

# **Appendix A**

## **Agencies Contacted Regarding Project**

**Lakefield Wind Project**

Jackson County, Minnesota

**Lakefield Wind Project**  
**Agency Contact List**  
**Updated July 14, 2009**

<b>Agency</b>	<b>Contact(s)</b>
U.S. Army Corps of Engineers (USACE)	David.A.Studenski U.S. Army Corps of Engineers Attn: OP-R 1114 South Oak Street La Crescent, MN 55947-1338 Fax: (507)895-4116 Phone: (507) 895-2064 Email: <a href="mailto:David.A.Studenski@usace.army.mil">David.A.Studenski@usace.army.mil</a>
U.S. Fish and Wildlife Service (USFWS) (Region 3)	Tony Sullins U.S. Fish and Wildlife Service Twin Cities Ecological Services Office 4101 American Boulevard East Bloomington, Minnesota 55425-1665 Phone: (612) 725-3548, ext. 2201 Fax: (612) 725-3609 Email: <a href="mailto:Tony_Sullins@fws.gov">Tony_Sullins@fws.gov</a>  Gary Wege U.S. Fish and Wildlife Service Twin Cities Ecological Services Office 4101 American Boulevard East Bloomington, Minnesota 55425-1665 Phone: (612) 725-3548, ext. 207 Fax: (612) 725-3609 Email: <a href="mailto:Gary_Wege@fws.gov">Gary_Wege@fws.gov</a>
Windom Wetland Management District (WMD)	Mark Vaniman - District Manager Windom Wetland Management District (WMD) 49663 County Road 17 Windom, Minnesota 56101 Phone: (507) 831-2220 Fax: (507) 831-5524 Email: <a href="mailto:WindomWMD@fws.gov">WindomWMD@fws.gov</a>

**Lakefield Wind Project  
Agency Contact List  
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Agency	Contact(s)
Environmental Protection Agency (Region 5) (EPA) in coordination with the Minnesota Pollution Control Agency (MPCA)	Bharat Mathur, Acting Regional Administrator US EPA Region 5 77 W. Jackson Blvd. Chicago, IL 60604 Phone: 312-886-3000 Fax: NA Email: <a href="mailto:mathur.bharat@epa.gov">mathur.bharat@epa.gov</a>
U.S. Department of Agriculture (USDA)  Natural Resources Conservation Service (NRCS)	Paul Flynn Minnesota State NRCS 375 Jackson Street, Suite 600 St. Paul, Minnesota 55101 Phone: (651) 602-7870 Fax: (651) 602-7914 Email: <a href="mailto:paul.flynn@mn.usda.gov">paul.flynn@mn.usda.gov</a>  Joel Poppe, District Conservationist Natural Resources Conservation Service 603 South Highway 86 Lakefield, MN 56150 Phone: (507) 662-6682 x 3 Fax: (507) 662-5600 Email: <a href="mailto:joel.poppe@mn.usda.gov">joel.poppe@mn.usda.gov</a>
U.S. Department of Agriculture Farm Service Agency (FSA)	Jeff Johnson, State Environmental Coordinator Farm Service Agency Box 994 Wilmar, Minnesota 56201 Phone: (320) 235-3450 x 113 Email: <a href="mailto:jeff.johnson@mn.usda.gov">jeff.johnson@mn.usda.gov</a>  Larry Stuckenbroker County Executive Director FSA Service Center Office Jackson County Farm Service Agency 601 S Highway 86 Lakefield, MN 56150-3295 (507) 662-5203 (507) 662-5600 fax <a href="mailto:Larry.Stuckenbroker@mn.usda.gov">Larry.Stuckenbroker@mn.usda.gov</a>
Lead Federal Agency	To be determined if applicable, based on federal agency involvement

**Lakefield Wind Project  
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<b>Agency</b>	<b>Contact(s)</b>
Federal Aviation Administration	Kandice Krull Environmental Protection Specialist Minneapolis Airports District Office MSP-ADO-600 6020 28th Avenue, South, Room 102 Minneapolis, Minnesota 55450 Phone: (612) 713-4362 Fax: (612) 713-4364 Email: <a href="mailto:Kandice.Krull@faa.gov">Kandice.Krull@faa.gov</a>
<b>State</b>	
Minnesota Public Utilities Commission (PUC) <u>Not contacted via letter for comment.</u> <u>On list for informational purposes only.</u>	Bob Cupit, Manager Minnesota Public Utilities Commission Energy Facilities Permitting 121 7 <sup>th</sup> Place East, Suite 350 St. Paul, Minnesota 55101 Phone: (651) 201-2255 Fax: (651) 297-7073 Email: <a href="mailto:Bob.Cupit@state.mn.us">Bob.Cupit@state.mn.us</a>  Burl W. Harr, Executive Secretary Minnesota Public Utilities Commission 121 7 <sup>th</sup> Place East, Suite 350 St. Paul, Minnesota 55101 Phone: (651) 201-2222 Fax: (651) 297-7073 Email: <a href="mailto:Burl.Haar@state.mn.us">Burl.Haar@state.mn.us</a>
Minnesota State Historic Preservation Office (SHPO)	Dennis Gimmestad State Historic Preservation Office Minnesota Historical Society 345 Kellogg Boulevard West St. Paul, Minnesota 55102 Phone: (651) 259-3456 Fax: (651) 282-2374 Email: <a href="mailto:dennis.gimmestad@mnhs.org">dennis.gimmestad@mnhs.org</a>

**Lakefield Wind Project  
Agency Contact List  
Updated July 14, 2009**

<b>Agency</b>	<b>Contact(s)</b>
Minnesota Board of Water and Soil Resources (BWSR)	Kane Radel, Wetland Specialist Minnesota Board of Water and Soil Resources Wetland Conservation Act Work Area, Southern Region 1400 East Lyon Street, Box 267 Marshall, Minnesota 56258 Phone: (507) 537-7069 Fax: (507) 537-6368 Email: <a href="mailto:kane.radel@state.mn.us">kane.radel@state.mn.us</a>
Minnesota Department of Natural Resources (MnDNR)	Lisa Joyal Endangered Species Environmental Review Coordinator Natural Heritage and Nongame Research Program 500 Lafayette Road, Box 25 St. Paul, Minnesota 55155 Phone: (651) 259-5109 Fax: (651) 296-1811 Email: <a href="mailto:lisa.joyal@dnr.state.mn.us">lisa.joyal@dnr.state.mn.us</a>
Minnesota Department of Natural Resources (MnDNR)	Lisa Gelvin-Innvaer, Nongame Wildlife Specialist Minnesota DNR Nongame Wildlife - South Region 261 Highway 15 South New Ulm, MN 56073 Phone: (507) 359-6033 Email: <a href="mailto:lisa.gelvin-innvaer@dnr.state.mn.us">lisa.gelvin-innvaer@dnr.state.mn.us</a>
Minnesota Department of Natural Resources (MnDNR)	John Schladweiler, Regional Ecological Resources Manager Minnesota Department of Natural Resources 261 Hwy 15 S New Ulm, MN 56073 Phone: 507-359-6003 Email: <a href="mailto:john.schladweiler@dnr.state.mn.us">john.schladweiler@dnr.state.mn.us</a>
Minnesota Department of Natural Resources (MnDNR)	Randy Markl, Area Wildlife Manager Minnesota Department of Natural Resources 175 Co Rd 26 Windom, 56101 507-831-2900 x226 Email: <a href="mailto:Randy.Markl@state.mn.us">Randy.Markl@state.mn.us</a>

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Agency Contact List  
Updated July 14, 2009**

<b>Agency</b>	<b>Contact(s)</b>
Minnesota Department of Natural Resources (MnDNR)	Tom Kresko, Region 4 Area Hydrologist Minnesota Department of Natural Resources DNR Windom Office 175 County Road 26 Windom, MN 56101-1868 Phone: (507) 831-2900 X 224 Email: <a href="mailto:Tom.Kresko@state.mn.us">Tom.Kresko@state.mn.us</a>
Minnesota Department of Natural Resources (MnDNR)	Bob Hobart DNR Lands and Minerals, Region 4 261 Highway 15 South New Ulm, Minnesota 56073 Phone: (507) 350-6071 Fax: (507) 359-6018 Email: <a href="mailto:bob.hobart@dnr.state.mn.us">bob.hobart@dnr.state.mn.us</a>
Minnesota Pollution Control Agency (MPCA)	Karen Kromar, Principal Planner Minnesota Pollution Control Agency Environmental Review and Operations Section Regional Division 520 Lafayette Road North St. Paul, Minnesota 55155-4194 Phone: (651) 757-2508 Fax: NA Email: <a href="mailto:Karen.Kromar@state.mn.us">Karen.Kromar@state.mn.us</a>
Minnesota Pollution Control Agency (MPCA)	Joseph Hauger Minnesota Pollution Control Agency Tanks Compliance and Enforcement Southwest Region 1420 East College Drive, Suite 900 Marshall, Minnesota 56258 Phone: (507) 430-4904 Fax: (507) 537-6001 Email: <a href="mailto:Joseph.Hauger@state.mn.us">Joseph.Hauger@state.mn.us</a>

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**Updated July 14, 2009**

<b>Agency</b>	<b>Contact(s)</b>
Minnesota Department of Health (MDH)	Robert Nielsen Minnesota Department of Health Well Management Section 1400 East Lyon Street Marshall, Minnesota 56258 Phone: (507) 537-6071 Fax: (507) 537-7194 Email: <a href="mailto:robert.nielsen@state.mn.us">robert.nielsen@state.mn.us</a>
Minnesota Department of Labor and Industry	Michael Freiderich Minnesota Department of Labor and Industry Construction Codes and Services 410 Jackson Street, Suite 520 Mankato, Minnesota 56001 Phone: (507) 389-6507 ext. 6 Fax: (507) 389-2746 Email: <a href="mailto:Michael.freiderich@state.mn.us">Michael.freiderich@state.mn.us</a>
Minnesota Department of Transportation	Jim Swanson, District 7 Engineer Minnesota Department of Transportation 501 S. Victory Drive Mankato, MN 56001-5302 Phone: 507-304-6101 Fax: 507-304-6119 Email: <a href="mailto:james.swanson@dot.state.mn.us">james.swanson@dot.state.mn.us</a>
Minnesota Department of Transportation	Ted Coulianos, Supervisor Minnesota Department of Transportation OFCVO – Transportation Permit Section 395 John Ireland Boulevard St. Paul, Minnesota 55155 Phone: (651) 355-0250 Fax: (651) 215-9677 Email: <a href="mailto:ted.coulianos@dot.state.mn.us">ted.coulianos@dot.state.mn.us</a>

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Agency Contact List  
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<b>Agency</b>	<b>Contact(s)</b>
Minnesota Department of Transportation	Darlene Dahlseide Minnesota Department of Transportation Office of Aeronautics 222 East Plato Boulevard St. Paul, Minnesota 55107 Phone: (651) 234-7248 Fax: (651) 234-7261 Email: <a href="mailto:darlene.dahlseide@dot.state.mn.us">darlene.dahlseide@dot.state.mn.us</a>
<b>Local</b>	
Local Government Unit (LGU)	Brian Nyborg District Manager Jackson Soil and Water Conservation District 603 South Highway 86 Lakefield, MN 56150 Phone: (507) 662-6682 x 3 Fax: (507) 662-5600 Email: <a href="mailto:brian.nyborg@mn.nacdnet.net">brian.nyborg@mn.nacdnet.net</a>
City of Lakefield	Darrell Nissen, Mayor City of Lakefield 301 Main Street P.O. Box 900 Lakefield, Minnesota 56150 Phone: (507) 662-5457 Fax: (507) 662-5990  Kelly Rasche, City Clerk City of Lakefield 301 Main Street P.O. Box 900 Lakefield, Minnesota 56150 Phone: (507) 662-5457 Fax: (507) 662-5990
City of Jackson	Jackson City Hall c/o City Clerk 80 West Ashley Street Jackson, MN 56143 Phone: (507) 847-4410

**Lakefield Wind Project  
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<b>Agency</b>	<b>Contact(s)</b>
Jackson County Parks, Planning, and Environmental Services	Gordon Olson, Director Jackson County Parks, Planning, and Environmental Services 405 4th St. Jackson, MN 56143 Phone: (507) 847-2240 Fax: (507) 847-6865 Email: gordon.olson@co.jackson.mn.us
Jackson County Highway Department	Tim Stahl, Engineer Jackson County Highway Department 53053 780th St. Jackson, MN 56143 Phone: (507) 847-2525 Fax: (507) 847-2539
Belmont Township, Jackson County	BELMONT - 2nd Commissioner's District Jim Thoreson, Supervisor Jackson County Courthouse 405 4th Street Jackson, MN 56143
Hunter Township, Jackson County	HUNTER - 1st Commissioner's District Richard Klima, Supervisor Jackson County Courthouse 405 4th Street Jackson, MN 56143
Des Moines Township, Jackson County	DES MOINES - 1st Commissioner's District Ron Bezdicek, Supervisor Jackson County Courthouse 405 4th Street Jackson, MN 56143
Heron Lake Township, Jackson County	HERON LAKE - 3rd Commissioner's District Norman Stender, Supervisor Jackson County Courthouse 405 4th Street Jackson, MN 56143

# **Appendix B**

## **Agency Correspondence and Responses**

**Lakefield Wind Project**

Jackson County, Minnesota



## Minnesota Department of Transportation

### Office of Freight and Commercial Vehicle Operations

Oversize & Overweight Permit section  
395 John Ireland Boulevard, M.S. 420  
St. Paul, MN 55155-1899

Tel: 651-296-6000  
Fax: 651-215-9677

[www.dot.state.mn.us/cvo/oversize/oversize.html](http://www.dot.state.mn.us/cvo/oversize/oversize.html)

David Weetman  
Senior Environmental Scientist  
Westwood Development Service

Thank you for contacting the Office of Freight and Commercial Vehicle Operations Oversize/Overweight Permit Section. The OS/OW permit section reviews and issues oversize/overweight vehicle permits for travel on Minnesota roadways. Our permit issuing authority is exclusively for Minnesota Trunk, US, and Interstate roadways, leaving all other county and local roadway permitting belonging to those specific counties and localities.

In regards to your question, every vehicle combination will face different variables due to overall loaded dimensions, width of roadway restrictions; District reviews, and/or construction projects. Route and escort requirements are subject to change due to conditions. We ask our customers to allow 2 days for processing permits. Within this timeline we can review any Physical Route Surveys, submittal of bridge checks and District approvals. Applications can be submitted up to 7 days in advance and issued as permits up to 5 days prior to the start date. Our Single Trip permits are valid for 5 days and are subject to Holiday and weekend restrictions.

Our offices Wind Energy Transportation web information is located on our website at <http://www.dot.state.mn.us/cvo/oversize/oversize.html>

Here you will find information on:

- Minnesota Tire Law
- Travel Hours
- General Conditions
- Minnesota Commercial Truck Regulations
- Minnesota Statutes

Links to popular sites such as the Commerce Department, Public Safety Department, online CADD Maps, and other Associations & Councils are also available on our website in the General Information link under Wind Energy Transportation.

Respectfully,

Rob Holschbach  
Mn/DOT Wind Coordinator  
Oversize/Overweight Permits  
651/296-6000 Info Ext 3  
651/355-0243 PH  
651/215-9677 Fax

July 21, 2009



CITY HALL

(507) 847-4410 • Fax (507) 847-5586

July 23, 2009

**RECEIVED**

**JUL 24 2009**

**WESTWOOD  
PROFESSIONAL SERVICES**

David Weetman  
Senior Environmental Scientist  
Westwood Professional Services, Inc.  
7699 Anagram Drive  
Eden Prairie, MN. 55344

Re: Lakefield Wind Project  
Jackson County, Minnesota  
File: 20092538

Dear Mr. Weetman:

The City of Jackson and the Jackson Airport Commission would like to go on record informing you of the pending re-zoning of the Jackson Municipal Airport and the surrounding area for a new runway at the Jackson Airport.

I have included with the letter a map prepared by Bolton and Menk engineers showing the proposed zoning surrounding the airport land.

If you have any questions, please feel free to contact our engineer, Ron Roetzel, concerning the map and proposed zoning. His number in Burnsville is 952-890-0509.

Sincerely,

Dean Albrecht  
City Administrator

Cc: Ron Roetzel, Bolton and Menk



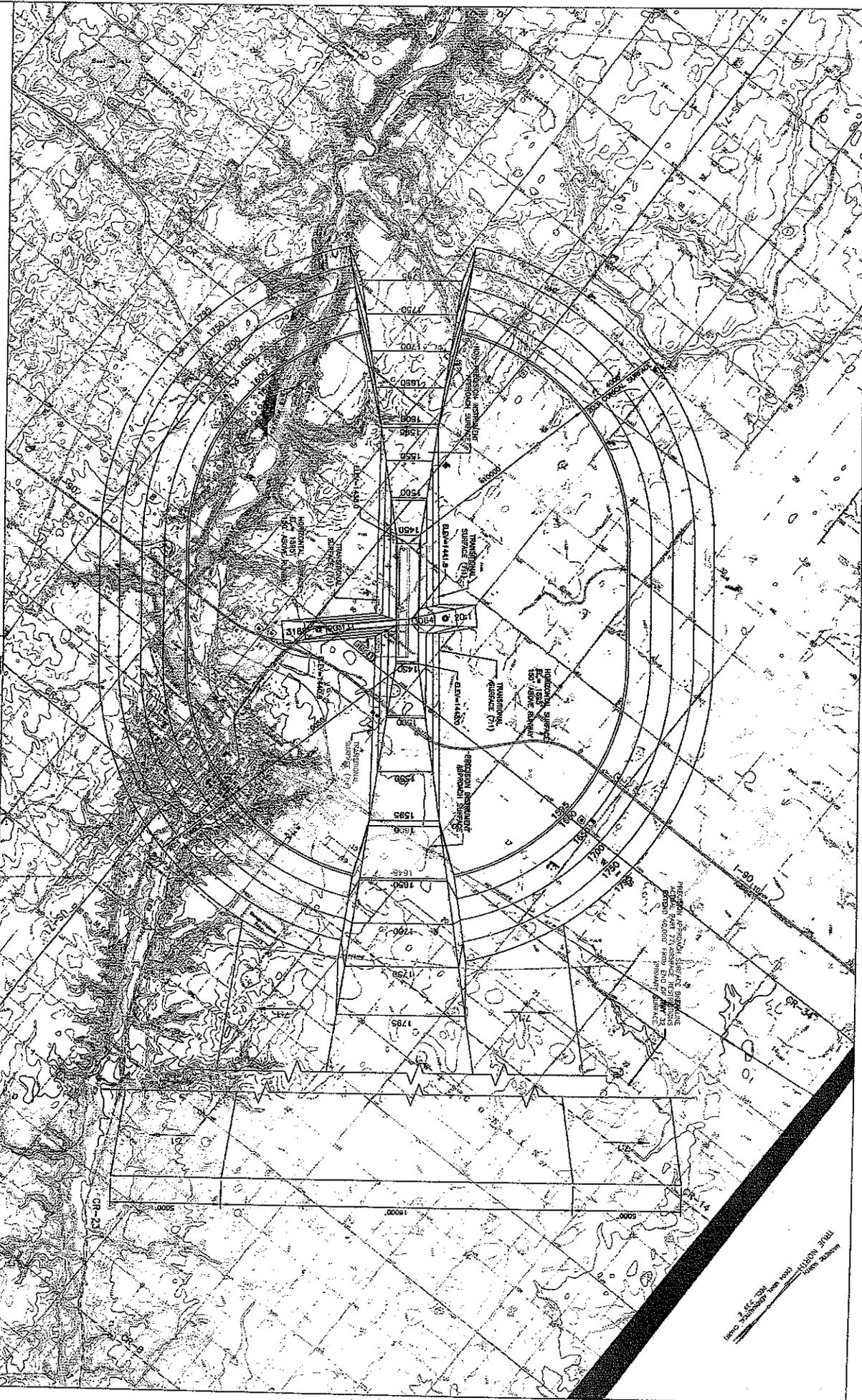
0 1000 2000 3000  
 FEET

**BOLTON & MENK, INC.**  
 Consulting Engineers & Surveyors  
 WILSON, IN 46780; IN 46780; IN 46780; IN 46780  
 ELIZABETH, IN 46732; IN 46732; IN 46732; IN 46732

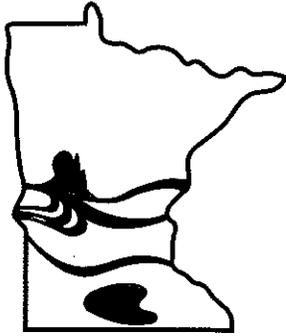
DATE	BY	CHKD

JACKSON MUNICIPAL AIRPORT  
 ULTIMATE FAA PART 77 AND MDDOT AIRSPACE  
 ALP 03/08/2006

SHEET  
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DATE NORTH  
 1000 2000 3000  
 FEET



**JACKSON SOIL & WATER CONSERVATION DISTRICT**

603 South Hwy 86  
Lakefield, MN 56150-3295  
(507) 662-6682 Ext. # 3

**MINNESOTA**  
**SOIL AND WATER CONSERVATION DISTRICTS**

**RECEIVED**

**AUG 06 2009**

**WESTWOOD  
PROFESSIONAL SERVICES**

August 5, 2009

David Weetman  
Senior Environmental Scientist  
7699 Anagram Drive  
Eden Prairie, MN 55344

David,

Thank you for the early notification and the opportunity to comment on the Lakefield Wind Project, LLC, proposed project. The Jackson SWCD is the Local Government Unit (LGU) for the Wetland Conservation Act in Jackson County.

As this project progresses, we will need additional details on locations of wind turbines, access roads, and any other activities that could impact wetlands. You will need to identify these wetlands by doing a wetland delineation/investigation on all areas that are not obvious uplands.

Applications for projects and guidance on wetland delineations can be found on the BWSR website [www.bwsr.state.mn.us](http://www.bwsr.state.mn.us).

Thanks again for the opportunity to comment on your wind energy project.

**Brian Nyborg**  
**Jackson SWCD**



U.S. Department  
of Transportation

**Federal Aviation  
Administration**

**RECEIVED**

**AUG 10 2009**

**WESTWOOD  
PROFESSIONAL SERVICES**

Great Lakes Region  
Minneapolis Airports District Office  
6020 28<sup>th</sup> Ave S, Room 102  
Minneapolis, MN 55450

August 7, 2009

Mr. David Weetman  
Senior Environmental Scientist  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344

Re: Proposed Lakefield Wind Project in Jackson County, Minnesota

Dear Mr. Weetman:

The Minneapolis Airports District Office received your letter, dated July 20, 2009, and attached maps requesting our assistance in providing comments regarding the proposed Lakefield Wind Project. Lakefield Wind Project, LLC plans to obtain a site permit for the Lakefield Wind Project in Jackson County, Minnesota. Based on the information provided, we offer the following comments for your consideration.

I have identified one airport within five miles, two airports within 20 miles and two airports within 40 miles of the proposed project. If not already included on your distribution list, please consider giving each airport an opportunity to provide input and comments on the project. The airports are:

- Jackson Municipal Airport (approximately 3 miles east of the proposed project)
- Airports within 20 miles of the proposed project:
  - Windom Municipal Airport (~12 miles north)
  - Worthington Municipal Airport (~18 miles west)
- Airports within 40 miles of the proposed project:
  - Fairmont Municipal Airport (~31 miles east)
  - St. James Municipal Airport (~33 miles northeast)

Though all five airports are located outside the project area, an Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) is required to determine if the proposed project will have any impact on the airspace for each airport. You can access the required forms and additional information on the OE/AAA analysis at <https://oeaaa.faa.gov>.

I appreciate the opportunity to provide comments on the proposed wind-powered energy facility. Please contact me if you have any questions or need further information.

Sincerely,

A handwritten signature in black ink, appearing to read 'Kandice Krull', enclosed within a large, hand-drawn oval.

Kandice Krull  
Environmental Protection Specialist  
FAA - Minneapolis Airport District Office  
612-713-4362  
Kandice.Krull@faa.gov

United States Department of Agriculture



Natural Resources Conservation Service  
800 E Main Street  
Suite 400  
Marshall, MN 56258

*Helping People  
Help the Land*

Phone: (507) 537-0541  
FAX: (507) 537-0734

August 13, 2009

**RECEIVED**

**AUG 14 2009**

**WESTWOOD  
PROFESSIONAL SERVICES**

David Weetman  
Senior Environmental Scientist  
Westwood Professional Services, Inc.  
7699 Anagram Drive  
Eden Prairie, Minnesota 55344

IN REPLY REFER TO: Lakefield Wind Project, Jackson County, Minnesota

Dear Mr. Weetman:

The Minnesota Natural Resources Conservation Service (NRCS) has reviewed the above referenced project. The project sponsors are not USDA program benefit recipients, thus the wetland conservation provisions of the 1985 Food Security act, as amended are not applicable. It should be noted, however, that actions by a non-USDA participant third party (project sponsor) which impact agricultural wetlands owned or operated by USDA participants, may jeopardize the owner/operators USDA eligibility. If such impacts are anticipated, the owner/operator should contact the county Farm Service Agency (FSA) office to consider an application for a third party exemption.

The following agencies may have federal or state wetlands, cultural resources, water quality or threatened and endangered species jurisdiction in the proposed project, and should be consulted.

- Army Corps of Engineers (USACOE) – Clean Water Act
- US Fish and Wildlife Service (FWS) – Endangered Species Act
- Board of Water and Soil Resources (BWSR) - Minnesota Wetlands Conservation Act
- Minnesota Department of Natural Resources (MDNR)
- Minnesota Pollution Control Agency (MPCA)
- State Historic Preservation Officer/State Archaeologist (SHPO)

Finally, if as a result of your proposal you are affecting agricultural lands, and if any federal monies are involved, it is a requirement that a Farmland Policy Protection Act (FPPA) site assessment be appropriately filed. Because of the location and type of activity proposed, this project may impact agricultural lands. If so, you should submit a Farmland Conversion Impact Rating form (Form AD-1006) for each Minnesota county with part one filled out. Along with the AD-1006, send a detailed map of the area impacted. We will then complete the form and mail it back to you. FPPA land evaluations are conducted by local NRCS personnel who review the project for possible effects on unique, prime or statewide important farmland. You can find

the FPPA form AD-1006 at <http://www.nrcs.usda.gov/programs/fppa/>. Please refer specific FPPA requests in Jackson County to Joseph Kristoff, area soil scientist, at 507-537-0541 or [joseph.kristoff@mn.usda.gov](mailto:joseph.kristoff@mn.usda.gov).

Sincerely,



JOHN E. BECKWITH  
Water Resources Staff Leader

cc: Joseph Kristoff, ARSS, NRCS, Marshall, MN



*Protecting, maintaining and improving the health of all Minnesotans*

August 12, 2009

**RECEIVED**

**AUG 17 2009**

**WESTWOOD  
PROFESSIONAL SERVICES**

Mr. David Weetman  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344

Dear Mr. Weetman:

Subject: Proposed Lakefield Wind Energy Project, Lakefield Wind Project, LLC, Located in Multiple Sections of Des Moines, Hunter, Belmont and Heron Lake Townships, Jackson County, Minnesota

This letter is in response to your request for comments regarding the subject wind project. The Well Management Section of the Minnesota Department of Health (MDH) regulates wells and borings in Minnesota. A boring drilled for this project will likely be an Environmental Bore Hole (EBH). EBH's are regulated by the MDH and the contractor drilling the EBH's must be a Minnesota licensed well contractor or Minnesota registered monitoring well contractor. The Minnesota licensed or registered contractor drilling the EBH's is responsible to drill, seal and report the sealing of these borings in conformance with Minnesota Rules, Chapter 4725.

If you have any questions, please contact me at 507/537-6071.

Sincerely,

A handwritten signature in cursive script, reading "Robert C. Nielsen".

Robert C. Nielsen, P.G.  
District Hydrologist  
Well Management Section  
1400 East Lyon Street  
Marshall, Minnesota 56258

cc: Peter J. Zimmerman - Rochester



DEPARTMENT OF THE ARMY  
ST. PAUL DISTRICT, CORPS OF ENGINEERS  
190 FIFTH STREET EAST  
ST. PAUL, MN 55101-1638

RECEIVED

AUG 17 2009

WESTWOOD  
PROFESSIONAL SERVICES

August 13, 2009

Operations  
Regulatory (2009-3211-DAS)

Mr. David Weetman  
Westwood Professional Services, Inc.  
7699 Anagram Drive  
Eden Prairie, Minnesota 55344

Dear Mr. Weetman:

This letter responds to your request for comments about a project of Lakefield Wind Project, LLC to construct a Windfarm, which includes turbines, collection lines, an operation and maintenance facility, permanent meteorological towers, and associated roads. The project site is in Sec. 5-8, 17-20, T. 102N, R. 35W, Sec. 1-5, 8-17, 20-29, T. 102N, R. 36W, Sec. 19, 30-31, T. 103N, R. 35W, and Sec. 14-17, 20-29, 33-36, T. 103N, R. 36W, Jackson County, Minnesota.

Underground utility lines through waters of the U.S., including wetlands, as well as navigable waters of the U. S. are regulated under Section 404 of the Clean Water Act if there is a discharge of dredged or fill material. Any discharge would require authorization by a general permit or letter of permission.

Underground lines installed by vibratory plow and directional bore method through waters of the U.S., including wetlands, do not involve a discharge and a permit is not required. However, if installation of connecting points requires excavation and backfill in waters of the U.S., including wetlands, a permit would be required.

The placement of poles, overhead wiring, and/or buried wiring at upland locations is not within the jurisdiction of the Corps of Engineers, provided the work does not involve the placement of dredged or fill material into any water body or wetland.

Temporary placement of fill material into any water body or wetland for purposes such as bypass roads, temporary stream crossings, cofferdam construction, or storage sites may require a Department of the Army permit.

If any of the proposed projects would involve the placement of fill material, either permanent or temporary, please notify our office.

Without detailed construction plans, we cannot provide specific comments regarding the effects that the proposed activity would have on watercourse flood stages. It has been our experience that underground and overhead utility construction has

negligible effects on flood stages, provided excess construction material is removed from the floodplain and additional care is taken not to disturb its hydraulic characteristics.

You may also need city, county, or State permits for the project. You should contact the appropriate agencies for their permit requirements. If the project includes the placement of dredged or fill material in a Federal regulated water body, we will notify the responsible State agency for water quality (401) certification.

You should also contact the State Historical Preservation Officer (SHPO) to determine if there are any known historic or archeological sites in the area or if any cultural resource survey would be required.

If you have any questions, contact Dave Studenski in our La Crescent Field office at (507) 895-2064. In any correspondence or inquiries, please refer to the Regulatory number shown above.

Sincerely,



for Tamara E. Cameron  
Chief, Regulatory Branch



# Minnesota Department of Natural Resources

Division of Ecological Resources – Reg. 4

261 Hwy 15 South

New Ulm, MN 56073-8915

Phone: (507) 359-6073 Fax: (507) 359-6018 E-mail: kevin.mixon@dnr.state.mn.us

August 17, 2009

Mr. David Weetman  
Westwood Professional Services, Inc.  
7699 Anagram Drive  
Eden Prairie, MN 55344

In re: Lakefield LWECs  
Preliminary Review  
Jackson County, MN

Dear David:

The Minnesota Department of Natural Resources (DNR) has received information concerning the above referenced wind project located in Jackson County, MN. The DNR is providing the following comments as a mechanism to collaboratively work together to identify potential natural resource issues that should be considered during project development.

The Summers, Husen, Dead Horse, Toe, and Bootleg Wildlife Management Area's (WMA) are within or adjacent to the project area. The DNR recommends that no direct impacts occur to these public recreational lands from tower construction, transmission lines, or road networks associated with the project. In addition, a buffer should be established around all WMA's that is a minimum of five times the rotor blade diameter. This buffer may be re-evaluated as the project progresses if more information on sensitive resources associated with the WMA are discovered. State Wildlife Management Area boundaries can be downloaded from the DNR Data Deli (<http://deli.dnr.state.mn.us/>).

Kilen Woods State Park is located adjacent to the project area and the viewshed associated with the park may be altered as a result of this project. The DNR recommends a viewshed analysis be conducted for a distance of 5 miles from the park boundary. The analysis involves the development of a map or model that shows how far the viewshed extends from the State Park and if any wind farm infrastructure is within the viewshed. The DNR recommended setback from the park will be based on the viewshed analysis.

The DNR recommends 2 years of post-construction mortality studies using the Minnesota Protocols to Monitor Bat & Bird Mortality at Large Wind Energy Conversion Systems (attached). The Post-Construction Report Guidelines (attached) include the information that should be contained in the reports and where they should be sent. An additional year of surveys are recommended if any bald eagles, tundra swans, white pelicans, or state or federal listed species are killed due to operation of the wind farm.

White pelicans were observed on July 29, 2009 soaring from 300-800 feet from ground level and hundreds of birds were observed on Heron Lake that is posted as a Migratory Waterfowl Feeding and Resting Area and on the Waterfowl Production Area that is east of the project area along CSAH 14. Based on those observations it is possible that mortality could occur to white pelicans and other species as they have been observed within the potential rotor swept zone. The portion of the study area west of Route 86 and south of CSAH 16 should be avoided and no turbines erected in this area.

The area also contains numerous tracts of Waterfowl Production Areas that are managed by the U.S. Fish and Wildlife Service (USFWS) including new parcels on the southern end of the project area. Rich Davis (612-725-3548) of the USFWS needs to be contacted in order to coordinate potential impacts and setbacks from these federally managed lands. In addition, you should also inquire about any USFWS conservation easements that may occur in the project area.

Conservation Reserve Program properties are located within and adjacent to the project area boundary. Contact the Farm Service Agency located in the county(s) where the project is occurring at (<http://www.fsa.usda.gov/FSA/stateoffapp?mystate=mn&area=home&subject=landing&topic=landing>) to coordinate the locations and potential issues concerning these properties. Coordination should also occur with the USFWS concerning any conservation easements that are under their jurisdiction.

The Bureau of Water and Soil Resources (BWSR) conservation easement areas prohibit the construction of turbines. Conservation Reserve Enhancement Program, Reinvest in Minnesota-Wetland Reserve Program, and Permanent Wetland Preserves easements are all considered RIM Reserve easements for program policy and administration. Conservation easement information can be found at: <http://www.bwsr.state.mn.us/easements/index.html> under Download Our Statewide GIS (shapefile) of All RIM Easements. For additional site specific information you can contact the Soil and Water Conservation District (SWCD) for the county where the land is located. The SWCD directory can be found at: <http://www.bwsr.state.mn.us/directories/SWCDs.pdf>

The project area contains numerous areas enrolled in the Conservation Reserve Program (CRP) and Reinvest in Minnesota (RIM) areas that could potentially be affected by this project. The CRP and RIM properties contain blocks of habitat that can attract higher concentrations of birds and bats that may result in increased mortality if turbines are placed in close proximity. In addition, the larger blocks may attract area sensitive birds that may be less tolerant of turbines being in close proximity to their habitat. The DNR recommends the CRP, RIM, WMA, and WPA areas be surveyed for breeding birds. The surveys will help determine if any rare or listed species are present or any area sensitive birds. This information will be used to determine further DNR recommendations for setbacks. Please develop the methods to be used for the breeding bird survey and provide them to the DNR for review prior to conducting the surveys next spring.

The recommended minimum setback for turbines from the ordinary high water level of Public Waters is 1,000 feet. The setback is designed to reduce potential avian avoidance of the Public Water and its associated habitat and to reduce avian and bat mortality. In rare instances the recommended setback may be increased if rare species are known to use the Public Water in question. This buffer may be re-evaluated if more information on sensitive resources associated with the area is known or as the project becomes more defined.

The following regulations may apply within the recommended 1,000 foot setback:

State Listed Wild, Scenic, and Recreational Rivers (WSR) under Minnesota Rules have a zoning district established to protect the designated rivers. Wind turbines shall not be located within the WSR district that is administered through ordinance by the local units of government. For additional information on the Wild and Scenic Rivers go to:

[http://www.dnr.state.mn.us/waters/watermgmt/section/wild\\_scenic/index.html](http://www.dnr.state.mn.us/waters/watermgmt/section/wild_scenic/index.html). Coordination on Federally designated Wild & Scenic Rivers would need to occur with the USFWS and National Park Service.

Shoreland Rules (Minnesota Rules 6120.2500 - 3900) provide statewide standards that local governmental units must adopt into their own land use controls to provide for the orderly development and protection of Minnesota's shorelands (lakes and rivers). The local governmental unit needs to be contacted in regards to the rules and their application to wind energy development.

The recommended minimum setback from wetlands and perennial streams (non-Public Waters) is 600 feet (FWS Circular 39 Type III-VIII). Some county wind ordinances and conditional use permits have included wetland setbacks. The setbacks are designed to reduce potential avian avoidance of the wetland and its associated habitat and to reduce avian and bat mortality.

Additional project considerations include utilities and roads that could cross or impact waters, streams, or wetlands. Discharge of fill or dredge material in waters of the U.S. are regulated under Section 404 of the Clean Water Act and may require a permit from the U.S. Army Corp of Engineers.

Minnesota Administrative Rules 7836.0500, Subpart 7, requires the applicant to analyze potential environmental impacts of the project, proposed mitigative measures, and any adverse environmental effects that cannot be avoided. Groundwater resources, surface waters, wetlands, vegetation, wildlife, rare and unique natural resources, etc. are included. In order to address the potential environmental impacts the applicant should resolve all outstanding issues with the DNR prior to applying for the Large Wind Energy Conversion System permit from the Public Utilities Commission.

Wind projects disturb soils, surface water and associated ground cover. These disturbances create openings for invasive species that quickly colonize these sites putting adjoining lands and habitat at risk. In addition, this can cause erosion and sedimentation into adjacent waters. The DNR, Soil and Water Conservation District, Minnesota Pollution Control Agency or the Department of Agriculture may recommend BMP's for different areas of the project. These BMP practices help address construction and maintenances activities to minimize impacts to soil, water and existing ground cover. The BMP's may also provide site restoration recommendations.

The US Fish and Wildlife Service guidelines to avoid and minimize impacts to wildlife from wind development should be adhered to as part of the project. The guidelines and additional information can be found at the following site:

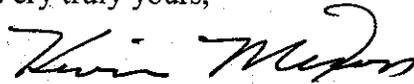
[http://www.fws.gov/habitatconservation/Service Interim Guidelines. PDF](http://www.fws.gov/habitatconservation/Service%20Interim%20Guidelines.PDF)

This review constitutes a preliminary review of the project and is not a substitute for reviewing potential turbine placement. Further review of the project should be conducted when the preliminary tower locations are determined. The DNR will provide a second review of the project that is site specific to the proposed tower locations, transmission lines, and access roads.

In order to address the above referenced issues, prior to submitting the LWECS Site Application with the PUC, a meeting needs to occur. The purpose of the meeting is to address all of the identified issues and how the company plans to avoid and minimize impacts. The company should be prepared during the meeting to provide maps that depict strategies to avoid and minimize impacts and that show all of the setbacks. The company should also be prepared to make commitments for surveys and the corresponding methods.

The DNR looks forward to working in a positive and collaborative manner on this project to ensure that sustainable energy sources are developed while protecting Minnesota's natural resources. Please contact me directly at 507-359-6073 if you have any questions.

Very truly yours,



Kevin Mixon  
Regional Environmental Assessment Ecologist  
Division of Ecological Services

Cc: Lisa Joyal, DNR  
Randall Doneen, DNR  
John Schladweiler, DNR  
Ken Varland, DNR  
Randy Markl, DNR  
Bob Hobart, DNR  
Mark Matuska, DNR  
Ruth Thornton, DNR  
Jeff Sieve, DNR  
David Breyfogle, DNR  
Peggy Booth, DNR  
Rich Davis, U.S. FWS  
Matt Langan, PUC

# **Protocols to Monitor Bat & Bird Mortality at Large Wind Energy Conversion Systems**

**Minnesota Department of Natural Resources  
Ecological Resources  
July 15, 2009**

## **Post-Construction Mortality Monitoring**

### I. Duration and Frequency of Monitoring:

All mortality monitoring should be conducted 5 days per week for the period between April 1 and November 15 for 2 complete years following construction, unless other mortality information is available and the Minnesota Department of Natural Resources (DNR) can justify a reduced monitoring effort. In order to handle and possess carcasses you will need a DNR salvage permit from Wildlife Research (612-713-5438) and a U.S. Fish & Wildlife Service Migratory Bird Permit (612-713-5438).

### II. Number of Turbines to Monitor:

The number of turbines monitored will follow the guidelines below as per "Standard Mortality Transect Survey", and will include validation procedures to correct bias. Validation procedures include carcass removal trials and searcher efficiency. Monitored turbines shall be identified in consultation between the parties. Twenty percent of the turbines will be searched (minimum of 10 and maximum of 25). A different set of turbines should be monitored in the second year.

### III. Mortality Monitoring Procedures

Carcass removal and searcher efficiency trials will be performed, and the duration, frequency and number of turbines to monitor are the same. The search area should be cleared of all carcasses prior to April 1 and the initiation of data collection. The carcasses should be identified and reported separately from the data collected from April 1-November 15 and should not be used in the mortality estimates.

At each turbine to be monitored, a rectangular plot that is 100 meters by 100 meters will be centered on the base of the turbine. Although evidence suggests that > 80% of the bat fatalities fall within ½ the maximum distance of turbine height to ground (Erickson 2003a,b) search areas vary and often do not allow surveys to consistently extend to this distance. Therefore, the searchable area underneath turbines will be delineated and mapped, and estimates of mortality will be produced. Maps are to be constructed illustrating all turbine locations, a designated numbering system for turbines, 100 meter plot, boundaries of survey areas, and searchable areas (broken down into visibility classes and transect numbering for standard transect surveys).

- 1) Each turbine should be searched for a minimum of 1 person hour (1 person – 1 hour, 2 person-1/2 hour) starting on transects running past the base of the turbine and working outward. Times spent surveying each turbine should be recorded daily and remain consistent. Mortality monitoring should commence at sunrise and the surveys completed for all turbines within 8 hours.
- 2) All information gathered (i.e. specimen location, species, transect, etc.) should be entered on data sheets provided. Any mortality that occurs to state listed endangered or threatened species should be reported to the DNR within 24 hours.

- 3) Any large mortality events (>20 total animals) or mortality of any eagle, or threatened or endangered species that occur outside of the survey periods are to be reported to the DNR Regional Environmental Assessment Ecologist within 24 hours.
- 4) Separate data sheets will be used for each survey date. All carcasses are to be picked up and bagged upon discovery. They are to be identified, handled, and labeled properly with the date, turbine number, transect number, and unique specimen number. The specimen should be frozen for use in the carcass removal and searcher efficiency trials.
- 5) All specimens located should have an azimuth **from** tower and distance to turbine, and be recorded on the data sheet. It is appropriate to use a numbered flag for each specimen and record distance and azimuth upon completion of transect searches, so long as flags are removed after each day/turbine.
- 6) A summary report of this monitoring, including all data sheets and maps are to be submitted by January 1 of each year to the DNR Regional Environmental Assessment Ecologist.

#### Standard Mortality Transect Surveys:

The basis for the methods to be followed for this procedure are set forth by Erickson 2003a, 2003b, Bats and Wind Energy Cooperative 2005 final report, and Kerns and Kerlinger 2004. Areas defined for surveys should be mapped and depict not only prominent structures and area, but in addition to previous studies, label search areas into 1 of 4 visibility classes. All visibility classes represented should be included in the map and proportion of each noted in report. Each visibility class will be equally tested with a minimum of 200 trials using carcasses resulting from mortality at the site. If enough carcasses have not been recovered contact the DNR on how to proceed.

Visibility Classes: Each turbine will have the vegetation in the searchable area defined into one of the following 4 classes and mapped for submission.

Class 1 (easy): Bare ground 90% or greater; all ground cover sparse and 6 inches or less in height (i.e. gravel pad or dirt road).

Class 2 (moderate): Bare ground 25% or greater; all ground cover 6 inches or less in height and mostly sparse.

Class 3 (difficult): Bare ground 25% or less; 25% or less of ground cover over 12 inches in height.

Class 4 (very difficult): Little or no bare ground; more than 25% of ground cover over 12 inches in height.

- 1) Following the establishment of searchable areas, the breakdown of this area into visibility classes, and mapping of each turbine, transects should be established at no greater than 6 meters apart and marked every 10 meters.
- 2) Each transect will be walked with  $\frac{1}{2}$  of the distance between transects equal to the distance on each side to be examined by the searcher.
- 3) As transects are searched, carcasses should be bagged and labeled properly (date, turbine number, transect number, carcass number) and a numbered flag placed in their place. At completion of each turbine, the distance and bearing from each turbine should be recorded and then all flags removed.

- 4) Searches will be abandoned if severe weather is present, and continue if it clears. The time spent searching at all turbines will be recorded and should be consistent.

#### IV. Validation Guidelines

Performing carcass removal by scavenger and searcher efficiency are the standard methods performed together to correct for bias in data collection. Below are accepted techniques to perform this correction.

##### Carcass Removal Trials

Because there are numerous variables that may make every turbine unique, we suggest placing an equal number of carcasses per turbine to be monitored for removal by scavengers. Additionally, all 4 visibility classes should have a sample size equal to the percentage of that visibility class (ex. 60% of search area of Class 1 gets 60% of the carcasses placed). A random bearing and distance from the turbine should be selected to determine placement of the carcass. For these trials, carcasses must be placed within the surveyed area underneath turbines after sunset and under darkness, and monitored for removal every 24 hours. The carcasses should be left in place for a 14 day trial length. Ideally, the total number of bird and bat carcasses used should be representative of the actual size and species of killed animals, with no less than 50 specimens monitored per year. These trials should be performed periodically throughout the season to account for varying conditions. Before placement, each carcass must be uniquely marked in a manner that does not cause additional attraction and have its location recorded. Records shall include the turbine number, a brief description of immediate vegetation that may impede visibility, classification using one of the 4 visibility classes described above, and length of time before removal.

##### V. Searcher Efficiency Trials

To produce the best estimates of mortality, a high number of searcher efficiency trials will be performed. A minimum of 200 individual trials will be performed to test searchers. The carcasses will be toe clipped to identify and number them. Carcasses missed by searchers will be picked up after their survey, frozen and be used again. The habitat surrounding turbines may vary considerably and searcher efficiency appears highly correlated to visibility and habitat types. Therefore, the search area defined for each turbine surveyed will be divided into the 4 visibility classes (illustrated on map). The distribution of carcasses is based on the percentage of each visibility class and will be placed at a random azimuth and distance. Each turbine monitored by searchers should be examined, with an equal number of carcasses placed at each turbine.

Testing should occur sporadically throughout monitoring periods and searchers should not be made aware they are being tested. An effort should be made to test searchers equally during both inclement and good weather, with weather conditions recorded. Carcasses placed should be representative of the percentage and number of species found during the mortality monitoring, and should replicate the manner in which the majority of bats are found in that visibility class (i.e. crawled under vegetation). An effort to maximize the number of carcasses placed is best, with no less than 200 per year.

Minnesota Department of Natural Resources  
Ecological Resources  
Regional Office Environmental Assessment Ecologist

LARGE WIND ENERGY CONVERSION SYSTEM  
POST-CONSTRUCTION BIRD AND BAT MORTALITY SURVEY REPORT

Project Name: \_\_\_\_\_

PROJECT LOCATION: \_\_\_\_\_

Company/  
Organization/  
Name: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Phone: (\_\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_ Fax: (\_\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

E-Mail: \_\_\_\_\_

Project Supervisor Name: \_\_\_\_\_

Supervisor Contact: Phone: (\_\_\_\_\_) \_\_\_\_\_

E-Mail: \_\_\_\_\_

If this is contracted work, provide the name & address of the individual/organization work is being performed for:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## Description of Wind Turbine Searched for Carcasses

**Project Name:** \_\_\_\_\_ **Turbine Number:** \_\_\_\_\_

**1. Diameter of Blade Span:** \_\_\_\_\_ m **Number of Blades:** \_\_\_\_\_

**2. Blade Height Above Ground- Max.:** \_\_\_\_\_ m; **Min.:** \_\_\_\_\_ m

**3. Surface Area of Search Plot:** \_\_\_\_\_ m<sup>2</sup>

**4. Attach a map of each turbine with 100 meter plot, search boundaries, location and numbering of transects, and vegetation classification on a separate sheet.**

**5. Attach a spread sheet with weather data collected at 60-minute intervals. Data should include wind speed, temperature, precipitation, cloud ceiling height, etc.**

**6. General Habitat Description and Topography within 100 m of Turbine:**  
(Use Anderson Classification System)

**7. General Habitat Description and Topography >100m from Turbine:**  
(Use Anderson Classification System)





# MINNESOTA DEPARTMENT OF NATURAL RESOURCES

## POST-CONSTRUCTION REPORT GUIDELINES

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- Below is an outlined guide of what we are looking for in the annual and final post-construction reports.
  - Some general guidelines include:
    - Explain all methods used in detail.
    - Provide all equations and methods used for all calculations
    - Provide average, range, confidence intervals, *p* values, and other statistics where applicable.
    - Provide raw data as Appendices or as accompanying files on a CD.
  - For final reports, include all years of study reporting on each individual year, as well as overall results and trends, detailing any similarities and/or difference between years of study.
  - All reports are due January 1 following that years data collection. Reports need to be sent to the Regional Environmental Assessment Ecologist for the projects location and to the Natural Heritage Review Coordinator.
- 

### 1. Executive Summary

### 2. Introduction

- a. Description of project area
  - i. Map of site including turbine locations, roads, transmission lines, substation, etc.
  - ii. Distribution, number and size of turbines (height, MW, etc.)
  - iii. Location of project (state, county, township, etc.)
  - iv. Any other general information
- b. Habitat/landcover
  - i. Landcover types – map and percentages of each
  - ii. Critical or unique habitats identified
- c. Wind speed
  - i. Overall wind speed and direction (wind rose)
  - ii. Prevailing winds from which direction and what times of the year

### 3. Methods

- a. Carcass searches
  - i. Turbines & search area
    1. No. turbines searched
    2. How turbines selected
    3. Dates of survey
    4. Time of day searched
    5. Maps of each turbine's search plot delineating vegetation classes and habitat
    6. Table showing searchable area in each vegetation class for each turbine
  - ii. Search methods
  - iii. Incidental kills – how documented

- b. Mortality Patterns
  - i. Temporal patterns - seasonal
  - ii. Spatial patterns - distance from turbine
  - iii. Weather and generation associations - how collected and analyzed
    - 1. Temperature
    - 2. Wind speed
    - 3. Other variables (MW, rotor sweep zone, etc.)
  - iv. Age, species, and gender
- c. Mortality estimates and adjustment— methods used showing all equations used (see last page of guidelines for mortality equations)
  - i. Searcher efficiency trials & scavenger removal trials
    - 1. Searcher efficiency methods
    - 2. Scavenger removal methods
    - 3. Searcher efficiency and scavenging removal corrections (SESR) – methods and equations used
  - ii. Searchable area corrections
- d. Mortality and habitat (landcover) correlations

#### 4. Results

- a. Carcass searches
  - i. Overall data
    - 1. Summary of search effort
      - a. Average time each turbine searched
      - b. # days surveys conducted
      - c. Explanation why any days and/or turbines were not surveyed
    - 2. Bird carcasses
      - a. Total No. found
      - b. Breakdown by turbine
      - c. Breakdown by species
      - d. Breakdown by date, month, etc.
      - e. Alive, injured, sent to rehab, etc.
    - 3. Bat carcasses
      - a. Total No. found
      - b. Breakdown by turbine
      - c. Breakdown by species
      - d. Breakdown by date, month, etc.
      - e. Alive, injured, sent to rehab, etc.
    - 4. Maps showing carcass location at each search turbine, broken down in 10 m increments; any trends?
  - ii. Temporal patterns - Seasonal distribution of mortality
    - 1. Day
    - 2. Week
    - 3. Month
  - iii. Spatial patterns
    - 1. Distance from turbines
    - 2. Direction from turbine (showing N, S, E, W)

- iv. Weather and generation associations
  - 1. Temperature
  - 2. Wind speed
  - 3. Other variables (MW, rotor sweep zone, etc.)
- v. Age, species, and gender
  - 1. Males vs. females
  - 2. Species
  - 3. Adults vs. juveniles
- b. Mortality estimates and adjustments (see pages 6- 8 for guidance)
  - i. Searcher efficiency trials & scavenger removal trials
    - 1. Searcher efficiency
      - a. Overall searcher efficiency average and range
      - b. Individual searcher average and range
      - c. No. trials and searcher efficiency broken down by bat carcasses, bird carcasses, vegetation class, and date of trial
      - d. Fresh vs. frozen, intact vs. broken, colored vs. dull (birds), etc. and effects on searcher efficiency if any
    - 2. Carcass removal
      - a. Overall average No. days before carcass removal and range
      - b. Average and range of all bat carcass removal trials and all bird carcass removal trials
      - c. No. trials broken down by bat species and bird species
      - d. No. trials and mean carcass removal broken down by bats carcasses, bird carcasses, vegetation class, and date of trial
      - e. Fresh vs. frozen, intact vs. broken, colored vs. dull (birds), etc. and effects on carcass removal time if any
      - f. Carcass removal by vegetation class
    - 3. Searcher efficiency and scavenging removal (SESR) Corrections
  - ii. Searchable area corrections
  - iii. Mortality estimates and adjustments
    - 1. Bats
      - a. Total estimated No. of bats killed at site
      - b. Bats/turbine/year include confidence interval
      - c. Bats/MW/year include confidence interval
      - d. Bats/ft<sup>2</sup> of rotor area/year include confidence interval
    - 2. Birds
      - a. Total estimated No. of birds killed at site
      - b. Birds/turbine/year include confidence interval
      - c. Birds/MW/year include confidence interval
      - d. Birds/ft<sup>2</sup> of rotor area/year include confidence interval
    - 3. Turbines with greatest/least kills
    - 4. Other trends?
- c. Correlation of mortality and Weather data
  - i. Temperature
  - ii. Wind speed
  - iii. Other variables
- d. Note any other trends observed

## 5. Discussion

- a. Avian mortality
- b. Bat mortality
- c. Implications of results
- d. Suggestions for improvements to protocol
- e. Any recommended adjustments for this site for next year's surveys
- f. If final report, discuss entire study (both years)

## 6. References

## 7. Data sheets

- a. Mortality datasheets
  - i. Cover
  - ii. GPS location of all wind turbines
  - iii. Description of wind turbine searched for carcass (using Anderson Level III land cover codes)
  - iv. Daily Search Summary
  - v. Carcass Data Sheet
- b. Searcher efficiency data
- c. Carcass removal data

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**Mortality Estimate:** Please use at least these methods to determine mortality; other methods are welcome and encouraged as long as they are done in addition to the below method.

To estimate the time that carcasses persisted in the study plots, the average time that a carcass was present in scavenger removal trials,  $t$ , was calculated. Because trials were halted after  $X$  days, the data are right-censored, and this was compensated for by estimating the mean time to removal using a maximum likelihood estimator for  $t$  using the following formula:

$$\hat{t} = \frac{\sum_{i=1}^s t_i}{s - s_c}$$

where  $s$  = the number of test carcasses used in search trials,  $s_c$  = the number of test carcasses that remained in the study area at the end of the 14-day removal trial, and  $t_i$  = the number of days carcass  $i$  remains in the search area. The probability that a carcass would be detected by searchers ( $p$ ) was assessed through searcher efficiency trials. The estimate of  $p$  was calculated as the number of trial carcasses found by searchers divided by the total number of successful trials (excluding trials where the carcasses were not found by searchers and were also not found later that day by testers; these carcasses were assumed to be scavenged).

Erickson et al.'s (2004) mortality estimator calculates a per-turbine annual fatality rate ( $m$ ) as:

$$m = \frac{c}{\hat{\pi}}$$

where  $c$  is the mean number of carcasses observed per turbine, and  $\hat{\pi}$  adjusts for both carcass removal and observer detection under the assumption that carcass removal times ( $t_i$ ) follow an exponential distribution:

$$\hat{\pi} = \frac{\bar{t} \cdot p}{I} \cdot \left[ \frac{e^{\frac{I}{t}} - 1}{e^{\frac{I}{t}} - 1 + p} \right]$$

This searcher-efficiency, scavenger-removal (SESR) corrected estimate was calculated separately for each turbine, using the averaged figures of  $t$  and  $p$ . Because searches were conducted daily,  $I$  (the search interval) = 1.

Individual SESR-adjusted mortality figures for each turbine were adjusted for searchable area using two different methods. Finally, the estimated total annual mortalities for the searched turbines were summed and adjusted for the proportion of turbines searched. The final result is an estimate of the total mortality.

A confidence interval for the corrected estimate of total mortality is determined by bootstrapping the trials of carcass persistence and efficiency.

### **Bootstrapping Guidance:**

The statistic whose confidence limits we are interested in calculating is the total fatality at a site. You have sampled a subset of turbines at the site and should have three different data sets that need to be combined in order to calculate fatality: Searcher efficiency (SE) trial data, carcass persistence (CP) trial data, and the actual casualty data. Your SE and CP trials should be able to estimate different parameters for different size classes of birds and bats and perhaps different seasons. It is critical that you have an adequate sample size to estimate each parameter. It is critical to remember the parameter that we are interested in bootstrapping is the fatality. We do not have a closed form estimate of its variance, so we need to bootstrap it. We cannot bootstrap the SE separately from the CP then apply them once to estimate fatality. We need to bootstrap sample each of these at each iteration. Because this process involves three bootstrap samples, there is no canned software that will carry this out but an experienced programmer should be able to calculate this in R or C or C++ or SAS. Please do not even think about doing it in Excel.



## Memo

**District 7 – Mankato and Windom**  
501 South Victory Drive  
Mankato, MN 56001-5302

Office Tel: (507) 304-6100  
Fax: (507) 304-6119

**TO:** David Weetman, Westwood Professional Services, Eden Prairie, MN  
**FROM:** Mark Scheidel, Transportation Planner Tel: (507) 304-6196  
**DATE:** Aug. 18, 2009  
**SUBJECT:** Lakefield Wind Project, TH 86, MP 11 [8-14]

As the point person for development reviews here in District 7, I'm responding to your letter of 7/20/09 to Jim Swanson requesting input on this proposed project.

The following are District 7 comments:

1. Any work in the state right of way will require a District permit. This includes, but is not limited to, public streets, private driveways, utilities, radii extensions, sign moving, additional storm water and moving heavy equipment [cranes] through the right of way. The District 7 contact for your project area is Marc Fischer, at our Windom Office, 507-831-8012.
2. On some highways, controlled access has been acquired by the state and there are no new access points allowed in these areas. All of I-90 is in this status. TH 86 does not appear to have controlled access except for some sight corners but I have not researched all the areas you might potentially use.
3. No installations will be allowed in the Interstate right of way but transmission line crossings are possible.

You will notice that our comments are somewhat general because we don't have the information to be more specific. But hopefully, this will give you a heads up on some things and we urge you to contact District 7 as your project moves along. Specifically, when you start to consider haul routes we can give you more input on the specific state highway intersections you propose to use and planned MnDOT projects along the routes. There are no major planned MnDOT projects for 2010 at this time.

Thank you for the opportunity to give early comment on this project. We may comment more during the official PUC application process.

**CC:** James Swanson, District 7 Engineer  
District 7 access Management Committee  
Stacy Kotch, MnDOT, St Paul



# Minnesota Pollution Control Agency

520 Lafayette Road North | St. Paul, MN 55155-4194 | 651-296-6300 | 800-675-3843 | 651-282-5332 TTY | [www.pca.state.mn.us](http://www.pca.state.mn.us)

August 19, 2009

**RECEIVED**

**AUG 20 2009**

**WESTWOOD  
PROFESSIONAL SERVICES**

Mr. David Weetman  
Senior Environmental Scientist  
Westwood  
7699 Anagram Drive  
Eden Prairie, MN 55344

RE: Lakefield Wind Project  
Jackson County, Minnesota  
File: 20092538

Dear Mr. Weetman:

Thank you for the opportunity to review and comment on the proposed Lakefield Wind Project, a 201 megawatt wind farm in Jackson County, Minnesota. Regarding matters for which the Minnesota Pollution Control Agency (MPCA) has regulatory responsibility and other interests, the MPCA has the following comments to provide at this time.

- If the total project will disturb one acre or more of land, a National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Construction Stormwater Permit is required from the MPCA prior to construction. Information regarding the MPCA's Construction Stormwater Program can be found on the MPCA's Web site at <http://www.pca.state.mn.us/water/stormwater/stormwater-c.html>.
- Please be aware that South Heron Lake and Clear Lake are listed on the MPCA 2008 303(d) Total Maximum Daily Load (TMDL) List of Impaired Waters for aquatic recreation because of excess nutrients. We recommend you check with our current listing of impaired waters at our MPCA Web site at <http://www.pca.state.mn.us/water/tmdl/tmdl-303dlist.html>. The impairment will dictate additional increased stormwater treatment both during construction and require additional increased permanent treatment post construction. These requirements will be included in the NPDES Construction Stormwater Permit. Lakefield Wind Project should identify that compliance with these increased stormwater water quality treatments can be achieved on the project site or elsewhere. Questions regarding Construction Stormwater Permit requirements should be directed to Larry Zdon at 651-757-2839.
- Also, the Des Moines River has several impairments and the West Fork of the Des Moines River has an approved TMDL from the U.S. Environmental Protection Agency. Please visit the Web site at <http://www.pca.state.mn.us/water/tmdl/project-westforkdesmoines.html> to see if the project will be impacted by the specifics of this TMDL.

Mr. David Weetman  
August 19, 2009  
Page 2

- In addition, any project that will result in over 50 acres of disturbed area and has a discharge point within one mile of an impaired water is required to submit their Stormwater Pollution Prevention Plan (SWPPP) to the MPCA for a review at least 30 days prior to the commencement of land disturbing activities. If the SWPPP is found to be out of compliance with the terms and conditions of the General Permit, further delay may occur. The MPCA encourages the project proposer to meet with staff at preliminary points to avoid this situation.
- The project proposer is required to ascertain whether a U.S. Army Corp of Engineers Section 404 Permit is required. If so, based on the project's proximity to impaired waters, a Clean Water Act Section 401 Water Quality Certification or waiver from the MPCA may be required to verify compliance with state water quality standards. For further information about the 401 Water Quality Certification process, please contact Kevin Molloy at 651-757-2577 or visit our Web site at <http://www.pca.state.mn.us/water/wetlands/index.html>.

Please be aware that this letter does not constitute approval by the MPCA of any or all elements of the project for the purpose of pending or future permit action(s) by the MPCA. Ultimately, it is the responsibility of the project proposer to secure any required permits and to comply with any requisite permit conditions. If you have any questions concerning our review of this project, please contact Elise Doucette of my staff by e-mail at [elise.doucette@pca.state.mn.us](mailto:elise.doucette@pca.state.mn.us) or by telephone at 651-757-2316.

Sincerely,



Craig Affeldt  
Supervisor, Environmental Review Unit  
St. Paul Office  
Regional Division

CA/EMD:mbo

cc: Larry Hartman, Minnesota Office of Energy Security

RECEIVED

AUG 21 2009

WESTWOOD  
PROFESSIONAL SERVICES

August 19, 2009

David Weetman  
Westwood Professional Services, Inc.  
7699 Anagram Dr.  
Eden Prairie, MN 55344

RE: Lakefield Wind Farm Project  
Jackson County  
Westwood File Number: 20092538  
SHPO Number: 2009-2991

Dear Mr. Weetman:

Thank you for the opportunity to review and comment on the above project. It has been reviewed pursuant to the responsibilities given the Minnesota Historical Society by the Minnesota Historic Sites Act and the Minnesota Field Archaeology Act.

Due to the nature of the proposed project, we recommend that an archaeological survey be completed. The survey must meet the requirements of the Secretary of the Interior's Standards for Identification and Evaluation, and should include an evaluation of National Register eligibility for any properties that are identified. For your information, we have enclosed a list of consultants who have expressed an interest in undertaking such surveys.

If the project area can be documented as previously disturbed or previously surveyed, we will re-evaluate the need for survey. Previously disturbed areas are those where the naturally occurring post-glacial soils and sediments have been recently removed. Any previous survey work must meet contemporary standards.

Please note that this comment letter does not address the requirements of Section 106 of the National Historic Preservation Act of 1966 and 36CFR800, procedures of the Advisory Council on Historic Preservation for the protection of historic properties. If this project is considered for federal assistance, or requires a federal license or permit, it should be submitted to our office with reference to the appropriate federal agency.

If you have any questions on our review of this project, please contact me at (651) 259-3456.

Sincerely,



Dennis A. Gimmestad  
Government Programs and Compliance Officer

Enclosure: List of Consultants



# Minnesota Department of Natural Resources

Division of Ecological Resources, Box 25

500 Lafayette Road

St. Paul, Minnesota 55155-4025

Phone: (651) 259-5109 Fax: (651) 296-1811 E-mail: [lisa.joyal@dnr.state.mn.us](mailto:lisa.joyal@dnr.state.mn.us)

September 14, 2009

**Correspondence # ERDB 20100092**

Ms. Brie Anderson  
Westwood Professional Services, Inc.  
7699 Anagram Drive  
Eden Prairie, MN 55344

RE: Natural Heritage information in the vicinity of the proposed Lakefield Wind Project

County	Township (N)	Range (W)	Section(s)
Jackson	103	36	14-17, 20-29, 33-36
	103	35	19, 30, 31
	102	36	1-5, 8-17, 20-29
	102	35	5-8, 17-20

Dear Ms. Anderson,

As requested, the Minnesota Natural Heritage Information System has been queried to determine if any rare species or other significant natural features are known to occur within an approximate two-mile radius of the proposed project. Based on this query, several rare features have been documented within the search area (for details, see the enclosed database reports; please visit the Rare Species Guide at <http://www.dnr.state.mn.us/rsg/index.html> for more information on the biology, habitat use, and conservation measures of these rare species). We recommend that the following issues be resolved before submitting a Site Permit Application to the Public Utilities Commission:

- Kilen Woods State Park and several Wildlife Management Areas (WMAs) are located in the vicinity of the project area (GIS shapefiles of the State Park Statutory Boundaries and the State Wildlife Management Area Boundaries can be downloaded from the DNR Data Deli at <http://deli.dnr.state.mn.us/>). The boundary of the proposed project should be modified to explicitly exclude all WMAs. Please refer to Kevin Mixon's letter dated 17 August 2009 for recommended setbacks from public lands.
- Please note that the Holthe Prairie Scientific and Natural Area and the Prairie Bush Clover Scientific and Natural Area are located in T103N R35W Section 5, 8, & 17 (A GIS shapefile of Scientific and Natural Area Boundaries can be downloaded from the DNR Data Deli at <http://deli.dnr.state.mn.us/index.html>). This is outside the current project boundary, but within the two-mile search radius. If the project boundary expands into the two-mile buffer, potential impacts to the SNA may need to be addressed. Scientific and Natural Areas (SNA) are legally designated public nature preserves established to protect the state's rarest natural features and sensitive resources. These natural areas are given the highest level of protection and the utmost consideration in assessing potential impacts from nearby projects.
- The Minnesota County Biological Survey (MCBS) has identified several Sites of Biodiversity Significance within the proposed project boundary (see enclosed maps). Sites of Biodiversity Significance have varying levels of native biodiversity and are ranked based on the relative significance of this biodiversity at a statewide level. Factors taken into account during the ranking process include the number of rare species documented within the site, the quality of the native plant communities in the site, the size of the site, and the context of the site within the landscape (please see the enclosed MCBS Guidelines for further information). We recommend that the project be designed to avoid impacts to these ecologically significant sites. Indirect impacts from surface runoff or the spread of invasive species should also be considered during project design and implementation.
  - Most of the Sites of Biodiversity Significance in the project boundary are located within DNR Wildlife Management Areas, and will be avoided by following the recommended setbacks from public lands. These Sites contain several native prairie remnants.

- Although the Site in T102N R36W Section 27 is ranked as Below and does not meet the minimum biodiversity threshold for statewide significance, it may have conservation value at the local level as habitat for native plants and animals or it may be an area with high potential for restoration of native habitat.
- There are a couple of small Sites of Moderate Biodiversity Significance in T103N R36W Section 13 just outside of the project boundary that contain native prairie remnants, including The Nature Conservancy's Blue Gentian Prairie (EO ID #413 on enclosed reports; please see enclosed map).
- A Site of Moderate Biodiversity Significance is located in T103N R36W Sections 29 & 32. This Site contains Dry Hill Prairie, Prairie Wet Meadow/Carr, and Southern Seepage Meadow/Carr native plant communities (please see enclosed map; these native plant communities are not listed on the enclosed reports). In addition, this Site contains a calcareous fen (see below).
- A calcareous fen (EO ID # 9198 on enclosed reports) has been documented within the project boundary in the SW ¼ of Section 29 in T103N R36W. In addition, several calcareous fens have been documented northeast of the project boundary near the Des Moines River. Calcareous fens are rare and distinctive peat-accumulating wetlands that are legally protected in Minnesota (see attachment). Calcareous fens are designated as "outstanding resource value waters" in water quality regulations administered by the MPCA (*Minnesota Rules*, part 7050.0180) and they are given special protection through *Minnesota Rules*, parts 8420.1010 - 8240.1060. The Wetlands Conservation Act, authorized by *Minnesota Statutes*, section 103G.223, states that calcareous fens may not be filled, drained, or otherwise degraded, wholly or partially, by any activity, except as provided for in a management plan approved by the Commissioner of the Department of Natural Resources. Many of the unique characteristics of calcareous fens result from the upwelling of groundwater through calcareous substrates. Because of their dependence on delicate groundwater hydrology, calcareous fens can be indirectly affected by activities several miles away from the fen.

Wind turbines and associated infrastructure should completely avoid the calcareous fens. Also, given that wind turbine footings need to go deep into the ground to support the above ground turbine, turbine footings should be placed far enough away from the fens as to not interfere with the hydrology of the fens. If this is not possible and it is determined that the project will adversely affect a calcareous fen in any way, you will need to consult with Doug Norris, DNR Wetlands Program Coordinator, at 651-259-5125.

- As mentioned above, several native prairie remnants have been documented within the project boundary. In addition to the Sites of Biodiversity Significance, there is also a native prairie remnant (EO ID #14056) in the NE ¼ of T102N R35W Section 5. Because more than 99% of the prairie that was present in the state before settlement has been destroyed, and more than one-third of Minnesota's endangered, threatened, and special concern species are now dependent on the remaining small fragments of Minnesota's prairie ecosystem, we feel that all prairie remnants merit protection. In addition, there is some evidence to suggest that grassland birds are deterred from nesting in otherwise appropriate habitat due to the nearby presence of wind turbines. As such, we request that wind turbines not be placed within at least ¼ mile of prairie remnants.
- Several populations of prairie bush clover (*Lespedeza leptostachya*), a federally and state-listed threatened plant, have been documented in prairie remnants in the vicinity of the proposed project. The majority of Minnesota populations of prairie bush clover occur in prairies that have been or are presently used as pasture. If the proposed project boundary expands beyond the GIS shapefile that you submitted (see location information listed above), you will need to contact me for the locations of known occurrences of this rare plant. Also, given the federal status of this plant, I recommend that you contact the U.S. Fish and Wildlife Service at 612-725-3548 regarding any applicable federal regulations.

- Several rare butterflies have been documented within native prairie in the vicinity of the proposed project, including the Ottoe skipper (*Hesperia ottoe*), a state-listed threatened species, and the Arogos skipper (*Atrytone arogos*), and regal fritillary (*Speyeria idalia*), both state-listed species of special concern. These butterflies are completely dependent upon native prairie habitat. Yet, as mentioned above, less than 1% of Minnesota's native prairie remains and this remaining prairie mostly consists of widely scattered small fragments surrounded by agriculture and development. As a result, small colony sizes (due to past habitat loss) and further habitat destruction are the primary threats facing these rare species in Minnesota. The use of herbicides to control weeds or shrubs can also eliminate critical nectar sources, and insecticide drift from nearby agricultural fields may kill these butterflies.

Given the rarity of this native plant community, the known occurrences of a threatened plant, and the potential for rare prairie obligate butterflies to occur within this habitat, it is imperative that destruction and disturbance of native prairie remnants be avoided. **Please contact me if avoidance of prairie remnants is not feasible**, as a botanical survey will be required and a butterfly survey may be required. We will need to discuss potential surveyors, survey protocol, and other requirements before any survey work is initiated.

If applicable, please send me a copy of the native prairie protection and management plan (Section III.C.6. of the Site Permit). The plan should include measures to avoid impacts to native prairie and measures to mitigate for impacts if unavoidable.

- Trumpeter swans (*Cygnus buccinator*), a state-listed threatened species, have been documented nesting within the project boundary. The trumpeter swan was a widespread but uncommon breeder throughout the prairies and parkland regions of Minnesota. By the 1880's, however, trumpeter swans had disappeared from the state due to overhunting and the loss of habitat. Subsequent reintroduction and recovery efforts have been successful, but the long-term viability of the population is still unknown. Continued threats to the trumpeter swan population in Minnesota include lead poisoning, illegal shooting, the loss or degradation of wetland habitat, and collisions with transmission lines.

In the 1990's there were also breeding season observations of the loggerhead shrike (*Lanius ludovicianus*; see enclosed fact sheet), a state-listed threatened bird, and the upland sandpiper (*Bartaramia longicauda*), a Species in Greatest Conservation Need as identified in Minnesota's Comprehensive Wildlife Conservation Strategy (<http://www.dnr.state.mn.us/cwcs/index.html>), in the vicinity of the project.

Given the potential for state-listed threatened birds to breed in the area, the proximity of the proposed project to conservation lands (DNR Wildlife Management Areas and USFWS Waterfowl Production Areas), and the potential for wind turbines to cause avian mortality, we strongly encourage pre- and post-construction avian monitoring. Any cumulative impact assessment should also address the issue of avian mortality.

- Minnesota's endangered species law (*Minnesota Statutes*, section 84.0895) and associated rules (*Minnesota Rules*, part 6212.1800 to 6212.2300 and 6134) prohibit the taking of threatened or endangered species without a permit.
- As mentioned above, there are USFWS Waterfowl Production Areas in the vicinity of the project area. If you have not done so already, I encourage you to contact the USFWS Twin Cities Field Office at 612-725-3548.
- Further guidance on wind farm siting can be found at [http://www.fws.gov/midwest/Eco\\_Serv/wind/index.htm](http://www.fws.gov/midwest/Eco_Serv/wind/index.htm)

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features

within the state. Therefore, ecologically significant features for which we have no records may exist within the project area.

The enclosed results include an Index Report and a Detailed Report of records in the Rare Features Database, the main database of the NHIS. To control the release of specific location information, which might result in the destruction of a rare feature, both reports are copyrighted.

The Index Report provides rare feature locations only to the nearest section, and may be reprinted, unaltered, in an environmental review document (e.g., EAW or EIS), municipal natural resource plan, or report compiled by your company for the project listed above. If you wish to reproduce the index report for any other purpose, please contact me to request written permission. **The Detailed Report is for your personal use only as it may include specific location information that is considered nonpublic data under *Minnesota Statutes*, section 84.0872, subd. 2. If you wish to reprint or publish the Detailed Report for any purpose, please contact me to request written permission.**

This letter does not constitute review or approval by the Department of Natural Resources as a whole. Instead, it identifies issues regarding known occurrences of rare features and potential effects to these rare features. Additional rare features for which we have no data may be present in the project area, or there may be other natural resource concerns associated with the proposed project. For these concerns, please contact your DNR Regional Environmental Assessment Ecologist, Kevin Mixon, at (507) 359-6073. Please be aware that additional site assessments or review may be required.

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources. An invoice will be mailed to you under separate cover.

Sincerely,



Lisa Joyal  
Endangered Species Environmental Review Coordinator

enc. Rare Features Database: Index Report  
Rare Features Database: Detail Report  
Rare Features Database Reports: An Explanation of Fields  
MCBS Biodiversity Significance Guidelines  
Calcareous Fen Fact Sheet  
Loggerhead Shrike Fact Sheet  
Maps (3)

cc: Randall Doneen, DNR  
Kevin Mixon, DNR  
Lisa Gelvin-Innvaer, DNR  
Nancy Sather, DNR  
Nick Rowse, USFWS  
Richard Davis, USFWS  
Phil Delphey, USFWS

Links: Prairie Bush Clover  
<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDFAB27090>  
Trumpeter Swan  
<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABNJB02030>  
Loggerhead Shrike  
<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABPBR01030>  
Ottoe Skipper  
<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IILEP65050>

Printed August 2009  
Data valid for one year

Minnesota Natural Heritage Information System  
Index Report of records within 2 mile radius of:  
ERDB #20100092 - Lakefield Wind Project  
Multiple TRS  
Jackson County

**Rare Features Database:**

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
<b>Vertebrate Animal</b>						
<u>Bartramia longicauda</u> (Upland Sandpiper) #44 T103N R36W S13, T103N R36W S24 ; Jackson County		NON	S4B	G5	1981-05	7919
<u>Bartramia longicauda</u> (Upland Sandpiper) #59 T103N R35W S7, T103N R35W S18, T103N R36W S12, T103N R36W S13 ; Jackson County		NON	S4B	G5	1984-07	7946
<u>Bartramia longicauda</u> (Upland Sandpiper) #492 T103N R36W S36, T103N R36W S35 ; Jackson County		NON	S4B	G5	1999-07-09	27899
<u>Cygnus buccinator</u> (Trumpeter Swan) #69 T102N R36W S17 ; Jackson County		THR	S2B	G4	2005-03-29	32160
<u>Gallinula chloropus</u> (Common Moorhen) #14 T103N R36W S29, T103N R36W S19, T103N R36W S20, T103N R36W S30 ; Jackson County	No Status	SPC	S3B	G5	1903-06-15	9824
<u>Gallinula chloropus</u> (Common Moorhen) #15 T103N R36W S29, T103N R36W S21, T103N R36W S20, T103N R36W S28 ; Jackson County	No Status	SPC	S3B	G5	1903-06-15	9825
<u>Lanius ludovicianus</u> (Loggerhead Shrike) #68 T102N R35W S14, T102N R35W S13, T102N R35W S12, T102N R35W S34, T [...] ; Jackson County	No Status	THR	S2B	G4	1992	9819
<u>Larus pipixcan</u> (Franklin's Gull) #9 T103N R37W S13, T103N R37W S24, T103N R36W S18 ; Jackson County		SPC	S3B	G4G5	1902-05-30	25239
<u>Onychomys leucogaster</u> (Northern Grasshopper Mouse) #23 T103N R35W S17 ; Jackson County		NON	SNR	G5	1982-08-29	6343
<u>Sterna forsteri</u> (Forster's Tern) #25 T103N R37W S13, T103N R37W S24, T103N R36W S18 ; Jackson County		SPC	S3B	G5	1902-05-30	25170
<b>Invertebrate Animal</b>						
<u>Actinonaias ligamentina</u> (Mucket) #238 T103N R35W S17, T103N R35W S16, T103N R35W S28, T103N R35W S34, T [...] ; Jackson County		THR	S2	G5	1999-Pre	31765
<u>Atrytone arogos</u> (Arogos Skipper) #5 T103N R35W S8, T103N R35W S7 ; Jackson County		SPC	S3	G3	1998-07-19	23281

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Multiple TRS  
Jackson County

**Rare Features Database:**

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
<b>Invertebrate Animal</b>						
<u>Atrytone arogos</u> (Arogos Skipper) #25 T103N R36W S13, T103N R36W S24 ; Jackson County		SPC	S3	G3	1982-07-24	25112
<u>Atrytone arogos</u> (Arogos Skipper) #32 T102N R35W S10 ; Jackson County		SPC	S3	G3	1977-06-25	25123
<u>Elliptio dilatata</u> (Spike) #196 T102N R35W S3, T102N R35W S15, T103N R35W S34, T103N R35W S6, T [...]; Jackson County		SPC	S3	G5	1999-08-PRE	33663
<u>Hesperia ottoe</u> (Ottoe Skipper) #4 T103N R36W S13 ; Jackson County		THR	S2	G3G4	1982-07-24	2456
<u>Ligumia recta</u> (Black Sandshell) #429 T102N R35W S15 ; Jackson County		SPC	S3	G5	1999-08-12-PR E	33879
<u>Pleurobema coccineum</u> (Round Pigtoe) #128 T102N R35W S3, T103N R35W S34 ; Jackson County		THR	S2	G4G5	1999-Pre	31712
<u>Speyeria idalia</u> (Regal Fritillary) #4 T103N R36W S13, T103N R36W S24, T103N R35W S18 ; Jackson County		SPC	S3	G3	1996-07-06	22496
<u>Speyeria idalia</u> (Regal Fritillary) #17 T103N R35W S8, T103N R35W S7 ; Jackson County		SPC	S3	G3	1998-07-19	23280
<u>Speyeria idalia</u> (Regal Fritillary) #75 T102N R35W S10 ; Jackson County		SPC	S3	G3	1977-06-25	23579
<u>Speyeria idalia</u> (Regal Fritillary) #76 T103N R35W S17, T103N R35W S16, T103N R35W S20, T103N R35W S21 ; Jackson County		SPC	S3	G3	1977-06-25	23581
<b>Vascular Plant</b>						
<u>Carex festucacea</u> (Fescue Sedge) #1 T103N R35W S17 ; Jackson County		THR	S2	G5	1982-06-23	3972
<u>Lespedeza leptostachya</u> (Prairie Bush Clover) #3 T102N R35W S10 ; Jackson County	LT	THR	S2	G3	2006-10-02	4888

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**Rare Features Database:**

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
<b>Vascular Plant</b>						
<u>Lespedeza leptostachya</u> (Prairie Bush Clover) #6 T103N R35W S17 ; Jackson County	LT	THR	S2	G3	2004-09-25	4891
<u>Lespedeza leptostachya</u> (Prairie Bush Clover) #13 T103N R35W S7 ; Jackson County	LT	THR	S2	G3	2004-08-27	4898
<u>Lespedeza leptostachya</u> (Prairie Bush Clover) #63 T103N R35W S6 ; Jackson County	LT	THR	S2	G3	2003-09-02	28960
<u>Lespedeza leptostachya</u> (Prairie Bush Clover) #64 T103N R35W S28 ; Jackson County	LT	THR	S2	G3	2001-09-21	28976
<u>Panax quinquefolius</u> (American Ginseng) #21 T103N R35W S17, T103N R35W S16 ; Jackson County		SPC	S3	G3G4	1980-08-21	5195
<u>Rhynchospora capillacea</u> (Hair-like Beak-rush) #12 T103N R35W S7 ; Jackson County		THR	S2	G4	1998-07-19	5438
<u>Rhynchospora capillacea</u> (Hair-like Beak-rush) #69 T103N R35W S8 ; Jackson County		THR	S2	G4	1999-07-30	25330
<u>Scleria verticillata</u> (Whorled Nut-rush) #9 T103N R35W S7 ; Jackson County		THR	S2	G5	1981-08-06	5570
<u>Triglochin palustris</u> (Marsh Arrow-grass) #6 T103N R35W S8, T103N R35W S6, T103N R35W S5, T103N R35W S7 ; Jackson County		NON	S4	G5	1980-07-09	5754
<u>Triglochin palustris</u> (Marsh Arrow-grass) #99 T103N R35W S8, T103N R35W S7 ; Jackson County		NON	S4	G5	1998-07-19	25439
<b>Terrestrial Community - Other Classification</b>						
<u>Calcareous Fen (Southwestern) Type</u> #7 T103N R35W S17 ; Jackson County		N/A	S2	GNR	1999-07-29	239
<u>Calcareous Fen (Southwestern) Type</u> #8 T103N R35W S8, T103N R35W S6, T103N R35W S5, T103N R35W S7 ; Jackson County		N/A	S2	GNR	1980-07	240

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Multiple TRS  
Jackson County

**Rare Features Database:**

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
<b>Terrestrial Community - Other Classification</b>						
<u>Calcareous Fen (Southwestern) Type #12</u> T103N R36W S29 ; Jackson County		N/A	S2	GNR	1986-12-10	9198
<u>Calcareous Fen (Southwestern) Type #25</u> T103N R35W S8, T103N R35W S6, T103N R35W S5, T103N R35W S7 ; Jackson County		N/A	S2	GNR	1999-07-30	2892
<u>Calcareous Fen (Southwestern) Type #26</u> T103N R35W S8, T103N R35W S7 ; Jackson County		N/A	S2	GNR	1998-07-19	24443
<u>Dry Hill Prairie (Southern) Type #68</u> T102N R35W S10, T102N R35W S11, T102N R35W S3 ; Jackson County		N/A	S2	GNR	2001	1311
<u>Dry Hill Prairie (Southern) Type #142</u> T103N R35W S8, T103N R35W S7 ; Jackson County		N/A	S2	GNR	1998-07-19	11186
<u>Dry Hill Prairie (Southern) Type #143</u> T103N R35W S17 ; Jackson County		N/A	S2	GNR	1986-08-20	11188
<u>Dry Hill Prairie (Southern) Type #150</u> T103N R35W S27 ; Jackson County		N/A	S2	GNR	1993-07-10	17354
<u>Dry Hill Prairie (Southern) Type #151</u> T103N R35W S8 ; Jackson County		N/A	S2	GNR	1993-07	17357
<u>Dry Hill Prairie (Southern) Type #152</u> T103N R35W S17, T103N R35W S16 ; Jackson County		N/A	S2	GNR	1993-07	17360
<u>Dry Hill Prairie (Southern) Type #153</u> T103N R35W S28, T103N R35W S27, T103N R35W S34, T103N R35W S33 ; Jackson County		N/A	S2	GNR	2001-08-19	17358
<u>Dry Hill Prairie (Southern) Type #157</u> T103N R35W S22, T103N R35W S28, T103N R35W S21 ; Jackson County		N/A	S2	GNR	1993-07	17361
<u>Dry Hill Prairie (Southern) Type #161</u> T103N R35W S8, T103N R35W S6, T103N R35W S5, T103N R35W S7 ; Jackson County		N/A	S2	GNR	1996-07-18	9692
<u>Dry Hill Prairie (Southern) Type #162</u> T103N R35W S8, T103N R35W S5 ; Jackson County		N/A	S2	GNR	1993-07	9690

Printed August 2009  
Data valid for one year

Minnesota Natural Heritage Information System  
Index Report of records within 2 mile radius of:  
ERDB #20100092 - Lakefield Wind Project  
Multiple TRS  
Jackson County

**Rare Features Database:**

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
<b>Terrestrial Community - Other Classification</b>						
<u>Dry Hill Prairie (Southern) Type #271</u> T103N R35W S21, T103N R35W S29, T103N R35W S28, T103N R35W S20 ; Jackson County		N/A	S2	GNR	2001-09-21	22112
<u>Dry Hill Prairie (Southern) Type #274</u> T103N R35W S6, T103N R36W S1 ; Jackson County		N/A	S2	GNR	2001-09-06	28957
<u>Dry Hill Prairie (Southern) Type #275</u> T103N R35W S28 ; Jackson County		N/A	S2	GNR	2001-08-27	28979
<u>Dry Hill Prairie (Southern) Type #276</u> T103N R35W S28 ; Jackson County		N/A	S2	GNR	2001-09-21	28977
<u>Dry Hill Prairie (Southern) Type #277</u> T103N R35W S34, T103N R35W S27 ; Jackson County		N/A	S2	GNR	2001-09-21	28980
<u>Dry Hill Prairie (Southern) Type #284</u> T103N R35W S22, T103N R35W S28, T103N R35W S27, T103N R35W S21 ; Jackson County		N/A	S2	GNR	2001-09-20	29148
<u>Mesic Prairie (Southern) Type #210</u> T103N R35W S19, T103N R35W S18, T103N R36W S13, T103N R36W S24 ; Jackson County		N/A	S2	GNR	1980-07-08	413
<u>Mesic Prairie (Southern) Type #214</u> T103N R35W S16, T103N R35W S20, T103N R35W S17, T103N R35W S21 ; Jackson County		N/A	S2	GNR	2001	409
<u>Mesic Prairie (Southern) Type #216</u> T102N R35W S5, T102N R35W S4 ; Jackson County		N/A	S2	GNR	1992-07	14056
<u>Mesic Prairie (Southern) Type #365</u> T103N R35W S17, T103N R35W S16, T103N R35W S20, T103N R35W S21 ; Jackson County		N/A	S2	GNR	2001-08-20	28768
<u>Native Plant Community, Undetermined Class #1003</u> T103N R35W S6 ; Jackson County		N/A	SNR	GNR	2001-09-12	28944
<u>Native Plant Community, Undetermined Class #1395</u> T103N R35W S21 ; Jackson County		N/A	SNR	GNR	2001-09-21	21852
<u>Native Plant Community, Undetermined Class #1434</u> T103N R35W S21, T103N R35W S28 ; Jackson County		N/A	SNR	GNR	2001-09-21	28975

Printed August 2009  
Data valid for one year

**Minnesota Natural Heritage Information System**  
**Index Report of records within 2 mile radius of:**  
ERDB #20100092 - Lakefield Wind Project  
Multiple TRS  
Jackson County

**Rare Features Database:**

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
<b>Terrestrial Community - Other Classification</b>						
<u>Native Plant Community, Undetermined Class</u> #1509 T103N R35W S22, T103N R35W S21 ; Jackson County		N/A	SNR	GNR	2001-05	29149
<u>Native Plant Community, Undetermined Class</u> #1555 T103N R35W S17, T103N R35W S16, T103N R35W S20, T103N R35W S21 ; Jackson County		N/A	SNR	GNR	1980	8500
<u>Southern Seepage Meadow/Carr Class</u> #34 T103N R35W S6, T103N R36W S1 ; Jackson County		N/A	SNR	GNR	2001-09-06	28958
<u>Wet Prairie (Southern) Type</u> #92 T103N R35W S6, T103N R36W S1 ; Jackson County		N/A	S2	GNR	2001-09-06	28961
<u>Wet Seepage Prairie (Southern) Type</u> #12 T103N R35W S21, T103N R35W S28, T103N R35W S29 ; Jackson County		N/A	S1	GNR	2001-09-11	28978

**Records Printed = 67**

Minnesota's endangered species law (Minnesota Statutes, section 84.0895) and associated rules (Minnesota Rules, part 6212.1800 to 6212.2300 and 6134) prohibit the taking of threatened or endangered species without a permit. For plants, taking includes digging or destroying. For animals, taking includes pursuing, capturing, or killing.

## David Weetman

---

**From:** Tom Kresko [Tom.Kresko@dnr.state.mn.us]  
**Sent:** Wednesday, October 21, 2009 4:22 PM  
**To:** Tom.Kresko@state.mn.us; David Weetman  
**Cc:** Bob Hobart  
**Subject:** Re: Proposed Wind Farm - Lakefield, MN - Please Read Attached Letter

Dave -

I have not responded to your request due to the likely minimal or no impact potential to public water basins and streams. However, your electrical collection lines and associated roads would likely require some permitting or authorizations through the DNR Lands and Minerals Division. Please contact them accordingly.

~tjk

Tom Kresko - Area Hydrologist  
MN DNR - Waters Division  
175 County Road 26  
Windom, MN 56101-1868

office: (507) 831-2900 ext. 224  
fax: (507) 831-2921  
e-mail: <[tom.kresko@state.mn.us](mailto:tom.kresko@state.mn.us)>

>>> David Weetman <[David.Weetman@westwoodps.com](mailto:David.Weetman@westwoodps.com)> 7/20/2009 12:02 PM >>>

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# **Appendix C**

## **Microwave and RF Communications Impact Report (Evans Associates)**

**Lakefield Wind Project**  
Jackson County, Minnesota



**ENGINEERING REPORT  
CONCERNING THE EFFECTS UPON  
FCC LICENSED RF FACILITIES  
DUE TO CONSTRUCTION OF THE  
LAKEFIELD WIND PROJECT  
IN  
JACKSON COUNTY, MN**

**enXco, Inc.**

**April 17, 2009**

**By: B. Benjamin Evans, P.E.  
Evans Associates  
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**ENGINEERING REPORT  
CONCERNING THE EFFECTS UPON  
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In  
JACKSON COUNTY, MN**

**enXco, Inc.**

**I. INTRODUCTION**

This engineering report describes the results of a study and analysis to determine the locations of federally-licensed (FCC) point-to-point microwave and fixed station radio frequency facilities that may be adversely impacted as a result of the construction of the enXco Lakefield wind turbine project in Jackson County, Minnesota. This document describes impact zones and any necessary mitigation procedures, along with recommendations concerning individual wind turbine siting. All illustrations, calculations and conclusions contained in this document are subject to on-site verification<sup>1</sup>.

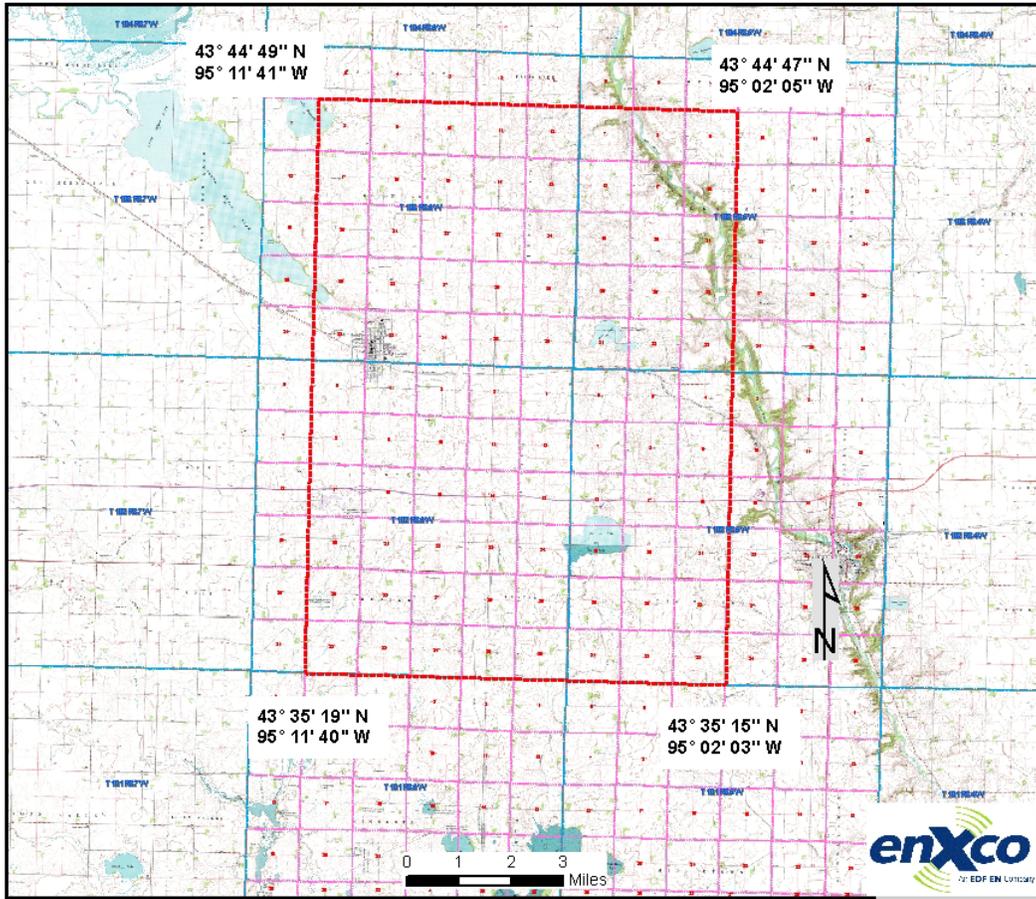
Frequently, wind turbines located on land parcels near RF facilities can cause more than one mode of RF impact, and may require an iterative procedure to minimize adverse effects. This procedure is necessary in order to ensure that disruption of RF facilities either does not occur or, in the alternative, that mitigation procedures will be effective. The purpose of this study is to facilitate the siting of turbines to avoid such unacceptable impact.

The Lakefield project involves the construction of approximately 134 new turbines near the community of Lakefield, Minnesota. The wind turbines will have a hub height of 80 meters above ground and a blade radius of 38.5 meters. Thus, the total height will be about 118.5 meters above ground level to the tip of one blade at the 12:00 position.

Using industry standard procedures and FCC databases, a search was conducted to determine the presence of any existing microwave paths crossing the subject property, or land mobile or broadcast RF facilities within or adjacent to the identified area. A specific turbine layout has not been submitted for analysis. Accordingly, this report will address specific issues and guidelines regarding the siting of turbines to minimize impact to RF communications facilities.

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<sup>1</sup> The databases used in creating the attached tables and maps are generally accurate, but anomalies have been known to occur. An on-site verification survey is suggested as part of the due diligence process.



**Figure 1 - Lakefield Wind Turbine Project Area**

With respect to the broadcast facilities, pertinent TV, FM and AM stations were reviewed, and the potential impact to those broadcast facilities is discussed herein.

The following tabulation and analysis consists of four sections:

1. Microwave point-to-point path analysis<sup>2</sup>
2. Land mobile and public safety radio analysis
3. Broadcast television and radio analysis

The attached maps were generated based upon the operating parameters of the FCC-licensed stations as contained in the FCC station database.

<sup>2</sup> Only point-to-point microwave facilities were considered (for instance, a study of earth station facilities is not included).

The following analysis examines the pertinent FCC licensed services in the area for impact. This analysis assumes that all licensed services have been designed and constructed according to FCC requirements and good engineering practice. If this is not the case, the impacted facility must share responsibility with the wind turbine company for the costs of any mitigation measures<sup>3</sup>.

Each of the RF analyses is described separately in the sections that follow.

## **II. ANALYSIS OF MICROWAVE LINKS**

An extensive analysis was undertaken to determine the likely effect of the new wind turbine farm upon the existing microwave paths, consisting of a Fresnel x/y axis study and a z-axis (height) evaluation. The microwave paths have been overlaid on Google Earth™ maps, and the images of the microwave paths and the proposed turbines also available as KMZ and GIS shape files.

Important Note: Microwave path studies are based upon third party and FCC databases that normally exhibit a high degree of accuracy and reliability. Although Evans performs due diligence to ensure that all existing microwave facilities are represented, we cannot be responsible for errors that may lead to incomplete results. However, should such situations occur, Evans would perform an engineering analysis to determine how the additional facilities can be accommodated or, if wind turbine structures are already built, determine a method to re-direct the offending beam path. It is recommended that a consultant visit the site to visually check for anomalies.

For this microwave study, *Worse Case Fresnel Zones* (WCFZ) were calculated for each microwave path. The mid-point of a microwave path is the location where the widest (or worst case) Fresnel zone occurs. Possible geographic coordinate errors must be added to the Fresnel zone clearance numbers<sup>4</sup>. The radius  $R$  of the Worst Case Fresnel Zone, in meters, is calculated for each path using the following formula:

$$R \cong 8.65 \sqrt{\frac{D}{F_{GHz}}}$$

where  $D$  is the microwave path length in kilometers and  $F_{GHz}$  is the frequency in gigahertz.

In general, the WCFZ is defined by the cylindrical area whose axis is the direct line between the microwave link endpoints and whose radius is  $R$  as calculated above. This is the zone where the siting of obstructions should be avoided. Evans Associates has identified and tabulated in Table

---

<sup>3</sup> For instance, some microwave paths may have insufficient ground clearances as they are presently configured.

<sup>4</sup> Many microwave facilities were built before accurate methods were available to establish exact geographic coordinates (such as GPS). It is not unusual for database errors of up to 4 or 5 seconds to occur, which can effect the positioning of critical turbines located near Fresnel paths.



**Evans Associates  
Lakefield Wind Project**

1 eight unique microwave paths listed as active in the FCC database that intersect the project area. These paths are shown in Figure 2.

ID	Call Sign 1	Call Sign 2	Name Site 1	Name Site 2	Freq. (MHz)	Licensee	WCFZ (m)
5,7	WNTP301	WNTP302	Worthington	Lakefield	6665	Interstate Power & Light Company	22.7
6,8	WNTP302	WNTP303	Lakefield	W Sherburn	6605	Interstate Power & Light Company	19.1
9,14	WQGD293	WQJG674	SVRLB HS	Lakefield RP	10735	Trillion Partners, Inc.	14.8
10,16	WQGI304	WQJG675	SSC HS	Pleasantview	17765	Trillion Partners, Inc.	7.7
11,12	WQJG670	WQJG674	Jackson CHS	Lakefield RP	17965	Trillion Partners, Inc.	6.0
13,15	WQJG674	WQJG675	Lakefield RP	Pleasantview	17865	Trillion Partners, Inc.	5.0
17,18	WEF471	WEF472	968	2771	2138	Great River Energy	36.9
19,20	WMR723	WMR726	Windom	Jackson	6640	RCC Minnesota, Inc.	19.4

**Table 1 – Microwave Links Crossing Lakefield Wind Project Area**

All eight microwave paths create blackout zones through the project area. Therefore, turbines should not be sited within a distance to the centerline of any microwave path equal to the sum of the Fresnel Zone distance and the blade radius (38.5 meters).



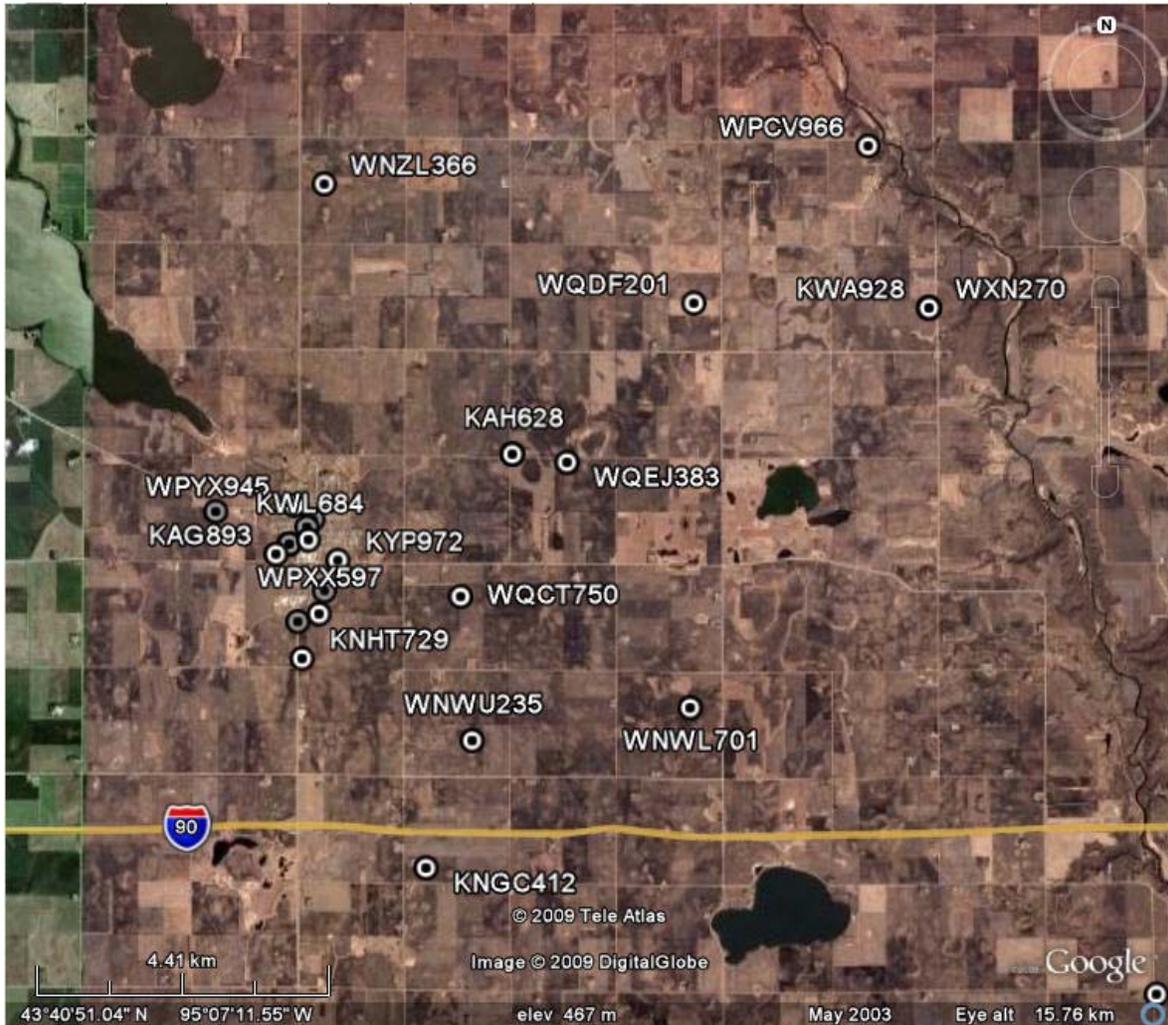


**III. ANALYSIS OF LAND MOBILE RADIO FACILITIES**

There are 26 *Land Mobile* stations identified from the FCC’s database that fall within the search area (within two miles beyond the project boundary). The complete list of land mobile sites is shown in Table 2 below and shown in Figure 3.

<b>Call Sign</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Ant. Ht. AGL (m)</b>	<b>Licensee</b>
KAG893	43.67581	95.17861	27	RACOM CORPORATION
KAH628	43.68942	95.13416	61	JACKSON COUNTY OF
KJU873	43.66664	95.17444	11	VETERINARY MEDICAL CENTER PA
KNAN820	43.6772	95.17611	59	CO OP AGRICULTURE CENTER
KNGC412	43.6333	95.15028	24	RUBIS CRAIG M
KNHT729	43.66164	95.17361	58	ACKERMAN JAMES
KWA928	43.70939	95.05556	61	ALPHA WIRELESS COMMUNICATIONS
KWL684	43.67775	95.1725	46	L C KRUSE & SONS INC
KYP972	43.67497	95.16694	27	ZELLAR GERALD J
WNGN653	43.68942	95.13416	61	RACOM CORP
WNUW618	43.68053	95.17166	17	INDEPENDENT SCHOOL DISTRICT 2895
WNWL701	43.65497	95.10083	14	HODNEFIELD PETER
WNWU235	43.65053	95.14166	21	TUNGLAND TIM
WNZL366	43.72636	95.16972	23	BURESCH KEITH
WPCV966	43.73161	95.06694	14	MINNESOTA STATE OF
WPXX597	43.66769	95.17044	96	RACOM CORP
WPYX945	43.68245	95.17525	9	UAP DISTRIBUTION INC
WPYX945	43.68161	95.18997	14	UAP DISTRIBUTION INC
WQBH251	43.67083	95.16944	21.3	Hage Oil & Bowlers Inn, Inc.
WQCJ664	43.6795	95.17278	47	RACOM CORP
WQCT750	43.67006	95.14386	83.8	Interstate Power and Light Company
WQDF201	43.71	95.1	42.6	CARA ENTERPRISES INC.
WQEJ383	43.6883	95.12389	11	Federated Rural Electric Association
WQFN804	43.6772	95.17611	59	NEXTEL WIP LICENSE CORP.
WSQ422	43.70939	95.05556	52	ALPHA WIRELESS COMMUNICATIONS CO
WXN270	43.70939	95.05556	52	SVOBODA EXCAVATING INC

**Table 2 – Land Mobile Stations Within 2 Miles of Project Area**



**Figure 3 – Land Mobile Sites in Lakefield Area**



Generally, wind turbines should not adversely affect the signals of land mobile stations if the turbines are physically spaced at least 400 meters (one-quarter mile) from these stations. It is suggested that the exact positions of the antennas of these land mobile stations, indeed their very existence<sup>5</sup>, be confirmed via a physical site survey.

The reader is referred to the provided KMZ and GIS shape files for more magnification and closer inspection.

Unless the existing service signals of these land mobile facilities are already marginal because of insufficient power or antenna ground clearance, service disruption should not be significant if the recommended clearance distance of 400 meters is observed<sup>6</sup>. This contingency should be covered in a Memorandum of Understanding. Therefore, the following procedure is recommended concerning the land mobile stations:

1. When the turbine layout is finalized, and the 400 meter spacing or a lesser acceptable distance is observed, land mobile licensees whose stations are within 2 miles of any planned turbine site should be contacted via a notification letter in order to obtain their concurrence for a letter of “no impact” (usually dubbed a “*Memorandum of Understanding*”).
2. If such a letter is not forthcoming, the licensees should be contacted to solicit their opinions concerning the adverse effects they contend will result from the turbine configuration. A deadline should then be established for a reply. If comments are received, they should be addressed via an engineering analysis that either:
  - a. Shows how the licensee’s analysis is not accurate, or
  - b. Suggests a compromise mitigation procedure.
3. Mitigation measures should be considered, including the following:
  - a. Converting to digital transmitting and receiving equipment.
  - b. Increasing the height of the antenna above the turbine blade sweep.
  - c. Installing more sensitive mobile radio receivers.

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<sup>5</sup> Oftentimes, communication companies will “warehouse” land mobile frequencies, holding valid licenses but not utilizing them immediately, which is an illegal practice, or transmitters could be dismantled without the FCC being notified.

<sup>6</sup> It is possible in many cases that a detailed analysis would show a lesser acceptable clearance. This analysis should be performed once the turbines have been microsited and some turbine sites appear to be closer than 400 meters to one or more licensed land mobile sites.



Although significant disruption is not expected to land mobile stations more than 400 meters from any turbine, some occasional time-varying received levels for facilities between 400 and 800 meters from the nearest turbine would be possible, although not usually disruptive.

#### **IV. ANALYSIS OF BROADCAST FACILITIES**

##### **4.1 HDTV Broadcast Facilities**

The rotating blades of a wind turbine have the potential to disrupt over-the-air broadcast TV reception within a few miles of the turbine, especially when the direct path from the viewer's residence is obstructed by terrain. This is manifest in an analog TV picture by a flickering or tearing of the image in time with the blade rotation, which is caused by signals reflected by the blades arriving at the viewer's TV antenna at the same time as the direct signal. This is known as "multipath interference." However, as turbine manufacturers have replaced all-metal blades with blades constructed of mostly nonmetallic materials<sup>7</sup>, this effect has been reduced. Also, the new generation of HDTV receivers is better equipped to deal with minor multipath interference (which is manifested by "pixilating" or "freezing" of the digital picture) than analog TV sets, as special circuitry is employed to suppress the weaker reflected signal. Occasionally, however, multipath interference from one or more turbines can cause video failure in HDTV receivers (a blank screen or frozen picture), especially if the receiver location is in a valley or other place of low elevation.

Analog TV transmission is scheduled to end on June 12, 2009 (unless the date is extended by Congress or the FCC), after which TV stations are mandated to transmit only in HDTV<sup>8</sup> ("Digital" or "High Definition"). For this reason, analog facilities have not been considered in these analyses.

Jackson County is in the Minneapolis-St. Paul, MN Designated Market Area (DMA) according to Nielsen Media Research; however, no digital TV stations from that market are predicted to provide over-the-air service to any area in the vicinity of the Lakefield wind project. The full service digital TV facilities that would place an predicted FCC primary service signal over at least a part of the turbine area, on their final DTV channel assignments and authorized operating values, have been identified, and are listed in Table 3.

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<sup>7</sup> Modern turbine blades are usually constructed from glass-reinforced plastic (GRP), although they usually contain some metal for strengthening, balance and grounding.

<sup>8</sup> Some TV stations currently serving Jackson County may already have gone digital only, due to the fact that February 17<sup>th</sup> was the original date mandated by the FCC to discontinue analog transmission before federal legislation to extend the deadline was signed by President Obama on February 11, 2009.

Call Sign	Network Affiliate	Channel	City of License	Power (KW)	Ant. Height (m HAAT)	Distance (km)	Azimuth (°T)
KELO-TV	CBS, MyNetworkTV	11	Sioux Falls, SD	30	610	115.9	262.3
KEYC-TV <sup>9</sup>	CBS/FOX	12	Mankato, MN	15.2	317	64.0	61.7
KSFY-TV	ABC	13	Sioux Falls, SD	22.7	610	115.9	262.3
KSMN <sup>10</sup>	PBS	15	Worthington, MN	200	290	71.8	291.3
KDLT-TV	NBC	47	Sioux Falls, SD	1000	608	117.8	261.7

**Table 3 – Digital TV Stations to Serve Project Area**

The Mankato and Worthington stations’ signals are much closer and stronger than those coming from Sioux Falls; however, the Sioux Falls stations could have a significant viewership in the area since KEYC-TV and KSMN do not represent all the major networks. It is possible that any of the above stations could be significantly affected by multipath interference from the wind turbines, and most of the instances of interference could occur in the communities of Lakefield and Jackson. Lakefield (population 1,721) is within the primary service areas of all five stations. Jackson (population 3,501) is within the primary service area of KEYC-TV; KSMN does not now cover Jackson, but if it is granted authority to increase facilities as per its pending FCC application, its primary service area will encompass Jackson.

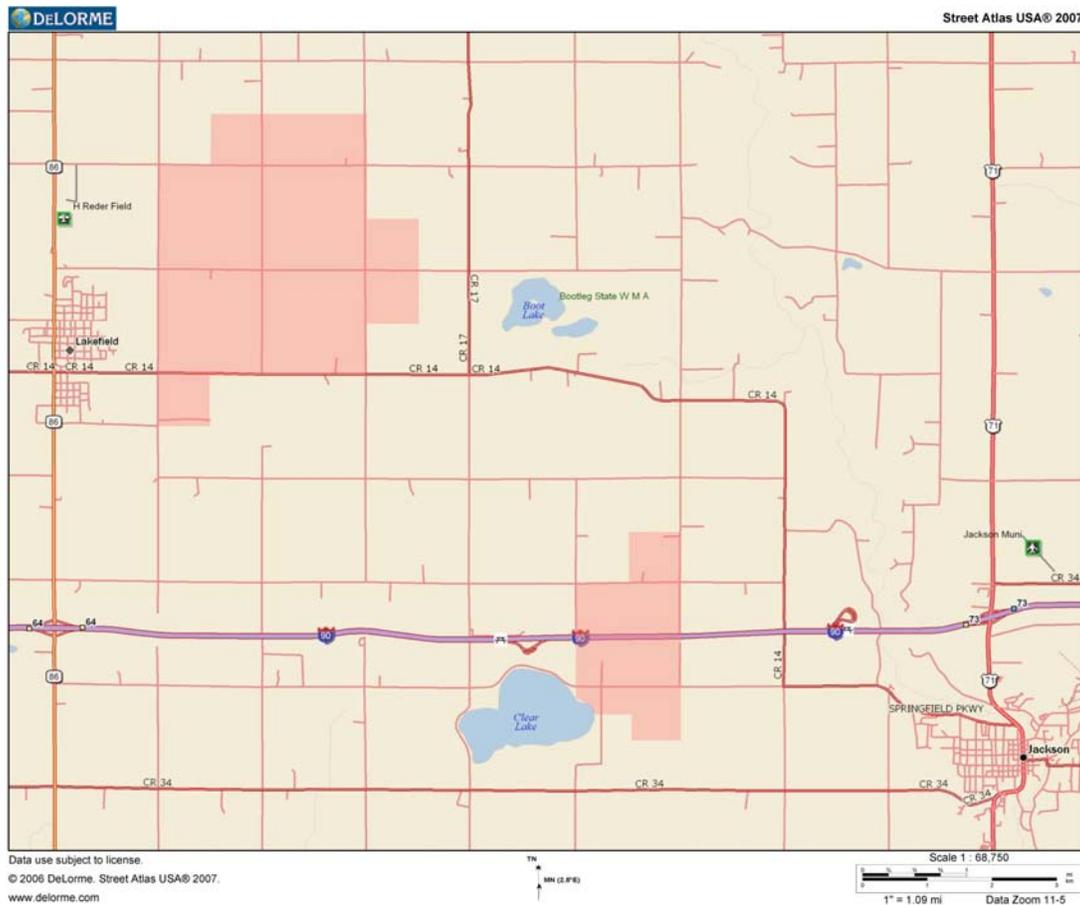
There is some possibility of signal disruption for residences that have to point their outdoor antennas through the turbine area, or that utilize “rabbit ear” antennas, or that utilize older HDTV receivers. Most of this effect should be dissipated for locations at least 3 miles of a turbine, but some residual problems could be noted for HDTV receivers that are located below the grade level at the turbine base. Usually, a rule of thumb is that approximately 10% of receiver locations are affected to some extent within 2 to 3 miles of a large turbine. The usual effect is intermittent “pixilation” or freezing of the digital TV picture. This estimate is based upon Evans’ experience with similar turbine farms.

#### **4.2 Advisory Areas for Broadcast TV Interference**

Figure 4 shows the areas within the project boundaries that would have the highest potential of broadcast TV multipath interference if wind turbines were constructed there. All stations listed in Table 3 were considered for this analysis. Turbine siting within this areas should be minimized if possible, but there is no hard limit on the number of turbines. The more turbines located in the defined area, the more homes in Lakefield and Jackson are likely to require mitigation.

<sup>9</sup> KEYC-TV has an FCC application pending to increase power to 52.7 KW.

<sup>10</sup> KSMN has an FCC application pending to increase facilities to 1000 KW power and 332 meters antenna height HAAT.



**Figure 4 – TV Interference Advisory Areas For Turbine Siting**

This engineer is aware that turbine siting is determined by many factors, and placement of some turbines in the advisory areas described herein may be inevitable. It is always the desire of the wind farm developer to keep the number of cases of broadcast signal disturbances to a bare minimum so as not to develop ill will among nearby residents. To that end, these advisory zones<sup>11</sup> have been determined so that if no turbines were erected in the zones, no significant instances of harmful effect on broadcast signals would be expected to occur. However, since it may not be practicable to remove such large areas from wind energy production, a mitigation program to respond to a number of interference complaints should be in place during the development stage of the wind farm project. The mitigation methods described in this report should resolve all interference complaints that may occur.

<sup>11</sup> These advisory zones have been applied only to population centers (cities, villages, and other densely-populated places) where the most instances of broadcast receiver impact would occur by virtue of being where most of the households are located.

In the opinion of this consultant, the number of instances of turbine disruption to over-the-air TV could be numerous but should be manageable. Mitigation would consist of the installation of a rooftop high-gain antenna in the nominal case, and providing a satellite receive dish or cable hookup in the worst case.

According to this engineer’s calculations, there are about 1,240 households within an area likely to be affected. It is conservatively estimated that at least 50% of the households in the area are served by cable or satellite TV and thus would not be affected by wind turbine disruption. Based on the 10% criteria described previously, under a worst-case scenario, up to 64 HDTV receiver locations may be affected. Mitigation costs would range from \$200 to \$600 in each instance.

Again, this estimate is based on worst-case assumptions with the actual preliminary turbine locations not taken into account. The estimated number of HDTV households could be further refined if the locations of the turbines were known.

**4.3 FM Facilities**

The following full-service FM stations each place a predicted primary signal over most or all of the turbine properties:

Call Sign	Format	Freq. (MHz)	City of License	Power (KW)	Ant. Height (m HAAT)	Dist. (km)	Azimuth (°T)
KDOM-FM	Country/News/Talk/Sports	94.3	Windom, MN	5.7	102	24.8	347.4
KJWR	Christian	90.9	Windom, MN	25	100	38.3	349.4
KILR-FM	Country/Sports	95.9	Estherville, IA	20	99	35.4	138.3
KLLT	Light Rock	104.9	Spencer, IA	25	85	42.3	183.1
KRAQ	Oldies, Classic Rock	105.7	Jackson, MN	25	100	13.5	115.5
KJIA	Christian	88.9	Spirit Lake, IA	50	83	36.8	191.7
KITN	Adult Contemp.	93.5	Worthington, MN	50	142	28.8	236.8
KILR-FM(CP)	Country/Sports	95.9	Estherville, IA	50	150	48.0	158.1
KUQQ	Classic Rock	102.1	Milford, IA	50	128	29.2	175.1
KUOO	Adult Contemp.	103.9	Spirit Lake, IA	50	150	29.2	175.1
KNSW	NewsTalk	91.7	Worthington-Marshall, MN	99	243	69.8	290.5
KWOA-FM	Classic Hits	95.1	Worthington, MN	100	198	45.5	265.0
KFMC-FM	Classic Rock	106.5	Fairmont, MN	100	113	51.1	94.6
KISD	Oldies	98.7	Pipestone, MN	100	309	71.8	291.3

**Table 4 – FM Stations Serving Project Area**

Because of the “capture effect” supported by the “discriminator” in FM receivers, significant disruptions to the above facilities are not expected. Although the received signal may vary with the blade rotation at some receive locations in the immediate area, good quality FM receive radios will most likely factor out such time-varying signals. In those relatively few cases where significant impact is caused, home FM radios could be connected to the rooftop TV receive antennas to pull in a stronger direct signal.

#### **4.4 AM Facilities**

A search of the FCC's database revealed no AM facilities within the required notification distance of 3 kilometers from the project boundaries.

There should therefore be no reasonable expectations of disruptions in transmitted radiations on the AM band due to the presence of the turbines. Occasionally, depending upon ground conditions, local AM receivers may experience slight signal changes due to local effects, but such anomalies are not recognized by the FCC or the standards of good engineering practice as harmful effects.

#### **V. CONCLUSIONS**

1. The proposed turbines, including the blades, should not penetrate the WCFZs (Worst-Case Fresnel Zones) of any known active FCC-licensed microwave paths. Eight unique microwave paths found in the FCC databases have been determined to create blackout zones in the Lakefield project area.
2. There are 26 licensed land mobile transmitting sites in the project area and within two miles of the project boundaries. If possible, turbines should not be sited within 400 meters of any land mobile station that is known to be operating legally. Further analysis may permit a lesser clearance distance once the turbines have been microsited.
3. Based upon FCC database information, no significant impact is expected to the reception of FM broadcast facilities. A few receive locations may experience signal fluctuations in time with the blade rotors with respect to this facility, but the receiver automatic gain control should be able to manage these variations. In a few cases, it might be necessary to reconfigure antennas at nearby households.
4. Some HDTV receiver pixelating, ranging from minor to severe, could potentially occur on the TV signals available in the area. Mitigation measures are expected to be available for all expected anomalies. Turbine areas that potentially could cause a significant number of instances of over-the-air TV interference are shown in Figure 4, but these do not represent "blackout" areas. Turbines may be placed within these areas, but if possible, the total number should be minimized in order to reduce the incidence of TV interference and the associated cost of mitigation.
5. Mitigation measures are expected to be available for all broadcast reception anomalies, with satellite or cable service and/or receiver upgrades providing the worst-case solution.
6. Notification to land mobile licensees in the area should be made in accordance with the procedure outlined in Section III.



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Lakefield Wind Project**

7. An on-site inspection of the Lakefield area should be done to determine the existence of any undocumented communications towers and to verify the locations and operational status of the land mobile sites that are near planned turbines.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "B. Benjamin Evans".

B. Benjamin Evans, P.E.  
RF Impact Consultant

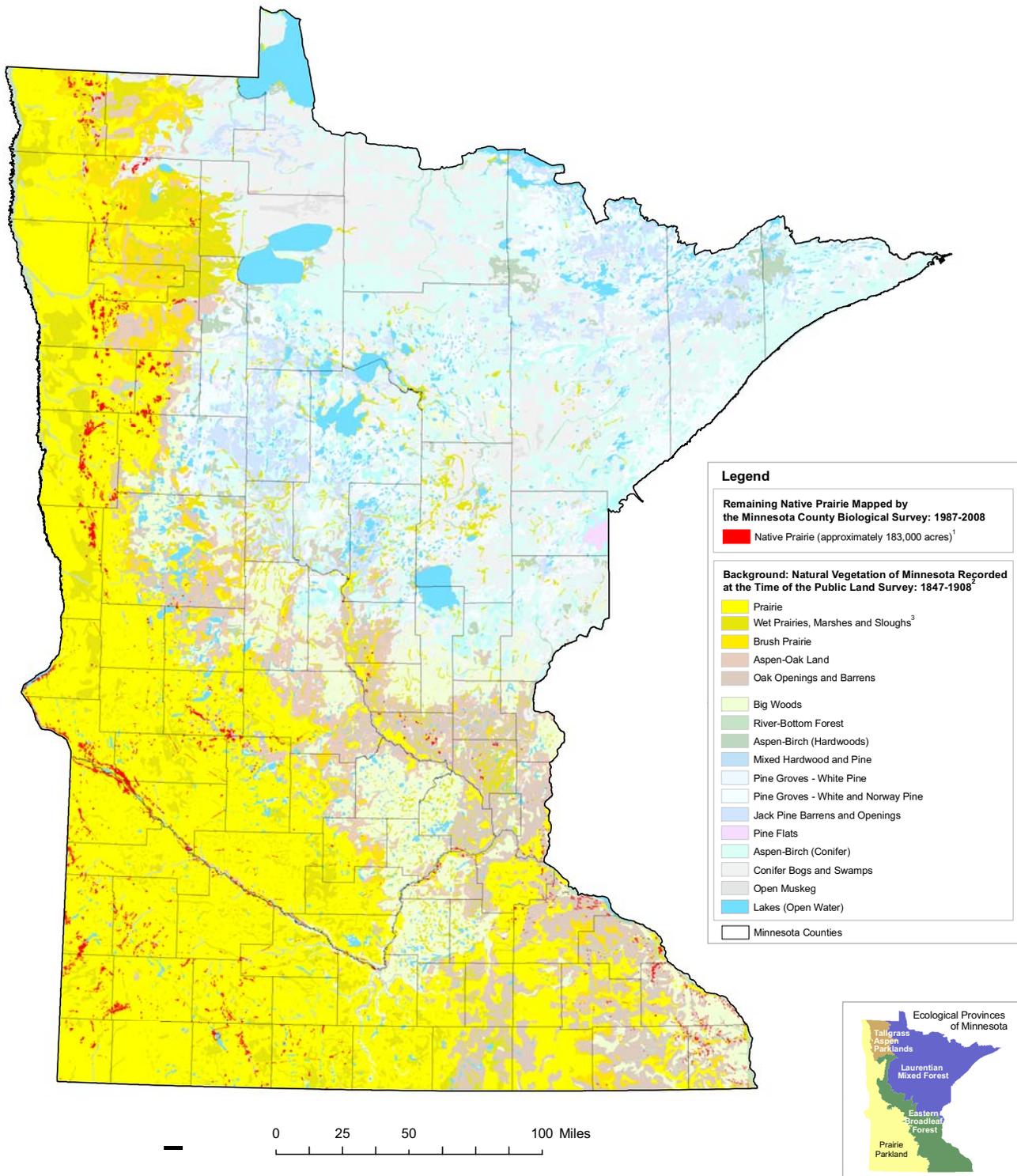
April 17, 2009

# **Appendix D**

**Minnesota's Remaining Native  
Prairie Mapping (DNR)**  
**Lakefield Wind Project**  
Jackson County, Minnesota

# Minnesota's Remaining Native Prairie 100 Years After the Public Land Survey

Native Prairie Recorded 1847-1908 (Shown in Yellows and Tans)  
Remaining Native Prairie Mapped 1987-2008 (Shown in Red)



<sup>1</sup> Prairies mapped by the Minnesota County Biological Survey (MCBS) as of March, 2009. Some of the prairies represented on this map may have been destroyed since the time of their documentation by MCBS. Mapping of native prairies by MCBS is in progress in the following counties and will be completed by 2010: Dodge, Faribault, Freeborn, Mower, Nobles, Roseau, Steele, Waseca, and Watonwan.

<sup>2</sup> Adapted from Marschner, F.J. 1974. *The original vegetation of Minnesota, compiled from U.S. General Land Office Survey notes* [map]. 1:500,000. Redrafted from the 1930 original by P.J. Burwell and S.J. Haas under the direction of M.L. Heinselman. St. Paul: North Central Forest Experiment Station, United States Department of Agriculture.

<sup>3</sup> In the Laurentian Mixed Forest Province, this category mainly comprises marshes and sloughs. If wet prairies were present in the province, they were uncommon and likely restricted to western and southern regions bordering the Tallgrass Aspen Parklands and Eastern Broadleaf Forest provinces.

GIS data for many of the native prairies depicted on this map are available in shapefile format as "MCBS Native Plant Communities" and "MCBS Railroad Rights-of-Way Prairies" on the DNR's data deli at <http://deli.dnr.state.mn.us/index.html>. Information on MCBS procedures for mapping Minnesota's prairies and other native plant communities is available at <http://www.dnr.state.mn.us/eco/mcbs/index.html>.

Map is also available online at: [http://files.dnr.state.mn.us/eco/mcbs/prairie\\_map.pdf](http://files.dnr.state.mn.us/eco/mcbs/prairie_map.pdf)



March, 2009

# **Appendix E**

## **Potential Permits/Approvals**

**Lakefield Wind Project**

Jackson County, Minnesota

## Appendix E: Potential Permits/Approvals

### Lakefield Wind Project

Agency	Permit/Approval	Authority	Description
<b>Federal Permits</b>			
Federal Aviation Administration (FAA)	Notice of Proposed Construction of Alteration/Determination of No Hazard	14 CFR Ch. 1 Subchapter E Part 77	Establishes standards for determining obstructions and sets requirements for notice to FAA for proposed construction. FAA determines whether proposed construction poses an aviation hazard.
US Fish and Wildlife Services	Consultation and Review of the Proposed Project regarding Federally Threatened and Endangered Species	Endangered Species Act of 1973	The Act requires all projects that are in areas designated to be habitat for endangered species to be reviewed by FWS.
US Army Corps of Engineers	Section 404 Permit	Clean Water Act	Required for activities that involve dredging or filling wetlands and waters of the U.S.
Federal Energy Regulatory Commission (FERC)	Exempt Wholesale Generator Status	1992 Energy Policy Act	Self-Certification of exempt wholesale generator requires filing with FERC.
FERC	Market-Based Rate Authorization	Section 205 of the Federal Power Act	Requires approval of market-based rates upon commissioning of wind facility.
<b>State of Minnesota Permits</b>			
MPUC	LEGF Certificate of Need	Minn. R. Ch. 7849	For wind turbines and transmission interconnection (as associated facility).
	LWECS Site Permit	Minn. R. Ch. 7854	For wind turbines—meet threshold for LWECS requiring permit.
MN State Historic Preservation Office	Cultural and Historic Resources Review	National Historic Preservation Act; Historic Sites Act (Minn. Stat. §§ 138.661-138.669); Field Archaeology Act (Minn. Stat. §§ 138.31-138.42); Private Cemeteries Act (Minn. Stat., Ch. 307)	Cultural Resources Review and State and National Register of Historic Sites Review.
MN Pollution Control Agency	401 Certification	Clean Water Act	When a federal permit is required (i.e., Section 404 Permit with the Corps of Engineers) a State Water Quality Certification/Waiver is needed.
	NPDES Stormwater Permit for Construction	Clean Water Act	Program designed to reduce the amount of sediment and pollution entering surface and groundwater during and after construction projects.

Agency	Permit/Approval	Authority	Description
	Small Quantity Generator	Minn. R. ch. 7045	Hazardous Waste rules regarding storage and disposal of turbine lubricating oil.
MN Dept. of Natural Resources	Consultation and Review of the Proposed Project regarding State Threatened and Endangered Species	Minn. Stat. § 84.0895	Establishes Guidelines for the protection of Threatened and Endangered species in the State of Minnesota.
	Public Water Works	Minn. Stat. § 103G.005	Applies to activities conducted below the Ordinary High Water Level of public waters and public waters wetlands.
	License to Cross Public Lands and Waters	Minn. Stat. § 84.415	Required for utilities passing over, under, or across state lands and public waters.
MN Dept. of Health	Water Well Permit	MN Well Code (Minn. Stat. § 103I); Safe Drinking Water Act	Ensures development and protection of groundwater in an ordinary, healthful, and reasonable manner.
	Plumbing Plan Review	Minn. R. 4715.3130	Ensures healthy and safe plumbing installation.
MN Board of Water and Soil Resources	Wetland Conservation Act Approval	Minn. Stat. §§ 103G.222-103G.2373; Minn. R. ch. 8420	Requires proposed impacts to wetlands be avoided and minimized.
MN Dept. of Transportation	Utility Access Permit	Minn. Stat. § 161.45	Regulates utility construction impacts to State roads or right-of-ways.
	Highway Access Permit	Minn. Stat. ch. 505	Permits access to State roads.
	Oversize and Overweight Permit	Minn. Stat. § 169.862	Permits oversized and overweight loads to travel on State roads.
<b>Local Permits</b>			
Jackson County	Conditional Use Permit	County Ordinance	Permit to install substation and transmission line.
	Individual Septic Tank Systems (ISTS) Permit	County Ordinance	Permits connection to existing or approval of on-site sewage and water (for O&M building).
	Driveway Permit		Permits construction of driveways to building sites and farmland.
	Utility Permit	Rules and Regulations of Board of County Commissioners for Utilities on County Highways	Permits utility construction and relocation on county highway right of way.
	Moving Permit		Permits oversized loads on county roads.
	Sign Permit		Permits erection or maintenance of signs.
Town of Lakefield	Driveway permits	Township board	Permits construction of driveways to building sites and farmland.
	Building Permit	Town Council	Permits the construction of new structures.