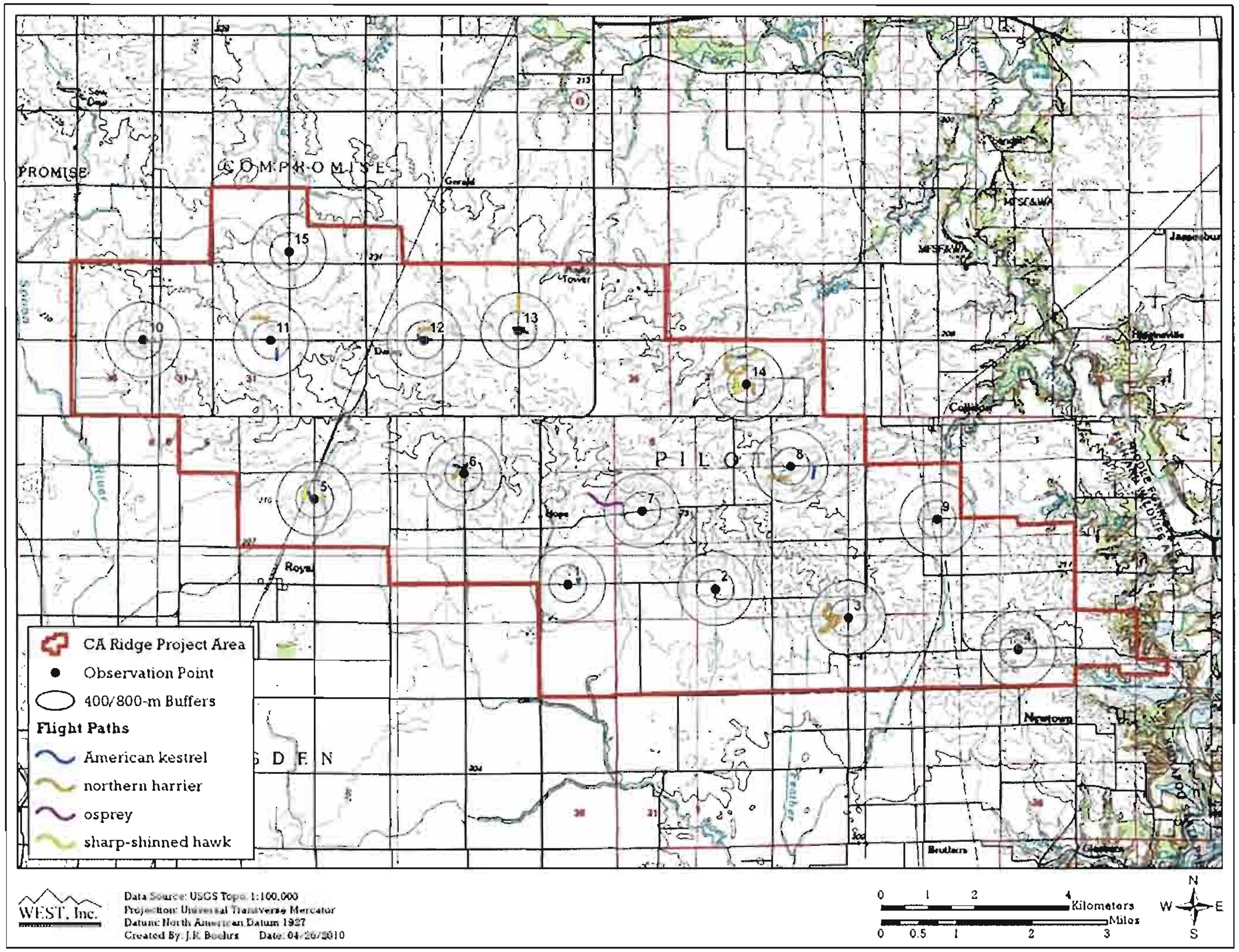


Figure 6d. Spatial use by flight paths of accipiters, falcons, harriers, and other raptor species at the California Ridge Wind Farm.

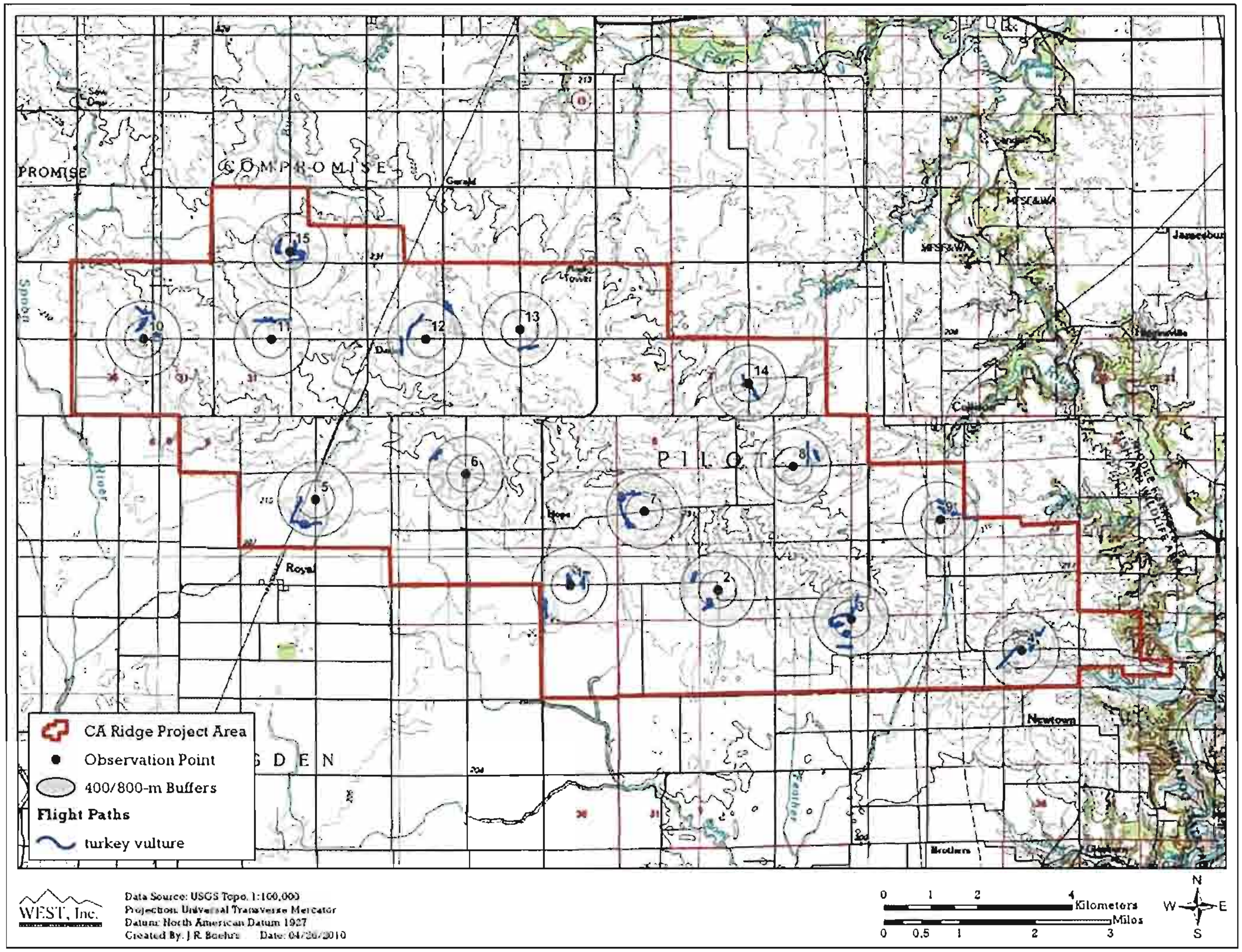
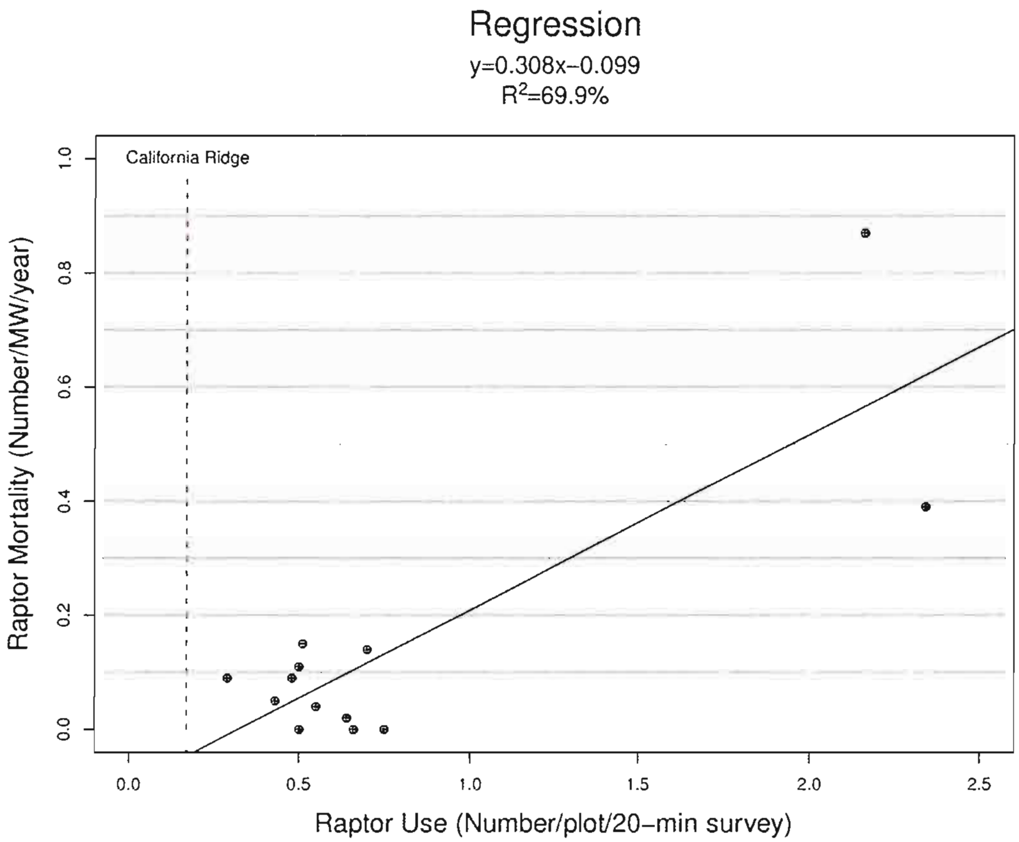


Figure 6e. Spatial use by flight paths of vultures at the California Ridge Wind Farm.



Overall Raptor Use 0.17
Predicted Fatality Rate 0 fatalities/MW/year
90.0% Prediction Interval (0, 0.22 fatalities/MW/year)

Figure 7. Regression analysis comparing raptor use estimations versus estimated raptor mortality.

Data from the following sources:

Study and Location	Raptor Use (birds/plot /20-min survey)	Source	Raptor Mortality (fatalities/MW/yr)	Source
Buffalo Ridge, MN	0.64	Erickson et al. 2002b	0.02	Erickson et al. 2002b
Combine Hills, OR	0.75	Young et al. 2003d	0.00	Young et al. 2006
Diablo Winds, CA	2.16	WEST 2006	0.87	WEST 2008
Foote Creek Rim, WY	0.55	Johnson et al. 2000b	0.04	Young et al. 2003c
High Winds, CA	2.34	Kerlinger et al. 2005	0.39	Kerlinger et al. 2006
Hopkins Ridge, WA	0.70	Young et al. 2003a	0.14	Young et al. 2007a
Klondike II, OR	0.50	Johnson 2004	0.11	NWC and WEST 2007
Klondike, OR	0.50	Johnson et al. 2002a	0.00	Johnson et al. 2003
Stateline, WA/OR	0.48	Erickson et al. 2004	0.09	Erickson et al. 2002b
Vansycle, OR	0.66	WCIA and WEST 1997	0.00	Erickson et al. 2000
Wild Horse, WA	0.29	Erickson et al. 2003d	0.09	Erickson et al. 2008
Zintel, WA	0.43	Erickson et al. 2002a	0.05	Erickson et al. 2002b
Bighorn, WA	0.51	Johnson and Erickson 2004	0.15	Kronner et al. 2008

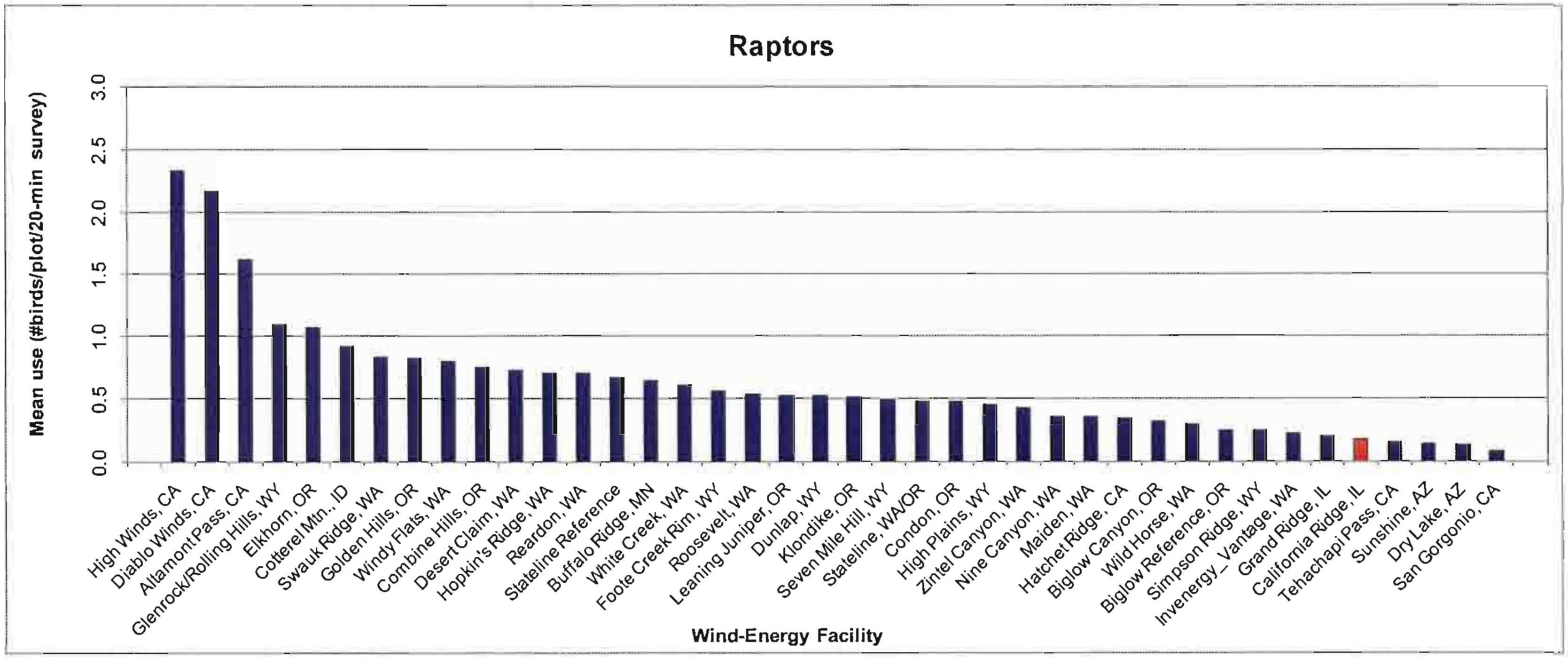


Figure 8. Comparison of annual raptor use between the California Ridge Wind Farm and other US wind-energy facilities.

Data from the following sources:

California Ridge, IL	This study.				
High Winds, CA	Kerlinger et al. 2005	Stateline Reference	URS et al. 2001	Nine Canyon, WA	Erickson et al. 2001b
Diablo Winds, CA	WEST 2006	Buffalo Ridge, MN	Erickson et al. 2002b	Maiden, WA	Erickson et al. 2002b
Altamont Pass, CA	Erickson et al. 2002b	White Creek, WA	NWC and WEST 2005	Hatchet Ridge, CA	Young et al. 2007b
Glenrock/Rolling Hills, WY	Johnson et al. 2008a	Foote Creek Rim, WY	Erickson et al. 2002b	Biglow Canyon, OR	WEST 2005c
Elkhorn, OR	WEST 2005a	Roosevelt, WA	NWC and WEST 2004	Wild Horse, WA	Erickson et al. 2003d
Cotterel Mtn., ID	BLM 2006	Leaning Juniper, OR	Kronner et al. 2005	Biglow Reference, OR	WEST 2005c
Swauk Ridge, WA	Erickson et al. 2003a	Dunlap, WY	Johnson et al. 2009a	Simpson Ridge, WY	Johnson et al. 2000b
Golden Hills, OR	Jeffrey et al. 2008	Klondike, OR	Johnson et al. 2002a	Invenergy_Vantage, WA	WEST 2007
Windy Flats, WA	Johnson et al. 2007	Seven Mile Hill, WY	Johnson et al. 2008b	Grand Ridge, IL	Derby et al. 2009
Combine Hills, OR	Young et al. 2003d	Stateline, WA/OR	Erickson et al. 2002b	Tehachapi Pass, CA	Erickson et al. 2002b
Desert Claim, WA	Young et al. 2003b	Condon, OR	Erickson et al. 2002b	Sunshine, AZ	WEST and the CPRS 2006
Hopkin's Ridge, WA	Young et al. 2003a	High Plains, WY	Johnson et al. 2009b	Dry Lake, AZ	Young et al. 2007c
Reardon, WA	WEST 2005b	Zintel Canyon, WA	Erickson et al. 2002a	San Gorgonio, CA	Erickson et al. 2002b

APPENDIX G

Shadow Flicker Assessment
California Ridge Wind Energy Project

Prepared for:

California Ridge Energy LLC

Invenergy

Prepared by:

HDR Engineering, Inc.
Minneapolis, Minnesota

June 2011

HDR

Introduction

California Ridge Energy LLC (California Ridge), a wholly owned subsidiary of Invenergy Wind LLC (together with its subsidiaries, Invenergy), contracted HDR to perform a shadow flicker analysis for the proposed California Ridge Wind Energy Project (Project) in Vermilion and Champaign counties, Illinois (Figure 1). Shadow flicker caused by wind turbines is commonly defined as alternating changes in light intensity at a given stationary location, or receptor, such as the window of a home. The analysis assessed the potential impact of shadow flicker 134 wind turbine generators (WTGs) on 333 receptors. All receptors chosen for this analysis are residential homes. In selecting residential homes as receptors, the analysis attempts to capture those stationary locations where people are most likely to exist over the course of a year. A widely accepted shadow flicker model, WindPro (Version 2.7.486, January 2011), was employed to estimate the maximum and predicted number of hours per year that shadows would be cast upon these receptors.

Background

Shadow flicker caused by WTGs is defined as alternating changes in light intensity caused by moving rotor blades at a given stationary location, or receptor, such as the window of a home. In order for shadow flicker to occur, three conditions must be met: 1) the sun must be shining with no clouds obscuring the sun; 2) the rotor blades must be spinning and be located between the receptor and the sun; and 3) the receptor must be sufficiently close to the turbine to be able to distinguish a shadow created by the turbine. Shadow flicker intensity and frequency of occurrence at a given receptor are determined by such factors as the sun angle and sun path, turbine and receptor locations, cloud cover and degree of visibility, wind direction, wind speed, nearby obstacles, and local topography.

Shadow flicker may be analytically modeled, using geometry and site-specific data to estimate the number of hours per year that flickering shadows may be cast upon a given receptor. The movement of the sun over the year is simulated and assessed at one-minute intervals to calculate the potential frequency of shadows at receptors in the Project area. The model predicts shadow results, where historical sunshine probability and wind direction data representative of the Project site are incorporated in the assumptions. However, even these predicted shadow scenarios may produce higher shadow flicker values than one would experience at the receptors as the scenarios do not account for the numerous factors that can influence the intensity of shadow flicker, but instead report only the potential occurrence of flicker. For example, these results do not consider the potential screening effect of nearby vegetation or buildings.

In the United States, there are no federal standards related to shadow flicker. Some states and counties require that an applicant provide an analysis of shadow flicker when applying for permits but, in Illinois, specific numerical thresholds have not been set at the state level, as of this report. No specific shadow flicker requirements appear in zoning ordinances for Vermilion County. Champaign County Ordinance No. 848 has two Standard Conditions related to shadow flicker as follows:

1) The Applicant shall submit the results of a study on potential shadow flicker. The shadow flicker study shall identify the locations of both summer and winter shadow flicker that may be caused by the project with an expected duration of 30 hours or more per year.
2) Shadow flicker that exceeds the above standards shall be mitigated by any means such as landscaping, awnings, or fencing.

Invenergy has initiated this analysis as part of its development of the Project and this analysis serves to comply with the first condition listed above. As shown in the Results section, no receptors are predicted to experience shadow flicker durations which exceed those listed above. As a result, the June, 2011 layout complies with the Champaign County Ordinance.

Shadow Flicker Model

The WindPro software package was employed to document the flickering effects of the Project and has been widely accepted in the review of other wind energy projects. By simulating the sun path throughout a whole year, the software calculates the number of hours per year as well as maximum minutes per day during which a given receptor could realistically expect to be exposed to shadow flicker from nearby WTGs. To calculate the actual expected shadow model results, the following inputs were required:

- **Location of WTGs and receptors:** The location of potential WTGs and receptor data was provided by Invenergy (Figures 2 and 3). All proposed WTGs are located in Vermilion and Champaign counties in Illinois. Only potential receptors within 2 kilometers (6,562 meters) of a turbine were considered. All positions were referenced to the Universal Transverse Mercator (UTM), North American Datum 1983 (NAD 83), Zone 16 coordinate system.
- **Topography:** Elevations for WTGs and receptors were derived from digital elevation model (DEM) data from the United States Department of Agriculture/Natural Resource Conservation Service (USDA/NRCS) – National Cartography & Geospatial Center. ArcGIS was used to convert the 30-meter DEM data into 3-meter contours used in the model. WindPro accounts for terrain elevation differences when calculating shadow paths.
- **Turbine Type:** For the purposes of this analysis, the GE 1.6-100 turbine model was used. This unit has a hub height of 328.1 feet (100 meters) and a rotor diameter of 328.1 feet (100 meters).
- **Sunshine Probability:** NOAA's National Climatic Data Center provided the average percent of possible sunshine. This is the total time that sunshine reaches the surface of the earth and is expressed as the percentage of the maximum amount possible from sunrise to sunset with clear sky conditions[1]. This data represents the average percent of possible sunshine (averaged over 52 years through 2009) of a nearby station (approximately 92 miles from the Project) in Peoria, IL (Table 1).

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1 NOAA's National Climatic Data. [Online] URL: http://www.ncdc.noaa.gov/oa/climate/online/ccd/pctpos.txt. (Accessed May 2011).

- **Wind Direction:** Wind rose data calculated from onsite wind data was provided by Invenergy. Onsite, measured wind data was analyzed to calculate the percent of annual hours of operation for each wind-direction sector (Table 2). The data assumes a cut-in speed of 3.5 m/s and a cut-out speed of 25 m/s. Although the WTGs will not operate all of the time, the model assumes that they will.

Table 1. Sunshine Probability in Peoria, Illinois

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
47%	50%	51%	55%	60%	67%	69%	67%	64%	61%	43%	42%

Table 2. Operational Time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW
6.7%	6.6%	6.4%	5.7%	5.1%	7.8%	14.4%	12.2%	8.4%	8.0%	9.4%	9.4%

All receptors included in the analysis were defined as 1 square meter (10.76 square feet) windows located 1 meter above the ground surface. Each receptor was modeled in "Green House" mode, so that windows are not assumed to face any particular direction but rather face perpendicular to all WTGs. The model applied a minimum sun angle of three degrees to account for the diffusion of light through the atmosphere at lower angles on the horizon. At angles less than three degrees above the horizon, this diffusion of light is sufficient to prevent the formation of a distinct shadow. The height above ground ("eye height") for observers was set at 1.5 meters (5 feet).

Results

Using the 134 potential WTGs and 333 receptors in the Project area, a shadow flicker analysis was completed. The predicted annual shadow flicker hours for each receptor is presented in Appendix A of this document and a summary is provided in Table 3. Figure 3 shows the predicted shadow flicker per year for the receptors included in the analysis.

Table 3. Summary of Predicted Shadow Hours at Receptor Locations

Predicted Shadow Hours Per Year (cumulative)	Number of Receptors	Percentage (%)
0 Hours	112	33.63%
0.01-10 Hours	128	38.44%
10.01-20 Hours	66	19.82%
20.01-30 Hours	27	8.11%
>30 Hours	0	0.00%

A review of the predicted times of shadow flicker over the course of the year in the Project area (Appendix B) indicates that some of the shadow flicker at individual receptors is predicted to occur during working hours (defined as 8 a.m. through 5 p.m.). If residents are not at their homes during these (or other) hours when shadow flicker is occurring, the actual experienced shadow flicker hours will be reduced. In addition, the model does not account for mitigation provided by nearby vegetation or degree of visibility. The model also does not account for specific window locations, but rather, assumes the receptor can be impacted from any direction. Finally, the model assumes WTGs operate 100 percent of the time. If, during a time of potential shadow flicker, wind speeds are outside the range of WTG operation, or if a given WTG is down for maintenance reasons, the shadow flicker hours will be reduced from those predicted here. For this model run, the June, 2011 layout complies with the Champaign County Ordinance

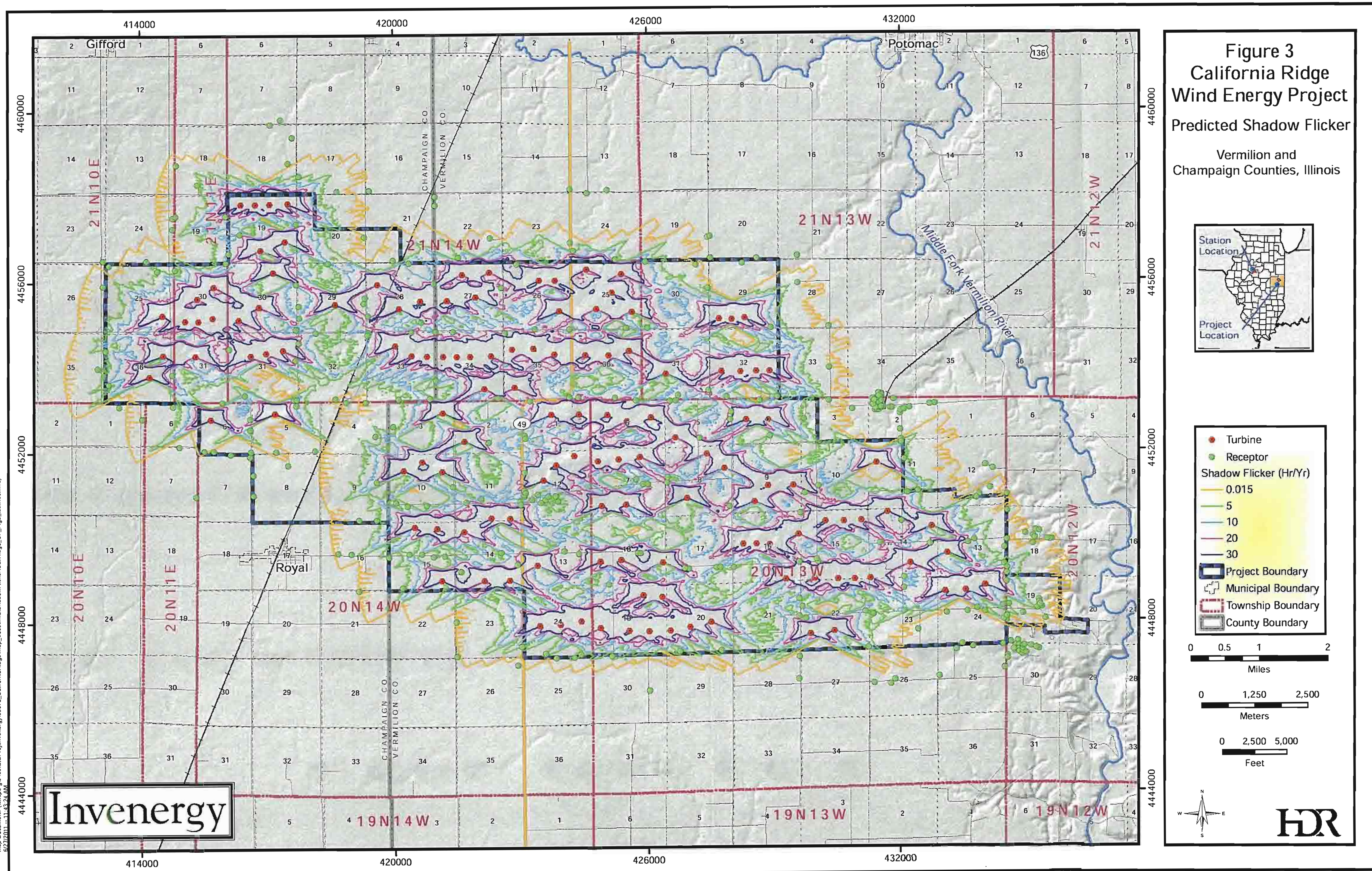
Conclusions

The predicted hours of shadow flicker per year were calculated for 333 receptors within the Project area of the California Ridge Wind Energy Project in Vermilion and Champaign counties in Illinois. The results of the shadow flicker modeling show that the impacts on nearby receptors are predicted to be minor. For a one year period:

- 112 of the 333 receptors (33.63 percent) are predicted to experience no shadow flicker
- 128 receptors (38.44 percent) are predicted to experience between 0.01 and 10 hours of shadow flicker
- 66 receptors (19.82 percent) are predicted to experience between 10.01 and 20 hours of shadow flicker
- 27 receptors (8.11 percent) are predicted to experience between 20.01 and 30 hours of shadow flicker
- No receptors are predicted to experience more than 30 hours per year.

For some receptors, shadow flicker is predicted to occur during working hours when some residents would not be as likely to be at home. It should also be noted that the shadow flicker modeling software package employs several conservative assumptions. The model assumed that all receptors had a direct in-line view of incoming shadow flicker ("Green House" mode) when, in reality, windows will not always be facing the sun when shadow flicker is predicted to occur. The model did not consider the effects of screening (e.g. trees, buildings), degree of visibility, and factors affecting operations that will influence shadow frequency or intensity. As a result, the actual impact of the shadow flicker on the receptors will likely be less than suggested by these results and so shadow flicker is not expected to be a significant environmental concern for the Project.

FIGURES



Source: ISGS, USGS, ESRI

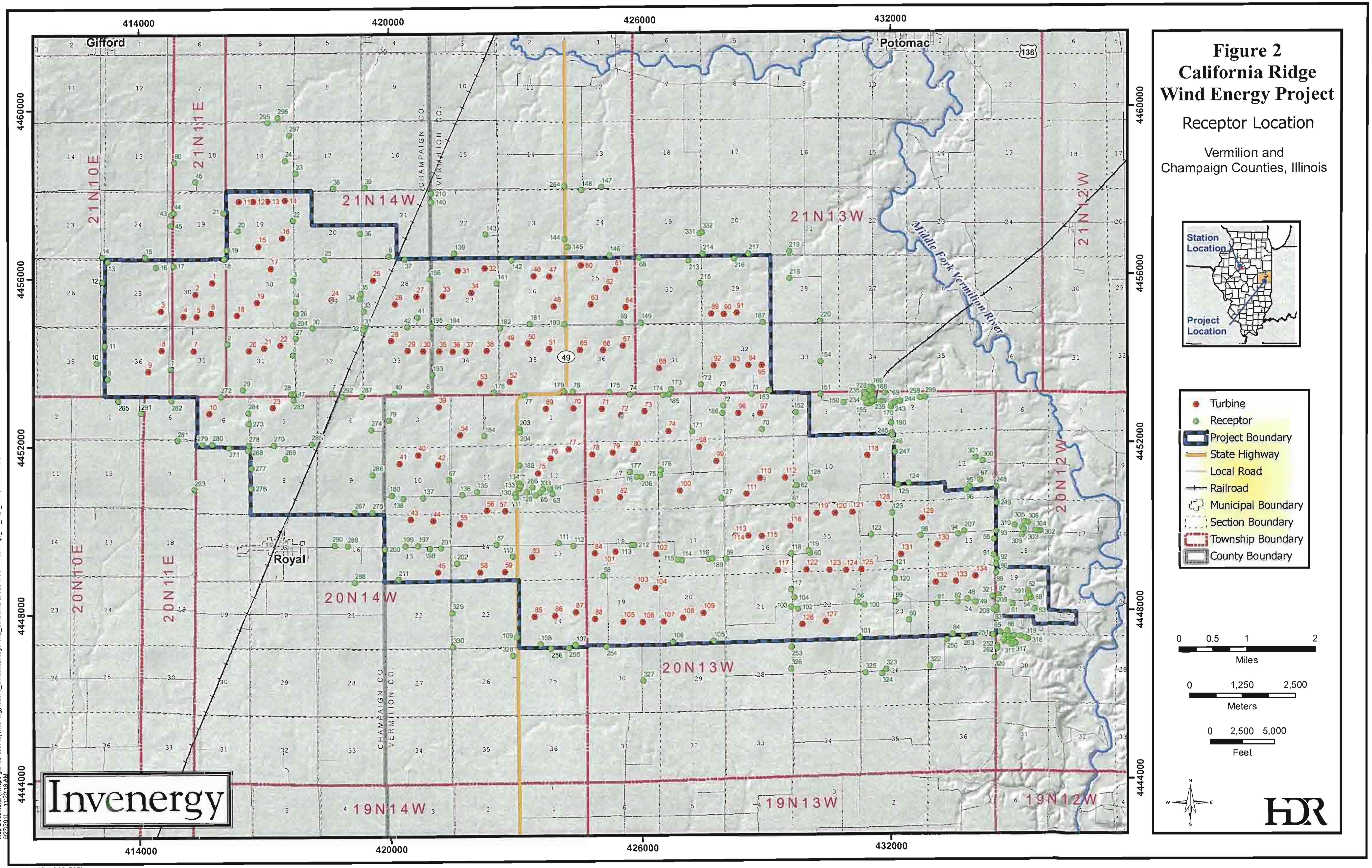


Figure 2
California Ridge Wind Energy Project
Receptor Location
Vermilion and Champaign Counties, Illinois
Station Location
Project Location
Turbine
Receptor
Project Boundary
State Highway
Local Road
Railroad
Municipal Boundary
Section Boundary
Township Boundary
County Boundary
Miles
Meters
Feet
Gifford
Potomac
Royal
Middle Fork Vermilion River
21N10E
21N11E
21N14W
21N13W
21N12W
20N10E
20N11E
20N14W
20N13W
20N12W
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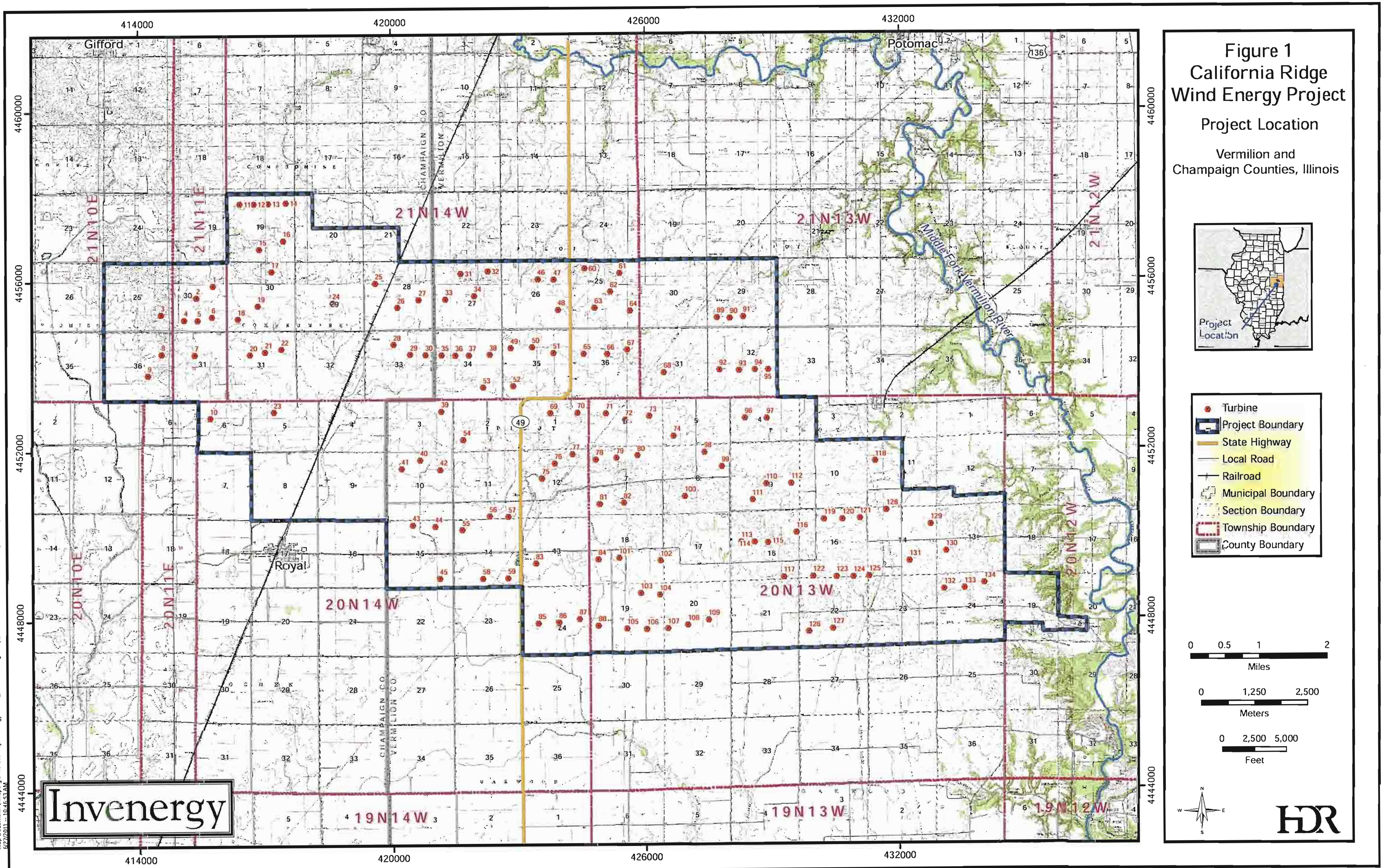
CHAMPAIGN CO.
VERMILION CO.
Invenergy
HDR
Source: ISGS, USGS, ESRI



Source: ISGS, USGS, ESRI

APPENDICES

APPENDIX A

MAXIMUM AND PREDICTED ANNUAL SHADOW HOURS FOR RECEPTORS

California Ridge Wind Energy Project Shadow Flicker Impact by Receptor

Receptor No.	Receptor Location (UTM NAD83 Zone 16)[a]		Elevation	Shadow Hours per year	Shadow Days per year	Max Shadow Hours per day	Shadow Hours per year
	X - Coordinate	Y - Coordinate	[m]	[HH:MM/year][b] (Worst Case)	[days/year][c] (Worst Case)	(HH:MM/yr)[d] (Worst Case)	(HH:MM/yr)[e] (Predicted)
001	414,760.99	4,453,833.83	215	31:25	72	0:42	10:53
002	416,116.49	4,454,430.07	229.8	67:22	126	1:21	23:07
003	417,686.28	4,455,941.11	230.7	50:44	158	0:34	17:31
004	417,747.91	4,455,430.53	235.5	26:51	94	0:37	9:23
005	417,675.02	4,454,159.99	228.6	32:01	84	0:34	11:48
006	419,991.06	4,456,502.28	228.7	10:54	53	0:21	3:07
007	418,610.67	4,453,248.31	227.9	2:53	20	0:13	0:55
008	420,864.11	4,453,246.51	225.6	64:07	103	0:54	18:56
009	413,250.96	4,453,608.97	207.4	16:50	73	0:24	6:17
010	412,990.88	4,453,986.03	207.3	8:52	44	0:19	3:03
011	413,183.96	4,454,404.49	208.9	14:28	63	0:20	4:26
012	413,124.50	4,455,915.66	220.4	3:39	24	0:14	1:03
013	413,257.84	4,456,398.98	219.3	0:00	0	0:00	0:00
014	413,123.27	4,456,508.40	216.6	0:00	0	0:00	0:00
015	414,153.86	4,456,500.33	221.6	12:13	61	0:17	3:33
016	414,418.83	4,456,264.43	221.9	23:20	91	0:22	6:50
017	414,833.29	4,456,298.84	222.5	10:21	35	0:24	3:19
018	416,032.86	4,456,452.85	223.9	34:54	113	0:28	13:03
019	416,108.42	4,456,671.58	223.2	31:20	78	0:42	10:57
020	416,369.30	4,457,126.04	222.5	59:35	120	0:40	17:32
021	416,031.47	4,457,553.39	224.9	57:12	158	0:33	21:37
022	417,689.57	4,457,359.91	225	49:02	156	0:25	17:12
023	417,755.41	4,458,486.97	221.9	19:44	93	0:21	5:22
024	417,497.83	4,458,792.47	219.5	0:00	0	0:00	0:00
025	418,443.21	4,456,437.51	228.6	33:48	165	0:22	12:39
026	417,755.64	4,455,153.06	236	41:04	138	0:28	15:34

Receptor No.	Receptor Location (UTM NAD83 Zone 16)[a]		Elevation	Shadow Hours per year	Shadow Days per year	Max Shadow Hours per day	Shadow Hours per year
	X - Coordinate	Y - Coordinate	[m]	[HH:MM/year][b] (Worst Case)	[days/year][c] (Worst Case)	(HH:MM/yr)[d] (Worst Case)	(HH:MM/yr)[e] (Predicted)
027	417,745.83	4,454,562.27	231.6	75:40	106	1:27	24:52
028	417,633.78	4,453,239.06	228.6	60:21	95	0:44	16:26
029	416,481.59	4,453,338.46	225.8	44:46	99	0:41	12:30
030	418,149.35	4,454,802.02	234.2	32:42	132	0:34	10:20
031	419,402.93	4,454,808.94	228.6	31:37	68	0:48	10:03
032	419,374.77	4,454,750.84	228.5	29:19	68	0:43	9:42
033	419,384.89	4,455,199.25	232.3	55:35	152	0:57	20:16
034	419,287.36	4,455,491.97	234.7	35:05	69	0:47	12:12
035	419,318.45	4,455,622.42	233.8	34:05	77	0:47	11:21
036	419,309.40	4,457,050.27	226.1	2:45	35	0:08	1:02
037	420,373.28	4,456,428.50	228.6	36:02	128	0:27	10:15
038	418,654.19	4,458,127.72	224.9	7:55	34	0:21	2:33
039	419,426.42	4,458,139.31	223.2	1:01	12	0:07	0:20
040	420,120.01	4,453,239.80	222.5	12:20	65	0:22	3:56
041	420,668.61	4,455,044.96	234.7	13:37	143	0:35	12:00
042	420,428.29	4,454,816.95	237.7	102:46	180	1:15	29:07
043	414,782.31	4,457,516.42	219.5	3:30	26	0:12	1:14
044	414,850.02	4,457,554.18	219.9	3:52	27	0:13	1:22
045	414,775.80	4,457,251.46	219.5	3:13	24	0:12	1:12
046	415,364.40	4,458,295.66	231.6	12:18	59	0:21	3:56
047	417,694.56	4,453,235.93	228.6	45:38	96	0:40	12:36
048	433,842.56	4,448,269.75	228	16:51	47	0:27	7:12
049	434,026.78	4,448,199.60	223.7	19:47	59	0:24	8:22
050	432,435.40	4,447,772.22	219.5	0:40	11	0:05	0:13
051	434,929.12	4,448,152.32	220.7	7:29	48	0:16	2:54
052	435,306.56	4,448,460.13	214.5	8:07	47	0:18	2:58
053	435,454.51	4,448,027.28	216.4	4:05	37	0:09	1:45
054	435,263.73	4,448,279.68	218	11:46	64	0:18	4:39

Receptor No.	Receptor Location (UTM NAD83 Zone 16)[a]		Elevation	Shadow Hours per year	Shadow Days per year	Max Shadow Hours per day	Shadow Hours per year
	X - Coordinate	Y - Coordinate	[m]	[HH:MM/year][b] (Worst Case)	[days/year][c] (Worst Case)	(HH:MM/yr)[d] (Worst Case)	(HH:MM/yr)[e] (Predicted)
055	434,469.81	4,449,696.69	216.3	10:07	66	0:17	3:11
056	431,186.78	4,448,205.38	211.9	28:07	103	0:28	8:02
057	422,547.62	4,449,621.28	209.2	27:03	122	0:26	9:54
058	425,084.71	4,448,860.44	204.2	33:04	141	0:39	11:19
059	428,057.44	4,449,252.60	216.4	17:54	117	0:18	6:35
060	430,068.16	4,449,376.04	228.6	85:56	200	0:49	25:59
061	429,644.07	4,450,522.33	224.6	61:16	175	0:51	19:39
062	429,753.14	4,450,990.56	223.2	43:35	169	0:26	14:01
063	423,892.78	4,450,818.37	216.4	17:29	72	0:26	5:51
064	423,830.54	4,450,941.26	218.5	18:08	89	0:20	5:37
065	423,596.31	4,450,855.90	220.5	23:46	119	0:26	7:15
066	423,486.69	4,450,784.10	217.4	27:20	92	0:29	8:14
067	421,404.53	4,451,175.94	216.4	17:05	89	0:19	5:34
068	425,959.20	4,456,432.51	219.5	30:16	77	0:37	9:21
069	425,504.55	4,454,883.98	225.6	23:44	106	0:22	6:48
070	428,916.93	4,452,328.97	219.5	18:39	77	0:19	5:10
071	428,675.35	4,453,172.93	219.5	0:00	0	0:00	0:00
072	427,992.04	4,452,895.56	222.5	76:00	122	1:08	25:43
073	427,887.38	4,453,251.11	219.9	18:32	101	0:22	5:51
074	425,728.21	4,453,176.72	231.7	49:13	121	0:38	14:27
075	426,452.35	4,451,244.66	234.3	86:08	209	0:54	27:21
076	425,892.95	4,451,209.84	231.6	42:16	169	0:30	15:42
077	423,230.71	4,453,173.47	230.5	60:50	148	0:45	18:56
078	424,373.54	4,453,250.09	237.7	63:25	125	1:09	18:16
079	419,986.90	4,452,596.31	225.6	10:04	50	0:20	3:32
080	414,862.24	4,458,760.06	226.8	2:56	27	0:10	0:50
081	433,112.13	4,448,165.90	224.9	1:30	22	0:06	0:36
082	433,606.59	4,448,196.20	225.6	0:00	0	0:00	0:00

Receptor No.	Receptor Location (UTM NAD83 Zone 16)[a]		Elevation	Shadow Hours per year	Shadow Days per year	Max Shadow Hours per day	Shadow Hours per year
	X - Coordinate	Y - Coordinate	[m]	[HH:MM/year][b] (Worst Case)	[days/year][c] (Worst Case)	(HH:MM/yr)[d] (Worst Case)	(HH:MM/yr)[e] (Predicted)
083	434,532.04	4,447,990.35	222.6	6:46	43	0:14	2:47
084	433,481.98	4,447,434.56	222.9	0:00	0	0:00	0:00
085	434,636.66	4,447,479.45	216	0:00	0	0:00	0:00
086	434,800.92	4,447,504.06	210.3	0:00	0	0:00	0:00
087	434,588.76	4,448,358.62	225.6	13:54	58	0:22	5:16
088	435,376.10	4,448,298.69	215.5	8:03	51	0:16	3:07
089	434,529.42	4,448,891.18	222.5	48:36	122	0:45	16:54
090	434,529.31	4,449,092.74	220.4	52:25	102	1:02	16:12
091	434,467.31	4,449,317.87	219.4	34:28	167	0:23	10:27
092	434,537.36	4,449,220.54	220	62:36	141	0:46	17:30
093	434,531.23	4,449,876.58	215.3	5:11	36	0:15	1:44
094	433,619.00	4,449,814.34	213.4	65:04	138	0:56	23:22
095	433,892.90	4,450,946.46	206.6	13:27	62	0:19	3:38
096	433,813.00	4,450,856.72	207.3	11:56	52	0:20	3:16
097	434,139.65	4,451,097.38	202.1	8:29	57	0:15	2:17
098	432,721.46	4,449,780.27	218.2	87:48	171	0:52	27:04
099	432,107.18	4,448,211.55	219.4	30:07	109	0:32	11:56
100	431,372.91	4,448,135.92	210.3	16:22	67	0:25	5:17
101	431,258.21	4,447,366.97	211.5	31:39	91	0:28	13:01
102	429,776.26	4,448,048.89	216.4	19:28	46	0:32	6:24
103	429,614.67	4,448,093.86	211.2	16:02	74	0:26	5:36
104	429,688.84	4,448,317.84	214.7	36:21	134	0:27	11:41
105	427,753.31	4,447,302.23	203.6	9:18	54	0:17	3:36
106	426,756.94	4,447,285.80	204.2	9:49	55	0:18	3:52
107	424,422.56	4,447,220.04	201.2	18:29	81	0:20	7:21
108	423,593.99	4,447,242.05	201.2	13:43	65	0:17	5:30
109	423,024.58	4,447,410.24	201.9	8:56	65	0:15	3:24
110	422,930.10	4,449,335.73	207.3	57:53	122	0:54	19:37

Receptor No.	Receptor Location (UTM NAD83 Zone 16)[a]		Elevation	Shadow Hours per year	Shadow Days per year	Max Shadow Hours per day	Shadow Hours per year
	X - Coordinate	Y - Coordinate	[m]	[HH:MM/year][b] (Worst Case)	[days/year][c] (Worst Case)	(HH:MM/yr)[d] (Worst Case)	(HH:MM/yr)[e] (Predicted)
111	424,033.57	4,449,649.03	208.2	44:27	133	0:35	13:51
112	424,383.12	4,449,577.13	206.9	63:40	175	1:06	21:51
113	425,759.65	4,449,593.22	213.4	87:16	74	1:47	28:54
114	426,972.60	4,449,223.12	210.7	56:18	175	0:43	20:24
115	426,875.00	4,449,231.92	210.8	78:13	182	0:56	27:58
116	427,639.28	4,449,247.71	215.4	22:25	131	0:18	7:55
117	429,618.12	4,448,507.92	216.4	22:02	93	0:22	8:39
118	429,614.34	4,449,363.33	226.1	87:13	218	1:09	27:49
119	430,035.81	4,449,436.64	228.6	74:31	181	0:44	22:10
120	432,101.16	4,448,751.57	216.4	41:27	150	0:32	14:58
121	432,109.07	4,449,000.82	215.5	29:21	99	0:29	10:05
122	431,529.56	4,449,810.97	216.4	49:37	171	0:38	15:52
123	432,038.97	4,450,325.45	214	42:53	129	0:32	13:56
124	432,430.35	4,451,035.96	213.4	36:49	107	0:29	10:00
125	432,184.58	4,450,988.51	213.4	35:15	102	0:34	9:26
126	430,076.79	4,451,149.49	221.3	44:51	160	0:38	15:37
127	427,952.93	4,450,684.30	230.7	56:14	129	0:57	20:53
128	423,282.85	4,450,858.76	213.4	45:32	121	0:37	12:38
129	423,095.44	4,450,942.93	216.7	34:19	131	0:34	10:03
130	422,997.01	4,450,820.41	216.4	26:31	89	0:37	7:36
131	423,012.50	4,450,746.38	216.4	61:27	124	0:52	17:36
132	423,089.88	4,450,977.99	217.1	34:04	111	0:33	9:44
133	423,089.71	4,451,043.80	218	23:07	85	0:29	6:36
134	423,090.98	4,451,077.99	218.5	26:43	121	0:26	9:10
135	422,077.12	4,450,878.26	219.5	54:44	160	0:48	16:10
136	421,726.62	4,450,805.10	216.4	54:50	189	0:45	17:28
137	420,790.10	4,450,741.23	211.1	24:08	85	0:24	7:01
138	420,330.99	4,450,726.95	210.4	31:36	89	0:29	8:59

Receptor No.	Receptor Location (UTM NAD83 Zone 16)[a]		Elevation	Shadow Hours per year	Shadow Days per year	Max Shadow Hours per day	Shadow Hours per year
	X - Coordinate	Y - Coordinate	[m]	[HH:MM/year][b] (Worst Case)	[days/year][c] (Worst Case)	(HH:MM/yr)[d] (Worst Case)	(HH:MM/yr)[e] (Predicted)
139	421,548.56	4,456,561.34	230.2	18:24	60	0:30	5:47
140	421,002.00	4,457,790.31	225.3	0:00	0	0:00	0:00
141	422,567.73	4,455,842.67	231.6	61:23	158	0:47	21:20
142	422,924.21	4,456,394.99	228.4	92:15	179	0:47	27:46
143	422,303.58	4,457,008.24	224.7	4:24	45	0:10	1:15
144	424,190.03	4,456,886.90	220.4	7:46	41	0:18	2:14
145	424,267.81	4,456,699.53	222.5	10:22	51	0:19	2:54
146	425,253.91	4,456,489.63	225.3	20:37	48	0:40	6:40
147	425,065.38	4,458,118.93	216.4	0:00	0	0:00	0:00
148	424,590.67	4,458,051.86	215.7	0:00	0	0:00	0:00
149	425,996.85	4,454,882.50	225.1	32:26	132	0:23	9:50
150	430,875.41	4,452,962.85	215.7	0:00	0	0:00	0:00
151	430,320.35	4,453,160.79	214.1	15:57	107	0:14	6:19
152	429,731.11	4,452,729.36	216.4	12:58	35	0:31	4:31
153	429,094.60	4,453,253.23	218.1	35:15	112	0:28	10:34
154	430,324.04	4,453,937.86	216.4	3:32	20	0:15	1:12
155	431,416.02	4,452,927.24	213.4	0:00	0	0:00	0:00
156	431,463.89	4,452,928.30	213.4	0:00	0	0:00	0:00
157	431,505.74	4,452,930.50	213.4	0:00	0	0:00	0:00
158	431,567.29	4,452,976.33	213.4	0:00	0	0:00	0:00
159	431,499.02	4,452,989.73	213.4	0:00	0	0:00	0:00
160	431,463.47	4,452,994.11	213.4	0:00	0	0:00	0:00
161	431,425.40	4,452,995.74	213.4	0:00	0	0:00	0:00
162	431,514.09	4,453,043.13	213.4	0:00	0	0:00	0:00
163	431,419.62	4,453,051.79	213.4	0:00	0	0:00	0:00
164	431,356.14	4,453,091.84	213.4	0:00	0	0:00	0:00
165	431,396.65	4,453,193.01	213.3	0:00	0	0:00	0:00
166	431,561.96	4,453,314.80	211.4	0:00	0	0:00	0:00

Receptor No.	Receptor Location (UTM NAD83 Zone 16)[a]		Elevation	Shadow Hours per year	Shadow Days per year	Max Shadow Hours per day	Shadow Hours per year
	X - Coordinate	Y - Coordinate	[m]	[HH:MM/year][b] (Worst Case)	[days/year][c] (Worst Case)	(HH:MM/yr)[d] (Worst Case)	(HH:MM/yr)[e] (Predicted)
167	431,500.48	4,453,315.86	211.9	0:00	0	0:00	0:00
168	431,564.43	4,453,284.88	211.4	0:00	0	0:00	0:00
169	431,859.52	4,453,182.04	210.1	0:00	0	0:00	0:00
170	432,006.35	4,452,853.55	203.3	0:00	0	0:00	0:00
171	427,229.32	4,452,286.35	228.6	61:14	194	0:40	22:15
172	427,446.38	4,453,403.63	222.5	52:02	154	0:40	17:44
173	426,724.56	4,453,300.60	228.6	45:41	194	0:30	14:02
174	426,528.64	4,453,165.11	228.6	62:36	171	0:42	17:37
175	425,232.14	4,453,244.87	232.8	50:45	200	0:46	16:38
176	426,472.16	4,451,373.67	234.7	29:17	146	0:19	9:25
177	425,733.65	4,451,328.66	228.6	50:07	176	0:25	18:20
178	422,487.78	4,453,247.19	234.8	9:25	40	0:27	3:05
179	424,160.94	4,453,262.29	237.7	44:02	125	0:37	12:48
180	420,052.88	4,450,805.53	210.3	14:20	69	0:22	4:09
181	423,354.93	4,454,869.82	235.6	57:27	206	0:34	17:24
182	422,642.09	4,454,776.72	235.2	74:18	209	1:00	22:40
183	424,176.38	4,454,865.03	228.8	44:41	149	0:30	13:17
184	422,261.14	4,452,205.02	233	50:43	187	0:40	17:10
185	426,665.03	4,453,168.30	228.6	52:20	174	0:35	15:09
186	427,971.12	4,452,723.48	222.5	78:25	111	1:11	28:07
187	428,944.59	4,454,878.81	213.4	62:04	146	0:37	24:23
188	423,098.96	4,451,506.65	220.4	82:32	214	0:47	29:45
189	427,724.95	4,449,259.96	216.4	27:22	147	0:20	10:07
190	432,013.87	4,452,464.06	209.6	0:00	0	0:00	0:00
191	435,309.82	4,448,403.96	215.1	8:24	48	0:18	3:10
192	435,331.15	4,448,352.89	213.4	8:39	50	0:17	3:18
193	421,014.24	4,453,676.24	228.6	20:31	97	0:20	7:36
194	421,416.65	4,454,813.96	235.3	45:04	152	0:44	13:53

Receptor No.	Receptor Location (UTM NAD83 Zone 16)[a]		Elevation	Shadow Hours per year	Shadow Days per year	Max Shadow Hours per day	Shadow Hours per year
	X - Coordinate	Y - Coordinate	[m]	[HH:MM/year][b] (Worst Case)	[days/year][c] (Worst Case)	(HH:MM/yr)[d] (Worst Case)	(HH:MM/yr)[e] (Predicted)
195	421,006.32	4,454,824.24	234.8	39:28	128	0:25	11:47
196	420,962.30	4,455,953.51	229.1	91:57	214	1:12	29:51
197	420,670.14	4,449,602.97	207.6	14:45	69	0:20	5:43
198	420,947.72	4,449,529.42	206.2	7:04	42	0:18	2:09
199	420,367.61	4,449,600.45	209.2	21:18	93	0:23	6:47
200	419,882.01	4,449,524.31	207.3	6:44	44	0:17	2:11
201	421,209.20	4,449,544.14	206.3	15:39	69	0:23	4:39
202	421,597.04	4,449,181.87	205.4	72:44	101	1:22	24:01
203	423,098.07	4,452,368.77	228.6	18:06	91	0:19	6:23
204	423,111.68	4,452,298.22	228.6	28:58	139	0:20	10:08
205	423,128.45	4,451,024.89	217.8	29:29	101	0:30	8:27
206	426,003.01	4,451,213.17	231.6	46:47	197	0:25	16:36
207	433,767.11	4,449,886.21	210.3	34:59	90	0:43	11:35
208	434,464.04	4,448,018.26	222.7	8:30	51	0:15	3:32
209	434,537.67	4,448,078.14	225.6	4:39	32	0:13	1:51
210	420,999.82	4,457,990.11	222.5	0:00	0	0:00	0:00
211	420,202.39	4,448,806.47	207.2	12:41	49	0:25	4:31
212	425,827.83	4,449,593.38	215	78:42	76	1:35	26:06
213	427,160.28	4,456,356.15	216.5	4:56	37	0:11	1:24
214	427,505.43	4,456,513.29	216.4	0:00	0	0:00	0:00
215	427,443.53	4,455,814.06	218.2	10:31	51	0:19	2:59
216	428,263.48	4,456,395.31	213.4	0:00	0	0:00	0:00
217	428,606.95	4,456,511.33	216	0:00	0	0:00	0:00
218	429,582.95	4,455,921.04	210.6	11:43	79	0:16	3:11
219	429,576.47	4,456,564.89	210.3	0:00	0	0:00	0:00
220	430,318.31	4,454,895.90	214.9	0:41	10	0:05	0:10
221	431,416.91	4,453,099.85	213.4	0:00	0	0:00	0:00
222	431,461.04	4,453,112.30	213.3	0:00	0	0:00	0:00

Receptor No.	Receptor Location (UTM NAD83 Zone 16)[a]		Elevation	Shadow Hours per year	Shadow Days per year	Max Shadow Hours per day	Shadow Hours per year
	X - Coordinate	Y - Coordinate	[m]	[HH:MM/year][b] (Worst Case)	[days/year][c] (Worst Case)	(HH:MM/yr)[d] (Worst Case)	(HH:MM/yr)[e] (Predicted)
223	431,457.65	4,453,065.34	213.4	0:00	0	0:00	0:00
224	431,465.57	4,453,156.42	213	0:00	0	0:00	0:00
225	431,507.43	4,453,159.82	212.7	0:00	0	0:00	0:00
226	431,507.43	4,453,139.45	212.8	0:00	0	0:00	0:00
227	431,509.69	4,453,097.59	213.1	0:00	0	0:00	0:00
228	431,422.01	4,453,199.98	213	0:00	0	0:00	0:00
229	431,470.66	4,453,201.68	212.6	0:00	0	0:00	0:00
230	431,548.16	4,453,202.25	212.1	0:00	0	0:00	0:00
231	431,507.43	4,453,208.47	212.3	0:00	0	0:00	0:00
232	431,502.34	4,453,248.07	212.1	0:00	0	0:00	0:00
233	431,423.70	4,452,970.31	213.4	0:00	0	0:00	0:00
234	431,362.04	4,453,052.33	213.4	0:00	0	0:00	0:00
235	431,355.82	4,453,195.46	213.4	0:00	0	0:00	0:00
236	431,564.56	4,453,142.85	212.4	0:00	0	0:00	0:00
237	431,778.40	4,452,978.79	208.7	0:00	0	0:00	0:00
238	431,815.17	4,452,977.09	207.4	0:00	0	0:00	0:00
239	431,615.48	4,452,998.59	212.5	0:00	0	0:00	0:00
240	431,556.64	4,452,997.46	213.4	0:00	0	0:00	0:00
241	431,399.38	4,453,155.86	213.4	0:00	0	0:00	0:00
242	432,019.08	4,452,919.53	201.2	0:00	0	0:00	0:00
243	432,098.36	4,452,946.07	199.6	0:00	0	0:00	0:00
244	432,229.28	4,452,986.44	198.1	0:00	0	0:00	0:00
245	432,035.85	4,452,241.80	211.8	8:10	30	0:20	2:07
246	432,041.35	4,452,176.46	212	29:20	63	0:33	7:51
247	432,111.48	4,451,774.56	210.6	19:08	44	0:34	6:29
248	434,535.27	4,450,948.48	196.2	2:04	18	0:11	0:34
249	434,537.61	4,450,557.09	203.7	10:04	57	0:14	2:47
250	433,340.50	4,447,308.65	223.4	0:00	0	0:00	0:00

Receptor No.	Receptor Location (UTM NAD83 Zone 16)[a]		Elevation	Shadow Hours per year	Shadow Days per year	Max Shadow Hours per day	Shadow Hours per year
	X - Coordinate	Y - Coordinate	[m]	[HH:MM/year][b] (Worst Case)	[days/year][c] (Worst Case)	(HH:MM/yr)[d] (Worst Case)	(HH:MM/yr)[e] (Predicted)
251	434,440.42	4,447,418.72	217.3	0:00	0	0:00	0:00
252	434,550.32	4,447,154.05	216.4	0:00	0	0:00	0:00
253	429,622.45	4,447,150.62	204.2	0:00	0	0:00	0:00
254	425,152.26	4,447,185.46	204.2	11:05	58	0:19	4:18
255	424,262.54	4,447,157.75	201.2	15:38	81	0:17	6:13
256	423,841.34	4,447,139.12	201.2	2:38	24	0:10	0:59
257	434,752.48	4,447,391.21	215.3	0:00	0	0:00	0:00
258	434,826.74	4,447,392.20	213.5	0:00	0	0:00	0:00
259	434,822.75	4,447,295.52	217.5	0:00	0	0:00	0:00
260	434,703.64	4,447,303.99	219.5	0:00	0	0:00	0:00
261	434,835.28	4,447,243.90	217.1	0:00	0	0:00	0:00
262	434,552.29	4,447,093.52	214.2	0:00	0	0:00	0:00
263	433,735.95	4,447,372.67	222.5	0:00	0	0:00	0:00
264	424,191.92	4,458,147.54	218.8	0:00	0	0:00	0:00
265	413,500.50	4,453,081.59	207.3	0:00	0	0:00	0:00
266	423,413.04	4,450,979.43	216.4	23:03	112	0:23	6:35
267	419,161.92	4,450,408.51	210.3	4:11	22	0:17	1:25
268	416,604.50	4,451,893.54	213.4	0:00	0	0:00	0:00
269	417,488.59	4,451,693.65	212.6	0:00	0	0:00	0:00
270	417,220.99	4,452,021.20	215.5	5:36	42	0:11	2:20
271	416,149.83	4,451,956.85	213	0:00	0	0:00	0:00
272	415,952.46	4,453,178.69	223.5	6:19	40	0:18	2:11
273	416,612.67	4,452,535.71	218.2	12:20	40	0:25	4:32
274	419,558.42	4,452,369.85	223.9	10:26	58	0:19	3:18
275	419,586.52	4,450,398.66	210.3	12:00	33	0:31	4:03
276	416,688.09	4,450,987.27	208.9	0:00	0	0:00	0:00
277	416,684.06	4,451,468.51	210.1	0:00	0	0:00	0:00
278	416,623.76	4,452,017.06	215.6	0:00	0	0:00	0:00

Receptor No.	Receptor Location (UTM NAD83 Zone 16)[a]		Elevation	Shadow Hours per year	Shadow Days per year	Max Shadow Hours per day	Shadow Hours per year
	X - Coordinate	Y - Coordinate	[m]	[HH:MM/year][b] (Worst Case)	[days/year][c] (Worst Case)	(HH:MM/yr)[d] (Worst Case)	(HH:MM/yr)[e] (Predicted)
279	415,529.15	4,452,035.89	210.3	3:30	36	0:08	1:25
280	415,754.04	4,452,039.53	210.3	0:00	0	0:00	0:00
281	414,928.33	4,452,138.24	207.3	0:00	0	0:00	0:00
282	414,782.03	4,453,085.37	212	10:36	32	0:25	3:35
283	417,684.69	4,453,095.22	228.6	33:35	60	0:44	10:57
284	416,605.77	4,452,792.08	216.6	45:13	100	0:40	16:19
285	418,125.48	4,452,038.19	216	0:00	0	0:00	0:00
286	419,588.07	4,451,293.90	213.4	49:42	98	0:41	19:28
287	419,324.75	4,453,171.78	219.2	1:46	16	0:10	0:35
288	419,158.25	4,448,737.27	207.3	0:56	12	0:06	0:19
289	418,981.97	4,449,603.82	209.5	4:26	32	0:12	1:42
290	418,670.89	4,449,619.61	210.3	1:38	18	0:08	0:36
291	414,047.47	4,452,795.68	207.3	2:44	18	0:13	0:56
292	418,867.79	4,453,169.10	224.1	1:40	15	0:10	0:32
293	415,334.04	4,450,966.10	206.6	0:00	0	0:00	0:00
294	417,677.99	4,454,884.64	233.7	31:39	105	0:27	8:54
295	417,083.03	4,459,698.01	222.4	0:00	0	0:00	0:00
296	417,322.89	4,459,813.75	219.5	0:00	0	0:00	0:00
297	417,598.92	4,459,395.34	219.5	0:00	0	0:00	0:00
298	432,707.51	4,453,069.49	206.3	0:00	0	0:00	0:00
299	432,820.15	4,453,081.40	207.3	0:00	0	0:00	0:00
300	434,200.86	4,451,558.04	207.3	0:00	0	0:00	0:00
301	434,034.94	4,451,641.26	204.2	0:00	0	0:00	0:00
302	435,600.85	4,449,892.63	195.8	7:15	43	0:13	1:55
303	435,552.50	4,449,883.36	199.6	6:44	38	0:13	1:46
304	435,489.49	4,449,896.01	204.2	2:22	20	0:09	0:36
305	435,215.61	4,450,108.98	198.1	0:00	0	0:00	0:00
306	435,306.39	4,450,086.42	197.5	0:00	0	0:00	0:00

Receptor No.	Receptor Location (UTM NAD83 Zone 16)[a]		Elevation	Shadow Hours per year	Shadow Days per year	Max Shadow Hours per day	Shadow Hours per year
	X - Coordinate	Y - Coordinate	[m]	[HH:MM/year][b] (Worst Case)	[days/year][c] (Worst Case)	(HH:MM/yr)[d] (Worst Case)	(HH:MM/yr)[e] (Predicted)
307	435,166.14	4,449,968.99	201.2	0:00	0	0:00	0:00
308	435,206.63	4,449,927.48	205.2	0:00	0	0:00	0:00
309	435,155.32	4,449,789.92	207.3	6:12	39	0:12	1:38
310	434,982.83	4,450,026.25	205	1:34	15	0:10	0:30
311	434,905.44	4,447,187.39	216.4	0:00	0	0:00	0:00
312	434,919.72	4,447,263.12	213.4	0:00	0	0:00	0:00
313	434,918.95	4,447,318.01	215.5	0:00	0	0:00	0:00
314	434,929.42	4,447,384.09	210.3	0:00	0	0:00	0:00
315	434,959.29	4,447,401.59	210.3	0:00	0	0:00	0:00
316	435,122.56	4,447,382.43	213.2	0:00	0	0:00	0:00
317	434,999.84	4,447,222.08	216	0:00	0	0:00	0:00
318	435,296.65	4,447,326.06	210.3	0:00	0	0:00	0:00
319	435,241.09	4,447,344.29	210.3	0:00	0	0:00	0:00
320	434,476.21	4,446,877.16	219.1	0:00	0	0:00	0:00
321	434,437.66	4,448,331.52	225.6	29:45	111	0:26	11:53
322	432,937.35	4,446,680.56	210.7	0:00	0	0:00	0:00
323	431,890.17	4,446,609.04	211.6	0:00	0	0:00	0:00
324	431,788.93	4,446,504.64	208	0:00	0	0:00	0:00
325	431,392.55	4,446,525.17	207.3	0:00	0	0:00	0:00
326	429,607.57	4,446,626.31	201.9	0:00	0	0:00	0:00
327	426,035.98	4,446,366.23	204.2	0:00	0	0:00	0:00
328	422,933.97	4,446,981.16	201.2	0:00	0	0:00	0:00
329	421,483.23	4,448,002.83	202.9	1:02	12	0:07	0:21
330	421,491.50	4,447,189.23	202	0:00	0	0:00	0:00
331	427,432.13	4,457,003.95	216.4	0:00	0	0:00	0:00
332	427,496.81	4,457,031.83	216.4	0:00	0	0:00	0:00
333	423,659.78	4,450,932.96	222.4	1:46	142	0:24	8:09

Receptor No.	Receptor Location (UTM NAD83 Zone 16)[a]		Elevation	Shadow Hours per year	Shadow Days per year	Max Shadow Hours per day	Shadow Hours per year
	X - Coordinate	Y - Coordinate	[m]	[HH:MM/year][b] (Worst Case)	[days/year][c] (Worst Case)	(HH:MM/yr)[d] (Worst Case)	(HH:MM/yr)[e] (Predicted)
[a] *The coordinate system is the Universal Transverse Mercator (UTM) system, using North American Datum 1983 (NAD 83), Zone 16.*							
[b] *Total hours per year of shadow flicker at this receptor under worst-case conditions.*							
[c] *Days per year in which shadow flicker is possible at this receptor under worst-case conditions.*							
[d] *The maximum daily hour and minutes of shadow flicker at this receptor, under worst-case conditions. This value is the single day maximum due to the combination of receptor and turbine locations, and sun path across the sky. All other days will be less than this maximum as the sun path changes throughout the year. All days will also be less than this maximum due to real world conditions such as cloud cover, changes in wind direction, and less than 100% wind turbine operation.*							
[e] *Predicted hours of shadow flicker at this receptor, including sunshine probability and actual wind direction data. Actual hours should be less than this value due to less than 100% wind turbine operation, and other mitigating factors such as screening due to trees or structures.*							

APPENDIX B

PREDICTED SHADOW HOURS CALENDAR BY RECEPTOR

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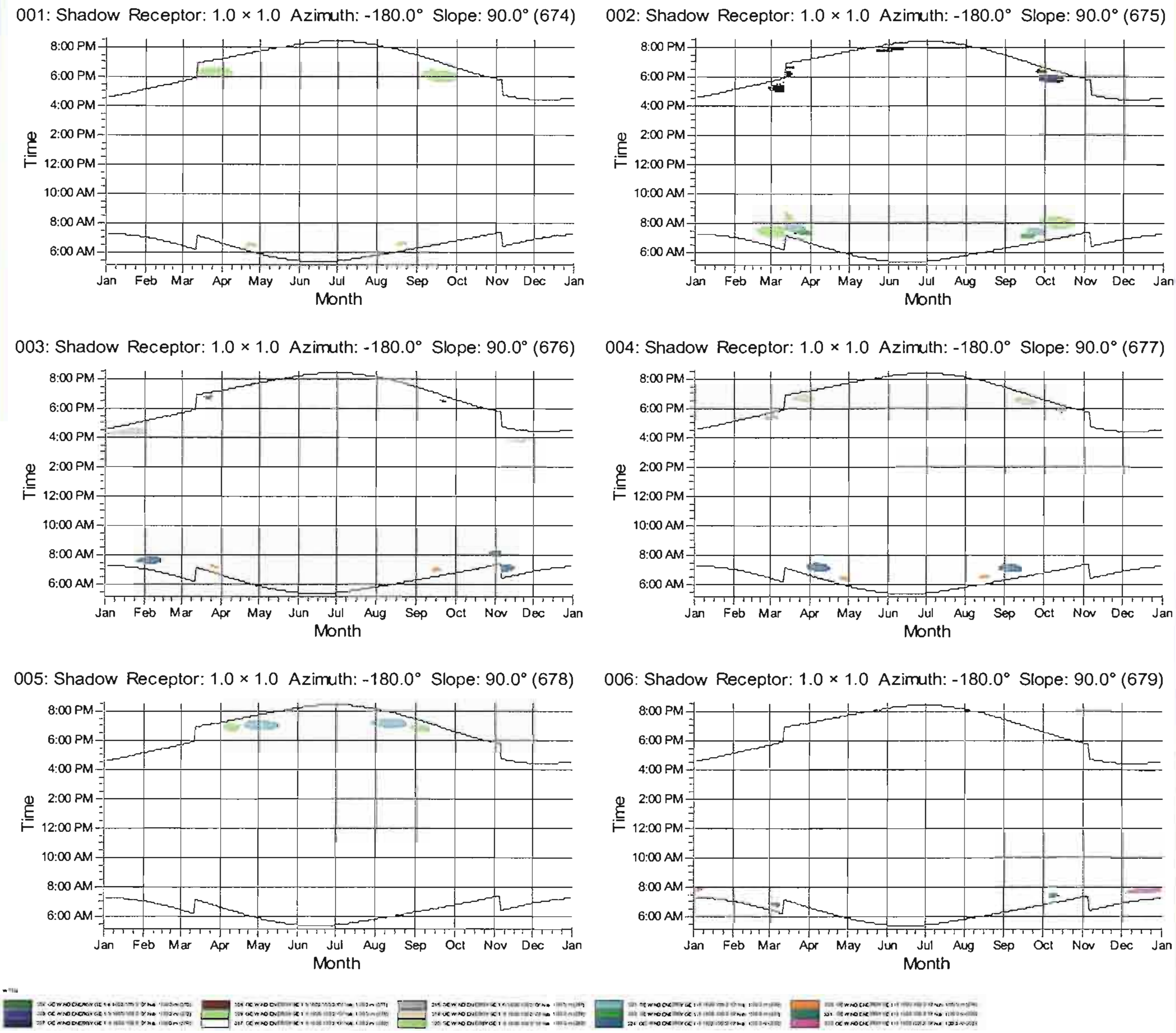
SHADOW - Calendar, graphical

Calculation: SF_CaliRidge_ver3_20110624



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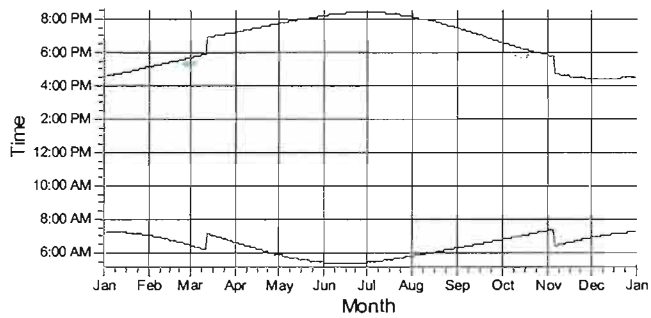
SHADOW - Calendar, graphical

Calculation: SF_CaliRidge_ver3_20110624

007: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (680)



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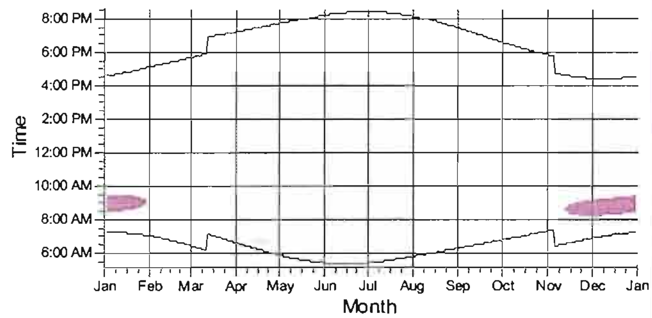
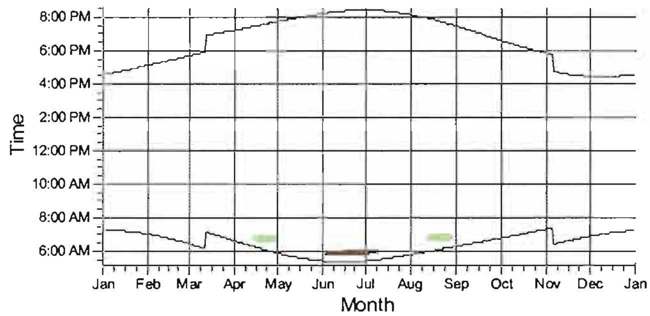
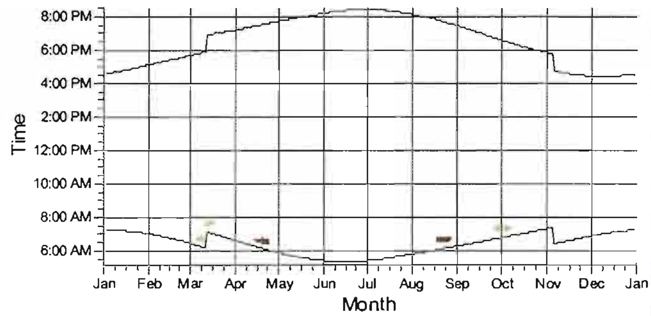


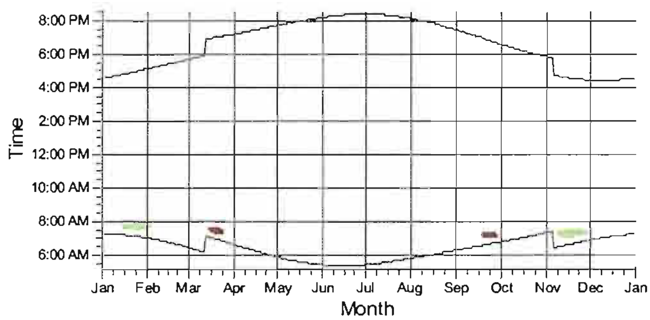
009: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (682)



010: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (683)



011: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (684)



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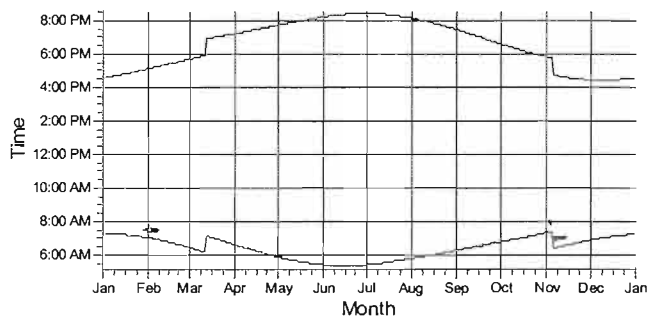

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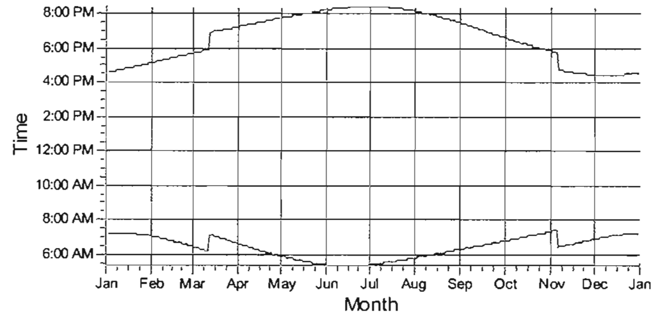
SHADOW - Calendar, graphical

Calculation: SF_CaliRidge_ver3_20110624

013: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (686)



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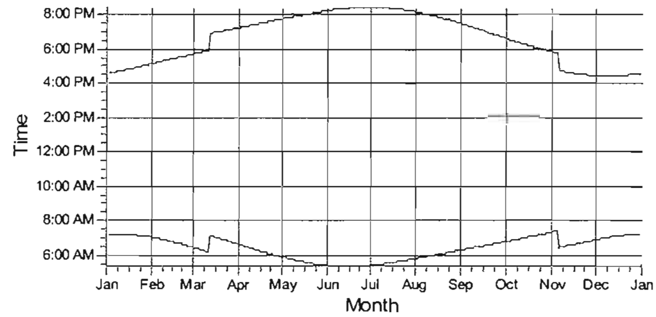

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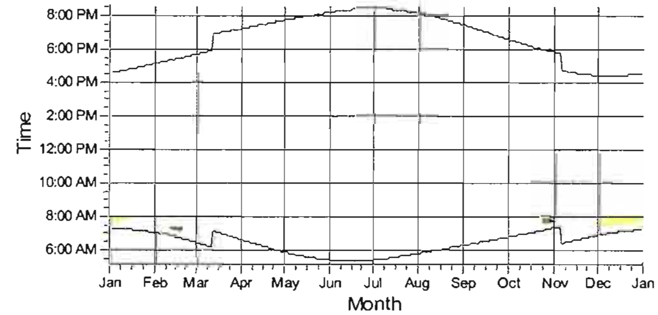
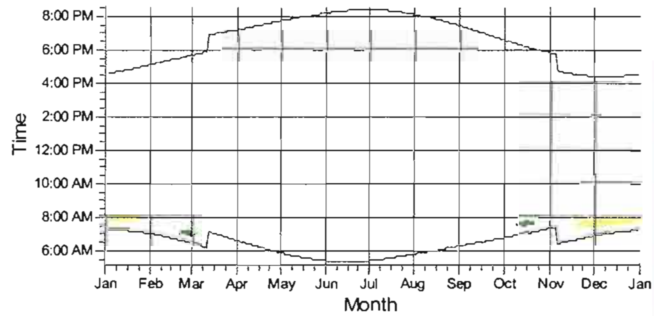


016: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (689)



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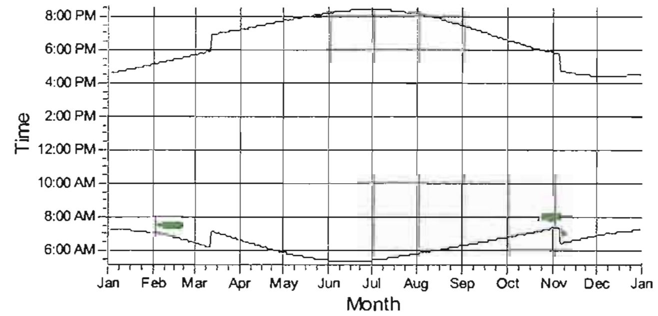
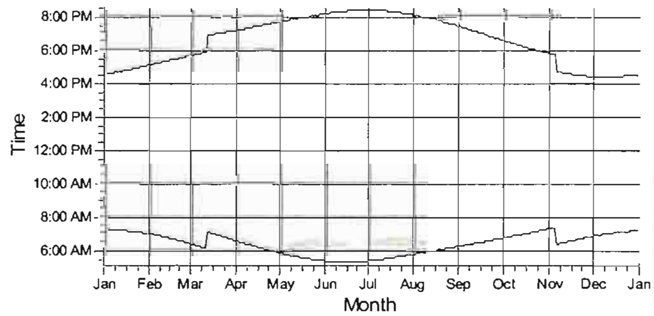
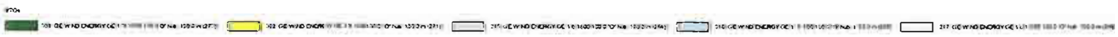


018: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (691)





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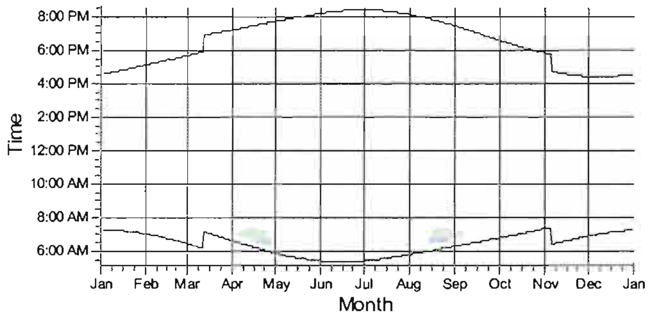
SHADOW - Calendar, graphical

Calculation: SF_CaliRidge_ver3_20110624

019: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (692)



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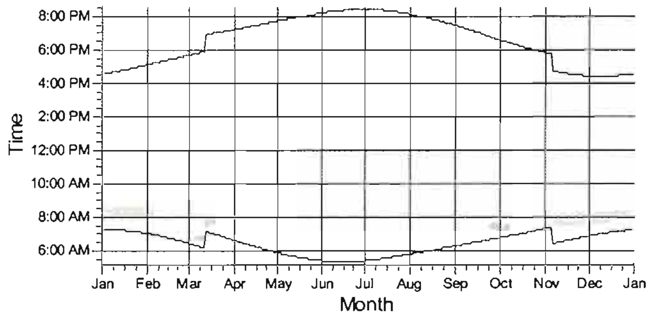

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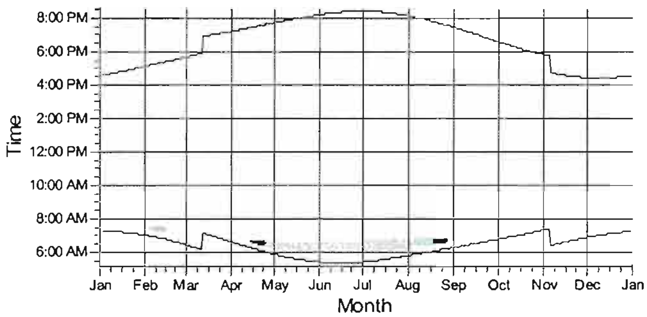

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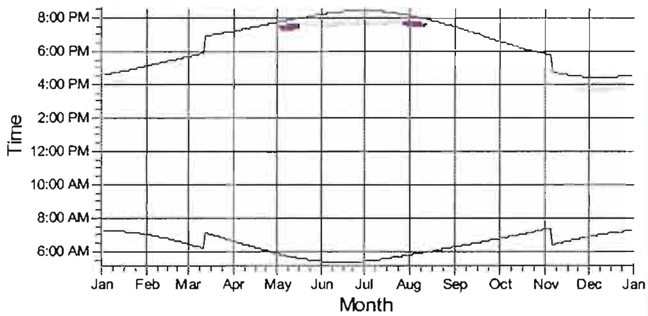
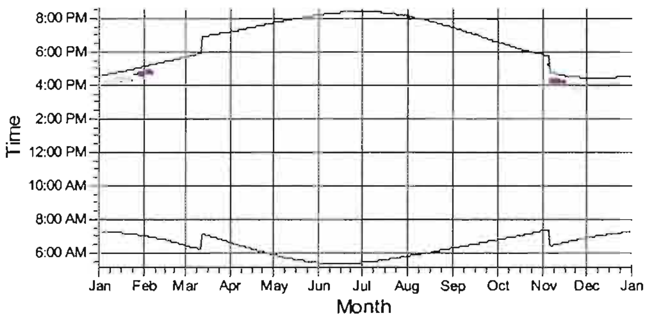


023: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (696)



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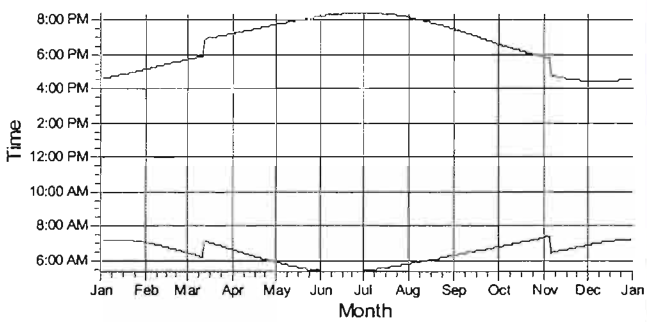

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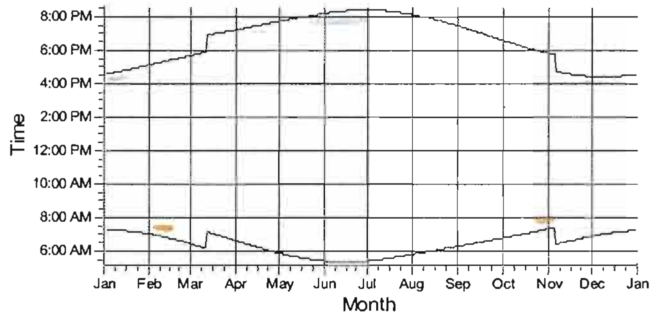
SHADOW - Calendar, graphical

Calculation: SF_CaliRidge_ver3_20110624

025: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (698)



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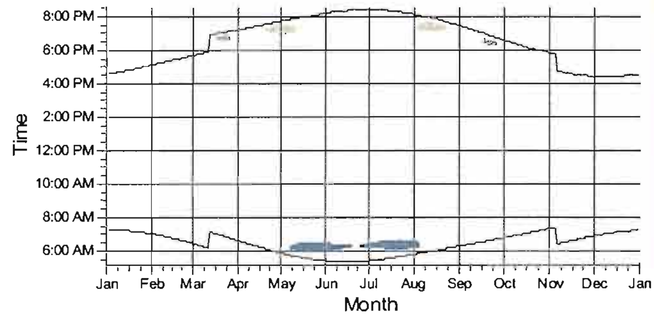
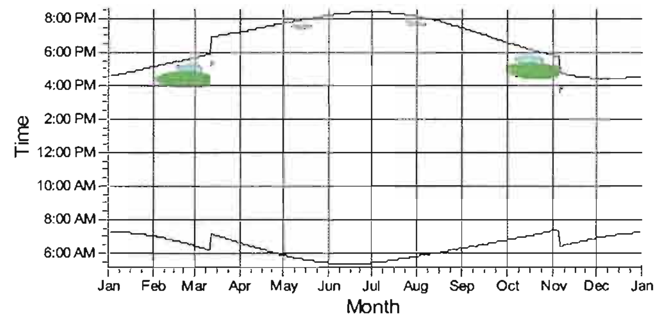
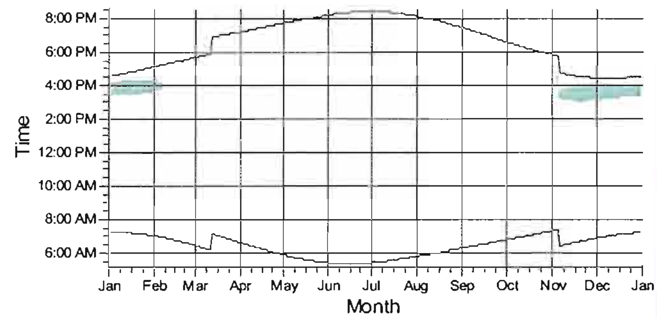


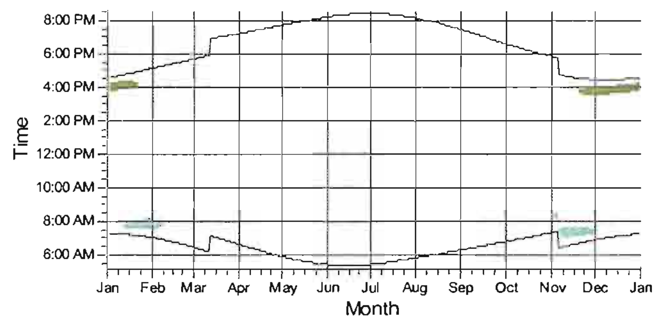
027: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (700)



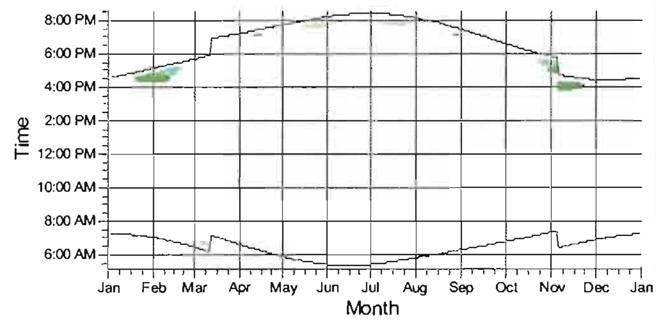
028: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (701)

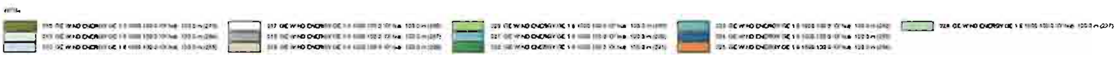


029: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (702)



030: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (703)





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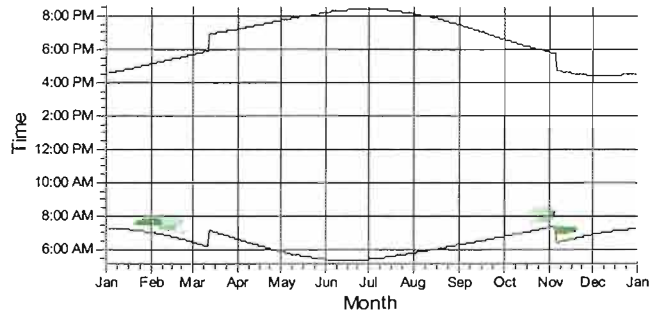
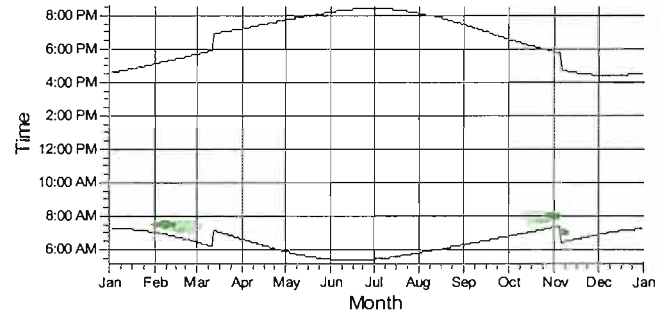
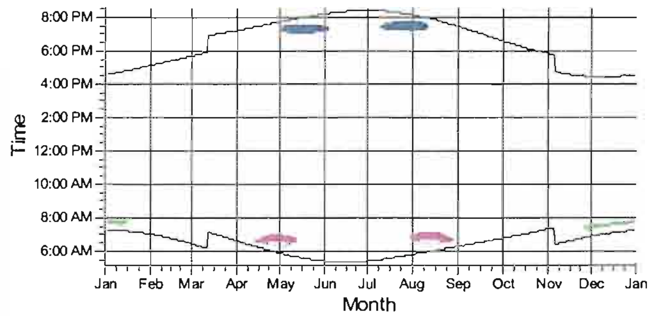
031: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (704)



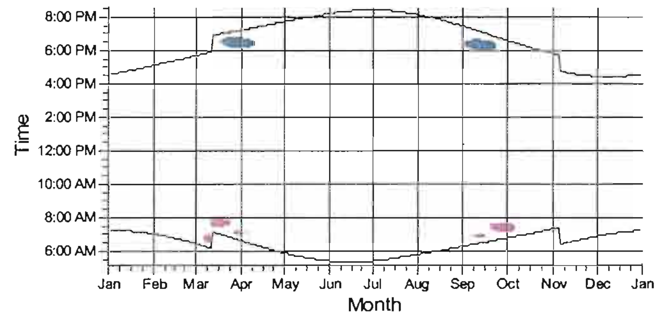
032: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (705)



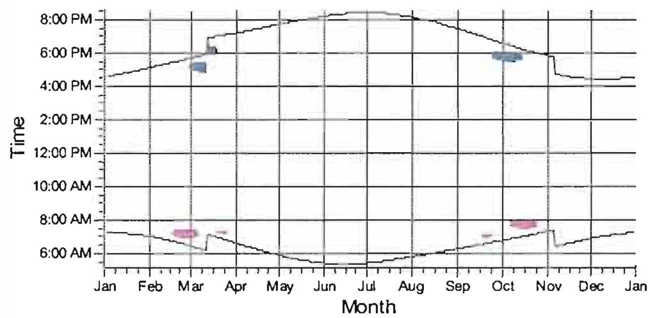
033: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (706)



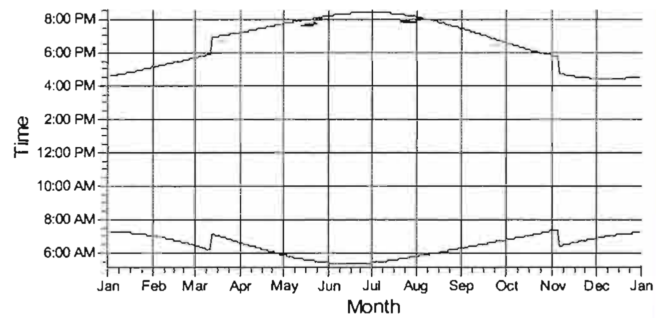
034: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (707)



035: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (708)



036: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (709)



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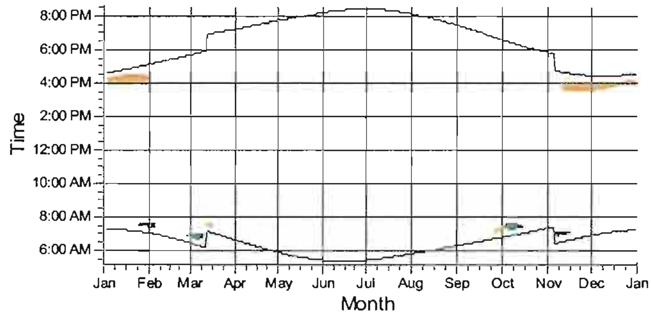
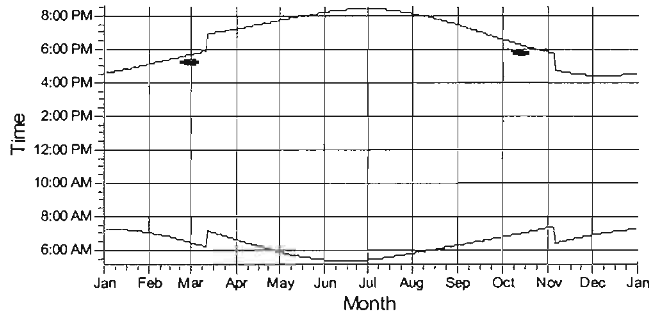
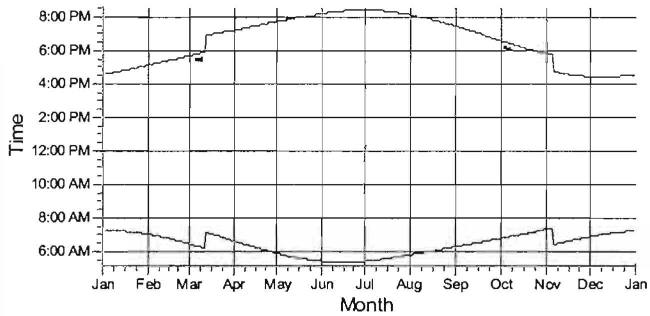
037: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (710)



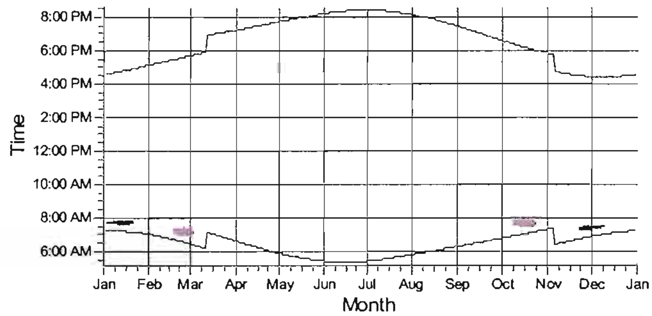
038: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (711)



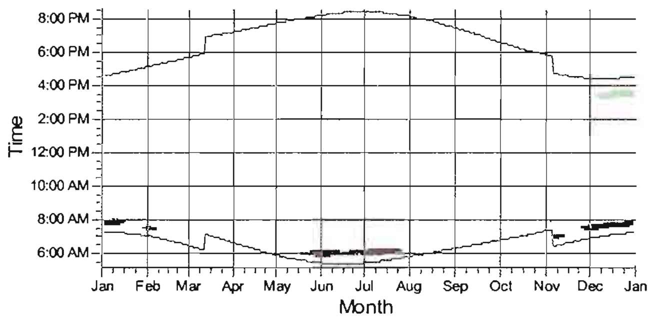
039: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (712)



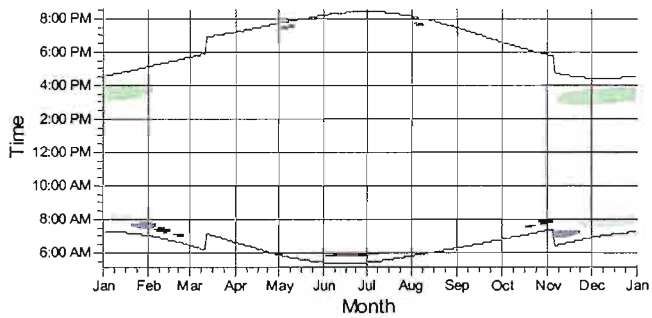
040: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (713)

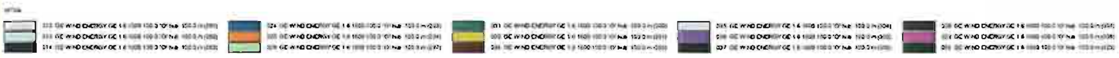


041: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (714)



042: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (715)





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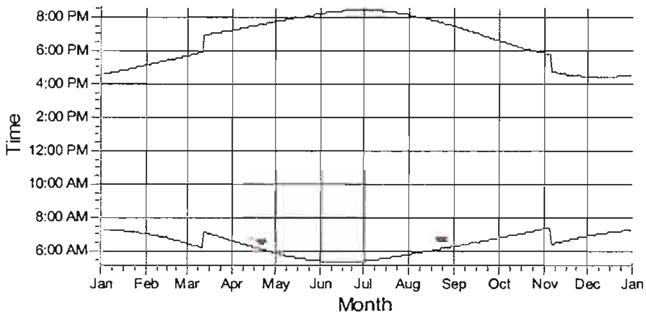
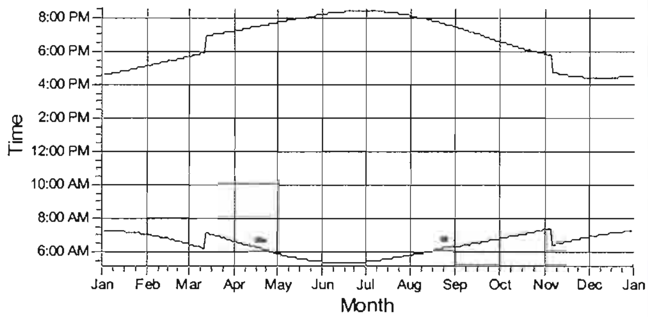
Calculation: SF_CaliRidge_ver3_20110624

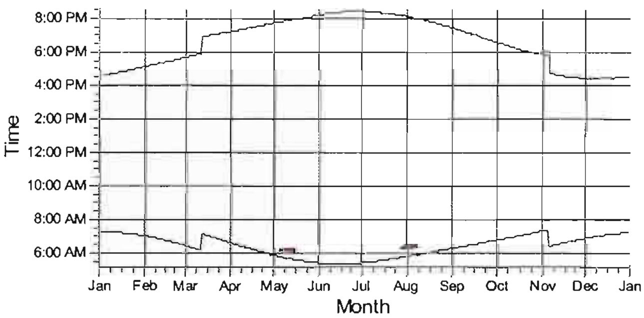
043: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (716)



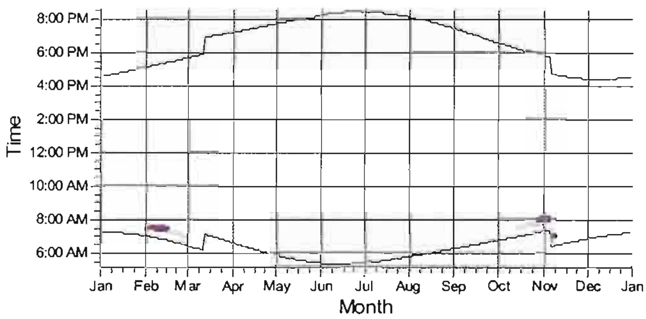
044: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (717)



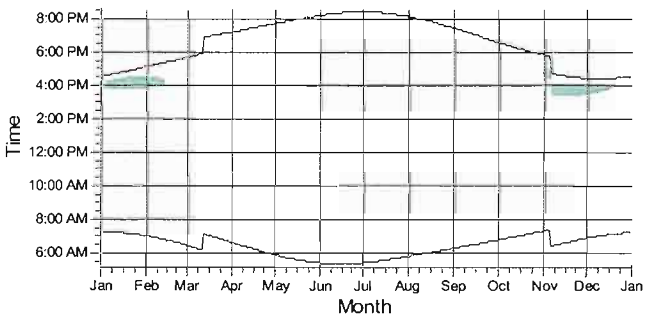
045: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (718)



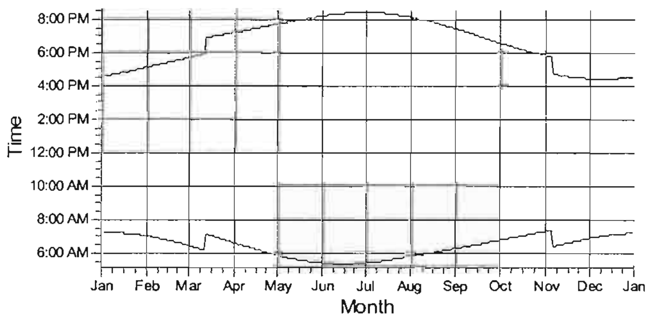
046: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (719)



047: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (720)



048: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (721)



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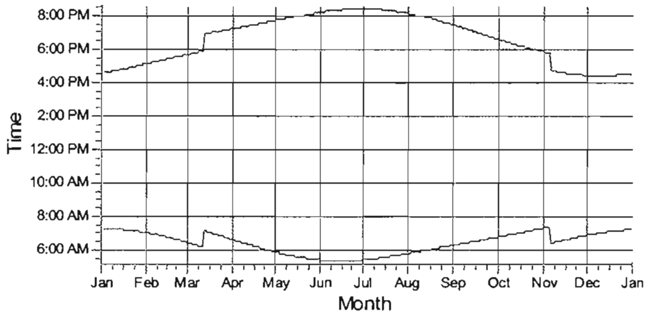
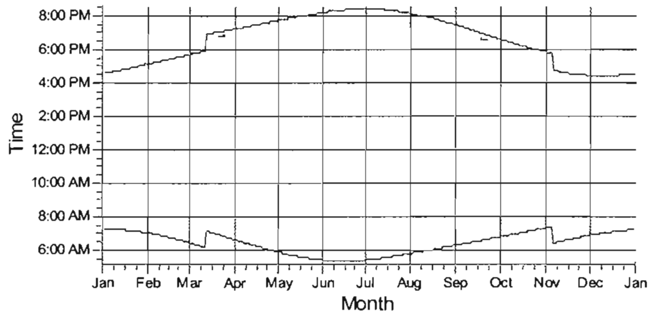
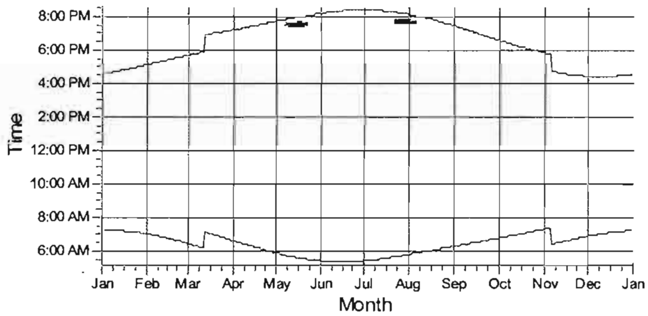
049: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (722)



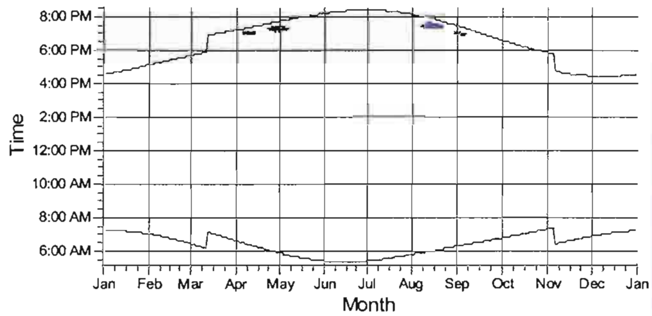
050: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (723)



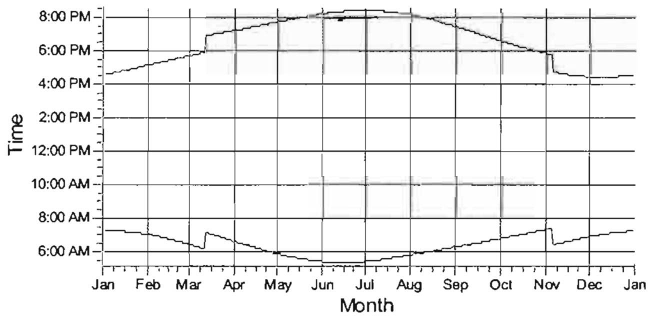
051: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (724)



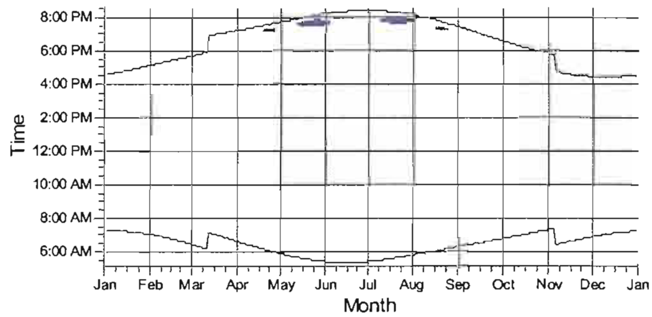
052: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (725)



053: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (726)



054: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (727)



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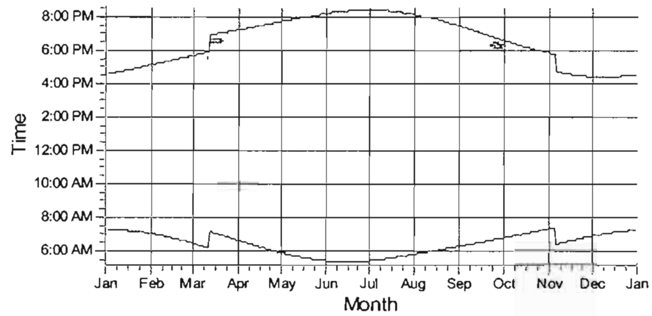
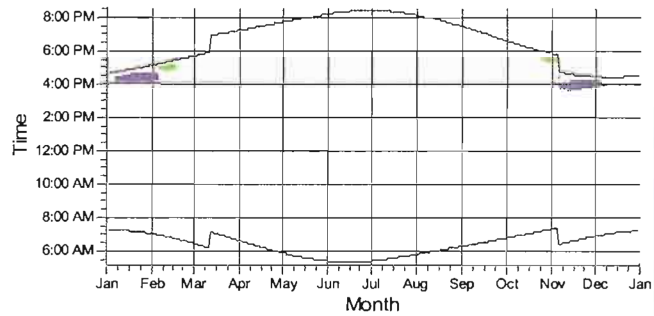
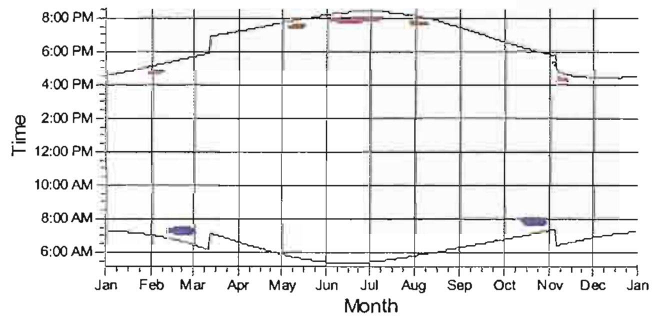
055: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (728)



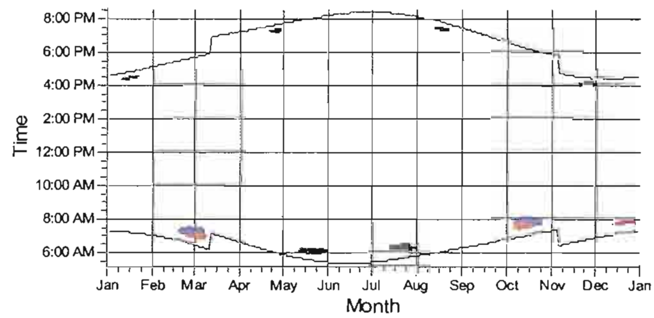
056: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (729)



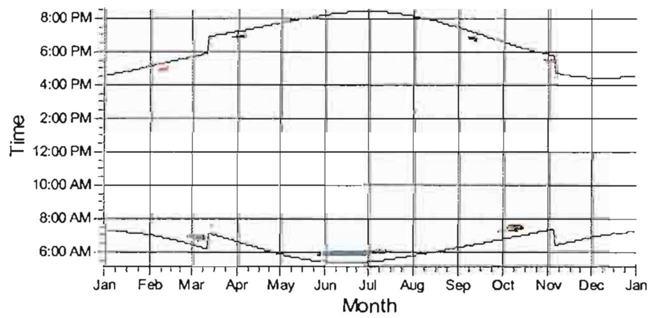
057: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (730)



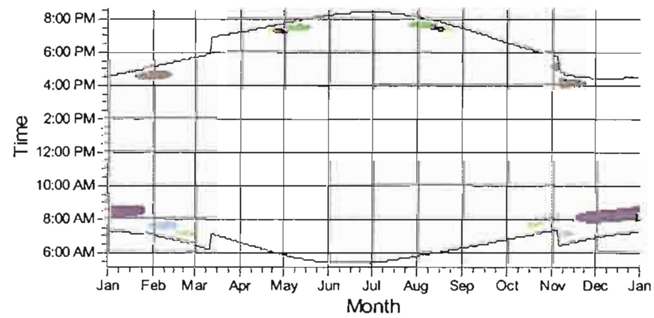
058: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (731)

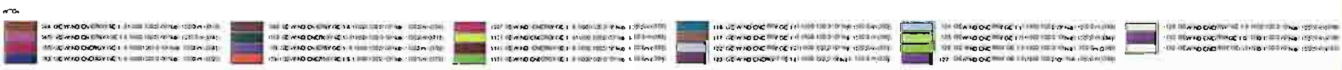


059: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (732)



060: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (733)





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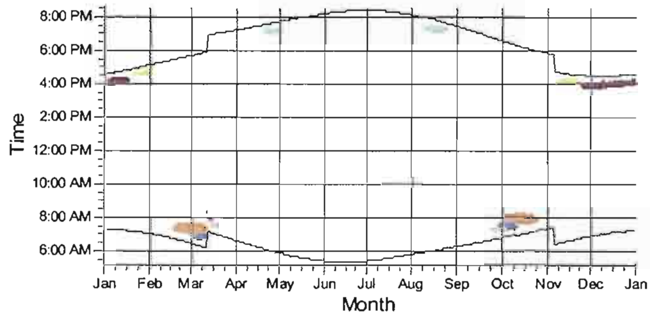
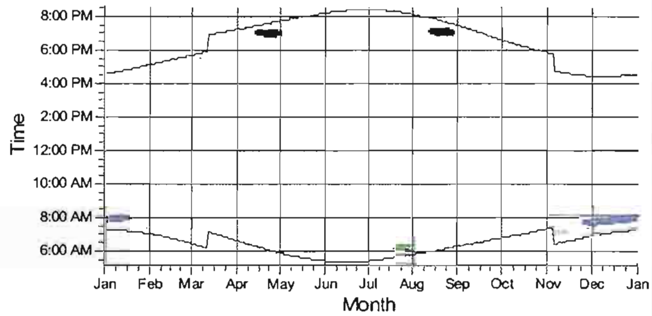
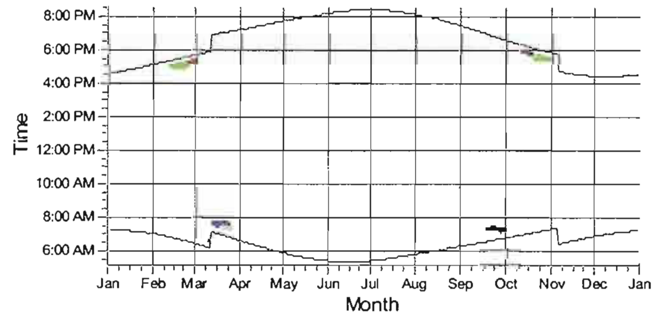
061: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (734)



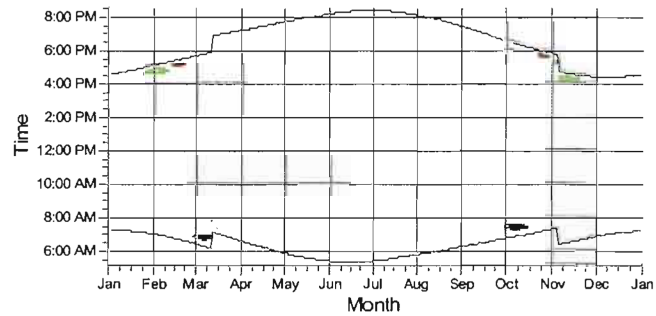
062: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (735)



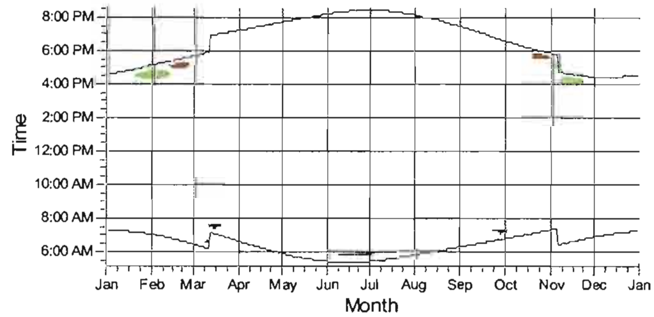
063: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (736)



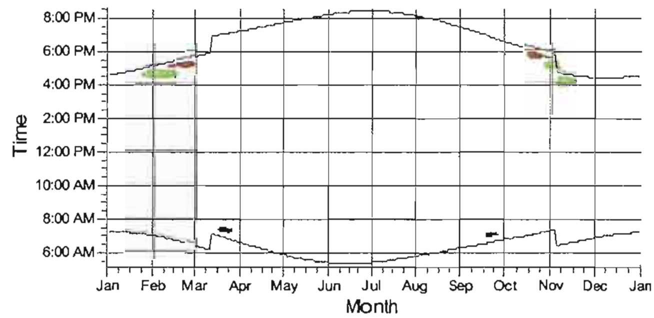
064: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (737)



065: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (738)



066: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (739)



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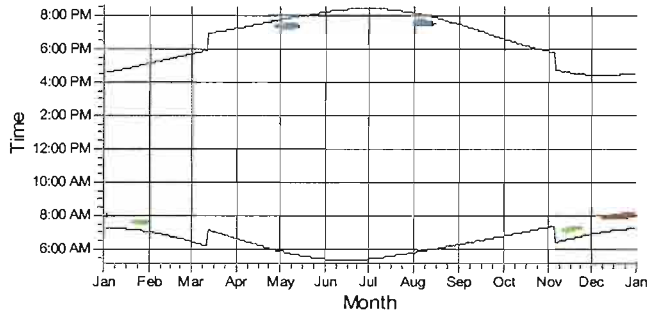
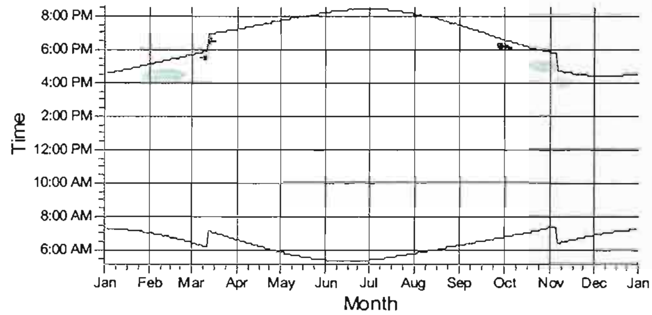
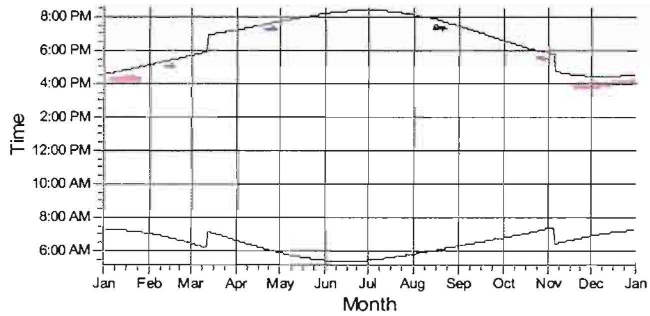
067: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (740)



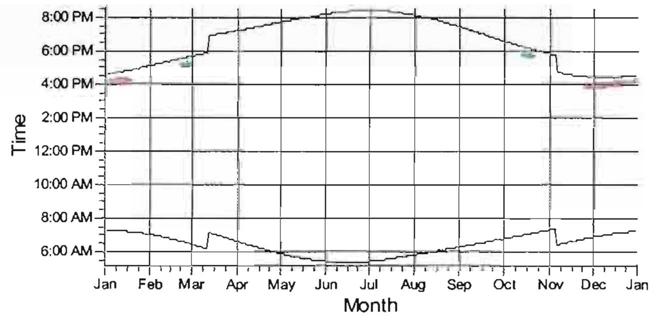
068: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (741)



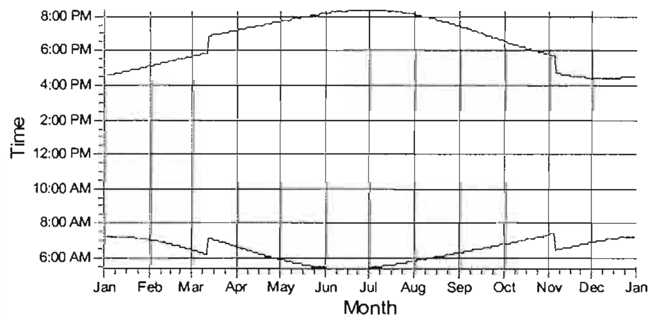
069: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (742)



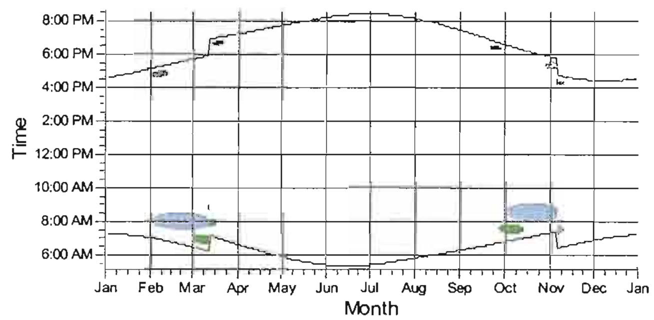
070: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (743)

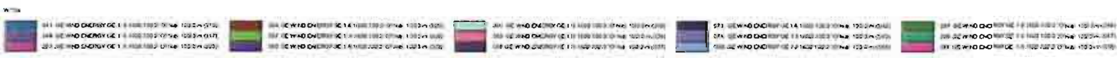


071: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (744)



072: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (745)





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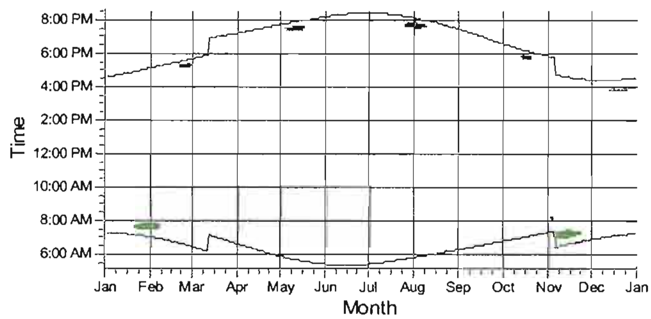
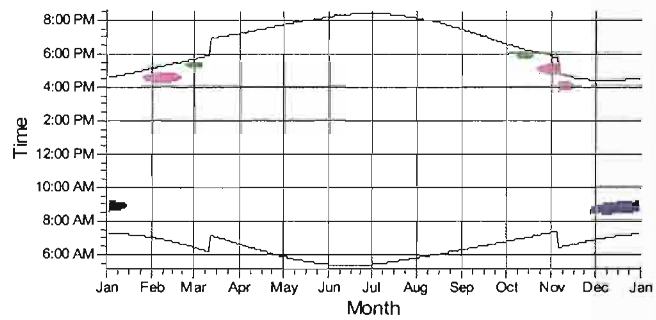
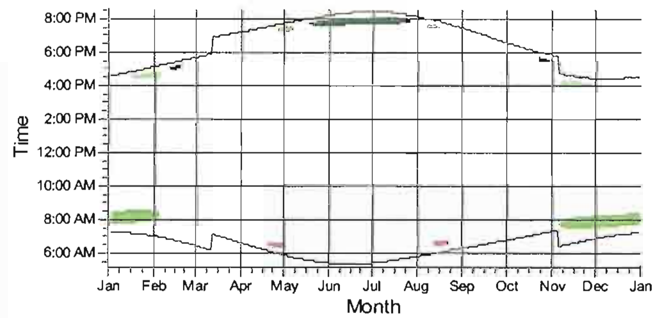
073: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (746)



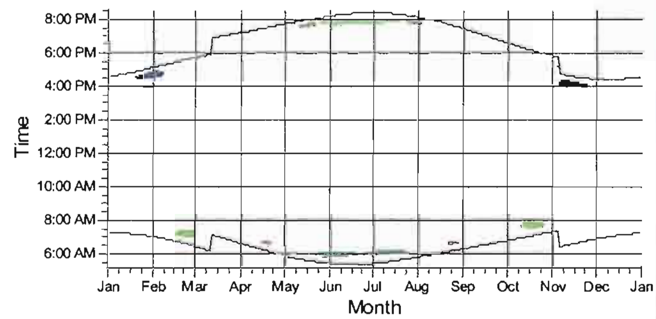
074: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (747)



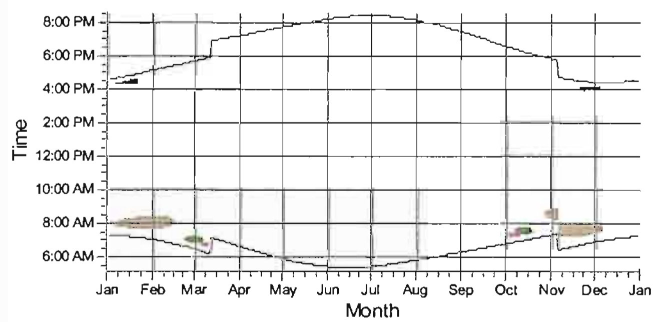
075: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (748)



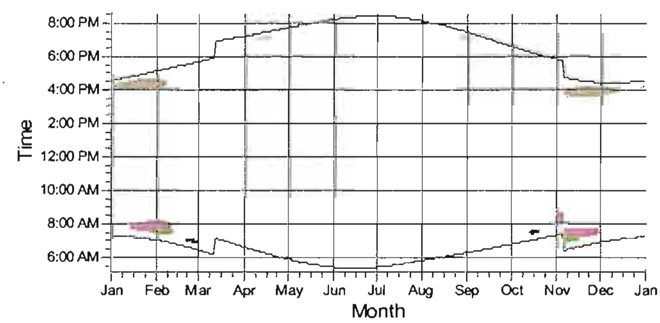
076: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (749)

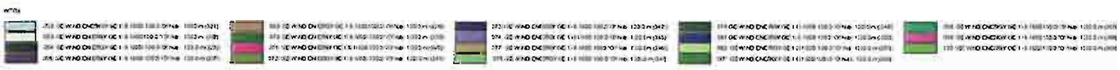


077: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (750)



078: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (751)





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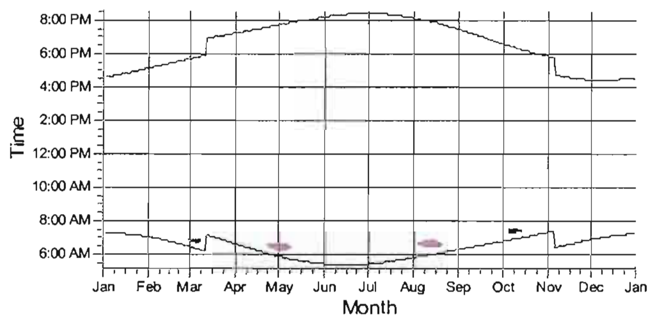
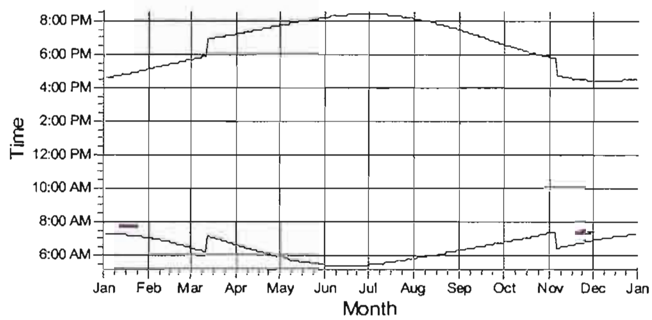
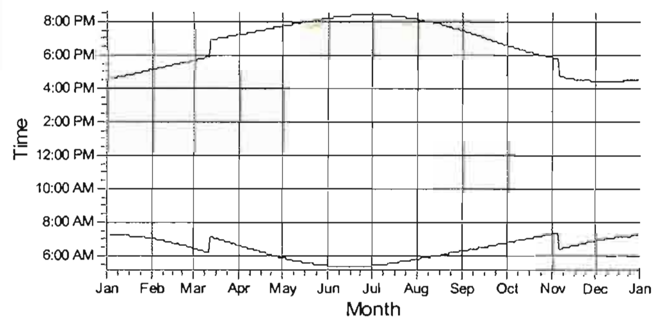
079: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (752)



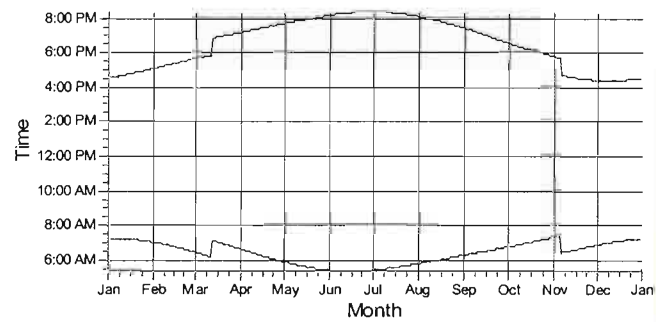
080: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (753)



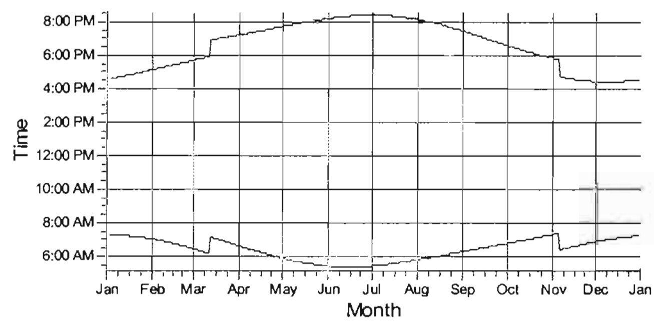
081: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (754)



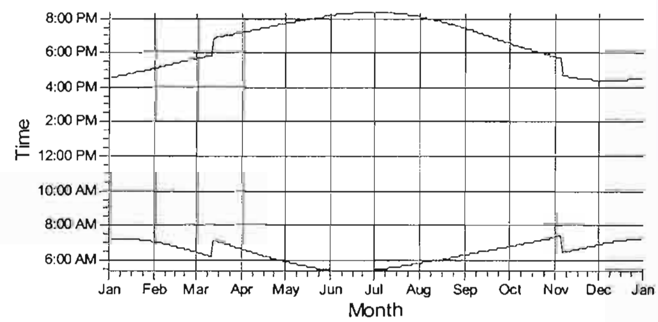
082: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (755)



083: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (756)



084: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (757)



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SHADOW - Calendar, graphical

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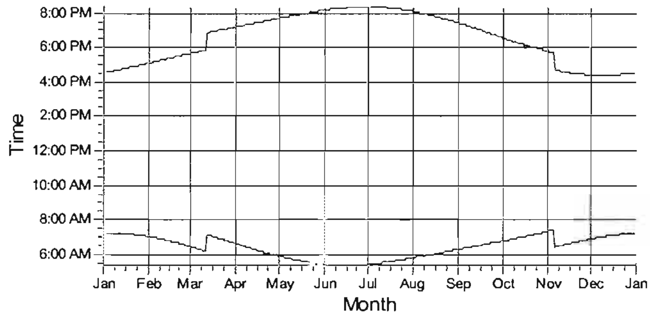
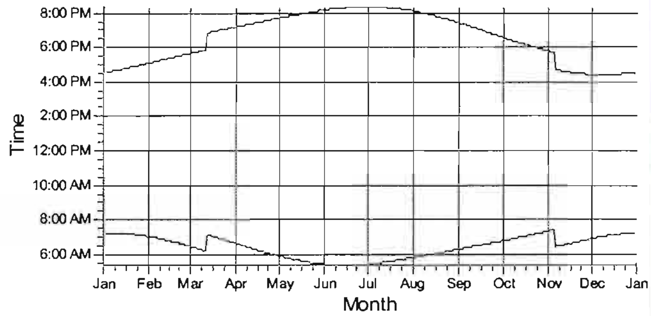
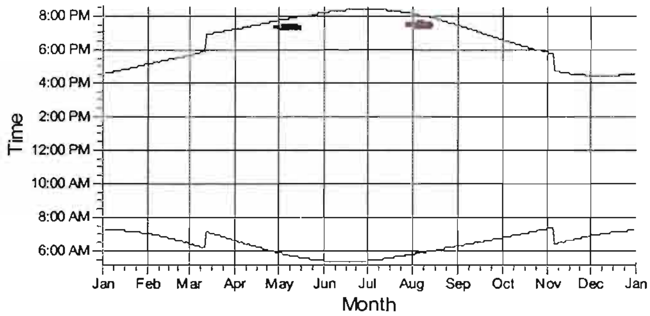
085: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (758)



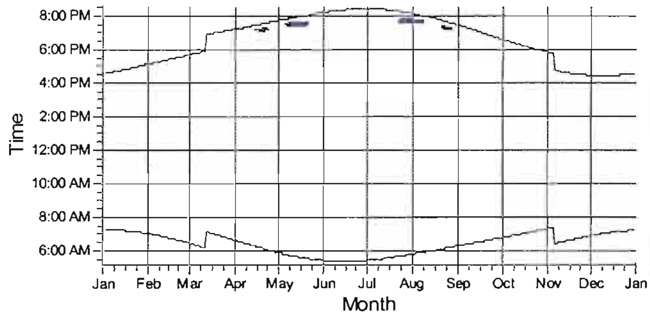
086: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (759)



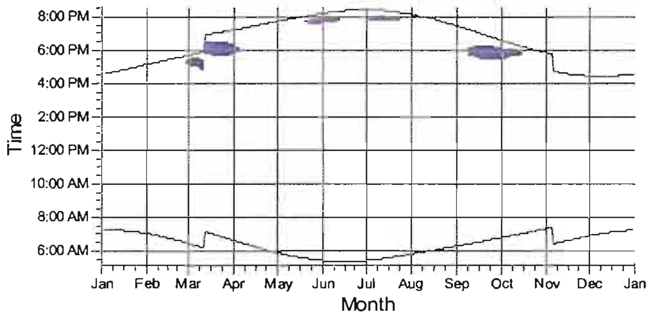
087: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (760)



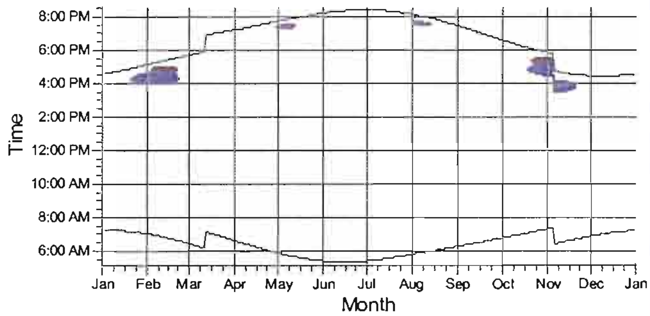
088: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (761)



089: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (762)



090: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (763)



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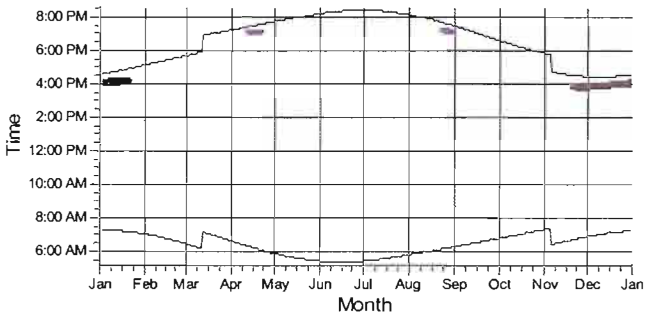
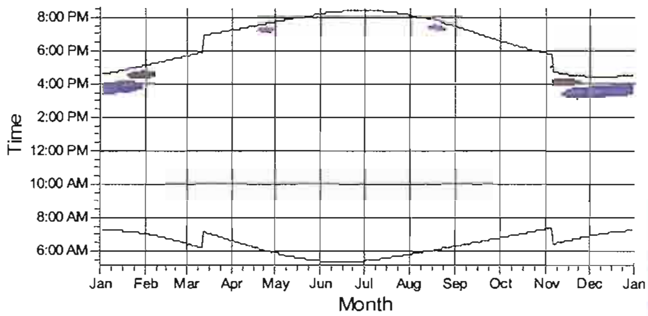
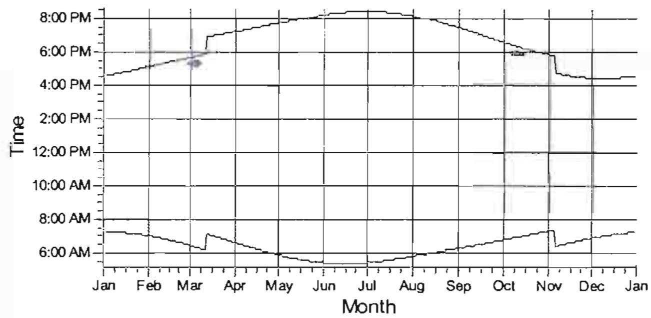
091: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (764)



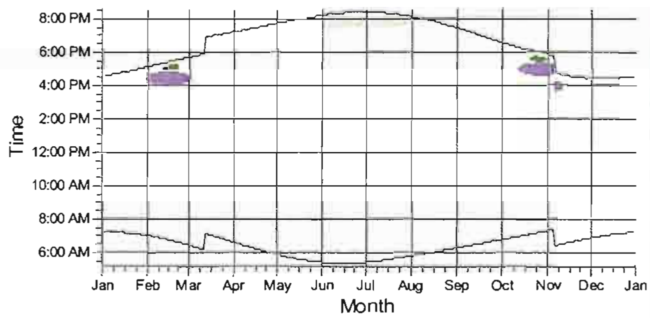
092: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (765)



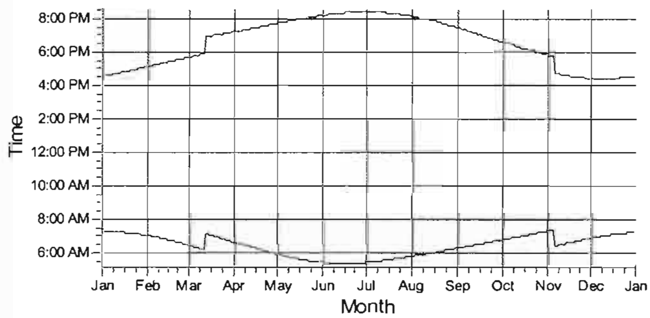
093: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (766)



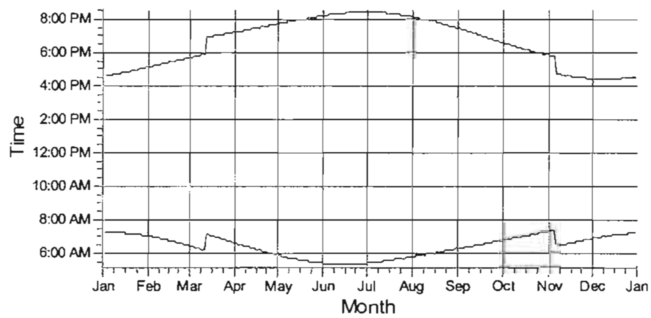
094: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (767)

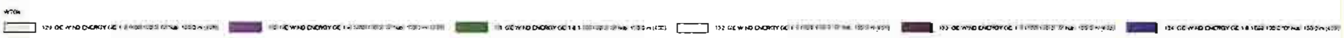


095: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (768)



096: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (769)





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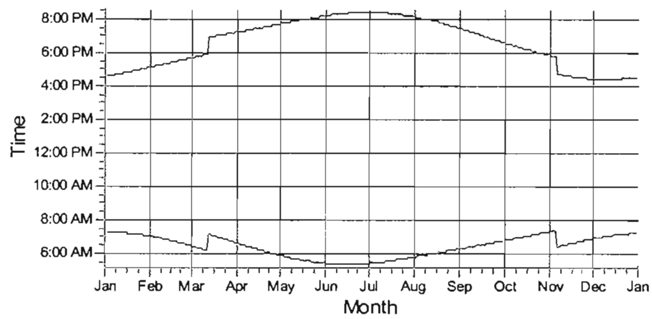
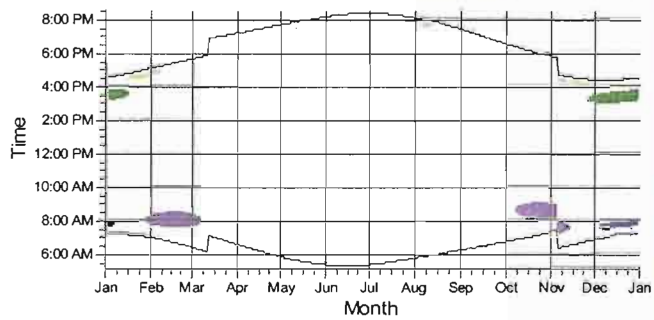
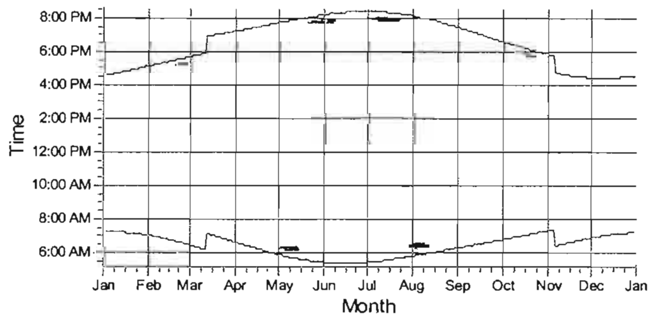
097: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (770)



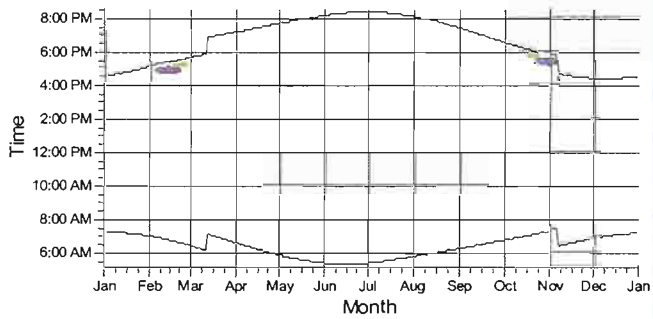
098: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (771)



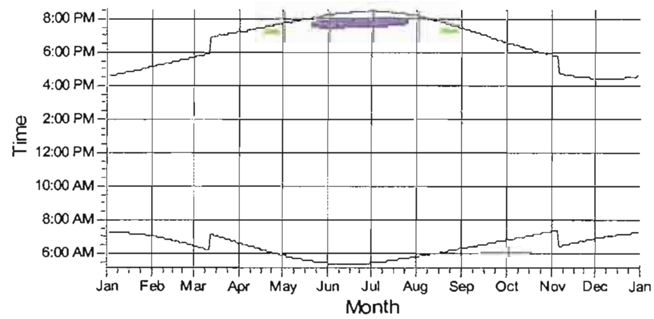
099: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (772)



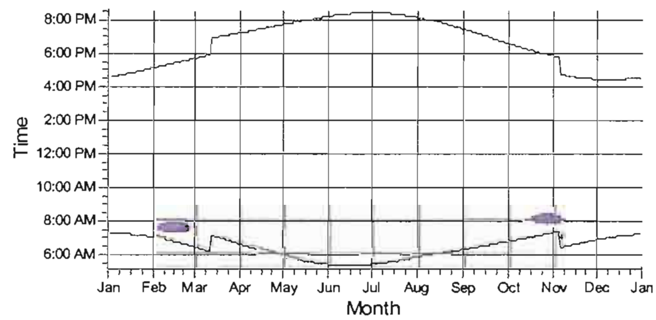
100: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (773)



101: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (774)



102: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (775)



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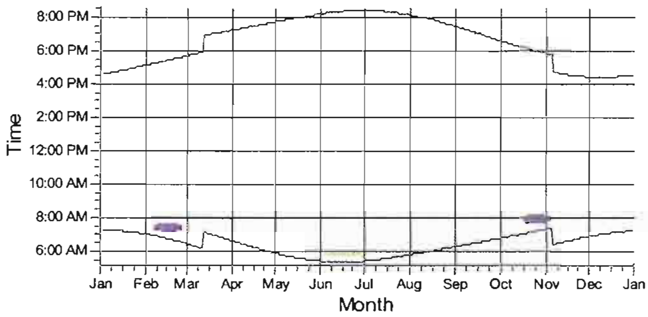
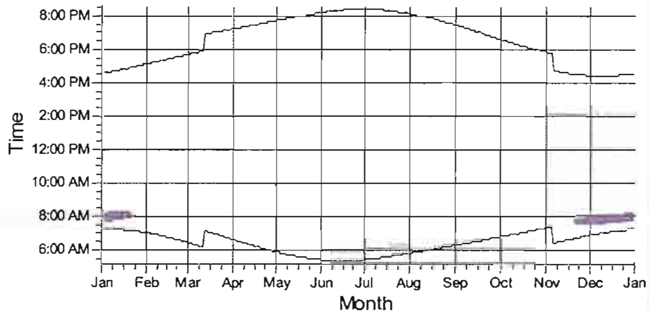
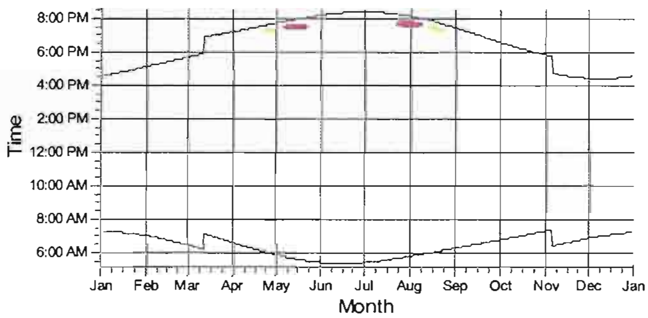
103: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (776)



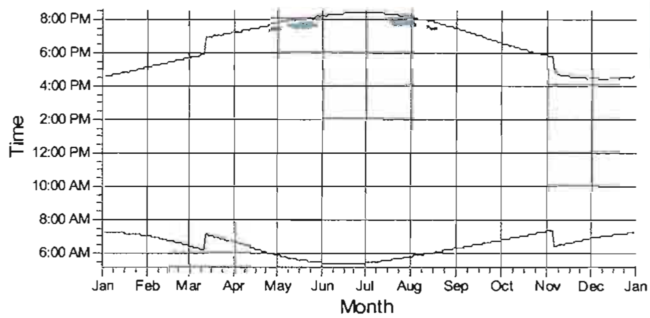
104: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (777)



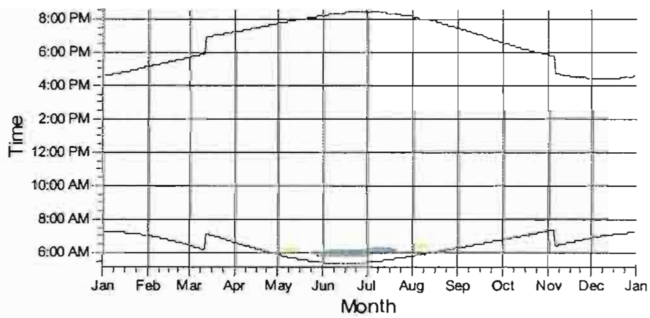
105: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (778)



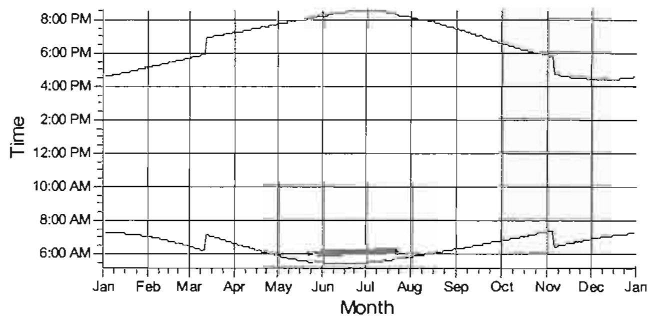
106: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (779)



107: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (780)



108: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (781)



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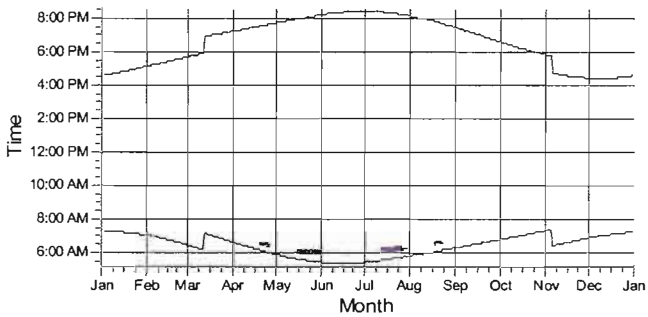
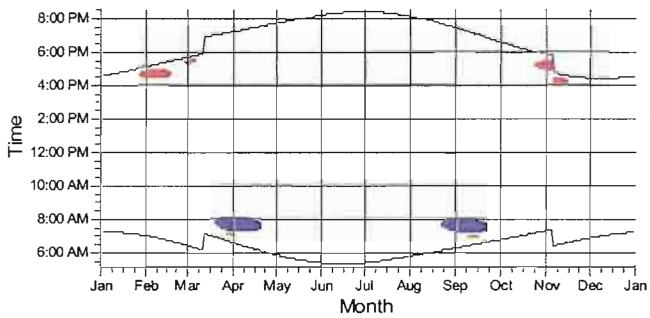
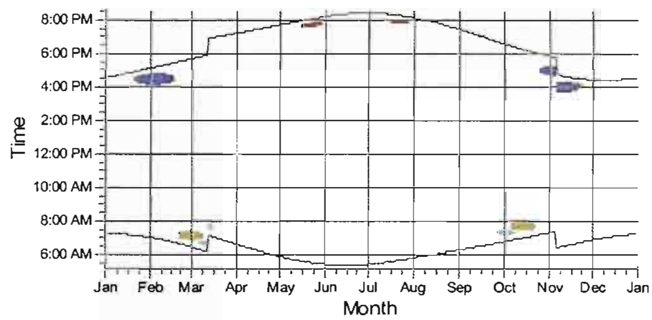
109: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (782)



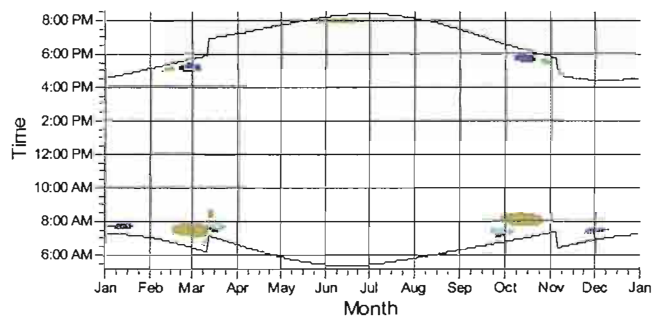
110: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (783)



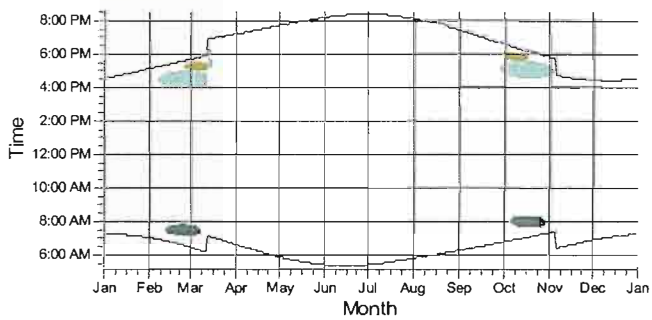
111: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (784)



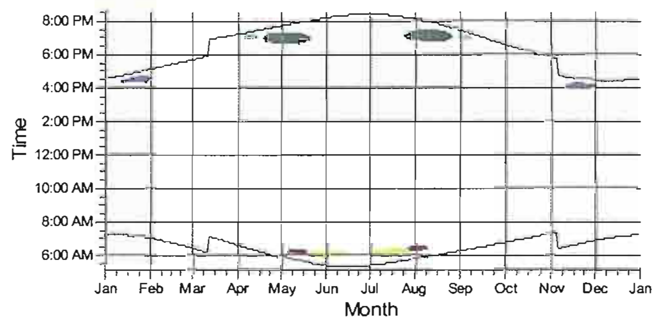
112: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (785)

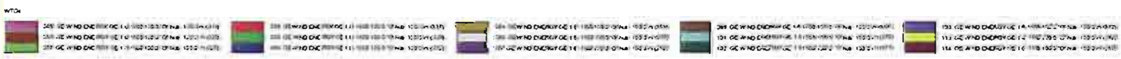


113: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (786)



114: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (787)





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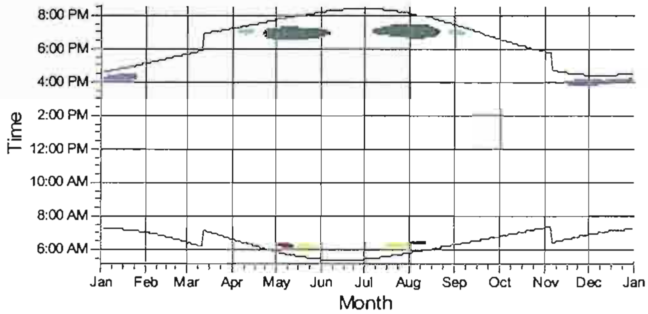
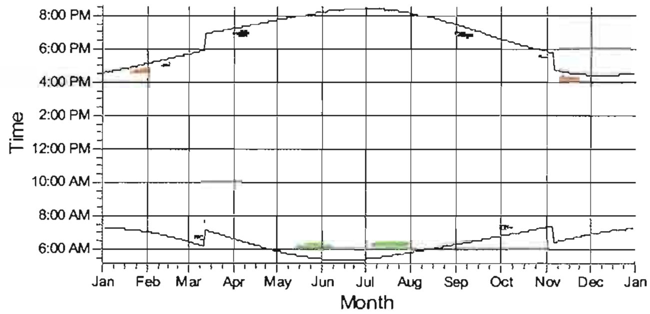
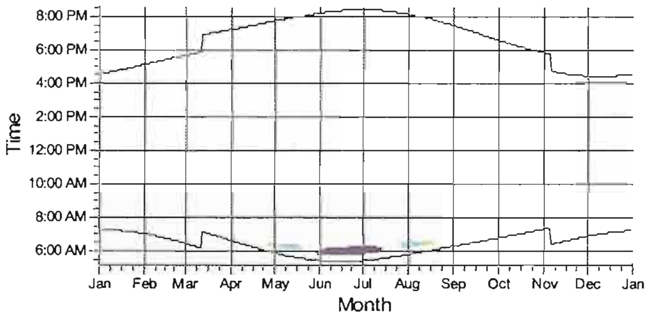
115: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (788)



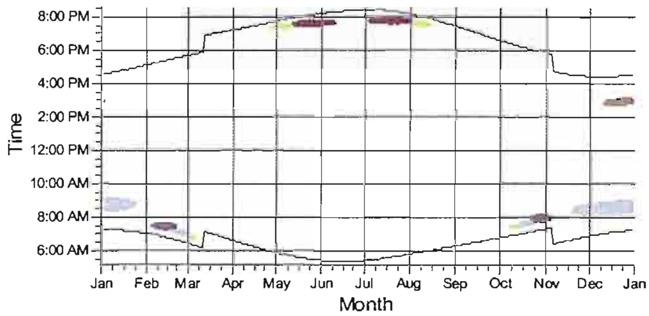
116: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (789)



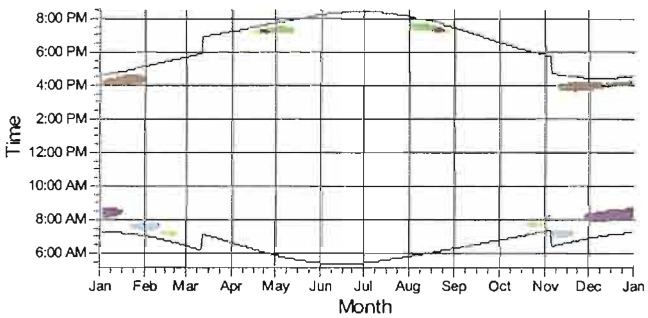
117: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (790)



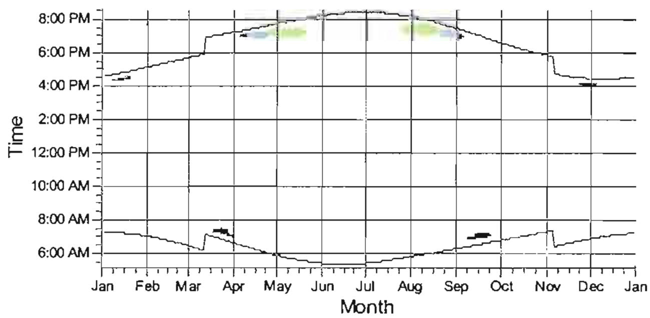
118: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (791)



119: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (792)



120: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (793)



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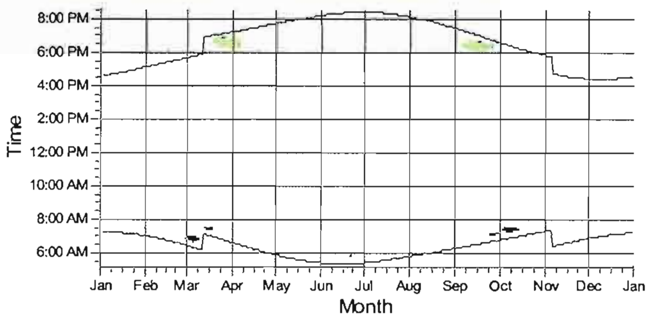
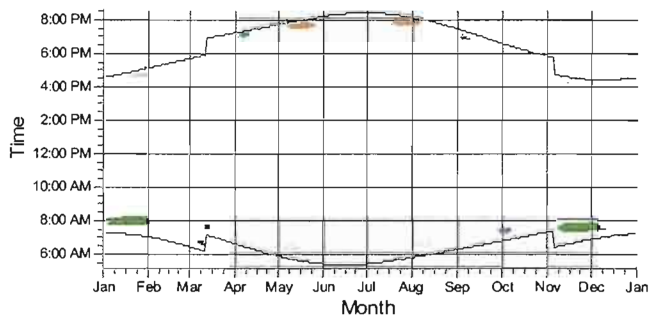
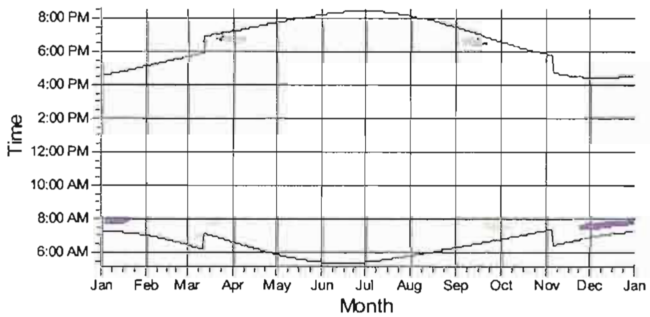
121: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (794)



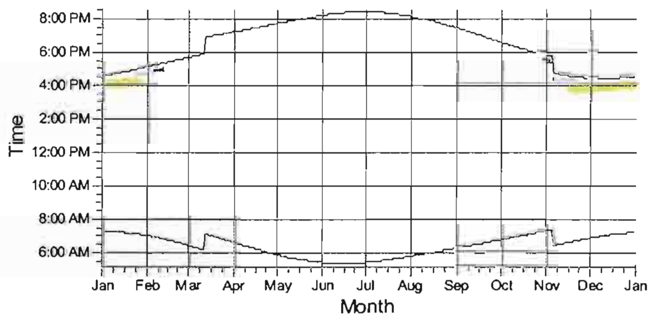
122: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (795)



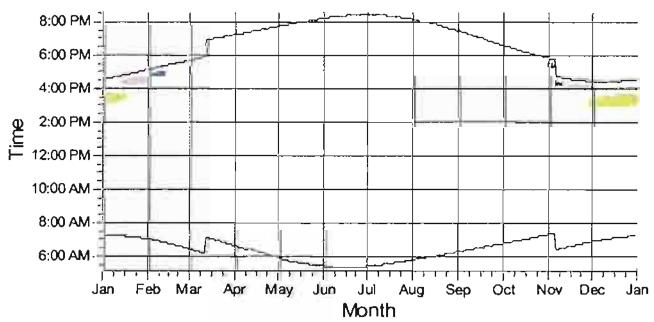
123: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (796)



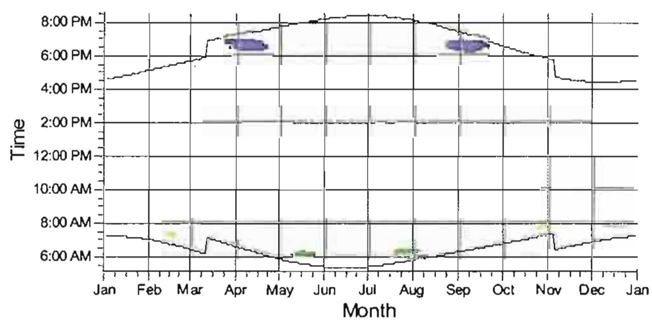
124: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (797)

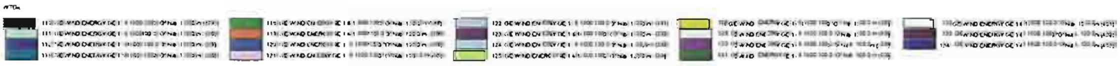


125: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (798)



126: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (799)





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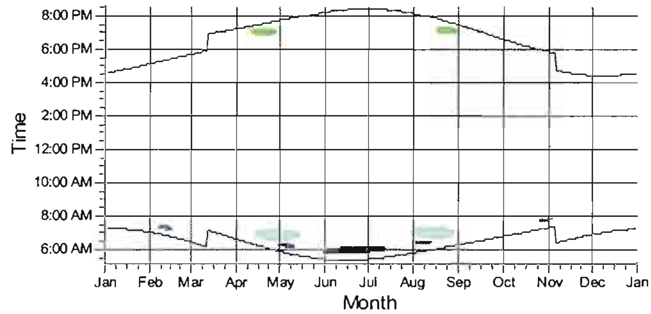
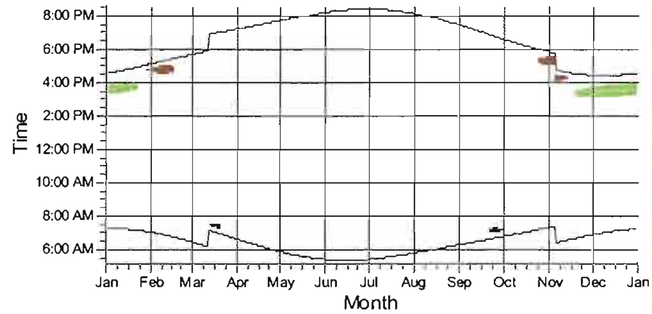
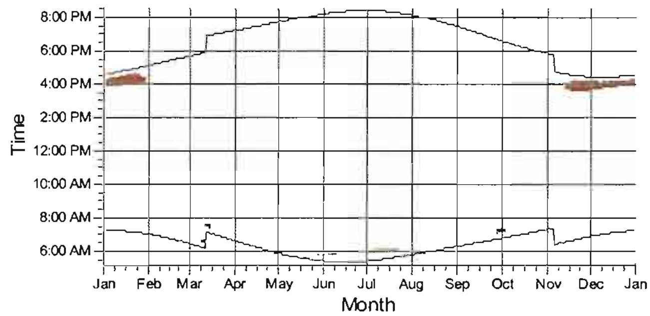
127: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (800)



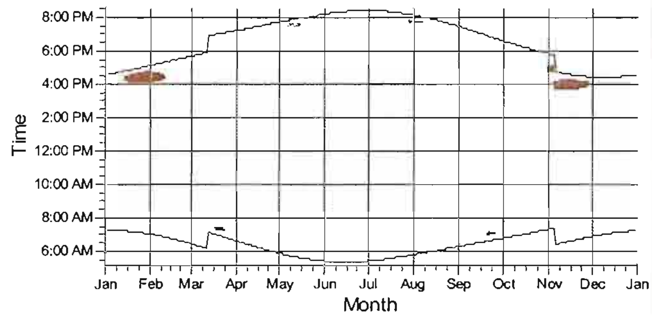
128: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (801)



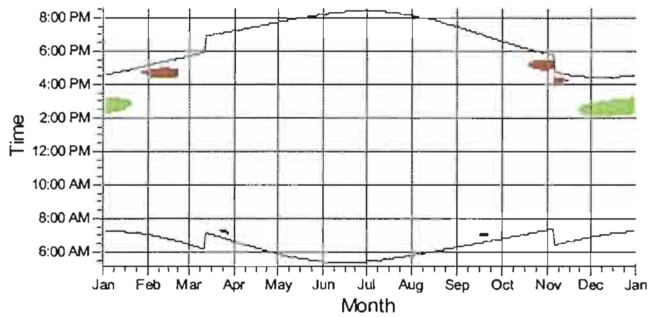
129: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (802)



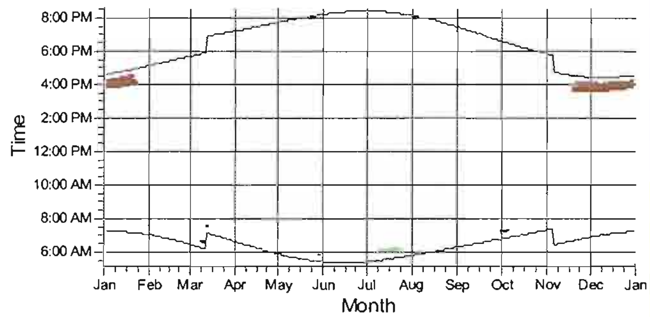
130: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (803)



131: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (804)



132: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (805)



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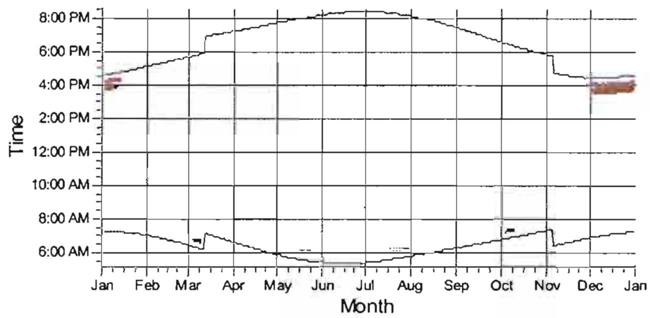
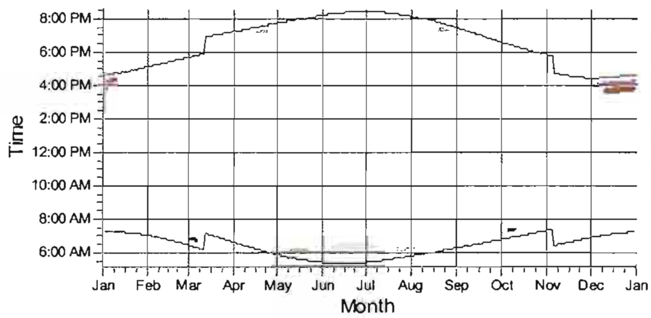
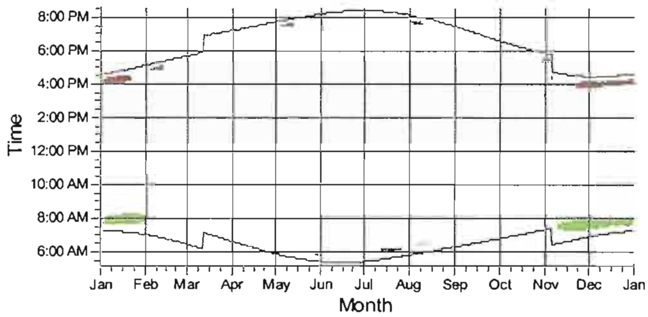
133: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (806)



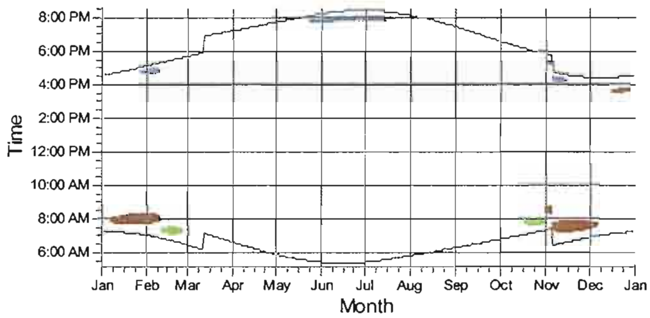
134: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (807)



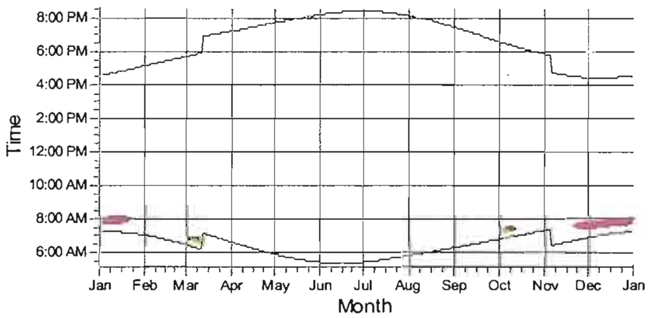
135: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (808)



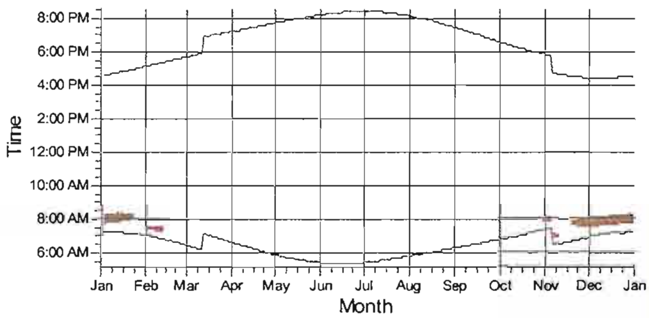
136: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (809)



137: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (810)



138: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (811)



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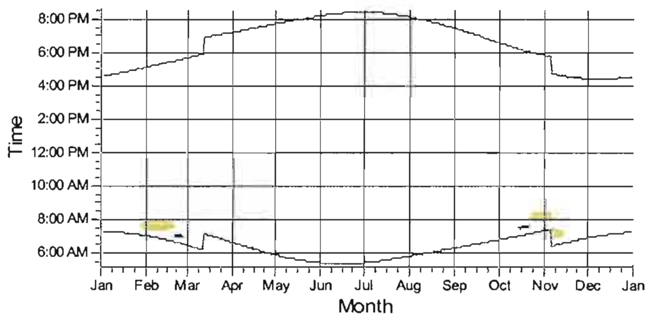
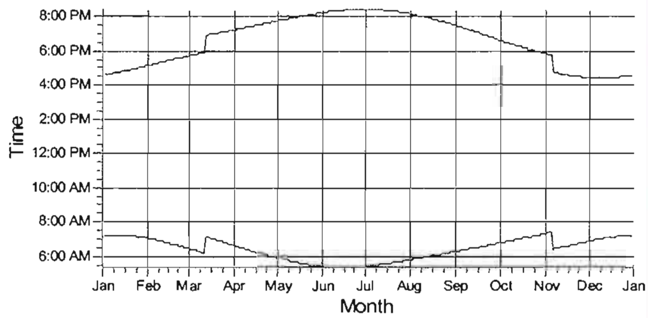
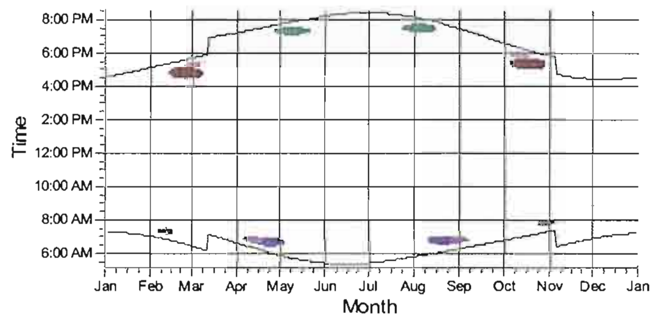
139: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (812)



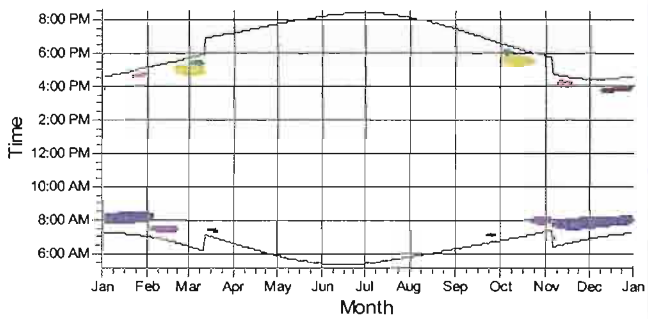
140: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (813)



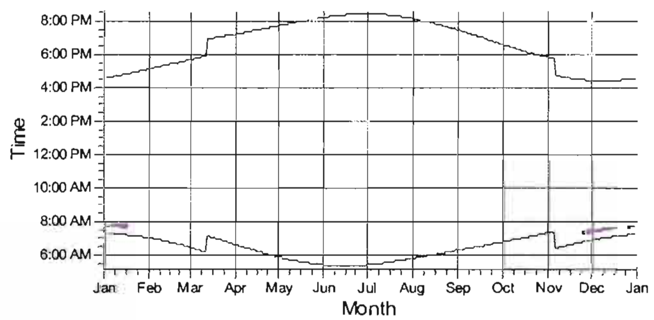
141: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (814)



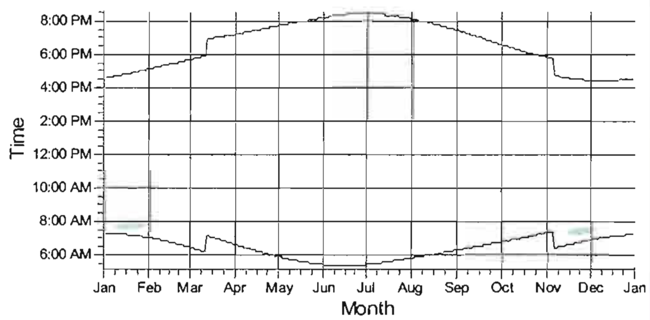
142: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (815)

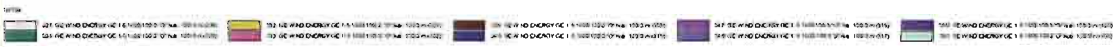


143: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (816)



144: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (817)





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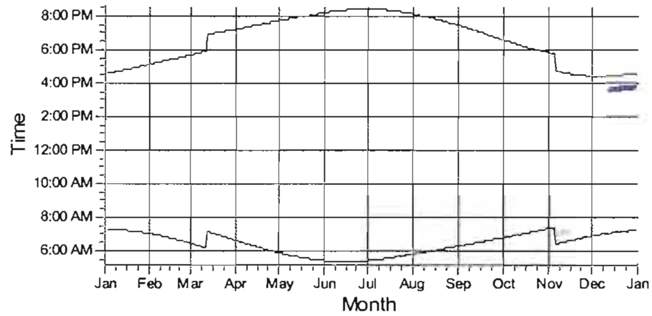
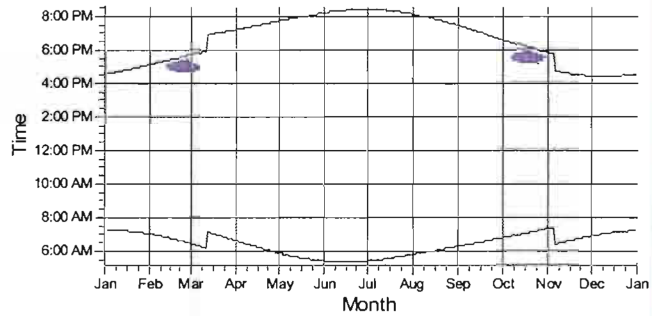
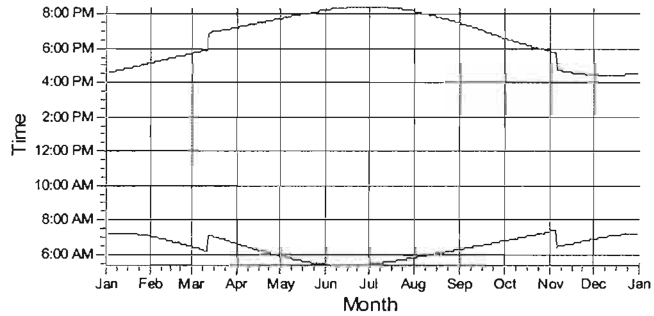
145: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (818)



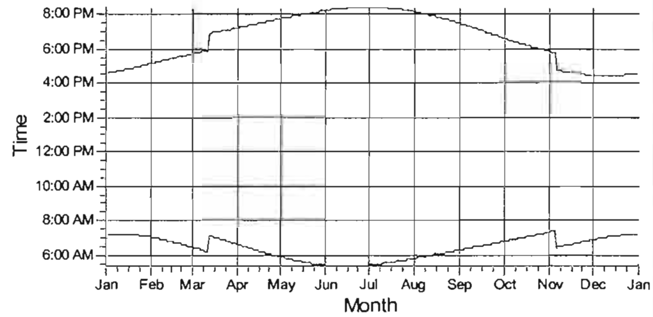
146: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (819)



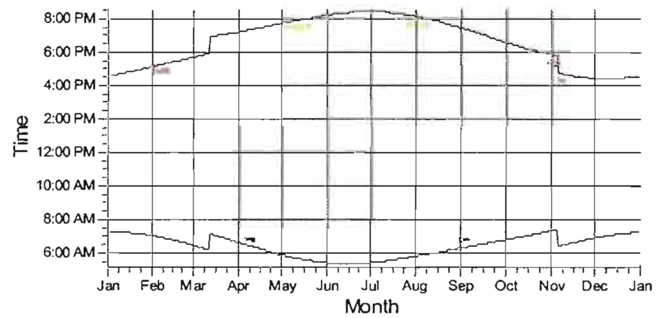
147: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (820)



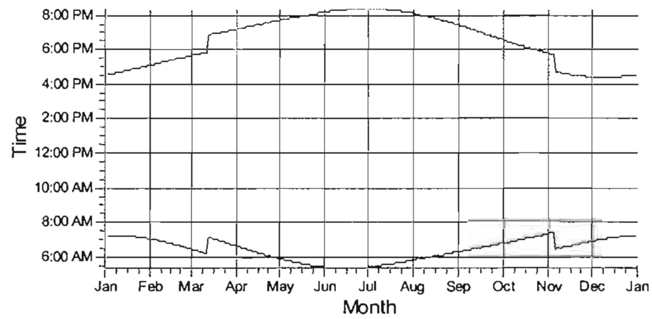
148: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (821)



149: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (822)



150: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (823)



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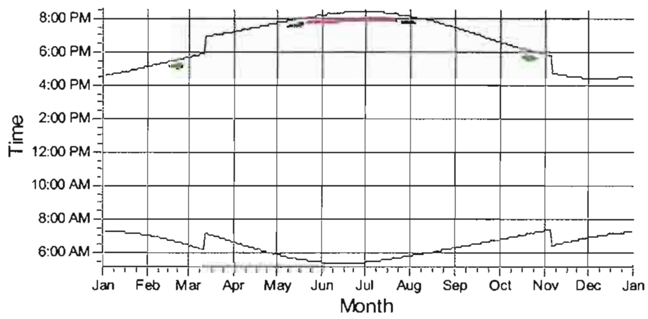
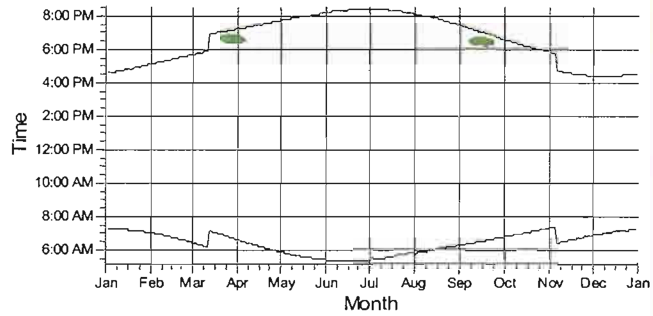
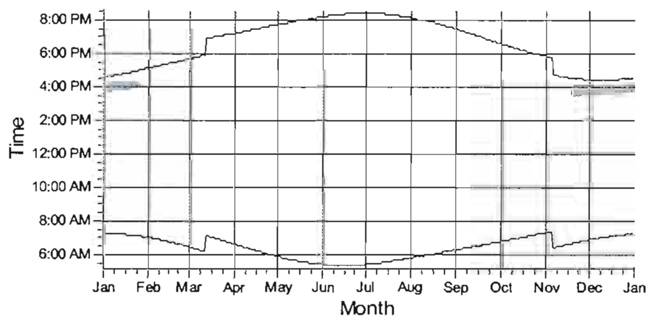
151: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (824)



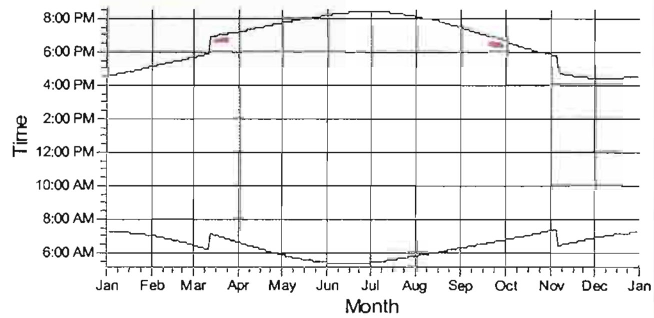
152: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (825)



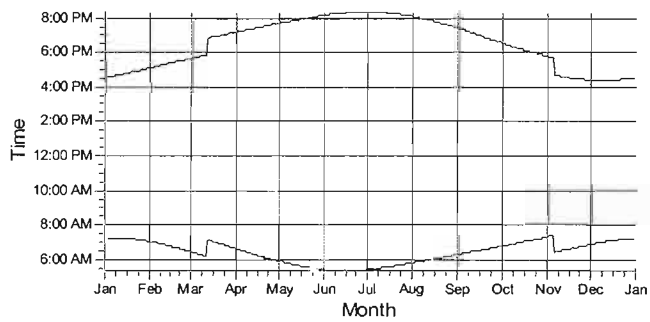
153: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (826)



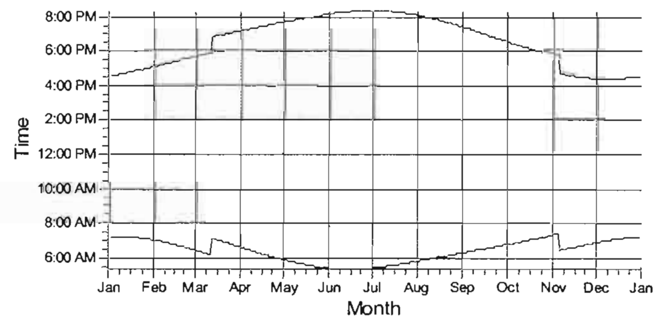
154: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (827)



155: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (828)



156: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (829)



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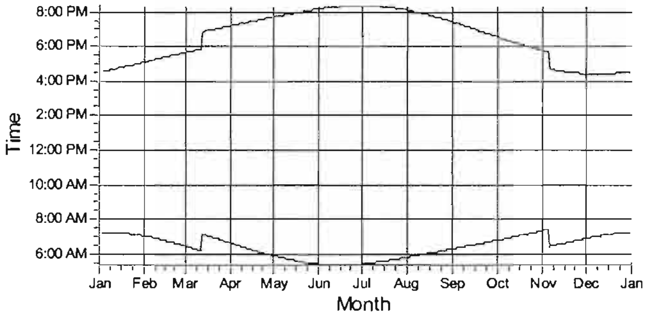
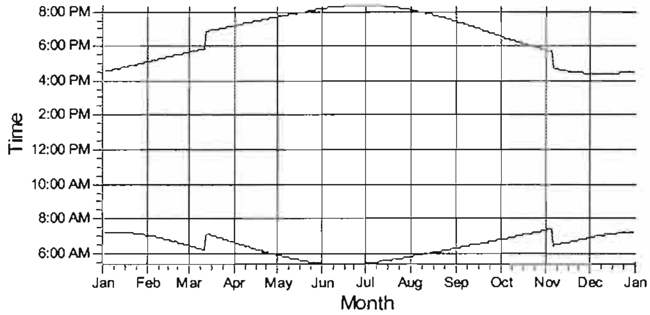
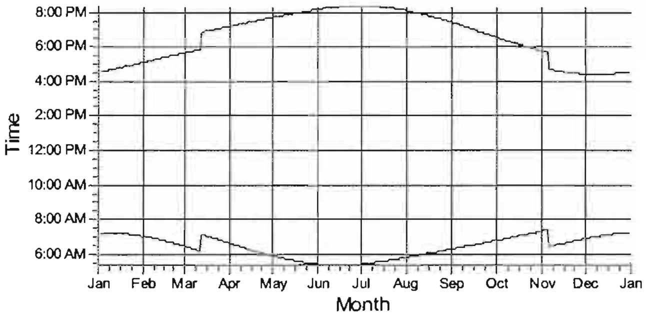
157: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (830)



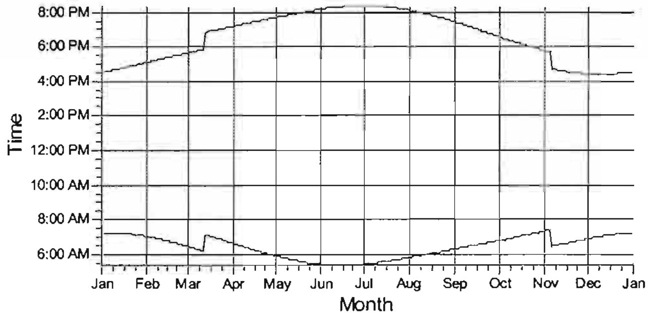
158: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (831)



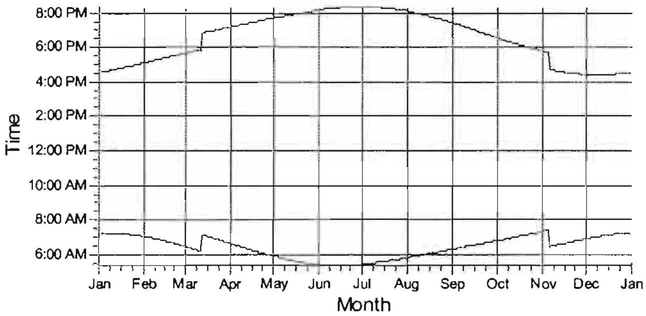
159: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (832)



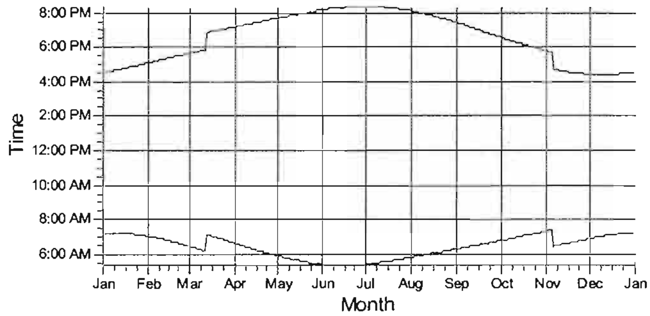
160: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (833)



161: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (834)



162: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (835)



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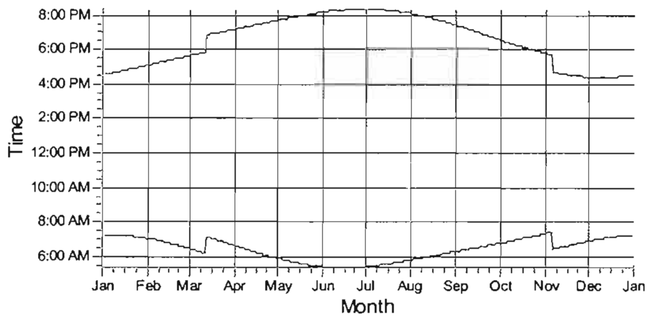
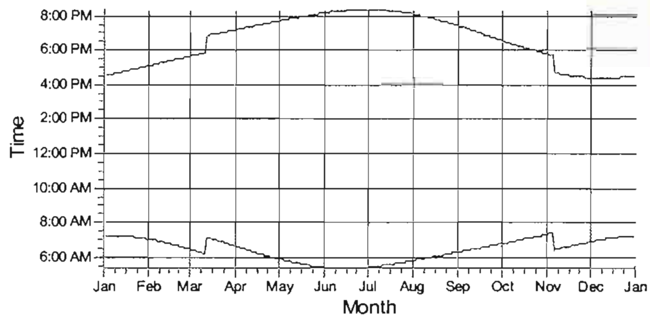
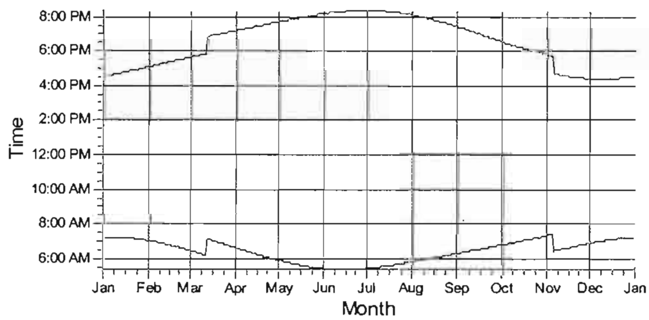
163: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (836)



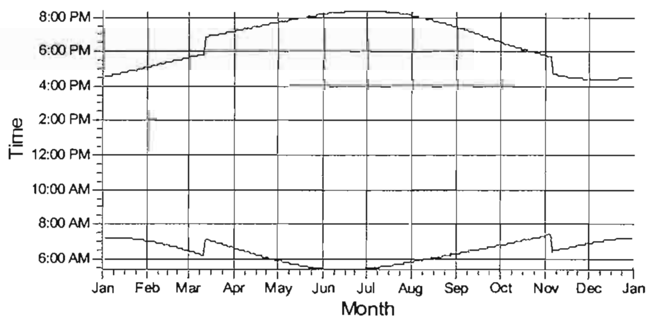
164: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (837)



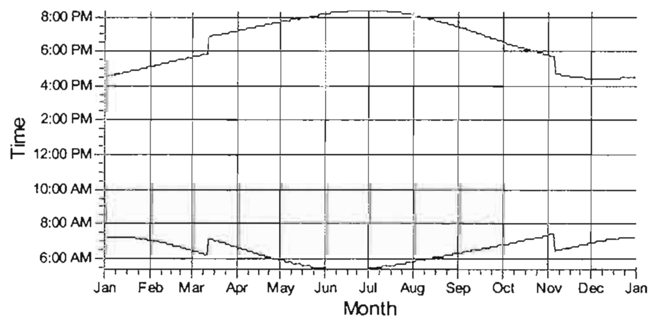
165: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (838)



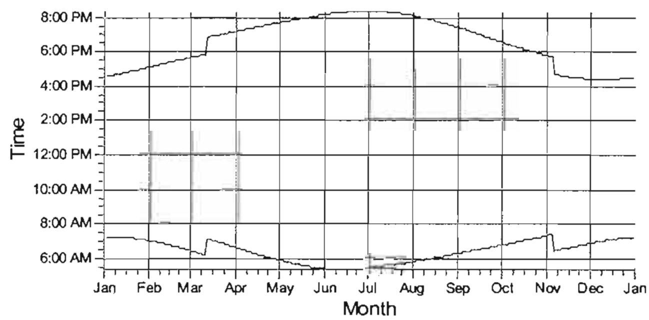
166: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (839)



167: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (840)



168: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (841)



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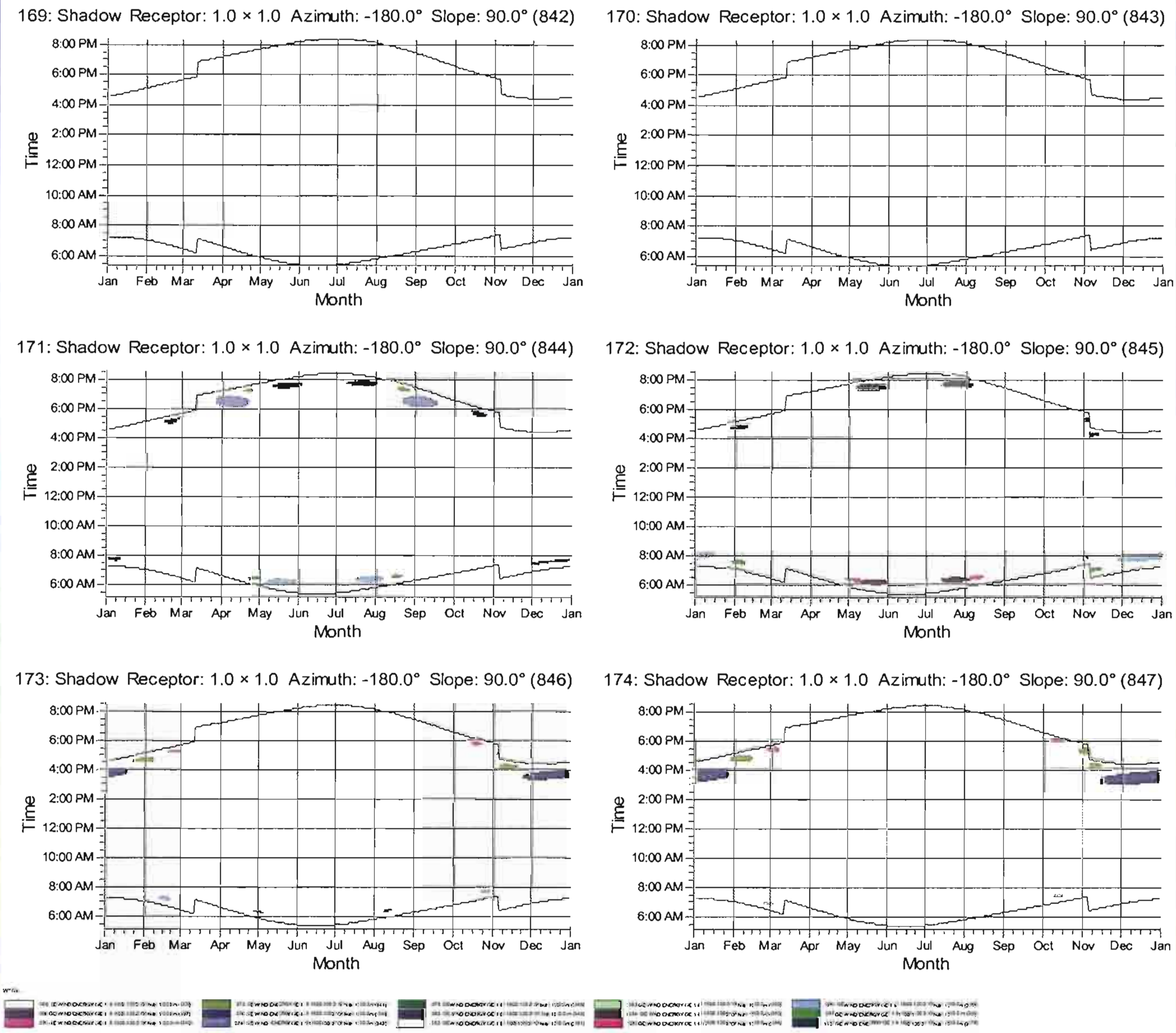

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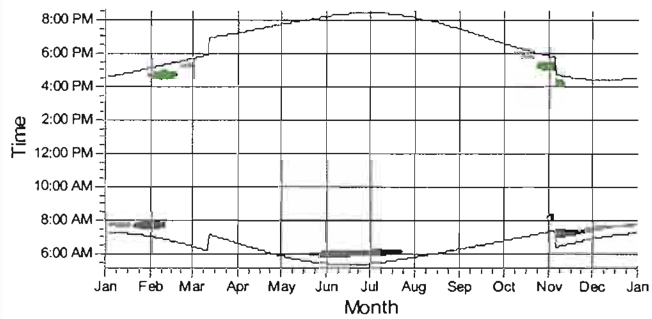
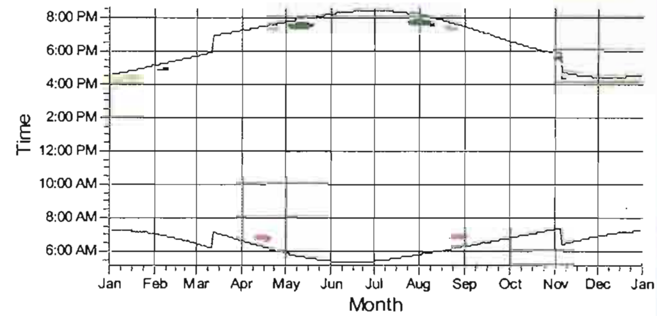
Calculation: SF_CaliRidge_ver3_20110624

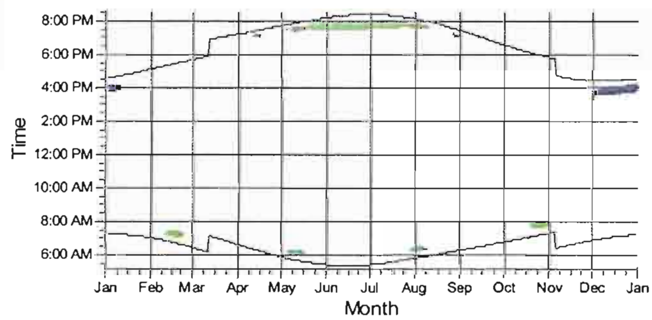
175: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (848)



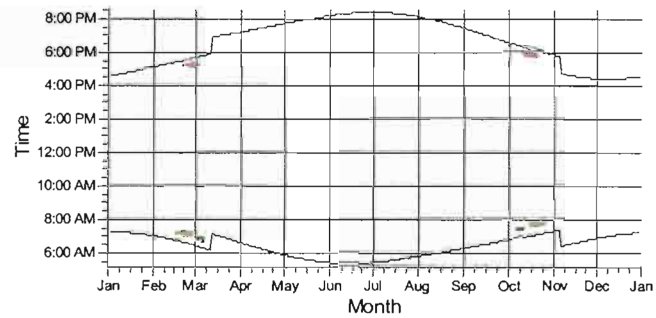
176: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (849)



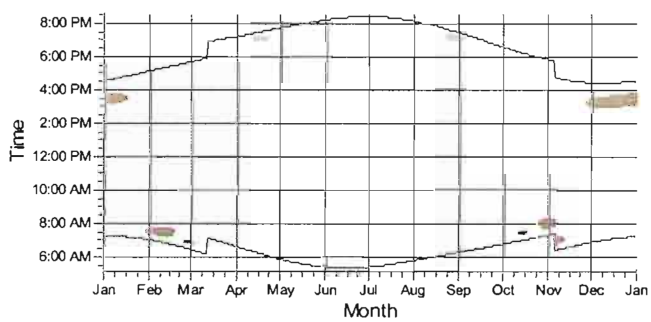
177: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (850)



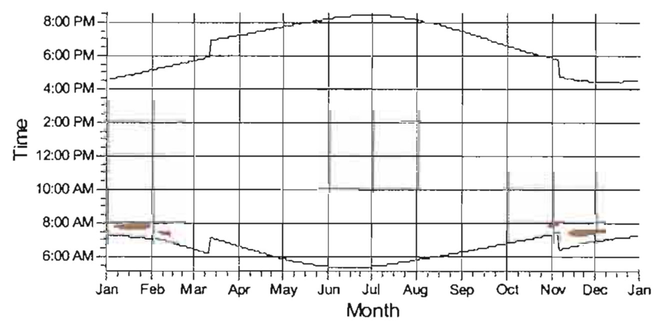
178: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (851)



179: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (852)



180: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (853)



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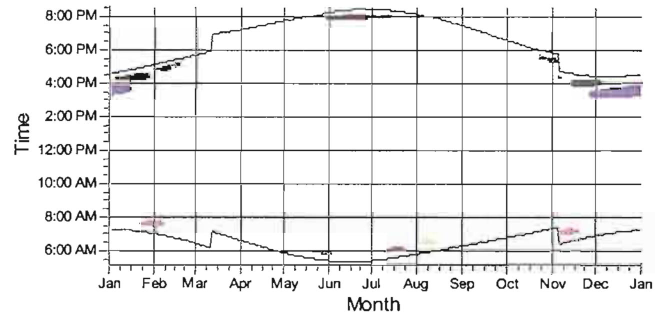
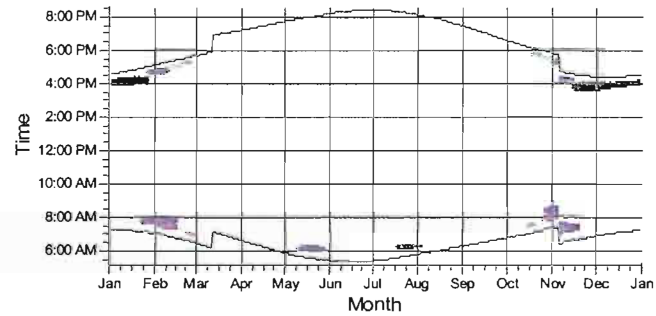
SHADOW - Calendar, graphical

Calculation: SF_CaliRidge_ver3_20110624

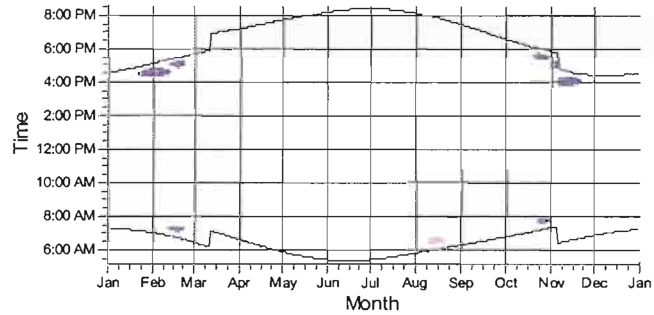
181: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (854)



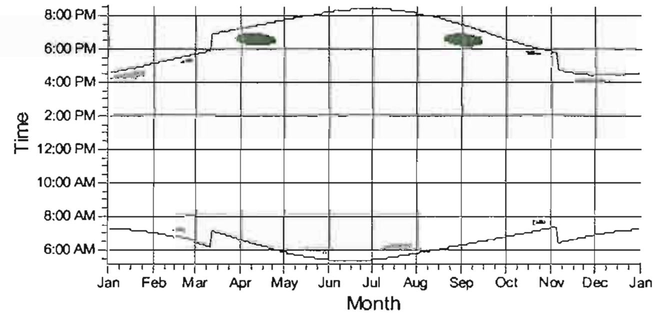
182: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (855)



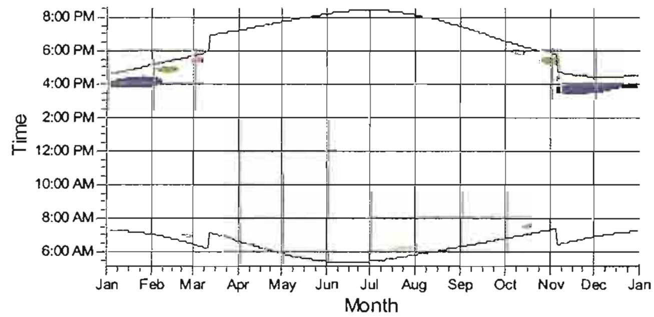
183: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (856)



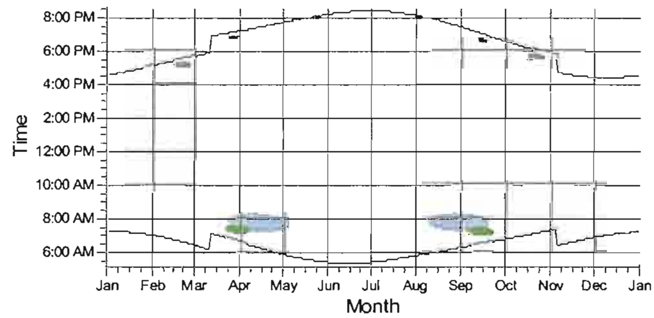
184: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (857)



185: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (858)



186: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (859)



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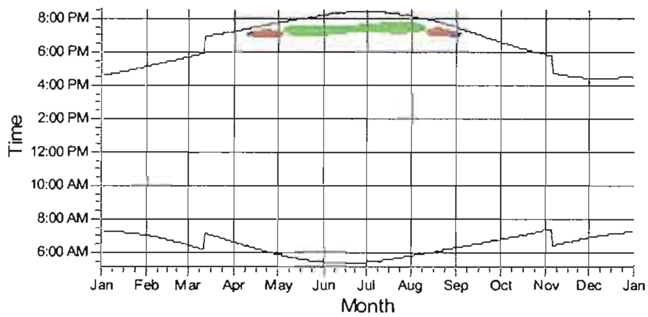
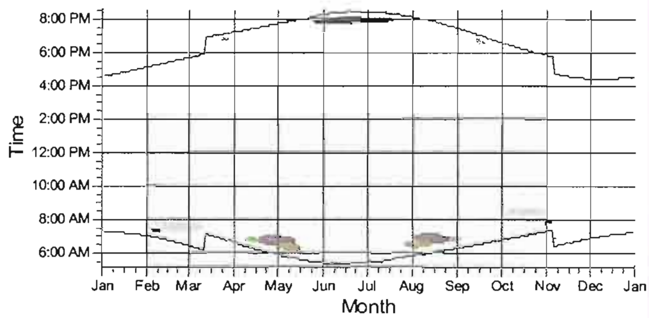
SHADOW - Calendar, graphical

Calculation: SF_CaliRidge_ver3_20110624

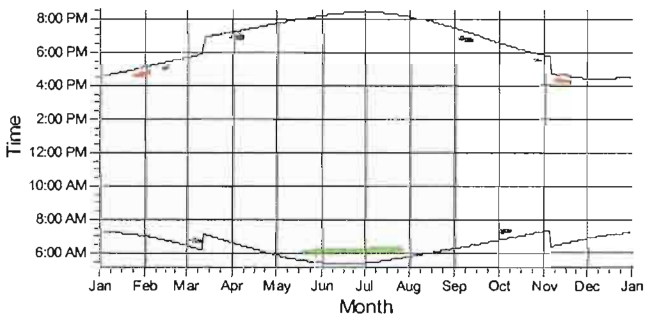
187: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (860)



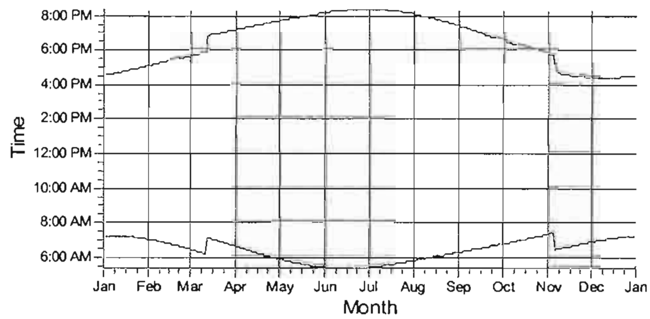
188: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (861)



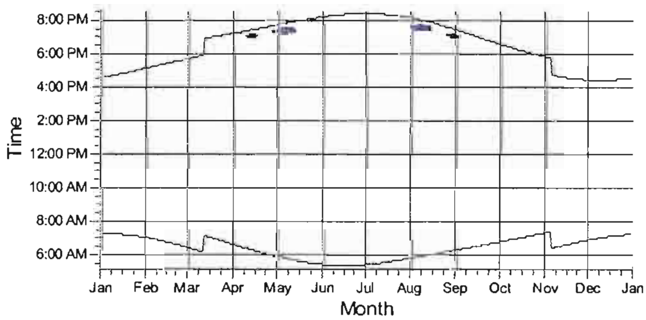
189: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (862)



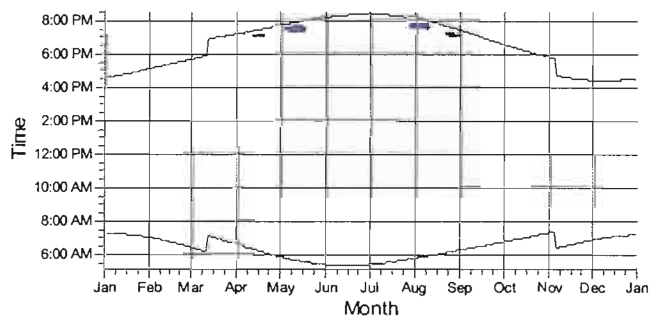
190: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (863)



191: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (864)



192: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (865)



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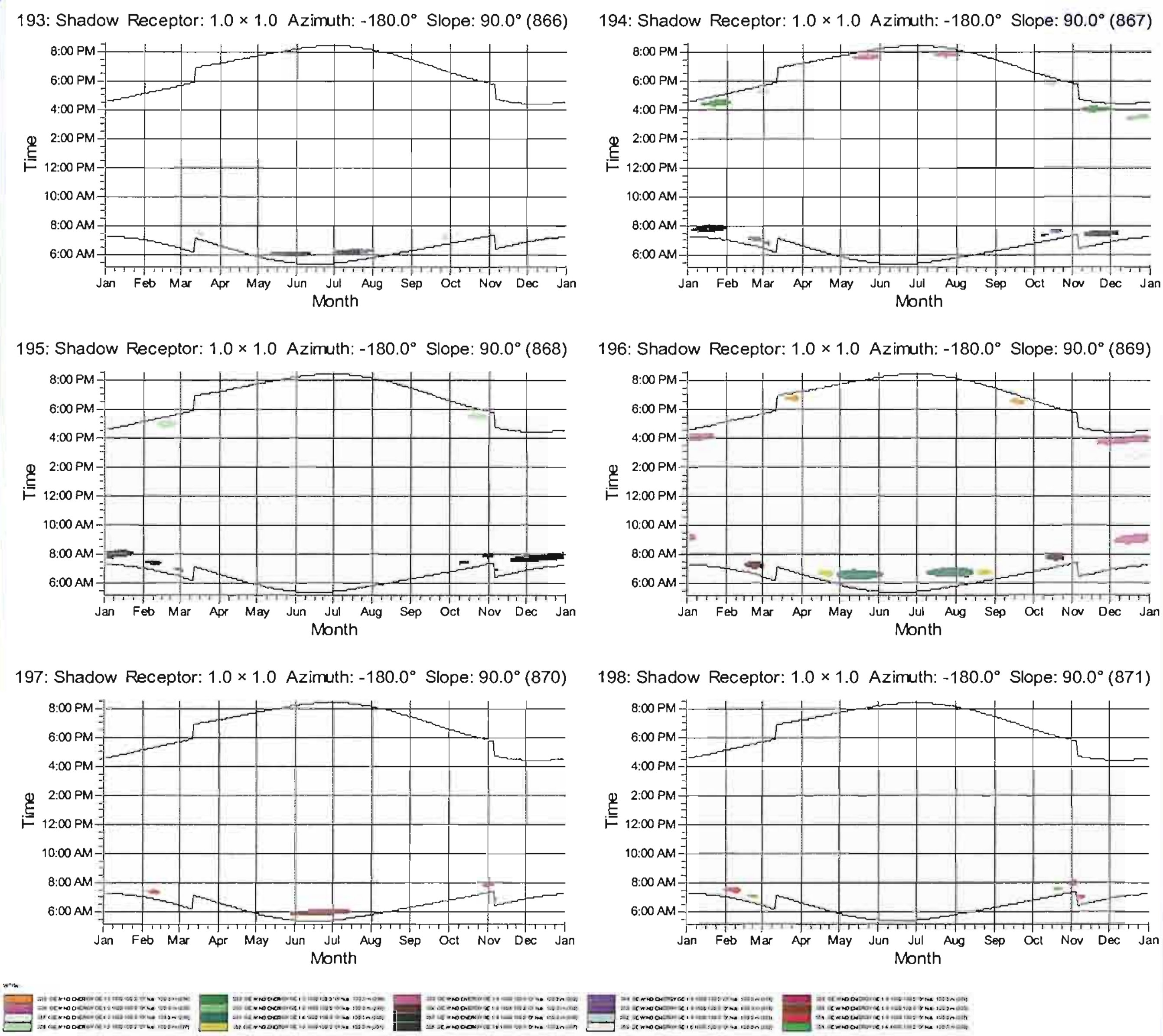

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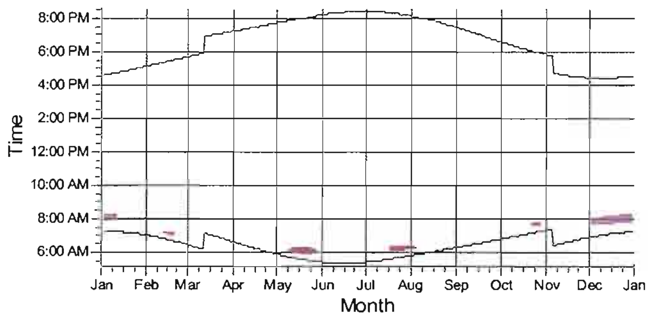
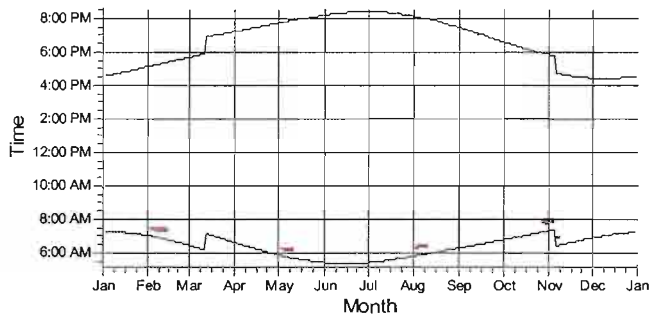
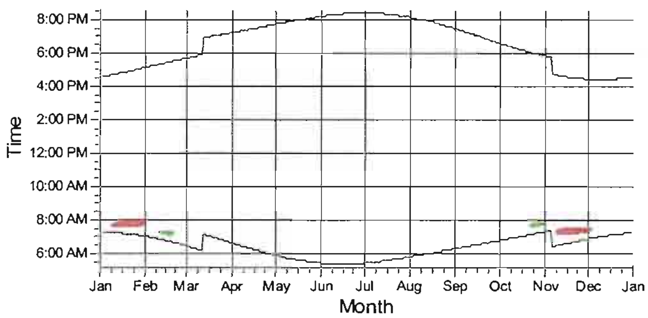
199: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (872)



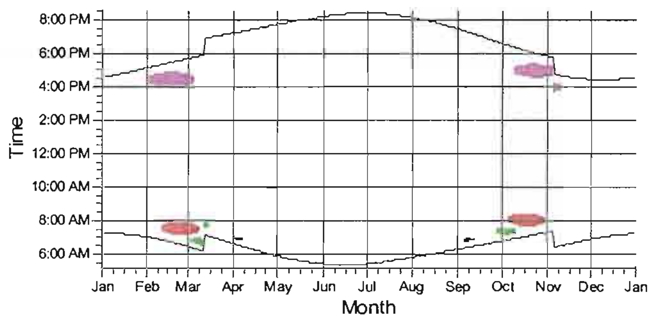
200: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (873)



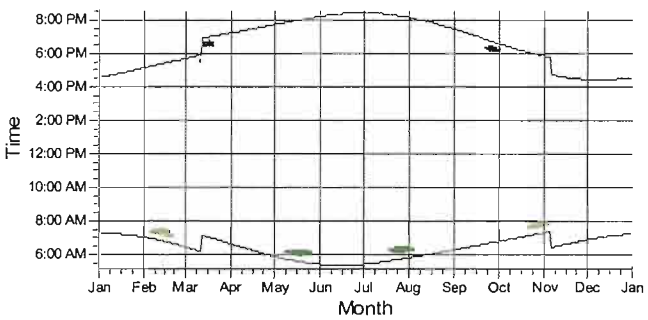
201: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (874)



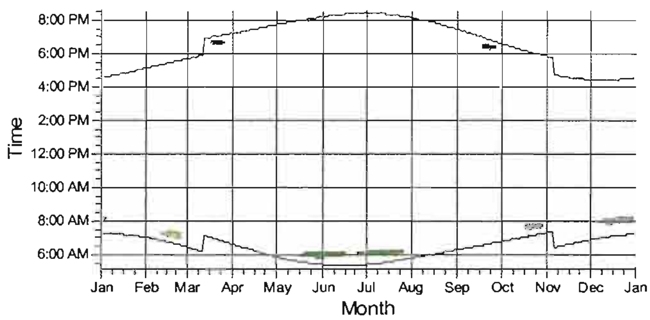
202: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (875)



203: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (876)



204: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (877)



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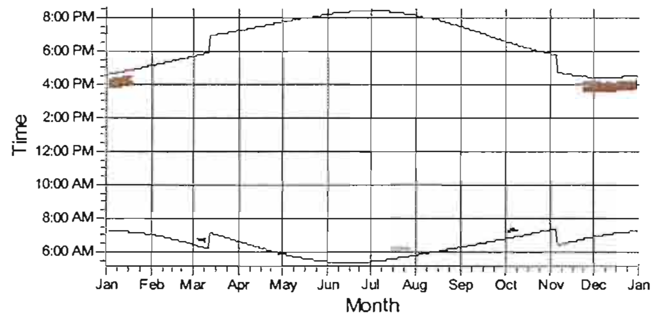
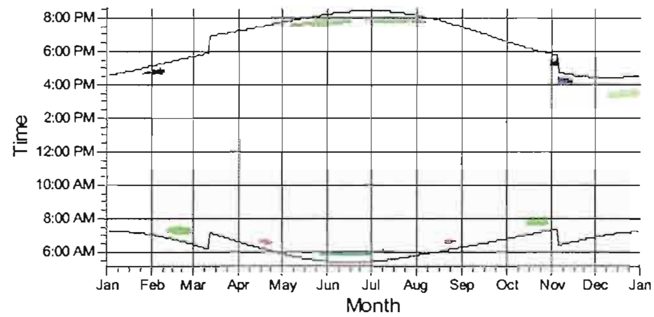
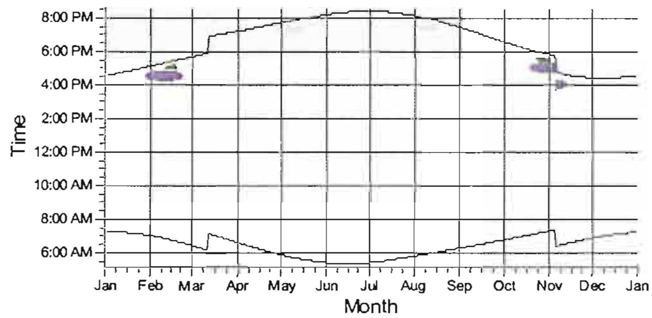
205: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (878)



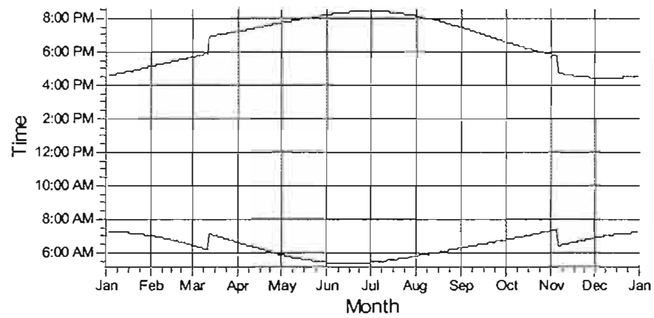
206: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (879)



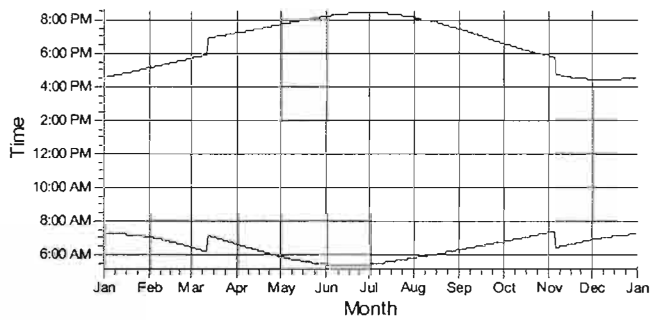
207: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (880)



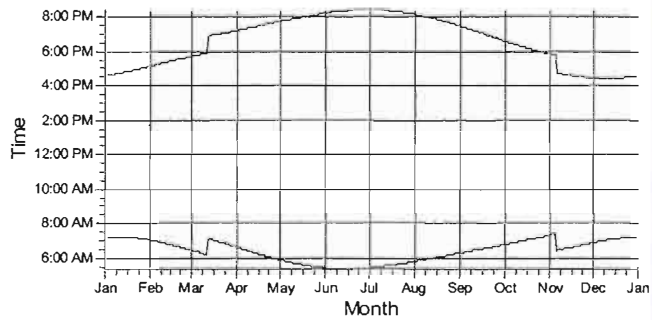
208: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (881)

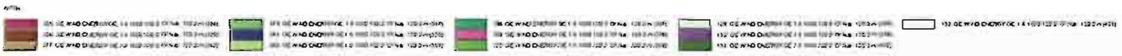


209: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (882)



210: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (883)





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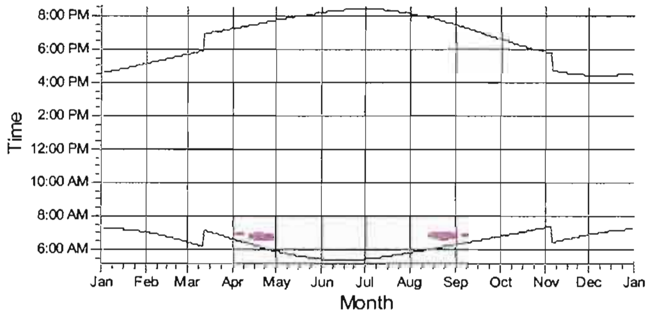
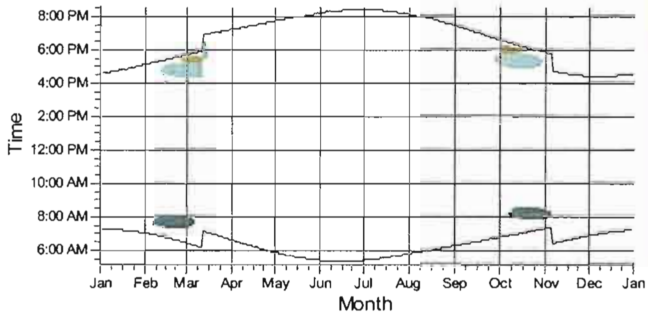
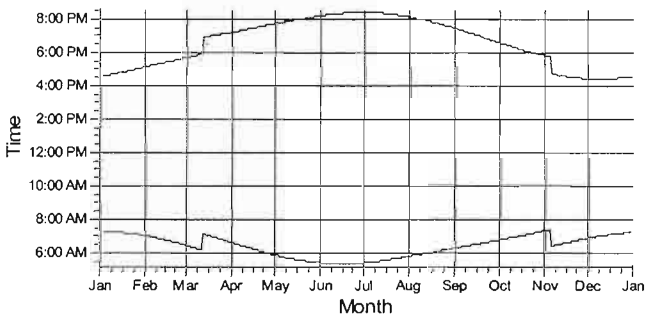
211: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (884)



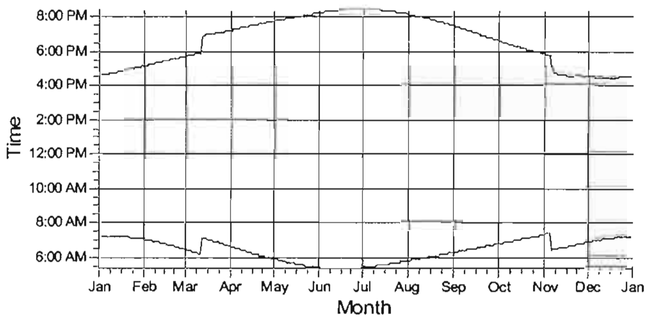
212: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (885)



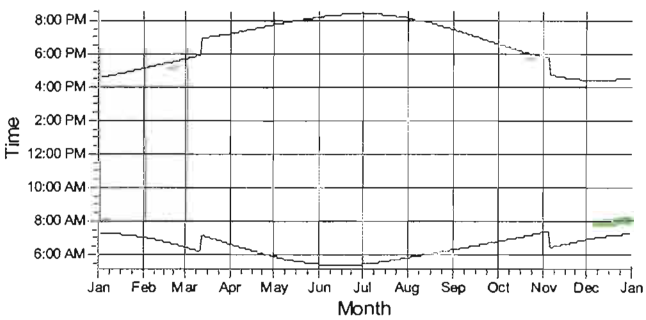
213: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (886)



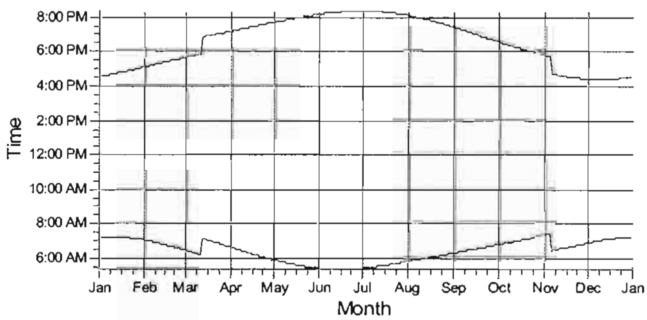
214: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (887)



215: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (888)



216: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (889)



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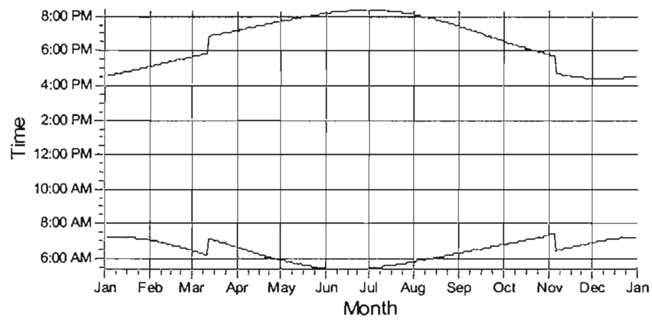
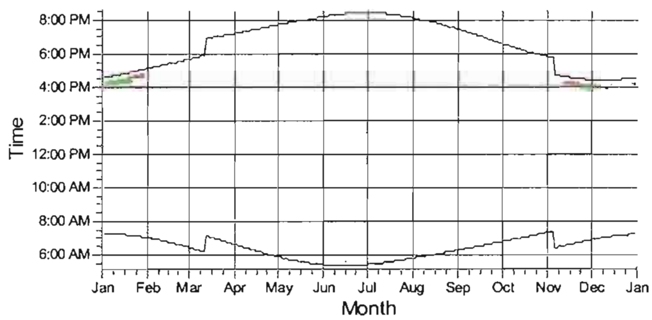
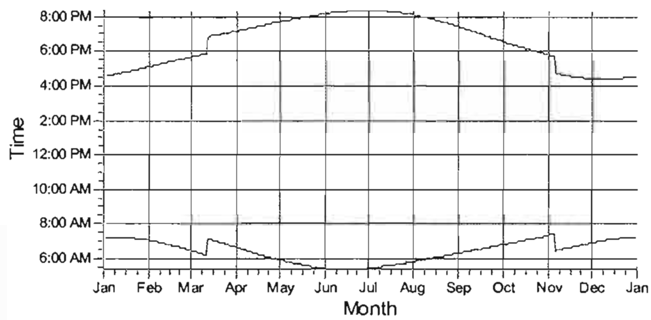
217: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (890)



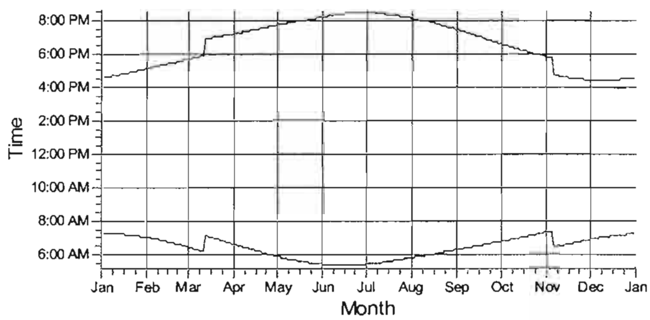
218: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (891)



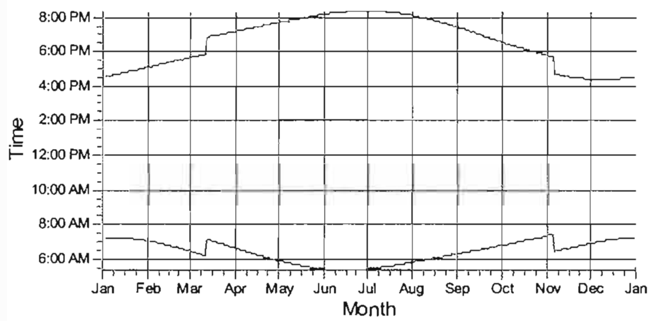
219: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (892)



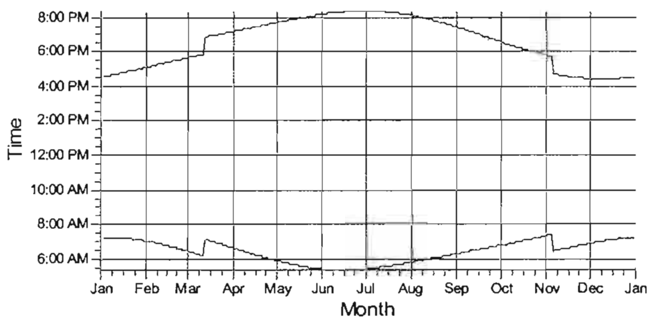
220: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (893)



221: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (894)



222: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (895)



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SHADOW - Calendar, graphical

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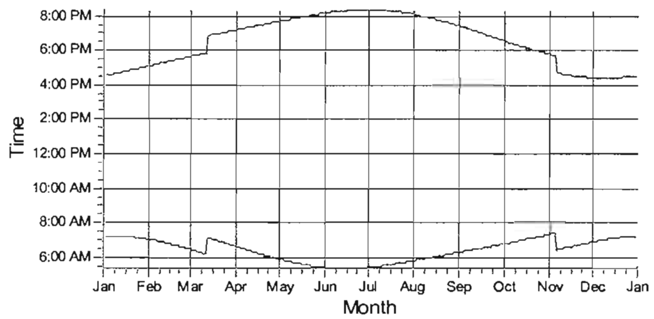
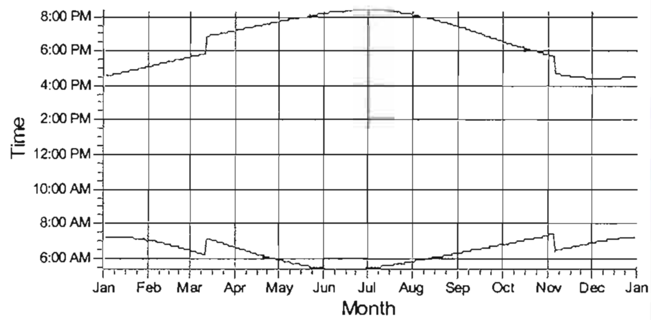
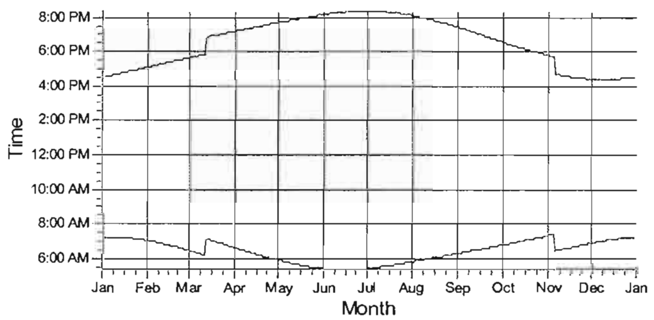
223: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (896)



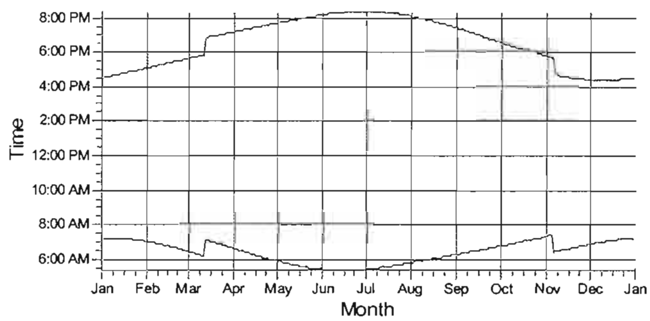
224: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (897)



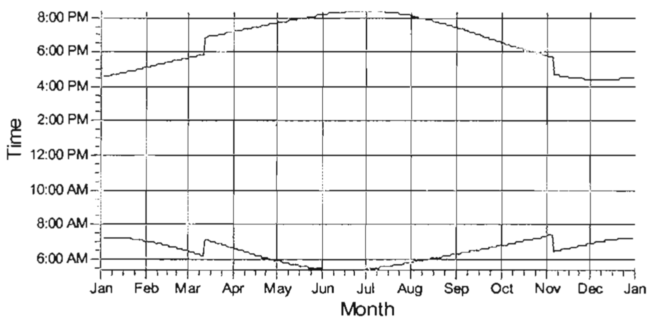
225: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (898)



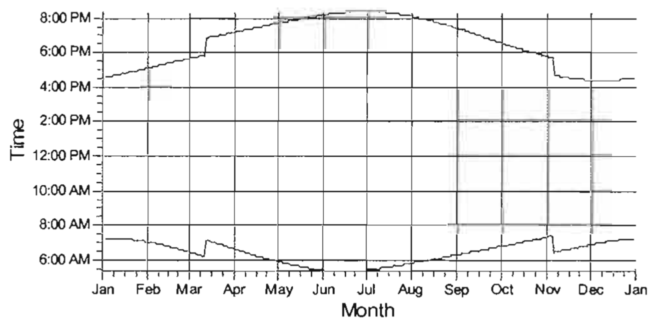
226: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (899)



227: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (900)



228: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (901)



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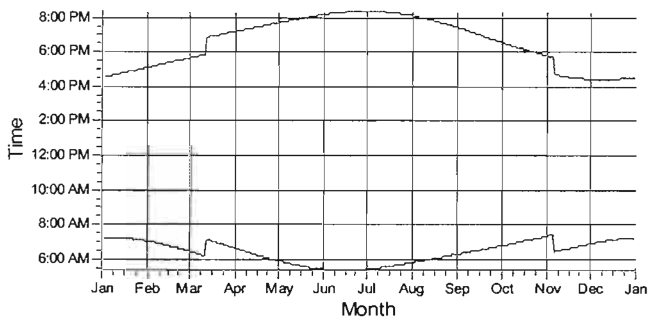
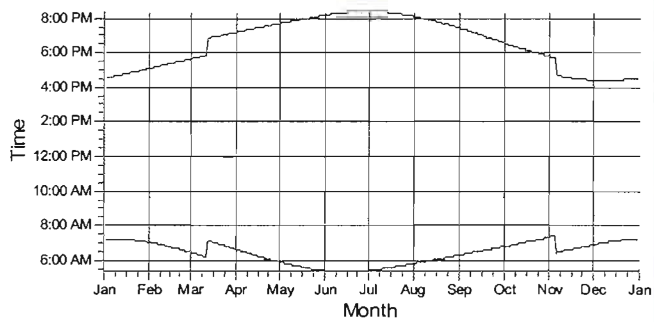
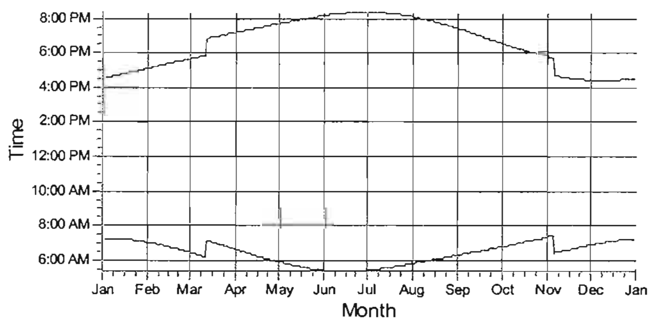
229: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (902)



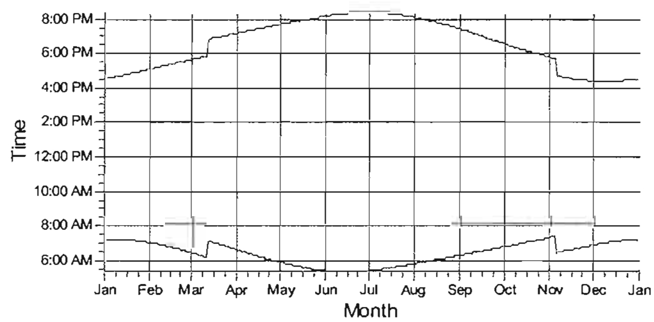
230: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (903)



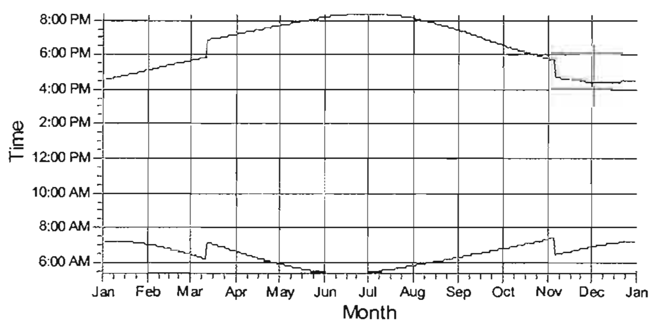
231: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (904)



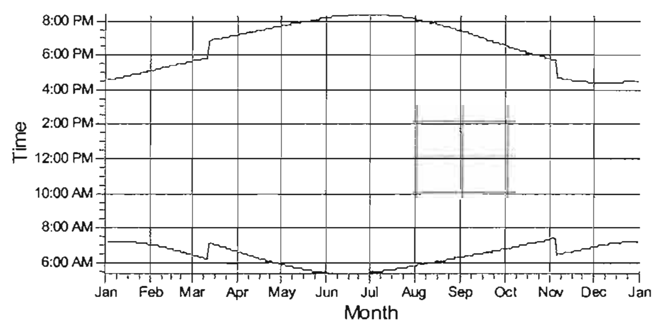
232: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (905)



233: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (906)



234: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (907)



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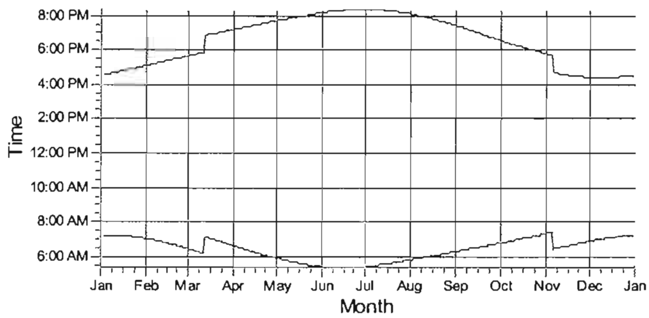
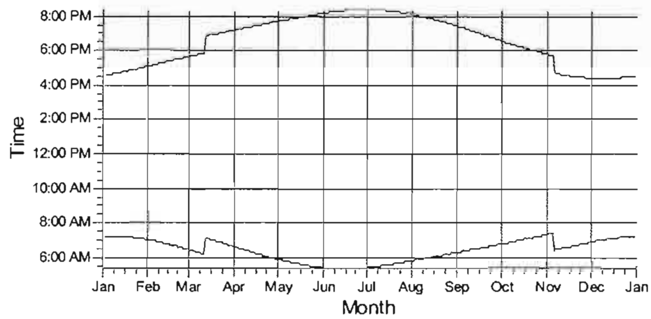
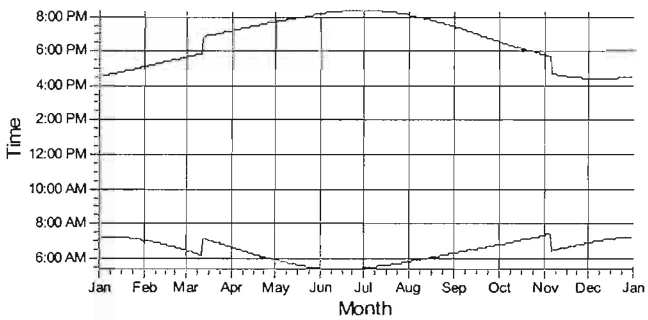
235: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (908)



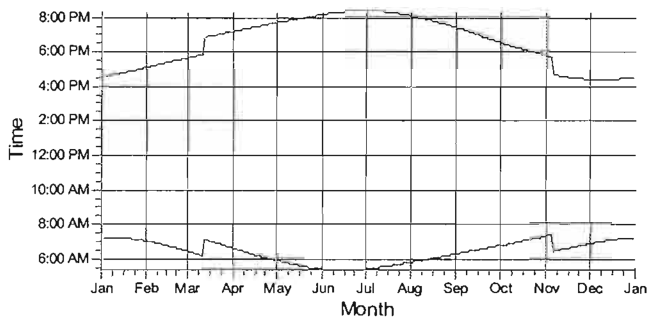
236: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (909)



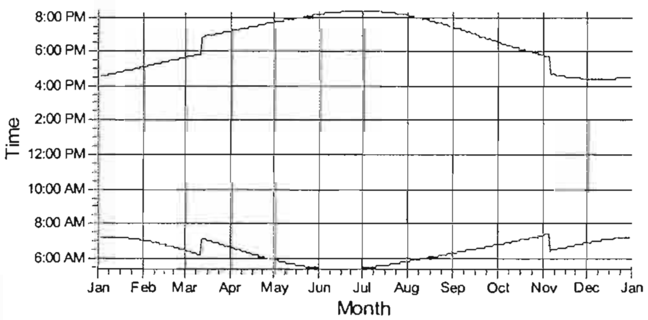
237: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (910)



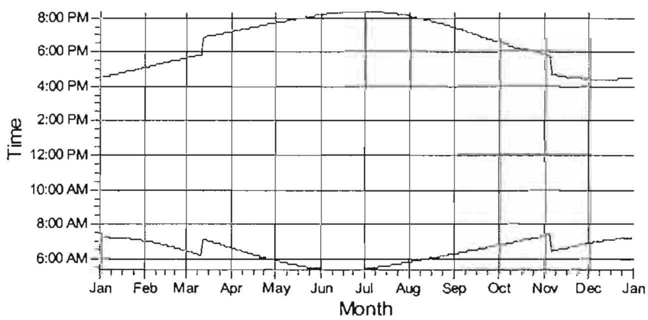
238: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (911)



239: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (912)



240: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (913)



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SHADOW - Calendar, graphical

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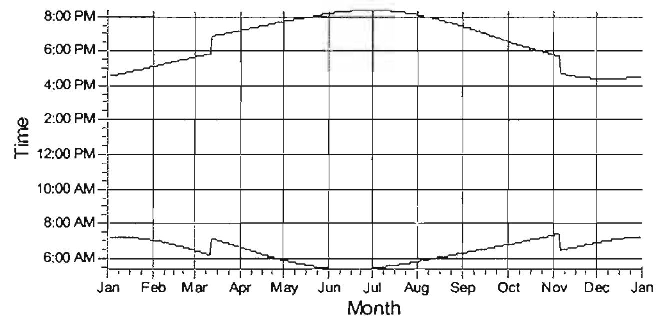
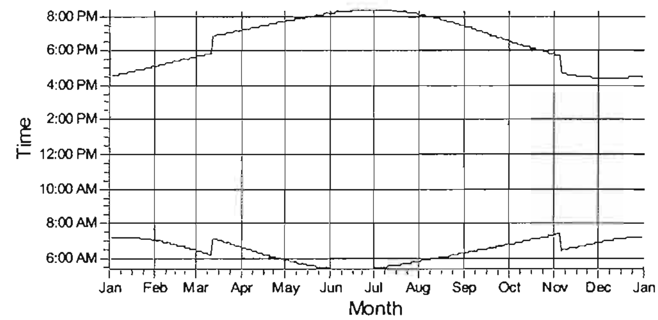
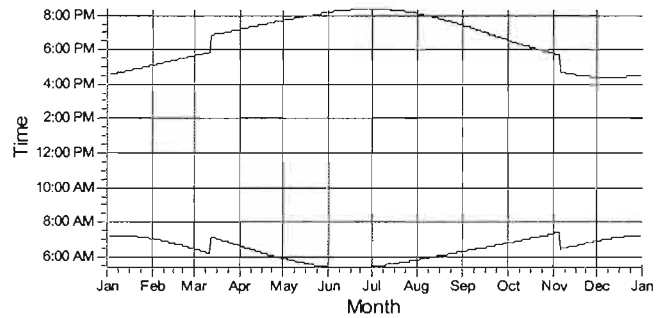
241: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (914)



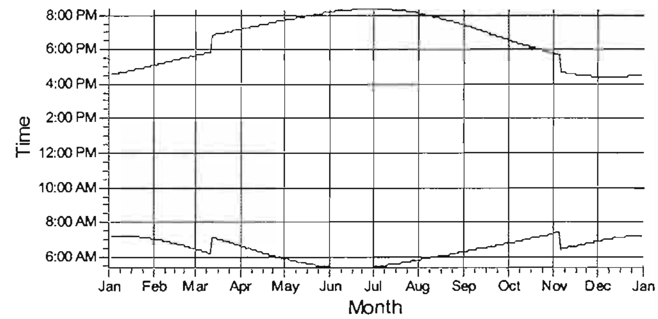
242: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (915)



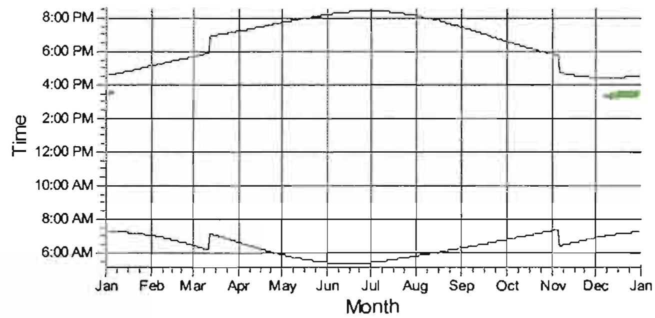
243: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (916)



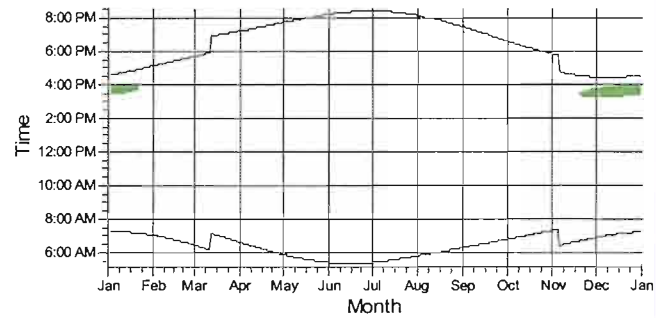
244: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (917)



245: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (918)



246: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (919)



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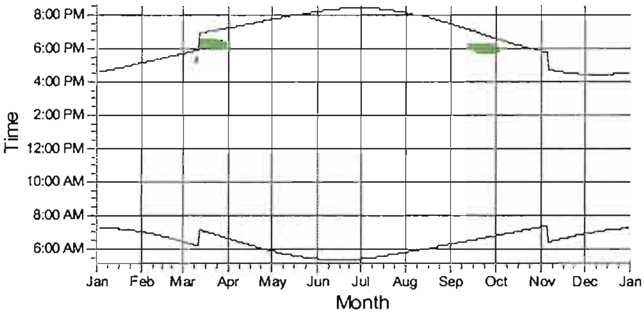
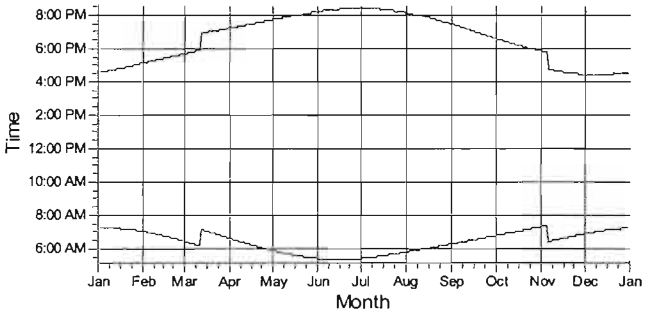
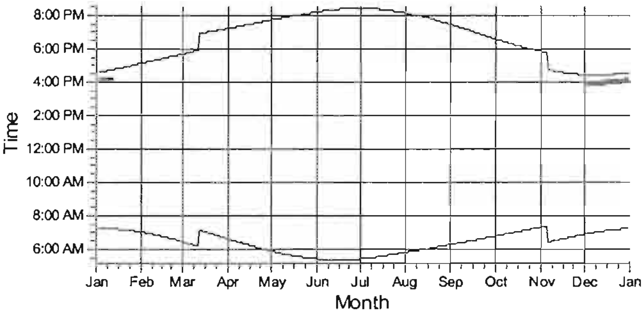
247: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (920)



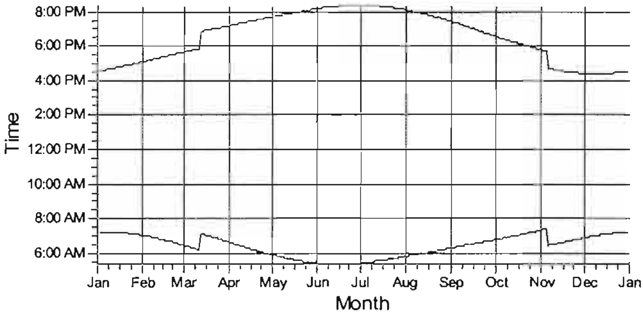
248: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (921)



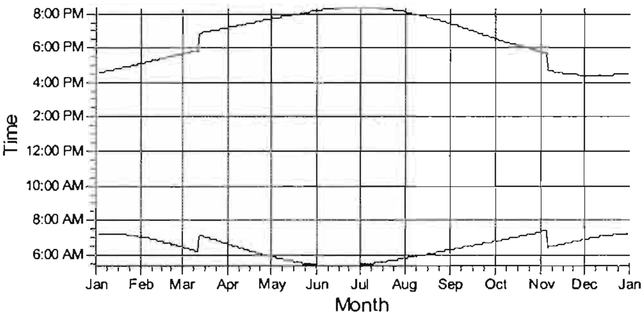
249: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (922)



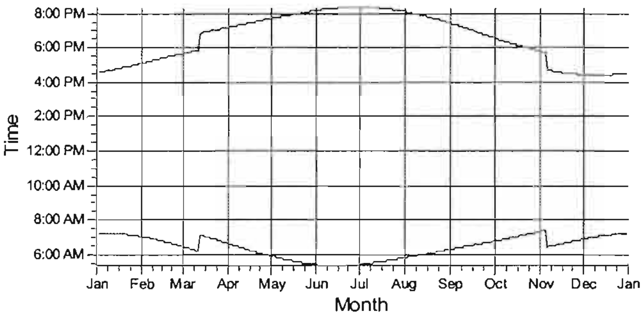
250: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (923)



251: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (924)



252: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (925)



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SHADOW - Calendar, graphical

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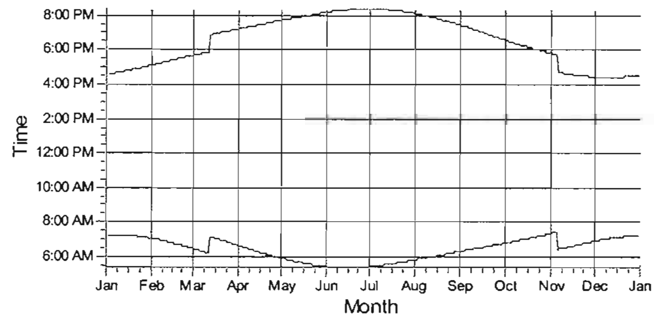
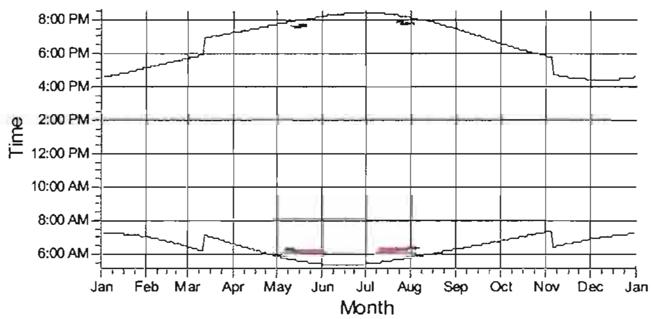
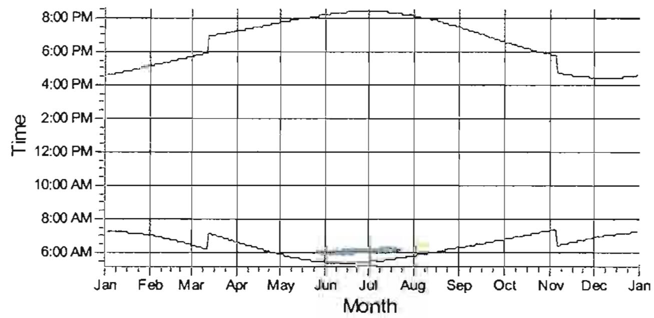
253: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (926)



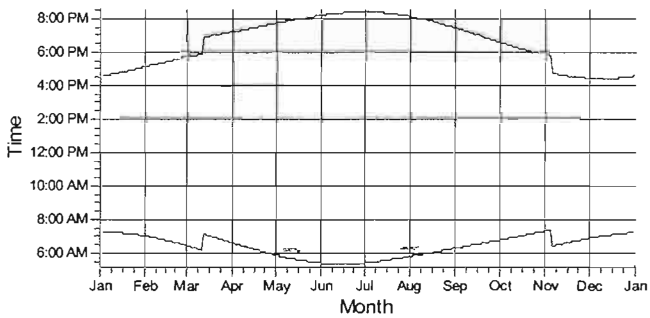
254: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (927)



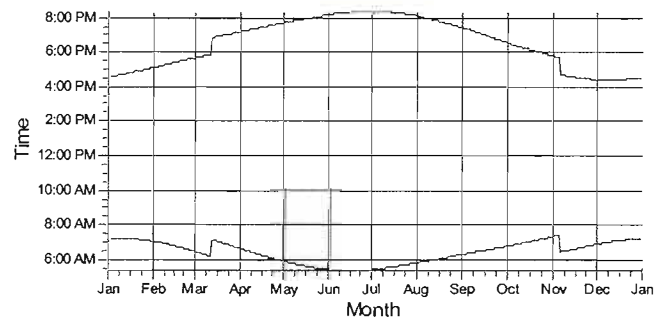
255: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (928)



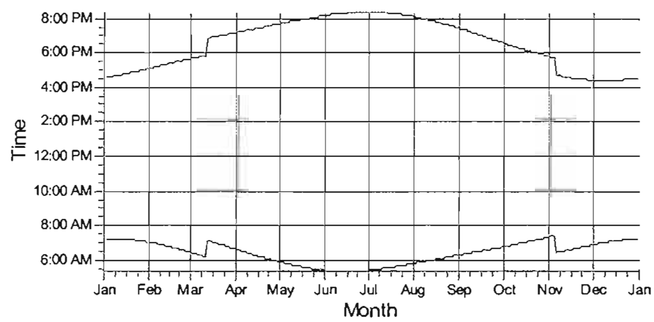
256: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (929)



257: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (930)



258: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (931)



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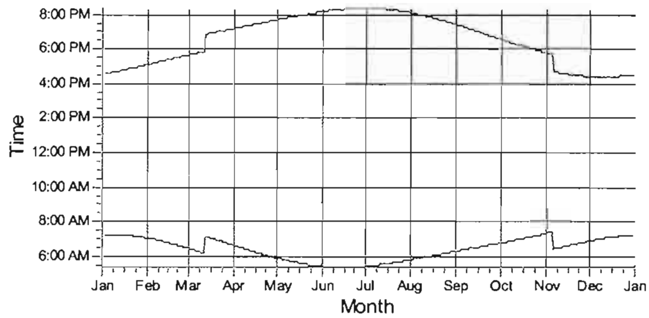
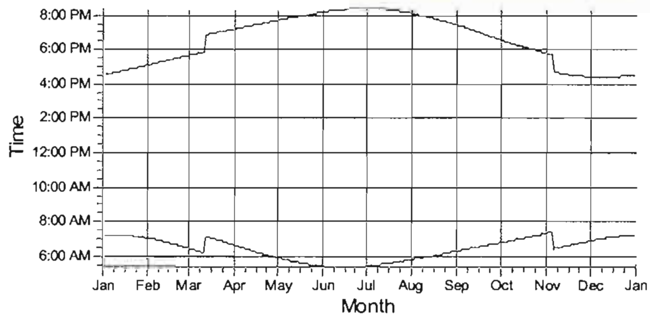
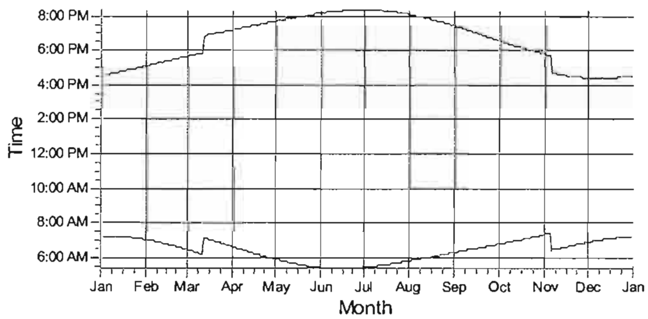
259: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (932)



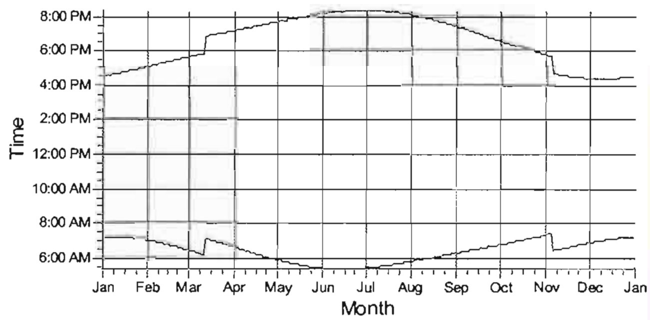
260: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (933)



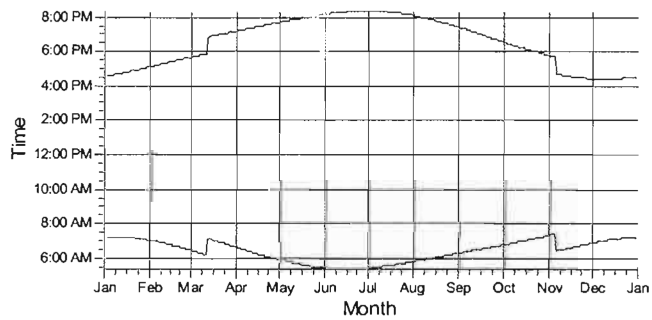
261: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (934)



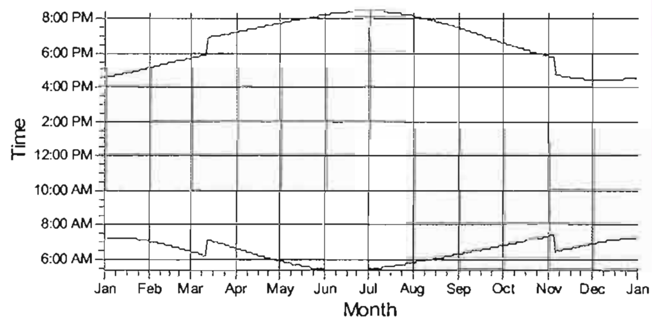
262: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (935)



263: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (936)



264: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (937)



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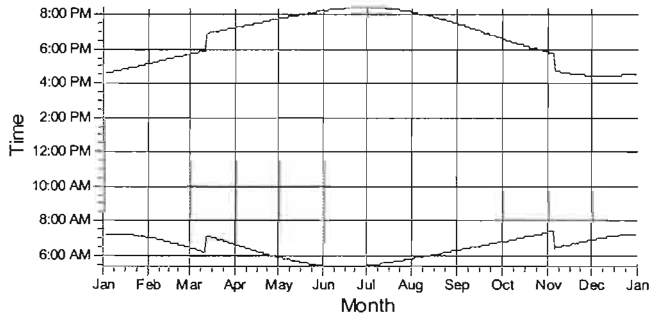
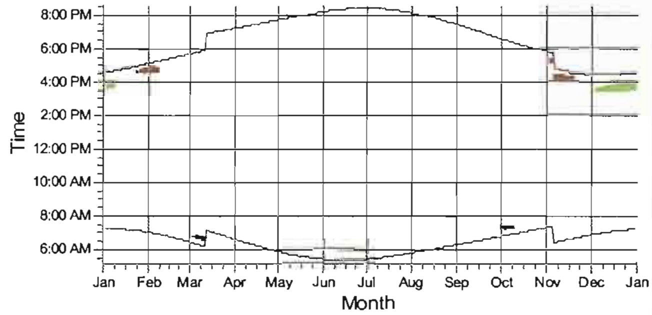
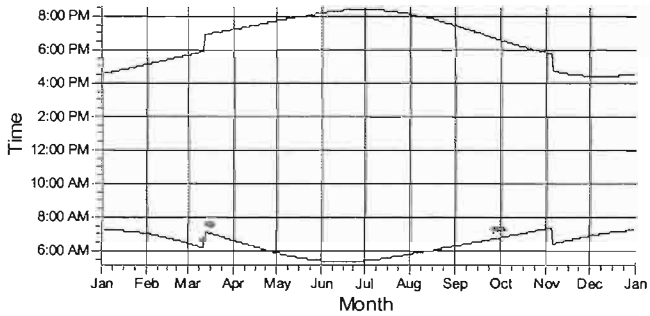
265: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (938)



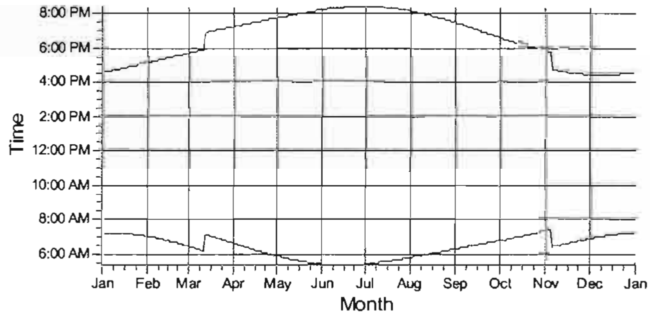
266: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (939)



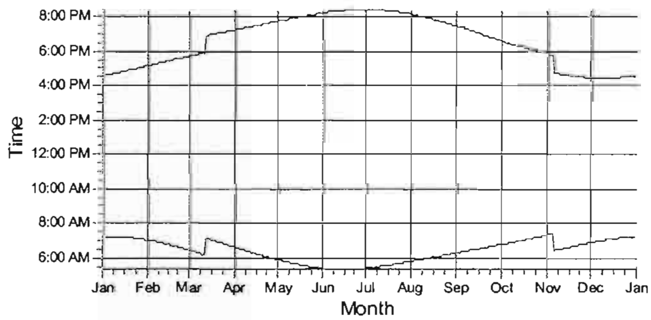
267: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (940)



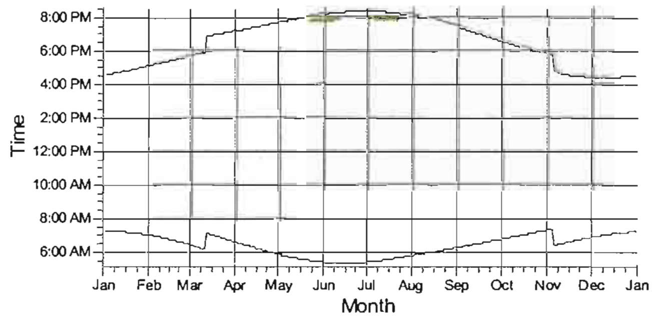
268: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (941)



269: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (942)



270: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (943)



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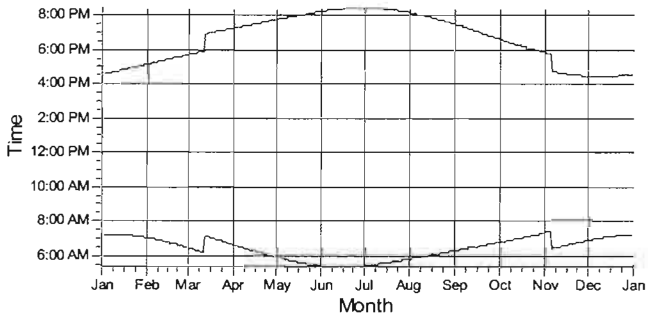
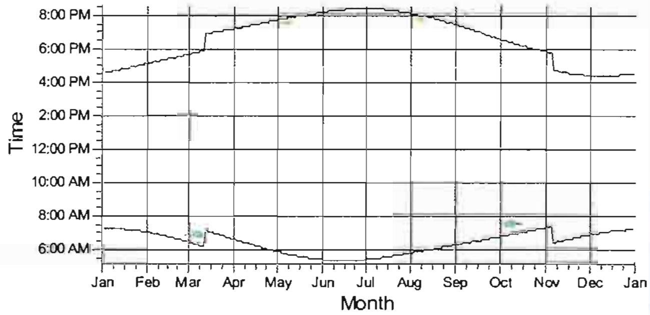
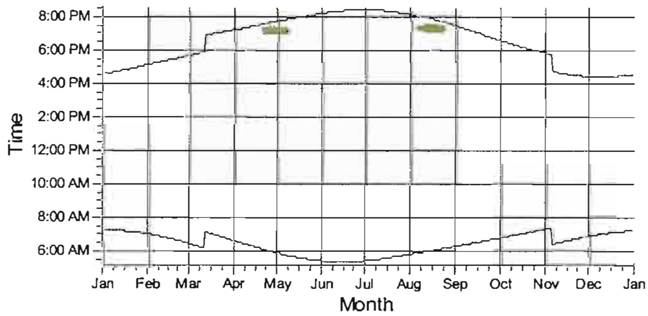
271: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (944)



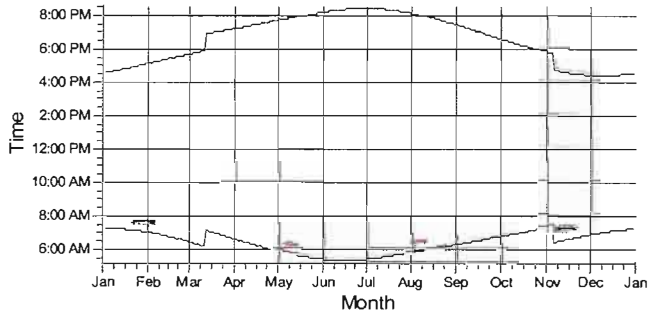
272: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (945)



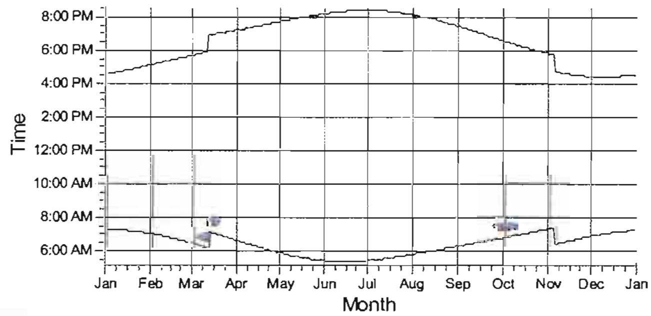
273: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (946)



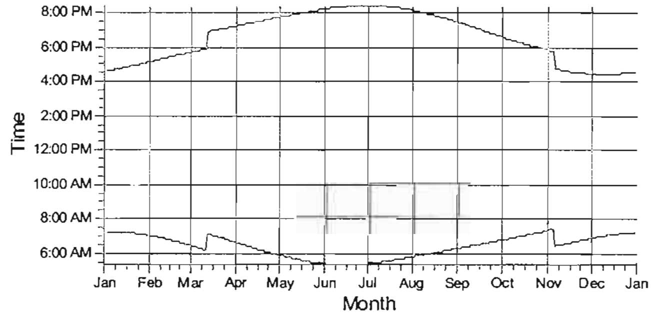
274: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (947)



275: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (948)



276: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (949)



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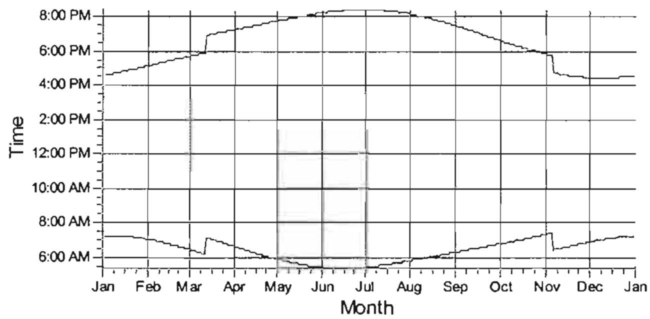
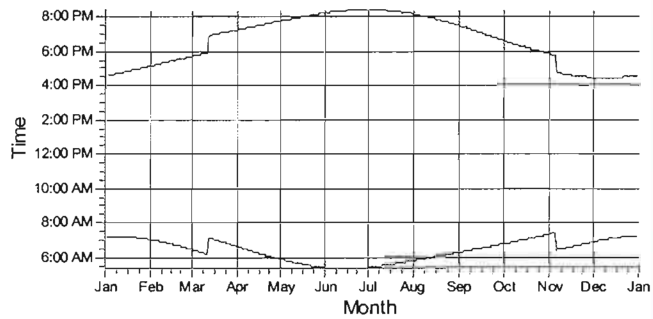
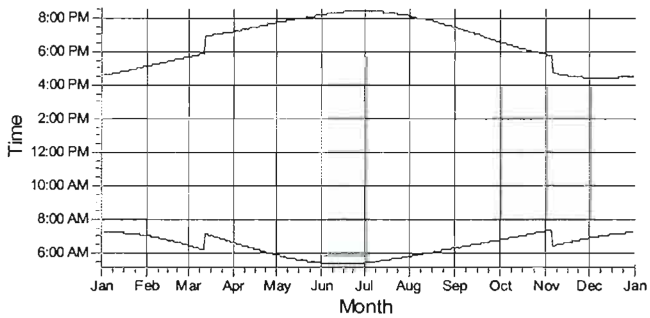
277: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (950)



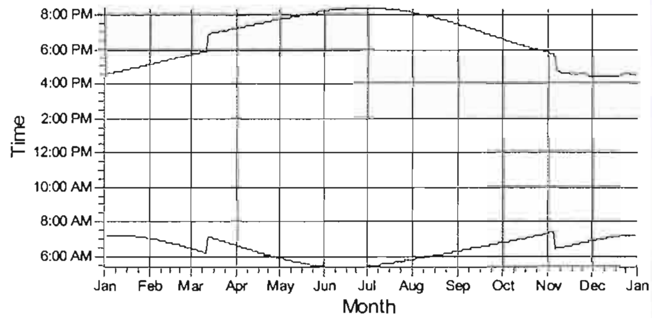
278: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (951)



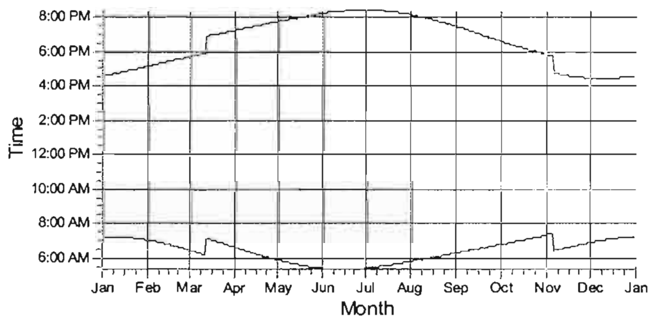
279: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (952)



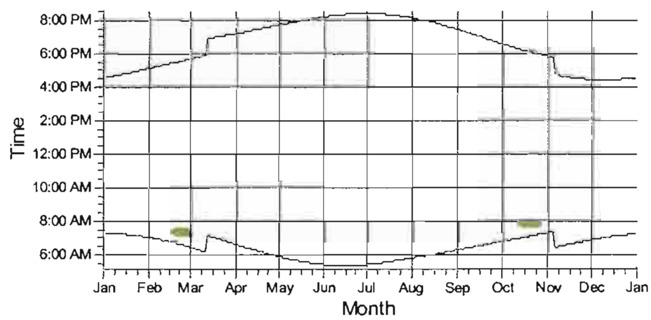
280: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (953)



281: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (954)



282: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (955)



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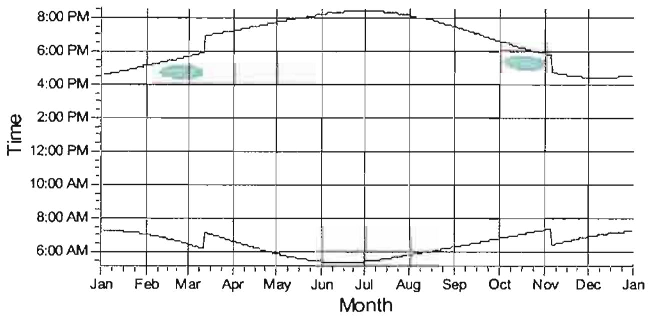
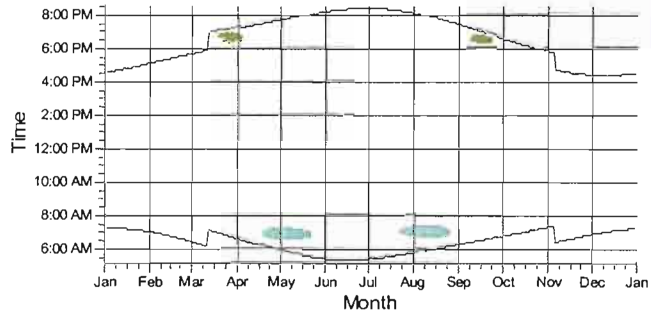
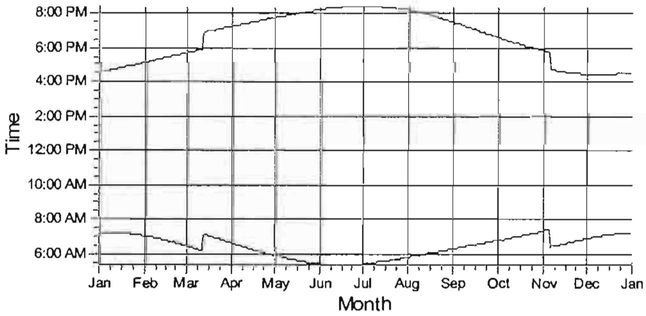
283: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (956)



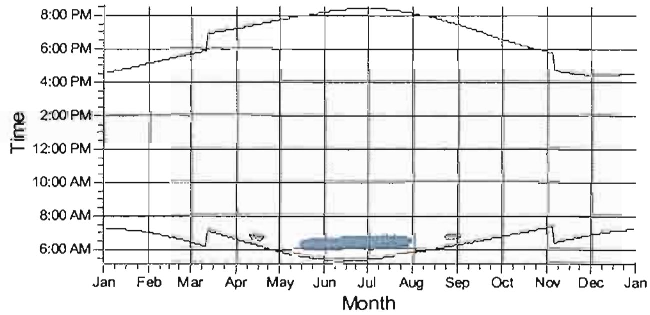
284: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (957)



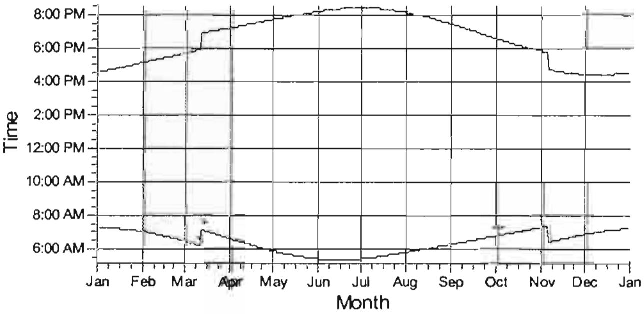
285: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (958)



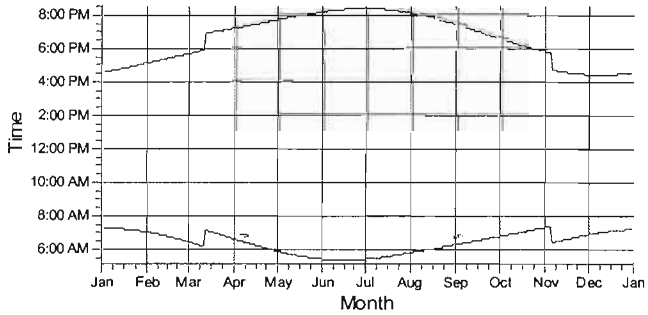
286: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (959)



287: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (960)



288: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (961)



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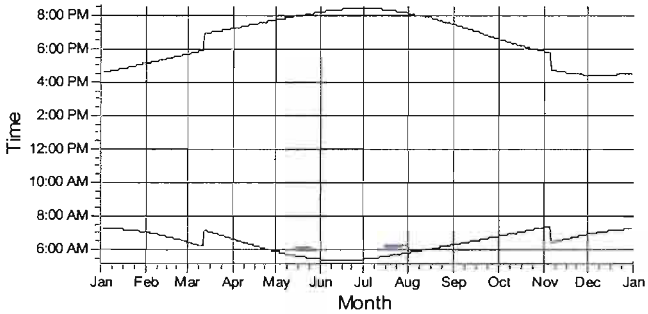
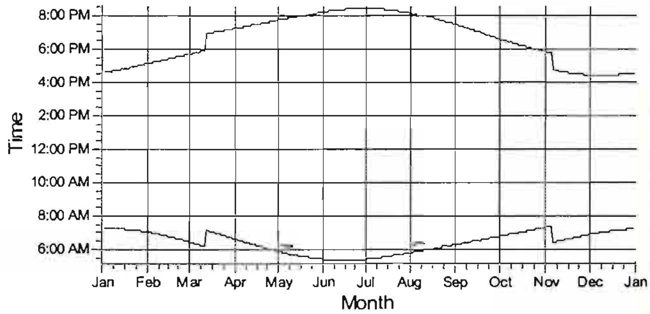
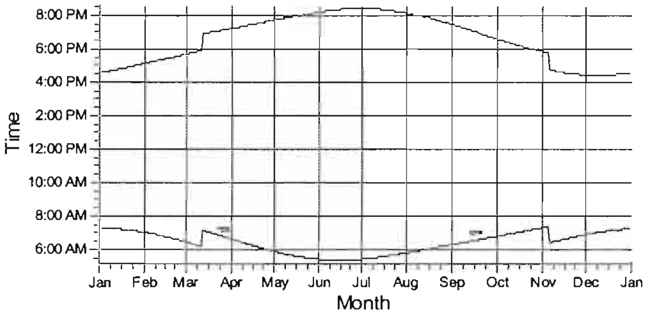
289: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (962)



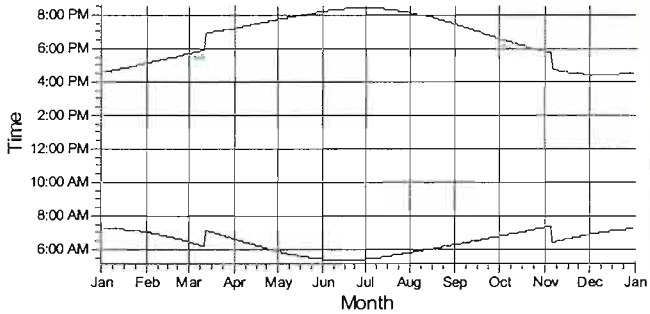
290: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (963)



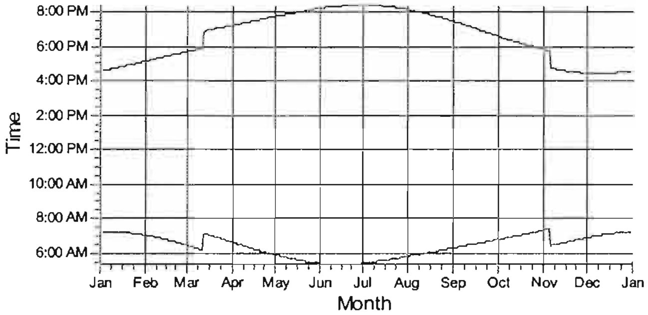
291: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (964)



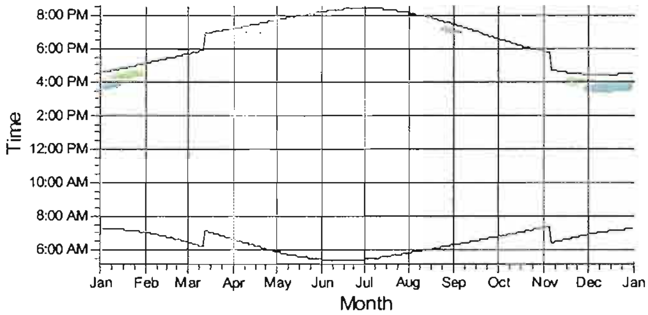
292: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (965)



293: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (966)



294: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (967)



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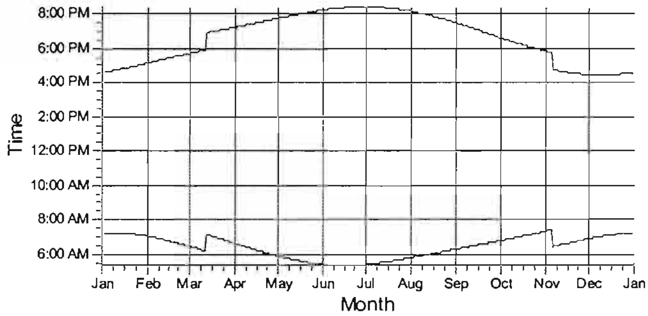
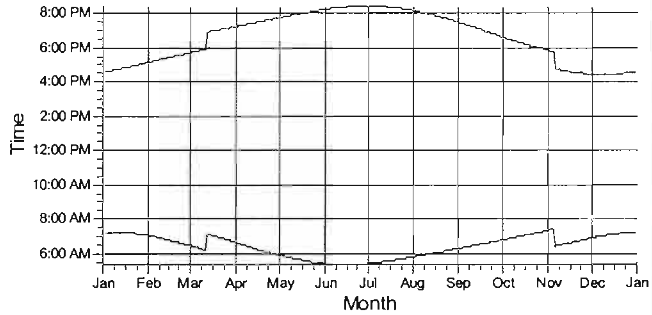
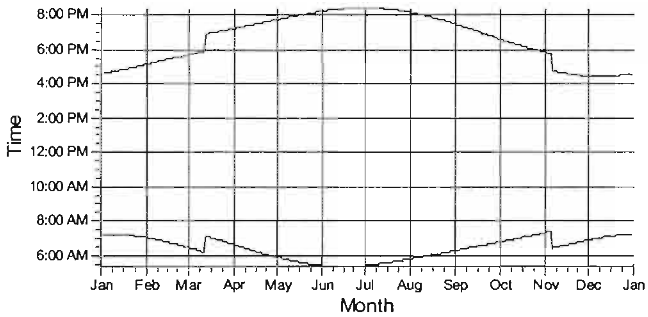
295: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (968)



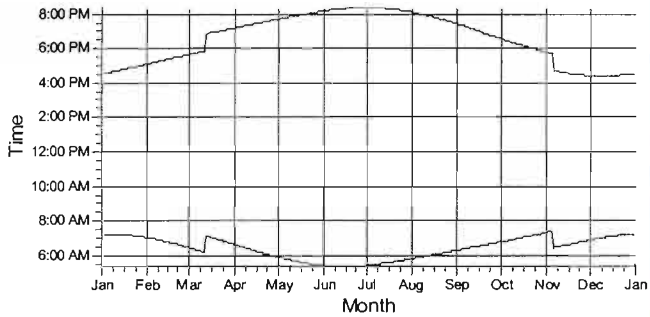
296: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (969)



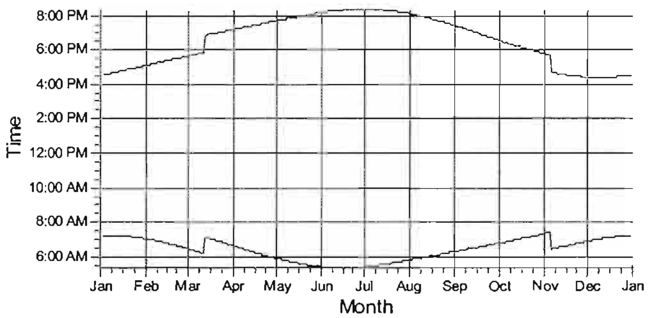
297: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (970)



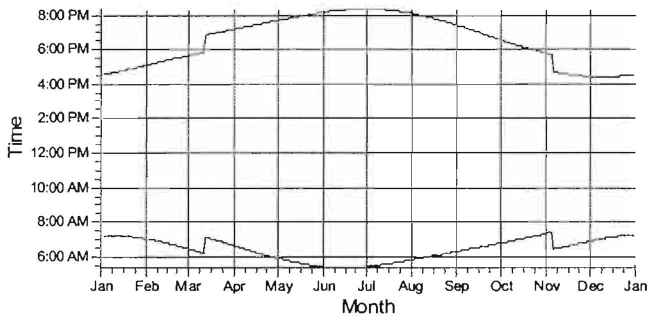
298: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (971)



299: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (972)



300: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (973)



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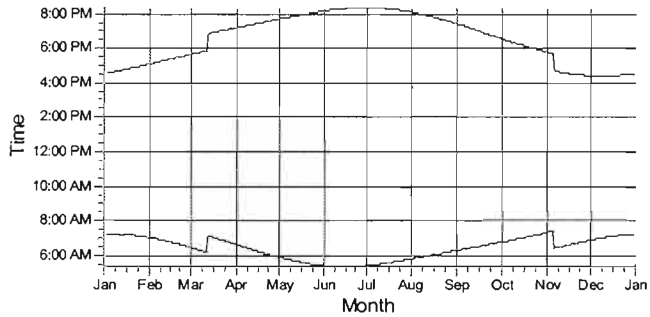
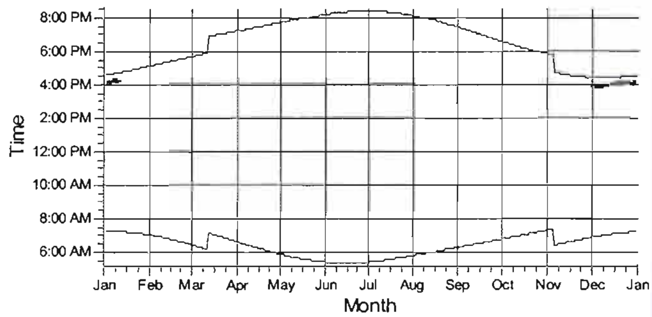
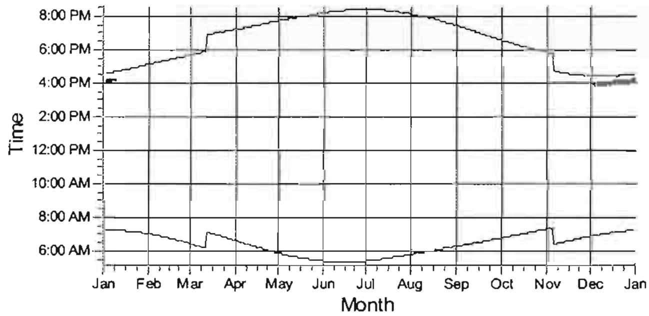
301: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (974)



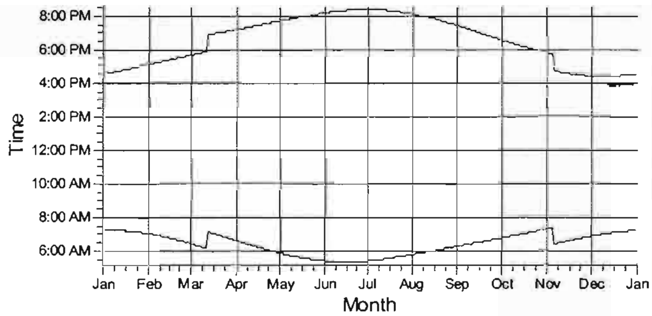
302: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (975)



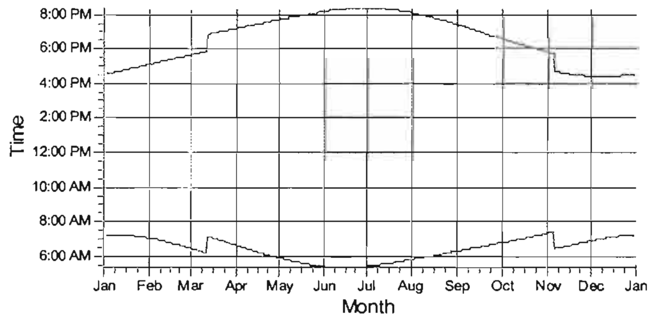
303: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (976)



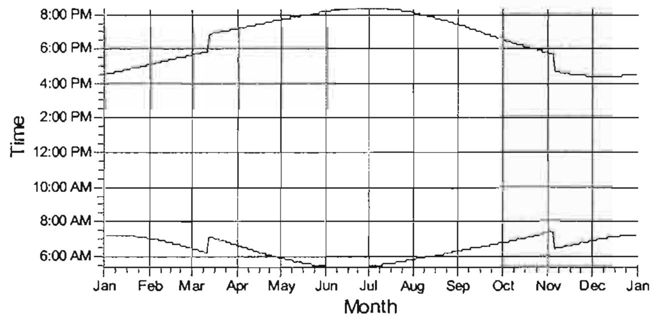
304: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (977)



305: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (978)



306: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (979)



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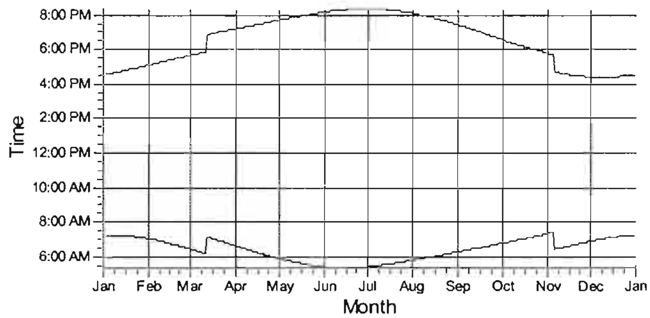
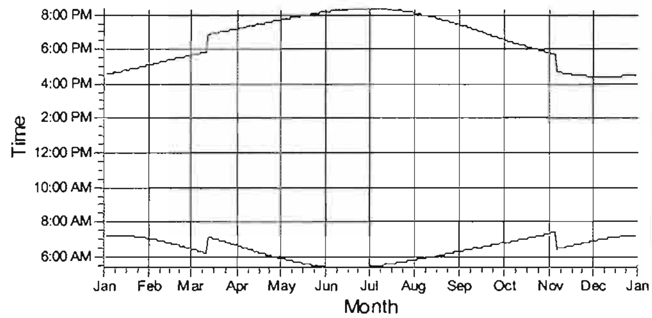
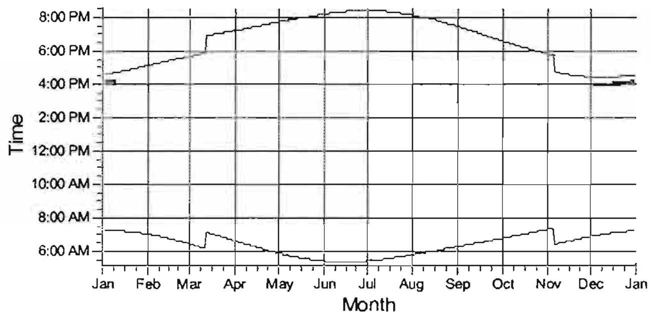
307: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (980)



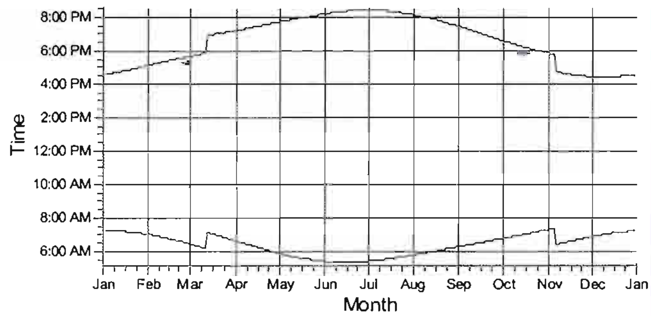
308: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (981)



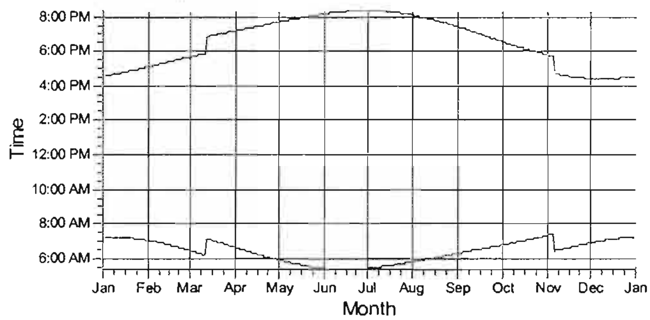
309: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (982)



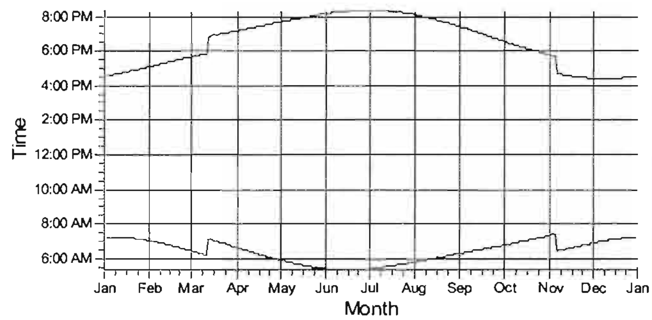
310: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (983)



311: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (984)



312: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (985)



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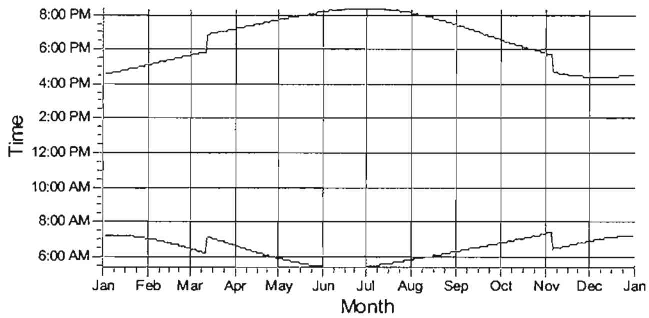
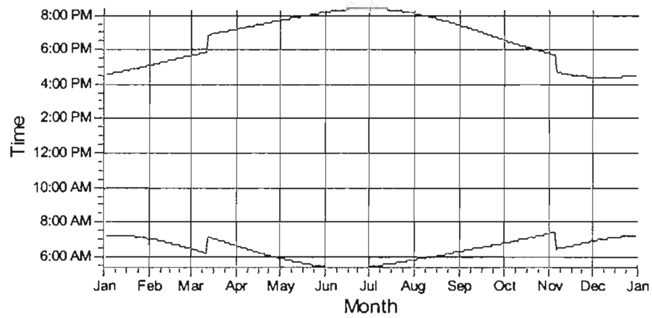
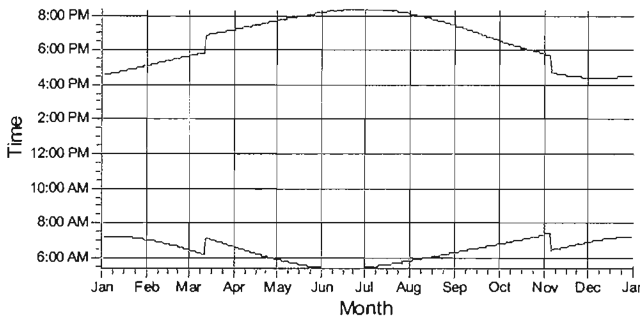
313: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (986)



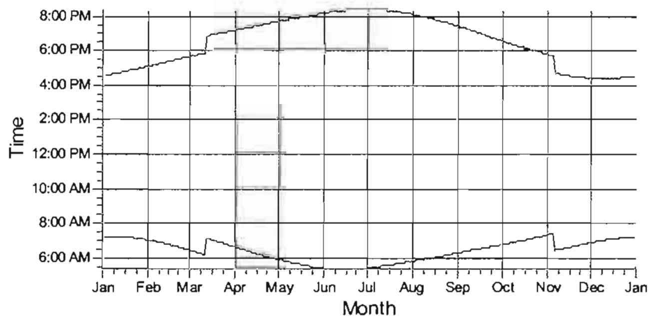
314: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (987)



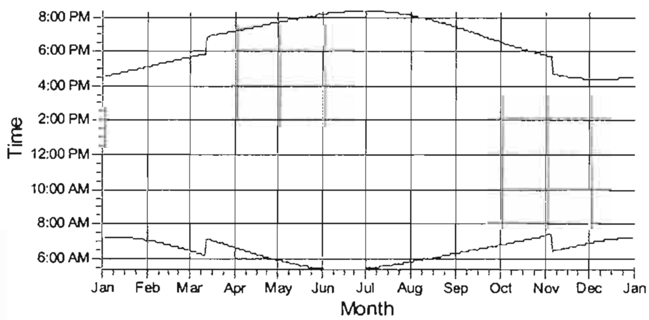
315: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (988)



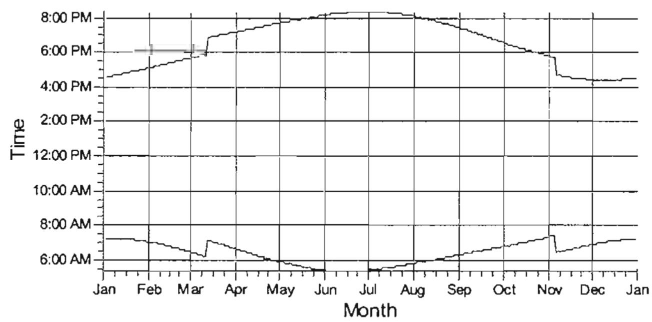
316: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (989)



317: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (990)



318: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (991)



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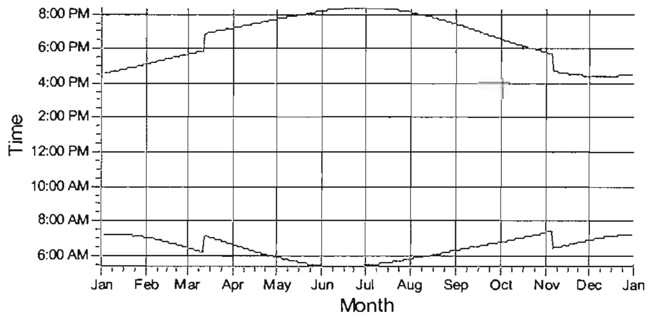
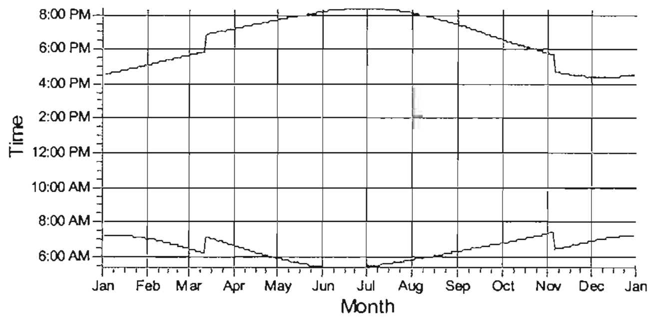
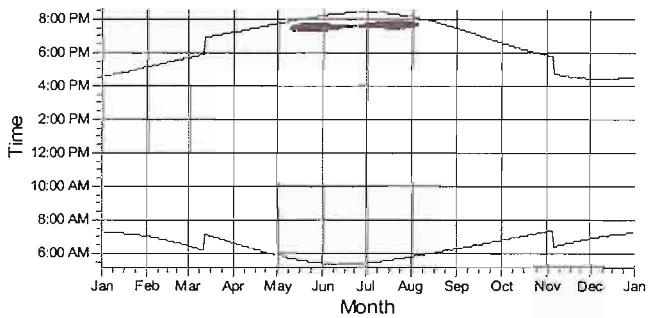
319: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (992)



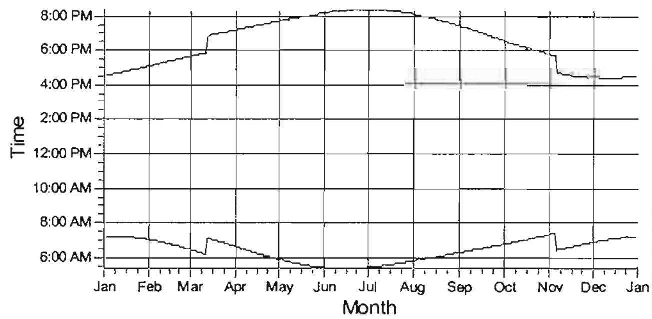
320: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (993)



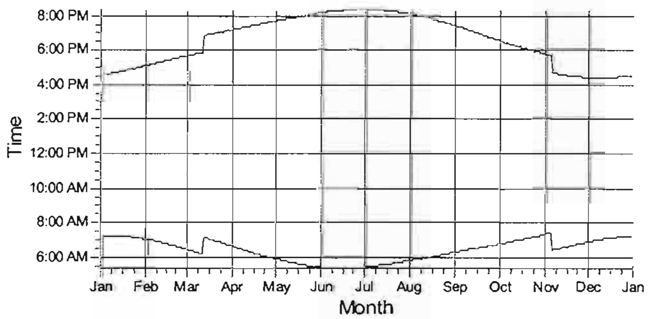
321: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (994)



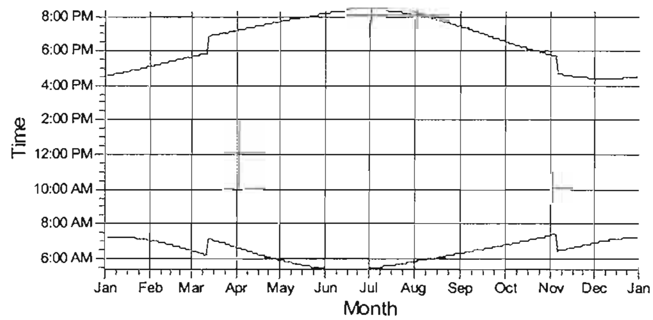
322: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (995)



323: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (996)



324: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (997)



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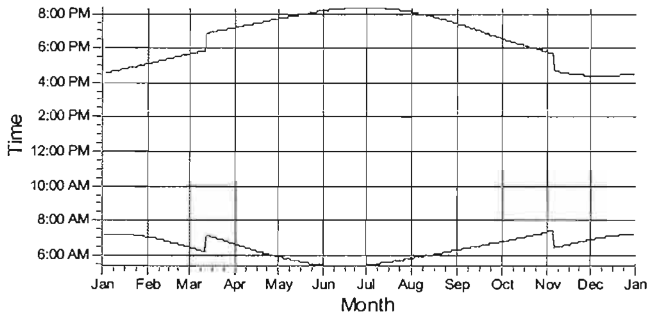
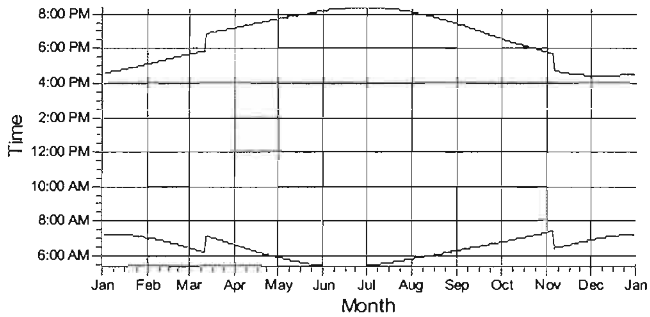
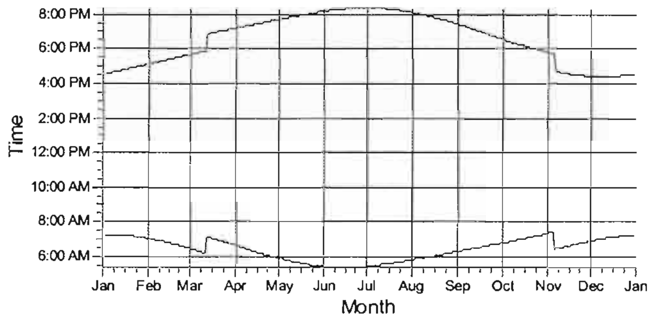
325: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (998)



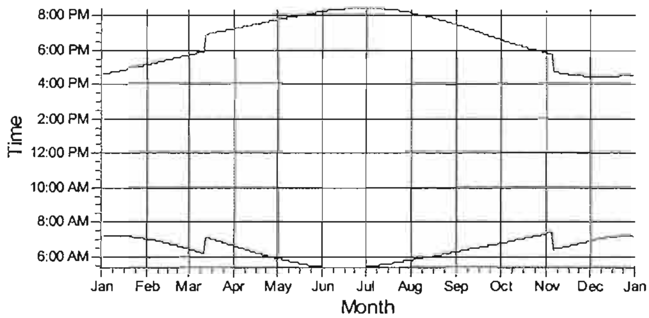
326: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (999)



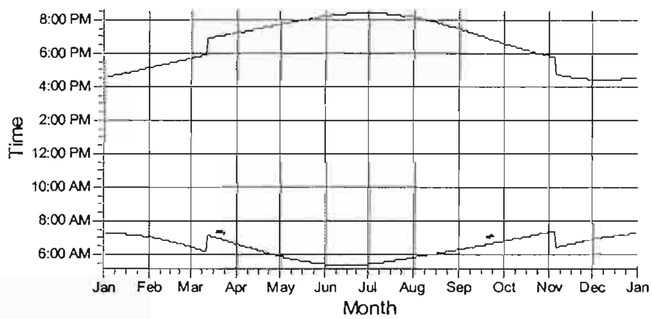
327: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (1000)



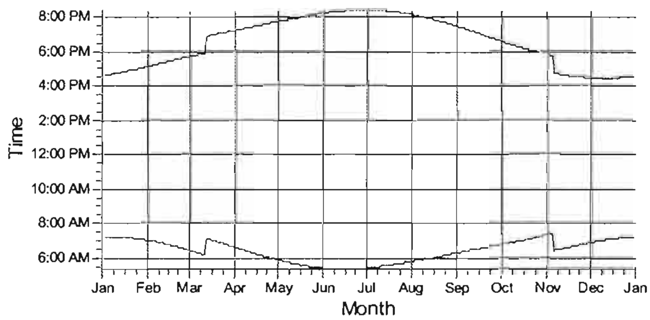
328: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (1001)



329: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (1002)



330: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (1003)



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Anjali Malhotra / Anjali.Malhotra@hdrinc.com

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6/24/2011 11:56 AM/2.7.486

SHADOW - Calendar, graphical

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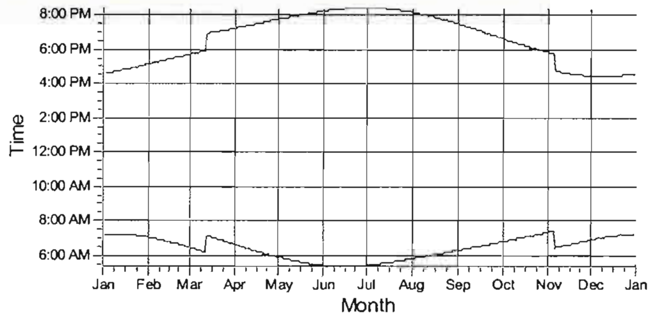

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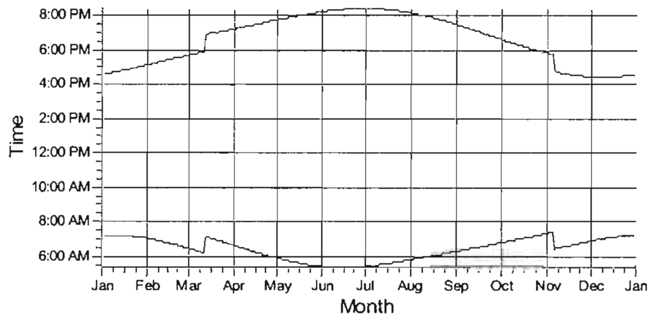

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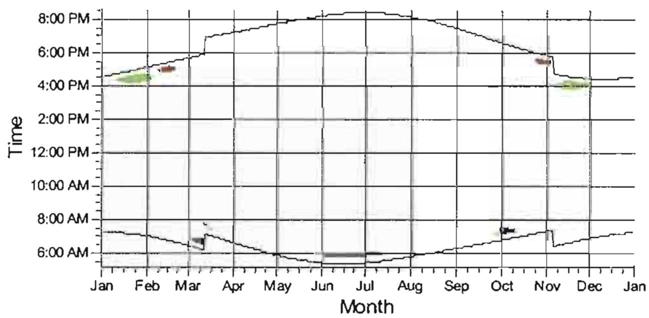

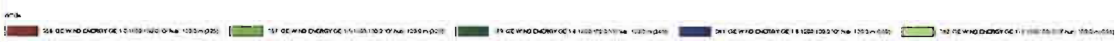

APPENDIX H

Appendix H
Road Use and Repair Agreement

The Road Use and Repair Agreement with the Champaign County Engineer and the Compromise and Ogden Township Road Commissioners is still being negotiated and will be submitted once it is finalized.

In regard to Section 9.1.11.D of the Champaign County Zoning Ordinance, as amended (the "Zoning Ordinance"), provides that:

> Any other provision of this ordinance notwithstanding, the BOARD or GOVERNING BODY, in granting any SPECIAL USE, may waive upon application any standard or requirement for the specific SPECIAL USE enumerated in Section 6.1.3 Schedule of Requirements and Standard Conditions, to the extent that they exceed the minimum standards of the DISTRICT, except for any state or federal regulation incorporated by reference, upon finding that such waiver is in accordance with the general purpose and intent of this ordinance, and will not be injurious to the neighborhood or to the public health, safety and welfare.

In accordance with that provision, California Ridge hereby requests that the Champaign County Board (the "Board") waive the requirement of §6.1.4.F.1.u of Champaign County Ordinance No. 848 (the "Wind Farm Ordinance"), which requires that:

> Any WIND FARM Applicant proposing to use any County Highway or a township or municipal STREET for the purpose of transporting WIND FARM TOWERS or Substation parts and/or equipment for construction, operation or maintenance of the WIND FARM TOWERS or Substations(s)...shall enter into a Roadway Upgrade and Maintenance agreement approved by the County Engineer and State's Attorney; or Township Highway Commissioner; or municipality where relevant, and the signed and executed Roadway Upgrade and Maintenance agreements must provide for the following minimum conditions:
>
> u. The Applicant shall agree that the County shall design all STREET upgrades in accordance with the IDOT Bureau of Local Roads and Streets Manual, 2005 edition.

By its terms, the above requirement applies to all County and Township "streets" that may be used during the course of this project. "Street" is defined in the Zoning Ordinance to include:

> A thoroughfare dedicated to the public within a RIGHT-OF-WAY which affords the principal means of ACCESS to abutting PROPERTY. A STREET may be designated as an avenue, a boulevard, a drive, a highway, a lane, a parkway, a place, a road, a thoroughfare, or by other appropriate names. STREETS are identified on the Official Zoning Map according to type of USE, and generally as follows:
>
> (a) MAJOR STREET: Federal or State highways.
>
> (b) COLLECTOR STREET: COUNTY highways and urban arterial STREETS.

(c) MINOR STREET: Township roads and other local roads.

This application for a waiver of the above requirement is based on several factors:

First, the Wind Farm Ordinance already requires that California Ridge engage in extensive activities to insure that roadways are either not damaged or, if any damage occurs, that repairs be implemented in a professional manner and as expeditiously as possible. This includes pre-use planning, coordination with both the County Engineer and any independent consultant retained by the County, reimbursement of all costs incurred by the County, the posting of security to cover the costs of any necessary or potentially necessary repairs, and a substantial list of additional requirements – all with the intent of insuring that all roads used in connection with the Project will be in as good a condition after the Project as they were before the Project. Requiring upgrades and widening of roads, in addition to these extensive repair and rehabilitation requirements, is both duplicative and unnecessary.

Second, implementation of the upgrade requirements called for by the Bureau of Local Roads and Streets Manual would entail, among other things, substantial widening and reconstruction of a number of roads. This would impose a significant financial burden on California Ridge – to the extent that it would jeopardize the financial viability of the entire Project. Again, given the extensive repair and rehabilitation requirements called for by the Wind Farm Ordinance, requiring such an additional expenditure is both unnecessary and unreasonable.

Finally, an obligation that California Ridge, by agreement with the appropriate Township Highway Commissioner(s), widen, alter and upgrade township roads, as would be called for by the Bureau of Local Roads and Streets Manual, would violate Illinois law. Pursuant to §6-303 of the Illinois Highway Code, 605 ILCS 5/6-303, a Township Highway Commissioner does not have the authority to unilaterally agree to the widening or alteration of township roads.

For all of these reasons, California Ridge requests that the Board grant it a waiver from the requirements of §6.1.4.F.1.u of the Wind Farm Ordinance.

Champaign
County
Department of
PLANNING &
ZONING

**Brookens
Administrative Center**
1776 E. Washington Street
Urbana, Illinois 61802

(217) 384-3708
FAX (217) 328-2426

July 24, 2009

RECEIVED
JUL 27 2009
By

Jeff Veazie, Project Engineer
Invenergy
Suite 1900
One South Wacker Drive
Chicago IL 60606

RE: California Ridge Wind Farm in Champaign County, Illinois

Dear Jeff:

I received a call today from our County Engineer, Jeff Blue, about the California Ridge Wind Farm. Jeff has reason to believe that Invenergy may be losing interest in the Champaign County portion of the California Ridge Wind Farm due to the Ordinance requirements related to public streets. Jeff's call reminded me what you had said in our meeting on June 16, 2009, regarding Art Fletcher's concerns about rebuilding to the Bureau of Local Roads Standards and I mentioned that to Jeff. At that meeting I explained that waivers can be requested for any requirement that seems unreasonable. Jeff Blue pointed out that rebuilding or repairing is not the same as an upgrade and the Ordinance only refers to the Bureau of Local Roads Standards in paragraph 6.1.4 F. 1.u. which pertains to upgrades.

I hope this helps clarify any concern that Art Fletcher may have about this particular standard. I encourage Mr. Fletcher or anyone to call at anytime there is a question about the Ordinance requirements. Jeff Blue and I will do all that we can to answer questions and assist you with your application.

It was good to see you at the conference last week in Bloomington. As I mentioned last week, we are managing the docket of zoning cases so that a wind farm application can be processed as promptly as possible once it is received. We also update the Zoning Board of Appeals regularly on the status of the anticipated wind farm application to ensure that this case can proceed as quickly as possible once the application is received.

Sincerely,

John Hall
Director
Zoning Administrator

XC: Jeff Blue, Champaign County Engineer
Barbara Wysocki, Chair, Champaign County Board Environment and Land Use Committee

APPENDIX I

California Ridge Wind Energy Project

Stormwater Pollution Prevention Plan (SWPPP)

SWPPP MUST BE KEPT ONSITE

Prepared for:

Invenergy

One South Wacker Drive
Suite 1900
Chicago, IL 60606

Prepared by:

HDR

HDR Engineering, Inc.

701 Xenia Avenue South, Suite 600
Minneapolis, Minnesota 55416
(763) 591-5400
www.hdrinc.com

Department 164
Project No 98073

June 2011

CERTIFICATION STATEMENT

Responsible Official Certification

All reports required by the General Permit for Construction Activities (Appendix A) and other information requested by the Illinois Environmental Protection Agency (IEPA) shall be signed by a Responsible Official described by Part VI.G of the General Permit for Construction Activities (Appendix A). The Responsible Official shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Name ______________________________

Signature ______________________________

Date ______________________________

Phone ______________________________

Address ______________________________

Contractor Certification

All contractors and subcontractors identified in a storm water pollution prevention plan in accordance with Part IV.F, paragraph 1 of the General Permit for Construction Activities (Appendix A) shall sign a copy of the following certification statement before conducting any professional service at the site identified in the storm water pollution prevention plan:

"I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit (ILR10) that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification."

Name ______________________________

Signature ______________________________

Date ______________________________

Phone ______________________________

Address ______________________________

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REGULATORY PERMITTING REQUIREMENTS

NPDES REQUIREMENTS

Construction activities resulting in disturbance of one (1) acre or more of land must be covered under the National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Activities. The general permit is provided in Appendix A of this document. As a requirement of the NPDES permit, a SWPPP must be crafted to meet site-specific requirements of each project.

A typical SWPPP covers five (5) items:

1. Temporary Erosion and Sediment Control Best Management Practices (BMPs)
2. Permanent Erosion and Sediment Control BMPs
3. Permanent Stormwater Management
4. Pollution Prevention Management Measures
5. Inspection and Maintenance

The intent of the SWPPP is to address soil erosion on the site and thereby reduce pollution of receiving water resources (lakes, rivers, streams, wetlands, etc.). In addition to preparing and effectively implementing a project-specific SWPPP, the Owner must comply with the following items identified in the IEPA General NPDES Permit for Stormwater Discharge from Construction Site Activities (ILR10):

1. Submittal of a complete Notice of Intent (NOI) at least thirty (30) days before construction begins. The NOI and associated fee may be submitted to the IEPA through the mail or electronically. See Appendix B for a copy of the NOI and the prescribed signatures required.
2. Completion of regular inspections and maintenance of the prescribed best management practices (BMPs).
3. Submittal of a Notice of Termination (NOT) to the IEPA once the project area has reached final stabilization as outlined in the SWPPP and ILR10 (Appendix H).

Champaign County requires the completion of an additional drainage report which is attached as Appendix I. There are no additional requirements delegated by Vermilion County.

PROJECT DESCRIPTION

The California Ridge Wind Energy Project consists of several major components in Champaign County and Vermilion County, Illinois (Figure 1). The Project will be approximately 214 megawatts (MW), consisting of the construction of 134 wind turbine structures, each with a 1.6 MW capacity. A new 34.5 / 138 kV substation will be built with an adjacent operation and maintenance (O&M) building. A transmission line will span approximately 9 miles from the Project substation to the point of interconnect (POI) located at the Amaren interconnection switchyard, located in the southeast corner of the Project area. New 34.5 kV underground collection cable and communication cable will be installed throughout the project, connecting wind turbine structures and ultimately delivering the power to the Project substation. Two laydown areas will be present for construction equipment storage. To access the windpower facilities and construction locations, 16-foot wide access roads will be developed.

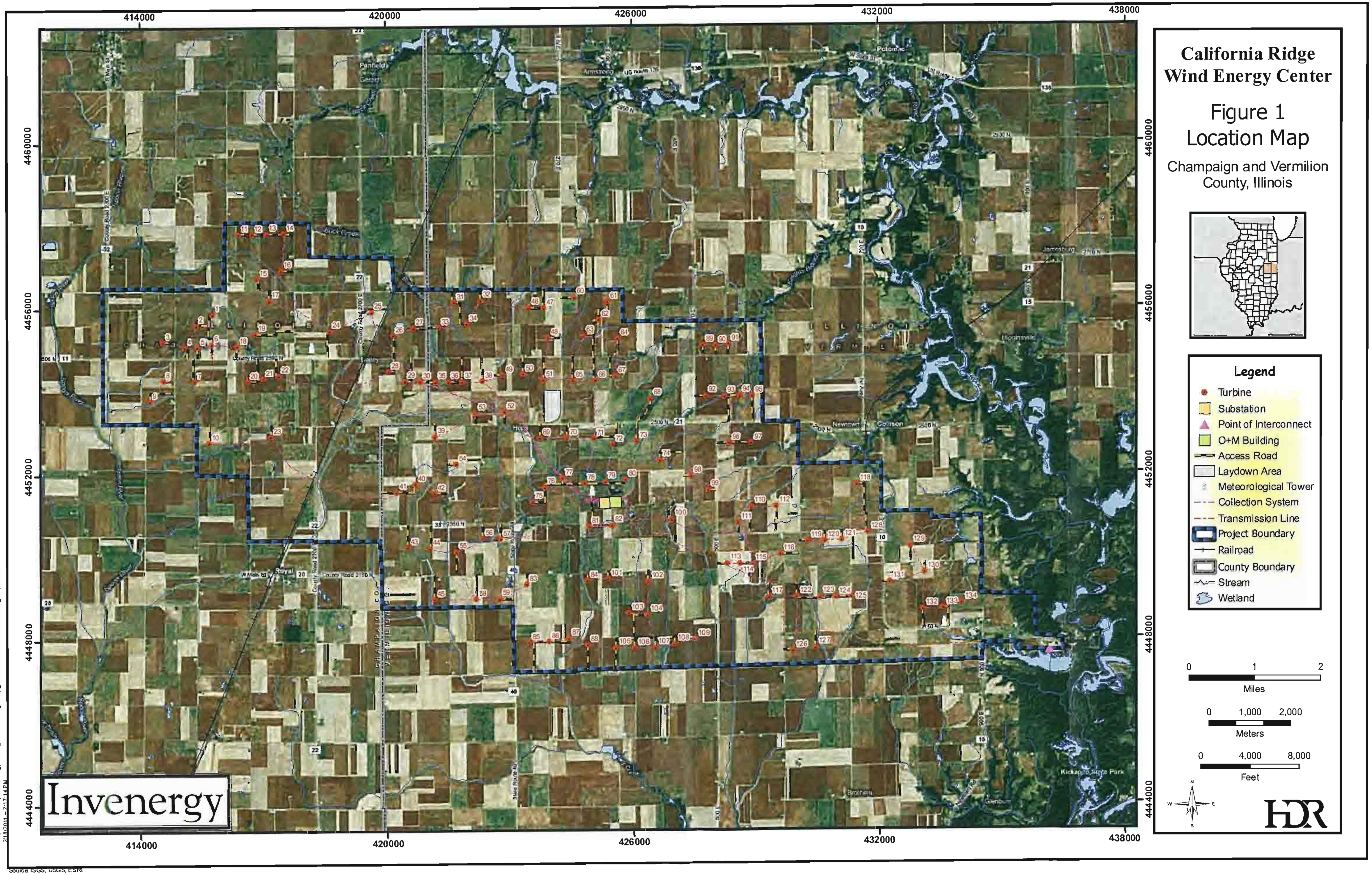
A drainage study was conducted on the proposed project area to determine the impact of construction on the existing drainage system (Figure 2). Using the methodology prescribed in the National Resources Conservation Service (NRCS) Technical Release 55 (TR-55), the study concluded that the impacts to the existing drainage system would be well within the standard margin of error and thereby rendering the impact insignificant. The complete drainage study is in Appendix I for review.

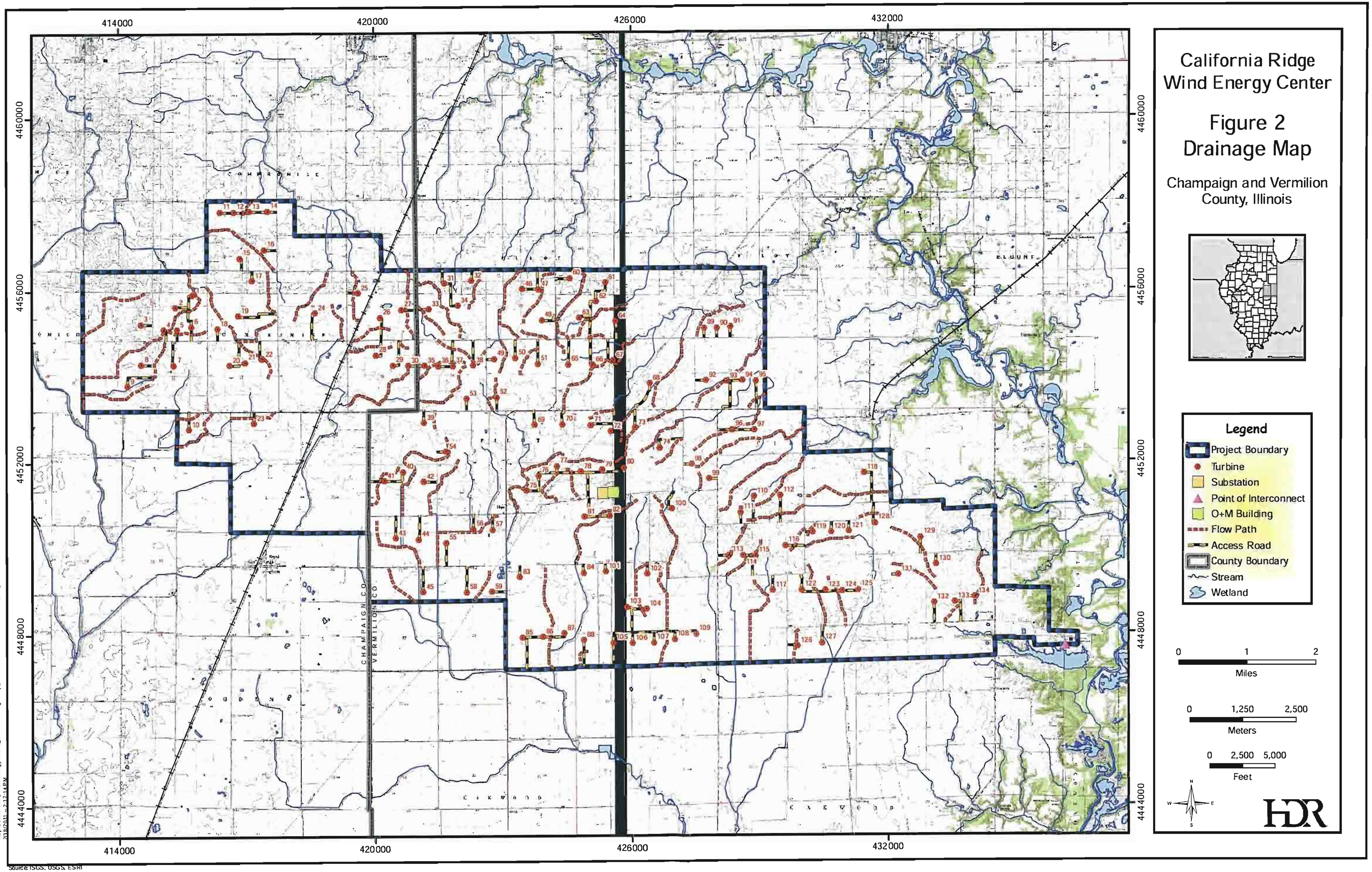
The Project area encompasses approximately 34,881 acres in Champaign and Vermilion County, Illinois. The precise location is north of the town of Royal, Illinois, and south of the cities of Gifford and Potomac, Illinois. A map of the project location can be seen in Figure 1, and the townships, ranges, and sections are listed below in Table 1. The total disturbed area from this project will be 193 acres, with 89 acres of permanent impervious area created. 73 of the impervious acres are due to the installation of access roads.

Table 1. Project Location

County	Township	Range	Section(s)
Champaign	20N	14W	4-6, 8-9
	21N	10E	25, 36
	21N	11E	30-31
	21N	14W	19-21, 28-33
Vermilion	20N	12W	19-20
	20N	13W	3-24
	20N	14W	1-3, 10-15, 24
	21N	13W	29-32
	21N	14W	25-27, 34-36

Within this project area, various water resources will be encountered that may be receiving stormwater runoff. The waters should be protected from high pollutant loads using proper erosion control practices. The drainage pattern for runoff in the Project area can be found in Figure 2. Stream crossings will be necessary for construction activities as intermittent streams are present in the area. There are no impaired waters that will be receiving direct runoff from construction activities.


California Ridge Wind Energy Center
Figure 1
Location Map
Champaign and Vermilion County, Illinois
Legend
Turbine
Substation
Point of Interconnect
O+M Building
Access Road
Laydown Area
Meteorological Tower
Collection System
Transmission Line
Project Boundary
Railroad
County Boundary
Stream
Wetland
0 1 2
Miles
0 1,000 2,000
Meters
0 4,000 8,000
Feet
Invenergy
HDR
414000
420000
426000
432000
438000
4460000
4456000
4452000
4448000
4444000
Kickapoo State Park
Source: ISGS, USGS, ESRI



California Ridge Wind Energy Center
Figure 2
Drainage Map
Champaign and Vermilion County, Illinois
Legend
Project Boundary
Turbine
Substation
Point of Interconnect
O+M Building
Flow Path
Access Road
County Boundary
Stream
Wetland
0 1 2
Miles
0 1,250 2,500
Meters
0 2,500 5,000
Feet
HDR
414000
420000
426000
432000
4460000
4456000
4452000
4448000
4444000
CHAMPAIGN CO
VERMILION CO
Source: ISGS, USGS, ESRI

GENERAL SITE INFORMATION

The SWPPP was created to minimize pollution of receiving water resources in conjunction with this project. Pollution prevention is addressed through assessing existing conditions such as: land use, soil types, natural features, and overland slope and precipitation. Site management is utilized to prevent pollution through the implementation of temporary and permanent erosion and sediment controls, and material handling and containment management.

LAND USE

Existing land use in Champaign and Vermilion Counties is primarily rural agriculture, i.e. pasture or cropland and nearby farmsteads. Small farm-based towns are present outside of the project area. Other institutional and residential locations exist in the greater vicinity of each county. In Champaign County, there is a large campus for the University of Illinois more than 10 miles southwest of the Project.

SOILS

There are 4 soil types identified within the project area: Morley-Blount-Beecher, Plano-Proctor-Worthen, Saybrook-Dana-Drummer, and Varna-Elliot-Ashkum (Figure 3). The majority of the soil comes from the Varna-Elliot-Ashkum and Plano-Proctor-Worthem associations, which are typically moderately well to well drained with a silt loam composition near the surface. A small portion of the soil, including the Morley-Blount-Beecher association, along with minor soils in the Saybrook-Dana-Drummer and Varna-Elliot-Ashkum, are somewhat poor to poorly drained soils. These are composed of silt loam or silty clay loams near the surface. The remaining soils are moderately well to well drained and have a silt loam structure near the ground surface[1]. The soil association and percent representation within the Project area are shown in the table below.

Table 2. Soil Associations and Characteristics

Soil Association	Acreage in Project Area	Percent of Project Area
Morley-Blount-Beecher	801	2
Plano-Proctor-Worthen	7942	23
Saybrook-Dana-Drummer	1099	3
Varna-Elliot-Ashkum	25008	72
Unclassified	31	< 0.1
TOTAL	34881	100

[1] Soil Survey Staff, Natural Resources Conservation Service (NRCS). *Published Soil Surveys for Illinois.* Website accessed June 08, 2011. < http://soils.usda.gov/survey/printed_surveys/state.asp?state=Illinois&abbr=IL>.

The unclassified soil association listed above is due to the soil associations being cropped inside of the Project boundary, resulting in a slightly smaller area than the Project border entails. It is safe to assume that the 31 acres are represented by the existing soil associations in the Project area.

Natural Features and Overland Slope

The Project area is primarily rural and used for agriculture; flat terrain is expected throughout the project. Minor ridges may be present, as well as stream banks that may have higher slopes and be more susceptible to erosion. Minor slope variations exist throughout the Project area; however the majority of the soil associations are composed of soils with 0-6% slopes. The Proctor and Varna soil series within the associations listed above are described by the NRCS Web Soil Survey as having the potential to reach 10% or 12% slopes, respectively[2].

Groundwater

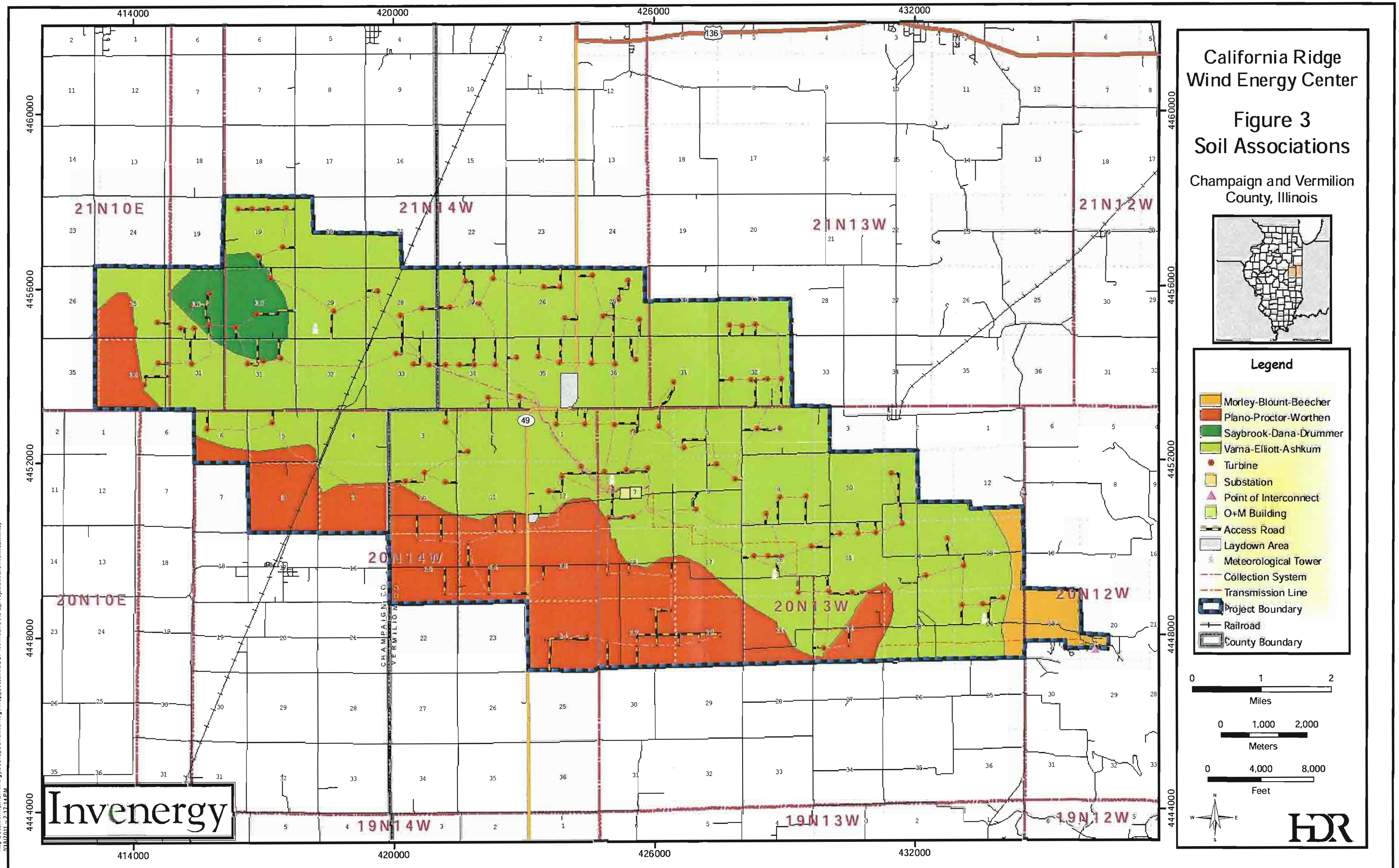
The depth to groundwater is expected to vary across the project boundary because of the presence of intermittent streams throughout the location. It's possible that gravel resource areas are present within the Project boundary; there is an indication of a gravel pit on the U.S. Geological Survey (USGS) topographic map. This area will not be impacted by construction activities; it is located more than 1,000 feet away from any turbine structure and is not in the area of access road construction or underground collection system cable installation.

Precipitation

Average yearly rainfall between the Champaign and Vermilion County areas is approximately 40 inches with about 60 percent of it falling between April and September. The average annual snowfall between the counties is 25 inches. Average winter month temperature is 28°F with a daily minimum average of 20°F. During spring, snowmelt and individual storms can produce significant quantities of runoff[3].

Again, without erosion and sediment control BMPs, the project could produce significant amounts of sediment. The function of this SWPPP is to outline procedures to minimize erosion and mitigate sediment during construction.

[2,3] Soil Survey Staff, Natural Resources Conservation Service (NRCS). *Published Soil Surveys for Illinois.* Website accessed June 08, 2011. < http://soils.usda.gov/survey/printed_surveys/state.asp?state=Illinois&abbr=IL>.



Source: ISGS, USGS, ESRI

CONSTRUCTION SCHEDULE AND SEQUENCING

The Contractor will schedule and conduct all operations to minimize the exposure of soils to erosion and provide means to trap sediments leaving the site. Installation of temporary control measures that will contribute to the control of erosion and prevention of sediment leaving the site will be carried out prior to and concurrently with construction activities. Construction activities are slated to begin in the Fall of 2011 with the anticipated completion 9-12 months after, in Fall of 2012. The activities and anticipated schedule covered in the SWPPP are presented below. These dates are subject to change due to site conditions and other unforeseen circumstances. However, the sequence of activities is not anticipated to change.

- Drainage tile management: September 2011 – September 2012
- Installation of erosion and sediment control BMPs: September 2011
- Preparation of lay down and staging areas: September 2011
- Construction of access roads: September 2011
- Installation of wind turbine structures: September 2011 – September 2012
- Installation of underground cables: September 2011 – September 2012
- Installation of above-ground transmission line: September 2011 – September 2012
- Construction of Project substation / O&M building: September 2011 – September 2012
- Turf establishment / revegetation: September 2011 – September 2012
- Removal of BMPs: September 2012

CONSTRUCTION ACTIVITIES

Installation of erosion and sediment control BMPs: Necessary erosion and sediment control measures, such as perimeter control and culvert protection, will be installed prior to land disturbing activities at pole construction sites. These activities also include development of temporary access points from existing roads. Where necessary, construction exits/entrances will be installed to prevent sediment tracking on public paved roads (Appendix C). The most effective erosion control BMP is preserving existing vegetation; this should be a constant practice throughout the duration of the Project.

Laydown and staging areas preparation: Construction staging and laydown preparation will be determined at the contractor's discretion. There are two laydown areas designated for the Project; one consisting of a 73-acre plot and another designated in an 11-acre space. Recommended BMPs include perimeter control, construction entrance/exit installation, and stockpile protection.

Construction of access roads: Grading of access roads throughout the Project area represents the largest land-disturbing construction activity. Access roads should follow the natural terrain to the maximum extent possible. The access roads are anticipated to be 16' wide with gravel as cover to adequately support the size and weight of maintenance vehicles. Access roads are located among intermittent streams throughout the project; stream crossings will be necessary. Recommended BMPs include perimeter control and culvert protection when crossing streams.

Installation of wind turbine structures: Construction of wind turbine sites includes the stripping of topsoil and excavation for foundation slabs. The excavated soil can be effectively used as perimeter control as a soil berm around the perimeter; the exposed soil used should be seeded with rye grass or oats to ensure quick stabilization. Each turbine pad will be approximately 50' wide and disturb a total area of roughly 2,100 square feet. The foundation design may be altered based on the groundwater conditions. The wind turbine rotor will consist of three (3) blades mounted to a rotor hub with a diameter up to 328 feet (100 meters). The tower will be a self-supporting, tubular steel tower with a hub height of 328 feet. Soil disturbance and grading should be minimized to the maximum extent practicable. Recommended BMPs include using perimeter control downslope from construction sites when appropriate and minimizing land disturbance to the area of the turbine foundation.

<u>Installation of underground cables</u>: Electrical and communication cables will be placed underground using a trenching machine. If required to maintain a minimum one (1) foot of clearance between underground cables and any drainage tile, the underground cables shall be installed at a minimum depth of four (4) feet. The collection system cable lengths are minimized by installing them the shortest distance between wind turbines. There are approximately 80 miles of underground cable.

California Ridge will address soil compaction, rutting, and land leveling following the completion of open trenching with private landowners. California Ridge will attempt to mitigate any soil compaction and rutting to the land as well as attempt to return the land to its original pre-construction elevation and contours. Recommended BMPs include minimizing the disturbance along the underground cable route and stabilizing the exposed soil within seven (7) days of construction permanently or temporarily ending for the disturbed area.

<u>Installation of above-ground transmission line</u>: Approximately 9 miles of overhead 138 kV generation transmission line will be installed from the Project substation to the Ameren interconnection switchyard in the southeast corner of the Project area. The installation procedure includes excavation for each transmission line structure, foundation placement, and erection of transmission poles. Grading for the installation of transmission poles should be minimized and occur only in the immediate terrain of the construction, if at all. The structures will be assembled on the ground along with insulator assemblies and then raised into position. Recommended BMPs include using perimeter control downslope when appropriate and minimizing the disturbance in construction areas.

<u>Construction of Project substation / O&M building</u>: Ten (10) acres of land will be used to install a new 34.5 / 138 kV Project substation adjacent to a new Operations & Maintenance facility. The substation will include a step-up transformer that raises the voltage from 34.5 kV to 138 kV. The substation will conform to industry standards and be owned by California Ridge. The O&M building will be approximately 7,000 square feet, and will house all the necessary equipment to operate and maintain each phase of the Project. Construction of these facilities will involve the stripping of topsoil and excavation of additional material for foundation construction. The excavated material can be effectively used as perimeter control as a soil berm. Recommended BMPs include perimeter control and a temporary sediment trap. A site plan for the Project substation and O&M building will be developed to meet NPDES requirements prescribed by Section IV.D.2.b of the General Permit for Construction Activities (Appendix A), which describes measures to be installed for permanent storm water management. These systems will be designed by others and shall be designed for a storm event equal to or greater a 25-year, 24-hour rainfall event.

Turf establishment / revegetation: The disturbed soils will be seeded using mixes as indicated in the Permanent Erosion and Sediment Control BMPs Section.

Removal of temporary erosion controls – After the construction work is completed and final stabilization is established all temporary BMPs will be removed.

TEMPORARY EROSION AND SEDIMENT CONTROL BMPS

The SWPPP provides structural and non-structural, activity-specific erosion and sediment control BMPs. The BMPs selected for each activity are based upon expected construction conditions and methods. The BMPs may be modified in accordance with actual conditions encountered in the field, as determined by the qualified person[3].

A sequence for installation of erosion and sediment control BMPs, stabilization activities, and maintenance will be prepared by the Contractor and included into the SWPPP. General principles in developing the sequence of activities include, but are not limited to, the following:

- Install downslope and sideslope perimeter controls before the land disturbing activity occurs.
- Do not disturb an area until it is necessary for construction to proceed.
- Cover or stabilize disturbed areas as soon as possible.
- Time construction activities to limit impact from seasonal climate changes or weather events.
- Do not remove temporary perimeter controls until after all upstream areas reach final stabilization.

Temporary controls for construction activities include the following:

- Control of surface water
- Culvert Protection
- Dewatering
- Dust control
- Mulching
- Perimeter control
- Preserving existing vegetation
- Protecting roadside ditches
- Protecting soil stockpiles
- Stream crossings
- Street cleaning
- Temporary construction entrances/exits
- Wetland BMPs

[3] Qualified Person refers to a person knowledgeable in the principles and practices of erosion and sediment control measures, such as a licensed professional engineer (P.E.), a Certified Professional in Erosion and Sediment Control (CPESC), a Certified Erosion Sediment and Storm Water Inspector (CESSWI), or other knowledgeable person who possesses the skills to assess conditions at the construction site that impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activities.

Control of Surface Water and Runoff Management

Control of surface water may be necessary during this project. Surface water may need to be diverted around or through the construction by earthen berms or trenches. Water collected in excavation pits will be remove and treated as specified in the Dewatering Section.

Culvert Protection

Where stream crossings occur, culvert protection will be necessary to maintain the hydrologic and hydraulic features of the Project area. Inlet protection will be installed on the upstream end of the culvert to prevent sediment from traveling through the system. This can either be riprap or sod, and must be installed surrounding the culvert inlet. The downstream end of the culvert will need energy dissipation to eliminate potential for scour when the water flows back into the channel. Sod or riprap installation will be effective on at the culvert outlet as energy dissipation. For lower velocity flows, sod can be used effectively at a lower cost. The installation and removal of culverts has potential to cause disturbance to the stream. When the crossing is no longer necessary, it should be removed immediately. The stream should then be restored to its original cross-section is it was disturbed, and exposed soils should be immediately stabilized. Ditch checks can be constructed along channels to stabilize flow and reduce soil erosion and sediment transfer. These can be constructed using riprap or other rock, biorolls, or hay bales. If rock check dams are used, an erosion control blanket should be inserted underneath the ditch check to prevent erosion of the ditch bottom, especially when installing and removing the ditch check. Spacing (in feet) for a series of ditch check checks can be determined by multiplying the height (in feet) by 100, and dividing the result by the slope gradient (%). For a two (2) foot ditch check structure, the spacing requirements are as follow:

Table 3. Ditch Check Spacing

Ditch Grade	Spacing (ft)
1	200
2	100
4	50
6	33

Dewatering

During excavation and other construction-related activities, dewatering may be required. Sediment-laden water will not be discharged directly into surface water or into a drainage pipe, inlet, or ditch that flows directly to a water of the State without intermediate treatment. Water from the area to be dewatered will pass through a sediment control device or sediment trap to settle out sediment before the water is discharged. Dewatering devices will be sized and operated to allow pumped water to flow through the device without exceeding its design criteria. Additional silt fencing or hay bales will be used to trap sediment if the perimeter control device cannot handle the flow. The following dewatering methods will be used as appropriate:
Method 1: Pump directly into a temporary sedimentation basin, overflow protection by rock, or super-duty silt fence system;

Method 2: Chitosan or flock sock installed into a pump or hose section, which will be directed into a temporary sedimentation basin with outflow protection

Method 3: Pump head placed into a barrel with filtering holes and rock;

Method 4: Pump head and gravity inlet installed on a floating head skimmer;

Method 5a: Pump into a plastic lined dumpster, with Chitosan treatment and floating head discharge;

Method 5b: Pump into an engineered treatment plastic lined dumpster, with Chitosan or starch floc treatment and filter fence liner;

Method 6: Sand media particulate filter with inline Chitosan sock; and

Method 7: Alternative method engineered to meet specific circumstances.

Dust Control

Measures will be taken to prevent fugitive dust during construction activities. Dust control measures depend on the topography and land cover of the site, soil characteristics, and expected rainfall. In addition, construction sequencing and disturbing only small areas at a time can greatly reduce the amount of fugitive dust. The following are some of the control measures that can be used as appropriate:

- **Sprinkling/Irrigation**: Wetting exposed soils is an effective dust control method, especially for unpaved access roads. Sprinkling will be done carefully to avoid excess runoff from the site or vehicles tracking mud onto public paved roads.

- **Vegetative Cover**: Where possible, vegetative stabilization will be used for disturbed soil.
- **Rolled-on or Hydro Mulch**: This is a quick and effective dust control measure for a recently disturbed area.
- **Wind Breaks**: Trees and shrubs left in place during site clearing work well to reduce wind velocity through a site. Constructed wind breaks include snow fencing, tarp curtains, hay bales, and sediment walls.
- **Gravel**: This is an effective means of dust control for construction entrances and access roads.
- **Spray-on chemical soil treatments (palliatives)**. These can be used only on mineral soils. Palliatives include anionic asphalt emulsion, latex emulsion, resin-water emulsions, and calcium chloride. The potential effects of a palliative treatment's chemical biodegradability and water-solubility on the surrounding environment will be determined before its use[4].

MULCHING

Mulch materials shall be spread uniformly by hand or machine. Straw mulch shall be anchored immediately after spreading to prevent wind transport. The choice of materials and application method shall be based on the soil type, slope, and season.

Method 1: This method shall consist of the application of straw mulch at a rate of 2 tons per acre. This method should be used on relatively flat surfaces in areas protected from wind.

Method 2: This method shall consist of the application of stabilized straw mulch at a rate of 2 tons per acre. This method shall be used in areas of moderate slope, when the ground is not frozen, and should be stabilized by one of the following methods:

[4] Environmental Protection Agency (EPA). 2006. *Dust Control*. Website accessed June 08, 2011: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=52.

- Anchoring by means of mechanical stabilizer, or crimper, with dull, flat, parallel disks spaced approximately eight (8) inches apart.
- Stabilizing the application of an overspray of hydraulic mulch after the application of straw mulch.
- Anchoring by means of stabilizing the mulch with a chemical mulch binder applied with the straw or as an overspray.

Method 3: This method shall consist of machine application of hydraulic mulch using an approved hydraulic mulcher. This mulch shall be applied at a rate of 1 ton per acre. The hydraulic mulch shall be mixed in accordance with manufacturer's recommendations.

Method 4: This method shall consist of the application of compost. Compost shall be applied using a pneumatic blower to a depth of 2 inches. Compost shall be produced at an IEPA permitted facility and be United States Composting Council (USCC) certified.[5]

Perimeter Control

Earthen berms, straw biorolls, or silt fence will be installed as needed around staging areas and stockpiles. These perimeter controls will also be installed downslope from construction activities and land disturbances (Appendix C). As topsoil is stripped and areas are excavated for construction, the soil can be used as an earthen berm as perimeter control. The berm should be seeded with rye grass or oats to stabilize in a timely manner. These berms will be a cost-effective solution and are very convenient to plow when construction is finished in agricultural areas, requiring little effort for installation, maintenance, and removal. The berm has potential to serve as backfill for structure excavations as well. Silt fence will either be machine sliced into the soil or installed by hand. Hand installed silt fence will have the edge buried or weighted by sand bags.

[5] Illinois Urban Drainage Manual. Natural Resources Conservation Service Standard Practice. Website accessed June 08, 2011. <http://aiswcd.org/IUM/standards/urbst87S.html>.

Preservation of Existing Vegetation

Existing natural vegetation will be preserved as practicable. Natural vegetation provides a buffer zone and stabilized area which helps control erosion, protect water quality, and enhance aesthetic benefits. It also minimizes the amount of exposed bare soil. Areas where vegetation will be preserved will be flagged as appropriate.

Protecting Roadside Ditches

To protect roadside ditches, perimeter control will be used around the construction sites and/or stockpiles areas that are located next to the road ditch.

Protecting Soil Stockpiles

It is envisioned that some excavated materials will be suitable for backfill and site restoration. Topsoils and organic soils stripped prior to excavation will be stockpiled separately from materials suitable for backfill. Unsuitable material will be promptly removed from the site or stockpiled until removal is possible. Perimeter control will be installed around the entire perimeter of stockpiles to prevent sediment from escaping. Geotextile fabric can be used underneath the material or to cover the stockpile, if necessary.

Street Cleaning

Cleaning tracked sediments and debris from paved streets, as needed, prevents unwanted material from being washed into surface waters, and improves the appearance of public roadways. Paved roadways in front of construction entrances/exits will be inspected at the end of each day and tracked soil will be removed within 24 hours of discovery or, if applicable, within a shorter time.

Stream Crossings

It is expected that stream crossings will be necessary for this project; the area is populated with intermittent streams. When a stream crossing is necessary, a culvert will be constructed to allow the water to continue to flow along its natural path, and a gravel road can be installed over the culvert crossing. Riprap or sod can be installed on each end of the culvert to deter sediment transport and prevent scour by dissipating the energy of the flowing water. For low velocity flows, sod will be an effective and less costly method. The installation and removal of culverts has potential to cause disturbance to the stream. When the crossing is no longer necessary, it should be removed immediately. The stream should then be restored to its original cross-section is it was disturbed, and exposed soils should be immediately stabilized.

TEMPORARY CONSTRUCTION ENTRANCES/EXITS

To prevent tracking sediments onto paved surfaces in the areas of potential access points, construction entrances will be constructed by overlaying geotextile fabric with a 6-inch of class V (5). Vegetation and topsoil will not be removed from the shoulder zones to construct the entrances, but tall vegetation may be mowed. If entrance begins to rut, stabilize by placing a geogrid and additional class V (5) in roadway.

The entrance radius should be reduced and the area restored to the geometry of a rural county road intersection at the end of the project. Areas outside of the permanent roadway shoulder may require re-grading. Compacted soils will be loosened by ripping or disking, then re-vegetated and mulched.

TEMPORARY SEEDING

When disturbed soils are left exposed or permanent turf establishment is not possible due to seasonal restrictions in pasture, ditch bottoms, side slopes and fill slopes, then apply the appropriate seed mix for the time of year and apply straw mulch. Temporary seeding should be used as a stabilization of exposed soils, and shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case later than seven (7) days after construction activity has ended for that portion of the site. In cropland areas, temporary seeding is not necessary; the land will be restored to accommodate existing agricultural practices. The Contractor shall apply the following as deemed appropriate for seeding dates and construction activities[6]:

Table 4. Seed Mixtures

Seeding Dates	Species	Application Rate
Early Spring – July 1	Oats	90 lbs/acre
Early Spring – September 30	Cereal Rye	90 lbs/acre
Early Spring – September 30	Wheat	90 lbs/acre
Early Spring – September 30	Perennial Ryegrass	25 lbs/acre

[6] Illinois Urban Drainage Manual. Natural Resources Conservation Service Standard Practice. Website accessed June 08, 2011. <http://aiswcd.org/IUM/standards/urbst965.html>.

WETLAND BMPs

Wetlands are present in the Project area, though no major construction is expected to occur within wetlands. However, they may be encountered between work sites, and it's possible that some construction elements, such as installation of underground cable, may occur in a wetland's proximity. The following options are potential BMPs for working within a wetland. Most importantly, the hydraulic and hydrologic features should not be altered; impact from construction should be avoided to the maximum extent practicable.

Composite Mats: Composite mats are made of high density polyethylene (HDPE) that can be used all year round and during all weather conditions. They are usually 8 feet by 14 feet in size, designed with overlapping lip and secured with a drop-in locking pin feature. The mat acts as one continuous part in the field and reduces slippage or movement. Thread pattern of the mats improve traction for load-bearing vehicles and heavy equipment[7].

Wood Mats: Wood mats are individual cants, saw dense hardwood (oak), or round logs cabled together to make a single-layer crossing.

Wood mats provide a surface that protects wetlands during hauling or equipment-moving operations. A 3-m (10-foot) long, 10 cm by 10 cm (4 inch by 4 inch) center log is the recommended minimum size. If the surface of the crossing becomes slippery, add expanded metal grating to provide traction.

Low Ground-Pressure Equipment: Low pressure equipment exerts ground pressure of less than 5 or 6 psi. Low ground pressure equipment reduces this pressure by reducing overall machine weight, or by increasing the contact area between the equipment and soil, spreading the weight over a larger surface area. By reducing ground pressure at each contact point, equipment flotation is enhanced, traction is usually improved, and road maintenance requirements, such as grading, can be reduced. Low ground pressure equipment can also reduce rut depth and compaction, and can result in reduced fuel consumption[8].

[7] Safety-Box. 2005. *Dura-Base.* Website accessed June 08, 2011: http://www.safety-box.com/durabase.html.
[8] U. S. Department of Agriculture, Forest Service. 1998. *Temporary Stream and Wetland Crossing Options for Forest Management.*

SITE SPECIFIC CONTROL MEASURES

Work near the Road

Potential access points from the roads have been identified and are shown in Appendix C. These areas will be maintained for safe and accessible conditions throughout construction.

Refer to BMPs previously discussed for erosion control and sediment control as most if not all are applicable. A few that stand out are as follows:

- Preservation of existing vegetation
- Mulch
- Perimeter control adjacent to roadway
- Construction entrance and exits
- Street cleaning

Mud tracked onto paved roadways will be shoveled or swept off the road daily. The use of access roads across agricultural land may result in compaction of agricultural soils and loss of crops. Where necessary, compacted soils will be disked following construction, and landowners will be compensated for crop losses. If necessary, Invenergy will work with the proper governing authority to avoid impacts at the access points.

Work in or near a Wetland

Construction impacts will be minimized near wetlands to preserve wetland characteristics to the maximum extent practical. Clearing and grading within wetlands must be limited to topsoil segregation and enhancing natural re-vegetation. Hay bales or anchored biorolls will be used for perimeter control to limit the size of the construction site. Soil stockpiles will not be placed in existing wetlands. To preserve wetland hydrology, construction activities will be minimized in wetlands or low ground-pressure equipment will be used to reduce soil compaction. In the case of open water wetlands, floating silt curtains/barriers will be incorporated.

Construction equipment operating in wetland areas will be limited to that needed for the installation of transmission lines. Construction equipment will only use temporary wetland crossings to access the construction site if necessary, and will be removed from the wetland area when not in use. Temporary wetland crossing options including composite mats, wood mats, wood panels, wood aggregate, and low ground pressure equipment.

Work in or near Waters and Streams

The Project area will encounter several intermittent streams during construction. These waters must be protected when temporary crossings are installed. Construction crews must exercise caution when equipment is within 50 feet of streams and rivers and will not drive equipment through streams or rivers.

PERMANENT EROSION AND SEDIMENT CONTROL BMPS

Permanent erosion control reestablishes vegetative cover with native or adapted species appropriate to the geographic region and includes any structural modifications to ensure long-term sustainability. Permanent BMPs include: cleaning out sediment from channels, sedimentation basins, ditches, and perimeter control devices. Removing any unneeded temporary BMPs within the construction area that will interfere with permanent BMPs, except perimeter controls as directed by the qualified professional.

Permanent controls for construction activities shall consist of the following:

- Turf establishment
    - Soil Conservation
    - Seedbed Preparation
    - Seeding
    - Mulch
    - Turf Maintenance
- Storm water Management Structures
- Drainage Tile Management
- Final Stabilization

TURF ESTABLISHMENT

When land disturbing activities have ceased, turf establishment shall then be completed. Permanent seeding includes oats and perennial ryegrass at seeding rates of 30 to 50 lbs/acre and 10 to 30 lbs/acre, respectively, based upon Pure Live Seed[9]. These are the most practical options for permanent vegetation as they have also been identified for temporary cover.

All seeds shall have the proper stratification and/or scarification to break seed dormancy for spring or early summer plantings. No treatments are needed for late summer, early fall, or dormant seeding.

Soil Conservation

Any soil conservation practices that are damaged by the Project shall be restored by California Ridge to the pre-construction condition. When trenching is required, topsoil shall be stripped and replaced as follows:

- The top 12 inches of topsoil shall first be stripped from the area to be trenched and from an adjacent area to be used for subsoil storage. The topsoil shall be stored in a windrow parallel to the trench in such a manner that it will not become intermixed with subsoil materials.

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[9] Illinois Urban Drainage Manual. Natural Resources Conservation Service Standard Practice. Table A, Code 880. Website accessed June 08, 2011. <http://www.aiswcd.org/IUM/standards/urbst880a.html>.

- All subsoil material that is removed from the trench shall be placed in the second adjacent stripped windrow parallel to the trench but separate from the topsoil windrow.
- In backfilling the trench, the stockpiled subsoil material shall be placed back into the trench before replacing the topsoil.
- The topsoil must be replaced such that after the settling occurs, the topsoil's original depth and contour (with an allowance for settling) will be restored.

Seedbed Preparation

When land disturbing activities are completed permanent, turf establishment shall then be Disturbed areas that are not cultivated will be reseeded based on site characteristics to blend in with native vegetation. Prior to seeding or planting, the seedbed shall be relatively free of all weeds (greater than 80 percent weed free), stones, roots, sticks, rivulets, gullies, crusting, and caking, or other debris which may interfere with seeding or planting operations or plant establishment. The seedbed shall not be worked when frozen or saturated.

Prior to seeding or planting the surface shall be disked or raked to a depth of 2 to 3 inches either by hand or mechanical means to create a smooth, uniform seedbed. If needed, based upon soil conditions and desired vegetation type, incorporate the lime and fertilizer into the soil with a disk harrow, springtooth harrow, or similar tool, to a depth of at least 3 inches. On sloping areas, the final operation shall be on the contour.

Fertilizer or lime is generally not recommended for native vegetation establishment unless soil tests indicate a pH less than 5.5, Phosphorus less than 15 lbs/ac or Potassium less than 150 lbs/ac. If levels are below this, apply lime and fertilizer according to a soil test and the needs of the vegetation selected. In areas that have not been regraded, which have grown up in weeds, or to be no-till seeded, an herbicide application may be necessary to reduce competition with the desired vegetation. An approved herbicide may be used to treat such areas to kill all existing vegetation. Herbicide application shall be done at least 15 days prior to seeding or planting.

Seeding

Seeding may be done by any of the following methods:

1. Conventional Drill
    a. Apply seed uniformly at a depth of quarter-to-half-inch with a drill (band seed) or cultipacker seeder. On sloping land, seeding operations should be on the contour wherever possible.
    b. Apply mulch or erosion blanket following seeding as required.
2. Broadcast Seeding
    a. Culti-pack or roll seedbed, then apply seed uniformly and cover to a quarter to half-inch depth with a cultipacker, or similar tool. Spinning disc type broadcasters equipped with an agitator are effective with native seed mixes. Often broadcasters require the use of a carrying agent such as oats or

vermiculite. Attention should be given to seed mixes with seeds of varying size and weight so that the seed remains effectively mixed during seeding operations.

b. On sloping land, dragging, harrowing, or culti-packing should be done on the contour to ensure seed-soil contact and reduce erosion.
c. Apply mulch or erosion blanket following seeding as required.

3. Hydroseeding
   a. For areas to be hydroseeded, final seedbed preparation shall leave the soil surface in a slightly roughened condition.
   b. Lime and fertilizer shall be incorporated prior to seeding unless they are to be applied at the same time as the seed (applying lime with a hydroseeder may be abrasive to the equipment). Do not use hydrated lime in a slurry mix.
   c. A minimum of 1,000 gallons of water/acre shall be used. The hydraulic seeding equipment shall include a pump rated and operated at no less than 100 gallons per minute and at no less than 100 pounds/sq. in. pressure. The tank shall have a mechanical agitator powerful enough to keep all materials in a uniform suspension in the water. Calibration of the hydraulic equipment shall be accurate.
   d. If seed and fertilizer are mixed together they should be seeded within two hours of mixing.
4. Dormant Seeding

   Dormant seeding may be done between November 15 and March 15 by using conventional drill or broadcast methods.

   If soil conditions are suitable during the dormant seeding period, prepare the seedbed and seed as indicated in this specification. Apply mulch or erosion blanket following seeding.
5. No-till

   In some instances it may be desirable to sow seed into existing sod, a temporary cover crop, or natural vegetation. Drilling may be done after herbicide application to non-native sod or undesirable weeds such as Canada thistle. A rangeland type grass drill with a no-till attachment shall be used. Seeds should be drilled to the depth appropriate for the species, according to the supplier's recommendations.

   The seeds of some plants require light-to-stimulate germination and growth. In situations with some of these species, particularly some native forbs, a combination of broadcasting and no-till drilling may be used. Grasses should be drilled first, followed by broadcasting of the desired forbs.

Mulch

All permanent seeding application shall be mulched upon completion of seed application or planting. Erosion blanket should be substituted for mulch on slopes greater than 3:1 (H:V) or wherever highly erosive conditions exist (e.g. in drainage swales or waterbody shorelines). When planting ground covers, it may be advantageous to apply mulch or erosion blanket prior to planting. Plants should then be tucked into the soil through slits or holes. In all cases, planting should be done in a staggered pattern to minimize erosion.

Turf Maintenance

Turf areas will be maintained until the site has undergone final stabilization, which will include watering, reseeding, and reapplying mulch as needed. Seeded areas will be protected from traffic or other uses by warning signs, temporary fencing, or tape. Surface rills and gullies or other damage will be repaired within 24 hours of discovery by re-grading or re-seeding. Care of turf may extend into the next growing season.

Storm Water Management Structures

Measures will be installed as part of a site plan at the Project substation and the O&M building to control pollutants in storm water discharges that will occur after construction operations have been completed. Structural measures should be placed on upland soils to the degree attainable. These structures may include storm water detention structures, storm water retention structures, flow attenuation, infiltration techniques, or a combination of these practices. The storm water management shall be designed for a storm event equal to or greater than a 25-year, 24-hour rainfall event. The storm water management system is to be designed by others.

Drainage Tile Management

In accordance with Champaign County Stormwater Management Policy (Policy)[10], Section 7.2, all agricultural tile located underneath areas that will be developed shall be replaced existing or equivalent material approved by the reviewing authority as described by Section 4.1 of the Policy. Drainage tile may be relocated within development areas upon approval of the reviewing authority. Such relocation shall maintain sufficient slope and capacity to prevent sedimentation and to prevent an increase in scouring or structural damage to the conduit.

Permanent repairs shall be made within 14 days of tile damage provided that weather and soil conditions are suitable, otherwise temporary repairs shall be made. Immediate temporary repair shall also be required if water is flowing through any damaged tile line.

[10] Champaign County Department of Planning and Zoning. *Champaign County Stormwater Management Policy.* Website accessed June 08, 2011. <http://www.co.champaign.il.us/pandz/stormwaterpolicy.pdf>.

FINAL STABILIZATION

Turf areas will be maintained until the site has undergone final stabilization, which will include watering, reseeding, and re-applying mulch, as needed. Final stabilization will be measured as soil disturbing activities have been completed and a uniform perennial vegetation cover with density at least equal to 70 percent of the natural surrounding cover for unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures have been employed and;

1. All drainage ditches, constructed to drain water from the site after construction is complete, must be stabilized to preclude erosion;
2. All temporary synthetic, and structural erosion prevention and sediment control BMPs (such as silt fence) must be removed as part of the site final stabilization; and
3. Temporary sedimentation basins that will be used as permanent water quality management basins must be cleaned out of all sediment. Sediment must be stabilized to prevent it from being washed back into the basin, conveyances of drainage ways discharging off-site; or to surface waters. The cleanout of permanent basins must be sufficient to return the basin to design capacity.

INSPECTIONS AND MAINTENANCE

INSPECTIONS

Periodic inspections of temporary erosion and sediment controls will be conducted at least once every 14 days, and within 24 hours of rainfall events that produce more than 0.5 inches of rain in a 24-hour period, or a snowmelt event that causes surface erosion. Where the entire site is temporarily stabilized, such inspections will be conducted at least once per month. Inspections may be ceased during frozen ground conditions.

Routine inspections will include:

- All areas disturbed by construction activity and areas used for storage of materials that are exposed to precipitation
- Discharge locations, and where those are inaccessible, nearby downstream locations to the extent that such inspections are practicable
- Locations where vehicles enter or exit the site for evidence of off-site sediment tracking

Records will be kept for each inspection and maintenance activity and will contain the following information:

- Date and time of inspections;
- Name, title, and qualifications of person(s) conducting inspection;
- Findings of the inspections, including recommendations for corrective action including implementation dates;
- Date, duration, and amount of all rainfall events that produce more than 0.5 inches of rain in a 24-hour period and whether any discharges occurred
- Locations of the following:
    - Discharges of sediment or other pollutant from the site.
    - BMPs that need to be maintained.
    - BMPs that have failed to operate as designed or proved inadequate for a particular location.
    - BMPs that are needed and did not exist at the time of inspection.
- Document changes to SWPPP; and
    - Inspector's signature.

An Inspection Log is provided in Appendix E. Owner shall keep SWPPP along with the inspection records for 3 years after Notice of Termination (NOT) is submitted.

If modifications are required as noted by the qualified person after site inspections, those modifications must be implemented within seven (7) calendar days following the inspection. If the site is in violation of the SWPPP, an Incident of Noncompliance (ION) must be completed and submitted within five (5) calendar days to the IEPA (Appendix F).

Maintenance

Silt fences and other temporary erosion and sediment controls will be kept in working order throughout the Project's construction. Maintenance will include the following:

- Sediment traps and basins will be maintained to at least 50 percent capacity.
- Excess sediment behind silt fences and biorolls will be removed and properly disposed when sediments reach one-third the height of the structure.
- Tracked sediments will be removed from paved surfaces at the end of each day.
- Construction entrances will be maintained daily.
- Turf will be maintained until final stabilization is established.

All remaining temporary erosion and sediment controls and accumulated sediments from silt fences will be removed 30 days after the site has undergone final stabilization.

POLLUTION PREVENTION MANAGEMENT MEASURES

Control measures as described in this section will be installed, implemented, and maintained during construction to minimize pollutants in discharges as necessary to meet applicable water quality standards.

SPILL CLEAN-UP

Control measures will be employed to prevent any spills and leaks during construction. Controlled staging areas will be used for hazardous material loading/unloading operations. Spill cleanup materials and equipment will be required for each piece of construction equipment with the potential to discharge any hazardous material to the environment. Any spill impacts would have to be mitigated in compliance with applicable federal, state, and local cleanup standards. In general, the following procedures will be followed:

- Once a spill has been identified, the source of the spill will be immediately identified and contained.
- Absorbent materials will be used to contain and/or isolate the spilled material. An effort will be made to stop the spilled material from reaching any body of water or storm drain.
- The spill and contaminated soils will be collected, treated, and disposed of in accordance with all applicable federal, state, and local requirements.

If a significant spill occurs, the appropriate agencies will be notified and an emergency response contractor will be employed, if necessary, to further contain and clean up a spill.

Illinois Emergency Management Agency	1-800-782-7860 (within state)
	217-782-7860 (out of state)

Within 24 hours following a spill, a description of the release, the circumstances leading to the release and the date of the release will be provided to the appropriate agencies. In addition, the measures implemented to prevent the reoccurrence of such spill and to effectively respond if there is a reoccurrence will also be provided to the appropriate agencies.

TRASH AND DEBRIS

Work sites will be kept clean. Appropriate containers will be provided on site for storing debris and other wastes until disposal. Litter and debris shall be picked-up regularly to reduce the chance for materials to be carried off the site by wind or water. Collected materials shall be taken to appropriate facility for disposal or recycling.

Hazardous Materials

Oils, fuels, and any hazardous substances must be properly stored, to prevent spills, leaks or other discharges. Restricted access to storage areas must be provided to prevent vandalism. Storage and disposal of hazardous waste must be in compliance with applicable regulations.

Sanitary/ Septic Waste Management

Sanitary/ septic waste handling will adhere to local, state, and federal regulations, if required. Sanitary facilities will be located for convenient access and away from drainage inlets and water resources. Untreated raw waste will not be discharge to land, into drainage inlets, or to water resources. A licensed service will be employed to maintain sanitary/septic systems.

Truck Washing

If required, a location shall be set aside for washing trucks and other construction vehicles. Discharge from the wash shall be directed into a sediment trap, which will also receive waste concrete. The trap shall be cleaned out at least weekly and the material disposed off-site.

PLAN MODIFICATIONS

The SWPPP must accurately reflect site features and operations. If it is observed that the SWPPP's control measures are not effective in minimizing pollutant discharge from a site, then the SWPPP must be updated or changed to correct the situation. The SWPPP will also be updated to include contractors and subcontractors identified after the submittal of the NOI. These additional contractors/subcontractors will certify the SWPPP and be identified as co-permittees (Appendix G). In addition, the SWPPP will be updated if local, state, or federal officials determine that the existing stormwater controls are ineffective in eliminating or minimizing pollutants in stormwater discharges from the construction sites. Revisions to the SWPPP will be completed within seven (7) calendar days following an inspection where additional or modified control measures have been identified. As noted above, if the site is in violation of the SWPPP, an Incident of Noncompliance (ION) must be completed and submitted within five (5) calendar days to the IEPA (Appendix F).

NOTICE OF TERMINATION

The Owner is required to submit a Notice of Termination (NOT) to the IEPA after one or more of the following conditions have been met:

1. Final stabilization has been achieved on all portions of the site for which the permittee is responsible and all construction activity is completed; or
2. All stormwater discharge from construction activities authorized by this permit is eliminated.

A copy of the NOT can be found in Appendix H.

Appendix A
Illinois Environmental Protection Agency General Construction Permit – ILR10

General NPDES Permit No. ILR10

Illinois Environmental Protection Agency
Division of Water Pollution Control
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276
www.epa.state.il.us

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

General NPDES Permit For Storm Water Discharges From Construction Site Activities

Expiration Date: July 31, 2013

Issue Date: August 11, 2008

Effective Date: August 11, 2008

In compliance with the provisions of the Illinois Environmental Protection Act, the Illinois Pollution Control Board Rules and Regulations (35 Ill. Adm. Code, Subtitle C, Chapter I), and the Clean Water Act, and the regulations thereunder the following discharges are authorized by this permit in accordance with the conditions and attachments herein.

Alan Keller

Alan Keller, P.E.
Manager, Permit Section
Division of Water Pollution Control

Part I. COVERAGE UNDER THIS PERMIT

A. **Permit Area.** The permit covers all areas of the State of Illinois with discharges to any waters of the State.

B. **Eligibility.**

1. This permit shall authorize all discharges of storm water associated with industrial activity from construction sites that will result in the disturbance of one or more acres total land area, construction sites less than one acre of total land that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb one or more acres total land area. This permit also authorizes discharges from construction sites designated by the Agency that have the potential for contribution to a violation of water quality standards or significant contribution of pollutants to waters of the State, occurring after the effective date of this permit (including discharges occurring after the effective date of this permit are also authorized by this permit, except for discharges identified under Part I.B.3 (Limitations on Coverage).

2. This permit may only authorize a storm water discharge associated with industrial activity from a construction site that is mixed with a storm water discharge from an industrial source other than construction, where:

   a. the industrial source other than construction is located on the same site as the construction activity;

   b. storm water discharges associated with industrial activity from the areas of the site where construction activities are occurring are in compliance with the terms of this permit; and

   c. storm water discharges associated with industrial activity from the areas of the site where industrial activity other than construction are occurring (including storm water discharges from dedicated asphalt plants and dedicated concrete plants) are covered by a different NPDES general permit or individual permit authorizing such discharges.

3. **Limitations on Coverage.** The following storm water discharges from construction sites are not authorized by this permit:

   a. storm water discharges associated with industrial activity that originate from the site after construction activities have been completed and the site has undergone final stabilization;

b. discharges that are mixed with sources of non-storm water other than discharges identified in Part III.A (Prohibition on Non-Storm Water Discharges) of this permit and in compliance with paragraph IV.D.5 (Non-Storm Water Discharges) of this permit;

c. storm water discharges associated with industrial activity that are subject to an existing NPDES individual or general permit or which are issued a permit in accordance with Part VI.N (Requiring an Individual Permit or an Alternative General Permit) of this permit. Such discharges may be authorized under this permit after an existing permit expires provided the existing permit did not establish numeric limitations for such discharges;

d. storm water discharges from construction sites that the Agency has determined to be or may reasonably be expected to be contributing to a violation of a water quality standard; and

e. Storm water discharges that the Agency, at its discretion, determines are not appropriately authorized or controlled by this general permit.

f. Storm water discharges to any receiving water specified under 35 Ill. Adm. Code 302.105(d)(6).

C. Authorization.

1. In order for storm water discharges from construction sites to be authorized to discharge under this general permit a discharger must submit a Notice of Intent (NOI) in accordance with the requirements of Part II below, using an NOI form provided by the Agency.

2. Where a new contractor is selected after the submittal of an NOI under Part II below, a new Notice of Intent (NOI) must be submitted by the owner in accordance with Part II.

3. For projects that have complied with State law on historic preservation and endangered species prior to submittal of the NOI, through coordination with the Illinois Historic Preservation Agency and the Illinois Department of Natural Resources or through fulfillment of the terms of interagency agreements with those agencies, the NOI shall indicate that such compliance has occurred.

4. Unless notified by the Agency to the contrary, dischargers who submit an NOI in accordance with the requirements of this permit are authorized to discharge storm water from construction sites under the terms and conditions of this permit in 30 days after the date the NOI is received by the Agency.

5. The Agency may deny coverage under this permit and require submittal of an application for an individual NPDES permit based on a review of the NOI or other information.

Part II. NOTICE OF INTENT REQUIREMENTS

A. Deadlines for Notification.

1. To receive authorization under this general permit, a discharger must submit a completed Notice of Intent (NOI) in accordance with Part VI.G (Signatory Requirements) and the requirements of this Part in sufficient time to allow a 30 day review period after the receipt of the NOI by the Agency and the start of construction. The completed NOI may be submitted electronically to the following email address: epa.constilr10swppp@illinois.gov

2. Discharges that were previously covered by a valid General NPDES Permit for Storm Water Discharges from Construction Site Activities are automatically covered by this permit.

3. A discharger may submit an NOI in accordance with the requirements of this Part after the start of construction. In such instances, the Agency may bring an enforcement action for any discharges of storm water associated with industrial activity from a construction site that have occurred on or after the start of construction.

B. **Failure to Notify.** Dischargers who fail to notify the Agency of their intent to be covered, and discharge storm water associated with construction site activity to Waters of the State without an NPDES permit, are in violation of the Environmental Protection Act and Clean Water Act.

C. **Contents of Notice of Intent.** The Notice of Intent shall be signed in accordance with Part VI.G (Signatory Requirements) of this permit by all of the entities identified in paragraph 2 below and shall include the following information:

1. The mailing address, and location of the construction site for which the notification is submitted. Where a mailing address for the site is not available, the location can be described in terms of the latitude and longitude of the approximate center of the facility to the nearest 15 seconds, or the nearest quarter section (if the section, township and range is provided) that the construction site is located in;

2. The owner's name, address, telephone number, and status as Federal, State, private, public or other entity;

3. The name, address and telephone number of the general contractor(s) that have been identified at the time of the NOI submittal;

4. The name of the receiving water(s), or if the discharge is through a municipal separate storm sewer, the name of the municipal operator of the storm sewer and the ultimate receiving water(s);

5. The number of any NPDES permit for any discharge (including non-storm water discharges) from the site that is currently authorized by an NPDES permit;

6. A description of the project, detailing the complete scope of the project, estimated timetable for major activities and an estimate of the number of acres of the site on which soil will be disturbed; and

7. An electronic copy of the storm water pollution prevention plan that has been prepared for the site in accordance with Part IV of this permit. The electronic copy shall be submitted to the Agency at the following email address: epa.constilr10swppp@illinois.gov

D. **Where to Submit.**

1. Facilities which discharge storm water associated with construction site activity must use an NOI form provided by the Agency. NOIs must be signed in accordance with Part VI.G (Signatory Requirements) of this permit. NOIs and the applicable fee for construction site activities are to be submitted by certified mail to the Agency at the following address:

   Illinois Environmental Protection Agency
   Division of Water Pollution Control, Mail Code #15
   Attention: Permit Section
   1021 North Grand Avenue East
   Post Office Box 19276
   Springfield, Illinois 62794-9276

   The completed NOI and SWPPP may be submitted electronically to the following email address: epa.constril10swppp@illinois.gov

2. A copy of the letter of notification of coverage along with the General NPDES Permit for Storm Water Discharges from Construction Site Activities or other indication that storm water discharges from the site are covered under an NPDES permit shall be posted at the site in a prominent place for public viewing (such as alongside a building permit).

E. **Additional Notification.** Facilities which are operating under approved local sediment and erosion plans, grading plans, or storm water management plans, in addition to filing copies of the Notice of Intent in accordance with Part D above, shall also submit signed copies of the Notice of Intent to the local agency approving such plans in accordance with the deadlines in Part A above. See Part IV.D.2.d (Approved State or Local Plans).

F. **Notice of Termination.** Where a site has been finally stabilized and all storm water discharges from construction sites that are authorized by this permit are eliminated, the permittee of the facility must submit a completed Notice of Termination that is signed in accordance with Part VI.G (Signatory Requirements) of this permit.

1. The Notice of Termination shall include the following information:

   a. The mailing address, and location of the construction site for which the notification is submitted. Where a mailing address for the site is not available, the location can be described in terms of the latitude and longitude of the approximate center of the facility to the nearest 15 seconds, or the nearest quarter section (if the section, township and range is provided) that the construction site is located in;

   b. The owner's name, address, telephone number, and status as Federal, State, private, public or other entity;

   c. The name, address and telephone number of the general contractor(s); and

   d. The following certification signed in accordance with Part VI.G (Signatory Requirements) of this permit:

   "I certify under penalty of law that all storm water discharges associated with construction site activity from the identified facility that are authorized by NPDES general permit ILR10 have otherwise been eliminated. I understand that by submitting this notice of termination, that I am no longer authorized to discharge storm water associated with construction site activity by the general permit, and that discharging pollutants in storm water associated with construction site activity to Waters of the State is unlawful under the Environmental Protection Act and Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this notice of termination does not release an operator from liability for any violations of this permit or the Clean Water Act."

   For the purposes of this certification, elimination of storm water discharges associated with industrial activity means that all disturbed soils at the identified facility have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with construction activities from the identified site that are authorized by a NPDES general permit have otherwise been eliminated.

2. All Notices of Termination are to be sent to the Agency to the mailing address in Part II.D.1, using the form provided by the Agency.

Part III. SPECIAL CONDITIONS, MANAGEMENT PRACTICES, AND OTHER NON-NUMERIC LIMITATIONS

A. **Prohibition on Non-Storm Water Discharges.**

1. Except as provided in Part I paragraph B.2 and paragraph 2 below, all discharges covered by this permit shall be composed entirely of storm water.

2. a. Except as provided in paragraph b below, discharges of materials other than storm water must be in compliance with a NPDES permit (other than this permit) issued for the discharge.

b. The following non-storm water discharges may be authorized by this permit provided the non-storm water component of the discharges is in compliance with Part IV.D.5 (Non-Storm Water Discharges): discharges from fire fighting activities; fire hydrant flushings; waters used to wash vehicles where detergents are not used; waters used to control dust; potable water sources including uncontaminated waterline flushings; landscape irrigation drainages; routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; uncontaminated air conditioning condensate; springs; uncontaminated ground water; and foundation or footing drains where flows are not contaminated with process materials such as solvents.

B. **Discharges Into Receiving Waters With an Approved Total Maximum Daily Load (TMDL):**

Discharges to waters for which there is a TMDL allocation for sediment or a parameter that addressed sediment (such as total suspended solids, turbidity, or siltation) are not eligible for coverage under this permit unless you develop and certify a SWPPP that is consistent with the assumptions and requirements in the approved TMDL. To be eligible for coverage under this general permit, operators must incorporate into their SWPPP any conditions applicable to their discharges necessary for consistency with the assumptions and requirements of the TMDL within any timeframes established in the TMDL. If a specific numeric waste load allocation has been established that would apply to the project's discharges, the operator must incorporate that allocation into its SWPPP and implement necessary steps to meet that allocation. Please refer to the Agency website at: http://www.epa.state.il.us/water/tmdl/report-status.html

C. Discharges covered by this permit, alone or in combination with other sources, shall not cause or contribute to a violation of any applicable water quality standard.

Part IV. STORM WATER POLLUTION PREVENTION PLANS

A storm water pollution prevention plan shall be developed for each construction site covered by this permit. Storm water pollution prevention plans shall be prepared in accordance with good engineering practices. The plan shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with construction site activity from the facility. In addition, the plan shall describe and ensure the implementation of best management practices which will be used to reduce the pollutants in storm water discharges associated with construction site activity and to assure compliance with the terms and conditions of this permit. Facilities must implement the provisions of the storm water pollution prevention plan required under this part as a condition of this permit.

A. **Deadlines for Plan Preparation and Compliance.**

The plan shall:

1. Be completed prior to the start of the construction to be covered under this permit and submitted electronically to the Agency; and

2. Provide for compliance with the terms and schedule of the plan beginning with the initiation of construction activities.

B. **Signature, Plan Review and Notification.**

1. The plan shall be signed in accordance with Part VI.G (Signatory Requirements), and be retained on-site at the facility which generates the storm water discharge in accordance with Part VI.E (Duty to Provide Information) of this permit.

2. Prior to commencement of construction, the permittee shall provide the plan to the Agency. Said plan shall be available at the site.

3. The permittee shall make plans available upon request from this Agency or a local agency approving sediment and erosion plans, grading plans, or storm water management plans; or in the case of a storm water discharge associated with industrial activity which discharges through a municipal separate storm sewer system with an NPDES permit, to the municipal operator of the system.

4. The Agency may notify the permittee at any time that the plan does not meet one or more of the minimum requirements of this Part. Such notification shall identify those provisions of the permit which are not being met by the plan, and identify which provisions of the plan require modifications in order to meet the minimum requirements of this part. Within 7 days from receipt of notification from the Agency, the permittee shall make the required changes to the plan and shall submit to the Agency a written certification that the requested changes have been made. Failure to comply shall terminate authorization under this permit.

5. All storm water pollution prevention plans and all completed inspection forms/reports required under this permit are considered reports that shall be available to the public at any reasonable time upon request. However, the permittee may claim any portion of a storm water pollution prevention plan as confidential in accordance with 40 CFR Part 2.

C. **Keeping Plans Current.** The permittee shall amend the plan whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to Waters of the State and which has not otherwise been addressed in the plan or if the storm water pollution prevention plan proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified under paragraph D.2 below, or in otherwise achieving the general objectives of controlling pollutants in storm water discharges associated with construction site activity. In addition, the plan shall be amended to identify any new contractor and/or subcontractor that will implement a measure of the storm water pollution prevention plan. Amendments to the plan may be reviewed by the Agency in the same manner as Part IV.B above. Any revisions of the documents for the storm water pollution prevention plan shall be kept on site at all times.

D. **Contents of Plan.** The storm water pollution prevention plan shall include the following items:

1. **Site Description.** Each plan shall, provide a description of the following:

a. A description of the nature of the construction activity or demolition work;

b. A description of the intended sequence of major activities which disturb soils for major portions of the site (e.g. clearing, grubbing, excavation, grading);

c. An estimate of the total area of the site and the total area of the site that is expected to be disturbed by excavation, grading, or other activities;

d. An estimate of the runoff coefficient of the site after construction activities are completed and existing data describing the soil or the quality of any discharge from the site;

e. A site map indicating drainage patterns and approximate slopes anticipated before and after major grading activities, locations where vehicles enter or exit the site and controls to prevent offsite sediment tracking, areas of soil disturbance, the location of major structural and nonstructural controls identified in the plan, the location of areas where stabilization practices are expected to occur, surface waters (including wetlands), and locations where storm water is discharged to a surface water; and

f. The name of the receiving water(s) and the ultimate receiving water(s), and areal extent of wetland acreage at the site.

2. **Controls.** Each plan shall include a description of appropriate controls that will be implemented at the construction site. The Illinois Urban Manual (http://www.il.nrcs.usda.gov/technical/engineer/urban/index.html) or other similar documents shall be used for developing the appropriate management practices, controls or revisions of the plan. The plan will clearly describe for each major activity identified in paragraph D.1 above, appropriate controls and the timing during the construction process that the controls will be implemented. (For example, perimeter controls for one portion of the site will be installed after the clearing and grubbing necessary for installation of the measure, but before the clearing and grubbing for the remaining portions of the site. Perimeter controls will be actively maintained until final stabilization of those portions of the site upward of the perimeter control. Temporary perimeter controls will be removed after final stabilization). The description of controls shall address as appropriate the following minimum components:

a. **Erosion and Sediment Controls.**

(i) **Stabilization Practices.** A description of interim and permanent stabilization practices, including site-specific scheduling of the implementation of the practices. Site plans should ensure that existing vegetation is preserved where practicable and that disturbed portions of the site are stabilized. Stabilization practices may include: temporarily seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, staged or staggered development, and other appropriate measures. A record of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated shall be included in the plan. Except as provided in paragraphs (A) and (B) below, stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 7 days after the construction activity in that portion of the site has temporarily or permanently ceased as follows:

(A) Where the initiation of stabilization measures by the 7th day after construction activity temporarily or permanently ceases on a portion of the site is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.

(B) Where construction activity will resume on a portion of the site within 14 days from when activities ceased, (e.g. the total time period that construction activity is temporarily ceased is less than 14 days) then stabilization measures do not have to be initiated on that portion of site by the 7th day after construction activity temporarily ceased.

(ii) **Structural Practices.** A description of structural practices utilized to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Such practices may include silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. Structural practices should be placed on upland soils to the degree practicable. The installation of these devices may be subject to Section 404 of the CWA.

(iii) **Best Management Practices for Impaired Waters.** For any site which discharges directly to an impaired water identified on the Agency's website for 303(d) listing for suspended solids, turbidity, or siltation the storm water pollution prevention plan shall be designed for a storm event equal to or greater than a 25-year 24-hour rainfall event. If required by federal regulations or the Illinois Environmental Protection Agency's Illinois Urban Manual, the storm water pollution prevention plan shall adhere to a more restrictive design criteria. Please refer to the Agency's website at: (http://www.epa.state.il.us/water/tmdl/303d-list.html)

b. **Storm Water Management.** A description of measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed. Structural measures should be placed on upland soils to the degree attainable. The installation of these devices may be subject to Section 404 of the CWA. This permit only addresses the installation of storm water management measures, and not the ultimate operation and maintenance of such structures after the construction activities have been completed and the site has undergone final stabilization. Permittees are responsible for only the installation and maintenance of storm water management measures prior to final stabilization of the site, and are not responsible for maintenance after storm water discharges associated with industrial activity have been eliminated from the site.

(i) Such practices may include: storm water detention structures (including wet ponds); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff onsite; and sequential systems (which combine several practices). The storm water pollution prevention plan shall include an explanation of the technical basis used to select the practices to control pollution where flows exceed predevelopment levels.

(ii) Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g. maintenance of hydrologic conditions, such as the hydroperiod and hydrodynamics present prior to the initiation of construction activities).

(iii) Unless otherwise specified in the Illinois Environmental Protection Agency's Illinois Urban Manual, the storm water pollution prevention plan shall be designed for a storm event equal to or greater than a 25-year 24-hour rainfall event.

c. **Other Controls.**

(i) **Waste Disposal.** No solid materials, including building materials, shall be discharged to Waters of the State, except as authorized by a Section 404 permit.

(ii) The plan shall ensure and demonstrate compliance with applicable State and/or local waste disposal, sanitary sewer or septic system regulations.

(iii) For construction sites that receive concrete or asphalt from off site locations, the plan must identify and include appropriate controls and measures to reduce or eliminate these discharges.

d. **Approved State or Local Plans.**

(i) The management practices, controls and other provisions contained in the storm water pollution prevention plan must be at least as protective as the requirements contained in Illinois Environmental Protection Agency's Illinois Urban Manual, 2002. Facilities which discharge storm water associated with construction site activities must include in their storm water pollution prevention plan procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials. Requirements specified in sediment and erosion site plans or site permits or storm water management site plans or site permits approved by local officials that are applicable to protecting surface water resources are, upon submittal of an NOI to be authorized to discharge under this permit, incorporated by reference and are enforceable under this permit. The plans shall include all requirements of this permit and include more stringent standards required by any local approval. This provision does not apply to provisions of master plans, comprehensive plans, non-enforceable guidelines or technical guidance documents that are not identified in a specific plan or permit that is issued for the construction site.

(ii) Dischargers seeking alternative permit requirements are not authorized by this permit and shall submit an individual permit application in accordance with 40 CFR 122.26 at the address indicated in Part II.D (Where to Submit) of this permit, along with a description of why requirements in approved local plans or permits should not be applicable as a condition of an NPDES permit.

3. **Maintenance.** The plan shall include a description of procedures to maintain in good and effective operating conditions vegetation, erosion and sediment control measures and other protective measures identified in the site plan.

4. **Inspections.** Qualified personnel (provided by the permittee) shall inspect disturbed areas of the construction site that have not been finally stabilized, structural control measures, and locations where vehicles enter or exit the site at least once every seven calendar days and within 24 hours of the end of a storm that is 0.5 inches or greater or equivalent snowfall. Qualified personnel means a person knowledgeable in the principles and practices of erosion and sediment controls measures, such as a licensed Professional Engineer (P.E.), a Certified Professional in Erosion and Sediment Control (CPESC), a Certified Erosion Sediment and Storm Water Inspector (CESSWI) or other knowledgeable person who possesses the skills to assess conditions at the construction site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activities.

a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the plan shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

b. Based on the results of the inspection, the description of potential pollutant sources identified in the plan in accordance with Part IV.D.1 (Site Description) of this permit and pollution prevention measures identified in the plan in accordance with Part IV.D.2 (Controls) of this permit shall be revised as appropriate as soon as practicable after such inspection. Such modifications shall provide for timely implementation of any changes to the plan within 7 calendar days following the inspection.

c. A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance with paragraph b above shall be made and retained as part of the storm water pollution prevention plan for at least three years from the date that the permit coverage expires or is terminated. All inspection reports shall be retained at the construction site. The report shall be signed in accordance with Part VI.G (Signatory Requirements) of this permit.

d. The permittee shall notify the appropriate Agency Field Operations Section office by email at: epa.swnoncomp@illinois.gov, telephone or fax within 24 hours of any incidence of noncompliance for any violation of the storm water pollution prevention plan observed during any inspection conducted, or for violations of any condition of this permit. The permittee shall complete and submit within 5 days an "Incidence of Noncompliance" (ION) report for any violation of the storm water pollution prevention plan observed during any inspection conducted, or for violations of any condition of this permit. Submission shall be on forms provided by the Agency and include specific information on the cause of noncompliance, actions which were taken to prevent any further causes of noncompliance, and a statement detailing any environmental impact which may have resulted from the noncompliance.

e. All reports of noncompliance shall be signed by a responsible authority as defined in Part VI.G (Signatory Requirements).

f. After the initial contact has been made with the appropriate Agency Field Operations Section Office, all reports of noncompliance shall be mailed to the Agency at the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Compliance Assurance Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

5. **Non-Storm Water Discharges.** Except for flows from fire fighting activities, sources of non-storm water listed in Part III.A.2 of this permit that are combined with storm water discharges associated with industrial activity must be identified in the plan. The plan shall identify and insure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

E. **Additional requirements for storm water discharges from industrial activities other than construction, including dedicated asphalt plants, and dedicated concrete plants.** This permit may only authorize any storm water discharge associated with industrial activity from a construction site that is mixed with a storm water discharge from an industrial source other than construction, where:

1. The industrial source other than construction is located on the same site as the construction activity;

2. Storm water discharges associated with industrial activity from the areas of the site where construction activities are occurring are in compliance with the terms of this permit; and

3. Storm water discharges associated with industrial activity from the areas of the site where industrial activity other than construction are occurring (including storm water discharges from dedicated asphalt plants (other than asphalt emulsion facilities) and dedicated concrete plants) are in compliance with the terms, including applicable NOI or application requirements, of a different NPDES general permit or individual permit authorizing such discharges.

F. Contractors.

1. The storm water pollution prevention plan must clearly identify for each measure identified in the plan, the contractor(s) or subcontractor(s) that will implement the measure. All contractors and subcontractors identified in the plan must sign a copy of the certification statement in paragraph 2 below in accordance with Part VI.G (Signatory Requirements) of this permit. All certifications must be included in the storm water pollution prevention plan except for owners that are acting as contractors.

2. **Certification Statement.** All contractors and subcontractors identified in a storm water pollution prevention plan in accordance with paragraph 1 above shall sign a copy of the following certification statement before conducting any professional service at the site identified in the storm water pollution prevention plan:

"I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit (ILR10) that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification."

The certification must include the name and title of the person providing the signature in accordance with Part VI.G of this permit: the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification is made.

Part V. RETENTION OF RECORDS

A. The permittee shall retain copies of storm water pollution prevention plans and all reports and notices required by this permit, and records of all data used to complete the Notice of Intent to be covered by this permit, for a period of at least three years from the date that the permit coverage expires or is terminated. This period may be extended by request of the Agency at any time.

B. The permittee shall retain a copy of the storm water pollution prevention plan and any revisions to said plan required by this permit at the construction site from the date of project initiation to the date of final stabilization.

Part VI. STANDARD PERMIT CONDITIONS

A. **Duty to Comply.** The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Illinois Environmental Protection Act and the CWA and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

B. **Continuation of the Expired General Permit.** This permit expires five years from the date of issuance. An expired general permit continues in force and effect until a new general permit or an individual permit is issued. Only those facilities authorized to discharge under the expiring general permit are covered by the continued permit.

C. **Need to halt or reduce activity not a defense.** It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. **Duty to Mitigate.** The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. **Duty to Provide Information.** The permittee shall furnish within a reasonable time to the Agency or local agency approving sediment and erosion control plans, grading plans, or storm water management plans; or in the case of a storm water discharge associated with industrial activity which discharges through a municipal separate storm sewer system with an NPDES permit, to the municipal operator of the system, any information which is requested to determine compliance with this permit. Upon request, the permittee shall also furnish to the Agency or local agency approving sediment and erosion control plans, grading plans, or storm water management plans; or in the case of a storm water discharge associated with industrial activity which discharges through a municipal separate storm sewer system with an NPDES permit, to the municipal operator of the system, copies of all records required to be kept by this permit.

F. **Other Information.** When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the Notice of Intent or in any other report to the Agency, he or she shall promptly submit such facts or information.

G. **Signatory Requirements.** All Notices of Intent, storm water pollution prevention plans, reports, certifications or information either submitted to the Agency or the operator of a large or medium municipal separate storm sewer system, or that this permit requires be maintained by the permittee, shall be signed.

1. All Notices of Intent shall be signed as follows:

a. For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (1) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or (2) any person authorized to sign documents that has been assigned or delegated said authority in accordance with corporate procedures;

b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (1) the chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

2. All reports required by the permit and other information requested by the Agency shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described above and submitted to the Agency.

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).

c. **Changes to Authorization.** If an authorization under Part I.C (Authorization) is no longer accurate because a different individual or position has responsibility for the overall operation of the construction site, a new authorization satisfying the requirements of Part I.C must be submitted to the Agency prior to or together with any reports, information, or applications to be signed by an authorized representative.

d. **Certification.** Any person signing documents under this Part shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. **Penalties for Falsification of Reports.** Section 309(c)(4) of the Clean Water Act provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or by both. Section 44(j)(4) and (5) of the Environmental Protection Act provides that any person who knowingly makes any false statement, representation, or certification in an application form, or form pertaining to a NPDES permit commits a Class A misdemeanor, and in addition to any other penalties provided by law is subject to a fine not to exceed $10,000 for each day of violation.

I. **Penalties for Falsification of Monitoring Systems.** The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by fines and imprisonment described in Section 309 of the CWA. The Environmental Protection Act provides that any person who knowingly renders inaccurate any monitoring device or record required in connection with any NPDES permit or with any discharge which is subject to the provisions of subsection (f) of Section 12 of the Act commits a Class A misdemeanor, and in addition to any other penalties provided by law is subject to a fine not to exceed $10,000 for each day of violation.

J. **Oil and Hazardous Substance Liability.** Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under section 311 of the CWA.

K. **Property Rights.** The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

L. **Severability.** The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

M. **Transfers.** This permit is not transferable to any person except after notice to the Agency. The Agency may require the discharger to apply for and obtain an individual NPDES permit as stated in Part I.C (Authorization).

N. **Requiring an Individual Permit or an Alternative General Permit.**

1. The Agency may require any person authorized by this permit to apply for and/or obtain either an individual NPDES permit or an alternative NPDES general permit. Any interested person may petition the Agency to take action under this paragraph. Where the Agency requires a discharger authorized to discharge under this permit to apply for an individual NPDES permit, the Agency shall notify the discharger in writing that a permit application is required. This notification shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the discharger to file the application, and a statement that on the effective date of the individual NPDES permit or the alternative general permit as it applies to the individual permittee, coverage under this general permit shall automatically terminate. Applications shall be submitted to the Agency indicated in Part II.D (Where to Submit) of this permit. The Agency may grant additional time to submit the application upon request of the applicant. If a discharger fails to submit in a timely manner an individual NPDES permit application as required by the Agency under this paragraph, then the applicability of this permit to the individual NPDES permittee is automatically terminated at the end of the day specified by the Agency for application submittal. The Agency may require an individual NPDES permit based on:

   a. information received which indicates the receiving water may be of particular biological significance pursuant to 35 Ill. Adm. Code 302.105(d)(6);

   b. whether the receiving waters are impaired waters for suspended solids, turbidity or siltation as identified by the Agency's 303(d) listing;

   c. size of construction site, proximity of site to the receiving stream, etc.

   The Agency may also require monitoring of any storm water discharge from any site to determine whether an individual permit is required.

2. Any discharger authorized by this permit may request to be excluded from the coverage of this permit by applying for an individual permit. In such cases, the permittee shall submit an individual application in accordance with the requirements of 40 CFR 122.26(c)(1)(ii), with reasons supporting the request, to the Agency at the address indicated in Part II.D (Where to Submit) of this permit. The request may be granted by issuance of any individual permit or an alternative general permit if the reasons cited by the permittee are adequate to support the request.

3. When an individual NPDES permit is issued to a discharger otherwise subject to this permit, or the discharger is authorized to discharge under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. When an individual NPDES permit is denied to a discharger otherwise subject to this permit, or the discharger is denied for coverage under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee remains in effect, unless otherwise specified by the Agency.

O. **State/Environmental Laws.** No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

P. **Proper Operation and Maintenance.** The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of storm water pollution prevention plans. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of the permit.

Q. **Inspection and Entry.** The permittee shall allow the IEPA, or an authorized representative upon presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

R. **Permit Actions.** This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

Part VII. REOPENER CLAUSE

A. If there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with industrial activity covered by this permit, the discharger may be required to obtain an individual permit or an alternative general permit in accordance with Part I.C (Authorization) of this permit or the permit may be modified to include different limitations and/or requirements.

B. Permit modification or revocation will be conducted according to provisions of 35 Ill. Adm. Code, Subtitle C, Chapter I and the provisions of 40 CFR 122.62, 122.63, 122.64 and 124.5 and any other applicable public participation procedures.

C. The Agency will reopen and modify this permit under the following circumstances:

1. the U.S. EPA amends its regulations concerning public participation;

2. a court of competent jurisdiction binding in the State of Illinois or the 7th Circuit Court of Appeals issues an order necessitating a modification of public participation for general permits; or

3. to incorporate federally required modifications to the substantive requirements of this permit.

Part VIII. DEFINITIONS

"Agency" means the Illinois Environmental Protection Agency.

"Best Management Practices" ("BMPs") means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control construction site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

"Commencement of Construction or Demolition Activities" The initial disturbance of soils associated with clearing, grading, or excavating activities or other construction or demolition activities.

"CWA" means Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub. L. 92-500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. (96-483 and Pub. L. 97-117, 33 U.S.C. 1251 et seq.).

"Dedicated portable asphalt plant" A portable asphalt plant that is located on or contiguous to a construction site and that provides asphalt only to the construction site that the plant is located on or adjacent to. The term dedicated portable asphalt plant does not include facilities that are subject to the asphalt emulsion effluent limitation guideline at 40 CFR 443.

"Dedicated portable concrete plant" A portable concrete plant that is located on or contiguous to a construction site and that provides concrete only to the construction site that the plant is located on or adjacent to.

"Dedicated sand or gravel operation" An operation that produces sand and/or gravel for a single construction project.

"Director" means the Director of the Illinois Environmental Protection Agency or an authorized representative.

"Final Stabilization" means that all soil disturbing activities at the site have been completed, and either of the two following conditions are met:

(i) A uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of 70 percent of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or

(ii) Equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

For individual lots in residential construction, final stabilization means that either:

(i) The homebuilder has completed final stabilization as specified above, or

(ii) The homebuilder has established temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for, and benefits of, final stabilization.

"Large and Medium municipal separate storm sewer system" means all municipal separate storm sewers that are either:

(i) Located in an incorporated place (city) with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census (these cities are listed in Appendices F and G of 40 CFR Part 122); or

(ii) Located in the counties with unincorporated urbanized populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships or towns within such counties (these counties are listed in Appendices H and I of 40 CFR Part 122): or

(iii) Owned or operated by a municipality other than those described in paragraph (i) or (ii) and that are designated by the Director as part of the large or medium municipal separate storm sewer system.

"NOI" means notice of intent to be covered by this permit (see Part II of this permit.)

"Point Source" means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharges. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

"Runoff coefficient" means the fraction of total rainfall that will appear at the conveyance as runoff.

"Storm Water" means storm water runoff, snow melt runoff, and surface runoff and drainage.

"Storm Water Associated with Industrial Activity" means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing or raw materials storage areas at an industrial plant. The term does not include discharges from facilities or activities excluded from the NPDES program. For the categories of industries identified in subparagraphs (i) through (x) of this subsection, the term includes, but is not limited to, storm water discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined at 40 CFR 401); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water. For the categories of industries identified in subparagraph (xi), the term includes only storm water discharges from all areas listed in the previous sentence (except access roads) where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, or industrial machinery are exposed to storm water. For the purposes of this paragraph, material handling activities include the storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, finished product, by-product or waste product. The term excludes areas located on plant lands separate from the plant's industrial activities, such as office buildings and accompanying parking lots as long as the drainage from the excluded areas is not mixed with storm water drained from the above described areas. Industrial facilities (including industrial facilities that are Federally or municipally owned or operated that meet the description of the facilities listed in this paragraph (i)- (xi)) include those facilities designated under 40 CFR 122.26(a)(1)(v). The following categories of facilities are considered to be engaging in "industrial activity" for purposes of this subsection:

(i) Facilities subject to storm water effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards under 40 CFR Subchapter N (except facilities with toxic pollutant effluent standards which are exempted under category (xi) of this paragraph);

(ii) Facilities classified as Standard Industrial Classifications 24 (except 2434), 26 (except 265 and 267), 28, 29, 311, 32, 33, 3441, 373;

(iii) Facilities classified as Standard Industrial Classifications 10 through 14 (mineral industry) including active or inactive mining operations (except for areas of coal mining operations meeting the definition of a reclamation area under 40 CFR 434.11(l)) and oil and gas exploration, production, processing, or treatment operations, or transmission facilities that discharge storm water contaminated by contact with or that has come into contact with, any overburden, raw material, intermediate products, finished products, byproducts or waste products located on the site of such operations; inactive mining operations are mining sites that are not being actively mined, but which have an identifiable owner/operator;

(iv) Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under Subtitle C of RCRA;

(v) Landfills, land application sites, and open dumps that have received any industrial wastes (waste that is received from any of the facilities described under this subsection) including those that are subject to regulation under Subtitle D of RCRA;

(vi) Facilities involved in the recycling of materials, including metal scrapyards, battery reclaimers, salvage yards, and automobile junkyards, including but limited to those classified as Standard Industrial Classification 5015 and 5093;

(vii) Steam electric power generating facilities, including coal handling sites;

(viii) Transportation facilities classified as Standard Industrial Classifications 40, 41, 42, 44, and 45 which have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, airport deicing operations, or which are otherwise identified under subparagraphs (i)-(vii) or (ix)-(xi) of this subsection are associated with industrial activity;

(ix) Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0 mgd or more, or required to have an approved pretreatment program under 40 CFR 403. Not included are farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility, or areas that are in compliance with 40 CFR 503;

(x) Construction activity including clearing, grading and excavation activities except: operations that result in the disturbance of less than one acre of total land area which are not part of a larger common plan of development or sale unless otherwise designated by the Agency pursuant to Part I.B.1.

(xi) Facilities under Standard Industrial Classifications 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 31 (except 311), 34 (except 3441), 35, 36, 37 (except 373), 38, 39, 4221-25, (and which are not otherwise included within categories (i)-(x)).

"Waters" mean all accumulations of water, surface and underground, natural, and artificial, public and private, or parts thereof, which are wholly or partially within, flow through, or border upon the State of Illinois, except that sewers and treatment works are not included except as specially mentioned; provided, that nothing herein contained shall authorize the use of natural or otherwise protected waters as sewers or treatment works except that in-stream aeration under Agency permit is allowable.

Appendix B
Notice of Intent

Illinois Environmental Protection Agency

Bureau of Water • 1021 North Grand Avenue East • P.O. Box 19276 • Springfield • Illinois • 62794-9276

Division of Water Pollution Control
Notice of Intent (NOI) for General Permit
to Discharge Storm Water Associated with Construction Site Activities

This fillable form may be completed online, a copy saved locally, printed and signed before it is submitted to the Permit Section at the above address.

For Office Use Only

Permit No. ILR10 ________

OWNER INFORMATION

Company/Owner Name: ____________________

Mailing Address: ____________________ Phone: ____________

City: ____________ State: ___ Zip: ________ Fax: ____________

Contact Person: ____________________ E-mail: ____________________

Owner Type (select one) ____________

MS4 Community: ☐ Yes ☐ No

CONTRACTOR INFORMATION

Contractor Name: ____________________

Mailing Address: ____________________ Phone: ____________

City: ____________ State: ___ Zip: ________ Fax: ____________

CONSTRUCTION SITE INFORMATION

Select One: ☐ New ☐ Change of information for: ILR10 ________

Project Name: ____________________ County: ____________

Street Address: ____________ City: ____________ IL Zip: ________

Latitude: ____ (Deg) ____ (Min) ____ (Sec) Longitude: ____ (Deg) ____ (Min) ____ (Sec) ____ Section ____ Township ____ Range

Approximate Construction Start Date ____________ Approximate Construction End Date ____________

Total size of construction site in acres: ________

If less than 1 acre, is the site part of a larger common plan of development?

☐ Yes ☐ No

Fee Schedule for Construction Sites:
Less than 5 acres - $250
5 or more acres - $750

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

Has the SWPPP been submitted to the Agency? ☐ Yes ☐ No

(Submit SWPPP electronically to: epa.constilr10swppp@illinois.gov)

Location of SWPPP for viewing: Address: ____________________ City: ____________

SWPPP contact information: Inspector qualifications:

Contact Name: ____________________ ____________

Phone: ____________ Fax: ____________ E-mail: ____________

Project inspector, if different from above Inspector qualifications:

Inspector's Name: ____________________ ____________

Phone: ____________ Fax: ____________ E-mail: ____________

TYPE OF CONSTRUCTION (select one)

Construction Type ______________________

SIC Code: ____________________

Type a detailed description of the project:

____
____
____
____
____
____

HISTORIC PRESERVATION AND ENDANGERED SPECIES COMPLIANCE

Has the project been submitted to the following state agencies to satisfy applicable requirements for compliance with Illinois law on:

Historic Preservation Agency ☐ Yes ☐ No

Endangered Species ☐ Yes ☐ No

RECEIVING WATER INFORMATION

Does your storm water discharge directly to: ☐ Waters of the State or ☐ Storm Sewer

Owner of storm sewer system: ______________________________

Name of closest receiving water body to which you discharge: ______________________

Mail completed form to: Illinois Environmental Protection Agency
Division of Water Pollution Control
Attn: Permit Section
Post Office Box 19276
Springfield, Illinois 62794-9276
or call (217) 782-0610
FAX: (217) 782-9891

Or submit electronically to: epa.constilr10swppp@illinois.gov

I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage this system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. In addition, I certify that the provisions of the permit, including the development and implementation of a storm water pollution prevention plan and a monitoring program plan, will be complied with.

Any person who knowingly makes a false, fictitious, or fraudulent material statement, orally or in writing, to the Illinois EPA commits a Class 4 felony. A second or subsequent offense after conviction is a Class 3 felony. (415 ILCS 5/44(h))

______________________________ ______________________
Owner Signature: Date:

______________________________ ______________________
Printed Name: Title:

INSTRUCTIONS FOR COMPLETION OF CONSTRUCTION ACTIVITY NOTICE OF INTENT (NOI) FORM

Submit original, electronic or facsimile copies. Facsimile and/or electronic copies should be followed-up with submission of an original signature copy as soon as possible. Please write "copy" under the "For Office Use Only" box in the upper right hand corner of the first page.

This fillable form may be completed online, a copy saved locally, printed and signed before it is submitted to the Permit Section at:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Permit Section
Post Office Box 19276
Springfield, Illinois 62794-9276
or call (217) 782-0610
FAX: (217) 782-9891

Or submit electronically to: epa.constilr10swppp@illinois.gov

Reports must be typed or printed legibly and signed.

Any facility that is not presently covered by the General NPDES Permit for Storm Water Discharges From Construction Site Activities is considered a new facility.

If this is a change in your facility information, renewal, etc., please fill in your permit number on the appropriate line, changes of information or permit renewal notifications do not require a fee.

NOTE: FACILITY LOCATION IS NOT NECESSARILY THE FACILITY MAILING ADDRESS, BUT SHOULD DESCRIBE WHERE THE FACILITY IS LOCATED.

Use the formats given in the following examples for correct form completion.

	Example	Format
Section	12	1 or 2 numerical digits
Township	12N	1 or 2 numerical digits followed by "N" or "S"
Range	12W	1 or 2 numerical digits followed by "E" or "W"

For the Name of Closest Receiving Waters, do not use terms such as ditch or channel. For unnamed tributaries, use terms which include at least a named main tributary such as "Unnamed Tributary to Sugar Creek to Sangamon River."

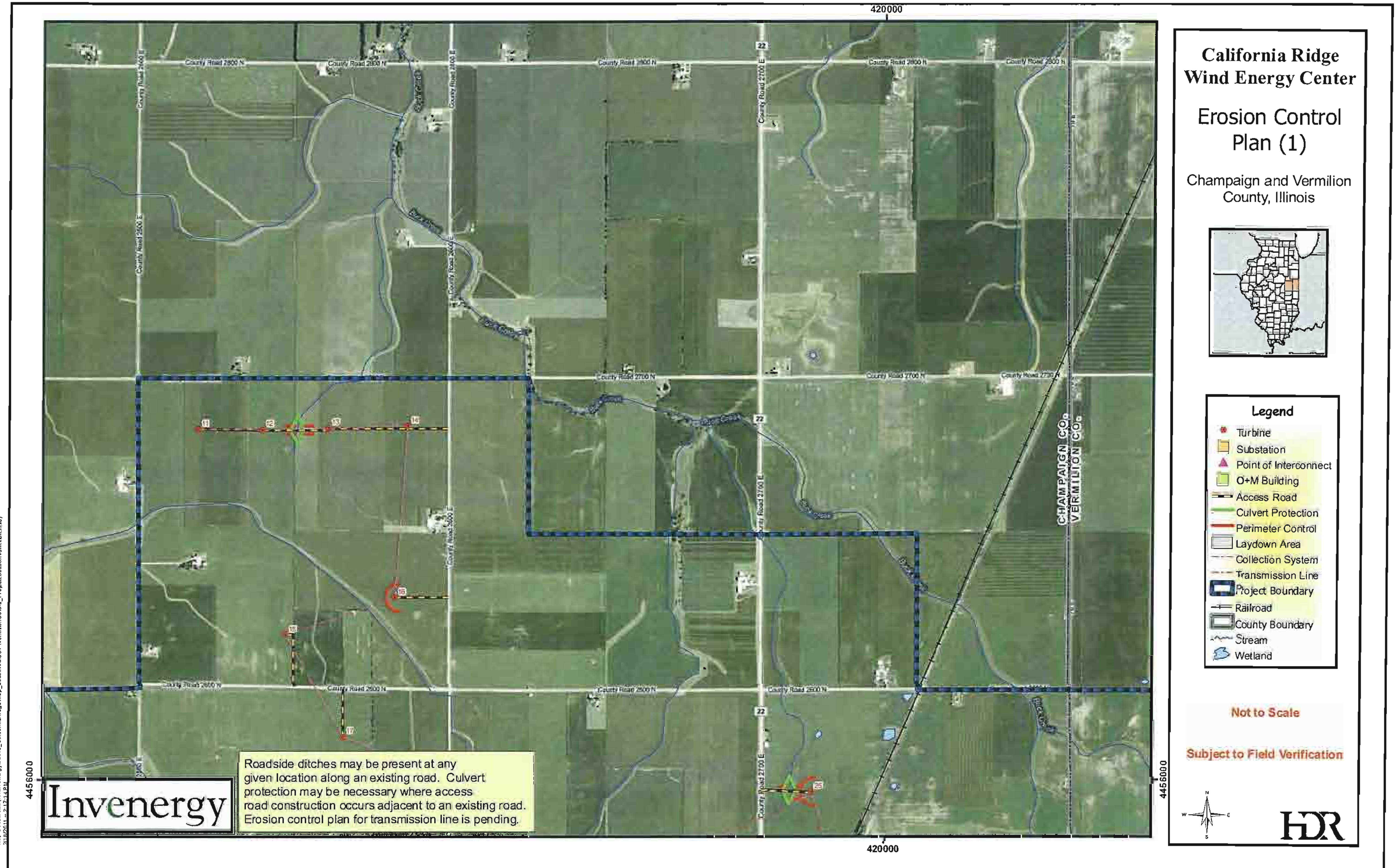
Submission of initial fee and an electronic submission of Storm Water Pollution Prevention Plan (SWPPP) for Initial Permit prior to the Notice of Intent being considered complete for coverage by the ILR10 General Permits. Please make checks payable to: Illinois EPA at the above address.

Construction sites with less than 5 acres of land disturbance - fee is $250.

Construction sites with 5 or more acres of land disturbance - fee is $750.

SWPPP should be submitted electronically to: epa.constilr10swppp@illinois.gov When submitting electronically, use Project Name and City as indicated on NOI form.

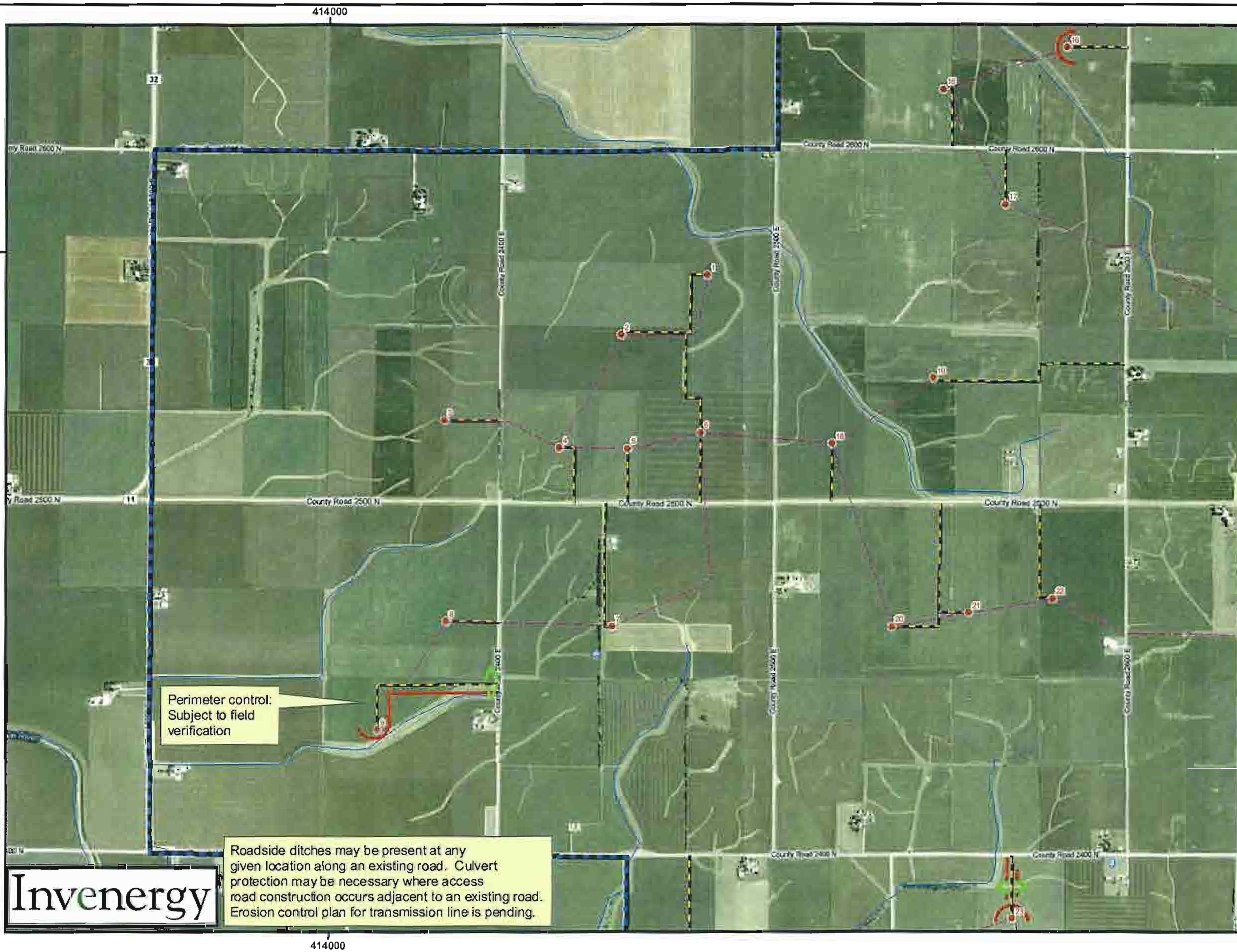
Appendix C
Erosion Control Plan


California Ridge Wind Energy Center
Erosion Control Plan (1)
Champaign and Vermilion County, Illinois
Legend
Turbine
Substation
Point of Interconnect
O+M Building
Access Road
Culvert Protection
Perimeter Control
Laydown Area
Collection System
Transmission Line
Project Boundary
Railroad
County Boundary
Stream
Wetland
Not to Scale
Subject to Field Verification
Roadside ditches may be present at any given location along an existing road. Culvert protection may be necessary where access road construction occurs adjacent to an existing road. Erosion control plan for transmission line is pending.
Invenergy
HDR
420000
4456000
CHAMPAIGN CO.
VERMILION CO.
County Road 2800 N
County Road 2700 N
County Road 2600 N
County Road 2700 E
Source ISGS, USGS, ESRI

California Ridge Wind Energy Center

Erosion Control Plan (2)

Champaign County, Illinois



Legend

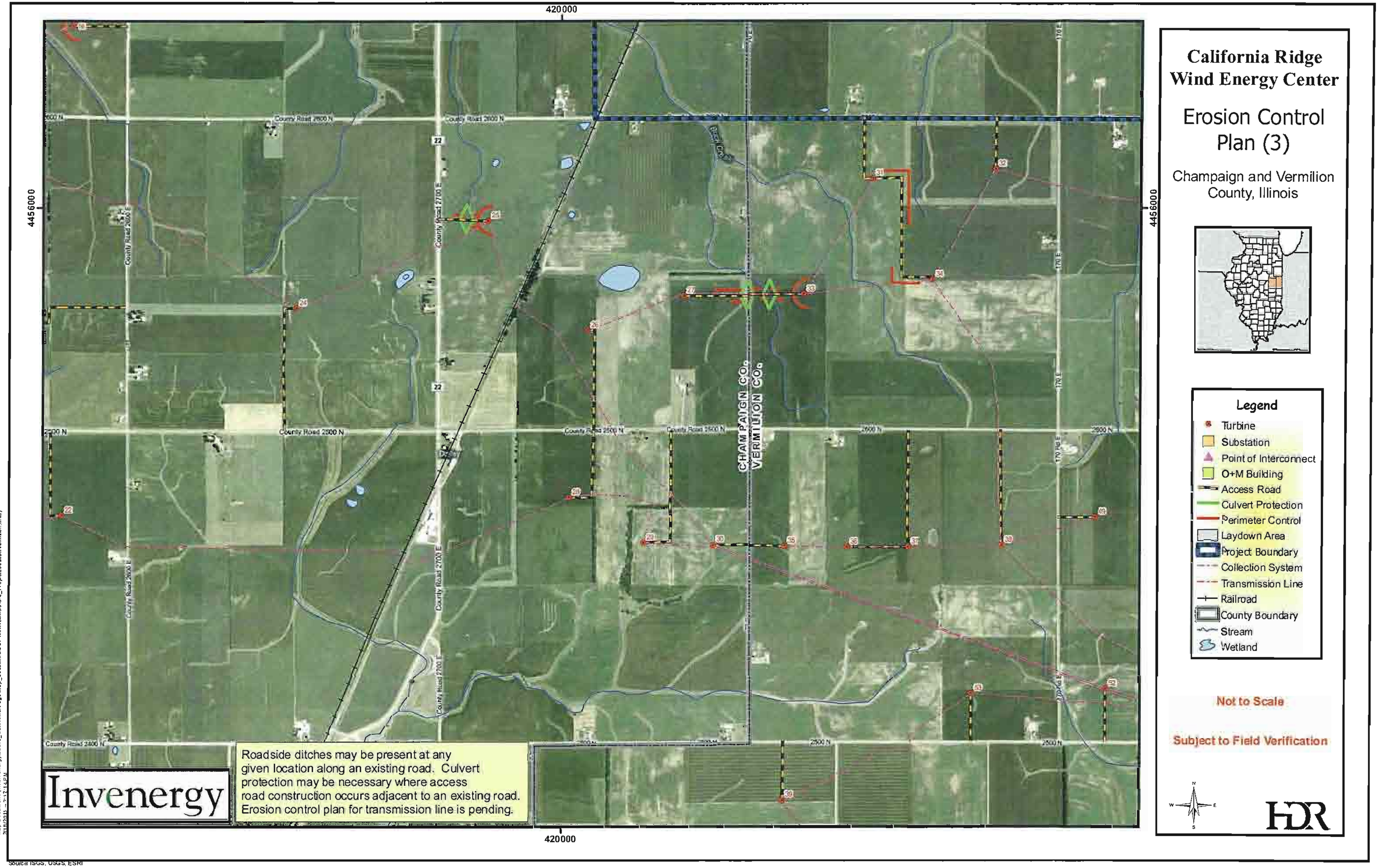
- Turbine
- Substation
- Point of Interconnect
- O+M Building
- Access Road
- Culvert Protection
- Perimeter Control
- Laydown Area
- Collection System
- Transmission Line
- Project Boundary
- Railroad
- County Boundary
- Stream
- Wetland

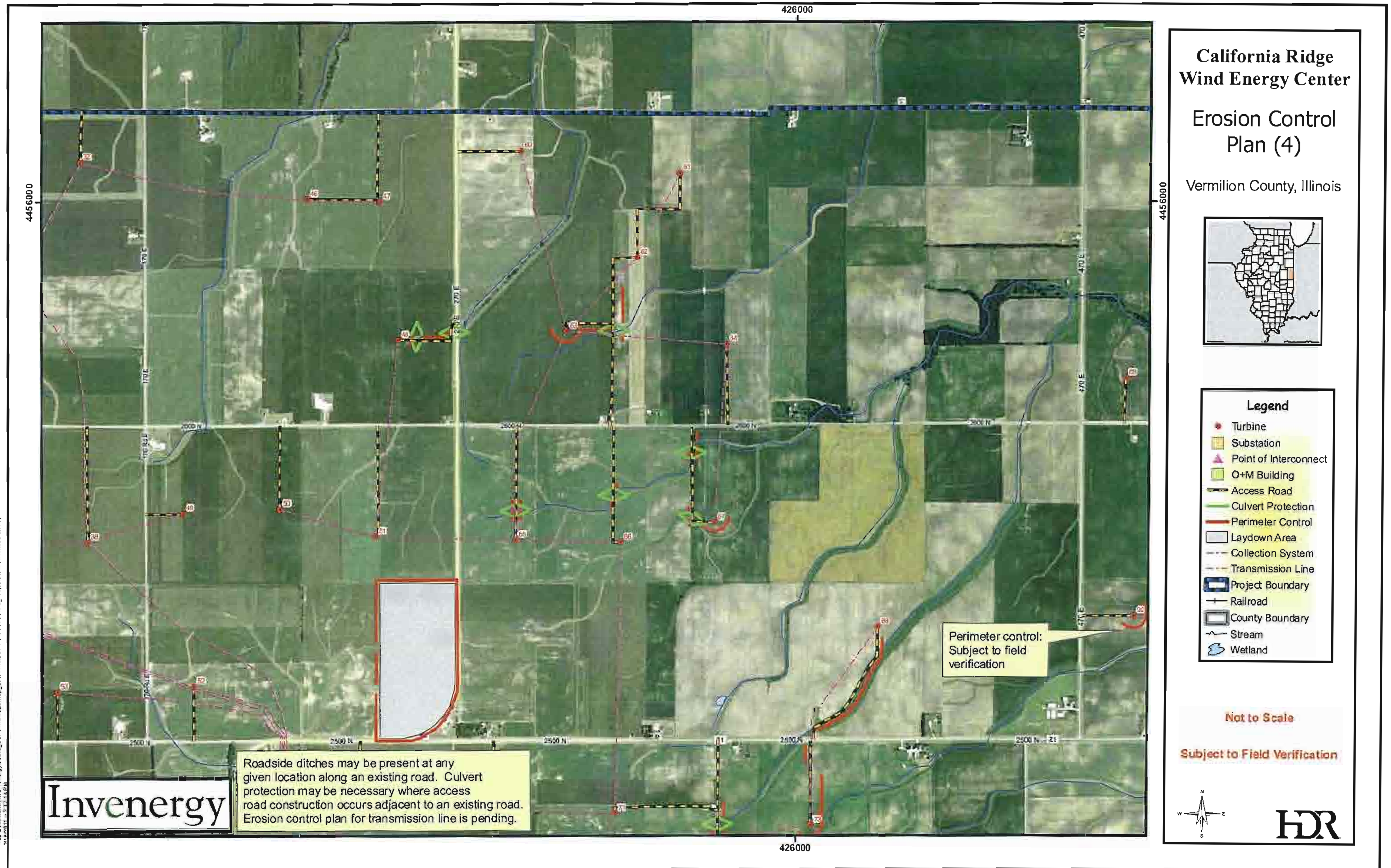
Not to Scale

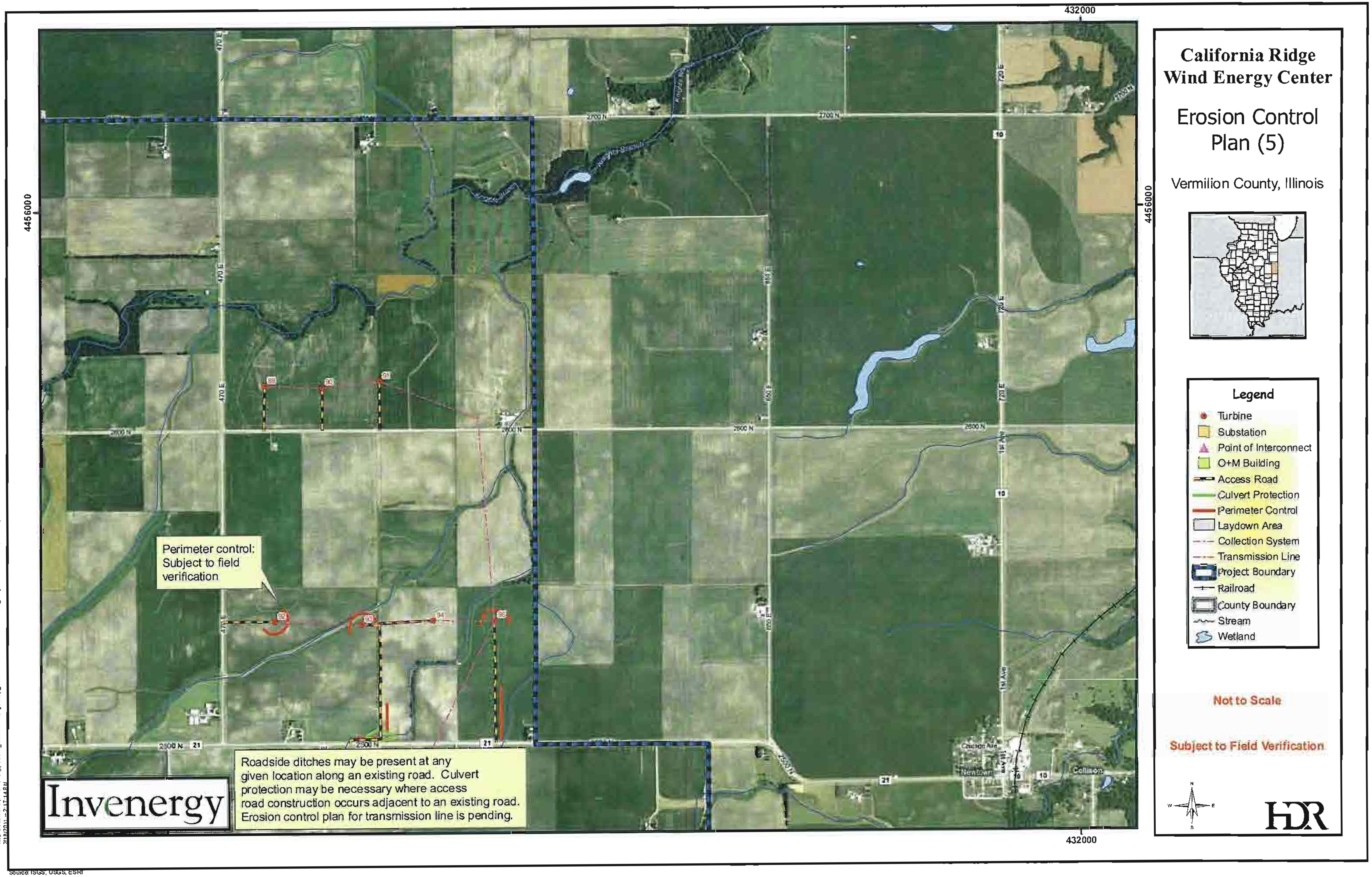
Subject to Field Verification

HDR

Source ISGS, USGS, ESRI


California Ridge Wind Energy Center
Erosion Control Plan (3)
Champaign and Vermilion County, Illinois
Legend
Turbine
Substation
Point of Interconnect
O+M Building
Access Road
Culvert Protection
Perimeter Control
Laydown Area
Project Boundary
Collection System
Transmission Line
Railroad
County Boundary
Stream
Wetland
Not to Scale
Subject to Field Verification
Roadside ditches may be present at any given location along an existing road. Culvert protection may be necessary where access road construction occurs adjacent to an existing road. Erosion control plan for transmission line is pending.
Invenergy
HDR
420000
4456000
County Road 2600 N
County Road 2500 N
County Road 2400 N
County Road 2700 E
County Road 2600 E
CHAMPAIGN CO.
VERMILION CO.
Source ISGS, USGS, ESRI


California Ridge Wind Energy Center
Erosion Control Plan (4)
Vermilion County, Illinois
Legend
Turbine
Substation
Point of Interconnect
O+M Building
Access Road
Culvert Protection
Perimeter Control
Laydown Area
Collection System
Transmission Line
Project Boundary
Railroad
County Boundary
Stream
Wetland
Not to Scale
Subject to Field Verification
HDR
Invenergy
Roadside ditches may be present at any given location along an existing road. Culvert protection may be necessary where access road construction occurs adjacent to an existing road. Erosion control plan for transmission line is pending.
Perimeter control: Subject to field verification
426000
426000
4456000
4456000
2600 N
2500 N
470 E
270 E
170 E
Source ISGS, USGS, ESRI


California Ridge Wind Energy Center
Erosion Control Plan (5)
Vermilion County, Illinois
Legend
Turbine
Substation
Point of Interconnect
O+M Building
Access Road
Culvert Protection
Perimeter Control
Laydown Area
Collection System
Transmission Line
Project Boundary
Railroad
County Boundary
Stream
Wetland
Not to Scale
Subject to Field Verification
HDR
Invenergy
Perimeter control: Subject to field verification
Roadside ditches may be present at any given location along an existing road. Culvert protection may be necessary where access road construction occurs adjacent to an existing road. Erosion control plan for transmission line is pending.
432000
4456000
2700 N
2600 N
2500 N
470 E
720 E
Newtown
Collison
Source ISGS, USGS, ESRI

California Ridge Wind Energy Center

Erosion Control Plan (6)

Champaign and Vermilion County, Illinois

Legend

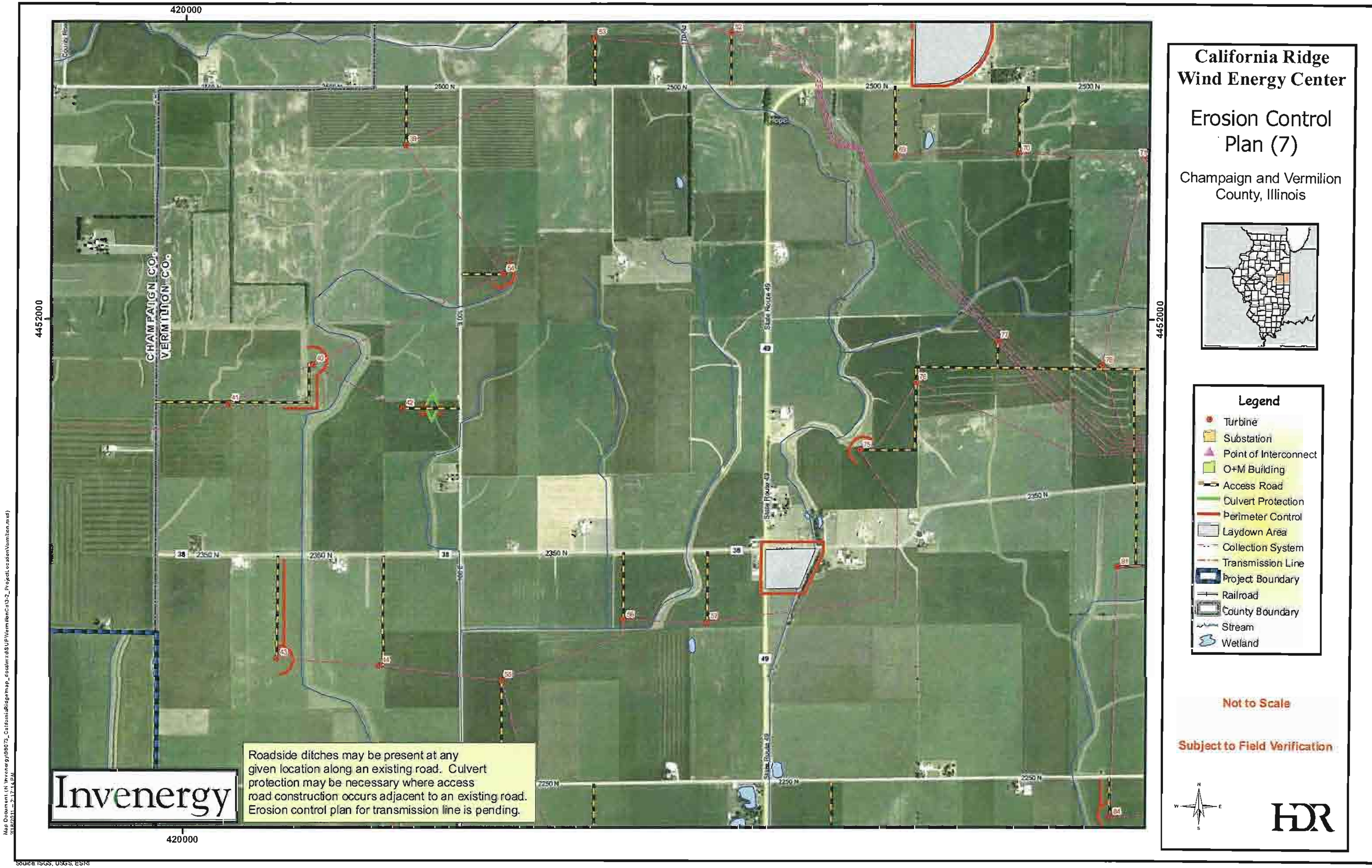
- Turbine
- Substation
- Point of Interconnect
- O+M Building
- Access Road
- Culvert Protection
- Perimeter Control
- Laydown Area
- Collection System
- Transmission Line
- Project Boundary
- Railroad
- County Boundary
- Stream
- Wetland

Not to Scale

Subject to Field Verification

HDR

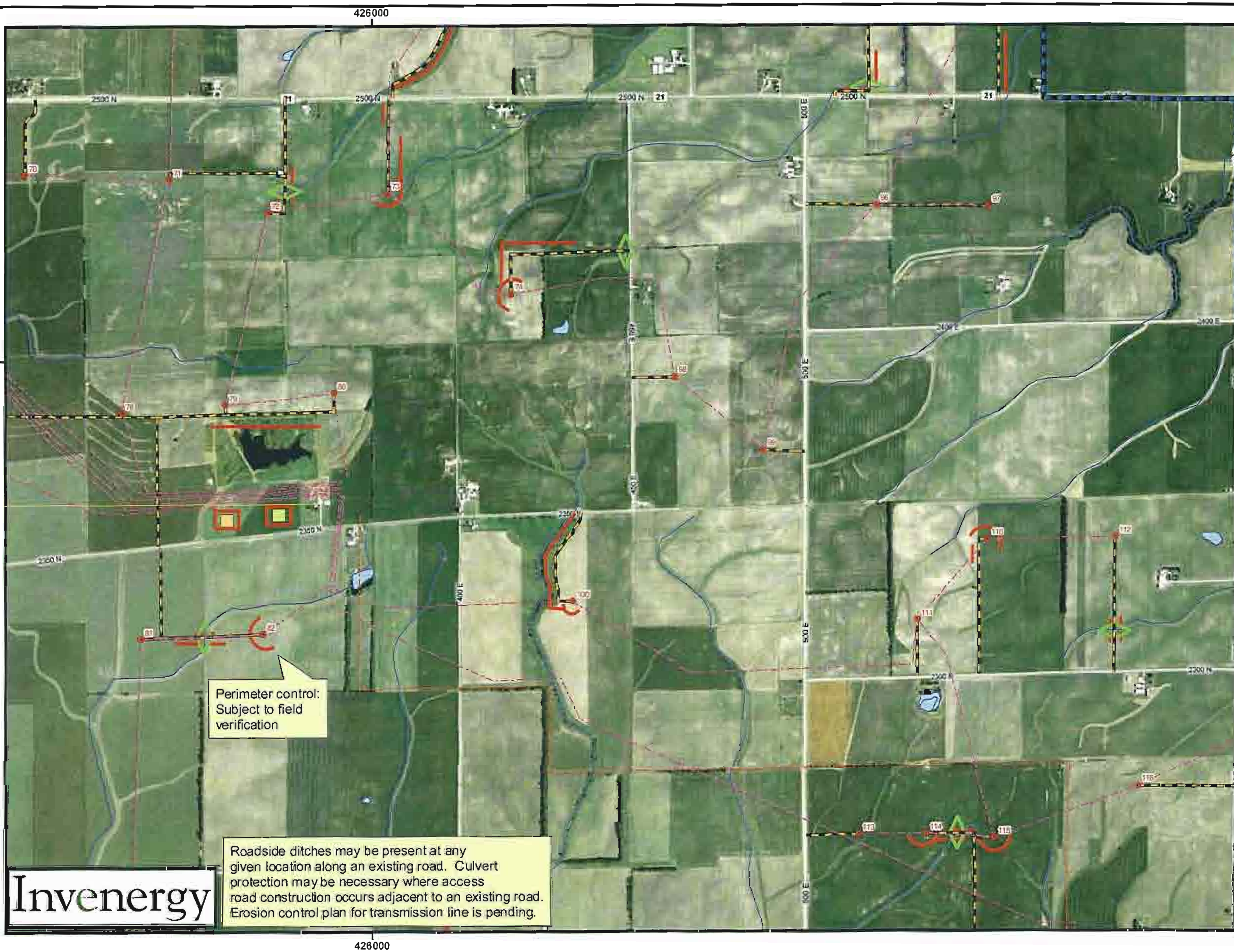
Source: ISGS, USGS, ESRI


California Ridge Wind Energy Center
Erosion Control Plan (7)
Champaign and Vermilion County, Illinois
Legend
Turbine
Substation
Point of Interconnect
O+M Building
Access Road
Culvert Protection
Perimeter Control
Laydown Area
Collection System
Transmission Line
Project Boundary
Railroad
County Boundary
Stream
Wetland
Not to Scale
Subject to Field Verification
Roadside ditches may be present at any given location along an existing road. Culvert protection may be necessary where access road construction occurs adjacent to an existing road. Erosion control plan for transmission line is pending.
Invenergy
HDR
420000
4452000
CHAMPAIGN CO.
VERMILION CO.
2500 N
2350 N
2250 N
State Route 49
49
38
Source: ISGS, USGS, ESRI

California Ridge Wind Energy Center

Erosion Control Plan (8)

Vermilion County, Illinois



Legend

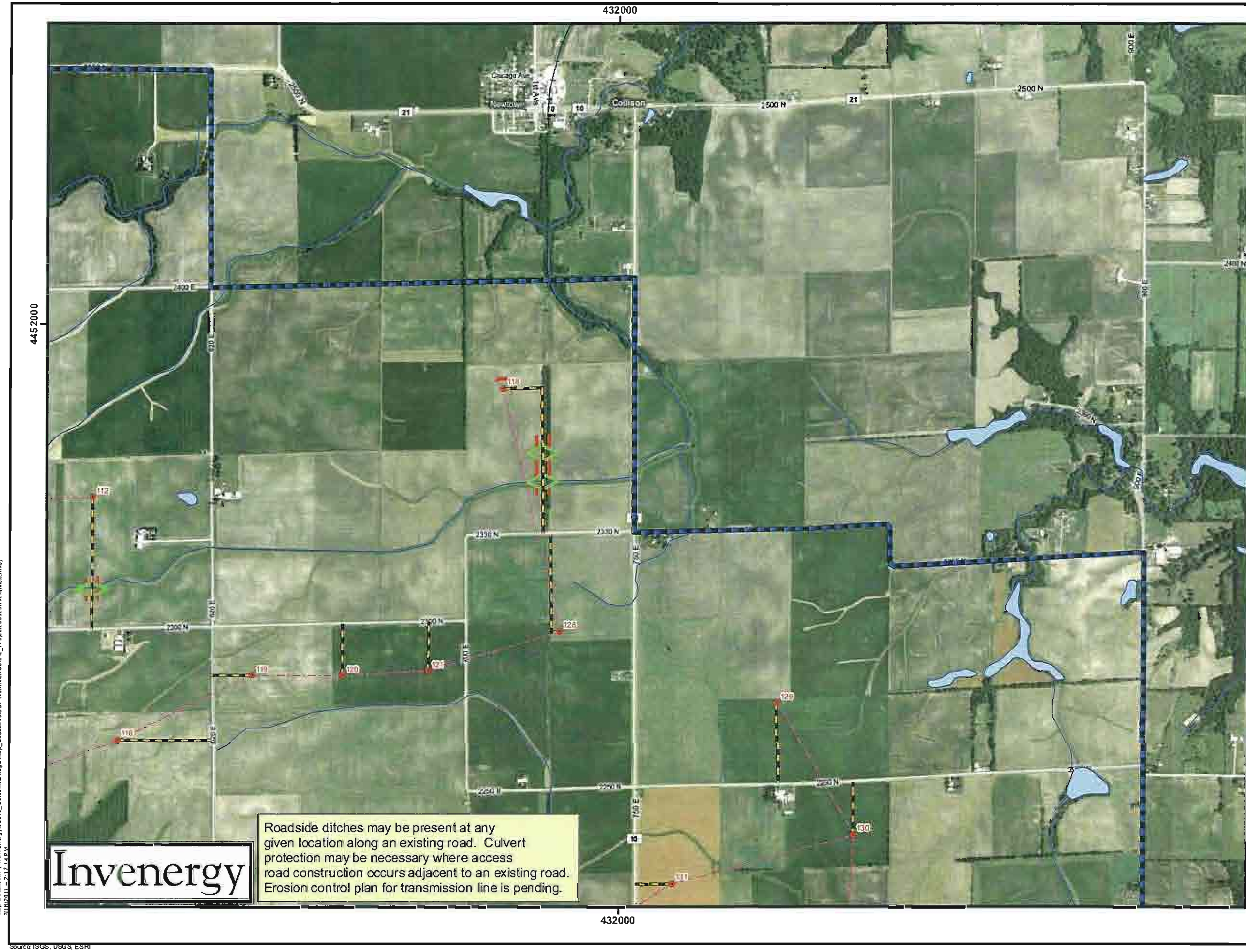
- Turbine
- Substation
- Point of Interconnect
- O+M Building
- Access Road
- Culvert Protection
- Perimeter Control
- Laydown Area
- Collection System
- Transmission Line
- Project Boundary
- Railroad
- County Boundary
- Stream
- Wetland

Not to Scale

Subject to Field Verification

HDR

Source: ISGS, USGS, ESRI



California Ridge Wind Energy Center

Erosion Control Plan (9)

Vermilion County, Illinois

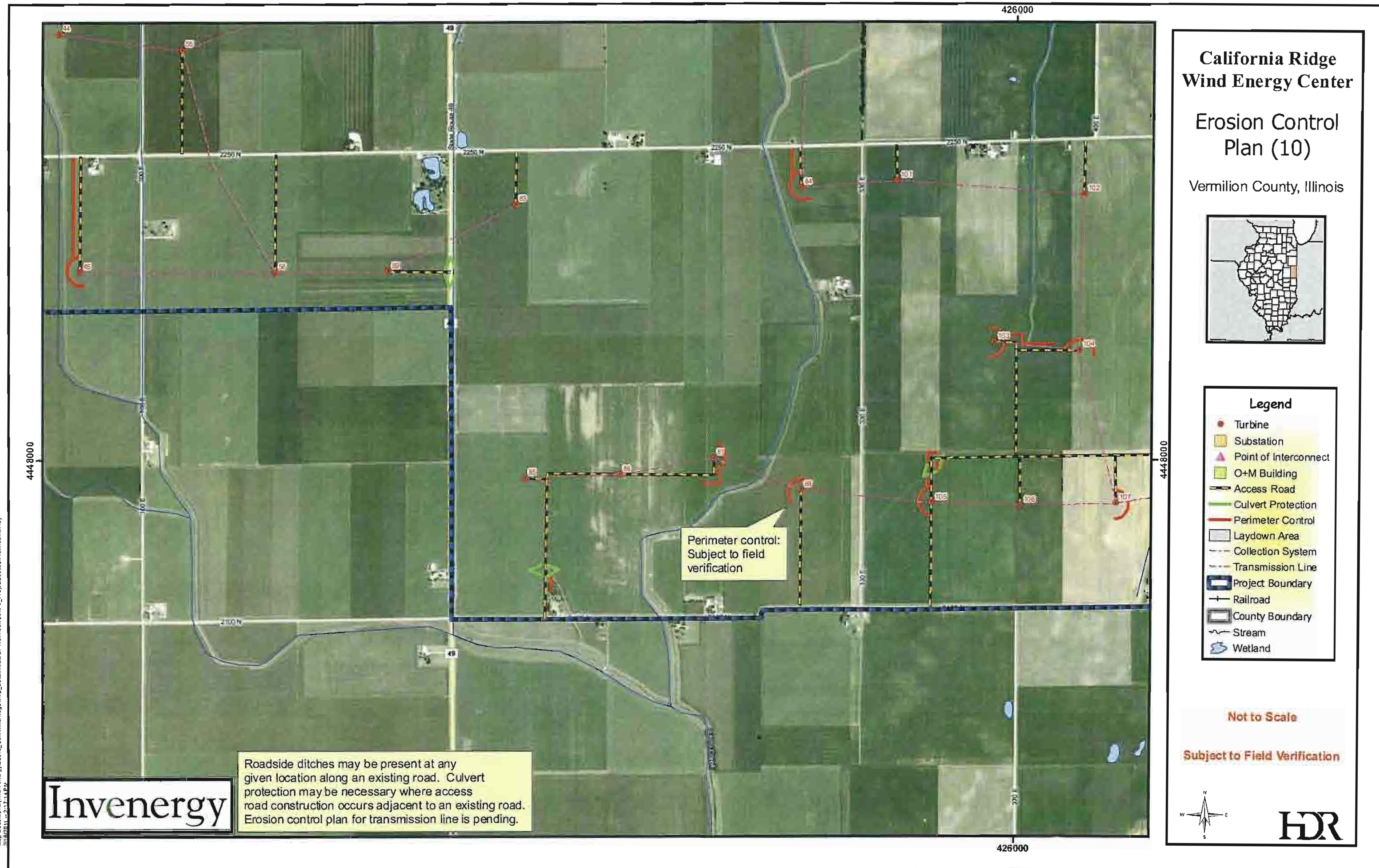
Legend

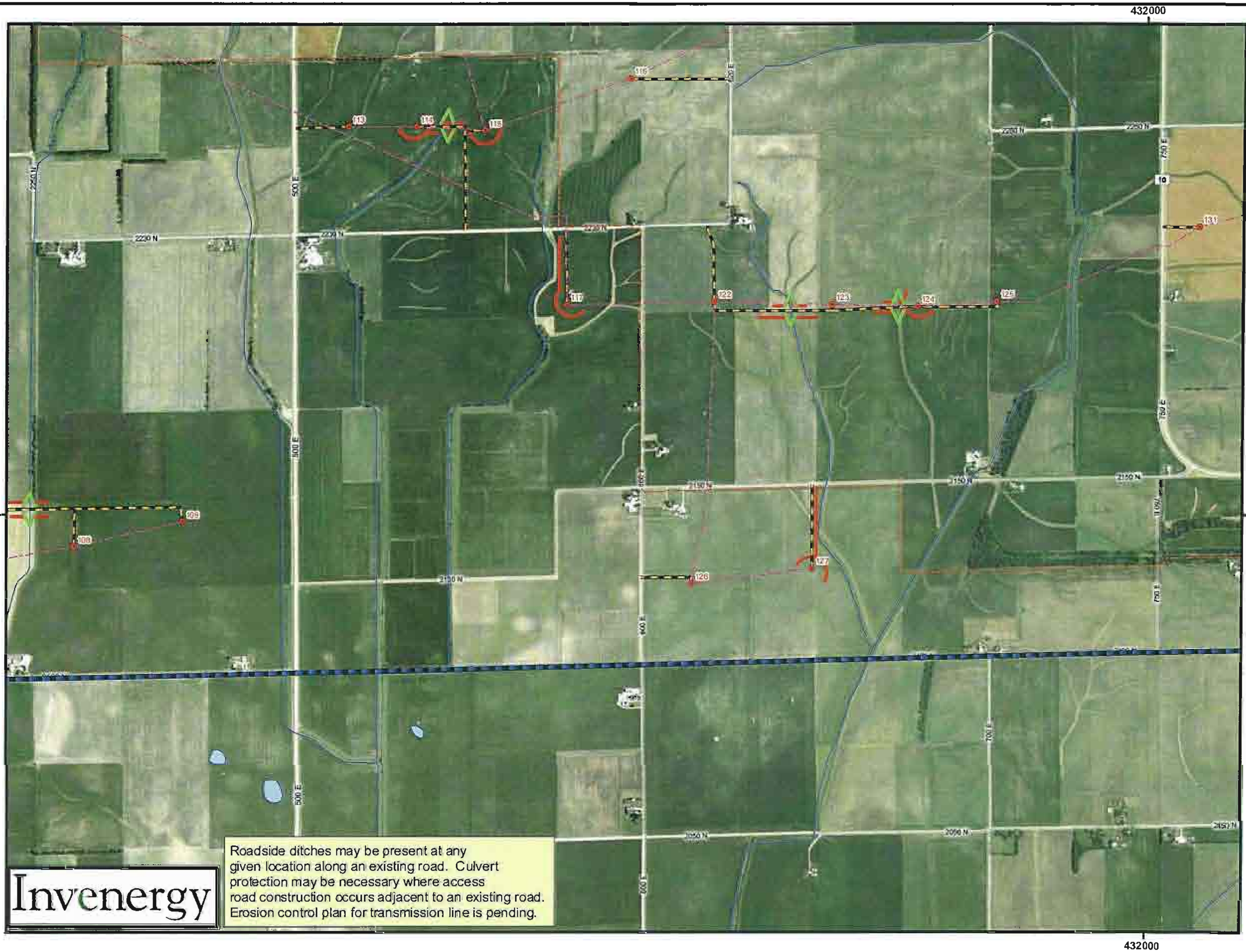
- Turbine
- Substation
- Point of Interconnect
- O+M Building
- Access Road
- Culvert Protection
- Perimeter Control
- Laydown Area
- Collection System
- Transmission Line
- Project Boundary
- Railroad
- County Boundary
- Stream
- Wetland

Not to Scale

Subject to Field Verification

HDR


California Ridge Wind Energy Center
Erosion Control Plan (10)
Vermilion County, Illinois
Legend
Turbine
Substation
Point of Interconnect
O+M Building
Access Road
Culvert Protection
Perimeter Control
Laydown Area
Collection System
Transmission Line
Project Boundary
Railroad
County Boundary
Stream
Wetland
Not to Scale
Subject to Field Verification
Perimeter control: Subject to field verification
Roadside ditches may be present at any given location along an existing road. Culvert protection may be necessary where access road construction occurs adjacent to an existing road. Erosion control plan for transmission line is pending.
Invenergy
HDR
426000
4448000
2250 N
2100 N
49
Source: ISGS, USGS, ESRI



California Ridge Wind Energy Center

Erosion Control Plan (11)

Vermilion County, Illinois

Legend

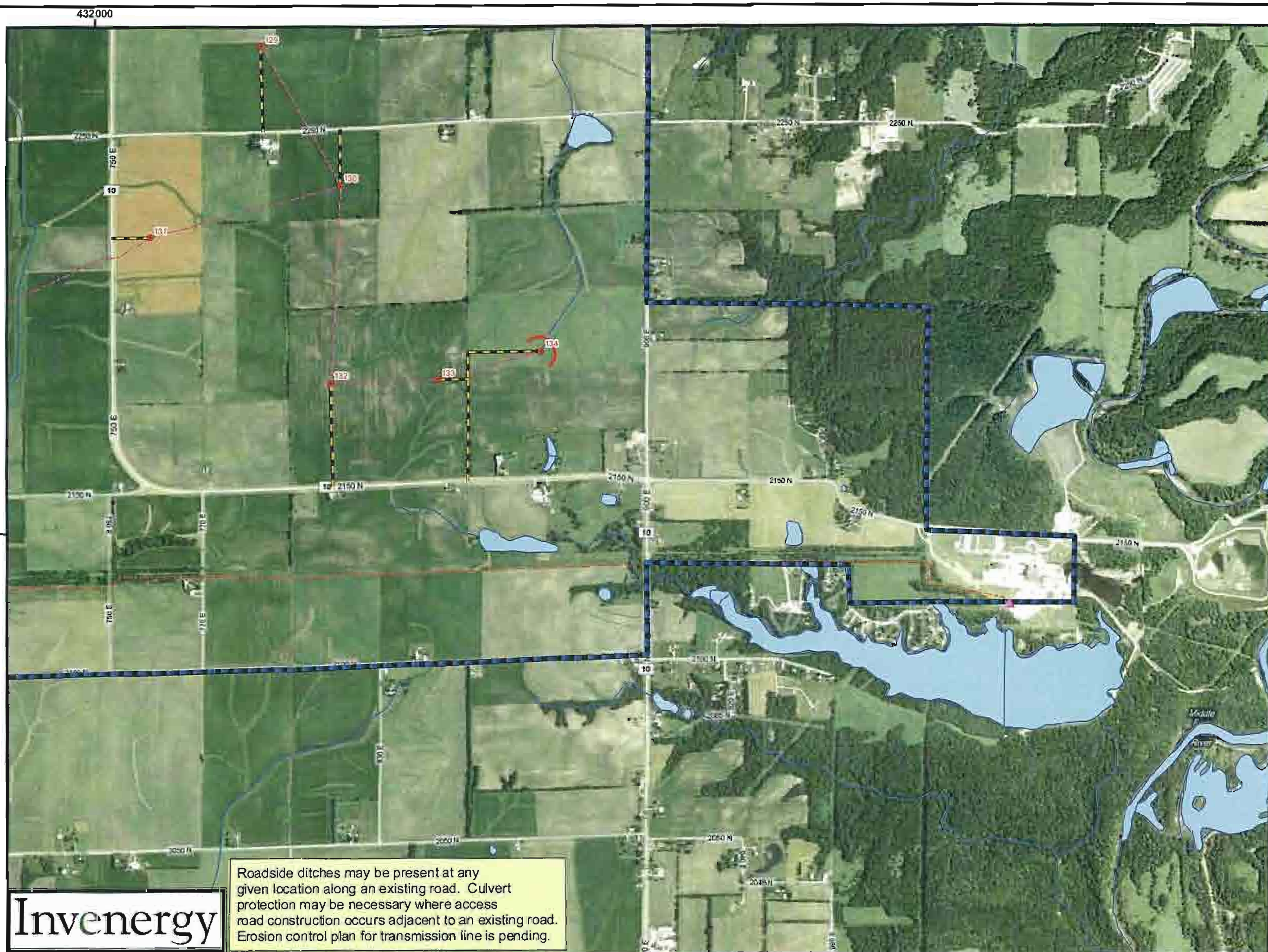
- Turbine
- Substation
- Point of Interconnect
- O+M Building
- Access Road
- Culvert Protection
- Perimeter Control
- Laydown Area
- Collection System
- Transmission Line
- Project Boundary
- Railroad
- County Boundary
- Stream
- Wetland

Not to Scale

Subject to Field Verification

HDR

Source ISGS, USGS, ESRI



California Ridge Wind Energy Center

Erosion Control Plan (12)

Vermilion County, Illinois

Legend

- Turbine
- Substation
- Point of Interconnect
- O+M Building
- Access Road
- Culvert Protection
- Perimeter Control
- Transmission Line
- Laydown Area
- Collection System
- Project Boundary
- Railroad
- County Boundary
- Stream
- Wetland

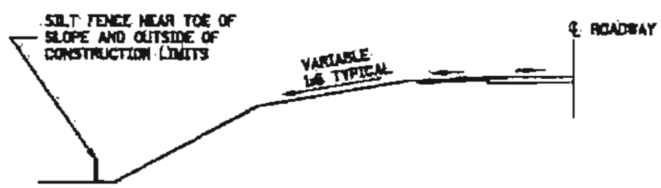
Not to Scale

Subject to Field Verification

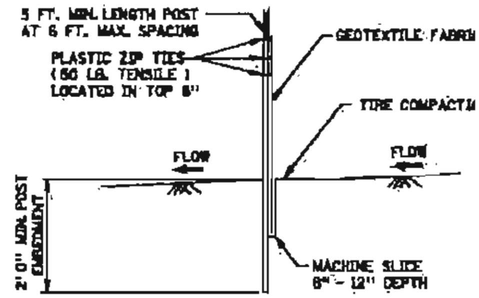
HDR

Source: ISGS, USGS, ESRI

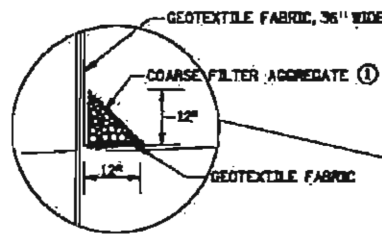
Appendix D
Erosion Control Details



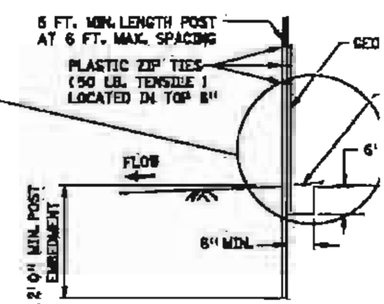
LOCATION OF SILT FENCE
AT TOE OF ROADWAY EMBANKMENT



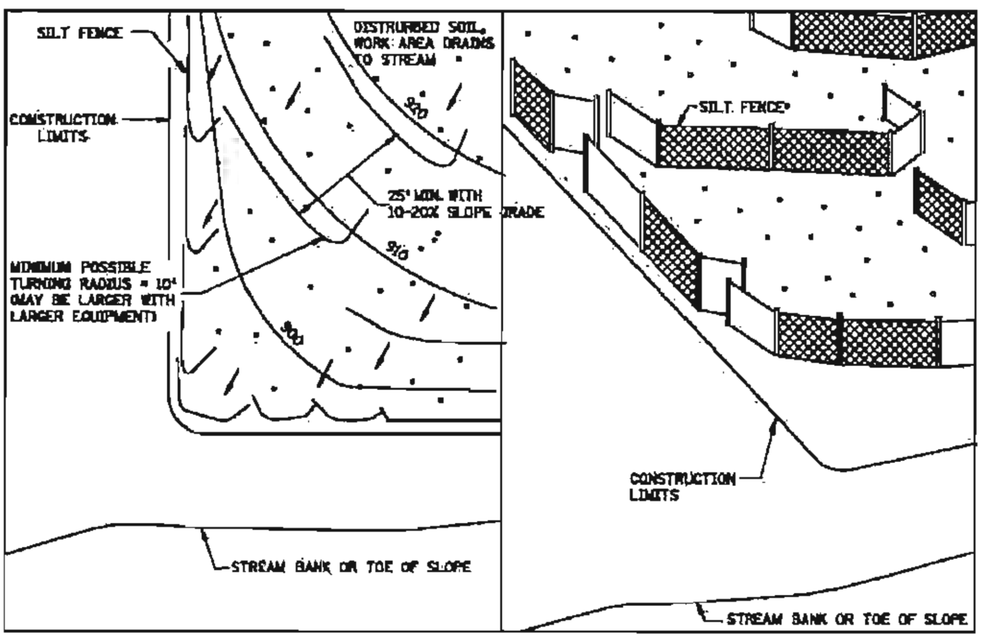
SILT FENCE, MACHINE SLICED
DESIGN GUIDELINES:
TO PROTECT AREAS FROM SHEET FLOW.
MAXIMUM CONTRIBUTING AREA: 1 ACRE.



OPTIONAL METHOD
FOR SILT FENCE, HEAVY DUTY



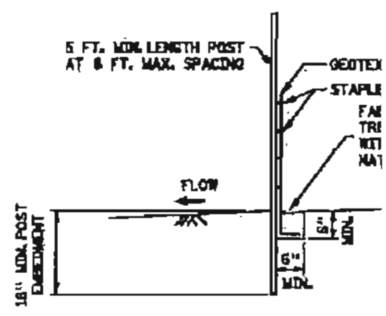
SILT FENCE, HEAVY DUTY
(HAND INSTALLED)
DESIGN GUIDELINES:
TO PROTECT AREAS FROM SHEET FLOW.
MAXIMUM CONTRIBUTING AREA: 1 ACRE.



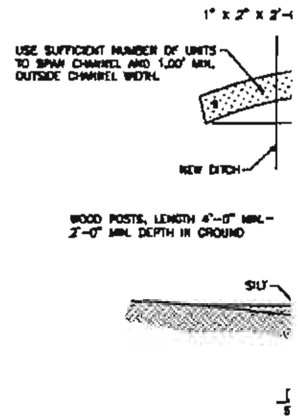
PLAN VIEW

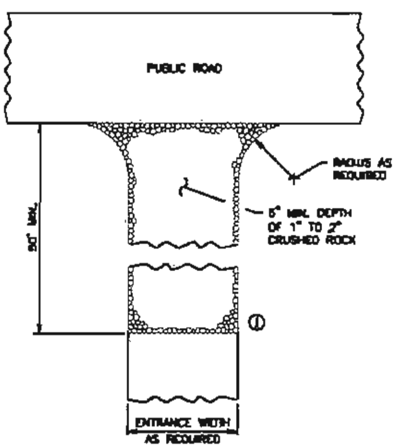
SIDE VIEW

SILT FENCE, J-HOOK INSTALLATION

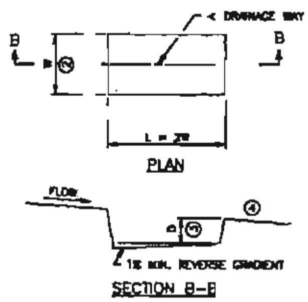


SILT FENCE, PREASSEMBLED
DESIGN GUIDELINES:
TO PROTECT AREAS FROM SHEET FLOW.
MAXIMUM CONTRIBUTING AREA: 1 ACRE.





DETAIL 3
ROCK CONSTRUCTION ENTRANCE
N.T.S.



NOTES:
SEE SPECS. 2575, 3882, & 3884.

① ROCKS AT ENTRANCE CLEAN WORKSITE MUD OFF OF TRUCK TIRES BEFORE TRUCKS ENTER MAIN ROAD. KEEPING MUD OFF THE ROAD WILL PREVENT AUTO DAMAGE AND KEEP CONSTRUCTION SEDIMENT OUT OF DRAINAGE SYSTEMS AND WETLANDS. GEOTEXTILE MAY BE PLACED UNDER THE ROCK TO KEEP ROCKS SEPARATE FROM SOIL.

② W = 10 FT. MIN., 20 FT. MAX.

③ D = 2 FT.

④ LOCATION OF DOWNSTREAM TEMPORARY SEDIMENT CONTROL DEVICE.

④ LOCATION OF DOWNSTREAM TEMPORARY SEDIMENT CONTROL DEVICE.

DETAIL 4
SEDIMENT TRAP DETAIL
N.T.S.

Appendix E
Inspection Log

Inspectors Log for IEPA NPDES Construction Permit

Inspectors should enter their initials, type, date, and time of the inspection in the blanks provided. After inspecting each shaded area*, inspectors should check each box, and make any necessary comments regarding their findings in the blanks provided below and on the back of this sheet.

* Refer to the Grand Ridge Wind Farm Project SWPPP for guidance during inspection of these areas at the construction site.

Initials of Inspector	Type of Inspection		Date of Inspection				Time of Inspection			Areas to be Inspected*				Comments:
	Routine weekly	24 hours after a rain event	Month	Day	Year	Insignificant rainfall, no inspection needed.		AM	PM	All erosion and sediment control BMP	Temporary Sedimentation basins	Drainage ditches and other waters of the state	Construction site exits	

Appendix F
Incidence of Non-Compliance (ION)

Illinois Environmental Protection Agency

Bureau of Water • 1021 North Grand Avenue East • P.O. Box 19276 • Springfield • Illinois • 62794-9276

Division of Water Pollution Control
Construction Site Storm Water Discharge Incidence of Non-Compliance (ION)

This fillable form may be completed online, a copy saved locally, printed and signed before it is submitted to the Compliance Assurance Section at the above address. You may email this completed form to:
epa.swnoncomp@illinois.gov

For Office Use Only

Permit No. ILR10________

Permittee Name: ____________________

Address: ____________________ County: ____________________

City: ____________ State: _____ Zip: ________ Phone: ____________________

Construction Site Name: ____________________ E-mail: ____________________

Latitude: _____ _____ _____ Longitude: _____ _____ _____ _____ _____ _____
(Deg) (Min) (Sec) (Deg) (Min) (Sec) Section Township Range

Cause of Non-Compliance

____
____
____
____

Actions Taken to Prevent Any Further Non-Compliance

____
____
____
____

Environmental Impact Resulting From the Non-Compliance

____
____
____
____

Actions Taken to Reduce the Environmental Impact Resulting From the Non-Compliance

____
____
____
____

Any person who knowingly makes a false, fictitious, or fraudulent material statement, orally or in writing, to the Illinois EPA commits a Class 4 felony. A second or subsequent offense after conviction is a Class 3 felony. (415 ILCS 5/44(h))

____________________ ____________________
Owner Signature: Date:

____________________ ____________________
Printed Name: Title:

This Agency is authorized to require this information under Section 4 and Title X of the Environmental Protection Act (415 ILCS 5/4, 5/39). Failure to disclose this information may result in: a civil penalty of not to exceed $50,000 for the violation and an additional civil penalty of not to exceed $10,000 for each day during which the violation continues (415 ILCS 5/42) and may also prevent this form from being processed and could result in your application being denied. This form has been approved by the Forms Management Center.

DIVISION OF WATER POLLUTION CONTROL
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
FIELD OPERATIONS SECTION

GUIDELINES FOR COMPLETION OF INCIDENCE OF NON-COMPLIANCE (ION) FORM

Complete and submit this form for any violation of the Storm Water Pollution Prevention Plan observed during any inspection conducted, including those not required by the SWPPP. Please adhere to the following guidelines:

Initial submission within 24 hours by email, telephone or fax (see region fax numbers) of any incidence of non-compliance for any violation. Submit email copy to: epa.swnoncomp@illinois.gov. After 24 hours notification, submit signed original ION within 5 days to the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Compliance Assurance #19
Post Office Box 19276
Springfield, Illinois 62794-9276

FIELD OPERATIONS HEADQUARTERS
Bruce Yurdin, Manager
Phone: 217/782-3362 Fax: 217/785-1225
EMAIL: epa.swnoncomp@illinois.gov

Region 1 - ROCKFORD
Chuck Corley, Manager
Phone: 815/987-7760 Fax: 815/987-7005

Region 2 - DESPLAINES
Jay Patel, Manager
Phone: 847/294-4000 Fax: 847/294-4058

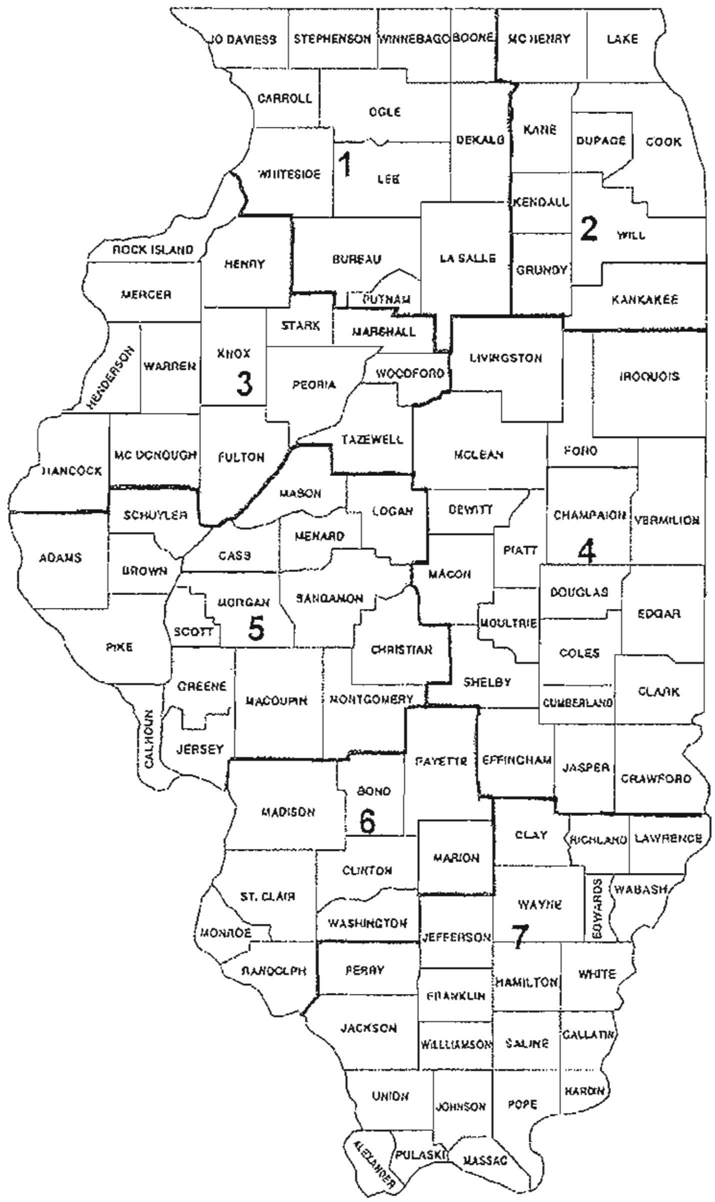
Region 3 - PEORIA
Jim Kammueller, Manager
Phone: 309/693-5463 Fax: 309/693-5467

Region 4 - CHAMPAIGN
Joe Koronkowski, Manager
Phone: 217/278-5800 Fax: 217/278-5808

Region 5 - SPRINGFIELD
Bruce Yurdin, FOS Manager
Phone: 217/782-3362 Fax: 217/785-1225

Region 6 - COLLINSVILLE
Bruce Yurdin, FOS Manager
Phone: 217/782-3362 Fax: 217/785-1225

Region 7 - MARION
Byron Marks, Manager
Phone: 618/993-7200 Fax: 618/997-5467



Appendix G
Revision Documentation

Revision	Date	Comments
00	June 2011	Original
01		
02		

Appendix H
Notice of Termination

Illinois Environmental Protection Agency

Bureau of Water • 1021 North Grand Avenue East • P.O. Box 19276 • Springfield • Illinois • 62794-9276

Division of Water Pollution Control
NOTICE OF TERMINATION (NOT)
of Coverage under the General Permit for Storm Water Discharges Associated with Construction Site Activities

This fillable form may be completed online, a copy saved locally, printed and signed before it is submitted to the Permit Section at the above address.

Permit No. ILR10 ____________

OWNER INFORMATION

Owner Name: ______________________________

Owner Type (select one) ______________

Mailing Address: ______________________________ Phone: ______________

City: ______________ State: ___ Zip: __________ Fax: ______________

Contact Person: ______________________ E-mail: ______________________

CONTRACTOR INFORMATION

Contractor Name: ____

Mailing Address: ______________________________ Phone: ______________

City: ______________ State: ___ Zip: __________ Fax: ______________

CONSTRUCTION SITE INFORMATION

Facility Name: ______________________________

Street Address: ____

City: ______________ IL Zip: __________ County: ______________

NPDES Storm Water General Permit Number: ILR10 __________

Latitude: ______ ______ ______ Longitude: ______ ______ ______ ______ ______ ______

(Deg) (Min) (Sec) (Deg) (Min) (Sec) Section Township Range

DATE PROJECT HAS BEEN COMPLETED AND STABILIZED: ______________________

NOTE: Coverage under this permit cannot be terminated without the completion date.

I certify under penalty of law that disturbed soils at the identified facility have been finally stabilized or that all storm water discharges associated with industrial activity from the identified facility that are authorized by an NPDES general permit have otherwise been eliminated. I understand that by submitting this notice of termination, that I am no longer authorized to discharge storm water associated with industrial activity by the general permit, and that discharging pollutants in storm water associated with industrial activity to Waters of the State is unlawful under the Environmental Protection Act and the Clean Water Act where the discharge is not authorized by an NPDES Permit.

Any person who knowingly makes a false, fictitious, or fraudulent material statement, orally or in writing, to the Illinois EPA commits a Class 4 felony. A second or subsequent offense after conviction is a Class 3 felony. (415 ILCS 5/44(h))

______________________________ ______________________

Owner Signature: Date:

Mail completed form to: Illinois Environmental Protection Agency
Division of Water Pollution Control
Attn: Permit Section
Post Office Box 19276
Springfield, Illinois 62794-9276

(Do not submit additional documentation unless requested)

GUIDELINES FOR COMPLETION OF NOTICE OF TERMINATION (NOT) FORM

Please adhere to the following guidelines:

Submit original, electronic or facsimile copies. Facsimile and/or electronic copies should be followed-up with submission of an original signature copy as soon as possible.

Submit completed forms to:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Attn: Permit Section
Post Office Box 19276
Springfield, Illinois 62794-9276
or call (217) 782-0610
FAX: (217) 782-9891

Or submit electronically to: epa.constilr10swppp@illinois.gov

Reports must be typed or printed legibly and signed.

NOTE: FACILITY LOCATION IS NOT NECESSARILY THE FACILITY MAILING ADDRESS, BUT SHOULD DESCRIBE WHERE THE FACILITY IS LOCATED.

Use the formats given in the following examples for correct form completion.

	Example	Format
Section	12	1 or 2 numerical digits
Township	12N	1 or 2 numerical digits followed by "N" or "S"
Range	12W	1 or 2 numerical digits followed by "E" or "W"

Final stabilization has occurred when:

(a) all soil disturbing activities at the site have been completed;

(b) a uniform perennial vegetative cover with a density of 70% of the native background vegetative cover for the area has been established on all unpaved areas not covered by permanent structures; or

(c) equivalent permanent stabilization measures have been employed.

CALIFORNIA RIDGE WIND ENERGY PROJECT

CHAMPAIGN COUNTY DRAINAGE STUDY

APPENDIX I

Prepared for:

Invenergy

One South Wacker Drive
Suite 1900
Chicago, Il 60606

Prepared by:

HDR

701 Xenia Avenue South, Suite 600
Minneapolis, Minnesota 55416
(763) 591-5400
www.hdrinc.com

Department 164
Project No 98073

June 2011

CERTIFICATION

I, Matt Redington, certify that this drainage report (Champaign County Drainage Study of Appendix I) was prepared under my direct control and supervision. The work has been prepared and administered in accordance with standards of reasonable professional skill and diligence. To the best of my knowledge and belief, the design and layout of the proposed facility is in accordance with generally accepted engineering practices as pertains to stormwater runoff. This project will have minimal impact to peak flow rates and runoff volumes, and will pose minimal risk to adjacent public right of way or downstream properties. This report is intended for permitting purposes only, and is not intended to be used for project design.

MATTHEW K. REDINGTON
062-062441
LICENSED
PROFESSIONAL
ENGINEER
OF
ILLINOIS
6-28-11

exp. 11-30-11

Background

California Ridge Energy LLC (California Ridge), a wholly owned subsidiary of Invenergy Wind LLC (together with its subsidiaries, Invenergy), are proposing to construct the California Ridge Wind Energy Project (Project). The Project is located in the Pilot and Ogden Townships of Champaign and Vermilion counties (Figure 1). The Project will consist of installing 134 wind turbines and the gravel roadways associated with constructing and maintaining such a facility. Thirty of the turbines will be located in Champaign County. This report documents compliance with the Champaign County Stormwater Management Policy (Policy), as amended February 20, 2003.

As required by Section 12 of the Policy, the following items are to be submitted with this Stormwater Drainage Study:

1. Description of before and after topography, existing drainage, grading, and environmental characteristics of the property;
2. Potential impacts of development on upstream and downstream water resources;
3. Erosion control plan *(provided in the SWPPP as Appendix C)*
4. Explanation of minor and major drainage systems' performance up to and including the 100-year precipitation event;
5. Stormwater detention or retention system designs. *(Not applicable)*

These items (unless otherwise indicated above) are provided in the following Hydrologic Evaluation Approach and Hydrologic Evaluation sections of the report. Information on potential impacts to tile lines, soil conservation practices, and the need for detention are provided in the Additional Considerations section of the report.

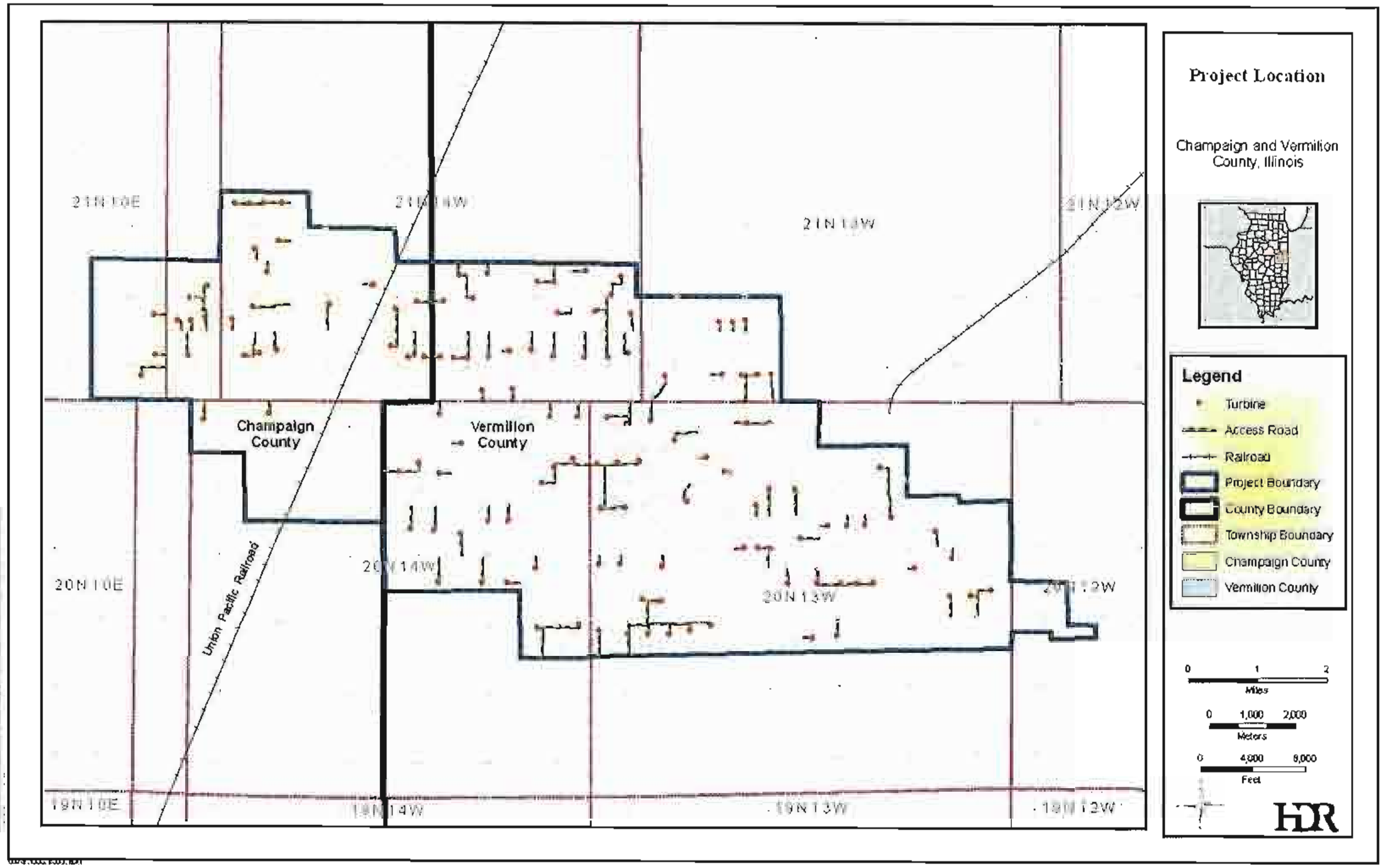


Figure 1 – Project Location

Hydrologic Evaluation Approach

The study area was divided in 47 subbasins, as shown in Figure 2. Wind turbines and access roads will be constructed in 23 of the 47 delineated subbasins. This study evaluates potential hydrologic or hydraulic impacts to these 23 subbasins. Primary considerations in this evaluation include changes to land use due to the construction of proposed wind turbines and access roads.

Due to limited availability of County ditch and culvert data, it was conservatively assumed that County Road embankments and ditches prevent the flow of off-project site drainage into the project subbasins. Although it is likely that some culverts would allow offsite drainage into the project area, the exclusion of these drainage areas increases the percentage of impervious (gravel surfacing) area that would occur due to the effects of changing land use in project subbasins (increases to impervious area will have a more noticeable impact on smaller subbasin sizes).

As specified by Section 6.1 of the Policy, watersheds less than or equal to 2,000 acres in area should be evaluated using the National Resources Conservation Service Technical Release 55 -Urban Hydrology for Small Watersheds (TR-55) methodology. The project subbasins meet this criterion. TR-55 provides an approach for estimating pre- and post-project peak flow rates taking into account any changes to land use, flow paths, hydraulic changes, and time of concentration for subbasins.

The Policy typically excludes cropland in hydrologic analyses, as described by Section 4.3.B. Since the Project is located entirely on agricultural land, however, including cropland in the model is the only way to reasonably evaluate hydrologic impacts of the Project. As per a conversation with John Hall, the Champaign County Planning and Zoning Director on Friday, June 10, 2011, the measurement for total area and impervious area used in any hydrologic evaluation should take into account portions of the lot that are devoted to cropland.

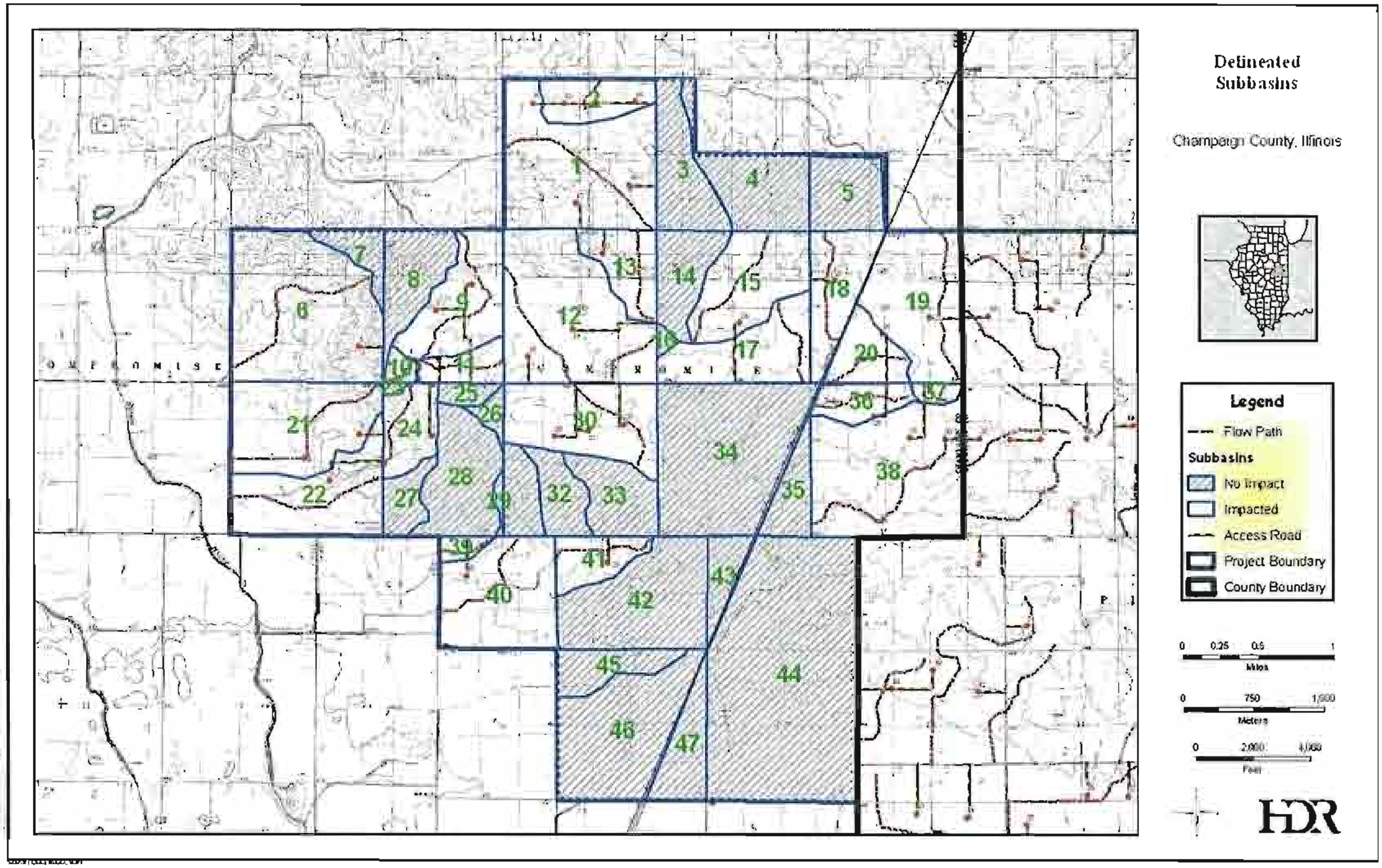


Figure 2 – Champaign County Subbasin Delineations

Hydrologic Evaluation

The following paragraphs provide descriptions of watershed characteristics evaluated as part of a typical TR-55 analysis, along with the anticipated impacts to these characteristics due to the Project. The characteristics evaluated, which are relevant to the proposed project, are topography, land use, and time of concentration. Tables to describe these characteristics are only provided for the subbasins in which construction would occur (referred to in this report as 'impacted' subbasins).

Topography is used to delineate and characterize each subbasin. The Project area is primarily rural and used for agriculture. Minor ridges are present in the area, as well as intermittent streams which may have steeper slopes in their immediate vicinities. Figure 3 shows a close-up view of the delineation for subbasin 9 and the location of proposed project features within that subbasin. This figure is provided as an example to show typical subbasin impacts. As seen in the figure, turbine pads are located on ridges and access roads cross drainage ways. Existing flow paths for these drainage ways will not be moved or hydraulically improved as a result of this project. No significant grading activities are anticipated in the areas outside of the access road and turbine pad construction limits.

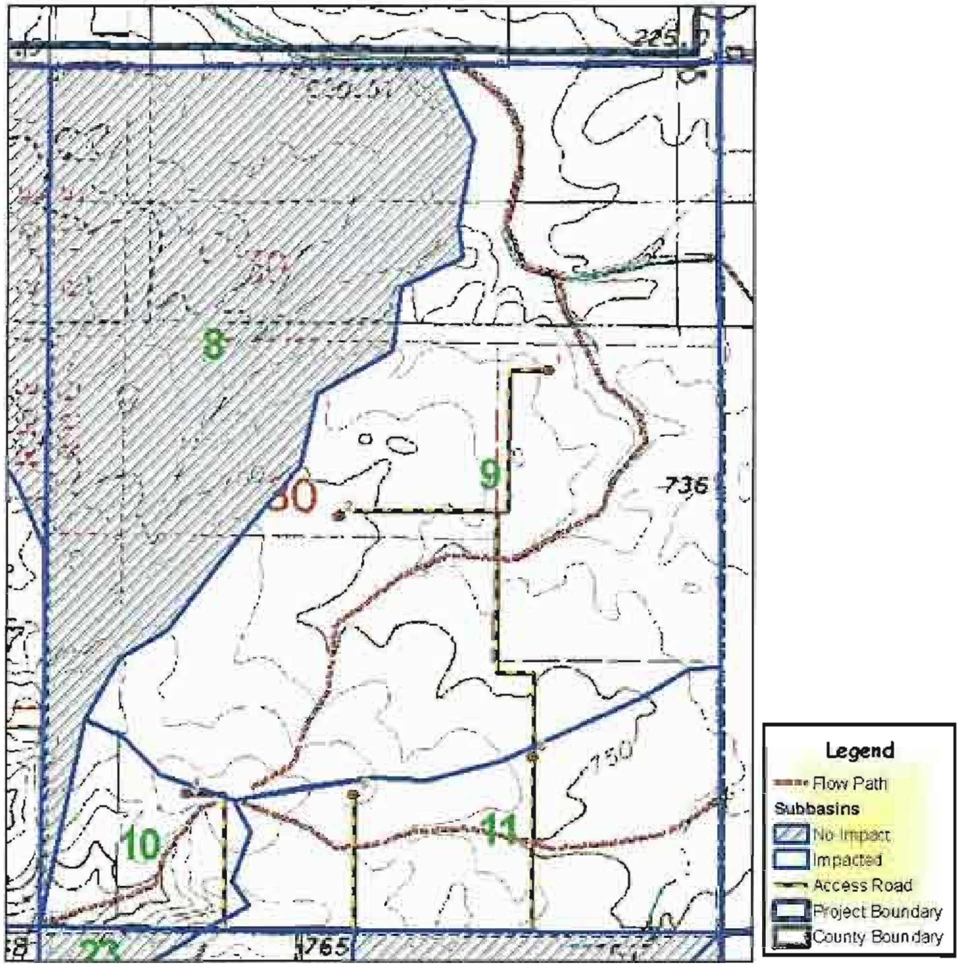


Figure 3 – Subbasin 9 Topography and Delineation

Land use defines the ground cover characteristics. Changes to land use can result in changes to the amount of rainfall which is infiltrated into the ground and is used to calculate changes to stormwater runoff rates and volumes. Table 2 shows the pre- and post-project land use characteristics for the 'impacted' subbasins in the project area. As shown in this table, the post-project land use remains predominantly agricultural, and increases to impervious area are extremely small in relation to the size of the subbasins. For the sake of this analysis, it was conservatively assumed that gravel access road surfaces would be impervious to any stormwater infiltration. Table 3 provides the change to impervious area as a percentage of the subbasin areas.

Condition	Subbasin ID	Ag (Corn/Soy)	Ag (Hay)	Developed	Mowed Grassland	Open Water	Pasture	Shelterbelt (Trees)	Shelterbelt (Shrubs)	Unmowed Grassland/CRP	Woodlot	Gravel	Total
Existing	1	493	2	8	16	0	0	6	0	0	0	0	525
Proposed		491	2	8	16	0	0	6	0	0	0	1.6	
Existing	2	129	0	0	0	0	0	0	0	0	0	0	129
Proposed		128	0	0	0	0	0	0	0	0	0	1	
Existing	6	529	0	3	32	0	0	0	6	18	2	0	590
Proposed		528	0	3	32	0	0	0	6	18	2	0.7	
Existing	9	232	0	0	0	0	0	0	0	16	0	0	248
Proposed		230	0	0	0	0	0	0	0	16	0	1.6	
Existing	10	23	0	0	3	0	0	1	0	0	0	0	27
Proposed		22	0	0	3	0	0	1	0	0	0	0.7	
Existing	11	78	0	0	0	0	0	0	0	0	0	0	78
Proposed		77	0	0	0	0	0	0	0	0	0	0.9	
Existing	12	476	0	5	6	0	10	1	0	33	0	0	531
Proposed		474	0	5	6	0	10	1	0	33	0	1.6	
Existing	13	123	0	3	0	0	0	5	0	7	0	0	138
Proposed		122	0	3	0	0	0	5	0	7	0	0.4	
Existing	15	250	0	1	8	0	2	0	2	0	0	0	263
Proposed		250	0	1	8	0	2	0	2	0	0	0.3	
Existing	17	221	0	7	7	0	0	0	2	0	0	0	237
Proposed		221	0	7	7	0	0	0	2	0	0	0.6	
Existing	18	191	0	3	0	0	0	0	0	0	0	0	194
Proposed		190	0	3	0	0	0	0	0	0	0	0.4	
Existing	19	316	0	3	21	0	3	4	0	0	0	0	347
Proposed		316	0	3	21	0	3	4	0	0	0	0.5	
Existing	20	116	0	0	0	0	0	4	0	0	0	0	120
Proposed		116	0	0	0	0	0	4	0	0	0	0.7	
Existing	21	334	0	3	14	0	0	0	0	0	0	0	351
Proposed		333	0	3	14	0	0	0	0	0	0	0.3	
Existing	22	271	0	7	13	0	0	0	2	16	0	0	309
Proposed		270	0	7	13	0	0	0	2	16	0	1	
Existing	24	100	0	2	12	0	0	6	0	4	1	0	125
Proposed		100	0	2	12	0	0	6	0	4	1	0.8	
Existing	30	306	0	9	0	0	0	0	0	0	0	0	315
Proposed		304	0	9	0	0	0	0	0	0	0	1.9	
Existing	36	84	0	2	0	0	0	2	1	3	0	0	92
Proposed		83	0	2	0	0	0	2	1	3	0	0.5	
Existing	37	24	0	1	0	0	0	0	0	0	0	0	25
Proposed		24	0	1	0	0	0	0	0	0	0	0.3	
Existing	38	478	0	4	19	0	0	6	1	18	12	0	538
Proposed		477	0	4	19	0	0	6	1	18	12	1	
Existing	39	23	0	1	1	0	3	0	0	2	0	0	30
Proposed		23	0	1	1	0	3	0	0	2	0	0.3	
Existing	40	289	10	13	6	0	0	4	0	27	0	0	349
Proposed		289	10	13	6	0	0	4	0	27	0	0.3	
Existing	41	99	0	1	2	0	0	4	0	4	0	0	110
Proposed		98	0	1	2	0	0	4	0	4	0	0.8	

Table 2 – Land Use and Acreage

Subbasin ID	Area (ac)	Impervious Area Created (ac)	% Increase in Impervious Area
1	525	1.6	0.3
2	129	1	0.8
6	590	0.7	0.1
9	248	1.6	0.6
10	27	0.7	2.6
11	78	0.9	1.2
12	531	1.6	0.3
13	138	0.4	0.3
15	263	0.3	0.1
17	237	0.6	0.3
18	194	0.4	0.2
19	347	0.5	0.1
20	120	0.7	0.6
21	351	0.3	0.1
22	309	1	0.3
24	125	0.8	0.6
30	315	1.9	0.6
36	92	0.5	0.5
37	25	0.3	1.2
38	538	1	0.2
39	30	0.3	1.0
40	349	0.3	0.1
41	110	0.8	0.7

Table 3 – Impervious Area Analysis

The runoff curve number (CN) is an index combining hydrologic soil group and land use factors. Hydrologic soil groups classify soils according to their minimum infiltration rate. Figure 3 shows the predominant soil types in the portion of the project area in Champaign County. As indicated in the Champaign County Soil Survey, the soils in the project site are type C[1]. The major land use factors that determine CN are cover type, condition of vegetation, and antecedent moisture condition. For this project, the only land use factor that would change from existing to proposed conditions would be the land cover (through conversion of farmland to an impervious gravel surface).

Pre- and post-project conditions curve numbers were calculated for each of the 'impacted' subbasins. In no case did the changes to curve number exceed two-tenths. Typical standard of practice is to round curve numbers to the nearest whole number and the TR-55 program does not allow entry to the tenth's place. Furthermore, the access roadway impervious areas will be disconnected from the subbasin flow paths (they would be very narrow corridors surrounded by much larger pervious areas). As such, any slight increases to subbasin impervious area will have a negligible impact to total subbasin stormwater runoff rates or volumes. The pre- and post-project curve numbers will be the same for all subbasins in the project area.

[1] Soil Survey Staff, Natural Resources Conservation Service (NRCS). *Soil Survey of Champaign County, Illinois*. Website accessed June 23, 2011. <http://soildatamart.nrcs.usda.gov/Manuscripts/IL019/0/champaign_IL.pdf>

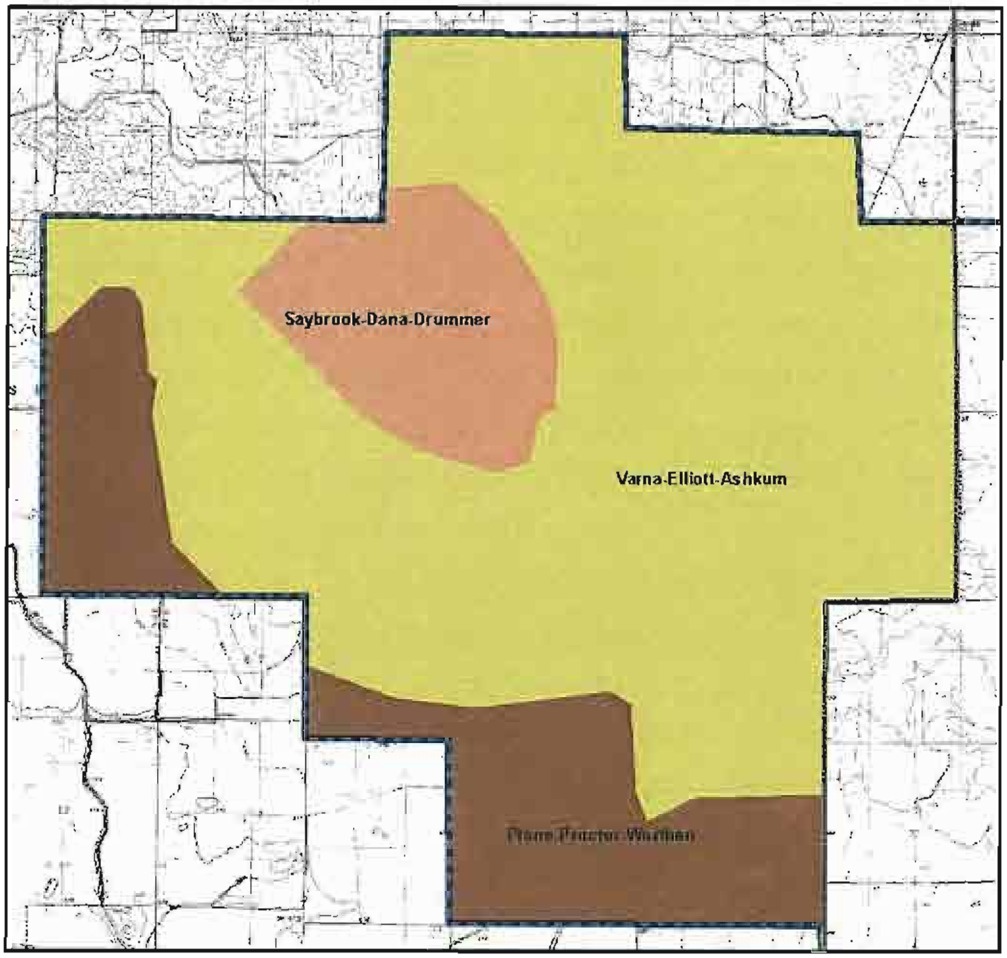


Figure 3 –Soils Map

Time of concentration (Tc) is the time for runoff to travel from the hydraulically most distant point of the watershed to the outlet. Factors which affect the time of concentration include surface roughness, channel shape and flow patterns, and slope. Aerial photographs and contour maps were used to evaluate time of concentration. Figure 4 shows, as an example, the watershed delineation and longest flow path for subbasin 9 on an aerial background. Because the wind turbines will be constructed on ridges, new impervious areas will not be directly connected to main drainageways, which will minimize any impacts to basin timing. As shown in Figure 4, an access road crosses the longest flow path of subbasin 9. A small culvert would likely be built under this access road to maintain the existing flow path for this subbasin. Replacing 18 +/- feet of open channel with a similar length of culvert will have a negligible impact to the time of concentration for the subbasin given the total flow path length of 6,440 +/- feet for this subbasin. The changes occurring in subbasin 9 are typical to the changes which would occur in other project subbasins. From reviewing the configuration of project features on the delineated subbasins, it was determined that the potential impacts to time of concentration will be negligible for all the subbasins in the project area.

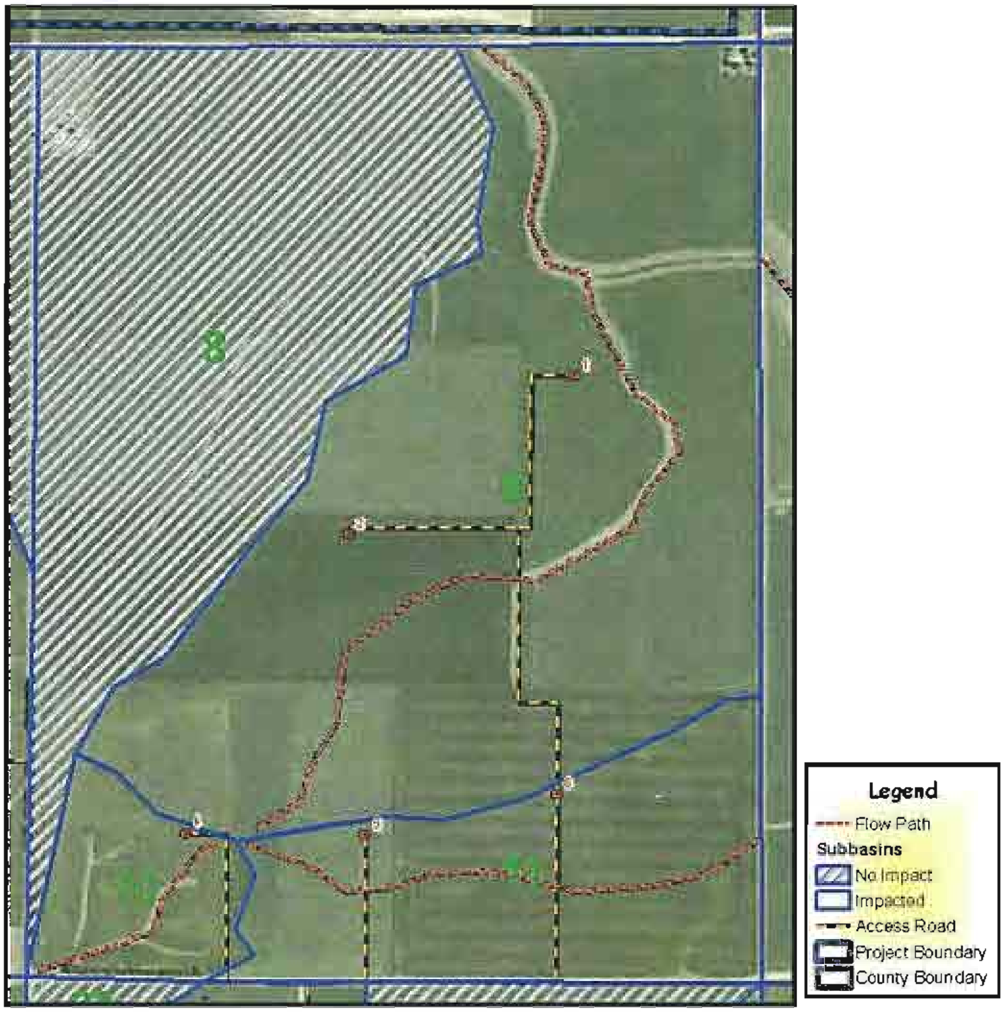


Figure 4 – Aerial Photo of Subbasin 9

Additional Considerations

The potential impact to existing tile lines, soil conservation practices, and the need for detention were also evaluated as part of this study. As required by County Ordinance No. 848, tile lines must be located and flagged prior to construction. All underground wiring or cabling for the Project shall be at a minimum depth of four (4) feet below grade or deeper if required to maintain a minimum one (1) foot clearance between the wire or cable and any agricultural drainage tile. Any damages to tile lines must be repaired. Any relocation, if required, must be designed in accordance with paragraph 7.2 of the Champaign County Stormwater Management Policy and must be certified by a Professional Engineer. The land that is being developed may contain agricultural drainage tiles. Impacts to drainage tile due to construction of wind turbine pads should be minimal since they will be located on ridges. Proposed access roads will be built to the existing grade. Any damages due to construction of access roadways could be addressed through replacing any damaged tile lines. Tile line damages due to the construction of electric lines could be addressed through adjusting the profile of electric lines and replacement of damaged tile lines.

Any soil conservation practices that are damaged by the Project shall be restored by California Ridge to the pre-construction condition. When trenching is required, topsoil shall be stripped and replaced as follows:

- The top 12 inches of topsoil shall first be stripped from the area to be trenched and from an adjacent area to be used for subsoil storage. The topsoil shall be stored in a windrow parallel to the trench in such a manner that it will not become intermixed with subsoil materials.
- All subsoil material that is removed from the trench shall be placed in the second adjacent stripped windrow parallel to the trench but separate from the topsoil windrow.
- In backfilling the trench, the stockpiled subsoil material shall be placed back into the trench before replacing the topsoil.

The topsoil must be replaced such that after the settling occurs, the topsoil's original

depth and contour (with an allowance for settling) will be restored.
California Ridge will address soil compaction, rutting, and land leveling following the completion of open trenching with private landowners. California Ridge will attempt to mitigate any soil compaction and rutting to the land as well as attempt to return the land to its original pre-construction elevation and contours.

The hydrologic evaluation determined that peak flow rates will remain unchanged for pre-and post-project conditions. As such, there will be no need for detention facilities, flow path modifications, or channel modifications.

Conclusion

Based on the analysis performed for existing and proposed conditions, changes in land use and impervious area will be negligible. No channel or drainage path modifications are necessary as a result of the Project. As such, the curve numbers and times of concentration for the project subbasins will not change under proposed conditions. Because these factors will not change, any changes to pre- and post-construction runoff rates and volumes under storm events up to and including the 100-year precipitation event will be negligible.

The Project will pose minimal risk to adjacent public right of way or downstream properties. Any impacts to upstream water resources would be limited to the immediate vicinity of culvert inlets installed by the contractor. These culverts would be located well within Project limits and would not impact upstream adjacent properties. Stormwater best management practices should be used on the project site as outlined in the SWPPP to minimize erosion and sediment discharge.

APPENDIX J

HDR

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February 27, 2009

Mr. Keith Shank
Division of Ecosystems & Environment, Impact Assessment Section
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702-1271

Re: California Ridge Wind Project, Vermilion and Champaign Counties, Illinois

Dear Mr. Shank:

California Ridge Energy LLC, an affiliate of Invenergy Wind LLC, is proposing to construct an up to 200-Megawatt (MW) wind farm in Vermilion and Champaign Counties, Illinois. This project is known as the California Ridge Wind Project. The attached figure identifies the project.

Typically, wind facility construction includes erecting wind turbines and constructing associated facilities such as gravel access roads and underground and overhead transmission lines. Although final turbine locations, access roads, and electrical connections have not been determined at this time, Table 1, below, identifies sections potentially affected by the project.

California Ridge Energy LLC is planning to submit a Special Use Permit (SUP) application for the project to both Vermilion and Champaign Counties during August 2009. At this time, HDR Engineering, Inc. (HDR) requests your review of the sections identified in Table 1. Your agency's comments will be incorporated into the SUP review process for the project.

Table 1 – Sections within Project Area

County	Township	Range	Section(s)
Champaign County	21N	10E	16, 25
	21N	11E	30, 31
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	21N	13W	31, 32
	20N	14W	1-3, 10-15, 24
	20N	13W	3-24
	20N	12W	19, 20

The enclosed map details the location of California Ridge Wind Project Area to facilitate your review. If you require further information or have questions regarding this matter, please contact me at (763) 591-5432 or at Jacqueline.Hamilton@hdrinc.com.

Sincerely,

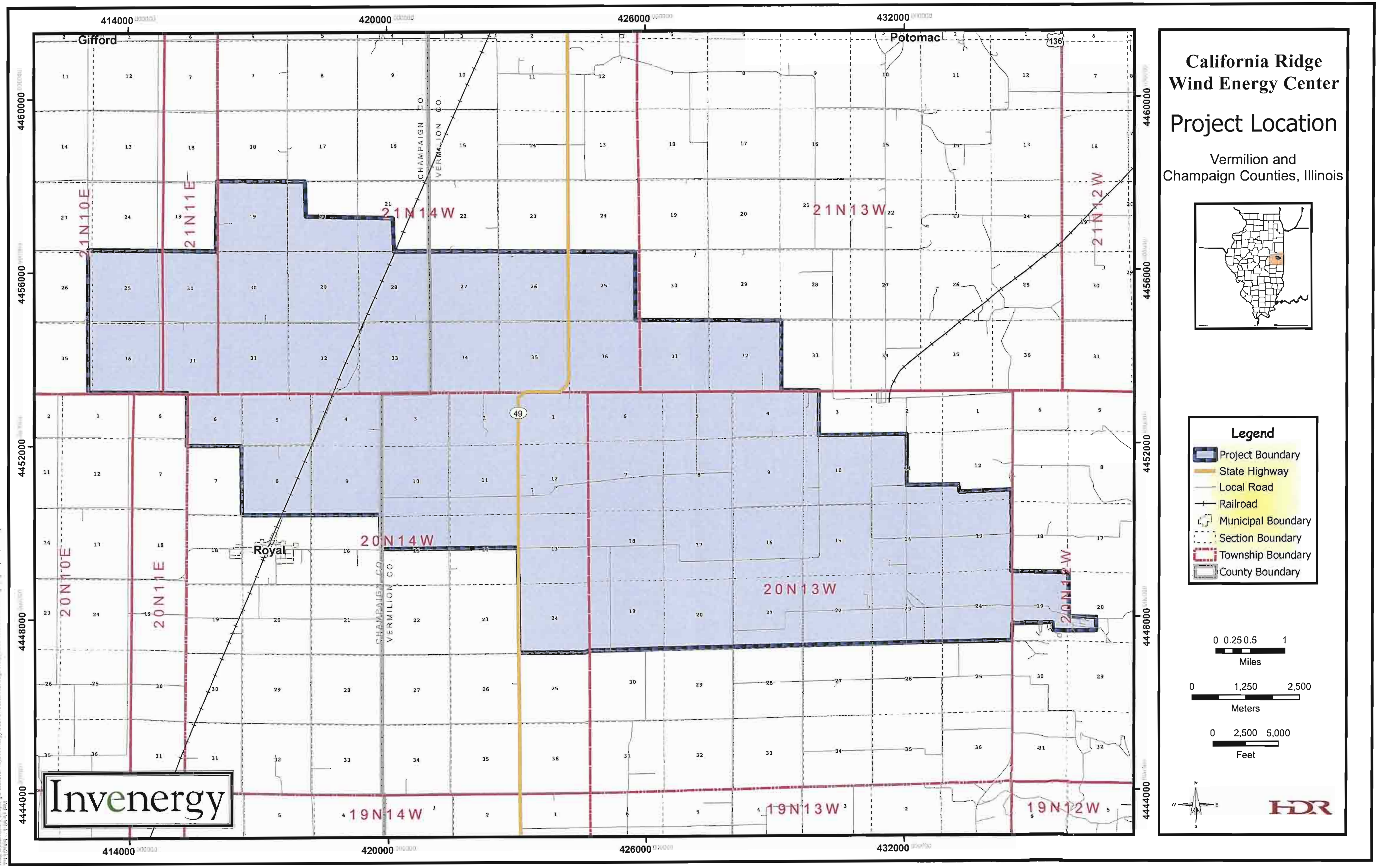
HDR Engineering, Inc.

Jacqueline O. Hamilton

Jacque Hamilton
Environmental Project Manager

Attachment: Project Location Map

cc: Rhett Good, Western EcoSystems Technology, Inc.
Russ Romme, BHE Environmental, Inc.
John Doster, Invenergy


California Ridge Wind Energy Center
Project Location
Vermilion and Champaign Counties, Illinois
Legend
Project Boundary
State Highway
Local Road
Railroad
Municipal Boundary
Section Boundary
Township Boundary
County Boundary
0 0.25 0.5 1
Miles
0 1,250 2,500
Meters
0 2,500 5,000
Feet
Gifford
Potomac
Royal
21N10E
21N11E
21N14W
21N13W
21N12W
20N10E
20N11E
20N14W
20N13W
20N12W
19N14W
19N13W
19N12W
CHAMPAIGN CO.
VERMILION CO.
49
136
414000
420000
426000
432000
4460000
4456000
4452000
4448000
4444000
Invenergy
HDR

February 27, 2009

Mr. Rich Gerard, Regional Manager
Illinois Environmental Protection Agency, Region
42125 South First Street
Champaign, IL 61820

Re: California Ridge Wind Project, Vermilion and Champaign Counties, Illinois

Dear Mr. Gerard:

California Ridge Energy LLC, an affiliate of Invenergy Wind LLC, is proposing to construct an up to 200-Megawatt (MW) wind farm in Vermilion and Champaign Counties, Illinois. This project is known as the California Ridge Wind Project. The attached figure identifies the project.

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Sincerely,

HDR Engineering, Inc.

Jacqueline O. Hamilton

Jacque Hamilton
Environmental Project Manager

Attachment: Project Location Map

cc: Rhett Good, Western EcoSystems Technology, Inc.
Russ Romme, BHE Environmental, Inc.
John Doster, Invenergy

HDR

ONE COMPANY | *Many Solutions* ℠

February 27, 2009

Mr. William J. Gradle, State Conservationist
USDA - Natural Resources Conservation Service
2118 W Park Court
Champaign, IL 61821

Re: California Ridge Wind Project, Vermilion and Champaign Counties, Illinois

Dear Mr. Gradle:

California Ridge Energy LLC, an affiliate of Invenergy Wind LLC, is proposing to construct an up to 200-Megawatt (MW) wind farm in Vermilion and Champaign Counties, Illinois. This project is known as the California Ridge Wind Project. The attached figure identifies the project.

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Sincerely,

HDR Engineering, Inc.

Jacqueline O. Hamilton

Jacque Hamilton
Environmental Project Manager

Attachment: Project Location Map

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Russ Romme, BHE Environmental, Inc.
John Doster, Invenergy

HDR ONE COMPANY | *Many Solutions*℠

February 27, 2009

Ms. Anne E. Haaker
Deputy State Historic Preservation Officer
Illinois Historic Preservation Agency
1 Old State Capitol Plaza
Springfield, IL 62701-1512

Re: California Ridge Wind Project, Vermilion and Champaign Counties, Illinois

Dear Ms. Haaker:

California Ridge Energy LLC, an affiliate of Invenergy Wind LLC, is proposing to construct an up to 200-Megawatt (MW) wind farm in Vermilion and Champaign Counties, Illinois. This project is known as the California Ridge Wind Project. The attached figure identifies the project.

Typically, wind facility construction includes erecting wind turbines and constructing associated facilities such as gravel access roads and underground and overhead transmission lines. Although final turbine locations, access roads, and electrical connections have not been determined at this time, Table 1, below, identifies sections potentially affected by the project.

At this time, there is no federal agency involvement or Section 106 consultation process anticipated for this project. The project will be built solely on private property using private funds. However, California Ridge LLC is planning to submit a Special Use Permit (SUP) application to Vermillion and Champaign Counties in August 2009. At this time, HDR Engineering, Inc. (HDR) anticipates the need for certification under Section 401 of the Clean Water Act and the need for a National Pollutant Discharge Elimination System (NPDES) permit from the Illinois Environmental Protection Agency.

HDR requests your review under *Illinois State Agency Historic Resources Preservation Act* (20 ILCS 3410) specifically of the project sections (Table 1) for potential effects on known cultural resources. HDR anticipates a request for archaeological inventory of areas within the project construction footprint that have a high probability for buried resources; we also anticipate a request for an inventory of standing structures in the project constriction footprint. IHPA comments will be considered during the planning process.

HDR Engineering, Inc.
701 Xenia Avenue South
Minneapolis, MN 55416-3636
Phone (763) 591-5400
Fax (763) 591-5413
www.hdrinc.com

Table 1 – Sections within Project Area

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John Doster, Invenergy

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February 27, 2009

Mr. James Townsend, Chief
US Army Engineer District Louisville
ATTN: CELRL-OP-F
P.O. Box 59
Louisville, KY 40201-0059

Re: California Ridge Wind Project, Vermilion and Champaign Counties, Illinois

Dear Mr. Townsend:

California Ridge Energy LLC, an affiliate of Invenergy Wind LLC, is proposing to construct an up to 200-Megawatt (MW) wind farm in Vermilion and Champaign Counties, Illinois. This project is known as the California Ridge Wind Project. The attached figure identifies the project.

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Sincerely,

HDR Engineering, Inc.

Jacqueline O. Hamilton

Jacque Hamilton
Environmental Project Manager

Attachment: Project Location Map

cc: Rhett Good, Western EcoSystems Technology, Inc.
Russ Romme, BHE Environmental, Inc.
John Doster, Invenergy

HDR ONE COMPANY | *Many Solutions*[SM]

February 27, 2009

Mr. Mike Ricketts, Chief
Newburgh Field Office
US Army Corps of Engineers
P.O. Box 489
Newburgh, IN 47629-0489

Re: California Ridge Wind Project, Vermilion and Champaign Counties, Illinois

Dear Mr. Ricketts:

California Ridge Energy LLC, an affiliate of Invenergy Wind LLC, is proposing to construct an up to 200-Megawatt (MW) wind farm in Vermilion and Champaign Counties, Illinois. This project is known as the California Ridge Wind Project. The attached figure identifies the project.

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HDR Engineering, Inc.

Jacqueline O. Hamilton

Jacque Hamilton
Environmental Project Manager

Attachment: Project Location Map

cc: Rhett Good, Western EcoSystems Technology, Inc.
Russ Romme, BHE Environmental, Inc.
John Doster, Invenergy

HDR ONE COMPANY | *Many Solutions* SM

February 27, 2009

Ms. Heidi Woeber
U.S. Fish and Wildlife Service
Rock Island Field Office
4469 48th Avenue Court
Rock Island, IL 61201

Re: California Ridge Wind Project, Vermilion and Champaign Counties, Illinois

Dear Ms. Woeber:

California Ridge Energy LLC, an affiliate of Invenergy Wind LLC, is proposing to construct an up to 200-Megawatt (MW) wind farm in Vermilion and Champaign Counties, Illinois. This project is known as the California Ridge Wind Project. The attached figure identifies the project.

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Sincerely,

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Jacqueline O. Hamilton

Jacque Hamilton
Environmental Project Manager

Attachment: Project Location Map

cc: Rhett Good, Western EcoSystems Technology, Inc.
Russ Romme, BHE Environmental, Inc.
John Doster, Invenergy

HDR

ONE COMPANY | *Many Solutions* ℠

April 30, 2009

Mr. Hector Santiago
National Park Service
Midwest Regional Office – Planning and Compliance Division
601 Riverfront Dr.
Omaha, NE 68102

Mr. Louis Yockey
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702-1271

Re: California Ridge Wind Project, Vermilion and Champaign Counties, Illinois

Dear Messrs. Santiago and Yockey:

California Ridge Energy LLC, an affiliate of Invenergy Wind LLC, is proposing to construct a 200-Megawatt (MW) wind farm, referred to as the California Ride Wind Project, in Vermilion and Champaign Counties, Illinois. The attached figure shows the project location.

Typically, wind facility construction includes erecting wind turbines and constructing associated facilities such as gravel access roads and underground and overhead transmission lines. Although final turbine locations, access roads, and electrical connections have not been determined at this time, Table 1 identifies sections potentially affected by the project.

California Ridge Energy LLC is planning to submit a Special Use Permit (SUP) application for the project to both Vermilion and Champaign Counties during August 2009. At this time, HDR Engineering, Inc. (HDR) requests your review of the project. We are contacting your offices specifically in regards to the Middle Fork of the Vermilion River, which we understand is both a State and National Scenic River. Please note that the project does not overlap the 1,000-foot designated scenic river corridor; the farthest eastern edge of the project boundary is approximately a quarter mile west of the Middle Fork of the Vermilion River. Your agency's comments on this project will be incorporated into the SUP review process. We have also contacted Mr. Keith Shank at the Illinois Department of Natural Resources and Ms. Joyce Collins at the U.S. Fish and Wildlife Service requesting their offices' comments.

Table 1 – Sections within Project Area

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Sincerely,

HDR Engineering, Inc.

Jacqueline O. Hamilton

Jacque Hamilton
Environmental Project Manager

Attachment: Project Location Map

cc: John Doster, Invenergy

HDR ONE COMPANY | *Many Solutions*℠

March 9, 2009

Ms. Joyce Collins
U. S. Fish and Wildlife Service
8588 Route 148
Marion, Il 62959-4565

Re: California Ridge Wind Project, Vermilion and Champaign Counties, Illinois

Dear Ms. Collins:

California Ridge Energy LLC, an affiliate of Invenergy Wind LLC, is proposing to construct an up to 200-Megawatt (MW) wind farm in Vermilion and Champaign Counties, Illinois. This project is known as the California Ridge Wind Project. The attached figure identifies the project.

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Jacqueline O. Hamilton

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Attachment: Project Location Map

cc: Rhett Good, Western EcoSystems Technology, Inc.
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John Doster, Invenergy

EcoCAT
Ecological Compliance Assessment Tool

Applicant:	HDR Engineering,Inc. - MN	*IDNR Project #:*	0906735
Contact:	Jacqueline Hamilton	Date:	03/11/2009
Address:	701 Xenia Ave., Suite 600 Minneapolis, MN 55416		

Project: Invenergy California Ridge Wind Energy Center
Address: Rural Royal, Royal

Description: 200-MW 102-turbine utlity scale wind energy project.

Natural Resource Review Results

Consultation for Endangered Species Protection and Natural Areas Preservation (Part 1075)
The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

INAI Site
Kennekuk Cove County Park INAI Site
Middle Fork Of The Vermilion River INAI Site
Spoon River INAI Site
Orchid Hill Natural Heritage Landmark
Bluebreast Darter *(Etheostoma camurum)*
Northern Harrier *(Circus cyaneus)*
Wavy-Rayed Lampmussel *(Lampsilis fasciola)*
Wavy-Rayed Lampmussel *(Lampsilis fasciola)*

An IDNR staff member will evaluate this information and contact you within 30 days to request additional information or to terminate consultation if adverse effects are unlikely.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Champaign

Township, Range, Section:

20N, 10E, 1	20N, 10E, 2
20N, 10E, 3	20N, 10E, 12
20N, 11E, 6	20N, 11E, 7
20N, 11E, 18	20N, 14W, 4
20N, 14W, 5	20N, 14W, 6
20N, 14W, 7	20N, 14W, 8
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20N, 14W, 17	20N, 14W, 18
21N, 10E, 22	21N, 10E, 23

21N, 10E, 24	21N, 10E, 25
21N, 10E, 26	21N, 10E, 27
21N, 10E, 33	21N, 10E, 34
21N, 10E, 35	21N, 10E, 36
21N, 11E, 19	21N, 11E, 30
21N, 11E, 31	21N, 14W, 19
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21N, 14W, 28	21N, 14W, 29
21N, 14W, 30	21N, 14W, 31
21N, 14W, 32	21N, 14W, 33

County: Vermilion

Township, Range, Section:

20N, 12W, 7	20N, 12W, 17
20N, 12W, 18	20N, 12W, 19
20N, 12W, 20	20N, 12W, 29
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20N, 13W, 11	20N, 13W, 12
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20N, 13W, 15	20N, 13W, 16
20N, 13W, 17	20N, 13W, 18
20N, 13W, 19	20N, 13W, 20
20N, 13W, 21	20N, 13W, 22
20N, 13W, 23	20N, 13W, 24
20N, 14W, 1	20N, 14W, 2
20N, 14W, 3	20N, 14W, 10
20N, 14W, 11	20N, 14W, 12
20N, 14W, 13	20N, 14W, 14
20N, 14W, 15	20N, 14W, 22
20N, 14W, 23	20N, 14W, 24
21N, 13W, 30	21N, 13W, 31
21N, 14W, 22	21N, 14W, 23
21N, 14W, 25	21N, 14W, 26
21N, 14W, 27	21N, 14W, 34
21N, 14W, 35	21N, 14W, 36

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Attachment

Invenergy California Ridge Wind Energy Center
Champaign County

Wildlife Impact Recommendations

Champaign County may wish to consider permit conditions requiring the applicant to monitor, assess, and report possible fish and wildlife effects of the proposed action in the following ways.

- Incorporate best management practices to minimize risk to federally-listed and state-listed species, as outlined in this Attachment. Focus should be on appropriate avoidance and minimization of habitat disturbance, with mitigation measures implemented as applicable.
- Where feasible, permanent engineering solutions to soil erosion and water quality issues should be required and maintained, particularly with reference to service and access roads.
- Perform pre-construction assessments of avian and bat usage within the project area. Such assessments should include inventories of habitat types in and near the project area, including crop rotations or choices, and observations of both migratory and resident bird usage. Consideration of all seasons should be included, although spring migration is anticipated to be of greatest interest. Acoustic bat activity monitoring is also appropriate, particularly during the fall migratory season when activity would be expected to be highest. Specific federally-listed and state-listed species of interest are discussed in the following narrative. Risks to protected species should be evaluated and appropriate regulatory permits sought for potential incidental taking of protected animals.
- Perform at least one year of post-construction monitoring and assessment, noting any changes in wildlife usage patterns and evaluating potential causes of such changes.
- Consideration should be given to periodic repetition of the post-construction wildlife surveys during the life of the project.

Natural resources within, or in the vicinity of, the proposed wind energy facility are listed below, along with a discussion of potential issues.

Coal Resources

According to the Illinois State Geological Survey databases, the only known past coal mining location in Champaign County is a late-19th-Century underground mine west of Sidney, well - outside the project area. However, the developer may wish to verify the ownership of the mineral rights beneath turbine lease locations to determine if mining conflicts might exist in the future which might pose issues of geologic stability for wind turbines.

State Lands; Nature Preserves; Land & Water Reserves; and INAI Sites

National Scenic River - Middle Fork of the Vermilion River

A portion of the Middle Fork comprises the State's only designated National Scenic River. The River is formally protected as a National Scenic River where title (fee or easement) is held by the Illinois Department of Natural Resources, but this legal protection extends only 500 feet from the River's center-line.

The nearest point of the project area in Champaign County lies approximately seven miles from the National Scenic River. However, in this area the River lies in a valley more than 100 feet below the uplands to the west, and the valley walls are typically forested, circumstances which should prevent the visibility of turbines in Champaign County to recreational users of the River. Nevertheless, it may be that from some points on the River, upstream of the designated Scenic River, turbines in Champaign County might be visible. A visibility analysis is appropriate to determine to what degree the operation of wind turbines in the project area may degrade the recreational experience of persons on the River.

The river's riparian corridor forms an important avenue for the movement of all forms of wildlife, providing food and shelter for both migrant and resident species. By no means is wildlife limited to this area, however. Recent radar-based studies along the Illinois River demonstrate that even waterfowl may arrive and depart cross-country, rather than following the river. Hence, distance from the river provides no assurance that wildlife commonly found there will not also occur within the project area.

Erosion related to wind energy facility construction and operation has the potential to adversely affect the Middle Fork and its tributaries through siltation and sedimentation, while disruption of field tile systems may temporarily or permanently adversely modify the prevailing thermal regime in feeder stream habitats essential to Middle Fork fish, reptiles, amphibians, and mussels, including many State-listed endangered or threatened species, several of which are unique to the Vermilion River system in Illinois.

Measures should be adopted to minimize erosion and siltation related to construction and maintenance of the project and facilitate tile repairs. Fortunately, much of the project is located outside of the watershed of that portion of the Middle Fork which is designated as National Scenic River.

Middle Fork of the Vermilion River INAI Site

The Middle Fork of the Vermilion River is a designated Illinois Natural Areas Inventory (INAI) Site, from its confluence with the Salt Fork east of Oakwood, upstream to the northern boundary of Champaign County, well beyond the reaches designated as National Scenic River. The Middle Fork, its tributaries, and its riparian forests support a plethora of federally-listed and State-listed endangered and threatened species, including protected mussels, fish, amphibians, reptiles, bats, raptors and other birds. <u>All drainage from the north side of the project in Champaign County enters the Middle Fork INAI Site.</u>

High water quality is a hallmark of this stream. Erosion related to wind facility construction and operation has the potential to adversely affect tributaries and the Middle Fork through siltation and sedimentation, and to adversely modify feeder stream habitats essential to Middle Fork fish and mussels, several of which are unique to the Vermilion River system in Illinois.

<u>Salt Fork of the Vermilion River INAI Site</u>

The Salt Fork is designated as an INAI Site from a point northwest of Homer downstream to its confluence with the Middle Fork in Vermilion County. This reach of the River supports numerous aquatic listed species of fish, mussels, reptiles, and amphibians, including the Mudpuppy Salamander, the Bigeye Chub, Bluebreast Darter, River Redhorse, Blanding's Turtle, Wavy-Rayed Lampmussel, Purple Wartyback, and the Salamander Mussel.

The Salt Fork receives the drainage from the Spoon River INAI Site, and from portions of the Stoney Creek watershed in Champaign County. Both of these streams drain significant portions of the proposed project area.

<u>Spoon River INAI Site</u>

The Spoon River is a tributary of the Salt Fork of the Vermilion River, located entirely within Champaign County south of Gifford. Although it is completely channelized and maintained by the Spoon River Drainage District, it has been designated because it retains an unusually high fish diversity, likely due to its constant influx of cool tile drainage.

The Spoon River INAI could be adversely modified by erosion and siltation related to turbine construction, and by disruption of the numerous agricultural tile drains which feed it and maintain its temperature.

<u>Edgewood Farm land and Water Reserve and INAI Site</u>

Located along the Salt Fork southeast of Ogden, and more than seven miles from the project area, the higher elevations of the LWR exceed 660 feet MSL, about the same elevation as the wind farm. Consequently, wind turbines may be visible from the higher elevations within the LWR unless forests on the opposite side of the Salt Fork valley are tall enough to screen them. However, at that distance, visibility is not likely to be intrusive on the senses of site users.

Pelville Cemetery INAI Site

Pelville Cemetery lies 14 miles north of the project area, just west of Rankin in Vermilion County and on the opposite side of the Middle Fork's valley. A keen-eyed observer at Pell Cemetery might possibly be able to see California Ridge turbines under conditions of excellent visibility, but they are unlikely to intrude on a visitor's experience. The Cemetery supports breeding pairs of the **Henslow's Sparrow** and other migratory birds, whose migratory passages could pose issues for the project.

Henschel Workman State Habitat Area

The Department's 135-acre Henschel Workman State Habitat Area is located southeast of Rankin in Vermilion County, about 13 miles north of the project footprint. It supports breeding **Henslow's Sparrows** and provides a large expanse of suitable wintering habitat and migratory staging area attractive to other State-listed bird species, whose migratory passages could pose issues for the project.

Sleeter State Habitat Area

The 103-acre Sleeter SHA is located about 1.5 miles northwest of Gifford in Champaign County. It lies eight miles northwest of project areas within Vermilion County, but only four miles from the nearest project areas in Champaign County. Turbines located in both Champaign and Vermilion Counties will be visible to site users, but this should have little impact on hunting activities, the major recreational use of this site. However, the Sleeter SHA may be a focal point for birds whose migratory passages could pose issues for the project.

Documented Listed Species

Indiana Bat, *Myotis sodalis*.

Summer nursery colonies of this bat, listed by the federal government and Illinois as endangered, have been documented in forested riparian tracts along the Middle Fork of the Vermilion River and the Big Four Ditch in Ford County, north of the project area, and along the Little Vermilion River in the southern half of Vermilion County. It is reasonable to assume that this species traverses or roosts in the intervening segments of the Vermilion River system.

Nursing females may forage above crop-fields a mile or more from the nursery colony. This species winters in caves or mines some distance from summer habitats, but its migratory behavior is poorly understood. No hibernation sites are known from Vermilion County, although critical hibernating habitat is known in LaSalle County. It is surmised that bats using the Middle Fork for summer habitat most likely migrate from hibernation sites in southwestern Indiana and Kentucky, although a banding study in the 1970's indicated that at least some LaSalle County bats move in this direction.

The risk to bats from collisions with moving wind turbine blades appears to be much higher than for birds. To date, no Indiana Bats have been documented as killed by wind turbines. But, until recently, no utility-scale wind farms have been proposed or constructed within the range of Indiana Bats, so the risk to this species from wind turbines remains unquantified.
The project area itself appears to contain no potential summer nursery or roosting habitat for the Indiana Bat, but individuals roosting along the Middle Fork may forage above fields within the project area.

Because the winter hibernation sites of these bats are unknown, the greatest risk may be to Indiana Bats migrating across or through the project area. Efforts to identify and monitor the foraging and migration behavior of this bat population may establish the degree of risk which this facility would pose to this species.

The Department is unable to evaluate the potential for an incidental take of an Indiana Bat at this facility based on existing data; capture studies along creeks in the nearer vicinity of the project may be advisable. More common bat species undoubtedly occupy habitats in the vicinity, and are at risk of mortality, directly through collisions with wind turbines, or indirectly through barotrauma (lung hemorrhages caused by extremely low air pressures in the vortices created by wind turbine vanes).

Vermilion County is known to be particularly rich in bat fauna: a 1996 netting survey on the Little Vermilion River east of Georgetown captured seven of nine species whose ranges contain Vermilion County, including the Eastern Red Bat, Hoary Bat, Northeastern Myotis, Eastern Pipistrelle, Big Brown and Little Brown Bats, in addition to the Indiana Bat. Similar diversity may exist along the Sangamon River in western Champaign County, placing the proposed wind farm between two major bat habitat areas. An acoustic bat survey is recommended, particularly during the fall bat migratory season (August 1 through October 31) when activity would be expected to be the highest, in order to characterize bat activity in the project area. A high level of bat activity may warrant post-construction mortality studies.

Blanding's Turtle, *Emydoidea blandingii*

The State-listed threatened Blanding's Turtle has been recommended by the Illinois Endangered Species Protection Board (IESPB or Board) for up-listing to "endangered." This rulemaking change should be accomplished in 2009.

The Blanding's Turtle, distinguishable by its solid bright yellow lower jaw and throat, has been documented most recently in the Middle Fork SFWA (Horseshoe Bottom Nature Preserve), about two miles from the project area in Vermilion County. The Blanding's Turtle was last recorded in Champaign County in 1953, when an individual was collected in Lea Park in Urbana, from the Saline Branch of the Salt Fork. While existing populations may be small and localized, the entire Vermilion River system is accessible to this species. In Northern Illinois, the species frequently ascends waterways to access open upland areas for nesting.

The Blanding's Turtle reaches sexual maturity only after 15-20 years, and has a documented life-span beyond 70 years, although females beyond age 50 may not be reproductively active. This species is known to move widely across the landscape, following streams and drainage ditches, but also moving overland when necessary. Overland movements typically occur at night. It is believed to demonstrate fidelity to nesting and hatching areas, attempting to return to its own natal site for egg-laying. The species is known to nest farther from the water than any other aquatic turtle in North America, at times nesting up to a mile inland. The species' life cycle appears to be compatible with row-crop agriculture, since egg-laying occurs in late spring or early summer after planting, and hatching usually occurs before harvest. The project area lies near the southern limits of the species' range, so overwintering in the nest by hatchlings should be a rare occurrence, if the species remains present.

The main threats to this species are nest predation by skunks, raccoons, and other mammalian predators, road-kill, and poaching (illegal collection for the pet trade). Wind energy construction activities may result in disturbance of traditional nesting areas, the destruction of nests, the entrapment of individuals in excavations, and road-kill.

Workers on the project should be educated about this species' appearance and behavior; excavations left open overnight should be covered and inspected before filling: and any Blanding's Turtle observed should be documented with photographs and reported to the Department of Natural Resources. A Turtle may not be moved to facilitate the project unless the applicant has obtained an Incidental Take Authorization.

Smooth Softshell Turtle, *Apalone mutica*.

The Board has recommended listing the Smooth Softshell as "endangered;" this designation is pending the completion of rulemaking, which should be accomplished in 2009.

This aquatic turtle inhabits larger streams and rivers, in segments with sandy substrates and sand bars. Regarded as a delicacy by many fishermen, this species has suffered from over-collecting, while pollution, siltation, and sedimentation have degraded many habitats. This species has been documented in Vermilion County, and it is potentially present in all reaches of the Vermilion River system.

Unless transportation of wind turbine components requires the upgrade or reconstruction of bridges, there should be little risk of direct adverse effects to this species. Erosion and siltation pose indirect threats.

River Redhorse, *Moxostoma carinatum*

The state-listed threatened River Redhorse is a member of the sucker family which feeds largely on invertebrates, including young mussels and crustaceans, for which it possesses specialized grinding teeth. It prefers medium-to-high-gradient rivers and streams with clean sand, gravel, and cobble substrates. The River Redhorse has been recorded in the Middle Fork as far north as the Middle Fork SFWA, but is more common in the Salt Fork.

Erosion related to turbine construction and maintenance may degrade stream-bed habitats or suppress populations of prey species. Because the species rarely ascends small tributaries, direct adverse effects are unlikely.

Eastern Sand Darter, *Ammocrypta pellucidum*

This small fish is listed by Illinois as "threatened." Restricted to streams in the Wabash drainage of Illinois, it requires high water quality and bottom substrates of clean sand in fairly swift waters, requirements satisfied by all branches of the Vermilion River. It was last recorded in Champaign County in Buck Creek below Penfield, just above its confluence with the Middle Fork. Buck Creek does not drain the project area, but other tributaries of the Middle Fork do. Soil erosion and sedimentation pose the main threats to this species, followed by chemical pollution.

Bigeye Chub, *Hybopsis amblops*

The State-listed endangered Bigeye Chub is another small fish found only in the Wabash River watersheds of Illinois, but generally in smaller creeks and streams. It is present in the Middle Fork, the Salt Fork, and Stoney Creek. Degradation of water quality and alteration of stream habitats are the main threats to this species.

Mussels

The Salt Fork, Middle Fork, and North Fork of the Vermilion River, and their tributary creeks, provide essential habitat for a large number of freshwater mussels, among the most endangered organisms in North America. High water quality remains the most essential habitat requirement.

Federally-listed species found, or once found, in these streams include the **Clubshell**, *Pleurobema clava*, and the **Riffleshell**, *Epioblasma torulosa*. A cooperative program between the U.S. Fish & Wildlife Service and the IDNR is planned to re-introduce the extirpated Riffleshell, and to augment the existing Clubshell population.

Headwater streams are most likely to support populations of the **Slippershell**, *Alasmidonta viridis,* and the **Little Spectaclecase**, *Villosa lienosa.* Broadly distributed lower down are populations of the **Wavy-Rayed Lampmussel**, *Lampsilis fasciola*; **Rainbow**, *Villosa lienosa*; **Purple Wartyback**, *Cyclonaias tuberculata*; **Kidneyshell**, *Ptychobranchus fasciolaris*; **Rabbitsfoot**, *Quadrula cylindrica*, and **Purple Lilliput**, *Toxolasma lividus.*

The **Salamander Mussel**, *Simpsonaias ambigua*, is the only species in its genus, and is also unique among North American mussels as the only species with a non-fish glochidial host, the **Mudpuppy**, *Necturus maculosus*. The Salamander Mussel has been documented at seven locations in Vermilion County since 1980, in the North Fork, the Middle Fork, and in Stony Creek, a tributary of the Salt Fork. A small mussel (two inches or less), and commonly found beneath rocks and debris, where the Mudpuppy spends much of its time, the Salamander Mussel is likely under-sampled by the typical non-targeted mussel survey, and may be more locally common than these records indicate.

<u>Mudpuppy, *Necturus maculosus*</u>

This large (up to one foot total length) salamander has been recommended by the Board for listing as "threatened;" this designation is pending the completion of rulemaking, which should be accomplished in 2009. The Mudpuppy is the only known glochidial host of the State-listed endangered **Salamander Mussel**, *Simpsonaias ambigua,* a species which is now being evaluated for federal listing under the Endangered Species Act; the decline of the Mudpuppy may be a major factor in the disappearance of the Salamander Mussel.

The Mudpuppy never develops beyond an aquatic larval stage, and so is never found in terrestrial habitats. It inhabits clear rivers, creeks, streams, lakes, and ponds, but conceals itself under rocks or woody debris during the day, feeding actively at night. It typically goes unseen except by fishermen, who sometimes inadvertently catch it. It can cope with siltation and sedimentation so long as clear gravelly headwater areas remain available for reproduction.

The Vermilion River system is one of the last "strongholds" for this species in the state, and it should be presumed to be present throughout. Stony Creek drains the central portion of the project area, and has the most recent records for the Salamander Mussel, indicating a Mudpuppy population is present in Stoney Creek, a tributary of the Salt Fork.

Cool or cold water is essential for this species, which remains active all winter; water temperatures above 72EF are harmful, and those above 77EF can be fatal. Agricultural tile drainage helps lower stream temperatures, but the removal of riparian trees and shrubs exposes streams to direct solar radiation and heating. In-stream cover provided by rocks and woody debris is essential for concealment and reproduction, since eggs are suspended from the bottoms of rocks and logs. The common belief that removal of woody debris from stream channels improves drainage is a factor in the decline of this--and many other-- species.

Major threats include pollution, siltation and sedimentation, stream channelization, and woody debris removal. The main risks associated with wind energy projects will be direct stream modification through the repair or upgrade of roads, modification of aquatic thermal regimes through the disruption of agricultural tile drainage systems, and siltation and sedimentation associated with construction and permanent features, such as service roads, which suppresses prey populations and renders spawning areas unsuitable. Any planned in-stream work may require an Incidental Take Authorization.

<u>Bald Eagle, *Haliaeetus leucocephalus*</u>

The Bald Eagle, de-listed under the federal Endangered Species Act last year, is currently listed by Illinois as "threatened." The Board has recommended de-listing the Bald Eagle due to its recovery in Illinois, and this decision is now being implemented through the rule-making process, which should be completed prior to the end of 2009. It remains protected under the

Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act, each as stringent as the Endangered Species Act.

For several years there has been a Bald Eagle nest on the North Fork just above Lake Vermilion, about seven miles east of the project area. However, Illinois has experienced a significant increase in Bald Eagle nests over the last few years, and many new nests have not been tallied. Nests have been appearing on smaller tributaries of larger rivers in areas where Eagles have not been seen for years, and it may be assumed the Vermilion River Basin reflects this trend. Hence, it is likely that new Eagle nests will appear along the North Fork, Middle Fork, and Salt Fork during the project's life.

In addition, Illinois now has the highest population of wintering Bald Eagles in the Lower 48 States, although they tend to be concentrated around major rivers, cooling lakes, and other waters likely to remain ice-free. However, during migration, Eagles frequently fly overland. Thus, while the wind energy project is unlikely to pose any direct threat to the known Eagle nest and its surrounding hunting territory, there may be a collision risk for migrating Eagles.

Least Bittern, *Ixobrychus exilis*

This small heron nests in the emergent vegetation of marshes. It has been documented from Kennekuk Cove County Park in Vermilion County, and from wetlands near the Middle Fork in northeastern Champaign County.

Known breeding locations are unlikely to be affected by the project, although there may be a collision risk for migrating Bitterns. Generally speaking, waterfowl are rarely the victims of collisions with wind turbines, so this risk may be low.

Henslow's Sparrow, *Ammodramus henslowii*

The Henslow's Sparrow is listed by Illinois as a threatened species, but is scheduled for de-listing in 2009. Breeding populations of this grassland bird have been documented north of the project area, and may occur within the project area where suitable habitat exists. More northern breeding populations may migrate through the project area.

Wind turbines associated with this project have the potential to kill or injure birds through blade-strike, unless breeding populations are also found within the footprint. The species is extremely sensitive to the presence of vertical structures and to any form of break in contiguous habitat, such as roads or trails, so that construction in breeding areas during breeding season is likely to result in unlawful takings.

Northern Harrier, *Circus cyaneus*

The State-listed endangered Northern Harrier is a ground-nesting grassland hawk. It has been documented as recently as 2004 as nesting in Champaign County north of Rantoul, less than ten miles from the project footprint. Also a frequently-observed migrant, the species has a statewide range. While many sources indicate the species needs large open areas of habitat, Illinois studies have demonstrated this hawk can use relatively small patches of habitat for successful breeding, especially in the vicinity of larger habitats. Breeding is often associated with wetlands such as marshes, sedge meadows, and wet prairies.

While most hunting activities occur at fairly low altitudes, below typical rotor-swept elevations, hunting can expose this bird to collision risk. Like the Upland Sandpiper, this species engages in an aerial courtship display which places it at risk of collision with wind turbines. Wind farm construction and operation may alter concentrations of prey species.

This hawk relies heavily on its acute hearing to locate prey, and--if the noise generated by wind turbines interferes with this function (which is not known to be the case)--turbines might adversely affect their ability to hunt near the turbines, reducing available food resources.

If pre-construction surveys indicate use of the project area by migrant Harriers, post-construction surveys should be performed to determine whether the Harrier continues to hunt territories in proximity to turbines.

Barn Owl, *Tyto alba*

This endangered raptor nests in larger tree cavities and in barns or abandoned buildings, sometimes within city limits. A breeding record exists for Champaign County, about four miles northwest of Rantoul. This owl hunts both open woodlands and grasslands; its preferred prey consists of small rodents such as mice and voles. The main risk posed by wind power facilities to this species is the removal of suitable nesting trees and abandoned buildings to facilitate transportation of wind turbine components or to maximize wind energy conversion. Both trees and buildings should be examined for Barn Owl occupancy prior to removal.

Short-Eared Owl, *Asio flammeus*

The endangered Short-Eared Owl also nests and winters in grasslands and wetlands. Champaign County lies in both breeding and wintering ranges, and breeding Short-Eared Owls were reported from two separate locations in Vermilion County in 1990. Large numbers of wintering owls are observed annually in suitable winter habitat in Iroquois County.

Highly nomadic, the Short-Eared owl depends heavily on vole and mouse populations, and the size of its breeding and hunting territories varies inversely with prey population sizes. When prey populations are high, owls may be ground-roosting every few meters in suitable habitat. The Northern Harrier often harasses this Owl, stealing its food.

This Owl's hunting flights are often less than ten feet off the ground (a circumstance which makes this bird highly vulnerable to collisions with vehicles); during aerial mating rituals, flights occur at typical wind turbine rotor-swept height. This Owl is highly dependent on its acute hearing to locate and seize prey. The degree to which noise from wind turbines may interfere with predation behavior is unknown.

The effects of wind turbines on Short-Eared Owls may be heavily influenced by the proximity of turbines to breeding, roosting, and hunting areas. Once turbines are built, this proximity relationship will be subject to change as land owners alter land management practices. This is likely to be of concern mainly if attractive habitat for Owls and their prey is created within or near the turbine array following construction.

Upland Sandpiper, *Bartramia longicauda*

This State-listed threatened grassland bird prefers habitat of short-grass prairie/pasture. For many years this ground-nesting species was thought to be area sensitive, requiring ten acres or more of grassland habitat for successful breeding. However, many recent breeding efforts are occurring in grassed waterways of row-crop fields, which provide considerably less than ten acres of habitat, and from along roadsides.

Champaign County breeding records are associated with the University of Illinois and the Champaign-Urbana Airport. There has already been at least one instance in 2008 of identification of Upland Sandpipers at the commencement of wind project construction in Stephenson County, a county which had, until then, no prior breeding record for this species.

The Upland Sandpiper engages in an aerial courtship display which passes through the rotor-swept elevations of utility-scale wind turbines, placing it at risk of collision mortality. Whether this species will be sensitive to the proximity of vertical structures, or to shadow "flicker" on potential nesting areas, has not been demonstrated.

The Department recommends mapping all habitat types within the project footprint, and checking even relatively small areas of appropriate habitats for the presence of this species prior to any initiation of construction disturbance during the breeding season.

Potential Listed Species

Franklin's Ground Squirrel, *Spermophilus franklinii*

The State's largest ground squirrel was listed as "threatened" in 2004. Most active above-ground on sunny days in late spring and early summer, this species hibernates for seven to nine months of the year. It prefers taller vegetation than other ground squirrels, and so is seldom seen. Well-drained ground is a requisite, so today this species is most often found along railroads and highways where its requirements for food and shelter are satisfied. There appears to be no suitable habitat within the project footprint, but transport of turbine components often requires rebuilding or repairing roadways some distance from the ultimate destination.

The Franklin's Ground Squirrel has been documented around Champaign-Urbana, and along former rail-beds near St. Joseph. Offspring can disperse up to a mile in their first season. If present, this species can be threatened during construction through the crushing and collapse of its burrows by heavy equipment. Shadow flicker cast in its territory by operating turbines may also be detrimental.

Ornate Box Turtle, *Terrapene ornata*

The Board has recommended listing the Ornate Box Turtle as "threatened;" this designation is pending the completion of rulemaking, which should be accomplished in 2009.
This terrestrial turtle is usually found in open grassland areas, in contrast to its cousin, the Eastern Box Turtle, which is usually found in woodlands. This turtle hibernates underground from late September through April, so it can not evade disturbance during that period. Its carapace carries elaborate markings, including a yellow bar along the spine, which distinguishes it from the other species. While it appears to be more common in sandy soils, it is not restricted to them. Specimens have been collected from both Iroquois and Champaign County.

As with many turtles, road-kill and over-collecting are major causes of decline. In a recent study of a northwestern Illinois population, a significant number of individuals exhibited carapace scarring from farming equipment (discs and harrows), illustrating that this species may frequently be found in rowcrop fields.

Preferred habitat of this species may not be present in the project area, but too little is known of this species' current distribution to rule out its presence. Project workers should be educated as to its appearance and habits, remain alert for turtles on roads and in fields, and report any suspected Ornate Box Turtles to supervisors. The Department of Natural Resources should be promptly notified if any Ornate Box Turtles are identified. Once listed, it will be unlawful to move or capture an Ornate Box turtle to facilitate the project without first obtaining an Incidental Take Authorization from the Department.

Loggerhead Shrike, *Lanius ludovicianus*

The threatened Loggerhead Shrike is adapted to the savanna conditions of interspersed grasslands, shrubs, and trees. This species has been adversely affected by the decline in animal husbandry and the abandonment of the "shelter-belt" fence-row conservation practice, which has severely reduced both breeding and foraging habitat. The Shrike, also known as the "butcher bird," needs thorny trees and shrubs, even barbed wire, on which to impale its prey, which may be left for several days before being eaten. Areas which support large insects and small rodents, major food items, are also necessary. Due to losses of suitable habitat, Loggerhead Shrikes may attempt reproduction in trees near human habitations and in other areas where they would normally not be expected. The Shrike has been reported as breeding (1990) in southern Champaign County north of Villa Grove.

The primary consideration for wind energy facilities is the potential for further loss of remaining habitat, if fence-rows are cleared to avoid wind turbulence or to improve turbine exposure, or if road-side trees are cleared to create turning radii for turbine carriers or to establish power lines. A pre-construction survey to identify the presence of Shrike nests should be conducted for areas with suitable habitat if work is proposed during the breeding season in order to avoid direct mortality. "Resident" foraging birds are not thought to be at significant risk from operating wind turbines, but potential risk associated with migrants should be considered.

Black-Billed Cuckoo, *Coccyzus erythropthalmus*

The Black-Billed Cuckoo has been recommended by the Board to be listed as "threatened," and this listing is pending the completion of administrative rulemaking, which should occur in 2009.

This bird nests in interior thickets of forested tracts and feeds heavily on caterpillars. This species was documented as nesting at Jordan Creek of the North Fork Nature Preserve (Vermilion County) in the 1990's, and Vermilion County has thousands of acres of suitable nesting habitat along its streams and rivers. Similar habitat is available in Champaign County along the lower Salt Fork and the Sangamon River. This species is not directly threatened by wind turbine construction or operation, but may be subject to collision risk as a migrant.

Migratory Birds

American Golden Plover, *Pluvialis dominica*

This migratory bird breeds in the Arctic tundra, migrates south along the Atlantic seaboard to South America in the winter, but returns northward through central North America. Areas of Illinois and Indiana provide important spring migration staging areas, which may be occupied by this species for a month or more while birds go through a molt before resuming migration. It has become a species of concern due to its relatively low global population estimate of around 300,000 birds.

Based on 25 years of Spring Bird Count data, it is likely that significant numbers of this species congregate in Counties including northern Champaign and Vermilion Counties, but the locations of large concentrations vary from year to year. Large numbers of this species are routinely observed south of Sibley Grove in Ford County. Pre- and post-construction surveys should be performed to observe this species.

Plovers tend to aggregate in dense concentrations, and are known to fly in large tight groups at or below the approximate rotor-swept elevation, which may expose them to collision mortality risk. Concerns also exist pertaining to habitat fragmentation by service roads, and displacement from habitat due to potential sensitivity to vertical structures and human activity.

A research project has begun in an effort to better understand the behavior and needs of this species, as well as how it may be affected by the presence of wind turbines. Some preliminary results were recently published [O'Neal, *et. al.* (2008)] .

One apparent finding is that the species definitely concentrates in a few areas, rather than being generally dispersed across suitable habitat, resulting in temporarily dense population "hot-spots." However, where these may be located may be influenced year-to-year by poorly understood climatic cues. Very few birds appeared in 2008 in the expected concentration areas; instead, major concentrations were located more than one hundred miles to the south. Anecdotal evidence indicates this is an unusual occurrence.

A number of observers had reported a daytime habitat preference for short grass, soybean stubble, or bare ground with standing water or residual moisture, but O'Neal first reported a night roost preference for standing corn stubble cover, with crepuscular movement between the two. O'Neal reported all observations were located more than 70 meters from adjacent roads, suggesting an intolerance for breaks in habitat. (Effects of traffic were not investigated.) Interestingly, O'Neal also reported several observations of predation of the Golden Plover by the Northern Harrier.

Whooping Crane, *Grus americana*

An experimental population of the federally-listed endangered Whooping Crane has been established with breeding grounds in Wisconsin and wintering areas in Florida. Fall 2009 will see more than 100 birds move to Florida. Whooping Cranes often "stop over" during migration and this may occur virtually anywhere in the State.

Whooping Cranes may "stop over" for extended periods. In November 2006, during their first unescorted Fall Migration, a pair of Cranes rested for four days along the upper East Branch Vermilion River (Wabash Drainage) in Ford County. A Whooping Crane extended its Spring movement by loitering near Danville until the end of June 2008.

During such stop-overs, cranes often forage on waste corn in nearby agricultural fields. Wind turbines and associated power lines pose a collision risk for these large birds, which require some distance to achieve safe altitudes. Most non-predation losses to this flock have been to power line collisions. The visibility of power lines should be maximized with appropriate line markers. The developer may wish to consider other voluntary efforts to promote Crane conservation.

Due to the very high public profile of the Whooping Crane, the Department suggests the developer/operator of this facility coordinate at least annually with the Whooping Crane Eastern Partnership (www.bringbackthecranes.org) to track the passage of Whooping Cranes through the vicinity, and explore additional measures to reduce potential losses of these birds.

Attachment

Invenergy California Ridge Wind Energy Center
Vermilion County

Wildlife Impact Recommendations

Vermilion County may wish to consider permit conditions requiring the applicant to monitor, assess, and report possible fish and wildlife effects of the proposed action in the following ways.

- Evaluate whether and to what degree "flicker" shadows impinge on the Middle Fork SFWA, Kickapoo State Recreation Area, and Kennekuk Cove County Park, including Windfall Prairie Nature Preserve, and implement appropriate measures to avoid this effect. Such measures may include shifting turbine locations, shortening turbine towers or blade length, and curtailing operations during "flicker" periods, or a combination of these.

- Evaluate the visual and audible impacts, if any, of the project to recreational users of the Middle Fork National Scenic River.

- Incorporate best management practices to minimize risk to federally-listed and state-listed species, as outlined in this Attachment. Focus should be on appropriate avoidance and minimization of habitat disturbance, with mitigation measures implemented as applicable.

- Where feasible, permanent engineering solutions to soil erosion and water quality issues should be required and maintained, particularly with reference to service and access roads.

- Perform pre-construction assessments of avian and bat usage within the project area. Such assessments should include inventories of habitat types in and near the project area, including crop rotations or choices, and observations of both migratory and resident bird usage. Consideration of all seasons should be included, although spring migration is anticipated to be of greatest interest. Acoustic bat activity monitoring is also appropriate, particularly during the fall migratory season when activity would be expected to be highest. Specific federally-listed and state-listed species of interest are discussed in the following narrative. Risks to protected species should be evaluated and appropriate regulatory permits sought for potential incidental taking of protected animals.

- Perform at least one year of post-construction monitoring and assessment, noting any changes in wildlife usage patterns and evaluating potential causes of such changes.

- Consideration should be given to periodic repetition of the post-construction wildlife surveys during the life of the project.

Natural resources within, or in the vicinity of, the proposed wind energy facility are listed below, along with a discussion of potential issues.

Coal Resources

According to the Illinois State Geological Survey databases, no known past coal mining locations are associated with the proposed project footprint, despite the presence of significant coal resources. However, the developer may wish to verify the ownership of the mineral rights beneath turbine lease locations to determine if mining conflicts exist, whether past or future, which might pose issues of geologic stability for wind turbines.

State Lands; Nature Preserves; Land & Water Reserves; and INAI Sites

National Scenic River - Middle Fork of the Vermilion River

A portion of the Middle Fork comprises the State's only designated National Scenic River. The reaches of the River closest to the project area (less than two miles) are formally protected as a National Scenic River where title (fee or easement) is held by the Illinois Department of Natural Resources, but this legal protection extends only 500 feet from the River's center-line. However, in this area the River lies in a valley more than 100 feet below the uplands likely to host turbines, and the valley walls are typically forested, circumstances which should considerably reduce the visibility of turbines to recreational users of the River. Nevertheless, it may be that from some points on the River turbines may be visible. Likewise, the intrusion of industrial noise would also diminish the experience of traveling the River, although the potential for perceptible wind turbine noise on the River is likely much lower than the potential for visual impacts.

A visibility analysis is appropriate to determine to what degree the operation of wind turbines in the project area may degrade the recreational experience of persons on the River, and the County may wish to consider the impacts to economic benefits derived from tourism and recreation.

The river's riparian corridor forms an important avenue for the movement of all forms of wildlife, providing food and shelter for both migrant and resident species. By no means is wildlife limited to this area, however. Recent radar-based studies along the Illinois River demonstrate that even waterfowl may arrive and depart cross-country, rather than following the river. Hence, distance from the river provides no assurance that wildlife commonly found there will not also occur within the project area.

Erosion related to wind energy facility construction and operation has the potential to adversely affect the Middle Fork and its tributaries through siltation and sedimentation, while disruption of field tile systems may temporarily or permanently adversely modify the prevailing thermal regime in feeder stream habitats essential to Middle Fork fish, reptiles, amphibians, and mussels, including many State-listed endangered or threatened species, several of which are unique to the Vermilion River system in Illinois.

Measures should be adopted to minimize erosion and siltation related to construction and maintenance of the project, and to facilitate tile repairs. Fortunately, much of the project is located outside of the watershed of that portion of the Middle Fork which is designated as National Scenic River.

Middle Fork of the Vermilion River INAI Site

The Middle Fork of the Vermilion River is a designated Illinois Natural Areas Inventory (INAI) Site, from its confluence with the Salt Fork east of Oakwood, upstream to the northern boundary of Champaign County, well beyond the reaches designated as National Scenic River. The Middle Fork, its tributaries, and its riparian forests support a plethora of federally-listed and State-listed endangered and threatened species, including protected mussels, fish, amphibians, reptiles, bats, raptors and other birds. <u>All drainage from the north side of the project, whether in Vermilion or Champaign Counties, enters the Middle Fork INAI Site.</u>

High water quality is a hallmark of this stream. Erosion related to wind facility construction and operation has the potential to adversely affect tributaries and the Middle Fork through siltation and sedimentation, and to adversely modify feeder stream habitats essential to Middle Fork fish and mussels, several of which are unique to the Vermilion River system in Illinois.

Salt Fork of the Vermilion River INAI Site

The Salt Fork is designated as an INAI Site from a point northwest of Homer downstream to its confluence with the Middle Fork. This reach of the River supports numerous aquatic listed species of fish, mussels, reptiles, and amphibians, including the Mudpuppy Salamander, the Bigeye Chub, Bluebreast Darter, River Redhorse, Blanding's Turtle, Wavy-Rayed Lampmussel, Purple Wartyback, and the Salamander Mussel.

The Salt Fork receives the drainage from the Spoon River INAI Site, and from Stoney Creek and Feather Creek. All three of these streams drain significant portions of the proposed project area.

Spoon River INAI Site

The Spoon River is a tributary of the Salt Fork of the Vermilion River, located entirely within Champaign County south of Gifford. Although it is completely channelized and maintained by the Spoon River Drainage District, it has been designated because it retains unusually high fish diversity, likely due to its constant influx of cool tile drainage. While this resource is not located in Vermilion County, it is less likely the Champaign County portion of the project would go forward on its own without the Vermilion County portion. Consequently, a decision by Vermilion County to proceed has implications for the Spoon River INAI.

The Spoon River INAI could be adversely modified by erosion and siltation related to turbine construction, and by disruption of the numerous agricultural tile drains which feed it and maintain its temperature.

Middle Fork State Fish & Wildlife Area

The 4,120-acre Middle Fork SFWA occupies lands on both sides of the Middle Fork River, the nearest of which abut the project area's eastern boundary. The formally-designated National Scenic River begins at the north boundary of the SFWA and extends southward to Rt. 150. Turbines will be visible--and may be audible at some points--from within the SFWA.

Extensive areas of forest canopy in the SFWA may be swept by "flicker" effects in the evening from turbines sited on the high ground west of the SFWA, which could pose issues to wildlife for which the canopy provides essential breeding, feeding, or migratory staging habitat. The Department has not identified any research specifically directed at the effects "flicker" may have on wildlife behavior, but must presume such a change in conditions will have consequences, but these may be a matter of degree. A model analysis of the extent, seasonality, and duration of any "flicker" sustained by SFWA lands would be helpful.

In addition to a Nature Preserve, a Land & Water Reserve, five INAI Sites, and numerous state-listed endangered or threatened species within its boundaries, the SFWA also constitutes an important staging area for both migratory birds and bats, which may increase the risk of wildlife colliding with turbine blades due to the project's near proximity.

Other indirect, cumulative effects from the project (siltation and erosion) may be incurred via the river corridor.

Kickapoo State Recreation Area

This 2,700-acre State Park, once heavily strip-mined for coal, is one of the State's most popular camping, boating, fishing, and recreation destinations. Outdoor recreation is an important part of Vermilion County's economy. The Park is located mainly north of Interstate 74, on both sides of the Middle Fork. It contains the lower terminus of the National Scenic River designation, and provides essential habitat for a large number of State-listed endangered or threatened species.

The closest portions of the wind energy project area lie less than one mile from the Park's northwestern corner. Wind turbines will be easily visible from the western boundaries of the Park at many locations, though most visitor activities will be concentrated in areas where visibility will not be an issue due to topography and land cover.

There may be the potential for "flicker" impacts in the evening to some Park lands during the late spring and early summer, depending on final turbine placement. Models should be examined to determine the extent, duration, and seasonal timing of "flicker" effects in the Park when final siting is being considered, with the goal of minimizing or avoiding them.

Kennekuk Cove County Park and INAI Site

This INAI Site is located on the southern portions of the 3,000-acre Kennekuk Cove County Park, a property managed by the Vermilion County Conservation District, on the east bank of the Middle Fork. The INAI Site at its nearest is about two miles east of the project area. No part of the Park receives drainage from the project area, except by way of the Middle Fork.

However, because of its position on high ground east of the Middle Fork, wind turbines may be visible from some portions of the County Park. The major biological significance of the Park's proximity is that it provides significant staging and breeding habitat for bats and migratory birds, including the State-listed endangered Northern Harrier.

Kinney's Ford Seep Land & Water Reserve and INAI Site

Kinney's Ford Seep LWR lies within the northern part of the Middle Fork SFWA, two miles northeast of the closest portion of the project area, near the confluence of Collison Branch Creek with the Middle Fork. Despite its proximity to the project, topography makes it unlikely turbines will be visible from within the Reserve, or that "flicker" effects will be present at any time of year (from 1.5 MW turbines--shadows from taller machines might reach this area). The seep community of this Site is sensitive to ground water recharge impacts, but no project activities will be performed within the likely ground water recharge zone of this protected area.

Horseshoe Bottom Nature Preserve and INAI Site

This 100-acre Nature Preserve, as its name implies, is located in the Middle Fork bottoms, less than two miles northeast of the project. However, topography and land cover render it unlikely that turbines will be visible or audible from the Preserve, or that "flicker" will be an issue. Among its other biological values, it provides essential habitat for the State-listed endangered **Blanding's Turtle**.

Middle Fork Seeps INAI Site

These forested seeps are located on the *eastern* valley wall of the Middle Fork, facing the project, about 1.5 miles from the project area. Turbines may be visible to visitors in the winter, following leaf-fall, since the western valley wall at this point has little forest cover. The Department believes it is likely this INAI Site lies beyond potential flicker effects. Since it lies on the east bank, there is no potential for project activities to affect or alter ground water recharge zones for the seeps.

Fairchild Cemetery Prairie/Savanna Nature Preserve and INAI Site

This small (< one acre) Nature Preserve is part of the Kennekuk Cove County Park complex. It is located about 3.5 miles east-northeast of the project area and east of the Middle Fork. Because it lies on relatively high ground near the headwaters of Windfall Creek, project turbines may be visible to Nature Preserve visitors, although they may be screened by the forested bluffs of the Middle Fork SFWA or other intervening land covers.

Windfall Prairie Nature Preserve and INAI Site

This 60-acre Nature Preserve is located on the *east* bank of the Middle Fork, rising from the River to the top of the eastern bluffs, facing the project. In addition to riparian forest, it contains hill prairie and calcareous seep natural communities, and contains at least one State-listed endangered plant (**Wolf's Bluegrass,** *Poa wolfii*).

Because the nearest portions of the project area, only two miles southwest of the Nature Preserve, are of equal or higher elevation to the prairie areas of the Nature Preserve, and turbines will likely reach some 360 feet or more higher than that, it is likely that turbines will be visible to visitors in the Nature Preserve, although such visibility could be seasonal, limited to periods when the Preserve's trees are bare.

In addition, because the intervening forests of the Middle Fork SFWA along Gimlet Branch Creek are at lower elevations than the likely turbine sites, it may be possible for "flicker" effects from project turbines to extend to the lower elevations of the Nature Preserve over the tops of the trees. Modeling will be necessary to determine whether the Nature Preserve will sustain such effects, and, if so, at what time of year and for what duration. Both the Department and the Illinois Nature Preserves Commission seek to minimize or avoid "flicker" effects within Nature Preserves.

Orchid Hill Natural Heritage Landmark INAI Site

This 120-acre Natural Heritage Landmark INAI Site is home to an unusual number of native orchids and other rare plant groupings. Located adjacent to the extreme eastern end of the project area, near the existing coal-fired power plant, this forested area marches down the western bluff of the Middle Fork valley. Turbines will be easily visible--and perhaps audible--from the western margins of the INAI Site. Project areas within a mile to the west are approximately 50 feet higher in elevation than lands within the INAI Site, so there is an increased likelihood that "flicker" effects will occur over the forest canopy. Models of "flicker" effects should be evaluated to determine the time of year, time of day, and duration of "flicker" within the INAI site.

Middle Fork Woods Nature Preserve and INAI Site

This 77-acre Nature Preserve within Kickapoo State Recreation Area provides essential habitat to the very rare endangered **Silvery Salamander**. Located about 2.5 miles south and east of the project area, it lies beyond the reach of "flicker" and turbine noise. Because it is completely surrounded by forest, no turbines will be visible from within the Preserve, nor does it lie in a watershed which may be affected by turbine construction.

Rock Cut Road Botanical Area INAI Site

Located just southwest of Middle Fork Woods, above Glenburn Creek but outside Kickapoo SRA, this INAI Site provides essential habitat for the State-listed threatened **Fibrous-Rooted Sedge,** *Carex communis*. Distance and topography assure this INAI Site and the Fibrous-Rooted Sedge will not be affected by the proposed project.

Larimore's Salt Fork of the Vermilion Land and Water Reserve and INAI Site

This LWR consists of the channel and floodplain of the Salt Fork Vermilion River south of Muncie. In a valley and five miles south of the project area, the LWR will sustain no effects from the proposed wind farm.

Edgewood Farm land and Water Reserve and INAI Site

Located along the Salt Fork southeast of Ogden, and more than seven miles from the project area, the higher elevations of the LWR exceed 660 feet MSL, about the same elevation as the wind farm. Consequently, wind turbines may be visible from the higher elevations within the LWR unless forests on the opposite side of the Salt Fork valley are tall enough to screen them. However, at that distance, visibility is not likely to be intrusive on the senses of site users.

Pelville Cemetery INAI Site

Pelville Cemetery lies 14 miles north of the project area, just west of Rankin and on the opposite side of the Middle Fork's valley. A keen-eyed observer at Pell Cemetery might possibly be able to see California Ridge turbines under conditions of excellent visibility, but they are unlikely to intrude on a visitor's experience. The Cemetery supports breeding pairs of the **Henslow's Sparrow** and other migratory birds, whose migratory passages could pose issues for the project.

Henschel Workman State Habitat Area

The Department's 135-acre Henschel Workman State Habitat Area is located southeast of Rankin in Vermilion County, about 13 miles north of the project footprint. It supports breeding **Henslow's Sparrows** and provides a large expanse of suitable wintering habitat and migratory staging area attractive to other State-listed bird species, whose migratory passages could pose issues for the project.

Sleeter State Habitat Area

The 103-acre Sleeter SHA is located about 1.5 miles northwest of Gifford in Champaign County. It lies eight miles northwest of project areas within Vermilion County, but only four miles from the nearest project areas in Champaign County. Turbines located in both Champaign and Vermilion Counties will be visible to site users, but this should have little impact on hunting activities, the major recreational use of this site. However, the Sleeter SHA may be a focal point for birds whose migratory passages could pose issues for the project.

Documented Listed Species

Indiana Bat, *Myotis sodalis*

Summer nursery colonies of this bat, listed by the federal government and Illinois as endangered, have been documented in forested riparian tracts along the Middle Fork of the Vermilion River and the Big Four Ditch in Ford County, north of the project area, and along the Little Vermilion River in the southern half of Vermilion County. It is reasonable to assume that this species traverses or roosts in the intervening segments of the Vermilion River system.

Nursing females may forage above crop-fields a mile or more from the nursery colony. This species winters in caves or mines some distance from summer habitats, but its migratory behavior is poorly understood. No hibernation sites are known from Vermilion County, although critical hibernating habitat is known in LaSalle County. It is surmised that bats using the Middle Fork for summer habitat most likely migrate from hibernation sites in southwestern Indiana and Kentucky, although a banding study in the 1970's indicated that at least some LaSalle County bats move in this direction.

The risk to bats from collisions with moving wind turbine blades appears to be much higher than for birds. To date, no Indiana Bats have been documented as killed by wind turbines. But, until recently, no utility-scale wind farms have been proposed or constructed within the range of Indiana Bats, so the risk to this species from wind turbines remains unquantified.

The project area itself appears to contain no potential summer nursery or roosting habitat for the Indiana Bat, but directly abuts riparian forests; individuals roosting along the Middle Fork may forage above fields within the project area.

Because the winter hibernation sites of these bats are unknown, the greatest risk may be to Indiana Bats migrating across or through the project area. Efforts to identify and monitor the foraging and migration behavior of this bat population may establish the degree of risk which this facility would pose to this species.

The Department is unable to evaluate the potential for an incidental take of an Indiana Bat at this facility based on existing data; capture studies along creeks in the nearer vicinity of the project may be advisable. More common bat species undoubtedly occupy habitats in the vicinity, and are at risk of mortality, directly through collisions with wind turbines, or indirectly through barotrauma (lung hemorrhages caused by extremely low air pressures in the vortices created by wind turbine vanes).

Vermilion County is particularly rich in bat fauna: a 1996 netting survey on the Little Vermilion River east of Georgetown captured seven of nine species whose ranges contain Vermilion County, including the Eastern Red Bat, Hoary Bat, Northeastern Myotis, Eastern Pipistrelle, Big Brown and Little Brown Bats, in addition to the Indiana Bat. An acoustic bat survey is recommended, particularly during the fall bat migratory season (August 1 through October 31) when activity would be expected to be the highest, in order to characterize bat activity in the project area. A high level of bat activity may warrant post-construction mortality studies.

Blanding's Turtle, *Emydoidea blandingii*

The State-listed threatened Blanding's Turtle has been recommended by the Illinois Endangered Species Protection Board (IESPB or Board) for up-listing to "endangered." This rulemaking change should be accomplished in 2009.

The Blanding's Turtle, distinguishable by its solid bright yellow lower jaw and throat, has been documented most recently in the Middle Fork SFWA (Horseshoe Bottom Nature Preserve), about two miles from the project area. No estimate of the local population size is available, but observations are rare, suggesting few individuals. While the existing population may be small and localized, the entire Vermilion River system is accessible to this species. In Northern Illinois, the species frequently ascends waterways to access open upland areas for nesting.

The Blanding's Turtle reaches sexual maturity only after 15-20 years, and has a documented life-span beyond 70 years, although females beyond age 50 may not be reproductively active. This species is known to move widely across the landscape, following streams and drainage ditches, but also moving overland when necessary. Overland movements typically occur at night. It is believed to demonstrate fidelity to nesting and hatching areas, attempting to return to its own natal site for egg-laying. The species is known to nest farther from the water than any other aquatic turtle in North America, at times nesting up to a mile inland. The species' life cycle appears to be compatible with row-crop agriculture, since egg-laying occurs in late spring or early summer after planting, and hatching usually occurs before harvest. Vermilion County lies near the southern limits of the species' range, so overwintering in the nest by hatchlings should be a rare occurrence.

The main threats to this species are nest predation by skunks, raccoons, and other mammalian predators, road-kill, and poaching (illegal collection for the pet trade). Wind energy construction activities may result in disturbance of traditional nesting areas, the destruction of nests, the entrapment of individuals in excavations, and road-kill.

Workers on the project should be educated about this species' appearance and behavior; excavations left open overnight should be covered and inspected before filling: and any Blanding's Turtle observed should be documented with photographs and reported to the Department of Natural Resources. A Turtle may not be moved to facilitate the project unless the applicant has obtained an Incidental Take Authorization.

Smooth Softshell Turtle, *Apalone mutica*

The Board has recommended listing the Smooth Softshell as "endangered;" this designation is pending the completion of rulemaking, which should be accomplished in 2009.

This aquatic turtle inhabits larger streams and rivers, in segments with sandy substrates and sand bars. Regarded as a delicacy by many fishermen, this species has suffered from over-collecting, while pollution, siltation, and sedimentation have degraded many habitats. This species has been documented in Vermilion County, and it is potentially present in all reaches of the Vermilion River system.

Unless transportation of wind turbine components requires the upgrade or reconstruction of bridges, there should be little risk of direct adverse effects to this species. Erosion and siltation pose indirect threats.

River Redhorse, *Moxostoma carinatum*

The state-listed threatened River Redhorse is a member of the sucker family which feeds largely on invertebrates, including young mussels and crustaceans, for which it possesses specialized grinding teeth. It prefers medium-to-high-gradient rivers and streams with clean sand, gravel, and cobble substrates. The River Redhorse has been recorded in the Middle Fork as far north as the Middle Fork SFWA, but is more common in the Salt Fork.

Erosion related to turbine construction and maintenance may degrade stream-bed habitats or suppress populations of prey species. Because the River Redhorse rarely ascends small tributaries, direct adverse effects are unlikely.

Eastern Sand Darter, *Ammocrypta pellucidum*

This small fish is listed by Illinois as "threatened." Restricted to streams in the Wabash drainage of Illinois, it requires high water quality and bottom substrates of clean sand in fairly swift waters, requirements satisfied by all branches of the Vermilion River. Soil erosion and sedimentation pose the main threats to this species, followed by chemical pollution.

Bigeye Chub, *Hybopsis amblops*

The State-listed endangered Bigeye Chub is another small fish found only in the Wabash River watersheds of Illinois, but generally in smaller creeks and streams. It is present in the Middle Fork, the Salt Fork, and Stoney Creek. Degradation of water quality and alteration of stream habitats are the main threats to this species.

Mussels

The Salt Fork, Middle Fork, and North Fork of the Vermilion River, and their tributary creeks, provide essential habitat for a large number of freshwater mussels, among the most endangered organisms in North America. High water quality remains the most essential habitat requirement.

Federally-listed species found, or once found, in these streams include the **Clubshell**, *Pleurobema clava*, and the **Riffleshell**, *Epioblasma torulosa*. A cooperative program between the U.S. Fish & Wildlife Service and the IDNR is planned to re-introduce the extirpated Riffleshell, and to augment the existing Clubshell population.

Headwater streams are most likely to support populations of the **Slippershell**, *Alasmidonta viridis,* and the **Little Spectaclecase**, *Villosa lienosa*. Broadly distributed lower down are populations of the **Wavy-Rayed Lampmussel**, *Lampsilis fasciola*; **Rainbow**, *Villosa lienosa*; **Purple Wartyback**, *Cyclonaias tuberculata*; **Kidneyshell**, *Ptychobranchus fasciolaris*; **Rabbitsfoot**, *Quadrula cylindrica*, and **Purple Lilliput**, *Toxolasma lividus*.

The **Salamander Mussel**, *Simpsonaias ambigua*, is the only species in its genus, and is also unique among North American mussels as the only species with a non-fish glochidial host, the **Mudpuppy**, *Necturus maculosus*. The Salamander Mussel has been documented at seven locations in Vermilion County since 1980, in the North Fork, the Middle Fork, and in Stony Creek, a tributary of the Salt Fork. A small mussel (two inches or less), and commonly found beneath rocks and debris, where the Mudpuppy spends much of its time, the Salamander Mussel is likely under-sampled by the typical non-targeted mussel survey, and may be more locally common than these records indicate.

Four-Toed Salamander, *Hemidactylium scutatum*

This four-inch-long amphibian is present in the riparian forests along Collison Branch Creek in the Middle Fork SFWA. While woodland vernal pools used for breeding may be the most essential habitat component for this species, this salamander may be found more than a thousand feet from the nearest wetlands, beneath forest floor litter and detritus where sufficient moisture is available. This species will not be found in grasslands or row-crop fields.

It is unlikely this species occurs within the project footprint. However, good water quality remains important; Collison Branch rises in Section 9 and 10 within the project area. Sound erosion controls in these areas will be important in maintaining good habitat conditions downstream.

Silvery Salamander, *Ambystoma platineum*

This six-inch-long salamander is unusual because its population is entirely female; egg production is stimulated by exposure to the sperm of the much more common **Small-Mouthed Salamander**, *Ambystoma texanum*, which commonly shares its habitats, but there is no genetic interplay. (But this also means the presence of *A. texanum* is a crucial factor for the successful reproduction of *A. platineum.*) The Silvery Salamander may also occur with the endangered **Jefferson Salamander**, *Ambystoma jeffersonianum*, from which it cannot be distinguished except through analysis of its DNA chromosome count or the size of its red blood cells. However, the populations in question here have been established by these tests to be Silvery Salamanders.

A population within the Kickapoo SRA is beyond the range of effect from the proposed project. A second population, however, in Middle Fork Woods SFWA, five miles to the north, has a breeding pond less than a mile from portions of the project area draining to Gimlet Branch Creek. While the existing breeding pond should not be at risk from effects stemming from the project, a species recovery effort is now underway to create or enhance potential new breeding areas extending as far south as Cox Hollow, which drains the easternmost portions of the project area.

Salamanders can disperse surprising distances where suitable cover exists, and may potentially occur in any local woodlands, upland or lowland, which are connected to the more-or-less continuous riparian forest along the Middle Fork. Developers should avoid any direct impact to woodlands along streams feeding the Middle Fork, to assure any takings of listed salamanders are avoided.

Mudpuppy, *Necturus maculosus*

This large (up to one foot total length) salamander has been recommended by the Board for listing as "threatened;" this designation is pending the completion of rulemaking, which should be accomplished in 2009. The Mudpuppy is the only known glochidial host of the State-listed endangered **Salamander Mussel**, *Simpsonaias ambigua,* a species which is now being evaluated for federal listing under the Endangered Species Act; the decline of the Mudpuppy may be a major factor in the disappearance of the Salamander Mussel.

The Mudpuppy never develops beyond an aquatic larval stage, and so is never found in terrestrial habitats. It inhabits clear rivers, creeks, streams, lakes, and ponds, but conceals itself under rocks or woody debris during the day, feeding actively at night. It typically goes unseen except by fishermen, who sometimes inadvertently catch it. It can cope with some siltation and sedimentation so long as clear gravelly headwater areas remain available for reproduction.

The Vermilion River system is one of the last "strongholds" for this species in the state, and it should be presumed to be present throughout. Stony Creek drains the central portion of the project area, and has the most recent records for the Salamander Mussel, indicating a Mudpuppy population is present in Stoney Creek. The species has also been reported from the Middle Fork SFWA.

Cool or cold water is essential for this species, which remains active all winter; water temperatures above 72EF are harmful, and those above 77EF can be fatal. Agricultural tile drainage helps lower and maintain stream temperatures, but the removal of riparian trees and shrubs exposes streams to direct solar radiation and heating. In-stream cover provided by rocks and woody debris is essential for concealment and reproduction, since eggs are suspended from the bottoms of rocks and logs. The common belief that removal of woody debris from stream channels improves drainage is a factor in the decline of this--and many other-- species.

Major threats include pollution, siltation and sedimentation, stream channelization, and woody debris removal. The main risks associated with wind energy projects will be direct stream modification through the repair or upgrade of roads, modification of aquatic thermal regimes through the disruption of agricultural tile drainage systems, and siltation and sedimentation associated with construction and permanent features, such as service roads, which suppresses prey populations and renders spawning areas unsuitable. Any planned in-stream work may require an Incidental Take Authorization.

Bald Eagle, *Haliaeetus leucocephalus*

The Bald Eagle, de-listed under the federal Endangered Species Act last year, is currently listed by Illinois as "threatened." The Board has recommended de-listing the Bald Eagle due to its recovery in Illinois, and this decision is now being implemented through the rule-making process, which should be completed prior to the end of 2009. It remains protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act, each as stringent as the Endangered Species Act.

For several years there has been a Bald Eagle nest on the North Fork just above Lake Vermilion, about seven miles east of the project area. However, Illinois has experienced a significant increase in Bald Eagle nests over the last few years, and many new nests have not been tallied. Nests have been appearing on smaller tributaries of larger rivers in areas where Eagles have not been seen for years, and it may be assumed the Vermilion River Basin reflects this trend. Hence, it is likely that new Eagle nests will appear along the North Fork, Middle Fork, and Salt Fork during the project's life.

In addition, Illinois now has the highest population of wintering Bald Eagles in the Lower 48 States, although they tend to be concentrated around major rivers, cooling lakes, and other waters likely to remain ice-free. However, during migration, Eagles frequently fly overland. Thus, while the wind energy project is unlikely to pose any direct threat to the known Eagle nest and its surrounding hunting territory, there may be a collision risk for migrating Eagles.

Least Bittern, *Ixobrychus exilis*

This small heron nests in the emergent vegetation of marshes. It has been documented from Kennekuk Cove County Park in Vermilion County, and from wetlands near the Middle Fork in northeastern Champaign County.

Known breeding locations are unlikely to be affected by the project, although there may be a collision risk for migrating Bitterns. Generally speaking, waterfowl are rarely the victims of collisions with wind turbines, so this risk may be low.

Henslow's Sparrow, *Ammodramus henslowii*

The Henslow's Sparrow is listed by Illinois as a threatened species, but is scheduled for de-listing in 2009. Breeding populations of this grassland bird have been documented north of the project area, and may occur within the project area where suitable habitat exists. More northern breeding populations may migrate through the project area.

Wind turbines associated with this project have the potential to kill or injure birds through blade-strike, unless breeding populations are also found within the footprint. The species is extremely sensitive to the presence of vertical structures and to any form of break in contiguous habitat, such as roads or trails, so that construction in breeding areas during breeding season is likely to result in unlawful takings.

Northern Harrier, *Circus cyaneus*

The State-listed endangered Northern Harrier is a ground-nesting grassland hawk. It has been recently documented as nesting in Vermilion County, both within--and within a few miles of--the project footprint. Also a frequently-observed migrant, the species has a statewide range. While many sources indicate the species needs large open areas of habitat, Illinois studies have demonstrated this hawk can use relatively small patches of habitat for successful breeding, especially in the vicinity of larger habitats. Breeding is often associated with wetlands such as marshes, sedge meadows, and wet prairies.

While most hunting activities occur at fairly low altitudes, below typical rotor-swept elevations, hunting can expose this bird to collision risk. Like the Upland Sandpiper, this species engages in an aerial courtship display which places it at risk of collision with wind turbines. Wind farm construction and operation may alter concentrations of prey species.

This hawk relies heavily on its acute hearing to locate prey, and--if the noise generated by wind turbines interferes with this function (which is not known to be the case)--turbines might adversely affect their ability to hunt near the turbines, reducing available food resources.

If pre-construction surveys indicate use of the project area by migrant Harriers, post-construction surveys should be performed to determine whether the Harrier continues to hunt territories in proximity to turbines.

Barn Owl, *Tyto alba*

This endangered raptor nests in larger tree cavities and in barns or abandoned buildings, sometimes within city limits. A breeding record exists for Champaign County, about four miles northwest of Rantoul; none have been recorded from Vermilion County since the species was listed. This owl hunts both open woodlands and grasslands; its preferred prey consists of small rodents such as mice and voles. The main risk posed by wind power facilities to this species is the removal of suitable nesting trees and abandoned buildings to facilitate transportation of wind turbine components or to maximize wind energy conversion. Both trees and buildings should be examined for Barn Owl occupancy prior to removal.

Short-Eared Owl, *Asio flammeus*

The endangered Short-Eared Owl nests and winters in grasslands and wetlands. Vermilion County lies in both breeding and wintering ranges, and breeding Short-Eared Owls were reported from two separate locations in Vermilion County in 1990. Large numbers of wintering owls are observed annually in suitable winter habitat in Iroquois County.

Highly nomadic, the Short-Eared owl depends heavily on vole and mouse populations, and the size of its breeding and hunting territories varies inversely with prey population sizes. When prey populations are high, owls may be ground-roosting every few meters in suitable habitat. The Northern Harrier often harasses this Owl, stealing its food.

This Owl's hunting flights are often less than ten feet off the ground (a circumstance which makes this bird highly vulnerable to collisions with vehicles); during aerial mating rituals, flights occur at typical wind turbine rotor-swept height. This Owl is highly dependent on its acute hearing to locate and seize prey. The degree to which noise from wind turbines may interfere with predation behavior is unknown.

The effects of wind turbines on Short-Eared Owls may be heavily influenced by the proximity of turbines to breeding, roosting, and hunting areas. Once turbines are built, this proximity relationship will be subject to change as land owners alter land management practices. This is likely to be of concern mainly if attractive habitat for Owls and their prey is created within or near the turbine array following construction.

Upland Sandpiper, *Bartramia longicauda*

This State-listed threatened grassland bird prefers habitat of short-grass prairie/pasture. For many years this ground-nesting species was thought to be area sensitive, requiring ten acres or more of grassland habitat for successful breeding. However, many recent breeding efforts are occurring in grassed waterways of row-crop fields, which provide considerably less than ten acres of habitat, and from along roadsides.

A breeding record exists for Vermilion County, near the Danville airport. Additional breeding records are associated with the University of Illinois and the Champaign-Urbana Airport. There has already been at least one instance in 2008 of identification of Upland Sandpipers at the commencement of wind project construction in Stephenson County, a county which had, until then, no prior breeding record for this species.

The Upland Sandpiper engages in an aerial courtship display which passes through the rotor-swept elevations of utility-scale wind turbines, placing it at risk of collision mortality. Whether this species will be sensitive to the proximity of vertical structures, or to shadow "flicker" on potential nesting areas, has not been demonstrated.

The Department recommends mapping all habitat types within the project footprint, and checking even relatively small areas of appropriate habitats for the presence of this species prior to any initiation of construction disturbance during the breeding season.

Potential Listed Species

Franklin's Ground Squirrel, *Spermophilus franklinii*

The State's largest ground squirrel was listed as "threatened" in 2004. Most active above-ground on sunny days in late spring and early summer, this species hibernates for seven to nine months of the year. It prefers taller vegetation than other ground squirrels, and so is seldom seen. Well-drained ground is a requisite, so today this species is most often found along railroads and highways where its requirements for food and shelter are satisfied. There appears to be no suitable habitat within the project footprint, but transport of turbine components often requires rebuilding or repairing roadways some distance from the destination.

The Franklin's Ground Squirrel has been documented along railroads near Hoopeston, and along former rail-beds near St. Joseph in Champaign County. Offspring can disperse up to a mile in their first season. If present, this species can be threatened during construction through the crushing and collapse of its burrows by heavy equipment. Shadow flicker cast in its territory by operating turbines may also be detrimental.

<u>Ornate Box Turtle, *Terrapene ornata*</u>

The Board has recommended listing the Ornate Box Turtle as "threatened;" this designation is pending the completion of rulemaking, which should be accomplished in 2009.

This terrestrial turtle is usually found in open grassland areas, in contrast to its cousin, the Eastern Box Turtle, which is usually found in woodlands. This turtle hibernates underground from late September through April, so it can not evade disturbance during that period. Its carapace carries elaborate markings, including a yellow bar along the spine, which distinguishes it from the other species. While it appears to be more common in sandy soils, it is not restricted to them. Specimens have been collected from both Iroquois and Champaign County.

As with many turtles, road-kill and over-collecting are major causes of decline. In a recent study of a northwestern Illinois population, a significant number of individuals exhibited carapace scarring from farming equipment (discs and harrows), illustrating that this species may frequently be found in rowcrop fields.

Preferred habitat of this species may not be present in the project area, but too little is known of this species' current distribution to rule out its presence. Project workers should be educated as to its appearance and habits, remain alert for turtles on roads and in fields, and report any suspected Ornate Box Turtles to supervisors. The Department of Natural Resources should be promptly notified if any Ornate Box Turtles are identified. Once listed, it will be unlawful to move or capture an Ornate Box turtle to facilitate the project without first obtaining an Incidental Take Authorization from the Department.

<u>Loggerhead Shrike, *Lanius ludovicianus*</u>

The threatened Loggerhead Shrike is adapted to the savanna conditions of interspersed grasslands, shrubs, and trees. This species has been adversely affected by the decline in animal husbandry and the abandonment of the "shelter-belt" fence-row conservation practice, which has severely reduced both breeding and foraging habitat. The Shrike, also known as the "butcher bird," needs thorny trees and shrubs, even barbed wire, on which to impale its prey, which may be left for several days before being eaten. Areas which support large insects and small rodents, major food items, are also necessary. Due to losses of suitable habitat, Loggerhead Shrikes may attempt reproduction in trees near human habitations and in other areas where they would normally not be expected. The Shrike has not been reported as breeding in Vermilion County since its listing, but has been reported from Champaign County.

The primary consideration for wind energy facilities is the potential for further loss of remaining habitat, if fence-rows are cleared to avoid wind turbulence or to improve turbine exposure, or if road-side trees are cleared to create turning radii for turbine carriers or to establish power lines. A pre-construction survey to identify the presence of Shrike nests should be conducted for areas with suitable habitat if work is proposed during the breeding season in order to avoid direct mortality. "Resident" foraging birds are not thought to be at significant risk from operating wind turbines, but potential risk associated with migrants should be considered.

Black-Billed Cuckoo, *Coccyzus erythropthalmus*

The Black-Billed Cuckoo has been recommended by the Board to be listed as "threatened," and this listing is pending the completion of administrative rulemaking, which should occur in 2009.

This bird nests in interior thickets of forested tracts and feeds heavily on caterpillars. This species was documented as nesting at Jordan Creek of the North Fork Nature Preserve in the 1990's, and Vermilion County has thousands of acres of suitable nesting habitat along its streams and rivers. This species is not directly threatened by wind turbine construction or operation, but may be subject to collision risk as a migrant.

Migratory Birds

American Golden Plover, *Pluvialis dominica*

This migratory bird breeds in the Arctic tundra, migrates south along the Atlantic seaboard to South America in the winter, but returns northward through central North America. Areas of Illinois and Indiana provide important spring migration staging areas, which may be occupied by this species for a month or more while birds go through a molt before resuming migration. It has become a species of concern due to its relatively low global population estimate of around 300,000 birds.

Based on 25 years of Spring Bird Count data, it is likely that significant numbers of this species congregate in Counties including northern Champaign and Vermilion Counties, but the locations of large concentrations vary from year to year. Large numbers of this species are routinely observed south of Sibley Grove in Ford County. Pre- and post-construction surveys should be performed to observe this species.

Plovers tend to aggregate in dense concentrations, and are known to fly in large tight groups at or below the approximate rotor-swept elevation, which may expose them to collision mortality risk. Concerns also exist pertaining to habitat fragmentation by service roads, and displacement from habitat due to potential sensitivity to vertical structures and human activity.

A research project has begun in an effort to better understand the behavior and needs of this species, as well as how it may be affected by the presence of wind turbines. Some preliminary results were recently published [O'Neal, *et. al.* (2008)] .

One apparent finding is that the species definitely concentrates in a few areas, rather than being generally dispersed across suitable habitat, resulting in temporarily dense population "hot-spots." However, where these may be located may be influenced year-to-year by poorly understood climatic cues. Very few birds appeared in 2008 in the expected concentration areas; instead, major concentrations were located more than one hundred miles to the south. Anecdotal evidence indicates this is an unusual occurrence.

A number of observers had reported a daytime habitat preference for short grass, soybean stubble, or bare ground with standing water or residual moisture, but O'Neal first reported a night roost preference for standing corn stubble cover, with crepuscular movement between the two. O'Neal reported all observations were located more than 70 meters from adjacent roads, suggesting an intolerance for breaks in habitat. (Effects of traffic were not investigated.) Interestingly, O'Neal also reported several observations of predation of the Golden Plover by the Northern Harrier.

Whooping Crane, *Grus americana*

An experimental population of the federally-listed endangered Whooping Crane has been established with breeding grounds in Wisconsin and wintering areas in Florida. Fall 2009 will see more than 100 birds move to Florida. Whooping Cranes often "stop over" during migration and this may occur virtually anywhere in the State.

Whooping Cranes may "stop over" for extended periods. In November 2006, during their first unescorted Fall Migration, a pair of Cranes rested for four days along the upper East Branch Vermilion River (Wabash Drainage) in Ford County. A Whooping Crane extended its Spring movement by loitering near Danville until the end of June 2008.

During such stop-overs, cranes often forage on waste corn in nearby agricultural fields. Wind turbines and associated power lines pose a collision risk for these large birds, which require some distance to achieve safe altitudes. Most non-predation losses to this flock have been to power line collisions. The visibility of power lines should be maximized with appropriate line markers. The developer may wish to consider other voluntary efforts to promote Crane conservation.

Due to the very high public profile of the Whooping Crane, the Department suggests the developer/operator of this facility coordinate at least annually with the Whooping Crane Eastern Partnership (www.bringbackthecranes.org) to track the passage of Whooping Cranes through the vicinity, and explore additional measures to reduce potential losses of these birds.

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RECEIVED

MAR 9 2009

HDR Engineering, Inc.

Vermilion and Champaign Counties
Royal
Wind Farm/California Ridge Wind

PLEASE REFER TO: IHPA LOG #009030209

March 4, 2009

Ms. Jacque Hamilton
HDR Engineering, Inc.
Environmental Project Manager
701 Xenia Avenue South
Minneapolis, Minnesota 55416-3636

Dear Madam:

Thank you for requesting comments from our office concerning the possible effects of the project referenced above on cultural resources. Our comments are required by Section 106 of the National Historic Preservation Act of 1966 (16 USC 470), as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties".

The project area has not been surveyed and may contain prehistoric/historic archaeological resources. Accordingly, a Phase I archaeological reconnaissance survey to locate, identify, and record all archaeological resources within the project area will be required. This decision is based upon our understanding that there has not been any large scale disturbance of the ground surface (excluding agricultural activities) such as major construction activity within the project area which would have destroyed existing cultural resources prior to your project. If the area has been heavily disturbed prior to your project, please contact our office with the appropriate written and/or photographic evidence.

The area(s) that need(s) to be surveyed include(s) all area(s) that will be developed as a result of the issuance of the federal agency permit(s) or the granting of the federal grants, funds, or loan guarantees that have prompted this review.

Enclosed you will find an attachment briefly describing Phase I surveys and a list of archaeological contracting services. THE IHPA LOG NUMBER OR A COPY OF THIS LETTER SHOULD BE PROVIDED TO THE SELECTED PROFESSIONAL ARCHAEOLOGICAL CONTRACTOR TO ENSURE THAT THE SURVEY RESULTS ARE CONNECTED TO YOUR PROJECT PAPERWORK.

If you have further questions, please contact Joseph S. Phillippe, Chief Archaeologist at 217/785-1279.

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer

AEH

Enclosure

Illinois Historic Preservation Agency

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PROTECTING ILLINOIS' CULTURAL RESOURCES

An Introduction to Archaeological Surveys

Prepared by

ILLINOIS STATE HISTORIC PRESERVATION OFFICE

When you read the accompanying letter, you were notified that your Federal or State permitted, funded, or licensed project will require an archaeological survey. We also review projects that use public land. The purpose of this survey will be to determine if prehistoric or historic resources are present within the project area. If you are the average applicant you have had little or no experience with such surveys – this short introduction is designed to help you fulfill the Federal/State requirements and complete the process.

WHY PROTECT HISTORIC RESOURCES? Historic preservation legislation grew out of the public concern for the rapid loss of our prehistoric and historic heritage in the wake of increasingly large-scale Federal/State and private development. The legislation is an attempt to protect our heritage while at the same time allowing economic development to go forward.

WHAT IS THE LEGAL BASIS? The basis for all subsequent historic preservation legislation lies within the national Historic Preservation Act of 1966 (NHPA). Section 106 of NHPA requires all Federal Agencies "undertakings" to "take into account" their effect on historic properties. As of January 1, 1990, the State Agency Historic Resources Preservation Act (Public Act 86-707) requires the same for all private or public undertakings involving state agencies. An "undertaking" is defined to cover a wide range of Federal or State permitting, funding, and licensing activities. It is the responsibility of Federal/State Agencies to ensure the protection of historic resources and the State Historic Preservation Office (SHPO) regulates this effort. In Illinois the SHPO is part of the Illinois Historic Preservation Agency (IHPA).

WHAT IS AN ARCHAEOLOGICAL SURVEY? An archaeological survey includes both (1) an examination of the written records, such as county plat books, published and unpublished archaeological reports, state site files, and (2) a field investigation of the project area to determine if prehistoric or historic resources are present. This process of resource identification is called a Phase I survey.

WHAT DOES A PHASE I SURVEY REQUIRE? Archaeological evidence is normally buried beneath the surface of the ground. To determine if an archaeological site is present it is necessary to get below this surface. The most efficient way is by plowing. If the project area is or can be plowed then the artifactual evidence will be brought to the surface and systematic pedestrian surveys (walkovers) will determine if a site is present. These walkovers are best done when the vegetation is low in the fall or spring. If the project area is covered with vegetation then small shovel probes (1' sq.) are excavated on a systematic grid pattern (usually 50' intervals) to sample the subsurface deposits. Where deeply buried sites may be present, such as in floodplains, deep coring or machine trenching may be required.

WHO DOES ARCHAEOLOGICAL SURVEYS? Professional archaeologists who meet the Federal standards set forth in the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-9) may conduct Federal surveys, while those meeting the State standards set forth in the Archaeological and Paleontological Resources Protection Act (20 ILCS 3435) may conduct surveys on public land in the State (see the other side of this sheet for information on obtaining the services of a contract archaeologist). The applicant is responsible for obtaining and paying for such services.

AFTER THE SURVEY – WHAT NEXT? When the field investigations are completed the archaeologist will submit a report of their findings and recommendations to the applicant. **IT IS THE RESPONSIBILITY OF THE APPLICANT TO FORWARD TWO (2) PAPER COPIES AND ONE (1) CD WITH THE REPORT IN PDF FORMAT TO THE SHPO FOR EVALUATION AND FINDINGS!** If no sites were found or the sites found are not eligible for the National Register the project may proceed. Occasionally, a significant archaeological site may be encountered. In such a case the SHPO and the Federal or State Agency will work with the applicant to protect both the cultural resources and to facilitate the completion of your project.

NEED FURTHER ASSISTANCE? The IHPA is here to assist you and the Federal/State agencies in complying with the mandates of the historic preservation legislation. If you have questions or need assistance with archaeological resources protection or Federal/State compliance, please contact the Archaeology Section, Preservation Services Division, Illinois Historic Preservation Agency, One Old State Capitol Plaza, Springfield, Illinois 62701 (217-782-4836).

OVER

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Illinois Historic Preservation Agency – Archaeology Section
Information for Developers and Agencies about general procedures for Phase 2 archaeology projects

Anyone notified of an archaeological site subject to Phase 2 testing in their project area, has several options:

1 Preserve the site by planning your project to avoid or greenspace the site, a deed covenant maybe necessary depending on the land ownership and the law the project is being reviewed under.
2. Hire an archaeological firm to conduct a Phase 2 project on the site.
3. Choose a different location for the project (generally means starting review process over from scratch, but there will be rare occasions when this is actually the fastest and cheapest option). This is something you may wish to consider if there are burials in the project area, or an extremely large or dense site in the project area.

Phase 2 archaeological projects consist of fieldwork, analysis, and report by the archaeological firm, and then review of the report by the IHPA and sometimes also by the funding or permitting agency, with additional work required part of time depending on the significance of the site(s). However, if a project has no significant sites after a Phase 2 project has been completed and reviewed, then the archaeology is completed as soon as IHPA accepts the report. If a project area has more than 1 site, each one is reviewed independently, in other words, one could be determined not significant and while another one is determined significant or potentially significant.

Phase 2 field work generally consists of obtaining good artifact type and location data from the site surface by methods such as grid collections, piece plotting, etc., this is followed by a small scale excavation. In some cases the fieldwork (commonly called test units) can be done with assistance of machines like backhoes or occasionally even large equipment like belly scrapers (plowed or partially disturbed sites), but sometimes it is necessary to dig by hand (mounds, unplowed sites, or inaccessible locations). The test units are excavated to the base of the plowzone or topsoil, and then the base of the unit is checked for presence of archaeological features (foundations, pits, hearths, burials, middens, etc.) If features are present, a small number (generally not more than 5-10) of them are excavated to provide information about the site's age, function, integrity, etc. Samples of soil from each feature for botanical and zoological analysis are usually taken. Also on floodplains of large rivers, several additional "deep" trenches are usually necessary to check for buried sites. The amount of time required for fieldwork is highly dependent on the size of a site, on whether machines can be used, and on the density of features, as well as the weather.

Analysis at Phase 2 consists of identifying and inventorying all of the artifacts recovered and preparing data recorded in the field for a report. The length of time needed is again highly variable based on the factors listed above. The report describes the field and lab information, provides a preliminary interpretation of the site, and makes recommendations concerning the significance of the site.

The archaeology staff at the State Historic Preservation Office (IHPA in Illinois) and sometimes the archaeologists at the lead funding or permitting agency review the report. Based on the report and their knowledge of regional archaeological, they determine (following criteria outlined in the appropriate law and regulations for each project) if the work done was acceptable, and whether the site(s) are not significant and need no further investigation or are significant. If a site is significant (meets the eligibility criteria for the National Register of Historic Places), the choices are mitigation (generally by complete excavation) or preservation.

Joseph S. Phillippe, Chief Archaeologist (1-1-2005)

02/09/09

ILLINOIS-BASED CONSULTING SERVICES WITH PROFESSIONAL ARCHAEOLOGISTS (by zip code order, 1/01/2009 update)
In order to assist agencies, engineering firms, and others who require professional archaeological services the Illinois Historic Preservation Agency (IHPA) has listed below Illinois-based firms with professional archaeologists currently performing contract archaeological compliance work. Based on documentation supplied by them these individuals appear to meet current Federal qualifications. This list is provided for your assistance, however, you may use any archaeologist who meets the minimum qualifications as set forth in Secretary of the Interior's Professional Qualifications Standards (36 CFR 61). Federal and state regulations require a completed graduate degree with an emphasis in archaeology and 16 months of professional archaeological experience (**BOLD names** below). If you have any questions please contact IHPA at 217-785-4512. THE INCLUSION OF INDIVIDUALS OR ORGANIZATIONS ON THIS LIST DOES NOT CONSTITUTE ANY RECOMMENDATION OR ENDORSEMENT OF THEIR PROFESSIONAL EXPERTISE OR PERFORMANCE RECORD BY THE IHPA.

CHICAGO METRO REGION

Dr. Kevin P. McGowan
Public Service Archaeology Prgm
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Post Office Box 7085
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847-548-7961 (fax same)

Dr. Leslie B. Kirchler, RPA
Environmental Resources Management
1701 Golf Road, Suite 1-1000
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Dr. M. Catherine Bird
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CHICAGO METRO REGION CON'T

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CENTRAL REGION

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201 Tillman Hall
Macomb, Illinois 61455
309-298-1188

Dr. Michael D. Wiant
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Dr. Charles L. Rohrbaugh
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302 Kelly Drive
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Dr. Brian Adams
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109 Davenport Hall
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Mr. Dale McElrath
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More Central Listings – Over

CENTRAL REGION CON'T

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309-833-3097
Springfield Lab
217-522-4295 / 4395 (fax)

Dr. Terry Martin
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Mr. Floyd Mansberger
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Mr. Joseph Craig
Prairie Archaeology & Research
Environmental Compliance Consultants
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jcraig@prairiearchaeology.com
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METRO EAST REGION

Mr. Don Booth
2610 Sidney Street
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618-447-2031 / 618-465-9548 (fax)
dnbooth@charter.net

Dr. Charles W. Markman
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SOUTHERN REGION

Mr. Steve Titus
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127 North Washington Street
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Dr. Brian M. Butler
Southern Illinois University
Center for Archaeological Investigations
Mail Code 4527
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618-453-5031 / 8467 (fax)

Illinois Historic
Preservation Agency

1 Old State Capitol Plaza • Springfield, Illinois 62701-1512 • www.illinois-history.gov

FAX (217) 782-8161

RECEIVED

MAR 17 2009

HDR Engineering, Inc.

Vermilion County
Royal
New Construction, California Ridge Wind Farm
Champaign County
IHPA Log #009030209

March 11, 2010

Jacque Hamilton
HDR Engineering, Inc.
701 Xenia Avenue South
Minneapolis, MN 55416-3636

Dear Ms. Hamilton:

Thank you for requesting comments from our office concerning the possible effects of your project on cultural resources. Our comments are required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties".

Our staff has reviewed the specifications of the referenced project as submitted by your office. We cannot adequately review this proposed project until the following additional documentation has been submitted to our Agency:

Architectural survey of project area documenting structures within the viewshed of any proposed turbine, clearly labeled and keyed to a site map.

In your reply, please refer to IHPA Log #009030209. If you have any further questions, please contact me at 217/785-5027.

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer

Desmond, Meg

From: Brown, Robert J LRL [Robert.J.Brown@usace.army.mil]
Sent: Monday, March 30, 2009 10:10 AM
To: Hamilton, Jacqueline D.
Subject: California Ridge

Follow Up Flag: Follow up
Flag Status: Flagged

Categories: Purple Category, Invenergy-CaliforniaRidge

Jacqueline,

I am the project manager for a 404 permit associated with the California ridge wind farm.

This is in regard to your request for our review of the propsed wind farm located in Vermilion and Champain Co, IL.

The Corps of Engineers exercises regulatory jurisdiction under Section 404 (33 USC 1344) of the Clean Water Act (CWA). The performance of work on 'waters of the United States' is unlawful unless the work has been authorized by the Secretary of the Army prior to the start of such work. The authorization for the placement of dredged or fill material is administered under Section 404. Normally, the authorization under Section 404 is in the form of a Department of the Army (DA) permit.

Based on our review of the submitted data, it has been determined that additional information will be required before we can make a determination for the need for a Department of the Army (DA) permit under SSection 404 of the Clean Water Act.

If your project would impact any "waters of the United States," including jurisdictional wetlands, then you should submit a Department of the Army (DA) permit application for review by this office. Copies of DA permit application forms are available on Louisville District's Internet site at http://www.lrl.usace.army.mil under "Obtain a Permit".

Basically, I need all location information for roads, pads or utilities.
Call or contact me via e-mail for coordination for this project.

Robert J. Brown
Geographer / Regulatory Specialist
U.S. Army Corps of Engineers
Louisville District, West Section
phone: (812) 853-7632
fax: (812) 858-2678
robert.j.brown@usace.army.mil
Mailing Address:
P.O. Box 489
Newburgh, IN 47629-0489

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
2118 West Park Court
Champaign, IL 61821
(217)353-6600

www.il.nrcs.usda.gov

RECEIVED
APR 23 2009
HDR Engineering, Inc

April 20, 2009

Jacquie Hamilton, Environmental Project Manager
HDR Engineering, Inc.
701 Xenia Avenue South
Minneapolis, MN 55416-3636

Re: California Ridge Wind Project, Vermilion and Champaign Counties, Illinois

Dear Ms. Hamilton:

I have had my staff review the information provided by you regarding the California Ridge Wind Project proposal for Vermilion and Champaign Counties. While there are anticipated long term natural resource impacts associated with this project primarily through the land use change, it is also anticipated that most of the impacts will be short term, and can be mitigated with best management practices before, during, and after construction activities.

Regarding long term natural resource impacts, the vast majority of the project area is comprised of soil types that have been characterized as prime or important farmland, with approximately 1% of the project area not meeting prime or important farmland criteria. Accordingly, an efficient, compact layout of the wind turbines and the associated infrastructure is recommended. This will reduce the acreage of conversion and the impact this conversion may have on natural resources as a result of the conversion.

Regarding short term impacts, the following comments are arranged according to pre-construction phase, construction phase, and post-construction phase of the project. However, it should be noted that the comments are general in nature based on the project boundaries. As specific wind turbines sites are determined, the project developer is encouraged to consult with the Soil and Water Conservation Districts of both Champaign and Vermilion Counties for site specific resource inventories and best management practices. This will reduce the natural resource impact at the individual wind turbine sites, their access roads as well as the construction and equipment staging areas.

Pre-Construction Phase

- Existing permanent vegetative buffers should be maintained.
- Temporary sediment control measures should be employed on all disturbed areas prior to construction in order to reduce detachment and transport of sediment from the construction sites to adjacent waterways.

- Existing subsurface tile should be identified and avoided to the extent possible and if compromised, repaired to a level meeting or exceeding pre-construction condition. Landowners should be consulted 18 months following completion of construction activity to determine if damage to known and/or
unknown subsurface tile lines has been revealed through the appearance of new seeps or other symptoms of damaged tile resulting from construction activities.

- All construction activities in areas identified as wetlands on the US Fish and Wildlife Service National Wetland Inventory should be avoided.

- As wind turbines and associated infrastructure are sited, a consulting soil scientist should be conferred with so as to not impact other potential wetland areas not identified on the National Wetland Inventory.

- The Illinois Department of Natural Resources should be consulted as to potential long term and short term impacts to wildlife associated with the project.

Construction Phase

- Where access roads, both permanent and/or temporary, cross grassed waterways or other water conveyance channels, the original shape of the waterway or channel should be maintained allowing for the normal passage of runoff water within the channel. The channel should suitably protected according to NRCS Conservation Practice Standards 560-Access Road and 578-Stream Crossing as applicable. Our website contains these standards, along with standard drawings, for reference.

- If culverts are used as part of the crossing, the culverts should be sufficiently large enough to convey the runoff flow with out an appreciable altering of the waterway flow characteristics. Crossings shall be protected so that out-of-bank flows safely bypass without eroding adjacent cropland or the crossing fill material. Culvert sizing should follow our standard for Access Road, NRCS Conservation Practice Standard 560.

- Access roads should be constructed with road ditches as identified in Conservation Practice Standard 560 to convey increased runoff flow to a suitable stable outlet.

- Existing soil conservation practices (such as terraces, grassed waterways, etc.) that are damaged through project activities should be restored to at least pre-construction condition.

- Any open trenching as part of the project should have the top 12" of the soil profile stripped, stockpiled, and replaced.

- Although not specifically a potential resource concern, a locator wire should be run with the underground electrical connections to assist in the locating and avoidance of the utility during possible future land improvement construction activities.

Post-Construction Phase

- Following construction activities, the soil in the areas that have been compacted due to heavy equipment use and that will not remain as permanent access roads or work areas shall be ripped at least 18 inches deep (more shallow if required to miss tile lines) and then tandem disked.
- All ripping should be done at a time when the soil is dry enough for normal tillage operations to occur on undisturbed farmland adjacent to the areas to be ripped.
- All rutted land should be restored to the original condition.
- Disturbed areas should be seeded with a vegetative seeding using the NRCS critical area seeding standard. Construction areas that will be restored for use as cropland following construction should have a temporary vegetative cover established, while other disturbed areas should have a permanent vegetative cover established.

Thank you for the opportunity to review and comment on this proposal. If you have any questions regarding the information provided and need any clarification, please contact my State Conservation Engineer, Ruth Book, at 217/353-6626.

Sincerely,

William J. Gradle

WILLIAM J. GRADLE
State Conservationist

cc:
Ruth Book, State Conservation Engineer, NRCS, Champaign, IL

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Rock Island Field Office
1511 47th Avenue
Moline, Illinois 61265
Phone: (309) 757-5800 Fax: (309) 757-5807

IN REPLY REFER TO:
FWS/RIFO

May 14, 2009

Ms. Jacqueline Hamilton
Environmental Project Manager
HDR Engineering, Inc.
701 Xenia Avenue South
Minneapolis, Minnesota 55416-3636

Dear Ms. Hamilton:

This letter is in regard to plans for the California Ridge Wind Project proposed for Champaign and Vermilion Counties, Illinois. We have the following comments concerning threatened and endangered species, as well as non-listed migratory species and natural resources.

Threatened and Endangered Species

In order to determine if your project "may affect" species, we invite you to use a new tool the U.S. Fish and Wildlife Service (Service) has designed to help with the consultation process – the new Section 7(a)(2) Technical Assistance webpage (http://www.fws.gov/midwest/endangered/section7/s7process/index.htm). By following the instructions, you can determine what your action area is, whether listed species may be found within the action area, and if the project may affect listed species.

Habitat Descriptions for Federal Threatened and Endangered Species in Champaign and Vermilion Counties, Illinois

Indiana bat - The endangered Indiana bat (*Myotis sodalis*) is known to occur in several Illinois counties including Champaign and Vermilion. Potential habitat for this species occurs statewide. Therefore, Indiana bats are considered to potentially occur in any area with forested habitat in any county in Illinois.

Indiana bats migrate seasonally between winter hibernacula and summer roosting habitats. Winter hibernacula include caves and abandoned mines. Females form nursery colonies under the loose bark of trees (dead or alive) and/or cavities, where each female gives birth to a single young in June or early July. A single colony may utilize a number of roost trees during the summer, typically a primary roost tree and several alternates. The species or size of tree does not appear to influence whether Indiana bats utilize a tree for roosting provided the appropriate bark structure is present.

During the summer, the Indiana bat frequents the corridors of small streams with riparian woods as well as mature upland forests. It forages for insects along stream corridors, within the canopy of floodplain and upland forests, over clearings with early successional vegetation (old fields), along the borders of croplands, along wooded fencerows, over farm ponds, and in pastures.

Suitable summer habitat in Illinois is considered to have the following characteristics within a ½ mile radius of a project site:

1) forest cover of 15% or greater;
2) permanent water;
3) potential roost trees with 10% or more peeling or loose bark

If the project site contains any habitat that fits the above description, it may be necessary to conduct a survey to determine whether the bat is present. In addition, a search for this species should be made prior to any cave-impacting activities. If habitat is present or Indiana bats are known to be present, they must not be harmed, harassed or disturbed when present, and this field office should be contacted for further assistance.

Prairie bush clover - The prairie bush clover *(Lespedeza leptostachya)* is listed as threatened in Champaign County, Illinois. It occupies dry to mesic prairies with gravelly soil. There is no critical habitat designated for this species. Federal regulations prohibit any commercial activity involving this species or the destruction, malicious damage, or removal of this species from Federal land or any other lands in knowing violation of state law or regulation, including state criminal trespass law. This species should be searched for whenever prairie remnants are encountered.

Eastern prairie fringed orchid - The eastern prairie fringed orchid (*Platanthera leucophaea*) is listed as threatened for Champaign and Vermilion Counties, Illinois. It occupies wet grassland habitats. There is no critical habitat designated for this species. Federal regulations prohibit any commercial activity involving this species or the destruction, malicious damage or removal of this species from Federal land or any other lands in knowing violation of state law or regulation, including state criminal trespass law. This species should be searched for whenever wet prairie remnants are encountered.

The **clubshell mussel** (*Pluerobema plenum*) is listed as endangered and occurs in the North Fork Vermilion River in Vermilion County, Illinois. This species may potentially occur anywhere in the North Fork Vermilion River. The clubshell inhabits gravel or mixed sand and gravel substrates in medium to large rivers. Instream activities in the North Fork Vermilion River will typically require a mussel survey to determine if the clubshell is present.

The **rayed bean** *(Villosa fabalis)* is generally known from smaller, headwater creeks, but records exist in larger rivers. Substrates typically include gravel and sand. It is oftentimes associated with vegetation in and adjacent to riffles and shoals. Specimens are typically buried among the roots of the vegetation. These mussels in streams occur chiefly in flow refuges, or relatively stable areas that display little movement of particles during flood events. Historical habitat for the rayed bean is found in Champaign and Vermilion Counties, Illinois.

As of August 9, 2007, the bald eagle is no longer included on the list of threatened and endangered species. It remains protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. For more information go to http://www.fws.gov/midwest/eagle/guidelines/index.html.

Wetlands

Because wetlands are vital as flood water retention areas and for groundwater retention and filtration, and also because they provide habitat for many plants and animals, priority consideration should be given to avoid impacts to these wetland areas. Any future activities in the study area that would alter wetlands may require a Section 404 permit. Unavoidable impacts will require a mitigation plan to compensate for any losses of wetland functions and values. The U.S. Army Corps of Engineers, Clock Tower Building, P.O. Box 2004, Rock Island, Illinois 61201, should be contacted for information about the permit process.

Migratory Birds

In addition to trying to ensure that proposed wind power turbines do not adversely affect threatened and endangered species, the Service is also interested in minimizing potential impacts to other wildlife resources, particularly migratory birds. The siting of new turbines creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating neotropical songbirds. The problem is especially acute at tall, lighted, guyed turbines, particularly in inclement night weather conditions during spring and fall songbird migrations. Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) and the Code of Federal Regulations at Part 50 designed to implement the MBTA. It is possible that species protected under the Endangered Species Act and Bald and Golden Eagle Act may also be affected.

The American Golden Plover (*Pluvialis dominica*) and the Smith's Longspur (*Calcarius pictus*) are both species that pass through Illinois primarily during the spring migration (mid-March to late April) with the greatest numbers reported in the east central portion of Illinois. These species also may overwinter or stage migrations in Illinois.

In addition, the introduced and experimental population of whooping cranes migrates through north central and northeastern Illinois. Crane species are thought to be particularly vulnerable to wind turbine strikes. Whooping Crane locations have been recorded by the Whooping Crane Eastern Partnership as recent as 2008 in both of these counties. Inclement weather or high winds could push migrating birds further into the counties proposed for wind development.

The Migratory Bird Treaty Act (16 U.S.C. 703-712) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the Act has no provision for allowing unauthorized take, it must be recognized that some birds may be killed at structures such as wind farm turbines, even if all reasonable measures to avoid it are implemented. The Service's Division of Law Enforcement carries out its mission to protect migratory birds not only through investigations and enforcement, but also through fostering relationships with individuals and industries that proactively seek to eliminate their impacts on migratory birds.

Research into the actual causes of bird collisions with towers is limited. A Wind Energy Working Group composed of government agencies, industry, academic researchers, and non-government organizations has been formed to develop a research protocol to determine the best ways to construct turbines to minimize bird strikes. To assist field staff in the review of wind farm proposals until the results of that research are available, the Service is working to develop standard recommendations based on a review of currently available information. We refer you to the Service Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines at our website: http://www.fws.gov/habitatconservation/wind.htm.

Site Development Recommendations

We recommend that turbines not be sited on major bird migration corridors or in areas where birds are highly concentrated. Examples of high concentration areas for birds are wetlands, state or Federal refuges, staging areas, rookeries, and landfills. Avoid known migratory or daily movement flyways and areas with a high incidence of fog, mist, low cloud ceilings, and low visibility.

Turbines should be sited to avoid areas or features of the landscape known to attract raptors (hawks, falcons, eagles, owls). For example, golden eagles, hawks, and falcons use cliff/rim edges extensively; setbacks from these edges may reduce mortality. Other examples include avoiding siting turbines in a dip or pass in a ridge.

Avoid placing turbines near bat hibernation and breeding colonies, in migration corridors, and in flight paths between colonies and feeding areas. Where the height of the rotor-swept area produces a high risk for wildlife, adjust tower height where feasible to reduce the risk of strikes.

The Service recommends that all sites be monitored for impacts on wildlife after construction is completed. Post-construction monitoring is important to the Service, industry, and public because of the limited information available on impacts of wind turbines and wind resource areas on wildlife. Therefore, post-construction monitoring should be designed to detect major impacts. The intended timeframe for post-construction monitoring is not expected to exceed three years, however.

These comments provide technical assistance only and do not constitute the report of the Secretary of the Interior on the project within the meaning of Section 2(b) of the Fish and Wildlife Coordination Act, do not fulfill the requirements under Section 7 of the Endangered

Species Act, nor do they represent the review comments of the U.S. Department of the Interior on any forthcoming environmental statement.

If you have questions, please contact Heidi Woeber of my staff at (309) 757-5800, extension 209.

Sincerely,

Richard C. Nelson
Field Supervisor

S:\Office Users\Heidi\windnewletterchampaignvermilion.doc

Literature Cited

Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 (CEC-500-2006-022). Edison Electric Institute/Raptor Research Foundation, Washington, D.C., 128 pp.

Avian Power Line Interaction Committee (APLIC). 1994. Mitigating Bird Collisions with Power Lines: the State of the Art in 1994. Edison Electric Institute, Washington, D.C. 78 pp.

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
NEWBURGH REGULATORY OFFICE
P.O. Box 489
NEWBURGH, INDIANA 47629-0489
FAX: (812) 858-2678
http://www.lrl.usace.army.mil

24 August 2009

RECEIVED

AUG 27 2009

HDR Engineering, Inc.

Operations Division
Regulatory Branch (West)
ID No. LRL-2009-310

HDR Engineering, Inc.
Jacque Hamilton
701 Xenia Avenue South
Minneapolis, MN 55416-3636

Dear Ms. Hamilton:

This is in regard to your letter dated 6 March 2009 proposing to construct an up to 200-Megawatt wind farm in Vermilion and Champaign Counties in Illinois.

Based on our review of the submitted data, it has been determined that additional information will be required before we can make a determination for a permit. Please submit a detailed plan on the project specifics and a Department of the Army (DA) permit application. You are reminded that all drawings must be submitted on 8½ x 11-inch paper and be of reproducible quality. I have enclosed an Application for Department of the Army Permit, Eng 4345 for your convenience.

Your proposed project has been assigned ID No. LRL-2009-310. Please reference this number on all correspondence pertaining to this project. If you have any questions regarding the requested information, please contact this office by writing to the above address, ATTN: CELRL-OP-FW or by calling me at 812-853-7632.

Sincerely,

Robert J. Brown
Regulatory Specialist
Newburgh Regulatory

Barron/OP-FW

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT *(33 CFR 325)*	OMB APPROVAL NO. 0710-0003 Expires December 31, 2004

The Public burden for this collection of information is estimated to average 10 hours per response, although the majority of applications should require 5 hours or less. This includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection , Research and Sanctuaries Act, Section 103, 33 USC 1413. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED
LRL-2009-310			

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE *(an agent is not required)*
6. APPLICANT'S ADDRESS	9. AGENT'S ADDRESS
7. APPLICANT'S PHONE NOS. W/AREA CODE a. Residence b. Business	10. AGENT'S PHONE NOS. W/AREA CODE a. Residence b. Business

11. STATEMENT OF AUTHORIZATION

I hereby authorize, ______________________ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

APPLICANT'S SIGNATURE DATE

NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE *(see instructions)*

13. NAME OF WATERBODY, IF KNOWN *(if applicable)*	14. PROJECT STREET ADDRESS *(if applicable)*
15. LOCATION OF PROJECT COUNTY STATE	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN, *(see instructions)*

17. DIRECTIONS TO THE SITE

18. Nature of Activity *(Description of project, include all features)*

19. Project Purpose *(Describe the reason or purpose of the project, see instructions)*

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards

22. Surface Area in Acres of Wetlands or Other Waters Filled *(see instructions)*

23. Is Any Portion of the Work Already Complete? Yes _____ No _____ IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

25. List of Other Certifications or Approvals/Denials Received from other Federal, State or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

*Would include but is not restricted to zoning, building and flood plain permits

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

_______________ SIGNATURE OF APPLICANT   _______ DATE   _______________ SIGNATURE OF AGENT   _______ DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Instructions for Preparing a
Department of the Army Permit Application

Blocks 1 through 4. To be completed by Corps of Engineers.

Block 5. Applicant's Name. Enter the name of the responsible party or parties. If the responsible party is an agency, company, corporation or other organization, indicate the responsible officer and title. If more than one party is associated with the application, please attach a sheet with the necessary information marked **Block 5.**

Block 6. Address of Applicant. Please provide the full address of the party or parties responsible for the application. If more space is needed, attach an extra sheet of paper marked Block 6.

Block 7. Applicant Telephone Number(s). Please provide the number where you can usually be reached during normal business hours.

Blocks 8 through 11. To be completed if you choose to have an agent.

Block 8. Authorized Agent's Name and Title. Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer or any other person or organization. Note: An agent is not required.

Blocks 9 and 10. Agent's Address and Telephone Number. Please provide the complete mailing address of the agent, along with the telephone number where he/she can be reached during normal business hours.

Block 11. Statement of Authorization. To be completed by applicant if an agent is to be employed.

Block 12. Proposed Project Name or Title. Please provide name identifying the proposed project (i.e., Landmark Plaza, Burned Hills Subdivision or Edsall Commercial Center).

Block 13. Name of Waterbody. Please provide the name of any stream, lake, marsh or other waterway to be directly impacted by the activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

Block 14. Proposed Project Street Address. If the proposed project is located at a site having a street address (not a box number), please enter here.

Block 15. Location of Proposed Project. Enter the county and state where the proposed project is located. If more space is required, please attach a sheet with the necessary information marked Block 15.

Block 16. Other Location Descriptions. If available, provide the Section, Township and Range of the site and/or the latitude and longitude. You may also provide description of the proposed project location, such as lot numbers, tract numbers or you may choose to locate the proposed project site from a known point (such as the right descending bank of Smith Creek, one mile down from the Highway 14 bridge). If a large river or stream, include the river mile of the proposed project site if known.

Block 17. Directions to the Site. Provide directions to the site from a known location or landmark. Include highway and street numbers as well as names. Also provide distances from known locations and any other information that would assist in locating the site.

Block 18. Nature of Activity. Describe the overall activity or project. Give appropriate dimensions of structures such as wingwalls, dikes (identify the materials to be used in construction, as well as the methods by which the work is to be done), or excavations (length, width, and height). Indicate whether discharge of dredged or fill material is involved. Also, identify any structure to be constructed on a fill, piles or float supported platforms.

The written descriptions and illustrations are an important part of the application. Please describe, in detail, what you wish to do. If more space is needed, attach an extra sheet of paper marked **Block 18.**

Block 19. Proposed Project Purpose. Describe the purpose and need for the proposed project. What will it be used for and why? Also include a brief description of any related activities to be developed as the result of the proposed project. Give the approximate dates you plan to both begin and complete all work.

Block 20. Reason(s) for Discharge. If the activity involves the discharge of dredged and/or fill material into a wetland or other waterbody, including the temporary placement of material, explain the specific purpose of the placement of the material (such as erosion control).

Block 21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards. Describe the material to be discharged and amount of each material to be discharged within Corps jurisdiction. Please be sure this description will agree with your illustrations. Discharge material includes: rock, sand, clay, concrete, etc.

Block 22. Surface Areas of Wetlands or Other Waters Filled. Describe the area to be filled at each location. Specifically identify the surface areas, or part thereof, to be filled. Also include the means by which the discharge is to be done (backhoe, dragline, etc.). If dredged material is to be discharged on an upland site, identify the site and the steps to be taken (if necessary) to prevent runoff from the dredged material back into a waterbody. If more space is needed, attach an extra sheet of paper marked **Block 22**.

Block 23. Is Any Portion of the Work Already Complete? Provide any background on any part of the proposed project already completed. Describe the area already developed, structures completed, any dredged or fill material already discharged, the type of material, volume in cubic yards, acres filled, if a wetland or other waterbody (in acres or square feet). If the work was done under an existing Corps permit, identify the authorization if possible.

Block 24. Names and Addresses of Adjoining Property Owners, Lessees, etc., Whose Property Adjoins the Project Site. List complete names and full mailing addresses of the adjacent property owners (public and private) lessees, etc., whose property adjoins the waterbody or aquatic site where the work is being proposed so that they may be notified of the proposed activity (usually by public notice). If more space is needed, attach an extra sheet of paper marked Block 24.

Information regarding adjacent landowners is usually available through the office of the tax assessor in the county of counties where the project is to be developed.

Block 25. Information about Approvals or Denials by Other Agencies. You may need the approval of other Federal, state or local agencies for your project. Identify any applications you have submitted and the status, if any (approved or denied) of each application. You need not have obtained all other permits before applying for a Corps permit.

Block 26. Signature of Applicant or Agent. The application must be signed by the owner or other authorized party (agent) . This signature shall be an affirmation that the party applying for the permit possesses the requisite property rights to undertake the activity applied for (including compliance with special conditions, mitigation, etc.).

DRAWINGS AND ILLUSTRATIONS

General Information.

Three types of illustrations are needed to properly depict the work to be undertaken. These illustrations or drawings are identified as a **Vicinity Map**, a **Plan View** or a **Typical Cross-Section Map**. Identify each illustration with a figure or attachment number.

Please submit one original, or good quality copy, of all drawings on 8 l/2x11 inch plain white paper (tracing paper or film may be substituted). Use the fewest number of sheets necessary for your drawings or illustrations.

Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view or cross-section) . **While illustrations need not be professional (many small, private project illustrations are prepared by hand), they should be clear, accurate and contain all necessary information.**

United States Department of the Interior

National Park Service

Midwest Region
601 Riverfront Drive
Omaha Nebraska 68102-4226

L6015(MWR-PCL/PC)

3 SEP 2009

Ms. Jacqueline Hamilton
Environmental Project Manager
701 Xenia Avenue South
Minneapolis, Minnesota 55416-3636

Dear Ms. Hamilton:

Thank you for your April 29 letter requesting comments from the National Park Service (NPS) regarding the proposed California Ridge Wind Project, Vermillion and Champaign Counties, Illinois, in the vicinity of the Middle Fork of the Vermillion National Scenic River (River). The River is a component of the Wild and Scenic Rivers System (System) pursuant to Section 2(a)(ii) of the Wild and Scenic Rivers Act (Act). Each component of the System is to be preserved in its free-flowing condition and managed to protect and enhance the water quality and outstanding remarkable values (ORV), while providing for public recreation and resource uses which do not adversely impact or degrade those values. The River ORV include scenic, geologic, fish and wildlife, ecological, recreational, and historic resources. The River's unique mussel resources (including listed and nonlisted species) are specifically mentioned in documents related to the rivers designation, and are protected by the Act.

The State of Illinois is the river administering agency, and the NPS, on behalf of the Secretary of the Interior (SOI), retains Section 7(a) responsibilities under the Act. Components of the System are protected by Section 7(a) of the Act, which states, in part:

> ... no department or agency of the United States shall assist by loan, grant, license, or otherwise in the construction of any water resources project that would have a direct and adverse effect on the values for which such river was established, as determined by the Secretary charged with its administration.

Water resources projects include, but are not limited to, dams, water diversion projects, fisheries habitat and watershed restoration/enhancement projects, bridge construction or demolition, bank stabilization projects, boat ramps, and other activities that require a Section 404 or Section 10 permit from the U.S. Army Corps of Engineers. Water resource projects located within a designated reach or upstream/downstream or on tributaries to the designated reach are subject to section 7(a) review. A Section 7(a) determination is used to determine whether a proposed water resources project impacts would have a direct and adverse effect on the values for which the river was established, namely its free-flowing condition, water quality, and designated ORV. Federal water resources projects that are determined to have a direct and adverse effect on the values for which designated rivers were added to the System are prohibited.

The proposed wind farm does not meet the definition of a water resources project and is not subject to the requirements of Section 7(a) of the Act. Nonetheless, the river administering agency, project proponents, and all related Federal actions are charged by the Act to protect and enhance the values for which the river was designated.

Section 10(a) of the Act (16 U.S.C. 1281(a)) is considered the nondegradation and enhancement policy. Section 10(a) of the Act states the following:

> Each component of the National Wild and Scenic Rivers System shall be administered in such manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values.

At its easternmost border, the proposed project as described is located near the designated 1,000-foot-wide River corridor boundary. It is not clear to what extent the remainder of the project location will encumber the aesthetic qualities of the River. Consequently, the project has the elevated potential to have an adverse effect on the scenic value of the River by providing a visual intrusion as viewed from the River. The NPS requests that project proponents conduct a viewshed sensitivity analysis in order to evaluate the effect of the turbine array on the scenic view from the River. The analysis should take into account the maximum height of the turbine blades, their density and locations, and the expected view from the River. Additionally, an assessment of the potential noise production and how it may affect the corridor should also be conducted. The desired condition is that no wind turbine should be visible from the River at any point and there should be no detectable noise associated with the turbine operation within the corridor boundary.

These comments have been provided in early coordination on behalf of the SOI. The NPS has an interest in ensuring the values for which the River was designated are protected. The scenic ORV can be irretrievably harmed by the introduction of unnatural structural elements into the viewshed of the river. Every effort should be made to avoid a visual intrusion to the River. Should you have any questions or concerns, please call Regional Rivers Coordinator Hector Santiago of my staff at 402-661-1848.

Sincerely,

David N Given

David N. Given
Acting Regional Director

cc:
Mr. Sam Flood, Acting Director
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, Illinois 62702

Mr. Louis Yockey
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, Illinois 62702-1271

Ms. Joyce Collins
U.S. Fish and Wildlife Service
Ecological Services Office
8588 Route 148
Marion, Illinois 62959-4565

United States Department of the Interior

National Park Service

Midwest Region
601 Riverfront Drive
Omaha Nebraska 68102-4226

RECEIVED
HDR Engineering, Inc.

L6015(MWR-PCL/PC)

3 SEP 2009

Ms. Jacqueline Hamilton
Environmental Project Manager
701 Xenia Avenue South
Minneapolis, Minnesota 55416-3636

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cc:
Mr. Sam Flood, Acting Director
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, Illinois 62702

Mr. Louis Yockey
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, Illinois 62702-1271

Ms. Joyce Collins
U.S. Fish and Wildlife Service
Ecological Services Office
8588 Route 148
Marion, Illinois 62959-4565

From: Rolfes, Christina
Sent: Thursday, September 10, 2009 3:39 PM
To: Hamilton, Jacqueline D.
Subject: FW: WEST protocol review

Jacque,

Please see Keith's comments regarding the WEST protocol below.

Christina Rolfes
Environmental Scientist

HDR ONE COMPANY | *Many Solutions*
701 Xenia Avenue South | Suite 600 | Minneapolis, MN | 55416
Phone: 763.278.5994 | Fax 763.591.5413 | Email: christina.rolfes@hdrinc.com

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From: Shank, Keith [mailto:Keith.Shank@Illinois.gov]
Sent: Thursday, September 10, 2009 3:33 PM
To: Rolfes, Christina
Subject: RE: WEST protocol review

Hi, Christina

The methods and proposals outlined are acceptable, as far as they go, but probably are not adequate to comprehensively address all risks to or posed by listed species. We have the following comments.

The Illinois List of Endangered or Threatened Species is being revised, and this change will likely be final near the end of September 2009. Three birds of interest are being de-listed: Bald Eagle, Henslow's Sparrow, and Sandhill Crane. One bird is being added: the Black-Billed Cuckoo, which has bred in Vermilion County in the past.

Observations of the American Golden Plover will continue to be of interest. However, in this part of the State, we do not expect to see Smith's Longspurs, and experience with prior efforts indicates it is almost always impossible to distinguish Longspurs to the species level in these types of studies, so no special effort for the Smith's Longspur is necessary.

Because the study will be done only during daylight hours, it has the inherent weakness that no night-migrating species will be observed unless they stop-over in the study area. Hence, it may not be possible to draw conclusions about potential effects on night-migrating birds via these methods.

This protocol depends on acoustic bat detection to assess bat activity. It is very likely that the forests along the Middle Fork contain Indiana Bat roost trees for summer maternity colonies, since these are known from areas both upstream and downstream. Acoustic monitoring alone may not be adequate to assess the risk of an incidental taking of Indiana Bats through baro-trauma or blade-collision. In this case, it may be worth considering a mist-netting survey of forests and streams in close proximity to the project area in an effort to confirm the presence of the Indiana Bat in the vicinity.

The emphasis of this protocol is on birds and bats; observations of terrestrial species will be recorded only as a result of incidental encounters. This is not an adequate basis to judge the risks of impacts to terrestrial and aquatic listed species which may be present. The Ornate Box Turtle has been collected previously from Champaign County. The Department recommends a specific effort designed to detect the presence of this terrestrial species, in particular.

If roads or cabling will directly impact any drainage ditch or stream with permanent water, a survey of stream fauna is recommended. Tributaries of the Salt Fork and Middle Fork may contain the following listed species: the Mudpuppy Salamander, Smooth Soft-Shell Turtle, Eastern Sand Darter, and Bigeye Chub, as well as the Slippershell and Little Spectaclecase Mussels. Some portions of channelized streams, such as the upper reaches of the Spoon River Drainage District, do not have appropriate substrate or habitat conditions for mussels, but may provide important spawning habitat for fish or the Mudpuppy.

The Eastern Massasauga Rattlesnake has extant populations along the Sangamon River in Champaign and Piatt Counties; Vermilion County is within their historic range. the Department believes the chances of encountering this species in the project area are extremely low.

Although the Department has no documented records of the Timber Rattlesnake in Vermilion County, local residents often claim to know someone who has killed one in recent years; some local hunters swear to have seen mountain lions near the Middle Fork. The Department does not put much stock in such claims, but this area is well-within the historic ranges of both species, and essential habitat elements exist. Staff should be advised to always be alert in forested areas.

From: Rolfes, Christina [mailto:Christina.Rolfes@hdrinc.com]
Sent: Thursday, September 10, 2009 2:27 PM
To: Shank, Keith
Subject: WEST protocol review

Keith,

Per our phone conversation, here is a copy of the WEST Wildlife Baseline Study Plan protocol. If you could please review this protocol and provide a response indicating if these protocols are acceptable? A email response will be adequate.

Thanks Keith!

Christina Rolfes
Environmental Scientist

HDR ONE COMPANY | *Many Solutions*
701 Xenia Avenue South | Suite 600 | Minneapolis, MN | 55416
Phone: 763.278.5994 | Fax 763.591.5413 | Email: christina.rolfes@hdrinc.com

C. Pius Weibel
Chair
email: cweibel@co.champaign.il.us

Thomas Betz
Vice-Chair

Brookens Administrative Center
1776 East Washington Street
Urbana, Illinois 61802
Phone (217) 384-3772
Fax (217) 384-3896

SEAL OF THE COUNTY OF CHAMPAIGN, ILLINOIS
FEBRUARY 20, 1833

RECEIVED
SEP 17 2009
HDR Engineering, Inc.

Office of
County Board
Champaign County, Illinois

September 15, 2009

Jacqueline D. Hamilton
Environmental Project Manager
HDR One Company
701 Xenia Avenue S.
Minneapolis MN 55416

Re: Anticipated special use permit application for the California Ridge Wind Farm

Dear Ms. Hamilton:

I understand that you are preparing the special use permit application for the anticipated California Ridge Wind Farm on behalf of Invenergy. Champaign County awaits that application and our staff is available to answer your questions at any time. Because this is such an important project, I would like to clarify some rules regarding communications between County Board members and you or your client.

I have received copies of e-mail correspondence between you and County Board member Al Kurtz concerning your pending Special Use Permit with Champaign County. In reviewing the correspondence and discussing this matter with County legal staff, I would ask that in the future, you address such communications to John Hall, our Director of Planning and Zoning. Not only is this procedure more practical for you than trying to address the concerns of twenty-seven individual County Board members, it is also more in compliance with the requirements of our Zoning Ordinance in the Special Use Permit Procedure.

I have been assured that you received a copy of our Planning and Zoning Department handout entitled "Special Use Permit Procedure" and that you were told by our Planning and Zoning Director to feel free to address any concerns or questions you have about your Special Use Permit to him at any time. That is important to you because, as you know, the department is the staff for the Zoning Board of Appeals, the body which is authorized to determine whether your Special Use Permit should be granted, and also serves as staff to the County Board on all zoning matters.

County Board members are not authorized by our ordinance to negotiate or determine any issues related to your permit, and in fact it would be a conflict for any of our Board members to take any such action. Moreover, it is clear from the Illinois Supreme Court case, informally called the *Klaeren* decision, that proceedings related to a Special Use Permit are to be conducted in an adjudicatory manner, meaning that the decision-makers at any level cannot be contacted by the petitioner or any representative on the petitioner's behalf outside of the public hearing setting, and that there will be greater judicial scrutiny of the special use permit process if the decision is appealed to the Court.

I appreciate how important this process is to you and that you are undoubtedly going to have questions and concerns as you go through this process and I encourage you to contact our staff anytime you have a question. I also invite you to contact me at anytime that you have a concern or issue that you would like to share, about the process.

I hope that this letter has clarified how best to ensure that your questions and concerns are answered in a timely and correct manner so as to minimize the potential for any decision made by our Boards on this important project to end up in litigation.

Sincerely,

C. Pius Weibel

C. Pius Weibel
Champaign County Board Chair

XC: Jeff Veazie, Project Engineer, Invenergy, One South Wacker Drive, Suite 1900, Chicago IL 60696
John Hall, Director, Champaign County Planning & Zoning Department
Susan McGrath, Champaign County State's Attorney Office
Barbara Wysocki, Environment & Land Use Committee Chair

Illinois Department of
Natural Resources

One Natural Resources Way Springfield, Illinois 62702-1271
http://dnr.state.il.us

Pat Quinn, Governor
Marc Miller, Director

September 21, 2009

Mr. John Hall, Director
Champaign County Dept. of Zoning and Planning
Brookens Administrative Center
1776 E. Washington Street
Urbana, IL 61802

RE: Invenergy Wind LLC California Ridge Energy Center
Endangered Species Consultation Program
Natural Heritage Database Review #0906735

Dear Mr. Hall:

The Department has received information from Invenergy Wind LLC and HDR Engineering, Inc., pertaining to a proposed action in Champaign County, for the purpose of initiating consultation between the Department and Champaign County pursuant to the *Illinois Endangered Species Protection Act* [520 ILCS 10/11], the *Illinois Natural Areas Preservation Act* [525 ILCS 30/17], and Title 17 *Illinois Administrative Code* Part 1075.

After reviewing this information, the Department has determined the proposed action is in the vicinity of eighty-five (85) natural resource locations protected under these statutes, including eight INAI Sites registered as Illinois Land & Water Reserves or dedicated as Illinois Nature Preserves. Those believed relevant to a decision by Champaign County are listed on the accompanying EcoCAT Report.

It is the Department's opinion some INAI Sites and listed species are likely to be directly or indirectly adversely affected by the proposed action unless preventive measures are taken; but in some cases adverse effects may result in prohibited takings of listed species which require additional authorizations from the Department.

The Attachment discusses the effects expected at each IDNR-managed property, Illinois Natural Areas Inventory Site, Nature Preserve, Land & Water Reserve, and to each State-listed endangered or threatened species in sufficient detail for County officials to evaluate the project.

Of particular significance is the proximity of the Middle Fork of the Vermilion National Scenic River. At no point will the project physically encroach upon lands and waters which are formally protected by law. However, the Middle Fork Vermilion River, itself, provides essential habitat along and within its waters for no fewer than sixteen State-listed endangered or threatened species. High water quality, including consistently cool waters, is the key characteristic supporting these species. All areas within the proposed project footprint in Vermilion County drain to the Middle Fork. Consequently, the Department recommends the County consider imposing measures on the applicant to assure that siltation, sedimentation, and thermal pollution are minimized or avoided during construction and operation of the project.

Eight species of State-listed endangered or threatened birds are known to breed in the vicinity of the proposed project, while numerous migratory species pass through the area. In addition, the federally-listed Indiana Bat is a likely summer resident of the riparian woodlands of the Middle Fork and Salt Fork. The Department recommends the County require pre-and post-construction studies of avian use and bat activity of the project area, including acoustic monitoring of bat calls, with mortality studies following construction, to be filed with the County when completed. Any taking of endangered or threatened species should be promptly reported.

The Department's consultation process for this proposal is terminated, unless the County desires additional information or advice related to this proposal. However, consistent with Part 1075, the County must notify the Department of its disposition of recommendations pertaining to species or sites subject to the consultation process.

Termination does not imply the Department's approval or endorsement of this proposal. Consultation is valid only for a two-year period; if the proposed action is not implemented in that time, a new consultation will be necessary. The Natural Heritage Database is unable to state that no listed species exist within the project footprint, nor can it exclude the possibility that listed species other than those mentioned exist in the vicinity.

Should you need additional information regarding the consultation process, or should you have any questions, please do not hesitate to contact me.

Sincerely,

Keith M Shank

Keith M. Shank
Impact Assessment Section
Division of Ecosystems and Environment
Ph. (217) 785-5500
Fax (217) 524-4177

cc:

Illinois Department of
Natural Resources

One Natural Resources Way Springfield, Illinois 62702-1271
http://dnr.state.il.us

Pat Quinn, Governor
Marc Miller, Director

September 21, 2009

Mr. Bill Donahue
County Board Office
3rd Floor
6 North Vermilion
Danville, IL 61832

RE: Invenergy Wind LLC California Ridge Energy Center
Endangered Species Consultation Program
Natural Heritage Database Review #0906735

Dear Mr. Donahue:

The Department has received information from Invenergy Wind LLC and HDR Engineering, Inc., pertaining to a proposed action in Vermilion County, for the purpose of initiating consultation between the Department and Vermilion County pursuant to the *Illinois Endangered Species Protection Act* [520 ILCS 10/11], the *Illinois Natural Areas Preservation Act* [525 ILCS 30/17], and Title 17 *Illinois Administrative Code* Part 1075.

After reviewing this information, the Department has determined the proposed action is in the vicinity of eighty-five (85) natural resource locations protected under these statutes, including eight INAI Sites registered as Illinois Land & Water Reserves or dedicated as Illinois Nature Preserves. These are listed on the accompanying EcoCAT Report.

It is the Department's opinion many of these INAI Sites and listed species are unlikely to be directly or indirectly adversely affected by the proposed action, but in other cases adverse effects may result in prohibited takings of listed species or adverse modifications of Reserves or Preserves which may require additional authorizations from the Department and/or the Illinois Nature Preserves Commission.

The Attachment discusses the effects expected at each IDNR-managed property, Illinois Natural Areas Inventory Site, Nature Preserve, Land & Water Reserve, and to each State-listed endangered or threatened species in sufficient detail for County officials to evaluate the project.

Of particular significance is the proximity of the Middle Fork of the Vermilion National Scenic River. At no point will the project physically encroach upon lands and waters which are formally protected by law. Nevertheless, there is some potential for visual impacts to persons using the National Scenic River corridor. In view of the economic importance of the National Scenic River to the County, and its unique status within Illinois, the Department recommends the County request a visibility analysis from the project applicants which identifies the location and character of visual impacts, or which demonstrates that none will exist. If such impacts are identified, the County should consider whether action is appropriate to abate or to prevent such impacts.

The Middle Fork Vermilion River, itself, provides essential habitat along and within its waters for no fewer than sixteen State-listed endangered or threatened species. High water quality, including consistently cool waters, is the key characteristic supporting these species. All areas within the proposed project footprint in Vermilion County drain to the Middle Fork. Consequently, the Department recommends the County consider imposing measures on the applicant to assure that siltation, sedimentation, and thermal pollution are minimized or avoided during construction and operation of the project.

The Department has identified several natural resources which may be affected by the moving shadows cast by wind turbine blades, often referred to as "flicker." This represents a modification of existing environmental conditions which may affect essential habitats in ways that are not currently understood.

In view of the scale of investment this project represents, and the rare, even unique, nature of the natural resources involved, the Department recommends this effect be minimized on Department-managed lands, and be completely avoided on registered Land & Water Reserves and dedicated Nature Preserves. Local governments are mandated by statute to avoid planning any action which will adversely affect lands which are registered or dedicated.

A number of physical factors dictate the location, seasonality, time of day, and duration of flicker at any given point. The significant topographical relief associated with the Middle Fork and the presence of its riparian woodlands render a determination more difficult. The Department lacks sufficient information at this time to address this issue with certainty. Fortunately, modeling software is available to the wind energy industry which is capable of integrating topography and land cover to precisely define the location, seasonality, time of day, and duration of flicker for any proposed individual turbine location.

The Department recommends the County require a modeled flicker analysis for all wind turbines proposed to be sited within 1.5 miles of Department-managed lands or any registered Land & Water Reserve or dedicated Illinois Nature Preserve. Where such effects are indicated, the Department recommends the County impose measures to minimize or avoid them.

Eight species of State-listed endangered or threatened birds are known to breed in the vicinity of the proposed project, while numerous migratory species pass through the area. In addition, the federally-listed Indiana Bat is a likely summer resident of the riparian woodlands of the Middle Fork and Salt Fork. The Department recommends the County require pre-and post-construction studies of avian use and bat activity of the project area, including acoustic monitoring of bat calls, with mortality studies following construction, to be filed with the County when completed. Any taking of endangered or threatened species should be promptly reported.

The Department's consultation process for this proposal is terminated, unless the County desires additional information or advice related to this proposal. However, consistent with Part 1075, the County must notify the Department of its disposition of recommendations pertaining to species or sites subject to the consultation process.

Termination does not imply the Department's approval or endorsement of this proposal. Consultation is valid only for a two-year period; if the proposed action is not implemented in that time, a new consultation will be necessary. The Natural Heritage Database is unable to state that no listed species exist within the project footprint, nor can it exclude the possibility that listed species other than those mentioned exist in the vicinity.

Should you need additional information regarding the consultation process, or should you have any questions, please do not hesitate to contact me.

Sincerely,

Keith M Shank

Keith M. Shank
Impact Assessment Section
Division of Ecosystems and Environment
Ph. (217) 785-5500
Fax (217) 524-4177

cc:

Illinois Department of
Natural Resources
One Natural Resources Way Springfield, Illinois 62702-1271
http://dnr.state.il.us

Pat Quinn, Governor
Marc Miller, Director

December 4, 2009

Mr. Bill Donahue
County Board Office
3rd Floor
6 North Vermilion
Danville, IL 61832

RE: Invenergy Wind LLC California Ridge Energy Center
Endangered Species Consultation Program
Natural Heritage Database Review #0906735

Dear Mr. Donahue:

The Department has received information from Invenergy Wind LLC and HDR Engineering, Inc., pertaining to a proposed action in Vermilion County, for the purpose of initiating consultation between the Department and Vermilion County pursuant to the *Illinois Endangered Species Protection Act* [520 ILCS 10/11], the *Illinois Natural Areas Preservation Act* [525 ILCS 30/17], and Title 17 *Illinois Administrative Code* Part 1075.

After reviewing this information, the Department has determined the proposed action is in the vicinity of eighty-five (85) natural resource locations protected under these statutes, including eight INAI Sites registered as Illinois Land & Water Reserves or dedicated as Illinois Nature Preserves. These are listed on the accompanying EcoCAT Report.

It is the Department's opinion most of these INAI Sites and listed species are unlikely to be directly or indirectly adversely affected by the proposed action, but in other cases adverse effects may result in prohibited takings of listed species which may require additional authorizations from the Department.

The Attachment discusses the effects expected at each IDNR-managed property, Illinois Natural Areas Inventory Site, Nature Preserve, Land & Water Reserve, and to each State-listed endangered or threatened species in sufficient detail for County officials to evaluate the project.

Of particular significance is the proximity of the Middle Fork of the Vermilion National Scenic River. At no point will the project physically encroach upon lands and waters which are formally protected by law. Nevertheless, there may be some potential for visual impacts to persons using the National Scenic River corridor. In view of the economic importance of the

National Scenic River to the County, and its unique status within Illinois, the Department recommends the County conduct or request a visibility analysis which identifies the location and character of visual impacts, or which demonstrates that none will exist.

The Middle Fork Vermilion River, itself, provides essential habitat along and within its waters for no fewer than sixteen State-listed endangered or threatened species. High water quality, including consistently cool water temperatures, is the key characteristic supporting these species. All areas within the proposed project footprint in Vermilion County drain to the Middle Fork. Consequently, the Department recommends the County require measures to assure that siltation, sedimentation, and thermal pollution are minimized or avoided during construction and operation of the project.

Five species of State-listed endangered or threatened birds are known to breed in the vicinity of the proposed project, while numerous migratory species pass through the area. In addition, the federally-listed Indiana Bat is a likely summer resident of the riparian woodlands of the Middle Fork and Salt Fork. The Department recommends the County require pre-and post-construction studies of avian use and bat activity of the project area, including acoustic monitoring of bat calls, with mortality studies following construction, to be filed with the County when completed. Any taking of endangered or threatened species should be promptly reported to both the County and to the Department.

The Department's consultation process for this proposal is terminated, unless the County desires additional information or advice related to this proposal. However, consistent with Part 1075, the County must notify the Department of its disposition of recommendations pertaining to species or sites subject to the consultation process.

Termination does not imply the Department's approval or endorsement of this proposal. Consultation is valid only for a two-year period; if the proposed action is not implemented in that time, a new consultation will be necessary. The Natural Heritage Database is unable to state that no listed species exist within the project footprint, nor can it exclude the possibility that listed species other than those mentioned exist in the vicinity.

Should you need additional information regarding the consultation process, or should you have any questions, please do not hesitate to contact me.

Sincerely,

Keith M. Shank

Keith M. Shank
Impact Assessment Section
Division of Ecosystems and Environment
Ph. (217) 785-5500
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cc: Jeff Veazie, Invenergy LLC, Inc.
Jacqueline Hamilton, HDR, Inc.

Attachment

Invenergy California Ridge Wind Energy Center
Vermilion County

Wildlife Impact Recommendations

Vermilion County may wish to consider permit conditions requiring the applicant to monitor, assess, and report possible fish and wildlife effects of the proposed action in the following ways.

$ Evaluate the visual impacts, if any, of the project to recreational users of the Middle Fork National Scenic River.

$ Incorporate best management practices to minimize risk to federally-listed and state-listed species, as outlined in this Attachment. Focus should be on appropriate avoidance and minimization of habitat disturbance, with mitigation measures implemented as applicable.

$ Where feasible, permanent engineering solutions to soil erosion and water quality issues should be required and maintained, particularly with reference to service and access roads.

$ Perform pre-construction assessments of avian and bat usage within the project area. Such assessments should include inventories of habitat types in and near the project area, including crop rotations or choices, and observations of both migratory and resident bird usage. Consideration of all seasons should be included, although spring migration is anticipated to be of greatest interest. Acoustic bat activity monitoring is also appropriate, particularly during the fall migratory season when activity would be expected to be highest. Specific federally-listed and state-listed species of interest are discussed in the following narrative. Risks to protected species should be evaluated and appropriate regulatory permits sought for potential incidental taking of protected animals.

$ Perform at least one year of post-construction monitoring and assessment, noting any changes in wildlife usage patterns and evaluating potential causes of such changes.

$ Consideration should be given to periodic repetition of the post-construction wildlife surveys during the life of the project.

Natural resources within, or in the vicinity of, the proposed wind energy facility are listed below, along with a discussion of potential issues.

Coal Resources

According to the Illinois State Geological Survey databases, no known past coal mining locations are associated with the proposed project footprint, despite the presence of significant coal resources. However, the developer may wish to verify the ownership of the mineral rights beneath turbine lease locations to determine if mining conflicts exist, whether past or future, which might pose issues of geologic stability for wind turbines.

State Lands; Nature Preserves; Land & Water Reserves; and INAI Sites

National Scenic River - Middle Fork of the Vermilion River

A portion of the Middle Fork comprises the State's only designated National Scenic River. The reaches of the River closest to the project area (less than two miles) are formally protected as a National Scenic River where title (fee or easement) is held by the Illinois Department of Natural Resources, but this legal protection extends only 500 feet from the River's center-line. However, in this area the River lies in a valley more than 100 feet below the uplands likely to host turbines, and the valley walls are typically forested, circumstances which should considerably reduce the visibility of turbines to recreational users of the River. Nevertheless, it may be that from some points on the River turbines may be visible.

A visibility analysis is appropriate to determine to what degree the operation of wind turbines in the project area may degrade the recreational experience of persons on the River, and the County may wish to consider the impacts to economic benefits derived from tourism and recreation.

The river's riparian corridor forms an important avenue for the movement of all forms of wildlife, providing food and shelter for both migrant and resident species. By no means is wildlife limited to this area, however. Recent radar-based studies along the Illinois River demonstrate that even waterfowl may arrive and depart cross-country, rather than following the river. Hence, distance from the river provides no assurance that wildlife commonly found there will not also occur within the project area.

Erosion related to wind energy facility construction and operation has the potential to adversely affect the Middle Fork and its tributaries through siltation and sedimentation, while disruption of field tile systems may temporarily or permanently adversely modify the prevailing thermal regime in feeder stream habitats essential to Middle Fork fish, reptiles, amphibians, and mussels, including many State-listed endangered or threatened species, several of which are unique to the Vermilion River system in Illinois.

Measures should be adopted to minimize erosion and siltation related to construction and maintenance of the project, and to facilitate tile repairs. Fortunately, much of the project is located outside of the watershed of that portion of the Middle Fork which is designated as National Scenic River.

Middle Fork of the Vermilion River INAI Site

The Middle Fork of the Vermilion River is a designated Illinois Natural Areas Inventory (INAI) Site, from its confluence with the Salt Fork east of Oakwood, upstream to the northern boundary of Champaign County, well beyond the reaches designated as National Scenic River. The Middle Fork, its tributaries, and its riparian forests support a plethora of federally-listed and State-listed endangered and threatened species, including protected mussels, fish, amphibians, reptiles, bats, raptors and other birds. <u>All drainage from the north side of the project, whether in Vermilion or Champaign Counties, enters the Middle Fork INAI Site.</u>

High water quality is a hallmark of this stream. Erosion related to wind facility construction and operation has the potential to adversely affect tributaries and the Middle Fork through siltation and sedimentation, and to adversely modify feeder stream habitats essential to Middle Fork fish and mussels, several of which are unique to the Vermilion River system in Illinois.

Salt Fork of the Vermilion River INAI Site

The Salt Fork is designated as an INAI Site from a point northwest of Homer downstream to its confluence with the Middle Fork. This reach of the River supports numerous aquatic listed species of fish, mussels, reptiles, and amphibians, including the **Mudpuppy Salamander**, the **Bigeye Chub**, **Bluebreast Darter**, **River Redhorse**, **Blanding's Turtle**, **Wavy-Rayed Lampmussel**, **Purple Wartyback**, and the **Salamander Mussel**.

The Salt Fork receives the drainage from the **Spoon River INAI Site**, and from Stoney Creek and Feather Creek. All three of these streams drain significant portions of the proposed project area.

Spoon River INAI Site

The Spoon River is a tributary of the Salt Fork of the Vermilion River, located entirely within Champaign County south of Gifford. Although it is completely channelized and maintained by the Spoon River Drainage District, it has been designated because it retains unusually high fish diversity, likely due to its constant influx of cool tile drainage. While this resource is not located in Vermilion County, a decision by Vermilion County to proceed has implications for the Spoon River INAI.

The Spoon River INAI could be adversely modified by erosion and siltation related to turbine construction, and by disruption of the numerous agricultural tile-drains which feed it and maintain its temperature.

Middle Fork State Fish & Wildlife Area

The 4,120-acre Middle Fork SFWA occupies lands on both sides of the Middle Fork River, the nearest of which abut the project area's eastern boundary. The formally-designated National Scenic River begins at the north boundary of the SFWA and extends southward to Rt. 150. Turbines will be visible from within the SFWA, from along its western margins, and perhaps from high ground east of the Middle Fork of the Vermilion River.

The Department believes that only a small area at the southwest corner of the SFWA may be potentially swept by "flicker" effects, but it also believes that screening vegetation and topography will prevent flicker shadows from impinging on IDNR property.

In addition to a Nature Preserve, a Land & Water Reserve, five INAI Sites, and numerous state-listed endangered or threatened species within its boundaries, the SFWA also constitutes an important staging area for both migratory birds and bats, which may increase the risk of wildlife colliding with turbine blades due to the project's near proximity.

Other indirect, cumulative effects from the project (siltation and erosion) may be incurred via the river corridor.

Kickapoo State Recreation Area

This 2,700-acre State Park, once heavily strip-mined for coal, is one of the State's most popular camping, boating, fishing, and recreation destinations. Outdoor recreation is an important factor in Vermilion County's economy. The Park is located mainly north of Interstate 74, on both sides of the Middle Fork. It contains the lower terminus of the National Scenic River designation, and provides essential habitat for a large number of State-listed endangered or threatened species.

The closest portions of the wind energy project area lie less than one mile from the Park's northwestern corner. Wind turbines will be easily visible from the western boundaries of the Park at many locations, though most visitor activities will be concentrated in areas where visibility will not be an issue due to topography and land cover.

Kennekuk Cove County Park and INAI Site

This INAI Site is located on the southern portions of the 3,000-acre Kennekuk Cove County Park, a property managed by the Vermilion County Conservation District, on the east bank of the Middle Fork. The INAI Site at its nearest is about two miles east of the project area. No part of the Park receives drainage from the project area, except by way of the Middle Fork.

However, because of its position on high ground east of the Middle Fork, wind turbines may be visible from some portions of the County Park.

The major biological significance of the Park's proximity is that it provides significant staging and breeding habitat for bats and migratory birds, including the State-listed endangered Northern Harrier.

Kinney's Ford Seep Land & Water Reserve and INAI Site

Kinney's Ford Seep LWR lies within the northern part of the Middle Fork SFWA, two miles northeast of the closest portion of the project area, near the confluence of Collison Branch Creek with the Middle Fork. Despite its proximity to the project, topography makes it unlikely turbines will be visible from within the Reserve, or that "flicker" effects will be present at any time of year. The seep community of this Site is sensitive to ground water recharge impacts, but no project activities will be performed within the likely ground water recharge zone of this protected area.

Horseshoe Bottom Nature Preserve and INAI Site

This 100-acre Nature Preserve, as its name implies, is located in the Middle Fork bottoms, less than two miles northeast of the project. However, topography and land cover render it unlikely that turbines will be visible from the Preserve. Among its other biological values, it provides essential habitat for the State-listed endangered **Blanding's Turtle**.

Middle Fork Seeps INAI Site

These forested seeps are located on the *eastern* valley wall of the Middle Fork, facing the project, about 1.5 miles from the project area. Turbines may be visible to visitors in the winter, following leaf-fall, since the western valley wall at this point has little forest cover. Since it lies on the east bank, there is no potential for project activities to affect or alter ground water recharge zones for the seeps.

Fairchild Cemetery Prairie/Savanna Nature Preserve and INAI Site

This small (< one acre) Nature Preserve is part of the Kennekuk Cove County Park complex. It is located about 3.5 miles east-northeast of the project area and east of the Middle Fork. Because it lies on relatively high ground near the headwaters of Windfall Creek, project turbines may be visible to Nature Preserve visitors, although they may be screened by the forested bluffs of the Middle Fork SFWA or other intervening land covers.

Windfall Prairie Nature Preserve and INAI Site

This 60-acre Nature Preserve is located on the *east* bank of the Middle Fork, rising from the River to the top of the eastern bluffs, facing the project. In addition to riparian forest, it contains hill prairie and calcareous seep natural communities, and contains at least one State-listed endangered plant (**Wolf's Bluegrass,** *Poa wolfii*).

Because the nearest portions of the project area, only two miles southwest of the Nature Preserve, are of equal or higher elevation to the prairie areas of the Nature Preserve, and turbines will likely reach nearly 400 feet higher than that, it is likely that turbines will be visible to visitors in the Nature Preserve, although such visibility could be seasonal, limited to periods when the Preserve's deciduous trees are bare.

Orchid Hill Natural Heritage Landmark INAI Site

This 120-acre Natural Heritage Landmark INAI Site is home to an unusual number of native orchids and other rare plant groupings. Located adjacent to the extreme eastern end of the project area, near the existing coal-fired power plant, this forested area marches down the western bluff of the Middle Fork valley. Turbines are unlikely to be visible from the western margins of the INAI Site, due to screening vegetation, which will also serve to prevent flicker shadows from affecting the Site.

Middle Fork Woods Nature Preserve and INAI Site

This 77-acre Nature Preserve within Kickapoo State Recreation Area provides essential habitat to the very rare endangered **Silvery Salamander**. The Preserve is located about 2.5 miles south and east of the project area. Because it is completely surrounded by forest, no turbines will be visible from within the Preserve, nor does it lie in a watershed which may be affected by turbine construction.

Rock Cut Road Botanical Area INAI Site

Located just southwest of Middle Fork Woods, above Glenburn Creek but outside Kickapoo SRA, this INAI Site provides essential habitat for the State-listed threatened **Fibrous-Rooted Sedge,** *Carex communis*. Distance and topography assure this INAI Site and its population of the Fibrous-Rooted Sedge will not be affected by the proposed project.

Larimore's Salt Fork of the Vermilion Land and Water Reserve and INAI Site

This LWR consists of the channel and floodplain of the Salt Fork Vermilion River south of Muncie. In a valley and five miles south of the project area, the LWR will sustain no effects from the proposed wind farm.

Edgewood Farm land and Water Reserve and INAI Site

Located along the Salt Fork southeast of Ogden, and more than seven miles from the project area, the higher elevations of the LWR exceed 660 feet MSL, about the same elevation as the wind farm. Consequently, wind turbines may be visible from the higher elevations within the LWR unless forests on the opposite side of the Salt Fork valley are tall enough to screen them. However, at that distance, visibility is not likely to be obtrusive to site users.

Pellville Cemetery INAI Site

Pellville Cemetery lies 14 miles north of the project area, just west of Rankin and on the opposite side of the Middle Fork's valley. A keen-eyed observer at Pell Cemetery might possibly be able to see California Ridge turbines under conditions of excellent visibility, but they are unlikely to intrude on a visitor's experience. The Cemetery supports breeding pairs of the Henslow's Sparrow and other migratory birds, whose migratory passages could pose issues for the project.

Henschel Workman State Habitat Area

The Department's 135-acre Henschel Workman State Habitat Area is located southeast of Rankin in Vermilion County, about 13 miles north of the project footprint. It supports breeding Henslow's Sparrows and provides a large expanse of suitable wintering habitat and migratory staging area attractive to other migratory and State-listed bird species, whose migratory passages could pose issues for the project.

Sleeter State Habitat Area

The 103-acre Sleeter SHA is located about 1.5 miles northwest of Gifford in Champaign County. It lies eight miles northwest of project areas within Vermilion County, but only four miles from the nearest project areas in Champaign County. Turbines located in both Champaign and Vermilion Counties will be visible to site users, but this should have little impact on hunting activities, the major recreational use of this site. However, the Sleeter SHA may be a focal point for birds whose migratory passages could pose issues for the project.

Documented Listed Species In The Vicinity

Indiana Bat, *Myotis sodalis*

Summer nursery colonies of this bat, listed by the federal government and Illinois as endangered, have been documented in forested riparian tracts along the Middle Fork of the Vermilion River and the Big Four Ditch in Ford County, north of the project area, and along the Little Vermilion River in the southern half of Vermilion County. It is reasonable to assume that this species traverses or roosts in the intervening segments of the Vermilion River system.

Nursing females may forage above crop-fields a mile or more from the nursery colony. This species winters in caves or mines some distance from summer habitats, but its migratory behavior is poorly understood. No hibernation sites are known from Vermilion County, although critical hibernating habitat is known in LaSalle County. It is surmised that bats using the Middle Fork for summer habitat most likely migrate from hibernation sites in southwestern Indiana and Kentucky, although a banding study in the 1970's indicated that at least some LaSalle County bats move in this direction.

The risk to bats from collisions with moving wind turbine blades appears to be much higher than for birds. To date, no Indiana Bats have been documented as killed by wind turbines. But, until recently, no utility-scale wind farms have been proposed or constructed within the range of Indiana Bats, so the risk to this species from wind turbines remains unquantified.

The project area itself appears to contain no potential summer nursery or roosting habitat for the Indiana Bat, but directly abuts riparian forests; individuals roosting along the Middle Fork may forage above fields within the project area.

Because the winter hibernation sites of these bats are unknown, the greatest risk may be to Indiana Bats migrating across or through the project area. Efforts to identify and monitor the foraging and migration behavior of this bat population may establish the degree of risk which this facility would pose to this species.

The Department is unable to evaluate the potential for an incidental take of an Indiana Bat at this facility based on existing data; capture studies along creeks in the nearer vicinity of the project may be advisable. More common bat species undoubtedly occupy habitats in the vicinity, and are at risk of mortality, directly through collisions with wind turbines, or indirectly through barotrauma (lung hemorrhages caused by extremely low air pressures in the vortices created by wind turbine vanes).

Vermilion County is particularly rich in bat fauna: a 1996 netting survey on the Little Vermilion River east of Georgetown captured seven of nine species whose ranges include Vermilion County: the Eastern Red Bat, Hoary Bat, Northeastern Myotis, Eastern Pipistrelle, Big Brown and Little Brown Bats, in addition to the Indiana Bat. An acoustic bat survey is recommended, particularly during the fall bat migratory season (August 1 through October 31) when activity would be expected to be the highest, in order to characterize bat activity in the project area. A high level of bat activity may warrant post-construction mortality studies.

Blanding's Turtle, *Emydoidea blandingii*

Effective October 30, 2009, the Blanding's Turtle was listed by Illinois as "endangered

The Blanding's Turtle, distinguishable by its solid bright yellow lower jaw and throat, has been documented most recently in the Middle Fork SFWA (Horseshoe Bottom Nature Preserve), about two miles from the project area. No estimate of the local population size is available, but observations are rare, suggesting few individuals. While the existing population may be small and localized, the entire Vermilion River system is accessible to this species. In Northern Illinois, the species frequently ascends waterways to access open upland areas for nesting.

The Blanding's Turtle reaches sexual maturity only after 15-20 years, and has a documented life-span beyond 70 years, although females beyond age 50 may not be reproductively active. This species is known to move widely across the landscape, following streams and drainage ditches, but also moving overland when necessary. Overland movements typically occur at night. It is believed to demonstrate fidelity to nesting and hatching areas, attempting to return to its own natal site for egg-laying. The species is known to nest farther from the water than any other aquatic turtle in North America, at times nesting up to a mile inland. The species' life cycle appears to be compatible with row-crop agriculture, since egg-laying occurs in late spring or early summer after planting, and hatching usually occurs before harvest. Vermilion County lies near the southern limits of the species' range, so overwintering in the nest by hatchlings should be a rare occurrence.

The main threats to this species are nest predation by skunks, raccoons, and other mammalian predators, road-kill, and poaching (illegal collection for the pet trade). Wind energy construction activities may result in disturbance of traditional nesting areas, the destruction of nests, the entrapment of individuals in excavations, and road-kill.

Workers on the project should be educated about this species' appearance and behavior; excavations left open overnight should be covered and inspected before filling: and any Blanding's Turtle observed should be documented with photographs and reported to the Department of Natural Resources. A Turtle may not be moved to facilitate the project unless the applicant has obtained an Incidental Take Authorization.

Smooth Softshell Turtle, *Apalone mutica*

Effective October 30, 2009, the Smooth Softshell was listed by Illinois as "endangered

This aquatic turtle inhabits larger streams and rivers, in segments with sandy substrates and sand bars. Regarded as a delicacy by many fishermen, this species has suffered from over-collecting, while pollution, siltation, and sedimentation have degraded many habitats. This species has been documented in Vermilion County, and it is potentially present in all reaches of the Vermilion River system.

Unless transportation of wind turbine components requires the upgrade or reconstruction of bridges, there should be little risk of direct adverse effects to this species. Erosion and siltation pose indirect threats.

River Redhorse, *Moxostoma carinatum*

The State-listed threatened River Redhorse is a member of the sucker family which feeds largely on invertebrates, including young mussels and crustaceans, for which it possesses specialized grinding teeth. It prefers medium-to-high-gradient rivers and streams with clean sand, gravel, and cobble substrates. The River Redhorse has been recorded in the Middle Fork as far north as the Middle Fork SFWA, but is more common in the Salt Fork.

Erosion related to turbine construction and maintenance may degrade stream-bed habitats or suppress populations of prey species. Because the River Redhorse rarely ascends small tributaries, direct adverse effects are unlikely.

Eastern Sand Darter, *Ammocrypta pellucidum*

This small fish is listed by Illinois as "threatened." Restricted to streams in the Wabash drainage of Illinois, it requires high water quality and bottom substrates of clean sand in fairly swift waters, requirements satisfied by all branches of the Vermilion River. Soil erosion and sedimentation pose the main threats to this species, followed by chemical pollution.

Bigeye Chub, *Hybopsis amblops*

The State-listed endangered Bigeye Chub is another small fish found only in the Wabash River watersheds of Illinois, but generally in smaller creeks and streams. It is present in the Middle

Fork, the Salt Fork, and Stoney Creek. Degradation of water quality and alteration of stream habitats are the main threats to this species.

<u>Mussels</u>

The Salt Fork, Middle Fork, and North Fork of the Vermilion River, and their tributary creeks, provide essential habitat for a large number of freshwater mussels, among the most endangered organisms in North America. High water quality remains the most essential habitat requirement.

Federally-listed species found, or once found, in these streams include the **Clubshell**, *Pleurobema clava*, and the **Riffleshell**, *Epioblasma torulosa*. A cooperative program between the U.S. Fish & Wildlife Service and the IDNR is planned to re-introduce the extirpated Riffleshell, and to augment the existing Clubshell population.

Headwater streams are most likely to support populations of the **Slippershell**, *Alasmidonta viridis*, and the **Little Spectaclecase**, *Villosa lienosa*. Broadly distributed lower down are populations of the **Wavy-Rayed Lampmussel**, *Lampsilis fasciola*; **Rainbow**, *Villosa lienosa*; **Purple Wartyback**, *Cyclonaias tuberculata*; **Kidneyshell**, *Ptychobranchus fasciolaris*; **Rabbitsfoot**, *Quadrula cylindrica*, and **Purple Lilliput**, *Toxolasma lividus*.

The **Salamander Mussel**, *Simpsonaias ambigua*, is the only species in its genus, and is also unique among North American mussels as the only species with a non-fish glochidial host, the **Mudpuppy**, *Necturus maculosus*. The Salamander Mussel has been documented at seven locations in Vermilion County since 1980, in the North Fork, the Middle Fork, and in Stony Creek, a tributary of the Salt Fork. A small mussel (two inches or less), and commonly found beneath rocks and debris, where the Mudpuppy spends much of its time, the Salamander Mussel is likely under-sampled by the typical non-targeted mussel survey, and may be more locally common than these records indicate.

<u>**Four-Toed Salamander**, *Hemidactylium scutatum*</u>

This four-inch-long amphibian is present in the riparian forests along Collison Branch Creek in the Middle Fork SFWA. While woodland vernal pools used for breeding may be the most essential habitat component for this species, this salamander may be found more than a thousand feet from the nearest wetlands, beneath forest floor litter and detritus where sufficient moisture is available. This species will not be found in grasslands or row-crop fields.

It is unlikely this species occurs within the project footprint. However, good water quality remains important; Collison Branch rises in Section 9 and 10 within the project area. Sound erosion controls in these areas will be important in maintaining good habitat conditions downstream.

<u>**Silvery Salamander**, *Ambystoma platineum*</u>

This six-inch-long salamander is unusual because its population is entirely female; egg production is stimulated by exposure to the sperm of the much more common **Small-Mouthed**

Salamander, *Ambystoma texanum*, which commonly shares its habitats, but there is no genetic interplay. (But this also means the presence of *A. texanum* is a crucial factor for the successful reproduction of *A. platineum*.) The Silvery Salamander may also occur with the endangered **Jefferson Salamander**, *Ambystoma jeffersonianum*, from which it cannot be distinguished except through analysis of its DNA chromosome count or the size of its red blood cells. (The populations in question here have been established by these tests to be Silvery Salamanders.)

A population within the Kickapoo SRA is beyond the range of effect from the proposed project. A second population, however, in Middle Fork Woods SFWA, five miles to the north, has a breeding pond less than a mile from portions of the project area draining to Gimlet Branch Creek. While the existing breeding pond should not be at risk from effects stemming from the project, a species recovery effort is now underway to create or enhance potential new breeding areas extending as far south as Cox Hollow, which drains the easternmost portions of the project area.

Salamanders can disperse surprising distances where suitable cover exists, and may potentially occur in any local woodlands, upland or lowland, which are connected to the more-or-less continuous riparian forest along the Middle Fork. Developers should avoid any direct impact to woodlands along streams feeding the Middle Fork, to assure any takings of listed salamanders are avoided.

<u>Mudpuppy, *Necturus maculosus*</u>

Effective October 30, 2009, the Mudpuppy was listed by Illinois as "threatened."

The Mudpuppy is the only known glochidial host of the State-listed endangered **Salamander Mussel**, *Simpsonaias ambigua*, a species which is now being evaluated for federal listing under the Endangered Species Act; the decline of the Mudpuppy may be a major factor in the disappearance of the Salamander Mussel.

The Mudpuppy never develops beyond an aquatic larval stage, and so is never found in terrestrial habitats. It inhabits clear rivers, creeks, streams, lakes, and ponds, but conceals itself under rocks or woody debris during the day, feeding actively at night. It typically goes unseen except by fishermen, who sometimes catch it inadvertently. It can cope with some siltation and sedimentation so long as clear gravelly headwater areas remain available for reproduction.

The Vermilion River system is one of the last "strongholds" for this species in the state, and it should be presumed to be present throughout. Stony Creek drains the central portion of the project area, and has the most recent records for the Salamander Mussel, indicating a Mudpuppy population is present in Stoney Creek. The species has also been reported from the Middle Fork SFWA.

Cool or cold water is essential for this species, which remains active all winter; water temperatures above 72°F are harmful, and those above 77°F can be fatal. Agricultural tile drainage helps lower and maintain stream temperatures, but the removal of riparian trees and shrubs exposes streams to direct solar radiation and heating. In-stream cover provided by rocks and woody debris is essential for concealment and reproduction, since eggs are suspended from the bottoms of rocks and logs. The common belief that removal of woody debris from stream channels improves drainage is a factor in the decline of this species.

Major threats include pollution, siltation and sedimentation, stream channelization, and woody debris removal. The main risks associated with wind energy projects will be direct stream modification through the repair or upgrade of roads, modification of aquatic thermal regimes through the disruption of agricultural tile drainage systems, and siltation and sedimentation associated with construction and permanent features, such as service roads, which suppress prey populations and render spawning areas unsuitable. Any planned in-stream work may require an Incidental Take Authorization.

Least Bittern, *Ixobrychus exilis*

This small heron nests in the emergent vegetation of marshes. It has been documented from Kennekuk Cove County Park in Vermilion County, and from wetlands near the Middle Fork in northeastern Champaign County.

Known breeding locations are unlikely to be affected by the project, although there may be a collision risk for migrating Bitterns. Generally speaking, waterfowl are rarely the victims of collisions with wind turbines, so this risk may be low.

Northern Harrier, *Circus cyaneus*

The State-listed endangered Northern Harrier is a ground-nesting grassland hawk. It has been recently documented as nesting in Vermilion County, both within--and within a few miles of--the project footprint. Also a frequently-observed migrant, the species has a statewide range. While many sources indicate the species needs large open areas of habitat, Illinois studies have demonstrated this hawk can use relatively small patches of habitat for successful breeding, especially in the vicinity of larger habitats. Breeding is often associated with wetlands such as marshes, sedge meadows, and wet prairies.

While most hunting activities occur at fairly low altitudes, below typical rotor-swept elevations, hunting can expose this bird to collision risk. Like the Upland Sandpiper, this species engages in an aerial courtship display which places it at risk of collision with wind turbines. Wind farm construction and operation may alter concentrations of prey species.

This hawk relies heavily on its acute hearing to locate prey, and--if the noise generated by wind turbines interferes with this function (which is not known to be the case)--turbines might adversely affect their ability to hunt near the turbines, reducing available food resources.

If pre-construction surveys indicate use of the project area by migrant Harriers, post-construction surveys should be performed to determine whether the Harrier continues to hunt territories in proximity to turbines.

Barn Owl, *Tyto alba*

This endangered raptor nests in larger tree cavities and in barns or abandoned buildings, sometimes within city limits. A breeding record exists for Champaign County, about four miles northwest of Rantoul; none have been recorded from Vermilion County since the species was listed. This owl hunts both open woodlands and grasslands; its preferred prey consists of small rodents such as mice and voles. The main risk posed by wind power facilities to this species is the removal of suitable nesting trees and abandoned buildings to facilitate transportation of wind turbine components or to maximize wind energy conversion. Both trees and buildings should be examined for Barn Owl occupancy prior to removal.

Short-Eared Owl, *Asio flammeus*

The endangered Short-Eared Owl nests and winters in grasslands and wetlands. Vermilion County lies in both breeding and wintering ranges, and breeding Short-Eared Owls were reported from two separate locations in Vermilion County in 1990. Large numbers of wintering owls are observed annually in suitable winter habitat in Iroquois County.

Highly nomadic, the Short-Eared owl depends heavily on vole and mouse populations, and the size of its breeding and hunting territories varies inversely with prey population sizes. When prey populations are high, owls may be ground-roosting every few meters in suitable habitat. The Northern Harrier often harasses this Owl, stealing its food.

This Owl's hunting flights are often less than ten feet off the ground (a circumstance which makes this bird highly vulnerable to collisions with vehicles); during aerial mating rituals, flights occur at typical wind turbine rotor-swept height. This Owl is highly dependent on its acute hearing to locate and seize prey. The degree to which noise from wind turbines may interfere with predation behavior is unknown.

The effects of wind turbines on Short-Eared Owls may be heavily influenced by the proximity of turbines to breeding, roosting, and hunting areas. Once turbines are built, this proximity relationship will be subject to change as land owners alter land management practices. This is likely to be of concern mainly if attractive habitat for Owls and their prey is created within or near the turbine array following construction.

Upland Sandpiper, *Bartramia longicauda*

This State-listed threatened grassland bird prefers habitat of short-grass prairie/pasture. For many years this ground-nesting species was thought to be area sensitive, requiring ten acres or more of grassland habitat for successful breeding. However, many recent breeding efforts are occurring in grassed waterways of row-crop fields, which provide considerably less than ten acres of habitat, and from along roadsides.

A breeding record exists for Vermilion County, near the Danville airport. Additional breeding records are associated with the University of Illinois and the Champaign-Urbana Airport.

The Upland Sandpiper engages in an aerial courtship display which passes through the rotor-swept elevations of utility-scale wind turbines, placing it at risk of collision mortality. Whether this species will be sensitive to the proximity of vertical structures, or to shadow "flicker" on potential nesting areas, has not been demonstrated.

The Department recommends mapping all habitat types within the project footprint, and checking even relatively small areas of appropriate habitats for the presence of this species prior to any initiation of construction disturbance during the breeding season.

Potential Listed Species

Franklin's Ground Squirrel, *Spermophilus franklinii*

The State's largest ground squirrel was listed as "threatened" in 2004. Most active above-ground on sunny days in late spring and early summer, this species hibernates for seven to nine months of the year. It prefers taller vegetation than other ground squirrels, and so is seldom seen. Well-drained ground is a requisite, so today this species is most often found along railroads and highways where its requirements for food and shelter are satisfied. There appears to be no suitable habitat within the project footprint, but transport of turbine components often requires rebuilding or repairing roadways some distance from the destination.

The Franklin's Ground Squirrel has been documented along railroads near Hoopeston, and along former rail-beds near St. Joseph in Champaign County. Offspring can disperse up to a mile in their first season. If present, this species can be threatened during construction through the crushing and collapse of its burrows by heavy equipment. Shadow flicker cast in its territory by operating turbines may also be detrimental.

Ornate Box Turtle, *Terrapene ornata*

Effective October 30, 2009, the Ornate Box Turtle was listed by Illinois as "threatened."

This terrestrial turtle is usually found in open grasslands and fields, in contrast to its cousin, the Eastern Box Turtle, which is usually found in woodlands. This turtle hibernates underground from late September through April, so it cannot evade disturbance during that period. Its carapace carries elaborate markings, including a yellow bar along the spine, which distinguishes it from the other species. While it appears to be more common in sandy soils, it is not restricted to them. Specimens have been collected from both Iroquois and Champaign County.

As with many turtles, road-kill and over-collecting are major causes of decline. In a recent study of a northwestern Illinois population, a significant number of individuals exhibited carapace scarring from farming equipment (discs and harrows), illustrating that this species may frequently be found in rowcrop fields.

Preferred habitat of this species may not be present in the project area, but too little is known of this species' current distribution to rule out its presence. Project workers should be educated as to its appearance and habits, remain alert for turtles on roads and in fields, and report any suspected Ornate Box Turtles to supervisors. The Department of Natural Resources should be promptly notified if any Ornate Box Turtles are identified. Once listed, it will be unlawful to move or capture an Ornate Box turtle to facilitate the project without first obtaining an Incidental Take Authorization from the Department.

Loggerhead Shrike, *Lanius ludovicianus*

The threatened Loggerhead Shrike is adapted to the savanna conditions of interspersed grasslands, shrubs, and trees. This species has been adversely affected by the decline in animal husbandry and the abandonment of the "shelter-belt" fence-row conservation practice, which has severely reduced both breeding and foraging habitat. The Shrike, also known as the "butcher bird," needs thorny trees and shrubs, even barbed wire, on which to impale its prey, which may be left for several days before being eaten. Areas which support large insects and small rodents, major food items, are also necessary. Due to losses of suitable habitat, Loggerhead Shrikes may attempt reproduction in trees near human habitations and in other areas where they would normally not be expected. The Shrike has not been reported as breeding in Vermilion County since its listing, but has been reported from Champaign County.

The primary consideration for wind energy facilities is the potential for further loss of remaining habitat, if fence-rows are cleared to avoid wind turbulence or to improve turbine exposure, or if road-side trees are cleared to create turning radii for turbine carriers or to establish power lines. A pre-construction survey to identify the presence of Shrike nests should be conducted for areas with suitable habitat if work is proposed during the breeding season in order to avoid direct mortality. "Resident" foraging birds are not thought to be at significant risk from operating wind turbines, but potential risk associated with migrants should be considered.

Black-Billed Cuckoo, *Coccyzus erythropthalmus*

Effective October 30, 2009, the Black-Billed Cuckoo was listed by Illinois as "threatened."

This bird nests in interior thickets of forested tracts and feeds heavily on caterpillars. This species was documented as nesting at Jordan Creek of the North Fork Nature Preserve in the 1990's, and Vermilion County has thousands of acres of suitable nesting habitat along its streams and rivers. This species is not directly threatened by wind turbine construction or operation, but may be subject to collision risk as a migrant.

Migratory Birds

Bald Eagle, *Haliaeetus leucocephalus*

The Bald Eagle, de-listed under the federal Endangered Species Act last year, was recently de-listed by Illinois, effective October 30, 2009. It remains protected under the *Bald and Golden Eagle Protection Act* and the *Migratory Bird Treaty Act*, each as stringent as the better-known *Endangered Species Act.*

For several years there has been a Bald Eagle nest on the North Fork just above Lake Vermilion, about seven miles east of the project area. However, Illinois has experienced a significant increase in Bald Eagle nests over the last few years, and many new nests have not been tallied. Nests have been appearing on smaller tributaries of larger rivers in areas where Eagles have not been seen for years, and it may be assumed the Vermilion River Basin reflects this trend. Hence, it is likely that new Eagle nests will appear along the North Fork, Middle Fork, and Salt Fork during the project's life.

In addition, Illinois now has the highest population of wintering Bald Eagles in the Lower 48 States, although they tend to be concentrated around major rivers, cooling lakes, and other waters likely to remain ice-free. However, during migration, Eagles frequently fly overland. Thus, while the wind energy project is unlikely to pose any direct threat to the known Eagle nest and its surrounding hunting territory, there may be a collision risk for migrating Eagles.

Henslow's Sparrow, *Ammodramus henslowii*

The Henslow's Sparrow was de-listed by Illinois as a threatened species, effective October 30, 2009. Breeding populations of this grassland bird have been documented north of the project area, and may occur within the project area where suitable habitat exists. More northern breeding populations may migrate through the project area.

Wind turbines associated with this project have the potential to kill or injure birds through blade-strike, unless breeding populations are also found within the footprint. The species is extremely sensitive to the presence of vertical structures and to any form of break in contiguous habitat, such as roads or trails.

American Golden Plover, *Pluvialis dominica*

This migratory bird breeds in the Arctic tundra, migrates south along the Atlantic seaboard to South America in the winter, but returns northward through central North America. Areas of Illinois and Indiana provide important spring migration staging areas, which may be occupied by this species for a month or more while birds go through a molt before resuming migration. It has become a species of concern due to its relatively low global population estimate of around 300,000 birds.

Based on 25 years of Spring Bird Count data, it is likely that significant numbers of this species congregate in Counties including northern Champaign and Vermilion Counties, but the locations of large concentrations vary from year to year. Large numbers of this species are routinely observed south of Sibley Grove in Ford County. Pre- and post-construction surveys should be performed to observe this species.

Plovers tend to aggregate in dense concentrations, and are known to fly in large tight groups at or below the approximate rotor-swept elevation, which may expose them to collision mortality risk. Concerns also exist pertaining to habitat fragmentation by service roads, and displacement from habitat due to potential sensitivity to vertical structures and human activity.

A research project has begun in an effort to better understand the behavior and needs of this species, as well as how it may be affected by the presence of wind turbines. Some preliminary results were recently published [O'Neal, *et. al.* (2008)] .

One apparent finding is that the species definitely concentrates in a few areas, rather than being generally dispersed across suitable habitat, resulting in temporarily dense population "hot-spots." However, where these may be located may be influenced year-to-year by poorly understood climatic cues. Very few birds appeared in 2008 in the expected concentration areas; instead, major concentrations were located more than one hundred miles to the south. Anecdotal evidence indicates this is an unusual occurrence.

A number of observers had reported a daytime habitat preference for short grass, soybean stubble, or bare ground with standing water or residual moisture, but O'Neal first reported a night roost preference for standing corn stubble cover, with crepuscular movement between the two. O'Neal reported all observations were located more than 70 meters from adjacent roads, suggesting an intolerance for breaks in habitat. (Effects of traffic were not investigated.) Interestingly, O'Neal also reported several observations of predation of the Golden Plover by the Northern Harrier.

Whooping Crane, *Grus americana*

An experimental population of the federally-listed endangered Whooping Crane has been established with breeding grounds in Wisconsin and wintering areas in Florida. Fall 2009 will see more than 100 birds move to Florida. Whooping Cranes often "stop over" during migration and this may occur virtually anywhere in the State.

Whooping Cranes may "stop over" for extended periods. In November 2006, during their first unescorted Fall Migration, a pair of Cranes rested for four days along the upper East Branch Vermilion River (Wabash Drainage) in Ford County. A Whooping Crane extended its Spring movement by loitering near Danville until the end of June 2008.

During such stop-overs, cranes often forage on waste corn in nearby agricultural fields. Wind turbines and associated power lines pose a collision risk for these large birds, which require some distance to achieve safe altitudes. Most non-predation losses to this flock have been to power line collisions. The visibility of power lines should be maximized with appropriate line markers. The developer may wish to consider other voluntary efforts to promote Crane conservation.

Due to the very high public profile of the Whooping Crane, the Department suggests the developer/operator of this facility coordinate at least annually with the Whooping Crane Eastern Partnership (www.bringbackthecranes.org) to track the passage of Whooping Cranes through the vicinity, and explore additional measures to reduce potential losses of these birds.

Applicant: HDR Engineering,Inc. - MN
Contact: Jacqueline Hamilton
Address: 701 Xenia Ave., Suite 600
Minneapolis, MN 55416

IDNR Project #: 0906735
Date: 03/11/2009

Project: Invenergy California Ridge Wind Energy Center
Address: Rural Royal, Royal

Description: 200-MW 102-turbine utlity scale wind energy project.

Natural Resource Review Results

Consultation for Endangered Species Protection and Natural Areas Preservation (Part 1075)
The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

Edgewood Farm INAI Site
Fairchild Cemetery Savanna INAI Site
Horseshoe Bottom INAI Site
Kennekuk Cove County Park INAI Site
Kinney'S Ford Seep INAI Site
Middle Fork Of The Vermilion River INAI Site
Middle Fork Seeps INAI Site
Middlefork Woods INAI Site
Orchid Hill INAI Site
Pellville Cemetery INAI Site
Rock Cut Road Botanical Area INAI Site
Salt Fork Vermilion River INAI Site
Spoon River INAI Site
Windfall Prairie INAI Site
Edgewood Farm Land And Water Reserve
Fairchild Cemetery Prairie/Savanna Nature Preserve
Horseshoe Bottom Nature Preserve
Kinney'S Ford Seep Land And Water Reserve
Larimore'S Salt Fk Of Vermilion River Land And Water Reserve
Middle Fork Woods Nature Preserve
Orchid Hill Natural Heritage Landmark
Windfall Prairie Nature Preserve
Bald Eagle *(Haliaeetus leucocephalus)*
Barn Owl *(Tyto alba)*
Bigeye Chub *(Hybopsis amblops)*
Bigeye Chub *(Hybopsis amblops)*
Bigeye Chub *(Hybopsis amblops)*

Bigeye Chub *(Hybopsis amblops)*
Bigeye Chub *(Hybopsis amblops)*
Bigeye Chub *(Hybopsis amblops)*
Bigeye Chub *(Hybopsis amblops)*
Blanding'S Turtle *(Emydoidea blandingii)*
Bluebreast Darter *(Etheostoma camurum)*
Bluebreast Darter *(Etheostoma camurum)*
Bluebreast Darter *(Etheostoma camurum)*
Bluebreast Darter *(Etheostoma camurum)*
Bluebreast Darter *(Etheostoma camurum)*
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Bluebreast Darter *(Etheostoma camurum)*
Bluebreast Darter *(Etheostoma camurum)*
Bluebreast Darter *(Etheostoma camurum)*
Eastern Sand Darter *(Ammocrypta pellucidum)*
Eastern Sand Darter *(Ammocrypta pellucidum)*
Four-Toed Salamander *(Hemidactylium scutatum)*
Franklin'S Ground Squirrel *(Spermophilus franklinii)*
Franklin'S Ground Squirrel *(Spermophilus franklinii)*
Franklin'S Ground Squirrel *(Spermophilus franklinii)*
Franklin'S Ground Squirrel *(Spermophilus franklinii)*
Henslow'S Sparrow *(Ammodramus henslowii)*
Henslow'S Sparrow *(Ammodramus henslowii)*
Henslow'S Sparrow *(Ammodramus henslowii)*
Henslow'S Sparrow *(Ammodramus henslowii)*
Henslow'S Sparrow *(Ammodramus henslowii)*
Henslow'S Sparrow *(Ammodramus henslowii)*
Indiana Bat *(Myotis sodalis)*
Indiana Bat *(Myotis sodalis)*
Least Bittern *(Ixobrychus exilis)*
Least Bittern *(Ixobrychus exilis)*
Little Spectaclecase *(Villosa lienosa)*
Northern Harrier *(Circus cyaneus)*
Northern Harrier *(Circus cyaneus)*
Northern Harrier *(Circus cyaneus)*
Northern Harrier *(Circus cyaneus)*
Purple Wartyback *(Cyclonaias tuberculata)*
Purple Wartyback *(Cyclonaias tuberculata)*
Purple Wartyback *(Cyclonaias tuberculata)*
Purple Wartyback *(Cyclonaias tuberculata)*
Purple Wartyback *(Cyclonaias tuberculata)*
Rainbow *(Villosa iris)*
River Redhorse *(Moxostoma carinatum)*

River Redhorse *(Moxostoma carinatum)*
River Redhorse *(Moxostoma carinatum)*
River Redhorse *(Moxostoma carinatum)*
River Redhorse *(Moxostoma carinatum)*
Rookery *(Rookery)*
Rookery *(Rookery)*
Salamander Mussel *(Simpsonaias ambigua)*
Salamander Mussel *(Simpsonaias ambigua)*
Salamander Mussel *(Simpsonaias ambigua)*
Short-Eared Owl *(Asio flammeus)*
Short-Eared Owl *(Asio flammeus)*
Silvery Salamander *(Ambystoma platineum)*
Slippershell *(Alasmidonta viridis)*
Upland Sandpiper *(Bartramia longicauda)*
Upland Sandpiper *(Bartramia longicauda)*
Wavy-Rayed Lampmussel *(Lampsilis fasciola)*
Wavy-Rayed Lampmussel *(Lampsilis fasciola)*
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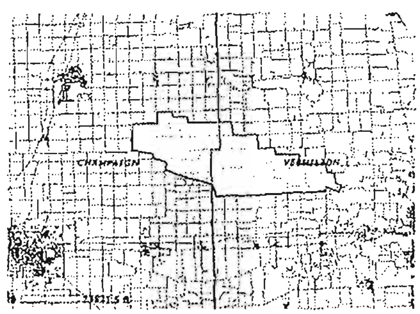
Wavy-Rayed Lampmussel *(Lampsilis fasciola)*

An IDNR staff member will evaluate this information and contact you within 30 days to request additional information or to terminate consultation if adverse effects are unlikely.

<u>Location</u>

The applicant is responsible for the accuracy of the location submitted for the project.



County: Champaign

Township, Range, Section:

20N, 10E, 1	20N, 10E, 2
20N, 10E, 3	20N, 10E, 12
20N, 11E, 6	20N, 11E, 7
20N, 11E, 18	20N, 14W, 4
20N, 14W, 5	20N, 14W, 6
20N, 14W, 7	20N, 14W, 8
20N, 14W, 9	20N, 14W, 16
20N, 14W, 17	20N, 14W, 18
21N, 10E, 22	21N, 10E, 23
21N, 10E, 24	21N, 10E, 25
21N, 10E, 26	21N, 10E, 27
21N, 10E, 33	21N, 10E, 34
21N, 10E, 35	21N, 10E, 36

21N, 11E, 19	21N, 11E, 30
21N, 11E, 31	21N, 14W, 19
21N, 14W, 20	21N, 14W, 21
21N, 14W, 28	21N, 14W, 29
21N, 14W, 30	21N, 14W, 31
21N, 14W, 32	21N, 14W, 33

County: Vermilion

Township, Range, Section:

20N, 12W, 7	20N, 12W, 17
20N, 12W, 18	20N, 12W, 19
20N, 12W, 20	20N, 12W, 29
20N, 13W, 3	20N, 13W, 4
20N, 13W, 5	20N, 13W, 6
20N, 13W, 7	20N, 13W, 8
20N, 13W, 9	20N, 13W, 10
20N, 13W, 11	20N, 13W, 12
20N, 13W, 13	20N, 13W, 14
20N, 13W, 15	20N, 13W, 16
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20N, 14W, 15	20N, 14W, 22
20N, 14W, 23	20N, 14W, 24
21N, 13W, 30	21N, 13W, 31
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21N, 14W, 25	21N, 14W, 26
21N, 14W, 27	21N, 14W, 34
21N, 14W, 35	21N, 14W, 36

IL Department of Natural Resources Contact
Keith Shank
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Vermilion County
Kolby J. Riggle
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Danville, Illinois 61832

Disclaimer

The Illinois Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of natural resources in Illinois. This review reflects the information existing in the Database at the time of this inquiry, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, compliance with applicable statutes and regulations is required.

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Meeting Notes

Subject: SWCD Coordination			
Client: Invenergy		Project No:	Mpls 98073
Project: California Ridge		Meeting Location:	State NRCS Office, Champain, IL
Meeting Date: April 29, 2009		Notes by:	Jacqueline Hamilton

ATTENDEES:

Bruce Stickkers – Champaign County SWCD, Resource Conservationist, bruce.stickkers@il.nacdnet.net, 217-352-3536 x3

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TOPICS DISCUSSED

Data Availability
Data Acquisition
Natural Resource Report
Cultural Resources

ACTION/NOTES

Data Availability: The NRCS has Farmed Wetland data is available for distribution given permission from individual landowner permission. Aerial photos, including some infrared aerials are available for viewing. All NRCS data is supposed to be the same nation wide. Maps are different per region but the data should be the same.

Data Acquisition: HDR will conduct initial parcel wetland delineation in a couple of weeks. With that field data and additional data generated from desk-top farmed wetland determinations, HDR will identify potential locations where Farmed Wetlands could be. The potential locations will be given to the SWCD's. The SWCD's will review the historical NRCS farm wetland maps to confirm locations. Where historical farmed wetlands are present, SWCD will send out letters to those specified landowners requesting permission to disclose those locations in which they have NRCS mapped Farmed Wetlands. HDR and/or Invenergy will assist SWCD with the language for the landowner authorization letter. Once the NRCS and SWCD's have permission to disclose the Farmed Wetland locations, they will give that information to HDR/Invenergy for micro-siting purposes.

HDR has Common Land Unit (CLU) shapefile information for Vermillion County. New NRCS policy prohibits disclosing this CLU information, in turn HDR will attempt to obtain the CLU shapefile information for Champaign County from an on-line source.

Natural Resource Inventory Report(s): Vermilion and Champaign counties Special Use Permit applications will each include a Natural Resource Inventory Report. The report(s) is/are created by the SWCD's. Invenergy will submit the final layout of the wind farm facilities to the SWCD's. They will also submit an application fee of $150/county and a $200/turbine fee to the respective county. In return, the SWCD's will generate a Natural Resource Inventory Report to their respective County as well as to Invenergy/HDR. The report will identify any areas of concern or locations pertaining to natural resources, which should be avoided. The report will take approximately 60 days to create once the final layout has been submitted. Both SWCD's will coordinate with Invenergy/HDR during the micro-siting process in order to avoid potential areas of concern prior to final site layout and submittal of the Natural Resource Report.

Cultural Resources: There was a brief discussion on the cultural resources within the Project Area. HDR informed everyone that they are in the process of working with Invenergy to identify cultural resources within the High Probability Areas of the project area as well as identifying the architectural resources. HDR asked the SWCD's that if any of these locations were known to them that they disclose those locations so that they can be avoided.

APPENDIX K

Appendix K
Reclamation Agreement

(The Reclamation Agreement will be forthcoming)

APPENDIX L

PN: 1664.020-001 May 2010

INVESTIGATIONS OF BAT ACTIVITY AT THE PROPOSED CALIFORNIA RIDGE WIND ENERGY GENERATION FACILITY CHAMPAIGN AND VERMILION COUNTIES, ILLINOIS

Prepared for:
Invenergy LLC
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Prepared by:
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Cincinnati, OH 45246-3405
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EXECUTIVE SUMMARY

Invenergy Wind LLC of Chicago, Illinois, has proposed construction of the California Ridge wind energy generation facility in Champaign and Vermilion counties, Illinois. The Illinois Department of Natural Resources (IDNR) requested preconstruction studies to assess the activity of bats in the proposed California Ridge wind energy generation facility project area. Monitoring designed to detect ultrasonic bat calls was conducted from August 5 to November 4, 2009. The study was implemented in accordance with methods, goals, and objectives established in coordination with the IDNR.

Earlier studies completed at sites in Pennsylvania and Wisconsin (Arnett et al. 2006, Redell et al. 2006) found that bat activity changes based on time of night and time of year; therefore, this study postulated that bat activity at California Ridge would also be a function of time of night and year and would yield a pattern similar to that found in Arnett et al. (2006) and Redell et al. (2006). In August through early November 2009, BHE used ultrasonic detectors (Anabat II with CF ZCAIM) mounted on three meteorological (MET) towers within the project area to assess bat activity during fall migration.

In summary, our investigation found:

- The combined MET towers recorded a mean of 4.85 ± 7.12 SD bat passes per detector-night during the survey period of August 5 through November 4, 2009.
- Bat activity at the proposed California Ridge Wind Farm was highest during the first half of the night. At MET Tower 3, activity also peaked a second time in the early morning before sunrise.
- Bat activity was highly variable among nights.
- In general, maximum bat activity was recorded during September, though the seasonal timing of activity peaks was different among the towers. Very little bat activity was recorded in October and early November.
- Bats were recorded in five species groups. The majority (62 percent) of the identifiable bat passes were attributed to the big brown/silver-haired bat species group.
- Passes of the *Myotis* (little brown, northern long-eared, and Indiana bat) species group comprised 4 percent of the identifiable bat passes.

1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

Invenergy Wind LLC of Chicago, Illinois (Invenergy) has proposed construction of the California Ridge wind energy generation facility in Champaign and Vermilion counties, Illinois (Figure 1). The Illinois Department of Natural Resources (IDNR) requested preconstruction studies to assess the nature of bat activity in the proposed project area.

The California Ridge facility ("project area") spans 15.95 mi^2 (41.32 km^2) of eastern Champaign County and 35.96 mi^2 (93.13 km^2) of western Vermilion County. Towns near the project area include Rantoul, Gifford, Potomac, Muncie, Fithian, Royal, Ogden, Oakwood, and Saint Joseph, Illinois. The California Ridge facility will consist of approximately 80 to 133 wind turbines, depending on final turbine model selection. Turbines will be located in strings or arrays within the project area.

1.2 BATS OF ILLINOIS

Fourteen species of bats have been documented in Illinois. Except for the gray bat (*Myotis grisescens*), the southeastern myotis (*M. austroriparius*), the eastern small-footed bat (*M. leibii*), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), and the Mexican free-tailed bat (*Tadarida brasiliensis*), each of the remaining nine species has potential to occur in the project area (Table 1). While gray bats, southeastern myotis, eastern small-footed bats, and Rafinesque's big-eared bats are considered to be residents of the State of Illinois, the ranges of these species are restricted to the southern portion of the state. There are historical records of the Mexican free-tailed bat in Illinois. However, the IDNR regards these records as an anomaly and this agency does not consider the species to be a resident or likely occurrence in the state (Joe Kath, IDNR, pers. comm.).

The other nine bat species that occur in Illinois include year-round residents as well as species present only during certain seasons (Table 1). The Indiana bat (*M. sodalis*) is federally and state listed as endangered. The remaining eight species are not federally or state listed, are not proposed for listing, and are not candidates for federal or state listing.

1.3 GOALS AND OBJECTIVES OF THE INVESTIGATION

To assess activity of bats in the proposed California Ridge project area, Invenergy and BHE Environmental, Inc. (BHE) coordinated with the IDNR to develop methods for a preconstruction study in the proposed project area. The IDNR agreed with the methods proposed, which established the following goal and associated objectives:

Goal: Assess temporal patterns of bat activity within the project area between August and October 31, 2009.

Objective 1: Characterize bat activity based upon total number of passes and number of passes in each of five species groups recorded.

Objective 2: Assess bat activity during the night.

Objective 3: Assess bat activity throughout the autumn season.

The data collection methods in this project are similar to some of the collection methods in a Dodge County, Wisconsin study (Redell et al. 2006). That study found that from mid-July through September, bat activity was associated with frequency group, height (measured at 2 m, 22 m, and 48 m), wind speed, season, and temperature. Data collected from the California Ridge site allowed assessment of bat activity by species group at 2 m and 58 m. Similar to the study done in Dodge County, data were collected at the California Ridge site during the fall migration, allowing investigation of activity during autumn when documented bat mortality at wind farms is highest (Arnett et al. 2006, Redell et al. 2006).

Data generated in this study may be useful in understanding bat activity at this and other wind energy facilities, and will establish baseline conditions in the proposed project area.

2.0 METHODS

2.1 DATA COLLECTION

Recording bat echolocation is a common method of assessing bat activity because bats use echolocation in flight to navigate and to search for and capture prey. Broadband acoustic detectors (Anabat II ultrasonic detectors and compact flash storage units with a zero-crossings analysis interface module [CF-ZCAIM storage units], Titley Electronics Pty Ltd, Ballina, NSW Australia) were used to record ultrasound at MET Towers 1 (9128), 2 (9127), and 3 (9129) located within the project area (Figure 1, Photos 1-5 of Appendix A). Hereafter, the Anabat II and CF-ZCAIM storage unit are collectively referred to as an Anabat unit or Anabat detector. Habitat surrounding each MET tower differed slightly. MET Tower 1 was situated in a corn field adjacent to a bean field. MET Tower 2 was in an old field adjacent to a pond and corn and bean fields. MET Tower 3 was in a bean field adjacent to a road.

BHE agreed to attach one Anabat microphone at 58 m on each of three MET towers. Microphones were installed on the MET towers by Invenergy prior to BHE's visit to the site. MET Towers 1 and 3 had microphones installed at 2 and 58 m; however, MET Tower 2 only had a microphone installed at 2 m.

To maintain BHE's agreement to install microphones on each tower at 58 m, BHE attached Anabats to the 58-m microphones on MET Towers 1 and 3. Additionally, BHE attached an Anabat to the 2-m microphone on MET Tower 2 (Photo 1 of Appendix A). This change in the methods was agreed to by Invenergy and IDNR during BHE's initial visit to the project site in August. Two meters approximates the height of full-grown corn and other tall herbaceous vegetation near the MET towers, and approximates the lowest elevation bats would fly. The 58-m height is the highest point on the MET tower to which equipment could be fixed without interfering with meteorological equipment, and it is within the rotor-swept area of the proposed turbine blades.

Each microphone was enclosed in a weather-resistant housing ("BatHats," EME Systems, Berkeley, California), and connected via cables to Anabat units on the ground (Photos 6 and 7 of Appendix A). Sound reflector plates beneath the microphone housings were positioned 15 degrees below horizontal so that the main acceptance angle was directed upward at 45 degrees (Figure 2, Photo 1 of Appendix A). Pre-amp drivers were installed with each microphone cable to prevent signal loss due to cable length. Detectors and data storage units were stored in waterproof boxes covered with reflective shields to prevent the equipment from overheating due to solar exposure (Photos 6 to 9 of Appendix A).

Because microphones were mounted to MET towers prior to the initiation of the project, calibration of Anabats by methods described in Larson and Hayes (2000) at the onset of the project was not completed. Anabat sensitivity was set as high as possible without picking up microphone feedback. Sensitivity was originally set at approximately 7 (slightly different on each Anabat based on individual unit variability), but was reduced to approximately 6 on September 16 because detected ultrasound included excessive noise (e.g., insects, mechanical, electrical, weather).

Each Anabat unit was programmed to collect data every night from approximately 30 minutes (min) prior to civil sunset to 30 min after civil sunrise. Anabat recordings were initiated the evening of August 5, 2009, and continued every night until the morning of November 4, 2009. Data were stored on a compact flash (CF) card in each CF ZCAIM unit and collected every 8 to 14 days. To control for variance among equipment, each Anabat detector and battery were disconnected from the microphone cable and rotated to another microphone every two weeks. Anabat detectors were rotated randomly among towers.

2.2 DATA ANALYSIS

Once downloaded to a computer, files recorded on Anabat units were filtered using Analook software (Chris Corben, Columbia, Missouri) to eliminate noise (ultrasonic sounds such as insects, rain, wind, and electrical interference). Remaining files were viewed and sorted in Analook to identify bat call sequences. A bat call is defined as a single pulse consisting of a range of frequencies over a brief period of time, and often the minimum frequency of the call is dominant (characteristic frequency). Bats typically produce a series of calls, called a sequence. The Anabat unit records a file for each sequence up to 15 seconds (sec) in length in which there are less than 5 sec between each call. Therefore, each file recorded by an Anabat unit represents one or more bat calls.

Bat activity was evaluated by counting the number of bat passes each night from approximately 30 min before civil sunset to approximately 30 min after civil sunrise. A pass represents a typical bat vocalization during normal flight. This study applied a definition of a bat pass that is consistent with similar studies (Redell et al. 2006, Arnett et al. 2006, Hayes 2000, Sherwin et al. 2000, Gannon et al. 2003). A pass is a file containing two or more complete bat calls (pulses). At least two calls in a sequence were required to identify the sound as a bat and to determine the species group from which the call sequence originated. Each pass was considered an independent event, and the number of passes was considered a representation of bat activity in the area.

Passes were tallied as either high (≥35 kHz) or low (<35 kHz) frequency based on characteristic frequency and, when possible, identified to one of five species groups. Hoary bats (*Lasiurus cinereus*), big brown bats (*Eptesicus fuscus*), silver-haired bats (*Lasionycteris noctivigans*), and occasionally red bats (*Lasiurus borealis*) and evening bats (*Nycticeius humeralis*) produce calls with characteristic frequencies below 35 kHz. Little brown bats (*Myotis lucifugus*), northern long-eared bats (*Myotis septentrionalis*), Indiana bats, tri-colored bats (*Perimyotis subflavus* [formerly eastern pipistrelles, *Pipistrellus subflavus*]) and often red bats and evening bats produce calls with a characteristic frequency at or above 35 kHz. Some species produce unique call sequences and can be identified to species (hoary bats and tri-colored bats), while others produce sequences too similar to be distinguished from other species. Because of the difficulty in distinguishing some species with similar call sequences (big brown bats from silver-haired bats, red bats from evening bats, and those species in the genus *Myotis* [little brown bats, northern long-eared bats, and Indiana bats]), five species groups were established: 1) hoary bats, 2) big brown/silver-haired bats, 3) red/evening bats, 4) little brown/northern long-eared/Indiana bats, and 5) tri-colored bats.

Though microphones were placed at both 2 and 58 m, one each at the three towers, sample size and other variables such as habitat differences (i.e., corn [MET Tower 1] and bean fields [MET Tower 3] compared to old field with a pond [MET Tower 2]) made comparisons between activity detected at the different heights impossible. We examined the number of bat passes associated with each of the five species groups, and bat passes associated with the high frequency and the low frequency groups. Additionally we assessed bat activity over time (by hour of the night and by week).

3.0 RESULTS

3.1 DETECTOR OPERATION

Echolocation calls were collected from each of three towers for 91 consecutive nights (evening of August 5 through the morning of November 4, 2009). During the three month recording period, the Anabat at MET Tower 1 recorded 59 nights, the Anabat at MET Tower 2 recorded 77 nights, and the Anabat at MET Tower 3 recorded 83 nights. Combined, the Anabats recorded 219 of the possible 274 detector nights (80 percent). A detector night is one Anabat recording one night.

The CF cards in the Anabat at MET Tower 1 often filled prior to field visits. Upon examining the data recorded, this Anabat detected and recorded bat passes on only two nights during the study period (Table 2). The rest of the files were noise unrelated to bat echolocation. Anabats only record one frequency at a time (dominant frequency). If noise is intense or constant, the Anabat will record that noise instead of a softer bat echolocation pulse. BHE suspects the noise recorded at MET Tower 1 dominated the ultrasound around the microphone, thus preventing the recording of bat echolocation. No conclusions about bat activity can be drawn from the six bat passes recorded at this tower; therefore, we excluded data from MET Tower 1 from further analysis. The Anabat at MET Tower 2 also recorded significant amounts of noise which filled the CF card prior to field visits and resulted in lost data on three separate occasions: nights of August 17-18, September 9-15, and September 24-29. Though this detector did not record data during these periods, and recorded a great deal of noise, it also recorded 239 bat passes. In an attempt to reduce the amount of noise recorded, BHE turned down the sensitivity on all Anabats from a setting of approximately 7 to approximately 6 on September 16. When the decrease in microphone sensitivity failed to prevent some CF cards from filling available memory, BHE changed the 1 gigabyte (GB) CF cards to 4 GB cards. The Anabat at MET Tower 3 did not record much noise and therefore, did not have CF memory issues. The eight nights that the Anabat at Tower 3 did not record were due to an Anabat malfunction at the end of the survey period (nights of October 27-November 3). Of the three Anabats, the Anabat at MET Tower 3 recorded the most complete and the highest quality set of data.

The Anabat at MET Tower 2 recorded 239 bat passes during 77 nights, and the Anabat at MET Tower 3 recorded 537 bat passes during 83 nights (Tables 3 and 4). Combined these two Anabats recorded 776 bat passes during 160 detector-nights. MET Tower 2 recorded a mean of 3.10 ± 6.07 SD passes per detector-night, and MET Tower 3 recorded a mean of 6.47 ± 7.67 SD passes per detector-night during the entire sampling period.

3.2 SPECIES AND SPECIES GROUP COMPOSITION

Although the precise proportion of recorded passes we attributed to the two frequency groups differed at towers 2 and 3, results were similar at both towers. Low frequency passes comprised 73 percent of recorded passes at MET Tower 2 and 82 percent at MET Tower 3 (Table 4). Analysis of data which were pooled from the two towers indicates low frequency passes comprised 79 percent (n=615), while high frequency passes comprised 21 percent (n=161) of recorded passes.

Ninety percent (n=723) of all recorded bat passes could be assigned to a species group. At both towers, the greatest number of identifiable bat passes were passes from the big brown bat/silver-haired bat species group with approximately 70 percent (n=167) at MET Tower 2 (Figure 3) and 52 percent (n=281) at MET Tower 3 (Figure 4). Passes of the *Myotis* species group were second most common (about 12 percent; n=28) at MET Tower 2, and least common (less than 1 percent; n=2) at MET Tower 3. The red bat/evening bat species group and hoary bats were second most common (38 percent; n=204) at MET Tower 3, but not nearly as common (8 percent; n=18) at MET Tower 2.

3.3 TEMPORAL CHARACTERISTICS

The number of bat passes recorded at the California Ridge site varied throughout the night, among nights, and among weeks. While bat passes were recorded throughout all hours of the night, the greatest number of bat passes were recorded during the first half of the night, with 59 percent and 63 percent of all passes being recorded at MET Towers 2 and 3 respectively within six hours of civil sunset (Figures 5 and 6). The number of bat passes peaked a second time around the ninth hour after sunset at MET Tower 3 (Figure 6).

Throughout the three month sampling period, the number of bat passes recorded varied substantially from night to night. The total number of bat passes recorded each night ranged from zero (numerous nights in October at both towers) to 35 (September 30) at MET Tower 2 and 27 (September 10) at MET Tower 3 (Table 3). The number of bat passes recorded per night was the least variable in October, when the number of passes varied between 0 and 4 in a night at MET Tower 2 and 0 and 6 at MET Tower 3. The greatest variation occurred in September at both MET towers.

The number of bat passes recorded varied during the sampling period. The Anabat unit at MET Tower 2 recorded a mean of 3.56 ± 3.56 SD passes per night in August (n=25 nights), peaked at 8.06 ± 10.56 SD passes per night in September (n=17 nights), and declined to 0.42 ± 0.89 SD passes per night in October (n=31 nights). The Anabat unit at MET Tower 3 recorded a mean of 8.41 ± 6.15 SD bat passes per night in August (n=27 nights), peaked at 9.73 ± 9.28 SD passes per night in September (n=30 nights), and declined to 0.69 ± 1.46 SD passes per night in October (n=26 nights; Table 3). Though the number of passes recorded at both MET towers peaked in September, the time of month varied between the two towers. Passes recorded at MET Tower 2 peaked the week of September 16 (Figure 7), whereas the number of passes recorded at MET Tower 3 peaked the week of September 2 (Figure 8). Note that little to no data was collected during the weeks of September 9 or 23 at MET Tower 2 due to CF card memory issues described above. Activity at MET Tower 2 could have peaked a week earlier or later than the data shows. At both towers, the number of calls associated with the hoary bat, red/evening bat, and *Myotis* groups peaked in August, while the number of passes associated with the big brown/silver-haired bat group peaked in September (Figures 7 and 8).

4.0 DISCUSSION

The purpose of the acoustic survey was to assess variations in bat activity at the California Ridge site relative to date (season) and time of night. When assessing bat activity by counting the number of bat passes recorded, care must be taken to avoid equating the number of bat passes with the number of bats present. A single bat may be recorded several times, or pass the Anabat detector without being recorded at all. Therefore, the number of bat passes recorded does not represent the number of bats present near the MET towers at the California Ridge site. The discussion herein addresses relative levels of bat activity. This study was designed to examine bat activity during the late summer and autumn period when adult bats forage, young have recently become volant, and bats disperse from summer habitat to winter sites. This study did not assess bat activity during the spring or early summer.

4.1 BAT ACTIVITY LEVEL

A total of 776 bat passes were recorded at MET towers 2 and 3 during 160 detector-nights, for a mean of 4.85 ± 7.12 SD bat passes per detector-night. Similarly, 5.1 passes per detector-night were recorded at the Cedar Ridge Wind Farm in Fond du Lac County, Wisconsin (BHE 2007). Though passes recorded at California Ridge is similar to better habitat diversity surrounding Cedar Ridge, survey efforts at Cedar Ridge were higher than California Ridge. Surveys included nine detectors and three heights, and monitoring included spring and summer activity periods. Overall passes recorded per detector-night may be similar, but the activity rate recorded is higher at Cedar Ridge when comparing similar sampling periods (August - early November). Bat passes recorded at Cedar Ridge during this period was 6.78 passes per detector-night.

Though recorded activity rates during the fall period mentioned above (August - early November) was lower at California Ridge than Cedar Ridge, it is higher than the 1.99 passes per detector-night recorded at Blue Creek, Ohio (BHE 2009). Blue Creek is located in a highly agricultural area similar to California Ridge. Unlike California Ridge, Blue Creek does not have a heavily forested river system within a short distance from the site. The higher number of bat passes recorded at California Ridge may be due to the site's proximity to the forested Middle Fork Vermilion and Salt Fork Vermilion river systems. These forested river systems provide roosting and foraging habitat and may be migration routes used by bats. While there is evidence bats migrate over open areas, other evidence suggest open land may not be preferred for migration. Baerwald and Barclay (2009) found bats migrate west to forested riparian zones before migrating south. Their study suggests bats will at least sometimes travel extra distances rather than migrate over open prairies, when wood habitat is nearby. Baerwald and Barclay suggest this may be due to the lack of roosting habitat over open prairies and the need for bats to have roosting stop-over sites during their migration. Though bats in Baerwald and Barclay's study (2009) seem to prefer migrating along forested habitats, little is known about the details of bat migration. Habits of individual species, origin and destination of a migration, and availability and location of suitable stop-over sites may be factors which influence the migration behavior of bats. It is possible the small number of roosting stopover sites on the California Ridge project area may not attract migrating bats in the numbers recorded in locations with more forested areas that contain potential roosting sites.

Mean detection rates recorded by the four detectors on MET towers at the Buckeye Wind site near Urbana, Ohio were reported at higher rates than the California Ridge study. Stantec (2009) recorded 1.8 passes per detector-night in spring and 12.4 passes per detector-night in fall. The Buckeye site has more forested area within the project area and contains some caves that support hibernating bats, yet lacks a forested river system similar to the system near California Ridge. Forested habitat that supports water features such as streams comprises 7 percent of the total Buckeye project area (Stantec 2009). The local topography is characterized by small rolling hills. These features, which may attract bats to an area during migration to their winter habitat, are absent from the California Ridge project area.

Based on the results of this study, overall bat activity at the California Ridge project area appears to be less than or similar to activity at other locations in the region. The low activity level is not unexpected for a site with the limited habitat available at the project area. Proximity to the Middle Fork and Salt Fork Vermilion rivers should be considered when selecting turbine locations. Buckeye placed two additional detectors near the edges of woodlots and recorded much higher rates of activity at these detectors than those detectors placed on the MET towers in the agricultural fields. Detectors near the woodlots recorded 17.7 passes per detector-night in the spring and 128.0 passes per detector-night in the fall (Stantec 2009).

4.2 SPECIES AND SPECIES GROUP COMPOSITION

The majority (73 percent at MET Tower 2 and 82 percent at MET Tower 3) of echolocation calls recorded were generated by the low frequency group (<35 kHz), which includes hoary bats, big brown bats, silver-haired bats, and occasionally red bats and evening bats (Figures 3 and 4). All but evening bats are relatively large-bodied, less maneuverable bats that tend to forage in open habitats where there are fewer obstacles (Brooks and Ford 2005). Insects are less abundant in open areas, and bats adapted to forage in open areas tend to have lower frequency passes, which travel farther than higher frequencies, thus increasing the search range of the bat (Altringham 1996). In addition, because low frequency vocalizations travel farther than those at high frequencies, the detectors likely record low-frequency bats at a greater distance from the microphone than high-frequency bats.

In east-central Wisconsin, a similar acoustic study found more high frequency passes at 2-m agl than 45-m agl, and a relatively higher proportion of low frequency group passes at 45-m agl (BHE 2007). Arnett et al. (2006) and Redell et al. (2006) also reported greater high frequency group activity at low elevations, and greater low frequency group activity at high elevations. Based upon the relative number of ultrasound passes recorded, results from these studies suggest that during the fall migration bats with high frequency passes (smaller bats) are less active at rotor-swept height than bats with low frequency passes (larger bats). This is consistent with results of studies that suggest different species of bats partition their use of habitats vertically (Kalcounis et al. 1999, Hayes and Gruver 2000). Results from California Ridge may indicate patterns similar to these studies (Figures 3 and 4); however, microphone height is only one possible explanation for the different proportions of bats found at each tower. Data differences could be a result of small sample size, the location of the tower on the landscape or habitat surrounding the towers. MET Tower 2 recorded more *Myotis* than MET Tower 3; however, sample sizes of 28 and 2 are not sufficient to determine statistical significance. Assuming statistical significance, the difference may be because MET Tower 2 was near a pond, had the microphone near the ground, and may have been near roosting habitat. Differences may be a result of any one or a combination of any of those variables.

4.3 TEMPORAL CHARACTERISTICS

Based upon the number of bat passes recorded, bat activity was greatest during the first half of the night, which is similar to results of several other studies (Arnett et al. 2006, Redell et al. 2006, BHE 2007). Kunz (1973) found that most species in Iowa were most active 1 to 2 hours after sunset. Kunz (1973) also noted that silver-haired bats, little brown bats, and northern long-eared bats often had a distinct second peak of activity before sunrise. Our study showed bat activity peaked within a few hours of sunset, and MET Tower 3 showed a second peak around the ninth hour after sunset. This second peak was comprised primarily of passes in the big brown/silver-haired bat species group (Figures 5 and 6).

Substantial variation in bat activity from night to night was observed during this study, as well as in similar studies. Several similar studies reported variation in the number of passes recorded per tower per night (Redell et al. 2006, Arnett et al. 2006, BHE 2007). Many factors may influence the amount of bat activity recorded each night. Climatic variables, including air temperature, wind speed, barometric pressure, and precipitation may affect bat behavior on a nightly basis. Other factors, including insect abundance and chance, could affect the amount of bat activity recorded nightly.

Monthly variation in bat activity was consistent with expected seasonal changes in bat behavior. Overall, the greatest bat activity at each tower was observed during early to mid September (Figures 7 and 8). For most species summering in central Illinois, autumn migration typically occurs between August and September (Kurta and Baker 1990, Kurta 1995, Whitaker and Hamilton 1998, Cryan 2003). Cryan (2003) indicates hoary bats may begin dispersing to winter areas during late July. The high level of activity documented in August and September may be associated with dispersal from summer habitat, young-of-the year becoming volant, the onset of breeding, and migration to winter habitats. By early October, most migratory bats have left summer habitat, leaving only the year-round residents (mostly big brown bats) foraging in the project area. Most bats remaining in central Illinois enter hibernation by the end of October, resulting in a significant decline in bat activity from early to late October. Because the big brown bat/silver-haired bat species group comprised over half of bat passes recorded at each tower in our study, overall activity peaks are driven by this species group. Other species groups show activity peaks in August, which is consistent with other similar studies. In Pennsylvania, Tennessee, and Wisconsin, the greatest bat activity was observed in August and September (Arnett et al. 2006, Redell et al. 2006, Fiedler 2004). In Minnesota, bat activity peaked between mid-July and late August, and decreased to the lowest levels by early September (Johnson et al. 2004).

4.4 SUMMARY

As with other similar studies, results of this study indicate bat activity varies on several temporal scales. While nightly and monthly scales are somewhat predictable, variation in bat activity from night to night is difficult to predict. Species in all five species groups potentially present in the project area were detected at the California Ridge site, though activity patterns vary between the two towers. This variation may be due to microphone height, habitat immediately surrounding the MET tower, location of the MET tower in relation to other landscape features (e.g., nearby barn, pond, proximity to the forested Vermilion River), or various other factors not tested.

Though there is evidence suggesting bat migration is not random, data on detailed migration routes is limited. However, some bats will fly over open land during migration as is evidenced by mortality documented at wind farms in agricultural areas (Johnson et al. 2004). However, it is possible bat activity on the California Ridge project area is reduced during migration compared to areas with more forest due to the lack of potential roosting stop-over sites. Such forested areas may include the Middle Fork and Salt Fork Vermilion rivers; therefore, proximity to these river systems should be considered when selecting turbine locations.

5.0 LITERATURE CITED

Altringham, J.D. 1996. Bats: Biology and Behaviour. Oxford University Press, New York. 262 pp.

Arnett, E.B., J.P. Hayes and M.M.P. Huso. 2006. Patterns of pre-construction bat activity at a proposed wind facility in south-central Pennsylvania. 2005 Annual Report prepared for the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas.

Baerwald, E.F. and R.M.R. Barclay. 2009. Geographic variation in activity and fatality of migratory bats at wind energy facilities. Journal of Mammalogy 90(6):1341—1349.

BHE Environmental, Inc. (BHE). 2007. Investigation of bat activity and species richness at the proposed Cedar Ridge Wind Farm in Fond du Lac County, Wisconsin. Unpublished report submitted to Wisconsin Power and Light Company, Madison, Wisconsin. 65pp + appendices.

BHE Environmental, Inc. (BHE). 2009. Investigations of bat activity at the proposed Blue Creek Wind Energy Generation Facility, Paulding and Van Wert counties, Ohio. Unpublished report submitted to Heartland Wind, LLC, Radnor, Pennsylvania. 81 pp.

Brooks, R.T. and W.M. Ford. 2005. Bat activity in a forest landscape in central Massachusetts. Northeastern Naturalist 12:447—462.

Cryan, P. 2003. Seasonal distribution of migratory tree bats (Lasiurus and Lasionycteris) in North America. Journal of Mammalogy 84:579—593.

Fiedler, J.K. 2004. Assessment of bat mortality and activity at Buffalo Mountain Windfarm, eastern Tennessee. M.S. Thesis, University of Tennessee, Knoxville, Tennessee.

Gannon, W.L., R.E. Sherwin, and S. Haymond. 2003. On the importance of articulating assumptions when conducting acoustic studies of bats. Wildlife Society Bulletin 31:45—61.

Hayes, J.P. 2000. Assumptions and practical considerations in the design and interpretation of echolocation-monitoring studies. Acta Chiroptologica 2:225—236.

Hayes, J.P. and J.C. Gruver. 2000. Vertical stratification of bat activity in an old-growth forest in western Washington. Northwest Science 74:102-108.

Johnson, G.D., M. Perlik, W. Erickson, and M. Strickland. 2004. Bat activity, composition, and collision mortality at a large wind plant in Minnesota. Wildlife Society Bulletin 32:1278—1288.

Kalcounis, M.C., K.A. Hobson, R.M. Brigham, and K.R. Hecker. 1999. Bat activity in the boreal forest: importance of stand type and vertical strata. Journal of Mammalogy 80:673—682.

Kunz, T.H. 1973. Resource utilization: temporal and spatial components of bat activity in central Iowa. Journal of Mammalogy 54:14—32.

Kurta, A. 1995. Mammals of the Great Lakes Region, Revised Edition. University of Michigan Press, Ann Arbor. 376 pp.

Kurta, A. and R.H. Baker. 1990. *Eptesicus fuscus*. Mammalian Species No. 356: 1—10.

Larson, D.J. and J.P. Hayes. 2000. Variability in sensitivity of Anabat II bat detectors and a method of calibration. Acta Chiroptoloica 2:209—213.

Redell, D., E. Arnett, J. Hayes and M. Huso. 2006. Patterns of pre-construction bat activity determined using acoustic monitoring at a proposed wind facility in south-central Wisconsin. Unpublished report to the Bats and Wind Energy Cooperative. Bat Conservation International, Austin, Texas.

Sherwin, R.E., W.L. Gannon, and S. Haymond. 2000. The efficacy of acoustic techniques to infer differential use of habitat by bats. Acta Chiroptologica 2:145—153.

Stantec Consulting. 2009. Spring, summer, and fall 2008 bird and bat survey report for the Buckeye Wind Power Project in Champaign and Logan counties, Ohio. Report included with Ohio Power Siting Board certificate application.

Whitaker, J.O., Jr. and W.J. Hamilton, Jr. 1998. The Mammals of the Eastern United States, Third Edition. Cornell University Press, Ithaca, New York. 583 pp.

TABLES

Table 1. Bats potentially present within the proposed California Ridge Project Area during summer, winter, and spring/fall migration.

Species	Status	Potential Seasonal Presence within the California Ridge Project Area[1]		
		Summer	Winter	Migration[2]
Big brown bat (*Eptesicus fuscus*)	None	X	X	X
Silver-haired bat (*Lasionycteris noctivigans*)	None	X		X
Red bat (*Lasiurus borealis*)	None	X		X
Hoary bat (*Lasiurus cinereus*)	None	X		X
Little brown bat (*Myotis lucifugus*)	None	X		X
Northern long-eared bat (*Myotis septentrionalis*)	None	X		X
Indiana bat (*Myotis sodalis*)	Federal: endangered Illinois: endangered	X		X
Evening bat (*Nycticeius humeralis*)	None	X		X
Tri-colored bat (*Perimyotis subflavus*)	None	X		X

[1]Based upon species range maps and natural history.
[2]Migration occurs during spring (early April-late May) and autumn (early August-mid October)

Table 2. Bat passes recorded at MET Tower 1 between the nights of August 5 and November 3, 2009.

Night of	Hour from Sunset	Low Frequency Bats	High Frequency Bats	Hoary Bats	Big Brown/ Silver-haired Bats	Unknown Bats	Total Number of Passes
Aug 13	1	1	0	1	0	0	1
Aug 13	1	1	0	1	0	0	1
Aug 13	1	1	0	1	0	0	1
Aug 13	7	1	0	0	0	1	1
Aug 13	8	1	0	1	0	0	1
Oct 4	5	1	0		1	0	1
Total		6	0	4	1	1	6

Table 3. Minimum, maximum, and average number of bat passes recorded at MET Towers 2 and 3 each month between August and October, 2009. Because the recording period ended November 4, data from that month are excluded from the table.

MET Tower	Month	Number of Nights (n)	Total Number of Passes	Minimum Number of Passes per Night	Maximum Number of Passes per Night	Mean Number of Passes per Night
2	August	25	89	0	14	3.56
	September	17	137	0	35	8.06
	October	31	13	0	4	0.42
3	August	27	227	1	25	8.41
	September	30	292	0	27	9.73
	October	26	18	0	6	0.69

Table 4. Summary of bat passes recorded at MET Towers 2 and 3 each month between August and October, 2009. Because the recording period ended November 4, data from that month are excluded from the table.

MET Tower	Month	Low Frequency Bats	High Frequency Bats	Hoary Bats	Big Brown/ Silver-haired Bats	Red/ Evening Bats	*Myotis*	Tri-colored Bats	Unknown Bats	Total Number of Passes
2	August	46	43	1	44	15	24	3	2	88
	September	123	14	0	119	0	3	4	11	137
	October	5	8	0	4	2	1	0	6	13
3	August	178	49	44	78	91	1	8	5	227
	September	247	45	18	189	49	1	8	27	292
	October	16	2	0	14	2	0	0	2	18
Total MET 2		174	65	1	167	17	28	7	19	239
Total MET 3		441	96	62	281	142	2	16	34	537
Total		615	161	63	448	159	30	23	54	776

FIGURES

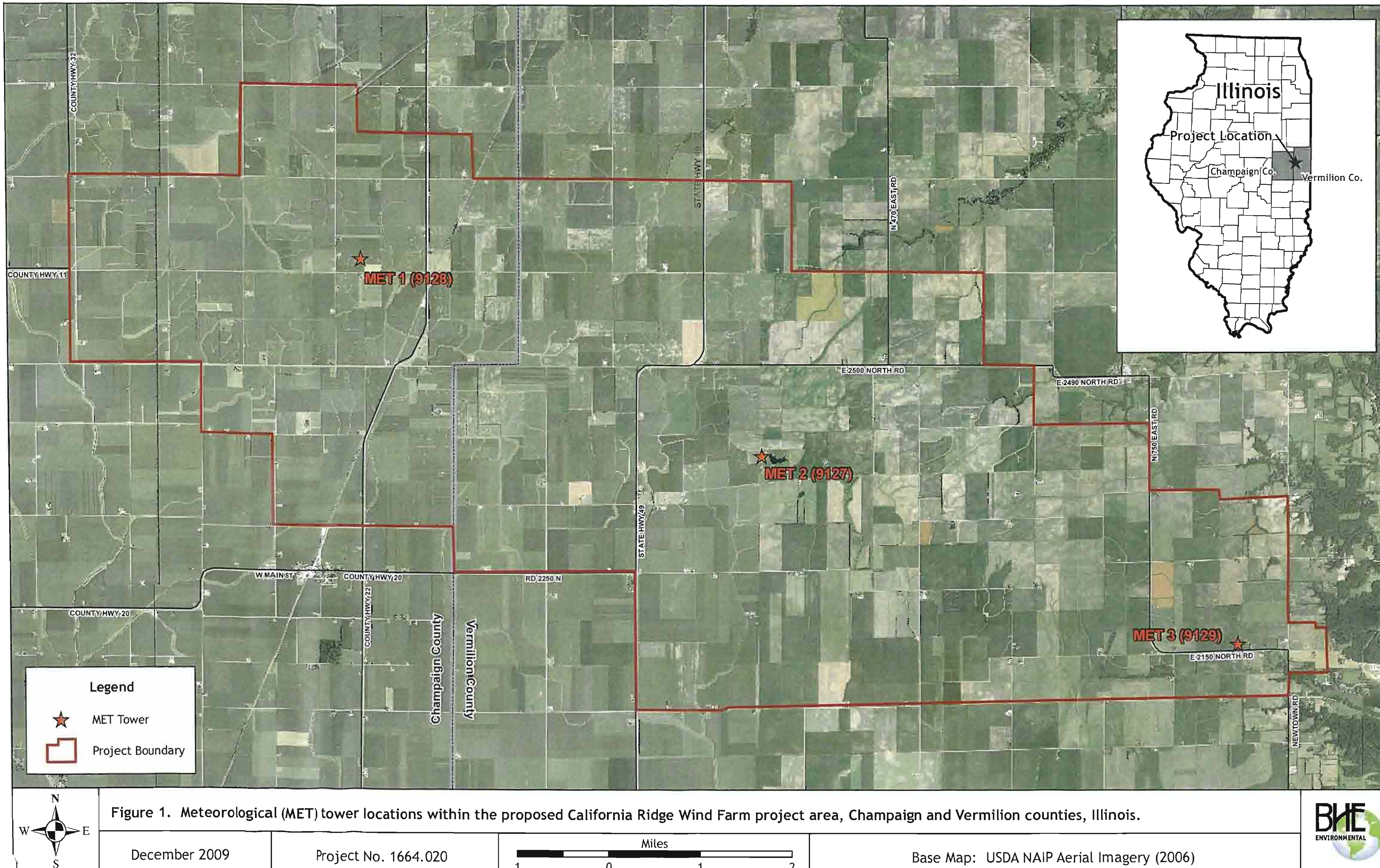


Figure 1. Meteorological (MET) tower locations within the proposed California Ridge Wind Farm project area, Champaign and Vermilion counties, Illinois.

December 2009 | Project No. 1664.020 | Base Map: USDA NAIP Aerial Imagery (2006)

BHE ENVIRONMENTAL

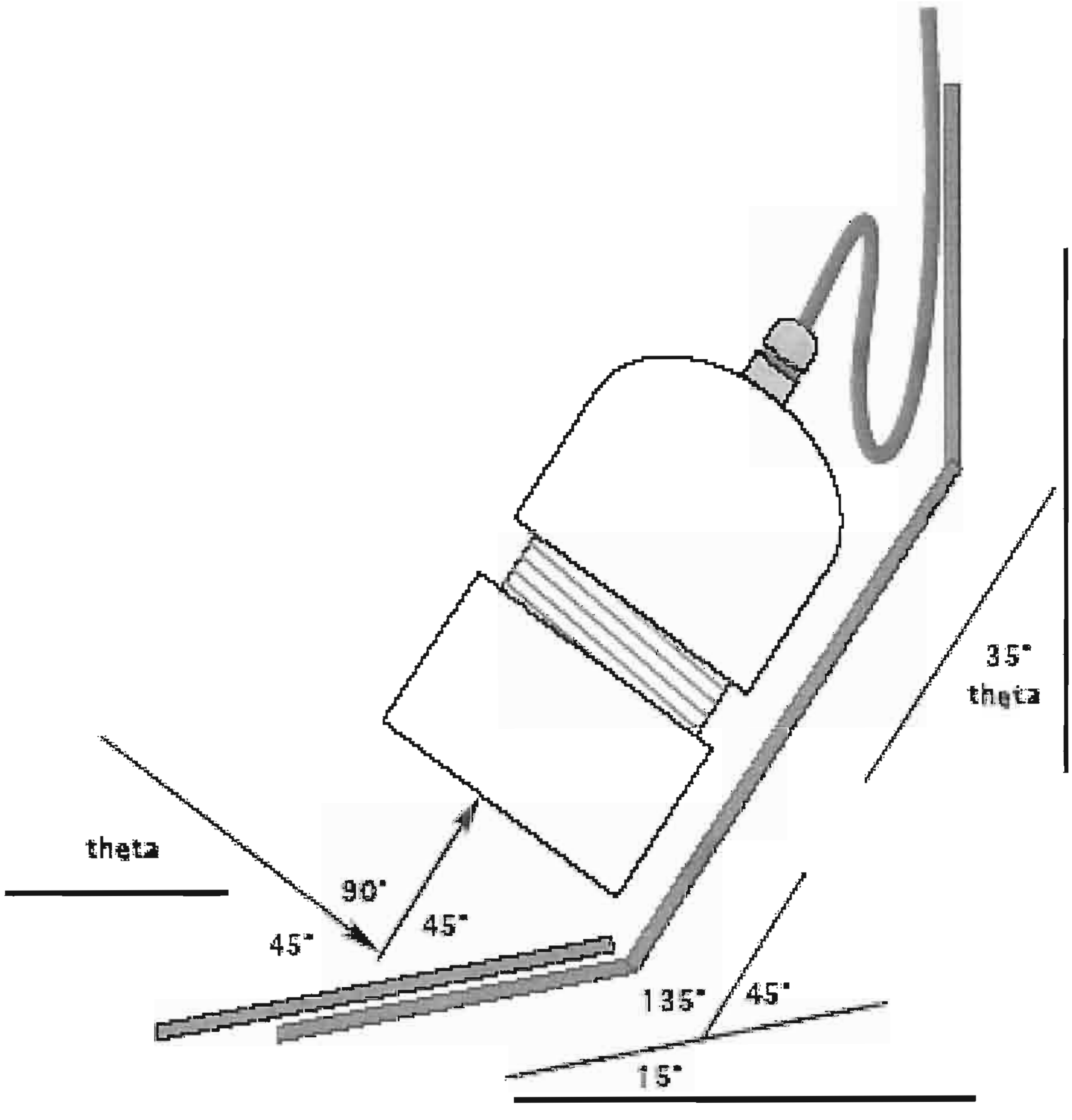


Figure 2. Weather resistant microphone enclosure (BatHat; EME Systems) configuration and set up.

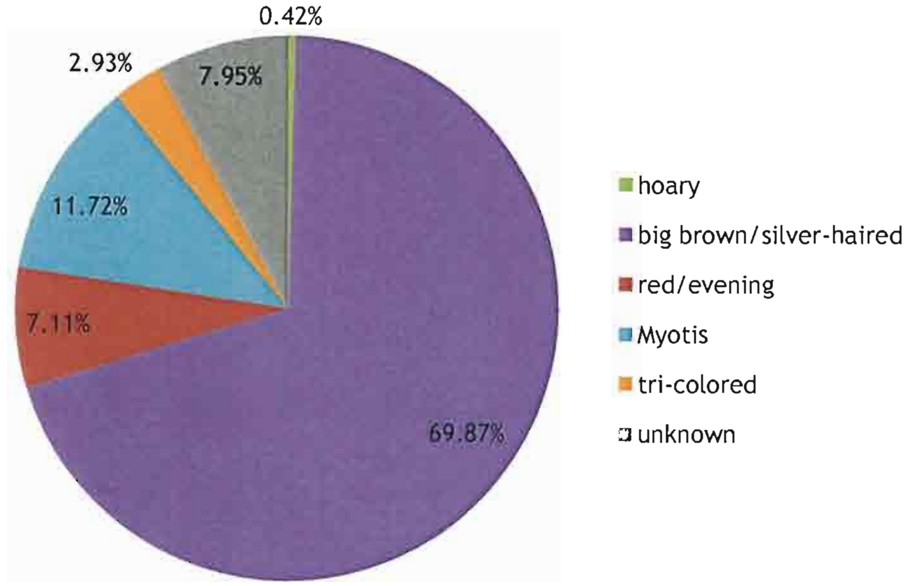


Figure 3. Percentage of bat passes recorded in each of five species groups at MET Tower 2 (n=239).

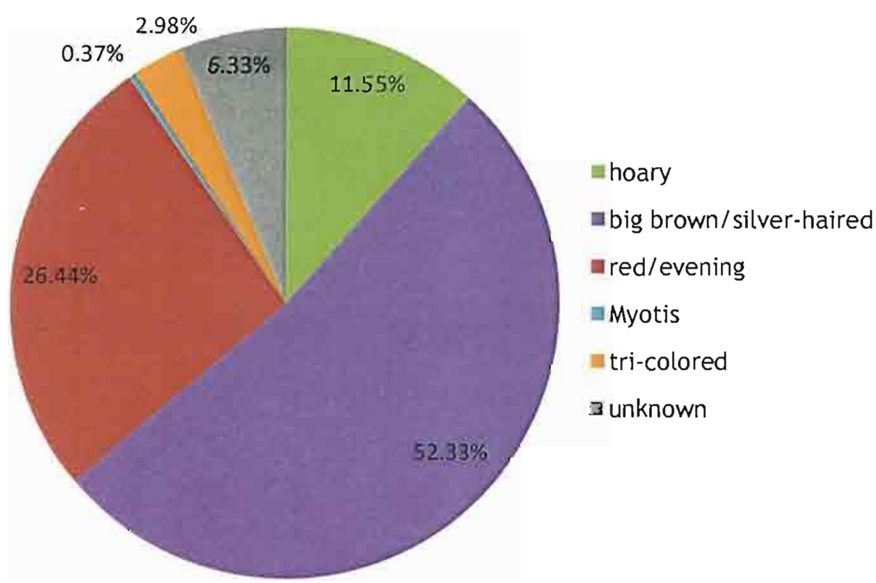
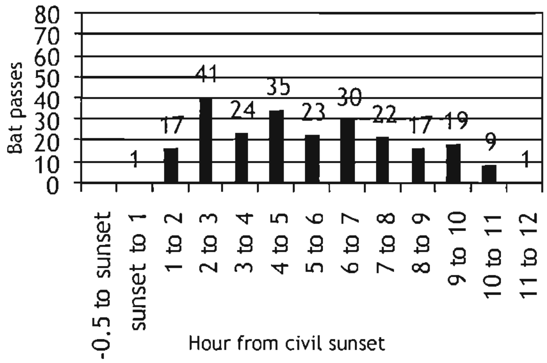
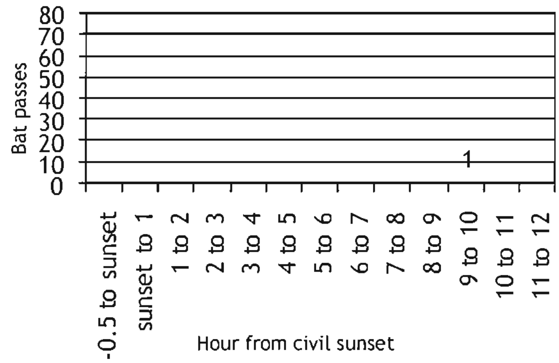


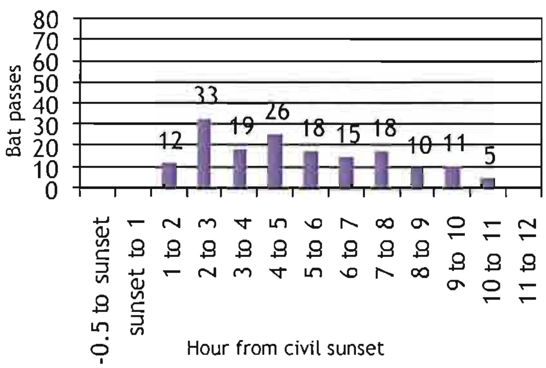
Figure 4. Percentage of bat passes recorded in each of five species groups at MET Tower 3 (n=537).



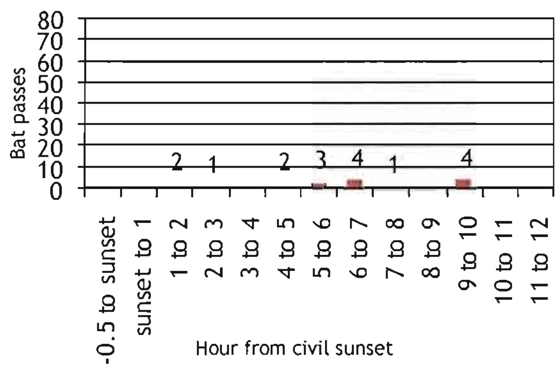
a. Total bat passes.



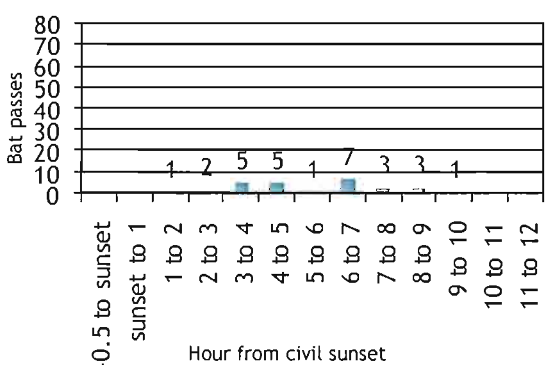
b. Hoary bat passes.



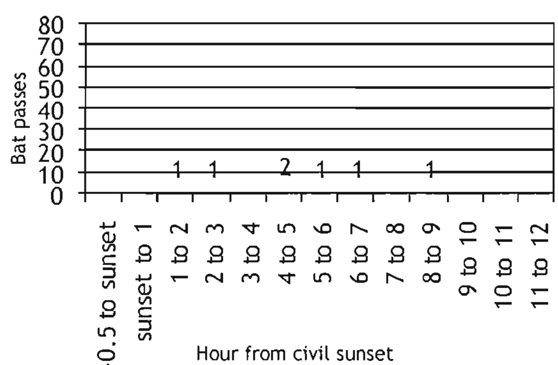
c. Big brown/silver-haired bat passes.



d. Red/evening bat passes.

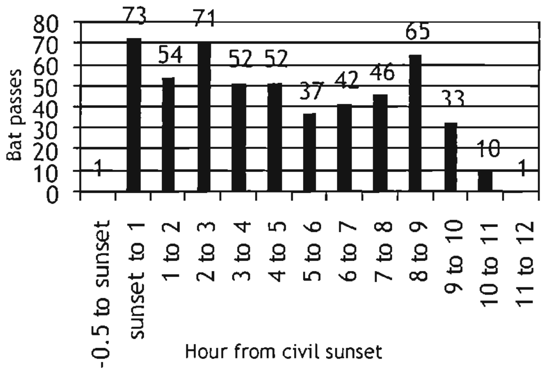


e. *Myotis* passes.

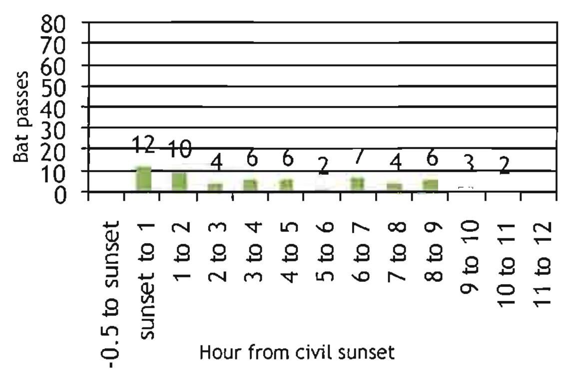


d. Tri-colored bat passes.

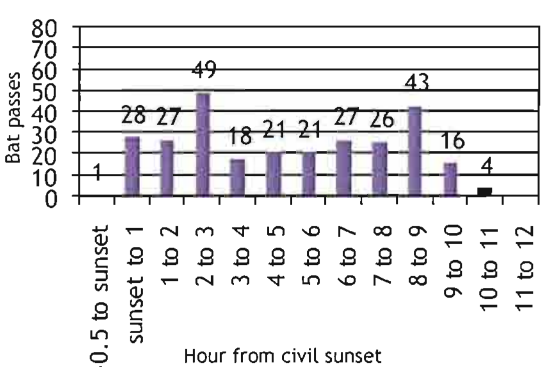
Figure 5. Number of bat passes recorded per hour at MET Tower 2.



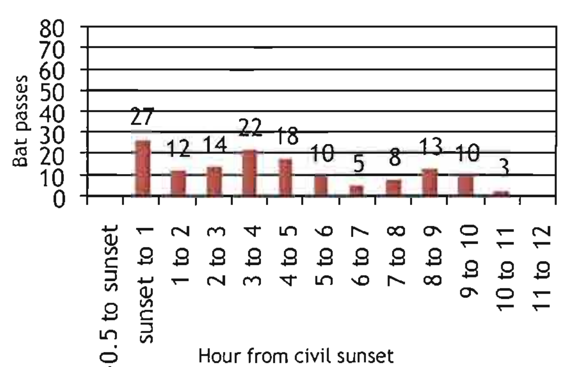
a. Total bat passes.



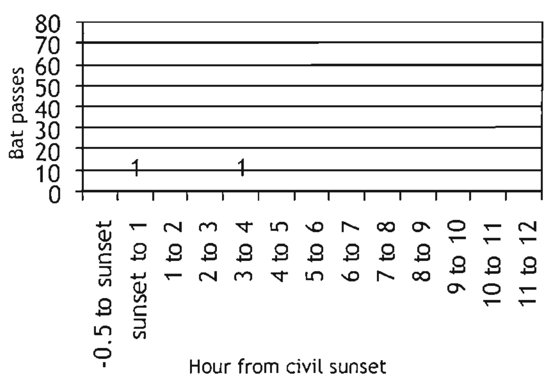
b. Hoary bat passes.



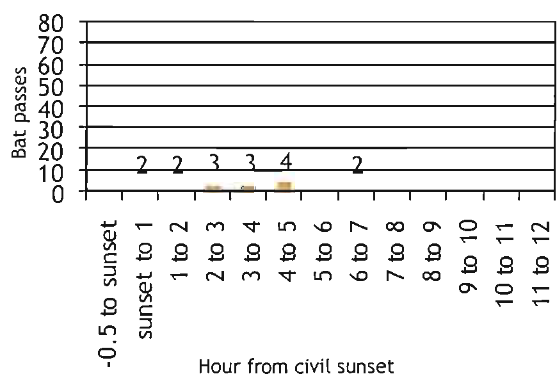
c. Big brown/silver-haired bat passes.



d. Red/evening bat passes.

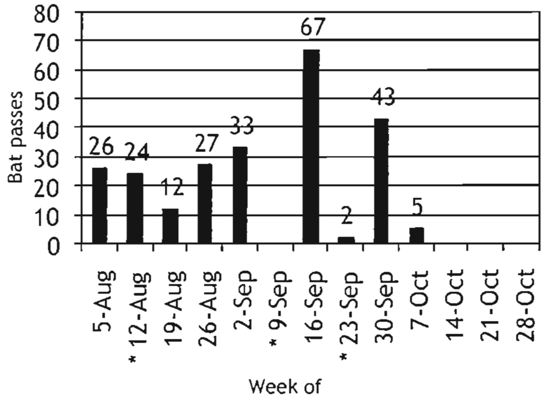


e. *Myotis* passes.

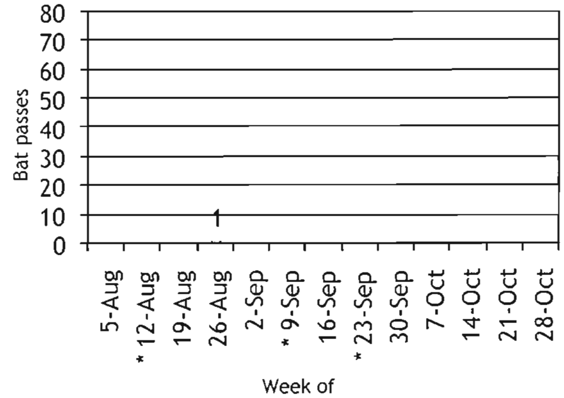


d. Tri-colored bat passes.

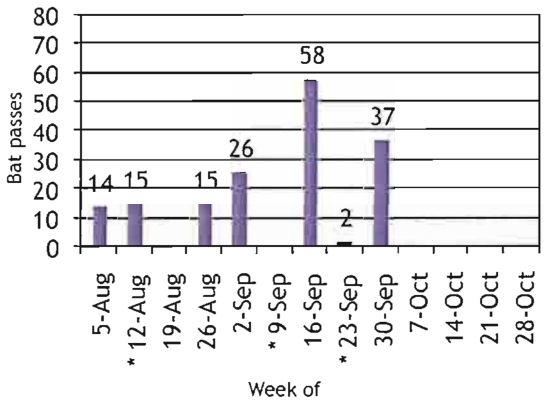
Figure 6. Number of bat passes recorded per hour at MET Tower 3.



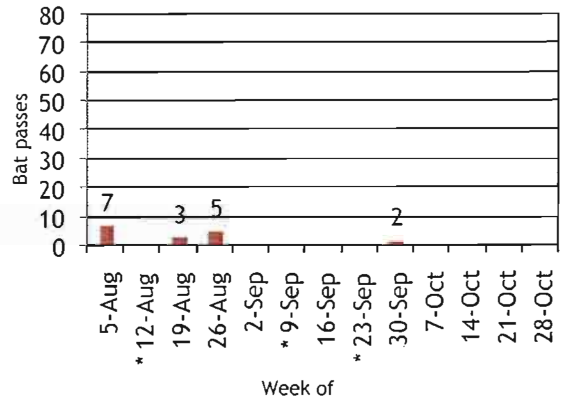
a. Total bat passes.



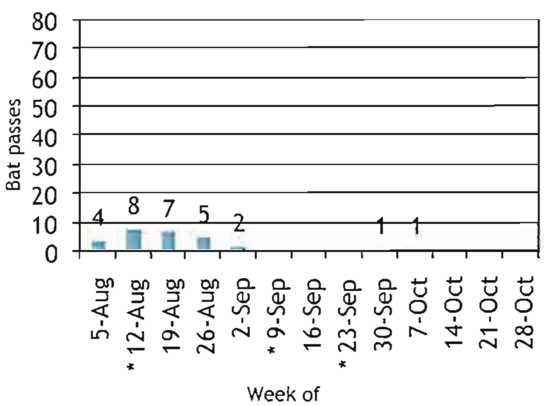
b. Hoary bat passes.



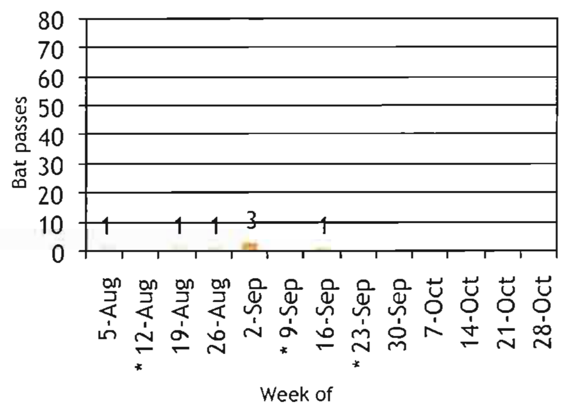
c. Big brown/silver-haired bat passes.



d. Red/evening bat passes.



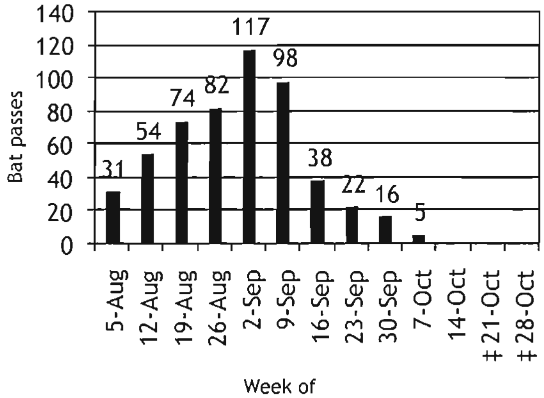
e. *Myotis* passes.



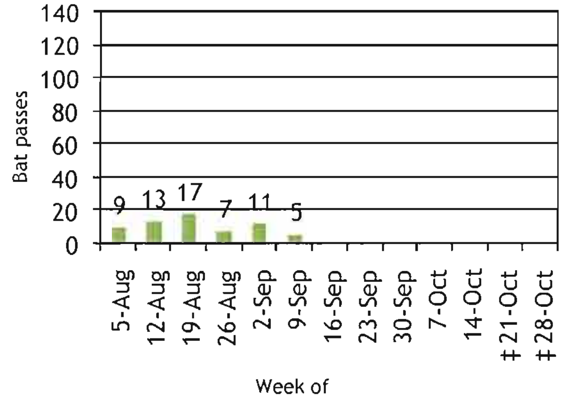
d. Tri-colored bat passes.

Figure 7. Number of bat passes recorded each week at MET Tower 2.

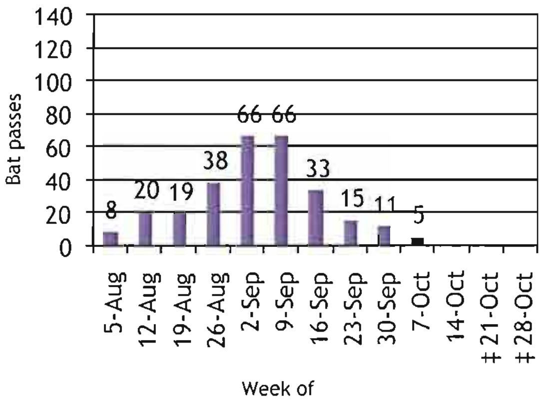
* Compact flash card filled. No data recorded nights of August 17-18, September 9-15, or September 24-29.



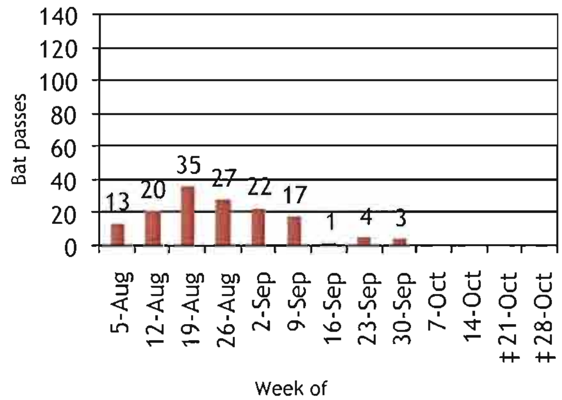
a. Total bat passes.



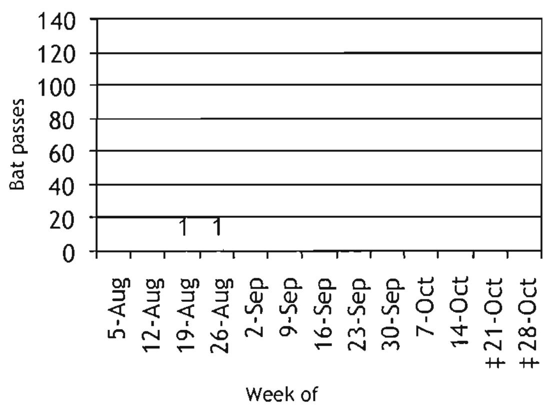
b. Hoary bat passes.



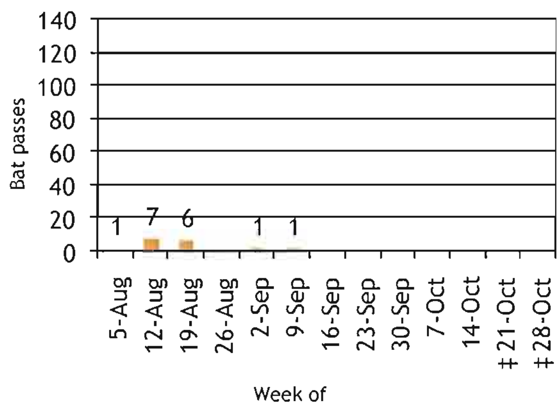
c. Big brown/silver-haired bat passes.



d. Red/evening bat passes.



e. *Myotis* passes.



d. Tri-colored bat passes.

Figure 8. Number of bat passes recorded each week at MET Tower 3.

‡ Anabat malfunction. No data after the night of October 26.

APPENDIX A

Photographs of MET Towers and Anabat Set-Up

Appendix A

Photographs taken by BHE Environmental, Inc.

August 2009

Acoustic Sites at the proposed California Ridge Wind Farm Project Area

Photo 1. Bat hat attached to MET tower.

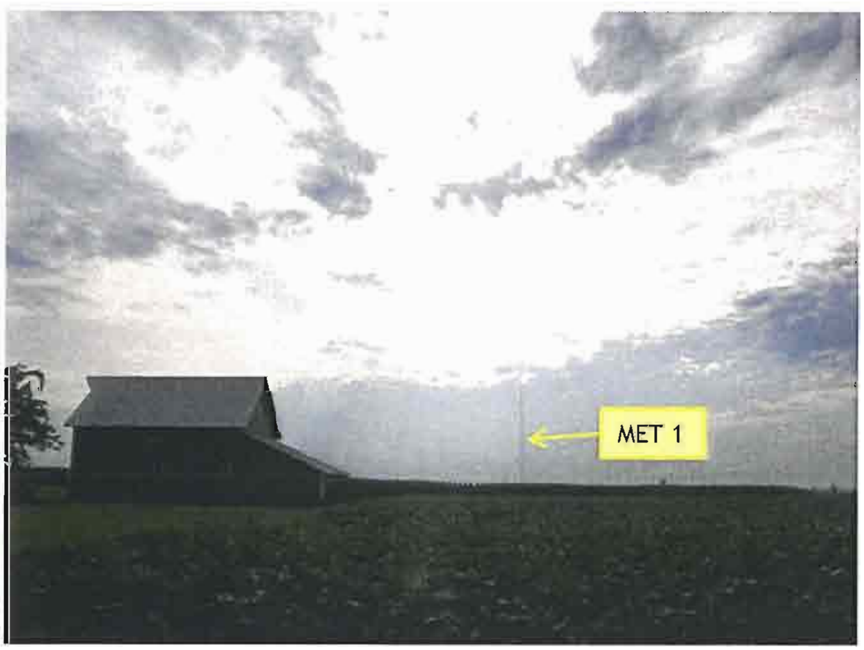


Photo 2. Habitat surrounding MET Tower 1 (9128). Camera is facing east from County Road 2600 East.

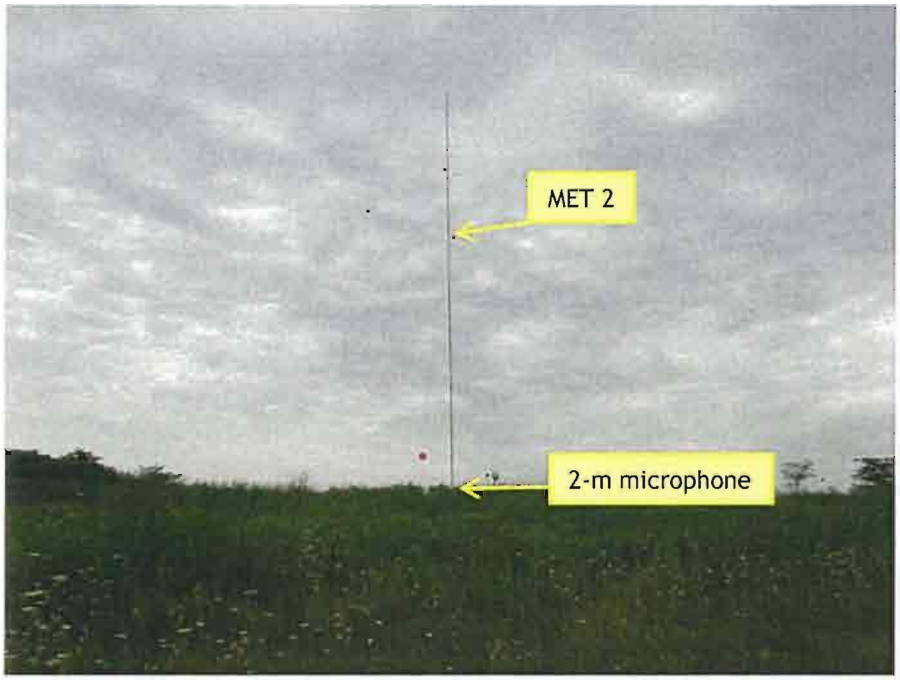


Photo 3. Habitat surrounding MET Tower 2 (9127). Camera is facing west from the farm lane.

Photo 4. Pond just east of MET Tower 2 (9127). Camera is facing east from farm lane.

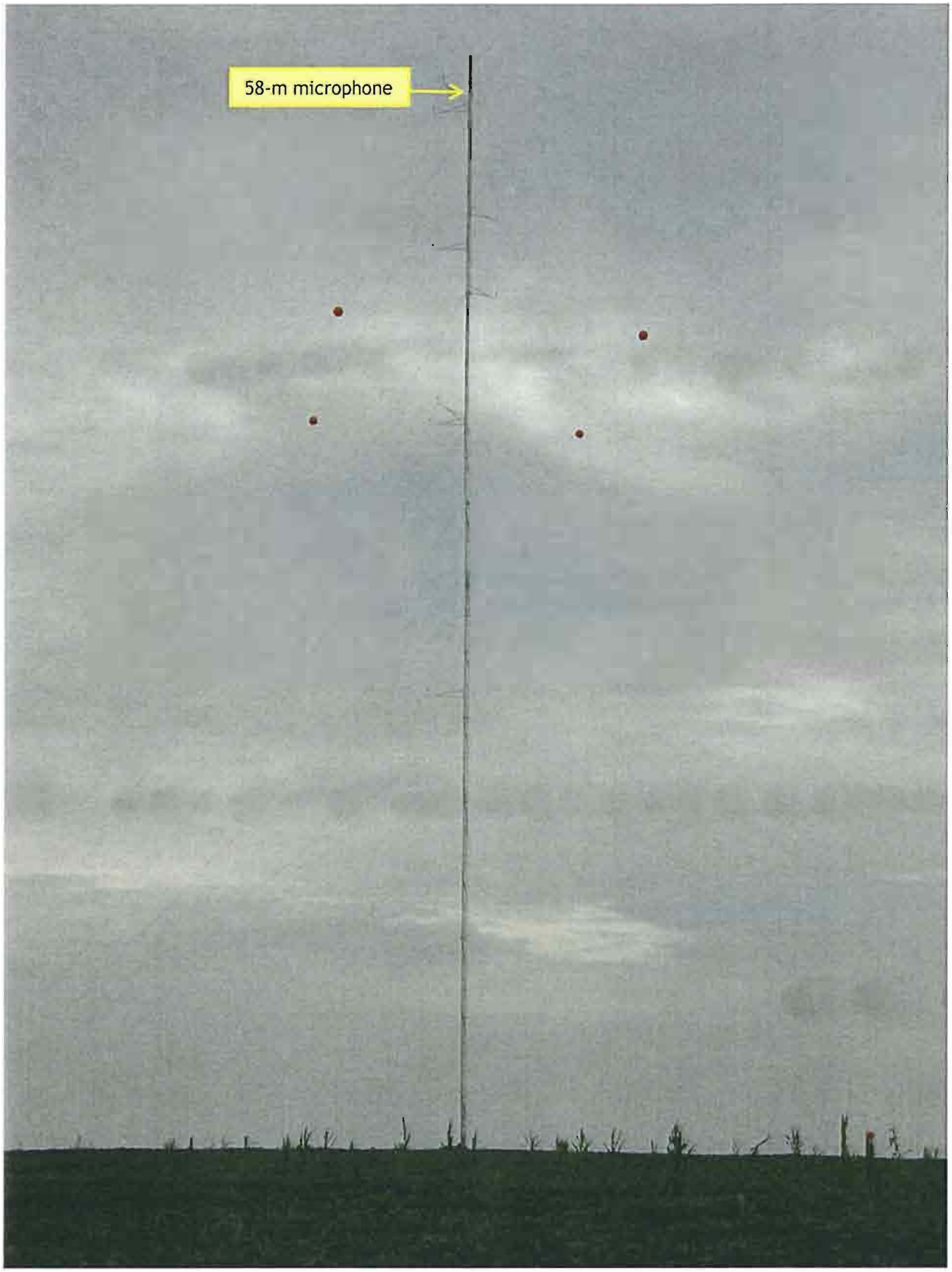


Photo 5. Habitat surrounding MET Tower 3 (9129). Camera is facing northwest from County Road 2150 North.

Photo 6. Ground set-up chained to MET Tower 3 (9129).

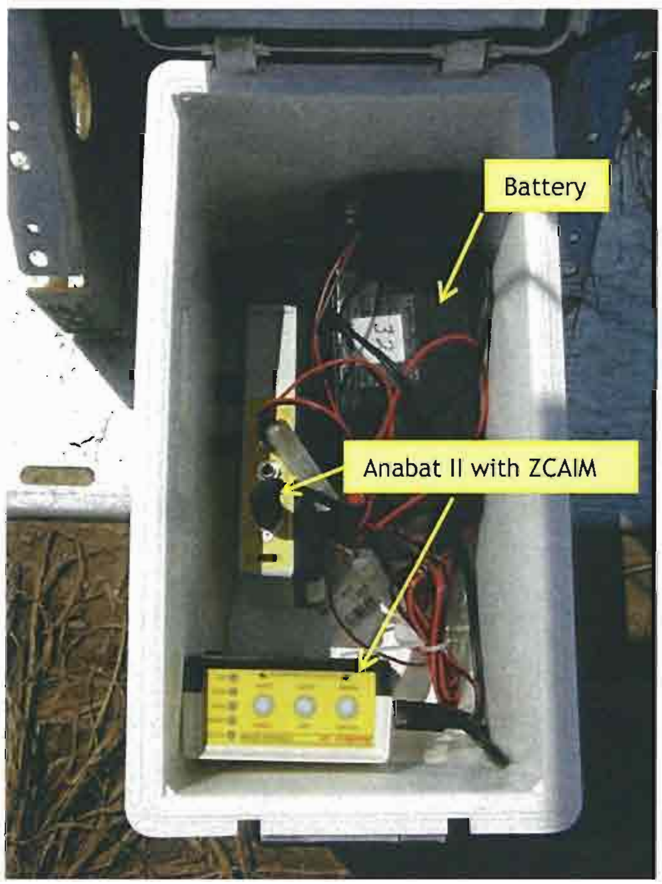


Photo 7. Inside the ground set-up. Each weather -resistant box contains one Anabat II with ZCAIM unit and one battery.

Photo 8. MET Tower 1 (9128) ground set-up covered with solar reflector to prevent overheating.

Photo 9. MET Tower 3 (9129) ground set-up covered with solar reflector to prevent overheating.

APPENDIX M

Parcel Identification Number	Legal Descriptions	Owners	Township Number	Township Name	Range	Section	Acres	Address	City	State	Zip Code	Phone Number
06-12-21-300-003	The West Half of the Southwest Quarter of the Southwest Quarter of Section 21, Township 21 North, Range 14 West of the Second Principal Meridian.	Ackerman, Derald L. and Florence A.	T21N	Compromise	R14W	21	20	519 S MAIN ST	GIFFORD	IL	61847	Sp
06-10-24-100-003	The South one-third of the Northwest quarter of Section 24, Township 21 North, Range 10 East of the third principal meridian, also described as: the South 53 1/3 acres of the Northwest quarter of Section 24, Township 21 North, Range 10 East of the Third Principal Meridian. All that part of the South half of the Northwest quarter of Section 24, Township 21 North, Range 10 East of the third principal meridian, lying South of the Spoon River drainage ditch, except the South 53 1/3 acres of the Northwest quarter of Section 24, Township 21 North, Range 10 East of the Third Principal Meridian, in Champaign County, Illinois.	Ackerman, Derald L. and Florence A.	T21N	Compromise	R10E	24	54	519 S MAIN ST	GIFFORD	IL	61847	(217) 568-7317
06-10-24-300-003	The East Half of the Southwest Quarter of Section 21, Township 21 North, Range 10 East of the Third Principal Meridian.	Ackerman, Derald L. and Florence A.	T21N	Compromise	R10E	24	80	519 S MAIN ST	GIFFORD	IL	61847	(217) 568-7317
17-18-05-400-004	The South one half of the North one half of the Southeast one quarter of Section Five, Township Twenty North, Range Fourteen West of the Second Principal Meridian; and also the South one half of the North one half of the North one half of the Southeast one Quarter of Section Five, Township Twenty North, Range Fourteen West of the Second Principal Meridian, all in Champaign County, Illinois.	Albers, Anna	T20N	Ogden	R14W	5	60	2304A COUNTY ROAD 3000N APT 107	GIFFORD	IL	61847	(217) 568-7295
17-18-05-400-003	The North Half of the North Half of the North Half of the Southeast Quarter of Section 5, Township 20 North, Range 14 West of the 2nd Principal Meridian, in Champaign County, Illinois.	Albers, Carl W. and Anna	T20N	Ogden	R14W	5	20	2304A COUNTY ROAD 3000N APT 107	GIFFORD	IL	61847	(217) 568-7295
06-12-29-300-001	The North Half of the Southwest Quarter of Section Twenty-nine (29) Township Twenty-one (21) North, Range Fourteen (14) West of the Second Principal Meridian, in Champaign County, Illinois	Albers, Dick	T21N	Compromise	R14W	29	80	PO BOX 213	ROYAL	IL	61871	(217) 469-7049
06-12-29-200-003	Approximately twenty acres of farm real estate mor particularly described as follows: The Southwest Quarter of the Northeast Quarter, except the South 20 acres thereof, all in Section 29, Township 21 North, Range 14 West of the Second Principal Meridian, situated in Champaign County, Illinois	Albers, Dick	T21N	Compromise	R14W	29	20	PO BOX 213	ROYAL	IL	61871	(217) 469-7049
06-12-29-200-004	The South one-half of the Southwest Quarter of the Northwest Quarter of Section 29, Township 21 North, Range 14 West of the Second Principal Meridian, Champaign County, Illinois	Albers Farms (c/o Sandra J. King)	T21N	Compromise	R14W	29	20	KING SANDRA, PO BOX 562	ST JOSEPH	IL	61873	(217) 469-7049
17-18-05-200-004	The East 1320 feet of the North Fractional One-half of Fractional Section 5, Township 20 North, Range 14 West of the Second Principal Meridian, Champaign County, Illinois	Albers Farms (c/o Sandra J. King)	T20N	Ogden	R14W	5	42	SANDRA J KING, PO BOX 562	ST JOSEPH	IL	61873	(217) 469-7049
06-12-20-400-009	The Southeast Quarter of Section 20, Township 21 North, Range 14 West of the Second Principal Meridian except the following: Commencing at the Southeast corner of Section 20, Township 21 North, Range 14 West of the Second Principal Meridian, proceed on an assumed bearing of North 0.00 degrees 0.00 minutes 0.00 seconds East along the East line of said Section 20 and the centerline of Champaign County Highway 22 a distance of 1,838.30 feet; thence South 90.00 degrees 0.00 minutes 0.00 seconds West a distance of 40.00 feet to a point on the West right-of-way of said County Highway, the point of beginning; thence continue South 90.00 degrees 0.00 minutes 0.00 seconds West a distance of 200.00 feet; thence North 0.00 degrees 0.00 minutes 0.00 seconds East a distance of 305.00 feet; thence North 90.00 degrees 0.00 minutes 0.00 seconds East a distance of 200.00 feet to a point on the West right-of-way of said County Highway; thence South 0.00 degrees 0.00 minutes 0.00 seconds West along said right-of-way line a distance of 305.00 feet to the point of beginning, containing 1.40 acres, more or less, in the Southeast Quarter of Section 20, Township 21 North, Range 14 West of the Second Principal Meridian, Champaign County, Illinois.	Babb, Michael	T21N	Compromise	R14W	20	158	2635 COUNTY ROAD 2700 E	PENFIELD	IL	61862	(217) 841-5858
06-12-28-200-009	Beginning at the Southeast Corner of the Northeast Quarter of Section 28, Township 21 North of the Base Line, Range 14 West of the Second Principal Meridian; thence north a distance of 531.91 feet on the East Line of said NE1/4; thence deflecting 90 degrees 07 minutes 56 seconds to the left 3482.89 feet; thence 65 degrees 46 minutes 52 seconds to the left 581.79 feet on the southeast line of the right of way of the Union Pacific Railroad; and thence east 3720.33 feet on the east-west quarter section line of said Section to the place of beginning; encompassing 43.926 acres in said NE1/4 and in the Northwest Quarter of said Section, situated in Champaign County, Illinois	Babb, Michele	T21N	Compromise	R14W	28	44	2635 COUNTY ROAD 2700 E	PENFIELD	IL	61862	(217) 841-5858
06-12-30-300-007	Beginning on the South Line of the Southwest Quarter of Section 30, Township 21 North of the Base Line, Range 14 West of the Second Principal Meridian a distance of 266.0 feet west of the Southeast Corner of said Southwest Quarter; thence North 56 degrees 28.3 minutes West (N56° 28.3'W) 144.2 feet on the centerline of a drainage ditch; thence N46° 18.9'W 199.9 feet on said centerline; thence N11° 57.8'W 166.3 feet on said centerline; thence N13° 22.0'W 198.0 feet on said centerline; thence N12° 08.0'W 196.2 feet on said centerline thence N15° 41.0'W 196.3 feet on said centerline; thence N51° 49.7'W 239.1 feet on said centerline; thence N59° 55.0'W 202.5 feet on said centerline; thence N57° 22.2'W 193.1 feet on said centerline; thence N 44° 47.8'W 164.3 feet on said centerline; thence S00° 25.0'E 1,425.8 feet on the West Line of the East Half of said Southwest Quarter and thence S90° 00.0'E 1,071.1 feet on said South Line to the point of beginning; encompassing 20.277 acres, situated in Champaign County, Illinois.	Blue, John G.	T21N	Compromise	R14W	30	21	2148 COUNTY ROAD 2650 E	OGDEN	IL	61859	(217) 583-3133
06-12-30-400-006	Beginning on the South Line of the Southwest Quarter of Section 30, Township 21 North of the Base Line, Range 14 West of the Second Principal Meridian a distance of 601.3 feet east of the Southwest Corner of said Southwest Quarter; thence South 90 degrees 00.0 minutes East (S90° 00.0'E) 189.0 feet on said South Line; thence N 00° 11.9'W 840.2 feet; thence S88° 19.6'E 121.4 feet; thence N00° 17.4'W 73.1 feet; thence N89° 56.4'E 423.0 feet; thence N00° 21.6'W 883.6 feet on the East Line of the West Half of said Southeast Quarter; thence N89° 48.1'W 736.5 feet parallel with the South Line of the Northwest Quarter of said Southeast Quarter; and thence S00° 23.0'E 1,796.4 feet parallel with the West Line of said Southeast Quarter to the point of beginning; encompassing 19.140 acres, situated in Champaign County, Illinois.	Blue, John G.	T21N	Compromise	R14W	30	19	2148 COUNTY ROAD 2650 E	OGDEN	IL	61859	(217) 583-3133
06-11-31-200-003	The East Half of the Southeast Quarter of the Northeast Quarter of Section 31, Township 21 North of the Base Line, Range 11 East of the Third Principal Meridian; encompassing 20.461 acres, situated in Champaign County, Illinois	Blue, John G.	T21N	Compromise	R11E	31	20	2148 COUNTY ROAD 2650 E	OGDEN	IL	61859	(217) 583-3133
17-18-04-400-004	The South 80 acres of the North 133.12 acres of the Southeast Quarter of Section 4, Township Twenty North, Range Fourteen West of 2nd P.M., Champaign County, Illinois	Britt, Inez K.	T20N	Ogden	R14W	4	80	2333 COUNTY ROAD 2800 E	OGDEN	IL	61859	217-583-3153
06-12-29-400-009	The South 75 acres of the Southeast Quarter of Section 29, Township 21 North, Range 14 West of the Second Principal Meridian, in Champaign County, Illinois	Bruinius Family Limited Partnership	T21N	Compromise	R14W	29	75	7723 W STUENKEL RD	FRANKFORT	IL	60423	N/A
17-18-06-300-006	The South half of fractional Section6, Township 20 North, Range 14 West of the Second Principal Meridian, in Champaign County, Illinois, EXCEPT the East half of the Southeast Quarter of said Section 6, EXCEPT that part which lies North of the center of the open drainage ditch, which intersects the South half of said fractional Section 6, EXCEPT the West 27.46 acres of that part of the West half of the Southwest Quarter of Section 6, Township 20 North, Range 14 West of the Second Principal Meridian in Champaign County, Illinois, which lies South of the center of the open drainage ditch, which intersects the South half of said Section 6, ALSO EXCEPT beginning at the Southeast corner of the Southwest Quarter of Fractional Section 6, Township 20 North, Range 14 West of the Second Principal Meridian; running thence West 230 feet on the South line of said Southwest Quarter; thence 90 00' to the right 286 feet; thence East 300 feet parallel with said South line; thence 90 00" to the right 286 feet; thence West 70 feet on said South line to the place of beginning, in Champaign County, Illinois	Bruns, Neil, Darrell & Kristi (c/o Marlys McCartney)	T20N	Ogden	R14W	6	81	1113 ASCOT DR	RANTOUL	IL	61866	(217) 568-7135

06-11-30-300-001	The West half of the following described real estate: The fractional Section 30, Township 21 North, Range 11 East of the Third Principal Meridian, EXCEPT the North 348 acres thereof, in Champaign County, Illinois.	Brya, Ellen J. (c/o Busey Bank)	T21N	Compromise	R11E	30	80	BUSEY AG SERVICES, P O BOX 107	LEROY	IL	61752	217-425-8275
06-12-28-200-002	The Northeast Quarter (NE-1/4) of the Northeast Quarter (NE-1/4) of Section Twenty-eight (28) Township Twenty-one North (21N) Range Fourteen (14) West of the Second Principal Meridian and Six (6) acres off the North (N) end of the Southeast Quarter (SE -¼) of the Northeast Quarter (NE -1/4) of Section Twenty-eight (28) as fixed by a survey made by M.H. Kinch, Surveyor, and recorded in Book K page 108 of the Champaign County, Illinois Records, and otherwise described as: Beginning at the Northwest (NW) corner of the Southeast Quarter (SE -¼) of the Northeast Quarter (NE ¼) of Section Twenty-eight (28) thence Easterly 1337.1 feet to the Northeast (NE) corner of the Southeast Quarter (SE -¼) of the Northeast Quarter (NE -¼) of Section Twenty-eight (28) thence Southerly (S) 195.47 feet thence Westerly (W) 1337.1 feet thence Northerly (N) 195.47 feet to the place of beginning, all in Township Twenty-one North (21N) Range Fourteen West (14W) of the Second Principal Meridian.	Buck, Alice L., c/o Steve Buck	T21N	Compromise	R14W	28	46	609 BAYSHORE DR #9	FT LAUDERDALE	FL	33304	N/A
06-12-28-200-008	Beginning at the Southeast Corner of the Northeast Quarter of Section 28, Township 21 North of the Base Line, Range 14 West of the Second Principal Meridian; thence north a distance of 531.91 feet on the East Line of said NE1/4 to a true place of beginning; thence deflecting 90 degrees 07 minutes 56 seconds to the left a distance of 3482.89 feet; thence 114 degrees 13 minutes 08 seconds to the right 166.04 feet on the southeast line of the right of way of the Union Pacific Railroad; thence 65 degrees 46 minutes 52 seconds to the right 2079.91 feet; thence north 461.67 feet on the West Line of the Southeast Quarter of said NE1/4; thence 89 degrees 50 minutes 58 seconds to the right 1162.71 feet; thence South 295.00 feet parallel with said East Line; thence 90 degrees 12 minutes 38 seconds to the left 173.00 feet; and thence south 319.92 feet to the true place of beginning; encompassing 25.00 acres in said NE1/4 and in the Northwest Quarter of said Section; situated in Champaign County, Illinois.	Buck, Steve	T21N	Compromise	R14W	28	25	609 BAYSHORE DR APT 9	FT LAUDERDALE	FL	33304	N/A
06-12-29-100-004	The East Half of the Northwest Quarter of Section Twenty-nine, Township Twenty-one North, Range Fourteen West of the Second Principal Meridian in Champaign County, Illinois, excepting the East Half of the Northeast Quarter of the Northeast Quarter of the Northwest Quarter of said Section.	Buck, Thomas and Patricia	T21N	Compromise	R14W	29	75	2321 COUNTY ROAD 2900 N	GIFFORD	IL	61847	(217) 565-7956
06-10-25-100-004	The North Half of the Northwest Quarter (NW ¼) of Section 25, Township 21 North, range 10 East of the Third Principal Meridian, EXCEPT the North 450 feet of even width of the West 542 feet of even width thereof, situated in Champaign County, Illinois, containing 77 acres more or less.	Buhr, Russell and Marilyn	T21N	Compromise	R10E	25	78	2594 COUNTY ROAD 2300 E	GIFFORD	IL	61847	(217) 694-4551
06-12-30-300-006	The West Half of the Southwest Quarter of Section 30, Township 21 North, Range 14 West of the Second Principal Meridian, containing 80.56 acres, more or less, in Champaign County, Illinos	Buhr, Vernon and Wilma	T21N	Compromise	R14W	30	80	2152 COUNTY ROAD 2400 N	ST JOSEPH	IL	61873	(217) 694-4149
06-10-25-200-005	The West Half of the Southwest Quarter of the Northeast Quarter of Section 25, Township 21 North, Range 10 East, of the Third Principal Meridian, situated in Champaign County, Illinois	Buhr, Vernon and Wilma	T21N	Compromise	R10E	25	20	2152 COUNTY ROAD 2400 N	ST JOSEPH	IL	61873	(217) 694-4149
17-18-07-200-008	The North one-third of the East Half of the North 200 acres of the West 344.37 acres of Fractional Section 7, Township 20 North, Range 14 West of the Second Principal Meridian, in Champaign County Illinois, and ALSO The South half of the North two-thirds of the Tract described as follows: the East Half of the North 200 acres of the West 344.37 acres of Fractional Section 7, Township 20 North, Range 14 West of the Second Principal Meridian in Champaign Coutny, Illinois; subject to an easement for ingress and egress over the east 20 feet of said tract, to the South one-third of said one hundred acre tract.	Buhr, Vernon and Wilma	T20N	Ogden	R14W	7	67	2152 COUNTY ROAD 2400 N	ST JOSEPH	IL	61873	(217) 694-4149
17-18-09-300-003	The East half of the Southwest Quarter and the West half of the West Half of the Southeast Quarter in Section 9, Township 20 North, Range 14 West of the Second Principal Meridian, in Champaign County, Illinois. (portion of this legal)	Busboom Family Trust (c/o Glen L. & Billie J. Busboom)	T20N	Ogden	R14W	9	40	2756 COUNTY ROAD 2200 N	OGDEN	IL	61859	(217) 583-3350
17-18-09-300-004	The East half of the Southwest Quarter and the West half of the West Half of the Southeast Quarter in Section 9, Township 20 North, Range 14 West of the Second Principal Meridian, in Champaign County, Illinois. (portion of this legal)	Busboom Family Trust (c/o Glen L. & Billie J. Busboom)	T20N	Ogden	R14W	9	40	2756 COUNTY ROAD 2200 N	OGDEN	IL	61859	(217) 583-3350
17-18-09-300-005	The East half of the Southwest Quarter and the West half of the West Half of the Southeast Quarter in Section 9, Township 20 North, Range 14 West of the Second Principal Meridian, in Champaign County, Illinois. (portion of this legal)	Busboom Family Trust (c/o Glen L. & Billie J. Busboom)	T20N	Ogden	R14W	9	40	2756 COUNTY ROAD 2200 N	OGDEN	IL	61859	(217) 583-3350
06-10-25-300-002	The South half of the Southwest Quarter of Section 25, Township 21 North, Range 10 East of the Third Principal Meridian, in Compromise Township, in Champaign County, Illinois, containing 80 acres, more or less. EXCEPT The Southeast Quarter of the Southwest Quarter of Section 25, Township 21 North, Range 10 East of the Third Principal Meridian, in Compromise Township, in Champaign County, Illinois.	Busboom, Luella	T21N	Compromise	R10E	25	40	2258 COUNTY ROAD 2500 N	ST JOSEPH	IL	61873	217-694-4138
06-12-28-300-001	All of the Northwest Quarter (NW-1/4) of the Southwest Quarter (SW-1/4) of Section Twenty-eight (28), Township Twenty-one North (21N), Range Fourteen West (14W) of the Second Principal Meridian situated in Champaign County, Illinois and lying on both sides of the right of way of the Chicago and Eastern Illinois Railroad with the exception of the right of way granted to the Chicago and Eastern Illinois Railroad, being a strip of ground 110 feet wide and being 50 feet on the west side and 60 feet on the east side of the line that has been surveyed across the Northwest Quarter (NW- ¼) of the Southwest Quarter (SW – ¼) of Section Twenty-eight (28) Township Twenty-one North (21N) Range Fourteen West (14W) of the Second Principal Meridian.	Cain, Alice J. (heirs) c/o Steve Cain	T21N	Compromise	R14W	28	38	PO BOX 103	PHILO	IL	61864	217-684-2394
06-12-30-200-002	The East half of the Northeast Quarter of Section 30 in Township 21 North, Range 14 West of the 2nd P.M., Champaign County, Illinois.	Cain, Daniel J. and Amy L.	T21N	Compromise	R14W	30	80	2567 COUNTY ROAD 2600 E	PENFIELD	IL	61862	217-202-1314
06-12-33-200-010	Tract 1 The West half of the Northeast Quarter-EXCEPT the South five acres thereof: Also Except the East thirty acres of the North forty acres thereof. Tract 2 The East 30 acres of the North 40 acres of the West half of the Northeast Quarter of Section 33, Township 21 North, Range 14 West of the 2nd P.M., Champaign County, Illinois; EXCEPT part of the North half of the Northwest Quarter of the Northeast Quarter of Section 33, Township 21 North, Range 14 West of the 2nd P.M., described as follows: Commencing at the Northeast corner of said North half of the Northwest Quarter of the Northeast Quarter of Section 33, Township 21 North, Range 14 West of the 2nd P.M., thence West 277 feet for a point of beginning, thence South 300 feet, thence West 431 feet, thence North 300 feet, thence East to the place of beginning, situated in Champaign County, Illinois. Tract 3 The South five acres of the West half of the Northeast Quarter (NE ¼) of Section 33, Township 21 North, Range 14 West of the Second P.M. Champaign County, Illinois.	Carter, Roger	T21N	Compromise	R14W	33	78	2562 COUNTY ROAD 3000 N	PENFIELD	IL	61862	217-595-5461
06-11-30-400-001	East Half of the following described real estate: Fractional Section 30, except the North 348 acres thereof in Township 21 North, Range 11 East of the Third Principal Meridian in Champaign County, Illinois.	Clifford, Roseann	T21N	Compromise	R11E	30	80	2008 SUNVIEW DR	CHAMPAIGN	IL	61821	217-352-2360
06-10-25-400-002	The Southeast Quarter of Section 25, Township 21N, Range 10 E of the 3rd P.M., in Champaign County, IL. NOTE: The land under key number 06-10-25-400-002 (80 acres) is only a portion of the above described legal description	Elfe, Mary Ruth Revoc. Trust; Van Blokland, Charlotte R. Revoc. Tru	T21N	Compromise	R10E	25	80	BUSEY AG SERVICES, 3002 W WINDSOR RD	CHAMPAIGN	IL	61822	217-351-2757

06-11-31-100-001	Beginning at the center of the public highway at the Northwest corner of Section 31, Township 21 N, Range 11E of the 3rd P.M., in Champaign County, thence East 532.32 feet; thence South 1320 feet; thence West 532.32 feet; thence North to the place of beginning containing 16.13 acres; ALSO a part of the NW fractional quarter of Section 31, Township 21N, Range 11E of the 3rd P.M., in Champaign County, IL, described as follows: Beginning at a point 2675 feet South of the NW corner of said Section 31 and running thence East 1571 feet; thence 2671.25 feet to the North line of Section 31, thence West along said Section line 1029.68 feet; thence South 1320 feet; thence West 532.32 feet to the West line of said section; thence South 1355 feet tot he place of beginning, containing 80 acres, more or less, all situated in Champaign County, Illinois	Elfe, Mary Ruth Revoc. Trust; Van Blokland, Charlotte R. Revoc. Tru	T21N	Compromise	R11E	31	94.5	BUSEY AG SERVICES, 3002 W WINDSOR RD	CHAMPAIGN	IL	61822	217-351-2757
06-10-25-400-001	The Southeast Quarter of Section 25, Township 21N, Range 10 E of the 3rd P.M., in Champaign County, IL. NOTE: The land under key number 06-10-25-400-001 (80 acres) is only a portion of the above described legal description	Elfe, Mary Ruth Revoc. Trust; Van Blokland, Charlotte R. Revoc. Tru	T21N	Compromise	R10E	25	80	BUSEY AG SERVICES, 3002 W WINDSOR RD	CHAMPAIGN	IL	61822	217-351-2757
06-11-30-300-003	The South half and the South 14.22 acres of the North half of : All except the North 32 acres of the following: The South 188 acres of the North 348 acres of Section 30, Township 21 North, Range 11 East of the Third Principal Meridian, EXCEPT the East one-third thereof, situated in Champaign County, Illinois.	Fiscus, Kay Marie	T21N	Compromise	R11E	30	61	105 THOMAS DR	ST JOSEPH	IL	61873	217-469-7512
06-11-31-200-002	The Northeast Quarter of Section 31, Township 21 North, Range 11 East of the 3rd Principal Meridian, except the East 20 acres of the South half of the Northeast Quarter of said Section 31, in Champaign County, Illinois.	Foster, Larry E.	T21N	Compromise	R11E	31	140	28012 STATE ROUTE 49	ARMSTRONG	IL	61812	217-569-2566
17-18-08-100-001	The West Thirty (30) acres of the North half (N ½) of the Northwest Quarter (NW ¼) of Section 8, Township 20 North, Range 14 West of the Second Principal Meridian in Champaign County, Illinois.	Franzen, Albert J.	T20N	Ogden	R14W	8	30	300 HENSON DR, PO BOX 206	BROADLANDS	IL	61816	217-834-3259
06-12-29-100-002	The Southwest quarter (SW ¼) of the Northwest quarter (NW ¼) of Section Twenty-nine (29) in Township Twenty-one (21) North, Range Fourteen (14) West of the Second Principal Meridian, in Champaign County, Illinois.	Franzen Family Living Trust	T21N	Compromise	R14W	29	40	831 CO RD 900E	TOLONO	IL	61880	309-825-1360
06-12-19-400-003	The Southeast ¼ of the Southeast ¼ of Section 19, Township 21 North, Range 14 West, of the Second Principal Meridian, in Champaign County, Illinois.	Frerichs, Gregory L.	T21N	Compromise	R14W	19	40	2506 COUNTY ROAD 2300 N	OGDEN	IL	61859	(217) 469-2238
06-12-31-100-003	The West half (W ½) of the Northwest Quarter (NW ¼) of Section 31, Township 21 North, Range 14 West of the Second Principal Meridian in Champaign County, Illinois	Frerichs, Larry	T21N	Compromise	R14W	31	81	2474 COUNTY ROAD 2500 E	PENFIELD	IL	61862	(217) 694-4198
06-11-30-100-007	The North 32 acres of the following; The South 188 acres of the North 348 acres of Section 30, Township 21 North, Range 11 East of the 3rd P.M., EXCEPT the East one-third thereof, situated in Champaign County, Illinois	Frerichs, Lois and Herbert	T21N	Compromise	R11E	30	32	305 CHURCH ST, PO BOX 25	ROYAL	IL	61871	(217) 583-3337
06-11-30-300-004	All except the North 32 acres of the following: The South 188 acres of the North 348 acres of Section 30, Township 21 North, Range 11 East of the 3rd P.M., EXCEPT the East one-third thereof situated in Champaign County, Illinois	Frerichs, Lois	T21N	Compromise	R11E	30	33	305 E CHURCH ST	ROYAL	IL	61871	(217) 583-3337
17-18-05-300-004	Commencing at the Southeast corner of the Southwest Quarter of said Section 5, proceed North 90°00'00" West along the South line of said Southwest Quarter, 586.72 feet to the true point of beginning; thence continue North 90°00'00" West along said South line of the Southwest Quarter, 332.79 feet; thence North 00°00'00" West, 550.00 feet; thence South 90°00'00" East, 332.79 feet; thence South 00°00'00" East, 550.00 feet to the true point of beginning, in Champaign County, Illinois.	Shearin, Dan	T20N	Ogden	R14W	5	4	2432 PARKLAKE DR	MORRIS	IL	60451	(815) 483-8631
17-18-05-300-003	The North half of the Southwest Quarter and the Southeast Quarter of the Southwest Quarter of Section 5, Township 20, Range 14 West of the Second Principal Meridian, situated in Champaign County, Illinois, EXCEPT a tract described as follows: Commencing at the Southeast corner of the Southwest Quarter of said Section 5, proceed North 90°00'00" West along the South line of said Southwest Quarter, 586.72 feet to the true point of beginning; thence continue North 90°00'00" West along said South line of the Southwest Quarter, 332.79 feet; thence North 00°00'00" West, 550.00 feet; thence South 90°00'00" East, 332.79 feet; thence South 00°00'00" East, 550.00 feet to the true point of beginning, in Champaign County, Illinois.	Shearin, Dan	T20N	Ogden	R14W	5	116	2433 PARKLAKE DR	MORRIS	IL	60452	(815) 483-8631
06-12-19-300-004	West 70 acres of even width of the South 100 acres of the West half (W ½) of Section 19, Township 21 North, Range 14 West, of the Second Principal Meridian, situated in Champaign County, Illinois. EXCEPT Part of the Southwest Quarter of the Southwest Quarter of Section 19, Township 21 North, Range 14 West of the Second Principal; Meridian, described as follows: Beginning on the West line of the Southwest Quarter of Section 19, Township 21 North of the Base Line, Range 14 West of the Second Principal Meridian a distance of 459.0 feet North of the Southwest corner of said Southwest Quarter, thence North 230.00 feet along said West Line; thence Easterly 245.0 feet at right angles; thence South 49.0 feet parallel with said West Line; thence Easterly 149.0 feet at right angles; thence South 113.0 feet parallel with said West Line; thence Westerly 92.0 feet at right angles; thence South 68.0 feet parallel with said West Line; and thence Westerly 302.0 feet to the point of beginning; situated in Champaign County, Illinois.	Fruhling, John	T21N	Compromise	R14W	19	70	2499 COUNTY ROAD 2600 N	PENFIELD	IL	61862	217-694-4135
06-12-19-400-002	The North Half (N ½) of the Southeast Quarter (SE ¼) in Section 19, Township 21 North, Range 14 West of the Second Principal Meridian in Champaign County, Illinois.	Fruhling, Loretta; Fruhling Family Trust	T21N	Compromise	R14W	19	82	FRUHLING FARM, 2543 COUNTY ROAD 3200 N	PENFIELD	IL	61862	217-649-0009
06-12-19-300-005	The East 30 acres of the South 101 acres of the Southwest Quarter of Section 19, Township 21 North, Range 14 West of the Second P.M. Champaign County, Illinois	Fruhling, Louise	T21N	Compromise	R14W	19	30	31361 N 750 EAST RD	POTOMAC	IL	61865	(217) 893-4163
06-12-19-100-002	The North 220 acres of the West half (W ½) of Section 19, Township 21 North, Range 14 West of the Second Principal Meridian in Champaign County, Illinois. EXCEPT A part of the West one-half of Section 19, Township 21 North, Range 14 West of the Second Principal Meridian, Champaign County, Illinois described as follows: Beginning on the west line of said Section 19, 1988 feet North of the Southwest corner of said Section; thence North 254 feet on said West line; thence Easterly 1,250.00 feet at right angles; thence South 254 feet parallel with said West line; thence westerly 1,200 feet to the point of beginning, containing 7 acres, more or less.	G & E Farms	T21N	Compromise	R14W	19	210	PO BOX 35	GIFFORD	IL	61847	217-694-4775
06-12-20-100-001	The West half (W ½) of the Northwest Quarter (NW1/4) of Section 20, Township 21 North, Range 14 West of the Second Principal Meridian in Champaign County, Illinois.	G & E Farms	T21N	Compromise	R14W	20	80	PO BOX 35, 502 S MAIN ST	GIFFORD	IL	61847	217-694-4775
06-12-20-300-002	The South half of the Southwest quarter of Section (20) in Township (21) North, Range (14), West of the Second Principal Meridian, situated in the County of Champaign, State of Illinois.	Gates, Marsha	T21N	Compromise	R14W	20	80	PO BOX 704	TOLONO	IL	61880	217-485-5741
06-10-25-100-008	The West One-Half of said described tract: Beginning on the South line of the North Half of the Southwest Quarter of Section 25, Township 21 North, Range 10 East of the Third Principal Meridian, 252.09 feet East of the Southwest Corner of the East Half of the Northwest Quarter of said Southwest Quarter, thence North 00 degrees 07 minutes 10 seconds East 2669.10 feet parallel with the West lines of said East Half of the Northwest Quarter of the Southwest Quarter and of the East Half of the Southwest Quarter of the Northwest Quarter, thence North 89 degrees 59 minutes 45 seconds East 693.98 feet on the North line of the South Half of the Northwest Quarter, thence South 00 degrees 00 minutes 00 seconds East 792.14 feet parallel with the East line of the West Half of the Southeast Quarter of the Northwest Quarter, thence Southwesterly 117.69 feet on a circular curve bearing to the left with a radius of 109.85 feet and a chord bearing of South 24 degrees 55 minutes 05 seconds West thence South 07 degrees 58 minutes 05 seconds East 428.45 feet, thence Southerly 95.88 feet on a circular curve bearing to the right with a radius of 498.72 feet and a chord bearing of South 01 degrees 04 minutes 10 seconds West, thence South 04 degrees 35 minutes 20 seconds West 1260.10 feet, and thence North 89 degrees 55 minutes 50 seconds West 607.85 feet on said South line to the true point of beginning, situated in	Gronewald, Roger and Betty	T21N	Compromise	R10E	25	21	508 E MAIN P O BOX 117	ROYAL	IL	61871	(217) 583-3135

17-18-06-100-001	The Northwest Quarter of the Northwest Quarter of Section 6, Township 20 North, Range 14 West, of the Second Principal Meridian, Ogden Township, Champaign County, Illinois, containing 41.22 acres more or less.	Harms, Bernita and Marvin Trusts	T20N	Ogden	R14W	6	42	TRUSTEES, 2592 COUNTY ROAD 2145 N	ST JOSEPH	IL	61873	217-583-3386
17-17-06-400-004	The Southeast Quarter of the Southeast Quarter of Section 6, Township 20 North, Range 11 East of the Third Principal Meridian, situated in Champaign County, Illinois, containing 40 acres, more or less. NOTE: The land under key number 17-17-06-400-004 - Pt SE ¼ SE ¼ 20-11-6 (20 acres) is only a portion of the above described legal description	Harms, Delores Ann trust and Harms, Alan trust	T20N	Ogden	R11E	6	20	PO BOX 87	ROYAL	IL	61871	N/A
17-17-06-400-005	The Southeast Quarter of the Southeast Quarter of Section 6, Township 20 North, Range 11 East of the Third Principal Meridian, situated in Champaign County, Illinois, containing 40 acres, more or less. NOTE: The land under key number 17-17-06-400-005 - Pt SE ¼ SE ¼ 20-11-6 (20 acres) is only a portion of the above described legal description	Harms, Delores Ann trust and Harms, Alan trust	T20N	Ogden	R11E	6	20	PO BOX 87	ROYAL	IL	61871	N/A
06-12-32-300-001	The West 26.45 Chains of the South ½ of Section 32 and the West 26.45 Chains of the South ½ of the South ½ of the North ½ of Section 32 all in Township 21 North, Range 14 West of the Second Principal Meridian, situated in Champaign County, Illinois, containing 136.11 acres.	Heeren, Wendy M. trust	T21N	Compromise	R14W	32	137	50 MAYWOOD DR	DANVILLE	IL	61832	(217) 442-3123
17-18-08-300-002	The South One-half of the Southwest Quarter, and that part of the Southwest Quarter of the Southeast Quarter lying West of the right-of-way of the Chicago & Eastern Railroad Company, all situated in Section 8, Township 20 North, Range 14 West of the Second Principal Meridian in Champaign County, Illinois, containing 99.29 acres, more or less.	Henderson, Jillene	T20N	Ogden	R14W	8	100	2651 COUNTY ROAD 2150 N	OGDEN	IL	61859	N/A
17-18-08-400-004	All that part lying West of the Chicago and Eastern Illinois Railroad right-of-way of the North Half of the Southeast Quarter of Section 8, Township 20 North, Range 14 West of the Second Principal Meridian, in Champaign County, Illinois, containing 36.04 acres, more or less.	Henderson, Jillene	T20N	Ogden	R14W	8	36	2651 COUNTY ROAD 2150 N	OGDEN	IL	61859	N/A
06-10-25-200-003	The North One-half (N ½) and the Southeast Quarter (SE ¼) of the Northeast (NE ¼) of Section Twenty-five (25), Township Twenty one (21), North, Range Ten (10) East of the Third Principal Meridian, in Champaign County, Illinois. EXCEPT Beginning on the North line of the Northeast Quarter of Section 25, Township 21 North, Range 10 East of the Third Principal Meridian, 1062 feet west of the Northeast Corner of said Section, running thence west 300 feet on said North line, thence 90°16' to the left 975 feet, thence East 300 feet parallel with said North line, and thence northerly 975 feet to the place of beginning, encompassing approximately 6.71 acres situated in the County of Champaign and State of Illinois.	Hinrichs, Erna	T21N	Compromise	R10E	25	114	1037 ENGLEWOOD DR	RANTOUL	IL	61866	217-892-9544
17-17-06-300-002	The South Half of the Southwest Fractional Quarter of Section 6, Township 20 North, Range 11 East of the Third Principal Meridian, Champaign County, Illinois, EXCEPT that part, if any, heretofore deeded for roadway purposes.	Hinrichs, Mildred Family Trust	T20N	Ogden	R11E	6	49	LAVEDA CLEM, 1982 COUNTY ROAD 2100 N	URBANA	IL	61802	217-694-4528
17-17-06-400-002	The Southwest Quarter of the Southeast Quarter of Section 6, Township 20 North, Range 11 East of the Third Principal Meridian, Champaign County, Illinois, EXCEPT that part, if any, heretofore deeded for roadway purposes.	Hinrichs, Mildred Family Trust	T20N	Ogden	R11E	6	40	LAVEDA CLEM, 1982 COUNTY ROAD 2100 N	URBANA	IL	61802	217-694-4528
06-12-30-400-001	The Northeast Quarter of the Southeast Quarter, except the South 462 feet of the West 20 feet thereof, in Section 30, Township 21 North, Range 14 West of the second Principal Meridian, in Champaign County, Illinois.	Hoveln, Edgar and Sharon	T21N	Compromise	R14W	30	40	408 MORAINE DR	RANTOUL	IL	61866	217-369-4741
06-12-29-100-001	The Northwest Quarter of the Northwest Quarter of Section 29, Township 21 North, Range 14 West of the Second Principal Meridian, situated in Champaign County, Illinois	Hoveln, Edgar and Sharon	T21N	Compromise	R14W	29	40	408 MORAINE DR	RANTOUL	IL	61866	217-369-4741
06-12-28-200-007	Part of the North East Quarter of Section 28, Township 21 North Range 14 West of the Second Principal Meridian, Champaign County, Illinois. Legal description is. The East half of the following described tract: Beginning at a point Six Hundred Eighty-two and Eighty-six Hundredths (682.86) feet North of the Southeast corner of the Southwest Quarter of the Northeast Quarter of Section Twenty-eight (28), thence North to the North section line of Section Twenty-eight (28), thence West to the East line of the Chicago and Eastern Illinois Railroad right-of-way, thence running Southwesterly along said right-of-way to a point located Seven Hundred Forty-eight and Fifty-five Hundredths (748.55) feet Northeasterly of the Intersection of said right-of-way with the quarter section line of said Section Twenty-eight (28), thence East to the place of beginning, all in Section Twenty-eight (28), Township Twenty-one (21) North, Range Fourteen (14) West of the 2nd Principal Meridian, situated in Champaign County, Illinois, excepting therefrom a tract described as: beginning on the North line of the Northeast Quarter of Section 28, Township 21 North, Range 14 West of the Second Principal Meridian, 577.0 feet East of the Northwest Corner of said Northeast Quarter, thence East 200.0 feet on said North line, thence 90.0° to the right 285.0 feet, thence West	Hoveln, Claas	T21N	Compromise	R14W	28	36	2971 COUNTY ROAD 2700 E	PENFIELD	IL	61862	(217) 595-5521
06-12-28-200-006	The West one-half (W ½) of the following described tract: Beginning at a point Six Hundred Eighty-two and Eighty-six Hundredths (682.86) feet North of the Southeast corner of the Southwest Quarter of the Northeast Quarter of Section Twenty-eight (28), thence North to the North section line of Section Twenty-eight (28), thence West to the East line of the Chicago and Eastern Illinois Railroad right-of-way, thence running Southwesterly along said right-of-way to a point located Seven Hundred Forty-eight and Fifty-five Hundredths (748.55) feet Northeasterly of the intersection of said right-of-way with the quarter section line of said Section Twenty-eight (28), thence East to the place of beginning, all in Section Twenty-eight (28), Township Twenty-one (21) North, Range Fourteen (14) West of the 2nd Principal Meridian, situated in Champaign County, Illinois, excepting therefrom a tract described as: Beginning on the North line of the Northeast Quarter of Section 28, Township 21 North, Range 14 West of the Second Principal Meridian, 577.0 feet East of the Northwest Corner of said Northeast quarter, thence East 200.0 feet on said North line, thence 90°00' to the right 285.0 feet, thence West 200.0 feet parallel with said North Line, and thence North 285.0 feet to the place of beginning, encompassing approximately 1.309 acres in Champaign County	Hoveln, Gary	T21N	Compromise	R14W	28	36	2518 COUNTY ROAD 2600 E	PENFIELD	IL	61862	217-595-5521
06-12-33-200-002	The East half of the Northeast Quarter of Section 33, Township 21 North, Range 14 West of the Second Principal Meridian, situated in Champaign County, Illinois.	Hoveln, Harold and Darlene	T21N	Compromise	R14W	33	80	PO BOX 134	ROYAL	IL	61871	217-583-3380
06-11-30-100-004	Part of Section 30, Township 21 North, Range 11 East of the Third Principal Meridian in Champaign County, Illinois, more particularly described as follows: Beginning on the West line of Section 30, Township 21 North, Range 11 East of the Third Principal Meridian, a distance of 629.3 feet South of the Northwest corner of said Section, thence South 00°39'30" East 519.5 feet on said West line, thence North 90°00'00" East 2930 feet to the centerline of the branch ditch of the Spoon River Drainage District, thence northerly along the centerline of said branch ditch of the Spoon River Drainage District to a point lying 595.36 feet north of the last described course, as measured perpendicularly, thence North 90°00'00" West 2606 feet, thence South 00°39'30" East 75.9 feet, and thence North 90°00'00" West 344.0 feet to the point of beginning, in Champaign County, Illinois.	Ideus, Alred and Lorine	T21N	Compromise	R11E	30	39	2124 COUNTY ROAD 2400 E	ST JOSEPH	IL	61873	(217) 694-4760
06-10-36-100-009	The Northwest Quarter (NW ¼) of the Northwest Quarter (NW ¼) and the West ten (10) acres of the Northeast Quarter (NE ¼) of the Northwest Quarter (NW ¼) of Section Thirty-six (36), Township Twenty-one (21) North, Range ten (10) East of the Third Principal Meridian, in Champaign County, Illinois, containing Fifty (50) acres more or less. EXCEPT The East 11 acres of the Northwest Quarter of the Northwest Quarter of Section 36, Township 21 North, Range 10 East of the Third Principal Meridian in Champaign County, Illinois.	Ideus, Earl and Delores	T21N	Compromise	R10E	36	39	508 N WEST ST	GIFFORD	IL	61847	217-568-7772
06-10-36-100-010	The East 11 acres of the Northwest Quarter of the Northwest Quarter of Section 36, Township 21 North, Range 10 East of the Third Principal Meridian in Champaign County, Illinois.	Ideus, Earl and Delores	T21N	Compromise	R10E	36	11	508 N WEST ST	GIFFORD	IL	61847	217-568-7772
06-10-36-200-001	The North half of the Northwest Quarter and the North half of the Northeast Quarter of Section 36, Township 21 North, Range 10 East of the Third Principal Meridian, in Compromise Township, in Champaign County, Illinois, containing 160 acres more or less. NOTE: The land under key number 06-10-36-200-001 –(70.00 acres) is only a portion of the above described legal description	Ideus, Earl and Delores	T21N	Compromise	R10E	36	70	508 N WEST ST	GIFFORD	IL	61847	217-568-7772

06-10-36-200-006	The North half of the Northeast Quarter of Section 36, Township 21 North, Range 10 East of the Third Principal Meridian, in Compromise Township, in Champaign County, Illinois, containing 160 acres more or less. NOTE: The land under key number 06-10-36-200-005 –(40.00 acres) is only a portion of the above described legal description	Ideus, Earl and Delores	T21N	Compromise	R10E	36	40	508 N WEST ST	GIFFORD	IL	61847	217-568-7772
06-11-30-400-003	The South half of the East one third (E 1/3) of the South One Hundred Eighty-eight (188) acres of the North Three Hundred Forty-eight (348) acres of fractional Section 30, Township 21 North, Range 11 East of the Third Principal Meridian, located in Champaign County, Illinois constituting approximately 31.33 acres ALSO The North half (N ½) of the East one third (E 1/3) of the South 188 acres of the North 348 acres of fractional Section 30, Township 21 North, Range 11 East of the Third Principal Meridian, located in Compromise Township in Champaign County, Illinois.	Ideus, Marvin and Pamela	T21N	Compromise	R11E	30	63	401 EDEN PARK DR	RANTOUL	IL	61866	217-893-1302
06-11-30-100-005	Beginning on the West line of Section 30, Township 21 North, Range 11 East of the Third Principal Meridian, a distance of 1,148.8 feet South of the Northwest corner of said Section, thence South 00 degrees, 39 minutes, 30 seconds East 525.2 feet on said West line, thence North 90 degrees, 00 minutes, 00 seconds East 3425.7 feet, thence Northwesterly on the Centerline of a waterway and the Centerline of the branch ditch of the Spoon River Drainage District, respectively, to a point lying 525.17 feet North of the last described course, as measured perpendicularly, and thence South 90 degrees 00 minutes 00 seconds West 2930 feet to the point of beginning, encompassing approximately 38.9 acres in said Section 30, situated in Champaign County, Illinois.	Ideus, Marvin and Pamela	T21N	Compromise	R11E	30	39	401 EDEN PARK DR	RANTOUL	IL	61866	217-893-1302
06-11-30-200-007	The East two-thirds (E 2/3) of the North 160 acres of Section Thirty (30), Township Twenty-one (21) North, Range Eleven (11) East of the Third Principal Meridian, except a tract described as: Commencing at a point on the South line of the North 160 acres of fractional Section Thirty (30), Township 21 North, Range 11 East of the Third Principal Meridian, in Champaign County, Illinois, which is 47.3 rods West of the east line of said Section Thirty (30), thence West along the South line of the North 160 acres of said Section Thirty (30) a distance of 120.67 rods; thence North to the North line of said Section Thirty (30) to a point in said North line which is 86.45 rods East of the Northwest (NW) corner of said Section Thirty (30), thence East along the North line of said Section Thirty (30) 70.97 rods to the point of its intersection with the centerline of the branch ditch of the Spoon River Drainage District; thence in a South and Southeasterly direction along the centerline of said ditch to a point in said ditch which is 61.8 rods West of the East line of said Section Thirty (30) and 25.5 rods North of the South line of the North 160 acres of said tract and thence in a South and Southeasterly direction along the centerline of a ditch which intersects with drainage ditch to a point which is 47.3 rods West of the East line of said Section Thirty (30), and which is the point of beginning, situated in Champaign County, Illinois:	Ideus, Marvin and Pamela	T21N	Compromise	R11E	30	30	401 EDEN PARK DR	RANTOUL	IL	61866	217-893-1302
06-11-30-200-008	The East two-thirds (E 2/3) of the North 160 acres of Section Thirty (30), Township Twenty-one (21) North, Range Eleven (11) East of the Third Principal Meridian, except a tract described as: Commencing at a point on the South line of the North 160 acres of fractional Section Thirty (30), Township 21 North, Range 11 East of the Third Principal Meridian, in Champaign County, Illinois, which is 47.3 rods West of the east line of said Section Thirty (30), thence West along the South line of the North 160 acres of said Section Thirty (30) a distance of 120.67 rods; thence North to the North line of said Section Thirty (30) to a point in said North line which is 86.45 rods East of the Northwest (NW) corner of said Section Thirty (30), thence East along the North line of said Section Thirty (30) 70.97 rods to the point of its intersection with the centerline of the branch ditch of the Spoon River Drainage District; thence in a South and Southeasterly direction along the centerline of said ditch to a point in said ditch which is 61.8 rods West of the East line of said Section Thirty (30) and 25.5 rods North of the South line of the North 160 acres of said tract and thence in a South and Southeasterly direction along the centerline of a ditch which intersects with drainage ditch to a point which is 47.3 rods West of the East line of said Section Thirty (30), and which is the point of beginning, situated in Champaign County, Illinois: Excepting therefrom a tract described as: Beginning at the Northeast corner of the Northeast Quarter (NE ¼) of Section 30, Township 21 North, Range 11 East of the Third Principal Meridian, thence Westerly along the North line of said Section 242 feet, thence Southerly parallel with the East line of said Section 180 feet, thence Easterly parallel with North line of said Section 242 feet to the East line of said Section, thence Northerly along the East line of said Section 180 feet to the point of beginning, in Champaign County, Illinois, Said tract also being described as:	Ideus, Marvin and Pamela	T21N	Compromise	R11E	30	18	401 EDEN PARK DR	RANTOUL	IL	61866	217-893-1302
06-10-36-200-008	The North 45 acres of the South 75 acres of the South half of the Northeast Quarter of Section 36, Township 21 North, Range 10 East of the Third Principal Meridian, Champaign County, Illinois. ALSO The North five (5) acres of the South 80 acres of the South half of the Northeast Quarter of Section 36, Township 21 North, Range 10 East of the Third Principal Meridian, Champaign County, Illinois.	Ideus, Royce and Shauna	T21N	Compromise	R10E	36	50	2229 COUNTY ROAD 2600 N	GIFFORD	IL	61847	217-694-4766
06-12-30-200-001	The West one-half (1/2) of the North East One-quarter (1/4) of Section Thirty (30), Township Twenty-one (21) North, Range Fourteen (14) West of the Second Principal Meridian in Champaign County, Illinois.	Jarboe, Michael and Eileen Trusts	T21N	Compromise	R14W	30	80	2792 COUNTY ROAD 2400 N	PENFIELD	IL	61862	217-595-5687
06-12-33-300-002	The Southwest Quarter of Section 33, Township 21 North, Range 14 West of the Second Principal Meridian, Champaign, Illinois except the following: Commencing at the Southeast corner of the SW ¼ of Section 33, Township 21 North, Range 14 West of the 2nd P.M., thence proceeding Northerly along the East line of the said SW ¼ a distance of 612.00 feet; thence Westerly perpendicular to the East line of the said SW ¼ a distance of 356.00 feet; thence Southerly parallel with the East line of the SW ¼ a distance of 612.00 feet to the South line of the said SW ¼; thence Easterly along the South line of said SW ¼ a distance of 356.00 feet to the point of beginning, containing five acres, more or less, situated in Champaign County, Illinois. NOTE: The land under key number 06-12-33-3000-002 – 80 acres is only a portion of the above described legal description	Jarboe, Michael and Eileen Trusts	T21N	Compromise	R14W	33	80	JARBOE EILEEN V TRUST, 2792 COUNTY ROAD 2400 E	PENFIELD	IL	61862	217-595-5687
06-12-33-300-003	The Southwest Quarter of Section 33, Township 21 North, Range 14 West of the Second Principal Meridian, Champaign, Illinois except the following: Commencing at the Southeast corner of the SW ¼ of Section 33, Township 21 North, Range 14 West of the 2nd P.M., thence proceeding Northerly along the East line of the said SW ¼ a distance of 612.00 feet; thence Westerly perpendicular to the East line of the said SW ¼ a distance of 356.00 feet; thence Southerly parallel with the East line of the SW ¼ a distance of 612.00 feet to the South line of the said SW ¼; thence Easterly along the South line of said SW ¼ a distance of 356.00 feet to the point of beginning, containing five acres, more or less, situated in Champaign County, Illinois. EXCEPT Commencing at the Southeast corner of the Southwest Quarter of Section 33, Township 21 North, Range 14 West of the Second Principal Meridian, thence proceeding Northerly along the East line of the said Southwest Quarter a distance of 612.00 feet, thence westerly perpendicular to the East line of the said Southwest Quarter a distance of 356.00 feet, thence Southerly parallel with the East line of the Southwest Quarter, a distance of 612.00 feet to the South line of the said Southwest Quarter, thence Easterly along the South line of said Southwest Quarter a distance of 356.00 feet to the point of beginning	Jarboe, Michael and Eileen Trusts	T21N	Compromise	R14W	33	75	JARBOE EILEEN V TRUST, 2792 COUNTY ROAD 2400 E	PENFIELD	IL	61862	217-595-5687
06-12-33-400-001	The Southeast Quarter of Section 33, Township 21 North, Range 14 West of the Second Principal Meridian, Champaign County, Illinois and the Southwest Quarter of Section 33, Township 21 North, Range 14 West of the Second Principal Meridian, Champaign, Illinois except the following: Commencing at the Southeast corner of the SW ¼ of Section 33, Township 21 North, Range 14 West of the 2nd P.M., thence proceeding Northerly along the East line of the said SW ¼ a distance of 612.00 feet; thence Westerly perpendicular to the East line of the said SW ¼ a distance of 356.00 feet; thence Southerly parallel with the East line of the SW ¼ a distance of 612.00 feet to the South line of the said SW ¼; thence Easterly along the South line of said SW ¼ a distance of 356.00 feet to the point of beginning, containing five acres, more or less, situated in Champaign County, Illinois. NOTE: The land under key number 06-12-33-400-001 – Pt S ½ 33-21-14 (120 acres) is only a portion of the above described legal description	Jarboe, Michael and Eileen Trusts	T21N	Compromise	R14W	33	120	JARBOE EILEEN V TRUST, 2792 COUNTY ROAD 2400 E	PENFIELD	IL	61862	217-595-5687

06-12-33-400-002	The Southeast Quarter of Section 33, Township 21 North, Range 14 West of the Second Principal Meridian in Champaign County, Illinois. NOTE: The land under key number 06-12-33-400-002 - N ½ N ½ SE ¼ (40 acres) is only a portion of the above described legal description	Jarboe, Michael and Eileen Trusts	T21N	Compromise	R14W	33	40	JARBOE EILEEN V TRUST, 2792 COUNTY ROAD 2400 N	PENFIELD	IL	61862	217-595-5687
06-12-28-400-007	The East half of the Southeast Quarter of Section 28, Township 21 North, Range 14, West of the Second Principal Meridian, situated in Champaign County, Illinois, EXCEPTING therefrom the following: beginning of the South line of the Southeast Quarter of Section 28, Township 21 North, Range 14 West of the Second Principal Meridian, a distance of 951.0 feet West of the Southeast Corner of said Southeast Quarter, thence West 258.0 feet on said South line, thence deflecting to the right 90 degrees, 27 minutes, 00 seconds a distance of 800.00 feet, thence East 258.0 feet parallel with said South line, and thence Southerly 800.0 feet to the point of beginning. EXCEPT Beginning at the Southwest Corner of the East half of the Southeast Quarter of Section 28, Township 21 North of the Base Line, Range 14 West of the Second Principal Meridian; thence North a distance of 1027.0 feet on the West line of said E ½ SE ¼; thence East 413.0 feet parallel with the South line of said SE ¼; thence South 1027.0 feet parallel with said West line; thence West 23.8 feet on said South line; thence deflecting 90 degrees 27.0 minutes to the right 800.0 feet; thence West 258.0 feet parallel with said South line; thence 89 degrees 33.0 minutes to the left 800.0 feet; and thence west 131.2 feet on said South line to the place of beginning; encompassing 5.000 acres situated in Champaign County, Illinois	Johnson, Roy and Barbara	T21N	Compromise	R14W	28	71	2640 COUNTY ROAD 2500 E	PENFIELD	IL	61862	(217) 694-4775
06-12-19-400-004	The Southwest Quarter of the Southeast Quarter of Section 19, Township 21 North, Range 14 West of the Second Principal Meridian, situated in Champaign County, Illinois.	Johnson, Roy and Barbara	T21N	Compromise	R14W	19	40	2640 COUNTY ROAD 2500 E	PENFIELD	IL	61862	(217) 694-4775
06-11-30-100-011	A part of the North ½ of Section 30, Township 21 North, Range 11 East of the Third Principal Meridian, Champaign County, Illinois, described as follows: Beginning at the Northwest Corner of Section 30, Township 21 North, Range 11 East of the Third Principal Meridian, thence South 00 degrees 39 minutes 30 seconds East 629.3 feet on the West line of said Section, thence North 90 degrees 00 minutes 00 seconds East 344.0 feet, thence North 00 degrees 39 minutes 30 seconds West 75.9 feet parallel with said West line, thence North 90 degrees 00 minutes 00 seconds East 2606 feet, thence Northwesterly on the centerline of the branch ditch of the Spoon River Drainage District to the North line of said Section, and thence South 88 degrees 38 minutes 10 seconds West 2597.4 feet on said North line to the point of beginning, situated in Champaign County, Illinois, EXCEPTING therefrom: Commencing at the Northwest Corner of Section 30, Township 21 North, Range 11 East of the Third Principal Meridian, thence South on the West line of said Section 30, 629.3 feet to the point of beginning; thence 90 degrees 00 minutes 00 seconds East 344 feet, thence North parallel with said West line 212 feet; thence due West 344 feet to the West line of said Section 30, thence due South on the West line of said Section 30 to the point of beginning, situated in Champaign County, Illinois. ALSO EXCEPT: Beginning at the Northwest Corner of Section 30, Township 21 North of the Base Line, Range 11	Johnson, Roy and Barbara	T21N	Compromise	R11E	30	34	2640 COUNTY ROAD 2500 E	PENFIELD	IL	61862	(217) 694-4775
06-10-36-400-003	The Southeast quarter of Section 36, Township 21 North, Range 10 East of the Third Principal Meridian, Champaign County, Illinois except the following portion thereof: Beginning at the Southeast corner of said Section 36, thence 190 feet west along the South line of the Southeast quarter of said Section 26; thence North 691 feet; thence east 190 feet to the east line of the Southeast quarter of said Section 36; thence South 691 feet along the east line of said Southeast quarter of said Section 36 to the place of beginning.	Kopmann, Judith, Leroy and Bonita	T21N	Compromise	R10E	36	157	PO BOX 7	ROYAL	IL	61871	(815) 584-2283
06-11-31-300-001	The North 47.63 acres of the fractional Southwest quarter of Section 31, Township 21 North, Range 11 East of the Third Principal Meridian in Champaign County, Illinois	Kopmann, Judith, Leroy and Bonita	T21N	Compromise	R11E	31	48	BOX 7	ROYAL	IL	61871	(815) 584-2283
06-10-36-200-003	The South 75 acres of the South half of the Northeast Quarter of Section 36, Township 21 North, Range 10 East, of the Third Principal Meridian, Champaign County, Illinois, except the North 45 acres thereof.	Kopmann, Leroy and Bonita Trust	T21N	Compromise	R10E	36	30	117 SUSAN DR	DWIGHT	IL	60420	217-583-3036
06-12-33-176-001	The Southeast Quarter of the Northwest Quarter of Section 33, in Township 21 North, Range 14 West of the Second Principal Meridian, in Champaign County, Illinois.	Lee, Thomas and Beverly	T21N	Compromise	R14W	33	40	2308 NAPLES CT	CHAMPAIGN	IL	61822	(217) 355-9905
06-12-33-126-002	The Northeast Quarter of the Northwest Quarter of Section 33, in Township 21 North, Range 14 West of the Second Principal Meridian in Champaign County, Illinois.	Long, Robert	T21N	Compromise	R14W	33	40	PEARL ST	BLUFFS	IL	62621	217-754-3800
17-18-08-400-005	All that part lying East of the Chicago and Eastern Illinois Railroad Right-of-Way of the North Half of the Southeast Quarter (SE ¼) and the Northeast Quarter (NE ¼) of Section 8, all in Township 20 North, Range 14 West of the 2nd P.M., Champaign County, Illinois, EXCEPT the following described tract: Beginning at the intersection of the South line of the North Half of the Southeast Quarter of Section 8, Township 20 North, Range 14 West of the 2nd P.M., Champaign County, Illinois, and the West line of County Highway No. 22; thence 760 feet North along said West right-of-way line; thence West 249 feet 10 inches; thence 760 feet South to the South line of the said North Half of the Southeast Quarter; thence East 249 feet 10 inches to the place of beginning, situated in the County of Champaign, and the State Illinois	Loschen, Randell and Deanna	T20N	Ogden	R14W	8	63	2629 COUNTY ROAD 1800 N	OGDEN	IL	61859	(217) 582-2607
06-12-32-300-002	The parcel described as beginning at a point which is 26.45 chains East and 1616.326 feet North of the Southwest corner of Section 32, Township 21 North, Range 14 West of the Second Principal Meridian, thence North 1780.694 feet to the South line of the land conveyed by Charles A. Haines to Otto Swigart by Deed dated January 15, 1898, recorded in Book 108, page 606, of the Deed of Records of Champaign County, Illinois, thence East 1186 feet, thence South 830.694 feet, thence West 108 feet, thence South 950 feet to a point which is 1078 feet East of the point of beginning, thence West to the point of beginning, containing 46.13 acres, more or less, together with a right-of-way for ingress and egress over the East 20 feet of the West 1765.7 feet of the North 1616.326 feet of said Section 32, Township 21 North, Range 14 West of the Second Principal Meridian, in Champaign County, Illinois	Loschen, Arnold and Delores Trusts	T21N	Compromise	R14W	32	47	TRUSTEES, 2654 COUNTY ROAD 2400 N	OGDEN	IL	61859	217-583-3137
06-12-32-400-001	Beginning at a point 26.45 chains East of the Southwest corner of Section Thirty-two (32), Township Twenty-one (21) North, Range 14 West of the Second Principal Meridian, thence North 51.47 chains more or less to the South line of land conveyed by Charles A. Haines to Otto H. Swigart by deed dated January 15, 1898 recorded in Book 108, page 606 of the Deed Records of Champaign County, Illinois, thence East 46.71 chains more or less to the West line of the Chicago and Eastern Illinois Railroad right-of-way, thence South at an angle of 24 West along the said right-of-way 55.10 chains more or less to the South line of said Section Thirty-two (32), thence West 24.41 chains more or less to the point of beginning, except a tract of land in the Southwest corner thereof described as follows: beginning at a point 26.45 chains East of the Southwest corner of Section Thirty-two (32), Township Twenty-one (21) North, Range Fourteen (14) West of the Second Principal Meridian, running thence North 1616.326 feet, thence Easterly parallel with the South line of said Section Thirty-two (32), 1078 feet, thence Southerly 1616.326 feet to a point on the South line of said Section Thirty-two (32), which is 1078 feet East of the point of beginning, thence West to the point of beginning. ALSO, excepting from the first described tract that part thereof described as: Beginning at a point which is 26.45	Loschen, Arnold and Delores Trusts	T21N	Compromise	R14W	32	97	TRUSTEES, 2654 COUNTY ROAD 2400 N	OGDEN	IL	61859	217-583-3137
06-12-32-400-002	Beginning at the Southeast corner of Section 32, Township 21 North, Range 14 West of the Second Principal Meridian, thence North 51.49 chains more or less to the South line of land conveyed by Charles A. Haines to Otto Swigart by deed dated January 15, 1898, recorded in Book 108 on page 606 of the deed records of Champaign County, Illinois, thence West 6.24 chains more or less to the East line of Chicago and Eastern Illinois Railroad right of way; thence South at an angle of 24 degrees West along said East line of Chicago and Eastern Illinois Railroad right of way 55.10 chains more or less to the South line of said section, thence East 28.38 chains more or less to the place of beginning, containing 89.12 acres, more or less, except that part in the Southwest corner thereof conveyed to the Chicago and Eastern Illinois Railroad Company by warranty deed dated August 6, 1917, and recorded in Book 165 of deeds on page 269 in the Recorder's Office of Champaign County, Illinois	Loschen, Arnold and Delores Trusts	T21N	Compromise	R14W	32	88	2654 COUNTY ROAD 2400 N	OGDEN	IL	61859	217-583-3137
17-18-05-400-005	The West 60 acres of the South half of the Southeast Quarter of Fractional Section 5, Township 20 North, Range 14 West of the Second Principal Meridian, Champaign County, Illinois.	Loschen, Arnold and Delores Trusts	T20N	Ogden	R14W	5	60	TRUSTEES, 2654 COUNTY ROAD 2400 N	OGDEN	IL	61859	217-583-3137

17-18-05-400-009	The South half of the Southeast Quarter of fractional Section 5, Township 20 North, Range 14 West of the Second Principal Meridian; EXCEPT the West 60 acres thereof, situated in the County of Champaign, in the State of Illinois. EXCEPT: Part of the Southeast Quarter of the Southeast Quarter of Section 5, Township 20 North, Range 14 West of the Second Principal Meridian, Champaign County, Illinois, described as follows: Beginning at the Southeast corner of said Southeast Quarter of Section 5; thence West 430 feet on the South line of Section 5; thence Northerly 491 feet at right angles; thence East 430 feet parallel to said South line to the East line of said Section 5; thence South along the East line of said Section 5, a distance of 491 feet, more or less, to the point of beginning. ALSO EXCEPT: Part of the Southeast ¼ of the Southeast ¼ of Section 5, Township 20 North, Range 14 West of the Second Principal Meridian, described as follows: Beginning on the South line of the Southeast ¼ of Section 5, a distance of 230.0 feet West of the Southeast corner of said Southeast ¼, thence West 200.0 feet on said South line, thence Northerly 263.0 feet at right angles, thence East 200.0 feet parallel with said south line, and thence Southerly 263.0 feet to the point of beginning, situated in Champaign County, Illinois	Loschen, Arnold and Delores Trusts	T20N	Ogden	R14W	5	15	TRUSTEE, 2654 COUNTY ROAD 2400 N	OGDEN	IL	61859	217-583-3137
06-12-32-300-003	Beginning at a point 26.45 chains East of the Southwest corner of Section 32, Township 21 North, range 14 West of the Second Principal Meridian, running thence North 1616.326 feet, thence Easterly parallel with the South line of said Section 32, 1078 feet, thence Southerly 1616.326 feet to a point on the South line of said Section 32, which is 1078 feet East of the point of beginning, thence West to the point of beginning, situated in Champaign County, Illinois.	Loschen, Arnold and Delores Trusts	T21N	Compromise	R14W	32	40	TRUSTEES, 2654 COUNTY ROAD 2400 N	OGDEN	IL	61859	217-583-3137
06-12-32-200-001	The East 120 acres of the North 240 acres of all that part of Section 32, Township 21 North, Range 14 West of the Second Principal Meridian lying North of a line drawn from a point on the East line of said Section 32, 51.49 chains North of the Southeast corner of said Section 32 to a point 51.47 chains more or less on the West line of said Section 32 North of the Southwest Corner of said Section 32, EXCEPTING therefrom the right of way of the Chicago and Eastern Illinois Railroad Company; ALSO EXCEPTING the following described tract: A part of the Northeast Quarter of Section 32, Township 21 North, Range 14 West of the Second Principal Meridian, being more particularly bounded and described as follows, and bearings are for the purpose of description only: Commencing at an iron rod at the Northeast corner of said Section 32; thence South along the East line of said Section 32, and also being along the centerline of County Highway No. 22, a distance of 985.9 feet to the point of beginning for the tract to be described, said point of beginning also being on the Southeasterly right of way line of the Chicago and Eastern Illinois Railroad, thence continuing South, along the East line of said Section 32, and also along the centerline of said County Highway No. 22, a distance of 953.0 feet, thence North 89 degrees 33 minutes West 408.7 feet to an iron rod; thence	Loschen, Brian	T21N	Compromise	R14W	32	113	2692 COUNTY ROAD 2300 N	OGDEN	IL	61859	217-583-3176
17-18-05-200-006	All of the North Fractional One half of Fractional Section 5, Township 20 North, Range 14 West of the Second Principal Meridian, except the West 40 acres thereof, and also except the East 1,320 feet thereof, all in Champaign County, Illinois, and except the following described real estate: Beginning on the North line of the Northeast Quarter of Section 5, Township 20 North of the base line, Range 14 West of Second Principal Meridian, a distance of 600 feet East of the Northwest Corner of said Northeast Quarter, thence East 379.0 feet on said North line, thence South 631.0 feet, thence West 379.0 feet parallel with said North line, and thence North 631.0 feet to the point of beginning; all situated in the Northeast Quarter of said Section 5, situated in Champaign County, Illinois.	Loschen, Mark	T20N	Ogden	R14W	5	79	2455 COUNTY ROAD 2050 N	ST JOSEPH	IL	61873	(217) 583-3225
17-18-08-200-001	That portion of the North half of the Northeast Quarter of Section Eight, Township Twenty North, Range Fourteen West of the Second Principal Meridian lying West of the West Right-of-Way line of the Chicago and Eastern Illinois Railroad and except the West Five Hundred Twenty-three and Two Tenths feet thereof, more particularly described as follows: Beginning at the Northeast corner of said Section Eight and running West on the North line of said Section Eighty-four and Fifty-five Hundredths feet for a true point of commencing; continuing thence West Two Thousand Thirty-three and Fourteen Hundredths feet; thence South one Thousand Three Hundred Eighteen and Seventy-six Hundredths feet to the South line of the North half of the Northeast Quarter of said Section Eight; thence East One Thousand Four Hundred Eighty-eight and Three Tenths feet to the West Right-of-Way line of the Chicago and Eastern Illinois Railroad; thence along said Right-of-Way line North Twenty degrees and Nineteen minutes West Twenty-two and Seven Tenths feet, North Twenty-three degrees 0 minutes, East One Thousand Four Hundred Fifteen feet to the true point of commencing, all in Champaign County, Illinois	Ludwig, John and Erna Living Trust	T20N	Ogden	R14W	8	53	2656 COUNTY ROAD 2150 N	OGDEN	IL	61859	(765) 497-4842
17-18-04-300-002	All that part of the West Fractional half of Section Four, Township Twenty North, Range Fourteen West of the Second Principal Meridian, in Champaign County, Illinois, lying West of the Missouri Pacific Railroad Company Right of-Way.	Ludwig, John and Erna Living Trust	T20N	Ogden	R14W	4	73	2656 COUNTY ROAD 2150 N	OGDEN	IL	61859	(765) 497-4842
17-18-08-100-006	All that part of the Northeast Quarter of Section Eight in Township Twenty North, Range Fourteen West of the Second Principal Meridian lying West of the Right of Way of the Chicago and Eastern Illinois Railroad as now located and except a tract of land described as follows: That portion of the North half of the Northeast Quarter of Section Eight, Township Twenty North, Range Fourteen West of the Second Principal Meridian lying West of the West Right-of-Way line of the Chicago and Eastern Illinois Railroad and except the West Five Hundred Twenty-three and Two Tenths feet thereof: And the East Fifty Acres of the North half of the Northwest Quarter of Section Eight in Township Twenty North, Range Fourteen West of the Second Principal Meridian, in Champaign County, Illinois. NOTE: The land under key number 17-18-08-100-006 – PT N ½ 8-20-14 (65.85 acres) is only a portion of the above described legal description	Ludwig, John and Erna Living Trust	T20N	Ogden	R14W	8	66	2656 COUNTY ROAD 2150 N	OGDEN	IL	61859	(765) 497-4842
17-18-08-200-002	All that part of the Northeast Quarter of Section Eight in Township Twenty North, Range Fourteen West of the Second Principal Meridian, lying West of the Right of Way of the Chicago and Eastern Illinois Railroad as now located and except a tract of land described as follows: That portion of the North half of the Northeast Quarter of Section Eight, Township Twenty North, Range Fourteen West of the Second Principal Meridian lying West of the West Right-of-way line of the Chicago and Eastern Illinois Railroad and except the West Five Hundred Twenty-three and Two tenths feet thereof; And the East Fifty Acres of the North half of the Northwest Quarter of Section Eight in Township Twenty North, Range Fourteen West of the Second Principal Meridian, in Champaign County, Illinois. NOTE: The land under key number 17-18-08-200-002 – Pt NE ¼ 8-20-14 (23.63 acres) is only a portion of the above described legal description	Ludwig, John and Erna Living Trust	T20N	Ogden	R14W	8	24	2656 COUNTY ROAD 2150 N	OGDEN	IL	61859	(765) 497-4842
17-18-08-200-003	All that part of the Northeast Quarter of Section Eight in Township Twenty North, Range Fourteen West of the Second Principal Meridian, lying West of the Right of Way of the Chicago and Eastern Illinois Railroad as now located and except a tract of land described as follows: That portion of the North half of the Northeast Quarter of Section Eight, Township Twenty North, Range Fourteen West of the Second Principal Meridian lying West of the West Right-of-Way line of the Chicago and Eastern Illinois Railroad and except the West Five Hundred Twenty-three and Two Tenths feet thereof.	Ludwig, John and Erna Living Trust	T20N	Ogden	R14W	8	28	2656 COUNTY ROAD 2150 N	OGDEN	IL	61859	(765) 497-4842

06-12-33-151-001	The W ½ of the NW ¼ of Sec. 33 excepting therefrom the right of way of the Chicago and Eastern Illinois Railroad Company; and excepting all land lying North and West of said right of way in Section 33 and excepting 1.59 acres described as follows: Commencing at a point 10 feet East of the Chicago and Eastern Illinois Railroad Company right of way, on the North line of said Section 33, thence Southwesterly 307 feet to a point 30 feet at right angles east of said right of way, thence East at right angles 70 feet, thence Southwesterly parallel with said right of way 330 feet, thence Southwesterly 510 feet to a point 50 feet South of the Chicago and Eastern Illinois Railroad Company right of way on the West line of said Section 33, thence North 50 feet to the said right of way; thence Northeasterly along the East line of said right of way 1,082 feet to the intersection of said East line of said right of way and the North line of said Section 33; thence East 10 feet along the North line of said Section 33, 10 feet to the place of beginning; also ,subject to Highway dedication of 0.237 acres; all of said lands being in Township 21 North, Range 14 West of the 2nd Principal Meridian, in Champaign County, Illinois, containing 73.5 acres more or less.	Madigan, Dennis Living Trust	T21N	Compromise	R14W	33	74	18877 MEDFORD	BEVERLY HILL	MI	48025	(248) 646-7737
06-10-25-100-003	The East half of the Southeast Quarter of the Northwest Quarter and the East half of the Northeast Quarter of the Southwest Quarter; all in Section 25, Township 21 North, Range 10 East of the Third Principal Meridian, situated in Champaign County, Illinois, containing 41.263 acres more or less. Together with an easement for Ingress and Egress as set forth in Grant Of Easement between Verna Hewitt, Hilda Sjuts, Marie Mennenga, Mildred Frerichs, Nancy Schmidt, Donna Uken, Sheila Baier and Keith Frerichs, dated March 4, 1988 and recorded April 21, 1988 in Miscellaneous Book 1576 page 810	Mennenga, Darrell and Marilyn	T21N	Compromise	R10E	25	42	5205 BEECH RIDGE RD	NASHVILLE	TN	37221	(615) 662-1995
06-12-28-300-004	The E ½ of the SW ¼ of Section 28, Township 21 North, Range 14 West of the Second Principal Meridian, situated in Champaign County, Illinois, except that part deeded to Chicago and Eastern Railroad Company by deed dated April 1, 1903 and filed April 8, 1903 in Book 129, page 171 as Document 33943 and further excepting that part deeded to Chicago and Eastern Illinois Railroad Company dated August 26, 1903 and filed August 29, 1903 in Book 130, page 79 as Document 35923	O'Neill, Michael	T21N	Compromise	R14W	28	79	PO BOX 236	PHILO	IL	61864	N/A
06-12-28-400-002	The W ½ of the SE ¼ of Section 28, Township 21 North, Range 14 West of the Second Principal Meridian, in Champaign County, Illinois	O'Neill, Michael	T21N	Compromise	R14W	28	80	PO BOX 236	PHILO	IL	61864	N/A
17-18-07-200-004	The North 20 acres of the East half of the Northeast Quarter of Section 7, Township 20 North, Range 14 West of the Second Principal Meridian, Champaign County, Illinois.	Osterbur, Louis and Laverne	T20N	Ogden	R14W	7	20	2293 COUNTY ROAD 2600 E	OGDEN	IL	61859	(217) 583-3129
17-18-07-200-005	The East half of the Northeast Quarter, except the North 20 acres thereof, in Section 7, Township 20 North, Range 14 West of the Second Principal Meridian, Champaign County, Illinois.	Osterbur, Louis and Laverne	T20N	Ogden	R14W	7	60	2293 COUNTY ROAD 2600 E	OGDEN	IL	61859	(217) 583-3129
17-18-07-400-003	The Northeast Quarter of the Southeast Quarter and the North Half of the Southeast Quarter of the Southeast Quarter of Section 7, Township 20 North, Range 14 West of the Second Principal Meridian, Champaign County, Illinois.	Osterbur, Louis and Laverne	T20N	Ogden	R14W	7	60	2293 COUNTY ROAD 2600 E	OGDEN	IL	61859	(217) 583-3129
17-18-06-400-010	Beginning at the Southwest Corner of the East half of the Southeast Quarter of Section 6, Township 20 North of the Base line, Range 14 West of the Second Principal Meridian; thence North a distance of 2641.5 feet on the West line of said East half of the Southeast Quarter; thence East 1188.25 feet on the North Line of said Southeast Quarter; thence deflecting 88 degrees 58.3 minutes (88°58.3') to the right 50.0 feet; thence 90°09.5' to the left 140.1 feet; thence South 2348.8 feet on the East line of said Southeast Quarter; thence West 99.0 feet parallel with the South Line of said Southeast Quarter; thence South 231.0 feet parallel with said East Line; and thence West 1217.7 feet on said South Line to the point of beginning; encompassing 79.279 acres, situated in Champaign County, Illinois, EXCEPT, however, the following described property towit: Beginning on the South Line of the Southeast Quarter of Section 6, Township 20 North of the Base Line, Range 14 West of the Second Principal Meridian a distance of 99.0 feet West of the Southeast Corner of said Section; thence West 31.8 feet on said South Line; thence deflecting 89 degrees 31.7 minutes (89°31.7') to the right 209.7 feet; thence 90 degrees 52.8 minutes to the right 31.6 feet; and thence Southerly 209.5 feet to the point of beginning; encompassing 0.152 acre, situated in Champaign County, Illinois. NOTE: The	Osterbur, Gene and Deanna (c/o Julie Carlson)	T20N	Ogden	R14W	6	22	3826 E WHIPPOORWILL LANE	BYRON	IL	61010	217-583-3121
17-18-06-400-011	Beginning at the Southwest Corner of the East half of the Southeast Quarter of Section 6, Township 20 North of the Base line, Range 14 West of the Second Principal Meridian; thence North a distance of 2641.5 feet on the West line of said East half of the Southeast Quarter; thence East 1188.25 feet on the North Line of said Southeast Quarter; thence deflecting 88 degrees 58.3 minutes (88°58.3') to the right 50.0 feet; thence 90°09.5' to the left 140.1 feet; thence South 2348.8 feet on the East line of said Southeast Quarter; thence West 99.0 feet parallel with the South Line of said Southeast Quarter; thence South 231.0 feet parallel with said East Line; and thence West 1217.7 feet on said South Line to the point of beginning; encompassing 79.279 acres, situated in Champaign County, Illinois, EXCEPT, however, the following described property towit: Beginning on the South Line of the Southeast Quarter of Section 6, Township 20 North of the Base Line, Range 14 West of the Second Principal Meridian a distance of 99.0 feet West of the Southeast Corner of said Section; thence West 31.8 feet on said South Line; thence deflecting 89 degrees 31.7 minutes (89°31.7') to the right 209.7 feet; thence 90 degrees 52.8 minutes to the right 31.6 feet; and thence Southerly 209.5 feet to the point of beginning; encompassing 0.152 acre, situated in Champaign County, Illinois. NOTE: The	Osterbur, Gene and Deanna (c/o Julie Carlson)	T20N	Ogden	R14W	6	8	3828 E WHIPPOORWILL LANE	BYRON	IL	61010	217-583-3121
17-18-05-300-002	The Southwest Quarter of the Southwest Quarter of Section 5, Township 20 North of the Base Line, Range 14 West of the Second Principal Meridian; comprising 39.481 acres, situated in Champaign County, Illinois.	Osterbur, Gene and Deanna (c/o Julie Carlson)	T20N	Ogden	R14W	5	40	3827 E WHIPPOORWILL LANE	BYRON	IL	61010	217-583-3121
17-18-06-400-009	Beginning at the Southwest Corner of the East half of the Southeast Quarter of Section 6, Township 20 North of the Base Line, Range 14 West of the Second Principal Meridian; thence North a distance of 2641.5 feet on the West Line of said East half of the Southeast Quarter; thence East 1188.25 feet on the North Line of said Southeast Quarter; thence deflecting 88 degrees 58.3 minutes (88°58.3') to the right 50.0 feet; thence 90°09.5' to the left 140.01 feet; thence South 2348.8 feet on the East Line of said Southeast Quarter; thence West 99.0 feet parallel with the South Line of said Southeast Quarter; thence South 231.0 feet parallel with said East Line; and thence West 1217.7 feet on said South Line to the point of beginning; encompassing 79.279 acres, situated in Champaign County, Illinois, EXCEPT, however, the following described property towit: Beginning on the South Line of the Southeast Quarter of Section 6, Township 20 North of the Base Line, Range 14 West of the Second Principal Meridian a distance of 99.0 feet West of the Southeast Corner of said Section; thence West 31.8 feet on said South Line; thence deflecting 89 degrees 31.7 minutes (89°31.7') to the right 209.7 feet; thence 90 degrees 52.8 minutes to the right 31.6 feet; and thence southerly 209.5 feet to the point of beginning; encompassing 0.152 acre, situated in Champaign County, Illinois	Osterbur, Gene and Deanna (c/o Julie Carlson)	T20N	Ogden	R14W	6	50	JULIE CARLSON TRUSTEE, 3828 E WHIPPOORWILL LANE	BYRON	IL	61010	217-583-3121
17-17-06-400-006	The following described land lying North and West of the center line of the Drainage Ditch running through the said land: The Northeast Quarter of the Southeast Quarter of Section 6, Township 20 North, Range 11 East of the Third Principal Meridian, and the East 23.572 acres of the North Half of Section 6, Township 20 North, Range 11 East of the Third Principal Meridian, described as follows: beginning at the Northeast Corner of said Section 6, thence West 1337.5 feet, thence South 767.7 feet, thence East to the East line of said Section 6, thence North along the East line of said Section 6, 769.5 feet to the place of beginning, situated in Champaign County, Illinois.	Osterbur, Herbert and Betty	T20N	Ogden	R11E	6	46	TRUST, 302 BENJAMIN ST	ROYAL	IL	61871	217-583-3063
17-17-06-400-007	That part of the following described land lying South and East of the center line of the Drainage Ditch running through the said land; The Northeast Quarter of the Southeast Quarter of Section 6, Township 20 North, Range 11 East of the Third Principal Meridian, and the East 23.572 acres of the North half of Section 6, Township 20 North, Range 11 East of the Third Principal Meridian, described as follows: Beginning at the Northeast Corner of said Section 6, thence West 1337.5 feet, thence South 767.7 feet, thence East to the East line of said Section 6, thence North along the East line of said Section 6, 769.5 feet to the place of beginning, situated in Champaign County, Illinois.	Osterbur, Herbert and Betty	T20N	Ogden	R11E	6	18	302 BENJAMIN ST	ROYAL	IL	61871	217-583-3063
17-18-16-200-002	Correct Legal Description is as follows: The East half of the Northeast Quarter of Section 16, Township 20 North, Range 14 West of the Third Principal Meridian, Champaign County, Illinois. Incorrect legal description is of record since after 1972 (Township 21) The East half of the Northeast Quarter of Section 16, Township 21 North, Range 14 West of the Third Principal Meridian, Champaign County, Illinois.	Peak, Carol Sage; Peak, Clifford; Green, Helen;	T20N	Ogden	R14W	16	80	206 RIDGEVIEW ST	DANVILLE	IL	61832	217-548-2530

06-12-30-300-004	The North Twenty-six and Sixty-six hundredths (26.66) acres of the Northwest Quarter (NW ¼) of the Southeast Quarter (SE ¼) of Section Thirty (30); and the North Twenty-six and Sixty-six hundredths (26.66) acres of the Northeast Quarter (NE ¼) of the Southwest Quarter (SW ¼) of Section Thirty (30), all in Township Twenty-one (21) North, Range Fourteen (14) West of the Second Principal Meridian.	Pflugmacher, Robert and Dorene as Joint Tenants	T21N	Compromise	R14W	30	53	866 E 2250 NORTH RD	OGDEN	IL	61859	217-568-7823
06-12-19-200-002	The West 454.55 feet of even width of the Northeast Quarter of Section 19, Township 21 North of the Base Line, Range 14 West of the Second Principal Meridian, also described as follows: Beginning at the Northwest Corner of said Northeast Quarter; thence South 0degrees07.0' East a distance of 2,623.3 feet along the West Line of said Northeast Quarter; thence South 89degrees02.0' East 454.65 feet along the South Line of said Northeast Quarter; thence North 07degrees07.0' West 2,631.0 feet parallel with said West Line; and thence North 90degrees00.0' West 454.55 feet along the North Line of said Northeast Quarter to the point of beginning; encompassing 27.414 acres, situated in Champaign County, Illinois.	Pflugmacher, Robert and Dorene as Joint Tenants	T21N	Compromise	R14W	19	28	866 E 2250 NORTH RD	OGDEN	IL	61859	217-568-7823
06-12-30-400-003	The Southeast Quarter (SE ¼) of the Southeast Quarter (SE ¼) of Section Thirty (30); and the North Twenty-six and Sixty-six hundredths (26.66) acres of the Northwest Quarter (NW ¼) of the Southeast Quarter (SE ¼) of Section Thirty (30); and the North Twenty-six and Sixty-six hundredths (26.66) acres of the Northeast Quarter (NE ¼) of the Southwest Quarter (SW ¼) of Section Thirty (30), all in Township Twenty-one (21) North, Range Fourteen (14) West of the Second Principal Meridian; and commencing at the Southwest corner of the Northeast Quarter (NE ¼) of the Southeast Quarter (SE ¼) of Section Thirty (30), Township Twenty-one (21) North, Range Fourteen (14) West of the Second Principal Meridian, thence North along the West property line of said Tract a distance of Four Hundred Sixty-two (462) feet, thence East a distance of Twenty (20) feet, thence South a distance of Four hundred Sixty-two (462) feet, to the South line of said Tract, thence West Twenty (20) feet to the place of beginning, in Champaign County, Illinois. EXCEPT Commencing at the Southeast Corner of Section 30, Township 21 North, Range 14 West of the Second Principal Meridian; thence North 300 feet; thence West 250 feet; thence South 300 feet to the South Section Line of said Section 30; thence East 250 feet to the point of beginning all situated in Section 30, Township 21 North, Range 14 West of the Second Principal Meridian, Champaign County, Illinois	Pflugmacher, Robert and Dorene as Joint Tenants	T21N	Compromise	R14W	30	39	866 E 2250N	OGDEN	IL	61859	217-568-7823
06-12-19-200-003	The East 1082.75 feet of even width of the West 1537.3 feet of even width of the Northwest Quarter of Section 19, Township 21 North of the Base Line, Range 14 West of the Second Principal Meridian, also described as follows: Beginning on the North Line of said Northeast Quarter a distance of 454.55 feet East of the Northwest Corner of said Northeast Quarter; thence South 90degrees00.0' East 1082.75 feet along the North Line; thence South 0degrees07.0' East 2649.25 feet parallel with the West Line of said Northeast Quarter; thence North 89degrees02.0' West 1082.95 feet along the South Line of said Northeast Quarter; thence North 0degrees07.0' West 2631.0 feet parallel with said West Line to the point of beginning; encompassing 65.624 acres, situated in Champaign County, Illinois.	Pflugmacher, William	T21N	Compromise	R14W	19	66	333 EILER DR	GIFFORD	IL	61847	217-568-7823
06-12-31-200-007	The Southeast Quarter (SE ¼) of the Northeast Quarter (NE ¼) of Section 31, Township 21 North, Range 14 West of the Second Principal Meridian in Champaign County, Illinois; And The Northeast Quarter (NE ¼) of the Northeast Quarter (NE ¼) of Section 31, Township 21 North, Range 14 West of the Second Principal Meridian in Champaign County, Illinois.	Pollock, LaVeda Trust	T21N	Compromise	R14W	31	80	KALIN KOCHER, 2455 COUNTY ROAD 2600 E	PENFIELD	IL	61862	217-841-1255
17-18-06-200-003	The East one-third (E 1/3) of the North one-half (N ½) of Fractional Section 6, Township 20 North, Range 14 West, of the Second Principal Meridian, in Champaign County, Illinois. EXCEPT Beginning at the Southeast Corner of the Northeast Quarter of Section 6, Township 20 North of the Base Line, Range 14 West of the Second Principal Meridian; thence North 01 Degrees 08.3 minutes West (N01degrees08.3W) a distance of 50.95 feet along the East line of said Quarter; thence S88degrees47.0'W 140.0 feet; thence S01degrees05.9'E 98.0 feet; thence N88degrees47.0'E 140 feet; and thence N01degrees03.4'W 47.05 feet along the East Line of the Southeast Quarter of said Section 6 to the point of beginning; encompassing 0.16 acre, more or less, situated in Champaign County, Illinois.	Sage, Reka (remainder to Sage, Wayne; Sage, Darold; Sage, Myron; Be	T20N	Ogden	R14W	6	42	APT 203, 2304A COUNTY ROAD 3000 N	GIFFORD	IL	61847	217-568-7570
17-18-05-100-001	The West forty (40) acres of the Northwest Fractional Quarter of Section 5, Township 20 North, Range 14 West of the Second Principal Meridian situated in the County of Champaign in the State of Illinois.	Sage, Wayne and Roxie	T20N	Ogden	R14W	5	40	2545 COUNTY ROAD 2400 N	OGDEN	IL	61859	217-694-4558
17-18-06-200-002	The West one-half (W ½) of the East Two-thirds (E 2/3) of the North One-half (N ½) of a Fractional Section 6, Township 20 North, Range 14 West of the Second Principal Meridian in Champaign County, Illinois.	Sage, Wayne and Roxie	T20N	Ogden	R14W	6	42	2545 COUNTY ROAD 2400 N	OGDEN	IL	61859	217-694-4558
17-18-09-200-009	Lot 3 of a Subdivision of the Northeast Quarter of Section 9, Township 20 North, Range 14 West of the Second Principal Meridian, Champaign County, Illinois, as per plat recorded in Book "P" at page 505, otherwise described as: Beginning at the Southeast corner of said Northeast Quarter of said Section 9, thence West 40 chains, thence North 15 chains and 58 links, thence East 40 chains, thence South 15 chains and 58 links to the Point of Beginning. EXCEPT Tract I: Part of Lot 3 of a Subdivision of the Northeast ¼ of Section 9, Township 20 North, Range 14 West of the 2nd P.M., Champaign County, Illinois, described as follows: Commencing at the Southeast corner of the Northeast ¼ of said Section 9; thence North 00 degrees, 00 minutes 00 seconds East along the East line of the Northeast ¼ of said Section 9 for 452.0 feet; thence South 89 degrees 59 minutes 33 seconds West for 746 feet to the place of beginning; thence South 1 degree 09 minutes 14 seconds West for 209 feet; thence South 89 degrees 59 minutes 33 seconds West for 209 feet; thence North 1 degree 09 minutes 14 seconds East for 209 feet; thence North 89 degrees 59 minutes 33 seconds East to the place of beginning, containing 1.00 acres more or less. ALSO EXCEPT Tract II Commencing at the Southeast corner of the Northeast ¼ of said Section 9, thence North 0 degrees 00 minutes 00 seconds East along the East line of the Northeast Quarter of Section 9, Township 20 North, Range 14 West of the 2nd Principal	Sattler, Robert and Joan Trusts	T20N	Ogden	R14W	9	101	207 MCKINLEY,	MILFORD	IL	60953	(815) 889-5366
17-18-09-100-001	The Northwest Quarter of Section 9, Township 20 North, Range 14 West of the Second Principal Meridian in Champaign County, Illinois, except for railroad right of way and public right of way. ALSO EXCEPT That part of the Northwest Quarter of Section 9, Township 20 North, Range 14 West of the Second Principal Meridian, situated in the County of Champaign, State of Illinois, more particularly described as follows: Beginning at the Southwest corner of Section 9, in Ogden Township, said section corner being also Station 126+02.01 on the centerline of County Highway 22, thence 4,890.15 feet Northerly along the section line between Section 9 and Section 8, said section line being also the centerline of County Highway 22, to Station 174+92.16, thence deflecting 22 degrees 52 minutes and 56 seconds of angle easterly 154.61 feet to Station 176+42.65 said location being the point of tangency of a curve of radius 763.94 and convex to the Northwest and a true point of beginning, thence Southeast to a point 50 feet measured perpendicularly right of said centerline, thence 266.24 feet Northeasterly along a line parallel to and 50 feet right of said centerline to a point 50 feet measured perpendicularly right of Station 180+24.60, said location being also a point on the section line between Section 9 and Section 4, thence Westerly along said section line to Station 180+03.5 on the centerline of County Highway 22, thence 245.74 feet Southwesterly along said centerline to the true point of	Scott, Robert Trust and Alsip Family Trust	T20N	Ogden	R14W	9	160	107 ARROWHEAD LN	HAINES CITY	FL	33844	815-268-4279
06-12-30-400-005	Beginning on the South Line of the Southwest Quarter of Section 30, Township 21 North of the Base Line, Range 14 West of the Second Principal Meridian a distance of 790.3 feet east of the Southwest Corner of said Southwest Quarter; thence North 00 degrees 11.9 minutes West (N00degrees11.9'W) 840.2 feet; thence S88degrees19.6'E 121.4 feet; thence N00degrees17.4'W 73.1 feet; thence N89degrees56.4'E 423.0 feet; thence S00degrees21.6'E 910.2 feet on the East Line of the West half of said Southeast Quarter; and thence N90degrees00.0'W 546.8 feet on the South Line of said Southeast Quarter to the point of beginning; encompassing 11.196 acres, situated in Champaign County, Illinois.	Sjuts, Evelyn and Blue, John	T21N	Compromise	R14W	30	0	JG BLUE & EM SJUTS, 2311 COUNTY ROAD 2000 E	URBANA	IL	61802	217-583-3133

06-12-30-300-008	Beginning at the Southeast Corner of the Southwest Quarter of Section 30, Township 21 North of the Base Line, Range 14 West of the Second Principal Meridian; thence North 90 degrees 00.0 minutes West (N90degrees00.0W) a distance of 266.0 feet on the South line of said Southwest Quarter; thence N56degrees28.3'W 144.2 feet on the centerline of a drainage ditch; thence N46degrees18.9' W 199.9 feet on said centerline; thence N11degrees57.8'W 166.3 feet on said centerline; thence N13degrees22.0'W 198.0 feet on said centerline; thence N12degrees08.0'W 196.2 feet on said centerline; thence N15degrees41.0'W 198.3 feet on said centerline; thence N51degrees49.7'W 239.1 feet on said centerline; thence N59degrees55.0'W 202.5 feet on said centerline; thence N57degrees22.2'W 193.1 feet on said centerline; thence N44degrees47.8'W 164.3 feet on said centerline; thence N00degrees25.0'W 378.9 feet on the West line of the East half of said Southwest Quarter, thence S89degrees48.1'E 1,338.1 feet parallel with the South line of the Northeast Quarter of said Southwest Quarter; thence S00degrees23.0'E 1.6 feet on the West line of the Southeast Quarter of said Section 30; thence S89degrees48.1'E 601.3 feet parallel with the South line of the Northwest Quarter of said Southeast Quarter; thence S00degrees 23.0'E 1,796.4 feet parallel with said West line; and thence N90degrees00.0'W 601.3 feet on the South line of said Southeast Quarter to the point of beginning encompassing	Sjuts, Evelyn	T21N	Compromise	R14W	30	60	2331 COUNTY ROAD 2000 E	URBANA	IL	61802	217-694-4728
06-12-31-400-001	The Southwest Quarter of the Southeast Quarter of Section 31, Township 21 North, Range 14 West of the Second Principal Meridian, situated in the County of Champaign, in the State of Illinois.	Sjuts, Evelyn	T21N	Compromise	R14W	31	40	2331 COUNTY ROAD 2000 E	URBANA	IL	61802	217-694-4728
06-12-19-200-004	The Northeast Quarter of Section 19, Township 21 North of the Base Line, Range 14 West of the Second Principal Meridian, EXCEPT the West 1537.3 feet of even width thereof, AND EXCEPT a tract described as follows: Beginning at the Southeast Corner of said Northeast Quarter; thence North 89degrees02.0' West a distance of 385.0 feet along the South Line of said Northeast Quarter; thence North 0degrees05.8' West 425.0 feet parallel with the East Line of said Northeast Quarter; thence South 89degrees02.0' East 385.0 feet parallel with said South Line; and thence South 0degrees05.8' East 425.0 feet along said East Line to the point of beginning, in Champaign County, Illinois.	Suits, Eric	T21N	Compromise	R14W	19	66	2655 COUNTY ROAD 2600 E	PENFIELD	IL	61862	217-595-0103
06-12-28-100-002	The North half (measured by acreage) of the following described Tract: All that part of the Northwest Quarter of Section 28, Township 21 North, Range 14 West of the Second Principal Meridian, situated in Champaign County, Illinois, lying West of the right of way of the Chicago and Eastern Illinois Railroad.	Suits, Jeffrey	T21N	Compromise	R14W	28	63	2703 COUNTY ROAD 2500 N	PENFIELD	IL	61862	217-595-5595
06-12-28-100-003	The South half (measured by acreage) of the following described Tract: All that part of the Northwest Quarter of Section 28, Township 21 North, Range 14 West of the Second Principal Meridian, situated in Champaign County, Illinois, lying West of the right of way of the Chicago and Eastern Illinois Railroad	Suits, Kenneth	T21N	Compromise	R14W	28	63	2738 COUNTY ROAD 2600 N	PENFIELD	IL	61862	217-595-5542
06-12-29-200-001	The East one-half of the NE ¼ and the NW ¼ of the NE ¼ of Section 29, Township 21 North, Range 14 West of the Second Principal Meridian, EXCEPT therefrom that part lying Easterly of a line described as: beginning at a point on the South property line 40 feet Westerly of the Southeast corner of the NE ¼ of Section 29, said point being 40 feet left of Station 311 + 27 on the proposed centerline for County Highway No. 22, Section 112-1-MFT; thence Northerly parallel to and 40 feet Westerly of said centerline, a distance of 2,628 feet to a point 40 feet left of Station 337 +55 on said centerline; thence Northwesterly to a point of ending on the existing South right of way line of Township Road (No. 1568), said point being 60 feet left of Station 337 + 46 on said centerline (said proposed centerline of Ch. No. 22 is also the East line of Section 29, in Champaign County, Illinois); excepting however the oil rights which are expressly reserved by the Grantor.	Suits, Kenneth and Rosetta	T21N	Compromise	R14W	29	120	2738 COUNTY ROAD 2600 N	PENFIELD	IL	61862	217-595-5542
06-12-21-300-004	The East half of the Southwest Quarter of the Southwest Quarter of Section 21, Township 21 North, Range 14 West of the Second Principal Meridian.	Suits, Kenneth and Rosetta	T21N	Compromise	R14W	21	30	2738 COUNTY ROAD 2600 N	PENFIELD	IL	61862	217-595-5542
06-10-24-300-002	The West Half of the Southwest Quarter of Section 24, Township 21 North, Range 10 East of the Third Principal Meridian, (part of 06-10-24-300-001)	Suits, Kenneth and Rosetta	T21N	Compromise	R10E	24	80	2738 COUNTY ROAD 2600 N	PENFIELD	IL	61862	217-595-5542
06-12-21-300-001	The Southwest Quarter (SW ¼) of the Southwest Quarter (SW ¼) of Section Twenty one (21) Township Twenty one (21) North, Range Fourteen (14) West of the Second Principal Meridian.	Suits, Rosetta	T21N	Compromise	R14W	21	120	2738 COUNTY ROAD 2600 N	PENFIELD	IL	61862	217-595-5542
06-12-31-100-004	The East half of the Northwest Quarter of Section 31, Township 21 North, Range 14 West of the 2nd P.M., situated in Champaign County, Illinois.	Udovich, Carl and Jane	T21N	Compromise	R14W	31	81	3526 BANKVIEW DR	JOLIET	IL	60431	815-741-3026
06-12-31-200-006	The Southwest Quarter of the Northeast Quarter of Section 31, Township 21 North, Range 14 West of the Second Principal Meridian, situated in Champaign County, Illinois.	Udovich, Carl and Jane	T21N	Compromise	R14W	31	40	3526 BANKVIEW DR	JOLIET	IL	60431	815-741-3026
06-12-31-200-005	The North half of the West half of the Northeast Quarter of Section 31, Township 21 North, Range 14 West of the Second Principal Meridian, situated in Champaign County, Illinois.	Udovich, Carl and Jane	T21N	Compromise	R14W	31	40	3526 BANKVIEW DR	JOLIET	IL	60431	815-741-3026
06-10-25-100-009	The East One-half of said described tract: Beginning on the South line of the North half of the Southwest Quarter of Section 25, Township 21 North, Range 10 East of the Third Principal Meridian, 252.09 feet East of the Southwest Corner of the East half of the Northwest Quarter of said Southwest Quarter, thence North 00 degrees 07 minutes 10 seconds East 2669.10 feet parallel with the West lines of said East half of the Northwest Quarter of the Southwest Quarter and of the East half of the Southwest Quarter of the Northwest Quarter, thence North 89 degrees 59 minutes 45 seconds East 693.98 feet on the North line of the South half of the Northwest Quarter, thence South 00 degrees 00 minutes 00 seconds East 792.14 feet parallel with the East line of the West half of the Southeast Quarter of the Northwest Quarter, thence Southwesterly 117.69 feet on a circular curve bearing to the left with a radius of 109.85 feet and a chord bearing of South 24 degrees 55 minutes 05 seconds West, thence South 07 degrees 58 minutes 05 seconds East 428.45 feet, thence Southerly 95.88 feet on a circular curve bearing to the right with a radius of 498.72 feet and a chord bearing of South 01 degrees 04 minutes 10 seconds West, thence South 04 degrees 35 minutes 20 seconds West 1260.10 feet, and thence North 89 degrees 55 minutes 50 seconds West 607.85 feet on said South line to the true point of beginning, situated in	Uken, David and Danita	T21N	Compromise	R10E	25	21	2146 COUNTY ROAD 2100N	ST JOSEPH	IL	61873	(217) 694-4142
06-11-31-400-002	The East Half (E ½) of the Southeast Quarter (SE ¼) of Section Thirty-one (31), Township Twenty-one (21) North, Range Eleven (11) East of the Third Principal Meridian, in Champaign County, Illinois.	Walker, Douglas; Kingston, Susan	T21N	Compromise	R11E	31	80	1111 STOCKHOLM RD	PAXTON	IL	60957	(217) 379-6810
06-12-29-400-008	The Southeast Quarter of Section 29, Township 21 North, Range 14 West of the Second Principal Meridian, except the South 75 acres thereof, and except the Northeast Quarter of the Northeast Quarter of the Southeast Quarter, all situated in Champaign Count, Illinois.	Werner, Velma	T21N	Compromise	R14W	29	75	312 PENNY LN	PEOTONE	IL	60468	815-469-4299
17-18-06-300-005	All that part of the following described real estate: The South Half of fractional Section 6, Township 20 North, Range 14 West of the Second Principal Meridian, in Champaign County, Illinois, EXCEPT the East Half of the Southeast Quarter of said Section 6, which lies North of the center of the open drainage ditch, which intersects the South Half of said fractional Section 6. ALSO: The West 27.46 acres of that part of the West Half of the Southwest Quarter of Section 6, Township 20 North, Range 14 West of the Second Principal Meridian in Champaign County, Illinois, which lies South of the center of the open drainage ditch, which intersects the South Half of said Section 6. EXCEPT Beginning on the South Line of the Southwest Quarter of Section 6, Township 20 North of the Base Line, Range 14 West of the Second Principal Meridian, a distance of 279.0 feet east of the Southwest Corner of said Section; thence east 315.0 feet on said South Line; thence northerly 415.0 feet at right angles; thence west 315.0 feet parallel with said South Line; and thence Southerly 415.0 feet to the point of beginning, in Champaign County, Illinois.	Fulk, Sylvia Revocable Trust	T20N	Ogden	R14W	6	84	PO BOX 837	ST JOSEPH	IL	61873	N/A

06-12-29-300-003	The South Half of the Southwest Quarter of Section 29, Township 21 North, Range 14 West of the Second Principal Meridian, Champaign County, Illinois: EXCEPT Beginning on the West line of Section 29, Township 21 North of the Base Line, Range 14 West of the Second Principal Meridian, a distance of 864.0 feet North of the Southwest corner of said Section, thence North 285.0 feet on said West line, thence deflecting 91°15' to the right 235.0 feet, thence South 285.0 feet, and thence Westerly 235.0 feet to the Point of Beginning, in Champaign County, Illinois.	Hoveln, Claas Edward Residuary Testamentary Trust & Grace Hoveln	T21N	Compromise	R14W	29	79	2518 COUNTY ROAD 2600 E	PENFIELD	IL	61862	217-595-5521

APPENDIX N

Parcel Identification Number	Owner	Address	City	State	Zip Code
06-10-24-100-003	ACKERMAN DERALD	519 S MAIN ST	GIFFORD	IL	61847
06-10-24-300-003	ACKERMAN DERALD	519 S MAIN ST	GIFFORD	IL	61847
06-12-21-300-003	ACKERMAN DERALD	519 S MAIN ST	GIFFORD	IL	61847
17-18-09-400-001	ADEN RICHARD	1970 COUNTY ROAD 2400 E	ST JOSEPH	IL	61873
17-18-05-400-004	ALBERS ANNA A	2304A COUNTY ROAD 3000N APT 107	GIFFORD	IL	61847
17-18-05-400-003	ALBERS CARL W	2304A COUNTY ROAD 3000N APT 107	GIFFORD	IL	61847
06-12-29-200-003	ALBERS DICK	PO BOX 213	ROYAL	IL	61871
06-12-29-300-001	ALBERS DICK	PO BOX 213	ROYAL	IL	61871
06-12-29-200-004	ALBERS FARM	KING SANDRA, PO BOX 562	ST JOSEPH	IL	61873
17-18-05-200-004	ALBERS FARMS	SANDRA J KING, PO BOX 562	ST JOSEPH	IL	61873
06-12-20-400-009	BABB MICHAEL	2635 COUNTY ROAD 2700 E	PENFIELD	IL	61862
06-12-20-400-010	BABB MICHAEL	2635 COUNTY ROAD 2700 E	PENFIELD	IL	61862
06-12-28-200-009	BABB MICHELE	2635 COUNTY ROAD 2700 E	PENFIELD	IL	61862
06-12-17-200-005	BABB MICHELE K	2635 COUNTY ROAD 2700 E	PENFIELD	IL	61862
06-11-31-200-003	BLUE JOHN G	2148 COUNTY ROAD 2650 E	OGDEN	IL	61859
06-12-30-300-007	BLUE JOHN G	2148 COUNTY ROAD 2650 E	OGDEN	IL	61859
06-12-30-400-006	BLUE JOHN G	2148 COUNTY ROAD 2650 E	OGDEN	IL	61859
06-12-32-100-003	BRADY WILLIAM D	2482 COUNTY ROAD 2600 E	PENFIELD	IL	61862
17-18-04-200-001	BRITT ALFRED F	2767 COUNTY ROAD 2400 N	OGDEN	IL	61859
17-18-09-200-006	BRITT ALFRED F	2767 COUNTY ROAD 2400 N	OGDEN	IL	61859
17-18-04-400-004	BRITT INEZ K	2333 COUNTY ROAD 2800 E	OGDEN	IL	61859
17-18-04-400-006	BRITT WILLIAM C	5813 S STATE ROAD 46	TERRE HAUTE	IL	47802
17-18-09-200-004	BRITT WILLIAM C	5813 S STATE ROAD 46	TERRE HAUTE	IN	47802
17-18-09-200-005	BRITT WILLIAM C	5813 S STATE ROAD 46	TERRE HAUTE	IN	47802
17-18-04-300-005	BRITT WILLIAM C.	5813 S STATE ROAD 46	TERRE HAUTE	IN	47802
06-12-29-400-009	BRUINIUS FAMILY LTD PART	7723 W STUENKEL RD	FRANKFORT	IL	60423
06-12-33-101-002	BRUNS CLAUS J TRUSTEE	2494 COUNTY ROAD 2700 E	PENFIELD	IL	61862
17-18-04-300-004	BUCK SAMUEL J & RANAE K	2725 COUNTY ROAD 2400 N	OGDEN	IL	61859
06-12-28-200-002	BUCK STEVE	609 BAYSHORE DR #9	FT LAUDERDALE	FL	33304
06-12-28-200-008	BUCK STEVE	609 BAYSHORE DR APT 9	FT LAUDERDALE	FL	33304
06-12-29-100-004	BUCK THOMAS H	2321 COUNTY ROAD 2900 N	GIFFORD	IL	61847
17-18-07-100-002	BUHR HERVIN R	1716 CORONADO DR	CHAMPAIGN	IL	61820
06-10-36-100-012	BUHR KENNETH	2166 COUNTY ROAD 2500 N	THOMASBORO	IL	61878
06-12-31-400-002	BUHR MARIE	2594 COUNTY ROAD 2400 N	PENFIELD	IL	61862
06-10-25-200-006	BUHR MARIE L	2594 COUNTY ROAD 2400 N	PENFIELD	IL	61862
17-18-07-200-002	BUHR MARIE L	2594 COUNTY ROAD 2400 N	PENFIELD	IL	61862
17-18-09-400-007	BUHR MARIE L	2594 COUNTY ROAD 2400 N	PENFIELD	IL	61862
06-10-25-100-004	BUHR RUSSELL & MARILYN	2594 COUNTY ROAD 2300 E	GIFFORD	IL	61847
06-10-36-100-011	BUHR RUSSELL & STEVE	2594 COUNTY ROAD 2300 E	GIFFORD	IL	61847
06-10-25-100-005	BUHR RUSSELL K	2594 COUNTY ROAD 2300 E	GIFFORD	IL	61847
06-12-30-300-006	BUHR VERNON	2152 COUNTY ROAD 2400 N	ST JOSEPH	IL	61873
06-10-25-200-005	BUHR VERNON & WILMA	2152 COUNTY ROAD 2400 N	ST JOSEPH	IL	61873
17-18-07-200-008	BUHR VERNON R	2152 COUNTY ROAD 2400 N	ST JOSEPH	IL	61873
17-18-09-300-003	BUSBOOM GLEN L	2756 COUNTY ROAD 2200 N	OGDEN	IL	61859
17-18-09-300-004	BUSBOOM GLEN L	2756 COUNTY ROAD 2200 N	OGDEN	IL	61859
17-18-09-300-005	BUSBOOM GLEN L & BILLIE J	2756 COUNTY ROAD 2200 N	OGDEN	IL	61859
06-10-25-300-002	BUSBOOM LUELLA	2258 COUNTY ROAD 2500 N	ST JOSEPH	IL	61873
06-10-26-400-005	BUSBOOM LUELLA	2258 COUNTY ROAD 2500 N	ST JOSEPH	IL	61873

Parcel Identification Number	Owner	Address	City	State	Zip Code
06-10-25-300-003	BUSBOOM MAURY	PO BOX 131	ROYAL	IL	61871
06-12-30-200-002	CAIN DANIEL J	2567 COUNTY ROAD 2600 E	PENFIELD	IL	61862
06-12-28-300-001	CAIN STEPHEN	PO BOX 103	PHILO	IL	61864
06-10-24-400-007	CAMP PATRICIA	511 LINDEN DR	ST JOSEPH	IL	61873
06-11-19-300-001	CAMP PATRICIA	511 LINDEN DR	ST JOSEPH	IL	61873
17-18-05-300-002	CARLSON JULIE CO TRUSTEE	3827 E WHIPPOORWILL LANE	BYRON	IL	61010
17-18-06-400-010	CARLSON JULIE CO TRUSTEE	3826 E WHIPPOORWILL LANE	BYRON	IL	61010
17-18-06-400-011	CARLSON JULIE CO TRUSTEE	3828 E WHIPPOORWILL LANE	BYRON	IL	61010
06-12-33-200-010	CARTER ROGER N	2562 COUNTY ROAD 3000 N	PENFIELD	IL	61862
06-12-30-100-001	CLIFFORD ROSE ANN	RIDEN MARY C, 2008 SUNVIEW DR	CHAMPAIGN	IL	61821
06-11-30-400-001	CLIFFORD ROSEANN	2008 SUNVIEW DR	CHAMPAIGN	IL	61821
06-12-17-100-003	CORNELIUS ELDRED J	2673 COUNTY ROAD 2800 N	PENFIELD	IL	61862
06-12-17-300-003	CORNELIUS JANET D	2673 COUNTY ROAD 2800 N	PENFIELD	IL	61862
17-18-09-400-008	CRAWFORD DIANE J	2782 COUNTY ROAD 2200 N	OGDEN	IL	61859
17-18-04-400-002	CUNNINGHAM KEITH & CYNTHIA	301 E MAIN ST, PO BOX 96	ROYAL	IL	61871
17-18-09-200-001	CUNNINGHAM KEITH & CYNTHIA	301 E MAIN ST, PO BOX 96	ROYAL	IL	61871
17-18-07-400-006	DALTON ROBERT OWEN & PAULA	2598 COUNTY ROAD 2200 N	ST JOSEPH	IL	61873
06-12-18-300-002	DEPASQUE EDWARD	261 N OAK ST	ELMHURST	IL	60126
06-12-21-100-001	DORSEY CATHERINE R	2704 COUNTY ROAD 2700 N	PENFIELD	IL	61862
06-12-21-100-002	DORSEY CATHERINE R	2704 COUNTY ROAD 27O ON	PENFIELD	IL	61862
17-18-08-400-003	DUITSMAN MARTIN	PO BOX 62	ROYAL	IL	61871
17-18-17-276-008	DUITSMAN MARTIN	PO BOX 62	ROYAL	IL	61871
06-12-30-400-005	E & J FARMS	JG BLUE & EM SJUTS, 2311 COUNTY ROAD 2000 E	URBANA	IL	61802
06-11-30-300-001	EDWARDS ANNETTE BRYA	BUSEY AG SERVICES, P O BOX 107	LEROY	IL	61752
06-10-24-200-003	F & W FARMS INC	2666 COUNTY ROAD 2400 E	GIFFORD	IL	61847
06-11-19-400-001	F & W FARMS INC	2666 COUNTY ROAD 2400 E	GIFFORD	IL	61847
17-18-16-400-001	FIREBAUGH RUTH F	3012 GOLF TER	DANVILLE	IL	61832
06-11-30-300-003	FISCUS JOHN & KAY	105 THOMAS DR	ST JOSEPH	IL	61873
06-10-23-200-011	FLESNER HARM	1432 BIRCH DR	RANTOUL	IL	61866
17-18-06-300-005	FLESSNER SYLVIA	PO BOX 837	ST JOSEPH	IL	61873
06-11-31-200-002	FOSTER LARRY	28012 STATE ROUTE 49	ARMSTRONG	IL	61812
17-18-08-100-001	FRANZEN ALBERT J	300 HENSON DR, PO BOX 206	BROADLANDS	IL	61816
06-12-29-100-002	FRANZEN THEA TRUST	831 CO RD 900E	TOLONO	IL	61880
06-10-35-200-010	FREED GLADYS	1415 COUNTRYSIDE PL	CHAMPAIGN	IL	61821
17-18-05-300-004	FRERICHS DOUGLAS	2634 COUNTY ROAD 2300 N	OGDEN	IL	61859
17-18-05-300-006	FRERICHS DOUGLAS A	2364 COUNTY ROAD 2300 N	OGDEN	IL	61859
17-18-06-300-004	FRERICHS GREGORY	2506 COUNTY ROAD 2300 N	OGDEN	IL	61859
06-12-19-400-003	FRERICHS GREGORY L	2506 COUNTY ROAD 2300 N	OGDEN	IL	61859
06-11-30-300-004	FRERICHS HERBERT & LOIS	305 E CHURCH ST	ROYAL	IL	61871
06-12-17-400-002	FRERICHS JIMMY C	PO BOX 418	GIFFORD	IL	61847
06-10-25-100-002	FRERICHS KEITH L	PO BOX 174	ROYAL	IL	61871
06-10-25-100-006	FRERICHS KEITH L	PO BOX 174	ROYAL	IL	61871
06-12-31-100-003	FRERICHS LARRY	2474 COUNTY ROAD 2500 E	PENFIELD	IL	61862
06-11-30-100-007	FRERICHS LOIS A	305 CHURCH ST, PO BOX 25	ROYAL	IL	61871
17-17-06-200-001	FRERICHS TIMOTHY R	2453 COUNTY ROAD 2400 N	ST JOSEPH	IL	61873
06-12-19-300-004	FRUHLING JOHN	2499 COUNTY ROAD 2600 N	PENFIELD	IL	61862
06-11-30-200-004	FRUHLING JOHN J	2499 COUNTY ROAD 2600 N	PENFIELD	IL	61862
06-12-19-400-002	FRUHLING LORETTA	FRUHLING FARM, 2543 COUNTY ROAD 3200 N	PENFIELD	IL	61862

Parcel Identification Number	Owner	Address	City	State	Zip Code
06-12-19-300-005	FRUHLING LOUISE	31361 N 750 EAST RD	POTOMAC	IL	61865
06-12-19-100-002	G & E FARMS INC	PO BOX 35	GIFFORD	IL	61847
06-12-20-100-001	G AND E FARMS INC.	PO BOX 35, 502 S MAIN ST	GIFFORD	IL	61847
06-12-20-300-002	GATES MARSHA S	PO BOX 704	TOLONO	IL	61880
17-18-16-200-002	GREEN HELEN	206 RIDGEVIEW ST	DANVILLE	IL	61832
06-10-25-100-008	GRONEWALD ROGER	508 E MAIN P O BOX 117	ROYAL	IL	61871
06-11-18-400-001	HANNAGAN MARY JANICE	PO BOX 490	GIFFORD	IL	61847
17-17-06-400-004	HARMS DELORES ANN TRUSTEE	PO BOX 87	ROYAL	IL	61871
17-17-06-400-005	HARMS DELORES ANN TRUSTEE	PO BOX 87	ROYAL	IL	61871
27-16-12-200-003	HARMS DELORES ANN TRUSTEE	PO BOX 87	ROYAL	IL	61871
17-18-06-100-001	HARMS MARVIN J & BERNITA A	TRUSTEES, 2592 COUNTY ROAD 2145 N	ST JOSEPH	IL	61873
17-18-06-300-003	HARPER TIMOTHY D	2528 COUNTY ROAD 2300 N	OGDEN	IL	61859
06-12-21-200-011	HEDRICK CHARLES	2775 COUNTY ROAD 2700 N	PENFIELD	IL	61862
06-12-32-300-001	HEEREN WENDY M	50 MAYWOOD DR	DANVILLE	IL	61832
06-12-33-300-004	HEINZ WILLIAM A	2746 COUNTY ROAD 2400 N	PENFIELD	IL	61862
17-18-08-300-002	HENDERSON BEN & JILL	2651 COUNTY ROAD 2150 N	OGDEN	IL	61859
17-18-08-400-004	HENDERSON BEN & JILL	2651 COUNTY ROAD 2150 N	OGDEN	IL	61859
06-10-25-200-003	HINRICHS ERNA M	1037 ENGLEWOOD DR	RANTOUL	IL	61866
17-17-07-200-007	HINRICHS MILDRED	LAVEDA CLEM, 1982 COUNTY ROAD 2100 N	URBANA	IL	61802
17-17-06-300-002	HINRICHS TRUST MILDRED	LAVEDA CLEM, 1982 COUNTY ROAD 2100 N	URBANA	IL	61802
17-17-06-400-002	HINRICHS TRUST MILDRED	LAVEDA CLEM, 1982 COUNTY ROAD 2100 N	URBANA	IL	61802
17-17-07-100-001	HINRICHS TRUST MILDRED	LAVEDA CLEM, 1982 COUNTY ROAD 2100 N	URBANA	IL	61802
27-16-01-400-004	HINRICHS TRUST MILDRED	LAVEDA CLEM, 1982 COUNTY ROAD 2100 N	URBANA	IL	61802
06-12-28-200-007	HOVELN CLAAS E	2971 COUNTY ROAD 2700 E	PENFIELD	IL	61862
06-12-29-100-001	HOVELN EDGAR E	408 MORAINE DR	RANTOUL	IL	61866
06-12-30-400-001	HOVELN EDGAR E	408 MORAINE DR	RANTOUL	IL	61866
06-12-28-200-006	HOVELN GARY	2518 COUNTY ROAD 2600 E	PENFIELD	IL	61862
06-12-29-300-004	HOVELN GARY	2518 COUNTY ROAD 2600 E	PENFIELD	IL	61862
06-12-29-300-003	HOVELN GARY D TRUSTEE	2518 COUNTY ROAD 2600 E	PENFIELD	IL	61862
06-12-33-200-002	HOVELN HAROLD E.	PO BOX 134	ROYAL	IL	61871
06-10-35-400-007	HULS LYNN	2273 COUNTY ROAD 2400 N	ST JOSEPH	IL	61873
06-10-26-200-009	HULS VERA E	301 N MAIN	GIFFORD	IL	61847
17-17-07-200-004	IDEUS ALFRED	2124 COUNTY ROAD 2400 E	ST JOSEPH	IL	61873
06-11-30-100-004	IDEUS ALFRED & LORINE	2124 COUNTY ROAD 2400 E	ST JOSEPH	IL	61873
06-10-36-100-009	IDEUS EARL	508 N WEST ST	GIFFORD	IL	61847
06-10-36-100-010	IDEUS EARL	508 N WEST ST	GIFFORD	IL	61847
06-10-36-200-001	IDEUS EARL	508 N WEST ST	GIFFORD	IL	61847
06-10-36-200-006	IDEUS EARL	508 N WEST ST	GIFFORD	IL	61847
06-10-36-300-007	IDEUS EARL	508 N WEST ST	GIFFORD	IL	61847
06-10-36-300-008	IDEUS EARL	508 N WEST ST	GIFFORD	IL	61847
27-16-01-400-006	IDEUS EARL	508 N WEST ST	GIFFORD	IL	61847
27-16-01-400-008	IDEUS EARL	508 N WEST ST	GIFFORD	IL	61847
06-11-30-400-003	IDEUS MARVIN	401 EDEN PARK DR	RANTOUL	IL	61866
06-11-30-100-005	IDEUS MARVIN & PAM	401 EDEN PARK DR	RANTOUL	IL	61866
06-11-30-200-007	IDEUS MARVIN & PAMELA	401 EDEN PARK DR	RANTOUL	IL	61866
06-11-30-200-008	IDEUS MARVIN & PAMELA	401 EDEN PARK DR	RANTOUL	IL	61866
06-10-36-200-008	IDEUS ROYCE	2229 COUNTY ROAD 2600 N	GIFFORD	IL	61847
06-11-19-400-003	IDEUS ROYCE & SHAUNA	2229 COUNTY ROAD 2600 N	GIFFORD	IL	61847

Parcel Identification Number	Owner	Address	City	State	Zip Code
17-18-07-100-003	IHNEN BETTY	1909 COUNTY ROAD 2800 N	RANTOUL	IL	61866
06-12-19-300-002	IHNEN DALE P	2612 COUNTY ROAD 2500 E	PENFIELD	IL	61862
06-12-29-100-007	IHNEN DELBERT W	2574 COUNTY RD 2800N	PENFIELD	IL	61862
06-12-32-200-002	ILLINI FS INC	1509 E UNIVERSITY AVE	URBANA	IL	61802
06-12-28-200-010	IRVIN CAROL	2563 COUNTY ROAD 2800E, PO BOX 82	PENFIELD	IL	61862
06-12-30-200-001	JARBOE MICHAEL D	2792 COUNTY ROAD 2400 N	PENFIELD	IL	61862
06-12-33-300-002	JARBOE MICHAEL D TRUST &	JARBOE EILEEN V TRUST, 2792 COUNTY ROAD 2400 E	PENFIELD	IL	61862
06-12-33-300-003	JARBOE MICHAEL D TRUST &	JARBOE EILEEN V TRUST, 2792 COUNTY ROAD 2400 E	PENFIELD	IL	61862
06-12-33-400-001	JARBOE MICHAEL D TRUST &	JARBOE EILEEN V TRUST, 2792 COUNTY ROAD 2400 E	PENFIELD	IL	61862
06-12-33-400-002	JARBOE MICHAEL D TRUST &	JARBOE EILEEN V TRUST, 2792 COUNTY ROAD 2400 N	PENFIELD	IL	61862
06-12-32-100-004	JARBOE THOMAS	17122 SE 60TH ST	BELLEVUE	WA	98006
06-12-29-400-010	JOHNSON AARON & BARBARA	2545 COUNTY ROAD 2700 E	PENFIELD	IL	61862
06-11-19-200-011	JOHNSON MARVIN J	2667 COUNTY ROAD 2500 E	PENFIELD	IL	61862
06-11-30-100-011	JOHNSON ROY P	2640 COUNTY ROAD 2500 E	PENFIELD	IL	61862
06-12-19-400-004	JOHNSON ROY P	2640 COUNTY ROAD 2500 E	PENFIELD	IL	61862
06-12-28-400-007	JOHNSON ROY P	2640 COUNTY ROAD 2500 E	PENFIELD	IL	61862
06-12-19-100-003	JOHNSON ROY P	2640 COUNTY ROAD 2500 E	PENFIELD	IL	61862
06-11-31-400-003	JONES JILL	319 S GARRARD ST	RANTOUL	IL	61866
06-11-31-300-002	JONES JILL S	319 S GARRARD ST	RANTOUL	IL	61866
06-10-24-400-006	KEAGLE HAROLD & DONNA	2360 COUNTY ROAD 2600 N	GIFFORD	IL	61847
17-18-16-100-006	KEIGHER EDWARD P	20274 W KAHLER RD	WILMINGTON	IL	60481
06-12-28-200-004	KELLY MICHAEL & LAURA	2763 COUNTY ROAD 2600 N	PENFIELD	IL	61862
06-10-36-400-007	KOPMANN CEMETERY ASSOICATI	EDGAR HOVELN, 408 MORAINE DR	RANTOUL	IL	61866
06-10-23-400-003	KOPMANN ESTHER	2304 A COUNTY ROAD 3000N APT 105	GIFFORD	IL	61847
06-10-36-400-006	KOPMANN JUDITH	PO BOX 7	ROYAL	IL	61871
06-11-31-300-001	KOPMANN JUDITH E	BOX 7	ROYAL	IL	61871
06-10-36-200-003	KOPMANN LEROY W	117 SUSAN DR	DWIGHT	IL	60420
06-10-36-400-005	KOPMANN LEVI	2439 COUNTY ROAD 2400 E	ST JOSEPH	IL	61873
06-10-23-400-004	KOPMANN MERLE D	2601 COUNTY ROAD 2600 N	GIFFORD	IL	61847
06-12-33-176-001	LEE THOMAS G	2308 NAPLES CT	CHAMPAIGN	IL	61822
17-18-16-200-001	LEUER JOHN E & MARIE C	4S718 HARTER RD	SUGAR GROVE	IL	60554
06-12-33-126-002	LONG ROBERT G	PEARL ST	BLUFFS	IL	62621
17-18-05-400-009	LOSCHEN ARNOLD & DELORES	TRUSTEE, 2654 COUNTY ROAD 2400 N	OGDEN	IL	61859
06-12-32-400-001	LOSCHEN ARNOLD & DELORES A	TRUSTEES, 2654 COUNTY ROAD 2400 N	OGDEN	IL	61859
17-18-05-400-005	LOSCHEN ARNOLD A & DELORES	TRUSTEES, 2654 COUNTY ROAD 2400 N	OGDEN	IL	61859
06-12-32-300-003	LOSCHEN ARNOLD E & DELORES	TRUSTEES, 2654 COUNTY ROAD 2400 N	OGDEN	IL	61859
06-12-32-400-002	LOSCHEN ARNOLD E & DELORES	2654 COUNTY ROAD 2400 N	OGDEN	IL	61859
17-18-05-400-008	LOSCHEN BRIAN	2692 COUNTY ROAD 2300 N	OGDEN	IL	61859
06-12-32-200-001	LOSCHEN BRIAN A	2692 COUNTY ROAD 2300 N	OGDEN	IL	61859
17-18-05-400-010	LOSCHEN BRIAN A	2692 COUNTY ROAD 2300 N	OGDEN	IL	61859
06-12-32-300-002	LOSCHEN DELORES & ARNOLD E	TRUSTEES, 2654 COUNTY ROAD 2400 N	OGDEN	IL	61859
17-18-05-200-006	LOSCHEN MARK	2455 COUNTY ROAD 2050 N	ST JOSEPH	IL	61873
17-18-08-400-005	LOSCHEN RANDALL & DEANNA	2629 COUNTY ROAD 1800 N	OGDEN	IL	61859
17-18-07-300-003	LOSCHEN WILLIAM G	2128 COUNTY ROAD 2640 E	OGDEN	IL	61859
17-18-08-200-002	LUDWIG JOHN	2656 COUNTY ROAD 2150 N	OGDEN	IL	61859
17-18-04-300-002	LUDWIG JOHN & ERNA	2656 COUNTY ROAD 2150 N	OGDEN	IL	61859
17-18-08-100-006	LUDWIG JOHN & ERNA	2656 COUNTY ROAD 2150 N	OGDEN	IL	61859
17-18-08-200-001	LUDWIG JOHN & ERNA	2656 COUNTY ROAD 2150 N	OGDEN	IL	61859

Parcel Identification Number	Owner	Address	City	State	Zip Code
17-18-08-200-003	LUDWIG JOHN & ERNA	2656 COUNTY ROAD 2150 N	OGDEN	IL	61859
06-12-33-151-001	MADIGAN DENNIS D	18877 MEDFORD	BEVERLY HILL	MI	48025
06-12-28-400-005	MANN MARY L	2778 COUNTY ROAD 2500 N	PENFIELD	IL	61862
06-12-28-400-008	MANN MARY L	2778 COUNTY ROAD 2500 E	PENFIELD	IL	61862
17-18-18-200-009	MARKESE SHARILYN	810 S RAVEN RD	SHOREWOOD	IL	60431
17-18-06-300-006	MCCARTNEY MARLYS	1113 ASCOT DR	RANTOUL	IL	61866
06-10-25-100-003	MENNENGA DARRELL & MARILYN	5205 BEECH RIDGE RD	NASHVILLE	TN	37221
17-18-17-101-004	OLSON MILDRED	OLSON RON, P O BOX 202	ROYAL	IL	61871
17-18-06-400-006	OLSON ORY W	HENRICHS NICOLE J, 2367 COUNTY ROAD 2600 E	OGDEN	IL	61859
06-12-28-300-004	ONEIL MICHAEL P	PO BOX 236	PHILO	IL	61864
06-12-28-400-002	ONEIL MICHAEL P	PO BOX 236	PHILO	IL	61864
17-18-07-400-005	OSTEBUR FRANK R	2191 COUNTY ROAD 2500 E	ST. JOSEPH	IL	61873
17-18-16-100-001	OSTEBUR HELENA J	PO BOX 175	ROYAL	IL	61871
17-18-08-300-005	OSTERBUR DAVID	1628 COUNTY ROAD 2400 N	THOMASBORO	IL	61878
17-18-08-300-004	OSTERBUR EILERT	PO BOX 42	ROYAL	IL	61871
17-18-07-400-001	OSTERBUR EILERT H	PO BOX 42	ROYAL	IL	61871
17-18-07-400-002	OSTERBUR ERNEST W	2266 COUNTY ROAD 2600 E	OGDEN	IL	61859
17-18-08-100-004	OSTERBUR ERNEST W	2266 COUNTY ROAD 2600 E	OGDEN	IL	61859
06-12-21-400-005	OSTERBUR ERNEST W &	IRENE K, 2266 COUNTY ROAD 2600 E	OGDEN	IL	61859
06-10-24-100-002	OSTERBUR FRANK C	PO BOX 237	GIFFORD	IL	61847
17-17-06-400-007	OSTERBUR HERBERT J	302 BENJAMIN ST	ROYAL	IL	61871
17-17-06-400-006	OSTERBUR HERBERT J & BETTY	TRUST, 302 BENJAMIN ST	ROYAL	IL	61871
06-12-21-400-002	OSTERBUR IRENE K	2266 COUNTY ROAD 2600 E	OGDEN	IL	61859
17-18-06-400-012	OSTERBUR IRREV TRUST	JULIE CARLSON TRUSTEE, 3828 E WHIPPOORWILL LANE	BYRON	IL	61010
17-18-08-100-005	OSTERBUR JANET R	PO BOX 214	ST JOSEPH	IL	61873
17-18-07-200-004	OSTERBUR LAVERNE I	2293 COUNTY ROAD 2600 E	OGDEN	IL	61859
17-18-07-200-005	OSTERBUR LOUIS M	2293 COUNTY ROAD 2600 E	OGDEN	IL	61859
17-18-07-400-003	OSTERBUR LOUIS M	2293 COUNTY ROAD 2600 E	OGDEN	IL	61859
17-18-09-300-002	OSTERBUR LOWELL W	2115 COUNTY ROAD 1200 E	CHAMPAIGN	IL	61822
17-18-09-300-006	OSTERBUR LOWELL W	2115 COUNTY ROAD 1200 E	CHAMPAIGN	IL	61822
17-18-08-300-003	OSTERBUR MARCIA A	500 S MONTGOMERY ST APT 208	BREMEN	IN	46506
06-12-28-300-005	PETERSON KEITH	2522 COUNTY ROAD 2700 E	PENFIELD	IL	61862
06-12-30-400-004	PFLUGMACHER MICHAEL R	2503 COUNTY ROAD 2600 E	PENFIELD	IL	61862
06-12-19-200-002	PFLUGMACHER ROBERT	866 E 2250 NORTH RD	OGDEN	IL	61859
06-12-30-300-004	PFLUGMACHER ROBERT	866 E 2250 NORTH RD	OGDEN	IL	61859
06-12-30-400-003	PFLUGMACHER ROBERT	866 E 2250N	OGDEN	IL	61859
06-12-19-200-003	PFLUGMACHER WILLIAM E	333 EILER DR	GIFFORD	IL	61847
17-17-07-200-003	PHELPS DENVER R	2465 COUNTY ROAD 2300 N	OGDEN	IL	61859
06-12-31-200-007	POLLOCK LAVEDA TRUST	KALIN KOCHER, 2455 COUNTY ROAD 2600 E	PENFIELD	IL	61862
06-11-19-200-002	RADEMACHER ERNEST	107 NORTH POINTE DR	GIFFORD	IL	61847
06-12-18-300-001	RADEMACHER FARMS INC	2853 COUNTY ROAD 2600 E	PENFIELD	IL	61862
06-12-18-400-005	RADEMACHER FARMS INC	2853 COUNTY ROAD 2600 E	PENFIELD	IL	61862
06-12-17-400-003	RASMUSSEN ALAN G	2656 COUNTY ROAD 2700 N	PENFIELD	IL	61862
17-17-06-300-003	RAUP RONALD L	2370 COUNTY ROAD 1600 E	THOMASBORO	IL	61878
06-12-32-100-002	RAWLINGS DELORES ANN	2627 COUNTY ROAD 2500 N	PENFIELD	IL	61862
17-18-08-400-006	RISLEY JASON & NICHOLE	2237 COUNTY ROAD 2700 E	OGDEN	IL	61859
06-12-29-400-006	ROTRAMEL JAMES S	2549 COUNTY ROAD 2700 E	PENFIELD	IL	61862
06-12-17-200-006	SAGE MARILYN	374 GIBBS DR	RANTOUL	IL	61866

Parcel Identification Number	Owner	Address	City	State	Zip Code
17-18-06-200-003	SAGE REKA	APT 203, 2304A COUNTY ROAD 3000 N	GIFFORD	IL	61847
17-18-05-100-001	SAGE WAYNE	2545 COUNTY ROAD 2400 N	OGDEN	IL	61859
17-18-06-200-002	SAGE WAYNE L	2545 COUNTY ROAD 2400 N	OGDEN	IL	61859
17-18-09-200-009	SATTLER JOAN R	207 MCKINLEY,	MILFORD	IL	60953
17-18-09-200-008	SATTLER THOMAS R	2253 COUNTY ROAD 2800 E	OGDEN	IL	61859
06-12-20-300-001	SCHOOLEY WINIFRED	SCHOOLEY MILDRED F, 7822 ZUNI ST	DENVER	CO	80221
17-18-09-100-001	SCOTT ROBERT P	107 ARROWHEAD LN	HAINES CITY	FL	33844
06-11-19-200-012	SEVERINS GENE & CAROL	521 S MAIN ST	GIFFORD	IL	61847
06-11-19-200-008	SEVERINS GENE N	521 S MAIN ST	GIFFORD	IL	61847
06-12-20-200-001	SEVERINS GENE N	521 N MAIN	GIFFORD	IL	61847
17-18-05-300-005	SHEARIN DANIEL	2431 PARKLAKE DR	MORRIS	IL	60450
06-12-33-200-003	SIMS CHARLES B	2765 COUNTY ROAD 2500 N	PENFIELD	IL	61862
06-12-30-300-008	SJUTS EVELYN M	2331 COUNTY ROAD 2000 E	URBANA	IL	61802
06-12-31-400-001	SJUTS EVELYN M.	2331 COUNTY ROAD 2000 E	URBANA	IL	61802
06-12-28-300-006	SKUDLAREK JANET I	1031 29TH AVE N	ST CLOUD	MN	56303
06-12-20-200-002	SOLON MARY M	PO BOX 3249	CHAMPAIGN	IL	61826
06-12-19-200-004	SUITS ERIC J	2655 COUNTY ROAD 2600 E	PENFIELD	IL	61862
06-12-19-200-005	SUITS ERIC J	2655 COUNTY ROAD 2600 E	PENFIELD	IL	61862
06-12-28-100-002	SUITS JEFFERY	2703 COUNTY ROAD 2500 N	PENFIELD	IL	61862
06-12-33-101-001	SUITS JEFFREY G	2703 COUNTY ROAD 2500 N	PENFIELD	IL	61862
06-12-33-151-002	SUITS JEFFREY G	2703 COUNTY ROAD 2500 N	PENFIELD	IL	61862
06-10-24-300-002	SUITS KENNETH	2738 COUNTY ROAD 2600 N	PENFIELD	IL	61862
06-12-21-300-004	SUITS KENNETH	2738 COUNTY ROAD 2600 N	PENFIELD	IL	61862
06-12-20-100-002	SUITS KENNETH	2738 COUNTY ROAD 2600 N	PENFIELD	IL	61862
06-12-21-300-001	SUITS KENNETH E	2738 COUNTY ROAD 2600 N	PENFIELD	IL	61862
06-12-28-100-003	SUITS KENNETH E	2738 COUNTY ROAD 2600 N	PENFIELD	IL	61862
06-12-29-200-001	SUITS KENNETH E	2738 COUNTY ROAD 2600 N	PENFIELD	IL	61862
17-18-05-200-005	SULSER JIM	2597 COUNTY ROAD 2400 N	PENFIELD	IL	61862
06-10-25-200-004	SWEARINGEN GARY L	2377 COUNTY ROAD 2600 N	GIFFORD	IL	61847
06-10-25-400-001	TATE FARM #3	BUSEY AG SERVICES, 3002 W WINDSOR RD	CHAMPAIGN	IL	61822
06-10-25-400-002	TATE FARM #3	BUSEY AG SERVICES, 3002 W WINDSOR RD	CHAMPAIGN	IL	61822
06-11-31-100-001	TATE FARM #3	BUSEY AG SERVICES, 3002 W WINDSOR RD	CHAMPAIGN	IL	61822
17-18-06-400-013	TYLER MICHAEL & DEBRA	2301 COUNTY ROAD 2600 E	OGDEN	IL	61859
06-12-31-100-004	UDOVICH CARL & JANE	3526 BANKVIEW DR	JOLIET	IL	60431
06-12-31-200-005	UDOVICH CARL A & JANE	3526 BANKVIEW DR	JOLIET	IL	60431
06-12-31-200-006	UDOVICH CARL A & JANE	3526 BANKVIEW DR	JOLIET	IL	60431
06-10-25-100-009	UKEN DAVID D & DANITA M	2146 COUNTY ROAD 2100N	ST JOSEPH	IL	61873
06-12-32-400-003	UNION PACIFIC RR CO	1700 FARNAM ST, 10TH FLOOR SOUTH	OMAHA	NE	68102
17-18-17-201-001	VILVEN TIRE CO INC	101 W MAIN ST, PO BOX 55	ROYAL	IL	61871
06-11-31-400-002	WALKER DOUGLAS	1111 STOCKHOLM RD	PAXTON	IL	60957
06-11-30-100-010	WARD EDWARD	2592 COUNTY ROAD 2400 E	GIFFORD	IL	61847
06-11-30-100-009	WARD EDWARD R & KAREN D	2592 COUNTY ROAD 2400 E	GIFFORD	IL	61847
06-12-29-400-008	WERNER VELMA	312 PENNY LN	PEOTONE	IL	60468
06-12-29-400-011	WERNER VELMA	PO BOX 341, 312 PENNY LN	PEOTONE	IL	60468
06-12-31-300-001	WOODARD KATHRYN	2239 NANCY LN	ST JOSEPH	IL	61873

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