

Merricourt Wind Power Project

APPLICATION FOR A CERTIFICATE OF SITE COMPATIBILITY

Dickey and McIntosh Counties

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1.0 Introduction

enXco Development Corporation (enXco) is submitting this application for a Certificate of Site Compatibility (Certificate) from the North Dakota Public Service Commission (PSC) to construct the proposed Merricourt Wind Power Project (the project). The proposed project is located within a 22,457-acre Project Area and will consist of 100 General Electric 1.5sle wind turbines. Please refer to Figure 1. Project Area on page A-3, in Appendix A. The wind turbines will convert wind energy into 150 megawatts (MW) of electrical power. Construction for this project is anticipated to begin in 2011 with a commercial operation date of December 31, 2011.

The generated power will be interconnected into the Midwest System Operator's (MISO) regional transmission system on Montana Dakota Utility's (MDU) existing Wishek to Ellendale 230kV transmission line. The interconnection will require a new substation and related transmission system upgrades. These facilities are the responsibility of MDU and will be permitted and constructed separately from the project.

enXco, an EDF Energies Nouvelles Company, is an international company that specializes in renewable energies in the green electricity generation market. enXco's focus is on development, construction, operations, and maintenance of large-scale renewable energy projects throughout the United States. With nearly 500 MW of renewable power in development and construction annually, enXco makes a substantial contribution to the goals of providing clean and reliable energy to meet the nation's electricity needs. Please refer to Figure 2. Organizational Structure on page A-4, in Appendix A.

1.1 Compliance with the Energy Conversion and Transmission Facility Siting Act Chapter 49-22

The North Dakota Energy Conservation and Transmission Facility Siting Act requires an Application for a Certificate of Site Compatibility to meet criteria established in North Dakota Century Code (NDCC) 49-22. According to NDCC 49-22-02, energy conversion facilities are to be sited with consideration given to environmental preservation and an efficient use of resources.

enXco has disclosed information in this application to the best of its ability and as required by the North Dakota Energy Conversion and Transmission Facility Siting Act. Exclusion and avoidance areas, along with policy criteria, were considered during the selection of the site and are discussed further in this application. These regulations will continue to be considered through design of the project. Information regarding project design, wind resources, and technical information has been included in this document to allow a thorough understanding of the project and to aid in review by the PSC, regulatory agencies, and the public. The table below provides a summary of information included in this application and the section of the document in which each is addressed. Please refer to Table 1. Certificate Completion Checklist on page 2.

Table 1. Certificate Completion Checklist

State Authority	Description	Section
Chapter 49-22	PSC Guideline: Energy Conversion and Transmission Facility Siting	1.1
Section A	**Description**	**1.2, 1.3, 1.5, 2.2, 6.0-6.6**
1.	Type: Describe the type of energy conversion facility proposed and provide a diagram of the major process system or a flow diagram.	1.0, 4.1.1
2.	Product: Describe in general terms and technical terms the products to be produced at the proposed facility.	4.1.1
3.	Size and Design: Provide the following description of the production capacity and design.	4.1.1, 4.2
a.	Gross design capacity;	1.3.2
b.	Net design capacity;	1.3.2
c.	Estimated thermal efficiency of the energy conversion process and the assumptions upon which the estimate is based.	—
d.	The number of acres that the proposed facility will occupy;	1.3
e.	One (1) copy of all design data reports separate from the application.	Appendix B
4.	Time Schedule: Provide the anticipated time schedule for the accomplishment of the following;	1.4
a.	Certificate of Site Compatibility;	1.4
b.	Land acquisition complete;	1.4
c.	Construction start date;	1.4
d.	Construction complete;	1.4
e.	Test operations;	1.4
f.	Commercial production date;	1.4
g.	100% capacity factor;	
h.	Any expansion or additions.	—
Section B	**Studies**	
	Provide a copy of any evaluative studies or assessments of the environmental impact of the proposed facility submitted to any federal, regional, state, or local authority.	Appendices C–K
Section C	**Need for Facility**	
1.	An analysis of the need for the proposed facility based on present projected demand for the product or products to be produced by the proposed facility, including the most recent system studies supporting the analysis of the need.	2.1
2.	A description of any feasible alternative methods of serving the area.	2.2
3.	A statement justifying any deviations from the Ten-Year Plan which the proposed facility may present.	2.3
Section D	**Location**	
1.	Select a Project Area, which includes the proposed facility site, of sufficient size to enable the PSC to evaluate the factors addressed in Section 49-22-09, NDCC.	1.2, 1.3.1
2.	Discuss the utility's policies and commitments to limit the environmental impact of its facilities, including copies of board resolutions and management directives.	Section 7.0

State Authority	Description	Section
3.	Identify and map the criteria that lead to the proposed facility location within the Project Area.	Section 3, Appendix A
4.	Discuss in detail the relative value of each criteria and how the proposed facility location was selected giving consideration to all criteria.	1.2
5.	The criteria to be evaluated shall include at a minimum all of the following which are within the Project Area:	—
a.	Exclusion areas;	3.1
b.	Avoidance areas;	3.2
c.	Selection criteria;	3.3
d.	Policy criteria;	3.4
e.	Design and construction limitations; and	3.5
f.	Economic considerations	3.6
6.	Discuss the mitigation measures that will be taken to minimize adverse impacts which result from the locations, construction, and operation of the proposed facility.	Section 7
7.	List the qualifications of the people in various disciplines that contributed to the facility site location study.	12
8.	Maps	Appendix A
a.	Map the criteria within the Project Area showing the proposed facility location. Several different criteria may be shown on each map, depending on the map scale and the density and nature of the criteria. Minimum map scale shall be ½ inch = 1 mile. All maps shall be at the same scale unless otherwise specified.	Appendix A
b.	Furnish one Mylar map, separate from the application, of the same scale as the criteria maps and showing the same basic features as the criteria maps, including the Project Area but not the proposed facility location.	N/A
NDCC 49-22-09	**Factors to be considered in evaluating applications and the design of sites, corridors, and routes.**	
1.	Available research and investigations relating to the effects of the location, construction, and operation of the proposed facility on public health and welfare, natural resources, and the environment.	11.1
2.	The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects.	11.2
3.	The potential for beneficial uses of waste energy from a proposed energy conversion facility.	11.3
4.	Adverse direct and indirect environmental effects which cannot be avoided should the proposed site or route be designed.	7, 11.4
5.	Alternatives to the proposed site, corridor, or route which are developed during the hearing process and which minimize adverse effects.	11.5
6.	Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designed.	7.19, 11.6
7.	The direct and indirect economic impacts of the proposed facility.	7.10, 11.7
8.	Existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site, corridor, or route.	7.3, 7.4, 11.8

State Authority	Description	Section
9.	The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.	7.8, 11.9
10.	The effect of the proposed site or route on areas which are unique because of biological wealth or because they are habitats for rare and endangered species.	7.13–7.17
11.	Problems raised by federal agencies, other state agencies, and local entities.	11.11

1.2 Flexibility in Siting

enXco is utilizing a deductive approach to siting the project. This approach evaluates a significantly larger geographic area (the wind resource area or WRA) than is anticipated to be necessary for the project's final site location (Project Site) and it incorporates wind turbine generator (WTG) layouts in excess of that necessary for the final project design. The information obtained through this deductive evaluation naturally facilitates flexibility in siting the project components while also preserving time and lowering costs as more fully described below.

The initial WRA identified for the proposed Merricourt Wind Power Project consisted of approximately 50 square miles and was chosen based on its wind regime, community support for a wind project, and close proximity to existing electrical transmission lines. The WRA is nearly three times larger than the 18 square miles anticipated being necessary for the final Project Site. While the final Project Site has not yet been finalized an area of approximately 30 square miles has been identified in the northwest corner of the initial WRA (the Project Area) as the preferred area for the final Project Site. The potential for environmental, cultural, noise and other impacts are being considered through this evaluation process and have been and will continue to be a very important component of the final Project Site definition. The final project design and boundaries will consider the project's potential for impacts while balancing the overall benefits of the project for the local community and the country's emphasis on clean, renewable energy sources.

This siting approach involves ongoing data collection, evaluation, and refinement in order to determine the final Project Site and appropriate project design that meets project goals while minimizing potential impacts. Furthermore, as only certain portions of the WRA are suitable for installation of WTGs and their related facilities, the WRA evaluation involves frequent WTG layout optimizations that provide for more WTGs than are necessary for the final project design. By incorporating these WTG layouts early and often in the evaluation process, enXco can refine evaluation criteria and study work to address the portions of the WRA most likely to be impacted by the project. This approach also facilitates flexibility in designing the project's WTG layout and allows enXco to quickly adjust the WTG layout to constraints as they are identified. As the WRA evaluation progresses areas and specific sites are eliminated from consideration, design parameters are adjusted and project implementation and operational plans are drafted and revised to the sites specific characteristics.

For the project, the evaluation of the initial WRA started with a desktop review of the areas wind, geological, and demographic characteristics and a Critical Issues Analysis conducted by Kadrmas, Lee & Jackson (KL&J). The primary objective of this analysis was to broadly identify potential issues within the WRA, help establish further evaluation criteria and identify relevant site studies and the various governmental agencies with which discussions may be necessary or appropriate. The exclusion and

avoidance criteria outlined in the North Dakota Conversion Facility Siting Act were used as a basis for the study. Additionally, other categories of potential conflict were studied based on KL&J's past experience with wind farm projects and development in the state of North Dakota. These categories included: infrastructure, hazardous waste, land use, conservation easements, utilities, and vegetation. A GIS database was then developed for the Project Area utilizing all the information gathered through literature reviews, data use agreements, and office studies.

Simultaneous to the Critical Issues Analysis; agency coordination was initiated with scoping letters, which were mailed to governmental agencies with a possible interest in the project. The list of governmental agencies contacted during project scoping was generated from the requirements of the PSC, and supplemented with additional local, state, and federal entities. These letters were used to identify issues pertinent to the project and to obtain information about agency requirements.

enXco and KL&J also attended an Interagency Committee Meeting (ICM) and met with the United States Fish & Wildlife Service (USFWS) Ecological Services officials in Bismarck, North Dakota. These meetings provided additional information about the potential for impacts to ICM agency interests and also helped lay the foundation for future discussion(s). The feedback enXco received at these meetings is being used in the evaluation and siting process. All agencies indicated that opportunities to minimize and/or mitigate any potential impacts to ICM agency interests were available.

After the initial WRA evaluation enXco commissioned the following study work over a 12-month period:

- Radio Frequency Study
- Acoustic Modeling Study
- Sensitive Habitat Assessment
- Threatened & Endangered Species Habitat Assessment
- Grouse Lek Surveys
- Raptor Nest Survey
- Piping Plover Habitat Surveys
- Whooping Crane Habitat Review Study
- Bat Assessment
- Class III Cultural Resource Inventory
  - Tribal monitors from Sisseton-Wapheton Oyate Tribe (SWO) and the Standing Rock Sioux Tribe were present during the inventory.
- FAA Prescreening Study
- Field Wetlands Delineation Survey

At the completion of each of these studies enXco evaluated certain areas within the WRA, reviewed and adjusted the preliminary site design, began to draft various site specific action plans, reviewed (and adjusted if necessary) WTG siting parameters and engaged in additional study work and/or agency discussions as needed in an attempt to avoid and/or minimize any potential impacts that were identified. Over the same 12-month period enXco held additional [separate] meetings with the following interested parties:

- USFWS Ecological Services Office
- USFWS Kulm Wetland Management District
- North Dakota PSC
- State Historic Preservation Office (SHPO)
- Tribal authorities from SWO Tribe, Standing Rock Sioux Tribe, Rosebud Sioux Tribe, and Wahpekute Dakotah Band
- Officials from McIntosh County, Dickey County, and Spring Valley Township

These discussions were held to provide project updates, allow interested parties additional opportunities to comment on the project, and to gain additional information regarding the project's potential for impacts. All work completed to date on the project was evaluated after these meetings and adjustments were made if necessary.

For the proposed Merricourt Wind Power Project, an initial WRA of approximately 50 square miles was chosen and after initial evaluations were concluded, a Project Area of approximately 30 square miles was selected for further evaluation. By the time the evaluation is complete, the final Project Site is expected to consist of 100 WTGs sited over approximately 18 square miles. To date over 200 WTG locations have been reviewed and the project design has been revised over 15 times. The current Project Site design consists of 122 WTG locations; of which only 100 will be used. It is anticipated that the final Project Site shall be situated within the Project Area and shall consume the smallest area possible based on the sites characteristics and the project's potential for impact(s).

enXco intends to conduct additional study work and discussions with interested tribal authorities and officials from the USFWS as necessary. enXco is working cooperatively and with the USFWS, and is continuing this coordination currently. Both entities are working together to employ strategies for minimization and conservation measures specifically for the whooping crane. At this time, all the details have not been finalized and enXco will communicate with the PSC regarding the status of this ongoing coordination. The final Project Site and design as well as applicable project implementation and operational plan(s) will reflect the conclusion of these studies and discussions. The project is not currently subject to any federal consultation requirements and all study work and agency discussions to date have been completed on a voluntary basis.

Once final, all project designs and plans will be submitted to the PSC as required and necessary.

1.3 Project Summary

1.3.1 Proposed Site

The Project Area comprises a portion of 48 sections of agricultural land in Dickey and McIntosh Counties, North Dakota. It is situated between the communities of Merricourt, Edgeley, Kulm, Fredonia, Ellendale, Forbes, and Ashley. The Project Area is characterized by rolling hills and includes some of the highest elevations in Dickey and McIntosh Counties. The WRA initially encompassed 32,000 acres, and was then revised down to 22,457 acres for the Project Area. The final Project Site is expected to be approximately 12,000 acres. There are easement interests on 22,280 acres with 32 different landowners. Please refer to Figure 1. Project Area on page A-3 in Appendix A and Table 2. Site Location on page 7.

Table 2. Site Location

County	Township Name	Township	Range	Sections
Dickey	German	131	66	19, 20, 29–34
	Spring Valley	130	66	3–6, 8, 9
McIntosh	Rosenthal	131	68	25, 36
	Antelope	131	67	19–36
	Iowa	130	68	1, 12
	Beresina	130	67	1–10, 16, 17

1.3.2 Projected Output

The proposed facility will be capable of producing 150 MW of power. Given a rotor hub height of 260 feet above ground level (AGL), the projected net annual energy output is estimated between 576,000 and 596,900 MW hours. A more accurate prediction of output will depend upon final wind turbine selection and the resulting final analysis of the design and layout of the facility.

1.4 Project Schedule

Provided all pre-construction permits and approvals, financial closing and equipment deliveries, have been obtained, construction of the proposed project is anticipated to begin in 2011.

The proposed project is scheduled as follows:

Table 3. Project Schedule

Task	Date
Certificate of Site Compatibility	Anticipated October 2010
Land Acquisition	September 1, 2010
Permits	December 2010
Private Transmission Routing	Anticipated 2011[1]
Equipment & Construction	May 15, 2011
Turbine Erection & Commercial Testing	July 2, 2011
Commissioning	September 9–November 17, 2011
Commercial Operations	December 31, 2011

1 The proposed 230-kV transmission line will be permitted and constructed separately from this project by MDU.

1.5 Project Ownership

enXco has entered into agreements with Northern States Power Company (NSP), a Minnesota Corporation and wholly owned subsidiary of Xcel Energy to develop, construct, and operate the proposed 150 MW Merricourt Project. Ownership of the project is expected to be transferred from enXco to NSP upon the transactional close of a Purchase and Sale Agreement (PSA) anticipated to be no later than March 31, 2011. Upon PSA close, enXco assumes the primary contractor role for the construction of the project and is also responsible for the Operations & Maintenance duties once the project is commissioned. This arrangement is generally referred to as a "turn-key" project.

2.0 Need for Facility

2.1 Need Analysis

The United States Government, along with states serviced by NSP (North Dakota, South Dakota, Minnesota, Wisconsin, and Michigan), have adopted policies in recent years to proceed with initiatives to reduce the country's dependence on foreign oil and to reduce greenhouse gases produced via energy production and consumption. One way to meet these goals is to develop alternative sources of energy, including wind energy. As stated by the United States Department of Energy (DOE), "Wind energy diversifies the nation's energy supply, takes advantage of a domestic resource, and helps the nation meet its commitments to curb emissions of greenhouse gases, which threaten the stability of global climates."

The state of North Dakota has been identified as a leader in wind energy potential.[1] In a report commissioned by the North Dakota Division of Community Services, North Dakota has stated a desire to become a leader in "non-polluting wind generated energy" (PanAero Corporation, 1999).

The *EMPOWER North Dakota, 2008-2025 Comprehensive State Energy Policy* lists goals for renewable energy and wind energy for the state of North Dakota. One of the overall initiatives for the plan is to contribute to the helping the US's goal of limiting our dependence on foreign oil, while creating more jobs in the state and opportunities for economic development. Specially, three goals are outlined in the policy that relates directly to wind:

- Double North Dakota's energy production from all sources by the year 2025 to drive economic growth and help the nation achieve greater energy independence.
- Support the nation's 25x25 Initiative to derive at last 25% of all energy produced from renewable sources by 2025.
- Increase installed capacity of wind generation to 5,000 MW by 2020.

The development of the Merricourt Wind Farm will lead to a strengthening of the economic region and North Dakota as a whole through business expenses and state and local taxes.

The Merricourt Wind Power project is planned to aid NSP in meeting the renewable energy policies established by five upper Midwest states serviced by NSP. In addition, power produced from the proposed project would aid in supplying the continued gradual increase in power consumption of NSP's customers. North Dakota has established a Renewable Energy Objective that encourages the state's utilities to serve 10% of the energy they provide from renewable resources by 2015. The four additional states serviced by NSP also passed similar legislation. By 2020, NSP will be required to meet 30% of its retail requirements in Minnesota with renewable resources and, of this, 25% must be served by wind generation. In Wisconsin, effectively 15% of the energy sold must be from renewable sources by 2015. In South Dakota and Michigan, 10% of NSP's energy sold must be from renewable resources by 2015. The power produced by the proposed project will enter the electrical grid and be consumed by customers within NSP's five state jurisdiction. The Merricourt Wind Power Project is needed as an essential step in meeting the combined policy objectives in all of NSP's jurisdictions, including North Dakota.

1 Pacific Northwest Laboratory. *An Assessment of the Available Windy Land Area and Wind Energy Potential in the Contiguous United States, 1991.*

In addition, the project is needed to maintain cost effectiveness while meeting the growing needs of NSP customers in an environmentally sound matter. A diversified energy portfolio provides security against fuel price volatility in the future.

2.2 Alternatives

Two alternatives were analyzed regarding construction of the proposed wind farm. Under Alternative A (No Build), the project would not be constructed and there would be no impacts to the surrounding environment. Under Alternative B (Build), the wind farm would be constructed and options regarding turbines, access roads, collector lines, operation & maintenance (O&M) building, and substation location will be analyzed to minimize impacts.

- **Alternative A (No Build):** Under the no build alternative (Alternative A), the PSC would not authorize the development of the proposed wind farm. There would be no environmental impacts associated with Alternative A; however, local producers would not receive easement payments and the local communities would not see the economic benefits associated with construction and operation of the wind farm. In addition, NSP, other local utilities, and the five states serviced by NSP would not be able to use power produced by the proposed wind farm in meeting their renewable energy standards.
- **Alternative B (Build):** Under the build alternative (Alternative B), the proposed 150 MW Merricourt Wind Power Project would be constructed within the Project Area identified on Figure 1. Project Area on page A-3, in Appendix A. A total of 100 turbines would be constructed out of the 122 turbine locations analyzed for this application. In addition, a substation, access roads, collector lines, and the O&M building would be constructed as described in the following sections. The final location of all project components under the build alternative will be selected to avoid or minimize environmental impacts associated with the construction and operation of the project. Any impacts that cannot be avoided or minimized shall be mitigated as necessary.

2.3 Ten-Year Plan

The Merricourt Wind Power Project is consistent with the July 2009 Xcel Energy Ten-Year Plan. A copy of the July 2009 Xcel Energy Ten-Year Plan is on file at the PSC.

3.0 Site Selection Criteria

The preliminary micro-siting for turbines has been conducted based upon the identified positive wind regime, while accounting for the necessary setbacks and avoiding environmentally sensitive areas.

3.1 Exclusion Areas[2]

Per Section 69-06-08-01 of the North Dakota Administrative Code, certain geographical areas shall be excluded from energy facility siting consideration. In addition, a buffer zone shall be implemented around these areas to protect their integrity. Please refer to Figure 3. Exclusion Areas on page A-5[3], in Appendix A and Table 4. Summary of Exclusion Areas on page 12.

Additional areas were also excluded from the development of WTG layout and/or have setbacks. These include:

- Occupied residences — a minimum setback of 1,500 feet
- Churches/cemeteries — a minimum setback of 800 feet
- Overhead Utilities — a minimum setback of 500 feet
- Gravel pits — a minimum setback of 700 feet

2 As defined in North Dakota Administrative Code 69-06-08-01, exclusion criteria are defined as "criteria that remove areas from consideration for energy conversion facility sites and transmission facility routes." Exclusion areas are composed of these limiting criteria.

3 Archaeological sites remain confidential and are not identified on the figure. The purpose of this is to protect the integrity of the sites from intentional disturbance.

Table 4. Summary of Exclusion Areas

Exclusion Area	Present within Project Site	Proposed Buffer	Section Addressed
Designated or registered national areas; parks; memorial parks; historic sites and landmarks; natural landmarks; historic districts; monuments; wilderness areas; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands.	Present	25-foot buffer from USFWS wetland[1] and grassland easements[2], 1,320-foot setback from USFWS Waterfowl Production Areas	7.8, 7.9
Designated or registered state areas; parks; forests; forest management lands; historic sites; monuments; historical markers; archaeological sites; grasslands; wild, scenic, or recreational rivers; game refuges; game management areas; management areas; and nature preserves.	Present	A 100-foot setback is being used from known archaeological sites	7.8, 7.9
County parks and recreation areas; municipal parks; parks owned or administered by other governmental subdivisions; hardwood draws; and enrolled woodlands.	None	N/A	7.4, 7.9
Prime farmland and unique farmland, as defined by the land inventory and monitoring division of the Soil Conservation Service, United States Department of Agriculture in 7 CFR part 657; provided, however, that if the PSC finds that the prime farmland and unique farmland that will be removed from use for the life of the facility is of such small acreage as to be of negligible impact on agricultural productions, such exclusion shall not apply.	Present	Approximately 31.1 acres of prime farmland and 15.1 acres of farmland of statewide importance will be permanently impacted by the proposed construction. The acreage of farmland that is being removed will be minor in terms of total farmland within the study area. No buffer is proposed.	7.10, 7.11
Irrigated land.	None	N/A	7.10
Areas critical to threatened or endangered animal or plant species.	Present	75-foot buffer from USFWS protected wetland easements. No permanent impacts to wetlands.	7.17
Areas where animal or plant species that are unique or rare to this state will be irreversibly damaged.	None	N/A	7.15, 7.16, 7.17

1 Setbacks from USFWS wetland easements are based solely upon the wetland basins protected under the wetland easements.

2 In coordination with the USFWS Kulm Wetland Management District, a number of grassland easements were signed into protection in the last year. According to the District, enXco's wind easements supersede the newly acquired USFWS grassland easements; therefore, a number of turbines and associated facilities have been sited on these new easements. However, coordination for minimization measures to the newly acquired grassland easements is ongoing with the District.

3.2 Avoidance Areas[4]

Per section 69-06-08-01 of the North Dakota Administrative Code, certain geographical areas shall not be approved for use as energy conservation facilities unless the applicant shows that, under the circumstances, there is no reasonable alternative. In determining whether an avoidance area should be designated for a facility, the PSC may consider the following: the proposed management of adverse impacts; the orderly siting of facilities; system reliability and integrity; the efficient use of resources; and alternative sites. In addition, a buffer zone shall be implemented around these areas to protect their integrity. Please refer to Figure 4. Avoidance Areas on page A-6[5], in Appendix A and Table 5. Summary of Avoidance Areas.

Table 5. Summary of Avoidance Areas

Avoidance Area	Present within Project Site	Proposed Buffer	Section Addressed
Historical resources which are not designated as exclusion areas.	Present	A 100-foot buffer will be used from isolated archaeological finds	7.8
Areas within the city limits of a city or the boundaries of a military installation.	None	N/A	7.5
Areas within known floodplains as defined by the geographical boundaries of the 100-year flood.	None	N/A	7.13
Areas that are geologically unstable.	None	N/A	7.12
Woodlands and wetlands.	Present	A minimum 75-foot buffer will be used from all delineated wetlands. No woodlands are present.	7.10, 7.14
Areas of recreational significance which are not designated as exclusion areas.	None	N/A	7.9

Avoidance Measures (including access roads and other ancillary facilities):

- Total avoidance of all USFWS protected wetlands and no siting of permanent structures within wetlands.
- Total avoidance of identified cultural resource sites and artifacts.
- Elimination of any overhead power lines in the project site design (to the point of interconnect) to avoid avian impacts.
- Minimum setback of ¼-mile construction buffer for the red-tailed hawks and Swainson's hawks.

4 As defined in North Dakota Administrative Code 69-06-01-01, avoidance criteria are defined as "criteria that remove areas from consideration for energy conversion facility sites and transmission facility routes unless it is shown that under the circumstances there are no reasonable alternatives." Avoidance areas are composed of these limiting criteria.

5 Sensitive historical resources, such as unevaluated archaeological sites, remain confidential and are not shown on the figure. The purpose of this is to protect the integrity of the sites from intentional disturbance.

- A construction buffer of ½-mile from all active ferruginous hawk nests from March 15–July 15.
- A ¼-mile construction buffer for sharp-tailed grouse during March 15–May 15 will be put in place on all active lek sites.

These parameters reflect the minimum efforts made to date by enXco in the project's design; the final site design may include greater setbacks and additional measures than identified above. In fact, enXco's consultation with the USFWS regarding avian and bat impacts (specifically the whooping crane) have not yet concluded. As such, there may be additional conservation measures put into place to avoid, minimize, or mitigate potential impacts to specific species.

3.3 Selection Criteria[6]

Per section 69-06-08-01-3 of the North Dakota Administrative Code, a site shall be approved in an area only when it is demonstrated to the PSC by the applicant that any significant adverse effects resulting from the location, construction, and operation of the facility in that area, as they relate to the following, will be at an acceptable minimum, or that those effects will be managed and maintained at an acceptable minimum. Exclusion and avoidance areas, along with selection criteria described in the above section, were evaluated and taken into account when determining the Project Area and preliminary individual siting of the wind turbines. Please refer to Table 6. Summary of Selection Criteria.

Table 6. Summary of Selection Criteria

Selection Criteria	Potential Adverse Effect from Project	Section Addressed
The impact upon agriculture:		
(1) Agricultural production.	Approximately 112.6 acres of native rangeland and 272.8 acres of potential cropland will be permanently impacted due to wind turbine and access road construction.	7.3, 7.10, 7.15
(2) Family farms and ranches.	Economic losses to producers due to conversion of potential farmland may occur; however, economic losses are anticipated to be minor in comparison to additional income provided by the wind farm. Additionally, enXco has maintained a distance of 1,500 feet from occupied homes in order to minimize the turbine induced noise levels at each residence	7.6, 7.10
(3) Land which the owner demonstrates has soil, topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation.	No impacted owners have expressed concerns over land that is economically suitable for irrigation. No adverse impacts are anticipated.	N/A
(4) Surface drainage patterns and ground water flow patterns.	No adverse impacts are anticipated to surface drainage or groundwater flow patterns.	7.12, 7.13

6 As defined in North Dakota Administrative Code 69-06-01-01, selection criteria is defined as "criteria" that guide and govern the selection of energy conversion facility sits and transmission facility corridors and routes in order to minimize adverse human and environmental impact after the exclusion and avoidance criteria have been applied.

Selection Criteria	Potential Adverse Effect from Project	Section Addressed
(5) The agricultural quality of the cropland.	No adverse impacts to agricultural quality of cropland are anticipated. Landowners will be compensated for the placement of the turbines on their property and will be reimbursed for revenues lost due to temporary crop damage. enXco will alleviate any compaction issues caused by construction activities, if some occur.	7.3, 7.10
The impact upon the availability and adequacy of:		
(1) Law enforcement.	No adverse impacts are anticipated.	—
(2) School systems and education programs.	No adverse impacts to school systems and education programs are anticipated.	7.4
(3) Governmental services and facilities.	No adverse impacts to government services and facilities are anticipated.	—
(4) General and mental health care facilities.	No adverse impacts to general and mental health care facilities are anticipated.	7.4
(5) Recreational programs and facilities.	No adverse impacts to recreational programs and facilities are anticipated.	7.9
(6) Transportation facilities and networks.	There will be an increase in truck traffic during construction activities, up to approximately 200 additional daily trips during peak construction may occur. Turbines are not sited within 428 feet (1.1 x tower height) of jurisdictional gravel or paved roads. During facility operations no adverse impacts are anticipated.	7.4
(7) Retail service facilities.	No adverse impacts are anticipated to retail service facilities.	—
(8) Utility services.	No adverse impacts are anticipated to utility services.	7.4
The impact upon:		
(1) Local institutions.	No adverse impacts to local institutions are anticipated.	N/A
(2) Noise-sensitive land uses.	Noise sensitive land uses within the study area include residences near turbine sites. enXco has maintained a 1,500-foot wide setback distance for the placement of all turbines. A noise analysis was conducted to analyze potential noise impacts to residences and concluded the project is consistent with a rural setting; therefore, adverse impacts are not anticipated.	7.6
(3) Rural residences and businesses.	No turbines will be placed within 1,500 feet of occupied residences and businesses; therefore, no adverse impacts are anticipated.	7.6
(4) Aquifers.	No aquifers occur within the Project Area; therefore, no adverse impacts to aquifers are anticipated.	7.12
(5) Human health and safety.	No adverse impacts to human health and safety are anticipated.	7.5

Selection Criteria	Potential Adverse Effect from Project	Section Addressed
(6) Animal health and safety.	Generally, no adverse impacts to animal health or safety concerns are anticipated. Measures to keep livestock away from construction activities will be used as necessary. Setbacks are being implemented to minimize potential impacts to avian species. Coordination is ongoing with USFWS to ensure that any potential risks to whooping cranes are minimized and/or mitigated prior to construction.	7.16, 7.17
(7) Plant life.	Temporary and permanent vegetation impacts would occur during construction. Approximately 112.6 acres of native rangeland would be permanently impacted by the project.	7.15
(8) Temporary and permanent housing.	Temporary housing may be utilized in the form of motels, rental housing, and/or trailers during construction. Local housing facilities will experience short-term economic benefits. No long-term adverse impacts are anticipated.	—
(9) Temporary and permanent skilled and unskilled labor.	Short-term economic benefits may occur to temporary and permanent skilled and unskilled labor during construction. No long-term adverse impacts are anticipated.	3.6, 4.2
The cumulative effects of the location of the facility in relation to existing and planned facilities and other industrial development.		
Cumulative effects	No effects anticipated. The project generally avoids developed areas and would comply with local ordinances.	7.3

3.4 Policy Criteria[7]

Per section 69-06-08-01 of the North Dakota Administrative Code, the PSC may give preference to an applicant that will maximize benefits through the adoption of up to 13 criteria related to the applicant's policies and practices (The PSC may also require the adoption of such policies and practices). The table below identifies those 13 criteria and describes whether and how the applicant's policies and practices are consistent with these policy criteria. Please refer to Table 7. Summary of Policy Criteria on page 17. In addition, the PSC may also give preference to an applicant that will maximize interstate benefits.

7 As defined in North Dakota Administrative Code 69-06-08-01 policy criteria is defined as "criteria" that guide and govern the selection of energy conversion facility sits and transmission facility corridors and routes in order to maximize benefits during the construction and operation of a facility.

Table 7. Summary of Policy Criteria

Policy Criteria	Applicant's Policies and Practices	Section Addressed
Recycling of the conversion byproducts and effluents	None	N/A
Energy conservation through location, process, and design	The proposed project has been designed to maximize energy conversion where available.	1.3.2
Training and utilization of available labor in this state for the general and specialized skills required	The proposed project is anticipated to create approximately 200 construction jobs, 8-12 long-term operations and maintenance jobs, and 300 manufacturing jobs. enXco will use skilled and trained labor from this state wherever possible.	2.1, 3.6
Use of a primary energy source or raw material located within the state	The energy generated will come from the available wind resources of the state.	1, 2.1
Nonrelocation of residents	No relocation of residences is anticipated.	N/A
The dedication of an area adjacent to the facility to land uses such as recreation, agriculture, or wildlife management	The proposed project is not anticipated to impact adjacent land uses.	N/A
Economies of construction and operation	Local contractors will be utilized wherever possible. The project is expected to boost the local economy.	7.2
Secondary uses of appropriate associated facilities for recreation and the enhancement of wildlife	None	N/A
Use of citizen coordinating committees	enXco will work with landowners throughout the project process.	6.41, 6.43
A commitment of a portion of the energy produced for use in this state	Power produced from the proposed wind farm will enter the MISO electrical grid and be available for use by NSP's five state region.	2.1
Labor relations	No impacts to labor relations are anticipated.	N/A
The coordination of facilities		
Monitoring of impacts	Best Management Practices will be in place wherever possible. Monitoring of the project will occur throughout the installation of the turbines and access roads.	7.8, 7.14, 7.17

3.5 Design and Construction Limitations

In addition to the design and construction limitations associated with avoidance and exclusion areas, which were previously discussed, design and construction limitations encountered while finding a location for the proposed wind farm included a suitable Project Area and willing landowners. The Project Area had to be large enough to provide the project with economies of sufficient wind resources. Landowners within the Project Area also have to be willing to allow construction of wind turbines on their property.

3.6 Economic Considerations

NSP will distribute this renewable energy resource for the benefit of local and regional area residents. Further, according to national averages provided by the AWEA, a 150 MW wind energy project will create approximately 200 temporary construction jobs, 8 to 12 long-term operation and maintenance jobs, and 300 manufacturing jobs. These high-skilled, high-paying positions will contribute payroll dollars to the rural portions of North Dakota. These full-time personnel are likely to live in the immediate or surrounding communities near the proposed project. In addition, lease payments will be made to landowners for placement of wind turbines, access roads, and collector lines.

The project will contribute significantly to the State and local communities through additional tax revenues and other fees. For an eligible wind turbine, the taxable value is calculated at 1.5% of assessed value if the construction of the wind turbine is completed after June 30, 2006 and before January 1, 2015. Local mill levees may also apply.

4.0 General Description of Proposed Facility

4.1 Wind Power Technology

Wind turbines convert the kinetic energy of wind into rotational energy of a rotor and drivetrain. This energy is in turn converted into electrical power by industrial generators integrated within the wind turbine housing. In the technologies considered for this facility, this will be accomplished through a gear, which will amplify the speed of the rotor to achieve the higher speed required of the generator. An automated pitch system will control the speed of the rotor by turning the face of each rotor blade into or out of the wind. Such a system will typically operate in a wind speed range of 7 to 56 mph, beyond which the system will activate a brake to arrest rotation. Constant power output will be further accomplished through the use of power electronics, which convert generator output to achieve required output voltage and frequency control. An integrated wind speed and direction monitoring system works with a yaw motion control system to keep the face of the turbine presented into the wind.

Voltage from the turbine generator will be increased through the use of industrial step up transformers, which commonly increase the voltage to 34.5-kV for injection into a collection system. The collection system will consist of electrical cable, often organized into discrete circuits of interconnected wind turbines. These circuits will be connected to a substation which will further increase the voltage to levels required for the targeted transmission system. The substation will also provide protective isolation switching and energy measurement functions.

Monitoring and control of each wind turbine will be accomplished through the use of software typically provided by the wind turbine supplier. Information will be carried on communication lines connected to each turbine and transmitted from the wind energy facility by telephone carrier. This will allow remote monitoring and control by turbine suppliers, operation and maintenance providers, and wind farm owners.

GE 1.5sle turbines are being considered for this project. Specifications of this turbine type are given in the following table. Please refer to Table 8. Turbine Specifications.

Table 8. Turbine Specifications

Power Output	1.5 MW
Hub Height	262 feet
Rotor Diameter	253 feet
Cut-In Wind Speed	7.8 mph
Cut-Out Wind Speed	55.9 mph
Rated Wind Speed	31.3 mph
Rotor RPM[1] Range	10.1 to 20.4
Cold Temp Limit	To -30° Celsius
Generator	Doubly-fed three-phase asynchronous generator

1 Revolutions per minute

4.1.1 Wind Energy Center Layout

The following sections discuss the proposed layout in terms of placing the 100 GE 1.5sle wind turbines in the Project Area, as well as the proposed infrastructure that is necessary for the operation of the proposed project.

Orientation and Spacing

Turbines have been oriented and spaced to maximize turbine exposure in the prevailing wind directions while minimizing downwind wake effects and turbulence to adjacent and nearby turbines within the site. Turbines are spaced 231 meters (3 rotor diameters [RD]) apart in non-prevailing wind directions and 616 meters (8 RD) apart in prevailing wind directions. There is an ellipse around each wind turbine with a major axis of 8 RD and a minor axis of 3 RD. Further, the site layout utilizes the natural geomorphology of the area to maximize energy production, while avoiding sensitive environmental features, cultural resources, and geotechnical constraints.

Facility Layout

Wind-powered electric generation is primarily dependent on the availability of the wind resource at a specific location. enXco has developed a site layout that maximizes use of the site's wind resources while minimizing or avoiding impacts to environmental and cultural resources. Analysis of enXco's wind resource data suggests that optimal turbine alignments are generally wind turbine strings running east-west in the low relief areas on the site, and following on, or near, the top of ridges in the high relief areas on the site subject to the site's constraints. These alignments are such that distance between turbines in the primary wind directions is maximized to increase energy and reduce wake effects and turbulence to nearby downwind turbines.

Setbacks

The turbine layout incorporates setbacks from occupied residences, roads, and land over which the wind rights are not controlled, as well as culturally and environmentally significant features. Setbacks were determined using PSC guidelines, past experience on similar projects, and recommendations from resource experts (e.g., biologists and archaeologists). enXco has maintained a setback distance of 1,500 feet from occupied homes in order to minimize the turbine induced sound levels at each residence. Turbines are not sited within 428 feet (1.1 x tower height) of jurisdictional gravel or paved roads. The minimum distance maintained from local trails is 200 feet, field reviews of these areas indicate minimal to no traffic use and no routine maintenance. In the area outside of Spring Valley Township, the maintained distance from unsigned land is 632 feet (2.5 x RD), and in Spring Valley Township, 1,263 feet (5 x RD) to comply with the county and township zoning ordinances. There are a number of cultural resource sites in the Project Area, and turbines and access roads have been located to fully avoid these sites during construction and operation of the wind project. Turbines are located a minimum distance of 75 feet away from wetlands and 1,320 feet away from Waterfowl Production Areas to reduce the impact on the landscape and the wildlife that use those areas. Please refer to Table 9. Wind Turbine Setbacks on page 21.

Table 9. Wind Turbine Setbacks

From	Minimum distance
Delineated wetland edge (including wetland easements)[1]	75 feet
Waterfowl Production Areas	1,320 feet
Grassland easement[2]	25 feet
Occupied residence	1,500 feet
Non-occupied buildings	500 feet
Transmission overhead lines	500 feet
Maintained jurisdictional road	1.1 x tip height
Identified cultural resource	100 feet
Land Mobile Station	1,300 feet
Red-tailed hawks and Swainson's hawks	1/4-mile construction buffer
Ferruginous hawk nests	1/2-mile construction buffer March 15–July 15
Active sharp-tailed grouse leks	1/4-mile construction buffer March 15–May 15

1 Setbacks from USFWS wetland easements are based solely upon the wetland basins protected under the wetland easements.

2 In coordination with the USFWS Kulm Wetland Management District, a number of grassland easements were signed into protection in the last year. According to the District, enXco's wind easements supersede the newly acquired USFWS grassland easements; therefore, a number of turbines and associated facilities have been sited on these new easements. However, coordination for minimization measures to the newly acquired grassland easements is ongoing with the District.

Associated Infrastructure

- Each turbine will sit atop a concrete foundation whose size and design will be finalized once geotechnical analyses have been completed. Please refer to Figure 5. Foundation Design Plan Sheet on page A-7, located in Appendix A.
- Each turbine will also have an associated crane pad occupying an area of approximately 125 x 25 feet. The crane pad will provide a working surface for the crane during turbine erection and subsequent maintenance.
- Construction and service access to each turbine location will be facilitated by a compacted gravel road by using as many existing roadways and section lines as possible. These will be designed in consultation with the landowner and be constructed so as to minimize total land consumption, cost, and impact to land use.
- An electrical collection system consisting of buried conductors will interconnect all turbines to the wind farm substation. This system will operate at 34.5-kV and will be buried to minimize cost and land consumption, while facilitating access.
- The total disturbed surface area of the project will be known once final design is approved, but it is estimated to be less than 3.0% of the total area within the Project Area.

4.2 Associated Facilities

The wind power facility will share several key resources, as outlined below:

Maintenance Building

An O&M facility will be associated with the project; however, a final location for this facility has not yet been selected. The O&M facility will consist of approximately 4,000 square feet of space divided roughly in half between staffing space to accommodate 8 to 12 full-time employees and work space for maintaining turbine components and storage of equipment and supplies. The land used for such a facility will be purchased and, ideally, will be centrally located within the project's boundary.

Laydown Area

A temporary laydown area will be associated with the project; however, a final location has not yet been selected. The area will be leased and consist of approximately 5–8 acres. It will host numerous temporary construction trailers, materials and parking for construction workers. Depending on the capabilities and availability of local aggregate services this site may also host a concrete batch plant. The site will be strategically located to best accommodate construction personnel and activities and it will be cleared and reclaimed at the conclusion of the project's construction.

Collector Substation

A 230-kV/34.5-kV electrical substation will be associated with the project. The substation will consist of approximately 5–6 acres with a graded pad approximately 500 feet x 500 feet. The substation equipment will include two 230-kV/34.5-kV step-up transformers; switching, protection, and metering equipment; as well as a small control house. The entire substation yard will be secured with a chain link fence. This substation will collect (via underground cable) power from the proposed Merricourt Wind Power Project at a 34.5-kV voltage then condition the power and step it up to an interconnect voltage of 230-kV. The power will be transmitted to a 230-kV interconnect substation to be designed, permitted, built and operated by MDU, separately from the proposed project. The location for the collector substation has been selected, and the necessary land is currently in the process of being acquired. Until the purchase transaction is complete, this location is subject to change. The two substation facilities (collector substation and interconnect substation) are expected to be built directly adjacent to each other and, at this time, the overhead transmission line necessary to connect the two substation facilities is not expected to exceed 100 feet.

Transmission Feeder Line

Power from the wind turbines will be collected at a collector substation and transmitted to a proposed Interconnection Substation. This line is not anticipated to exceed 500 feet in length. A 230-kV MDU transmission line is being proposed from the Interconnection Substation, approximately 30 miles in length. This 230-kV transmission line will connect the proposed Merricourt Wind Power Project to the existing MDU Ellendale substation. The transmission line will be permitted under a separate application to the PSC and constructed independently from this project by MDU.

4.3 Land Rights

The Project Area/WRA initially encompassed 32,000 acres, and was then revised down to a 22,457-acre Project Area. The final Project Site is expected to be approximately 12,000 acres. There are easement interests on 22,280 acres with 32 different landowners. Execution of leases and lease terms were done in compliance with North Dakota State law in place at the time of the lease agreements.

5.0 Proposed Site

5.1 Identification of Project Site

The Project Area initially identified for the project was based on the wind regime, community interest in the area, and the ability and proximity to interconnect to the existing electrical system.

As described in Section 1.2, the initial Project Area or wind resource area was approximately 32,000 acres or 50 square miles. Based on data received through agency feedback, literature reviews and site studies, the current Project Area has been narrowed down to approximately 22,457 acres and once the evaluation is complete, enXco expects that the final Project Site will consist of approximately 12,000 acres. The entire Project Area is located in a rural location with sparsely scattered farmsteads occurring throughout. The Project Area is situated along a higher native ridge and the lower elevations on each side of the ridge. The main ridge is primarily used for livestock grazing and the lower elevations on each side of the ridge for farming. The lower elevations on each side of the ridge consist of gently rolling land with numerous wetland basins.

5.2 Wind Resource Areas—General

The US DOE and the North Dakota Division of Community Services have conducted wind resource assessment studies in North Dakota. The February 2010 US DOE wind map for the state of North Dakota indicates that the wind resources within the Project Area are Class #4 winds or greater. Class #4 winds have an average annual wind speed of approximately 16 mph.[8]

5.3 Wind Characteristics in Project Site

AWS Truewind, LLC was retained by enXco to evaluate the long-term wind resource and energy production potential within the Merricourt Wind Power Project Area. AWS submitted its findings in the report: *Estimation of the Wind Resource and Energy Production of the proposed Merricourt Wind Power Project.* Four meteorological towers were constructed in the general area of the proposed project in May of 2003. Two of the towers have been removed. The remaining two towers are still actively collecting data. These towers collect average and annualized wind speeds, shear exponent, turbulence intensity, Weibull parameters, and air density. Data collected from the meteorological towers was used to predict a net annual capacity factor of approximately 40–50%.

8 Based on 50m above the ground.

6.0 Engineering and Operational Design Analysis

This section provides an overall summary of the proposed project, including project layout and associated facilities, turbine components, electrical systems, construction, schedule, operations, and site decommission. A summary of information is also included in Appendix B, Design Data Report.

6.1 Project Layout and Associated Facilities

The proposed project will consist of an array of 100 wind turbine generators (WTGs) and padmount transformers at the base of each WTG, approximately 29.4 miles of access roads to primary turbines, approximately 46.5 miles of underground electrical collector cables to primary turbines, a collector substation, an Operations & Maintenance Building and a temporary laydown yard.

Access roads shall be installed to provide access to each wind turbine generator for construction, maintenance and operational purposes. The underground electrical collector cables shall be installed to transmit the generated power from each wind turbine generator to the collector substation which will condition and step-up the generated power to the interconnect voltage specified in the Generation Interconnect Agreement with the transmission owner. The Operations & Maintenance facility will provide long-term facilities for the operation and maintenance of the project and the laydown yard will be used temporarily to host construction trailers, equipment and parts, employee parking and potentially a concrete batch plant.

6.2 Description of Wind Turbines

enXco plans to utilize GE 1.5sle turbines for the project. A description of this turbine type is included below. Please refer to Table 10. Turbine Description.

The turbines will be controlled and monitored by supervisory control and data acquisition (SCADA) communication technology, allowing for the simultaneous control of many wind turbines.

Table 10. Turbine Description

Rated Capacity	1.5 MW
Begin Operation Wind Speed	7.8 mph
Capacity Reached Wind Speed	31.3 mph
Maximum Operation Wind Speed	55.9 mph
Withstandable Wind Speed	100 mph

6.2.1 Rotor

A rotor consists of three blades mounted to a central rotor hub. The hub attaches to the nacelle, which houses the gearbox, generator, break, cooling system, and other electrical and mechanical systems. Please refer to Table 11. Rotor Description.

Table 11. Rotor Description

Rated Capacity	1.5 MW
Rotor Diameter	253 feet
Swept Area	50,128 square feet
Rotor Speed	10.1 to 20.4 rpm

6.2.2 Tower

The towers, on which the nacelle is mounted, will be constructed of conical tubular steel, with a hub height of 262 feet. All

tower welds will be made according to specifications established by the American National Standards Institute. Surfaces of the tower components will be sandblasted and coated to protect against corrosion. A secured door at the base of the tower will provide internal access to the turbine.

6.2.3 Lightning Protection

Lightning and grounding protection for all wind farm equipment will be designed and constructed to comply with all applicable National Electrical Code and National Electric Safety Code requirements. Grounding and shielding components will be integrated into the foundation and structural elements of all equipment and conductor lines. In particular, each turbine will include conductive elements in the blades and a complete grounding and shielding network within the turbine, tower, and foundation. All turbine lightning protection systems will adhere to the turbine manufacturer's specifications.

6.3 Description of Electrical System

enXco has contracted the design of the project's electrical collector system to POWER Engineers, Inc. The design work includes analysis of the project to ensure the facility will meet the power factor, voltage control specifications, protective relay settings, and selectivity requirements for the project's electrical system and the Transmission Owners system, as required by the MISO.

Power from each turbine will be generated at 690 volts (V) and fed down the tower from the generator. It would pass through the power conditioning equipment and breaker panel out to a padmount transformer. The padmount transformer steps the voltage up to an internal collector system voltage of 34.5-kV.

The 34.5-kV / 690-V padmount transformers will meet all state code requirements, as well as industry standards and will be configured in a loop fed, dead front arrangement. All transformers will be equipped with locking doors to prevent unauthorized entry.

The collector system will use direct burial collector cables that will run from the turbines to a centrally located collector substation. These underground cables will be plowed or trenched into the ground to a nominal depth of 48 inches, pending the final results of the geotechnical investigation. A non-degradable warning tape will be installed 12 inches above the collector cables and the locations of all underground collector cables will be cataloged using a GPS system and filed with the State of North Dakota as required.

The collector substation will consist generally of two 230-kV / 34.5-kV step-up transformers, switching, protection, and metering equipment, as well as a small control house. Power from the turbines will be collected at this substation and transmitted to a proposed Interconnection Substation via a 230-kV transmission line; this line is not expected to exceed 500 feet in total length end to end. MISO completed all the required study work to interconnect the power generated from this project onto regional transmission system in 2009, and a Generator Interconnect Agreement was filed with the Federal Energy Regulatory Commission (FERC) in March 2010.

6.4 Construction Processes

A variety of activities must be completed to carry the project through construction. Below is a preliminary list of activities needed to develop the project. Pre-construction, construction, and post-construction activities for the project include:

- Site development, including access roads;
- Foundation excavation;
- Pouring concrete foundations;
- All electrical and communications installation;
- Tower assembly and machine erection;
- System testing and commissioning;
- Site reclamation and cleanup;
- Substation; and
- O&M building.

Permanent access roads will provide access to the turbines both during and after construction. The roads will be approximately 16 feet wide and have a Class 5 gravel surface. Class 5 gravel is considered adequate to support the size and weight of construction and maintenance vehicles. All access roads will meet state and local requirements.

During the construction phase, construction equipment and worker vehicles will travel to and from the site. It is estimated that there may be up to approximately 200 trips generated per day during peak construction periods. Peak construction periods are anticipated to be when the majority of the foundation and tower assembly are taking place. Upon completion of construction, heavy equipment will be removed from the site.

To minimize impact to local agricultural business and residents, enXco and its subcontractors are planning to meet with local landowners and their farm tenants (where applicable) to gain input on construction practices that could be implemented, in addition to BMPs, during the construction phase of the project. enXco and its subcontractors will use good faith efforts to implement reasonable suggestions gathered from landowners and farm tenants in the area.

6.4.1 Construction Management

enXco and its subcontractors will perform the construction management services for the project and maintains a high level of expertise in construction methods, budgets, and schedules. In addition, enXco and its subcontractors have an intimate knowledge of project design standards and engineering practices, and of owner, operator, and lender requirements.

Generally, enXco and its subcontractors will undertake the following activities independently or in coordination with qualified contractors:

- Securing the building, electrical, and grading permits;
- Performing detailed civil, structural, and electrical engineering;
- Scheduling execution of construction activities;

- Completing surveying and geotechnical investigations; and
- Forecasting project labor requirements and budgeting.

enXco and its subcontractors will oversee all aspects of the construction process, including the installation of communication and power collection lines, the collector substation, the installation of access roads, concrete foundations, towers, and the erection of the wind turbines. The project will be constructed under the direct supervision of enXco's on-site personnel and will employ qualified contractors.

Throughout the construction phase, ongoing coordination will occur between the project's development and construction teams. The on-site personnel will help coordinate all aspects of the project, including communication with local officials, citizen groups, and landowners. Even before the proposed project becomes fully operational, O&M staff will be integrated into the construction phase of the project. The enXco personnel and O&M staff manager will work together to ensure a smooth transition from construction through wind power plant commissioning and, ultimately, operations.

6.4.2 Foundation Design

The freestanding turbine towers will be connected by anchor bolts to an underground concrete foundation. The foundation will be designed to anchor the turbine in all weather conditions. Design parameters of the foundations will be dependent upon geotechnical surveys, tower load specifications, and cost considerations. Foundations for similar sized turbines are typically octagonal or circular in shape, 30 to 50 feet in diameter, and 7 to 10 feet thick.

6.4.3 Civil Works

The completion of the project will require various types of civil works and physical improvements to the land. These civil works primarily include the following:

- Improvements to existing roads within and to the project site;
- Construction of access roads to and between the wind turbines to allow construction and continued servicing of the wind turbines;
- Clearing and grading for wind turbine tower foundation installations;
- Plowing or trenching underground electrical collection cabling for connecting the individual wind turbines and transferring the power to the collection substation;
- Clearing and grading for pad-mounted transformers and other installations;
- Clearing and grading for collector substation equipment foundations and leveling of the substation yard;
- Installation of site fencing and security facilities; and
- Reclamation of staging and construction areas as well as certain improvements to existing roadways and intersections as necessary.

It is anticipated that improvements to existing access roads will primarily consist of re-grading and filling, as well as temporarily widening of roadway segments and/or intersections to allow for material deliveries. An access road will be constructed to each turbine, and landowner input has been solicited to assist in finalizing the access road location. Roads will be sited in areas with stable soils. All access

roads will include appropriate drainage and culverts and will allow for the crossing of farm equipment, if possible. The access roads will be approximately 16 feet wide and will be covered with road base designed to allow passage under inclement weather conditions. enXco and its subcontractors will be responsible for maintenance and snow removal of the installed access roads. Where applicable, enXco and its subcontractors will obtain the necessary haul permits and/or road maintenance agreements from state and local jurisdictions as necessary and follow relevant regulations.

Electrical and communications wires and cables will be plowed or trenched into the ground at a nominal depth of 48 inches, depending on the results of the final geotechnical investigation. Adequate spacing between the communication and electrical wires will ensure no interference between the lines.

6.4.4 Commissioning

The project will be commissioned after completion of the construction phase. The five major subsystems that comprise a wind power plant (e.g., turbines, communication system, meteorological system, electrical collection system, and wind power plant SCADA System), and the project as a whole, will undergo detailed inspection and testing procedures. Applicable manufacturer's inspection criteria will augment the inspection process and the project's acceptance is dependent upon cooperation of each component within the major wind power plant subsystems.

6.5 Project Operation and Maintenance

enXco has entered into a multi-year contract with NSP to operate and maintain the project. enXco's operations and maintenance team will be responsible for daily operations and scheduled and unscheduled maintenance — as required by the equipment manufacturers, and in accordance with good utility practice — for the term of the contract.

The project will be staffed with approximately 8 to 12 full-time site technicians, a wind power plant supervisor, and additional support staff as appropriate. The site technicians will be responsible for performing daily plant checks and resets, as well as scheduled and non-scheduled maintenance.

Generally, the project will be staffed five days per week. At all other times, O&M personnel will be on-call, and the project will be monitored by remote monitoring and control capabilities as described below.

6.5.1 Project Control Management and Service

The wind turbines, as well as certain circuit breakers, metering and meteorological equipment, would be monitored by a centralized SCADA system. The SCADA system is designed to monitor the condition of the wind plant equipment, alert service technicians to any fault or alarm conditions, and also record and sort data relating to availability, kWh production and turbine performance.

If a turbine faults off line or if a collection system circuit breaker trips, an error code is enunciated on the SCADA system, which is monitored by enXco's Operations Control Center (OCC). The OCC technician then notifies the on-site technicians, who respond as appropriate. During times when the plant is not staffed, the OCC technicians take into account the type of fault being shown, current energy production, projected energy production, time until a regularly scheduled technician will be available,

and special instructions by the owner. Using these criteria the OCC technician notifies the plant operator and, if appropriate, deploys an on-call technician at the site to correct the fault.

6.5.2 Maintenance Schedule

The project will require scheduled maintenance of the individual wind turbines, the transmission facilities, and the site improvements (e.g., roads, gates, and fences). Estimates of the duration and scheduling of the maintenance activities are based on enXco's experience in operating and maintaining similar projects, as well as those recommended by the equipment manufacturer. Scheduled maintenance of the wind turbines and transmission facilities will be completed whenever possible, at times when the wind speed at the site is insufficient for the project to produce power.

The preventative maintenance schedule will include, but is not limited to, the items identified in Table 12. Maintenance Schedule.

Table 12. Maintenance Schedule

Task
Semi-Annual Inspection
Control box/top cabinets (sensors, emergency stop switch)
Wind direction tracking (gliding areas, yaw drive, yaw position sensor, cable torsion safety switch, slide bearing, wind flag, anemometer)
Wind direction tracking (gliding areas, yaw drive, yaw position sensor, cable torsion safety switch, slide bearing, wind flag, anemometer)
External rotor blades
Annual Inspection
Switch Cupboards (door, floor place, and cable clamps)
Safety chain with centrifugal switch
Low tension main distribution (power switch)
Converter cabinets (low tension part, power switch, network contact)
Tower components including climb protection and resting platforms
External rotor blades
Blade fastenings
Rotor hub (rotor shaft fastening, pitch bearing fastening-outer ring), pitch bearing (fastening-inside ring)
Machine strap
Pitch motors
Pitch adjustment (pitch gearing, position switch)
Nose cone (general, entry to the hub)
Generator
Hydraulics (valves, hydraulic tubes, control block, pipe work, hydraulic)
Annual or Semi-Annual Inspection Depending on Component
Drive land (pillow block, shaft, gear box, oil cooler, decoupling for structure-borne noise, coupling, decoupling for the generator)
Braking hydraulics unit (brake disc, coatings, calipers)

6.5.3 General Maintenance Duties

Each wind turbine will require periodic scheduled maintenance in accordance with schedules and procedures required by the turbine manufacture. Generally, scheduled maintenance is conducted in two separate inspections at approximately six-month intervals. On average, the turbines will require 40 to 50 person hours of scheduled mechanical and electrical maintenance per year. Usually, no more than two turbines are serviced at any single time.

enXco will coordinate the timing cycle for service of collection system equipment with any scheduled outages planned whenever possible. If coordination of these service activities in conjunction with the purchasing utility is deemed impractical, enXco will attempt to schedule these service outages during low wind periods. enXco will provide data that may be required by the purchasing utility to respond to information requests from the following: Midcontinent Area Power Pool (MAPP), North American Electric Reliability Corporation (NERC), MISO, and Regional Transmission Organization (RTO) guidelines.

6.5.4 Operations and Maintenance Facility

An O&M facility will be associated with the project; however, a final location for this facility has not yet been selected. The O&M facility will consist of approximately 4,000 square feet of space divided roughly in half between staffing space to accommodate 8 to 12 full time employees and work space for maintaining turbine components and storage of equipment and supplies. The land used for such a facility will be purchased and, ideally, will be centrally located within the project's boundary.

6.6 Decommissioning and Restoration

Once the useful life of the project has expired, it will be decommissioned and project-related disturbances will be restored in a manner that is consistent with the surrounding land use. A commercial wind energy facility or individual wind turbine is considered to be at the end of its useful life if it ceases to generate electricity for a continuous period of 12 months. It is anticipated that the proposed project can be operated for approximately 30 years based on the types of equipment used.

Decommissioning shall take place in accordance with NDCC Chapter 69-09-09, Wind Decommissioning. According to the NDCC, decommissioning shall begin within 8 months and be completed within 18 months after determining the useful life of the turbine or facility has expired. Decommissioning activities include the removal of wind turbine nacelles, blades, towers, and foundations, as well as the removal of cables, access roads, and other facilities to a depth of 4 feet below grade. As the owner of the project, NSP will be responsible for decommissioning and restoration activities and the associated costs. A decommissioning plan shall be filed with the PSC prior to the commencement of operation of the project.

7.0 Environmental Analysis

This section describes the existing conditions within the Project Area. The existing conditions, or affected environment, are the baseline conditions that may be affected by the proposed project. This section discusses the direct environmental impacts of each project alternative. Indirect impacts are identified in the resource discussions where applicable. Mitigation measures, such as Best Management Practices (BMPs), which will avoid, minimize, or mitigate impacts, are discussed where appropriate.

In order to allow for flexibility in final siting and implementation of further avoidance and/or minimization measures, 22 alternative wind turbines sites were analyzed. Impacts discussed in the following sections are related to 122 turbines and associated access roads and collector lines. The final siting for the Build Alternative will consist of 100 turbines and associated access roads and collector lines; therefore, impacts resulting from the construction of the project are anticipated to be less than those discussed below.

7.1 Description of Environmental Setting

The Project Area is located in a rural portion of Dickey and McIntosh Counties in North Dakota. The Project Area is located west of ND Highway 56 and north of ND Highway 11. Other roadways in the Project Area range from well-maintained county and township gravel roadways, such as County Major Collector (CMC) 2610, County Road 3, and County Road 3A which run through the Project Area, to very low or minimum maintenance roadways and dirt trails. Cities and small towns near the Project Area include Merricourt (population unknown), Edgeley (population 637), Kulm (population 422), Fredonia (population 51), Ellendale (population 1,559), Forbes (population 64), and Ashley (population 882).

7.2 Demographics

The project is located in a rural area in southeastern North Dakota. The Project Area is located within portions of German and Spring Valley Townships in Dickey County and Antelope, Beresina, Iowa, and Rosenthal Townships in McIntosh County. Major employment industries within these counties include educational, health, and social services and agriculture, forestry, fishing and hunting, and mining. Both Dickey and McIntosh County have a higher than statewide average of individuals living below the poverty level and have lower per capita income than the state. Please refer to Table 13. Demographic Trends on page 33.

Table 13. Demographic Trends

County/Township	Population in 2000	% of County Population	Per Capita Income	% of Individuals Below Poverty Level
Dickey County	5,757	—	$15,846	14.8%
German Township	23	0.3%	$19,093	27.3%
Spring Valley Township	30	0.5%	$17,306	—
McIntosh County	3,390	—	$15,018	15.4%
Antelope Township	No data available	No data available	No data available	No data available
Beresina Township	No data available	No data available	No data available	No data available
Iowa Township	No data available	No data available	No data available	No data available
Rosenthal Township	No data available	No data available	No data available	No data available
Statewide	**642,200**	**—**	**$17,769**	**11.9%**

Source: US Bureau of the Census, Census 2000.

7.2.1 Demographic Impacts/Mitigation

- **Alternative A (No Build):** Alternative A would not affect area demographics.
- **Alternative B (Build):** The project will result in increased income to landowners receiving easement payments, which could raise the per capita income in Dickey and McIntosh Counties. It is not anticipated that the project will alter long-term population trends within Dickey or McIntosh Counties. No mitigation is required.

7.3 Land Use

The Project Area is located in a rural setting predominantly comprised of grasslands, which are primarily used for rangeland, and agricultural land, with grasslands making up approximately 62% and cultivated fields approximately 24.9% of the Project Area. Please refer to Table 14. Land Use, and Figure 6. Land Use on page A-8, in Appendix A.

Table 14. Land Use

Land Classification	Acreage	% of Project Area	Permanent Impacts (Acres)	Temporary Impacts (Acres)
Grasslands	13,920	62.0%	192.4	227.8
Cultivated	5,591	24.9%	65.6	98.6
Wetlands	222	1.0%	1.0	1.1
Wooded	19	0.1%	0.2	0.1
Open Water	1,852	8.2%	0.6	0.8
Commercial/Transportation	803	3.6%	12.6	8.9
Shrubland	50	0.2%	0.4	0.8

Source: National Agricultural Statistics Service (NASS), 2008

With the exception of Spring Valley Township in Dickey County, there are no zoning regulations within the Project Area. Spring Valley Township is primarily zoned agricultural. Per Spring Valley Township regulations, wind energy facilities are considered conditional uses and are required to obtain a Township Wind Energy Facility Siting Permit and implement other requirements such as lighting and setbacks from buildings and existing utilities.

In addition, the Natural Resources Conservation Service (NRCS) administers the Conservation Reserve Program (CRP). Agricultural landowners may enroll their land into the CRP, essentially taking the land out of production for a given timeframe to protect wildlife and water resources, and receive annual payments. Approximately 1,161.1 acres of CRP land occur within the Project Area.

7.3.1 Land Use Impacts/Mitigation

- **Alternative A (No Build):** Alternative A would not impact land use.
- **Alternative B (Build):** Construction of the project will result in the conversion of approximately 2.7% (611.1 acres) of the total land within the Project Area from existing land uses into a renewable energy resource and its associated facilities. Of this, approximately 1.2% (272.8 acres) of the total land conversion will be permanent. Temporary land conversion associated with construction staging areas and underground utility lines will cease following construction and will be returned to pre-construction land uses, which will primarily consist of agricultural practices on grasslands and cultivated lands. It is not anticipated that the conversion of existing land use would result in a trend toward modification of existing land use patterns. Conflicts with the existing development plans of state, local, or private entities within the Project Area are not anticipated as the project generally avoids developed areas. If turbines and associated facilities are sited within Spring Valley Township, the proposed project will comply with the zoning ordinances and obtain a Township Wind Energy Facility Siting Permit. Adverse impacts to land use are not anticipated; therefore, no mitigation is proposed.
- In addition, construction of the project would permanently impact approximately 31.2 acres and temporarily impact approximately 39.3 acres of CRP land. enXco will coordinate with the local Farm Service Agency for areas of CRP lands that cannot be avoided to determine seeding specifications for the reclamation of temporarily disturbed land and payment requirements for permanently disturbed land.

7.4 Public Services

Electrical Services

Electrical service in the Project Area is provided by KEM Electric Cooperative Inc. and Dakota Valley Electric Cooperative. Several large transmission lines are currently located within the Project Area. Please refer to Figure 7. Public Service infrastructure on page A-9, located in Appendix A.

Local Services

The Project Area is located in a rural part of North Dakota mainly composed of grasslands or cultivated land. Several small towns are located within 20 miles of the Project Area, though none are located directly within the Project Area. These towns provide sewer, water, and utility services, as well as many recreational opportunities such as a golf course, parks, fishing, hunting, and camping. The Ashley Medical Center, located in Ashley, is the closest facility providing medical services. The facility includes a hospital and two clinics. The hospital includes 26 beds, which are designated as swingbeds. In addition, a satellite clinic is provided in Kulm. Local medical services also include dental, chiropractic, veterinary, and nursing home/assisted living facilities. Several of the communities have school systems providing Kindergarten through 12th Grade.

Roads

Major roadways near the Project Area include ND Highway 56 on the east side of the Project Area and ND Highway 11 to the south. Other roadways in the Project Area range from well-maintained county and township gravel roadways, such as CMC 2610, County Road 3, and County Road 3A which run through the Project Area, to very low or minimum maintenance roadways and dirt trails. Please refer to Figure 8. Existing Roadways on page A-10, in Appendix A.

Telephone, Fiber Optic, and Microwave Communications

Telephone, fiber optic (both Dickey Rural Networks), and microwave communications do currently exist within the Project Area. It is anticipated that Dickey Rural Networks will be laying additional fiber optic cables in the area in the summer of 2010. It is anticipated that the fiber optic cables will lie mostly within the existing road rights-of-way. Coordination with utility companies to determine locations of these facilities has been completed.

Evans Associates performed a search for Federal Communications Commission (FCC) licenses and FCC applications for microwave frequencies within a 40-mile radius of the Project Area. The FCC search indicated there were no licensed common carrier fixed point-to-point services in the Project Area as of July 2009. The FCC search found 15 licensed private operational fixed point-to-point microwave services and multiple address systems in the area. A detailed report on microwave findings can be found in Appendix C.

Traffic

Traffic counts have not been conducted for roadways within the Project Area due to the rural, limited use of these roadways; however, traffic counts have been completed for surrounding roadways. Based on the North Dakota Department of Transportation's (NDDOT) average annual daily traffic (AADT) volume information obtained for 88th Street SE and 91st Street SE, it is estimated that daily traffic for county roads in the Project Area is approximately 30 to 40 vehicles per day. Most of the traffic loads on the roadways in the Project Area can be attributed to local agricultural traffic and commuting from rural residences. NDDOT traffic counts have also been conducted for the two major highways located to the south and east of the Project Area. AADT volumes included 370 vehicles on ND Highway 11 and 135 vehicles on ND Highway 56.

Water Supply

Rural water is currently being developed in the area, on a limited basis, by Dickey Rural Water Users Association. Much of the development is occurring primarily within existing road rights-of-way. It is common for rural residences in the area to utilize private wells for alternative uses, such as agriculture. According to North Dakota State Water Commission data, there are 14 domestic/stock wells located within the Project Area. In addition, no sole source aquifers occur within the Project Area; the nearest aquifer is Spring Creek Aquifer which is approximately 2.5 miles west of the Project Area. Please refer to Figure 9. Geologic and Ground Water on page A-11, in Appendix A.

7.4.1 Public Service Impacts/Mitigation

Electrical Services

- **Alternative A (No Build):** Alternative A would not impact electrical service.
- **Alternative B (Build):** Construction of the proposed wind farm will have a substantial positive impact to electrical service. The output potential of 150 MW of sustainable energy will provide power throughout NSP's five-state region. Coordination with Dickey Rural Networks prior to construction of the Merricourt Wind Power Project is expected. In addition, the locations of telephone and fiber optic cables has been surveyed.

Local Services

- **Alternative A (No Build):** Alternative A would not impact local services.
- **Alternative B (Build):** Coordination with the 15 private services is ongoing to determine if the proposed project would result in interference with the facilities. Impacts to local services in and around the Project Area are not anticipated; no mitigation is required.

Roads

- **Alternative A (No Build):** Alternative A would not impact roads.
- **Alternative B (Build):** Alternative B would require the construction of access roads to individual tower locations. Constructed roadways may connect several tower locations in a string. To the greatest extent practicable, Alternative B utilizes existing access roads and section line roads for access to the proposed wind farm in order to minimize roadway impacts. To the extent possible, roadways would be constructed in locations which minimize impacts to the environment. Existing and new roads within the Project Area would be used for construction and maintenance of the wind towers. Haul road permits would be acquired from townships, Dickey and McIntosh Counties, and the North Dakota Department of Transportation, where required. As part of these permits, roadways would be returned to pre-existing conditions, in coordination with local authorities, in order to mitigate any stress impacts of tower construction on the roadway network. Improvements made to roadways may be left in place if requested by local County and Township authorities as determined through coordination during the reclamation process.

Telephone, Fiber Optic, and Microwave Communications

- **Alternative A (No Build):** Alternative A would not impact telephone, fiber optic, or microwave communications.
- **Alternative B (Build):** Routing of telephone and fiber optic lines will be taken into consideration during routing of the electrical collection lines. Mitigation for impacts to telephone and fiber optic communications would be coordinated with the impacted companies or residences. Coordination with Dickey Rural Networks prior to construction of the Merricourt Wind Power Project is expected. In addition, the locations of telephone and fiber optic cables has been surveyed.

  Recommendations from the FCC study suggest turbines should not be placed in direct line of the fixed point-to-point microwave communications. Additional impacts to radio frequencies are possible from construction of the turbines. These impacts will be dealt with on an individual basis and most likely require conversion of residences current antennae to an upgraded system.

Traffic

- **Alternative A (No Build):** Alternative A would not impact traffic.
- **Alternative B (Build):** It is anticipated that traffic volumes would increase both during and after construction of the proposed project. Additional traffic can be expected from workers and large trucks delivering equipment or tower parts during construction and from maintenance vehicles following construction. It is estimated that there may be up to approximately 200 trips generated per day during peak construction periods. Traffic related to maintenance of the proposed facilities is anticipated to be minor. The increase in traffic is not expected to be at a volume that would alter travel patterns in the area. Permits for transportation of large equipment would be required from the North Dakota Department of Transportation prior to construction and would be the responsibility of the contractor. Mitigation would not be required.

Water Supply

- **Alternative A (No Build):** Alternative A would not impact water supply.
- **Alternative B (Build):** The water supply for residents within the Project Area is not anticipated to be impacted by the proposed project. As the majority of the rural water line development is expected to occur within existing road right-of-way, it is not anticipated that the proposed project would impact existing or proposed water lines. Coordination will occur with Dickey Rural Water Users Association prior to construction to identify water line locations and avoid and/or minimize potential service disruptions, as needed. None of the identified stock/domestic wells will be impacted by construction of wind turbines or access roads.

7.5 Human Health and Safety

Air Traffic

The Federal Aviation Administration (FAA) regulates federal airspace. Wind turbines due to their height may have an effect on airports and navigable airspace. The FAA evaluates the proposed project on aeronautical compatibility.

The Pruetz Municipal Airport, in Kulm, North Dakota, is located approximately 10 miles northeast of the Project Area. Runway 12-30 is situated in a northwest/southeast orientation. The Pruetz Municipal Airport is a general aviation facility with no scheduled flights. Other general aviation airports in the vicinity of the Project Area include the Ashley Municipal Airport, located approximately 12 miles southwest, and the Ellendale Municipal Airport, located approximately 21 miles southeast of the Project Area.

Electromagnetic Fields

Evans Associates was hired to conduct a study of FCC licensed radio frequency facilities within the Project Area (hereafter referred to as the RF Communications Impact Report). The RF Communications Impact Report took into account interference of electromagnetic fields (EMF) as well as blade interference on radio communications. An EMF is a field created by the presence of voltage and electronic current flows. The strength of the field is directly proportional to the amount of voltage and current flow. EMFs are strongest at their origin and decrease in intensity as you move away. An EMF will be created by construction of the proposed project.

EMFs and turbine blade interference from wind farms may interfere with radio and television signals which may be used to communicate during emergencies or warn residents in the Project Area of dangerous storms. The RF Communications Impact Report identified 24 active licensed land mobile radio facilities within two miles of the Project Area, two FM stations with signals within the Project Area, seven digital TV stations, and 215 homes that likely utilize radio and television broadcast signals.

Hazardous Materials/Hazardous Waste

A search of the North Dakota Department of Health's hazardous waste site files was conducted as part of the Phase I Environmental Site Assessment. The site files indicated that there are no identified hazardous waste sites, underground storage tanks, or one-time use permits within the Project Area. During the Phase I Environmental Assessment Site Reconnaissance, several locations were identified that contained potentially hazardous materials. These included pesticides, herbicides, petroleum products, and fertilizer stored at farmsteads; uncontained sewage disposal systems at farmsteads; hydraulic cylinders at farm implements; and two sites of uncontrolled disposal of solid waste or dumping located at T131N, R66W, Section 30 and T130N, R67W, Section 4. Please refer to Appendix D: Phase I Environmental Site Assessment.

Security

The Project Area is located southwest of Kulm, North Dakota along Highway 56. Farms and rural residences are located in and around the Project Area. In addition, no towns are located within the boundaries of the Project Area.

7.5.1 Human Health and Safety Impacts/Mitigation

Air Traffic

- **Alternative A (No Build):** Alternative A would not impact air traffic.
- **Alternative B (Build):** Construction of wind turbines may influence aircraft operations in the Project Area. The FAA publishes Advisory Circulars (AC) that define standards for marking and lighting structures to promote aviation safety. AC 70/7460-1K Obstruction Marking and Lighting, Chapter 13, Marking and Lighting Wind Turbine Farms, provides guidelines to mark and light wind farms. Marking and lighting is intended to assist pilots in identifying and avoiding these obstacles. Any temporary or permanent structure that exceeds an overall height of 200 feet AGL, or exceeds any obstruction standard contained in 14 CFR Part 77, should normally be marked and/or lighted. FAA Form 7460-1, Notice for Proposed Construction or Alteration, was submitted to the FAA in April 2010. The results of this coordination were recommendations of marking and lighting of the wind turbines and 60 Determinations of No Hazard[9] and 62 Determinations of Does Not Exceed[10].

  The USFWS Interim Wind Turbine Siting Guidelines and the Whooping Crane White Paper all recommend white strobe lights with the minimum number of lights, minimum intensity, and minimum number of flashes per minute. The L-865 medium intensity flashing white obstruction lights were analyzed to mark the turbines in the Merricourt Wind Power Project. However, due to the number of lights required (300) and overall intensity due to the amount required, these lights were eliminated from further consideration. As such, turbines will be lit every ½-mile with a standard red L-865 strobe light.

Electromagnetic Fields

- **Alternative A (No Build):** Alternative A would not impact existing EMF or generate new EMF.
- **Alternative B (Build):** Potential impacts to residences caused by EMFs include television, radio, and cellular communications. According to the RF Communications Impact Report, land mobile radio facilities should not be affected if wind turbines are setback approximately 1,300 feet. As such, it is anticipated that the PSC-required setback distances of 1,500 feet from residences and businesses for wind towers would reduce the potential for impacts associated with EMFs to these facilities.

  Because of the capture effect supported by the discriminator in FM receivers, significant disruptions to the two identified FM signals are not expected. Although the received signal may vary with the blade rotation at some receiver locations in the immediate area, good quality FM-receive radios would most likely factor out such time-varying signals.

9 The structure exceeds obstruction standards but does not result in a substantial adverse effect.

10 The structure does not exceed obstruction standards, does not have substantial adverse physical or electromagnetic interference effect upon navigable airspace or air navigation facilities, and would not be a hazard to air navigation.

EMFs and turbine blade rotation may also disrupt HDTV signals, which usually cause intermittent "pixilation" or freezing of the digital TV picture. Based on Evans Associates' previous experience with similar wind turbines, they estimated that approximately 10% of receiver locations, or 22 households within the Project Area, may be affected.

Impacts would be mitigated on a case-by-case basis depending on the type of interference encountered.

Hazardous Materials/Hazardous Waste

- **Alternative A (No Build):** Alternative A would not impact hazardous materials or hazardous waste sites.
- **Alternative B (Build):** It is not anticipated that hazardous waste sites will be encountered during construction. If hazardous waste sites are encountered, construction will be suspended and the North Dakota Department of Health will be contacted immediately to determine the best method for removal or cleanup.

  Any hazardous materials used for the construction of the project will be contained according to the North Dakota Pollutant Discharge Elimination System (NDPDES) Permit. Hazardous materials used for maintenance will be stored inside a building or surrounded by a containment area to prevent contamination from spills. There will be no underground storage tanks installed at the project site. On-site storage of turbine petroleum products in the maintenance facility is anticipated to be minimal.

Security

- Alternative A (No Build): Alternative A would not impact security.
- Alternative B (Build): The perimeter of the substation would be fenced and locked. It is anticipated that construction of the project would not impact the security of surrounding residents or communities. Mitigation would not be required.

7.6 Noise

The project is located in a rural setting. Noise contributions in the Project Area typically include farm machinery and roadway traffic. Noise levels in rural settings typically range from 35 to 45 decibels (dBA). These noise levels are comparable to that of a quiet room. A noise analysis was completed by EAPC for a 125-turbine preliminary layout within the Project Area. The Preliminary Noise Analysis is located in Appendix E.

7.6.1 Noise Impacts/Mitigation

- **Alternative A (No Build):** Alternative A would not result in noise impacts.
- **Alternative B (Build):** Wind turbines will produce noise while operating. Implementing setbacks between turbines and residences will reduce noise impacts to residents. A setback of 1,500 feet from residences was used during turbine siting. Results of the noise study conducted by EAPC indicate the current layout will produce turbine-related noise levels consistent with that of a rural setting (45 dBA or less). Due to decibel levels being consistent with a rural setting, mitigation of noise impacts is not

anticipated. However, if individual cases arise indicating a potential noise concern, the concern will be investigated and consultations conducted, as appropriate.

7.7 Visual

The visual landscape of the Project Area consists of a rural setting including agricultural fields, pasture-land, and native prairie. The Project Area is largely void of large-scale developments and, in keeping with the rural nature of the area, is dotted with farmsteads. No visually sensitive areas, such as National Parks, exist in or directly adjacent to the Project Area.

Elevations in the Project Area range from 1,930 to 2,250 feet above sea level. Glacial till and sediments occur in the area. In addition, numerous large masses of shale that were displaced by glaciers from the underlying Pierre Formation cover the Project Area. Lands within the Project Area are utilized mainly for agricultural purposes, with a balance of rangeland and cropland. Commodities grown in the Project Area consist mainly of small grains, corn, soybeans, and sunflowers, with limited amounts of alternative crops grown. The native vegetation in the Project Area is mainly composed of western wheatgrass, green needlegrass, bluestem, and needle and thread along with prairie cordgrass and reedgrass occurring near wetlands. Wetlands of various hydrology, soils, and vegetation exist within the Project Area. In addition, numerous small drainages exist within the Project Area.

EAPC conducted a worst-case scenario[11] and a refined[12] preliminary shadow flicker analysis within the Project Area. Shadow flicker may result during certain conditions when the combination of lighting, location, and rotation of turbine blades can cast flickering shadows, which can be a nuisance if cast upon inhabited homes or visually sensitive areas. Please refer to Appendix F: Preliminary Shadow Flicker Analysis.

7.7.1 Visual Impacts/Mitigation

Alternative A (No Build): Alternative A would not result in visual impacts

Alternative B (Build): Visual and aesthetic impacts will result from the construction of the turbines. Measuring the aesthetic value of a specific landscape is difficult, and may vary based on an individual's personal values, experiences, or preferences. The North Dakota Wind I (11 miles), North Dakota Wind II (11 miles), and the Tatanka Wind (8 miles) farms exist around the proposed Project Area. The proposed project will create additional visual contrast, with the existing wind farms, to the natural landscape in the area. The degree of visual contrast will vary on the viewpoint. Distances and locations will play a large role as to the degree of visual contrast.

No local, state, or federal guidelines exist that determine the threshold for shadow flicker. However, cases in Europe indicate that less than 30 hours of shadow flicker per year is acceptable. EAPC's worst-case scenario shadow flicker analysis indicated five residences that would receive 30 or more hours of shadow flicker per year. Upon conducting the refined analysis, two residences of concern were identified. One residence would be slightly below and one residence would be slightly above 30 hours of

11 The worst-case scenario assumed that the wind turbines were always operating, perpendicular to the sun, no cloud cover, and that all shadows within 1.2 miles are visible, and that the sensors were "Greenhouses". Greenhouse sensor mode indicates that a shadow casted from any direction was cumulated in the results.

12 The refined analysis included sunshine probabilities and operational statistics.

shadow flicker per year. These two residences have large wind breaks around the properties. As such, it is unlikely that the shadow flicker would be as high as indicated in the refined shadow flicker analysis. Mitigation measures are currently being analyzed, such as removing the turbine or turbines creating shadow flicker near residences of concern. Additionally, if individual cases arise indicating a potential shadow flicker concern, the concern will be investigated and consultations conducted, as appropriate.

Additional impacts to adjacent land users may occur from tower lighting or marking. The FAA requires specific lighting depending on project location, and mitigation options for such impacts are limited because the lighting and markings are designed to be visible to pilots. In order to minimize visual impacts to adjacent land users, wind turbine lighting does not exceed FAA lighting requirements (See the air traffic impacts discussion in Section 7.5.1). Additionally, the use of setback distances from occupied residences is anticipated to alleviate some of the direct visual impacts to adjacent residents by reducing the intensity of the lights through distance buffers.

7.8 Cultural and Archaeological Resources

A Class I Literature Review was conducted in May 2009 for the entire proposed Merricourt Wind Power Project WRA. The literature review revealed that there were ten previously recorded sites and two previously recorded isolated finds within the Project Area. Additionally, the search revealed that 14 previous inventories had been conducted. The results of the literature review were supplied to enXco in an effort to allow for avoidance of all previously known historic properties. Because the majority of the Project Area had not been previously inventoried, KL&J recommended a Class III Intensive Pedestrian Inventory for all access roads, turbine locations, collector lines, and substation locations. KL&J, along with enXco, met with Mr. Paul Picha and Ms. Susan Quinnell of the State Historic Preservation Office (SHPO) regarding the proposed project. During the meeting, SHPO concurred with the recommendation for a Class III inventory, as well as additional follow-up work such as viewshed concerns for currently known historic properties.

Following consultation with Ms. Susan Quinnell and SHPO's potential concerns regarding view-shed issues with wind turbines, previously recorded properties identified by Ms. Quinnell were visited in an effort to ascertain whether the proposed project would have any view-shed impacts to cultural properties. At each of the identified locations photographs were taken of the structures and buildings as well as the surrounding landscape.

Although the project has no federal involvement, the project was approached from a National Historic Preservation Act Section 106 perspective due to its proximity to the Whitestone Hill State Historic Site. Scoping letters were sent to a number of tribes inviting involvement in the project. The Sisseton Wahpeton Oyate (SWO) has been involved in the entire cultural resource effort. The Standing Rock Sioux Tribe was also involved for one month of fieldwork.

Fieldwork began on August 18, 2009 with monitors from both tribes present in the field. During the initial field effort, 166 previously undocumented cultural resources were identified. Locational information for all of the cultural resources has been taken into account during subsequent layout designs. Additional fieldwork occurred in November 2009. Tribal monitors from SWO were present. Fieldwork was completed in May 2010. Monitors from SWO were present.

On May 5, 2010, KL&J and enXco held a meeting in Mitchell, South Dakota with representatives from Rosebud Sioux Tribe, SWO Tribe, Standing Rock Sioux Tribe, and Wahpekute Dakotah Band. The

discussions were centered on finding a working arrangement to allow for Tribal concerns to be met while still enabling the development of the proposed project. Consultation with the Tribes is still ongoing, and their participation has been an integral part of the overall project design and layout.

7.8.1 Cultural and Archaeological Resources Impacts/Mitigation

- **Alternative A (No Build):** Alternative A would not impact cultural or archaeological resources.
- **Alternative B (Build):** KL&J recommended a finding of *No Significant Sites Affect* and *No Historic Properties Affected*. SHPO concurred with this determination on September 24, 2010 (#09-1116). Please refer to Appendix G, SHPO Coordination.

  Wind turbines, access roads, and associated facilities were sited to avoid archaeological sites and traditional cultural properties. A 100-foot buffer from all known cultural resource sites has been incorporated into the project layout. An Avoidance Plan would be completed for the proposed project. This plan would outline the required policies and procedures to avoid disturbing identified, surface, cultural resources during the construction and operation of the Merricourt Wind Power Project. An Inadvertent Discovery Plan would also be created and submitted to SHPO and the Tribes. This plan would include details regarding the procedures that would be followed in the event subsurface cultural resources are found during excavation work necessary for the proposed project. Additionally, enXco may require cultural sensitivity training for construction and operational personnel as well as providing tribal monitoring during the construction process. Coordination with SHPO and the Tribes is ongoing.

7.9 Recreational Resources

Numerous recreational opportunities exist around the Project Area. Ashley, Kulm, Edgeley, and Ellendale have public golf courses. Lake Hoskins, a recreational area, located approximately 15 miles southwest of the Project Area, provides fishing, swimming, and camping opportunities.

USFWS Easements and Waterfowl Production Areas exist in and around the Project Area. North Dakota is located in the central flyway for waterfowl migration, attracting recreationalists, such as hunters and birdwatchers, to the region.

The Whitestone Battlefield State Park is located approximately 5.5 miles northeast of the Project Area. This State Historic Site marks the location of a clash between Native Americans and European settlers that occurred in 1863. The site includes a portion of the battlefield and a small museum that is open seasonally from May 16 through September 15.[13] Nearby is a picnic area with a shelter, table, horseshoe pits, public restrooms, and a parking lot.

7.9.1 Recreational Resources Impacts/Mitigation

- **Alternative A (No Build):** Alternative A would not impact recreational resources in the area.

13 Source: North Dakota State Historical Society Website <http://history.nd.gov/historicsites/whitestone/index.html>. The museum is not currently open due to a substantial fire.

- **Alternative B (Build):** Impacts to recreational resources from construction of the proposed project would be mainly visual in nature. Users of Lake Hoskins, including hunters, fishermen, campers, and birdwatchers, are unlikely to experience visual or audible impacts. However, users of other area waters which are in closer proximity to the turbines may be impacted by the visual impact of wind turbines in the background while enjoying activities. Using the established setback distance of 1,500 feet, it is anticipated that turbine-related noise will drop off to levels consistent with those of a rural setting. In addition, the proximity to recreational facilities is far enough removed that impacts are anticipated to be minor; therefore, no mitigation is planned.
- Furthermore, noise-related impacts to Whitestone Battlefield State Park are not anticipated due to the distance between the turbines and the park. However, visitors to the park may experience visual impacts from wind turbines in the distance which may alter the aesthetics of the park for users.

7.10 Land Based Economics

Agriculture/Farming

According to the 2007 USDA Census of Agriculture, Dickey County contains 545 farms which primarily produce wheat, corn, soybeans and other grains along with raising cattle. The market value of all agricultural products sold which were produced in Dickey County was $162.2 million. McIntosh County contains 513 farms, which also primarily produces wheat, corn, soybeans and other grains along with raising cattle. The market value of all agricultural products sold which were produced in McIntosh County was $75.9 million.

There are approximately 22,457 acres of land within the Project Area. Of this, approximately 2,366 acres are prime farmland and approximately 1,351 acres are considered to be farmland of statewide importance. There is no irrigated farmland within the Project Area. Please refer to Figure 10. Prime and Unique Farmland on page A-12, in Appendix A.

Woodlands

Wooded zones within the Project Area consist of shelter belts and wooded ravines. There are no economically significant forestry resources located within the Project Area.

7.10.1 Land Based Economics Impacts/Mitigation

Agriculture and Farming

- **Alternative A (No Build):** Alternative A would not impact agriculture or farming.
- **Alternative B (Build):** Construction of the proposed project will result in the permanent conversion of approximately 272.8 acres and the temporary conversion of approximately 338.2 acres of land that may be currently used for agricultural production into a renewable, alternative energy source. Of the land that would be permanently converted into an energy source, approximately 31.1 acres are considered to be prime farmland and 15.1 acres are considered to be farmland of statewide importance. Though the project will result in the conversion of potential farmland to use as a wind

farm, economic losses to producers due to this land conversion are anticipated to be minor in comparison to the additional income provided by the wind farm. Long-term benefits will be seen in the extent of payment to landowners who signed options and easements with wind farm developers, along with those who have a tower located on their property. This additional income will also be reflected as an increase to the county tax base. Additional money brought into the community will most likely be seen in increased spending at local businesses and improvements to the communities and counties.

Woodlands

- **Alternative A (No Build) and Alternative B (Build):** Impacts to woodlands are not anticipated; therefore, no mitigation is required.[14]

7.11 Soils

There are 59 soil types found within the Project Area. The majority of these soil types are loamy soils. Loamy soils are a broad textural class of soils that contain a mixture of sand, silt, and clay particles. While most soils contain some mixture of these three particles, an ideal loam exhibits the properties of sand, silt, and clay in approximately equal proportions (not equal amounts). The presence of clay in a soil has a greater influence on a soil than the presence of silt or sand; therefore, a soil name can include the modifier "clay" with as little as 20% clay, while a soil must contain at least 40% sand or 45% silt in order to contain those respective modifiers in its name. Soils identified as sandy loams have moderately coarse textures, silt loams have medium textures, and clay loams have moderately fine textures. Soil types located within the Project Area include loams, silt loams, sandy loams, and clay loams.

Of the 59 soil types within the Project Area, 38 soil types are not classified by the NRCS as prime or statewide important farmland. Of the remaining 21 soil types, 8 are classified as prime farmland, 9 are classified as farmland of statewide importance, and 4 are classified as prime farmland when drained. Please refer to Table 15. Soils Summary on page 46.

14 Section 7.3, Land Use, identifies impacts to woodlands. This impact assessment is based on data gathered from NASS and is not based on in-the-field data collection; therefore, a discrepancy occurs between the impact assessment in Section 7.3 and Section 7.10.

Table 15. Soils Summary

Map Unit Symbol	Soil Type	Identified within County		Prime Farmland	Farmland of Statewide Importance	Prime Farmland Only When Drained
		Dickey	McIntosh			
6	Parnell silty clay loam	X				
7	Southam silt loam	X				
8	Tonka silt loam, 0 to 1 percent slopes	X				X
25	Divide loam, 0 to 2 percent slopes	X		X		
40	Hamerly-Tonka-Parnell complex, 0 to 3 percent slopes	X				
41	Colvin silt loam, saline, 0 to 1 percent slopes	X				
44	Harriet loam	X				
51	Kratka-Letcher fine sandy loams, 0 to 2 percent slopes	X				
80	Makoti-Sakakawea silt loams, 0 to 3 percent slopes	X				
81B	Makoti-Sakakawea silt loams, 3 to 6 percent slopes	X				
85B	Lehr-Wabek loams, 2 to 6 percent slopes	X				
86E	Wabek loam, 6 to 25 percent slopes	X				
90	Vallers loam, 0 to 1 percent slopes	X				X
91B	Ruso sandy loam, 0 to 6 percent slopes	X				
92B	Williams-Bowbells loams, 3 to 6 percent slopes	X				
93C	Williams-Zahl loams, 6 to 9 percent slopes	X				
96E	Zahl-Williams loams, 6 to 25 percent slopes	X				
97F	Zahl-Max loams, 15 to 60 percent slopes	X				
118	Barnes-Buse loams, 3 to 6 percent slopes		X	X		
155	Barnes-Svea loams, 0 to 6 percent slopes		X	X		
168	Bearden silt loam, 0 to 2 percent slopes		X	X		
313	Buse-Barnes loams, 6 to 9 percent slopes		X			
314	Buse-Barnes loams, 9 to 15 percent slopes		X			
319	Buse-Barnes loams, 15 to 35 percent slopes		X			
450	Colvin silt loam		X			X
863	Hamerly loam, 0 to 3 percent slopes		X		X	
873	Hamerly-Parnell complex, 0 to 3 percent slopes		X			
1249	Appam sandy loam, 0 to 6 percent slopes		X			
1267	Marysland loam		X			X
1374	Nutley silty clay, 0 to 2 percent slopes		X	X		
1375	Nutley silty clay, 2 to 6 percent slopes		X	X		
1427	Parnell silty clay loam		X			
1676	Wildrose silty clay, 0 to 2 percent slopes		X		X	
1691	Sioux loam, 6 to 25 percent slopes		X			
1710	Southam silty clay loam		X			
1886	Hamerly and Vallers loams, saline, 0 to 3 percent slopes		X			

Map Unit Symbol	Soil Type	Identified within County		Prime Farmland	Farmland of Statewide Importance	Prime Farmland Only When Drained
		Dickey	McIntosh			
1978 (or W)	Water	X	X			
2014	Williams-Bowbells loams, 0 to 3 percent slopes		X		X	
2015	Williams-Bowbells loams, 3 to 6 percent slopes		X		X	
2031	Williams-Zahl loams, 3 to 6 percent slopes		X			
2037	Williams-Zahl-Parnell complex, 0 to 15 percent slopes		X			
2073	Zahl-Max loams, 15 to 60 percent slopes		X			
2081	Zahl-Williams loams, 9 to 15 percent slopes		X			
2170	Divide loam, 0 to 2 percent slopes		X		X	
2175	Zahl-Williams loams, 6 to 9 percent slopes		X			
2188	Wabek-Lehr complex, 2 to 6 percent slopes		X			
2235	Arnegard loam, 0 to 6 percent slopes		X		X	
2240	Bowdle-Lehr loams, 0 to 2 percent slopes		X			
2247	Harriet loam, 0 to 2 percent slopes		X			
2248	Lehr-Bowdle loams, 2 to 6 percent slopes		X			
2249	Makoti silty clay loam, 0 to 3 percent slopes		X		X	
2250	Makoti-Rusklyn silty clay loams, 2 to 6 percent slopes		X			
2253	Mondamin silty clay, 2 to 6 percent slopes		X		X	
2254	Overly silty clay loam, 0 to 2 percent slopes		X	X		
2255	Overly-Rusklyn silty clay loams, 2 to 6 percent slopes		X		X	
2260	Rusklyn silty clay loam, 2 to 6 percent slopes		X			
2262	Schaller loamy sand, 6 to 15 percent slopes		X			
2263	Sinai silty clay, 0 to 2 percent slopes		X	X		
2265	Wabek-Appam sandy loams, 0 to 6 percent slopes		X			
2266	Wabek-Appam sandy loams, 6 to 25 percent slopes		X			

7.11.1 Soils Impacts/Mitigation

- **Alternative A (No Build):** Alternative A would not impact soils.
- **Alternative B (Build):** Impacts to soils associated with the project are not expected to be significant. Soil impacts would be localized and BMPs will be implemented to minimize these impacts. Surface disturbance caused by construction of the wind turbines and associated infrastructure would result in the soil surface becoming more prone to wind and water erosion. Another soil resource issue is soil compaction, which can occur by use of heavy equipment. Silt and clay soils are especially susceptible to this. BMPs may include the use of erosion and sediment control during and after construction, segregating topsoil from subsurface materials, reseeding of disturbed areas, use

of construction equipment appropriately sized to the scope and scale of the project, ensuring access road grades fit closely with the natural terrain, and maintaining proper drainage.

7.12 Geologic and Groundwater Resources

The Project Area is located in a region of North Dakota known as the Missouri Coteau. The Missouri Coteau was formed by glaciers moving across the state that became stagnant, depositing rock debris, gravel, and fine grained sediments intermixed with large ice chunks. When buried ice chunks melted, wetlands were created. Due to these geologic sequences, the region in which the Project Area is located is commonly referred to as the prairie pothole region. Surface geology within the Project Area is considered part of the Coleharber Formation which consists of glacial till approximately 100 feet thick with large pockets of cross bedded sands and gravels. Please refer to Figure 9. Geologic and Ground Water on page A-11, in Appendix A.

No aquifers are located within the Project Area. The nearest aquifer is the Spring Creek Aquifer located approximately 2.5 miles west of the Project Area.

7.12.1 Geologic and Groundwater Resources Impacts/Mitigation

- **Alternative A:** Alternative A would not impact geologic and groundwater resources.
- **Alternative B:** Impacts to geologic and/or groundwater resources are not anticipated; therefore, no mitigation is required.

7.13 Surface Water and Floodplain Resources

The Project Area occurs in the prairie pothole region of North Dakota. This region is dotted with wetland basins of various sizes and water regimes. In addition, numerous drainageways, smaller streams/creeks, and larger water bodies occur within the Project Area. These water complexes may be used for hunting, bird watching, and fishing; however, they are likely not utilized for boating activities other than occasional occurrences of smaller watercraft associated with hunting or fishing. A search revealed no flood rating maps compiled for the Project Area due to its rural location.

7.13.1 Surface Water and Floodplain Resources Impacts/Mitigation

- **Alternative A:** Alternative A would not impact surface water and floodplain resources.
- **Alternative B:** Wind turbines, access roads, and associated facilities have been sited to avoid surface water.[15] Impacts to surface water will be avoided and/or minimized through use of BMPs such as silt fence, straw wattles, earth berms, retention ponds, and/or rock check dams. Measures will be taken to avoid disruption of the natural flow of any water conveyances within the Project Area.

15 Section 7.3, Land Use, identifies impacts to open water. This impact assessment is based on data gathered from NASS and is not based on in-the-field data collection; therefore, a discrepancy occurs between the impact assessment in Section 7.3 and Section 7.13.

7.14 Wetlands

Wetlands are defined in both the 1977 Executive Order 11990, Protection of Wetlands, and in Section 404 of the Clean Water Act of 1986, as those areas that are inundated by surface or ground water with a frequency to support and, under normal circumstances, do or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

Numerous wetlands of various hydrology and vegetation exist within the Project Area. In addition, several intermittent streams and drainages exist within the Project Area. Many of the wetlands are isolated basins that are not anticipated to fall under United States Army Corps of Engineers (USACE) jurisdiction. In addition, USFWS wetland easements exist in the Project Area. These easements provide perpetual, protection for certain wetland basins within each easement tract against activities such as draining, filling, or burning. Wind turbines and associated infrastructure may not be placed within the protected wetland basins; however, turbines may be allowed on upland property outside the wetland boundaries.

Field wetland delineations were completed by KL&J progressively during turbine siting to determine wetland impacts from the proposed construction. A total of approximately 207.8 wetlands were delineated within the Project Area. Additionally, the USFWS conducted an onsite evaluation of these wetlands and identified 66 wetland basins which are protected by USFWS wetland easements.

7.14.1 Wetlands Impacts/Mitigation

- **Alternative A (No Build):** Alternative A would not impact wetlands.
- **Alternative B (Build):** Turbines and access roads have been sited using a minimum setback distance of 75 feet from delineated wetlands. In addition, collector lines would be routed around USFWS protected wetland basins or directionally drilled beneath them. USFWS protected wetland basins would be fenced off during construction to ensure fill would not be placed within wetland basins. Delineated wetlands not protected by USFWS wetland easements may be trenched through to lay collector lines. This would be determined during final siting. The worst case scenario impact, meaning all unprotected wetlands currently within a collector line corridor are trenched through, is a temporary disturbance of approximately 2.1 acres of wetlands due to collector line placement. However, following construction, these areas would be restored to pre-construction contours and re-seeded with a native seed mix.

7.15 Vegetation

Primary vegetation communities in North Dakota include short grass prairie in the drier western part of the state and tall grass prairie in the eastern part of the state. In between the short and tall grass prairies is a transitional area called the mixed grass prairie, which consists of a mixture of both short and tall grasses. The Project Area is located on the edge of the mixed grass prairie and tall grass prairie of eastern North Dakota. Vegetation of the mixed grass prairie consists mainly of wheatgrass (*Agropyron cristatum* and *Pascopyrum smithii*), bluestem (*Andropogon gerardii* and *Schizachyrium scoparium*), and needlegrass (*Achnatherum sp.*), with tall grass prairie mainly comprised of bluestem.

Approximately 5,332.2 acres of native rangeland were identified within the Project Area during field surveys. Native rangeland is highly valued by resource agencies on account of the diversity of habitat it provides for wildlife and insect species. In addition, hundreds of plant species occur in these native landscapes. The USFWS identified several grassland easements within the Project Area. These easements are in place to protect grassland vegetation, primarily native prairie.

The Project Area is relatively vacant of naturally occurring trees, and no wooded draws are present. Trees within the Project Area consist of planted hardwood shelterbelts for wind protection around farmsteads or in cropland fields.

7.15.1 Vegetation Impacts/Mitigation

- **Alternative A (No Build):** Alternative A would not impact vegetation.
- **Alternative B (Build):** Temporary and permanent vegetation impacts will occur during construction. Wind towers and access roads are planned to be constructed on cropland or rangeland. Access roads have been sited to follow section lines wherever practicable and lessen the impact and fragmentation to native rangeland. However, approximately 112.6 acres of native rangeland would be permanently impacted and approximately 143.4 acres of native rangeland would be temporarily impacted by construction of the project. Following construction, the temporarily disturbed areas will be re-vegetated as appropriate in a manner consistent with the surrounding vegetation. Once re-vegetated, these areas will be available for their present use (e.g., cultivation, grazing, and prairie) following construction.

  Additionally, the project would avoid USFWS grassland easements within the Project Area and would be setback from easement boundaries by a minimum of 25 feet. However, a number of new grassland easements were signed into protection in the last year. According to the Kulm Wetland Management District, enXco's wind easements supersede the newly acquired USFWS grassland easements; therefore, turbines, access roads, and collector lines have been sited on these easements. Coordination for minimization measures to the newly acquired grassland easements is ongoing with the District.

7.16 Wildlife

Mammal Species

White-tailed deer flourish in the Project Area due to the ample forage from surrounding cropland intermingled with the native rangeland, ridge lines, and draws. Numerous other mammals such as rabbits, weasels, fox, beaver, muskrats, and coyotes also inhabit this part of the state.

Recently, wind farms have been identified as being a major contributor to bat mortality due to highly variable pressure conditions caused by the rapid spinning blades. Dr. Erin Gillam from the Department of Biological Sciences at North Dakota State University conducted a bat survey and documented her finding in a report, *Bat Assessment for the Merricourt Wind Power Project*. Anabat echolocation devices were used to determine if bat populations were present within the Project Area and if mitigation measures would be necessary for potential impact. Five bat species were identified during the study:

big brown bats, little brown bats, red bats, hoary bats, and silver-haired bats. The majority of calls recorded during the study were identified as red bats. Please refer to Appendix H: Bat Assessment.

Avian Species

The Project Area lies in the prairie pothole region of North Dakota and the central flyway of North America. As such, this area is used as resting grounds for many birds on their spring and fall migrations, as well as nesting and breeding grounds for many waterfowl species. Nine USFWS Waterfowl Production Areas are located adjacent to or within the Project Area. Other non-game bird species are known to fly through and inhabit this region, drawing birdwatchers to the area.

Protection is provided for the bald and golden eagle, as well as other migratory birds, through the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). The BGEPA of 1940, 16 U.S.C. 668–668d, as amended, was written with the intent to protect and preserve bald and golden eagles, both of which are treated as species of concern within the Department of the Interior. The MBTA (916 U.S.C. 703–711) regulates impacts to these species such as direct mortality, habitat degradation, and/or displacement of individual birds. The MBTA defines taking to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof, except when specifically permitted by regulations. The BGEPA affords additional protection to all bald and golden eagles. Under the BGEPA, take includes to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb, wherein "disturb" means to agitate or bother a bald or golden eagle to the degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, causing injury, death, or nest abandonment.

Correspondence received from the USFWS and North Dakota Parks and Recreation Department (NDPR) encourage avian studies to be conducted before and following construction activities. An avian study, *Avian Assessment and Surveys for the Proposed Merricourt Wind Power Project*, has been conducted to identify raptor nests. In addition a sharp-tailed grouse lek survey was completed for the project, entitled, *Sharp-tailed Grouse Lek Surveys for the Merricourt Wind Power Project, Dickey and McIntosh Counties, North Dakota*. These surveys were completed in spring of 2009 and 2010 by a qualified avian specialist, Dr. Bob Anderson, from ND Birding in coordination with the USFWS and North Dakota Game & Fish (NDGF).

The surveys identified 17 active grouse leks and 10 active raptor nests within the Project Area. The decision to conduct post-construction avian studies is pending and will be coordinated with the USFWS and NDGF. Please refer to the Avian Assessment in Appendix I and the Sharp-Tailed Grouse Lek Survey in Appendix J.

7.16.1 Wildlife Impacts/Mitigation

Mammal Species

- **Alternative A (No Build):** Alternative A would not impact mammal species.
- **Alternative B (Build):** Ground clearing activities associated with construction of the turbines and associated facilities may impact habitat for ground dwelling mammals and other wildlife species. While wildlife may use the Project Area for breeding and feeding, wildlife are anticipated to adapt to changing conditions and continue to thrive. Additionally, the areas of proposed surface disturbance are minimal in the

context of the setting. Approximately one-half of the Project Area has been previously and continues to be disturbed due to farming practices.

- The bat assessment identified potential impacts to red bats which were recorded in abundance within the Project Area. In addition, hoary and silver-haired bats may be impacted from the proposed construction; however, because of the low numbers recorded, these concerns should be minimal. In an effort to minimize impacts, enXco will avoid hardwood shelter belts during construction. Bats tend to concentrate in these areas for foraging and roosting. enXco may conduct post-construction monitoring to document bat mortality. This monitoring would be conducted by either qualified biologists or else trained maintenance staff. Coordination is ongoing with the USFWS and further minimization and/or mitigation measures may be implemented, as needed.

Avian Species

- **Alternative A (No Build):** Alternative A would not impact avian species.
- **Alternative B (Build):** Turbines have been sited a minimum of ¼-mile from USFWS Waterfowl Production Areas to minimize impacts associated with bird strikes. The project may result in impacts to avian species through increasing the potential for bird strikes with the turbine rotors. Findings from the avian studies have been used in the WTG layout to minimize impacts to raptor nests and sharp-tailed grouse leks. No eagle nests were observed within the WRA. Setbacks and buffers have been incorporated in the WTG layout:
  - Minimum setback of ¼-mile construction buffer for the red-tailed hawks and Swainson's hawks.
  - A construction buffer of ½-mile from all active ferruginous hawk nests from March 15 to July 15.
  - A ¼-mile construction buffer for sharp-tailed grouse from March 15 to May 15 will be put in place on all active lek sites.

In addition, collector lines between turbines will be buried to eliminate potential bird strikes. Additional post-construction mitigation measures may be implemented. Coordination is currently ongoing with the USFWS.

7.17 Rare and Unique Natural Resources

Threatened and Endangered Species

The Project Area was evaluated to determine the potential for occurrences of federally-listed threatened, endangered, and candidate species. The USFWS has identified the whooping crane for Dickey County and whooping crane and piping plover for McIntosh County. In addition, McIntosh County has USFWS designated critical habitat for the piping plover. Since USFWS' initial response identifying threatened and endangered species within the Project Area, the gray wolf has been re-listed as an endangered species for Dickey and McIntosh Counties. Habitat requirements and other information regarding listed species for Dickey and McIntosh Counties are discussed below.

The whooping crane (*Grus americana*) is the tallest bird in North America. In the United States, this species ranges through the Midwest and Rocky Mountain regions from North Dakota south to Texas and east into Colorado. Whooping cranes migrate through North Dakota along a band running from the south central to the northwest parts of the state. They use shallow, seasonally and semi-permanently flooded palustrine (marshy) wetlands for roosting and various cropland and emergent wetlands for feeding. Currently, there are three wild populations of whooping cranes, yielding a total species population of about 384. Of these flocks, only the Aransas-Wood Buffalo population, comprised of approximately 247 cranes, is self-sustaining.

The proposed project is located on the eastern edge of the whooping crane migration corridor where 90% to 95% of the sightings occur. Usually the USFWS puts greater emphasis on projects within the region that encompasses 75% of the observations. The closest whooping crane observation to the project is approximately 6 miles north. Additionally, there is suitable habitat for roosting and feeding throughout the Project Area.

A *Whooping Crane Habitat Assessment* was completed by Western EcoSystems Technology, Inc. (WEST). The goal of the study was to develop and implement a desktop review and analysis of whooping crane habitat resources in the Project Area and to compare these resources to areas outside of the project boundary north, south, east, and west. Similar land cover types as those in the project's boundary are found in the areas north, south, east, and west of the project. The analysis assumed that all wetlands are potential whooping crane roosting areas. The Project Area had the second highest percentage; however, by only 0.2% from the third highest coverage and the wetland basins to the north and west were on average larger basins. For feeding areas, the project had nearly the same as to the west, but less than areas to the north and east. It is understood that whooping cranes are opportunistic and the potential exists for whooping cranes to fly over the area during migration. The study analysis showed that habitat for migrating whooping cranes exists in and around the project and alternate areas. However, the project does not contain "the only suitable whooping crane stopover habitat." Please refer to Appendix K: Whooping Crane Habitat Assessment.

The piping plover (*Charadrius melodus*) is a small migratory shorebird. Historically, piping plovers could be found throughout the Atlantic Coast, Northern Great Plains, and the Great Lakes. Drastically reduced, sparse populations presently occur throughout this historic range. In North Dakota, breeding and nesting sites can be found along the Missouri River and saline wetlands. Preferred habitat for the piping plover includes riverine sandbars, gravel beaches, alkali areas of wetlands, and flat, sandy beaches with little vegetation. The USFWS has identified critical habitat for the piping plover in McIntosh County. Within the WRA, this habitat is located in T130N, R68W, Sections 13, 14, 23, and 24. Please refer to Appendix K: Whooping Crane Habitat Assessment.

The North Dakota Natural Heritage biological database indicated no occurrences of piping plover within the Project Area. The nearest occurrence identified is approximately 1.2 miles west of the nearest wind turbine. In addition, no USFWS-designated piping plover critical habitat occurs within the Project Area. The nearest piping plover critical habitat is approximately 2.0 miles south of the nearest wind turbine.

A piping plover survey and report has also been completed by a qualified avian specialist, Dr. Bob Anderson, from ND Birding in coordination with the USFWS and NDGF (*Piping Plover Survey for the Merricourt Wind Power Project, Dickey and McIntosh Counties, North Dakota [June 2010]*) . Wetlands to be surveyed were identified using aerials, NWI data, and the potential to have piping plovers present.

No piping plovers were identified during the survey. In addition, there was minimal potential piping plover habitat identified within the WRA due to high waters which extended past the emergent, aquatic habitat. Although no potential habitat was identified, due to the dynamic nature of wetlands, and that 2009 and 2010 have been wet years, it is possible that in drier years there may be suitable piping plover habitat.

The gray wolf is the largest wild canine species in North America. While the gray wolf is not common in North Dakota, occasionally individual wolves do pass through the state. Historically, its preferred habitat includes biomes such as boreal forest, temperate deciduous forest, and temperate grassland. Gray wolves live in packs of up to 21 members, although some individuals will roam alone. The Project Area is located far from other known wolf populations.

Rare and Sensitive Species

Coordination with the USFWS, NDGF, and NDPR has taken place to help identify sensitive species and sensitive habitat that may exist within the Project Area. It was recommended that a survey of raptor nests and grouse leks be completed prior to siting turbines to avoid impacts to extents possible. Environmental scientists from KL&J and avian experts from ND Birding have visited the Project Area to identify any areas of potential impact to rare species or habitats. The methodologies for these surveys are included in the reports that are located in Appendix I: Avian Assessment.

The NDPR administers the North Dakota Natural Heritage Inventory. North Dakota Natural Heritage Inventory provides a comprehensive system (Heritage System) for identifying and prioritizing ecologically significant natural features in the state. The Natural Heritage Database emphasizes features that are exemplary, unique, or endangered on a statewide or national level. The basis for inclusion on the Natural Heritage Database includes species occurrence, vulnerability, types of threats, degree of protection and Taxonomy. It should be noted that because the information is not based on a comprehensive survey, there may be species of concern or otherwise significant ecological communities in the area that are not represented in the database.

GIS shapefiles of species listed on the Natural Heritage Database that occur within or adjacent to Project Area were provided to KL&J by the NDPR. The North Dakota Natural Heritage Biological Database identified the occurrence of the red necked grebe and the swamp sparrow approximately 3 miles from the nearest wind turbine location.

- **Swamp Sparrow:** The swamp sparrow (*Melospiza georgiana*) has streaked rusty, buff and black upperparts with a gray breast, light belly and a white throat. The swamp sparrow is found north and east of the Missouri River in wetlands where water is ankle to waist deep. It primarily feeds by wading through shallow water picking up insects and seeds of sedges, weeds and grasses. The swamp sparrow often makes its nest out of dead marsh grasses, locating it in cattails.
- **Red Necked Grebe:** The red necked grebe (*Podicepts grisegena*) is a mid-size water bird with a heavy bill and a thick neck. It can be found on large freshwater lakes, sloughs and reservoirs. Red necked grebes prefer areas of stable water levels with emergent vegetation upon which they can anchor their floating nests.

North Dakota has identified 100 species of conservation priority with the state and has ranked those species into three levels. Through coordination with the USFWS and NDGF, six species of conservation

priority were identified as potential concerns for the proposed project, including the ferruginous hawk and Swainson's hawk (Level-1 Species of Conservation Priority), and the golden eagle, bald eagle, prairie falcon and sharp-tailed grouse (Level-2 Species of Conservation Priority). ND Birding conducted raptor nest and grouse lek surveys to identify breeding or nesting habitat for these North Dakota Conservation Priority species. Wind turbines were sited to avoid raptor nests and included a setback of 0.25 miles from grouse leks. A total of 14 raptor nests, 10 of which were active, were identified within the proposed Project Area. In addition, 17 active grouse leks were identified within the Project Area. Further information regarding findings of the avian surveys can be found in Appendix I.

7.17.1 Rare and Unique Natural Resources Impacts/Mitigation

Threatened and Endangered Species

- **Alternative A (No Build):** Alternative A would have no effect on threatened or endangered species.
- **Alternative B (Build):** According to *Whooping Crane Recovery Activities November 2007–September 2008* by T. Stehn, and *Predicting Availability of Stopover Roosting Habitat for Migrant Whooping Cranes in the Northern Great Plains* by D.A. Stahlecker, suitable stopover habitat is prevalent not only in and around the immediate area of the WRA but throughout the Dakotas and Nebraska. Results of the study conducted by WEST indicate that construction of the proposed wind farm may impact whooping crane habitat; however, habitat of equal importance exists in approximately 10 miles in each direction of the Project Area. All land area within the Project Area, as well as most of the prairie pothole region, would likely be suitable habitat for whooping cranes at some time, since the whooping crane are opportunistic and the potential exists for whooping cranes to fly over the area or roost during their migration. According to the USFWS, the "risk of lethal take to whooping cranes from wind turbines is not known at this time, but the highest source of know mortality to fledged whooping cranes if from striking power lines." enXco has eliminated the need for overhead power lines in the proposed Project Area. In addition, enXco is coordinating with MDU to facilitate the siting of the collector substation and MDU's interconnect substation directly adjacent to each other in order to eliminate the need for any overhead transmission lines between the two facilities. enXco will bury all collector cables between each WTG and the collector substation. While enXco has no control over the siting, installation, construction or operation of the MDU 230-kV transmission line, they will commit to suggesting certain practical conservation measures to MDU to facilitate measures to minimize or mitigate potential impacts. enXco is willing to include project specific conservation measures necessary to minimize or mitigate potential impacts to whooping cranes. In a February 5, 2010, letter to enXco, the USFWS stated that the project would have an adverse affect on the whooping crane. However, due to the availability of suitable stopover habitat adjacent to the Project Area, the avoidance of Waterfowl Production Areas and USFWS protected wetland easements, and burying of collector lines, enXco and KL&J recommend a determination that the project may affect, but is not likely to adversely affect, the whooping crane.

  enXco has met with the USFWS regarding impacts from the proposed wind farm to the whooping crane on three occasions, and is continuing to meet. enXco is committed to working with USFWS and is currently engaged in discussions regarding minimization

and conservation efforts for the whooping crane. The entities are working cooperatively in order to jointly minimization impacts to the whooping crane. In an effort to address USFWS concerns regarding cumulative impacts to whooping cranes due to continued development within the species' migration corridor, enXco has joined in the development of the American Wind Energy Association, affected States, and the USFWS whooping crane and lesser prairie chicken Regional Habitat Conservation Plan (Regional Plan). However, the Regional Plan is not expected to be completed prior to construction of the Merricourt Wind Power Project; therefore, additional discussions with the USFWS are anticipated in order to ensure that any potential risks to whooping cranes are minimized and/or mitigated prior to construction.

Additionally, due to the minimal potential piping plover habitat identified within the Project Area, and the lack of species observances, the project may affect, but is not likely to adversely affect, the piping plover. The project also avoided siting structures within or near designated critical habitat; therefore, the project is not likely to destroy or adversely modify critical habitat.

Although unlikely, there is potential for a transient gray wolf to pass through the Project Area and be impacted similar to other ground dwelling mammals. Due to this potential, the lack of species observances, and the distance to other known populations, the project may affect, but is not likely to adversely affect, the gray wolf.

Rare and Sensitive Species

- **Alternative A (No Build):** Alternative A would not impact rare and sensitive species.
- **Alternative B (Build):** Turbines and associated infrastructure have been sited to avoid impacts to wetlands which are known to be used by the swamp sparrow and red-necked grebe. Post-construction avian impact monitoring may be utilized to identify levels of impact to these species along with identifying all avian and bat mortality. A setback distance of ¼-mile construction buffer from grouse, between March 15 and May 15, and ¼-mile construction buffer from raptor nests, between March 15 and July 15, were used during turbine siting. These setbacks and timing restrictions are believed to be sufficient to minimize impacts to the species. Construction of the proposed wind farm is not anticipated to cause impacts to rare or sensitive species.

7.18 Summary of Impacts

Please refer to Table 16. Summary Comparison of Project Alternatives and Impacts.

Table 16. Summary Comparison of Project Alternatives and Impacts

Resource	Alternative A	Alternative B	Proposed Mitigation
Demographics	No impacts.	Easements payments to landowners may increase per capita income within the Project Area counties. No long-term changes to demographics are anticipated.	No mitigation is proposed.
Land Use	No impacts.	Conversion of 2.7% of total land in Project Area; of which, 1.2% would be permanently converted. This includes permanent conversion of 31.2 acres of CRP land and temporary conversion of 39.3 acres of CRP land.	No mitigation is proposed for general land use conversion. Coordination would occur with the Farm Service Agency (FSA) for CRP conversion and areas of temporary disturbance will be reclaimed and re-seeded according to FSA requirements.
Public Services	No impacts.	Construction of the project would impact local roadways through increased stress due to increased traffic and hauling. Additionally, electric, telephone, and fiber optic lines may be impacted by construction. Impacts to radio frequencies may occur also occur.	Local utility companies will be contacted prior to construction. Roadways will be returned to pre-existing conditions unless otherwise requested by County and Township authorities during coordination.
Human Health and Safety	No impacts.	No adverse impacts are anticipated.	Turbines would be marked with standard red L-865 strobe lights every half-mile. Mitigation for impacts from EMFs and turbine blade rotation will be dealt with on a case-by-case basis.
Noise	No impacts.	Noise levels would be consistent with a rural setting; therefore, no adverse impacts are anticipated.	No mitigation is proposed. However, if individual cases arise indicating a potential noise concern, the concern will be investigated and consultations conducted, as appropriate.
Visual	No impacts.	Visual and aesthetic impacts would result from construction of turbines. In addition, two residences may experience shadow flicker approximately 30 hours per year. Use of setbacks and minimum FAA lighting and marking requirements are anticipated to minimize visual impacts.	Mitigation measures are currently being analyzed to reduce potential for shadow flicker at the two residences of concern. If individual cases arise indicating a potential shadow flicker concern, the concern will be investigated and consultations conducted, as appropriate.

Resource	Alternative A	Alternative B	Proposed Mitigation
Cultural and Archaeological Resources	No impacts.	Identified cultural resource sites would be avoided; therefore, no historic properties would be affected.	No mitigation is proposed. However, turbines and associated facilities would be setback 100 feet from identified sites. In addition, an Avoidance Plan and Inadvertent Discovery Plan will be developed and implemented.
Recreational Resources	No impacts.	No adverse impacts anticipated.	No mitigation is proposed.
Land Based Economics	No impacts.	Permanent conversion of 272.8 acres and temporary conversion of 338.3 acres of potential farmland. Economic loss to producers due to land conversion is anticipated to be minor in comparison to additional income provided by wind farm.	Areas of temporary disturbance will be re-vegetated, as appropriate, following construction.
Soils	No impacts.	May cause soil surface to become more prone to wind and water erosion and may result in soil compaction.	Erosion and sediment control during and after construction, segregation of topsoil, and reseeding.
Geologic and Groundwater Impacts	No impacts.	No adverse impacts anticipated.	No mitigation is proposed.
Surface Water and Floodplain Resources	No impacts.	No adverse impacts anticipated.	Use of BMPs such as silt fence, straw wattles, earth berms, retention ponds, and/or rock check dams.
Wetlands	No impacts.	Approximately 2.1 acres of wetlands may be temporarily impacted due to placement of collector lines. No permanent wetland impacts would occur and all USFWS wetland easement protected basins would be avoided.	No mitigation is proposed. Any wetlands temporarily impacted would be restored to pre-construction conditions following construction. Additionally, easement-protected basins would be fenced to prevent disturbance during construction.
Vegetation	No impacts.	Temporary and permanent vegetation impacts will occur during construction. Approximately 112.6 acres of native rangeland would be permanently impacted and approximately 143.4 acres of native rangeland would be temporarily impacted by construction of the project. Grassland easements that precede wind easements will be avoided by a minimum of a 25-foot setback.	Following construction, disturbed areas will be re-vegetated, as appropriate.

Resource		Alternative A	Alternative B	Proposed Mitigation
Wildlife	**Mammal Species**	No impacts.	The project would impact potential habitat for ground dwelling mammals. Additionally, the project may impact bat species; however, the project would avoid hardwood shelter belts. No adverse impacts are anticipated.	Disturbed areas would be re-vegetated, as appropriate. Additional mitigation measures may be implemented. Coordination with the USFWS is ongoing.
	Avian Species	No impacts.	The project may impact avian species due to collisions with turbine rotors. Setbacks and buffers have been implemented to minimize this risk. • ¼-mile from red-tailed and Swainson's hawks • ½-mile from active ferruginous hawk nests between March 15 and July 15 • ¼-mile from sharp-tailed grouse leks between March 15 and May 15 All collector lines would be buried.	Post-construction mitigation measures may be implemented. Coordination with the USFWS is ongoing.
Rare and Unique Resources	**Threatened and Endangered Species**	No impacts.	The proposed project may affect, but is not likely to adversely affect, the gray wolf, piping plover, or whooping crane. In addition, it is not likely to destroy or adversely modify critical habitat.	Post-construction mitigation measures may be implemented. Coordination with the USFWS is ongoing.
	Rare and Sensitive Species	No impacts.	No adverse impacts are anticipated. The project has been sited to avoid wetlands used by swamp sparrow and red-necked grebe. Also, a setback of ¼-mile from grouse leks and raptor nests was used during turbine siting.	Post-construction mitigation measures may be implemented. Coordination with the USFWS is ongoing.

7.19 Irreversible and Irretrievable Commitment of Natural Resources

As with any construction project, certain irreversible and irretrievable commitments of natural resources, manpower, materials, and fiscal resources are required. Fossil fuels, labor, and construction materials will be expended to complete the project. Additionally, labor and natural resources will be used in the fabrication and preparation of construction materials, such as concrete, aggregate, and steel. These materials are generally not retrievable. However, they are not in short supply, and their use would not have an adverse effect on the availability of these resources. Any construction would require a one-time expenditure of funds, which are not retrievable. However, the anticipated benefits would balance the irretrievable commitment of resources caused by the construction of the build alternative. By constructing the build alternative, a renewable energy source can be utilized while reducing the country's pollution and green house gas emissions.

8.0 Public Coordination

PSC Hearing will be held in conjunction with the approval of this application. These meetings are open to the public, at this time a hearing has not been scheduled. Public notice of these meetings will be given by advertisement in local newspapers or as otherwise directed by the PSC.

9.0 Agency Coordination

To initiate early communication and coordination, a scoping package was sent to federal, tribal, state, and local agencies and other interested parties on June 17, 2009. This scoping package included information on the project and a project location map. At the end of the 30-day comment period, 18 responses were received. These comments have been referenced and incorporated where appropriate within the document. Please refer to Appendix M for the scoping letter, mailing list, and responses.

KL&J and enXco has held numerous meetings and coordination with resource agencies, the affected counties, Spring Valley Township, and tribal entities.

On June 11, 2009, KL&J and enXco presented at the ICM in Bismarck. The project was introduced and discussed with the attendees. The goal of this meeting was to initiate early agency consultation and to identify any key issues of concern. The agencies that attended this meeting included: Natural Resource Conservation Service, US Army Corps of Engineers, ND Department of Transportation, ND Game and Fish Department, and ND State Water Commission.

Also, on this same day, a meeting was held with the USFWS Ecological Services Office in Bismarck. The goal of this initial meeting was to discuss any of the Service's potential issues with the Project Area, as well as how to properly coordinate throughout this project.

KL&J and enXco met with the USFWS Ecological Services Office in Bismarck on October 27, 2009 to discuss the project more in depth, after one of the first versions of the layout was drafted. The goal of this meeting was to discuss avian and bat species, in particular the whooping crane and piping plover.

In addition, on this same day, KL&J and enXco met with the USFWS Kulm Management District and attended a Spring Valley Township board meeting. With the Kulm Management District, wetland and grassland easements and Waterfowl Production Areas were discussed in relation to the project. At the Spring Valley Township board meeting KL&J and enXco discussed the zoning regulations for the township, specifically the Wind Energy Facility Siting Permit.

On October 28, 2009, KL&J and enXco met with the SWO Tribe and a representative from Turtle Mountain Band of Chippewa to discuss the cultural resources in the Project Area.

Then on October 29, 2009, KL&J and enXco met with the State Historical Society of North Dakota to discuss the cultural resources that were identified in the Project Area, along with the efforts that were made for tribal coordination.

Letters were sent to the USFWS Ecological Services Office and to SWO Tribe in December 2009. These letters included the latest version of the layout and asked for comments back regarding the layout.

A conference call with the USFWS Ecological Services, enXco, and KL&J was held on March 4, 2010 to discuss the responses from USFWS to the December 2009 letter. At the meeting, potential mitigation and minimization measures were discussed. A subsequent meeting was held on September 8, 2010, with USFWS Ecological Services, enXco, and KL&J to again discuss potential effects to the whooping crane and minimization and mitigation measures. Coordination is still on-going with USFWS, and additional meetings are anticipated. enXco is committed to working with USFWS and is currently engaged in discussions regarding minimization and conservation efforts for the whooping crane. The entities are working cooperatively in order to jointly on this endeavor.

On May 5, 2010, KL&J and enXco held a meeting in Mitchell, South Dakota with representatives from Rosebud Sioux Tribe, SWO Tribe, Standing Rock Sioux Tribe, and Wahpekute Dakotah Band. The goal of this meeting was to discuss the cultural resources that have been identified in the Project Area and how the project is avoiding all impacts to the cultural resources. A follow-up meeting is currently being planned prior to November 2010.

9.1 Summary of Commenting Agencies

The following provides a list of agencies that provided comments during the project scoping process. Please refer to Table 17. Summary of Commenting Agencies.

Table 17. Summary of Commenting Agencies

Jurisdiction	Agency
Federal Agencies	US Department of Agriculture, Natural Resources Conservation Service
	US Department of Defense, Air Force—Grand Forks Air Force Base
	US Department of Defense Army Corps of Engineers—North Dakota Regulatory Office
	US Department of Defense Army Corps of Engineers—Omaha District
	US Department of the Interior, Bureau of Indian Affairs
	US Department of the Interior, Fish and Wildlife Service—Ecological Services
	US Department of the Interior, Fish and Wildlife Service—Kulm Wetland Management District
State Agencies	Job Service of North Dakota
	North Dakota Department of Commerce
	North Dakota Department of Health
	North Dakota Department of Transportation
	North Dakota Game and Fish Department
	North Dakota Geological Survey
	North Dakota Parks and Recreation Department
	North Dakota State Water Commission
	State Historical Society of North Dakota
	Senator Byron Dorgan
Local Entities	McIntosh County Board of Commissioners
	Township of Spring Valley, Dickey County, North Dakota

10.0 Identification of Potential Permits/Approvals

The following permits may be required or obtained prior to construction:

- **PSC:** Certificate of Site Compatibility
- **FAA (Federal Aviation Administration):** Form 7460-1, Notice of Proposed Construction or Alteration (Submitted April 2010)
- **North Dakota Department of Health:** NDPDES Permit
- **ND Highway Patrol:** Overweight-Overheight Permit
- **NDDOT:** Utility Permit-Risk Management Document
- **North Dakota Electrical Board:** Electrical Permit
- **County and Township Boards:** Building and Haul Road Permits

11.0 Factors Considered

To aid the North Dakota Public Service Commission in the evaluation and designation of sites, the North Dakota Energy Conversion and Transmission Facility Siting Act lists 11 factors to consider. They are discussed in the following sections.

11.1 Public Health and Welfare, Natural Resources, and the Environment

Section 7.0 Environmental Analysis, discusses and discloses the research and investigations regarding the effects of the project on public health and welfare, natural resources, and the environment. Impacts and mitigation measures are summarized in Section 7.18 Summary of Impacts on page 56.

11.2 Technologies to Minimize Adverse Environmental Effects

The project will be designed using the best available technology at the time of design and construction, such as computer-based siting tools. These technologies aid in minimizing environmental effects by identifying environmentally sensitive resources and avoiding siting turbines, access roads, and collector lines within those areas or implementing setback measures.

11.3 Potential for Beneficial Uses of Waste Energy

No waste energy would be produced by the facility; therefore, this consideration does not apply.

11.4 Unavoidable Adverse Environmental Effects

Adverse environmental effects have been minimized to the greatest extent practicable through the use of avoidance and exclusionary areas, setbacks, burying overhead lines, directional drilling, and other methods. The permanent conversion of approximately 272.8 acres of land and alteration of the visual landscape through construction and lighting of turbines is unavoidable.

11.5 Alternatives to the Proposed Site

A WRA of approximately 50 square miles was initially selected for investigation based on the wind regime, interest from the local community and proximity to available transmission lines. This investigation considered (but was not limited too) impacts to the local community, the environment, and natural resources. Using a deductive approach the WRA was narrowed down to an area of approximately 30 square miles and the final Project Site (without alternate wind turbines and facilities) is expected to be narrowed down further to an area encompassing approximately 18 square miles of the original WRA. Alternative areas and layouts within the initial WRA were considered for the project but ultimately eliminated from consideration due to constraints.

11.6 Irreversible and Irretrievable Commitment of Natural Resources

As with any construction project, certain irreversible and irretrievable commitments of natural resources, manpower, materials, and fiscal resources are required. Fossil fuels, labor, and construction materials will be expended to complete the project. Additionally, labor and natural resources will be

used in the fabrication and preparation of construction materials, such as concrete, aggregate, and steel. These materials are generally not retrievable. However, they are not in short supply, and their use would not have an adverse effect on the availability of these resources. Any construction would require a one-time expenditure of funds, which are not retrievable. However, the anticipated benefits would balance the irretrievable commitment of resources caused by the construction of the build alternative. By constructing the build alternative, a renewable energy source can be utilized while reducing the country's pollution and green house gas emissions.

11.7 Direct and Indirect Economic Impacts

Direct economic impacts would result from the permanent conversion of approximately 272.5 acres of potential farmland and the temporary conversion of approximately 338.2 acres of potential farmland into a renewable, alternative energy source. However, the majority of the WRA would still be available for agricultural practices.

Although the project will result in the conversion of potential farmland to use as a wind farm, economic losses to producers due to this land conversion are anticipated to be minor in comparison to the additional income provided by the wind farm. Long-term benefits will be seen in the extent of payment to landowners who signed options and easements with wind farm developers, along with those who have a tower located on their property. This additional income will also be reflected as an increase to the county tax base. The project may also indirectly benefit economies in surrounding communities due to temporary construction jobs and increased spending at local businesses.

11.8 Existing Development Plans of the State, Local, Government and private Entities at or in the Vicinity of the Site

There are no known development plans that would conflict with the project. The project would comply with county and township zoning ordinances, as applicable; therefore, no conflicts are anticipated.

11.9 Effect of Site on Cultural Resources

As discussed in Section 7.8 Cultural and Archaeological Resources, KL&J conducted a Class III Cultural Resource Inventory and identified 10 previously recorded sites, two previously recorded isolated finds, and 170 newly recorded sites. GIS information retrieved from the survey was used in the preliminary siting of the wind farm in order to avoid the identified sites. The project has avoided all identified sites in the siting of turbines, collector lines, and access roads and the final layout will include a 100-foot setback from all identified sites. An Avoidance Plan and Inadvertent Discovery Plan will be developed and implemented to further reduce the potential for any cultural resource disturbance. Additionally, extensive coordination has occurred, and continues to occur, with tribal historic preservation officers in an effort to avoid traditional cultural properties in the area.

11.10 Effect of Site on Biological Resources

As discussed in Sections 7.13–7.17, avoidance and minimization measures, such as setback distances and directional drilling, have been implemented to minimize potential impacts to biological resources within the Project Area. Primary resource agency concerns are related to potential impacts to avian and bat species through collisions with wind turbines or loss of potential habitat through avoidance

of the wind farm. Coordination is ongoing with the USFWS. enXco is committed to working with USFWS and is currently engaged in discussions regarding minimization and conservation efforts for the whooping crane. The entities are working cooperatively in order to jointly minimization impacts to the whooping crane. It is anticipated that additional minimization and/or mitigation measures may be implemented, as needed.

11.11 Agency Comments

A scoping package was distributed to local, state, and federal agencies and other interested parties on June 17, 2009. At the end of the 30-day comment period, 19 responses were received. The following sections summarize these responses.

11.11.1 US Department of Agriculture—Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) stated that if the project is supported by federal funding or actions, the Farmland Protection Policy Act would apply and a Farmland Conversion Impact Rating Form AD-1006 would need to be completed. They also recommended that impacts to wetlands be avoided.

11.11.2 US Department of Defense—Grand Forks Air Force Base

The Grand Forks Air Force Base stated that they have no in or adjacent to the Project Area and do not have any further comments.

11.11.3 US Department of Defense—Army Corps of Engineers

The USACE addressed flood concerns stating that no flood issues should occur if any overhead power lines are located as far from the banks of drainageways and streams as possible and any underground power lines are buried far enough below the beds of drainageways. Both these measures would minimize erosion and sedimentation along the drainageways. Any aboveground structures subject to flood damage should be placed above, or proofed to, a level above the 100-year floodplain. Additionally, the USACE recommended coordinating with the US Environmental Protection Agency, USFWS, NDGF, and SHPO.

11.11.4 US Department of Defense—Army Corps of Engineers, North Dakota Regulatory Office

If the project results in the discharged of dredged or fill materials into waters of the United States, a Section 404 permit will need to be acquired from the North Dakota Regulatory office.

11.11.5 US Department of Interior—Bureau of Indian Affairs

The Bureau of Indian Affairs (BIA) had no environmental objections to the project. In addition, the project would not affect cultural resources on tribal or individual landholdings for which the BIA is responsible.

11.11.6 US Department of Interior—Fish & Wildlife Service, Ecological Services

The USFWS Ecological Services office stated their concerns regarding migratory birds, threatened and endangered species, USFWS property interests (Waterfowl Production Areas and easements), and high value habitat. Primary concerns dealt with collisions of migratory birds with turbines and overhead power lines, potential impacts to the endangered whooping crane and threatened piping plover, and loss of high value habitat in the form of native prairie, wetlands, wooded draws, and riparian forests. Additionally, if the project were to impact USFWS property interests, such as easements, compliance with the National Environmental Policy Act is required. Avoidance and minimization measures were recommended, specifically referencing *2006 Suggested Practices for Avian Protection on Power Lines,* specific construction timing restrictions, and setback recommendations. Collision monitoring studies for three years following completion of the project were recommended.

Avoidance and minimization measures to address USFWS concerns have been implemented to the greatest extent practicable, as discussed in Section 7, Environmental Analysis. Coordination with the USFWS is ongoing and additional minimization and/or mitigation measures may be implemented, as needed, following conclusion of USFWS coordination.

11.11.7 US Department of Interior—Fish & Wildlife Service, Kulm Wetland Management District

The Kulm Wetland Management District identified Service-owned Waterfowl Production Areas, wetland easements, grassland easements, and FmHa easements within the Project Area. The Service desires avoidance of these areas and, if they cannot be avoided, minimization of impacts to maintain the integrity of the production area and easements.

11.11.8 US Senate—Byron Dorgan

Senator Dorgan responded with support for wind development within North Dakota through the National Energy Security Act and through tax and other financial incentives to encourage further renewable energy development.

11.11.9 Job Service North Dakota

Job Service North Dakota stated that they have no comments on the project or required permits.

11.11.10 North Dakota Department of Commerce

The North Dakota Department of Commerce stated that wind energy projects do not result in major disruptions to the economy and that socioeconomic consequences of construction are short-term and should not result in significant disruptions to the area's economy and infrastructure. In addition, the Department believes the proposed project may have a beneficial effect on the local economy of Ashley, Edgeley, Ellendale, and Wishek because the temporary work force for construction may come from these communities and the increased demand for goods and services from these communities during construction.

11.11.11 North Dakota Department of Health

The North Dakota Department of Health stated that they believed the environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. These methods included minimizing fugitive dust emissions, adverse effects to water bodies, noise, and obtaining a North Dakota Discharge Elimination System permit. Included in the letter were construction and environmental disturbance requirements of the Department. It was also stated that the Department owns no land in or adjacent to the Project Area and that they believe the project is consistent with the State Implementation Plan the Control of Air Pollution for the State of North Dakota.

11.11.12 North Dakota Department of Transportation

The North Dakota Department of Transportation responded that the project would create traffic volumes in excess of those anticipated for the roadway and would like information regarding where the traffic may be concentrated, specifically the concrete and aggregate haul routes. They would also like to be made aware of the highways most likely to be impacted in order to develop future surfacing projects on ND Highway 56 within the vicinity of the project. If any work needs to be done within the highway right-of-way, permits and risk management documents need to be obtained from the District Engineer.

11.11.13 North Dakota Game & Fish Department

The North Dakota Game & Fish Department's primary concern with regard to the project is disturbance or loss of native prairie. They request that native prairie be avoided to the greatest extent practicable and micro-siting of turbines be done on previously disturbed lands. The Department also identified the McIntosh County Wildlife Management Area in the E ½ Section 14, T131N, R68W. If turbines are to be placed near the management area, the Department requests that the turbines be set back a sufficient distance to minimize disturbance to wildlife. Furthermore, the Department recommended that unavoidable wetland impacts be mitigated in-kind, aboveground structures not be placed in wetlands, drainage patterns be unaltered, and routine avian and bat mortality monitoring.

11.11.14 North Dakota Geological Survey

The North Dakota Geological Survey (NDGS) identified numerous large masses of shale in the Project Area that were displaced by glaciers from the underlying Pierre Formation. Although essentially intact, the blocks are usually tilted and sheared up into thrusts or folds that are commonly overturned. These ice thrusts are located at the junction at ND Highways 11 and 56; on the border of Townships 160N and 159N, Range 67W; and in the east-central portion of Township 130N, Range 67W. The NDGS did not have specific concerns regarding these areas.

11.11.15 North Dakota Parks & Recreation Department

The Natural Heritage Inventory identified the following sensitive species and habitat: swamp sparrow (*Melospiza Georgiana*), piping plover (*Charadrius melodus*), and permanent open water. The Department recommended that project be accomplished with minimal impacts, avoid disturbance of critical

habitat to conserve sensitive species within North Dakota, and that disturbed areas be revegetated with species native to the area. Additionally, the Department recommended that all efforts be made to avoid impacts to wildlife and associated habitat due to the potential to disrupt nesting, feeding, and migratory birds and bats in the area. As a result, pre- and post-construction avian and bat monitoring studies were recommended.

11.11.16 North Dakota State Water Commission

The North Dakota State Water Commission responded that the project is not in an identified floodplain; modifications to water control structures may need permits; all waste material must be disposed of properly and not within floodways; no sole-source aquifers have been designated within the state; and the project sponsor is responsible for contacting local, state, and federal officials to determine required permits and approvals.

11.11.17 State Historical Society of North Dakota

The SHPO for the State Historical Society of North Dakota recommended a Class I Cultural Resource Inventory and a Class III Cultural Resource Inventory be completed for the project.

11.11.18 McIntosh County

The Board of Commissioners requested that the main road to be used during construction be identified and that the McIntosh County Road Supervisor do a pre- and post-construction inspection of the roadway. The County's main concern is the roadways. McIntosh County is also adopting zoning ordinances[16]. These regulations address the process for siting and permitting a wind energy facility within the county.

11.11.19 Township of Spring Valley

The Township identified zoning requirements for the wind farm and that a permit must be granted for the project. They are concerned with the impact the project would have on their roadways and their ability to maintain them with their low annual budget.

11.11.20 Agencies Solicited but no Response Received

Of the 84 agencies and other interested parties that were solicited, 65 did not respond. To see the comprehensive list of agencies solicited, please refer to Appendix L: Piping Plover Survey.

16 Per an email from Gina Ketterling on November 3, 2009, the Board of Commissioners voted not to approve the McIntosh County Zoning Ordinance; therefore, McIntosh County will not have any ordinances.

12.0 Qualifications of Contributors to Siting Study

Shanna Braun

Shanna earned a B.S. in Natural Resources Management and is currently pursuing a Master of Science in Water Resources Science at the University of Minnesota. She provides environmental planning, NEPA documentation, and permitting services on a variety of projects. Shanna has experience and understands working with both the science and coordination behind the NEPA process. She has eight years of experience conducting in-the-field resource inventories, including biological/botanical resources review, threatened and endangered species habitat assessments, and noxious weeds inventories. Shanna is also a wetland specialist and has completed more than 40 approved field wetland delineations in the upper Midwest region. Shanna uses her natural resources management background to develop avoidance, minimization, and mitigation measures to incorporate into project development.

Charlotte Brett

Charlotte holds a B.A. in Environmental Studies from Prescott College and a M.P.S. degree in Environmental Science from the State University of New York, College of Environmental Science and Forestry. Charlotte has 9 years of experience with KL&J, managing projects, coordinating with agencies and the public, conducting impact assessments, and preparing/reviewing environmental reports for private and public sponsored projects throughout the Upper Great Plains. Prior to joining KL&J, Charlotte worked for the USFWS Valley City Wetland Management District, where she conducted wetland, waterfowl, and grassland surveys, developed a monitoring program for the eradication of leafy spurge (*Euphorbia esula*), and facilitated environmental education workshops.

Rachel Clement

Rachel Clement graduated with a B.A. in Geography from the University of Arizona. She worked as a Geospatial Engineer for General Dynamics for three years, building her GIS skills in database management and analysis. As a GIS Analyst for enXco, she has worked on wind energy projects from the early stages of development through construction. Her role in the development process includes compiling and analyzing constraints data, creating project maps, assisting in the selection of meteorological tower locations, and micrositing turbine locations at project sites. Rachel is a member of Women of Wind Energy, a non-profit organization promoting professional development and advancement of women in the wind industry.

Steve Czeczok

Steve Czeczok graduated with a B.S. in Natural Resources Management from North Dakota State University. He has been involved with developing environmental documentation and field services for the past three years. Steve's specialties at KL&J include conducting biological and botanical surveys, environmental impact analysis, and permitting. He previously worked for the Natural Resource Conservation Service—Plant Materials Center where he aided in the raising of native grasses for foundation seed production. Through this position, he was able to gain knowledge of a wide variety of native grasses and their associated habitats. Steve also has worked as an environmental assistant for North American Coal Corporation at the Coteau Freedom Mine. At the mine he conducted waterfowl, songbird, and wildlife surveys, as well as the monitoring of active and post mining areas.

Jennifer Harty

Jennifer earned her M.A. in Archaeology from the University of Saskatchewan. Jen has an extensive background in Plains archaeology. Both her undergraduate and graduate work was focused on the Northern Plains culture area. She has over eight years of field experience and serves as Principal Investigator on cultural resource inventories, evaluative testing, and data recovery mitigation projects. Jennifer prepares, reviews, and submits reports to clients and lead agencies detailing the results of work conducted for the Section 106 process. Jennifer consults with Native American Tribes when called for on projects in which there is a Native American interest. Jennifer has conducted cultural resource work in Saskatchewan, North Dakota, South Dakota, Montana, Idaho, Wyoming, Illinois, and Alaska.

Becky Rude

Becky holds a M.S. in Environmental Law from Vermont Law School and a B.A. in Biology and English Literature from Concordia College (Moorhead, MN). She uses her combined background in law, science, and English to provide environmental planning and documentation services. Becky has experience in all aspects of the environmental process, including permitting, research, documentation, legal sufficiency review, and public and agency involvement. She determines the necessary processes to comply with federal, state, and local regulations and provides the needed documentation.

Skip Skattum

Skip holds a B.A. degree in Education from the University of North Dakota and an Associate of Applied Science degree in Geographic Information Systems from the Alexandria Technical School. Skip has eight years of experience working with a variety of clients on environmental documentation including mapping, modeling, and impact quantification. He has managed GIS projects involving the securing of funds, project implementation, project design, and management.

Chris Sternhagen

Chris Sternhagen holds a B.S. in Electrical Engineering Tech. from South Dakota State University. He comes from an agricultural background with experience in telecommunications and development work in both the real estate and renewable energy industries. Chris has served enXco for over 5 years working in both the real estate department and as a project development manager. Chris's primary responsibilities include project oversight from site origination to construction. His duties involve managing a development team responsible for site investigation including environmental compliance, transmission interconnection, permitting, siting and design. Chris has worked on over 15 wind projects in 6 different Midwestern states.

Jennifer Turnbow

Jennifer Turnbow has a B.S. in Environmental Science from the University of Idaho. She has provided environmental planning and documentation for projects throughout the region for the last seven years. She has extensive experience with the major permitting processes, NEPA process and documentation, and public and agency coordination. Jennifer's main focus includes environmental work and public involvement on energy and transportation projects. Prior to joining KL&J, she worked for the University of Idaho for four years in the Idaho Cooperative Fish and Wildlife Research Unit assisting in the evaluation of physiological changes of migrating juvenile Chinook salmonids (*Oncorhynchus*

tshawytcha) and effects on performance and survival throughout the Snake and Columbia Rivers. Also, she assisted with sampling of juvenile Chinook salmon for fish-transportation barge holds and collection of tissue and blood samples under permitting guidelines of the Endangered Species Act of 1973.

Grady Wolf

Grady was awarded a B.S. in Natural Resource Management from North Dakota State University. He has eight years of experience in land and water management, including wetland delineations, biological and ecological field studies, and holistic management plans for agricultural lands. Grady has coordinated efforts for securing funding, acquiring permits, and completed mitigation plans for projects through state and federal agencies, and managed the projects during implementation. He has experience with range and watershed management and conducting biological and botanical assessments, including threatened and endangered species surveys. Grady also is experienced in NEPA documentation, permitting, and authoring numerous environmental documents.

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14.0 Acronym List

AADT	average annual daily traffic
AC	Advisory Circulars
AGL	above ground level
AWEA	American Wind Energy Association
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
CIA	Critical Issues Analysis
CMC	County Major Collector
CRP	Conservation Reserve Program
dBA	decibels
DOE	Department of Energy
enXco	enXco Development Corporation
EIS	Environmental Impact Statement
EMF	electromagnetic field
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FERC	Federal Energy Regulatory Commission
HCP	Habitat Conservation Plan
ICM	Interagency Committee Meeting
KL&J	Kadrmas, Lee & Jackson
kV	kilovolt
MAPP	Midcontinent Area Power Pool
MBTA	Migratory Bird Treaty Act
MDU	Montana Dakota Utilities
MISO	Midwest Independent Transmission System Operator
mph	miles per hour
MW	megawatt
NASS	National Agricultural Statistics Service
NDCC	North Dakota Century Code
NDDOT	North Dakota Department of Transportation
NDGF	North Dakota Game and Fish
NDPR	North Dakota Parks and Recreation Department

NDPDES	North Dakota Pollutant Discharge Elimination System
NERC	North American Electric Reliability Corporation
NSP	Northern States Power company [Xcel Energy]
OCC	Operations Control Center
O&M	operation & maintenance
PSC	Public Service Commission
RF	Radio Frequency
rpm	revolutions per minute
RTO	Regional Transmission Organization
SCADA	supervisory control and data acquisition
SHPO	State Historic Preservation Office
SWO	Sisseton-Wahpeton Oyate Tribe
USACE	US Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
V	volts
WEST	Western Ecosystems Technology Incorporated
WRA	Wind Resource Area
WTG	wind turbine generator

APPENDIX A: FIGURES

Figure 1. Project Area

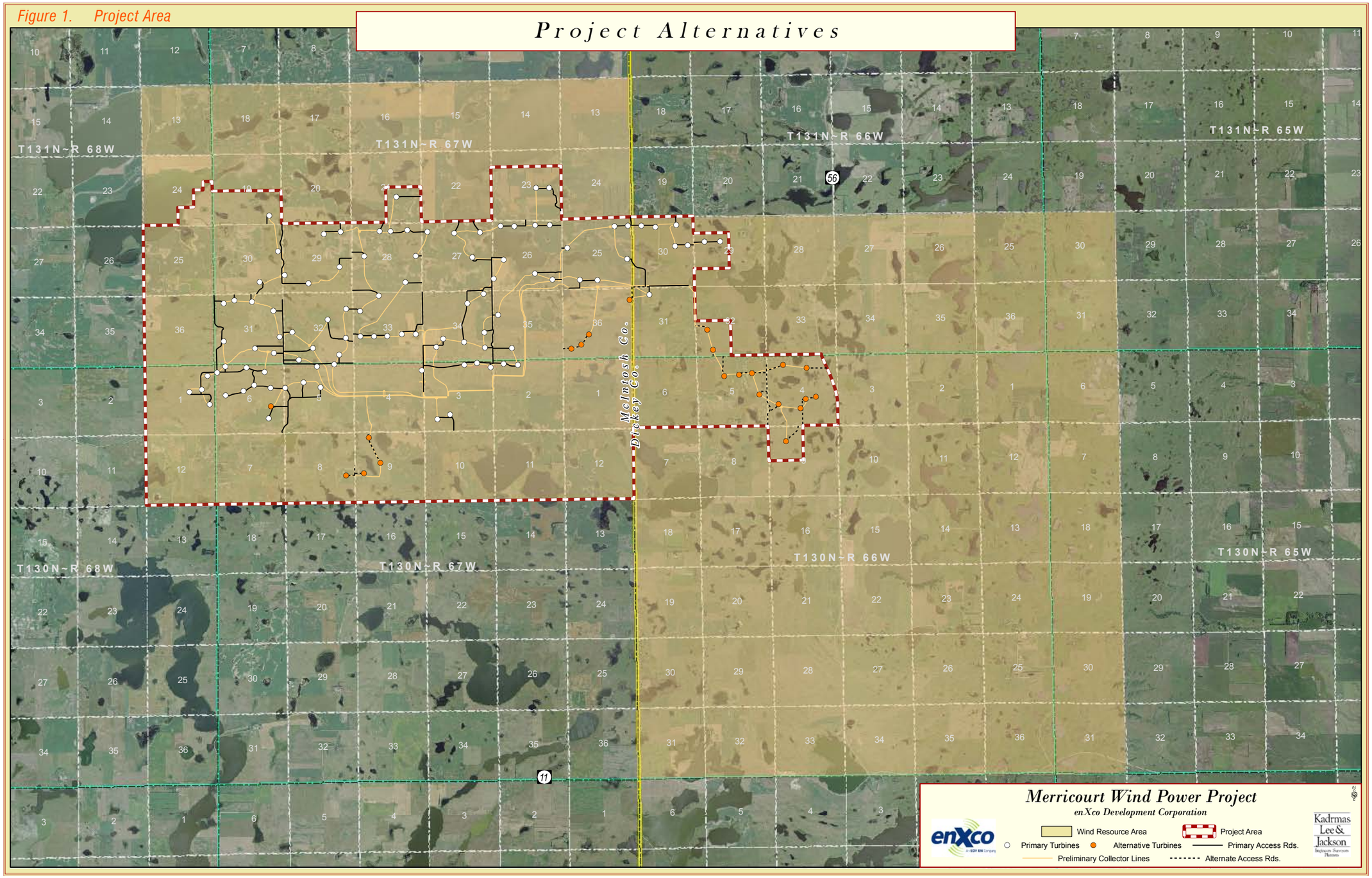


Figure 2. Organizational Structure

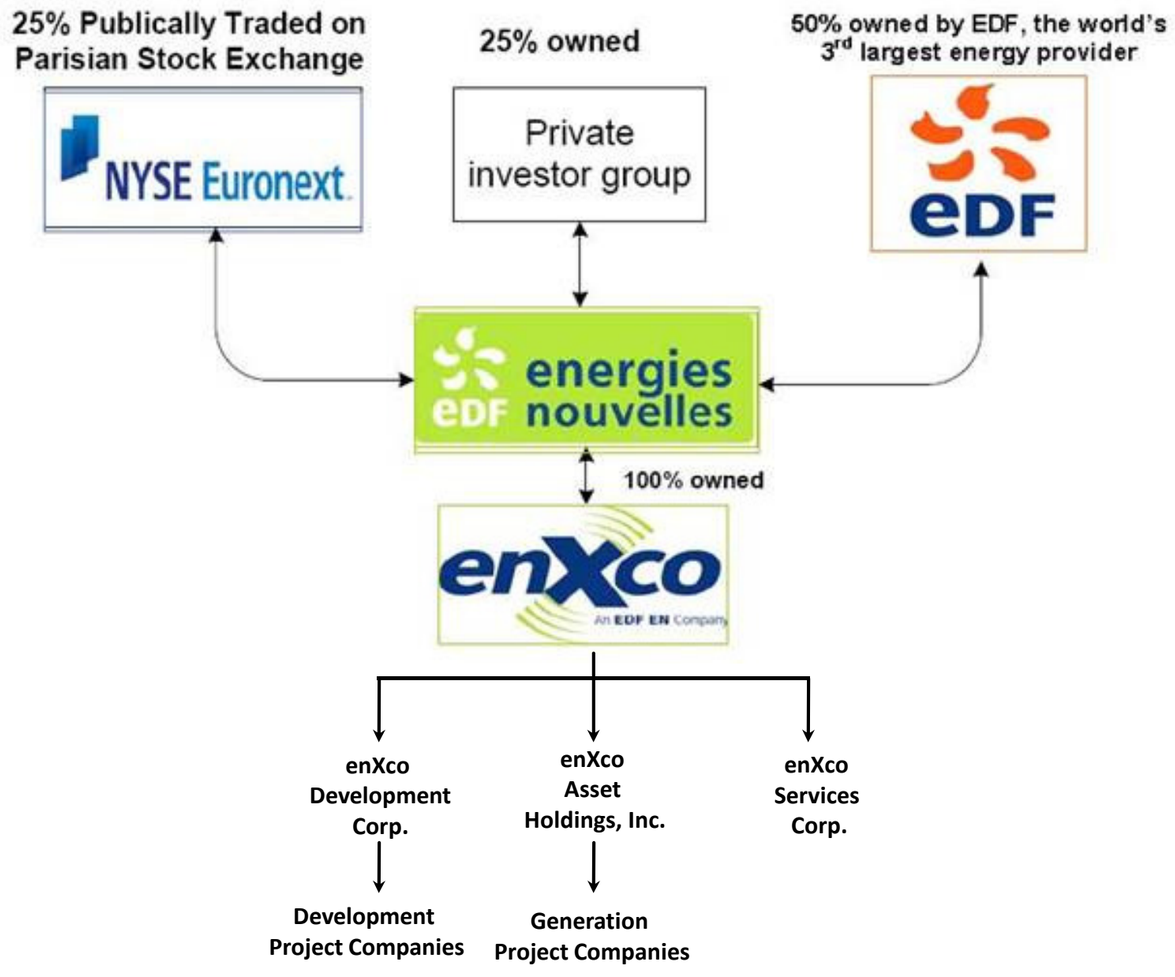


Figure 3. Exclusion Areas

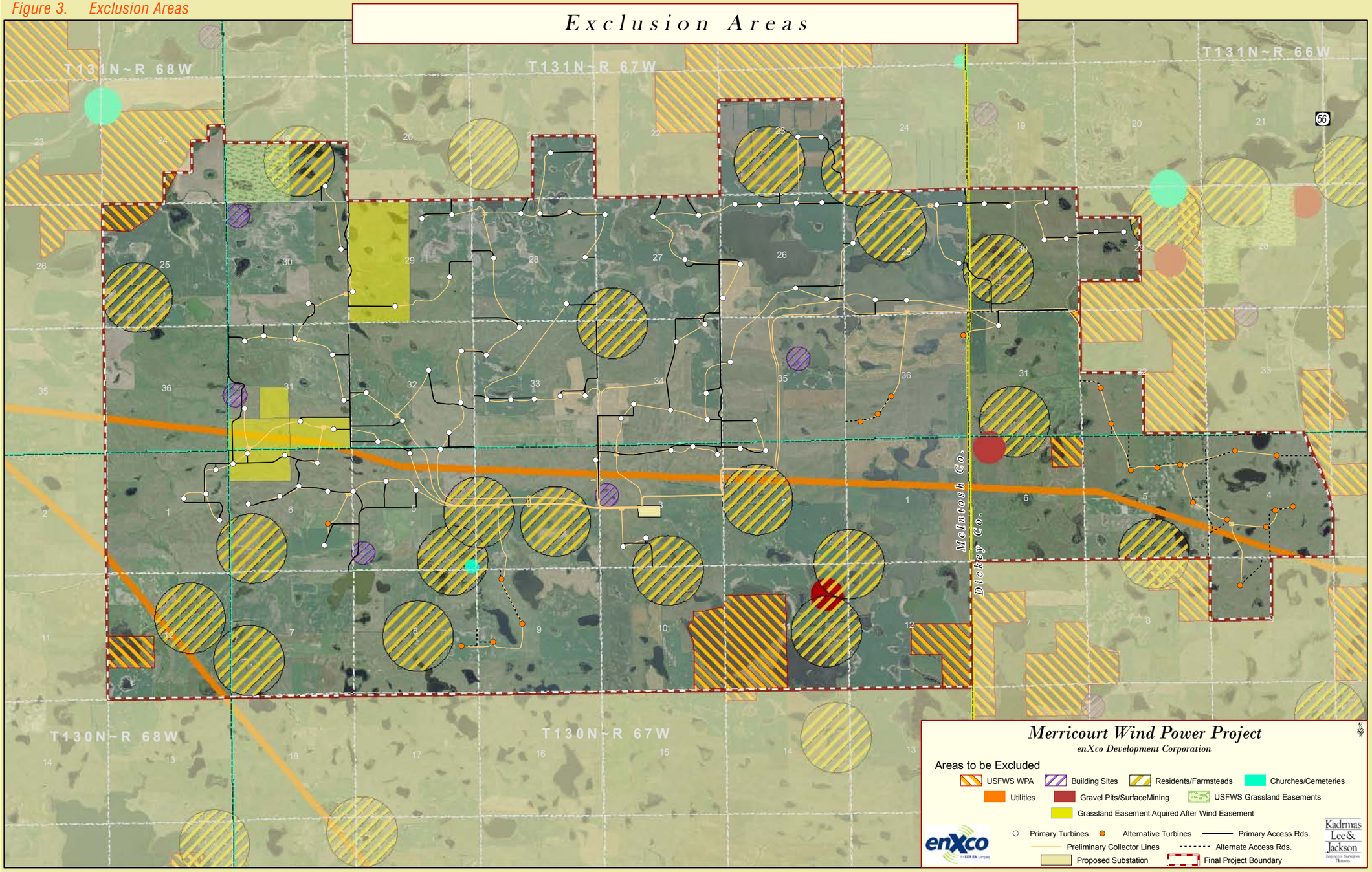


Figure 4. Avoidance Areas

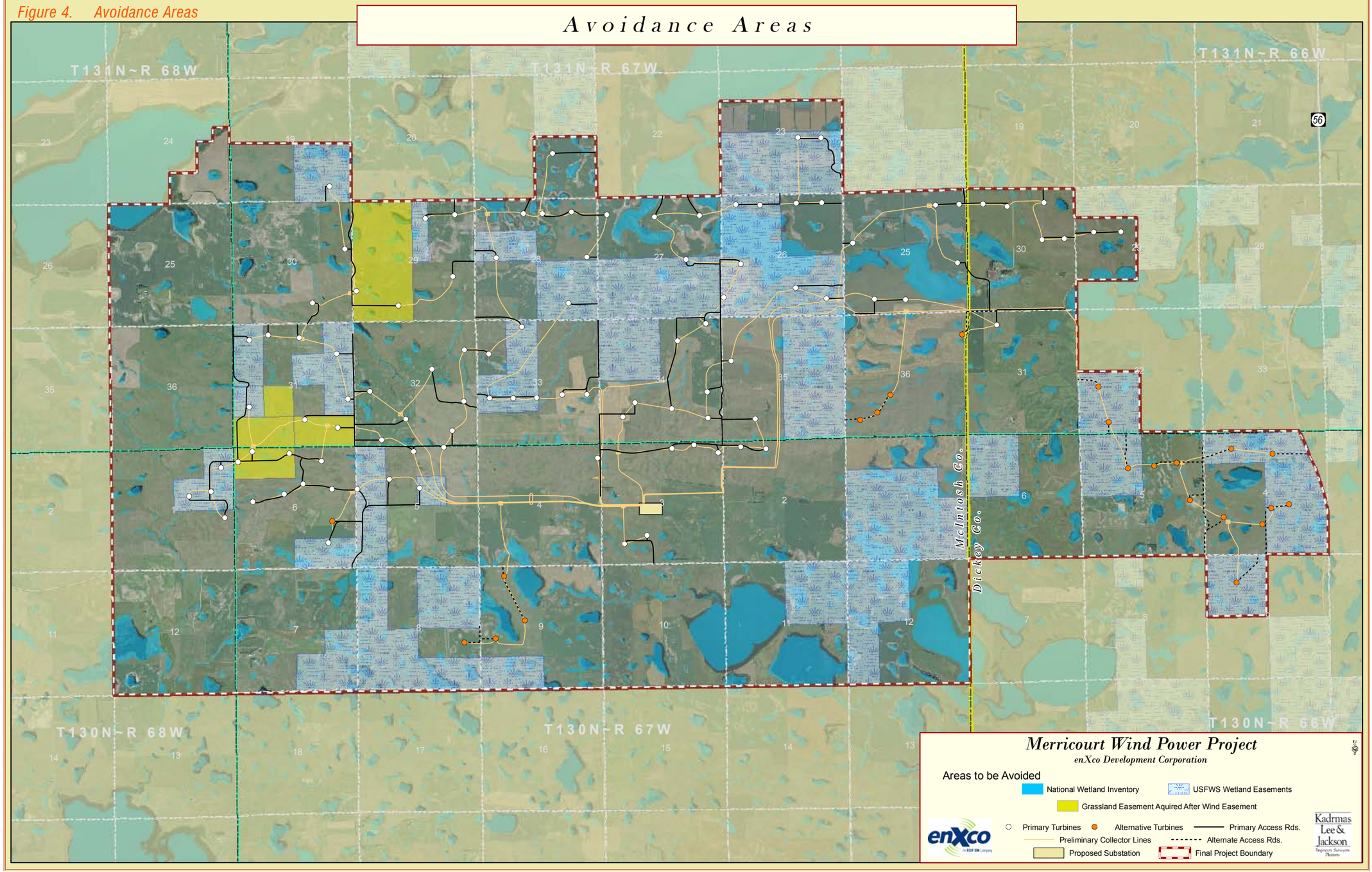
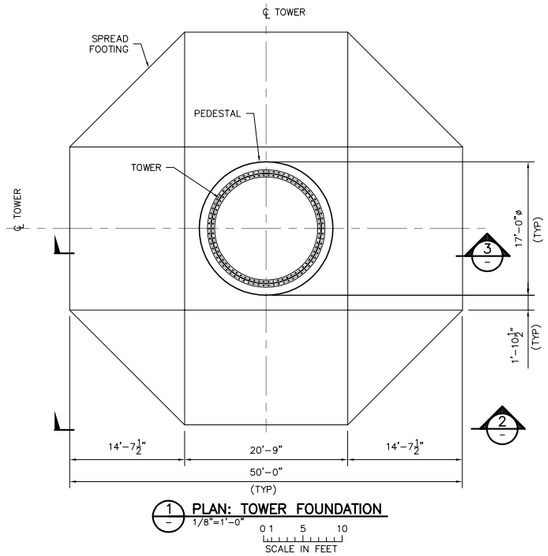
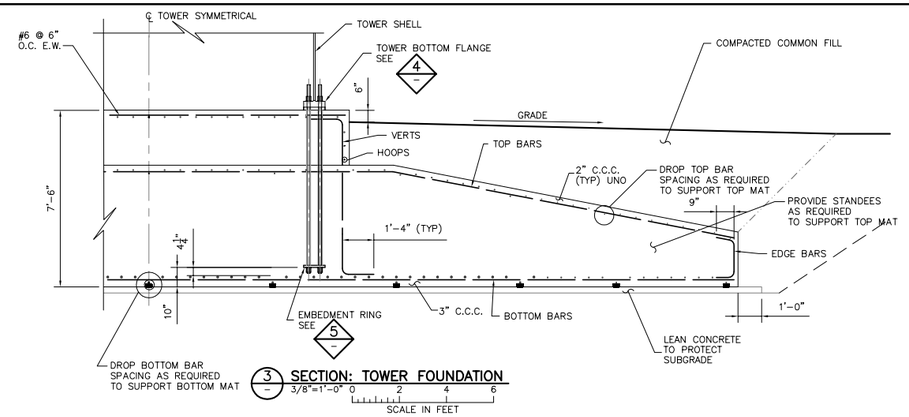
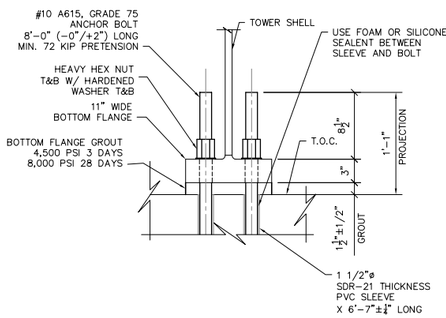
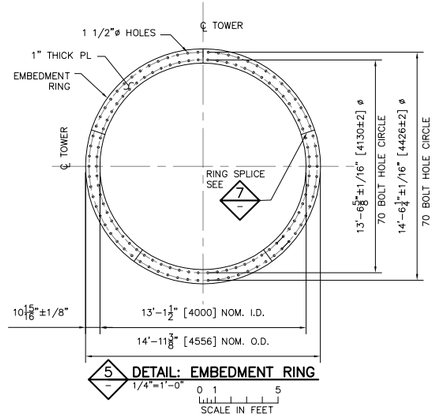


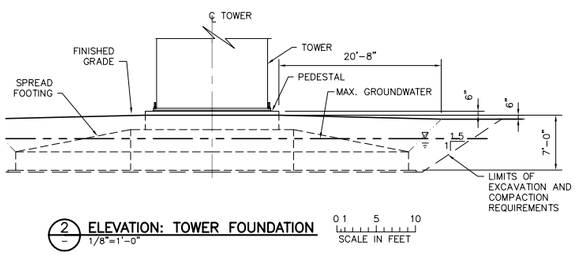
Figure 5. Foundation Design Plan Sheet











BUILDING AND DESIGN CODES:

INTERNATIONAL BUILDING CODE 2006, INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS.

BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, ACI 318, 2005, AMERICAN CONCRETE INSTITUTE.

WIND TURBINE AND TOWER:

MANUFACTURER: GE ENERGY
MODEL: GE1.5 SLE
POWER OUTPUT: 1.5 MW
TURBINE HUB HEIGHT: 80m
ROTOR DIAMETER: 77M

DESIGN SERVICE LOADS:

UNFACTORED SERVICE LOADS DUE TO EXTREME WIND CONDITION CLASS IEC-IIA (CRITICAL)

OVERTURNING MOMENT, Mxy = 34,908 kN-m = 25,747 ft-kips
HORIZONTAL BASE SHEAR, Hxy = 523 kN = 118 kips
VERTICAL TOWER LOAD, Wz = 1,845 kN = 415 kips

FOUNDATION DESIGN DATA:

MIN. FACTOR OF SAFETY AGAINST OVERTURNING: >1.5
MIN. FACTOR OF SAFETY AGAINST SLIDING: >1.5
MIN. FACTOR OF SAFETY AGAINST BEARING CAPACITY FAILURE: >2.26

REFERENCE DOCUMENTS:

1, GE ENERGY, "FOUNDATION DATA FOR WIND TURBINE GENERATOR SYSTEMS, GE 1.5SLE MTS, 61.4-85M HH, IEC TCIIA WITH REDUCED GUST (Ve50=55 M/S), LM 37.3P2 50& 60 Hz, GE37C 60 Hz", REVISION, DATED JULY 1, 2009.

MIN. 28-DAY COMPRESSIVE STRENGTH OF CONCRETE:
5000 PSI

MIN. YIELD POINT STRENGTH OF REINFORCING BAR:
60 KSI UNLESS NOTED **60 KSI** OR **75 KSI** FOR FOOTING

MIN. STRENGTH OF ANCHOR BOLTS:
TENSILE STRENGTH **100 KSI**, YIELD STRENGTH **75 KSI**

MIN. COMPRESSIVE STRENGTH OF NON-SHRINK GROUT:
8,000 PSI @ 28 DAYS, 4,500 PSI @ 3 DAYS

MIN. YIELD POINT STRENGTH OF EMBEDMENT PLATE:
36 KSI

FOR PERMITTING PURPOSES ONLY

ABBREVIATIONS:

B.O.	BOTTOM OF	O.C.	ON CENTER
C.C.C.	CLEAR CONCRETE COVER	O.D.	OUTSIDE DIAMETER
℄	CENTER LINE	R	RADIUS
EL.	ELEVATION	T&B	TOP AND BOTTOM
E.W.	EACH WAY	T.O.C.	TOP OF CONCRETE
EX.	EXISTING	TYP	TYPICAL
I.D.	INSIDE DIAMETER	UNO	UNLESS NOTED OTHERWISE
MIN.	MINIMUM	W/	WITH
NOM.	NOMINAL	ø	DIAMETER

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NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	CAK		CAK	5-MAR-10	INITIAL RELEASE

CAK W:\Business Units\ED\Technical Topics\WindFarms\enxco\enxco_ge generic_s-01_rev a.dwg Plot at 1 03/05/2010 10:57:05

CLIENT	3/5/10							
BID								
CONSTRUCTION								
RELEASED TO/FOR	A	B	0	1	2	3	4	
	DATE RELEASED							

BARR
Corporate Headquarters: Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
55435-4803
Ph: 1-800-632-2277
Fax: (952) 832-2601
www.barr.com

Scale	AS SHOWN
Date	5-MAR-10
Drawn	CAK
Checked	–
Designed	CAK
Approved	CAK

enXco DEVELOPMENT CORP.
ESCONDIDO, CALIFORNIA

–
–

TYPICAL GE SPREAD FOOTING FOUNDATION PLAN, ELEVATION, SECTION & DETAILS

BARR PROJECT No.	–
CLIENT PROJECT No.	–
DWG. No.	S-01
REV. No.	A

Figure 6. Land Use

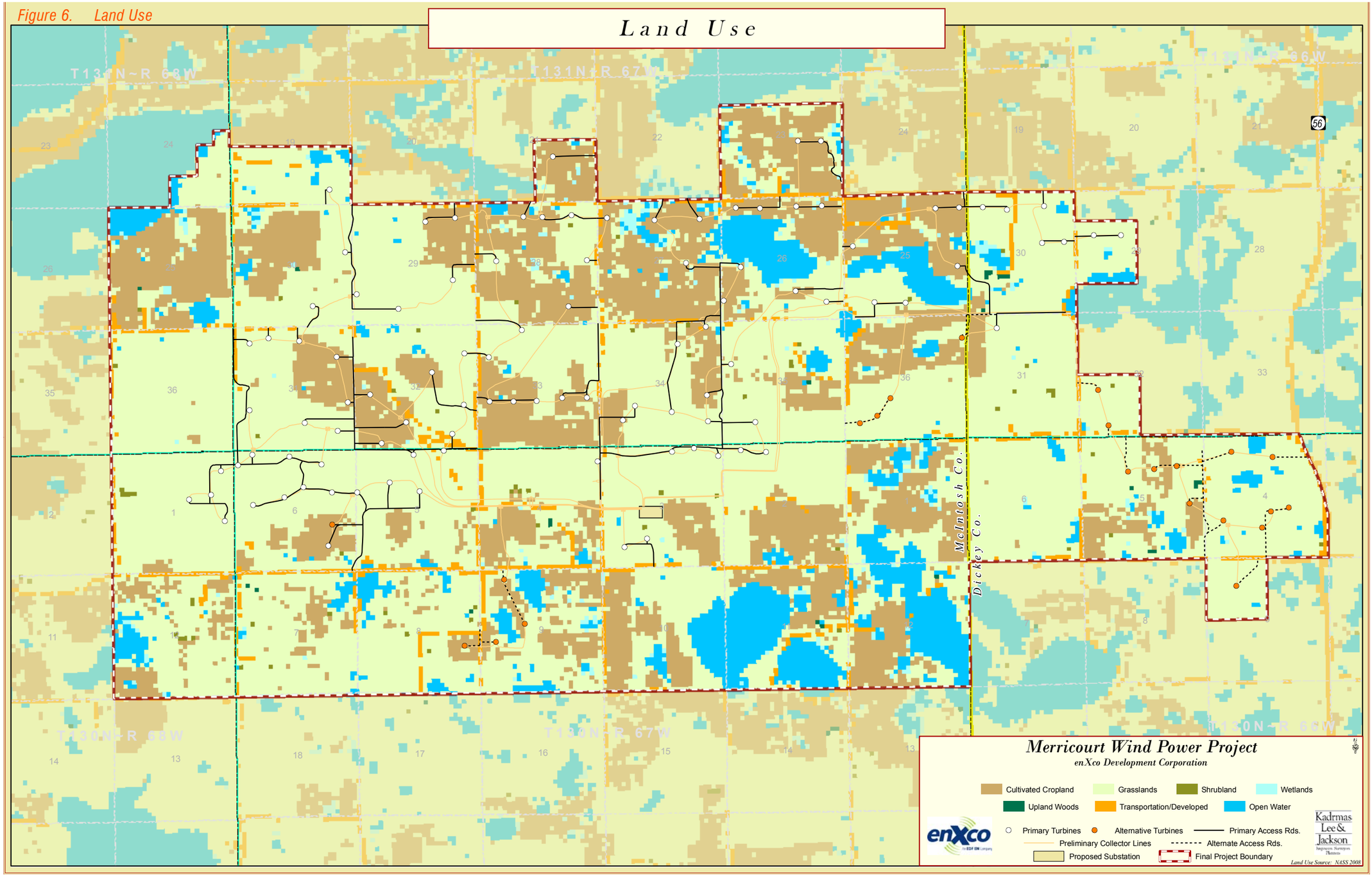


Figure 7. Public Service infrastructure

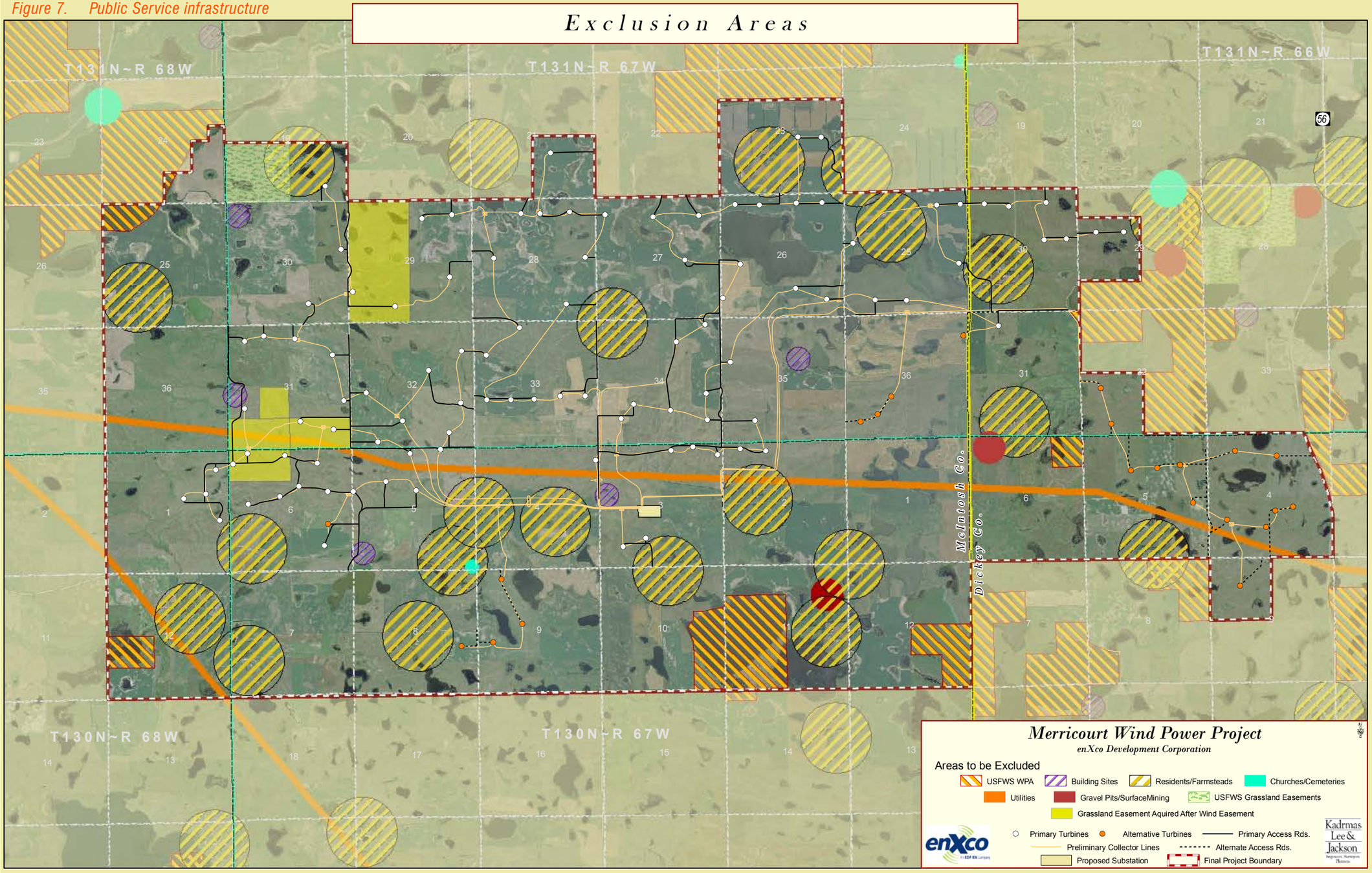


Figure 8. Existing Roadways

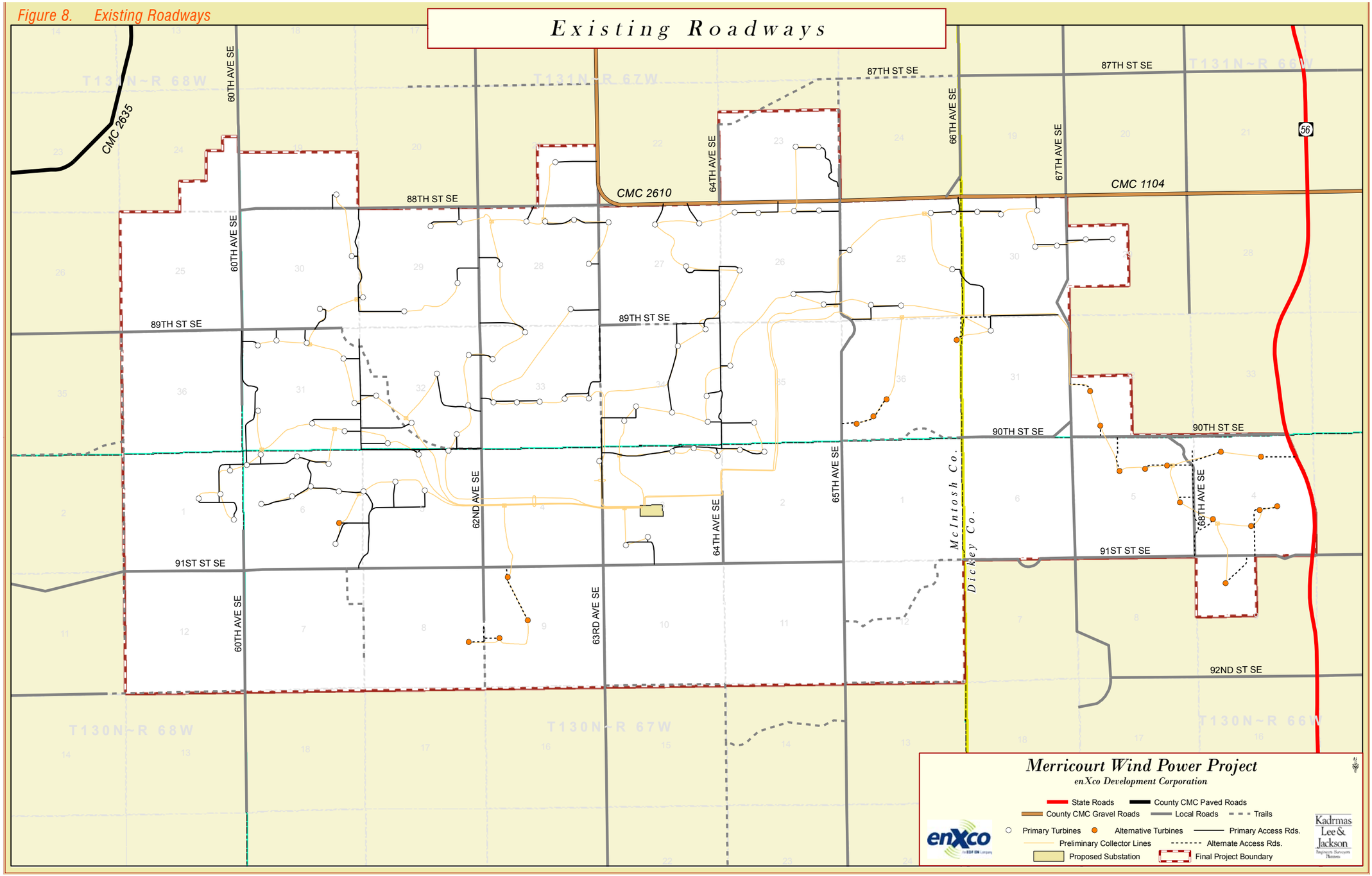


Figure 9. Geologic and Ground Water

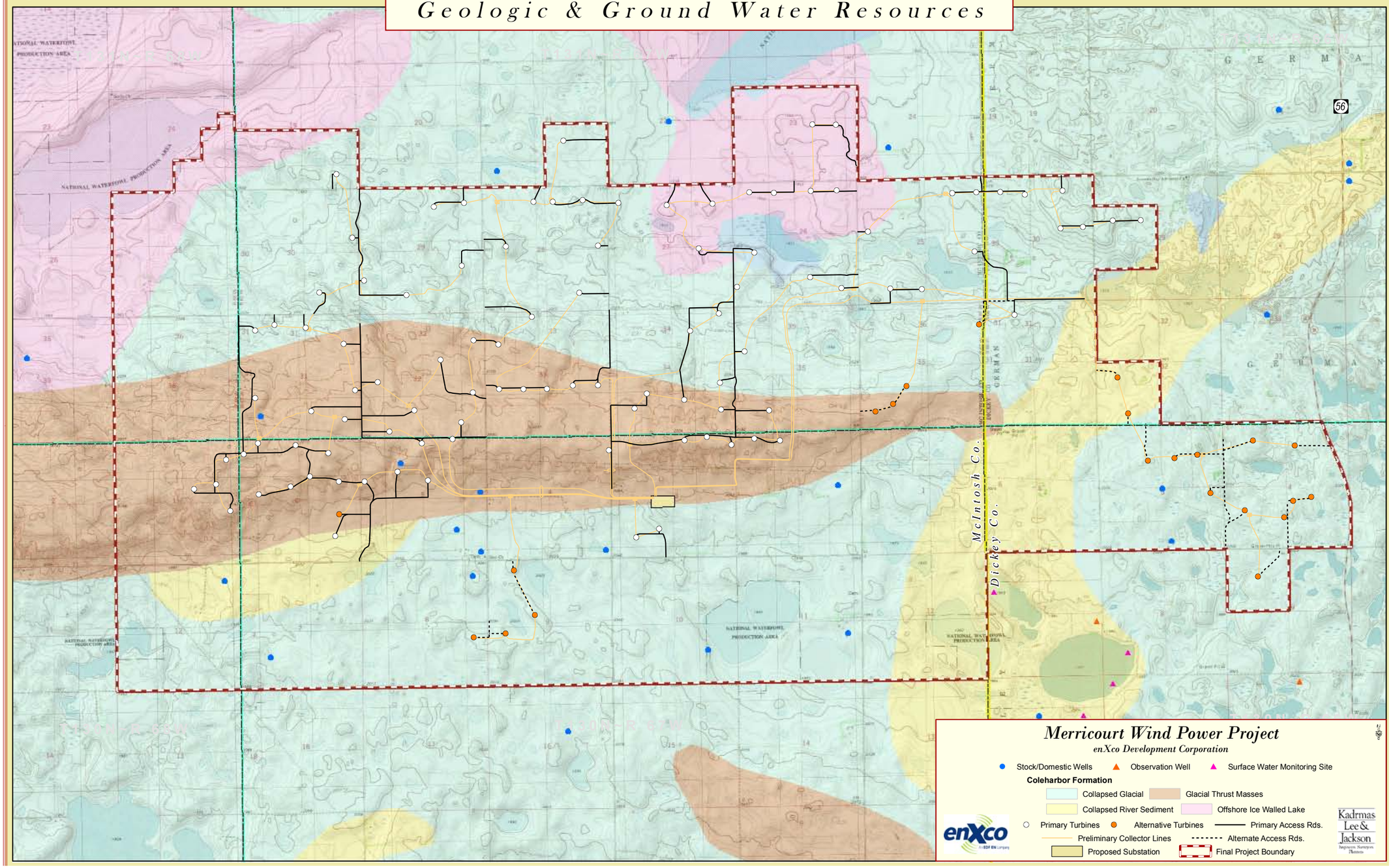
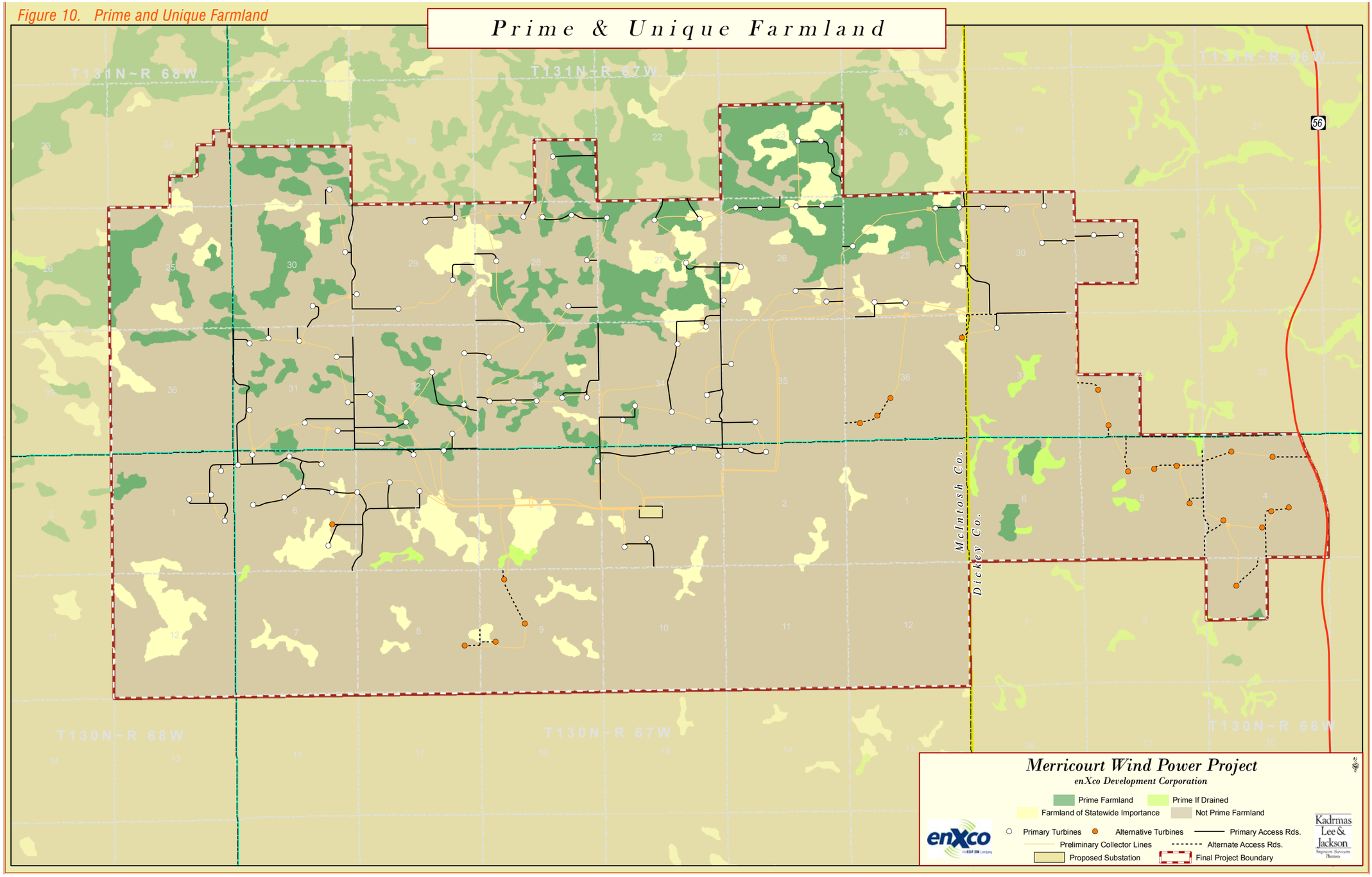


Figure 10. Prime and Unique Farmland



APPENDIX B:
DESIGN DATA REPORT

MERRICOURT WIND PROJECT DESIGN DATA

Project Overview

- 150 MW name plate capacity wind energy plant
- 100 General Electric SLE Wind Turbines

Wind Turbine Generator

General Electric 1.5 MW Series Technical Data	
Number of Generators	100
Model Types	1.5sle
Rotor Diameter	77 m (253 ft)
Swept Area	4657 m2 (50128 ft2)
Rotorspeed	10.1–20.4 rpm
Blade Material	Composite fiberglass
Pitch System	Active blade pitch control
Approximate Minimum Wind Speed Necessary for Operation	3.5 m/s (7.8 mph)
Approximate Wind Speed Necessary To Achieve Rated Electrical Output	14 m/s
Approximate Maximum 3-second Wind Gust Allowed During Operation	30 m/s (67 mph)
Maximum Wind Speed	25 m/s for 10-minute average (55.9 mph)
Modular Tower System	Multi-coated, conical tubular steel tower; 80 meter (262.5 feet) hub height
Obstruction Marking and Lighting	Turbine and tower finish color of standard white/gray; aviation lighting as required by FAA
Foundations	Spread Footing or Tensionless Pier
Generator Type	Doubly-fed three-phase asynchronous generator
Rated Power	1500kW
Generator Rated Voltage	690 VDC

Balance of Plant Facilities

Electrical Collector System	
Construction Type	Underground
Collector System Voltage	34.5 kV
Step-up Transformer at Tower Base	690 V to 34.5 kV
Collection System Design Standards	NESC, NEC
Collector Substation	
Approximate Substation Area	3 acres
Main Transformers Rating	57/76/95 MVA, 230 kV/34.5 kV
Major Equipment	Breakers, switches, 2 main power transformers
Substation Design Standards	Montana Dakota Utilities
Interconnecting Utility	Montana Dakota Utilities

APPENDIX C:
MICROWAVE COMMUNICATIONS

ENGINEERING REPORT
CONCERNING THE EFFECTS UPON
FCC LICENSED RF FACILITIES
DUE TO CONSTRUCTION OF THE
MERRICOURT WIND PROJECT
IN
MCINTOSH AND DICKEY COUNTIES, ND

enXco, Inc.

May 12, 2009

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**ENGINEERING REPORT
CONCERNING THE EFFECTS UPON
FCC LICENSED RF FACILITIES
DUE TO CONSTRUCTION OF THE
MERRICOURT WIND PROJECT
In
MCINTOSH AND DICKEY COUNTIES, ND**

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 Merricourt Wind Turbine Project in McIntosh and Dickey Counties, North Dakota. 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[1].

Wind turbines located on land parcels near federally licensed radio frequency facilities can cause one or more modes of RF impact, due to aperture blockage and/or re-radiation. An iterative procedure is frequently necessary to minimize adverse effects. Information provided in this document will minimize the chances that disruption of the studied 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 unacceptable impact.

The Merricourt project involves the construction of approximately 100 new turbines. 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 yet 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 by establishing “blackout areas”. The following Figure 1 shows the turbine siting area with a 2-

[1] 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.

mile buffer added to each site for the purposes of the point-to-point microwave station and fixed station search.

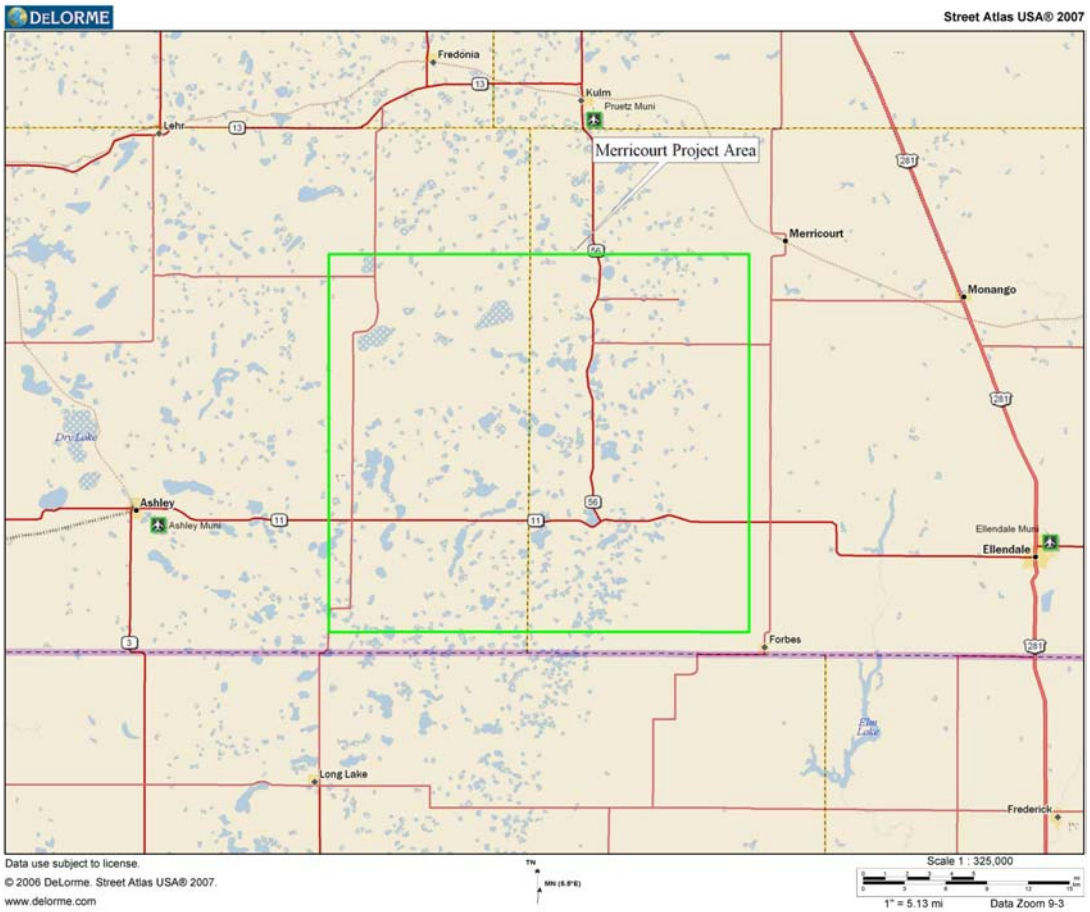


Figure 1 – Merricourt Windfarm Search Area

With respect to broadcast facilities, pertinent TV, FM and AM stations were also reviewed in this analysis, and the potential impact to local reception of those broadcast facilities is discussed herein.

The following tabulation and analysis consists of three sections:

1. Microwave point-to-point path analysis[2]
2. Land mobile and public safety radio analysis
3. Broadcast television and radio analysis

[2] Only point-to-point microwave facilities were considered (for instance, a study of earth stations is not included).

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

The analysis included herein examines the pertinent FCC licensed services in the area for potential impact according to generally accepted engineering standards. 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[3].

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[4]. 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.

[3] For instance, some microwave paths may have insufficient ground clearances as they are presently configured.

[4] 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.

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 5 unique microwave transmitting over three unique paths existing in the FCC database that intersect the project area. These paths are tabulated below in Table 1 and are shown in Figure 2.

ID	Call Sign	Status	Name Xmit	Dist/Bear (km)	Elevation (mAMSL)	Freq. (MHz)	Licensee	WCFZ (m)
1	WBD234	C	STATION	49.2@323.7	466	6665	Basin Electric Power	23.5
2	WBD235	A	FORBES	69.6@310	765.1	6775	Basin Electric Power	27.7
3	WBD235	A	FORBES	37.0@214.8	710.2	6825	Basin Electric Power	20.1
4	WBD236	A	STATION	69.6@129.5	807.1	6615	Basin Electric Power	28.1
5	WPOS232	A	LEOLA	37.0@34.6	663.5	6665	Basin Electric Power	20.4

Table 1 – Microwave Links Crossing Merricourt Wind Project Area

Paths 2 through 5 create blackout zones through the project area. Path 1 is a cancelled path, so protection is not needed at the present time[5]. 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 (the rightmost column) and the blade radius (38.5 meters), plus a coordinates uncertainty factor of 50 meters.

[5] This path is not shown in Figure 2, but is available for viewing in the associated KMZ file.

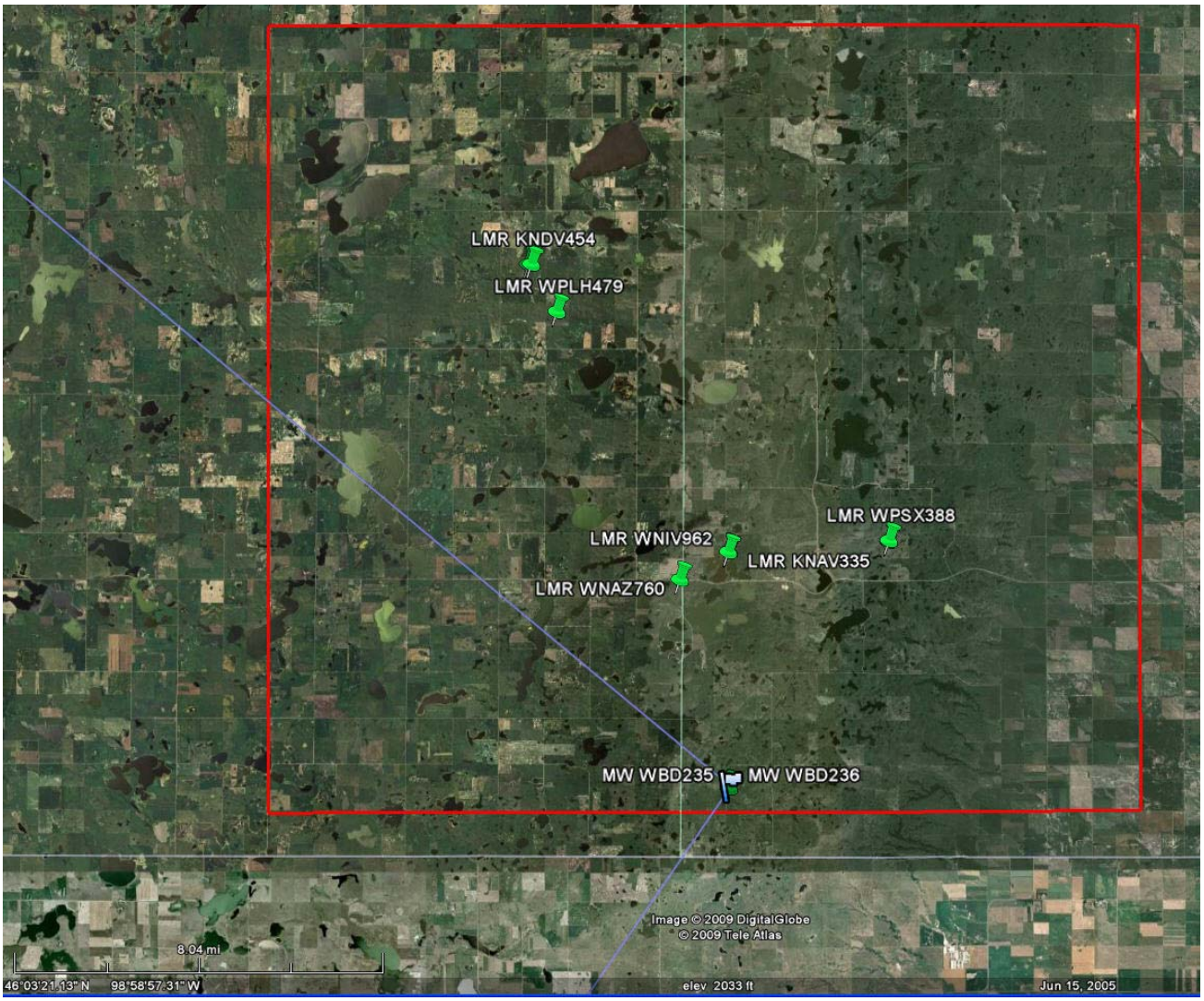


Figure 2 - Merricourt Wind Turbine Project Area Showing Active Facilities

There are two towers at the southern end of the project area that support microwave antennas. These tower locations are shown in Figure 3, along with the nearby land mobile stations, and the WCFZs of the two unique microwave paths.

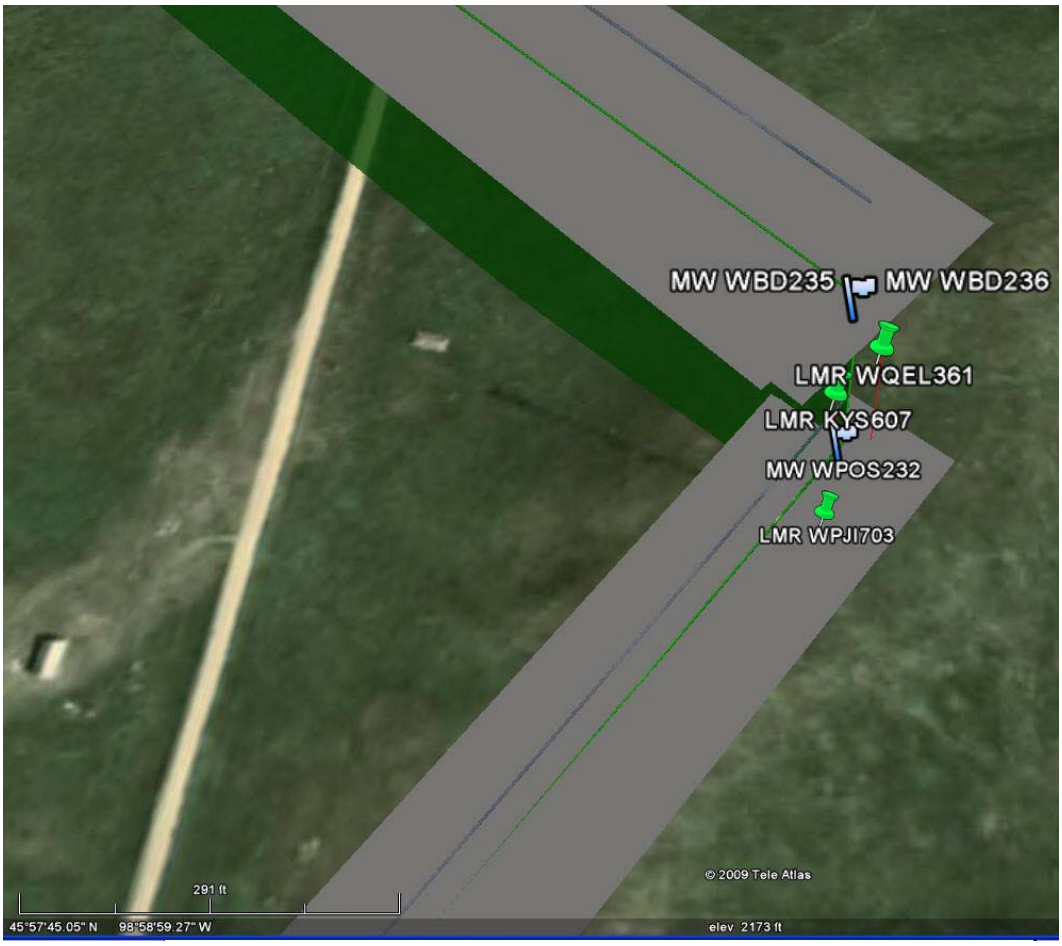


Figure 3 - Merricourt Wind Turbine Project Area Showing South Towers

The following Figure 4 shows the extent of the paths within the property, as well as the locations of the land-mobile facilities (active facilities only).

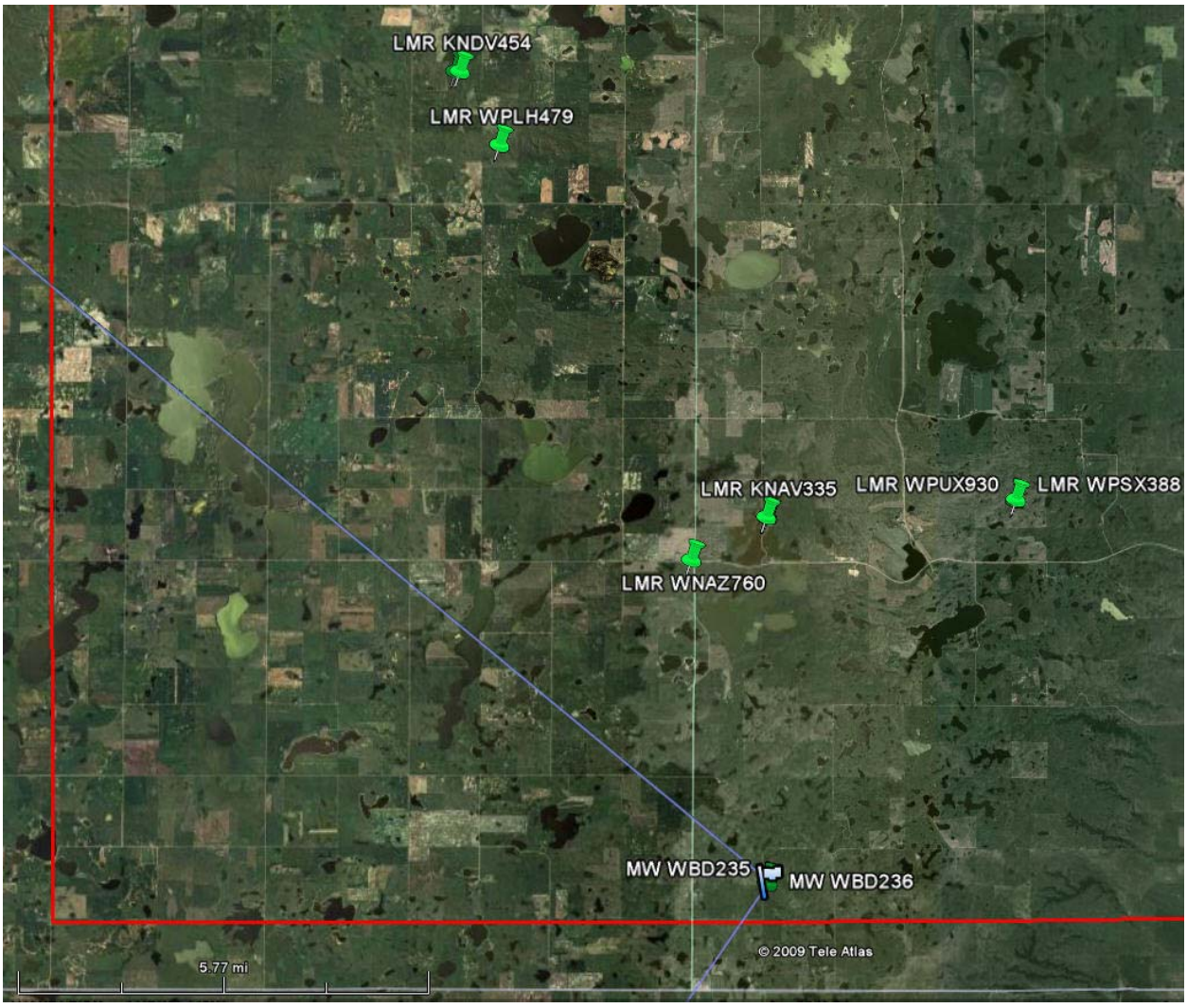


Figure 4 –Closeup of MW and LM Facilities in Merricourt Wind Project Area

If an excessive amount of time goes by before the turbines are to be constructed, it is recommended that this study be updated in case new paths have been added to the FCC's database.

The reader is referred to the provided KMZ and GIS shape files for more magnification and closer inspection. Spreadsheets are also provided tabulating additional information concerning each facility with blackout potential.

III. ANALYSIS OF LAND MOBILE RADIO FACILITIES

There are 38 *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 tabulated in Table 2 below and shown in Figure 4 along with the approximate exclusion zones.

Call Sign	Status	Latitude	Longitude	Ant. Ht. AGL (m)	Licensee
WNNZ390	E	46.0472	99.05872	12	NEU RALPH
WPJG554	A	46.11136	99.06039	58	Midwest Management Inc.
WNJH853	E	46.12636	99.07344	11	GACKLE CITY OF
WPBH245	E	46.03608	98.98289	36	NORTH CENTRAL FARMERS
WNIV962	A	46.03608	98.98289	61	SHAFER KENNETH W
WNVP680	E	46.03608	98.98289	61	RETZER ROBERT
WQEL361	A	45.96222	98.98278	82	Basin Electric Power Cooperative
KDR780	A	46.03919	98.91033	41	DICKEY COUNTY OF
KNDV454	A	46.12636	99.07205	41	GACKLE-STREETER PUBLIC SCHOOL
WNPG414	A	46.03608	98.98289	61	HEINRICH DUANE H
WNJF993	E	45.98442	99.00122	18	BEIDLER MARVIN
KNJV737	A	46.03608	98.98289	38	BURKHARDT DOYLE:
WNAZ760	A	46.02747	99.00484	64	Minn-kota Communications Inc
WNNZ390	E	46.03608	98.98289	36	NEU RALPH
WNPG409	E	46.03608	98.98289	36	JAMES DERALD
KNBT751	A	46.03608	98.98289	36	GRAND VALLEY SUPPLY
WNSU322	T	46.03608	98.98289	36	FISCHER EUGENE M
WNWQ751	E	46.03608	98.98289	61	NORTH CENTRAL FARMERS
WPUH960	A	46.03611	98.9825	36	FREY'S ELECTRONICS INC.
WQGB971	A	46.03608	98.98289	61	DAKOTA ELECTRONICS
WPGA774	A	46.12636	99.07344	11	NORTH DAKOTA STATE OF
KNNT534	A	46.11136	99.06039	58	JAMESTOWN COMMUNICATIONS INC
KNAV335	A	46.03608	98.98289	67	WEISZHAAR FARMS INC
WPSX388	A	46.0395	98.91019	61	OCHSNER TODD
WPQI804	A	46.03608	98.98289	36	FREY S ELECTRONICS
WNGN594	A	46.11136	99.06039	52	ROTT ELLIOTT
WPBW690	A	46.03608	98.98289	36	MELIUS ROGER D:MELIUS KELLY
KYS607	A	45.9622	98.98289	67	BASIN ELECTRIC POWER
WPUX930	A	46.0395	98.91019	61	DAKOTA ELECTRONICS
KJT529	E	46.03608	98.98289	36	FREY S ELECTRONICS
WPDU310	T	46.03608	98.98289	61	F E M ELECTRIC ASSOCIATION INC
WPLH479	A	46.11136	99.06039	60	JAMESTOWN COMMUNICATIONS INC
WNDU294	E	46.11136	99.06039	60	GIESLER JAMES
WPQA912	E	46.03608	98.98289	36	FREY S ELECTRONICS
WPJI703	A	45.9622	98.98289	11	DAKOTA VALLEY ELECTRIC COOP
WPHI902	A	46.03608	98.98289	36	ERDMANN PAUL
WPMQ916	E	46.03608	98.98289	61	NELSON CALVIN
WPES411	A	46.03608	98.98289	55	DAKOTA ELECTRONICS

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

Of these 38 land mobile records, 14 of the land mobile station licenses have either expired or were terminated. The remaining 24 land mobile stations are located at six unique sites which are shown in the figure below.

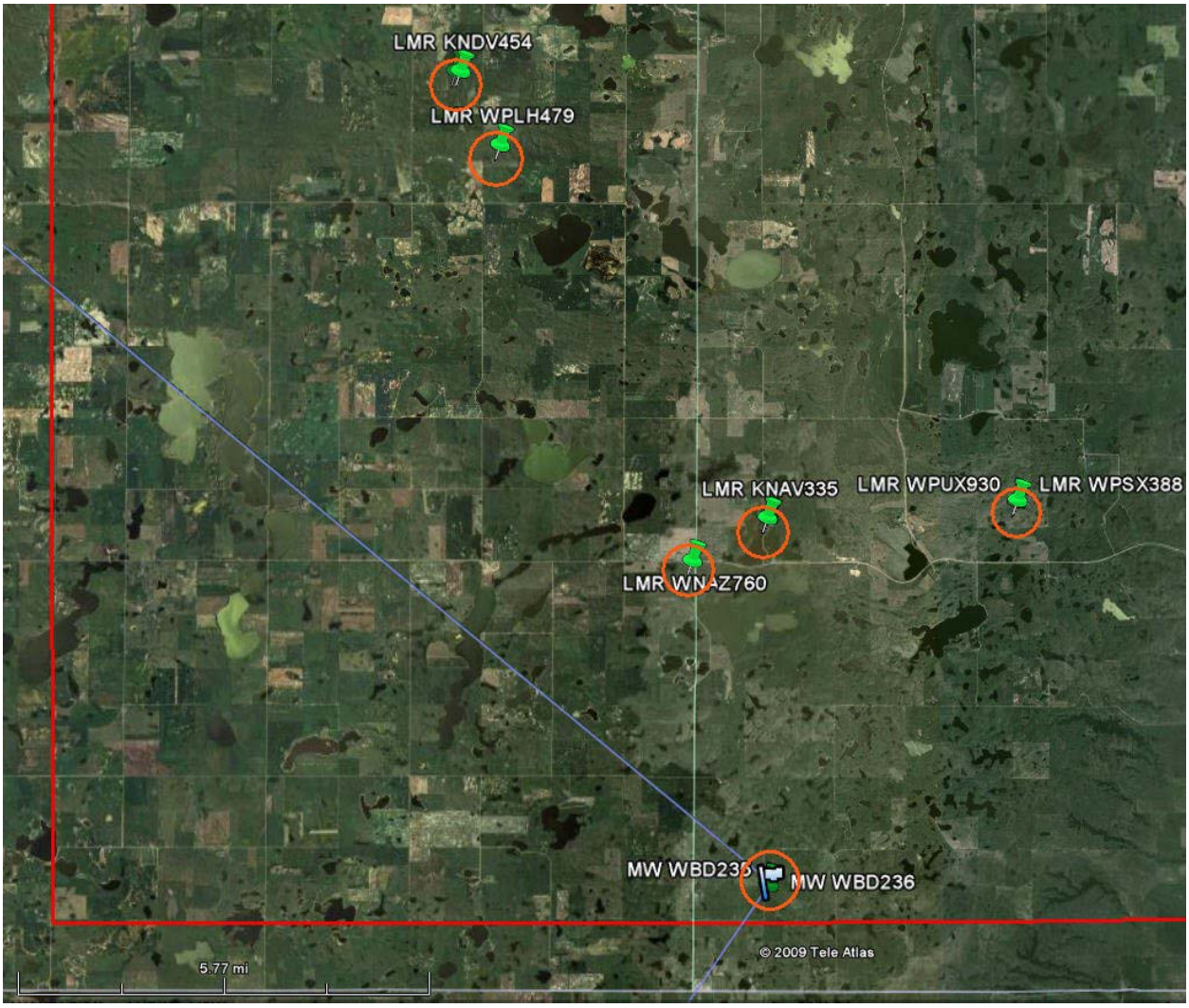


Figure 4 – Land Mobile Station Protection Zones in Merricourt Project Area

Generally, wind turbines should not adversely affect the signals of land mobile stations if the turbines are physically spaced at least 400 meters (approximately 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[6], be confirmed via a physical site survey.

The reader is referred to the provided KMZ, spreadsheets 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[7]. 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.

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.

[6] Oftentimes, communication companies will "warehouse" land mobile frequencies, holding valid licenses but not utilizing them immediately, which is an illegal practice. In addition, transmitters could be dismantled without the FCC being notified.

[7] 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.

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[8], 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 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[9] ("Digital" or "High Definition"). For this reason, analog facilities have not been considered in these analyses.

Dickey County is in the Fargo-Valley City, ND Designated Market Area (DMA) according to Nielsen Media Research. McIntosh County is in the Minot-Bismarck-Dickinson, ND DMA. However, only two stations from each of these two DMAs place a marginal or better signal towards the wind project area. Three stations from the Sioux Falls, SD DMA have also been determined to serve this region. These seven stations are listed in Table 3 at their final DTV channel assignments and operating parameters.

[8] Modern turbine blades are usually constructed from glass-reinforced plastic (GRP), although they usually contain some metal for strengthening, balance and grounding.

[9] Some TV stations currently serving McIntosh and Dickey Counties may already have gone digital only, due to the fact that February 17th 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 ERP)	Ant. Height (m HAAT)	Distance (mi)	Azimuth (°T)	Reception Antenna
KDLO	CBS	3	Florence SD	14.4	513.3	102.7	138.0	Outdoor +1.3
KJRR	Fox	7	Jamestown ND	10.6	135	59.5	10.2	Outdoor –1.0
KABY	ABC	9	Aberdeen SD	19.4	427	85.5	141.3	Nil –8.5
KQSD	PBS	11	Lowry SD	37.0	312.7	73.2	221.2	Nil –9.6
KXMB	CBS	12	Bismarck ND	19.1	444.3	93.6	292.9	Nil –15.2
KDSD	PBS	17	Aberdeen SD	37.8	349	75.3	121.7	Nil –12.3
KJRE	PBS	20	Ellendale ND	72.3	162.5	16.5	21.9	Indoor +46.0

Table 3 – Digital TV Stations in Vicinity of Merricourt Project Area

The Ellendale station's signal is closer and stronger than those coming from Aberdeen and elsewhere, and is probably the primary local programming outlet. It is believed that only KJRE, KJRR and KDLO have a significant viewership in McIntosh and Dickey Counties. The signals of stations KDLO-TV and KJRR-TV are deemed unlikely to be affected by multipath interference from the wind turbines to an extent whereby the effect cannot be mitigated. These stations will require high-gain outside antennas to obtain a satisfactory picture.

There are no TV translator, low power TV or low power digital TV stations in the area that are predicted to serve any part of the wind project area.

There is some possibility of signal disruption for residences that have to point their outdoor antennas through the turbine area, that utilize "rabbit ear" antennas, or that utilize older HDTV receivers. Most of this effect should be dissipated for locations more than 2 miles of a turbine, but some residual anomalies 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 a few 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.

In the opinion of this consultant, there would likely be several instances of turbine disruption to over-the-air TV, but these 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 215 households within an area likely to be affected[10]. It is estimated that a majority of the households in the area are served by 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 22 HDTV receiver locations may be

[10] Based upon the 2000 US Census centroid data.

affected. Mitigation costs would be approximately $300 in each instance. This estimate is based on worst-case assumptions pending information concerning the actual turbine locations.

4.2 FM FACILITIES

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

Call Sign	Format	Freq. (MHz)	City of License	Power (KW)	Ant. Height (m HAAT)	Dist. (km)	Azimuth (°T)
KMOM	Country	105.5	Roscoe SD	100	139	70.9	167.8
NEW	--	100.3	Linton ND	100	306	83.0	301.2

Table 4 – FM Stations Serving Project Area

There are no FM translator stations in the area that are predicted to serve any part of the wind 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.

The stations listed in Table 4 should be readily receivable using a household outdoor antenna from within the project area. The incremental cost to add FM stations to the outdoor TV receiving antenna would be approximately $40.

4.3 AM Facilities

A search of the FCC's database revealed no AM broadcast stations within 3 kilometers of the Merricourt wind project area boundaries. Therefore, there should be no significant impact to this broadcast service.

Occasionally, depending upon ground conditions, local AM receivers may experience slight signal changes on distant AM stations due to local effects. However, such an anomaly is not recognized by the FCC or the standards of good engineering practice as a harmful effect.

V. CONCLUSIONS

1. The proposed turbines, including the blades, should be located so as to not penetrate the WCFZs (Worst-Case Fresnel Zones) of any known active FCC-licensed microwave path. Four microwave links transmitted over two unique paths found in the FCC databases have been determined to create blackout zones in the Merricourt project area.

2. There are 24 active licensed land mobile transmitting sites within two miles of the project boundaries operating at six unique sites. If possible, turbines should not be sited within 400 meters of any active FCC licensed land mobile station. 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, but the receiver automatic gain control should be able to manage these variations. In a few cases, it might be necessary to reconfigure outdoor antennas at households within the project boundaries and within approximately two miles of the boundaries.

4. With respect to the listed TV station's signals, some pixelating, ranging from minor to moderate, could potentially occur on the DTV channels. Approximately 22 households may be affected. Mitigation would consist of the installation of an updated outside antenna at a cost of approximately $300 each, or installation of satellite TV equipment in intractable cases. Mitigation measures are expected to be available for all broadcast receptions anomalies.

5. Notification to land mobile licensees in the area should be made in accordance with the procedure outlined in Section III.

6. An on-site inspection of the Merricourt 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,



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

May 12, 2009

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APPENDIX D:
PHASE I ENVIRONMENTAL SITE ASSESSMENT

Merricourt Wind Power Project

PHASE I ENVIRONMENTAL ASSESSMENT

Dickey and McIntosh Counties

Prepared for: **enXco Develpment Corporation**

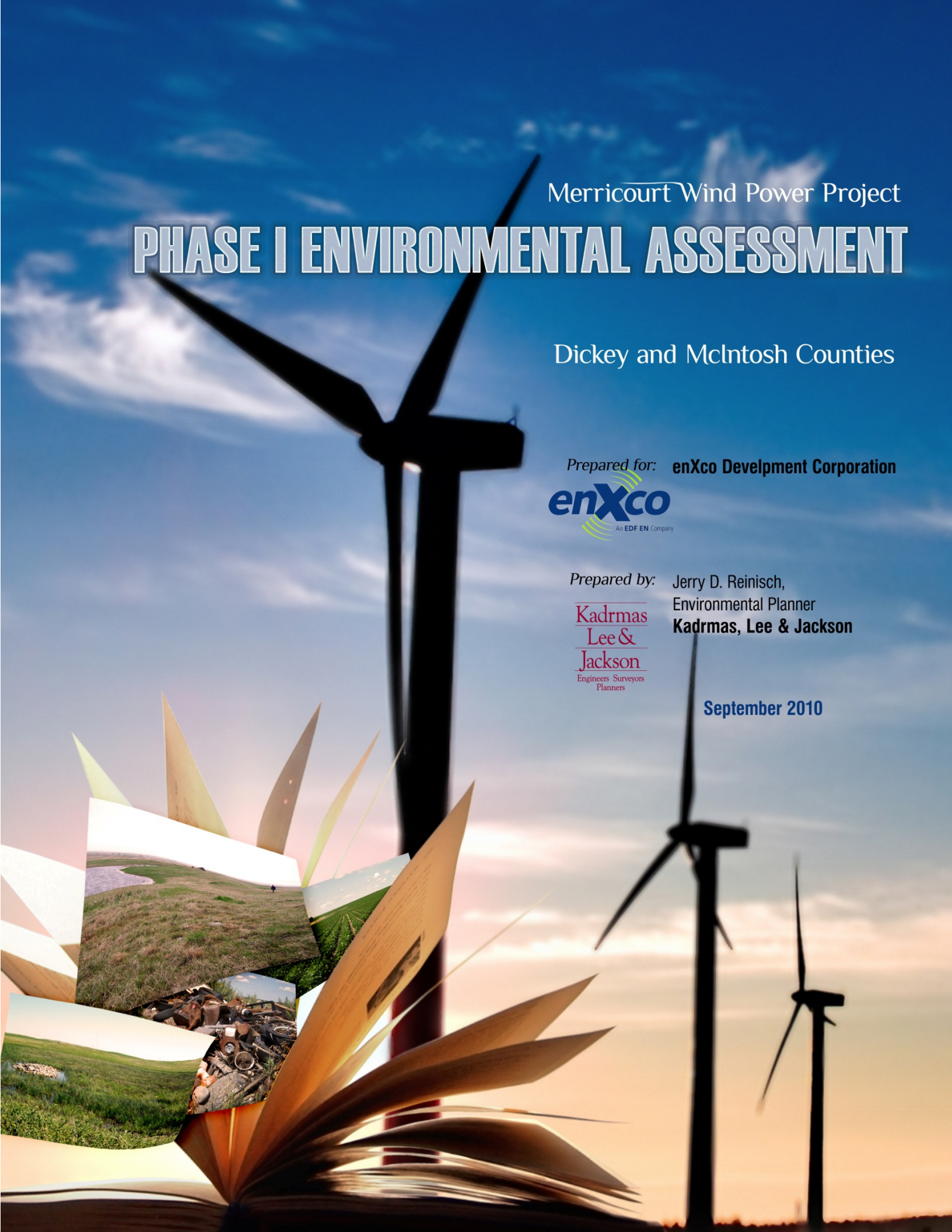
enXco
An EDF EN Company

Prepared by:

Jerry D. Reinisch,
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Kadrmas, Lee & Jackson

Kadrmas Lee & Jackson
Engineers Surveyors Planners

September 2010



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1.0 INTRODUCTION

1.1. Summary

Kadrmas, Lee & Jackson, Inc. (KL&J) was retained by enXco Development Corporation (enXco) in Minneapolis, Minnesota, to perform this Phase I Environmental Assessment on agricultural land in McIntosh and Dickey Counties near Merricourt, North Dakota. Work on this project was performed from September 15, 2009, to September 10, 2010. Information was gathered from a variety of sources as detailed in this report. The Findings were used to develop the conclusions outlined in Section 8.0.

1.2. Detailed Scope of Services

The objective of this Phase I Environmental Assessment was to identify recognized environmental conditions in connection with the above-referenced property, to the extent feasible and pursuant to the American Society of Testing and Materials (ASTM) Standard of Environmental Site Assessments for Commercial Real Estate Method E 1527-05. This Phase I Environmental Assessment consisted of four essential components:

a) Records review;

b) Site reconnaissance;

c) Interviews; and

d) Final report on the information gathered during the preceding activities.

1.3. Significant Assumptions, Limitations, Exceptions and Special Terms and Conditions

Standard industry practices and protocol were followed to develop the findings and conclusions contained in Section 8.0 of this report. A detailed list of issues that are outside the scope of the ASTM Standard E 1527-05 is included in Section 7.0 of this report. One exception or addition to this standard was to include information on wetlands in Section 7.1. The collection and analysis of soil, groundwater, surface water, and air quality samples were not included within the authorized scope of work. KL&J received landowner information from Mr. Chris Sternhagen with enXco. A copy of these documents is included in Appendix A. Abstract of Title documents were not obtained because the Site parcels will be leased from the current land owners.

1.4. User Reliance

Services performed by the Environmental Planners of KL&J for this project have been conducted in a professional manner consistent with that level of care and skill ordinarily exercised by members of this profession currently practicing in this area under similar time and budget restraints. The findings and conclusions presented herein apply to reasonably ascertainable environmental situations or conditions presently or pre-existing at or near the Site, that may represent an environmentally adverse impact upon Site conditions. No warranty, expressed or implied, is made.

This report has been prepared for the exclusive use and benefit of KL&J and enXco in Minneapolis, Minnesota. Reliance upon, or use of, this report by third parties is prohibited without express written consent from KL&J in Bismarck, North Dakota, and enXco.

1.5. Description of Appendices

Following the ASTM Standard, KL&J has grouped the appendices of supporting documents in this report as follows:

- Appendix A. Landowner Information
- Appendix B. Site and Adjacent Properties Map
- Appendix C. Site Photographs
- Appendix D. Scope of Work
- Appendix E. Regulatory Records Documentation
  - Unpermitted landfill locations
  - North Dakota State Water Commission Well Data
- Appendix F. Topographic Site Maps
  - United States Department of the Interior Geological Survey (USGS) Topographic Maps, 1971, 1975, 1982
- Appendix G. Historical Research Documentation
  - Farm Service Agency Aerial Photograph, 2005
  - McIntosh and Dickey County Atlases, 1959, 1960, 1964, 1976, 1977, 1981, 1982, 1993
  - McIntosh and Dickey County Soil Survey, 1968
  - United States Geologic Survey (USGS), Aerial Photographs, 1984, 1990, 1997
  - United States Fish and Wildlife Service (USFWS) National Wetlands Aerial Photographs, 1979

2.0 SITE DESCRIPTION

2.1. Local and Legal Description

The subject Site (herein after referred to as the "Site") is located in McIntosh and Dickey Counties near Merricourt, North Dakota and is described as primarily agricultural property. The Site legal location was described as:

An approximate 103 square-mile parcel located in Townships 130–131N, Ranges 66–68W, McIntosh and Dickey Counties, North Dakota.

Additional information regarding the legal description of the Site is contained in Section 3.1.

2.2. Site and Vicinity General Characteristics

The Site is located in rural McIntosh and Dickey Counties near Merricourt, North Dakota. The general nature of the surrounding area was cropland, hay land and pasture land. The following sections of this report describe the developments, history, and physical characteristics of the Site and the adjacent properties.

2.3. Current Uses of Property

The Site was used primarily for agricultural purposes. The projected area has several developed farmsteads, with the majority of the Site being used for cropland, hay land and pasture. Churches were also noted within the proposed Site. In addition, transmission lines and sub-stations were noted within the proposed boundaries. Section 5.0 further describes the Site and adjacent properties.

2.4. Descriptions of Structures, Roads, and Other Site Improvements

Two-lane paved roads were noted along the south border and eastern portions of the proposed study area. Graveled roads provided access to the interior portions of the Site (Appendices B and C). Some access roads have been closed due to elevated rainfall and the maintenance discontinued. The graveled and paved roads were traveled during the assessment of the proposed Site (Section 5.0). Several structures were noted on existing and abandoned farmsteads throughout the proposed Site.

2.5. Current Uses of Adjoining Property

The current uses of adjoining properties are detailed on the Site and Adjacent Properties Map in Appendix B and Section 5.0. The areas around the Site were primarily used for agricultural purposes, mainly cropland and pasture.

3.0 USER PROVIDED INFORMATION

3.1. Title Records

enXco is the user of this Phase I Environmental Assessment. Mr. Sternhagen, with enXco provided the Site's legal description as shown in Section 2.1 and the landowner contact information. KL&J reviewed and copied the documents. Copies of the documents cited are provided in Appendix A. Abstract of Title documents were not required as the Site parcels will be leased from the current landowners. The purpose of the landowner history or an abstract of title review is to allow KL&J to review this information to determine the following:

- The presence of environmental liens filed against the Site.
- Review the deeded history of the Site to determine if past owners could have usage that may represent a potential environmental concern, (e.g., gas stations, dry cleaners, oil companies, manufacturing facilities, and types of businesses that would be of historic concern).
- Confirm current ownership.

KL&J determined ownership of the parcels through the use of county atlases. In addition, no apparent potential environmental concerns were noted that could prompt the filing of environmental liens against the Site. Through interviews and review of regulatory records, KL&J further substantiated the above facts about the Site.

3.2. Environmental Liens or Activity and Use Limitations

Following ASTM Practice E 1527-05, Section 6.3.2-User Obligations, KL&J requested information from Mr. Sternhagen, representing enXco, who was interviewed on September 10, 2009, regarding environmental liens encumbering the property or knowledge of recognized environmental conditions. He was not aware of, and did not believe there were, any environmental liens encumbering the property.

3.3. Specialized Knowledge

According to Mr. Sternhagen the Site property has been primarily used for agriculture. Landowners contacted prior to the field survey indicated that the land-use for the Site was primarily agricultural.

3.4. Valuation Reduction for Environmental Issues

Mr. Sternhagen indicated that he was not aware of any problems that may lead to the valuation reduction for the Site.

3.5. Owner, Property Manager and Occupant Information

Mr. Sternhagen indicated that the Site has multiple landowners from which the proposed land will be leased. In addition, landowners were contacted prior to doing survey work at the Site. During these conversations additional information was collected in reference to the Site's history and usage. No environmental concerns for the Site were discussed.

3.6. Reason for Performing Phase I

According to Mr. Sternhagen, KL&J was retained to perform this Phase I Environmental Assessment as part of development of the construction for the Merricourt Wind Power Project location.

4.0 RECORDS REVIEW

4.1. Standard Environmental Record Sources

The ASTM standard states that a records review will be conducted to obtain and review records that will help identify recognized environmental conditions in connection with the Site. The records described in this section are specified in the standard.

4.1.1. Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS), Resource Conservation and Recovery Act (RCRA) and State Records of Hazardous Substances, CERCLIS/ National Priority List (NPL).

The following NPL[1]and CERCLIS[2] Lists by the US Environmental Protection Agency (EPA) and the North Dakota Department of Health (NDDH) were reviewed on August 19, 2010, for known NPL or CERCLIS sites within a one-mile radius of the Site.

- EPA's Final NPL (5/14/10)
- Proposed NPL Sites (5/14/10)
- Deleted NPL Sites (5/14/10)
- Partially Deleted NPL (5/10/10)
- Current CERCLIS List (6/2/10)
- Records of Decisions (6/2/10)
- Archived (NFRAP) CERCLIS Lists (4/12/10)

The EPA lists contained no NPL sites within an approximate one-mile radius of the Site and no CERCLIS or CERCLIS facility labeled "No Further Required Action Planned (NFRAP)" were documented on-Site or within the radius reviewed.

The Resource Conservation and Recovery Act (RCRA) is a federal act creating a cradle-to-grave system for managing hazardous wastes which includes tracking generated hazardous wastes from creation until disposal. The Resource Conservation Recovery Information System (RCRIS) Master Facility List dated June 2, 2009, was reviewed for facilities licensed as RCRA storage facilities on or within a one-half mile radius of the Site and RCRA Transporters on or within one-half mile of the Site. No facilities were identified within the researched area.

The RCRIS Master Facility List and the NDDH's current Hazardous Waste Notifiers List were reviewed on August 19, 2010, for permitted hazardous waste generating facilities on or within one-half mile of the Site. The ASTM standard requires that both large and small quantity permitted generating facility lists be reviewed and documented, as well as conditionally exempt small quantity generators that are adjacent to the Site. No records were noted to indicate that a registered hazardous waste generator had been located within the proposed Site.

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[1] *The National Priority List (NPL) is the U.S. EPA's list of the most hazardous of the uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under Superfund.*

[2] *The Comprehensive Environmental Response Compensation & Liability Information System (CERCLIS) List contains information on CERCLA or Superfund properties. Areas on this list have been identified by the U.S. EPA as hazardous waste areas and are in need of cleanup.*

No conditionally exempt small quantity generator was identified on adjacent property.

No small quantity generators were identified within an approximate one-half mile radius of the Site.

No large quantity generators were identified within the one-mile radius of the Site.

No CORRACTS or Non-CORRACTS (facilities subject to corrective action under RCRA) facilities were identified within a one-mile radius of the Site.

On August 18, 2010, Ms. Christine Roob, Environmental Scientist, with the Hazardous Waste Program of the NDDH was interviewed regarding the Site and surrounding properties. She stated that she was aware of the Site vicinity. Ms. Roob could not recall violations that may impact the Site or adjacent properties.

Toxic Release Inventory Records—On August 19, 2010, the EPA's current Toxic Release Inventory System (TRIS) records were reviewed for any facilities in the TRIS within a one-mile radius of the Site. No records were identified within the one-mile radius of the Site reviewed for the years 1987–2009.

State Hazardous Release Records—The State of North Dakota does not maintain lists of sites to be investigated or remediated due to hazardous releases. However, it does maintain a list of reported releases of hazardous materials or petroleum products that have impacted groundwater. They began keeping this Groundwater Release Report Summary in the mid-1980s.

The Groundwater Release Summary for McIntosh and Dickey Counties was reviewed for reported spills or chemical releases. No listings from the August 19, 2010, report for locations within one-half mile of the Site were noted.

The NDDH Waste Management Division maintains a chronological file, by city or county, of hazardous waste-related records, including spills, dumping, citizen complaints, and special requests. The material dates from the 1970s to the present. The Ashley, Kulm and Merricourt, North Dakota, and McIntosh and Dickey County files were reviewed for any incidents within a one-mile radius of the Site. No records of concern were found.

4.1.2. ERNS and Other Emergency Response Records

The Emergency Response Notification System (ERNS) database was searched on August 19, 2010. No reports were listed within a one-half mile radius reviewed.

4.1.3. Storage Tank and UST Records

Underground storage tanks (USTs) are defined as tanks that store “regulated substances” and have at least 10 % of their volume, including the contents of connected pipes and underground. The current NDDH list of registered USTs, dated March 16, 2010, was reviewed for tanks on or within one-half mile of the Site. It should be noted that “regulated substances” do not include heating or sometimes fuel oil and, therefore, most heating or fuel oil USTs are not recorded or included on the list. According to historical documents and NDDH UST records, no USTs were listed for the Site which is west of Merricourt, North Dakota.

The ASTM standard requires that only adjacent properties be reviewed for UST locations; however, KL&J extended its search to approximately one-half mile radius around the Site. No locations with USTs were identified. It should be mentioned that several farmsteads exist within the proposed Site. Both ASTs and USTs were noted at these sites. These storage tanks are not regulated by NDDH.

On August 19, 2010, Mr. Gary Berreth with the UST Program of the NDDH Waste Management Division was interviewed concerning the Site and adjacent properties. He indicated that he was aware of the Site but did not recall any problems or concerns for the Site or vicinity and stated that no active clean-ups were in progress in that area.

Above-Ground Storage Tanks (AST)—The North Dakota Petroleum Release Compensation Fund (NDPRCF) registers regulated above-ground tanks in the state but they do not have a registered tank list available for the public. Information was gathered during Site reconnaissance and during interviews with the local fire department and the NDDH. Releases reported from above-ground tanks would appear on the Groundwater Release Report described in Section 4.1.1. Some ASTs were noted on-Site during the reconnaissance. On August 20, 2010, the NDPRCF was contacted. Ms. Sharon Grosz indicated that no information was on file for proposed Site.

It should be noted that several active farmsteads are present within the study area. These operations generally store petroleum products at these locations in ASTs and USTs. Most of these storage facilities have not registered their tanks with the NDDH. The turbine sites, access roads and collector line routes should not be impacted by these locations.

4.1.4. Landfills and Solid Waste Disposal

The NDDH regulates all disposal facilities and waste transporters in the state. A search was conducted on August 20, 2010. The following is the most current permit lists provided by the NDDH:

- Solid waste landfills
- Inert, special use or industrial waste landfills
- Transfer stations
- Waste transporters
- Waste incinerators

No permitted solid waste, inert waste, or industrial waste landfills, transfer stations, waste transporters, special use landfills, or waste incinerators were identified within a one-mile radius of the Site.

During the Site reconnaissance, several areas were identified with potentially hazardous materials which included tires, automobiles, unlabeled containers, labeled containers, oil filters, propane tanks, animal carcasses and other materials that had been partially buried or that had been piled in open areas (rock piles and ravines). These locations were recorded in a table which included GPS locations and materials noted. The table and associated map were included in Appendix E. Pictures of these locations were included in Appendix C.

4.2. Additional Environmental Record Sources

According to the ASTM Standard, additional state or local sources of environmental records may be checked, at the discretion of an environmental professional to enhance and supplement federal and state sources. KL&J reviewed the following record sources in addition to those described in Section 4.1.

4.2.1. Records of Contaminated Wells

The North Dakota State Water Commission (NDSWC) maintains records of water well drilling activities in the state since 1965 and for many wells before that time. For the purpose of this assessment, these records were used to identify wells that may have been drilled on or near the Site, particularly monitoring wells.

A review of the well drilling records was conducted on August 18, 2010, for activities within an approximate one-half mile radius of the Site. Records at the NDSWC indicated that 130 domestic, stock, municipal, irrigation, and test holes were found within the one-half mile radius of the Site (Appendix E). No monitoring wells were noted within the one-half mile radius of the Site. These wells are used to access and manage contaminated areas.

4.2.2. Drinking Water Quality

The eastern portion of the Site has access to the Southeast Rural Water District-West for drinking water which serves over 1,520 customers in two counties. On August 26, 2010, KL&J reviewed the safe drinking water records for violations for the pipeline. No health based monitoring or reporting type violations were on file for the system. The system has upgraded water treatment procedures to follow the EPA's requirements for safe drinking water. In addition, the Wishek and Ashley, North Dakota groundwater systems were reviewed. The Ashley system had no violations to date. The Wishek system had two routine minor coliform violations in 2001 and 2008. The western portions of the Site will be connected to the South Central Regional Water District system which is under development.

4.2.3. Local Fire Department Records

Mr. Paul Wiedell, Fire Chief for the Ellendale Rural Fire Department, was interviewed on August 20, 2010, regarding the Site. He was familiar with the Site and indicated that the department had not responded to any fires or hazardous materials releases on-Site or in the vicinity. During another August interview, KL&J spoke with Mr. Nathan Klusmann, Fire Chief with the Kulm, North Dakota Rural Fire Department. He was asked the same questions as Mr. Wiedell, and concurred with his answers.

4.2.4. Local Environmental Health Agency Records

Ms. Cathy Brendal with the McIntosh County Health District and Ms. Roxanne Holm with the Dickey County Health District were interviewed on September 9, 2009, They did not recall any violations or incidents for the Site or vicinity.

4.2.5. Local Public Works or Engineering Department Records

Because of the rural nature of the Site location, no engineering department information was available (plat maps and utilities location maps). The eastern portion of the Site has access to the Southeast Water Users District-West and the western portion of the Site will have access to the South Central Regional Water District which is under development. Septic systems are utilized for sewage treatment and dispersal.

4.2.6. Records Related to Indications of PCBs

Mr. Shawn Stickney, with Montana-Dakota Utilities (MDU), was interviewed on August 26, 2010. Mr. Stickney assisted KL&J by securing transformer locations and polychlorinated biphenyl (PCB) level information. Mr. Stickney indicated that the transformers serving the Site and vicinity were fairly new and were primarily non-PCB containing units. Several units were replaced in 1987 and many were retro-fitted in 1991 to exchange PCB-containing oil. One unit at the sub-station tested at 14 ppb[3] PCBs. If a release were to occur from these transformers it would be the responsibility of MDU to clean up any impacted areas. KL&J also contacted Mr. Brad Lunneborg, an engineer with Dakota Valley Electric Cooperative in Milnor, North Dakota. He indicated that Dakota Valley Electric does serve a portion of the Site. Further, he indicated that the majority of the transformers set in that area are non-PCB containing. Dakota Valley Electric would also be responsible for the cleanup of releases from their transformers.

4.3. Physical Setting Sources

This section reviews the physical setting of the Site as it relates to the topography and the likelihood of contamination to migrate onto or from the Site (see Section 11.0 of this report for citation of references).

4.3.1. Topography

According to the United States Geological Survey (USGS) topographic map series for North Dakota, the Site ranges in elevation from 2,250 feet above mean sea level (MSL) in the northwest corner of the proposed project to an elevation of approximately 1,930 feet above MSL in the southeast corner. The terrain of the Site and surrounding area is graded from steep hills with deep ravines used primarily for grazing, to relatively flat with rolling hills that were primarily used for cultivation and contained frequent wetland areas. The gradient of the Site is primarily to the south-southeast.

4.3.2. General Geography

The Site is located in south-central North Dakota. Most of the area in McIntosh and Dickey Counties is in the glaciated Missouri Coteau section of the Central Lowlands physiographic province (Bluemle, 1979).

The climate is continental with cold/snowy winters and warm summer days with cool nights. The annual precipitation at the Wishek reporting station, approximately 24 miles northwest of the Site, was 18.45 inches per year. The average daily high and low temperatures were 53°F and 30 °F (NOAA, 1982).

[3] Parts per billion

4.3.3. Soils

The EDR Geocheck report and the Dickey/McIntosh County Soil Surveys were used for information regarding the soils at the Site (**Appendix E**).

The primary soil types found within the Dickey County portion of the Site are listed and described as follows:

- Southam silt loam (7) 0–1%—Southam silt loam is a deep, level, very poorly drained soil that occurs in deep depressions on till plains, moraines, and lake plains. Available water capacity is high and the permeability is slow. It is primarily used for wildlife habitat.
- Lehr-Wabek loams (85B) 1–6%—Lehr-Wabek loam is deep, nearly level, and undulating soil that is typically found on outwash plains. These soils are excessively drained, and the permeability is moderately rapid. Available water capacity is low. These soils are areas used for native prairie range or hay.
- Williams-Bowbells loams (92B) 3–6%—Williams-Bowbells loams are deep undulating soils that are located on till plains and moraines. These soils are well-drained. Available water capacity is high, and permeability is moderately slow. Most areas of this soil type are used for cultivated crops.
- Williams-Zahl loams (93C) 6–9%—Williams-Zahl loams are deep, gently rolling, well-drained soils that occur on moraines. Permeability is moderately slow, and available water capacity is high. These areas are primarily used for pasture, range and cultivated crops.
- Zahl-Williams loams (96E) 6–25%—Zahl-Williams loams are deep, gently rolling to hilly, well-drained soils that occur on till plains or moraines. Available water capacity is high, and permeability is slow. These areas are primarily used for rage or wildlife habitat.

The primary soil types found within the McIntosh County portion of the Site are listed and described as follows:

- Barnes-Buse loams(118) 3–6%—Barnes-Buse loams are deep, gently rolling soils formed on plains or moraines that are well-drained. The available water capacity is high and permeability is very high. These soils are primarily used for forage crops.
- Buse-Barnes loams (313) 6–9%—Buse-Barnes loams are deep, rolling and hilly soils that occur on till plains and moraines and are well-drained. Available water capacity is high, and permeability is slow. These soils are used primarily for range and wildlife habitat.
- Wabek-Appam sandy loams (2266) 6–25%—Wabek-Appam sandy loams are deep, moderately sloping to moderately deep excessively drained soils on hills and ridges. Available water capacity is low, and permeability is very rapid. These soils are primarily used for wildlife habitat, pasture and hayland.
- Zahl-Williams loams (2081) 9–15%—Zahl-Williams loams are deep, hilly to very steep that occur on hills and ridges, and are well-drained. Available water capacity is high, and permeability is high. These soils are primarily used for wildlife habitat, pasture and hayland.
- Zahl-Max loams (2073) 15–60%— Zahl-Max loams are deep, hilly to very steep soils found on hills and ridges, and are well-drained. Available water capacity and permeability is high. These soils are primarily used for wildlife habitat, pasture, and hayland.

4.3.4. Surficial and Bedrock Geology

Dickey and McIntosh Counties are predominantly located in the Drift Prairie district of the Central Lowland province. The Drift Prairie is characterized by low topographic relief, except where streams have been incised. The western part of the two counties is in the Coteau du Missouri district of the Great Plains province, which is characterized by small hills and isolated depressions. Local relief in the Coteau is commonly greater than 50 feet. Maximum topographic relief in the two counties is 954 feet. The highest altitude is 2,240 feet above National Geodetic Vertical Datum (NGVD, 1929) on a hill in Section 29, T. 129 N., R. 66 W. which is not included in the Site.

The lowest altitude in the Coteau District is about 1,286 feet above NGVD in Sec. 34, T. 129 N., R. 60 W. where the James River flows into South Dakota. This location is southeast of the Site. Drainage on the Drift Prairie is in a late youthful stage and moderately well developed (Clayton, 1962). Flow is either to the James or Maple Rivers. The principal tributaries of the James River are Bear Creek on the east and Bone Hill and Cottonwood Creeks on the west. Maple Creek and the South Fork Maple River are the principal tributaries of the Maple River. Drainage on the Coteau du Missouri is in an early youthful stage and is poorly developed. Surface runoff is toward un-drained or poorly drained depressions. Some of the depressions fill up and overflow into lower ones or drain into tributaries, which eventually lead to the James or Maple Rivers. According to the US Department of Agriculture's Soil Conservation Service the reported depth to groundwater in the vicinity of the Site is greater than 30 feet below land surface.

The pre-glacial sedimentary rocks underlying McIntosh County were deposited on the eastern flank of a large, sporadically subsiding basin now known as the Williston Basin. During Paleozoic time a Precambrian structural high located in Burleigh County was subjected to intermittent uplift (Ballard, 1963). Uplift of this structural feature resulted in thinning and non-deposition of some Paleozoic rocks. Following a period of erosion, deposition was renewed in early Mesozoic time and continued into the Cenozoic Era. The sedimentary rocks deposited during Paleozoic time consist principally of limestone, dolomite, and lesser amounts of sandstone, shale, and evaporates. This sequence of sedimentary rocks ranges in thickness from about 1,000 feet (300 meters) in the eastern part of McIntosh County to about 2,000 feet (600 meters) in the western part. The sedimentary rocks deposited during Mesozoic time consist principally of shale; however, some well-developed sandstones are present in the Lower Cretaceous Dakota Groups and in the Upper Cretaceous Fox Hills Formation. The rocks of Mesozoic age range in thickness from about 2,400 feet (730 meters) in the eastern part of the county to about 2,900 feet (880 meters) in the western part.

The rocks of Cenozoic age that are present in the county are the glacial-drift deposits that were laid down during the Pleistocene Epoch and thin alluvial and fluvial deposits of Holocene age. These deposits have not been differentiated in this report. The Pierre Formation underlies all of McIntosh County. It consists of dark-gray to black siliceous shale that is about 1,000 feet (300 meters) thick. The topography of the formation (pl. 1, in pocket) indicates that it has been subjected to considerable erosion. The Fox Hills Formation overlies the Pierre in the northwestern third of the county, and occurs as small outliers in the southern and eastern parts of the county (Clayton, 1962). Where the Fox Hills Formation is missing, the Pierre is overlain by glacial-drift deposits. The erosional features of the Pierre Formation where it is overlain by the Fox Hills Formation probably were formed

prior to or during the deposition of the Fox Hills. The erosional features of the Pierre where it is overlain by glacial-drift deposits are due to both pre-glacial and pro-glacial erosion. The topography of the Pierre Formation defines to some extent the location of bedrock valleys and depressions, some of which contain major glacial-drift aquifers (Bluemle, 1979).

4.3.5. Aquifer Features

No major aquifers underlie the Site location in Dickey County. The McIntosh Aquifer is located approximately one-mile northwest of the Site in McIntosh County. The southwest portion of the Site crosses the Spring Creek Aquifer System. The McIntosh and Spring Creek Aquifer System are aquifers of the Quaternary Age.

The Spring Creek aquifer system is a complex system of buried-valley and buried outwash aquifers. The aquifers consist of sand and gravel deposits that merge near the South Dakota border to form a vertical sequence of four laterally extensive aquifers. Recharge to this aquifer system is from infiltration of precipitation and surface run-off that accumulates in potholes and sloughs. Movement in groundwater through this system is to the south. The most common water types from this aquifer are sodium bicarbonate-sulfate and calcium-sodium-magnesium bicarbonate. The water is hard to very hard. Approximately 329,000 acre-feet of water is stored in this system according to the North Dakota State Water Commission. These aquifers can be a major source of water for industrial usage.

The McIntosh Aquifer consists primarily of buried outwash deposits. These deposits are composed of very fine to very coarse gravely sand. This aquifer is recharged by infiltration of precipitation and locally by infiltration of from surface runoff. The water is mainly a calcium bicarbonate type. Approximately 61,000 acre-feet of water is available from the McIntosh Aquifer according to the North Dakota State Water Commission.

4.4. Historical Use Information on the Property

The purpose of this section is to use available sources to develop a history of the previous uses of the Site in order to help identify the likelihood of past uses having led to recognized environmental conditions. The following sources were consulted.

4.4.1. Land Title Records

No Abstract of Title was reviewed for the Site parcels as the project will be leasing the property from the parcel owners. enXco provided KL&J with landowner information prior to field studies being conducted so that they could be informed when the surveys were being conducted. Additional information about Site parcels were obtained during the interviews conducted to gain access to the Site.

4.4.2. Fire Insurance Maps

No Sanborn Fire Underwriters Maps for the Site in McIntosh and Dickey Counties were available at the State Historical Society Archives. This search was completed with the assistance of Mr. Dan Johnson. These maps are used to establish ownership for a location, and the type of development on that property. Development of adjacent properties in the vicinity of the Site is discussed in Section 4.5.

4.4.3. USGS 7.5 Minute Topographic Maps

Copies of the USGS topographic maps are included in Appendix F.

1971

The Merricourt Southwest Quadrangle showed the portions of the Site three miles on either side of Highway 56. This topographic map provided a greater detail of the features present within the Site. Several lakes and lowlands were noted. Mature vegetation was also shown on the map. No environmental concerns were noted on the topographic map reviewed.

1975

This topographic map shows the entire Site. Elevations range from 1,900 to 2,200 feet above sea level. The western portion of the Site has the highest elevation, with a ridge running from west to east. Major highways were clearly shown. The larger wetland areas occupy the northwest portion of the Site. No hazardous materials storage or manufacturing facilities were noted on the topographic map.

1982

The Coldwater Lake and Coldwater Lake Northeast Quadrangles were produced in 1982. Lakes and wetland area depressions were clearly shown. The Coldwater Lake Quadrangles shows a transmission line running northwest to southeast across the map. Several United States Fish and Wildlife Service (USFWS) easement areas were also noted on the maps, and major roadways are clearly shown. No hazardous materials storage or manufacturing facilities were noted on the maps. (Appendix F).

4.4.4. County Atlases

The McIntosh County atlases from 1960, 1964, 1976 and 1981 were reviewed along with the Dickey County Atlases from 1958, 1964, 1977, 1982 and 1993 for the Site location. Review of the McIntosh County Atlases was completed by township and year. The numbers in parenthesis indicate the tract size in acres:

Antelope Township

- 1960- State lands were noted in Sections 20(80 acres) and Section 36 (160 acres). Small tract private transfers were also note in the years reviewed.
- 1964- In Section 14 USA (USFWS, 160 acres), State (80), Section 20 the State (80) and Section 36 State (320).
- 1976- Section 14 USA (312, Section 23 USA (360), Section 10 State (80) and Section 36 State (160).
- 1981- Section 14 (1004) including Sections 22 and 23, Section 36 State (160).

Iowa Township

Small parcel exchange was noted in 1960 and 1964. In 1976 USA owned parcel in Section 12 (60 acres). The 1981 McIntosh County Atlas showed the parcel in Section 12 owned by USA as 160 acres.

Rosenthal Township

- 1960- Section 36 State parcel (640).
- 1964- State owned in Section 36 and USA in Section 24 (80).
- 1976- USA owned in Section 24 (270) and Section 25 (51), State (640).
- 1981- USA Section 24 and Section 25 (622).

Beresina Township

- 1960- State parcels in Section 16 (320) and Section 36 (160).
- 1964- State parcels in Sections 16 and 36, USA parcel in Section 31 (127).
- 1976- State parcels in Section 16 (320) and USA in Sections 27 (250) and Section 34 (240).
- 1981- State parcels in Section 16 and 36 as described above. USA in Sections 27 (250), 31 (127) and Section 34 (160 shown as wildlife). Trend indicates USA ownership increases during the 1970's and 1980's.

Dickey County Atlases was completed by township and year. The numbers in parenthesis indicate the tract size in acres:

German Township

- 1958- large private property transfers occurred. State 160 aces in Section 33
- 1964- Additional private transfers of ownership. Section 29 USA (160), Section 33 State (160) and Section 36 State owned (400 acres).
- 1977- Section 36 USFWS (40) USA expanded Sections 28, 32, 33 (240), Section 33 USA (51) and Section 33 State parcel (160).
- 1982- 622 acres USA in Sections 28, 29, 32 and 33, USFWS in Section 36 (40) and Section 33 USA (88), State (160).
- 1993- USA parcel in Sections 29, 32 and 33 (622) , Section 33 USA (88) ,Section 36 (41) and Section 36 (40).

Spring Valley Township

- 1958- Primarily private and county ownership, State ownership in Sections 7 (147), 16 (320), and 35 (627).
- 1964- Small private ownership transfers. USA ownership shown in Sections 1 (80), 6 (80), 8 (120) and 10 (395). Section 36 contained 627 acres of State Land.
- 1977- School land ownership remained consistent, Parcel ownership for USA in Section 1 (79), 6 (41), 8 (120), 9 (375), 10 (384) and Section 31 (120 acres). Significant increase in federally owned land in the township.
- 1982- State land in Section 36 (560) and Dickey county ownership in Sections 33 (37) and 36 (80). USA ownership in Section 1 (79), 4 (157), 6 (41), 7 9200), 8 (120), 9 (375) and Section 31 (120 acres).

A copy of the McIntosh and Dickey County atlases reviewed are included in Appendix G.

4.4.5. Local Street Directories

No Polk Directories were available for the Site in rural McIntosh and Dickey Counties. These directories are used to develop and history of parcel ownership including business types for a street

address location. Development of adjacent properties in the vicinity of the Site will be discussed in Section 4.5.

4.4.6. Aerial Photographs

EDR obtained aerial photographs of the Site dated 1984, 1990, 1997, and 2005. Please refer to Appendix G, Aerial Photographs. 1979 colorized aerial photographs were received from the Kulm Wetlands Management Office (USFWS) for the Site and adjacent properties.

1979

Colorized aerial photographs from 1979 were reviewed. Over 50 farmsteads were noted on the aerial photographs. No manufacturing or petroleum-related industries were noted. In addition, no storage facilities or tanks were noted. According to contacts at the USFWS Wetland Management District in Kulm, ND, this was a very wet year, and the aerial photographs show that more of the Site was covered with water because of the increased amounts of stored precipitation.

1984

Black and white aerial photographs from 1984 were reviewed for the Site and vicinity. No hazardous materials storage or manufacturing facilities were noted. Several large wetland areas were noted and the major paved highways bordering the Site were clearly shown.

1990

Black and white aerial photographs from 1990 were reviewed, and no hazardous materials storage or manufacturing facilities were noted for the Site location. The aerial photographs showed the agricultural areas as green because of the June flight during which the data was collected.

1997

A black and white aerial photograph of the Site in 1997 showed the major wetland areas, but did not allow for a detailed analysis of environmental concerns due to the altitude from which it was taken.

2005

A colorized aerial photograph showed the Site in 2005. Major roadways were clearly shown. The largest wetland areas appeared in the northwest McIntosh county portion of the Site. Several farmsteads were also noted. No hazardous material storage or manufacturing facilities were noted on the aerial photograph. The area appeared similar to the Site reconnaissance (Appendix G). Because of the size of the Site detailed analysis was difficult to complete.

4.4.7. Building Department Records

No building department records were available for the Site because of the rural nature of the location. These documents include the plat map and utilities maps for the area. This information is used to determine if the Site would have access to these utilities. No Flood Insurance Rate map (FEMA) was available for the Site location.

4.5. Historical Use Information on Adjoining Properties

The purpose of this section is to use available sources to develop a history of the previous uses of properties adjoining the Site in order to help identify the likelihood of past uses having led to recognized environmental conditions which could impact the Site. The following sources were consulted. (See Section 12.0 of this report for citation of references).

4.5.1. Fire Underwriters Map for the Adjoining Properties

No Sanborn Fire Underwriters Maps for the adjacent properties in McIntosh and Dickey Counties were available at the State Historical Society Archives according to Mr. Dan Johnson.

4.5.2. USGS 7.5 Minute Topographic Map for the Adjoining Properties

Copies of the USGS topographic maps are included in Appendix F.

1971

The Merricourt Southwest Quadrangle was reviewed for areas outside the study area and adjacent to the Site. The terrain adjacent to the site consisted of small rises and lowland depressions. A transmission line was noted in the northeast corner of the map. Several lowland depressions were noted east of the study area. Areas of mature vegetation were noted surrounding small structures (farmsteads). To the south and east greater increases in elevation were noted. No environmental concerns were noted on the topographic map reviewed.

1975

The adjacent properties to the proposed Site location are covered with an abundance of wetland areas. The general flow direction would be from the center of the Site toward the west and to the north-northeast from the central ridge formation. The cities of Ashley and Kulm, North Dakota were also noted on the topographic map. Higher elevations were noted northwest of the Site (2,210 feet). No structures were noted on the adjacent properties. No hazardous materials storage or manufacturing facilities were noted on the topographic map. ND Highways 11 and 56 were noted providing access to the Site.

1982

The Coldwater Lake and Coldwater Lake NE Quadrangles were produced in 1982. Several large lakes (waterfowl production areas) and a transmission line were noted in the southwest portion of quadrangle. Mature vegetation (shelter belts) was noted in areas where buildings were present. Wetland areas appear to be more concentrated in the northeast portion of the Coldwater Lake Northeast Quadrangle. West of the Site the elevation changes were noted to be greater. No hazardous materials storage or manufacturing facilities were noted on the maps. (Appendix F).

4.5.3. County Atlases for the Adjoining Properties

The McIntosh County atlases from 1960, 1964, 1976 and 1981 were reviewed along with the Dickey County Atlases from 1958, 1964, 1977, 1982 and 1993 for the adjoining properties. The areas north of German Township in Dickey County adjacent to the Site showed some small parcel ownership exchange for the years reviewed. The 1964 county plat for German Township showed a marked

increase of USFWS acquisitions. Many of these areas increased in acreage by 1977. Additional acres were added to the parcels on the 1982 Dickey county plat. The adjacent areas around Spring Valley Township were not included on the plat for the years reviewed.

The plats reviewed for the adjacent areas in McIntosh County included Antelope, Iowa, Bersina and Rosenthal Townships. In Antelope Township, some parcel transfer occurred on the adjacent properties for the years reviewed. The 1976 Iowa Township plat showed several USFWS acquisitions in addition to the small parcel transfers. Established lakes were noted in Section 23 in the 1981 plat for Iowa Township. The 1960 plat for Beresina Township showed a State owned parcel in Section 16 adjacent to the Site. Additional wetland areas were shown after 1964. In addition, Alkali Lake was noted in Section 27 on the plats reviewed. The 1964 plat for Rosenthal showed the wetland areas on adjacent properties along with the drainage system in Section22 and 23. Some small parcel ownership exchange was noted from 1960 to 1964. In 1981, small parcel ownership was shown for the USFWS.

No environmental problems, hazardous materials storage or manufacturing facilities were noted on the adjacent properties using the McIntosh and Dickey County Atlases for reference.

4.5.4. Local Street Directories for the Adjoining Properties.

Polk Directories for developing a historical property ownership were not available for the adjacent property in McIntosh and Dickey Counties, North Dakota according to Mr. Dan Johnson with the State Historical Society.

4.5.5. Aerial Photographs for the Adjoining Properties

EDR obtained aerial photographs of the Site dated 1984, 1990, 1997, and 2005. Please refer to Appendix G, Aerial Photographs. 1979 colorized aerial photographs were received from the Kulm Wetlands Management Office (USFWS) for the Site and adjacent properties. The aerial photographs were viewed with a stereoscope to aid in identification of environmental concerns on the adjacent properties.

1979

Colorized aerial photographs from 1979 were reviewed for the adjacent property areas. Additional farmsteads were noted on the aerial photographs. No manufacturing or petroleum-related industries were noted. No storage facilities or tanks were noted. Limited area was included for the adjacent areas to the Site, so a detailed analysis could not be conducted.

1984

Black and white aerial photographs from 1984 were reviewed for the adjacent properties. No hazardous materials storage or manufacturing facilities were noted. Several large wetland areas were noted and the major paved highways bordering the Site were clearly shown. Most of the adjacent area was used for agricultural purposes. Because of the altitude from which the aerial photographs were taken, a detailed analysis could not be conducted for the adjacent areas to the Site.

1990

Black and white USGS aerial photographs from 1990 were reviewed, and no hazardous materials storage or manufacturing facilities were noted within the one-half mile radius reviewed. The areas to the east of the Site appeared to be less cultivated than areas further to the west. Several large wetland areas were also noted in these areas.

1997

A black and white USGS aerial photograph of the adjacent properties in 1997 showed the major wetland areas and some agricultural cultivation, but did not allow for a detailed analysis of environmental concerns due to the altitude from which it was taken and the large acreage included in the Site.

2005

The 2005 colorized aerial photographs were reviewed for the adjacent areas to the Site. Major roadways were clearly shown. Large lakes were noted southwest of the Site in McIntosh County. Several farmsteads were also noted on the adjacent areas. No hazardous material storage or manufacturing facilities were noted on the aerial photographs. Because of the size of the Site and the scale of the aerial photographs, a detailed analysis was difficult to complete.

5.0 SITE RECONNAISSANCE

5.1. Methodology and Limiting Conditions

Mr. Jerry D. Reinisch, an Environmental Planner with KL&J, conducted a walk-through reconnaissance of the Site on August 10–12, 2009, and September 30, 2009. Mr. Reinisch was accompanied by Mr. Grady Wolf, with KL&J, during the August 2009 reconnaissance. KL&J interviewed Mr. Sternhagen with enXco prior to the Site reconnaissance. The Site was observed and photographs were taken of the general Site and areas of potential concern. Photographs are included in Appendix C.

The Site reconnaissance began at the southeast corner of the Site progressing in a counter-clockwise direction. The Site consisted of primarily agricultural property at the time of the reconnaissance. The accessible exterior portions of the Site were visually and/or physically observed.

5.2. General Site Setting

The following section contains information gathered during the Site reconnaissance on the exterior and general setting of the Site.

5.2.1. Current Use(s) of Property

The Site was currently being used primarily for agricultural purposes which included cropland, hay land and pasture for livestock (Appendix C). In addition, several active farmsteads were located within the study area for the Site. Electrical transmission lines were noted in the southern portion of the study area. An electrical sub-station was also noted in the southeast portion of the Site. In the center of the study area, a hunting club with shooting ranges was observed.

5.2.2. Past Uses of Property

The Site has probably been used for agricultural purposes since the first development in the area (see Section 4.2.4). Some structures were noted at the active farmsteads along with structures remaining on some of the abandoned locations. No other apparent use for the Site location in McIntosh and Dickey Counties was noted.

5.2.3. Current Uses of Adjoining Properties

Appendix F contains a USGS topographic map and Appendix B contains the Site and Adjacent Properties map that was based on observations during the site visit. The adjacent property was primarily developed as agricultural land. The cities of Ashley, Ellendale, Kulm and Wishek were noted surrounding the Site location. Southeast of the Site was an active wind farm and associated transmission lines.

5.2.4. Past Uses of Adjoining Property

The adjacent properties appear to have been used primarily for agricultural uses (Section 4.5.5.). No other apparent uses were noted during the Site visitation, and during discussions with Mr. Sternhagen with enXco, other than agriculture.

5.2.5. Current or Past Uses in the Surrounding Area

Based on observations during the Site reconnaissance, no other current or past usages were noted for the surrounding area other than changes in agricultural ownership and structure updates or additions.

5.2.6. Geologic, Hydrogeologic, Hydrologic and Topographic Conditions

The Site reconnaissance confirmed the physical setting information contained in Section 4.3. The area had some topographic relief in the southwest corner of the Site. The area gradually sloped toward the south and east. A ridge or end moraine runs through the middle of the Site in McIntosh County. Numerous low lying (natural potholes) areas were noted in the central portion of the Site. Another ridgeline was noted along the eastern border of the Site.

5.2.7. Roads

The Site was bordered to the south by two-lane paved ND Highway 11. Highway 56, a two-lane paved highway also runs north and south in the eastern portion of the Site. Graveled county and township roads provide access to the center of the Site location.

5.2.8. Potable Water Supply

Several portable water wells were noted near the active farmsteads (Appendix E). The Southeast Water Users Authority-West also provides water to the eastern portion of the Site. The areas in the western portion of the Site will have access to the South Central Regional Water District as it is being developed.

5.2.9. Sewage Disposal System

No municipal utilities were available to the Site location. The Site would use septic systems developed for the areas where they would be employed.

5.3. Exterior Observations

The following section contains information gathered during the Site reconnaissance on the exterior of the Site.

5.3.1. General Description of Structures

The areas where the access roads, tower pads and collector routes would possibly be located contained no structures. The areas adjacent to the leased properties did have structures on the active farmsteads such as houses, barns, machine shops, grain bins and other livestock related shelters.

5.3.2. Exterior Hazardous Substances/Petroleum Products Connected with Identified Uses

Small amounts (<5 gallons) of exterior hazardous substance/petroleum product containers were noted during the Site reconnaissance in uncontained areas throughout the Site. These areas have been referenced in Section 4.1.4 (Landfills). These areas were un-regulated by NDDH and contained several potentially hazardous materials.

5.3.3. Exterior Storage Tanks

ASTs and USTs were observed in the active and abandoned farmsteads during the Site reconnaissance. These locations will probably not be included in the lease agreements for the Site as set-backs are required for tower locations from occupied structures. The tanks have not been registered with the NDDH.

5.3.4. Exterior Odors

Minimal odors were noted on-Site during the reconnaissance except in the areas where the dumping sites were noted (Appendix C and E).

5.3.5. Exterior Pools of Liquid

There were no pools noted on-Site during the Site reconnaissance.

5.3.6. Exterior Drums

Several 55-gallon drums with some potentially hazardous materials were noted in these areas where disposal of various items were recorded (Appendix C and E).

5.3.7. Exterior Hazardous Substances/Petroleum Containers without Identified Uses

Several small exterior hazardous substance/petroleum product containers without identified uses were noted during the reconnaissance in the dumping areas, and around the abandoned building sites. Most of these containers were small and content quantities appeared to be small.

5.3.8. Exterior Unidentified Substances Containers

Small unidentified substance containers were observed on the exterior of the Site during the Site visit (Appendix C). These containers were noted around the abandoned farmsteads, and in areas where these materials had been dumped for disposal (Appendix E).

5.3.9. Exterior Potential PCBs Sources

Transformers were noted near the Site. These transformers were maintained by MDU (Section 4.2.6). During an August 26, 2010, interview with Mr. Shawn Stickney, he indicated that these units would be non-PCB containing. KL&J noted tags on the pad mounted transformers that indicted that the units on-Site were non-PCB containing.

5.3.10. Exterior Pits, Ponds or Lagoons

No pits, ponds, or lagoons were observed on the exterior of the Site during the Site visit other than the natural wetlands and lakes.

5.3.11. Exterior Stained Soils or Pavement

During the Site reconnaissance, no areas of stained soil were note on-Site (Section 5.3.7 and Appendix C).

5.3.12. Exterior Stressed Vegetation

No stressed vegetation was noted on-Site during the reconnaissance other than in areas where the native grassland and cropland had been sprayed for noxious weeds.

5.3.13. Exterior Solid Waste

Some exterior solid waste was noted on-Site (Appendices B and C). Construction materials, animal carcasses, household items and other domestic garbage was noted in the previously mention dumping areas (Appendix E).

5.3.14. Exterior Waste Water

Based on exterior observations of the Site, during the Site visit, waste water or other liquid (including storm water) from the Site would follow the natural drainageways primarily to the south and east (Appendices C and F).

5.3.15. Wells

Potable water wells were noted in the farmsteads and near areas where livestock are watered during the Site visit. The other wells located within the one-half mile radius researched were described in Section 4.2.1 of this report. No monitoring wells were noted in the list reviewed.

5.3.16. Septic Systems

Septic systems were noted near the farmstead locations during the Site reconnaissance. The Site does not have access to any municipal sewage system.

5.4. Interior Observations

The following section contains information gathered during the Site reconnaissance on the interior of the Site structures. None of the farmsteads were accessed as permission was only granted for areas where the access roads, tower sites and collector lines would be placed. Farms commonly have structures used primarily for repairs to farm implements and contain potentially hazardous materials. In addition, chemicals used in farming practices are potentially prepared for field use at these locations. Many of these farmsteads may have unregistered USTs and ASTS, along with other potentially hazardous materials, but should not affect the leased property of the Site location. Spills and releases at these farmstead locations should be reported to the NDDH. Pole mounted transformers were also noted near these farmsteads. Electrical utility companies have changed out older transformers that were PCB-containing. Most utility companies will remediate spills or releases from these units.

6.0 INTERVIEW WITH OWNERS AND OCCUPANTS

6.1. Interviews with Site Owner or Operator

Mr. Chris Sternhagen was interviewed on September 10, 2009. He was asked about information pertaining to and regarding environmental liens encumbering the property or knowledge of recognized environmental conditions.

He indicated that he had no knowledge of environmental liens encumbering the property and was not aware of any environmental concerns for the property.

He was asked about his knowledge or information related to the following:

- Environmental site assessment reports
- Environmental audits
- Environmental permits (waste disposal, hazardous waste, wastewater, NPDES permits)
- Registrations or storage tanks
- Material safety data sheets
- Community right-to-know plans
- Safety plans
- Reports regarding hydrogeologic conditions on the property or surrounding area
- Notices or correspondence from any government agency relating to past or current violations environmental laws or environmental liens
- Hazardous waste generator permits
- Geotechnical audit studies

He indicated that he was not aware of environmental studies that had been previously conducted on-Site. Mr. Sternhagen indicated that the Site has been used for agricultural purposes. A Scope of Services between KL&J and enXco in Minneapolis, Minnesota was included in Appendix D. Several land owners and regulatory agencies were asked the same questions as Mr. Sternhagen. They concurred with Mr. Sternhagen's answers.

6.2. Interviews with Site Occupants

The remaining Site occupants were not available for interview during the Site reconnaissance.

7.0 NON-SCOPE CONSIDERATIONS

The following are considered some of the additional considerations that a user may wish assessed. However, they are considered outside the scope of E 1527 and do not represent a CERCLIS Liability.

There may be separate standards or protocol for assessment of these conditions. Each would require specific addition to a project-specific scope of work:

- Asbestos Containing Materials
- Radon
- Lead-Based Paint
- Lead in Drinking Water
- Wetlands
- Regulatory compliance
- Cultural and historic resources
- Industrial hygiene
- Health and safety
- Ecological resources
- Endangered species
- Indoor air quality and mold
- High voltage power lines

7.1. Wetlands

Per KL&J's authorized Scope of Work, KL&J included consideration of wetlands in this project. The USFWS List of Wetlands Eligible for Wetlands Acquisition was reviewed. It contained several areas within a one-half mile radius of the Site (Appendix E). In addition, maps containing waterfowl production areas in McIntosh and Dickey Counties were in included in Appendix E.

KL&J completed a wetland survey for the Site and coordination with the USFWS Kulm Wetland Management Office covering wetland easements. The findings will be published in a separate report.

The Kulm Wetland Management Office was contacted on June 2, 2009. They provided KL&J with a copy of aerial photographs of the wetland areas located in the Site study area (Appendix G). Because of the large number of wetland areas noted, individual classifications were not researched. A copy of the USFWS National Wetlands Inventory (NWI) for the Site location was included in Appendix E.

8.0 FINDINGS AND CONCLUSIONS

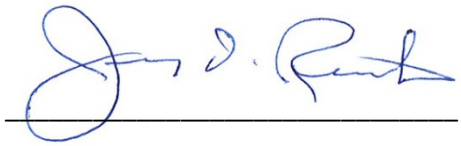
KL&J has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-05 of the proposed Merricourt Wind Power Project property in McIntosh and Dickey Counties near Merricourt, North Dakota. Any exception to, or deletions from this practice are described in Section 7.0 of this report. Except for the following, this assessment has revealed no further evidence of recognized environmental conditions in connection with the property:

8.1. Potential for Contamination from Historical Site Usage or From Adjacent Properties

- Finding–NDDH does not require that rural USTs and ASTs be registered with NDDH. Many of the active farm locations have petroleum products, fertilizers and chemicals for vegetation and insect control stored on location. No spills, leaks or releases have been documented for the Site.
- The dump locations previously noted contain some potentially hazardous materials, but these sites are not registered with NDDH. These locations should be avoided during construction.
- Transformers were located near the Site and were found to be non-PCB containing units. No spills or emergency responses for hazardous materials have been recorded for the Site.
- Opinion–Based upon a review of NDDH records and regulatory interviews, it is unlikely that significant subsurface contamination could be present at the Site.
-
- Conclusion –Phase II subsurface assessment does not appear to be warranted. KL&J recommends if future excavation activities encounter soil or groundwater that has an unusual appearance or odor that work is halted and an appropriate regulator or local agency be contacted to inspect the materials. Construction activities should be monitored to maintain compliance with the NDDH regulations.

9.0 SIGNATURE

This Phase I Environmental Site Assessment for Commercial Real Estate was performed according to the ASTM Standard Practice E 1527-05. The records review, interviews, Site reconnaissance, and report were prepared by, or under the direct supervision of the KL&J's Project Manager:



September 24, 2010

Kadrmas, Lee and Jackson
Jerry D. Reinisch
Environmental Planner
Environmental Scientist/Biologist

Date

10.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

Jerry Reinisch, Environmental Planner–Mr. Jerry Reinisch is an Environmental Planner/Biologist with KL&J. Mr. Reinisch's 20 years of environmental experience includes environmental assessments (NEPA, Phase I & II), ground and surface water quality sampling, analysis TMDL development and watershed management, aquatic invertebrate ecology and taxonomy, fish population estimates and dynamics, fish and wildlife habitat monitoring and assessment and vertebrate health assessments. His background includes the operation of a wide variety of sampling equipment and laboratory procedures used in the measurement of air, land, water, and wildlife parameters. He is experienced with air monitoring equipment, extensive chemical analysis, spectrophotometers, atomic absorption, chromatography, water interface meters, and microscopy and culture techniques along with preservation and taxonomy. He has completed several hundred Phase I and II ESAs, Transaction Screens, and Government Record Searches in eight mid-western and western states.

His current credentials include: Certified Environmental Inspector, Certified Indoor Environmentalist, and Certified Asbestos Inspector.

11.0 REFERENCES

This references section identifies published reference sources relied upon in preparing this Environmental Phase I Assessment.

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- US Fish and Wildlife Service Area Office, Kulm North Dakota aerial photographs, 1979
- USGS Aerial Photograph, 1997
- USGS, 1982, *Coldwater Lake, Coldwater NE and Merricourt SW Quadrangles North Dakota 7.5 Minute Series Topographic*. United States Department of the Interior Geological Survey.

- Unpublished, 2009, *EDR Radius Map Report with Geocheck*. Environmental Data Resources Inc.
- Unpublished, 2009, *EDR Data Map Well Search*. Environmental Data Resources Inc.

APPENDIX A

Merricourt Wind Farm





131068 131067 131066 131065

130068 130067 130066 130065

129067 129066

McIntosh Co.

Dickey Co.

56

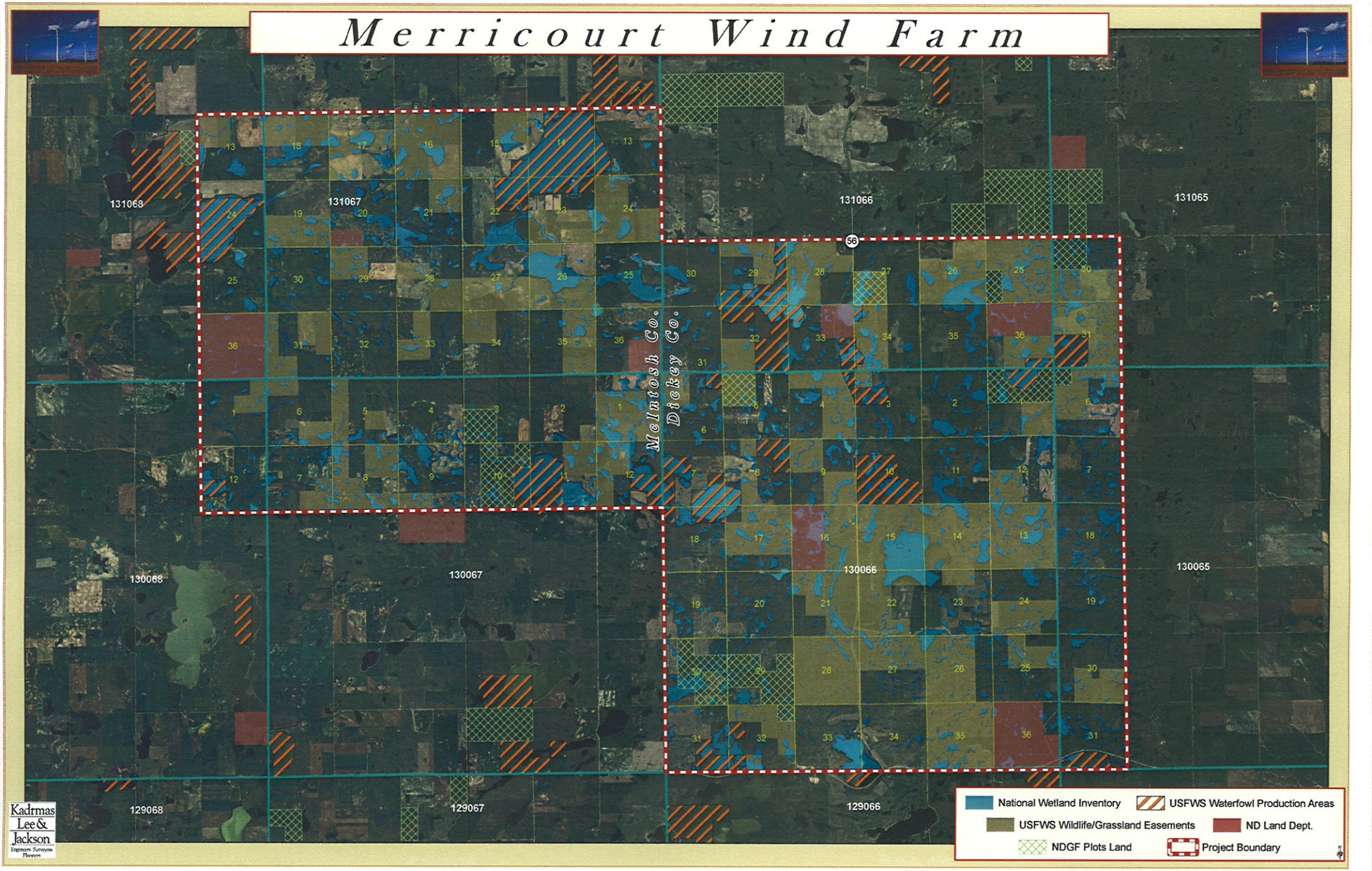
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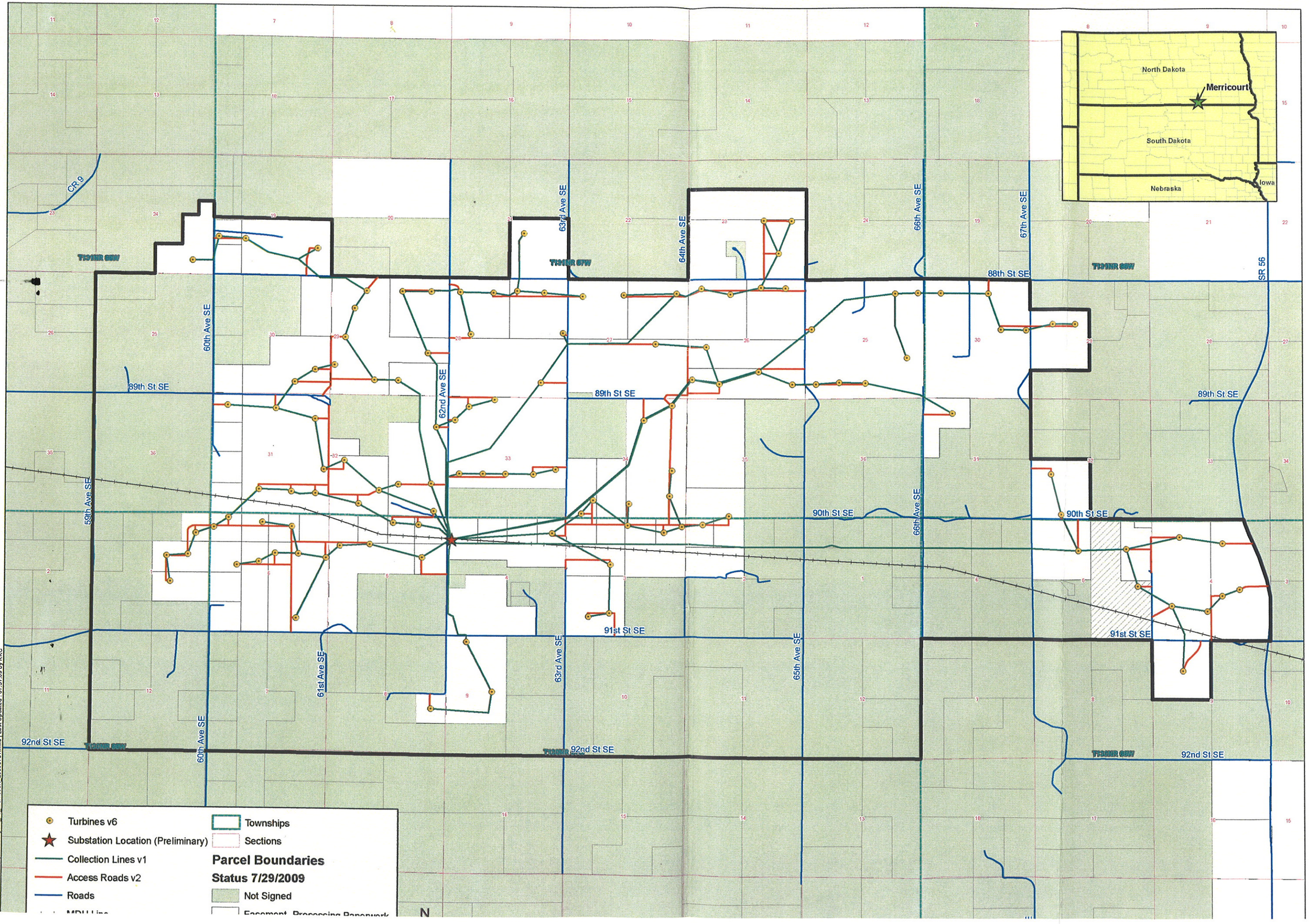


Kadrmas Lee & Jackson
Engineers Surveyors Planners

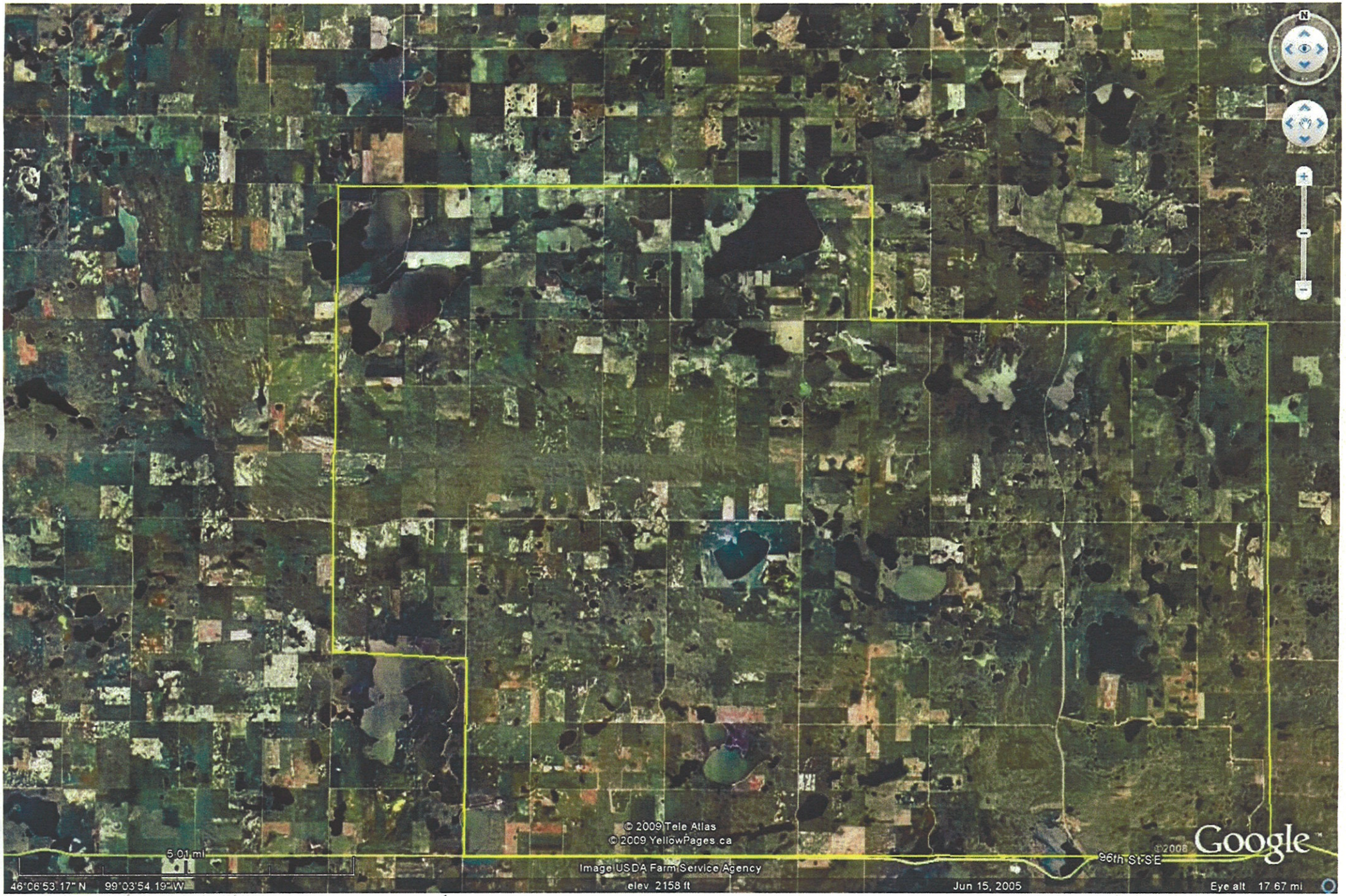
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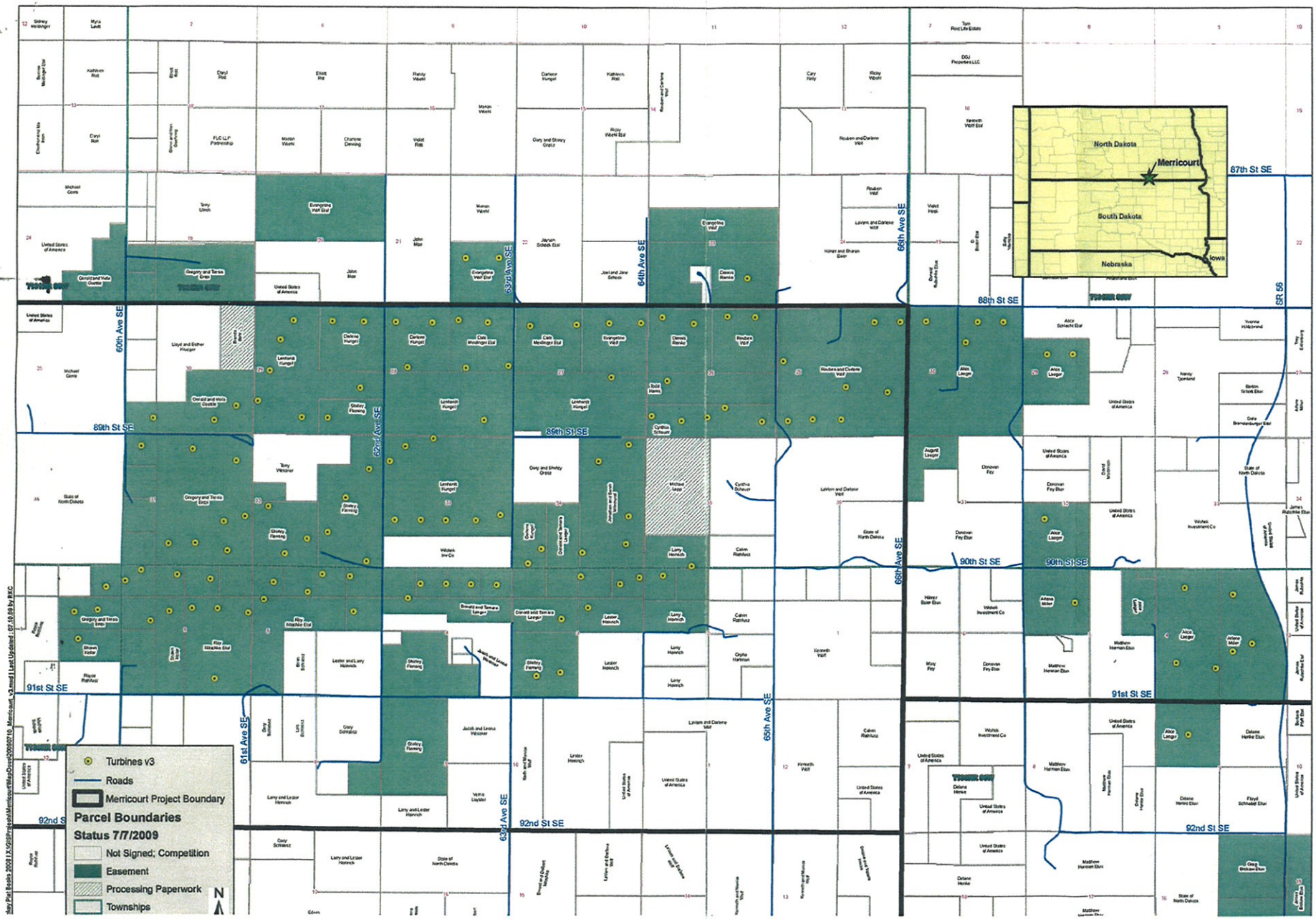
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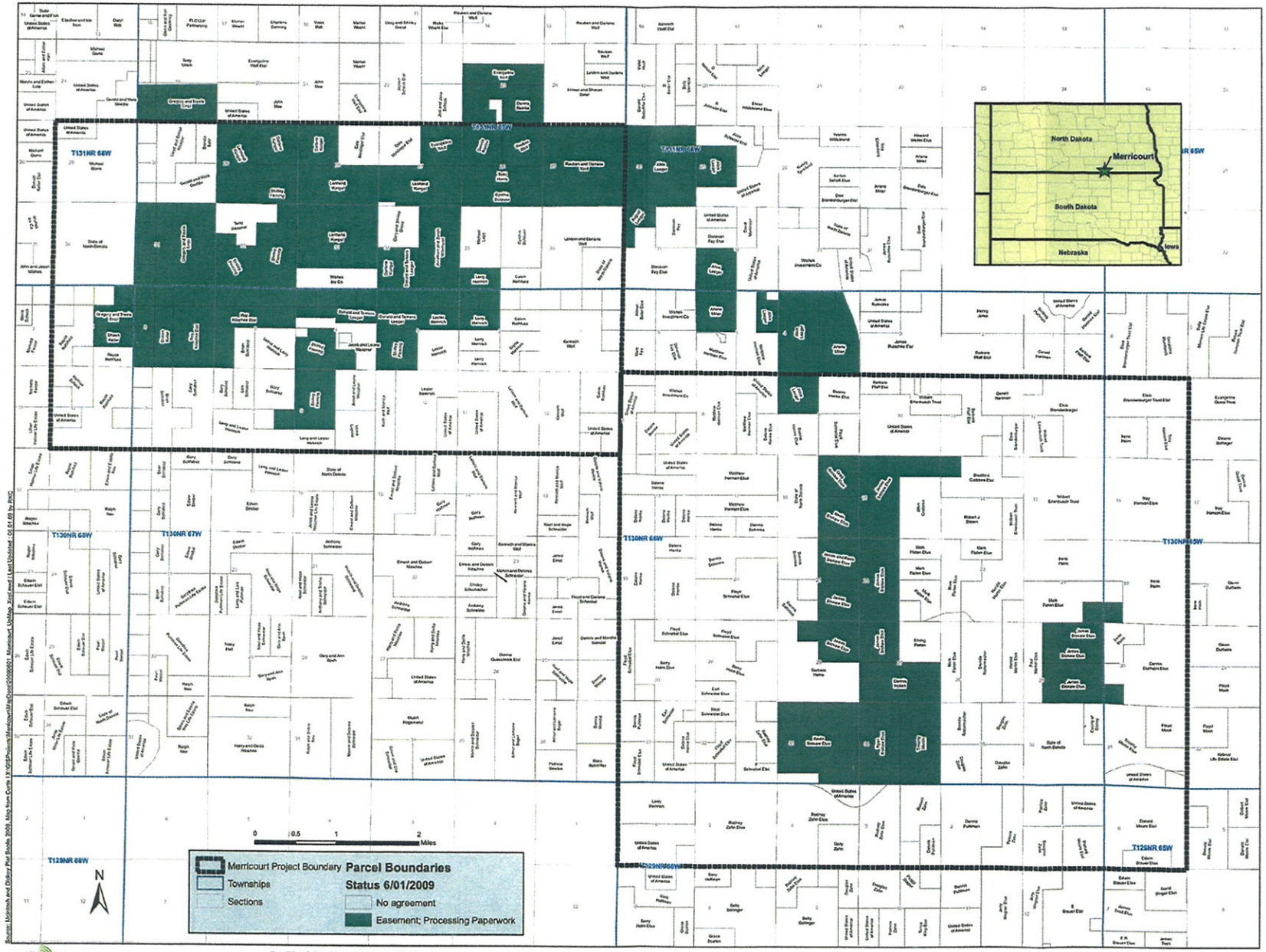

Merricourt Wind Farm
McIntosh Co.
Dickey Co.
131068
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130065
129068
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129066
56
National Wetland Inventory
USFWS Waterfowl Production Areas
USFWS Wildlife/Grassland Easements
ND Land Dept.
NDGF Plots Land
Project Boundary
Kadrmas Lee & Jackson
Engineers Surveyors Planners



ojects\MerricourtMapDocs\Layout_v6_Merricourt_20090731.mxd | Last Updated: 07.31.09 by RKC


© 2009 Tele Atlas
© 2009 YellowPages.ca
5.01 mi
Image USDA Farm Service Agency
96th St SE
©2009 Google
46°06'53.17" N 99°03'54.19" W
elev 2158 ft
Jun 15, 2005
Eye alt 17.67 mi


North Dakota
Merricourt
South Dakota
Nebraska
Iowa
Turbines v3
Roads
Merricourt Project Boundary
Parcel Boundaries
Status 7/7/2009
Not Signed; Competition
Easement
Processing Paperwork
Townships
N
60th Ave SE
61st Ave SE
62nd Ave SE
63rd Ave SE
64th Ave SE
65th Ave SE
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89th St SE
90th St SE
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92nd St SE
SR 56
TOWER 037
TOWER 038



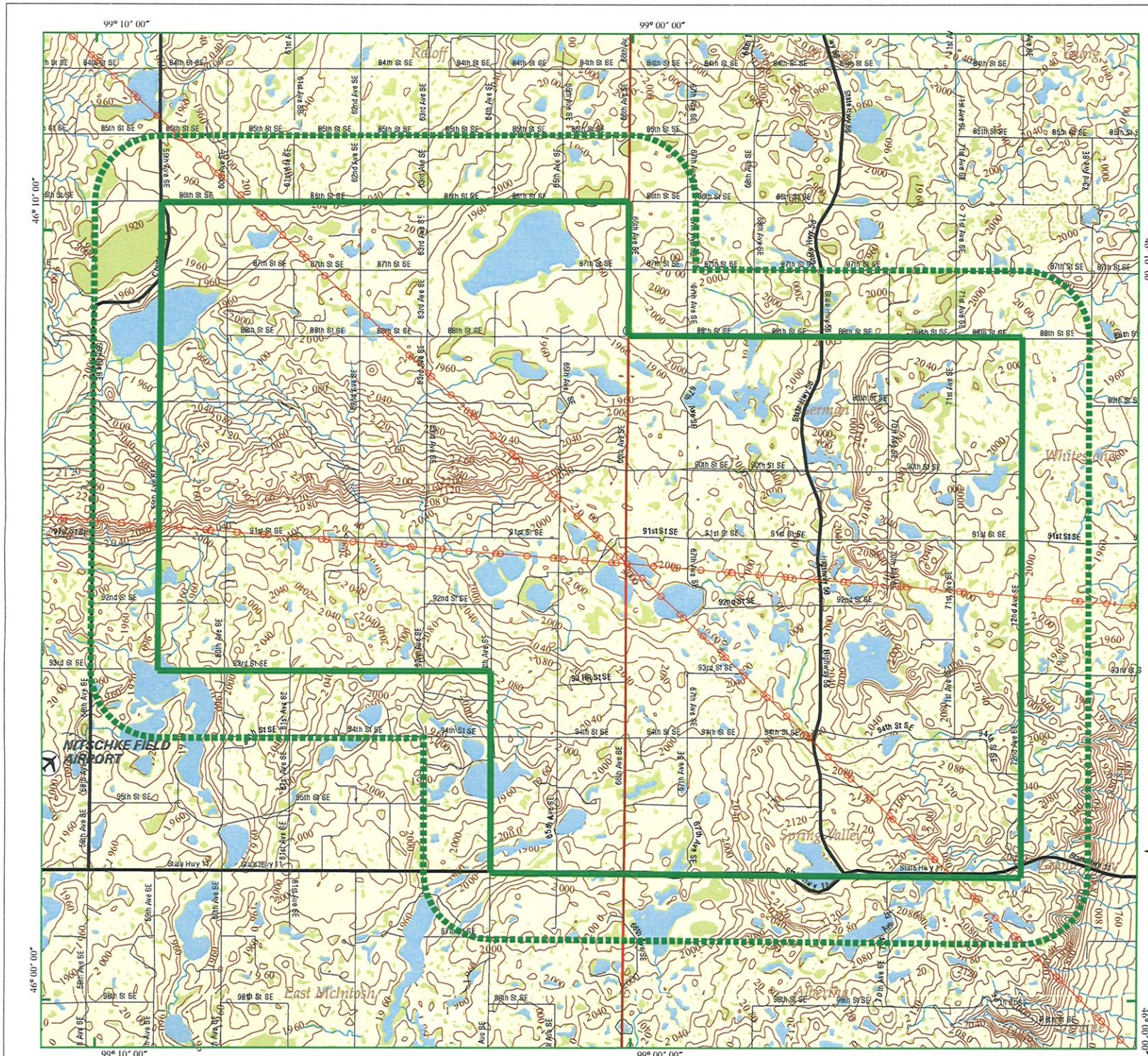
Source: McIntosh and Dickey Plat Books, 2009. Miles from Curtis 14 (GIS\Projects\Merricourt\MapDocs\20090901_Merricourt_Unitize_Xmd.mxd) Last Updated - 05.01.09 by RKC

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LAND STATUS
Merricourt Wind Farm, McIntosh and Dickey Counties, North Dakota

APPENDIX B



EDR DataMap®

Area Study

Merricourt Wind Farm

- Listed Sites
- Earthquake Epicenters (Richter 5 or greater)
- Search Boundary
- Roads
- Major Roads
- Waterways
- Railroads
- Contour Lines
- Pipelines
- Powerlines
- Fault Lines
- Water
- Superfund Sites
- Federal DOD Sites
- Indian Reservations BIA
- National Wetland Inventory





Kulm, ND

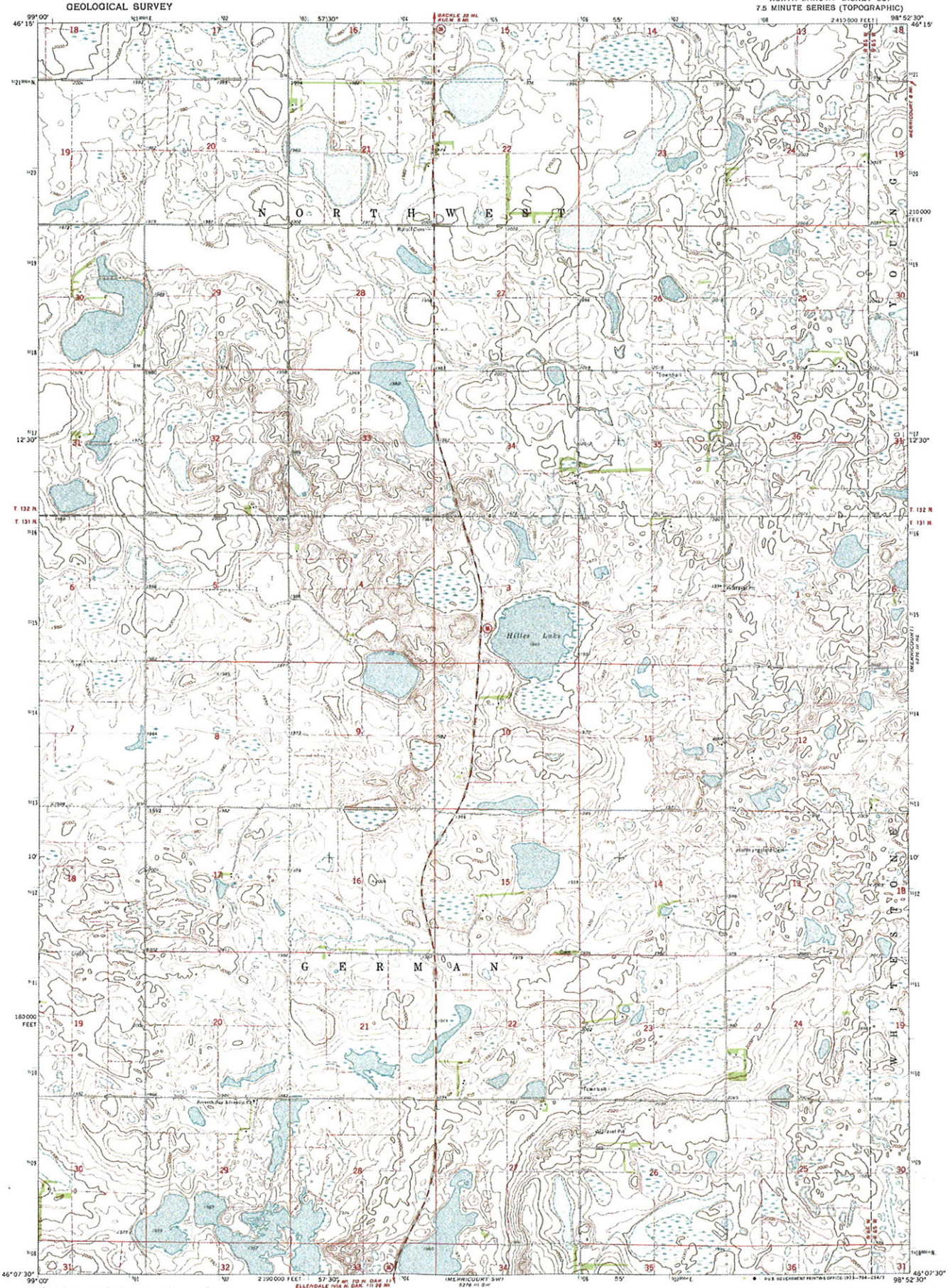


Scale in Miles

EDR Environmental Data Resources Inc

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02495636.1r - 21 May 09



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1967. Field checked 1971

Polyconic projection. 1927 North American datum
10,000-foot grid based on North Dakota coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 14, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs
This information is unchecked

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

ROAD CLASSIFICATION

Primary highway, hard surface — Light-duty road, hard or improved surface
Secondary highway, hard surface — Unimproved road
Interstate Route — U. S. Route — State Route

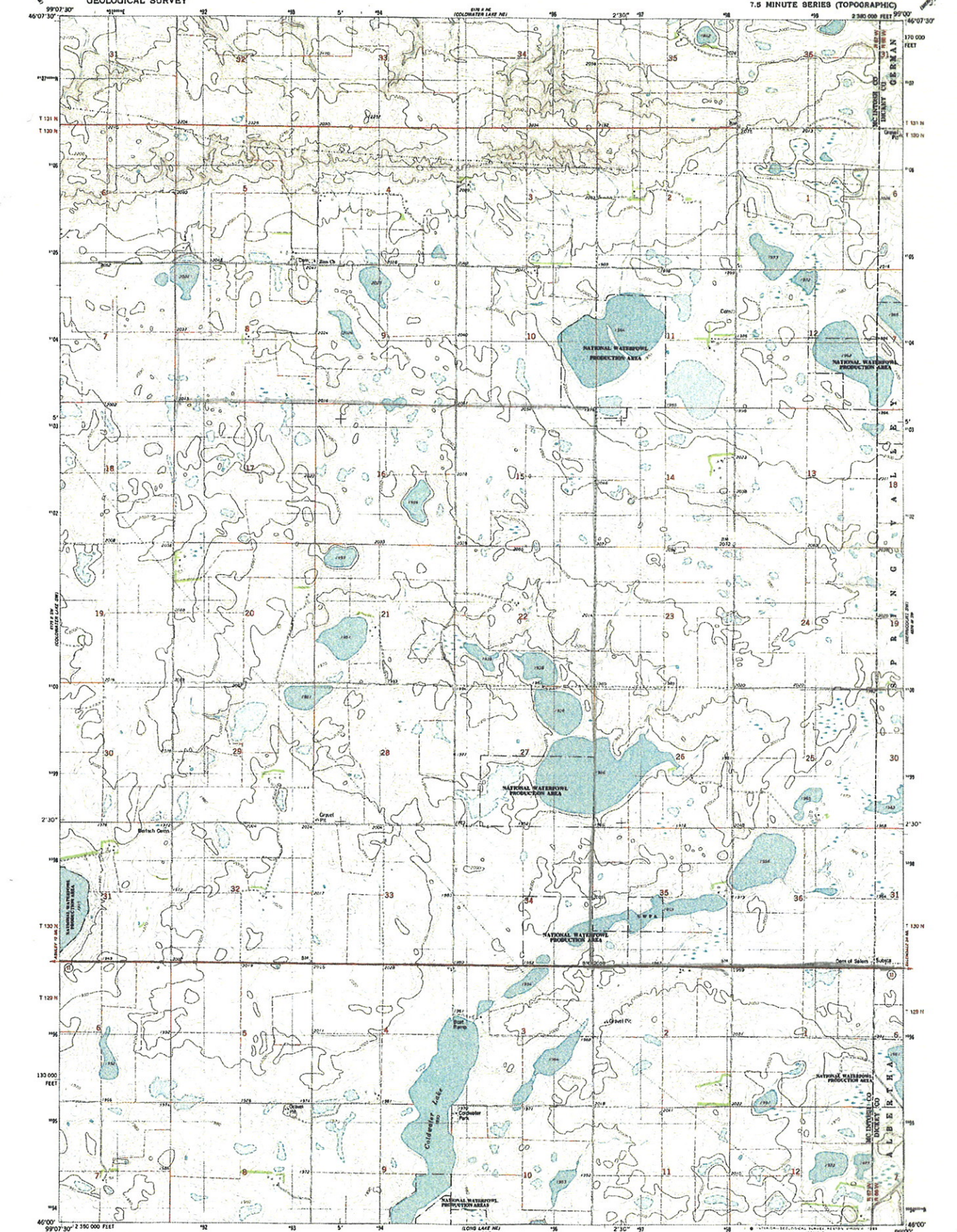
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D. C. 20242
AND BY THE STATE WATER COMMISSION, BISMARCK, NORTH DAKOTA 58501
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

NORTH DAKOTA
QUADRANGLE LOCATION

MERRICOURT NW, N. DAK.
N4607.5—W9852.5/7.5

1971

AMS 6276 III NW—SERIES V871



Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1976. Field checked 1978. Map edited 1982

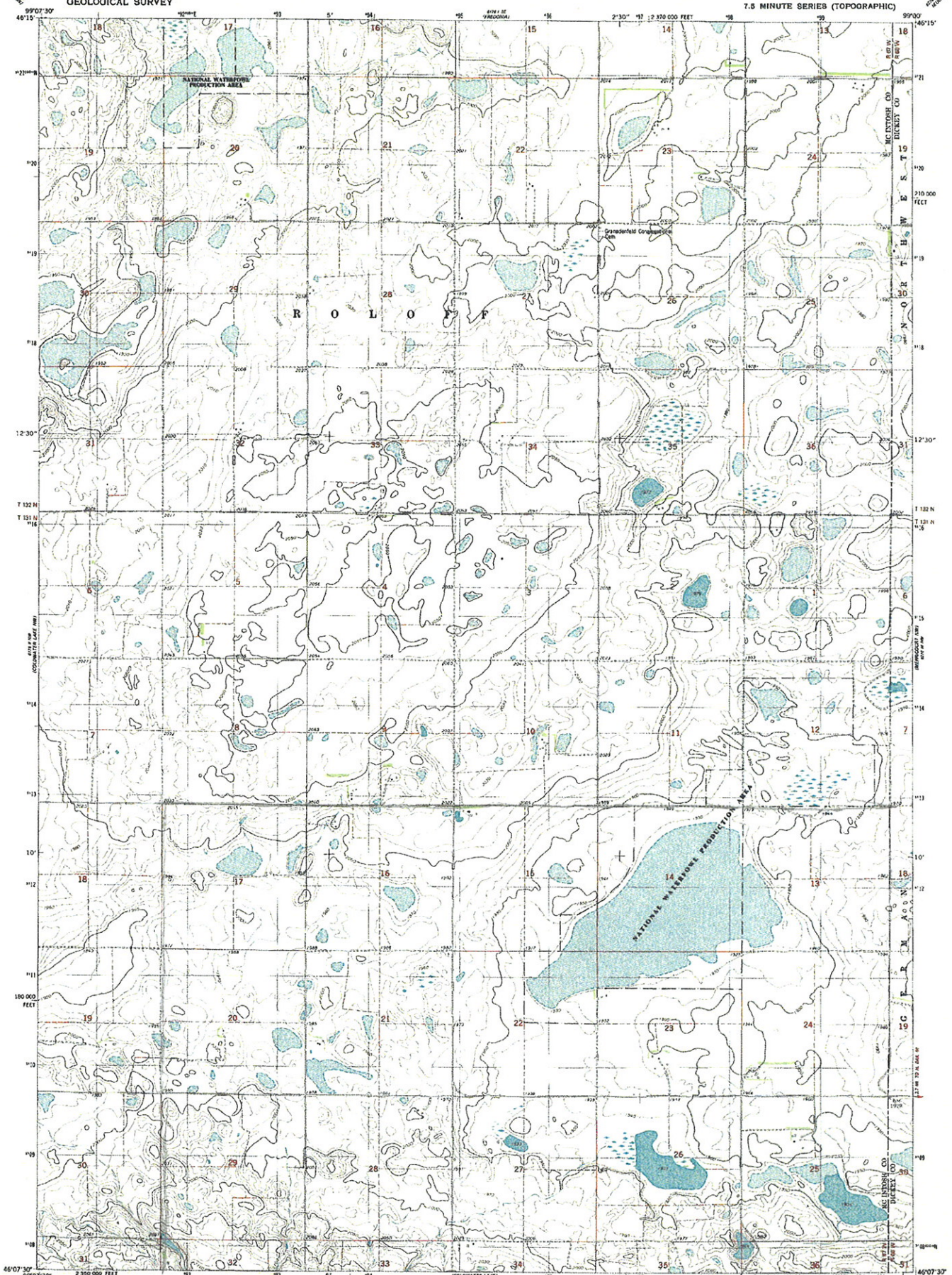
Projection and 10,000-foot grid ticks: North Dakota coordinate system, south zone (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 14
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 5 meters north and 31 meters east as shown by dashed corner ticks

There may be private inholdings within the boundaries of the National or State reservations shown on this map

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs
This information is unchecked

UTM GRID AND 1982 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
AND BY THE STATE WATER COMMISSION, BISMARCK, NORTH DAKOTA 58501
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST



Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1976. Field checked 1978. Map edited 1982

Projection and 10,000 foot grid ticks: North Dakota coordinate system, south zone (Lambert conformal conic)
1000 meter Universal Transverse Mercator grid, zone 14
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 6 meters north and 31 meters east as shown by dashed corner ticks

There may be private inholdings within the boundaries of the National or State reservations shown on this map

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

SCALE 1:24 000

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 KILOMETER

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

UTM GRID AND 1982 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
AND BY THE STATE WATER COMMISSION, BISMARCK, NORTH DAKOTA 58501
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

NORTH DAKOTA
QUADRANGLE LOCATION

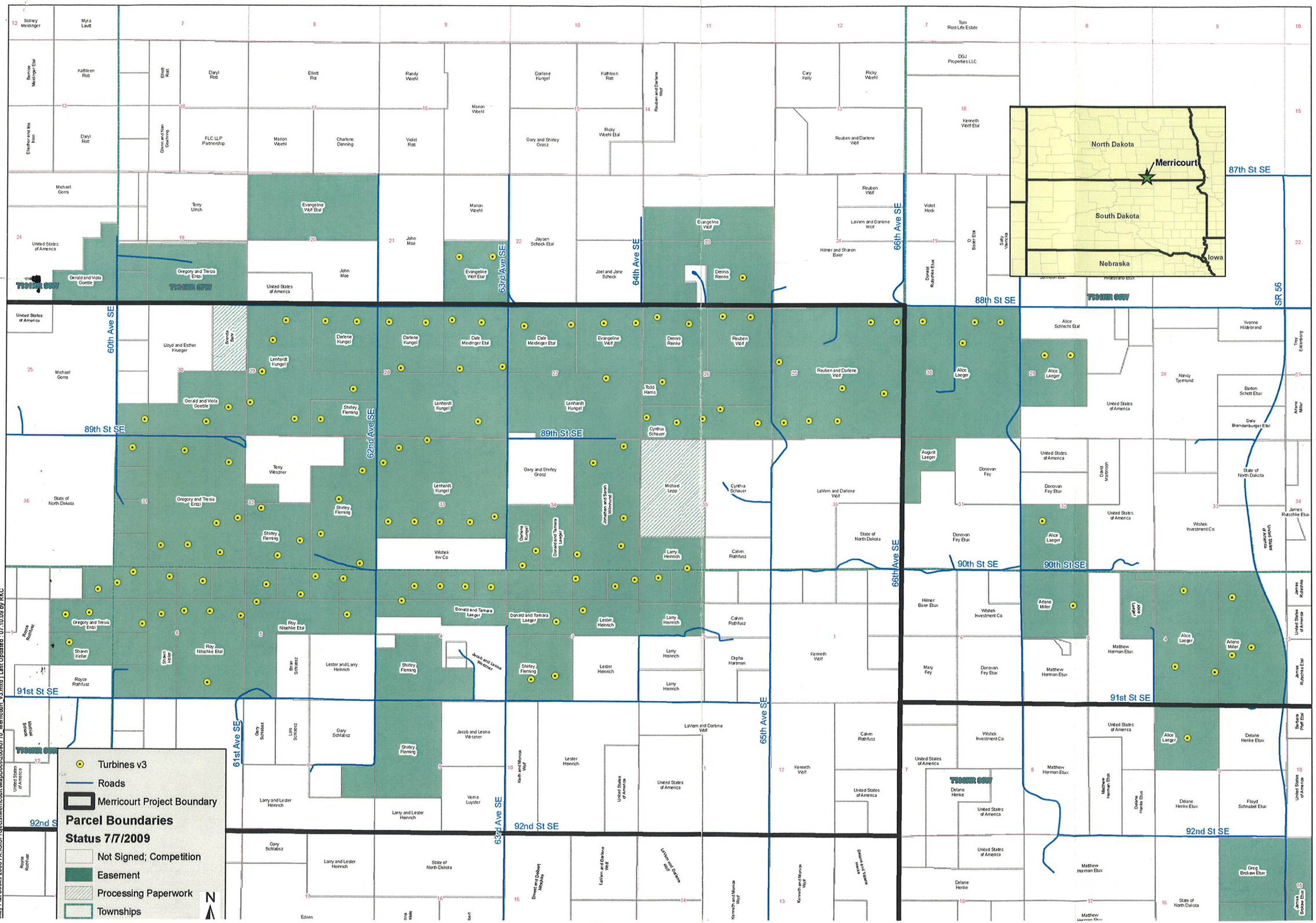
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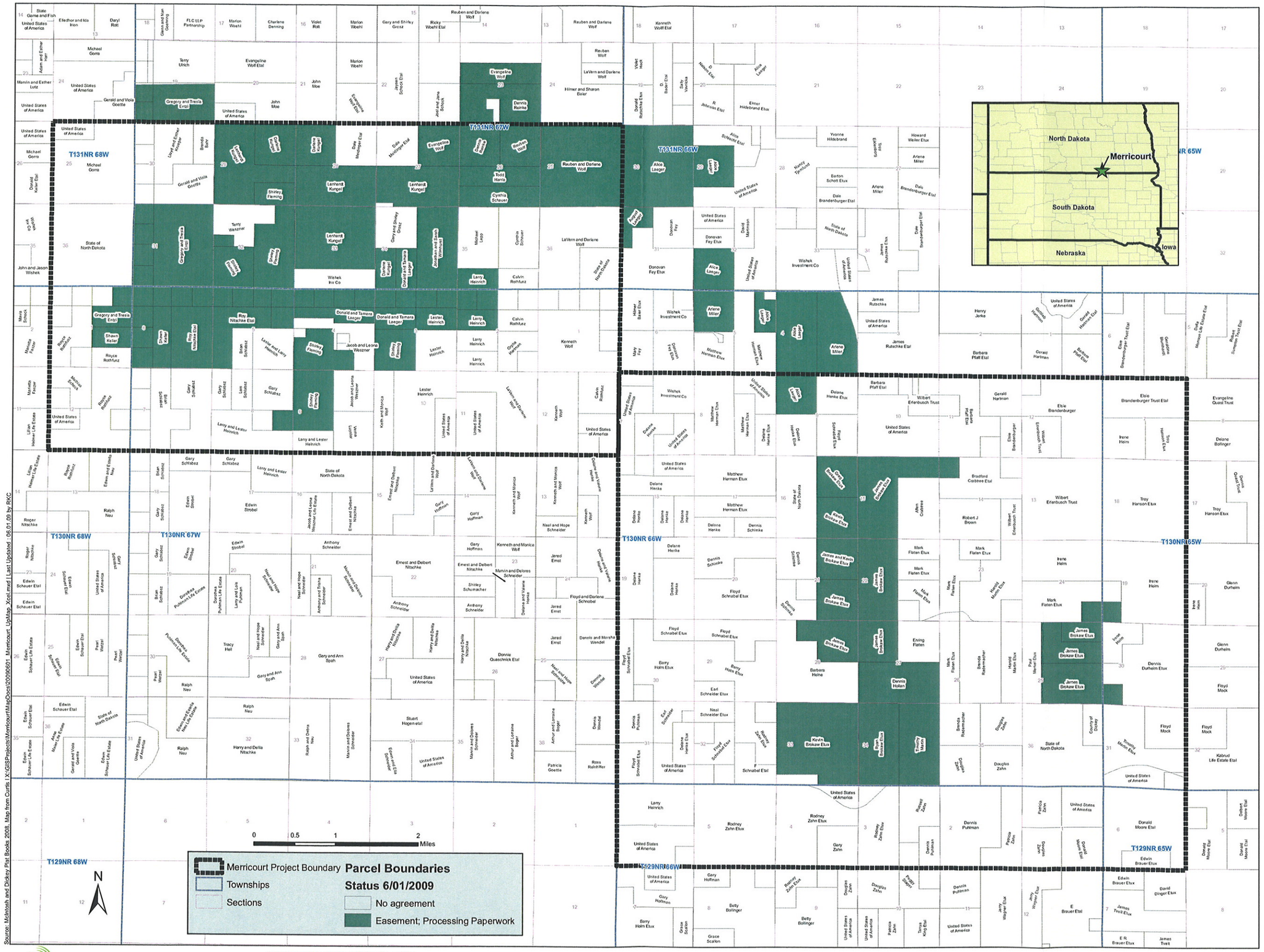
Primary highway, hard surface — Light-duty road, hard or improved surface
Secondary highway, hard surface — Unimproved road
Interstate Route U.S. Route State Route

COLDWATER LAKE NE, N. DAK.
N4607.5-W9900/7.5

1982

DMA 6176 II NE-SERIES V871


North Dakota
Merricourt
South Dakota
Nebraska
Iowa
87th St SE
88th St SE
89th St SE
90th St SE
91st St SE
92nd St SE
60th Ave SE
61st Ave SE
62nd Ave SE
63rd Ave SE
64th Ave SE
65th Ave SE
66th Ave SE
SR 56
Turbines v3
Roads
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Parcel Boundaries
Status 7/7/2009
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Easement
Processing Paperwork
Townships
N
Plat Books 2008 | X:\GIS\Projects\Merricourt\MapDocs\20090710_Merricourt_v3.mxd | Last Updated : 07.10.09 by RKC



Source: McIntosh and Dickey Plat Books 2008, Map from Curtis I:\GISProjects\Merricourt\MapDocs\20090601 Merricourt UpMap_Xcel.mxd | Last Updated : 06.01.09 by RKC

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LAND STATUS

Merricourt Wind Farm, McIntosh and Dickey Counties, North Dakota

APPENDIX C



Northwest. View of the rolling hills on-Site.



South. View of wetland in a cultivated field.



East. View of established wetland area on-Site.



Northeast. View of well located in drainage area on-Site.



Northeast. View manmade impoundment on-Site.



North. View of wetland area in the bottom of a drainage.



East. View of transmission line on-Site.



Northwest. View established wetland on-Site.



Southwest. View of debris piled on top of a hill on-Site.



Southeast. View of a large wetland area adjacent to cropland.



South. View of wetland area in a portion of pastureland.



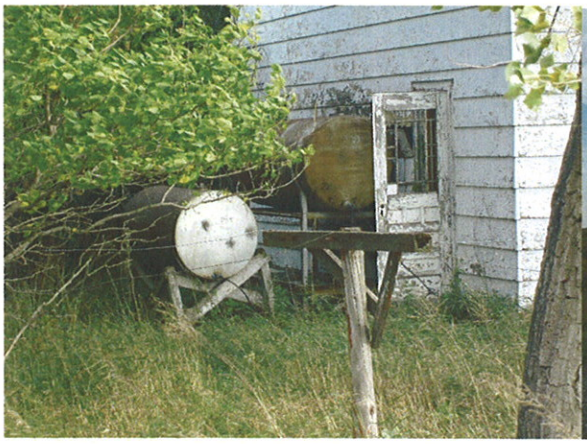
Southeast. View drainage area on-Site.



Northwest. View interior of building at Site #1



North. View of dumping area at Site #1



Northeast. View of ASTs at Site #6



Southeast. View utility substation



Northeast. View of tires at Site #10



North. View of abandoned well at Site #12



East. View of abandoned farm machinery#13



South. View of a farm dumping site #14.



East. View of AST at #15



Northwest. View of AST at farmstead #16



North. View of stained soil at #16



South. View of ASTs at farmstead #17



West. View of abandoned car at #18



East. View of AST at farmstead #15



Northwest. View of AST at farmstead #16



Northeast. View of dumping at #18



North. View of well at abandoned farm #19



North. View of abandoned farm machinery



View of dump site #23 located during the July, 2010 field reconnaissance

APPENDIX D

5. Introduction Meeting & Subsequent Meetings

KL&J will attend at least one Interagency Meeting to give all the agencies a "heads-up" on the project. If necessary, KL&J representatives will attend up to three subsequent Interagency Meetings.

Sub Task C. Environmental Studies & Documentation

1. Phase I ESA (Environmental Site Assessment)

The purpose of a Phase I ESA is to evaluate the potential for on-site contamination from on-site or off-site sources. The scope of services for the Phase I ESA has been designed to evaluate current and historical conditions at the site and the surrounding area that may represent potential environmental concern to the site and meets or exceeds the guidelines described in the American Society for Testing and Materials' Standard Practice for Site Assessments, Designation E 1527-05 (also know as All Appropriate Inquiries). KL&J will perform the following tasks:

- Visually observe the site property and grounds to identify potential sources or indications of on-site chemical and/or petroleum release(s). These potential sources may include tanks, chemical storage, and disposal areas. KL&J will include photographs taken during the site inspection within the final version of the report.
- Review of available published geological information obtained from the State Geological Survey, the US Department of Agriculture Soil Conservation Service, and the US Geological Survey, including the 7.5 Minute Series Topographic Map covering the site area.
- Visually inspect (from curbside) and categorize the use of the abutting property as potential off-site sources of chemical contamination.
- Review local records related to the site's development. This will also include interviewing local environmental authorities to identify complaints, violations, citations, or inspections related to the site.
- Interview site representatives and other persons familiar with the site including major tenants and occupants with regard to potentially hazardous materials at the site.
- Review the current listings of published regulatory federal records related to the site and potential off-site sources of chemical contamination. We will include this information, as well as documents relating to on-site activities as follows[2]:
    - **National Priorities List (NPL)** - List of EPA high priority cleanup property within a one-mile radius
    - **Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)** - List of property subject to investigation by EPA for contamination within a half mile radius
    - **Resource Conservation and Recovery Act (RCRA)** - List of notified generators at the site and adjacent property and RCRA Transfer, Storage, and Disposal Facilities (TSDFs) within a one-mile radius

[2] The assessment will not include a thorough review and evaluation of those off-site properties within the search radii. KL&J will conclude, however, whether or not those properties may have the potential to affect environmental conditions at the site due to their locations in reference to the site.

- **RCRA Corrective Action Facilities (CORRACTS)** within a one-mile radius
- **Emergency Response Notification System (ERNS)** - Review of data regarding on-site spills, the material released, and the medium into which it occurred for the site only.

- Review current listings of state regulatory records and publications for environmental activities related to the site and potential off-site sources of chemical contamination. We will incorporate the following information into the report:
  - State Hazardous Waste within a one-mile radius
  - Underground Storage Tank (UST) facilities on site and at adjacent property
  - Leaking UST (LUST) facilities within a half mile radius
  - Solid Waste/Landfills within a half mile radius
- Review of past site documents to assess the potential for on-site chemical contamination including:
  - Previous Environmental Assessments
  - Construction documents, as appropriate
  - Hazardous waste manifests and other selected operational documents
  - Records of previous environmentally related activities
- Access and retrieval of any federal, state, or local documents related to the scope of work is limited to the availability of records upon request from governmental agencies or commercial sources within the time frame allocated for this effort. KL&J will make a reasonable effort to obtain such information.
- Review of any readily available historical sources for the site such as aerial photographs, city directories, and/or Sanborn Fire Insurance Maps. Copies of pertinent historical documents will be included within the final version of the report.

Following the Phase I ESA field activities, KL&J will prepare a Phase I ESA report. KL&J will provide three copies of the final written report. The reports will conclude with KL&J's opinion regarding the potential presence of on-site contamination. If KL&J concludes that the potential for on-site contamination exists, a Phase II (sampling of the area(s) of concern) may be recommended.

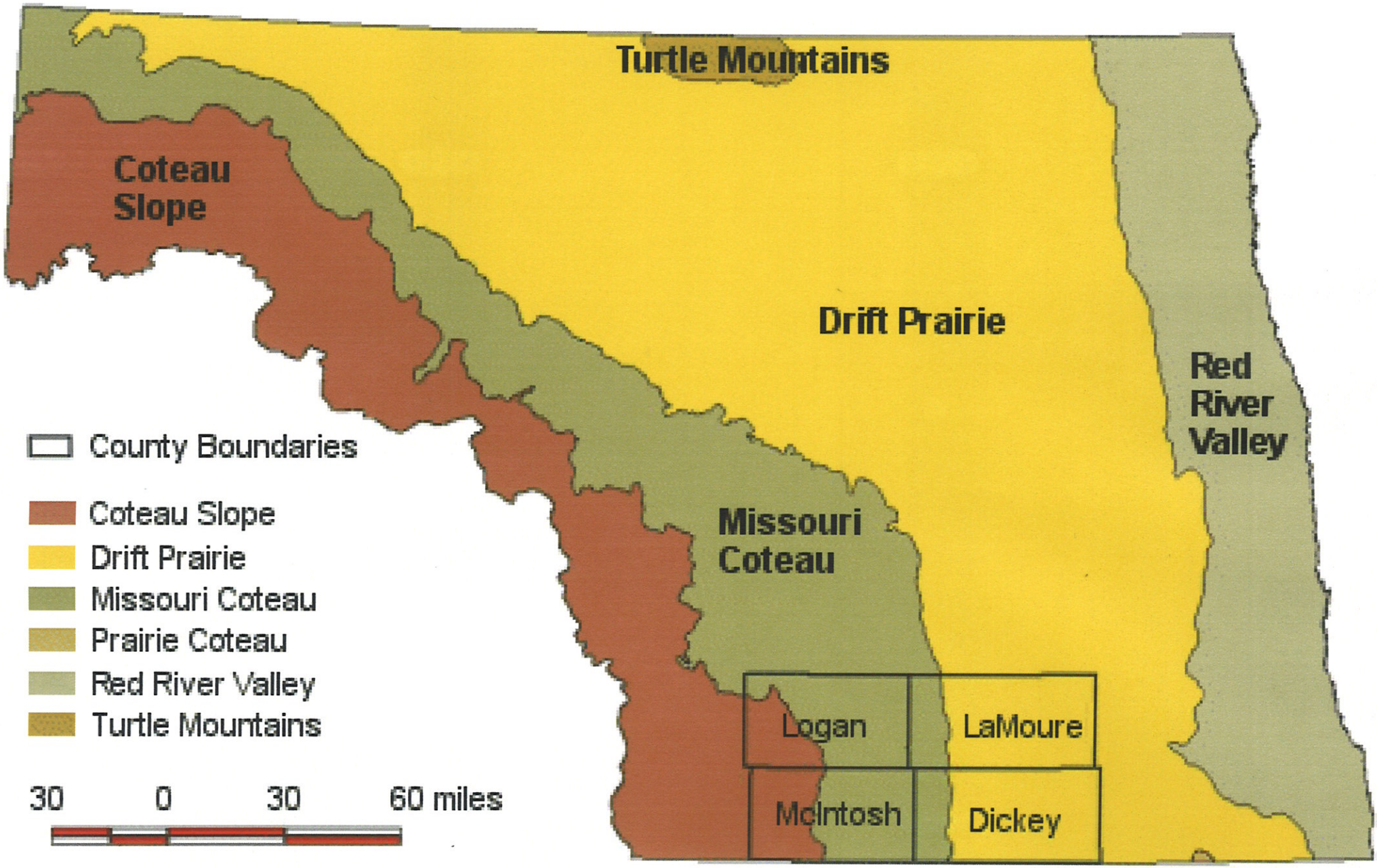
2. Avian Assessment

Phase I: Avian Assessment

KL&J will partner with North Dakota Birding to determine avian impacts associated with construction and/or operation of the proposed wind farm in Dickey and McIntosh Counties. Agency coordination will take place with the US Fish and Wildlife Service (USFWS), North Dakota Parks and Recreation Department (NDPR), and the North Dakota Game and Fish Department (NDGF). Agency coordination will include Wind Resource Area (WRA) specific discussions regarding the Endangered Species Act, Migratory Bird Act, grouse lek surveys, raptor nest surveys, and additional avian surveys requested by the agencies. More specific agency discussions and information will be requested regarding whooping crane and piping plover use and habitat within the WRA. Data and recommendations from the avian assessment will be compiled in a report to aid eDC in the decision making process as to the studies they want to proceed with in the future.

APPENDIX E

Physiographic Regions of Eastern North Dakota

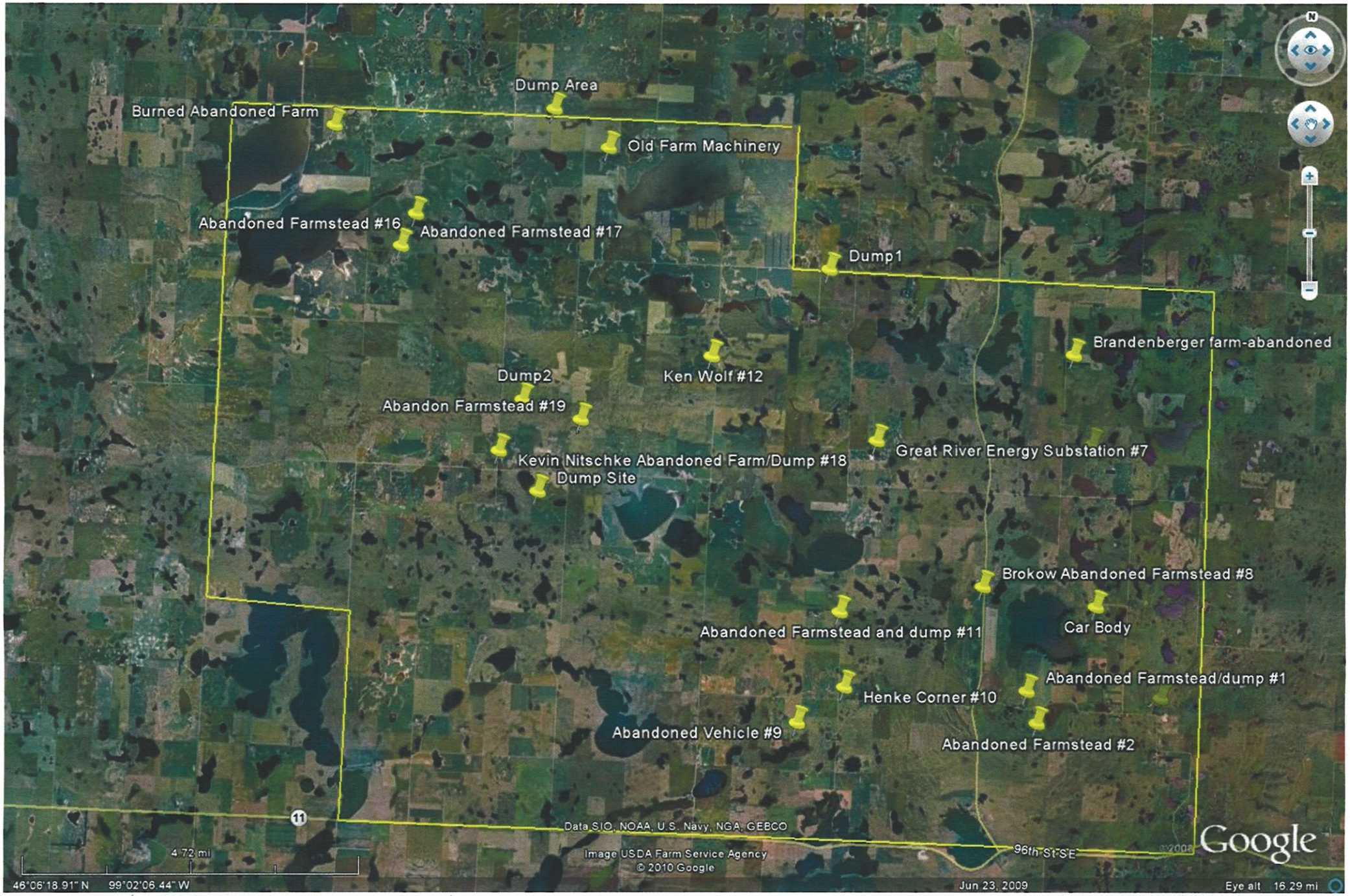


Merricourt Wind Power Project Area Potential Hazardous Waste Sites (**Appendix E**)

Site/Type	Location	Materials Observed
Abandoned farmstead #1	46° 03'21.31"N 98° 55'51.60"W	Tires, oil filters, containers
Abandoned farmstead #2	46° 03'20.65"N 98° 55'49.84"W	Tires, containers, batteries, oil filters
Foundation/basement #3	46° 03'20.50"N 98° 53'30.99"W	Containers, tires
Dump/farm #4	46° 06'07.40"N 98° 54'45.40"W	Tires, containers
Abandoned farm #5	46° 06'23.77"N 98° 54'53.73"W	NA-no permission
Dale Brandenberger farmstead #6	46°07'04.74"N 98°55'03.45"W	Aboveground storage tanks, containers
Great River Energy Substation #7	46° 06'19.55"N 98° 58'40.81"	Non-PCB containing transformers
Brokow Abandoned farmstead #8	46° 04'36.38"N 98° 56'42.79"W	No issues observed
Abandoned vehicle #9	46° 02'51.72"N 98° 59'51.57"W	Car body
Henke Corner/farmstead #10	46° 03'18.66"N 98° 59'03.64'W	Tires by buildings
Abandoned farmstead/dump #11	46° 04'13.54"N 98° 59'11.84"W	Tires, containers

Mericourt Wind Power Project Potential hazardous Waste Sites (continued)

Site/type	location	Materials Observed
Ken Wolf property #12	46° 07'16.74"N 98° 01'38.15"W	Abandoned well ,old structures
Old farm machinery #13	46° 09'44.94"N 99° 03'36.29"W	Old equipment
Dump area #14	46° 10'12.11"N 99° 04'35.31"W	Tires, containers
Burned abandoned farm #15	46° 09'53.15"N 99° 08'25.68"W	ASTs, tires, containers, well
Abandoned farmstead #16	46° 08'50.90"N 99° 06'56.81"W	Tires, AST, unlabeled containers
Abandoned farmstead #17	46° 08'27.56"N 99° 07'09.88"W	AST, vehicles
Kevin Nitschke abandoned farmstead #18	46° 06'00.61"N 99° 05'16.98"W	Vehicle, tires, containers
Abandoned farmstead #19	46° 06'25.97"N 99° 03'52.41"W	Tires, containers, well
Dump #1	46° 08'23.53"N 98° 59'38.94"W	Tires, oil filters, animals, containers
Dump #2	46° 06'39.69"N 98° 04'54.44"W	Unlabeled containers
Trench Dump site	46° 06'25.82"N 99° 07'24.79"W	Drums, unlabeled containers
Dump Site	46° 11'01.80"N 99° 06'08.88"W	Unlabeled containers


Dump Area
Burned Abandoned Farm
Old Farm Machinery
Abandoned Farmstead #16
Abandoned Farmstead #17
Dump1
Brandenberger farm-abandoned
Ken Wolf #12
Dump2
Abandon Farmstead #19
Great River Energy Substation #7
Kevin Nitschke Abandoned Farm/Dump #18
Dump Site
Brokow Abandoned Farmstead #8
Car Body
Abandoned Farmstead and dump #11
Abandoned Farmstead/dump #1
Henke Corner #10
Abandoned Vehicle #9
Abandoned Farmstead #2
11
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image USDA Farm Service Agency
© 2010 Google
96th St SE
4.72 mi
46°06'18.91" N 99°02'06.44" W
Jun 23, 2009
Eye alt 16.29 mi
Google

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State Water Commission

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Water Laws and Policies
Water Links
Employment
Contact Us

Map and Data Resources : Search Form : Search Results

27 Records were found matching Search Criteria

Location	County	Purpose	Well Driller	Date Drilled
130-067-02 ADC	McIntosh	Stock	Bob's Drilling	07/21/2004
130-067-04 DDD	McIntosh	Domestic	Albrecht Well Work	05/05/1977
130-067-05 ADD	McIntosh	Stock	Bob's Drilling	04/03/1990
130-067-05 BAC	McIntosh	Stock	Weispfenning Brothers	08/16/1979
130-067-05 D	McIntosh	Domestic	Venturia Well Drilling	04/21/1977
130-067-05 DDD	McIntosh	Stock	Venturia Well Drilling	07/16/1975
130-067-07 C	McIntosh	Stock	Bob's Drilling	03/22/1985
130-067-08 AA	McIntosh	Stock	Bob's Drilling	09/08/1983
130-067-10 D	McIntosh	Domestic	Gross Drilling	08/28/1973
130-067-10 DDC	McIntosh	Test Hole	LTP Enterprises	11/15/1994
130-067-11 CDD	McIntosh	Test Hole	LTP Enterprises	11/15/1994
130-067-11 DA	McIntosh	Domestic	Baumgartner Drilling	12/08/1999
130-067-12 DDC	McIntosh	Test Hole	LTP Enterprises	11/14/1994
130-067-16 AC	McIntosh	Stock	Bob's Drilling	07/03/1992
130-067-20 BBB	McIntosh	Test Hole	Venturia Well Drilling	09/08/1974
130-067-21 DB	McIntosh	Stock	Venturia Well Drilling	09/21/1976
130-067-22	McIntosh	Stock	Bob's Drilling	11/17/1982
130-067-29 C	McIntosh	Test Hole	Gross Drilling	07/06/1974
130-067-29 C	McIntosh	Test Hole	Gross Drilling	07/06/1974
130-067-29 DDB	McIntosh	Stock	Bob's Drilling	05/29/2007
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130-067-33 BDA	McIntosh	Stock	Albrecht Well Work	06/18/1975
130-067-35 ADD	McIntosh	Domestic	Bob's Drilling	05/18/2009

Search: GO

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900 East Boulevard Ave. • Bismarck, ND • 58505-0850 • 701-328-2750

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- Water Permits
- Well Contractors

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Permits
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Map and Data Resources : Search Form : Search Results

17 Records were found matching Search Criteria

Location	County	Purpose	Well Driller	Date Drilled
130-068-06 CCC	McIntosh	Stock	Seidel Well Drilling	10/01/1984
130-068-08 ADB	McIntosh	Stock	Bob's Drilling	09/27/2007
130-068-10 AD	McIntosh	Stock	Aberle Well Service	09/25/1991
130-068-10 ADD	McIntosh	Stock	Albrecht Well Work	08/26/1974
130-068-12 AA	McIntosh	Domestic	Weispfenning Brothers	05/29/1980
130-068-12 AC	McIntosh	Domestic	Bob's Drilling	08/13/2009
130-068-12 DB	McIntosh	Stock	Bob's Drilling	08/17/2009
130-068-19 CCD	McIntosh	Stock	M & W Drilling	10/01/2006
130-068-22 CC	McIntosh	Domestic/Stock	Huron Drilling	07/26/1999
130-068-22 DCD	McIntosh	Domestic	Albrecht Well Work	05/15/1982
130-068-22 DD	McIntosh	Stock	Bob's Drilling	07/01/1997
130-068-27	McIntosh	Stock	Gross Drilling	10/20/1974
130-068-27 AAA	McIntosh	Stock	Albrecht Well Work	04/16/1974
130-068-30 BBA	McIntosh	Domestic	Bob's Drilling	10/05/2003
130-068-30 BBB	McIntosh	Stock	Baumann Well Drilling	10/19/1976
130-068-30 BBB	McIntosh	Stock	Baumann Well Drilling	10/14/1976
130-068-30 BBB	McIntosh	Test Hole	M & W Drilling	10/01/2006

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Map and Data Resources : Search Form : Search Results

13 Records were found matching Search Criteria

Location	County	Purpose	Well Driller	Date Drilled
131-068-01 BBD	McIntosh	Stock	Bob's Drilling	08/24/2001
131-068-01 BBD	McIntosh	Stock	Bob's Drilling	11/04/2002
131-068-04 AC	McIntosh	Stock	Jacob Thurn	06/09/1976
131-068-04 ACC	McIntosh	Stock	Bob's Drilling	08/03/1988
131-068-06 CB	McIntosh	Stock	Bob's Drilling	10/15/1985
131-068-06 CB	McIntosh	Stock	Bob's Drilling	09/15/2004
131-068-06 CC	McIntosh	Stock	Jacob Thurn	06/10/1976
131-068-07 BBA	McIntosh	Stock	Bob's Drilling	09/09/2004
131-068-29 AC	McIntosh	Stock	Bob's Drilling	07/29/2003
131-068-31 DCC	McIntosh	Domestic	Albrecht Well Work	06/04/1976
131-068-32 CAA	McIntosh	Stock	Bob's Drilling	06/03/2009
131-068-34 CBB	McIntosh	Stock	Bob's Drilling	10/13/2007
131-068-35 BDB	McIntosh	Stock	Venturia Well Drilling	09/20/1974

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Map and Data Resources : Search Form : Search Results

17 Records were found matching Search Criteria

Location	County	Purpose	Well Driller	Date Drilled
131-067-01 BB	McIntosh	Domestic	Earth Energy & Water Systems	11/25/1997
131-067-01 BB	McIntosh	Domestic	Earth Energy & Water Systems	11/25/1997
131-067-01 BB	McIntosh	Domestic	Earth Energy & Water Systems	11/25/1997
131-067-01 BB	McIntosh	Domestic	Baumgartner Drilling	11/01/1990
131-067-01 BB	McIntosh	Stock	Earth Energy & Water Systems	09/22/2005
131-067-01 BBB	McIntosh	Stock	Baumgartner Drilling	08/24/1977
131-067-05 C	McIntosh	Domestic	Gross Drilling	07/06/1973
131-067-05 CBC	McIntosh	Domestic	Albrecht Well Work	05/06/1978
131-067-05 CDC	McIntosh	Test Hole	Weispfenning Brothers	05/14/1978
131-067-09 CA	McIntosh	Domestic/Stock	Earth Energy & Water Systems	09/20/2005
131-067-10 CB	McIntosh	Stock	Baumgartner Drilling	06/29/1977
131-067-15 BBB	McIntosh	Test Hole	Olson Water Wells	07/24/1973
131-067-21 CC	McIntosh	Domestic	Bob's Drilling	05/23/2003
131-067-22	McIntosh	Domestic/Stock	Kamoni Well Boring	06/10/1976
131-067-24 C	McIntosh	Stock	Thurn Well Boring	06/30/1977
131-067-31 CCA	McIntosh	Stock	Traut Wells Inc.	10/25/1984
131-067-36 DDD	McIntosh	Test Hole	LTP Enterprises	11/23/1994

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Map and Data Resources : Search Form : Search Results

41 Records were found matching Search Criteria

Location	County	Purpose	Well Driller
130-066-03 BCB	Dickey	Test Hole	LTP Enterprises
130-066-03 DDD	Dickey	Stock	Bob's Drilling
130-066-05	Dickey	Domestic/Stock	Kamoni Well Boring
130-066-05 ABB	Dickey	Test Hole	LTP Enterprises
130-066-05 ACC	Dickey	Test Hole	LTP Enterprises
130-066-05 DCC	Dickey	Domestic	LTP Enterprises
130-066-05 DCC	Dickey	Domestic	Bob's Drilling
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130-066-08 BBB	Dickey	Test Hole	LTP Enterprises
130-066-08 BCB	Dickey	Test Hole	LTP Enterprises
130-066-08 C	Dickey	Test Hole	LTP Enterprises
130-066-08 CAA	Dickey	Test Hole	LTP Enterprises
130-066-08 CB	Dickey	Test Hole	LTP Enterprises
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130-066-08 CDA	Dickey	Test Hole	LTP Enterprises
130-066-08 CDA	Dickey	Test Hole	LTP Enterprises
130-066-08 CDA	Dickey	Test Hole	LTP Enterprises
130-066-08 CDA	Dickey	Test Hole	LTP Enterprises
130-066-08 CDB	Dickey	Test Hole	LTP Enterprises
130-066-08 CDD	Dickey	Test Hole	LTP Enterprises
130-066-10 CBB	Dickey	Test Hole	LTP Enterprises
130-066-10 CBB	Dickey	Test Hole	LTP Enterprises
130-066-10 DDD	Dickey	Test Hole	LTP Enterprises
130-066-16 ABB	Dickey	Test Hole	LTP Enterprises
130-066-16 AC	Dickey	Stock	Schimelfenig Well Drilling
130-066-16 ACD	Dickey	Stock	Schimelfenig Well Drilling
130-066-16 BAB	Dickey	Test Hole	LTP Enterprises
130-066-16 DDB	Dickey	Test Hole	LTP Enterprises
130-066-17 AB	Dickey	Test Hole	LTP Enterprises
130-066-17 BBC	Dickey	Test Hole	LTP Enterprises

[1] [2]

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41 Records were found matching Search Criteria

Location	County	Purpose	Well Driller	Date Drilled
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130-066-17 DAC	Dickey	Test Hole	LTP Enterprises	11/17/1994
130-066-18 BDA	Dickey	Domestic	Bob's Drilling	11/20/2002
130-066-22 CDD	Dickey	Stock	Bob's Drilling	11/13/2002
130-066-25 CAC	Dickey	Test Hole	LTP Enterprises	11/22/1994
130-066-25 DC	Dickey	Stock	Baumgartner Drilling	09/10/1993
130-066-28 ABB	Dickey	Test Hole	LTP Enterprises	05/20/1994
130-066-29 BDD	Dickey	Stock	Bob's Drilling	06/21/2002
130-066-32 BCD	Dickey	Test Hole	LTP Enterprises	11/30/1994
130-066-33 ABC	Dickey	Test Hole	LTP Enterprises	05/19/1994
130-066-33 CCC	Dickey	Test Hole	LTP Enterprises	05/18/1994

[1] [2]

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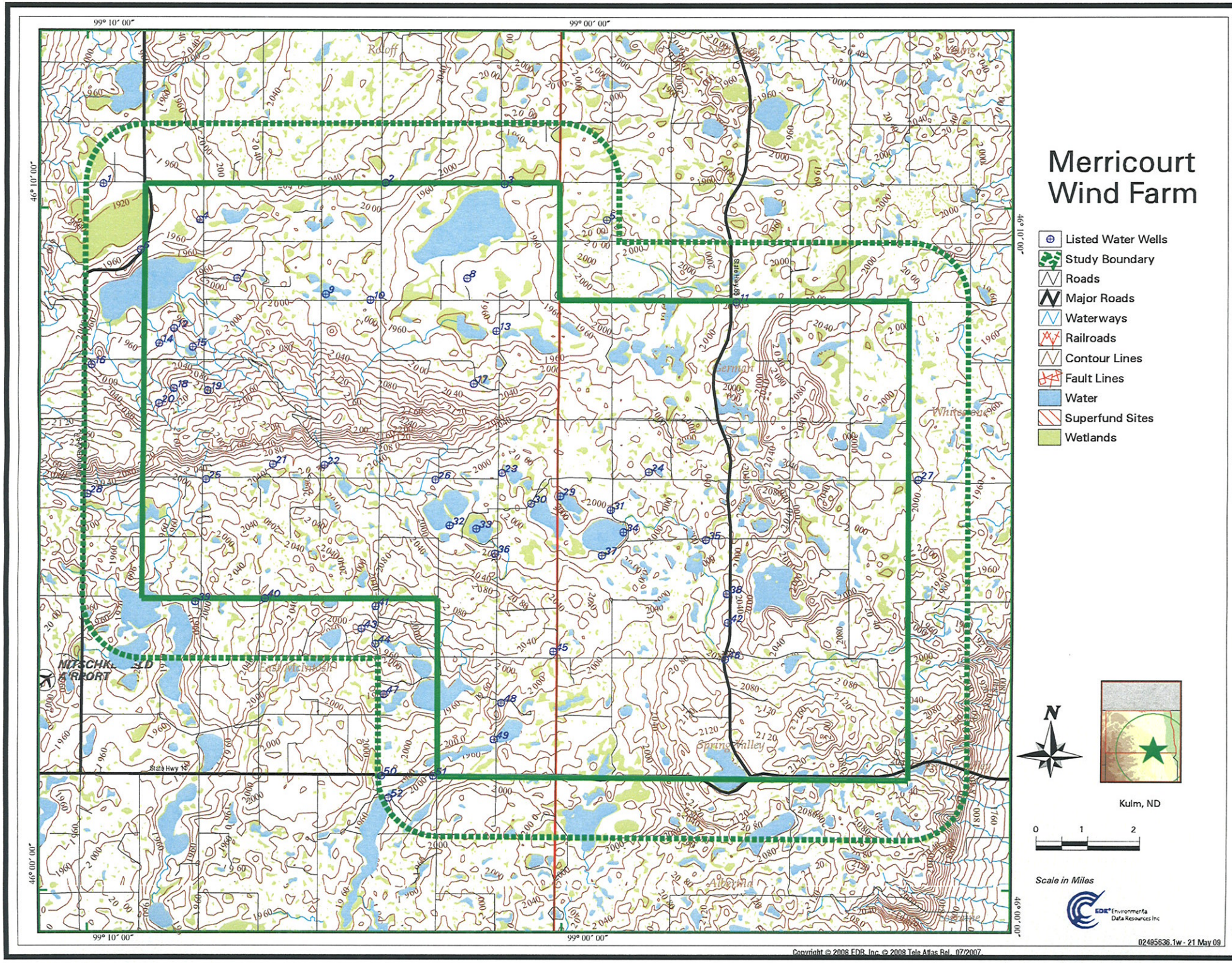
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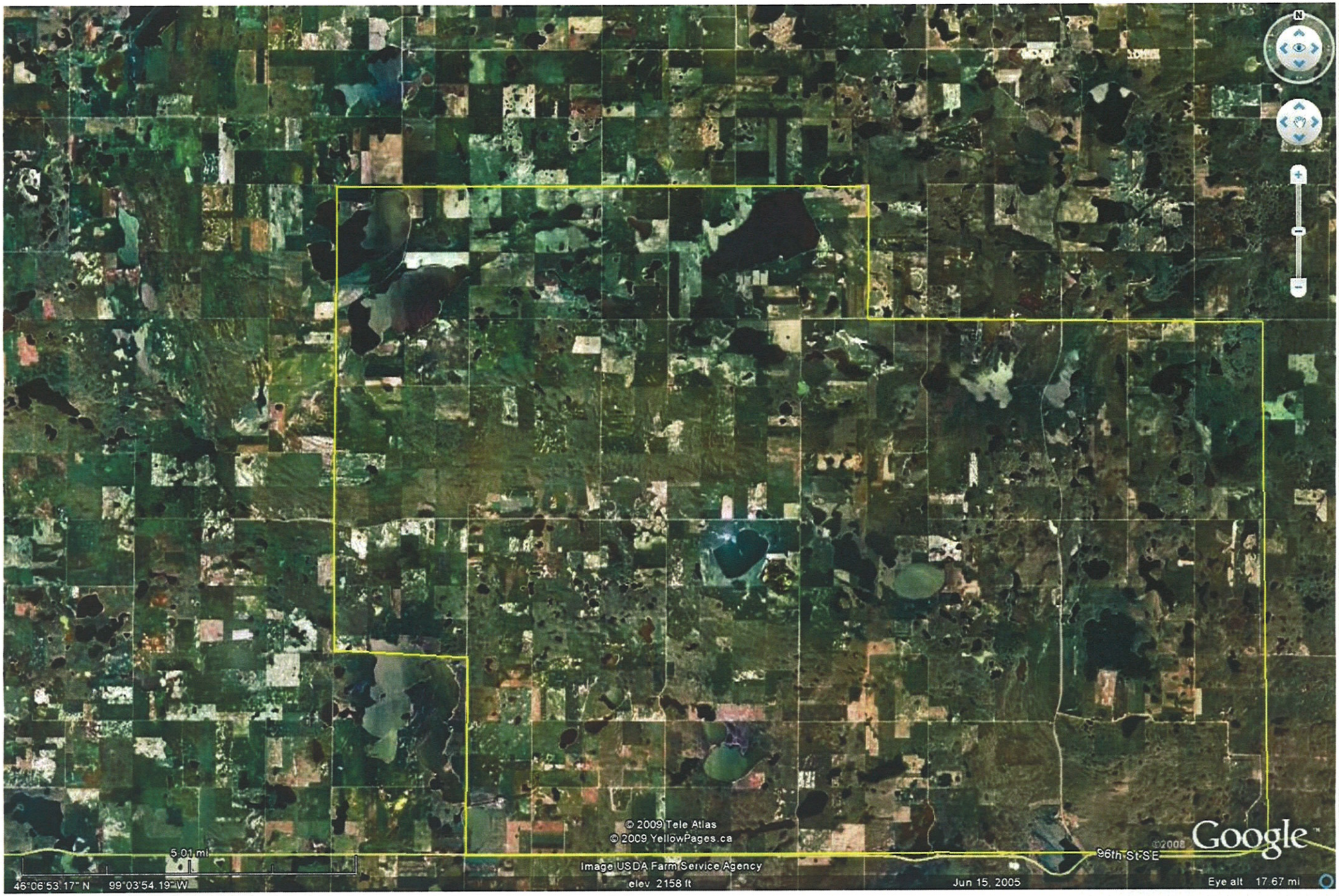
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131-066-06 AD	Dickey	Domestic	Baumgartner Drilling	10/02/1991
131-066-13 DD	Dickey	Stock	Baumgartner Drilling	09/16/1993
131-066-15 CA	Dickey	Domestic/Stock	Kamoni Water Wells	04/02/1981
131-066-16 CB	Dickey	Stock	Baumgartner Drilling	04/13/1988
131-066-21	Dickey	Domestic/Stock	Kamoni Well Boring	10/25/1978
131-066-22 BBB	Dickey	Test Hole	LTP Enterprises	11/30/1994
131-066-22 CCC	Dickey	Stock	Weispfenning Drilling	05/20/1981
131-066-22 CCC	Dickey	Test Hole	Weispfenning Drilling	11/30/1981
131-066-22 CCC	Dickey	Test Hole	Weispfenning Drilling	06/04/1981
131-066-23 CB	Dickey	Stock	Baumgartner Drilling	09/26/1982
131-066-24 CC	Dickey	Stock	Baumgartner Drilling	08/12/1993
131-066-27 BBB	Dickey	Domestic/Stock	Kamoni Water Wells	08/25/1990
131-066-32 BBB	Dickey	Test Hole	LTP Enterprises	11/16/1994
131-066-33 BA	Dickey	Domestic	Bob's Drilling	08/01/2003

Search: GO

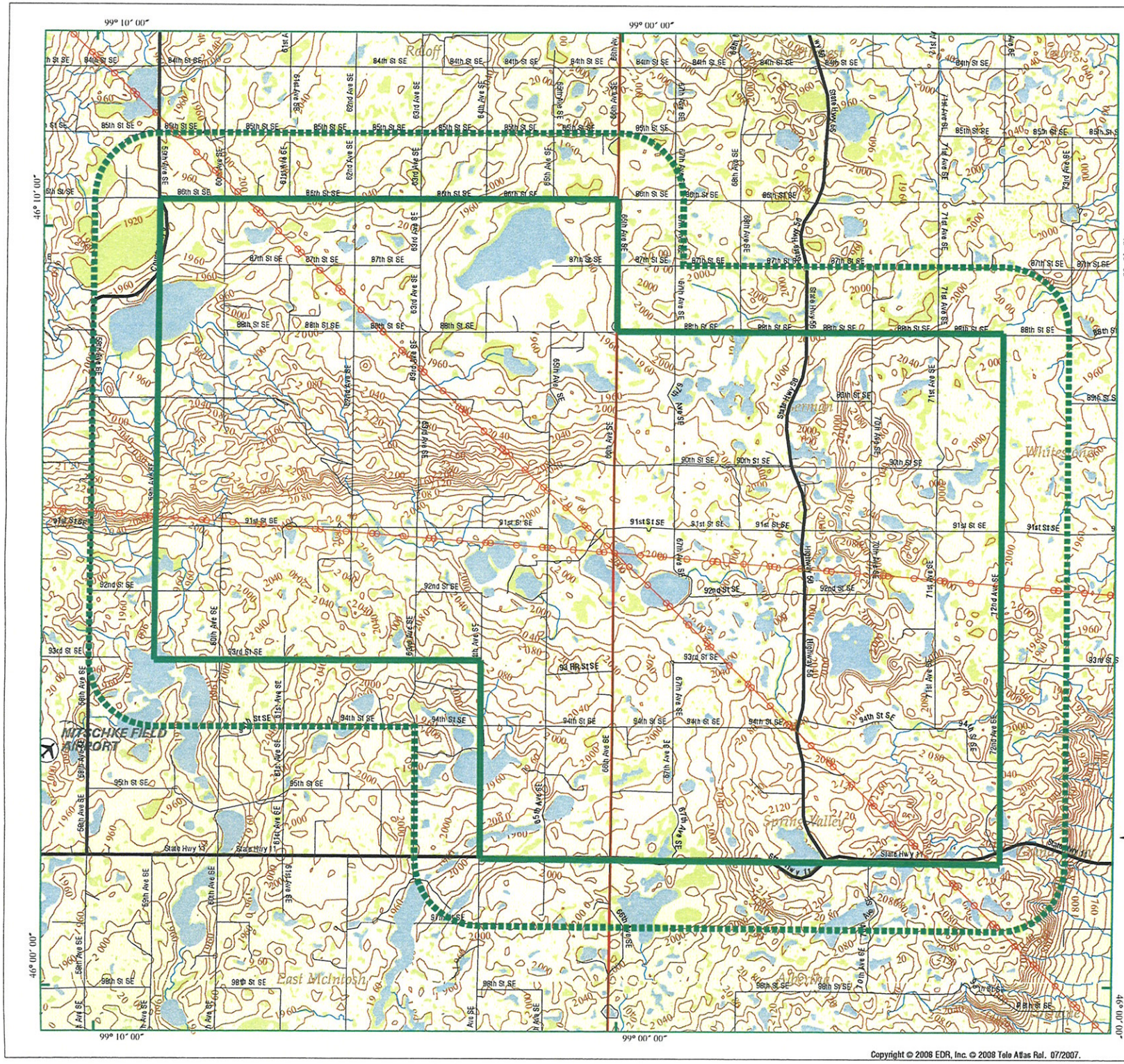
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N
© 2009 Tele Atlas
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5.01 mi
Image USDA Farm Service Agency
elev 2158 ft
96th St SE
©2008 Google
46°06'53.17" N 99°03'54.19" W
Jun 15, 2005
Eye alt 17.67 mi

APPENDIX F



EDR DataMap®

Area Study

Merricourt Wind Farm

- Listed Sites
- Earthquake Epicenters (Richter 5 or greater)
- Search Boundary
- Roads
- Major Roads
- Waterways
- Railroads
- Contour Lines
- Pipelines
- Powerlines
- Fault Lines
- Water
- Superfund Sites
- Federal DOD Sites
- Indian Reservations BIA
- National Wetland Inventory



Kulm, ND

0 1 2

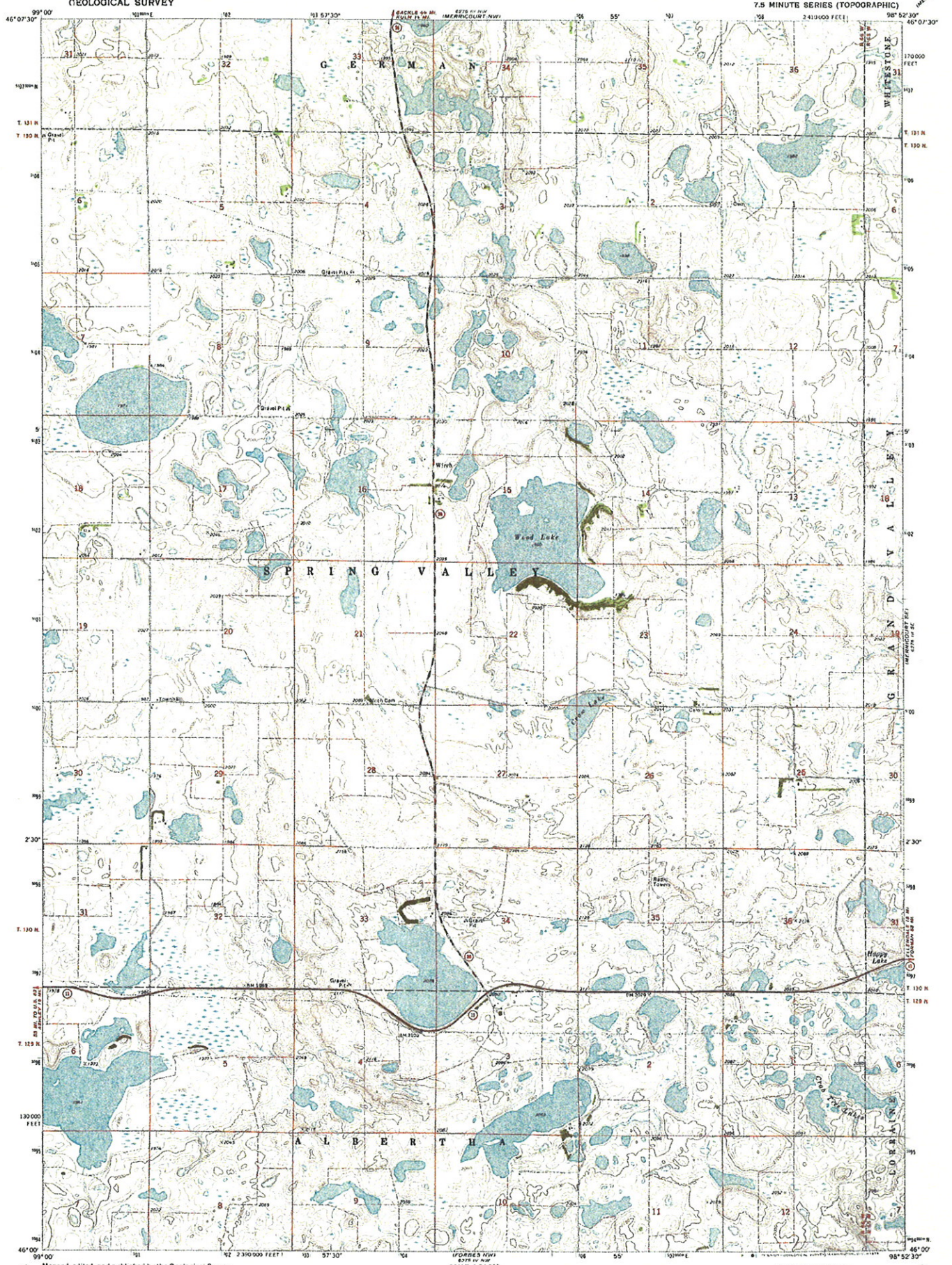
Scale in Miles

EDR Environmental Data Resources Inc

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

MERRICOURT SW QUADRANGLE
NORTH DAKOTA–DICKEY CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1967. Field checked 1971

Polyconic projection. 1927 North American datum
10,000-foot grid based on North Dakota coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 14, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs
This information is unchecked

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

UTM GRID AND 1971 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

ROAD CLASSIFICATION

Primary highway, hard surface
Light-duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U. S. Route
State Route

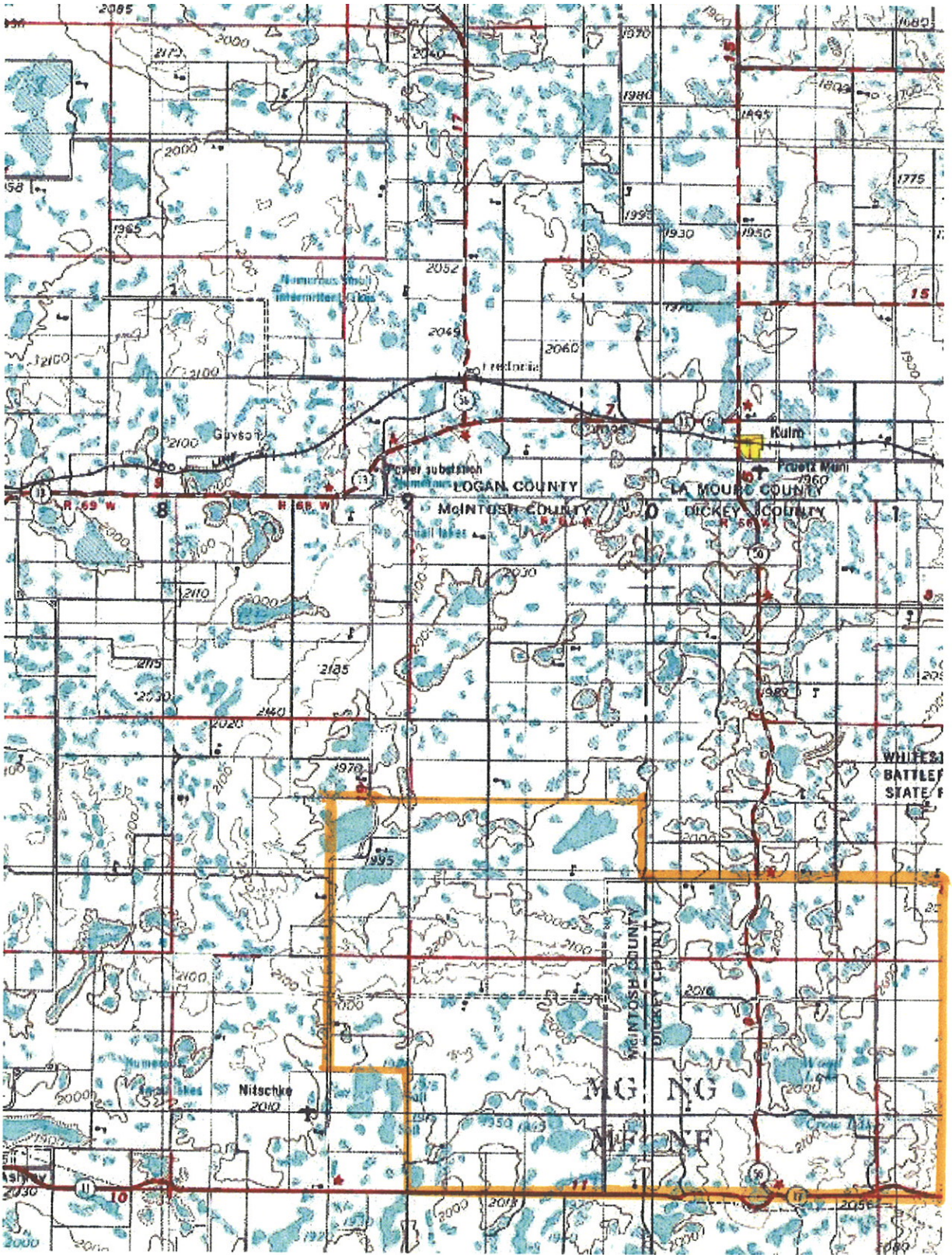
NORTH DAKOTA
QUADRANGLE LOCATION

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D.C. 20242
AND BY THE STATE WATER COMMISSION, BISMARCK, NORTH DAKOTA 58501
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

MERRICOURT SW, N. DAK.
N4600—W9852.5/7.5

1971

AMS 6276 II SW—SERIES V871


N
LOGAN COUNTY
McINTOSH COUNTY
LA MOURE COUNTY
DICKEY COUNTY
Kulm
Gackle
Nitschke
MG
NG
MF
NF

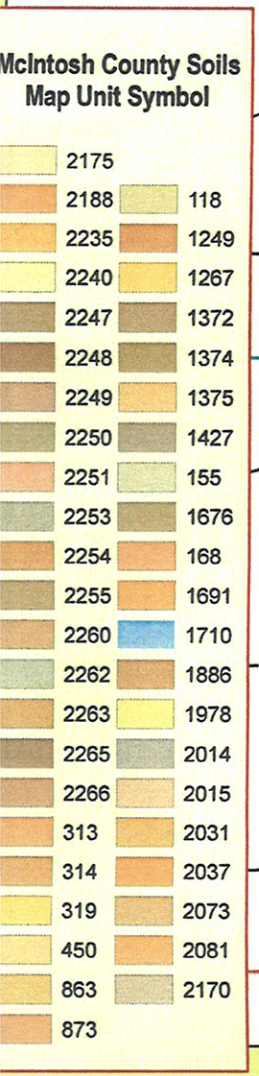
APPENDIX G

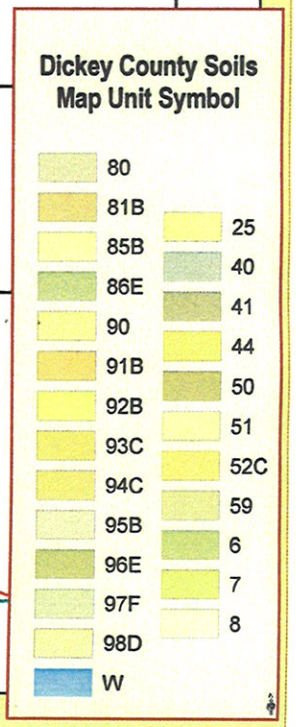
Merricourt Wind Power Project

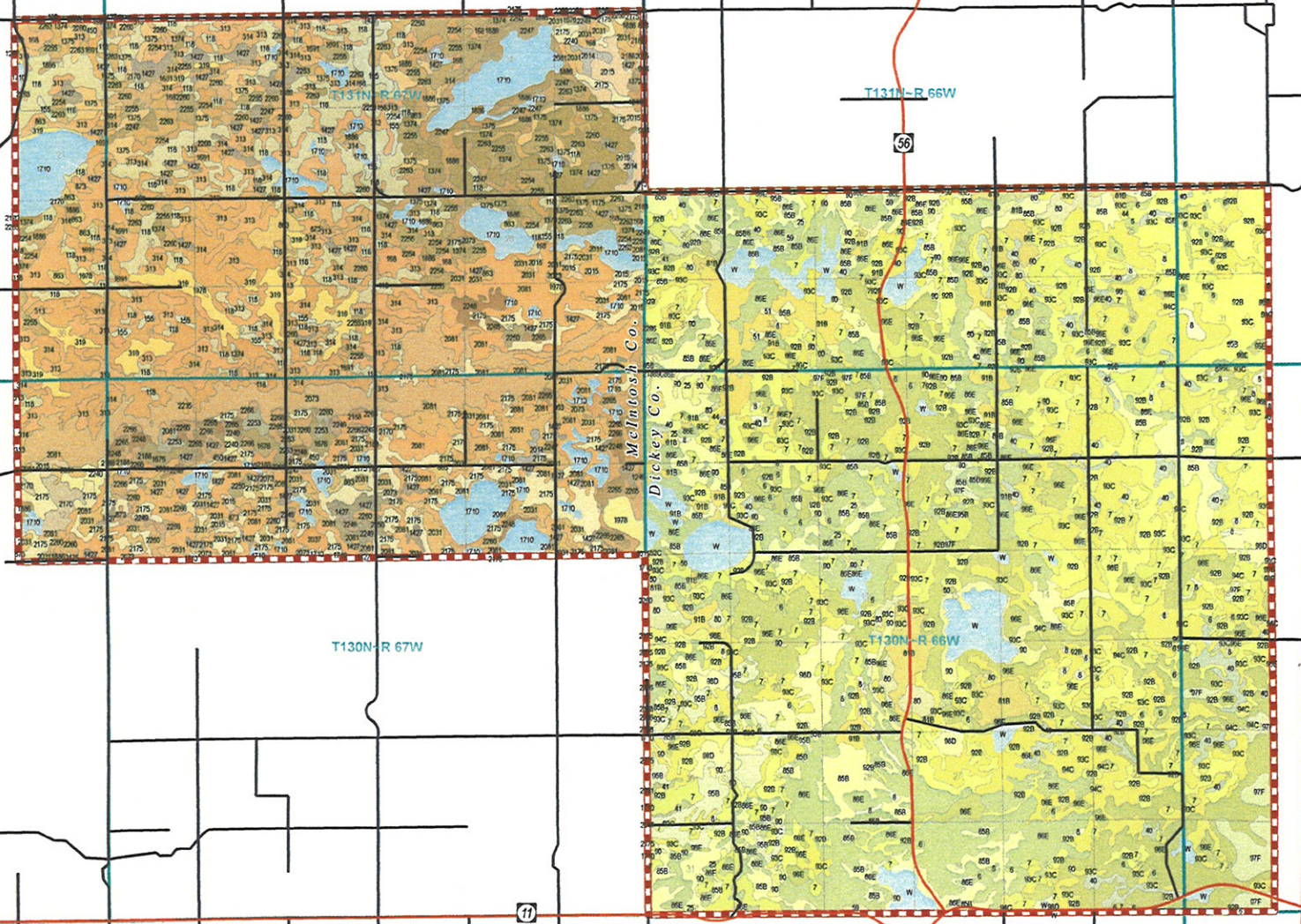
Soil Types









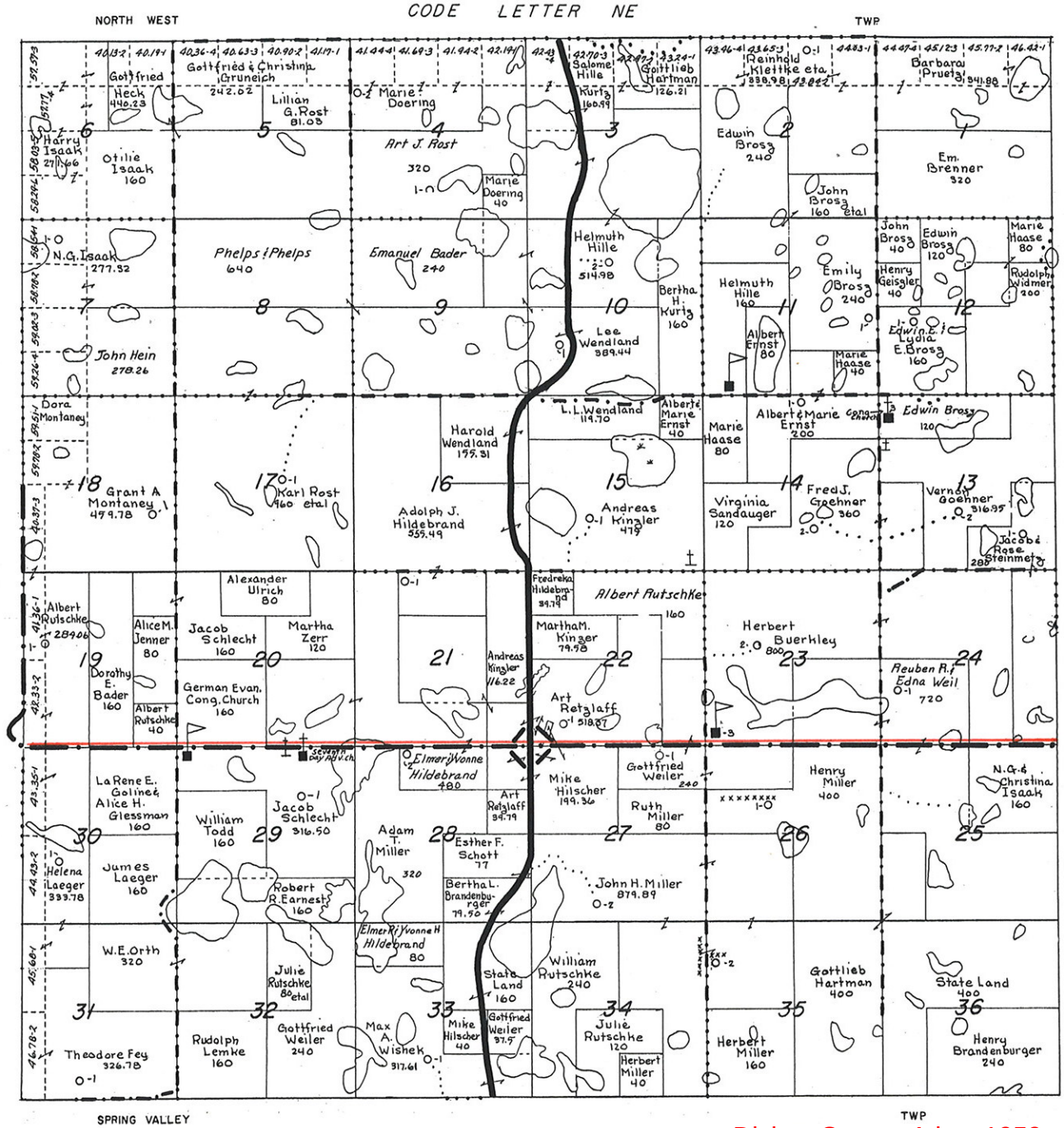


Kadrmas Lee & Jackson
Engineers Surveyors Planners

GERMAN

TOWNSHIP 131 N. RANGE 66 W.

CODE LETTER NE

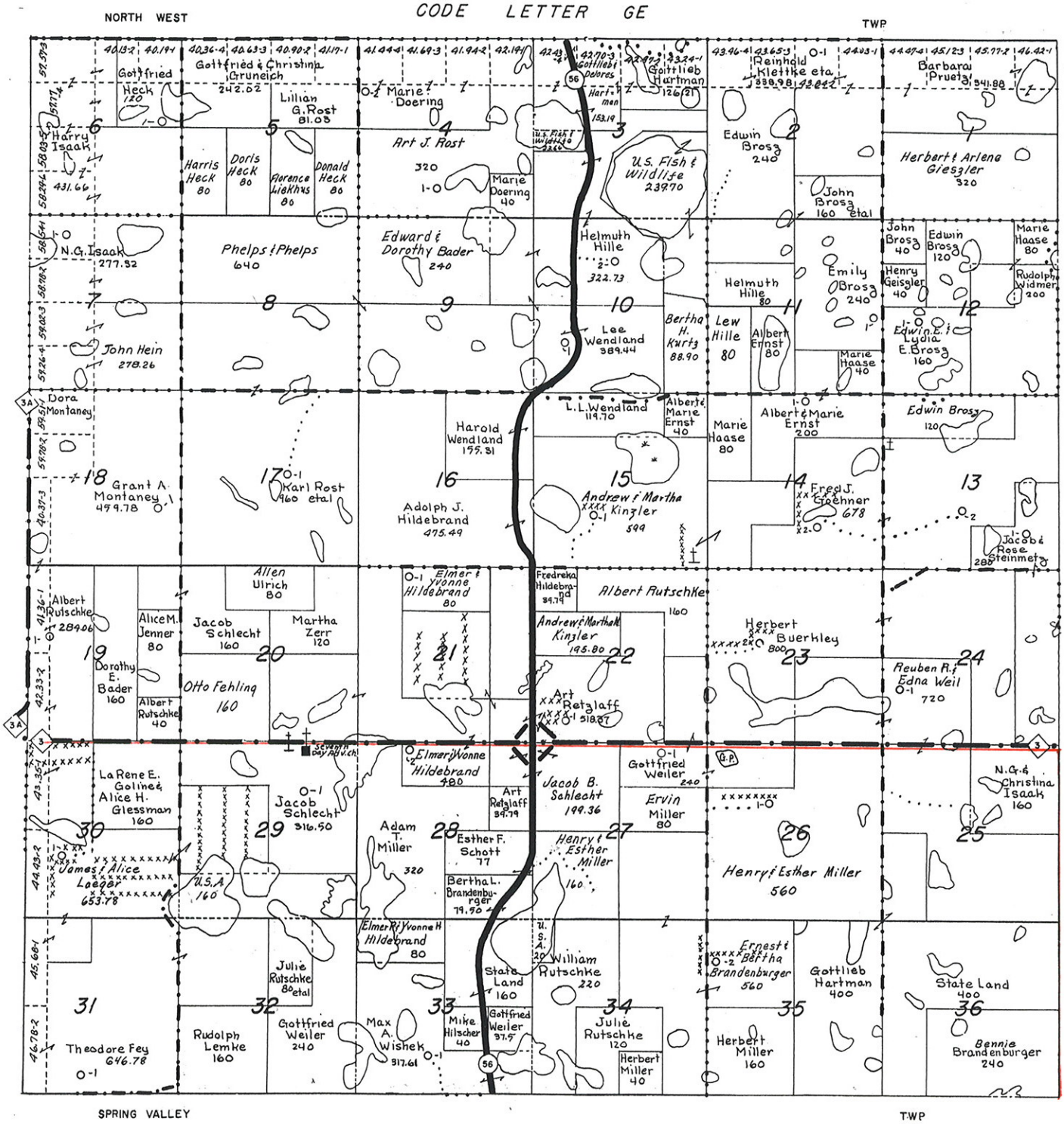


Dickey County Atlas, 1959

GERMAN

TOWNSHIP 131 N. RANGE 66 W.

CODE LETTER GE



Dickey County Atlas, 1964

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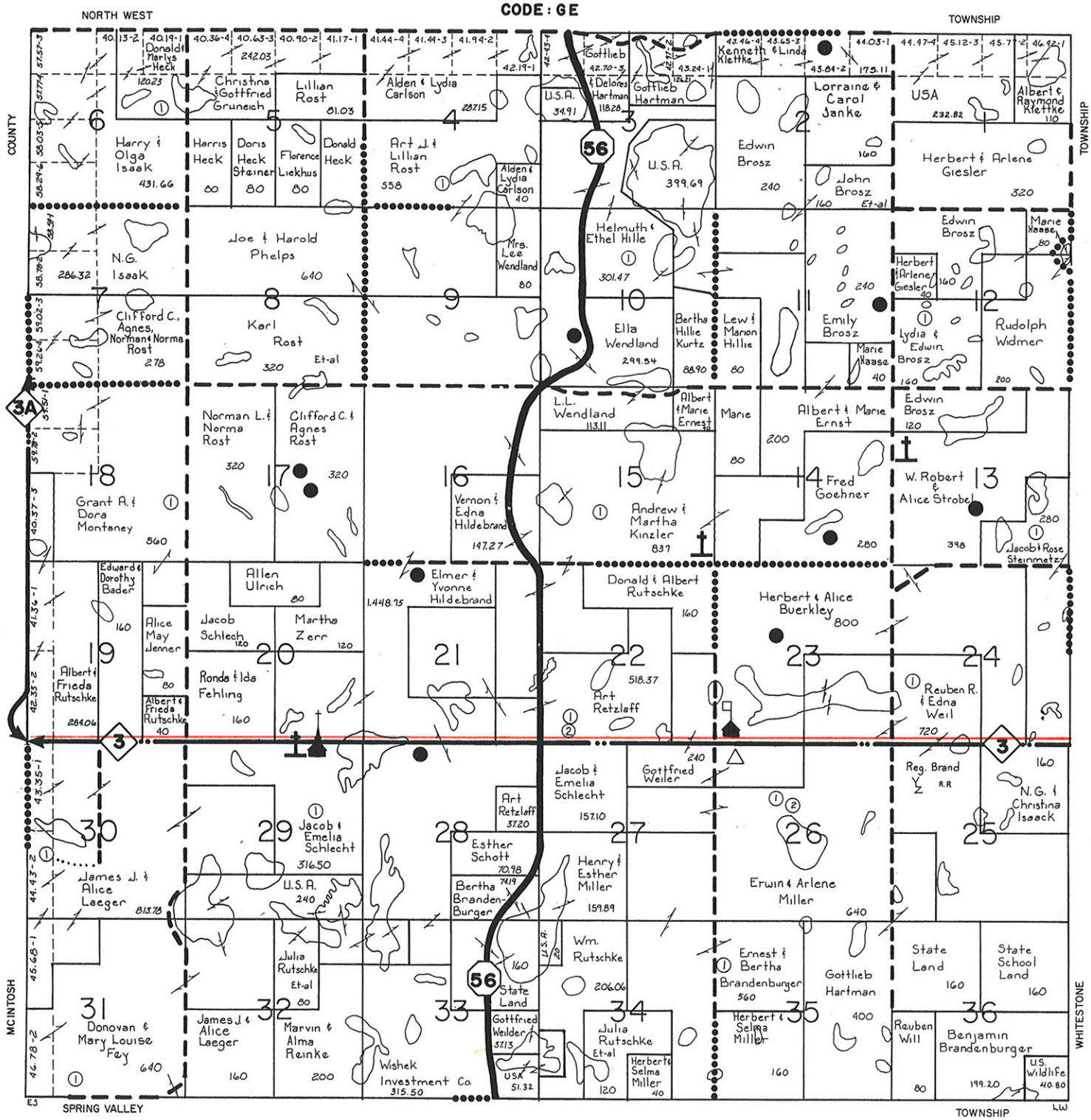
MAP OF GERMAN

MIDLAND PUBLISHING & PRINTING

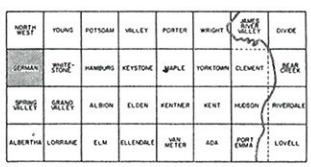
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RANGE : 66 W.

CODE : GE



Dickey County Atlas, 1977



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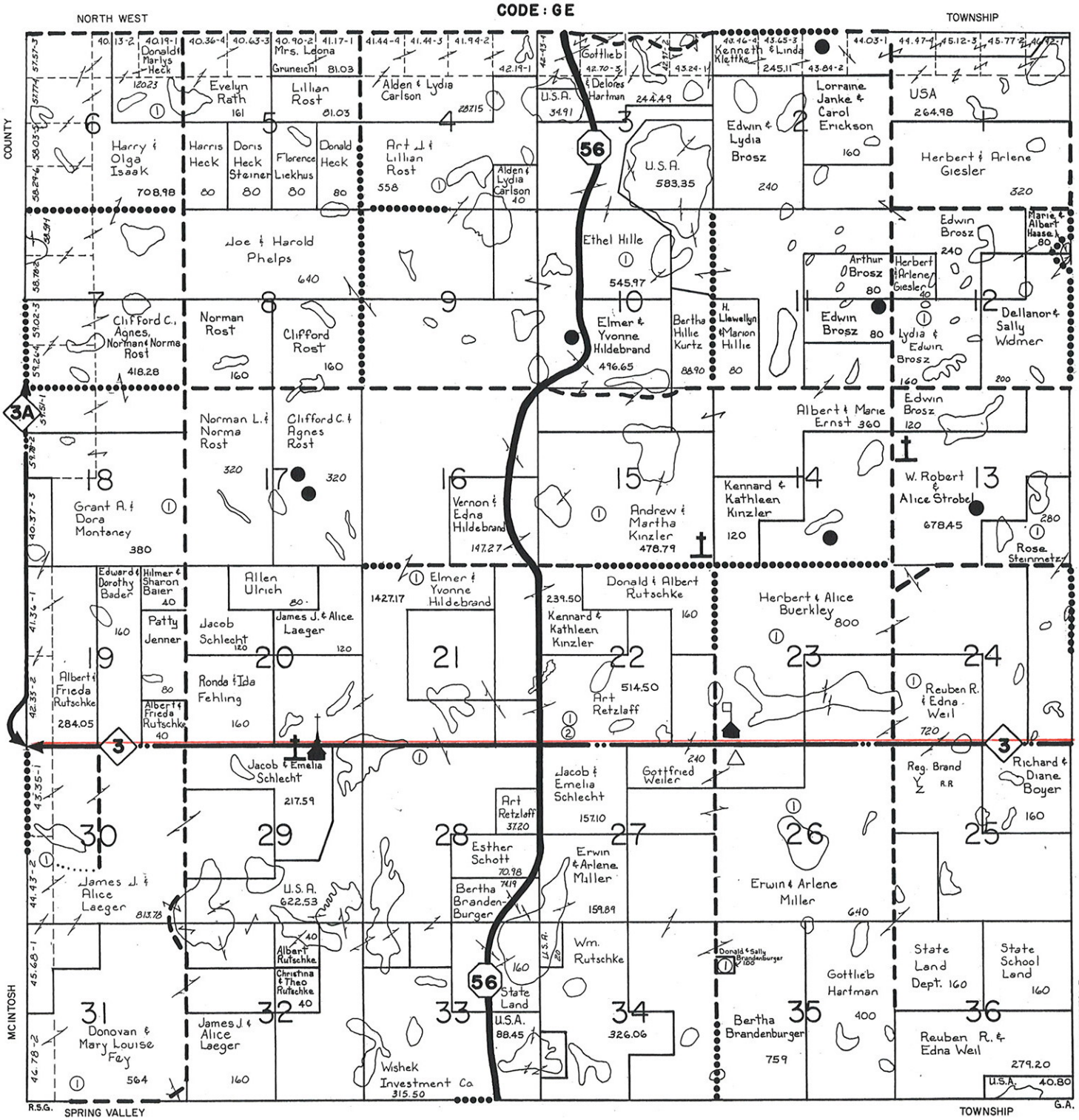
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TOWNSHIP : 131 N.

RANGE : 66 W.

CODE : GE



Dickey County Atlas, 1982

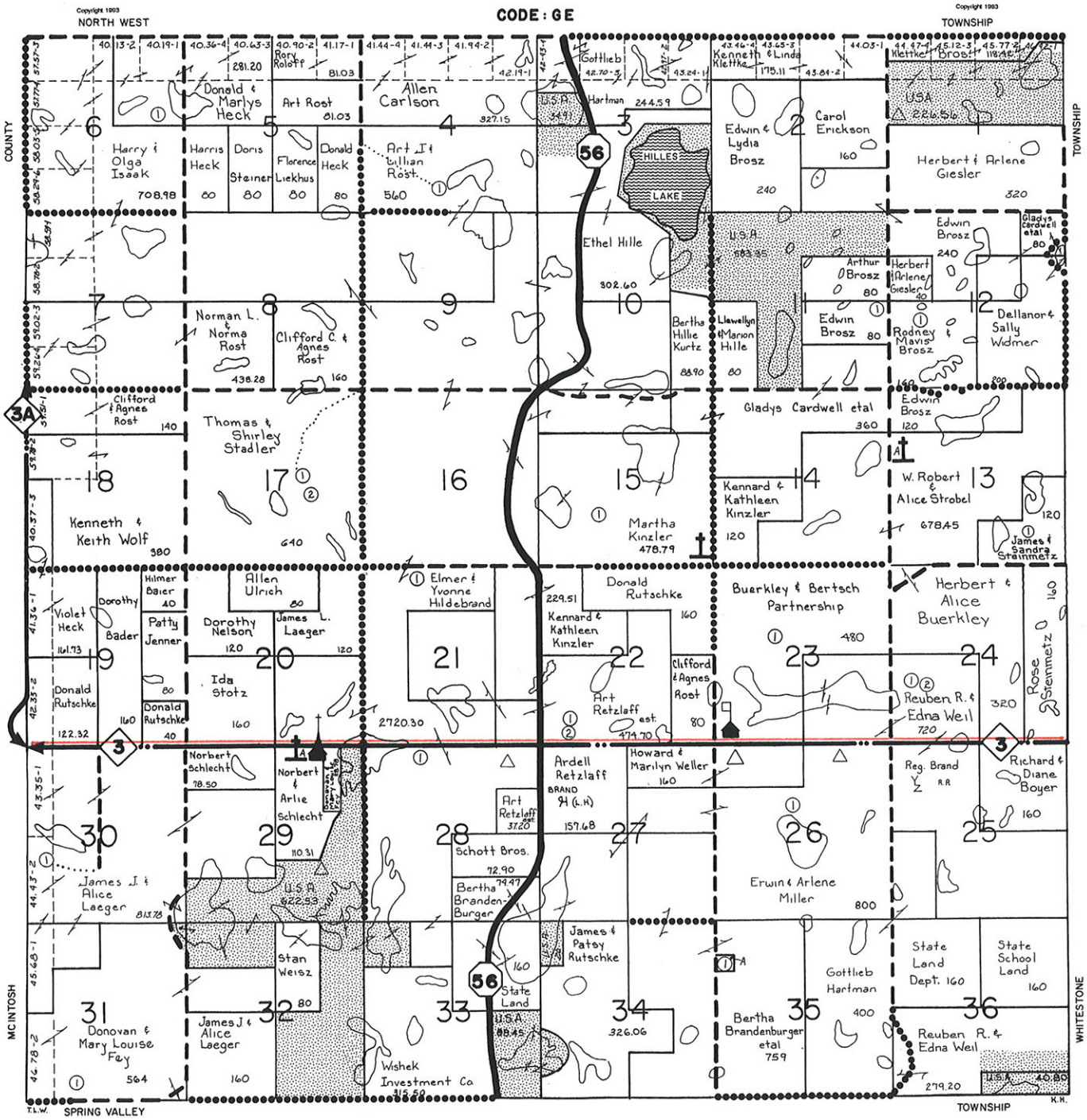
MIDLAND ATLAS CO. INC. MILBANK, SOUTH DAKOTA

MAP OF GERMAN

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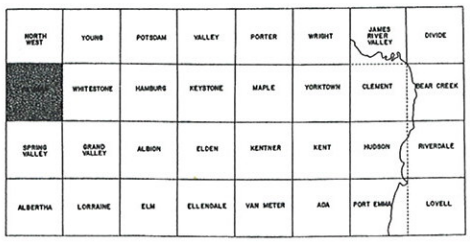
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CODE : GE



SEE SMALL TRACT OWNERS FOLLOWING TOWNSHIP MAPS

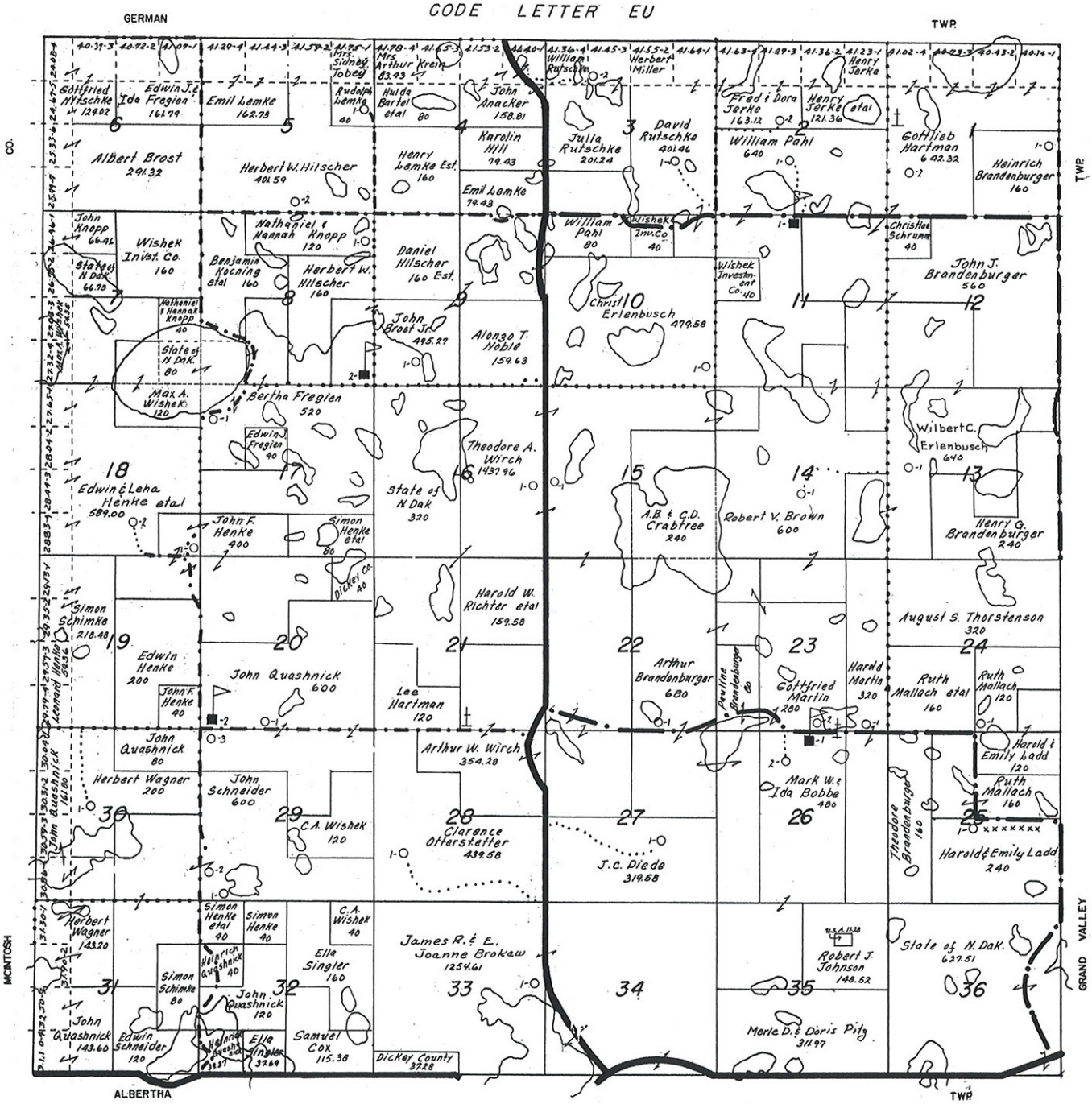
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SPRING VALLEY

TOWNSHIP 130 N. RANGE 66 W.

CODE LETTER EU

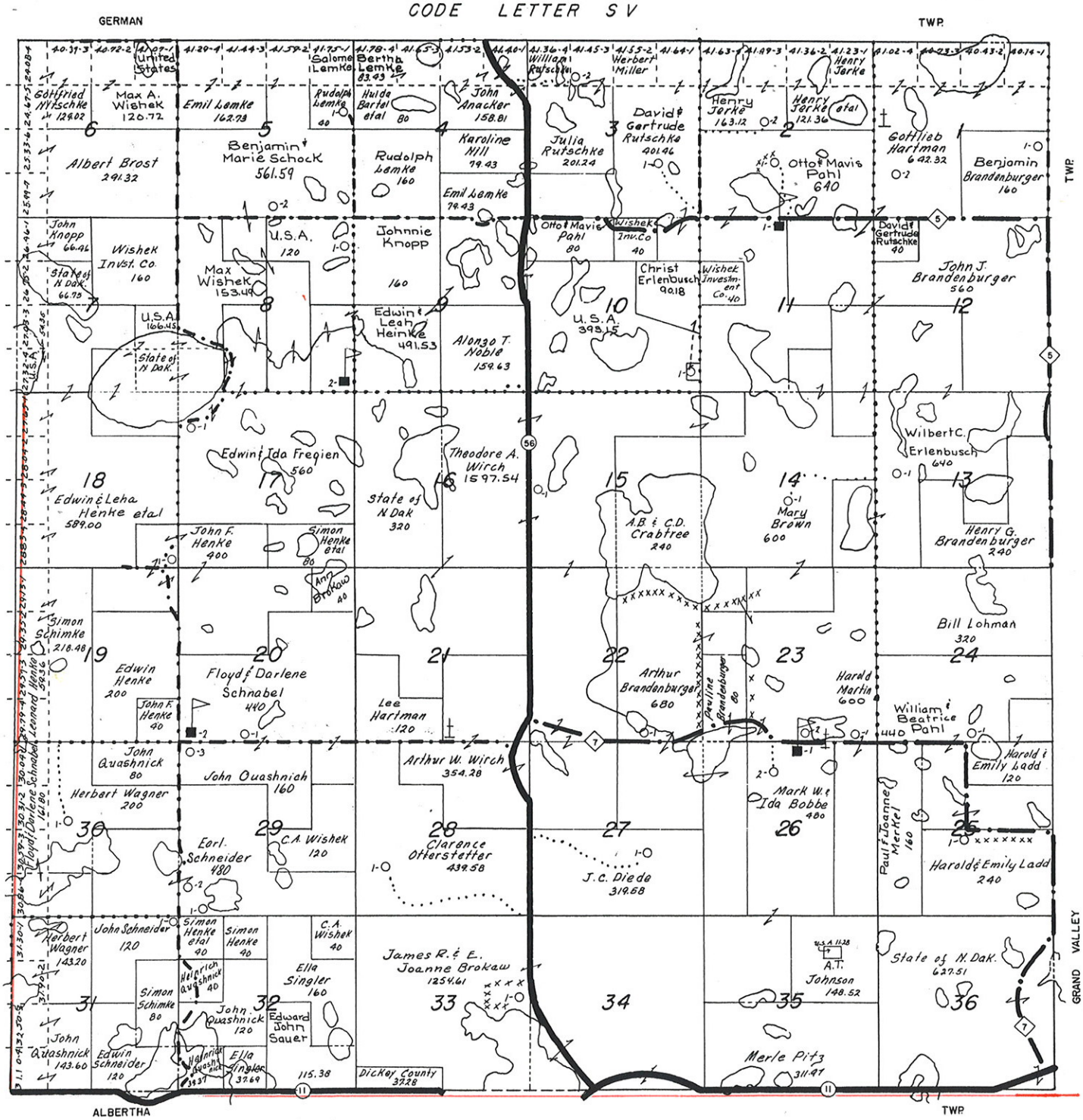


Dickey County Atlas, 1958

SPRING VALLEY

TOWNSHIP 130 N. RANGE 66 W.

CODE LETTER S V



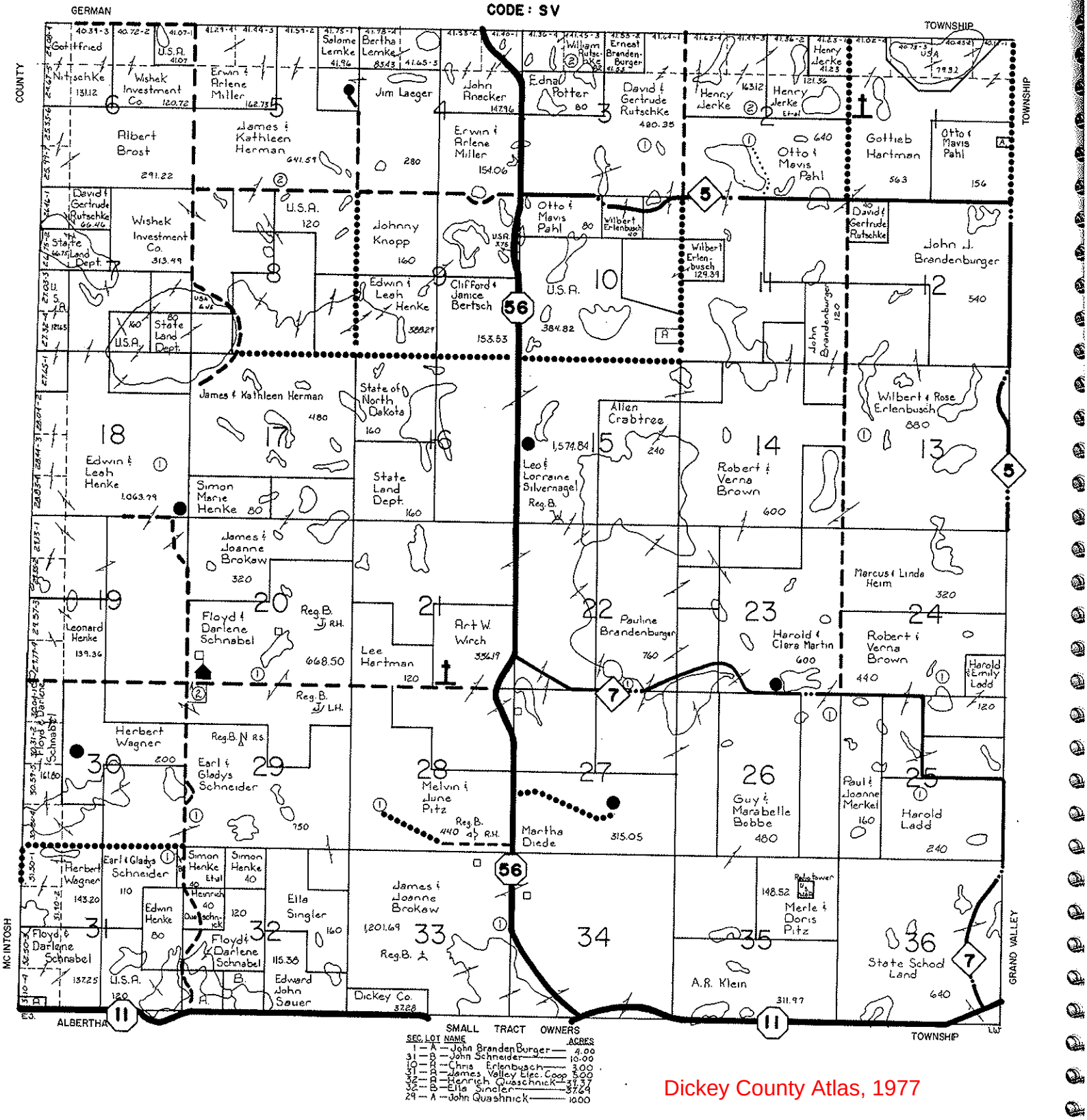
Dickey County Atlas, 1964

MIDLAND ATLAS CO. INC. MILBANK, SOUTH DAKOTA

MAP OF SPRING VALLEY

MIDLAND PUBLISHING & PRINTING

TOWNSHIP: 130 N. RANGE: 66 W. CODE: SV



Dickey County Atlas, 1977

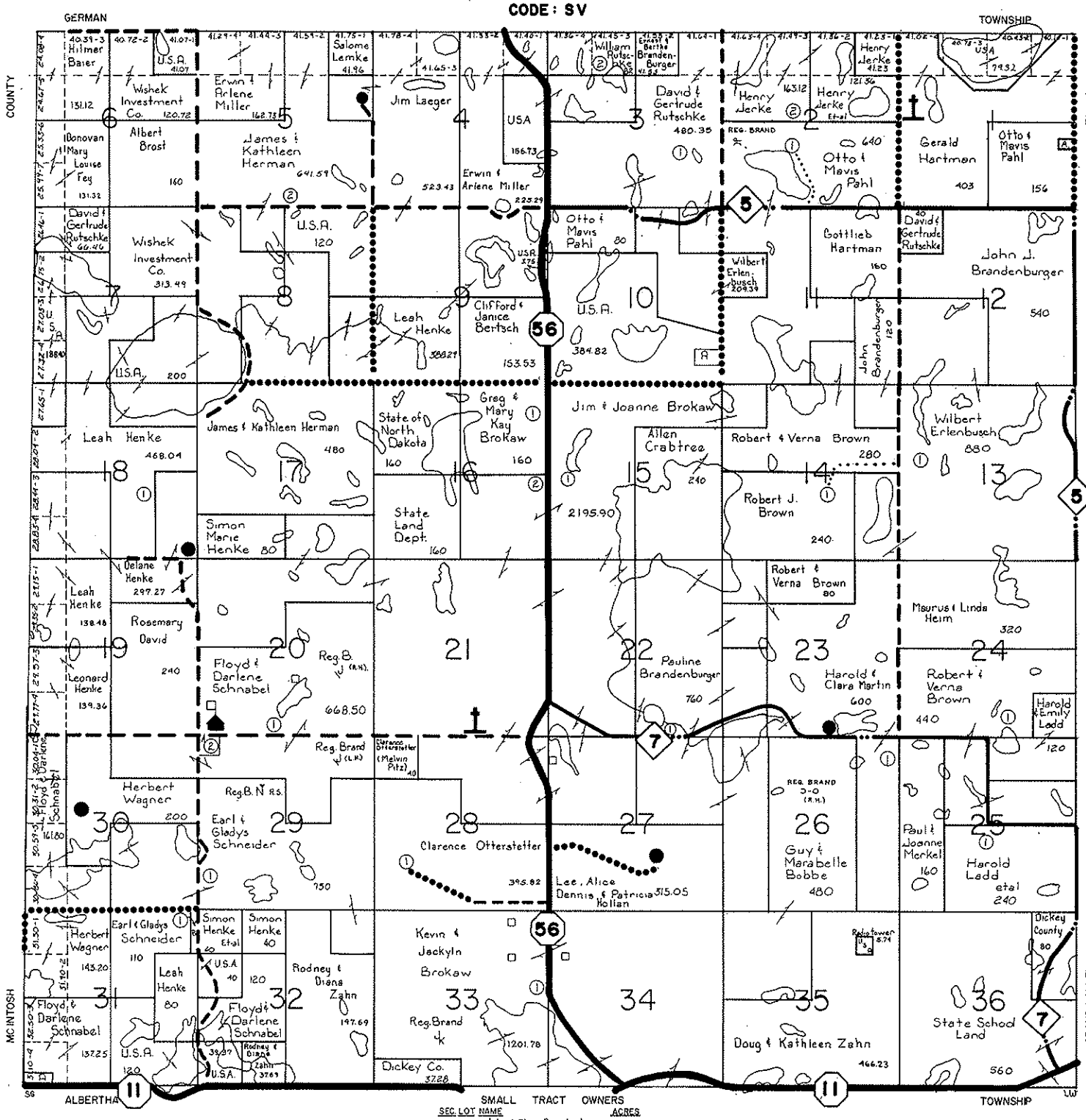
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TOWNSHIP: 130 N. RANGE: 66 W.

CODE: SV



SMALL TRACT OWNERS

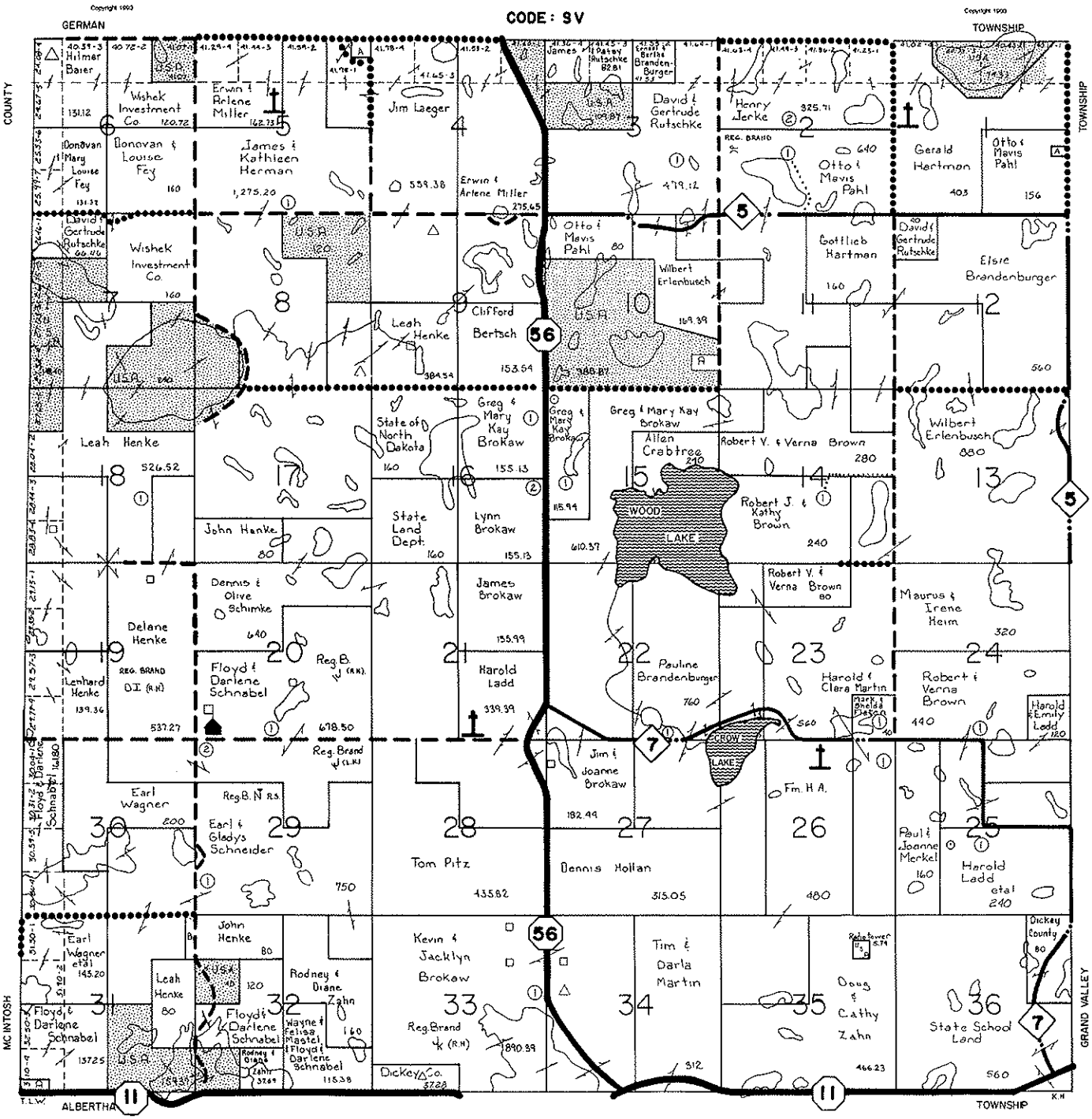
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10	A	Wilbert Erlenbusch	3.00
29	A	John Quashnick	10.00
31	A	Central Power Elec. Co-op Inc.	5.00
31	B	Mary Schneider	10.00

Dickey County Atlas, 1982

MAP OF SPRING VALLEY

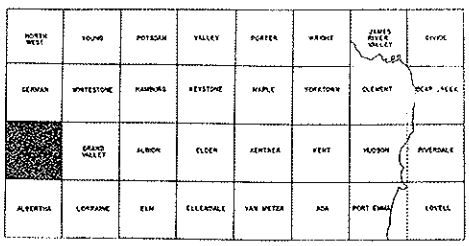
TOWNSHIP: 130 N. RANGE: 66 W.

CODE: SV



SEE SMALL TRACT OWNERS FOLLOWING TOWNSHIP MAPS

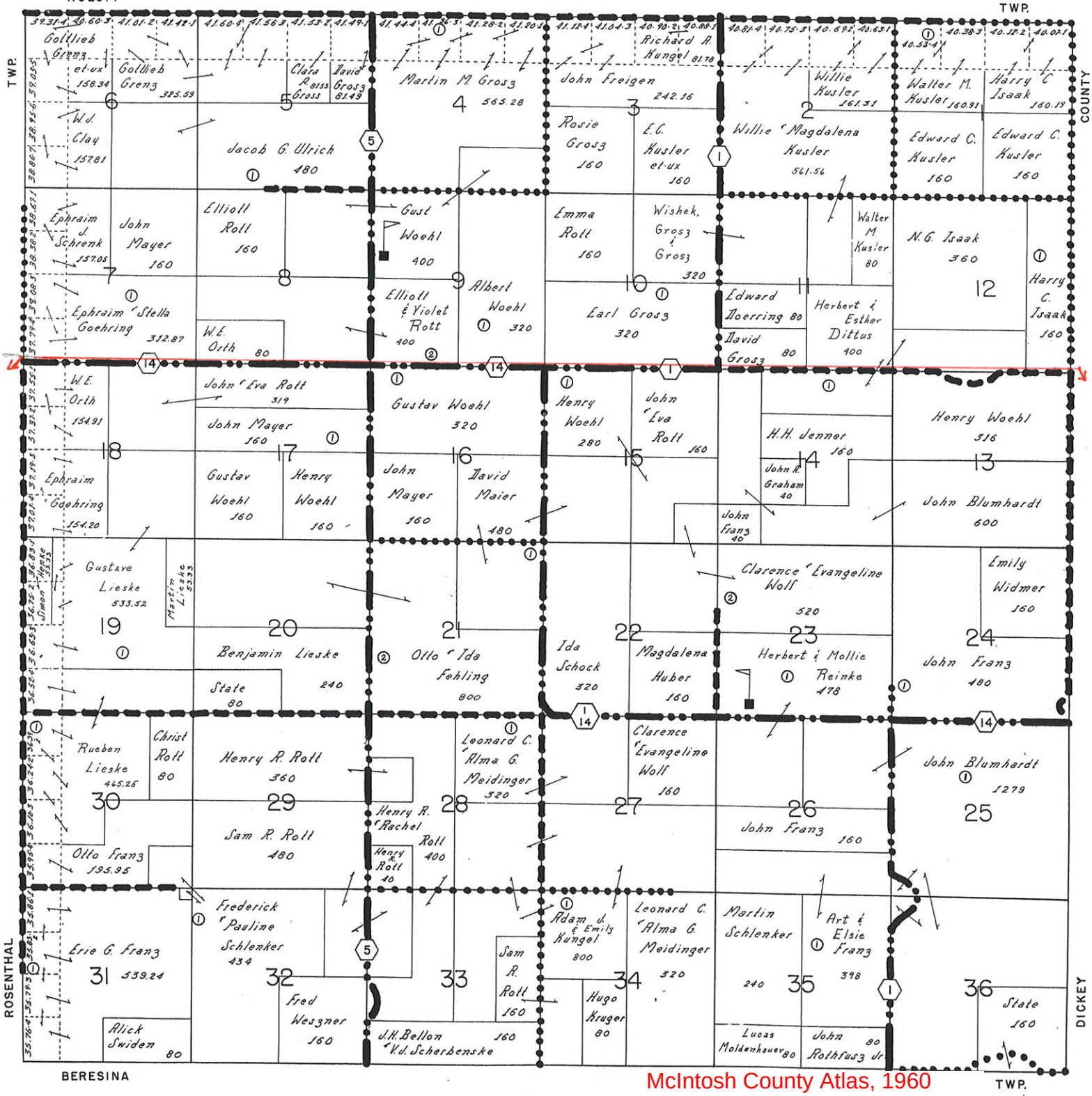
Dickey County Atlas, 1993



ANTELOPE

TOWNSHIP 131 N RANGE 67 W

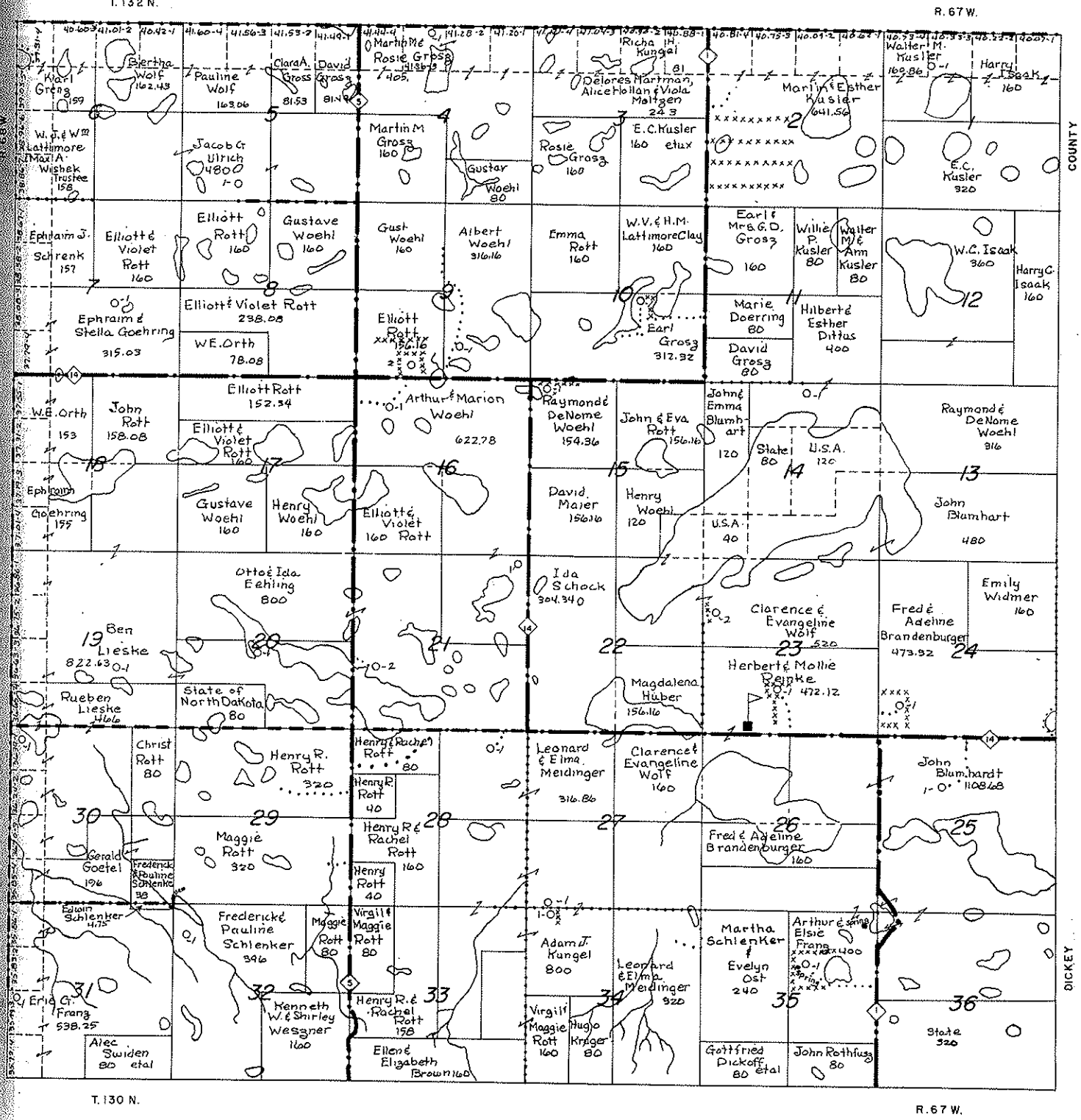
CODE A



McIntosh County Atlas, 1960

TOWNSHIP 131 N. RANGE 67 W.

CODE LETTER R



McIntosh County Atlas, 1964

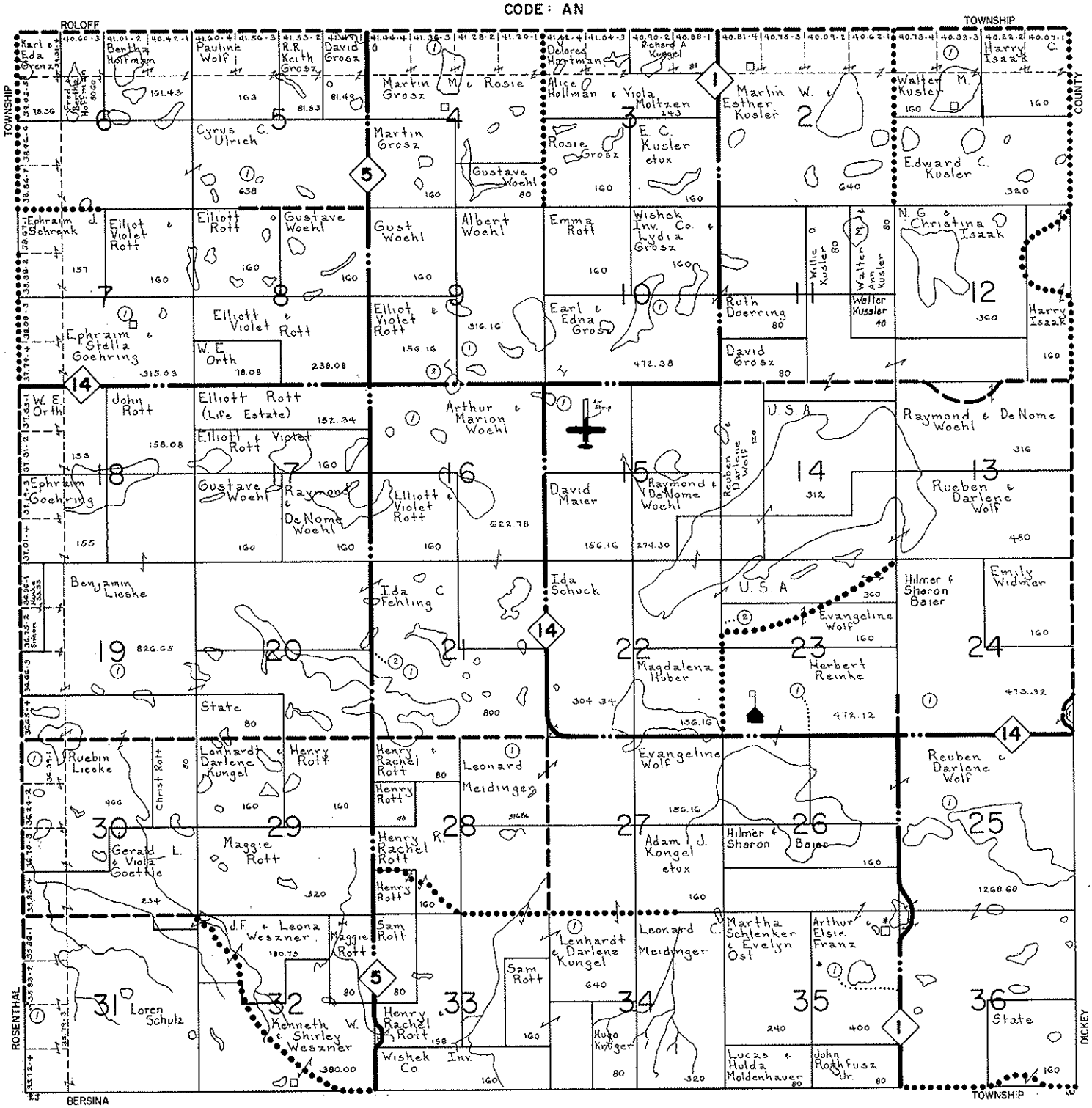
MIDLAND ATLAS CO. INC. MILBANK, SOUTH DAKOTA

MAP OF ANTELOPE

MIDLAND PUBLISHING & PRINTING

TOWNSHIP: 131 N. RANGE: 67 W.

CODE: AN



McIntosh County Atlas, 1976

FRIEDENSTHAL	SALEM	YOUNGSTOWN	GREEN LAKE	LOWENTHAL	HOFFMINGSTHAL	ROLOFF
FREDS	ROSENFIELD	MOSCOW	DANZIG	LYDIA	ROSENTHAL	ANTELOPE
STRASSBURG	BLUMENTHAL	ALEXANDER VALLEY	MOSCOW	EDELWEISSDALE	IOWA	BERSHIN
FAIRMOUNT-ICELAND	BERLIN	JOHNSTOWN	LOWELL	MYRTLE	JEWELL	COLCHESTER

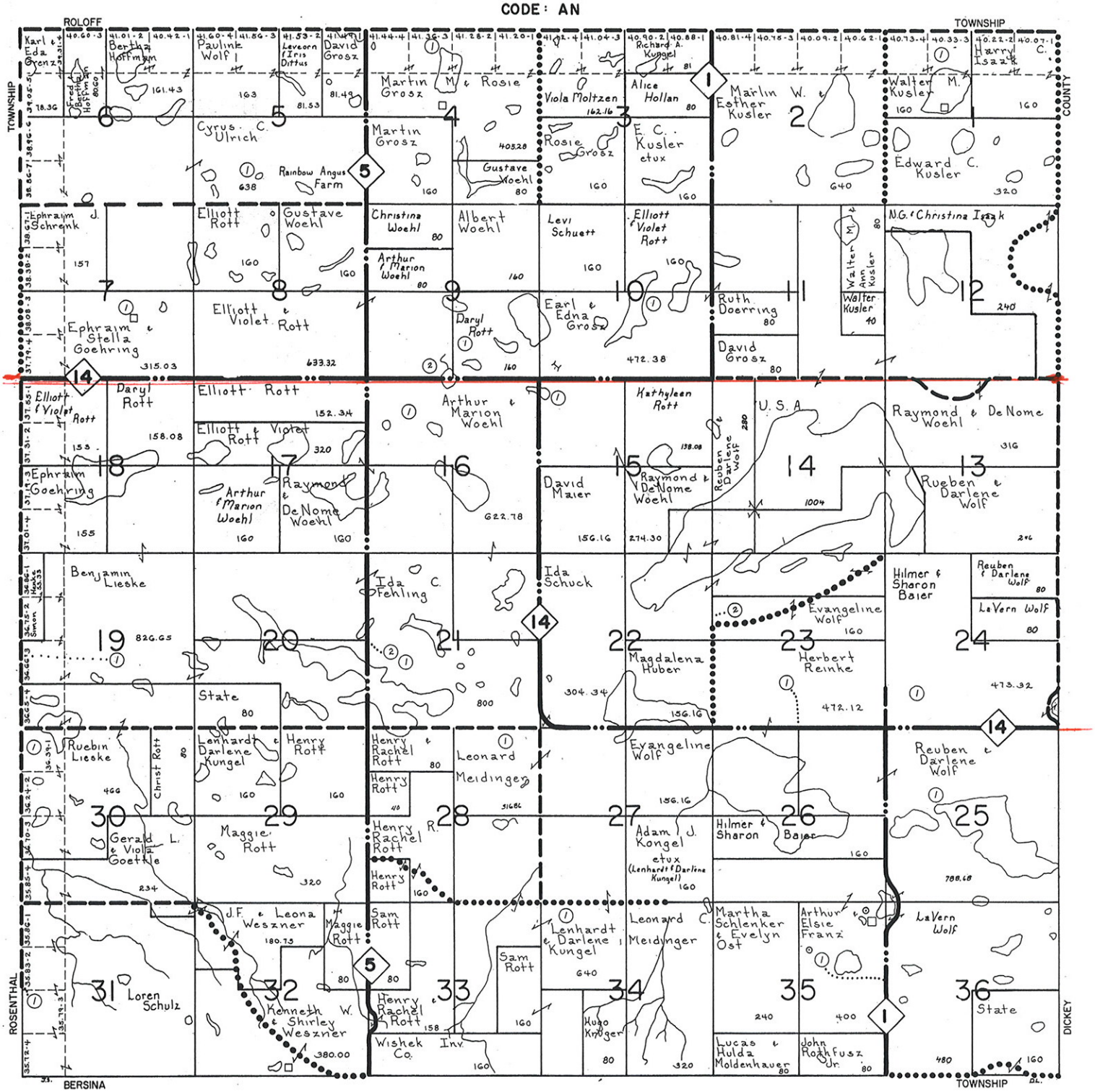
MIDLAND ATLAS CO. INC. MILBANK, SOUTH DAKOTA

MAP OF ANTELOPE

MIDLAND PUBLISHING & PRINTING

TOWNSHIP: 131 N. RANGE: 67 W.

CODE: AN

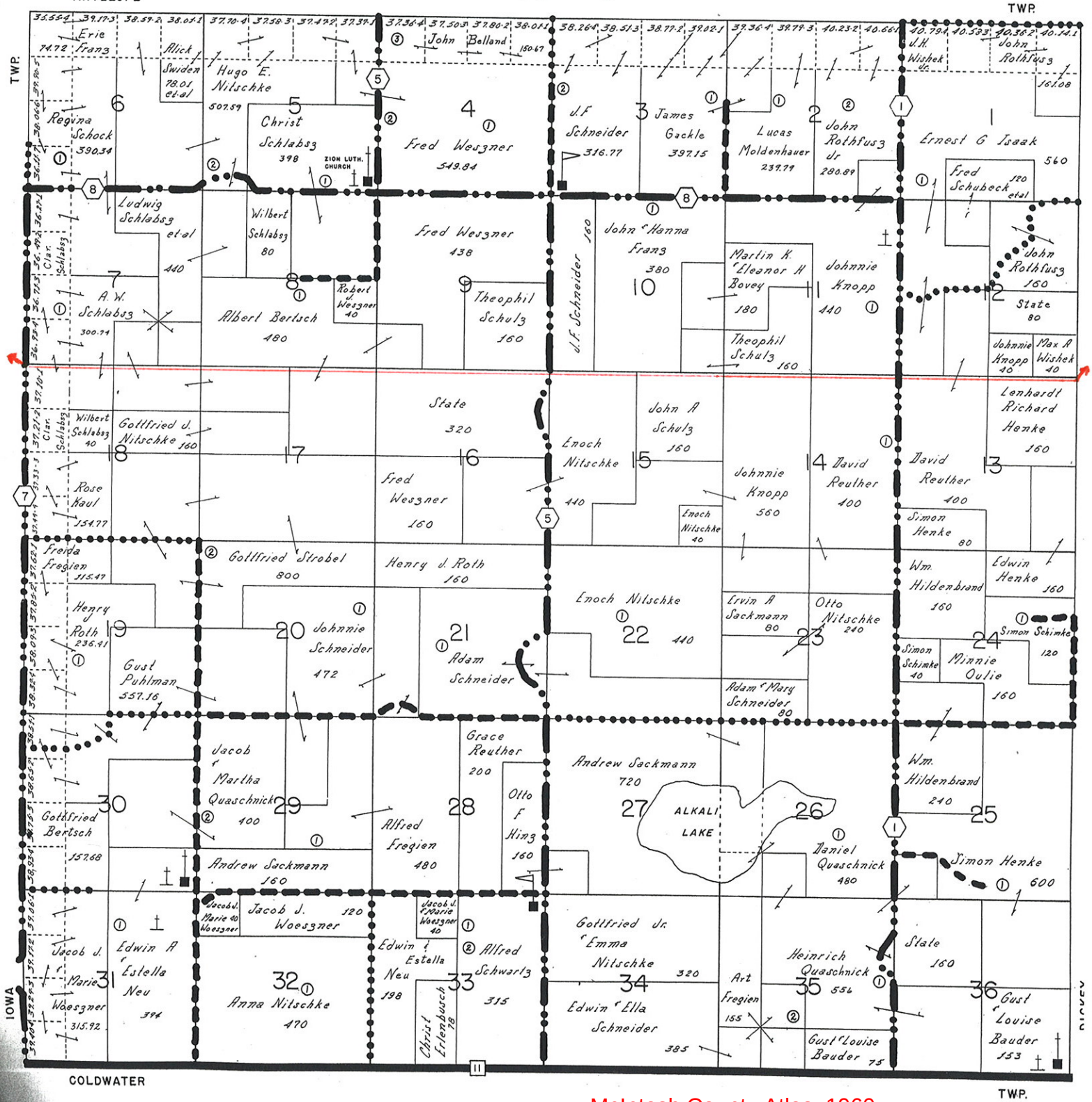


McIntosh County Atlas, 1981

BERESINA

TOWNSHIP 130 N — RANGE 67 W

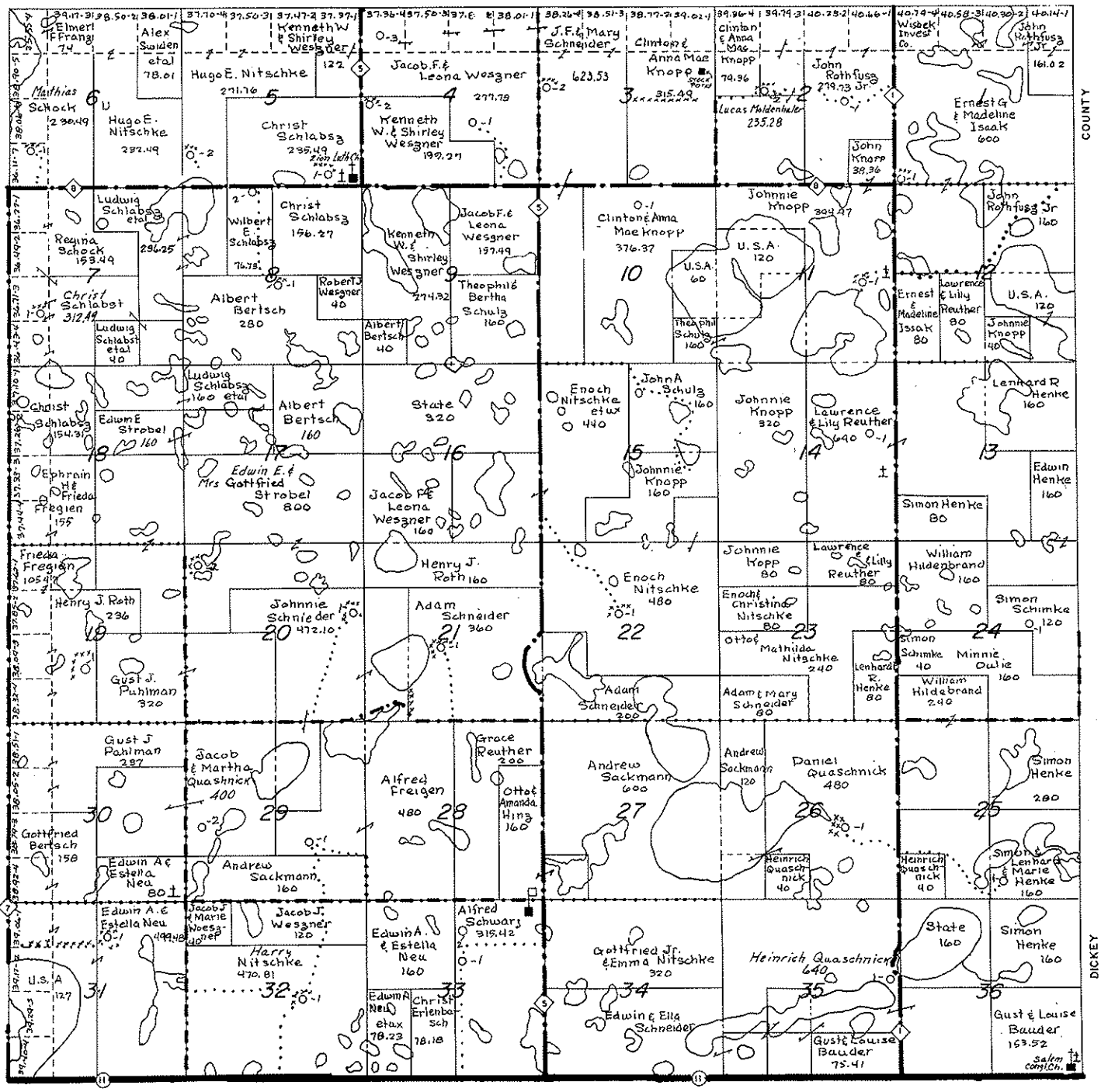
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McIntosh County Atlas, 1960

TOWNSHIP 130 N. RANGE 67 W.

CODELETTER H



McIntosh County Atlas, 1964

MIDLAND ATLAS CO. INC. MILBANK, SOUTH DAKOTA

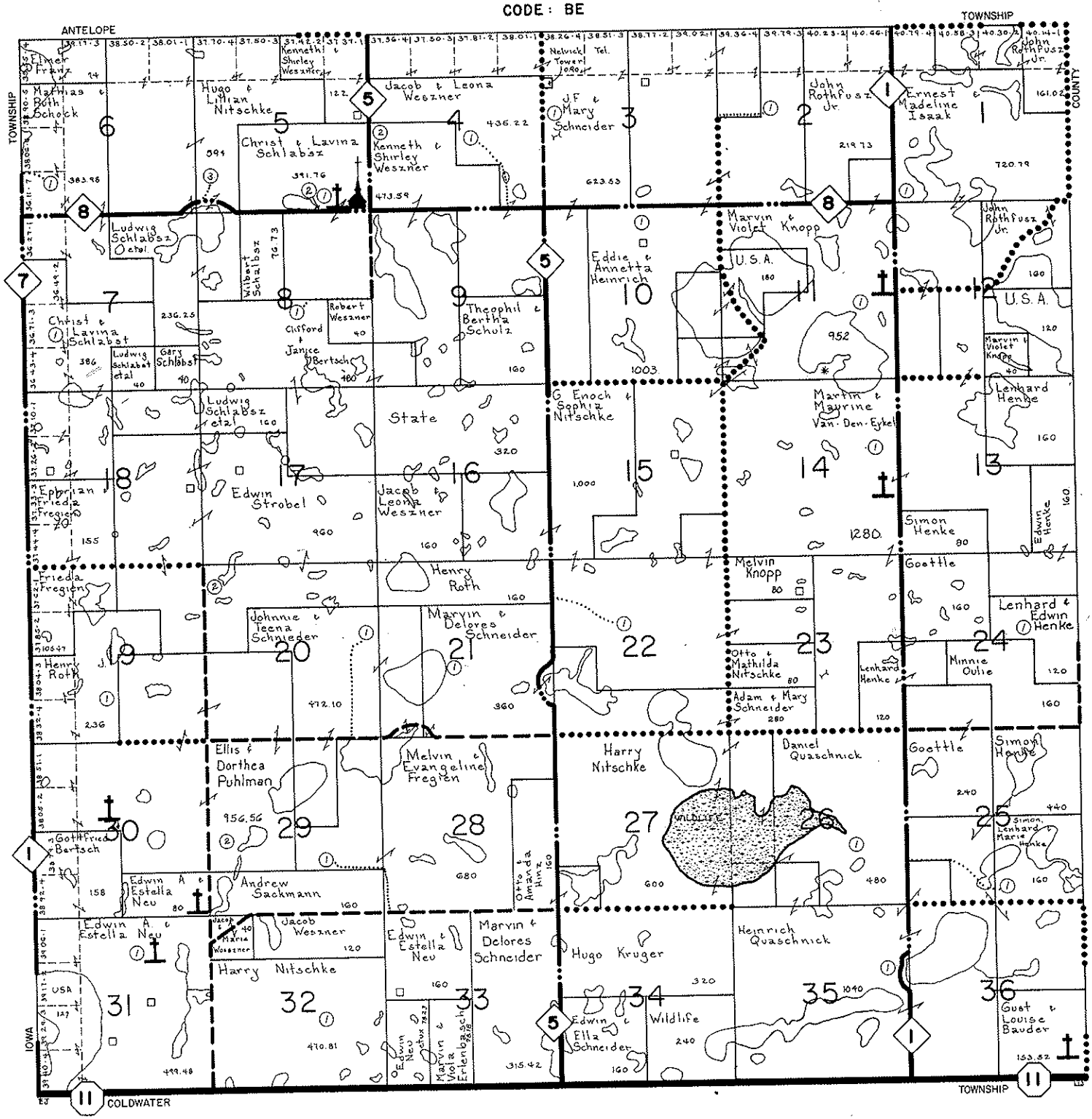
MAP OF BERESINA

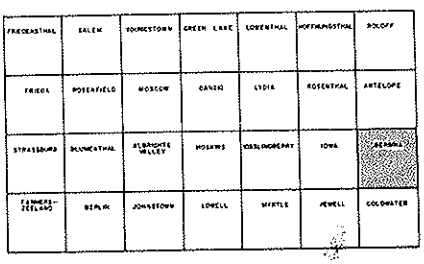
MIDLAND PUBLISHING & PRINTING

TOWNSHIP : 130 N.

RANGE : 67 W.

CODE : BE





McIntosh County Atlas, 1976

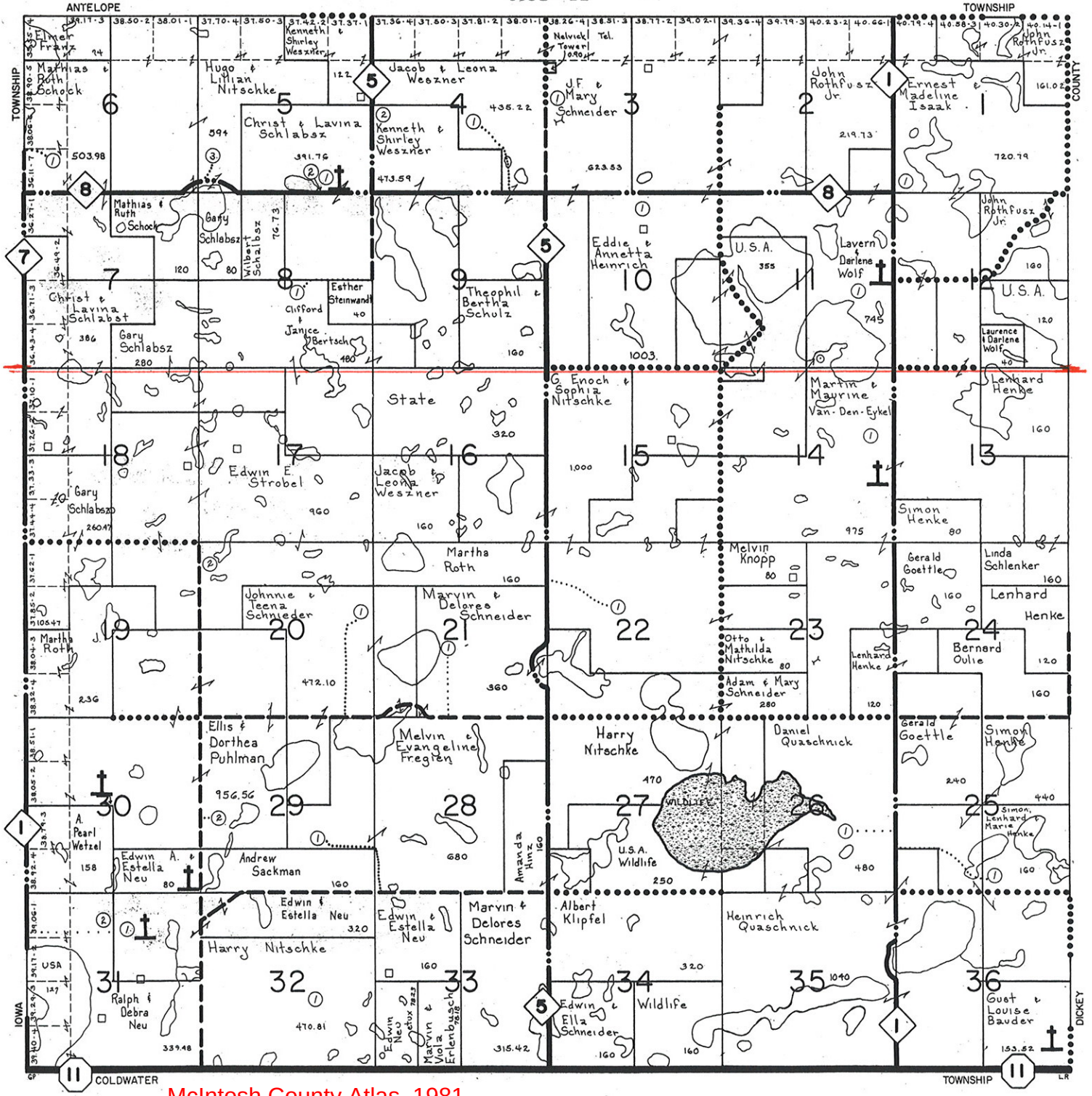
MIDLAND ATLAS CO. INC. MILBANK, SOUTH DAKOTA

MAP OF BERESINA

MIDLAND PUBLISHING & PRINTING

TOWNSHIP : 130 N. RANGE : 67 W.

CODE : BE

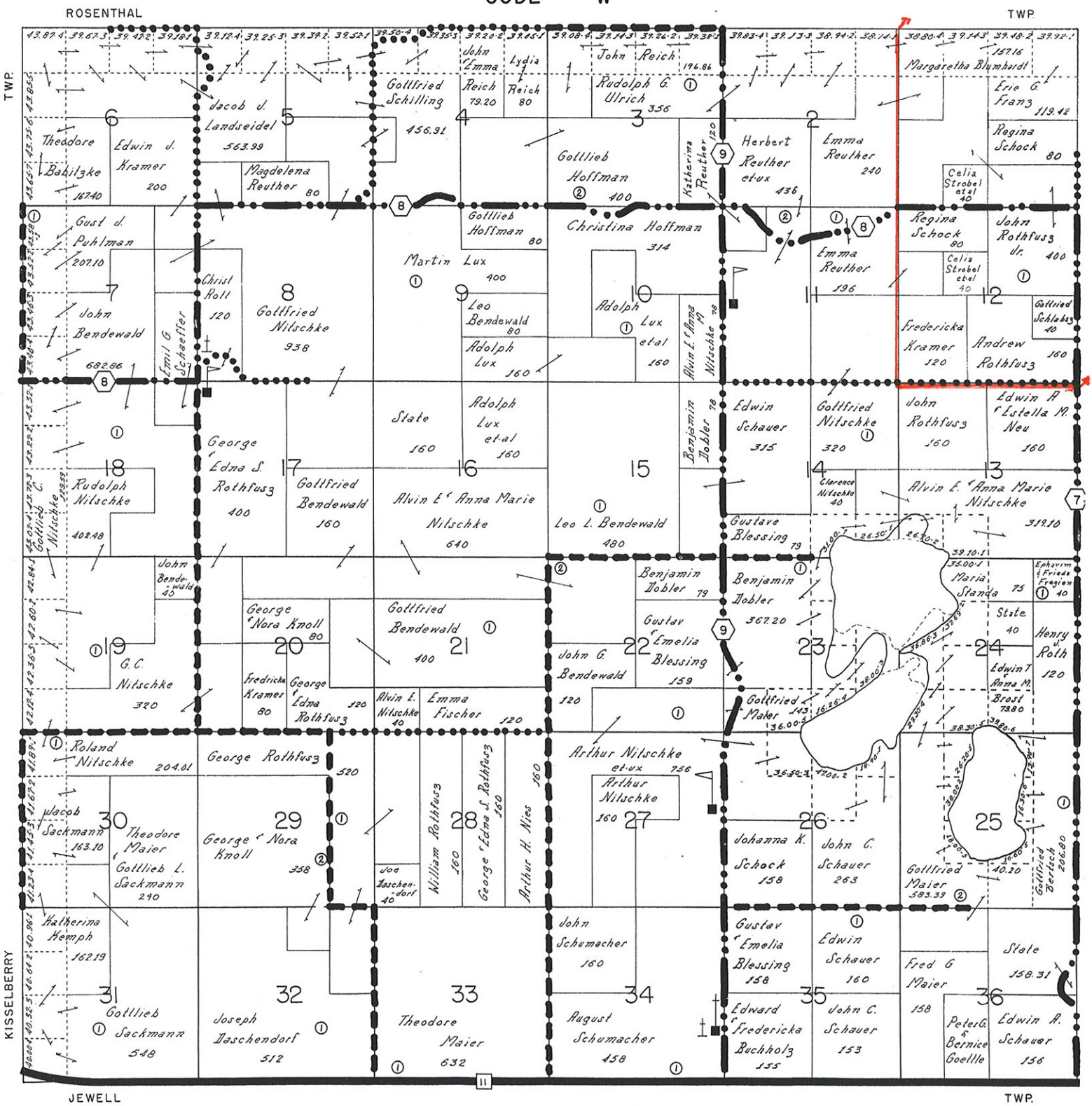


McIntosh County Atlas, 1981

IOWA

TOWNSHIP 130 N RANGE 68 W

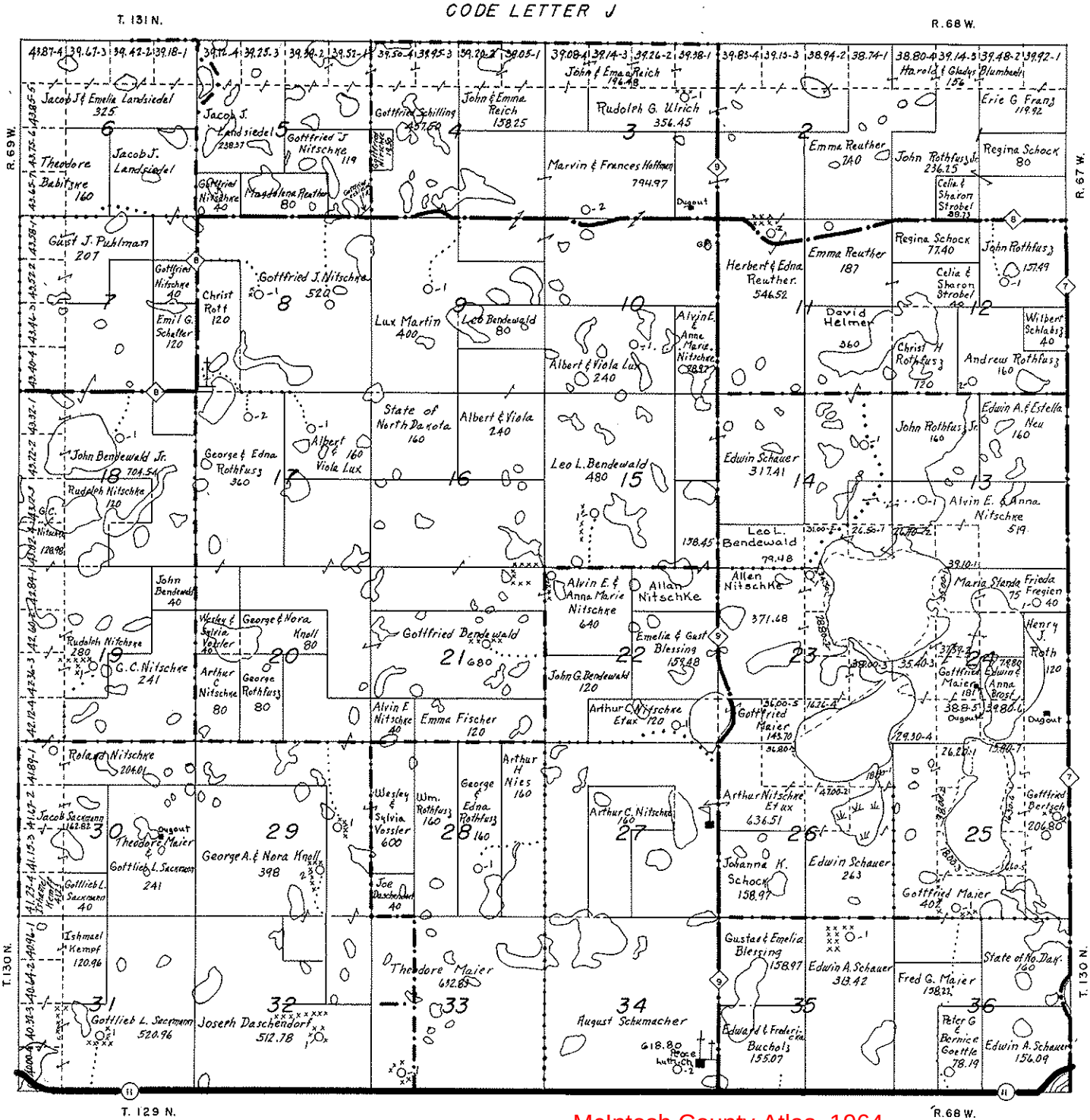
CODE W



McIntosh County Atlas, 1960

TOWNSHIP 130N. RANGE 68 W.

CODE LETTER J



McIntosh County Atlas, 1964

MIDLAND ATLAS CO. INC. MILBANK, SOUTH DAKOTA

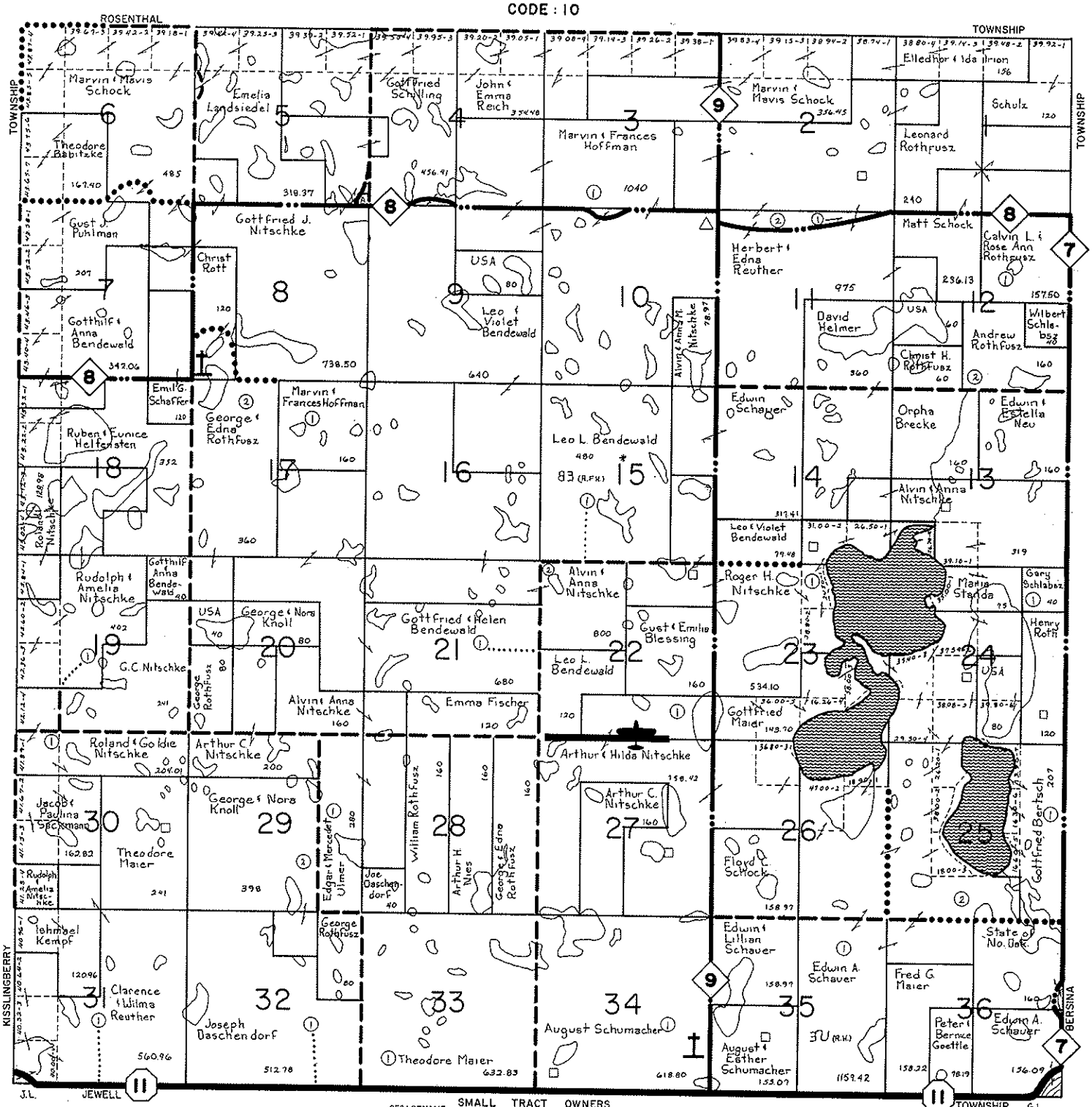
MAP OF IOWA

MIDLAND PUBLISHING & PRINTING

TOWNSHIP : 130 N.

RANGE : 68 W.

CODE : 10



McIntosh County Atlas, 1976

MAP OF

IOWA

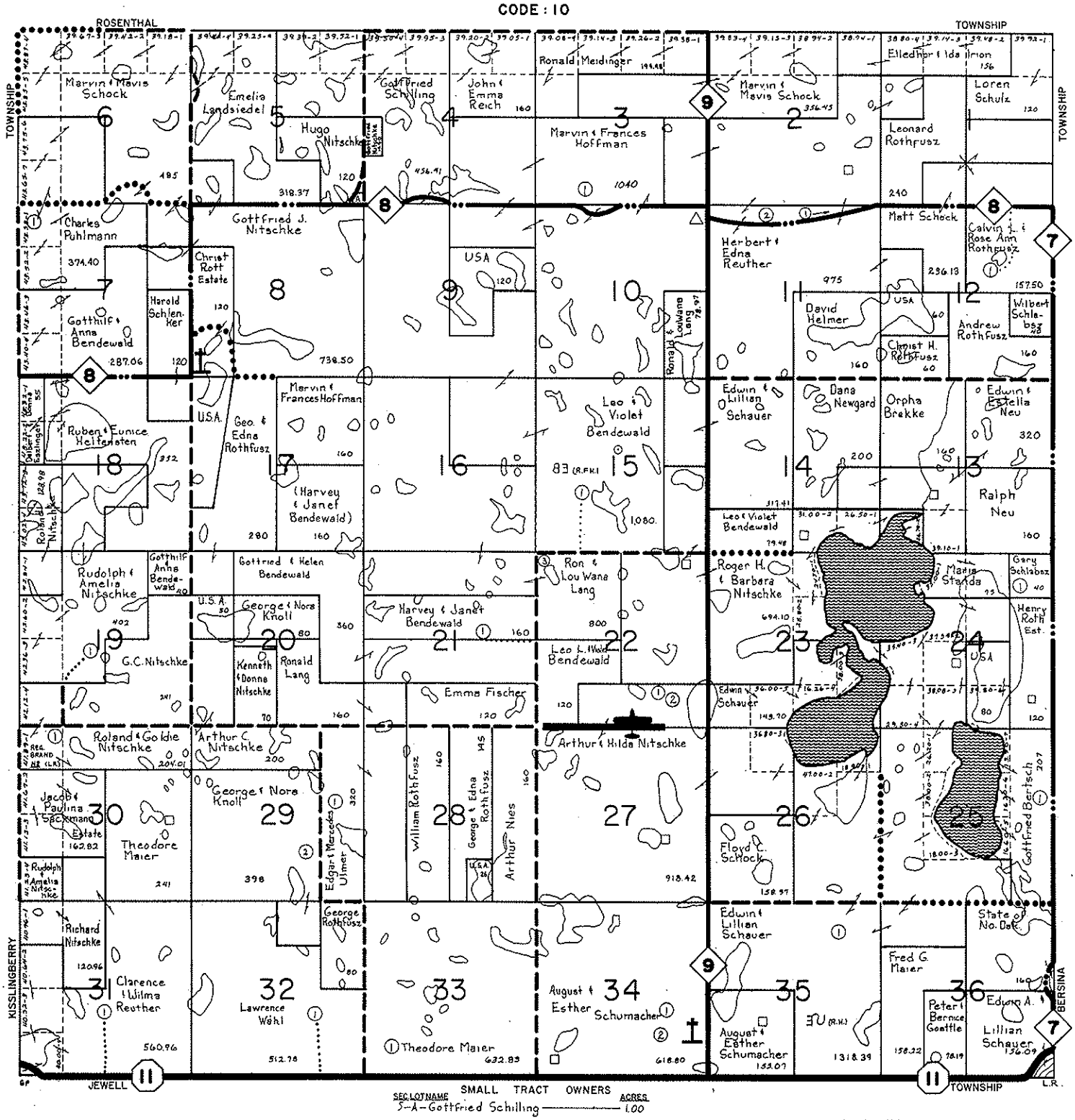
MIDLAND ATLAS CO. INC. WILBANK, SOUTH DAKOTA

MIDLAND PUBLISHING & PRINTING

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CODE : 10

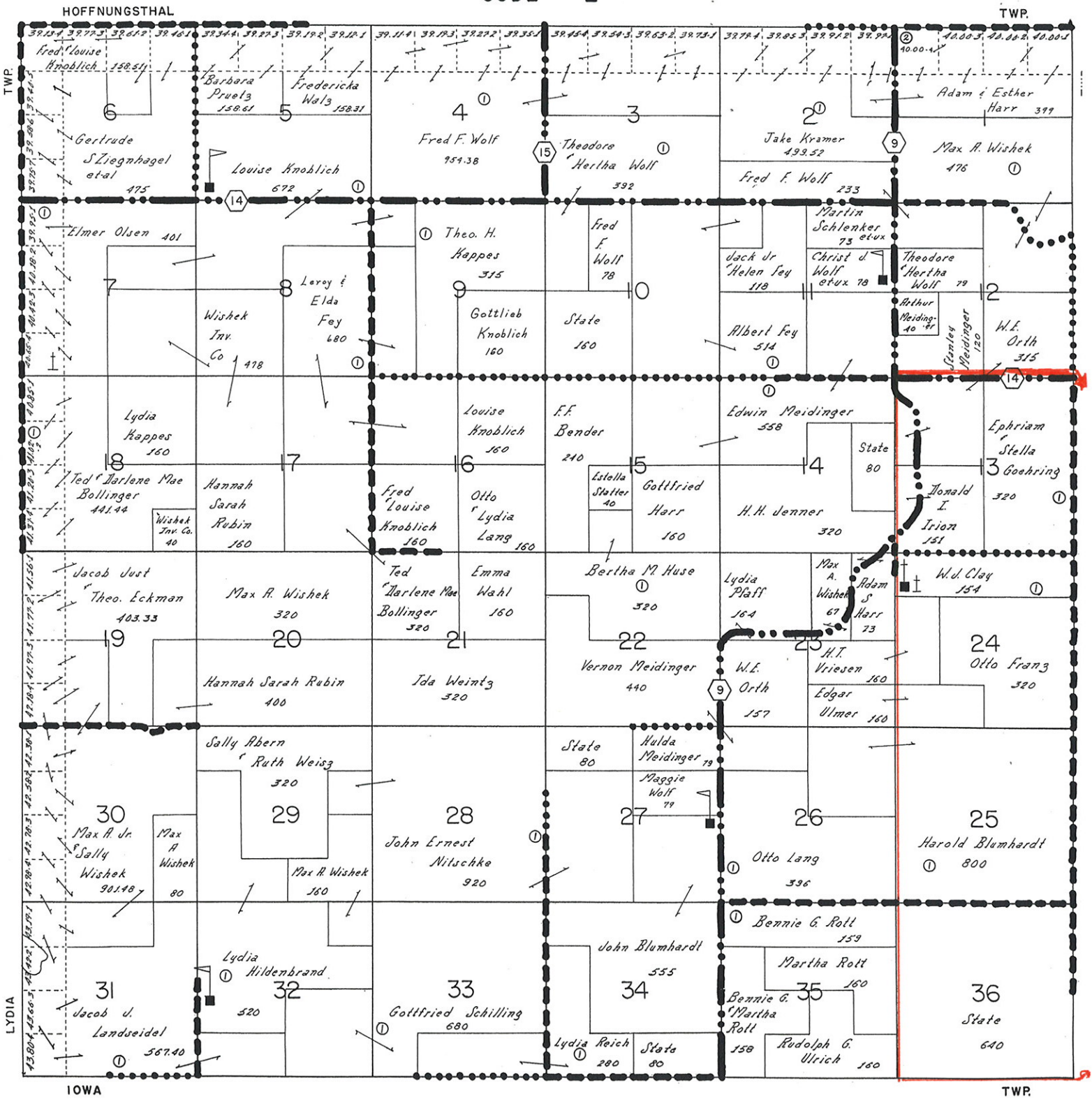


McIntosh County Atlas, 1981

ROSENTHAL

TOWNSHIP 131 N RANGE 68 W

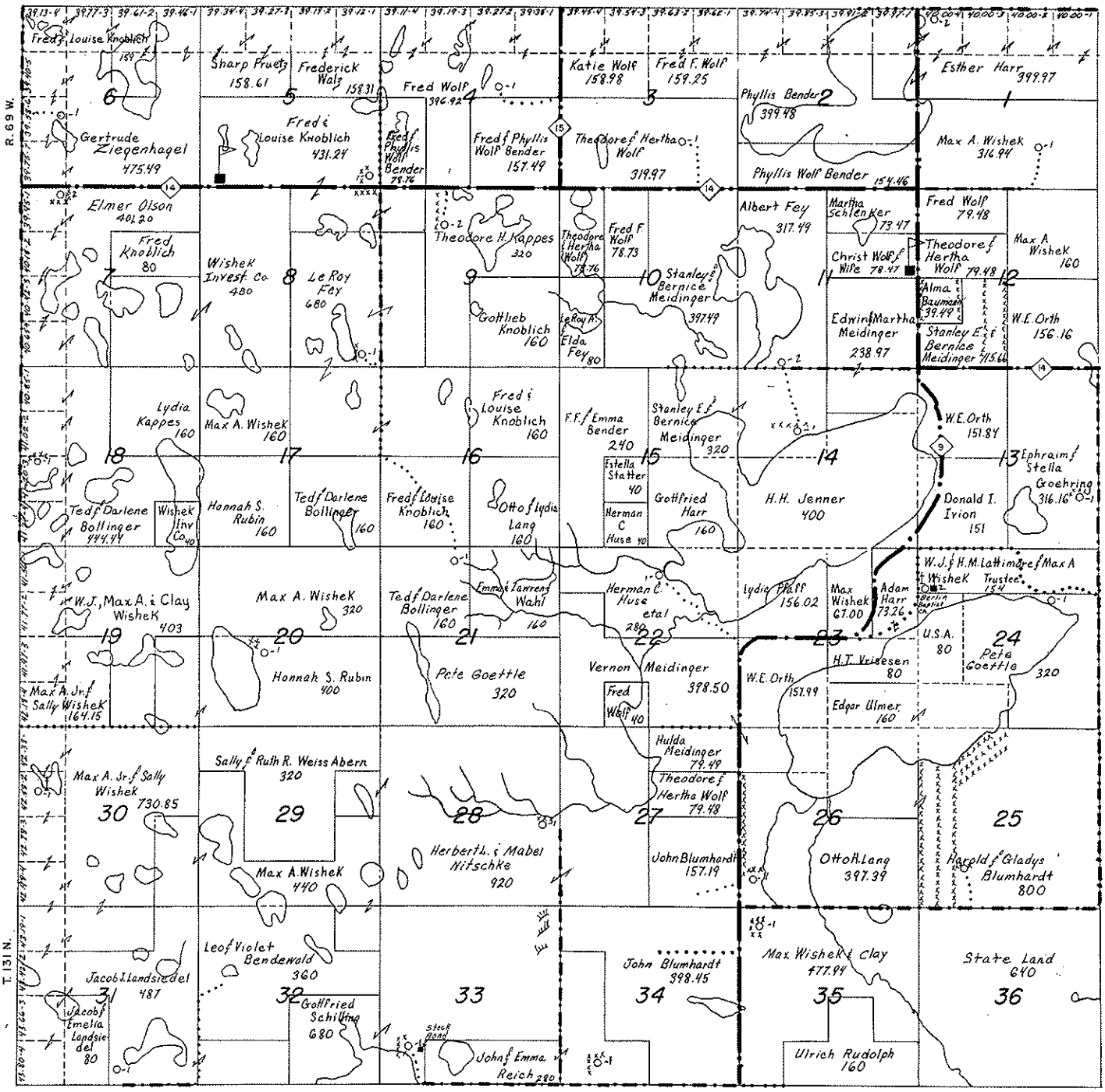
CODE L



McIntosh County Atlas, 1960

TOWNSHIP 131 N RANGE 68 W

CODE LETTER S



McIntosh County Atlas, 1964

MIDLAND ATLAS CO. INC. MILBANK, SOUTH DAKOTA

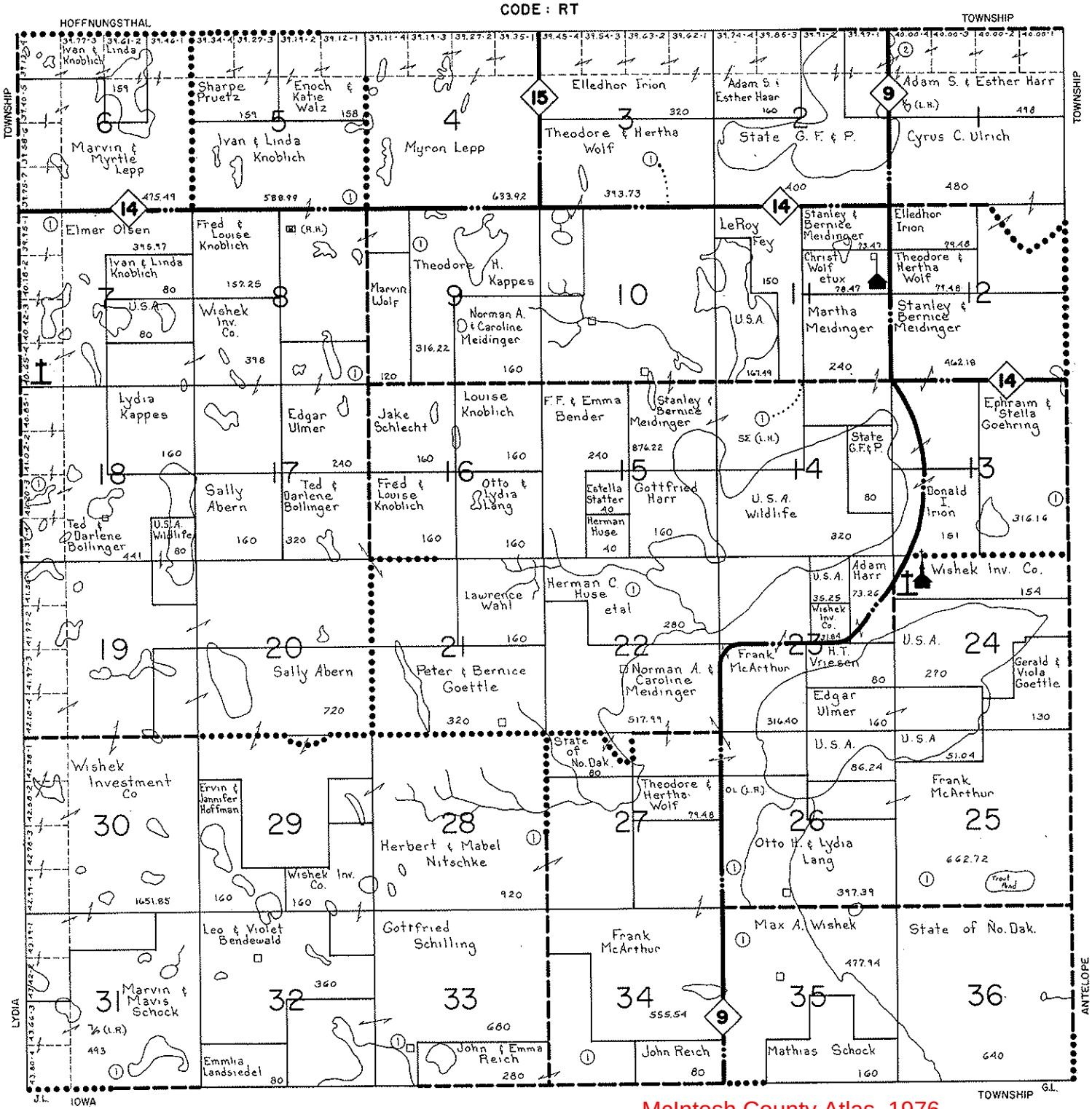
MAP OF ROSENTHAL

MIDLAND PUBLISHING & PRINTING

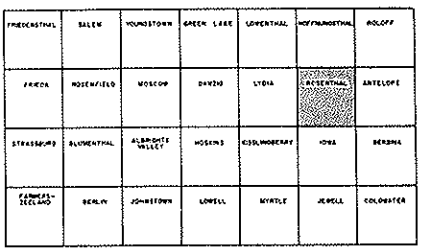
TOWNSHIP : 131 N.

RANGE : 68 W.

CODE : RT



McIntosh County Atlas, 1976



MIDLAND ATLAS CO. INC. MILBANK, SOUTH DAKOTA

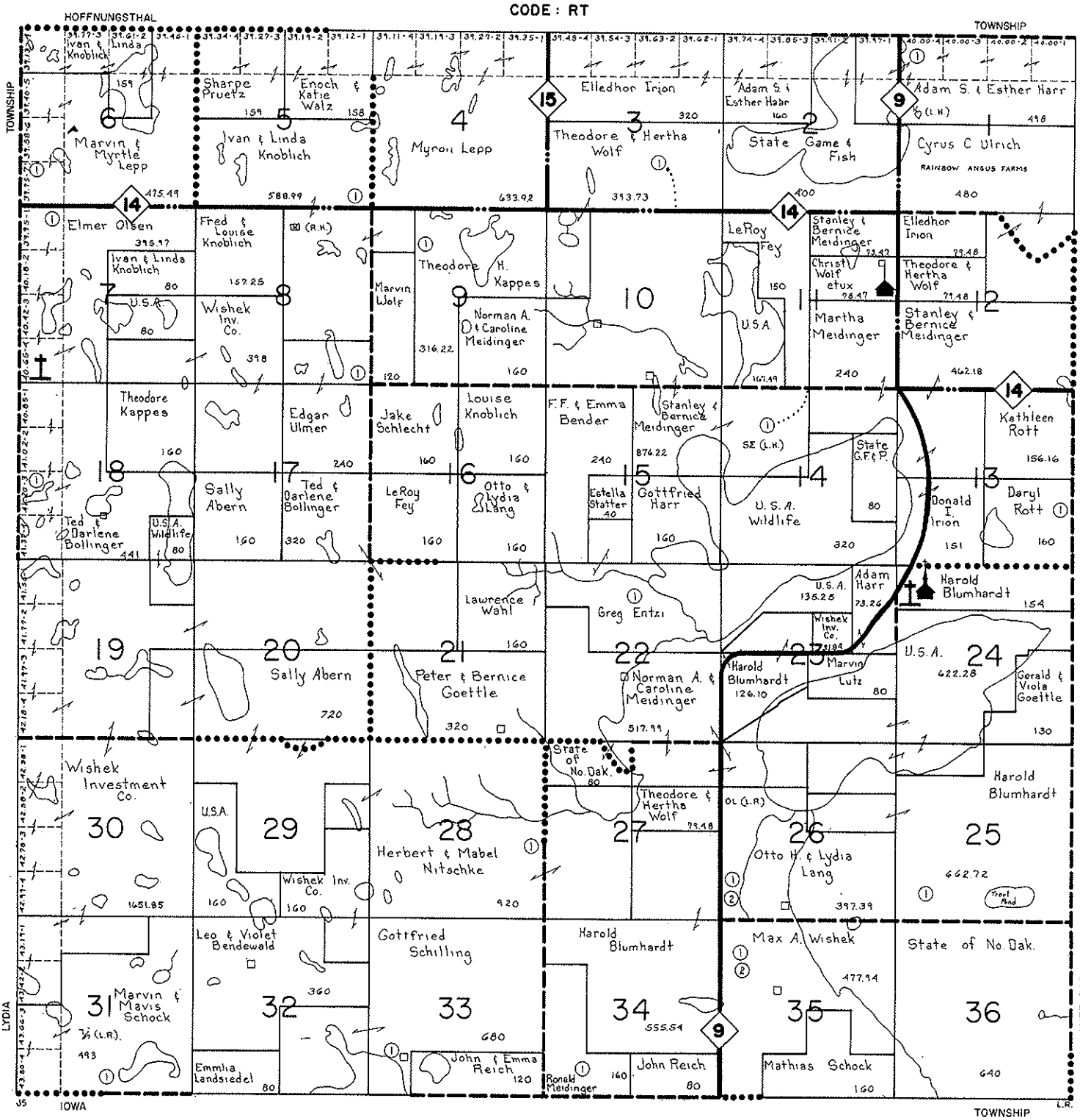
MAP OF ROSENTHAL

MIDLAND PUBLISHING & PRINTING

TOWNSHIP : 131 N.

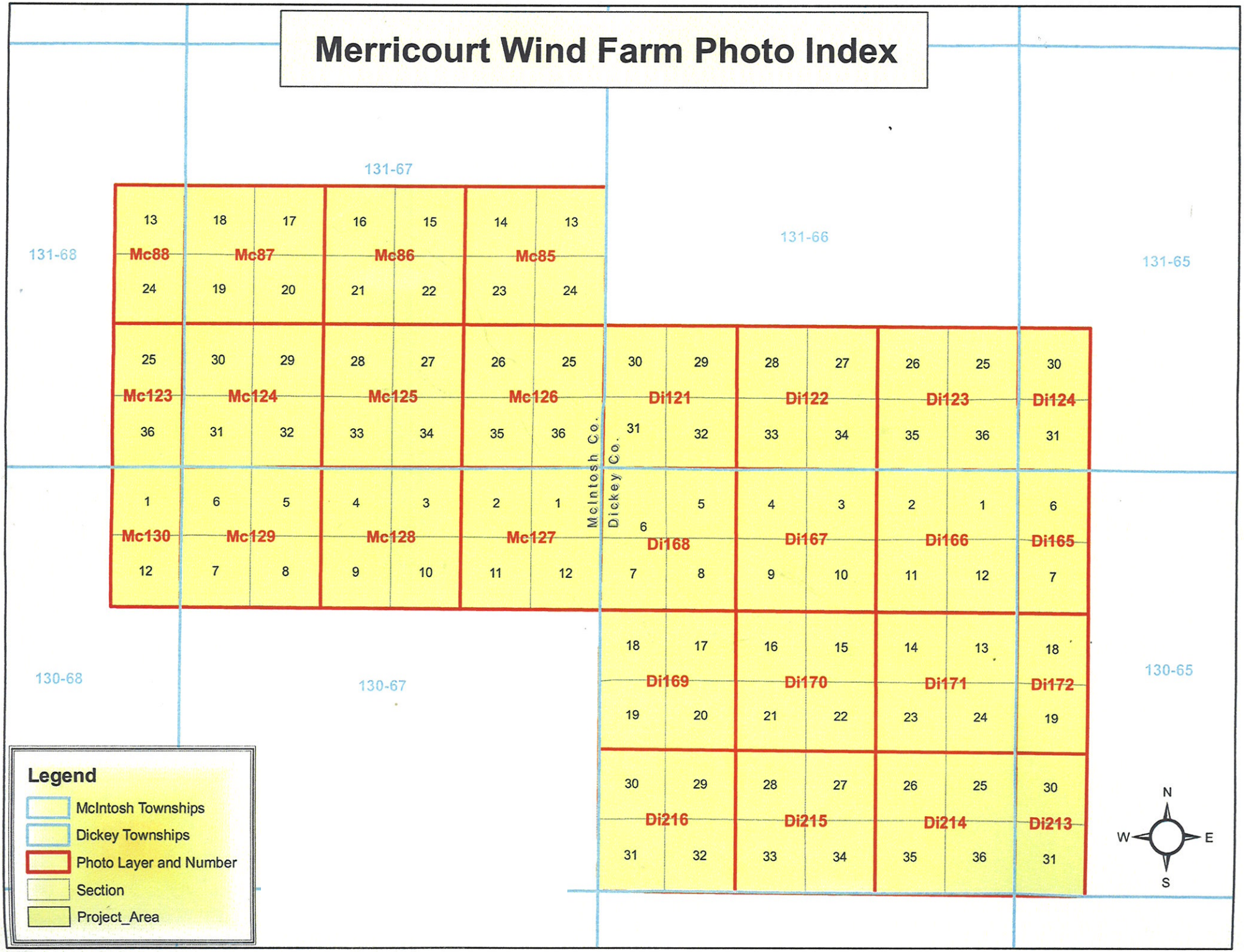
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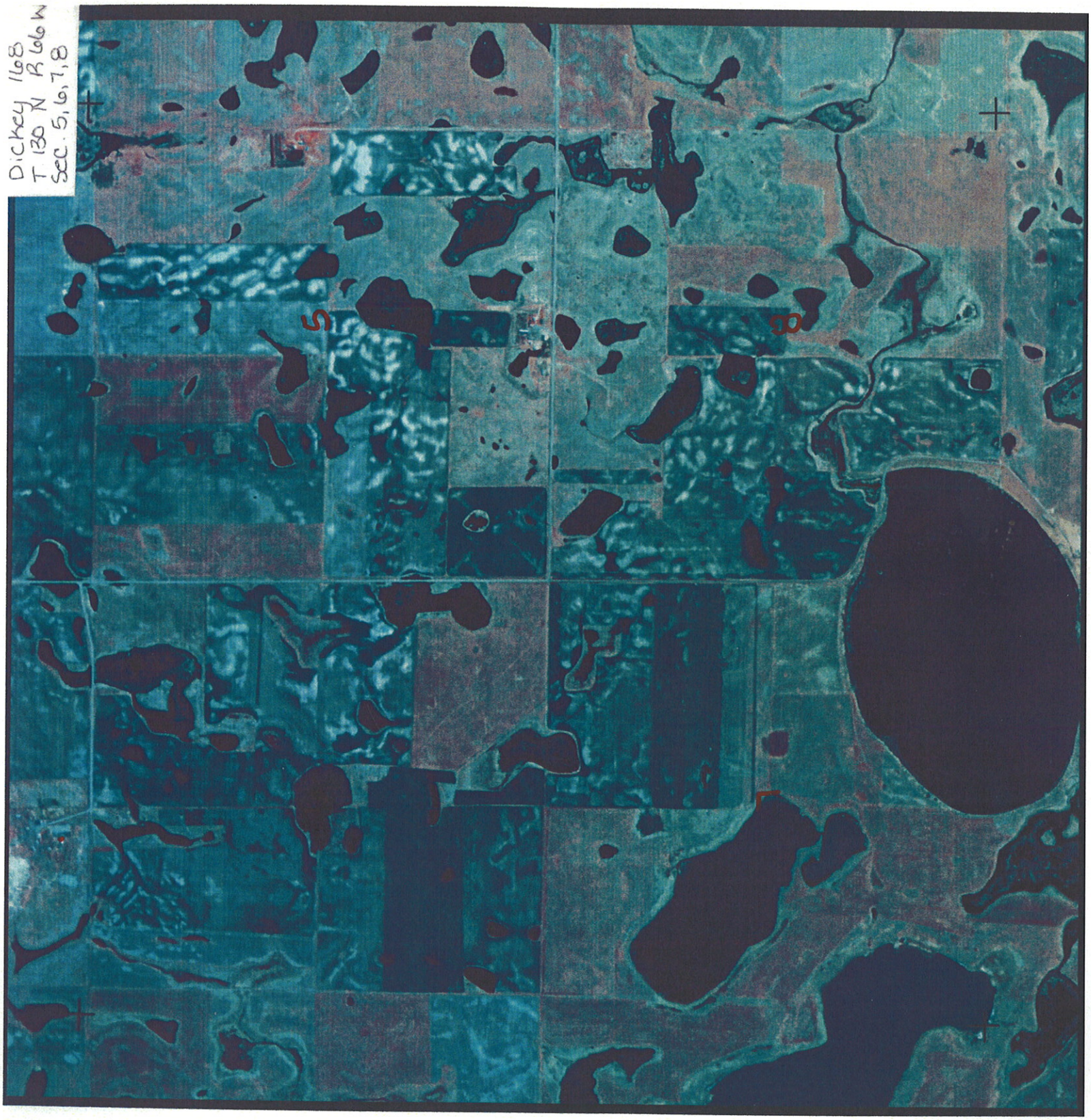


McIntosh County Atlas, 1981

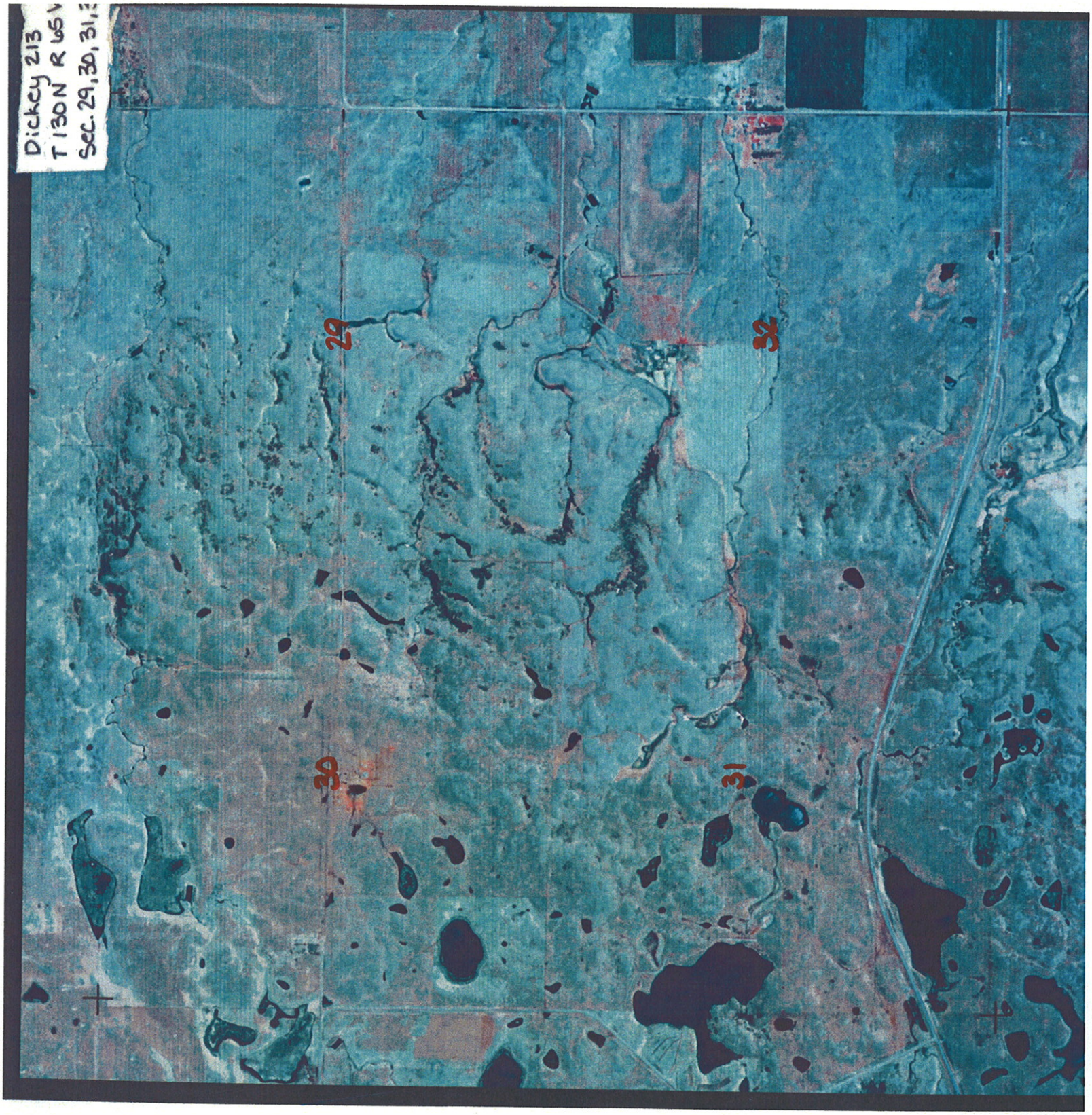
Merricourt Wind Farm Photo Index



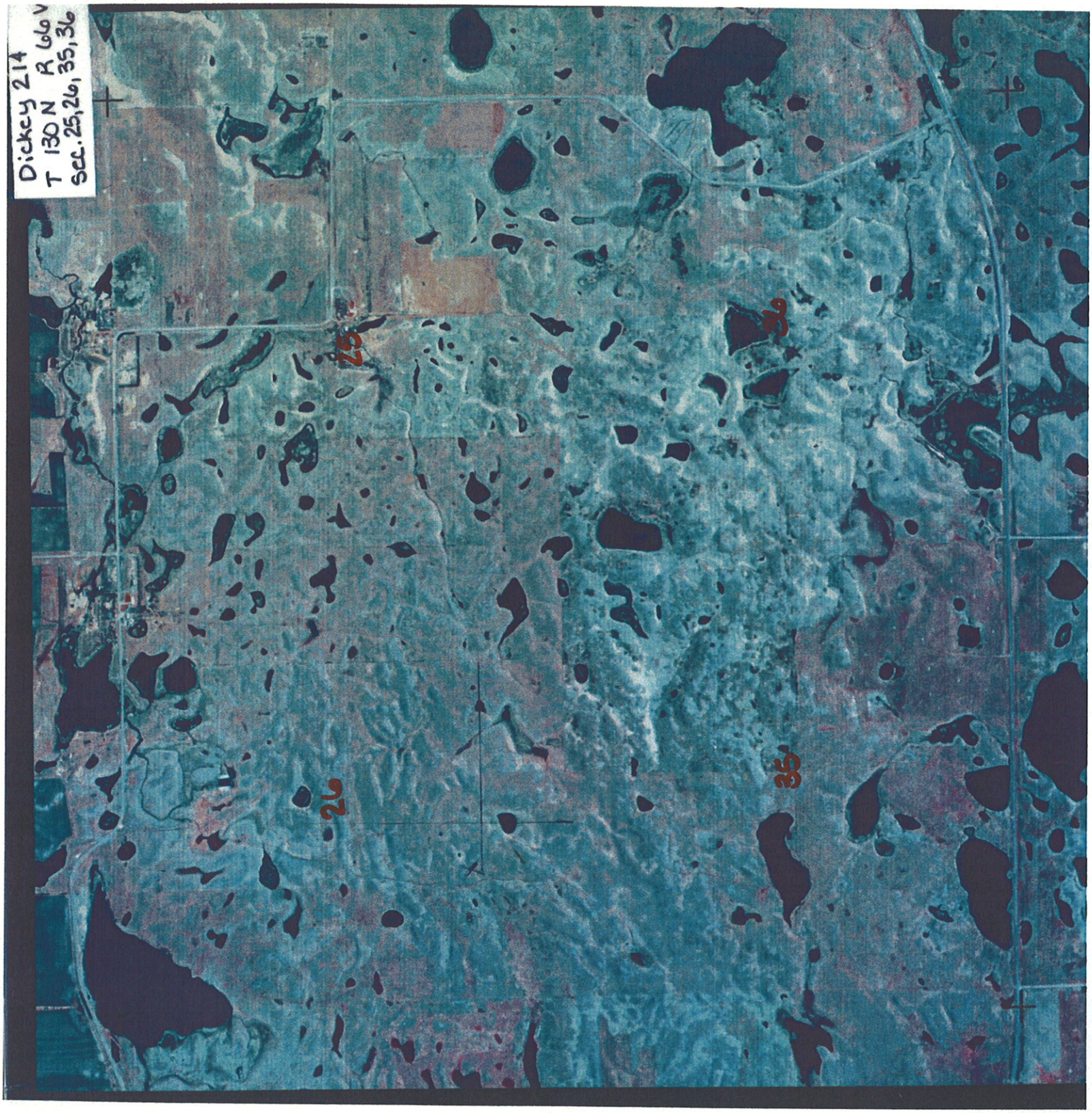
USFWS Aerial Photography, 1979



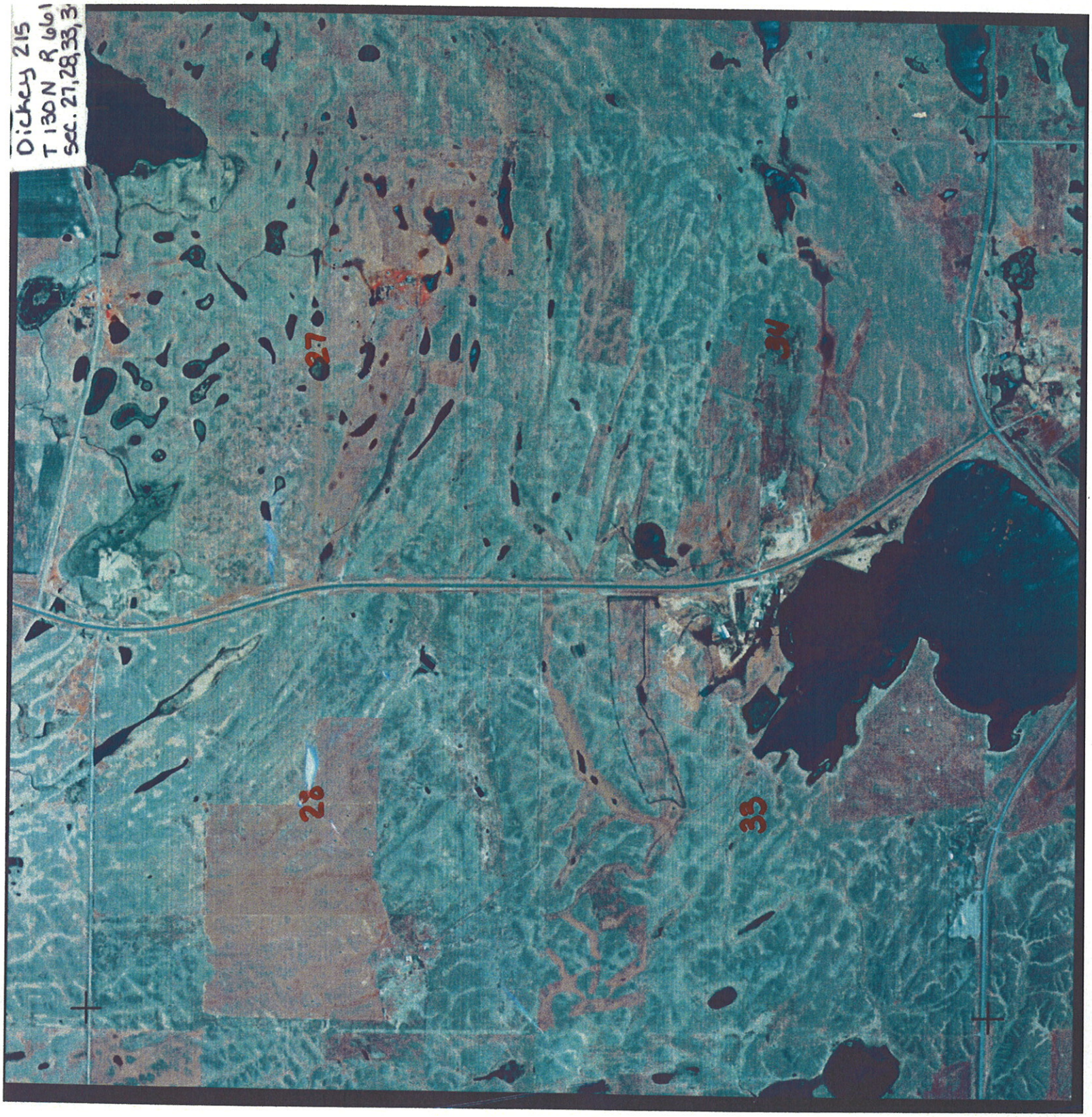
USFWS Aerial Photography, 1979



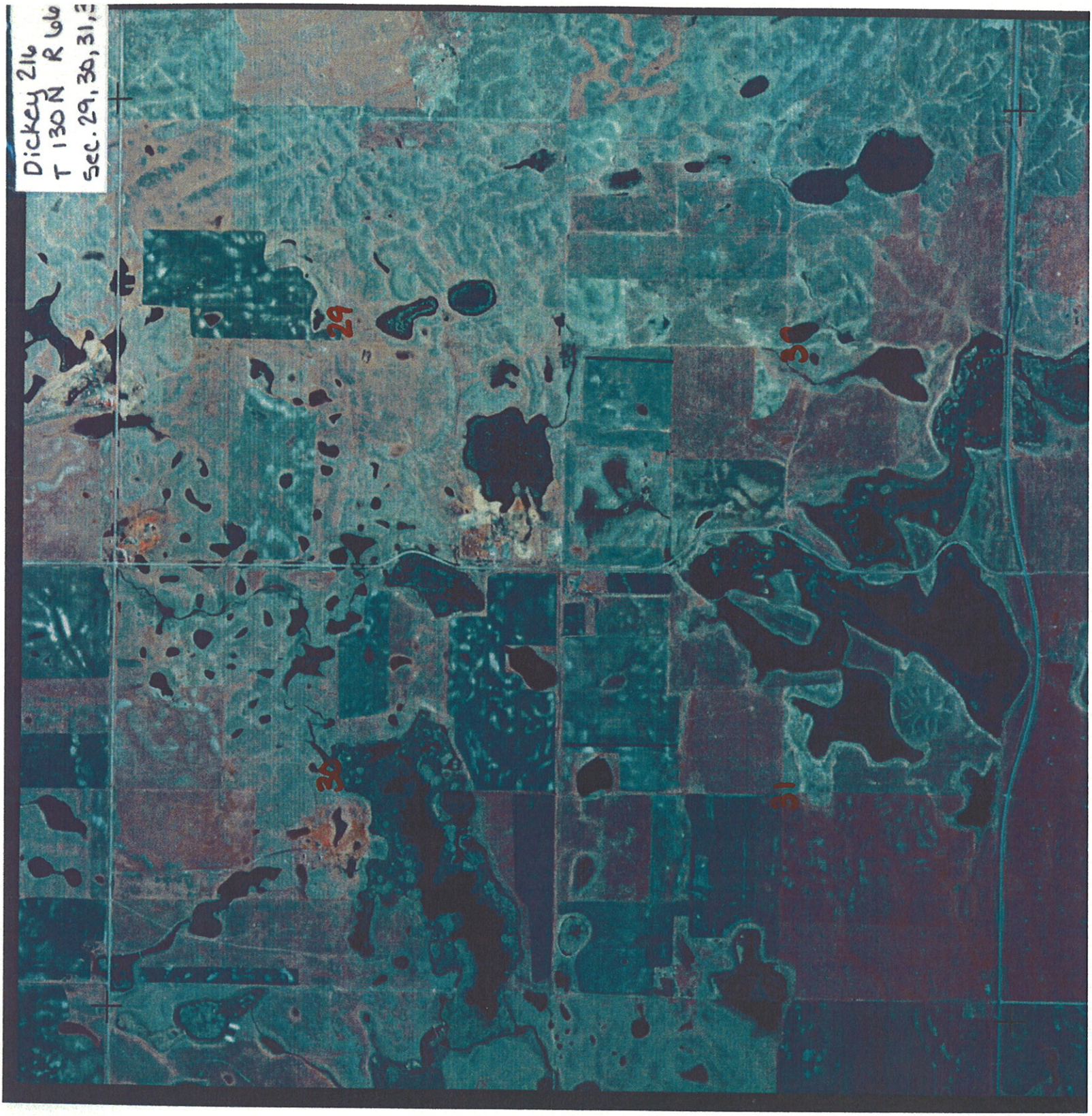
USFWS Aerial Photography, 1979



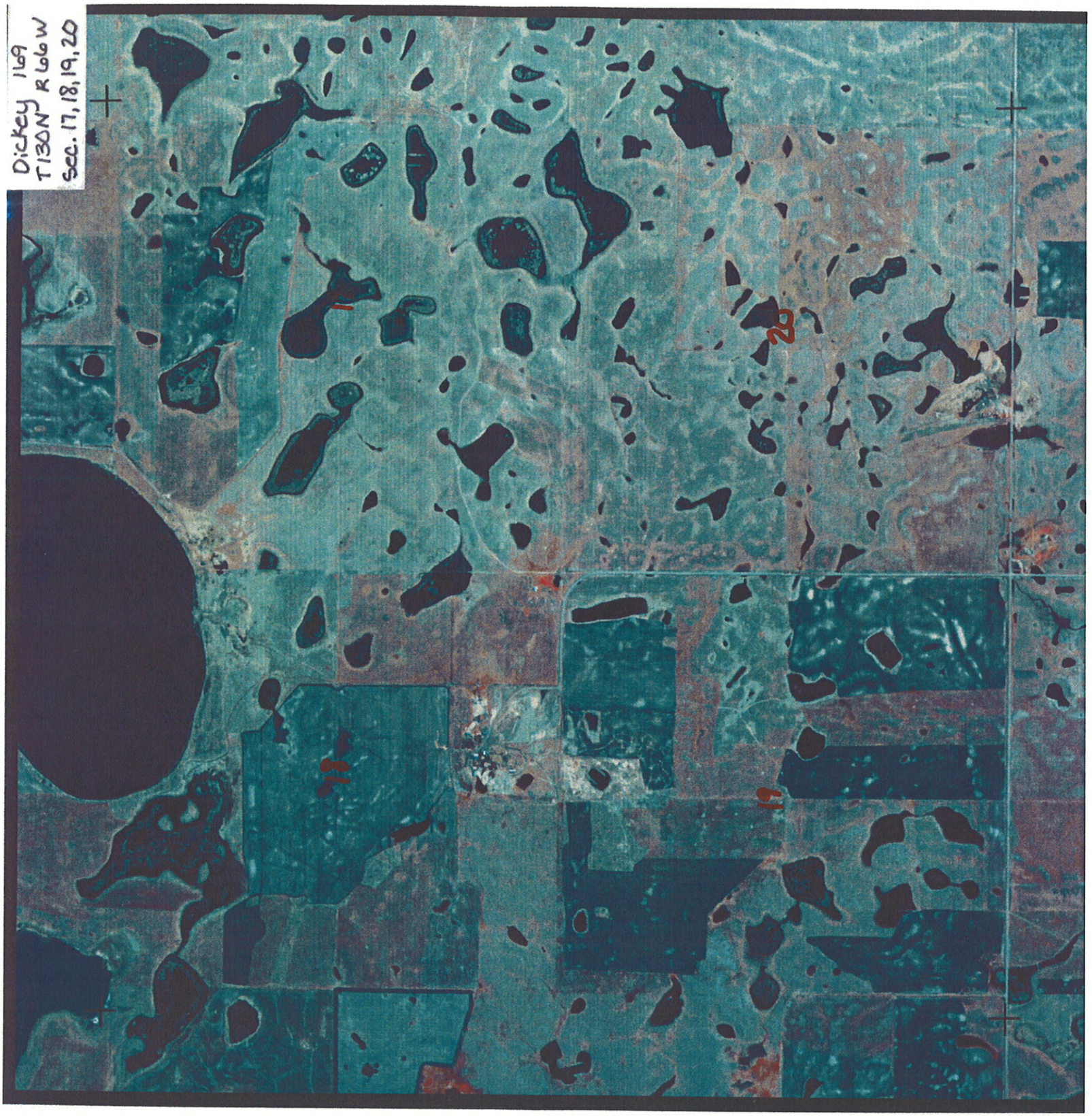
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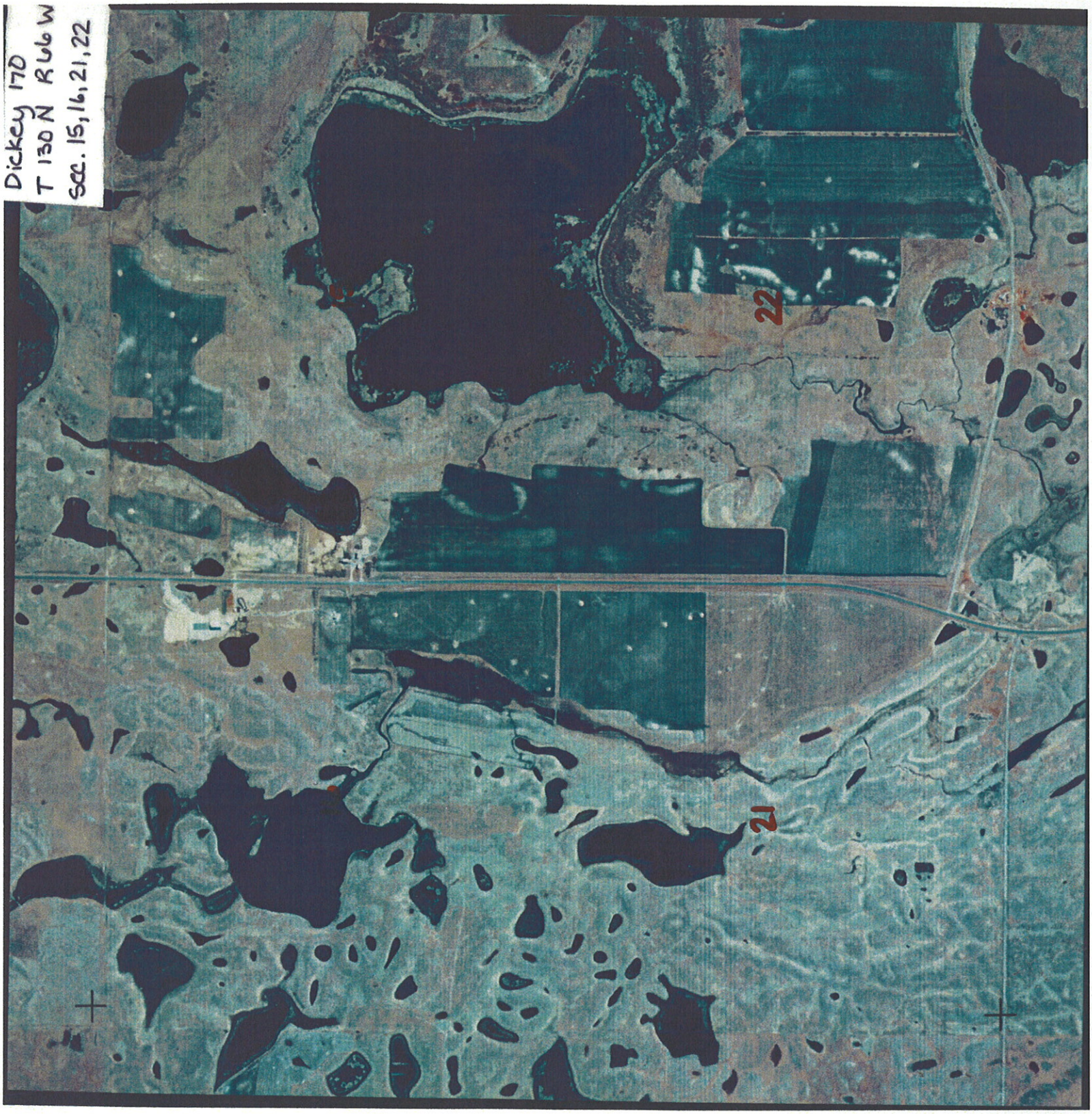
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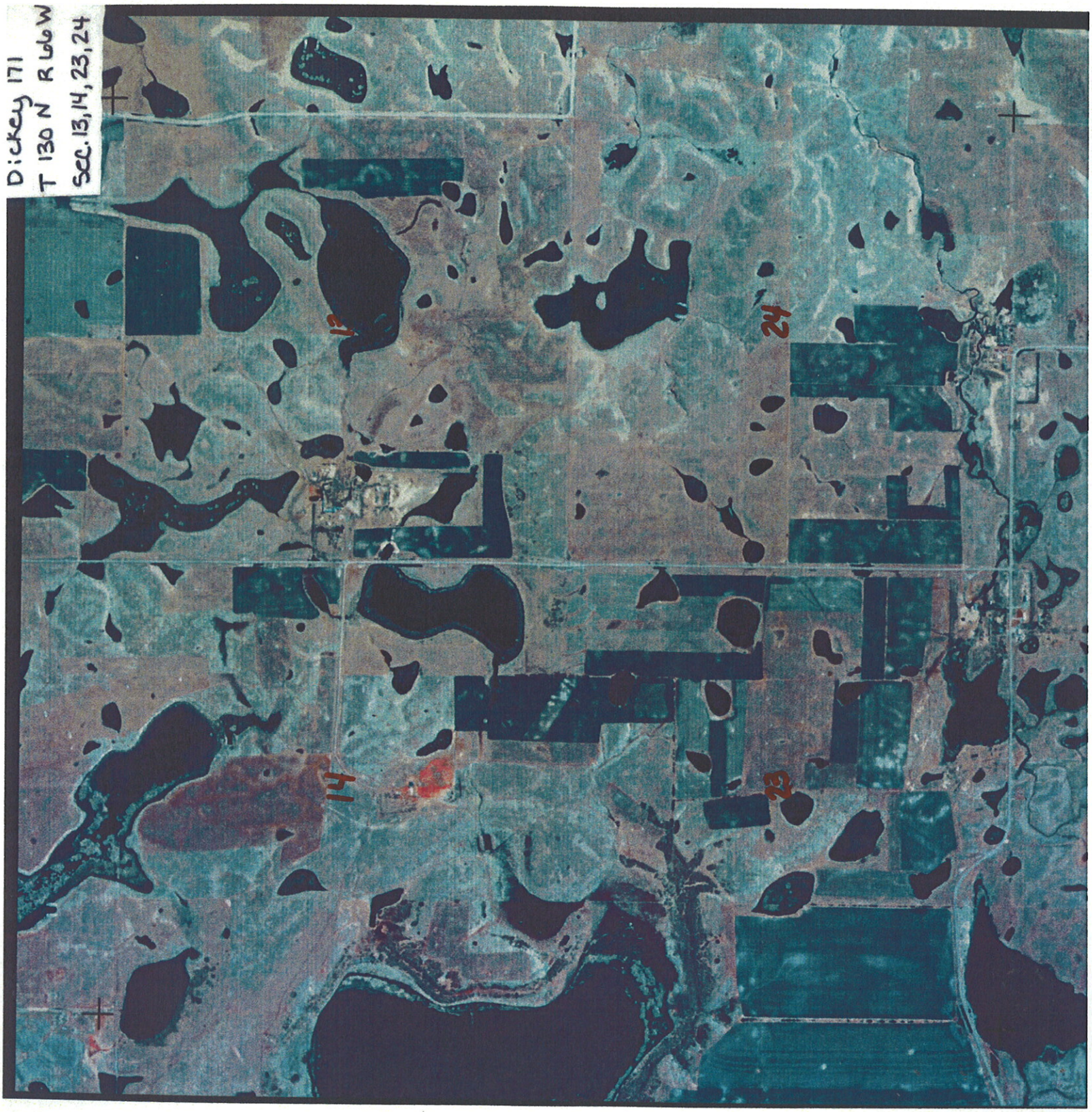
USFWS Aerial Photography, 1979



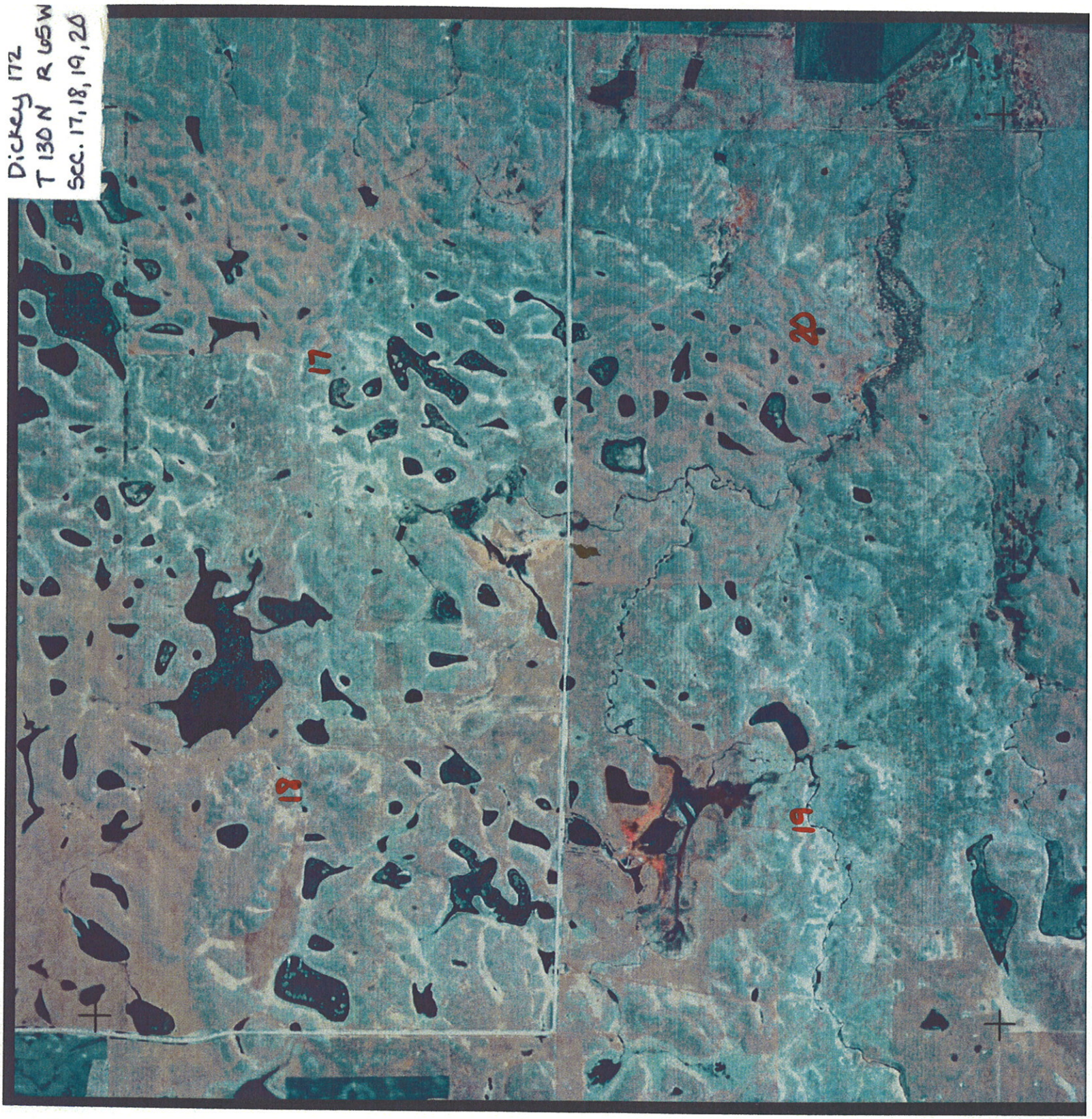
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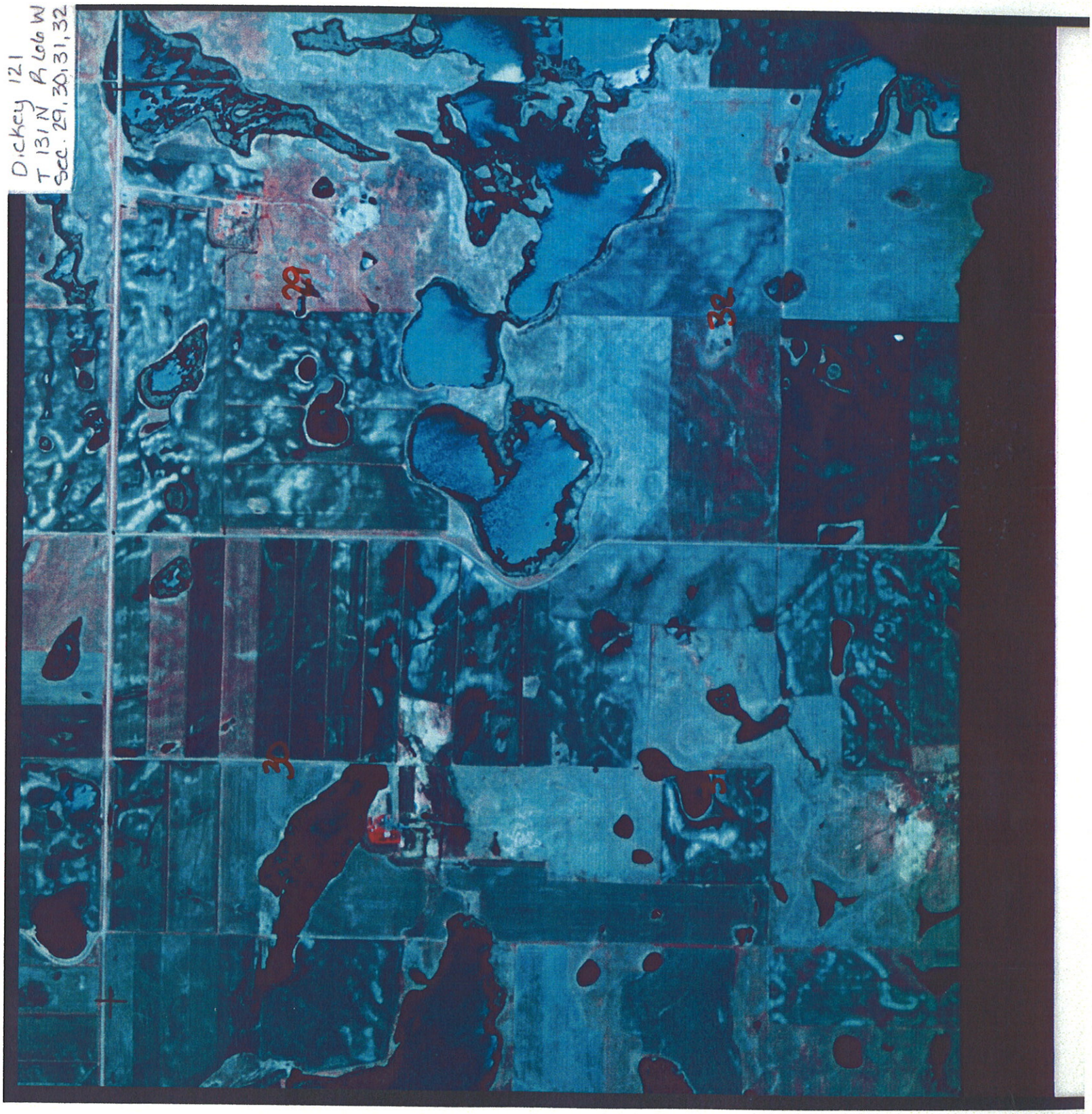
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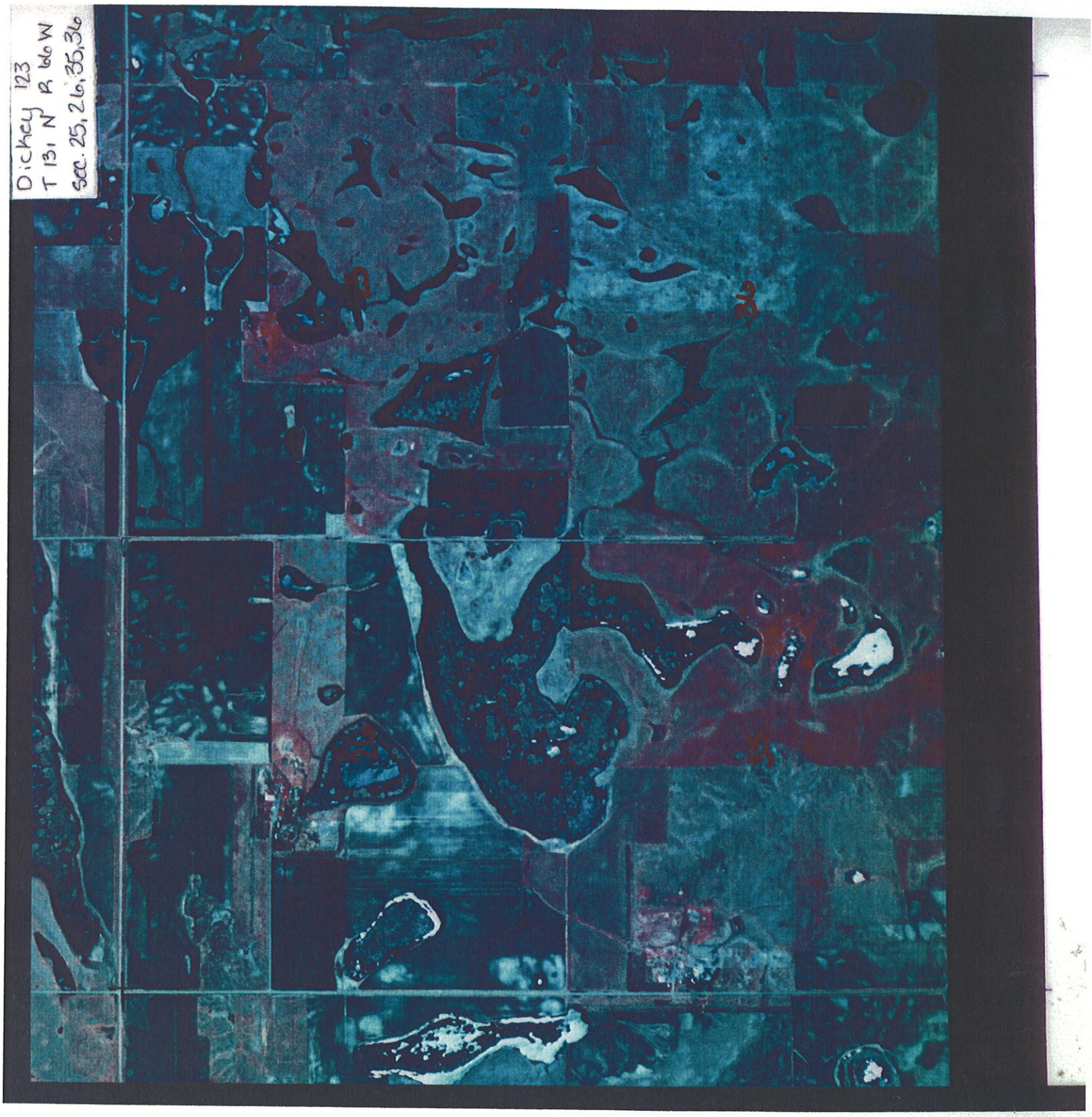
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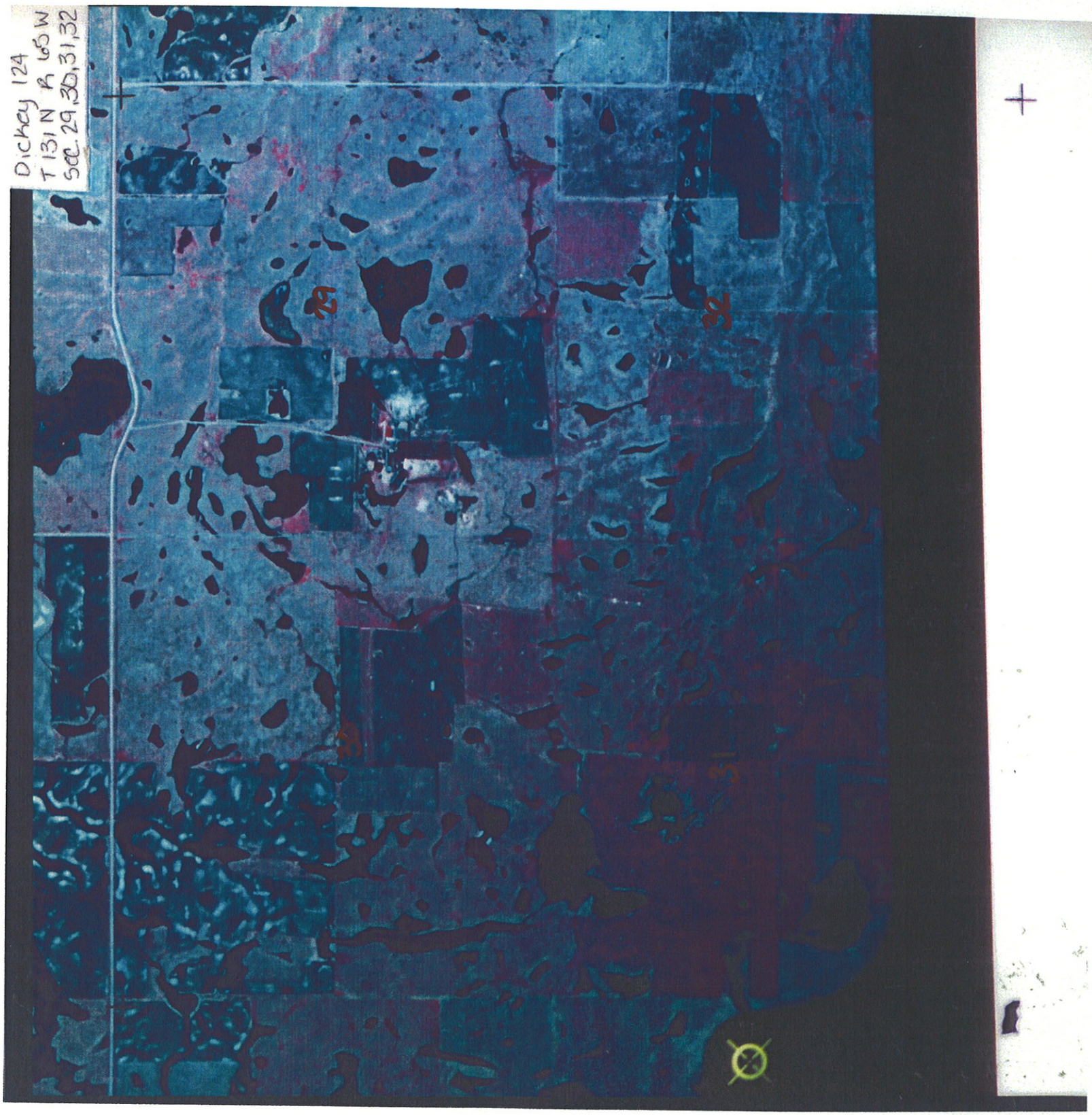
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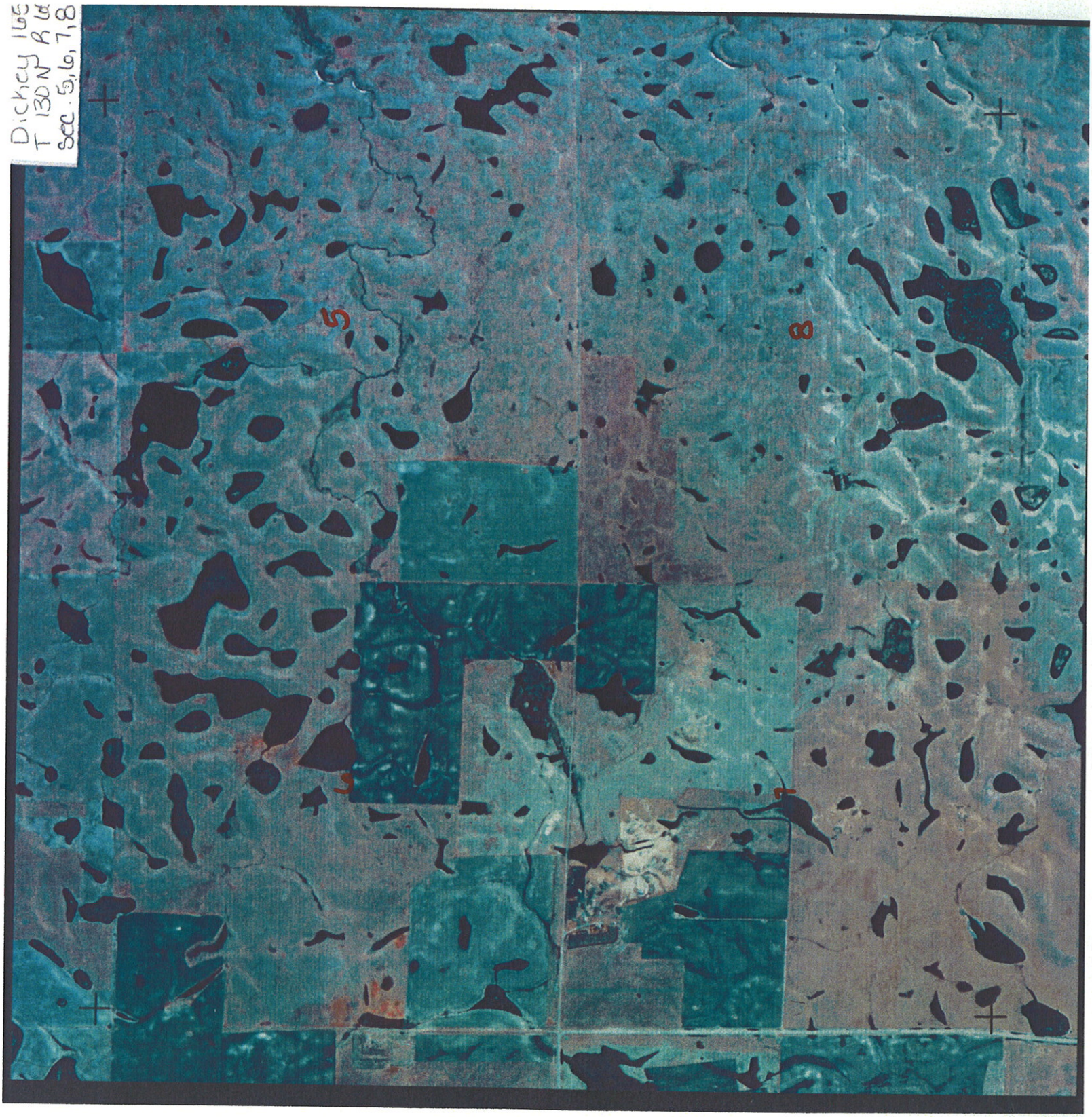
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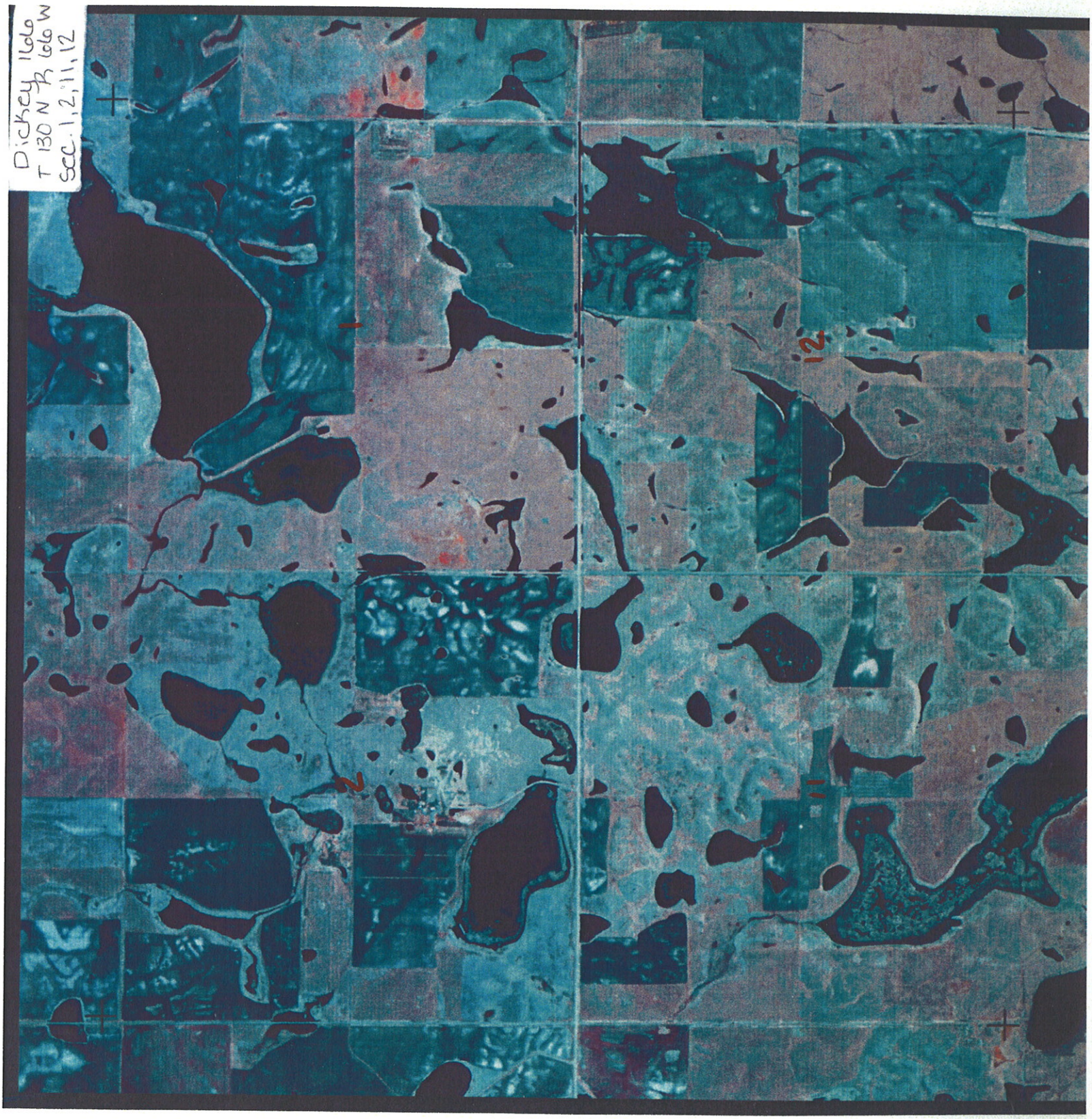
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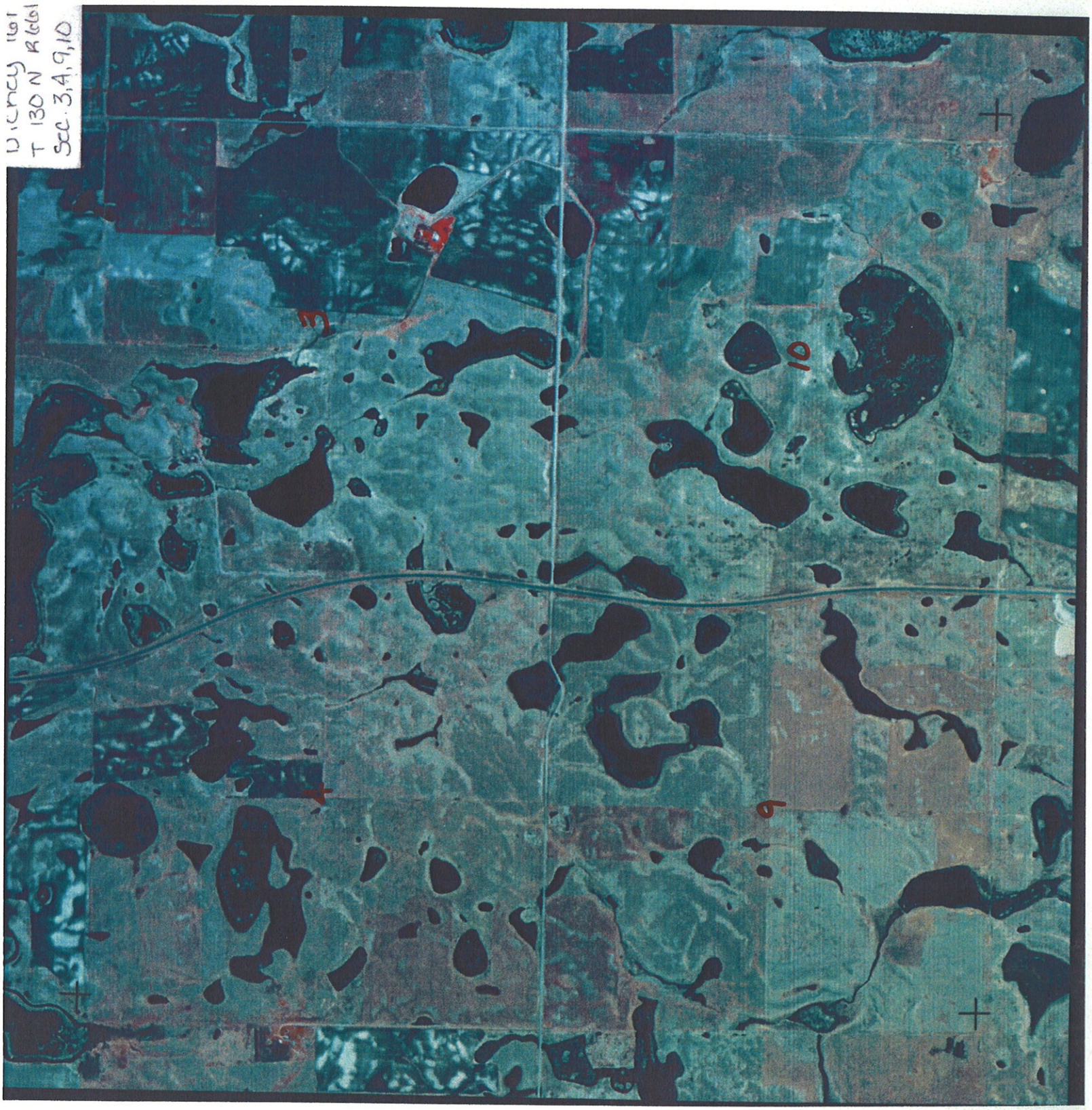
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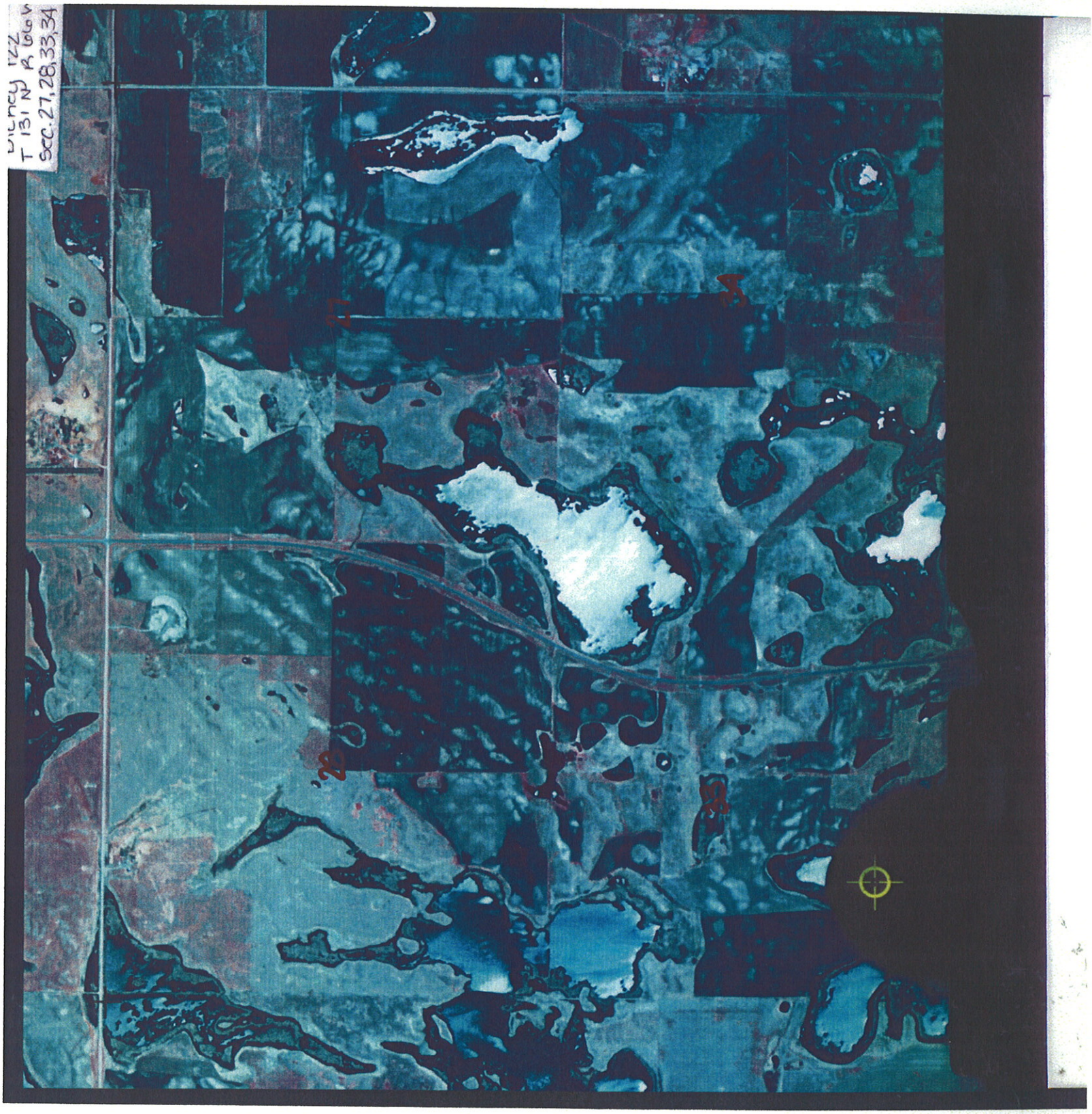
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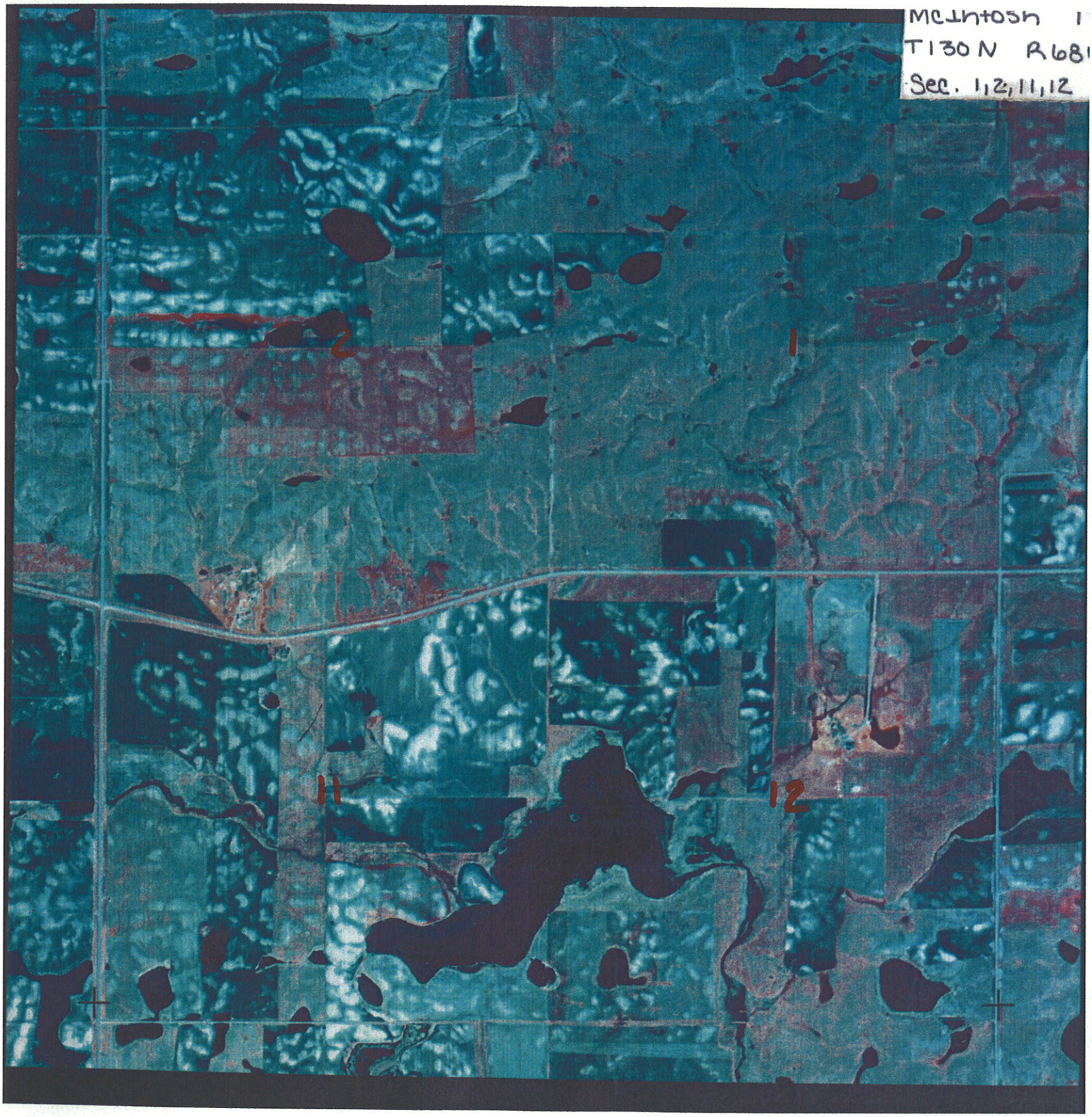
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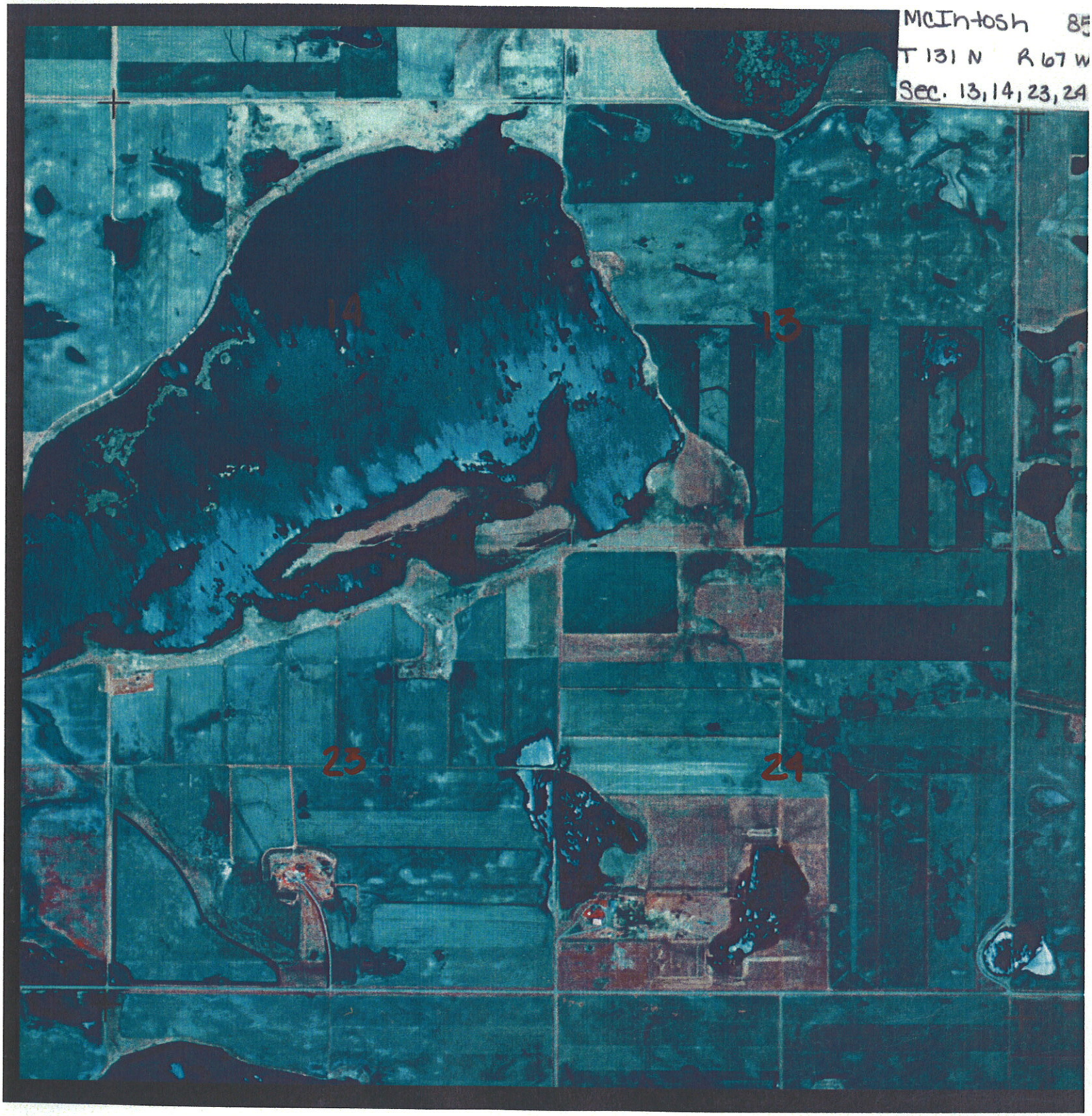
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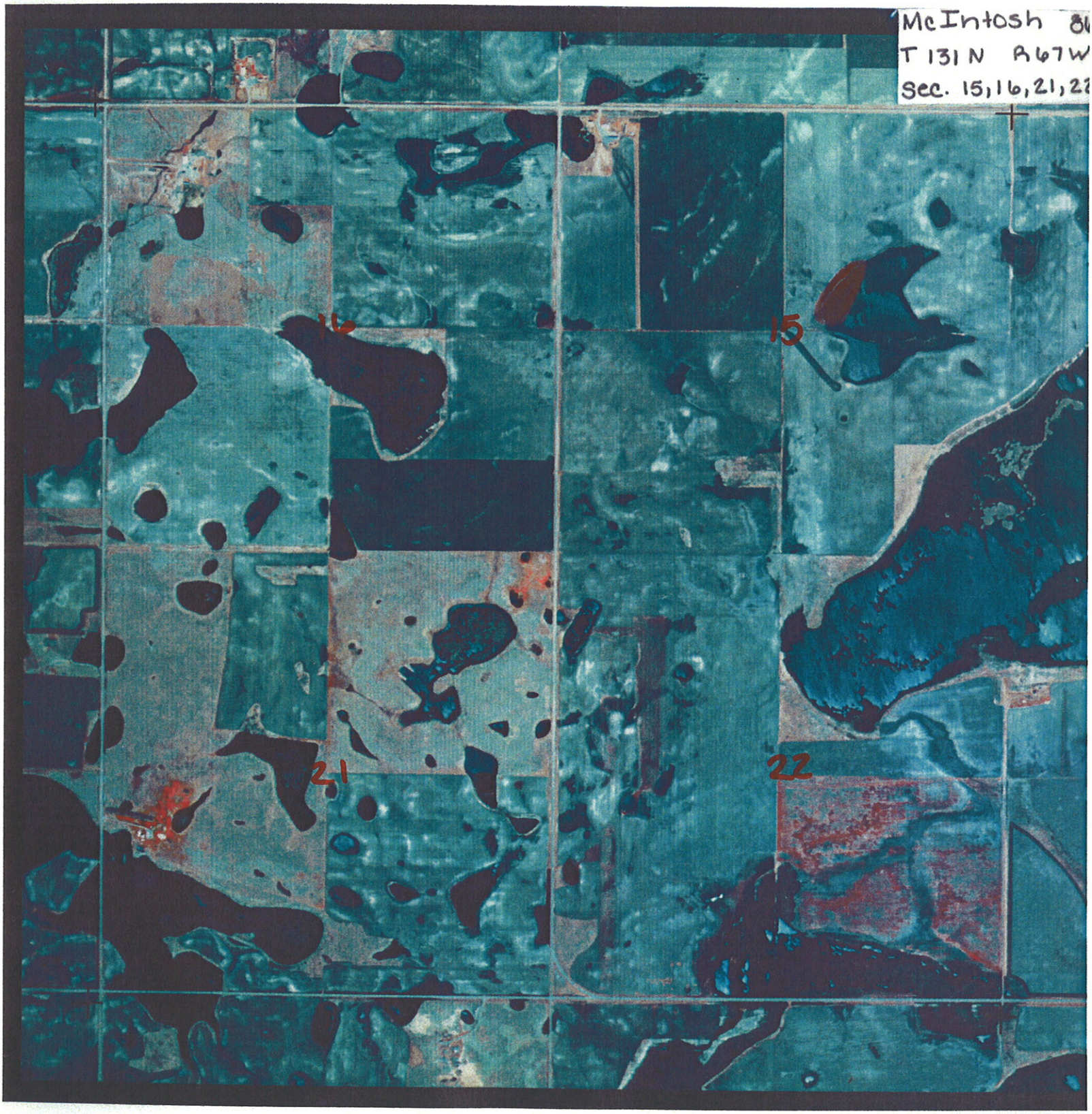
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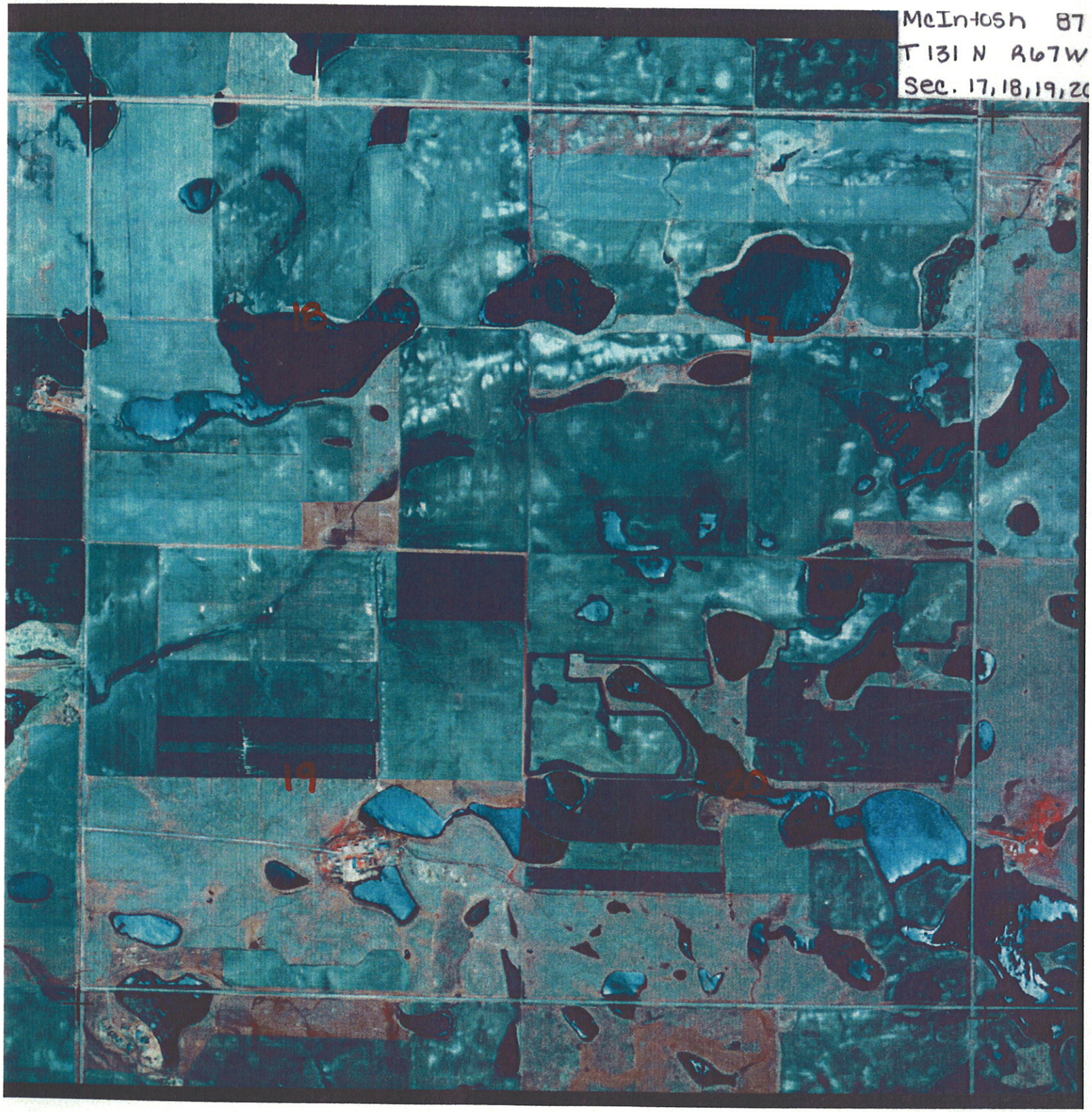
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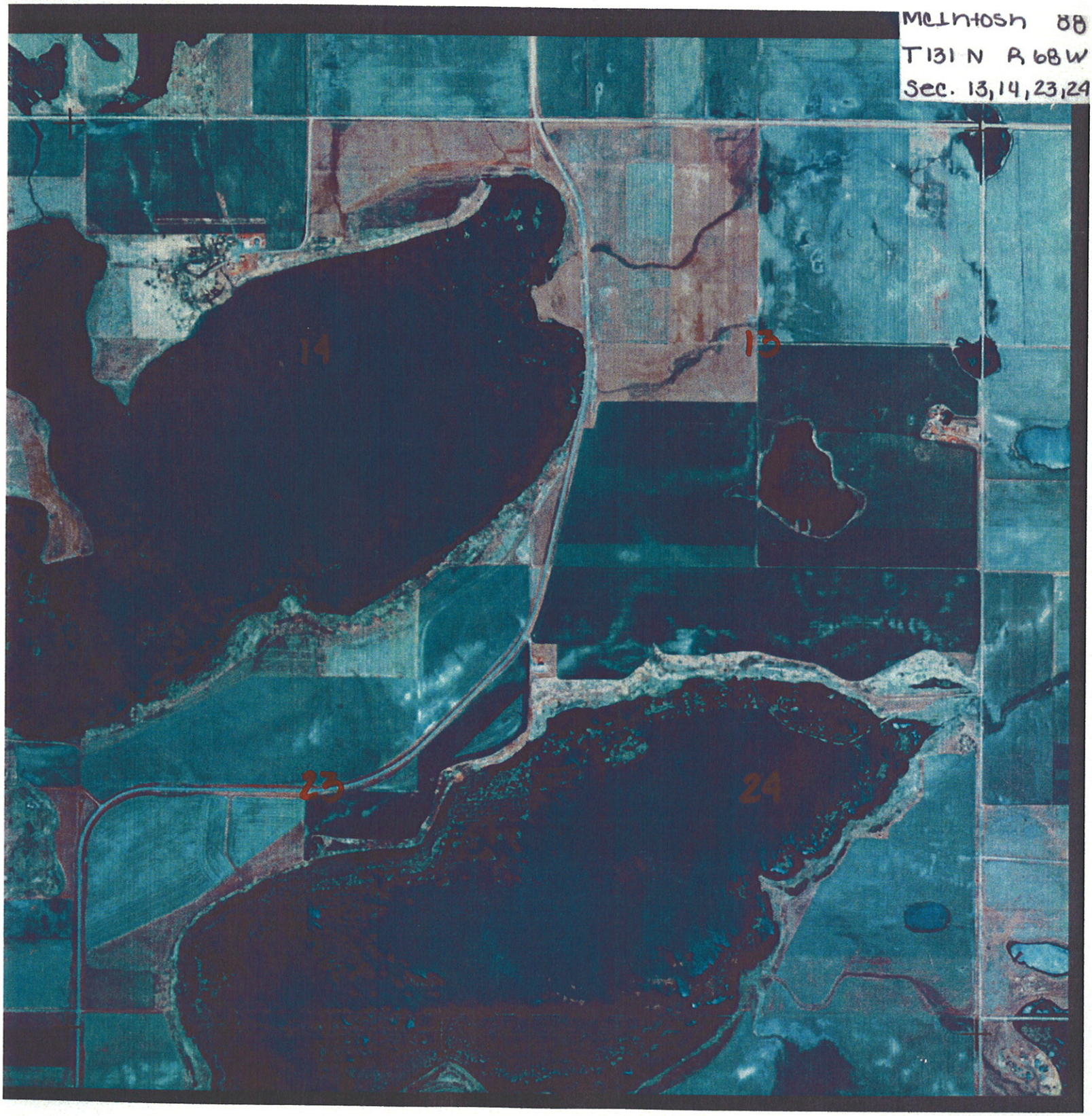
USFWS Aerial Photography, 1979



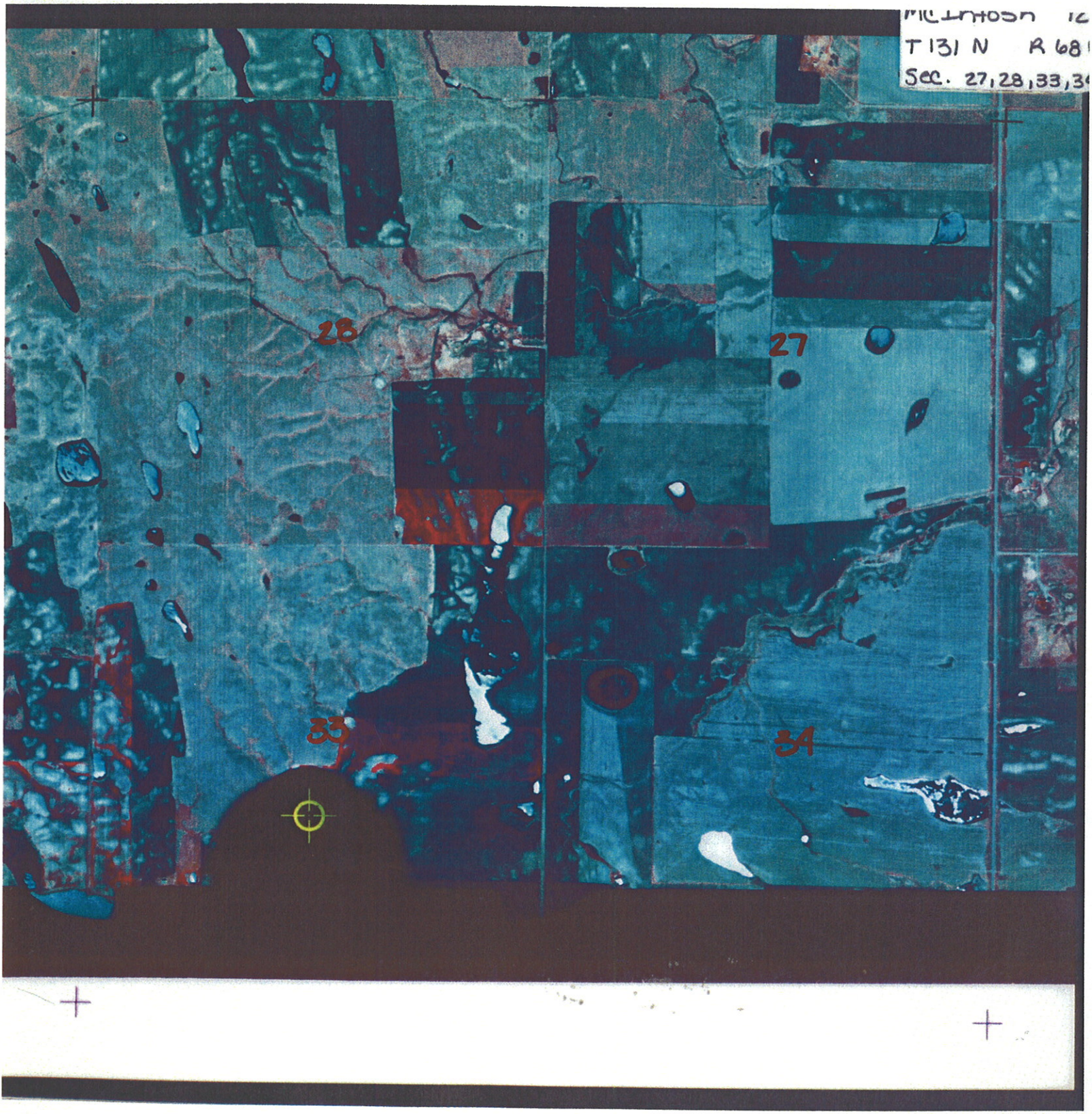
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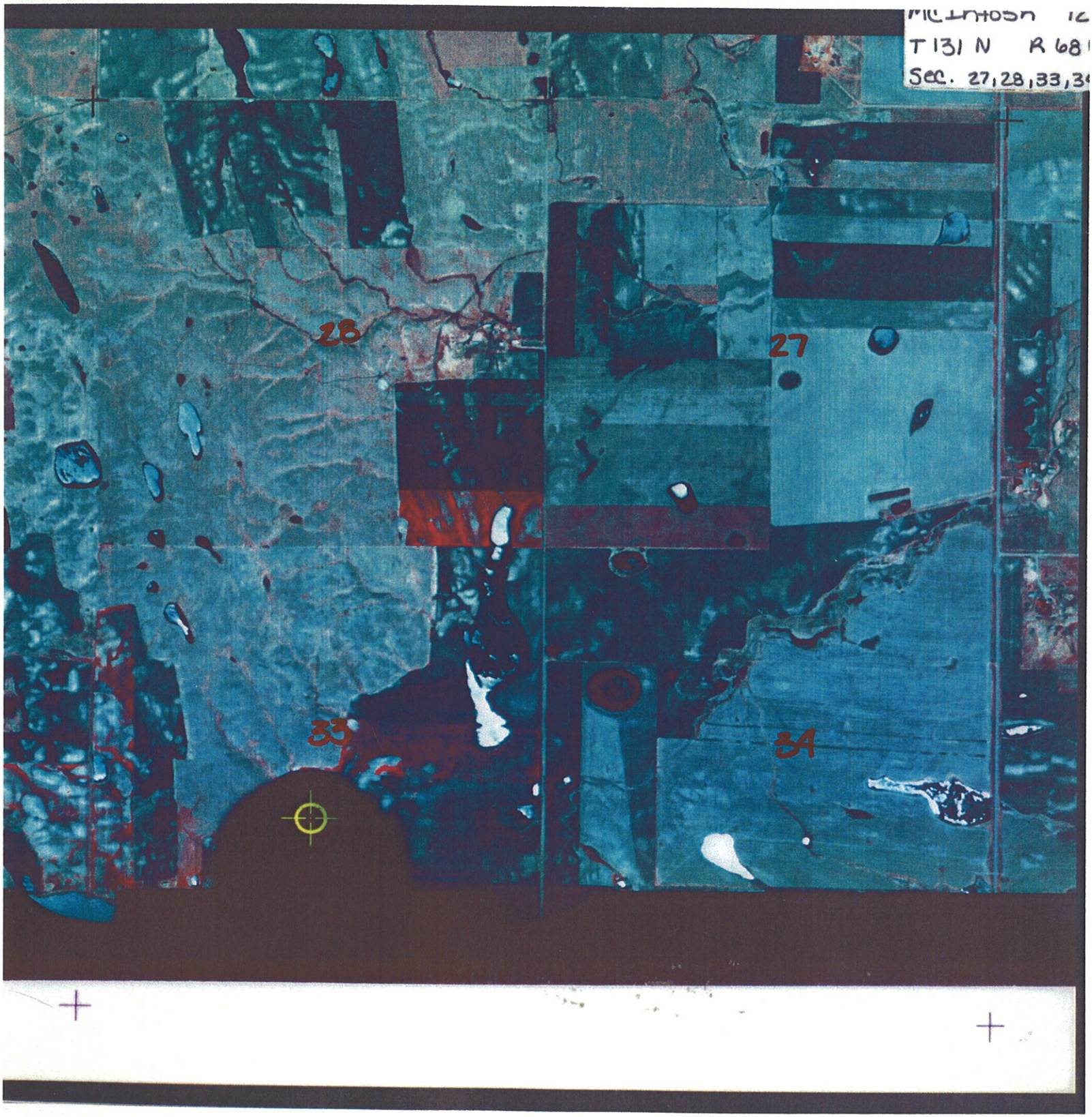
USFWS Aerial Photography, 1979



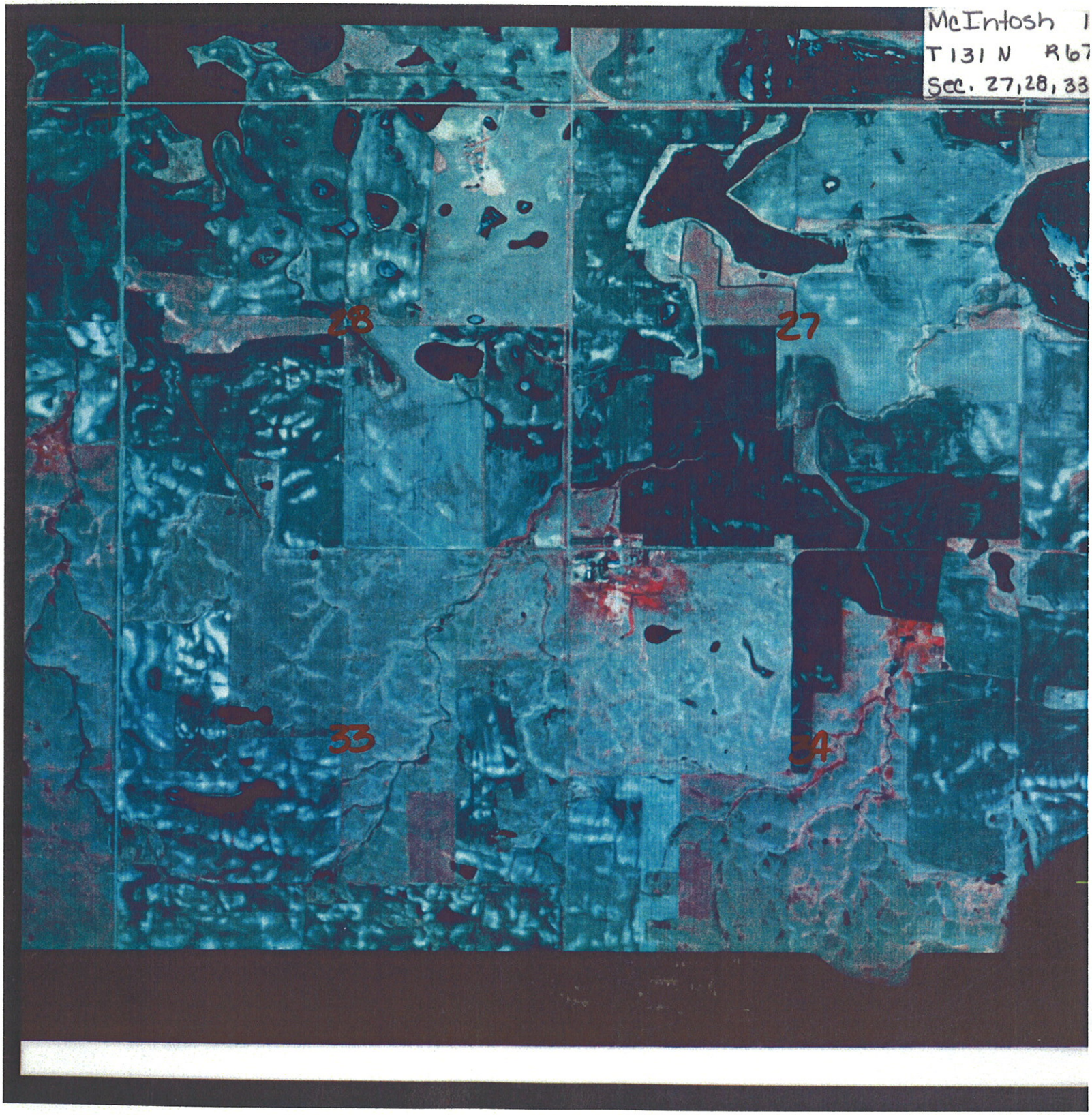
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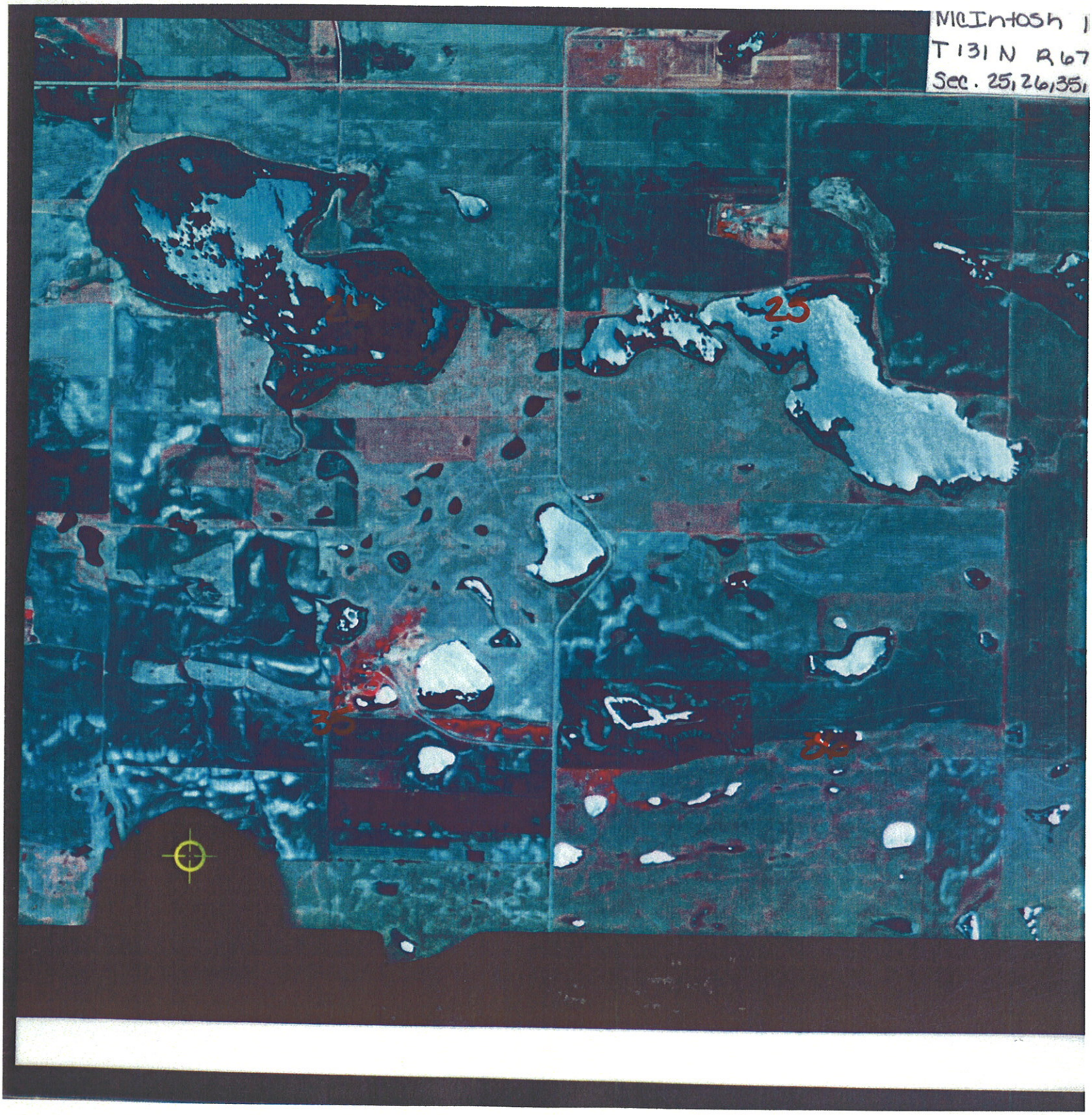
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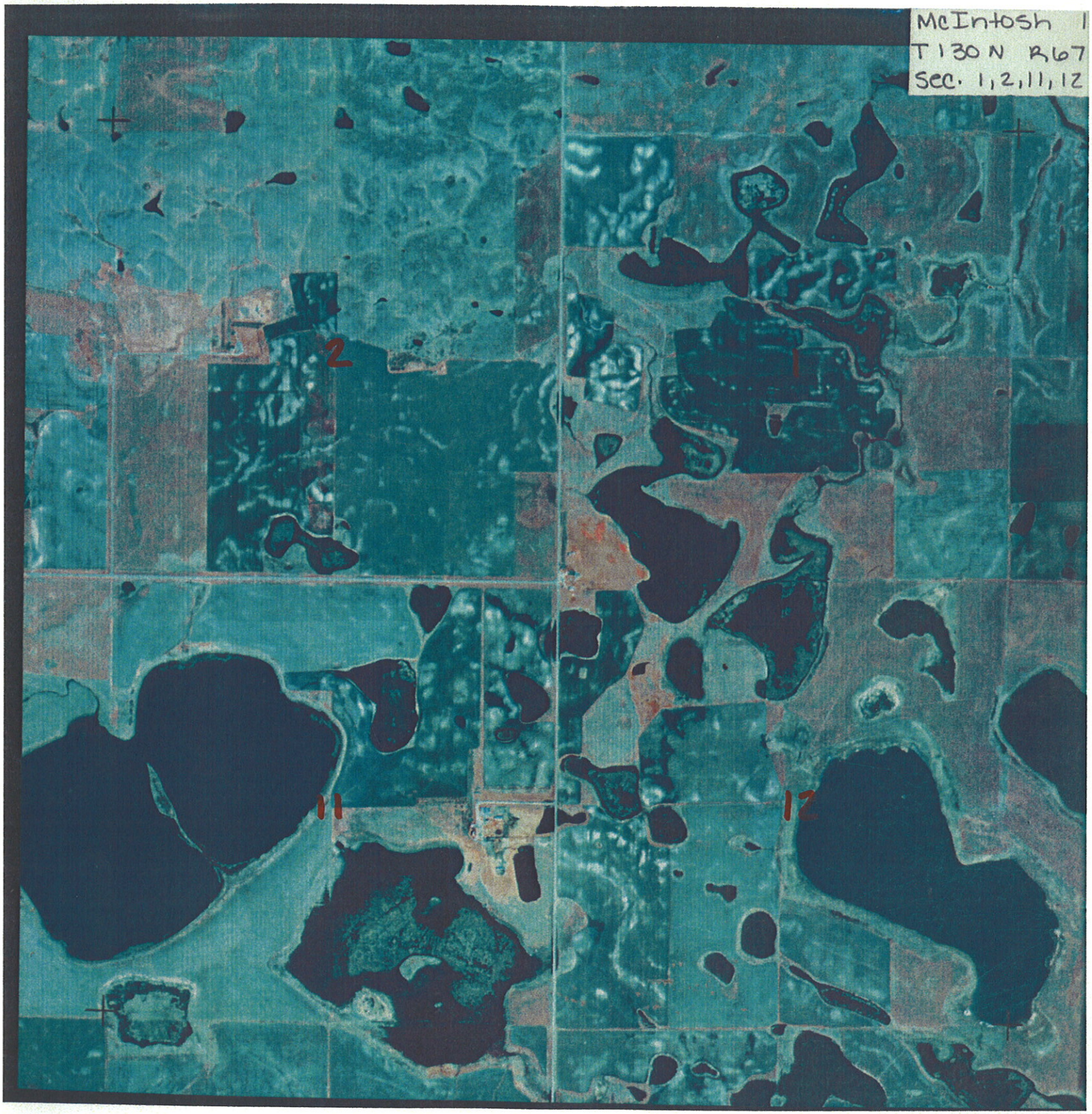
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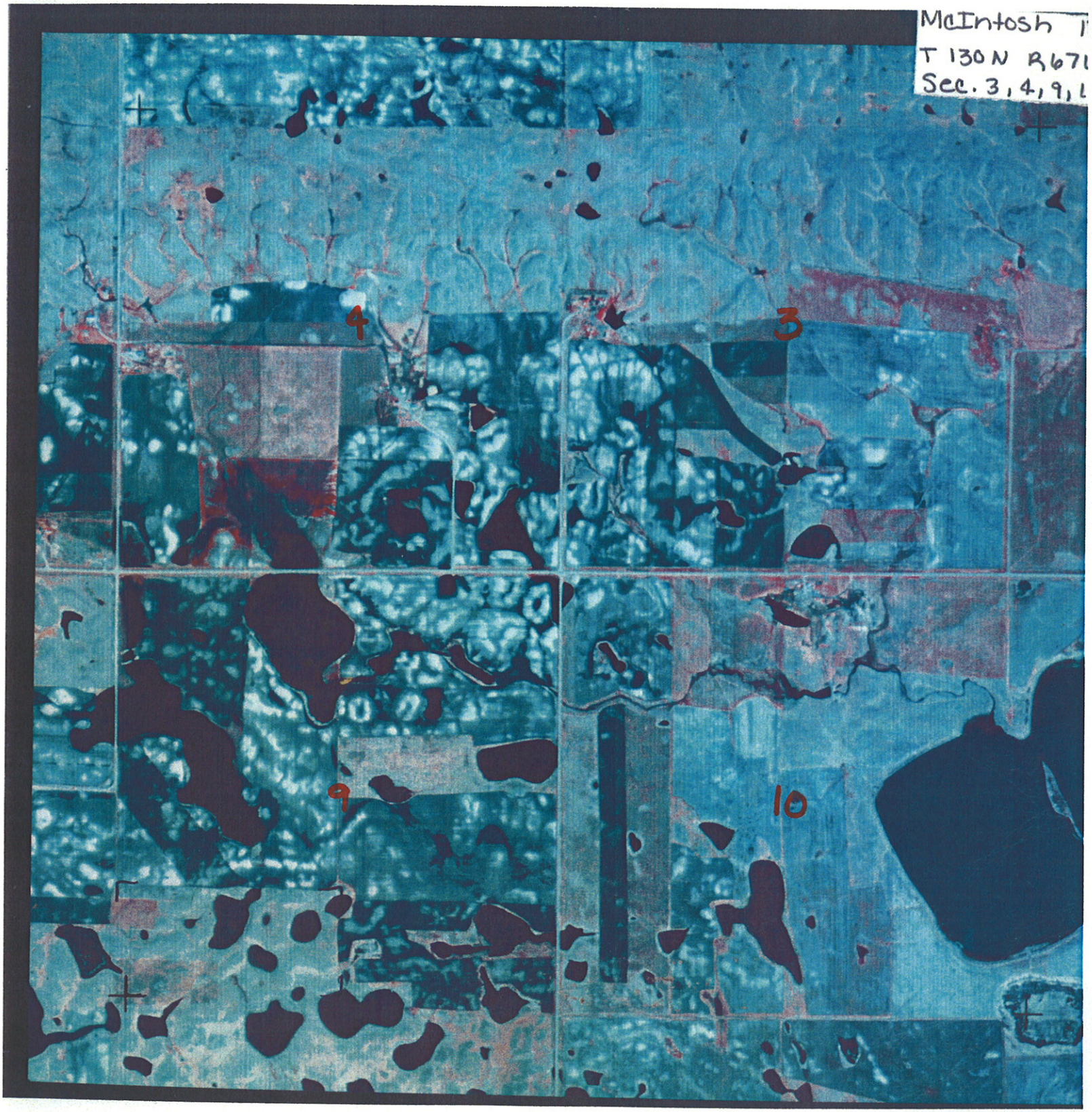
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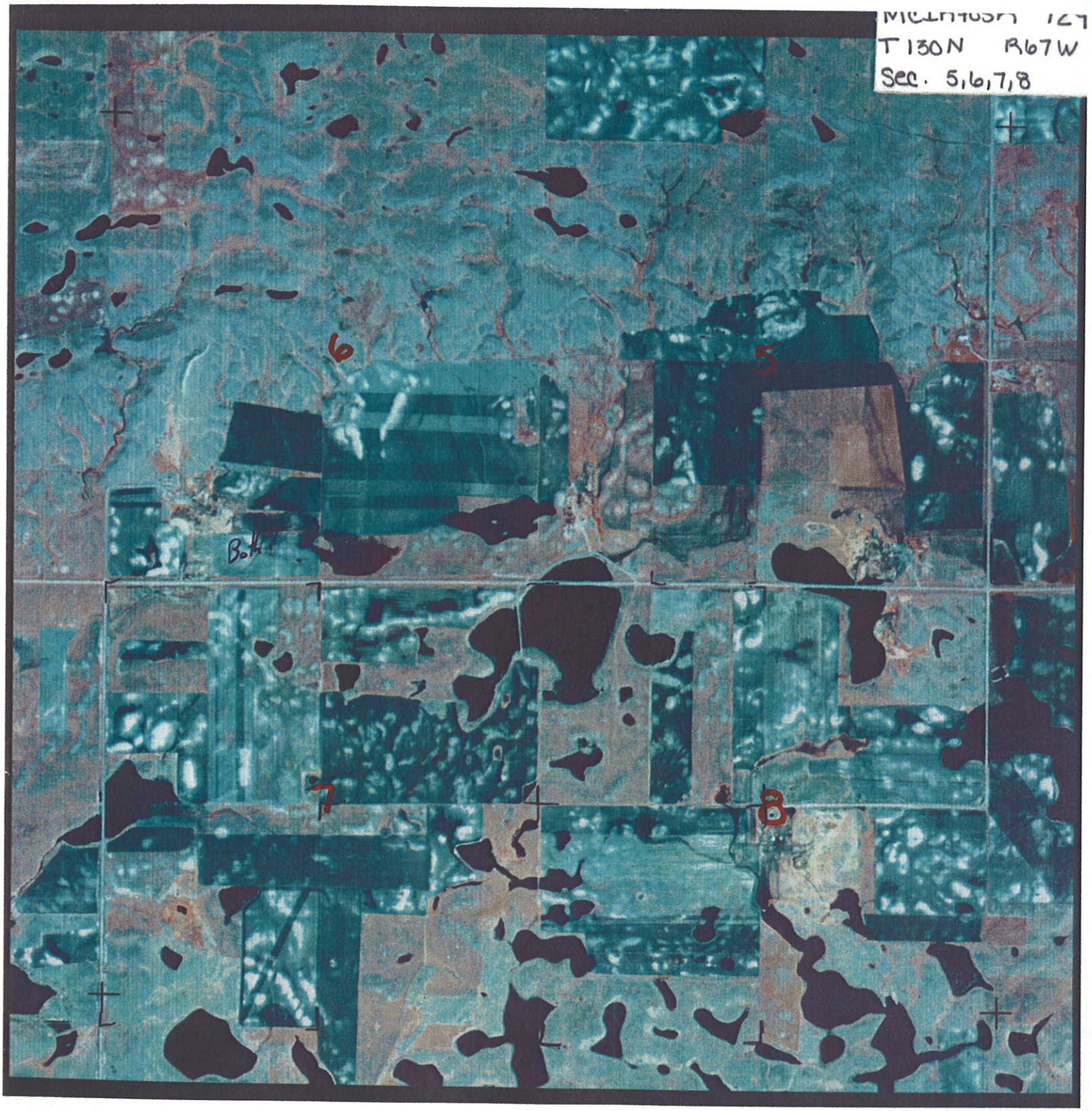
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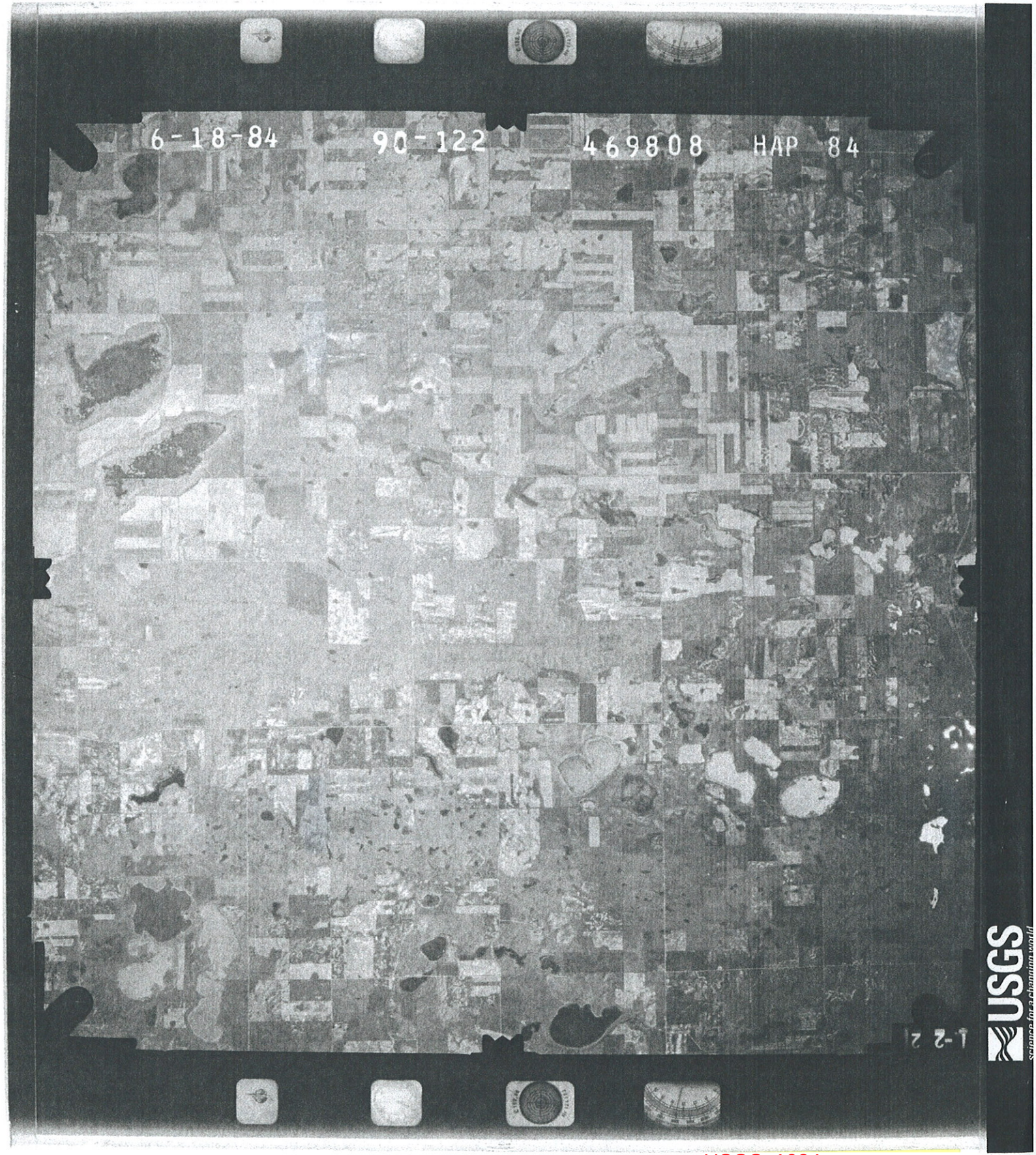


USFWS Aerial Photography, 1979

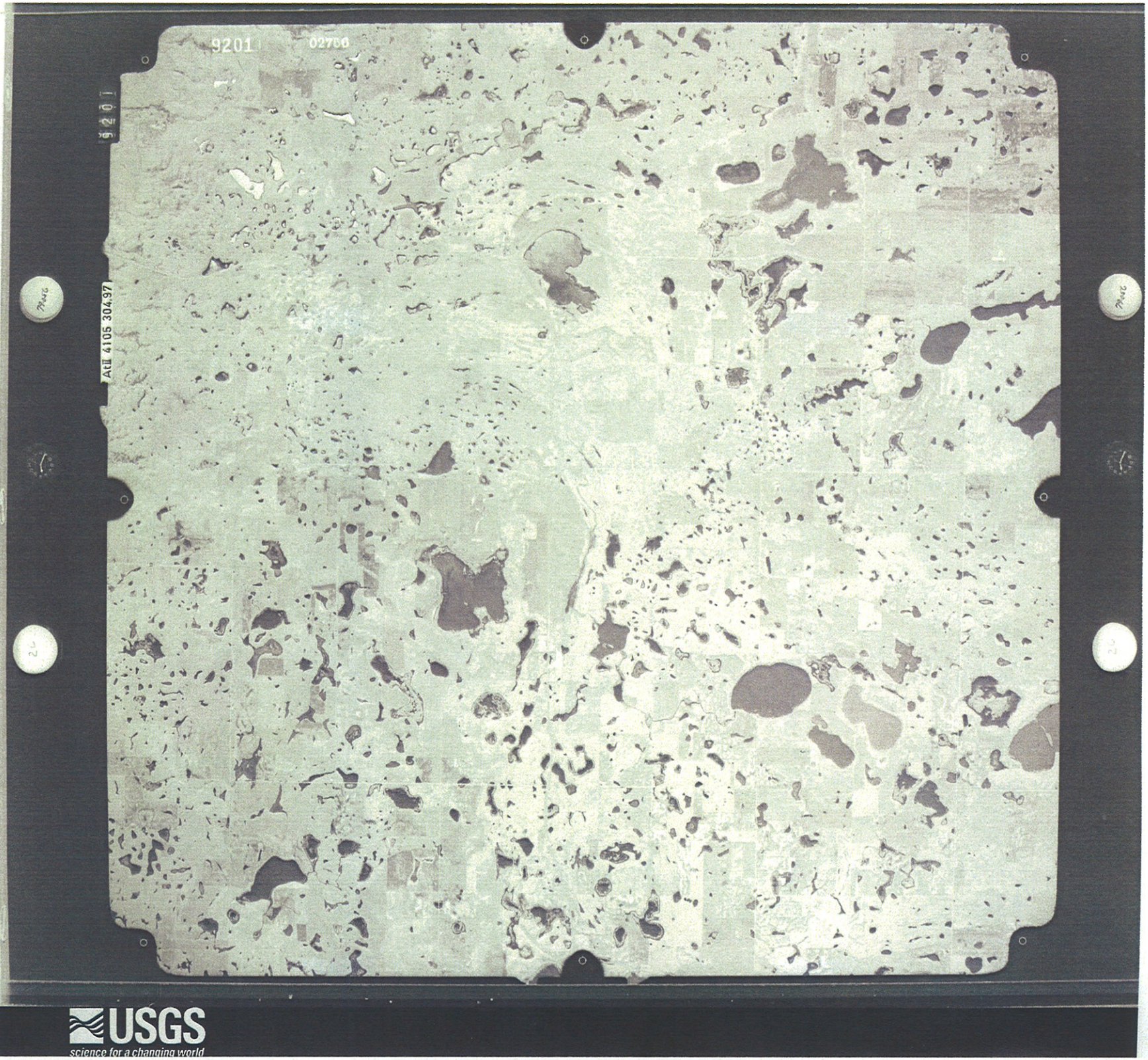


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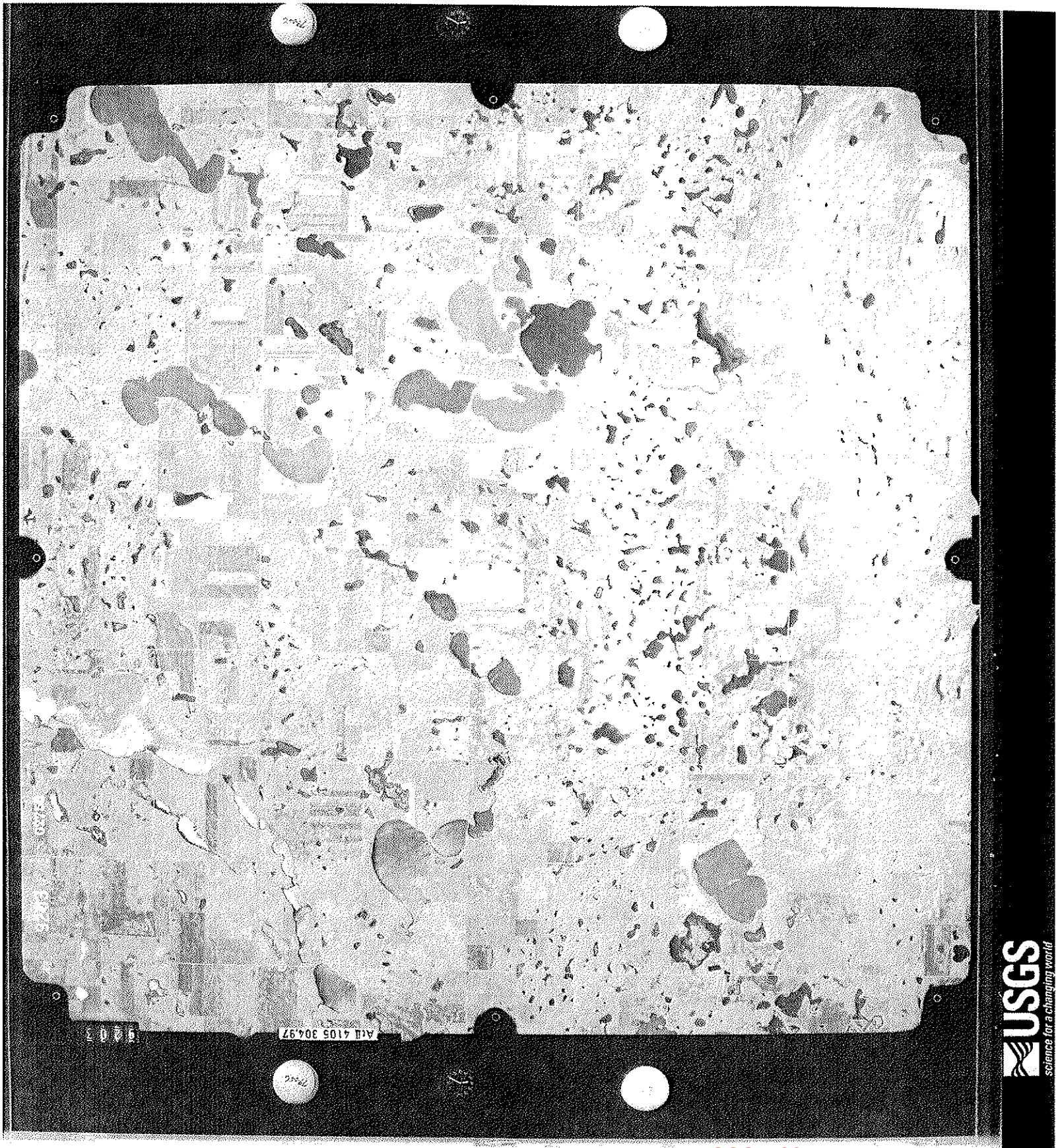


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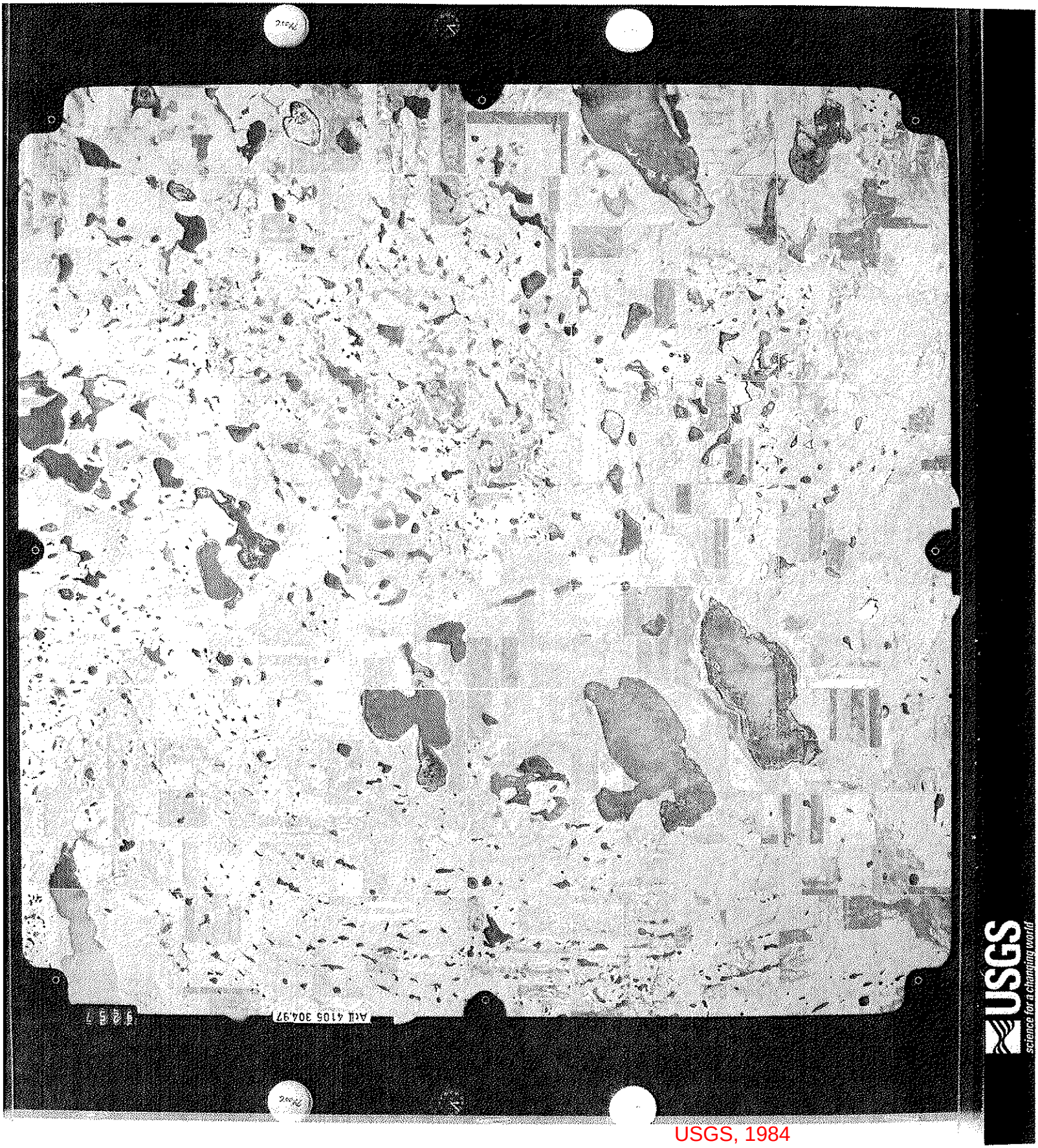


USGS, 1984

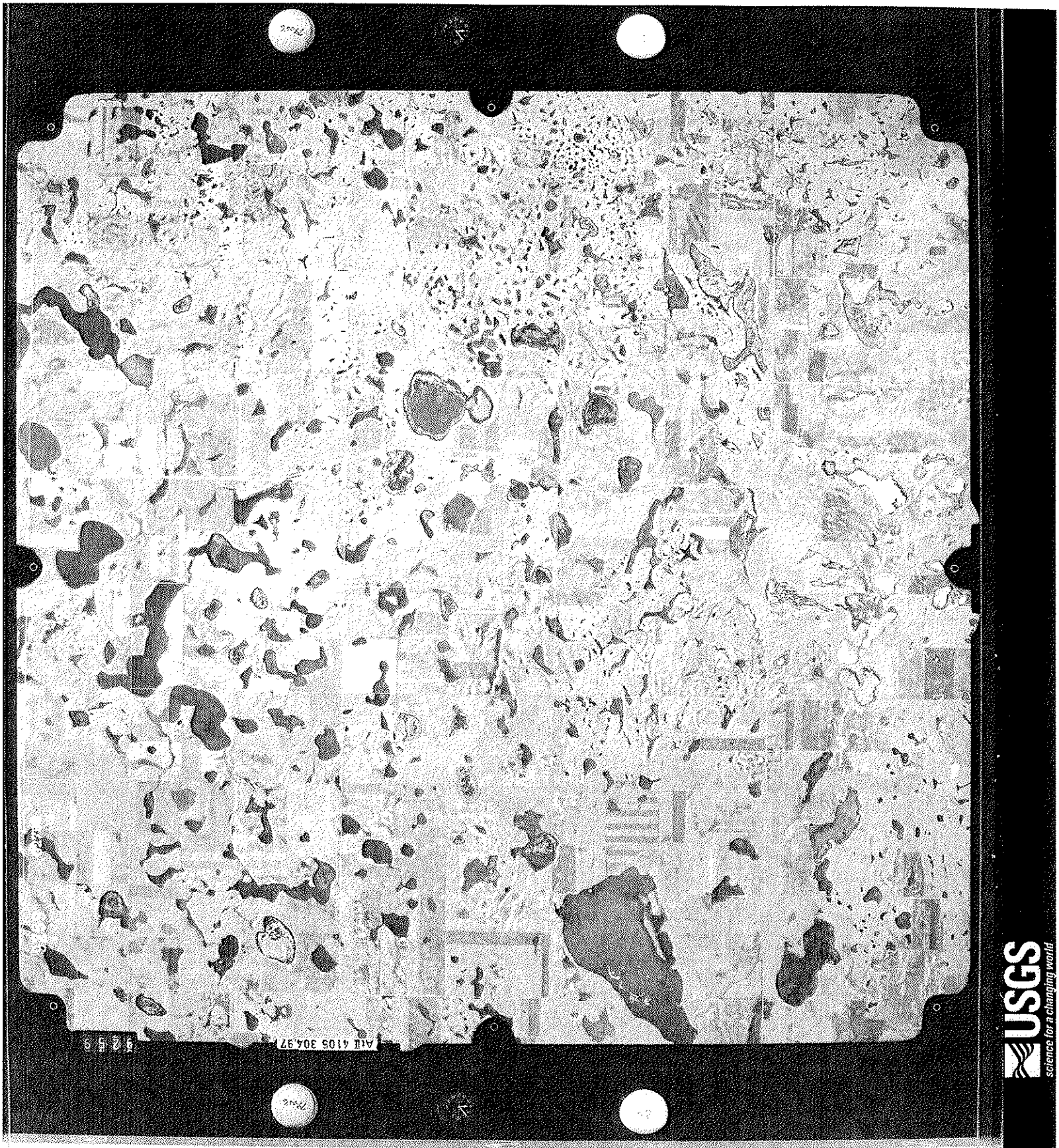
USGS
science for a changing world



USGS, 1984

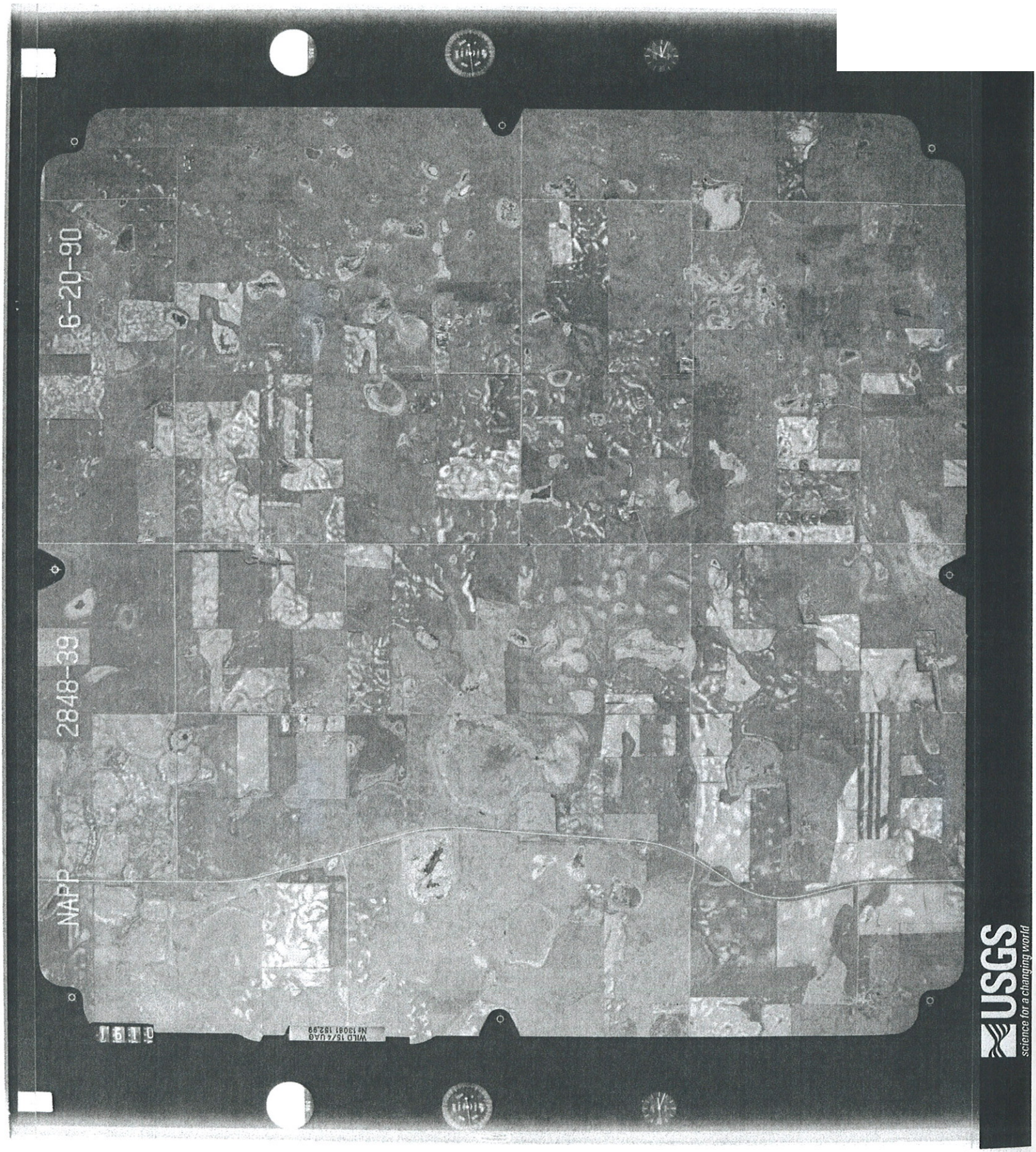


USGS, 1984

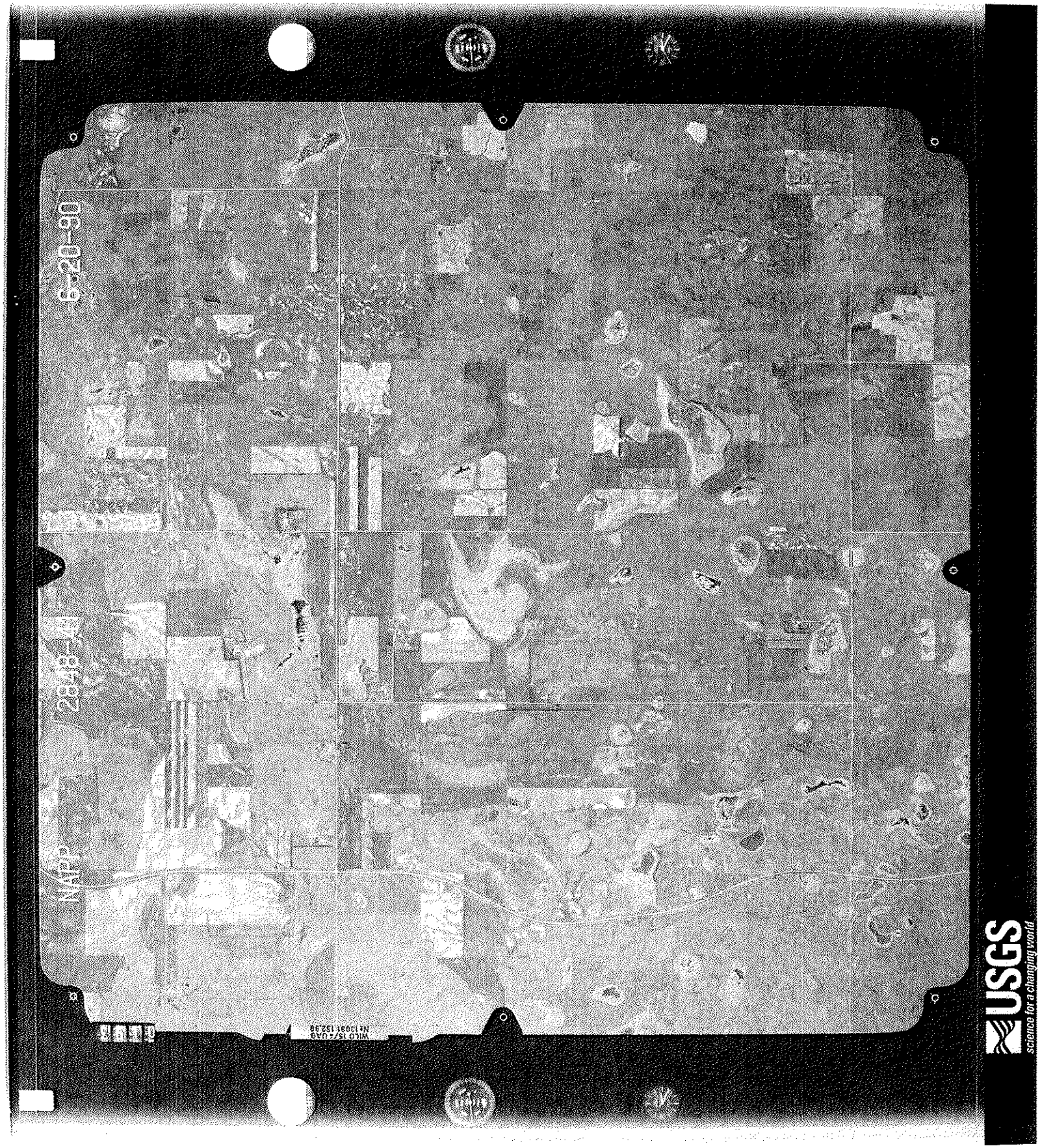


USGS, 1984

USGS, 1990



USGS, 1990



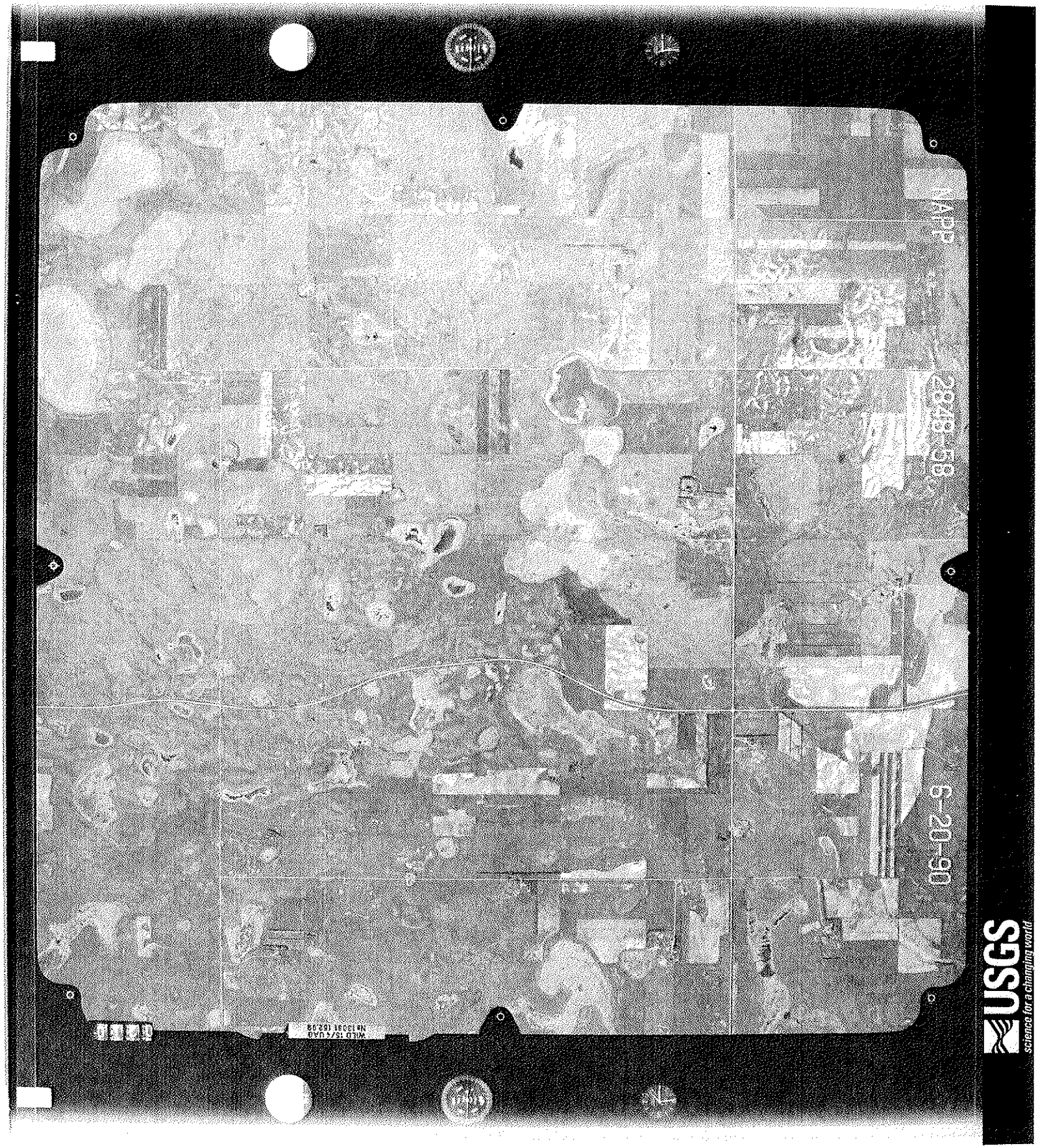
USGS, 1990



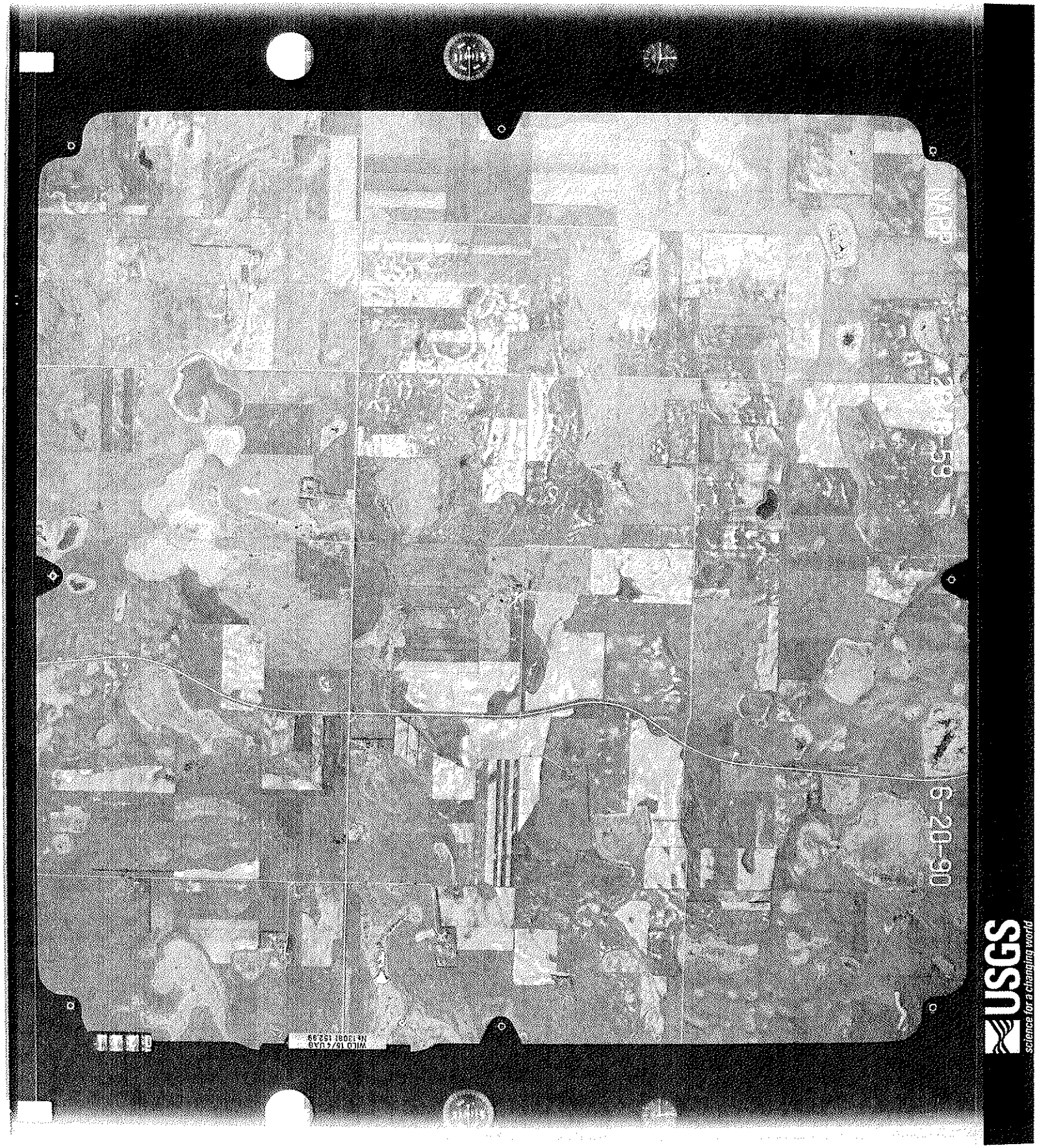
USGS, 1990



USGS, 1990



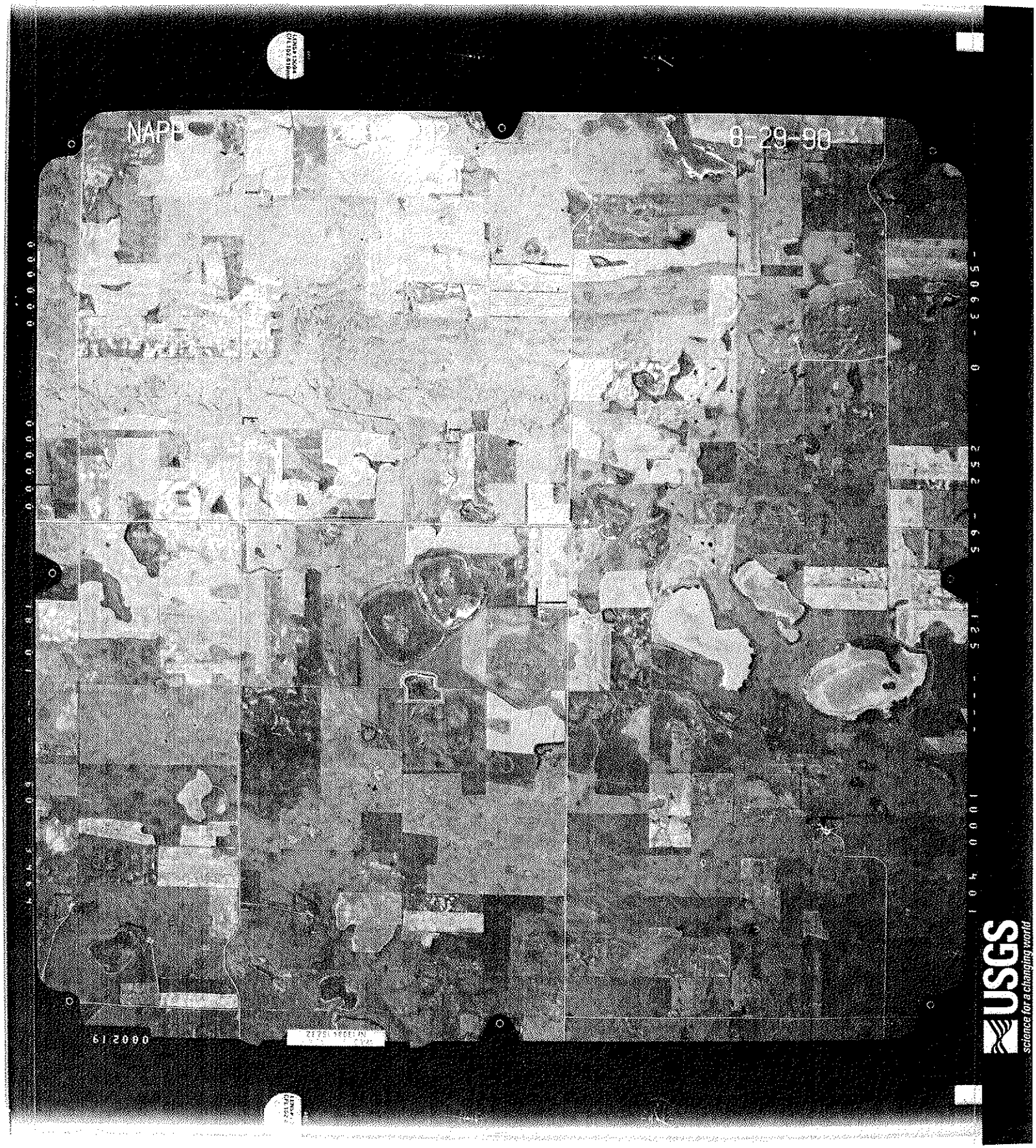
USGS, 1990



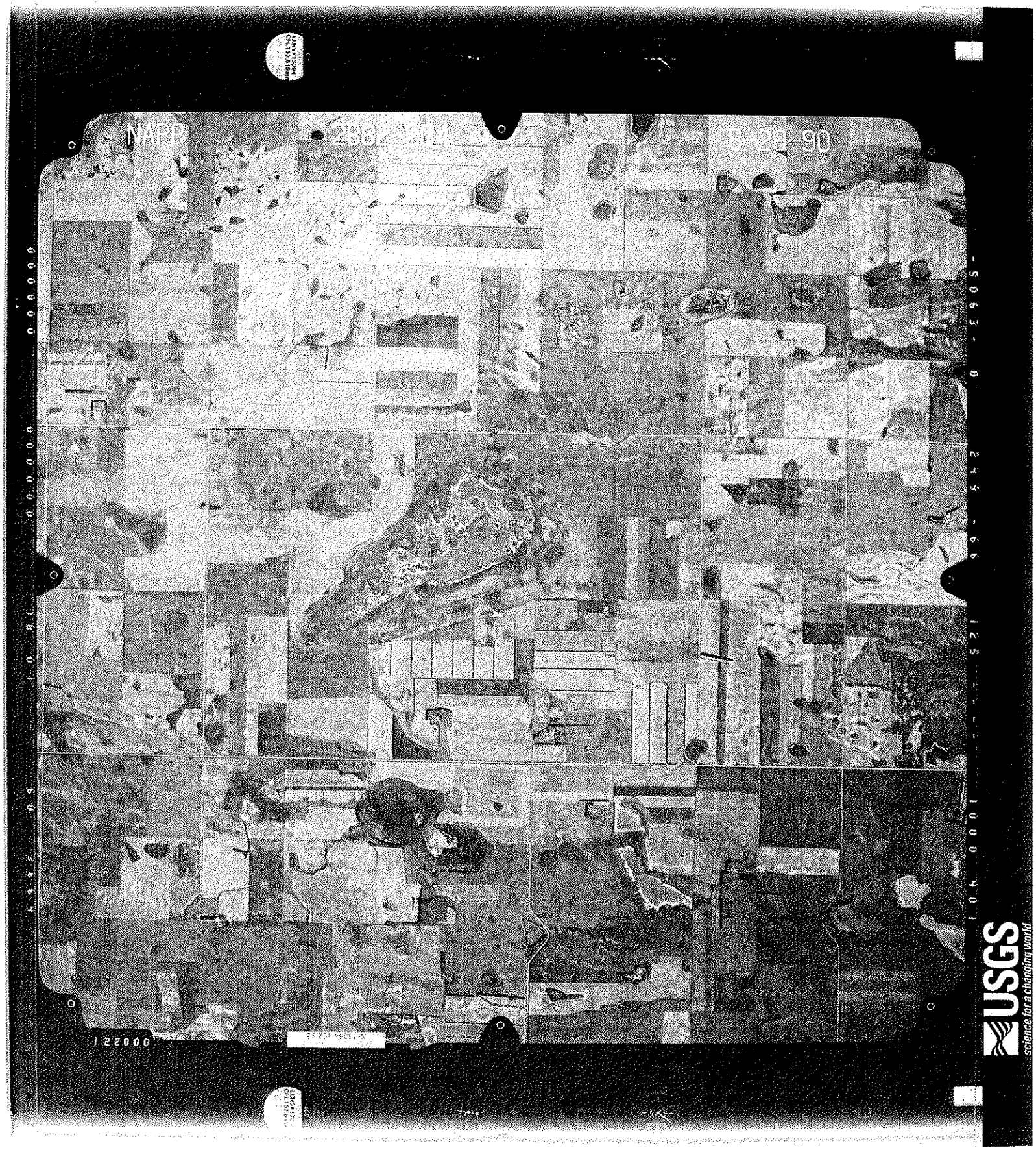
USGS, 1990



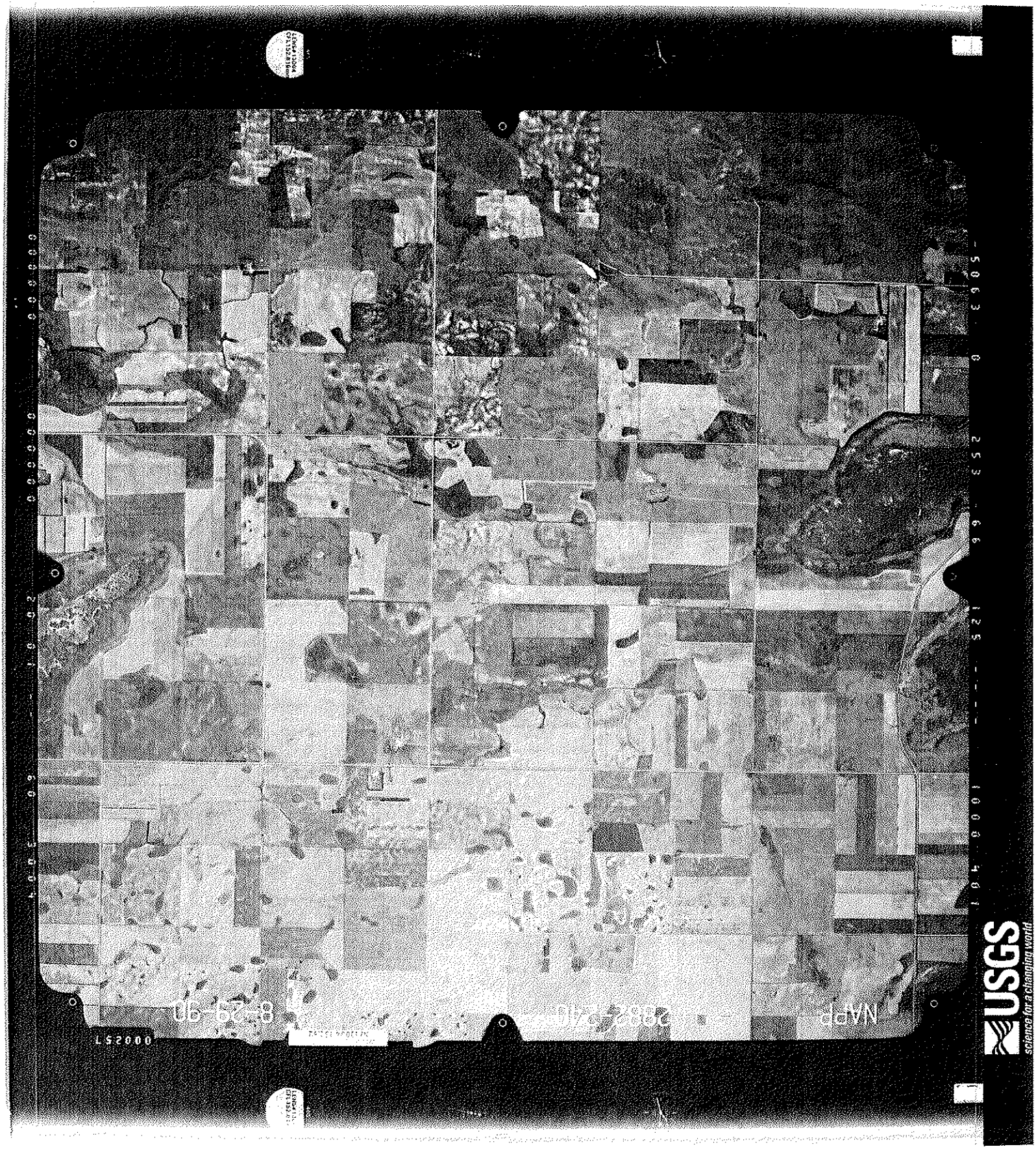
USGS, 1990



USGS, 1990



USGS, 1990



USGS, 1990

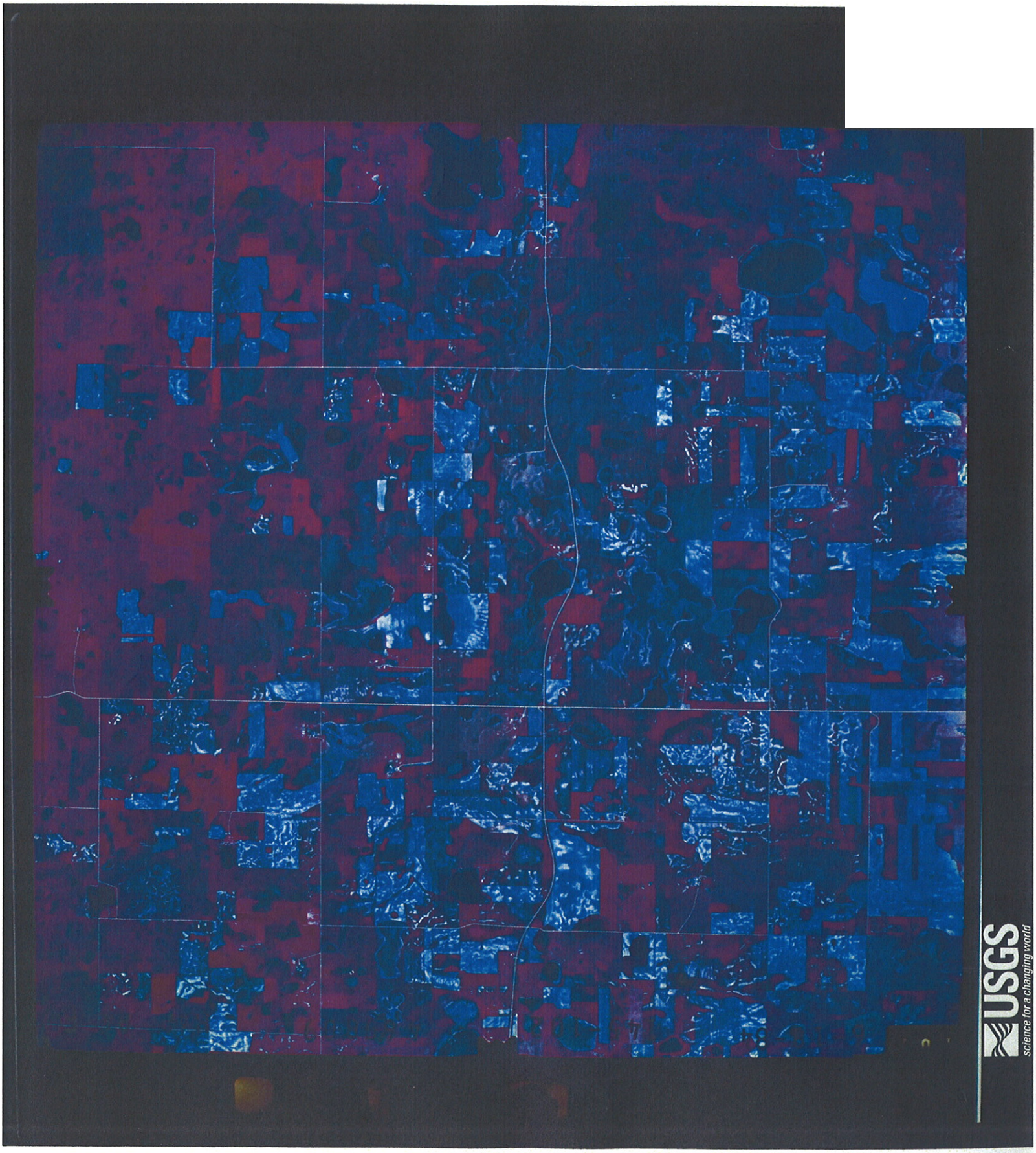


USGS, 1990

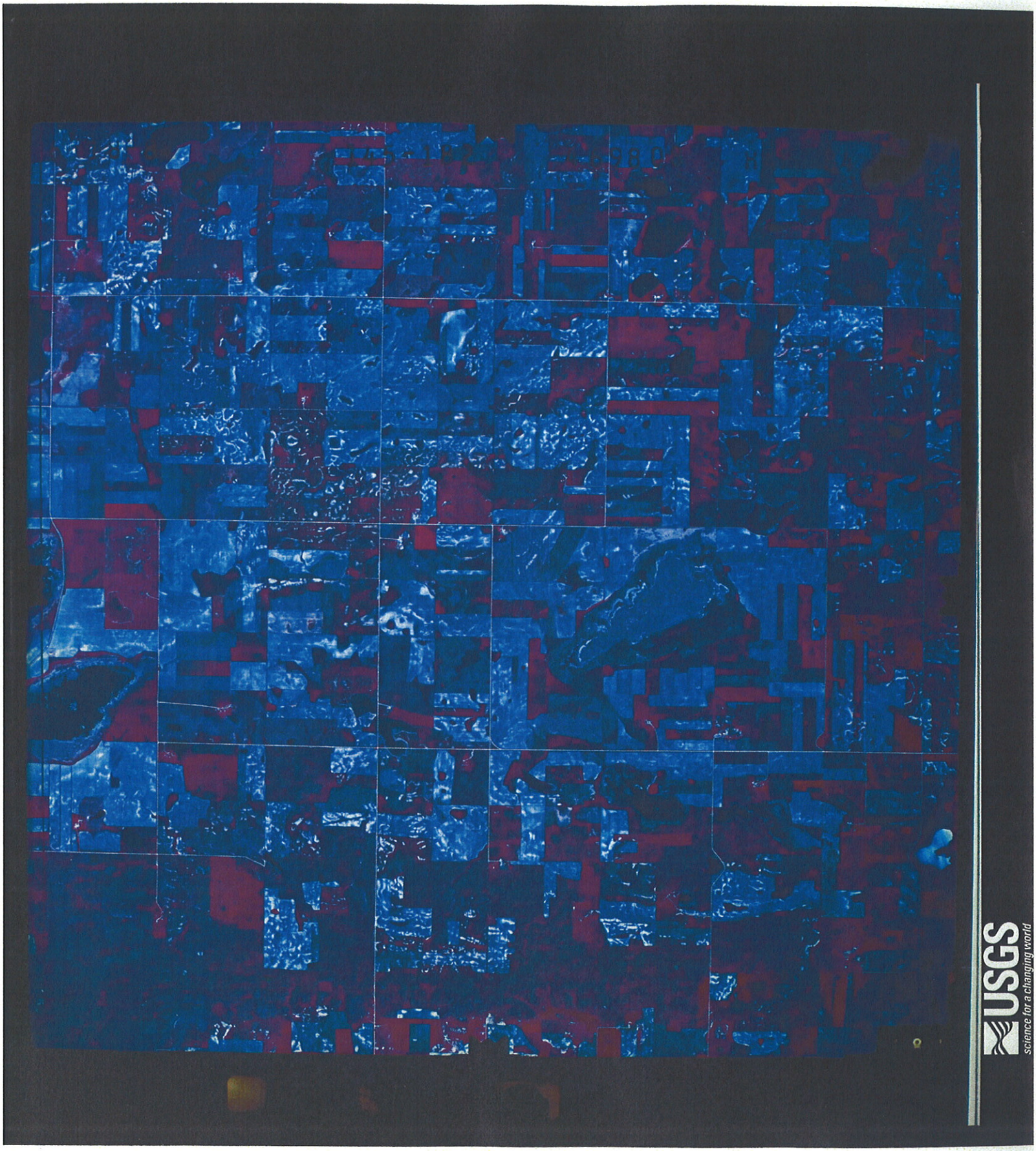



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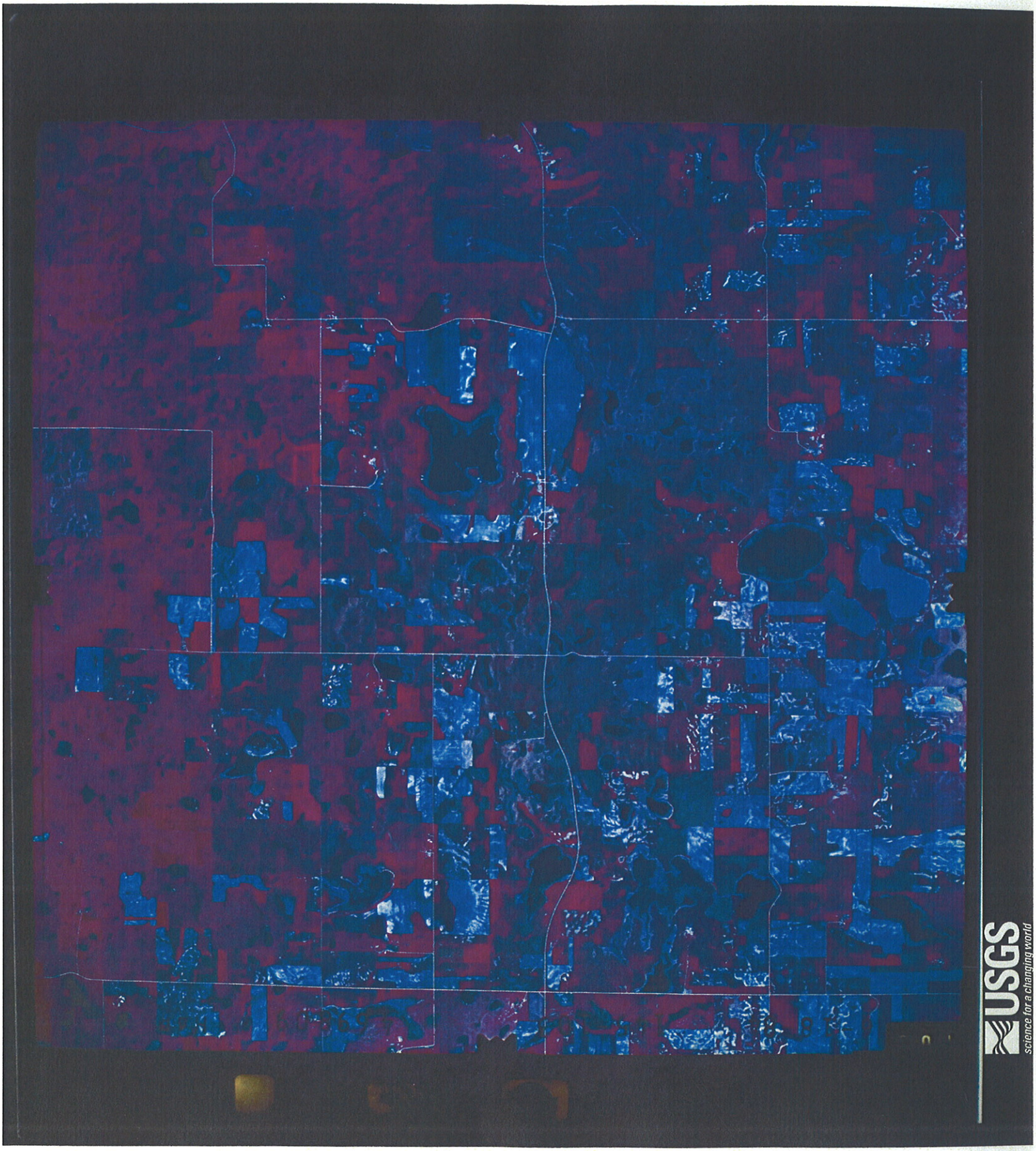
USGS, 2005



USGS, 2005



USGS, 2005



USGS
science for a changing world

USGS, 2005



Merricourt Wind Farm





McIntosh Co.

Dickey Co.

131068 131067 131066 131065

130068 130067 130066 130065

129068 129067 129066

56

National Wetland Inventory

USFWS Waterfowl Production Areas

USFWS Wildlife/Grassland Easements

ND Land Dept.

NDGF Plots Land

Project Boundary

Kadrmas Lee & Jackson

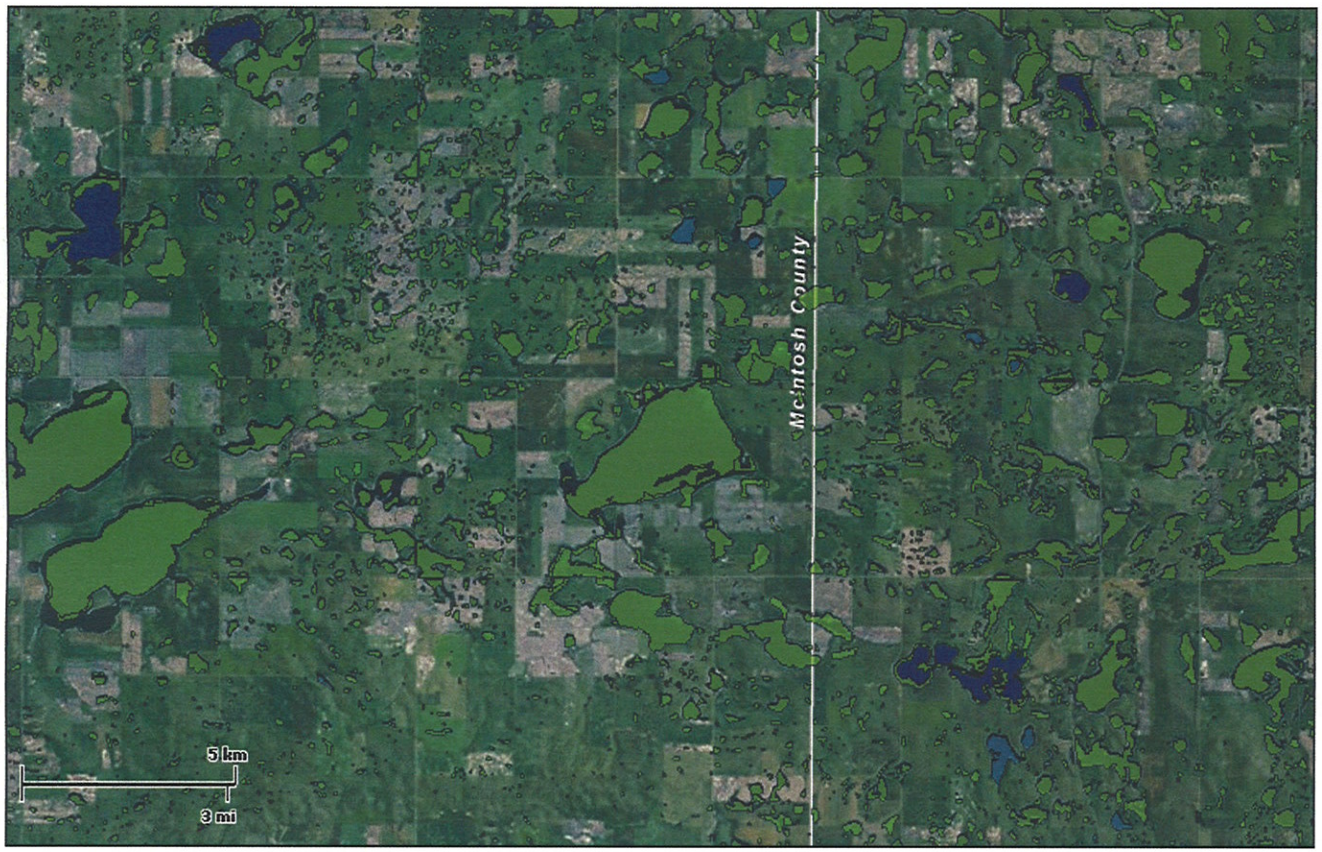
Engineers Surveyors Planners

U.S. Fish and Wildlife Service

National Wetlands Inventory

Merricourt Wind Farm North

Sep 2, 2010



Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deetwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

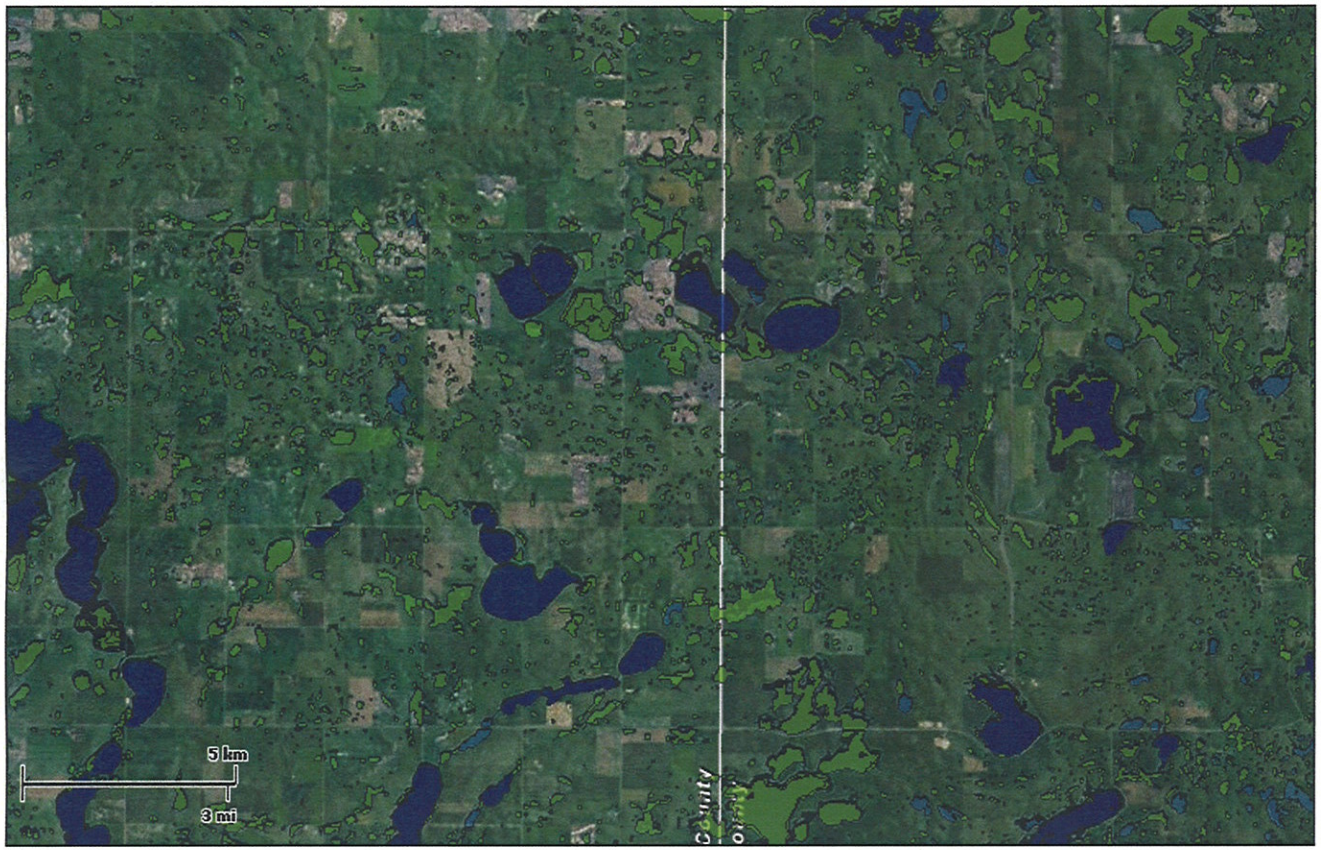
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U.S. Fish and Wildlife Service

National Wetlands Inventory

Merricourt Wind Farm South

Sep 2, 2010

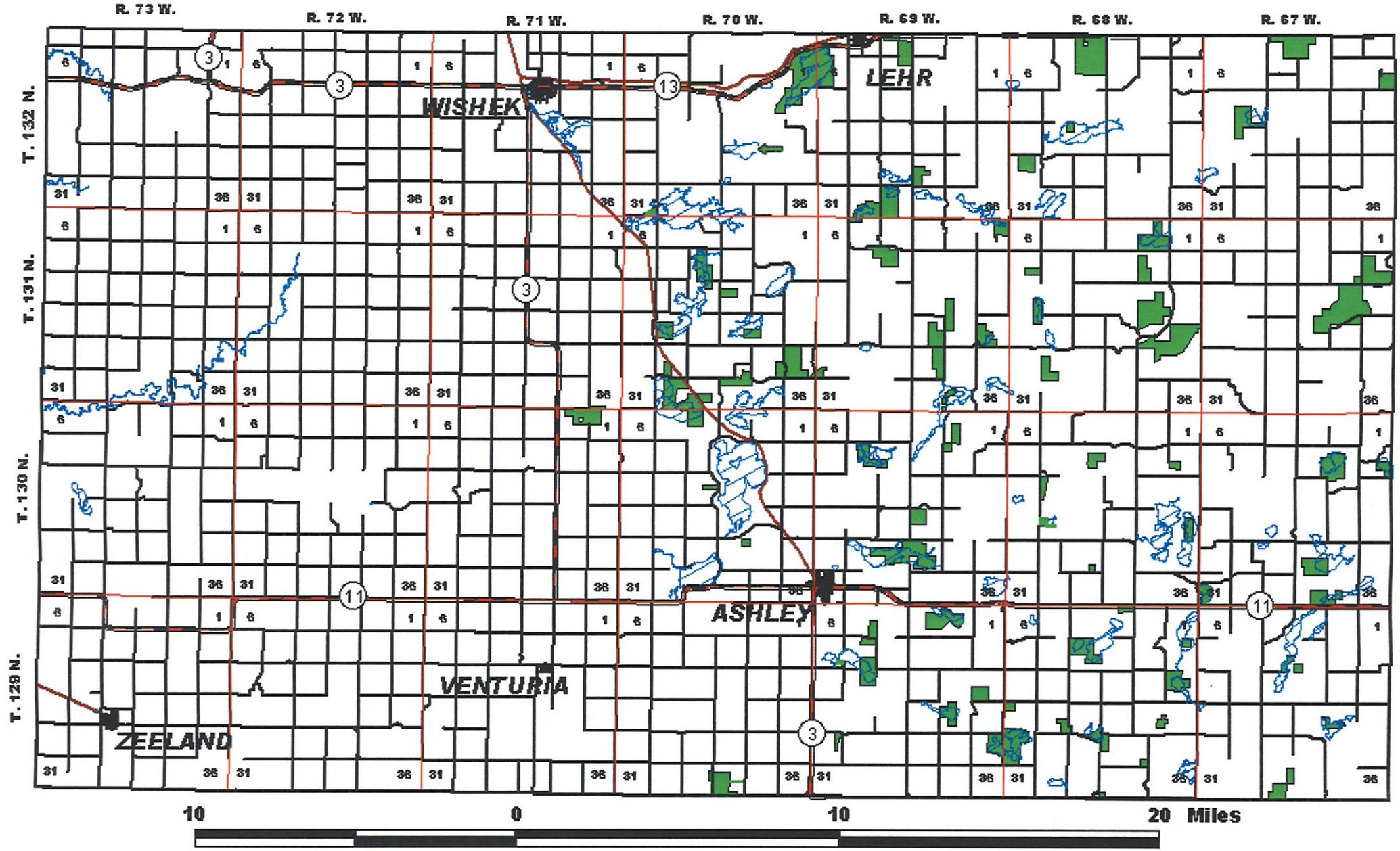


Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deetwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:



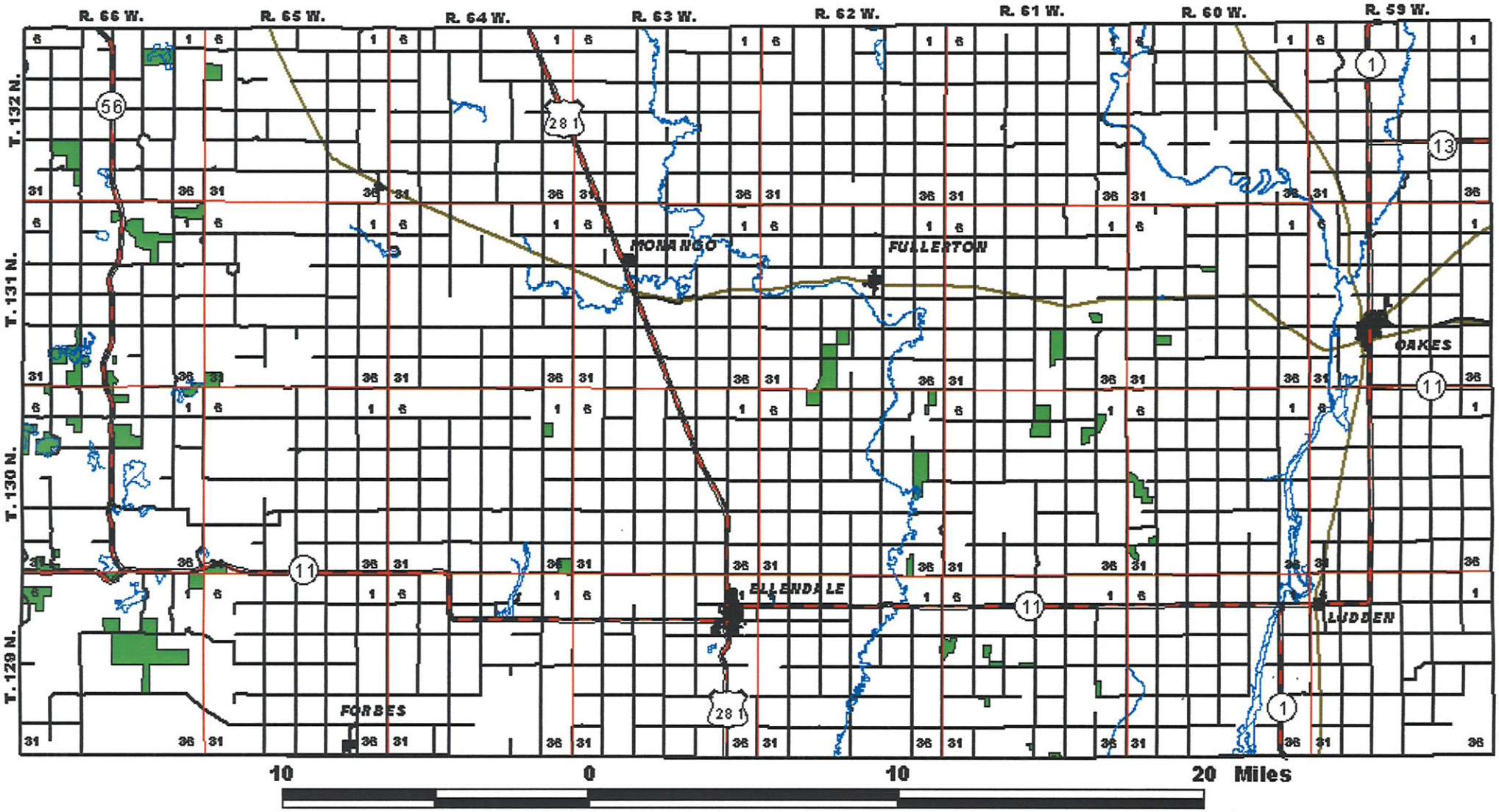
Waterfowl Production Areas

County Boundary
Township Boundaries

Major Highways
Lakes and Rivers

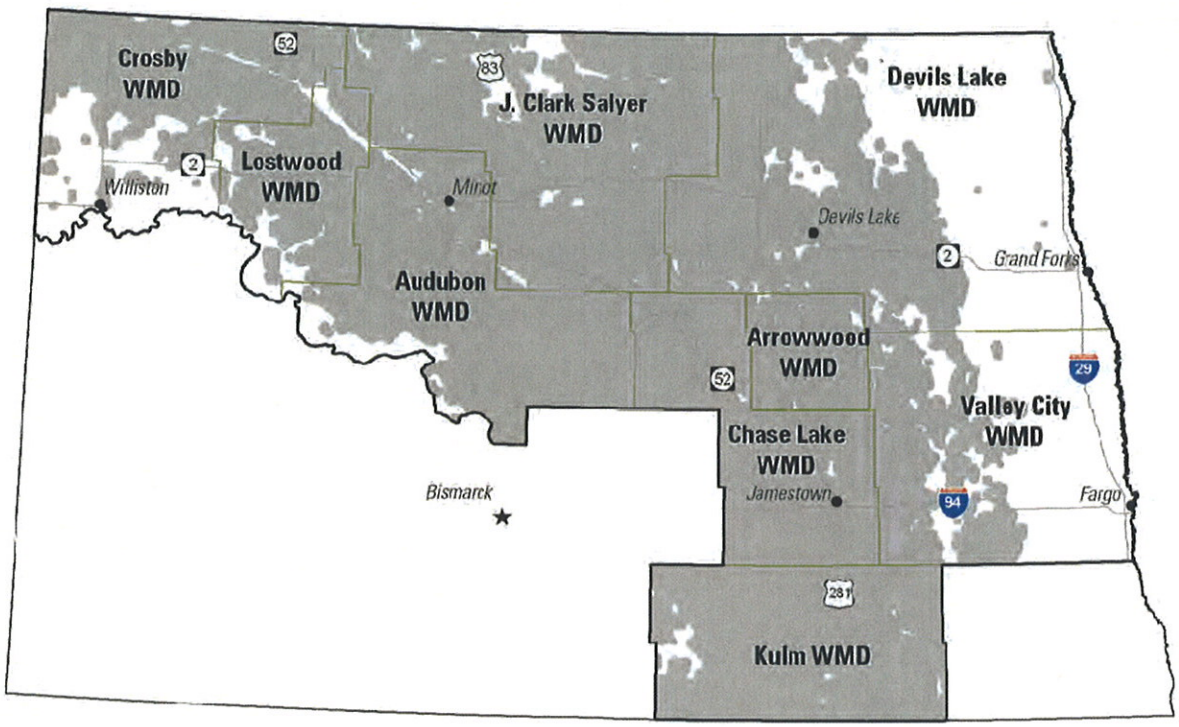
Secondary Roads and Trails
Railroads

McIntosh County, North Dakota **U.S. Fish & Wildlife Service** **Kulm Wetland Management District**



Dickey County, North Dakota **U.S. Fish & Wildlife Service** **Kulm Wetland Management District**

U.S. Fish & Wildlife Service



Wetland Priority Zone

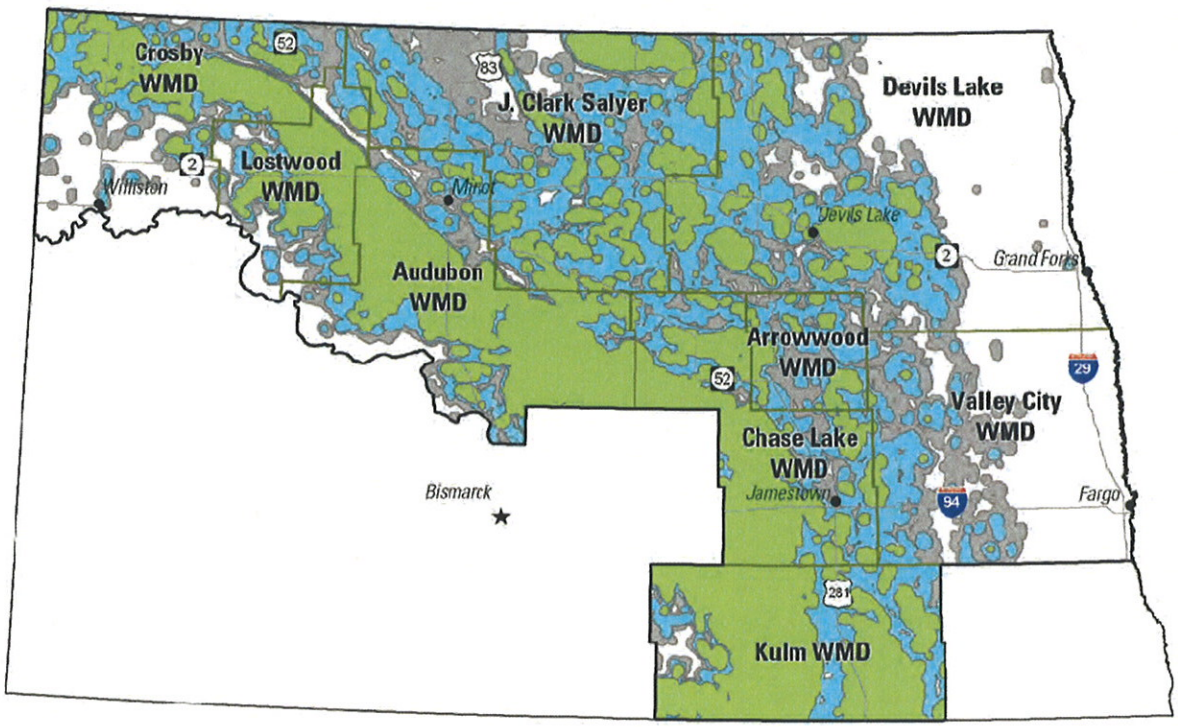
- >25 duck pairs per square mile
- CCP Project Area Boundary
- Wetland Management District (WMD) Boundary
- ★ Capital City
- ● Major City
- Major Road

0 50 100 Kilometers

0 50 100 Miles

N

U.S. Fish & Wildlife Service



Grassland Priority Zone

- Low (25-40 duck pairs/sq. mile)
- Medium (40-60 duck pairs/sq. mile)
- High (>60 duck pairs/sq. mile)
- CCP Project Area Boundary
- Wetland Management District (WMD) Boundary
- ★ Capital City
- • Major City
- Major Road

0 50 100 Kilometers

0 50 100 Miles

N

APPENDIX E:
NOISE ANALYSIS

EAPC Wind Energy
3100 Demers Avenue • Grand Forks • North Dakota • 58201
701.775.3000 • 701.772.3605 *fax* • www.eapc.net

Merricourt 187.5 MW Wind Farm
Preliminary Noise Analysis
Merricourt, North Dakota

April 23,

2010

Submitted To:
Chris Sternhagen
Project Manager - Development
enXco - an EDF Energies Nouvelles Company
10 Second Street NE, Ste 107
Minneapolis, MN 55413
Tel: 612.746.0770
E-mail: chriss@enXco.com

Submitted By:
Jay Haley, P.E., Partner
Brandon Storm, PhD
EAPC Architects Engineers
3100 DeMers Ave.
Grand Forks, ND 58201
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Report Update

EAPC bears no responsibility to update this report for any changes occurring subsequent to the final issuance of this report.

Revision History

Revision No.	Revision Purpose	Date	Revised By
0	Original	03/16/2010	B. Storm
1	Turbine version 15f (removal of T54)	04/23/2010	B. Storm

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APPENDIX A: WORST CASE NOISE MAP **2**

APPENDIX B: WORST CASE NOISE WINDPRO REPORT **4**

APPENDIX C: REALISTIC NOISE MAP **144**

APPENDIX D: REALISTIC NOISE WINDPRO REPORT **146**

EXECUTIVE SUMMARY

EAPC was hired by enXco to provide a preliminary noise analysis on residences within and surrounding the proposed wind farm of 125 G.E. 1.5sle wind turbines (187.5 MW) near Merricourt, ND. Coordinates of the proposed turbines as well as occupied residences were provided by enXco and Kadrmas, Lee and Jackson (KLJ). Locations denoted as farm sites and church/cemetery within KLJ's provided coordinates were analyzed in detail. Locations marked as buildings or building sites were only mapped for reference. A map of the turbine locations and assumed occupied residences is shown in the Appendicles.

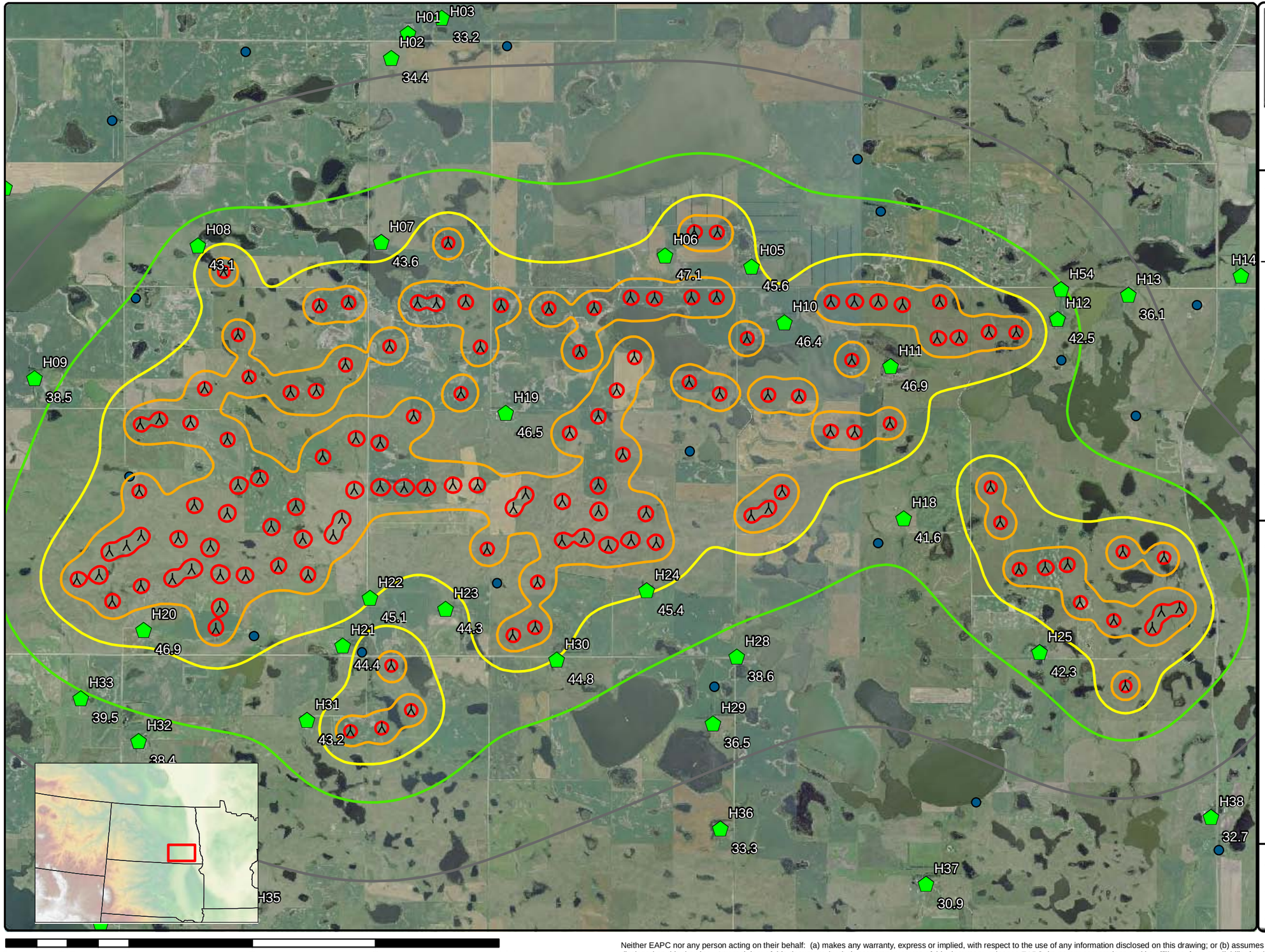
For preliminary screening purposes, an absolute worst case noise scenario was analyzed within WindPRO. The worst case scenario assumed that the wind turbines were operating at a wind speed that resulted in the loudest noise being emitted. According to the G.E. noise documentation provided to EAPC from the client, the loudest normal operating noise level emitted from the G.E. 1.5sle turbine is 104 dB(A). This noise emission level occurs for hub height wind speeds of 9 m/s and greater. The analysis also assumed the ISO 9613-2 General noise calculation model with no ground attenuation. Noise levels were modeled 1.5 m above ground level (AGL) at determined potential occupied residences. The worst case scenario resulted in eight locations being above 45 dB(A). Results and maps depicting the worst case noise scenario results are shown in Appendix A and Appendix B.

Due to the number of homes exceeding the 45 dB(A) level, which was determined by the client to be the desired threshold, a more refined analysis was performed. The refined analysis included the same assumptions and calculations as the worst case scenario, except the Alternative ground attenuation within WindPRO was used. This ground attenuation method takes into account local terrain (e.g. hills and valleys) as well as a porous surface. The results from the refined study can be found in Appendix C and Appendix D. All locations had a expected noise value below 45 dB(A).

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Appendix A: Worst Case Noise Map

The information presented in this report is subject to the Legal Notice and Disclaimer included at the beginning of the report



0 0.5 1 2 3 4 Miles

EAPC Wind Energy
3100 Demers Avenue • Grand Forks • North Dakota • 58201
701.775.3000 • 701.772.3605 fax • www.eapc.net

Merricourt, ND
Worst Case Noise
GE 1.5sle 187.5 MW

Client

Chris Sternhagen
enXco

Project Description

Worst case noise scenario for 187.5 MW GE 1.5sle layout (v15f). Assumes turbines at loudest level (104 dB(A)) and no ground attenuation within WindPRO.

Location: Merricourt, ND

Project #: 20102130

Issue Dates

#	Description	Date
1	Original	2010.04.23

Drawn By: BS *Checked By: JH*

Legend

- GE 1.5sle WTG
- Potential Occupied Residence

Realistic Noise Scenario (dB(A))

- 35
- 40
- 45
- 50
- 55
- Other Building Sites (non occupied)

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Appendix B: Worst Case Noise WindPRO Report

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Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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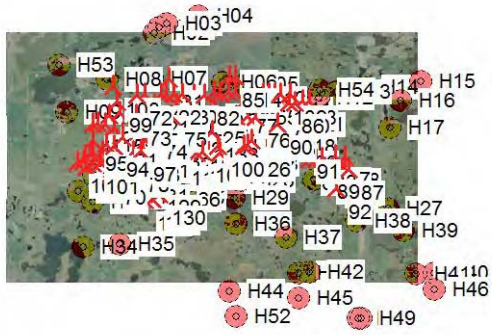
Licensed user:
EAPC Architects Engineers
3100 DeMers Avenue
US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net

Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Main Result

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)

Noise calculation model:
ISO 9613-2 General
Wind speed:
9.0 m/s
Ground attenuation:
None
Meteorological coefficient, C0:
0.0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Pure and Impulse tone penalty are added to WTG source noise
Height above ground level, when no value in NSA object:
1.5 m Allow override of model height with height from NSA object
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0.0 dB(A)



Scale 1:400,000

New WTG Noise sensitive area

WTGs

	UTM NAD83 Zone: 14 East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	Wind speed	Hub height	LwA,ref	Pure tones	Octave data
	UTM NAD83 Zone: 14		[m]					[kW]	[m]	[m]			[m/s]	[m]	[dB(A)]		
1	490,965	5,108,120	640.1	1	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
2	491,148	5,108,571	632.3	2	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
3	491,727	5,108,716	640.1	3	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
4	493,034	5,109,690	608.5	4	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
5	492,992	5,108,880	621.8	5	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
6	492,273	5,108,516	643.1	6	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
7	494,058	5,107,274	661.7	7	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
8	490,312	5,108,098	626.5	8	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
9	491,450	5,107,902	650.3	9	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
10	491,587	5,107,303	673.6	10	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
11	490,133	5,106,507	676.7	11	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
12	490,322	5,106,643	676.7	12	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
13	490,807	5,106,607	685.8	13	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
14	491,225	5,106,500	685.8	14	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
15	492,019	5,106,760	679.7	15	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
16	492,343	5,107,028	673.0	16	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
17	489,908	5,106,439	673.6	17	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
18	489,773	5,106,126	667.0	18	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
19	490,981	5,106,204	673.2	19	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
20	492,111	5,106,244	661.4	20	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
21	493,565	5,109,117	624.8	21	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
22	494,178	5,109,682	606.6	22	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
23	494,563	5,109,697	608.7	23	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
24	493,930	5,109,687	606.6	24	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
25	496,532	5,108,542	603.5	25	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
26	493,882	5,108,206	632.9	26	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
27	495,917	5,107,986	614.9	27	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
28	495,345	5,107,187	649.1	28	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
29	494,752	5,109,105	609.6	29	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
30	495,024	5,109,653	595.8	30	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
31	494,330	5,110,469	606.6	31	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
32	496,764	5,108,977	600.5	32	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
33	495,645	5,109,612	594.4	33	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
34	494,394	5,107,309	652.7	34	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
35	493,754	5,107,275	663.7	35	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
36	493,443	5,107,280	664.5	36	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
37	494,718	5,107,307	649.2	37	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
38	496,292	5,108,204	606.6	38	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
39	496,291	5,107,310	638.8	39	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
40	495,470	5,105,445	624.8	40	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
41	496,298	5,106,965	658.4	41	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
43	495,183	5,107,002	658.7	43	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
44	496,423	5,106,509	673.6	44	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
45	496,720	5,106,582	667.5	45	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
46	495,497	5,106,032	635.8	46	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
48	497,477	5,108,649	600.5	48	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
49	497,506	5,109,758	594.4	49	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
50	493,125	5,107,917	648.9	50	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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DECIBEL - Main Result

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)

...continued from previous page

	UTM NAD83 Zone: 14				WTG type							Noise data						
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Creator	Name	Wind speed	Hub height	LwA,ref	Pure tones	Octave data
	UTM NAD83 Zone: 14		[m]					[kW]	[m]	[m]			[m/s]	[m]	[dB(A)]		
51	497,029	5,109,742	591.3	51	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
52	496,713	5,109,755	591.3	52	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
53	497,840	5,109,759	599.9	53	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
55	499,330	5,109,696	595.1	55	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
56	499,638	5,109,702	600.5	56	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
57	499,602	5,108,937	597.4	57	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
58	496,048	5,109,045	595.2	58	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
59	499,950	5,109,699	603.9	59	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
60	501,393	5,109,304	612.1	60	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
61	501,750	5,109,300	606.1	61	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
62	501,414	5,107,279	615.7	62	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
63	501,784	5,106,203	624.8	63	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
64	503,022	5,105,538	621.8	64	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
65	503,647	5,105,647	621.8	65	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
66	495,174	5,105,339	618.7	66	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
67	503,142	5,106,435	618.7	67	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
68	503,679	5,106,358	612.1	68	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
69	503,527	5,105,436	621.8	69	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
70	491,296	5,105,430	626.0	70	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
71	491,878	5,107,400	667.5	71	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
72	492,646	5,109,647	612.6	72	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
73	492,611	5,108,539	635.3	73	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
74	493,444	5,107,858	652.3	74	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
75	494,498	5,108,503	613.4	75	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
76	498,913	5,108,467	606.5	76	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
77	498,235	5,109,222	594.4	77	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
78	492,503	5,106,122	646.1	78	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
80	501,006	5,109,227	614.8	80	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
81	490,731	5,106,077	671.6	81	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
82	496,237	5,109,617	594.4	82	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
83	502,422	5,106,264	621.2	83	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
85	497,544	5,110,614	594.4	85	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
86	500,716	5,109,217	610.0	86	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
87	503,880	5,105,693	618.7	87	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
89	502,583	5,105,769	623.6	89	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
90	500,101	5,108,112	611.4	90	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
91	501,541	5,106,814	618.9	91	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
92	503,174	5,104,680	618.7	92	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
94	491,447	5,106,932	680.7	94	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
95	490,296	5,107,226	660.4	95	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
97	492,829	5,106,648	682.9	97	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
98	491,016	5,107,045	675.9	98	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
99	491,587	5,109,269	624.8	99	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
100	496,917	5,106,943	648.0	100	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
101	490,319	5,105,984	667.5	101	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
102	496,106	5,106,616	677.3	102	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
103	489,484	5,106,071	665.0	103	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
104	495,824	5,107,098	649.7	104	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
107	491,687	5,106,123	667.5	107	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
108	491,399	5,110,092	610.8	108	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
109	500,266	5,109,661	607.2	109	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
110	497,878	5,108,500	601.9	110	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
111	498,507	5,108,481	607.1	111	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
113	491,356	5,106,130	667.5	113	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
114	497,846	5,110,606	594.4	114	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
115	490,562	5,108,163	627.9	115	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
116	494,841	5,106,468	667.5	116	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
118	500,750	5,109,701	609.6	118	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
119	492,694	5,107,675	658.4	119	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
120	489,947	5,105,780	658.4	120	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
121	493,103	5,107,245	665.3	121	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
125	502,127	5,106,227	621.8	125	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
126	498,288	5,106,902	637.0	126	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
127	498,513	5,106,995	637.0	127	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
128	498,692	5,107,222	636.3	128	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
129	493,588	5,104,945	627.9	129	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
130	493,847	5,104,363	627.9	130	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
131	493,464	5,104,131	624.8	131	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
132	493,053	5,104,089	624.8	132	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
133	496,614	5,107,707	618.7	133	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
134	491,350	5,105,709	633.4	134	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
141	492,945	5,106,864	681.9	141	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
142	495,820	5,106,577	682.8	142	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
143	492,433	5,106,601	682.7	143	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
144	497,049	5,106,551	649.3	144	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
145	499,643	5,107,997	615.7	145	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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DECIBEL - Main Result

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)

...continued from previous page

	UTM NAD83 Zone: 14				WTG type							Noise data						
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Creator	Name	Wind speed	Hub height	LwA,ref	Pure tones	Octave data
	UTM NAD83 Zone: 14		[m]					[kW]	[m]	[m]			[m/s]	[m]	[dB(A)]		
146	499,321	5,108,008	615.7	146	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes

Calculation Results

Sound Level

Noise sensitive area		UTM NAD83 Zone: 14				Demands		Sound Level	Demands fulfilled ?		
No.	Name	East	North	Z [m]	Imission height [m]	Noise [dB(A)]	Distance [m]	From WTGs [dB(A)]	Noise	Distance	All
H01	H01	493,803	5,113,211	618.9	1.5	45.0	427	33.6	Yes	Yes	Yes
H02	H02	493,587	5,112,886	609.6	1.5	45.0	427	34.4	Yes	Yes	Yes
H03	H03	494,248	5,113,411	621.8	1.5	45.0	427	33.2	Yes	Yes	Yes
H04	H04	495,928	5,113,827	614.9	1.5	45.0	427	32.4	Yes	Yes	Yes
H05	H05	498,292	5,110,165	596.6	1.5	45.0	427	45.6	No	Yes	No
H06	H06	497,162	5,110,309	594.4	1.5	45.0	427	47.1	No	Yes	No
H07	H07	493,457	5,110,480	605.6	1.5	45.0	427	43.6	Yes	Yes	Yes
H08	H08	491,062	5,110,436	603.5	1.5	45.0	427	43.1	Yes	Yes	Yes
H09	H09	488,929	5,108,707	604.5	1.5	45.0	427	38.5	Yes	Yes	Yes
H10	H10	498,722	5,109,435	595.5	1.5	45.0	427	46.4	No	Yes	No
H11	H11	500,105	5,108,858	594.4	1.5	45.0	427	46.9	No	Yes	No
H12	H12	502,286	5,109,481	602.3	1.5	45.0	427	42.5	Yes	Yes	Yes
H13	H13	503,211	5,109,791	600.5	1.5	45.0	427	36.1	Yes	Yes	Yes
H14	H14	504,680	5,110,041	606.0	1.5	45.0	427	31.6	Yes	Yes	Yes
H15	H15	507,670	5,110,359	606.7	1.5	45.0	427	25.9	Yes	Yes	Yes
H16	H16	506,627	5,109,318	620.5	1.5	45.0	427	28.6	Yes	Yes	Yes
H17	H17	506,041	5,107,907	627.0	1.5	45.0	427	31.4	Yes	Yes	Yes
H18	H18	500,278	5,106,873	617.0	1.5	45.0	427	41.6	Yes	Yes	Yes
H19	H19	495,083	5,108,248	614.0	1.5	45.0	427	46.5	No	Yes	No
H20	H20	490,353	5,105,415	626.5	1.5	45.0	427	46.9	No	Yes	No
H21	H21	492,952	5,105,211	621.8	1.5	45.0	427	44.4	Yes	Yes	Yes
H22	H22	493,309	5,105,833	630.6	1.5	45.0	427	45.1	No	Yes	No
H23	H23	494,296	5,105,689	627.7	1.5	45.0	427	44.3	Yes	Yes	Yes
H24	H24	496,923	5,105,928	632.1	1.5	45.0	427	45.4	No	Yes	No
H25	H25	502,051	5,105,123	615.7	1.5	45.0	427	42.3	Yes	Yes	Yes
H27	H27	505,934	5,103,586	618.0	1.5	45.0	427	30.7	Yes	Yes	Yes
H28	H28	498,098	5,105,063	607.6	1.5	45.0	427	38.6	Yes	Yes	Yes
H29	H29	497,786	5,104,193	607.1	1.5	45.0	427	36.5	Yes	Yes	Yes
H30	H30	495,745	5,105,026	609.6	1.5	45.0	427	44.8	Yes	Yes	Yes
H31	H31	492,486	5,104,236	621.1	1.5	45.0	427	43.2	Yes	Yes	Yes
H32	H32	490,288	5,103,962	618.7	1.5	45.0	427	38.4	Yes	Yes	Yes
H33	H33	489,534	5,104,522	603.7	1.5	45.0	427	39.5	Yes	Yes	Yes
H34	H34	489,793	5,101,582	593.7	1.5	45.0	427	31.2	Yes	Yes	Yes
H35	H35	491,713	5,101,713	621.7	1.5	45.0	427	33.0	Yes	Yes	Yes
H36	H36	497,884	5,102,817	617.3	1.5	45.0	427	33.3	Yes	Yes	Yes
H37	H37	500,571	5,102,094	622.1	1.5	45.0	427	30.9	Yes	Yes	Yes
H38	H38	504,292	5,102,969	620.4	1.5	45.0	427	32.7	Yes	Yes	Yes
H39	H39	506,783	5,102,415	609.6	1.5	45.0	427	27.0	Yes	Yes	Yes
H40	H40	508,385	5,100,218	620.8	1.5	45.0	427	22.2	Yes	Yes	Yes
H41	H41	507,435	5,100,145	622.4	1.5	45.0	427	23.2	Yes	Yes	Yes
H42	H42	501,763	5,100,251	609.8	1.5	45.0	427	27.4	Yes	Yes	Yes
H43	H43	501,209	5,100,184	605.5	1.5	45.0	427	27.4	Yes	Yes	Yes
H44	H44	497,551	5,099,204	595.7	1.5	45.0	427	27.2	Yes	Yes	Yes
H45	H45	501,233	5,098,861	606.6	1.5	45.0	427	25.5	Yes	Yes	Yes
H46	H46	508,413	5,099,339	629.6	1.5	45.0	427	21.4	Yes	Yes	Yes
H48	H48	504,352	5,097,819	638.6	1.5	45.0	427	22.7	Yes	Yes	Yes
H49	H49	504,504	5,097,783	640.1	1.5	45.0	427	22.6	Yes	Yes	Yes

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

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DECIBEL - Main Result

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)

...continued from previous page

Noise sensitive area		UTM NAD83 Zone: 14				Demands		Sound Level	Demands fulfilled ?		
No.	Name	East	North	Z [m]	Imission height [m]	Noise [dB(A)]	Distance [m]	From WTGs [dB(A)]	Noise	Distance	All
H52	H52	497,897	5,097,923	600.5	1.5	45.0	427	25.2	Yes	Yes	Yes
H53	H53	488,536	5,111,192	603.5	1.5	45.0	427	32.6	Yes	Yes	Yes
H54	H54	502,335	5,109,859	603.5	1.5	45.0	427	40.4	Yes	Yes	Yes

Distances (m)

WTG	H01	H02	H03	H04	H05	H06	H07	H08	H09	H10	H11	H12	H13	H14	H15	H16	H17	H18	H19	H20	H21	H22
1	5829	5440	6227	7563	7607	6572	3432	2318	2119	7868	9170	11403	12359	13849	16854	15708	15078	9396	4120	2773	3523	3275
2	5346	4957	5748	7105	7320	6260	2996	1867	2223	7623	8962	11175	12125	13612	16618	15497	14908	9287	3948	3255	3814	3488
3	4951	4566	5329	6616	6723	5664	2471	1844	2798	7032	8379	10587	11534	13021	16027	14912	14337	8747	3388	3576	3713	3289
4	3604	3244	3914	5049	5279	4174	896	2108	4221	5694	7120	9254	10178	11651	14651	13598	13129	7772	2506	5046	4480	3867
5	4406	4050	4702	5753	5454	4408	1666	2479	4067	5757	7113	9313	10260	11746	14752	13642	13085	7557	2184	4356	3669	3063
6	4938	4563	5278	6447	6241	5207	2293	2270	3349	6514	7839	10059	11012	12500	15507	14376	13781	8172	2823	3647	3374	2876
7	5942	5632	6140	6815	5127	4341	3262	4356	5325	5140	6251	8519	9493	10976	13957	12734	12000	6233	1414	4145	2341	1624
8	6191	5801	6612	8023	8243	7198	3945	2455	1511	8516	9822	12054	13010	14499	17505	16361	15730	10041	4773	2683	3912	3757
9	5807	5423	6179	7427	7207	6198	3267	2564	2646	7432	8708	10950	11912	13402	16405	15243	14591	8888	3649	2718	3082	2781
10	6310	5930	6662	7836	7290	6334	3687	3177	3006	7447	8659	10918	11887	13376	16371	15174	14467	8702	3621	2255	2498	2264
11	7643	7254	8037	9336	8941	7991	5180	4037	2508	9074	10245	12512	13484	14970	17955	16732	15969	10152	5247	1114	3103	3247
12	7433	7045	7824	9112	8714	7760	4955	3865	2490	8852	10031	12296	13268	14755	17742	16523	15770	9959	5024	1228	2995	3095
13	7252	6867	7625	8852	8288	7355	4693	3837	2817	8405	9567	11833	12806	14292	17275	16051	15289	9475	4580	1276	2559	2619
14	7189	6809	7543	8707	7961	7054	4563	3939	3185	8051	9188	11456	12430	13913	16892	15658	14883	9061	4236	1392	2155	2188
15	6693	6324	7015	8076	7138	6249	3988	3799	3652	7217	8354	10621	11595	13079	16059	14830	14069	8260	3406	2141	1808	1589
16	6353	5989	6661	7686	6725	5830	3627	3641	3805	6818	7975	10241	11214	12700	15685	14466	13726	7937	2999	2562	1916	1537
17	7812	7423	8212	9530	9175	8222	5378	4160	2470	9309	10480	12746	13719	15205	18189	16965	16200	10379	5482	1117	3282	3455
18	8151	7762	8550	9858	9428	8491	5703	4499	2716	9541	10687	12955	13929	15413	18391	17154	16365	10532	5718	918	3308	3548
19	7554	7172	7913	9088	8315	7420	4941	4233	3237	8388	9502	11770	12745	14226	17198	15953	15156	9321	4583	1008	2207	2357
20	7170	6804	7479	8490	7320	6484	4445	4321	4024	7341	8411	10677	11653	13130	16094	14838	14029	8191	3585	1944	1332	1267
21	4101	3769	4348	5270	4842	3789	1367	2829	4654	5167	6545	8729	9670	11153	14160	13064	12535	7078	1749	4901	3954	3294
22	3549	3258	3730	4499	4142	3049	1075	3206	5339	4551	5984	8110	9034	10508	13509	12454	11995	6716	1696	5730	4636	3946
23	3595	3335	3727	4350	3758	2670	1355	3578	5720	4167	5605	7726	8649	10123	13124	12070	11617	6375	1539	6005	4766	4062
24	3526	3217	3738	4597	4388	3291	923	2964	5096	4799	6230	8359	9282	10756	13756	12702	12241	6944	1844	5572	4582	3904
25	5408	5248	5378	5319	2394	1876	3635	5789	7605	2365	3587	5830	6795	8285	11285	10125	9530	4101	1479	6925	4890	4210
26	5006	4689	5218	5982	4826	3896	2313	3595	4978	4994	6257	8500	9463	10953	13955	12793	12163	6533	1202	4499	3136	2441
27	5636	5426	5676	5841	3223	2636	3503	5438	7025	3157	4278	6542	7514	9001	11990	10793	10124	4501	874	6129	4061	3382
28	6218	5964	6320	6666	4190	3612	3796	5376	6594	4057	5045	7310	8286	9762	12727	11481	10720	4943	1093	5297	3103	2445
29	4214	3956	4335	4866	3695	2694	1889	3923	5837	3984	5359	7543	8487	9972	12979	11877	11352	5960	919	5742	4290	3576
30	3762	3538	3837	4271	3308	2236	1772	4039	6168	3704	5143	7264	8188	9664	12666	11608	11154	5944	1406	6307	4901	4187
31	2792	2529	2943	3719	3974	2837	873	3268	5681	4512	5995	8017	8907	10359	13340	12351	11988	6951	2345	6431	5436	4747
32	5167	5037	5098	4922	1936	1390	3633	5886	7840	2011	3343	5545	6498	7987	10993	9869	9339	4096	1832	7334	5359	4671
33	4043	3867	4048	4225	2704	1669	2354	4656	6777	3082	4523	6642	7568	9045	12048	10986	10535	5382	1475	6754	5160	4443
34	5932	5635	6104	6696	4832	4082	3307	4570	5641	4822	5917	8185	9160	10643	13622	12397	11662	5900	1165	4463	2546	1832
35	5936	5613	6156	6903	5380	4563	3219	4152	5033	5417	6545	8813	9786	11271	14254	13034	12303	6536	1647	3876	2214	1509
36	5942	5608	6184	7003	5642	4796	3200	3953	4734	5702	6846	9113	10086	11571	14556	13341	12614	6847	1904	3609	2126	1453
37	5974	5692	6122	6631	4576	3871	3414	4812	5956	4534	5606	7874	8849	10330	13307	12078	11339	5577	1009	4757	2741	2039
38	5592	5407	5594	5635	2801	2278	3636	5686	7380	2724	3869	6129	7099	8587	11580	10395	9754	4202	1210	6561	4485	3810
39	6404	6197	6434	6527	3486	3123	4252	6092	7493	3229	4116	6376	7351	8822	11780	10529	9768	4011	1529	6233	3944	3328
40	7943	7676	8059	8395	5499	5150	5423	6659	7309	5147	5756	7921	8878	10293	13152	11810	10854	5016	2830	5117	2529	2196
41	6726	6512	6764	6872	3770	3454	4520	6282	7572	3461	4252	6495	7468	8929	11868	10594	9788	3981	1767	6144	3778	3196
43	6361	6097	6477	6866	4435	3854	3883	5364	6482	4295	5260	7523	8499	9971	12930	11676	10896	5097	1250	5084	2861	2209
44	7196	6979	7237	7335	4106	3871	4956	6645	7810	3721	4367	6573	7540	8981	11888	10584	9719	3872	2195	6168	3706	3187
45	7242	7040	7263	7288	3913	3753	5083	6846	8076	3485	4079	6276	7241	8679	11583	10278	9415	3570	2336	6473	4010	3492
46	7376	7115	7484	7807	4989	4590	4894	6250	7092	4688	5406	7615	8581	10020	12919	11605	10709	4854	2254	5181	2674	2197
48	5857	5752	5754	5405	1721	1690	4417	6659	8548	1472	2636	4880	5847	7336	10335	9174	8596	3317	2427	7824	5683	5030
49	5063	5014	4895	4364	885	650	4113	6480	8641	1258	2750	4788	5705	7180	10182	9132	8733	4001	2855	8368	6435	5746
50	5337	4990	5608	6541	5635	4692	2584	3256	4270	5799	7043	9294	10259	11749	14749	13574	12916	7229	1986	3734	2712	2092
51	4737	4662	4604	4231	1332	582	3647	6007	8166	1721	3201	5263	6182	7657	10659	9607	9197	4334	2453	7956	6095	5396
52	4518	4424	4409	4147	1631	713	3336	5692	7854	2034	3509	5580	6498	7972	10974	9924	9509	4584	2220	7700	5899	5193
53	5312	5279	5122	4495	608	873	4442	6812	8973	940	2438	4455	5371	6846	9848	8798	8408	3778	3144	8656	6677	5995
55	6550	6569	6295	5352	1139	2253	5925	8301	10448	662	1141	2964	3882	5361	8366	7307	6945	2978	4487	9946	7797	7154
56	6809	6838	6543	5548	1423	2549	6230	8607	10755	954	965	2657	3574	5053	8059	7000	6650	2900	4781	10227	8054	7418
57	7204	7195	6977	6116	1796	2799	6336	8671	10675	1011	509	2739	3709	5197	8192	7035	6521	2172	4571	9897	7623	7017
58	4732	4562	4723	4784	2508	1685	2962	5176	7127	2702	4061	6253	7202	8689	11696	10583	10058	4755	1252	6754	4928	4221

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DECIBEL - Main Result

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)

...continued from previous page

WTG	H01	H02	H03	H04	H05	H06	H07	H08	H09	H10	H11	H12	H13	H14	H15	H16	H17	H18	H19	H20	H21	H22
59	7080	7117	6804	5763	1722	2854	6540	8919	11066	1256	855	2346	3262	4742	7748	6688	6349	2845	5079	10510	8313	7684
60	8537	8589	8241	7094	3218	4349	8023	10393	12478	2674	1363	910	1882	3369	6365	5234	4853	2674	6398	11705	9381	8798
61	8857	8916	8555	7375	3565	4698	8377	10748	12835	3031	1703	566	1541	3022	6014	4877	4511	2838	6749	12041	9702	9125
62	9650	9628	9431	8542	4252	5221	8577	10823	12566	3449	2051	2368	3089	4277	6973	5598	4669	1206	6405	11217	8711	8233
63	10621	10576	10428	9613	5281	6182	9361	11527	13097	4452	3141	3316	3861	4808	7205	5758	4585	1648	7006	11458	8888	8483
64	11994	11959	11788	10910	6617	7557	10766	12924	14445	5803	4419	4011	4257	4799	6697	5223	3838	3052	8389	12670	10075	9717
65	12414	12394	12191	11247	7006	7987	11278	13465	15033	6213	4781	4068	4167	4514	6196	4728	3292	3585	8950	13296	10704	10340
66	7991	7712	8125	8521	5746	5353	5420	6549	7095	5419	6058	8230	9188	10605	13467	12125	11166	5330	2910	4822	2226	1929
67	11538	11529	11303	10329	6118	7125	10496	12725	14393	5342	3885	3164	3357	3920	5992	4523	3251	2897	8260	12830	10263	9851
68	12021	12019	11777	10764	6596	7621	11022	13260	14936	5834	4362	3420	3465	3817	5651	4178	2825	3440	8801	13359	10788	10383
69	12450	12422	12235	11321	7055	8016	11263	13430	14960	6251	4839	4231	4366	4747	6434	4968	3525	3553	8900	13174	10577	10226
70	8175	7800	8509	9590	8448	7630	5493	5011	4042	8437	9453	11713	12688	14156	17100	15816	14952	9097	4720	943	1670	2053
71	6122	5746	6461	7597	6985	6032	3461	3144	3226	7140	8355	10614	11582	13072	16067	14873	14172	8417	3315	2503	2438	2122
72	3747	3373	4091	5315	5670	4564	1163	1770	3834	6080	7501	9641	10566	12040	15041	13985	13508	8120	2810	4813	4447	3871
73	4822	4455	5140	6242	5909	4883	2117	2449	3686	6176	7501	9721	10674	12162	15169	14038	13445	7846	2489	3855	3345	2795
74	5365	5030	5611	6465	5369	4453	2622	3510	4594	5509	6736	8990	9956	11446	14444	13264	12597	6905	1685	3940	2692	2029
75	4759	4477	4914	5513	4142	3218	2234	3942	5573	4326	5618	7849	8808	10298	13302	12156	11558	6005	638	5169	3637	2923
76	6973	6921	6797	6135	1808	2541	5816	8094	9987	987	1254	3522	4497	5978	8959	7761	7150	2099	3836	9088	6792	6192
77	5963	5919	5783	5151	945	1527	4941	7275	9320	532	1905	4059	5008	6497	9503	8393	7916	3113	3299	8753	6633	5979
78	7207	6850	7495	8432	7061	6264	4461	4548	4411	7046	8079	10344	11319	12792	15748	14481	13655	7811	3343	2263	1016	856
80	8231	8272	7948	6852	2872	3993	7652	10017	12088	2293	974	1305	2276	3763	6759	5622	5205	2464	6003	11314	9000	8412
81	7767	7384	8134	9331	8595	7699	5179	4372	3188	8668	9778	12046	13021	14501	17472	16223	15419	9580	4863	762	2384	2590
82	4341	4208	4284	4221	2127	1155	2911	5239	7364	2492	3942	6051	6976	8454	11457	10394	9952	4885	1790	7230	5496	4785
83	11070	11041	10858	9969	5681	6635	9907	12102	13712	4873	3478	3220	3614	4401	6657	5197	3975	2229	7602	12099	9528	9123
85	4554	4563	4323	3597	872	489	4089	6484	8824	1667	3105	4875	5726	7159	10129	9175	8918	4634	3414	8874	7091	6387
86	7984	8018	7709	6647	2603	3718	7368	9731	11798	2006	709	1592	2560	4049	7047	5912	5484	2385	5716	11038	8737	8143
87	12572	12557	12343	11375	7157	8151	11470	13667	15252	6372	4926	4110	4152	4421	6011	4548	3094	3790	9161	13530	10939	10572
89	11510	11471	11308	10451	6143	7071	10270	12430	13967	5324	3960	3724	4071	4759	6852	5380	4066	2556	7899	12235	9647	9274
90	8103	8076	7895	7076	2736	3669	7053	9333	11188	1911	746	2578	3534	4969	7895	6637	5944	1252	5020	10114	7715	7164
91	10040	10007	9834	8983	4667	5603	8876	11087	12753	3849	2498	2769	3413	4502	7080	5669	4631	1264	6615	11275	8737	8290
92	12673	12619	12486	11669	7343	8236	11316	13410	14803	6514	5184	4882	5111	5569	7243	5782	4317	3633	8843	12842	10236	9932
94	6706	6327	7059	8223	7570	6638	4078	3525	3081	7694	8870	11135	12106	13593	16581	15366	14627	8831	3867	1870	2286	2162
95	6937	6547	7340	8677	8519	7526	4537	3300	2015	8711	9944	12200	13167	14657	17654	16464	15760	9988	4895	1812	3334	3319
97	6635	6284	6910	7819	6497	5673	3883	4180	4410	6519	7604	9872	10847	12327	15298	14054	13272	7452	2764	2766	1442	946
98	6767	6382	7139	8374	7917	6959	4214	3391	2668	8068	9268	11530	12500	13989	16981	15776	15050	9264	4241	1760	2667	2594
99	4522	4133	4923	6294	6765	5671	2228	1280	2717	7137	8528	10701	11636	13116	16120	15040	14518	9015	3642	4047	4281	3843
100	6999	6812	6997	6955	3503	3375	4948	6818	8180	3077	3719	5939	6908	8358	11283	9996	9175	3362	2251	6739	4327	3775
101	8023	7637	8402	9642	9003	8095	5483	4514	3057	9084	10199	12467	13442	14923	17894	16645	15839	9999	5275	570	2744	2994
102	6986	6757	7044	7213	4168	3841	4685	6327	7475	3846	4585	6812	7782	9233	12155	10862	10019	4180	1926	5877	3453	2905
103	8345	7955	8751	10084	9713	8770	5935	4641	2694	9831	10981	13248	14222	15706	18685	17448	16658	10824	6007	1089	3573	3832
104	6438	6205	6507	6730	3937	3479	4128	5815	7080	3723	4629	6887	7863	9332	12287	11029	10249	4460	1368	5724	3436	2815
107	7397	7025	7725	8794	7744	6892	4703	4358	3779	7776	8851	11118	12094	13571	16535	15278	14464	8624	4006	1510	1559	1648
108	3938	3549	4374	5870	6893	5767	2094	482	2832	7352	8793	10904	11816	13281	16273	15248	14804	9444	4120	4793	5122	4668
109	7374	7417	7091	6014	2037	3171	6858	9237	11377	1560	819	2028	2948	4430	7437	6370	6035	2788	5372	10784	8561	7941
110	6229	6136	6107	5673	1716	1946	4844	7086	8951	1260	2256	4516	5487	6974	9967	8787	8185	2899	2806	8133	5923	5290
111	6671	6604	6515	5936	1698	2270	5431	7697	9581	978	1642	3909	4883	6367	9353	8163	7556	2392	3432	8711	6446	5834
113	7492	7115	7834	8952	8024	7154	4831	4316	3540	8073	9164	11432	12407	13886	16853	15600	14792	8953	4287	1232	1842	1975
114	4810	4831	4562	3749	627	746	4391	6786	9117	1462	2856	4580	5427	6857	9827	8875	8628	4455	3632	9115	7284	6585
115	5999	5609	6413	7802	7985	6940	3708	2327	1721	8259	9568	11798	12753	14242	17248	16106	15481	9801	4522	2756	3798	3602
116	6822	6539	6968	7439	5057	4488	4244	5480	6322	4885	5781	8032	9006	10468	13406	12126	11292	5452	1796	4610	2269	1658
118	7783	7839	7486	6346	2501	3639	7334	9716	11863	2045	1061	1552	2463	3945	6951	5889	5587	2867	5850	11246	8998	8386
119	5646	5287	5943	6950	6127	5187	2907	3207	3904	6280	7505	9761	10728	12217	15215	14030	13349	7626	2457	3254	2477	1942
120	8372	7984	8760	10026	9427	8519	5866	4788	3099	9506	10614	12882	13857	15337	18305	17051	16234	10389	5698	546	3058	3362
121	6007	5662	6271	7163	5954	5086	3254	3788	4423	6031	7185	9451	10424	11910	14896	13682	12955	7185	2220	3303	2040	1427
125	10866	10829	10662	9808	5497	6428	9657	11838	13429	4678	3318	3258	3725	4590	6914	5459	4259	1959	7328	11802	9231	8827
126	7741	7610	7661	7316	3263	3588	6012	8044	9531	2570	2670	4758	5708	7121	9999	8682	7818	1990	3476	8073	5598	5092
127	7799	7679	7704	7305	3178	3579	6141	8207	9736	2449	2451	4518	5467	6878	9755	8440	7583	1769	3652	8312	5840	5332
128	7731	7625	7619	7160	2970	3445	6166	8279	9875	2213	2162	4245	5198	6618	9510	8207	7381	1624	3752	8533	6082	5559
129	8269	7941	8492	9185	7027	6446	5537	6044	5988	6820	7602	9810	10774	12207	15087	13753	12800	6962	3626	3269	689	931
130	8848	8527	9057	9690	7309	6808	6129	6681	6562	7035	7705	9870	10823	12231	15067	13707	12699	6903	4077	3649	1233	1565
131	9086	8756	9313	10004	7728	7200	6349	6747	6443	7469	8152	10317	11271	12678	15511	14148	13132	7345	4424	3366	1195	1709
132	9153	8813	9398	10154	8023	7455	6404	6652	6191	7792	8513	10692	11649	13062	15905	14546	13538	7743	4628	3008	1127	1763
133	6180	5999	6175	6158	2976	2659	4202	6186	7750	2726	3676	5943	6918	8397	11370	10142	9429	3758	1624	6667	4432	3799
134	7893	7518	8229	9320	8249	7412	5216	4736	3853	8260	9304	11568	12544	14016	16970	15698	14855	9004	4515	1039	1678	1963
141	6405	6056	6675	7575	6284	5445	3652	4038	4419	6323	7432	9701	10675	12157	15134	13900	13137	7333	2547	2970	1653	1093
142	6934	6693	7012	7251	4357	3966	4563	6126	7213	4073	4854	7088	8060	9513	12439	11149	10307	4468	1826	5589	3177	2619

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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4/23/2010 11:06 AM/2.7.453

DECIBEL - Main Result

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)

...continued from previous page

WTG	H01	H02	H03	H04	H05	H06	H07	H08	H09	H10	H11	H12	H13	H14	H15	H16	H17	H18	H19	H20	H21	H22
143	6750	6390	7048	8027	6858	6009	4012	4073	4088	6898	7997	10265	11240	12721	15694	14452	13671	7850	3120	2394	1484	1165
144	7409	7219	7410	7362	3822	3760	5323	7137	8401	3334	3829	6001	6962	8391	11283	9970	9094	3245	2597	6792	4311	3808
145	7829	7783	7643	6913	2555	3391	6666	8921	10737	1708	977	3031	3994	5436	8367	7108	6399	1291	4567	9642	7248	6693
146	7584	7528	7411	6736	2390	3155	6364	8609	10415	1548	1156	3311	4279	5732	8674	7423	6721	1485	4245	9335	6956	6393

WTG	H23	H24	H25	H27	H28	H29	H30	H31	H32	H33	H34	H35	H36	H37	H38	H39	H40	H41	H42	H43	H44	H45
1	4124	6348	11484	15641	7760	7871	5694	4171	4213	3872	6642	6451	8717	11340	14288	16815	19128	18299	13361	12958	11085	13826
2	4268	6351	11435	15604	7785	7952	5805	4537	4689	4359	7119	6881	8859	11434	14288	16803	19154	18337	13487	13098	11346	14000
3	3970	5897	10931	15105	7344	7561	5455	4544	4967	4733	7391	7003	8527	11048	13817	16321	18700	17894	13129	12756	11153	13693
4	4195	5411	10108	14271	6860	7266	5395	5481	6352	6242	8732	8086	8412	10701	13112	15555	18038	17277	12857	12538	11417	13583
5	3447	4916	9807	13983	6375	6704	4736	4671	5612	5563	7968	7280	7790	10173	12753	15231	17663	16879	12304	11964	10696	12973
6	3476	5322	10350	14523	6772	7006	4923	4285	4968	4843	7364	6826	7998	10493	13237	15740	18123	17319	12585	12218	10704	13172
7	1603	3165	8277	12435	4605	4836	2811	3421	5018	5295	7113	6035	5874	8322	11103	13621	15970	15158	10425	10070	8794	11057
8	4656	6958	12110	16261	8357	8433	6241	4432	4136	3660	6537	6537	9232	11887	14891	17424	19716	18880	13882	13468	11468	14304
9	3605	5818	10959	15113	7229	7342	5169	3810	4108	3885	6534	6195	8201	10813	13757	16285	18597	17768	12841	12442	10624	13321
10	3153	5510	10689	14821	6886	6935	4741	3196	3585	3457	5996	5591	7732	10385	13424	15963	18231	17390	12381	11969	10058	12818
11	4243	6815	11998	16069	8095	7995	5804	3270	2550	2073	4937	5048	8585	11333	14594	17145	19305	18435	13206	12754	10410	13479
12	4087	6640	11827	15908	7935	7856	5659	3237	2681	2263	5089	5122	8475	11213	14445	16995	19172	18305	13105	12659	10373	13402
13	3608	6154	11342	15426	7453	7385	5185	2905	2695	2443	5126	4977	8028	10757	13967	16517	18703	17840	12666	12225	10014	12989
14	3176	5727	10913	14995	7022	6955	4754	2591	2705	2602	5122	4812	7610	10332	13536	16085	18274	17411	12252	11814	9657	12590
15	2516	4974	10165	14272	6311	6313	4110	2567	3290	3344	5636	5056	7067	9742	12845	15390	17625	16775	11718	11300	9365	12136
16	2368	4710	9893	14020	6081	6137	3947	2796	3691	3764	6013	5352	6960	9594	12620	15159	17428	16587	11604	11200	9399	12072
17	4452	7034	12214	16278	8305	8192	6006	3391	2506	1953	4858	5059	8760	11514	14797	17348	19496	18623	13373	12917	10524	13627
18	4544	7153	12319	16359	8393	8243	6072	3306	2224	1622	4544	4821	8760	11526	14858	17410	19527	18647	13352	12888	10412	13569
19	3355	5948	11123	15180	7208	7096	4907	2477	2347	2219	4772	4550	7689	10434	13698	16250	18405	17534	12316	11868	9600	12610
20	2254	4822	10003	14076	6102	6034	3833	2043	2921	3099	5206	4548	6714	9423	12614	15163	17354	16493	11361	10931	8897	11735
21	3505	4631	9379	13549	6081	6486	4636	4999	6108	6113	8426	7632	7638	9920	12364	14820	17287	16519	12075	11757	10684	12806
22	3995	4651	9098	13243	6058	6569	4913	5703	6917	6942	9211	8342	7801	9922	12139	14550	17071	16331	12103	11817	11008	12918
23	4017	4447	8774	12909	5828	6378	4818	5843	7153	7216	9413	8477	7640	9690	11829	14225	16760	16029	11877	11605	10910	12724
24	4015	4805	9316	13465	6225	6712	5002	5639	6785	6782	9100	8276	7927	10087	12349	14768	17280	16536	12264	11970	11091	13059
25	3625	2643	6492	10628	3815	4526	3603	5909	7744	8070	9688	8358	5882	7609	9554	11942	14484	13762	9803	9578	9393	10762
26	2551	3800	8731	12907	5259	5599	3686	4208	5561	5699	7784	6846	6712	9061	11653	14141	16557	15769	11198	10864	9721	11890
27	2811	2291	6769	10941	3647	4228	2965	5083	6919	7262	8861	7551	5531	7508	9763	12211	14690	13934	9696	9427	8933	10561
28	1829	2019	7016	11185	3477	3863	2198	4109	5998	6393	7889	6569	5054	7297	9891	12394	14785	13991	9450	9134	8282	10198
29	3446	3848	8315	12470	5247	5773	4198	5370	6810	6945	9010	7992	7025	9111	11343	13766	16274	15529	11294	11013	10289	12122
30	4030	4181	8361	12483	5524	6119	4683	5982	7404	7514	9618	8603	7410	9376	11427	13808	16357	15634	11568	11310	10750	12451
31	4780	5229	9391	13492	6590	7165	5624	6500	7660	7640	9978	9139	8437	10445	12470	14831	17396	16683	12636	12373	11716	13505
32	4111	3053	6543	10637	4135	4892	4080	6386	8191	8492	10163	8847	6261	7866	9632	11977	14552	13852	10056	9853	9805	11059
33	4148	3899	7822	11924	5168	5827	4587	6235	7786	7953	9936	8824	7154	8988	10904	13261	15829	15120	11183	10947	10581	12116
34	1623	2881	7963	12126	4332	4606	2653	3617	5297	5602	7346	6205	5688	8084	10808	13321	15685	14879	10204	9859	8698	10869
35	1676	3443	8572	12726	4875	5075	3004	3293	4795	5039	6935	5925	6077	8562	11384	13906	16244	15427	10653	10289	8920	11257
36	1805	3733	8874	13026	5156	5328	3222	3191	4579	4784	6767	5830	6296	8815	11674	14199	16527	15706	10892	10520	9061	11470
37	1672	2601	7651	11817	4057	4371	2502	3796	5551	5885	7552	6350	5494	7838	10511	13019	15396	14595	9971	9637	8584	10667
38	3211	2362	6531	10691	3623	4280	3225	5498	7351	7696	9278	7944	5617	7459	9561	11982	14492	13752	9653	9407	9088	10569
39	2571	1520	6161	10337	2883	3457	2348	4892	6874	7310	8662	7231	4767	6747	9103	11578	14020	13249	8932	8658	8203	9788
40	1199	1531	6589	10628	2656	2633	501	3220	5390	6007	6867	5296	3568	6103	9163	11712	13933	13086	8160	7786	6579	8750
41	2374	1211	6041	10211	2619	3146	2016	4688	6718	7192	8443	6972	4441	6480	8937	11430	13843	13059	8657	8373	7861	9488
43	1585	2045	7120	11281	3501	3830	2054	3863	5762	6169	7644	6326	4981	7288	9962	12474	14843	14040	9427	9099	8150	10143
44	2280	767	5796	9950	2213	2687	1631	4546	6643	7170	8260	6722	3971	6058	8629	11140	13515	12719	8227	7932	7392	9035
45	2583	685	5527	9689	2051	2616	1836	4840	6945	7475	8543	6984	3941	5914	8390	10892	13288	12500	8094	7816	7425	8943
46	1249	1430	6617	10720	2776	2936	1036	3506	5605	6151	7234	5742	4004	6423	9313	11851	14139	13311	8525	8175	7130	9183
48	4345	2777	5775	9857	3639	4467	4016	6662	8582	8951	10440	9018	5846	7248	8872	11201	13786	13095	9428	9251	9445	10484
49	5183	3874	6492	10446	4732	5572	5049	7463	9257	9538	11240	9914	6951	8254	9599	11831	14469	13820	10417	10265	10554	11517
50	2517	4287	9353	13521	5734	5966	3902	3736	4867	4942	7158	6363	6976	9453	12214	14725	17092	16284	11549	11187	9773	12155
51	4888	3815	6823	10826	4800	5600	4888	7138	8880	9134	10906	9629	6978	8428	9931	12199	14821	14156	10606	10432	10551	11665
52	4730	3833	7068	11094	4892	5665	4827	6952	8651	8884	10709	9470	7036	8578	10173	12461	15073	14398	10762	10574	10584	11794
53	5397	3939	6263	10179	4703	5566	5176	7692	9520	9819	11472	10113	6942	8137	9367	11572	14221	13583	10286	10150	10559	11414
55	6434	4471	5321	8997	4794	5715	5887	8755	10707	11078	12522	11034	7029	7703	8359	10419	13108	12526	9753	9696	10642	11001
56	6681	4649	5176	8778	4888	5812	6084	9002	10971	11354	12762	11253	7105	7665	8185	10205	12902	12334	9687	9647	10703	10958
57	6221	4029	4533	8290	4156	5080	5493	8529	10559	10993	12260	10697	6357	6911	7590	9701	12376	11775	8951	8899	9947	10207
58	3786	3237	7171	11293	4479	5154	4030	5984	7682	7930	9738	8518	6493	8293	10241	12617	15170	14452	10488	10254	9955	11428
59	6932	4836	5035	8554	4992	5916	6286	9250	11237	11632	13002	11473	7185	7630	8009	9987	12690	12137	9620	9598	10766	10914
60	7965	5602	4232	7302	5371	6256	7085	10248	12323	12787	13935	12301	7375	7257	6967	8747	11465	10972	9061	9122	10806	10444
61	8283	5888	4188	7082	5594	6465	7371	10558	12644	13117	14232	12582	7548	7302	6822	8528	11247	10777	9049	9132	10934	10452

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Project:
20102130 - Merricourt ND Enxco

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DECIBEL - Main Result

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)

...continued from previous page

WTG	H23	H24	H25	H27	H28	H29	H30	H31	H32	H33	H34	H35	H36	H37	H38	H39	H40	H41	H42	H43	H44	H45
62	7293	4690	2248	5837	3988	4763	6100	9432	11610	12196	12942	11184	5689	5253	5183	7245	9922	9335	7037	7098	8951	8420
63	7506	4869	1113	4906	3858	4475	6153	9504	11712	12365	12851	11027	5165	4284	4093	6272	8910	8285	5952	6046	8179	7363
64	8727	6111	1056	3506	4947	5406	7295	10616	12831	13526	13808	11938	5814	4227	2866	4889	7554	6968	5435	5653	8370	6913
65	9351	6730	1680	3079	5580	6039	7926	11250	13465	14158	14438	12566	6420	4700	2755	4503	7206	6680	5715	5982	8870	7203
66	945	1846	6880	10902	2937	2852	651	2905	5076	5699	6563	5013	3702	6297	9421	11972	14169	13316	8325	7937	6579	8870
67	8877	6240	1706	3989	5227	5806	7530	10881	13090	13742	14204	12366	6383	5045	3652	5424	8133	7615	6336	6543	9140	7811
68	9407	6770	2043	3573	5729	6278	8045	11392	13604	14264	14684	12836	6791	5276	3444	5018	7736	7260	6400	6650	9420	7886
69	9234	6622	1509	3036	5442	5874	7793	11106	13321	14023	14264	12387	6221	4462	2583	4442	7129	6578	5477	5741	8634	6964
70	3011	5649	10759	14754	6812	6607	4467	1686	1781	1982	4131	3740	7087	9857	13227	15778	17866	16982	11678	11216	8825	11912
71	2962	5255	10425	14564	6645	6722	4538	3222	3788	3712	6180	5689	7555	10184	13181	15717	18002	17166	12199	11796	9968	12666
72	4288	5668	10437	14605	7123	7494	5564	5413	6155	5996	8555	7989	8607	10948	13425	15879	18347	17578	13092	12762	11538	13787
73	3311	5041	10039	14214	6495	6758	4708	4305	5133	5060	7506	6885	7781	10242	12941	15439	17834	17036	12347	11989	10562	12962
74	2330	3978	9031	13200	5429	5682	3649	3747	5014	5140	7261	6384	6718	9166	11899	14407	16781	15976	11273	10917	9579	11900
75	2821	3537	8275	12448	4979	5421	3694	4718	6192	6363	8369	7339	6618	8829	11249	13711	16171	15402	10994	10688	9787	11761
76	5388	3226	4586	8551	3500	4420	4677	7695	9731	10175	11427	9872	5743	6585	7692	9928	12560	11911	8696	8595	9363	9882
77	5291	3546	5600	9541	4161	5049	4879	7610	9530	9889	11386	9946	6415	7501	8706	10927	13568	12924	9640	9515	10041	10786
78	1845	4424	9600	13668	5694	5624	3422	1886	3094	3373	5287	4479	6315	9018	12203	14753	16944	16084	10964	10538	8564	11355
80	7586	5249	4235	7490	5079	5976	6732	9874	11941	12399	13571	11951	7130	7146	7068	8932	11645	11127	9008	9045	10602	10368
81	3586	6194	11360	15406	7436	7302	5123	2543	2161	1962	4592	4473	7861	10616	13913	16464	18601	17726	12476	12021	9682	12742
82	4381	3752	7348	11419	4920	5641	4617	6559	8208	8420	10300	9107	6997	8682	10444	12771	15360	14667	10875	10663	10496	11860
83	8146	5509	1200	4417	4488	5078	6791	10141	12350	13005	13469	11636	5699	4562	3789	5817	8492	7910	6049	6200	8577	7498
85	5900	4727	7104	10945	5579	6426	5870	8140	9844	10063	11902	10641	7804	9042	10197	12352	15020	14402	11189	11055	11410	12318
86	7326	5020	4306	7677	4910	5816	6502	9620	11677	12128	13327	11720	6999	7124	7199	9115	11824	11289	9027	9046	10501	10369
87	9584	6961	1916	2943	5816	6276	8162	11487	13702	14394	14675	12801	6650	4889	2755	4379	7090	6589	5839	6122	9064	7327
89	8287	5662	837	3999	4540	5049	6878	10213	12427	13108	13458	11602	5549	4190	3280	5375	8030	7428	5579	5752	8272	7039
90	6290	3856	3569	7383	3648	4552	5338	8545	10654	11160	12202	10550	5740	6036	6634	8781	11443	10829	8035	8005	9266	9320
91	7332	4702	1766	5451	3863	4579	6066	9415	11609	12224	12860	11073	5418	4819	4728	6843	9505	8900	6567	6638	8593	7959
92	8935	6374	1207	2969	5090	5410	7437	10697	12906	13641	13735	11839	5608	3669	2044	4261	6860	6223	4648	4907	7849	6134
94	3108	5567	10757	14868	6909	6905	4702	2889	3188	3077	5600	5226	7640	10327	13442	15987	18220	17369	12290	11867	9848	12685
95	4285	6753	11942	16056	8096	8081	5876	3706	3264	2809	5666	5692	8776	11485	14629	17175	19399	18544	13422	12988	10816	13769
97	1753	4157	9347	13458	5502	5532	3337	2436	3697	3921	5906	5060	6343	8982	12039	14582	16833	15988	10988	10583	8815	11457
98	3549	6012	11201	15314	7354	7346	5142	3170	3168	2926	5598	5377	8065	10762	13888	16433	18663	17810	12714	12287	10207	13091
99	4489	6296	11255	15432	7751	8012	5941	5113	5464	5172	7894	7557	9016	11498	14181	16670	19081	18287	13597	13233	11699	14191
100	2906	1015	5447	9622	2220	2884	2247	5192	7268	7770	8916	7378	4238	6072	8378	10855	13294	12524	8262	8007	7765	9162
101	3988	6604	11764	15798	7833	7679	5510	2784	2022	1659	4433	4493	8201	10965	14295	16846	18964	18085	12800	12338	9913	13033
102	2034	1068	6130	10284	2526	2948	1630	4332	6395	6898	8074	6583	4194	6355	8962	11474	13846	13047	8516	8210	7552	9297
103	4827	7440	12603	16637	8673	8512	6348	3518	2257	1550	4500	4895	9008	11779	15129	17681	19786	18904	13588	13120	10594	13785
104	2078	1605	6533	10703	3052	3505	2073	4397	6363	6797	8173	6775	4751	6897	9421	11918	14322	13534	9064	8764	8081	9854
107	2645	5240	10412	14471	6498	6397	4204	2049	2574	2683	4920	4410	7024	9755	12994	15545	17711	16844	11662	11222	9070	11994
108	5271	6918	11754	15925	8377	8694	6675	5956	6230	5874	8660	8385	9746	12169	14730	17193	19647	18871	14292	13943	12506	14928
109	7171	5011	4876	8309	5083	6004	6475	9485	11491	11899	13227	11676	7247	7573	7810	9746	12453	11914	9528	9524	10804	10843
110	4553	2744	5368	9436	3444	4308	4077	6874	8843	9244	10641	9169	5683	6949	8469	10785	13379	12694	9118	8958	9302	10206
111	5052	3004	4882	8895	3442	4348	4423	7367	9379	9808	11114	9590	5698	6712	7991	10261	12878	12215	8851	8726	9326	9999
113	2973	5571	10742	14798	6826	6715	4526	2205	2417	2430	4809	4431	7321	10060	13317	15868	18026	17157	11953	11508	9292	12263
114	6065	4768	6910	10710	5549	6413	5962	8325	10063	10301	12095	10803	7789	8938	9994	12123	14798	14191	11071	10951	11406	12224
115	4479	6742	11884	16039	8149	8243	6058	4373	4210	3783	6626	6552	9066	11705	14680	17209	19514	18681	13714	13305	11363	14156
116	951	2151	7334	11461	3547	3721	1702	3245	5197	5653	7025	5692	4753	7209	10078	12611	14917	14092	9304	8947	7753	9936
118	7599	5374	4759	8017	5343	6255	6849	9908	11933	12354	13637	12061	7457	7609	7607	9460	12175	11662	9504	9528	10974	10851
119	2552	4576	9699	13857	6002	6169	4041	3445	4424	4464	6748	6042	7109	9654	12516	15039	17373	16553	11720	11341	9765	12272
120	4350	6978	12122	16137	8182	7998	5847	2972	1850	1324	4201	4434	8472	11245	14618	17169	19259	18373	13046	12576	10053	13238
121	1961	4041	9196	13343	5451	5590	3450	3072	4325	4489	6559	5704	6517	9072	11978	14508	16820	15994	11132	10750	9189	11679
125	7849	5213	1107	4633	4194	4794	6494	9844	12054	12708	13180	11350	5443	4416	3912	6017	8676	8073	5987	6112	8382	7420
126	4172	1677	4162	8334	1849	2755	3160	6385	8523	9072	10023	8376	4105	5322	7177	9607	12109	11372	7504	7326	7733	8563
127	4415	1915	4003	8167	1976	2895	3397	6628	8766	9313	10263	8610	4225	5316	7043	9454	11974	11248	7486	7325	7850	8577
128	4656	2192	3961	8104	2239	3162	3675	6887	9014	9548	10536	8891	4478	5461	7032	9411	11959	11248	7617	7475	8099	8739
129	1027	3477	8465	12421	4512	4265	2159	1310	3443	4076	5071	3736	4794	7543	10885	13435	15534	14655	9427	8986	6976	9770
130	1400	3451	8239	12112	4308	3943	2010	1367	3582	4316	4916	3402	4323	7097	10538	13082	15117	14228	8920	8465	6351	9210
131	1766	3898	8644	12482	4727	4322	2450	984	3180	3949	4469	2985	4611	7393	10890	13429	15426	14528	9161	8693	6401	9388
132	2026	4285	9057	12891	5138	4734	2850	586	2768	3546	4112	2728	4996	7778	11295	13832	15813	14913	9518	9043	6640	9708
133	3073	1806	6020	10190	3032	3704	2818	5393	7351	7763	9167	7743	5052	6868	9022	11464	13951	13201	9061	8815	8554	9979
134	2946	5577	10717	14738	6779	6612	4448	1860	2044	2170	4411	4012	7145	9904	13229	15781	17898	17020	11757	11302	8987	12024
141	1790	4087	9271	13396	5459	5529	3349	2668	3935	4138	6151	5296	6385	8995	11997	14536	16810	15972	11022	10626	8938	11521
142	1764	1280	6398	10547	2735	3090	1553	4074	6119	6613	7828	6366	4289	6532	9208	11726	14082	13277	8680	8361	7573	9425

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Project:
20102130 - Merricourt ND Enxco

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DECIBEL - Main Result

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)

...continued from previous page

WTG	H23	H24	H25	H27	H28	H29	H30	H31	H32	H33	H34	H35	H36	H37	H38	H39	H40	H41	H42	H43	H44	H45
143	2074	4540	9731	13834	5870	5870	3667	2366	3401	3567	5671	4941	6636	9303	12403	14948	17182	16332	11286	10872	8995	11720
144	2885	636	5202	9367	1821	2470	2006	5117	7240	7784	8794	7203	3826	5681	8080	10576	12985	12203	7868	7606	7364	8755
145	5824	3417	3749	7683	3316	4233	4901	8085	10188	10690	11755	10118	5470	5975	6848	9063	11702	11062	8031	7968	9038	9273
146	5534	3174	3972	7955	3189	4112	4656	7807	9898	10389	11492	9875	5386	6045	7078	9325	11952	11299	8132	8049	8980	9345

WTG	H46	H48	H49	H52	H53	H54
1	19533	16891	17034	12330	3916	11502
2	19578	17028	17169	12607	3700	11261
3	19140	16677	16816	12432	4039	10669
4	18538	16402	16533	12732	4742	9303
5	18134	15855	15990	12005	5020	9394
6	18567	16135	16273	11993	4596	10151
7	16402	13977	14114	10108	6771	8671
8	20109	17401	17545	12691	3568	12151
9	19002	16375	16517	11880	4395	11060
10	18616	15903	16046	11305	4943	11048
11	19635	16663	16812	11574	4950	12654
12	19510	16574	16722	11551	4887	12436
13	19047	16146	16293	11211	5117	11978
14	18620	15738	15885	10866	5408	11607
15	17995	15233	15377	10613	5637	10771
16	17815	15133	15276	10665	5642	10385
17	19820	16821	16970	11677	4947	12889
18	19837	16780	16929	11545	5215	13105
19	18735	15783	15931	10789	5555	11928
20	17704	14860	15006	10135	6104	10844
21	17778	15621	15752	12003	5440	8801
22	17596	15628	15755	12333	5841	8159
23	17295	15392	15517	12237	6210	7774
24	17800	15795	15922	12415	5600	8407
25	15028	13272	13391	10706	8424	5951
26	17023	14748	14882	11039	6123	8613
27	15196	13210	13336	10256	8047	6686
28	15243	12996	13127	9609	7900	7483
29	16793	14817	14943	11616	6557	7620
30	16901	15068	15191	12077	6668	7314
31	17950	16139	16262	13043	5839	8028
32	15119	13494	13609	11112	8521	5640
33	16388	14659	14779	11904	7282	6695
34	16126	13756	13891	10018	7028	8340
35	16669	14203	14341	10229	6525	8962
36	16946	14440	14579	10363	6276	9258
37	15844	13522	13655	9908	7301	8033
38	15017	13146	13268	10406	8312	6266
39	14508	12452	12578	9523	8672	6560
40	14311	11707	11846	7904	9006	8162
41	14315	12187	12315	9182	8838	6695
43	15289	12977	13110	9476	7857	7702
44	13970	11764	11893	8712	9173	6795
45	13755	11621	11748	8739	9393	6501
46	14547	12077	12214	8457	8665	7836
48	14362	12828	12940	10734	9296	5006
49	15084	13763	13870	11841	9084	4830
50	17530	15100	15237	11075	5638	9413
51	15421	13992	14103	11851	8616	5307
52	15665	14171	14284	11891	8302	5623
53	14845	13600	13705	11836	9414	4496
55	13776	12895	12988	11860	10897	3009

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Project:
20102130 - Merricourt ND Enxco

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Brandon Storm, bstorm@eapc.net
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DECIBEL - Main Result

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)

...continued from previous page

WTG	H46	H48	H49	H52	H53	H54
56	13579	12784	12874	11907	11202	2702
57	13029	12090	12184	11145	11293	2884
58	15719	13963	14083	11275	7813	6339
59	13377	12669	12757	11954	11511	2390
60	12189	11860	11934	11906	12995	1093
61	11984	11772	11842	12012	13349	809
62	10584	9906	9986	9995	13459	2739
63	9542	8768	8848	9147	14156	3697
64	8215	7833	7895	9179	15550	4375
65	7906	7860	7911	9629	16096	4412
66	14535	11865	12006	7900	8850	8468
67	8839	8701	8759	9998	15361	3518
68	8466	8565	8615	10226	15896	3750
69	7813	7662	7715	9388	16058	4581
70	18168	15112	15262	9996	6389	11894
71	18395	15729	15871	11227	5055	10742
72	18838	16641	16774	12846	4391	9691
73	18285	15899	16035	11859	4863	9813
74	17223	14825	14961	10887	5933	9113
75	16662	14534	14664	11113	6540	7953
76	13175	11957	12058	10593	10729	3694
77	14187	12940	13044	11304	9897	4149
78	17296	14469	14614	9814	6438	10518
80	12355	11889	11967	11724	12624	1472
81	18922	15929	16077	10855	5566	12205
82	15934	14319	14436	11811	7860	6103
83	9157	8663	8733	9489	14735	3596
85	15661	14493	14597	12696	9027	4850
86	12523	11964	12045	11640	12339	1742
87	7805	7888	7935	9807	16300	4443
89	8679	8144	8214	9139	15057	4098
90	12085	11136	11228	10425	11968	2836
91	10154	9424	9505	9609	13722	3147
92	7482	6961	7024	8573	16021	5247
94	18588	15798	15943	11080	5160	11275
95	19759	16913	17060	12013	4339	12324
97	17213	14517	14659	10090	6251	10034
98	19027	16216	16362	11426	4832	11664
99	19538	17148	17285	12983	3606	10764
100	13783	11770	11894	9073	9397	6153
101	19276	16236	16385	11064	5505	12625
102	14297	12058	12188	8876	8846	7023
103	20090	17004	17155	11712	5208	13398
104	14788	12603	12732	9406	8359	7072
107	18049	15145	15292	10286	5969	11284
108	20127	17844	17979	13795	3067	10938
109	13150	12527	12611	11975	11829	2078
110	13961	12490	12600	10577	9722	4660
111	13480	12159	12264	10576	10333	4068
113	18359	15426	15574	10495	5795	11595
114	15447	14347	14448	12683	9328	4551
115	19913	17238	17382	12596	3644	11895
116	15330	12856	12992	9075	7878	8226
118	12888	12416	12495	12119	12305	1593
119	17793	15266	15405	11053	5446	9885
120	19557	16458	16609	11177	5593	13042
121	17231	14676	14816	10482	6036	9595

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

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DECIBEL - Main Result

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)

...continued from previous page

WTG	H46	H48	H49	H52	H53	H54
125	9325	8697	8772	9319	14470	3638
126	12638	10921	11036	8987	10654	5012
127	12515	10876	10989	9093	10824	4776
128	12516	10975	11085	9333	10904	4497
129	15850	12909	13056	8239	8034	10033
130	15408	12377	12525	7608	8651	10112
131	15698	12585	12735	7628	8611	10560
132	16078	12922	13073	7841	8418	10929
133	14465	12556	12678	9868	8798	6112
134	18213	15209	15357	10173	6163	11743
141	17201	14558	14699	10221	6178	9856
142	14525	12227	12359	8900	8623	7295
143	17553	14805	14949	10255	6022	10424
144	13459	11383	11509	8670	9696	6236
145	12324	11215	11312	10224	11557	3273
146	12562	11363	11464	10185	11245	3537

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DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

Assumptions

Calculated L(DW) = LWA,ref + K + Dc - (Adiv + Aatm + Agr + Abar + Amisc) - Cmet
(when calculated with ground attenuation, then Dc = Domega)

LWA,ref:	Sound pressure level at WTG
K:	Pure tone
Dc:	Directivity correction
Adiv:	the attenuation due to geometrical divergence
Aatm:	the attenuation due to atmospheric absorption
Agr:	the attenuation due to ground effect
Abar:	the attenuation due to a barrier
Amisc:	the attenuation due to miscellaneous other effects
Cmet:	Meteorological correction

Calculation Results

Noise sensitive area: H01 H01

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	5,829	5,829	**12.41**	104.0	3.00	86.31	8.24	0.00	0.00	0.00	94.56	0.00
2	5,346	5,347	**13.58**	104.0	3.00	85.56	7.82	0.00	0.00	0.00	93.38	0.00
3	4,951	4,952	**14.62**	104.0	3.00	84.90	7.45	0.00	0.00	0.00	92.35	0.00
4	3,604	3,605	**18.77**	104.0	3.00	82.14	6.06	0.00	0.00	0.00	88.19	0.00
5	4,406	4,407	**16.16**	104.0	3.00	83.88	6.91	0.00	0.00	0.00	90.80	0.00
6	4,938	4,939	**14.65**	104.0	3.00	84.87	7.44	0.00	0.00	0.00	92.31	0.00
7	5,942	5,944	**12.14**	104.0	3.00	86.48	8.34	0.00	0.00	0.00	94.82	0.00
8	6,191	6,192	**11.57**	104.0	3.00	86.84	8.55	0.00	0.00	0.00	95.39	0.00
9	5,807	5,808	**12.46**	104.0	3.00	86.28	8.23	0.00	0.00	0.00	94.51	0.00
10	6,310	6,311	**11.31**	104.0	3.00	87.00	8.65	0.00	0.00	0.00	95.65	0.00
11	7,643	7,644	**8.62**	104.0	3.00	88.67	9.68	0.00	0.00	0.00	98.34	0.00
12	7,433	7,435	**9.01**	104.0	3.00	88.43	9.53	0.00	0.00	0.00	97.95	0.00
13	7,252	7,253	**9.36**	104.0	3.00	88.21	9.39	0.00	0.00	0.00	97.60	0.00
14	7,189	7,191	**9.48**	104.0	3.00	88.14	9.34	0.00	0.00	0.00	97.48	0.00
15	6,693	6,695	**10.49**	104.0	3.00	87.51	8.96	0.00	0.00	0.00	96.47	0.00
16	6,353	6,354	**11.22**	104.0	3.00	87.06	8.69	0.00	0.00	0.00	95.75	0.00
17	7,812	7,813	**8.30**	104.0	3.00	88.86	9.80	0.00	0.00	0.00	98.66	0.00
18	8,151	8,152	**7.70**	104.0	3.00	89.23	10.04	0.00	0.00	0.00	99.26	0.00
19	7,554	7,555	**8.78**	104.0	3.00	88.56	9.61	0.00	0.00	0.00	98.18	0.00
20	7,170	7,171	**9.52**	104.0	3.00	88.11	9.33	0.00	0.00	0.00	97.44	0.00
21	4,101	4,102	**17.10**	104.0	3.00	83.26	6.60	0.00	0.00	0.00	89.86	0.00
22	3,549	3,550	**18.96**	104.0	3.00	82.00	6.00	0.00	0.00	0.00	88.00	0.00
23	3,595	3,596	**18.80**	104.0	3.00	82.12	6.05	0.00	0.00	0.00	88.16	0.00
24	3,526	3,527	**19.04**	104.0	3.00	81.95	5.97	0.00	0.00	0.00	87.92	0.00
25	5,408	5,408	**13.43**	104.0	3.00	85.66	7.87	0.00	0.00	0.00	93.53	0.00
26	5,006	5,007	**14.47**	104.0	3.00	84.99	7.50	0.00	0.00	0.00	92.49	0.00
27	5,636	5,637	**12.86**	104.0	3.00	86.02	8.08	0.00	0.00	0.00	94.10	0.00
28	6,218	6,219	**11.51**	104.0	3.00	86.87	8.57	0.00	0.00	0.00	95.45	0.00
29	4,214	4,215	**16.75**	104.0	3.00	83.50	6.72	0.00	0.00	0.00	90.21	0.00
30	3,762	3,762	**18.22**	104.0	3.00	82.51	6.23	0.00	0.00	0.00	88.74	0.00
31	2,792	2,793	**21.95**	104.0	3.00	79.92	5.09	0.00	0.00	0.00	85.01	0.00
32	5,167	5,167	**14.05**	104.0	3.00	85.26	7.65	0.00	0.00	0.00	92.92	0.00
33	4,043	4,043	**17.29**	104.0	3.00	83.13	6.54	0.00	0.00	0.00	89.67	0.00
34	5,932	5,933	**12.16**	104.0	3.00	86.46	8.33	0.00	0.00	0.00	94.80	0.00
35	5,936	5,937	**12.15**	104.0	3.00	86.47	8.34	0.00	0.00	0.00	94.81	0.00

To be continued on next page...

Project:
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DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	5,942	5,943	**12.14**	104.0	3.00	86.48	8.34	0.00	0.00	0.00	94.82	0.00
37	5,974	5,975	**12.07**	104.0	3.00	86.53	8.37	0.00	0.00	0.00	94.90	0.00
38	5,592	5,592	**12.97**	104.0	3.00	85.95	8.04	0.00	0.00	0.00	93.99	0.00
39	6,404	6,405	**11.11**	104.0	3.00	87.13	8.73	0.00	0.00	0.00	95.86	0.00
40	7,943	7,943	**8.07**	104.0	3.00	89.00	9.89	0.00	0.00	0.00	98.89	0.00
41	6,726	6,727	**10.42**	104.0	3.00	87.56	8.98	0.00	0.00	0.00	96.54	0.00
43	6,361	6,362	**11.20**	104.0	3.00	87.07	8.69	0.00	0.00	0.00	95.76	0.00
44	7,196	7,197	**9.47**	104.0	3.00	88.14	9.35	0.00	0.00	0.00	97.49	0.00
45	7,242	7,244	**9.38**	104.0	3.00	88.20	9.38	0.00	0.00	0.00	97.58	0.00
46	7,376	7,377	**9.12**	104.0	3.00	88.36	9.48	0.00	0.00	0.00	97.84	0.00
48	5,857	5,858	**12.34**	104.0	3.00	86.35	8.27	0.00	0.00	0.00	94.62	0.00
49	5,063	5,063	**14.32**	104.0	3.00	85.09	7.55	0.00	0.00	0.00	92.64	0.00
50	5,337	5,338	**13.60**	104.0	3.00	85.55	7.81	0.00	0.00	0.00	93.36	0.00
51	4,737	4,737	**15.21**	104.0	3.00	84.51	7.24	0.00	0.00	0.00	91.75	0.00
52	4,518	4,518	**15.84**	104.0	3.00	84.10	7.03	0.00	0.00	0.00	91.13	0.00
53	5,312	5,312	**13.67**	104.0	3.00	85.51	7.78	0.00	0.00	0.00	93.29	0.00
55	6,550	6,550	**10.79**	104.0	3.00	87.33	8.84	0.00	0.00	0.00	96.17	0.00
56	6,809	6,809	**10.25**	104.0	3.00	87.66	9.05	0.00	0.00	0.00	96.71	0.00
57	7,204	7,204	**9.46**	104.0	3.00	88.15	9.35	0.00	0.00	0.00	97.50	0.00
58	4,732	4,733	**15.22**	104.0	3.00	84.50	7.24	0.00	0.00	0.00	91.74	0.00
59	7,080	7,080	**9.70**	104.0	3.00	88.00	9.26	0.00	0.00	0.00	97.26	0.00
60	8,537	8,537	**7.03**	104.0	3.00	89.63	10.30	0.00	0.00	0.00	99.93	0.00
61	8,857	8,857	**6.50**	104.0	3.00	89.95	10.52	0.00	0.00	0.00	100.46	0.00
62	9,650	9,650	**5.25**	104.0	3.00	90.69	11.02	0.00	0.00	0.00	101.71	0.00
63	10,621	10,621	**3.84**	104.0	3.00	91.52	11.60	0.00	0.00	0.00	103.12	0.00
64	11,994	11,995	**2.03**	104.0	3.00	92.58	12.36	0.00	0.00	0.00	104.94	0.00
65	12,414	12,415	**1.51**	104.0	3.00	92.88	12.57	0.00	0.00	0.00	105.45	0.00
66	7,991	7,991	**7.98**	104.0	3.00	89.05	9.93	0.00	0.00	0.00	98.98	0.00
67	11,538	11,539	**2.61**	104.0	3.00	92.24	12.11	0.00	0.00	0.00	104.35	0.00
68	12,021	12,021	**1.99**	104.0	3.00	92.60	12.37	0.00	0.00	0.00	104.97	0.00
69	12,450	12,450	**1.47**	104.0	3.00	92.90	12.59	0.00	0.00	0.00	105.50	0.00
70	8,175	8,175	**7.66**	104.0	3.00	89.25	10.06	0.00	0.00	0.00	99.31	0.00
71	6,122	6,123	**11.73**	104.0	3.00	86.74	8.49	0.00	0.00	0.00	95.23	0.00
72	3,747	3,748	**18.27**	104.0	3.00	82.48	6.22	0.00	0.00	0.00	88.69	0.00
73	4,822	4,823	**14.97**	104.0	3.00	84.67	7.33	0.00	0.00	0.00	91.99	0.00
74	5,365	5,366	**13.53**	104.0	3.00	85.59	7.83	0.00	0.00	0.00	93.43	0.00
75	4,759	4,760	**15.15**	104.0	3.00	84.55	7.26	0.00	0.00	0.00	91.82	0.00
76	6,973	6,973	**9.92**	104.0	3.00	87.87	9.18	0.00	0.00	0.00	97.04	0.00
77	5,963	5,963	**12.09**	104.0	3.00	86.51	8.36	0.00	0.00	0.00	94.87	0.00
78	7,207	7,208	**9.45**	104.0	3.00	88.16	9.36	0.00	0.00	0.00	97.51	0.00
80	8,231	8,232	**7.56**	104.0	3.00	89.31	10.09	0.00	0.00	0.00	99.40	0.00
81	7,767	7,768	**8.39**	104.0	3.00	88.81	9.77	0.00	0.00	0.00	98.57	0.00
82	4,341	4,341	**16.36**	104.0	3.00	83.75	6.85	0.00	0.00	0.00	90.60	0.00
83	11,070	11,070	**3.22**	104.0	3.00	91.88	11.85	0.00	0.00	0.00	103.74	0.00
85	4,554	4,554	**15.73**	104.0	3.00	84.17	7.06	0.00	0.00	0.00	91.23	0.00
86	7,984	7,984	**8.00**	104.0	3.00	89.04	9.92	0.00	0.00	0.00	98.97	0.00
87	12,572	12,573	**1.32**	104.0	3.00	92.99	12.65	0.00	0.00	0.00	105.64	0.00
89	11,510	11,510	**2.64**	104.0	3.00	92.22	12.10	0.00	0.00	0.00	104.32	0.00
90	8,103	8,104	**7.78**	104.0	3.00	89.17	10.01	0.00	0.00	0.00	99.18	0.00
91	10,040	10,040	**4.67**	104.0	3.00	91.03	11.26	0.00	0.00	0.00	102.29	0.00
92	12,673	12,673	**1.20**	104.0	3.00	93.06	12.71	0.00	0.00	0.00	105.76	0.00
94	6,706	6,708	**10.46**	104.0	3.00	87.53	8.97	0.00	0.00	0.00	96.50	0.00
95	6,937	6,938	**9.99**	104.0	3.00	87.82	9.15	0.00	0.00	0.00	96.97	0.00
97	6,635	6,636	**10.61**	104.0	3.00	87.44	8.91	0.00	0.00	0.00	96.35	0.00
98	6,767	6,768	**10.34**	104.0	3.00	87.61	9.02	0.00	0.00	0.00	96.63	0.00

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DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	4,522	4,523	**15.82**	104.0	3.00	84.11	7.03	0.00	0.00	0.00	91.14	0.00
100	6,999	7,000	**9.86**	104.0	3.00	87.90	9.20	0.00	0.00	0.00	97.10	0.00
101	8,023	8,024	**7.92**	104.0	3.00	89.09	9.95	0.00	0.00	0.00	99.04	0.00
102	6,986	6,987	**9.89**	104.0	3.00	87.89	9.19	0.00	0.00	0.00	97.07	0.00
103	8,345	8,346	**7.36**	104.0	3.00	89.43	10.17	0.00	0.00	0.00	99.60	0.00
104	6,438	6,439	**11.03**	104.0	3.00	87.18	8.75	0.00	0.00	0.00	95.93	0.00
107	7,397	7,398	**9.08**	104.0	3.00	88.38	9.50	0.00	0.00	0.00	97.88	0.00
108	3,938	3,939	**17.63**	104.0	3.00	82.91	6.43	0.00	0.00	0.00	89.33	0.00
109	7,374	7,374	**9.13**	104.0	3.00	88.35	9.48	0.00	0.00	0.00	97.83	0.00
110	6,229	6,229	**11.49**	104.0	3.00	86.89	8.58	0.00	0.00	0.00	95.47	0.00
111	6,671	6,671	**10.54**	104.0	3.00	87.48	8.94	0.00	0.00	0.00	96.42	0.00
113	7,492	7,493	**8.90**	104.0	3.00	88.49	9.57	0.00	0.00	0.00	98.06	0.00
114	4,810	4,810	**15.01**	104.0	3.00	84.64	7.31	0.00	0.00	0.00	91.96	0.00
115	5,999	6,000	**12.01**	104.0	3.00	86.56	8.39	0.00	0.00	0.00	94.95	0.00
116	6,822	6,824	**10.22**	104.0	3.00	87.68	9.06	0.00	0.00	0.00	96.74	0.00
118	7,783	7,784	**8.36**	104.0	3.00	88.82	9.78	0.00	0.00	0.00	98.60	0.00
119	5,646	5,647	**12.84**	104.0	3.00	86.04	8.09	0.00	0.00	0.00	94.12	0.00
120	8,372	8,373	**7.31**	104.0	3.00	89.46	10.19	0.00	0.00	0.00	99.65	0.00
121	6,007	6,008	**11.99**	104.0	3.00	86.57	8.40	0.00	0.00	0.00	94.97	0.00
125	10,866	10,866	**3.50**	104.0	3.00	91.72	11.74	0.00	0.00	0.00	103.46	0.00
126	7,741	7,741	**8.44**	104.0	3.00	88.78	9.75	0.00	0.00	0.00	98.53	0.00
127	7,799	7,800	**8.33**	104.0	3.00	88.84	9.79	0.00	0.00	0.00	98.63	0.00
128	7,731	7,732	**8.45**	104.0	3.00	88.77	9.74	0.00	0.00	0.00	98.51	0.00
129	8,269	8,269	**7.49**	104.0	3.00	89.35	10.12	0.00	0.00	0.00	99.47	0.00
130	8,848	8,849	**6.51**	104.0	3.00	89.94	10.51	0.00	0.00	0.00	100.45	0.00
131	9,086	9,087	**6.13**	104.0	3.00	90.17	10.66	0.00	0.00	0.00	100.83	0.00
132	9,153	9,153	**6.02**	104.0	3.00	90.23	10.71	0.00	0.00	0.00	100.94	0.00
133	6,180	6,181	**11.60**	104.0	3.00	86.82	8.54	0.00	0.00	0.00	95.36	0.00
134	7,893	7,893	**8.16**	104.0	3.00	88.95	9.86	0.00	0.00	0.00	98.80	0.00
141	6,405	6,406	**11.10**	104.0	3.00	87.13	8.73	0.00	0.00	0.00	95.86	0.00
142	6,934	6,935	**9.99**	104.0	3.00	87.82	9.15	0.00	0.00	0.00	96.97	0.00
143	6,750	6,752	**10.37**	104.0	3.00	87.59	9.00	0.00	0.00	0.00	96.59	0.00
144	7,409	7,410	**9.06**	104.0	3.00	88.40	9.51	0.00	0.00	0.00	97.90	0.00
145	7,829	7,829	**8.28**	104.0	3.00	88.87	9.81	0.00	0.00	0.00	98.69	0.00
146	7,584	7,585	**8.73**	104.0	3.00	88.60	9.64	0.00	0.00	0.00	98.23	0.00

Sum 33.58

Noise sensitive area: H02 H02

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	5,440	5,441	**13.35**	104.0	3.00	85.71	7.90	0.00	0.00	0.00	93.61	0.00
2	4,957	4,958	**14.60**	104.0	3.00	84.91	7.45	0.00	0.00	0.00	92.36	0.00
3	4,566	4,567	**15.69**	104.0	3.00	84.19	7.08	0.00	0.00	0.00	91.27	0.00
4	3,244	3,244	**20.10**	104.0	3.00	81.22	5.64	0.00	0.00	0.00	86.86	0.00
5	4,050	4,051	**17.27**	104.0	3.00	83.15	6.55	0.00	0.00	0.00	89.70	0.00
6	4,563	4,565	**15.70**	104.0	3.00	84.19	7.07	0.00	0.00	0.00	91.26	0.00
7	5,632	5,633	**12.87**	104.0	3.00	86.02	8.07	0.00	0.00	0.00	94.09	0.00
8	5,801	5,802	**12.47**	104.0	3.00	86.27	8.22	0.00	0.00	0.00	94.49	0.00
9	5,423	5,424	**13.39**	104.0	3.00	85.69	7.89	0.00	0.00	0.00	93.57	0.00
10	5,930	5,932	**12.17**	104.0	3.00	86.46	8.33	0.00	0.00	0.00	94.80	0.00
11	7,254	7,256	**9.36**	104.0	3.00	88.21	9.39	0.00	0.00	0.00	97.60	0.00
12	7,045	7,047	**9.77**	104.0	3.00	87.96	9.23	0.00	0.00	0.00	97.19	0.00
13	6,867	6,869	**10.13**	104.0	3.00	87.74	9.10	0.00	0.00	0.00	96.83	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	6,809	6,811	**10.25**	104.0	3.00	87.66	9.05	0.00	0.00	0.00	96.71	0.00
15	6,324	6,325	**11.28**	104.0	3.00	87.02	8.66	0.00	0.00	0.00	95.68	0.00
16	5,989	5,990	**12.03**	104.0	3.00	86.55	8.38	0.00	0.00	0.00	94.93	0.00
17	7,423	7,424	**9.03**	104.0	3.00	88.41	9.52	0.00	0.00	0.00	97.93	0.00
18	7,762	7,763	**8.40**	104.0	3.00	88.80	9.76	0.00	0.00	0.00	98.56	0.00
19	7,172	7,174	**9.52**	104.0	3.00	88.11	9.33	0.00	0.00	0.00	97.44	0.00
20	6,804	6,805	**10.26**	104.0	3.00	87.66	9.05	0.00	0.00	0.00	96.70	0.00
21	3,769	3,770	**18.19**	104.0	3.00	82.53	6.24	0.00	0.00	0.00	88.77	0.00
22	3,258	3,259	**20.04**	104.0	3.00	81.26	5.66	0.00	0.00	0.00	86.92	0.00
23	3,335	3,336	**19.75**	104.0	3.00	81.46	5.75	0.00	0.00	0.00	87.21	0.00
24	3,217	3,218	**20.20**	104.0	3.00	81.15	5.61	0.00	0.00	0.00	86.76	0.00
25	5,248	5,249	**13.83**	104.0	3.00	85.40	7.73	0.00	0.00	0.00	93.13	0.00
26	4,689	4,690	**15.34**	104.0	3.00	84.42	7.20	0.00	0.00	0.00	91.62	0.00
27	5,426	5,426	**13.38**	104.0	3.00	85.69	7.89	0.00	0.00	0.00	93.58	0.00
28	5,964	5,965	**12.09**	104.0	3.00	86.51	8.36	0.00	0.00	0.00	94.87	0.00
29	3,956	3,957	**17.57**	104.0	3.00	82.95	6.45	0.00	0.00	0.00	89.39	0.00
30	3,538	3,539	**19.00**	104.0	3.00	81.98	5.98	0.00	0.00	0.00	87.96	0.00
31	2,529	2,530	**23.15**	104.0	3.00	79.06	4.75	0.00	0.00	0.00	83.81	0.00
32	5,037	5,038	**14.39**	104.0	3.00	85.04	7.53	0.00	0.00	0.00	92.58	0.00
33	3,867	3,868	**17.86**	104.0	3.00	82.75	6.35	0.00	0.00	0.00	89.10	0.00
34	5,635	5,636	**12.87**	104.0	3.00	86.02	8.08	0.00	0.00	0.00	94.10	0.00
35	5,613	5,615	**12.92**	104.0	3.00	85.99	8.06	0.00	0.00	0.00	94.04	0.00
36	5,608	5,609	**12.93**	104.0	3.00	85.98	8.05	0.00	0.00	0.00	94.03	0.00
37	5,692	5,694	**12.73**	104.0	3.00	86.11	8.13	0.00	0.00	0.00	94.23	0.00
38	5,407	5,408	**13.43**	104.0	3.00	85.66	7.87	0.00	0.00	0.00	93.53	0.00
39	6,197	6,198	**11.56**	104.0	3.00	86.85	8.56	0.00	0.00	0.00	95.40	0.00
40	7,676	7,676	**8.56**	104.0	3.00	88.70	9.70	0.00	0.00	0.00	98.40	0.00
41	6,512	6,513	**10.87**	104.0	3.00	87.28	8.81	0.00	0.00	0.00	96.09	0.00
43	6,097	6,098	**11.79**	104.0	3.00	86.70	8.47	0.00	0.00	0.00	95.18	0.00
44	6,979	6,981	**9.90**	104.0	3.00	87.88	9.18	0.00	0.00	0.00	97.06	0.00
45	7,040	7,041	**9.78**	104.0	3.00	87.95	9.23	0.00	0.00	0.00	97.18	0.00
46	7,115	7,116	**9.63**	104.0	3.00	88.04	9.29	0.00	0.00	0.00	97.33	0.00
48	5,752	5,752	**12.59**	104.0	3.00	86.20	8.18	0.00	0.00	0.00	94.37	0.00
49	5,014	5,015	**14.45**	104.0	3.00	85.00	7.51	0.00	0.00	0.00	92.51	0.00
50	4,990	4,992	**14.51**	104.0	3.00	84.97	7.49	0.00	0.00	0.00	92.45	0.00
51	4,662	4,662	**15.42**	104.0	3.00	84.37	7.17	0.00	0.00	0.00	91.54	0.00
52	4,424	4,425	**16.11**	104.0	3.00	83.92	6.93	0.00	0.00	0.00	90.85	0.00
53	5,279	5,279	**13.76**	104.0	3.00	85.45	7.75	0.00	0.00	0.00	93.21	0.00
55	6,569	6,570	**10.75**	104.0	3.00	87.35	8.86	0.00	0.00	0.00	96.21	0.00
56	6,838	6,838	**10.19**	104.0	3.00	87.70	9.07	0.00	0.00	0.00	96.77	0.00
57	7,195	7,196	**9.47**	104.0	3.00	88.14	9.35	0.00	0.00	0.00	97.49	0.00
58	4,562	4,562	**15.71**	104.0	3.00	84.18	7.07	0.00	0.00	0.00	91.25	0.00
59	7,117	7,117	**9.63**	104.0	3.00	88.05	9.29	0.00	0.00	0.00	97.33	0.00
60	8,589	8,589	**6.95**	104.0	3.00	89.68	10.34	0.00	0.00	0.00	100.02	0.00
61	8,916	8,916	**6.40**	104.0	3.00	90.00	10.55	0.00	0.00	0.00	100.56	0.00
62	9,628	9,628	**5.28**	104.0	3.00	90.67	11.01	0.00	0.00	0.00	101.68	0.00
63	10,576	10,576	**3.90**	104.0	3.00	91.49	11.57	0.00	0.00	0.00	103.06	0.00
64	11,959	11,959	**2.07**	104.0	3.00	92.55	12.34	0.00	0.00	0.00	104.89	0.00
65	12,394	12,394	**1.53**	104.0	3.00	92.86	12.56	0.00	0.00	0.00	105.43	0.00
66	7,712	7,713	**8.49**	104.0	3.00	88.74	9.73	0.00	0.00	0.00	98.47	0.00
67	11,529	11,529	**2.62**	104.0	3.00	92.24	12.11	0.00	0.00	0.00	104.34	0.00
68	12,019	12,020	**2.00**	104.0	3.00	92.60	12.37	0.00	0.00	0.00	104.97	0.00
69	12,422	12,422	**1.50**	104.0	3.00	92.88	12.58	0.00	0.00	0.00	105.46	0.00
70	7,800	7,801	**8.33**	104.0	3.00	88.84	9.79	0.00	0.00	0.00	98.63	0.00
71	5,746	5,748	**12.60**	104.0	3.00	86.19	8.17	0.00	0.00	0.00	94.36	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	3,373	3,374	**19.61**	104.0	3.00	81.56	5.79	0.00	0.00	0.00	87.36	0.00
73	4,455	4,456	**16.02**	104.0	3.00	83.98	6.96	0.00	0.00	0.00	90.94	0.00
74	5,030	5,032	**14.40**	104.0	3.00	85.03	7.52	0.00	0.00	0.00	92.56	0.00
75	4,477	4,477	**15.96**	104.0	3.00	84.02	6.99	0.00	0.00	0.00	91.01	0.00
76	6,921	6,921	**10.02**	104.0	3.00	87.80	9.14	0.00	0.00	0.00	96.94	0.00
77	5,919	5,919	**12.20**	104.0	3.00	86.44	8.32	0.00	0.00	0.00	94.77	0.00
78	6,850	6,851	**10.16**	104.0	3.00	87.72	9.08	0.00	0.00	0.00	96.80	0.00
80	8,272	8,273	**7.49**	104.0	3.00	89.35	10.12	0.00	0.00	0.00	99.48	0.00
81	7,384	7,385	**9.11**	104.0	3.00	88.37	9.49	0.00	0.00	0.00	97.86	0.00
82	4,208	4,209	**16.77**	104.0	3.00	83.48	6.71	0.00	0.00	0.00	90.19	0.00
83	11,041	11,042	**3.26**	104.0	3.00	91.86	11.84	0.00	0.00	0.00	103.70	0.00
85	4,563	4,563	**15.70**	104.0	3.00	84.19	7.07	0.00	0.00	0.00	91.26	0.00
86	8,018	8,018	**7.93**	104.0	3.00	89.08	9.95	0.00	0.00	0.00	99.03	0.00
87	12,557	12,558	**1.34**	104.0	3.00	92.98	12.65	0.00	0.00	0.00	105.63	0.00
89	11,471	11,471	**2.69**	104.0	3.00	92.19	12.08	0.00	0.00	0.00	104.27	0.00
90	8,076	8,077	**7.83**	104.0	3.00	89.14	9.99	0.00	0.00	0.00	99.13	0.00
91	10,007	10,007	**4.72**	104.0	3.00	91.01	11.24	0.00	0.00	0.00	102.24	0.00
92	12,619	12,620	**1.26**	104.0	3.00	93.02	12.68	0.00	0.00	0.00	105.70	0.00
94	6,327	6,329	**11.27**	104.0	3.00	87.03	8.66	0.00	0.00	0.00	95.69	0.00
95	6,547	6,549	**10.80**	104.0	3.00	87.32	8.84	0.00	0.00	0.00	96.17	0.00
97	6,284	6,286	**11.37**	104.0	3.00	86.97	8.63	0.00	0.00	0.00	95.60	0.00
98	6,382	6,383	**11.15**	104.0	3.00	87.10	8.71	0.00	0.00	0.00	95.81	0.00
99	4,133	4,134	**17.00**	104.0	3.00	83.33	6.63	0.00	0.00	0.00	89.96	0.00
100	6,812	6,813	**10.24**	104.0	3.00	87.67	9.05	0.00	0.00	0.00	96.72	0.00
101	7,637	7,638	**8.63**	104.0	3.00	88.66	9.67	0.00	0.00	0.00	98.33	0.00
102	6,757	6,759	**10.36**	104.0	3.00	87.60	9.01	0.00	0.00	0.00	96.61	0.00
103	7,955	7,956	**8.05**	104.0	3.00	89.01	9.90	0.00	0.00	0.00	98.92	0.00
104	6,205	6,206	**11.54**	104.0	3.00	86.86	8.56	0.00	0.00	0.00	95.42	0.00
107	7,025	7,026	**9.81**	104.0	3.00	87.93	9.22	0.00	0.00	0.00	97.15	0.00
108	3,549	3,550	**18.96**	104.0	3.00	82.00	6.00	0.00	0.00	0.00	88.00	0.00
109	7,417	7,417	**9.04**	104.0	3.00	88.40	9.51	0.00	0.00	0.00	97.92	0.00
110	6,136	6,136	**11.70**	104.0	3.00	86.76	8.50	0.00	0.00	0.00	95.26	0.00
111	6,604	6,604	**10.68**	104.0	3.00	87.40	8.89	0.00	0.00	0.00	96.28	0.00
113	7,115	7,116	**9.63**	104.0	3.00	88.04	9.29	0.00	0.00	0.00	97.33	0.00
114	4,831	4,831	**14.95**	104.0	3.00	84.68	7.33	0.00	0.00	0.00	92.02	0.00
115	5,609	5,610	**12.93**	104.0	3.00	85.98	8.05	0.00	0.00	0.00	94.03	0.00
116	6,539	6,541	**10.81**	104.0	3.00	87.31	8.84	0.00	0.00	0.00	96.15	0.00
118	7,839	7,840	**8.26**	104.0	3.00	88.89	9.82	0.00	0.00	0.00	98.71	0.00
119	5,287	5,289	**13.73**	104.0	3.00	85.47	7.76	0.00	0.00	0.00	93.23	0.00
120	7,984	7,985	**7.99**	104.0	3.00	89.05	9.92	0.00	0.00	0.00	98.97	0.00
121	5,662	5,663	**12.80**	104.0	3.00	86.06	8.10	0.00	0.00	0.00	94.16	0.00
125	10,829	10,830	**3.55**	104.0	3.00	91.69	11.72	0.00	0.00	0.00	103.41	0.00
126	7,610	7,610	**8.68**	104.0	3.00	88.63	9.65	0.00	0.00	0.00	98.28	0.00
127	7,679	7,680	**8.55**	104.0	3.00	88.71	9.70	0.00	0.00	0.00	98.41	0.00
128	7,625	7,626	**8.65**	104.0	3.00	88.65	9.67	0.00	0.00	0.00	98.31	0.00
129	7,941	7,942	**8.07**	104.0	3.00	89.00	9.89	0.00	0.00	0.00	98.89	0.00
130	8,527	8,528	**7.05**	104.0	3.00	89.62	10.30	0.00	0.00	0.00	99.91	0.00
131	8,756	8,756	**6.67**	104.0	3.00	89.85	10.45	0.00	0.00	0.00	100.30	0.00
132	8,813	8,814	**6.57**	104.0	3.00	89.90	10.49	0.00	0.00	0.00	100.39	0.00
133	5,999	5,999	**12.01**	104.0	3.00	86.56	8.39	0.00	0.00	0.00	94.95	0.00
134	7,518	7,518	**8.85**	104.0	3.00	88.52	9.59	0.00	0.00	0.00	98.11	0.00
141	6,056	6,058	**11.88**	104.0	3.00	86.65	8.44	0.00	0.00	0.00	95.09	0.00
142	6,693	6,694	**10.49**	104.0	3.00	87.51	8.96	0.00	0.00	0.00	96.47	0.00
143	6,390	6,392	**11.13**	104.0	3.00	87.11	8.72	0.00	0.00	0.00	95.83	0.00
144	7,219	7,220	**9.43**	104.0	3.00	88.17	9.36	0.00	0.00	0.00	97.54	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	7,783	7,784	**8.36**	104.0	3.00	88.82	9.78	0.00	0.00	0.00	98.60	0.00
146	7,528	7,529	**8.83**	104.0	3.00	88.53	9.59	0.00	0.00	0.00	98.13	0.00
Sum	34.35											

Noise sensitive area: H03 H03

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	6,227	6,228	**11.49**	104.0	3.00	86.89	8.58	0.00	0.00	0.00	95.47	0.00
2	5,748	5,748	**12.60**	104.0	3.00	86.19	8.17	0.00	0.00	0.00	94.36	0.00
3	5,329	5,330	**13.63**	104.0	3.00	85.53	7.80	0.00	0.00	0.00	93.34	0.00
4	3,914	3,915	**17.71**	104.0	3.00	82.85	6.40	0.00	0.00	0.00	89.25	0.00
5	4,702	4,703	**15.31**	104.0	3.00	84.45	7.21	0.00	0.00	0.00	91.66	0.00
6	5,278	5,279	**13.76**	104.0	3.00	85.45	7.75	0.00	0.00	0.00	93.21	0.00
7	6,140	6,141	**11.69**	104.0	3.00	86.76	8.51	0.00	0.00	0.00	95.27	0.00
8	6,612	6,613	**10.66**	104.0	3.00	87.41	8.89	0.00	0.00	0.00	96.30	0.00
9	6,179	6,180	**11.60**	104.0	3.00	86.82	8.54	0.00	0.00	0.00	95.36	0.00
10	6,662	6,664	**10.55**	104.0	3.00	87.47	8.93	0.00	0.00	0.00	96.41	0.00
11	8,037	8,038	**7.90**	104.0	3.00	89.10	9.96	0.00	0.00	0.00	99.06	0.00
12	7,824	7,825	**8.28**	104.0	3.00	88.87	9.81	0.00	0.00	0.00	98.68	0.00
13	7,625	7,626	**8.65**	104.0	3.00	88.65	9.67	0.00	0.00	0.00	98.31	0.00
14	7,543	7,545	**8.80**	104.0	3.00	88.55	9.61	0.00	0.00	0.00	98.16	0.00
15	7,015	7,016	**9.83**	104.0	3.00	87.92	9.21	0.00	0.00	0.00	97.13	0.00
16	6,661	6,662	**10.56**	104.0	3.00	87.47	8.93	0.00	0.00	0.00	96.41	0.00
17	8,212	8,213	**7.59**	104.0	3.00	89.29	10.08	0.00	0.00	0.00	99.37	0.00
18	8,550	8,551	**7.01**	104.0	3.00	89.64	10.31	0.00	0.00	0.00	99.95	0.00
19	7,913	7,914	**8.12**	104.0	3.00	88.97	9.87	0.00	0.00	0.00	98.84	0.00
20	7,479	7,480	**8.93**	104.0	3.00	88.48	9.56	0.00	0.00	0.00	98.04	0.00
21	4,348	4,349	**16.34**	104.0	3.00	83.77	6.86	0.00	0.00	0.00	90.62	0.00
22	3,730	3,730	**18.33**	104.0	3.00	82.43	6.20	0.00	0.00	0.00	88.63	0.00
23	3,727	3,728	**18.34**	104.0	3.00	82.43	6.20	0.00	0.00	0.00	88.62	0.00
24	3,738	3,738	**18.30**	104.0	3.00	82.45	6.21	0.00	0.00	0.00	88.66	0.00
25	5,378	5,378	**13.50**	104.0	3.00	85.61	7.85	0.00	0.00	0.00	93.46	0.00
26	5,218	5,219	**13.91**	104.0	3.00	85.35	7.70	0.00	0.00	0.00	93.05	0.00
27	5,676	5,676	**12.77**	104.0	3.00	86.08	8.11	0.00	0.00	0.00	94.19	0.00
28	6,320	6,321	**11.29**	104.0	3.00	87.02	8.66	0.00	0.00	0.00	95.67	0.00
29	4,335	4,336	**16.38**	104.0	3.00	83.74	6.84	0.00	0.00	0.00	90.58	0.00
30	3,837	3,838	**17.96**	104.0	3.00	82.68	6.32	0.00	0.00	0.00	89.00	0.00
31	2,943	2,944	**21.31**	104.0	3.00	80.38	5.28	0.00	0.00	0.00	85.66	0.00
32	5,098	5,098	**14.23**	104.0	3.00	85.15	7.59	0.00	0.00	0.00	92.74	0.00
33	4,048	4,048	**17.27**	104.0	3.00	83.14	6.54	0.00	0.00	0.00	89.69	0.00
34	6,104	6,105	**11.77**	104.0	3.00	86.71	8.48	0.00	0.00	0.00	95.19	0.00
35	6,156	6,157	**11.65**	104.0	3.00	86.79	8.52	0.00	0.00	0.00	95.31	0.00
36	6,184	6,185	**11.59**	104.0	3.00	86.83	8.55	0.00	0.00	0.00	95.37	0.00
37	6,122	6,123	**11.73**	104.0	3.00	86.74	8.49	0.00	0.00	0.00	95.23	0.00
38	5,594	5,594	**12.97**	104.0	3.00	85.95	8.04	0.00	0.00	0.00	93.99	0.00
39	6,434	6,435	**11.04**	104.0	3.00	87.17	8.75	0.00	0.00	0.00	95.92	0.00
40	8,059	8,060	**7.86**	104.0	3.00	89.13	9.97	0.00	0.00	0.00	99.10	0.00
41	6,764	6,765	**10.34**	104.0	3.00	87.61	9.01	0.00	0.00	0.00	96.62	0.00
43	6,477	6,478	**10.95**	104.0	3.00	87.23	8.79	0.00	0.00	0.00	96.01	0.00
44	7,237	7,238	**9.39**	104.0	3.00	88.19	9.38	0.00	0.00	0.00	97.57	0.00
45	7,263	7,264	**9.34**	104.0	3.00	88.22	9.40	0.00	0.00	0.00	97.62	0.00
46	7,484	7,485	**8.92**	104.0	3.00	88.48	9.56	0.00	0.00	0.00	98.05	0.00
48	5,754	5,754	**12.58**	104.0	3.00	86.20	8.18	0.00	0.00	0.00	94.38	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	4,895	4,895	**14.77**	104.0	3.00	84.80	7.40	0.00	0.00	0.00	92.19	0.00
50	5,608	5,609	**12.93**	104.0	3.00	85.98	8.05	0.00	0.00	0.00	94.03	0.00
51	4,604	4,604	**15.59**	104.0	3.00	84.26	7.11	0.00	0.00	0.00	91.38	0.00
52	4,409	4,410	**16.16**	104.0	3.00	83.89	6.92	0.00	0.00	0.00	90.81	0.00
53	5,122	5,123	**14.16**	104.0	3.00	85.19	7.61	0.00	0.00	0.00	92.80	0.00
55	6,295	6,295	**11.35**	104.0	3.00	86.98	8.64	0.00	0.00	0.00	95.62	0.00
56	6,543	6,543	**10.81**	104.0	3.00	87.32	8.84	0.00	0.00	0.00	96.15	0.00
57	6,977	6,977	**9.91**	104.0	3.00	87.87	9.18	0.00	0.00	0.00	97.05	0.00
58	4,723	4,723	**15.25**	104.0	3.00	84.48	7.23	0.00	0.00	0.00	91.71	0.00
59	6,804	6,804	**10.26**	104.0	3.00	87.66	9.05	0.00	0.00	0.00	96.70	0.00
60	8,241	8,242	**7.54**	104.0	3.00	89.32	10.10	0.00	0.00	0.00	99.42	0.00
61	8,555	8,555	**7.00**	104.0	3.00	89.64	10.31	0.00	0.00	0.00	99.96	0.00
62	9,431	9,432	**5.59**	104.0	3.00	90.49	10.88	0.00	0.00	0.00	101.38	0.00
63	10,428	10,428	**4.11**	104.0	3.00	91.36	11.49	0.00	0.00	0.00	102.85	0.00
64	11,788	11,789	**2.29**	104.0	3.00	92.43	12.25	0.00	0.00	0.00	104.68	0.00
65	12,191	12,191	**1.78**	104.0	3.00	92.72	12.46	0.00	0.00	0.00	105.18	0.00
66	8,125	8,125	**7.74**	104.0	3.00	89.20	10.02	0.00	0.00	0.00	99.22	0.00
67	11,303	11,304	**2.91**	104.0	3.00	92.06	11.98	0.00	0.00	0.00	104.05	0.00
68	11,777	11,777	**2.30**	104.0	3.00	92.42	12.24	0.00	0.00	0.00	104.66	0.00
69	12,235	12,235	**1.73**	104.0	3.00	92.75	12.48	0.00	0.00	0.00	105.23	0.00
70	8,509	8,510	**7.08**	104.0	3.00	89.60	10.28	0.00	0.00	0.00	99.88	0.00
71	6,461	6,463	**10.98**	104.0	3.00	87.21	8.77	0.00	0.00	0.00	95.98	0.00
72	4,091	4,091	**17.14**	104.0	3.00	83.24	6.59	0.00	0.00	0.00	89.83	0.00
73	5,140	5,140	**14.12**	104.0	3.00	85.22	7.63	0.00	0.00	0.00	92.85	0.00
74	5,611	5,612	**12.93**	104.0	3.00	85.98	8.05	0.00	0.00	0.00	94.04	0.00
75	4,914	4,915	**14.72**	104.0	3.00	84.83	7.41	0.00	0.00	0.00	92.24	0.00
76	6,797	6,798	**10.27**	104.0	3.00	87.65	9.04	0.00	0.00	0.00	96.69	0.00
77	5,783	5,783	**12.51**	104.0	3.00	86.24	8.20	0.00	0.00	0.00	94.45	0.00
78	7,495	7,496	**8.90**	104.0	3.00	88.50	9.57	0.00	0.00	0.00	98.07	0.00
80	7,948	7,949	**8.06**	104.0	3.00	89.01	9.90	0.00	0.00	0.00	98.90	0.00
81	8,134	8,135	**7.73**	104.0	3.00	89.21	10.03	0.00	0.00	0.00	99.23	0.00
82	4,284	4,284	**16.54**	104.0	3.00	83.64	6.79	0.00	0.00	0.00	90.43	0.00
83	10,858	10,858	**3.51**	104.0	3.00	91.72	11.73	0.00	0.00	0.00	103.45	0.00
85	4,323	4,323	**16.42**	104.0	3.00	83.72	6.83	0.00	0.00	0.00	90.55	0.00
86	7,709	7,709	**8.50**	104.0	3.00	88.74	9.73	0.00	0.00	0.00	98.47	0.00
87	12,343	12,343	**1.60**	104.0	3.00	92.83	12.54	0.00	0.00	0.00	105.37	0.00
89	11,308	11,308	**2.91**	104.0	3.00	92.07	11.99	0.00	0.00	0.00	104.05	0.00
90	7,895	7,896	**8.15**	104.0	3.00	88.95	9.86	0.00	0.00	0.00	98.81	0.00
91	9,834	9,834	**4.97**	104.0	3.00	90.85	11.13	0.00	0.00	0.00	101.99	0.00
92	12,486	12,486	**1.42**	104.0	3.00	92.93	12.61	0.00	0.00	0.00	105.54	0.00
94	7,059	7,060	**9.74**	104.0	3.00	87.98	9.24	0.00	0.00	0.00	97.22	0.00
95	7,340	7,341	**9.19**	104.0	3.00	88.31	9.46	0.00	0.00	0.00	97.77	0.00
97	6,910	6,912	**10.04**	104.0	3.00	87.79	9.13	0.00	0.00	0.00	96.92	0.00
98	7,139	7,141	**9.58**	104.0	3.00	88.07	9.30	0.00	0.00	0.00	97.38	0.00
99	4,923	4,924	**14.69**	104.0	3.00	84.85	7.42	0.00	0.00	0.00	92.27	0.00
100	6,997	6,998	**9.87**	104.0	3.00	87.90	9.20	0.00	0.00	0.00	97.09	0.00
101	8,402	8,403	**7.26**	104.0	3.00	89.49	10.21	0.00	0.00	0.00	99.70	0.00
102	7,044	7,046	**9.77**	104.0	3.00	87.96	9.23	0.00	0.00	0.00	97.19	0.00
103	8,751	8,751	**6.67**	104.0	3.00	89.84	10.45	0.00	0.00	0.00	100.29	0.00
104	6,507	6,508	**10.88**	104.0	3.00	87.27	8.81	0.00	0.00	0.00	96.08	0.00
107	7,725	7,726	**8.47**	104.0	3.00	88.76	9.74	0.00	0.00	0.00	98.50	0.00
108	4,374	4,375	**16.26**	104.0	3.00	83.82	6.88	0.00	0.00	0.00	90.70	0.00
109	7,091	7,091	**9.68**	104.0	3.00	88.01	9.27	0.00	0.00	0.00	97.28	0.00
110	6,107	6,107	**11.76**	104.0	3.00	86.72	8.48	0.00	0.00	0.00	95.20	0.00
111	6,515	6,515	**10.87**	104.0	3.00	87.28	8.82	0.00	0.00	0.00	96.09	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	7,834	7,835	**8.26**	104.0	3.00	88.88	9.82	0.00	0.00	0.00	98.70	0.00
114	4,562	4,562	**15.71**	104.0	3.00	84.18	7.07	0.00	0.00	0.00	91.25	0.00
115	6,413	6,414	**11.09**	104.0	3.00	87.14	8.73	0.00	0.00	0.00	95.88	0.00
116	6,968	6,969	**9.92**	104.0	3.00	87.86	9.17	0.00	0.00	0.00	97.04	0.00
118	7,486	7,486	**8.91**	104.0	3.00	88.49	9.56	0.00	0.00	0.00	98.05	0.00
119	5,943	5,944	**12.14**	104.0	3.00	86.48	8.34	0.00	0.00	0.00	94.82	0.00
120	8,760	8,760	**6.66**	104.0	3.00	89.85	10.45	0.00	0.00	0.00	100.30	0.00
121	6,271	6,273	**11.40**	104.0	3.00	86.95	8.62	0.00	0.00	0.00	95.57	0.00
125	10,662	10,663	**3.78**	104.0	3.00	91.56	11.62	0.00	0.00	0.00	103.18	0.00
126	7,661	7,661	**8.58**	104.0	3.00	88.69	9.69	0.00	0.00	0.00	98.38	0.00
127	7,704	7,705	**8.50**	104.0	3.00	88.74	9.72	0.00	0.00	0.00	98.46	0.00
128	7,619	7,620	**8.66**	104.0	3.00	88.64	9.66	0.00	0.00	0.00	98.30	0.00
129	8,492	8,492	**7.11**	104.0	3.00	89.58	10.27	0.00	0.00	0.00	99.85	0.00
130	9,057	9,057	**6.18**	104.0	3.00	90.14	10.65	0.00	0.00	0.00	100.79	0.00
131	9,313	9,313	**5.77**	104.0	3.00	90.38	10.81	0.00	0.00	0.00	101.19	0.00
132	9,398	9,399	**5.64**	104.0	3.00	90.46	10.86	0.00	0.00	0.00	101.32	0.00
133	6,175	6,176	**11.61**	104.0	3.00	86.81	8.54	0.00	0.00	0.00	95.35	0.00
134	8,229	8,230	**7.56**	104.0	3.00	89.31	10.09	0.00	0.00	0.00	99.40	0.00
141	6,675	6,677	**10.53**	104.0	3.00	87.49	8.94	0.00	0.00	0.00	96.44	0.00
142	7,012	7,014	**9.83**	104.0	3.00	87.92	9.21	0.00	0.00	0.00	97.13	0.00
143	7,048	7,049	**9.76**	104.0	3.00	87.96	9.23	0.00	0.00	0.00	97.20	0.00
144	7,410	7,411	**9.06**	104.0	3.00	88.40	9.51	0.00	0.00	0.00	97.90	0.00
145	7,643	7,643	**8.62**	104.0	3.00	88.67	9.68	0.00	0.00	0.00	98.34	0.00
146	7,411	7,412	**9.06**	104.0	3.00	88.40	9.51	0.00	0.00	0.00	97.91	0.00

Sum 33.21

Noise sensitive area: H04 H04

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	7,563	7,564	**8.77**	104.0	3.00	88.57	9.62	0.00	0.00	0.00	98.19	0.00
2	7,105	7,105	**9.65**	104.0	3.00	88.03	9.28	0.00	0.00	0.00	97.31	0.00
3	6,616	6,617	**10.65**	104.0	3.00	87.41	8.90	0.00	0.00	0.00	96.31	0.00
4	5,049	5,049	**14.36**	104.0	3.00	85.06	7.54	0.00	0.00	0.00	92.61	0.00
5	5,753	5,753	**12.59**	104.0	3.00	86.20	8.18	0.00	0.00	0.00	94.38	0.00
6	6,447	6,448	**11.01**	104.0	3.00	87.19	8.76	0.00	0.00	0.00	95.95	0.00
7	6,815	6,816	**10.24**	104.0	3.00	87.67	9.05	0.00	0.00	0.00	96.72	0.00
8	8,023	8,023	**7.93**	104.0	3.00	89.09	9.95	0.00	0.00	0.00	99.04	0.00
9	7,427	7,428	**9.02**	104.0	3.00	88.42	9.52	0.00	0.00	0.00	97.94	0.00
10	7,836	7,837	**8.26**	104.0	3.00	88.88	9.82	0.00	0.00	0.00	98.70	0.00
11	9,336	9,337	**5.73**	104.0	3.00	90.40	10.82	0.00	0.00	0.00	101.23	0.00
12	9,112	9,114	**6.09**	104.0	3.00	90.19	10.68	0.00	0.00	0.00	100.88	0.00
13	8,852	8,853	**6.51**	104.0	3.00	89.94	10.51	0.00	0.00	0.00	100.45	0.00
14	8,707	8,708	**6.75**	104.0	3.00	89.80	10.42	0.00	0.00	0.00	100.21	0.00
15	8,076	8,077	**7.83**	104.0	3.00	89.15	9.99	0.00	0.00	0.00	99.13	0.00
16	7,686	7,687	**8.54**	104.0	3.00	88.72	9.71	0.00	0.00	0.00	98.43	0.00
17	9,530	9,531	**5.43**	104.0	3.00	90.58	10.95	0.00	0.00	0.00	101.53	0.00
18	9,858	9,859	**4.94**	104.0	3.00	90.88	11.15	0.00	0.00	0.00	102.03	0.00
19	9,088	9,089	**6.13**	104.0	3.00	90.17	10.67	0.00	0.00	0.00	100.84	0.00
20	8,489	8,490	**7.11**	104.0	3.00	89.58	10.27	0.00	0.00	0.00	99.85	0.00
21	5,270	5,270	**13.78**	104.0	3.00	85.44	7.75	0.00	0.00	0.00	93.18	0.00
22	4,499	4,500	**15.89**	104.0	3.00	84.06	7.01	0.00	0.00	0.00	91.07	0.00
23	4,350	4,350	**16.33**	104.0	3.00	83.77	6.86	0.00	0.00	0.00	90.63	0.00
24	4,597	4,597	**15.61**	104.0	3.00	84.25	7.11	0.00	0.00	0.00	91.36	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
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4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	5,319	5,320	**13.65**	104.0	3.00	85.52	7.79	0.00	0.00	0.00	93.31	0.00
26	5,982	5,983	**12.05**	104.0	3.00	86.54	8.38	0.00	0.00	0.00	94.91	0.00
27	5,841	5,842	**12.38**	104.0	3.00	86.33	8.25	0.00	0.00	0.00	94.58	0.00
28	6,666	6,667	**10.55**	104.0	3.00	87.48	8.94	0.00	0.00	0.00	96.41	0.00
29	4,866	4,867	**14.85**	104.0	3.00	84.74	7.37	0.00	0.00	0.00	92.11	0.00
30	4,271	4,271	**16.58**	104.0	3.00	83.61	6.78	0.00	0.00	0.00	90.39	0.00
31	3,719	3,720	**18.37**	104.0	3.00	82.41	6.19	0.00	0.00	0.00	88.60	0.00
32	4,922	4,922	**14.70**	104.0	3.00	84.84	7.42	0.00	0.00	0.00	92.26	0.00
33	4,225	4,225	**16.72**	104.0	3.00	83.52	6.73	0.00	0.00	0.00	90.24	0.00
34	6,696	6,697	**10.48**	104.0	3.00	87.52	8.96	0.00	0.00	0.00	96.48	0.00
35	6,903	6,904	**10.06**	104.0	3.00	87.78	9.12	0.00	0.00	0.00	96.91	0.00
36	7,003	7,004	**9.85**	104.0	3.00	87.91	9.20	0.00	0.00	0.00	97.11	0.00
37	6,631	6,632	**10.62**	104.0	3.00	87.43	8.91	0.00	0.00	0.00	96.34	0.00
38	5,635	5,635	**12.87**	104.0	3.00	86.02	8.07	0.00	0.00	0.00	94.09	0.00
39	6,527	6,528	**10.84**	104.0	3.00	87.30	8.83	0.00	0.00	0.00	96.12	0.00
40	8,395	8,395	**7.28**	104.0	3.00	89.48	10.21	0.00	0.00	0.00	99.69	0.00
41	6,872	6,873	**10.12**	104.0	3.00	87.74	9.10	0.00	0.00	0.00	96.84	0.00
43	6,866	6,867	**10.13**	104.0	3.00	87.73	9.09	0.00	0.00	0.00	96.83	0.00
44	7,335	7,336	**9.20**	104.0	3.00	88.31	9.45	0.00	0.00	0.00	97.76	0.00
45	7,288	7,289	**9.29**	104.0	3.00	88.25	9.42	0.00	0.00	0.00	97.67	0.00
46	7,807	7,808	**8.32**	104.0	3.00	88.85	9.80	0.00	0.00	0.00	98.65	0.00
48	5,405	5,405	**13.44**	104.0	3.00	85.66	7.87	0.00	0.00	0.00	93.53	0.00
49	4,364	4,365	**16.29**	104.0	3.00	83.80	6.87	0.00	0.00	0.00	90.67	0.00
50	6,541	6,542	**10.81**	104.0	3.00	87.31	8.84	0.00	0.00	0.00	96.15	0.00
51	4,231	4,231	**16.70**	104.0	3.00	83.53	6.73	0.00	0.00	0.00	90.26	0.00
52	4,147	4,147	**16.96**	104.0	3.00	83.36	6.65	0.00	0.00	0.00	90.00	0.00
53	4,495	4,495	**15.90**	104.0	3.00	84.06	7.00	0.00	0.00	0.00	91.06	0.00
55	5,352	5,352	**13.57**	104.0	3.00	85.57	7.82	0.00	0.00	0.00	93.39	0.00
56	5,548	5,548	**13.08**	104.0	3.00	85.88	8.00	0.00	0.00	0.00	93.88	0.00
57	6,116	6,117	**11.74**	104.0	3.00	86.73	8.49	0.00	0.00	0.00	95.22	0.00
58	4,784	4,784	**15.08**	104.0	3.00	84.60	7.29	0.00	0.00	0.00	91.88	0.00
59	5,763	5,764	**12.56**	104.0	3.00	86.21	8.19	0.00	0.00	0.00	94.40	0.00
60	7,094	7,094	**9.67**	104.0	3.00	88.02	9.27	0.00	0.00	0.00	97.29	0.00
61	7,375	7,375	**9.13**	104.0	3.00	88.36	9.48	0.00	0.00	0.00	97.84	0.00
62	8,542	8,543	**7.02**	104.0	3.00	89.63	10.31	0.00	0.00	0.00	99.94	0.00
63	9,613	9,614	**5.31**	104.0	3.00	90.66	11.00	0.00	0.00	0.00	101.66	0.00
64	10,910	10,911	**3.44**	104.0	3.00	91.76	11.76	0.00	0.00	0.00	103.52	0.00
65	11,247	11,247	**2.99**	104.0	3.00	92.02	11.95	0.00	0.00	0.00	103.97	0.00
66	8,521	8,522	**7.06**	104.0	3.00	89.61	10.29	0.00	0.00	0.00	99.90	0.00
67	10,329	10,329	**4.25**	104.0	3.00	91.28	11.43	0.00	0.00	0.00	102.71	0.00
68	10,764	10,764	**3.64**	104.0	3.00	91.64	11.68	0.00	0.00	0.00	103.32	0.00
69	11,321	11,321	**2.89**	104.0	3.00	92.08	11.99	0.00	0.00	0.00	104.07	0.00
70	9,590	9,590	**5.34**	104.0	3.00	90.64	10.98	0.00	0.00	0.00	101.62	0.00
71	7,597	7,598	**8.70**	104.0	3.00	88.61	9.64	0.00	0.00	0.00	98.26	0.00
72	5,315	5,315	**13.66**	104.0	3.00	85.51	7.79	0.00	0.00	0.00	93.30	0.00
73	6,242	6,243	**11.46**	104.0	3.00	86.91	8.59	0.00	0.00	0.00	95.50	0.00
74	6,465	6,466	**10.97**	104.0	3.00	87.21	8.78	0.00	0.00	0.00	95.99	0.00
75	5,513	5,513	**13.17**	104.0	3.00	85.83	7.97	0.00	0.00	0.00	93.79	0.00
76	6,135	6,136	**11.70**	104.0	3.00	86.76	8.50	0.00	0.00	0.00	95.26	0.00
77	5,151	5,151	**14.09**	104.0	3.00	85.24	7.64	0.00	0.00	0.00	92.87	0.00
78	8,432	8,433	**7.21**	104.0	3.00	89.52	10.23	0.00	0.00	0.00	99.75	0.00
80	6,852	6,852	**10.16**	104.0	3.00	87.72	9.08	0.00	0.00	0.00	96.80	0.00
81	9,331	9,332	**5.74**	104.0	3.00	90.40	10.82	0.00	0.00	0.00	101.22	0.00
82	4,221	4,222	**16.73**	104.0	3.00	83.51	6.72	0.00	0.00	0.00	90.23	0.00
83	9,969	9,969	**4.77**	104.0	3.00	90.97	11.21	0.00	0.00	0.00	102.19	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	3,597	3,597	**18.79**	104.0	3.00	82.12	6.05	0.00	0.00	0.00	88.17	0.00
86	6,647	6,647	**10.59**	104.0	3.00	87.45	8.92	0.00	0.00	0.00	96.37	0.00
87	11,375	11,376	**2.82**	104.0	3.00	92.12	12.02	0.00	0.00	0.00	104.14	0.00
89	10,451	10,451	**4.08**	104.0	3.00	91.38	11.50	0.00	0.00	0.00	102.88	0.00
90	7,076	7,077	**9.71**	104.0	3.00	88.00	9.26	0.00	0.00	0.00	97.25	0.00
91	8,983	8,983	**6.30**	104.0	3.00	90.07	10.60	0.00	0.00	0.00	100.67	0.00
92	11,669	11,670	**2.44**	104.0	3.00	92.34	12.18	0.00	0.00	0.00	104.52	0.00
94	8,223	8,224	**7.57**	104.0	3.00	89.30	10.09	0.00	0.00	0.00	99.39	0.00
95	8,677	8,678	**6.80**	104.0	3.00	89.77	10.40	0.00	0.00	0.00	100.17	0.00
97	7,819	7,821	**8.29**	104.0	3.00	88.86	9.81	0.00	0.00	0.00	98.67	0.00
98	8,374	8,375	**7.31**	104.0	3.00	89.46	10.19	0.00	0.00	0.00	99.65	0.00
99	6,294	6,295	**11.35**	104.0	3.00	86.98	8.64	0.00	0.00	0.00	95.62	0.00
100	6,955	6,956	**9.95**	104.0	3.00	87.85	9.16	0.00	0.00	0.00	97.01	0.00
101	9,642	9,643	**5.26**	104.0	3.00	90.68	11.02	0.00	0.00	0.00	101.70	0.00
102	7,213	7,215	**9.44**	104.0	3.00	88.16	9.36	0.00	0.00	0.00	97.52	0.00
103	10,084	10,085	**4.60**	104.0	3.00	91.07	11.28	0.00	0.00	0.00	102.36	0.00
104	6,730	6,731	**10.41**	104.0	3.00	87.56	8.99	0.00	0.00	0.00	96.55	0.00
107	8,794	8,795	**6.60**	104.0	3.00	89.88	10.47	0.00	0.00	0.00	100.36	0.00
108	5,870	5,871	**12.31**	104.0	3.00	86.37	8.28	0.00	0.00	0.00	94.65	0.00
109	6,014	6,015	**11.97**	104.0	3.00	86.58	8.40	0.00	0.00	0.00	94.99	0.00
110	5,673	5,673	**12.78**	104.0	3.00	86.08	8.11	0.00	0.00	0.00	94.18	0.00
111	5,936	5,936	**12.16**	104.0	3.00	86.47	8.34	0.00	0.00	0.00	94.81	0.00
113	8,952	8,953	**6.34**	104.0	3.00	90.04	10.58	0.00	0.00	0.00	100.62	0.00
114	3,749	3,749	**18.26**	104.0	3.00	82.48	6.22	0.00	0.00	0.00	88.70	0.00
115	7,802	7,803	**8.32**	104.0	3.00	88.84	9.79	0.00	0.00	0.00	98.64	0.00
116	7,439	7,440	**9.00**	104.0	3.00	88.43	9.53	0.00	0.00	0.00	97.96	0.00
118	6,346	6,347	**11.23**	104.0	3.00	87.05	8.68	0.00	0.00	0.00	95.73	0.00
119	6,950	6,951	**9.96**	104.0	3.00	87.84	9.16	0.00	0.00	0.00	97.00	0.00
120	10,026	10,027	**4.69**	104.0	3.00	91.02	11.25	0.00	0.00	0.00	102.27	0.00
121	7,163	7,164	**9.54**	104.0	3.00	88.10	9.32	0.00	0.00	0.00	97.43	0.00
125	9,808	9,808	**5.01**	104.0	3.00	90.83	11.12	0.00	0.00	0.00	101.95	0.00
126	7,316	7,317	**9.24**	104.0	3.00	88.29	9.44	0.00	0.00	0.00	97.72	0.00
127	7,305	7,305	**9.26**	104.0	3.00	88.27	9.43	0.00	0.00	0.00	97.70	0.00
128	7,160	7,161	**9.54**	104.0	3.00	88.10	9.32	0.00	0.00	0.00	97.42	0.00
129	9,185	9,186	**5.97**	104.0	3.00	90.26	10.73	0.00	0.00	0.00	100.99	0.00
130	9,690	9,691	**5.19**	104.0	3.00	90.73	11.05	0.00	0.00	0.00	101.77	0.00
131	10,004	10,005	**4.72**	104.0	3.00	91.00	11.24	0.00	0.00	0.00	102.24	0.00
132	10,154	10,154	**4.50**	104.0	3.00	91.13	11.33	0.00	0.00	0.00	102.46	0.00
133	6,158	6,159	**11.65**	104.0	3.00	86.79	8.52	0.00	0.00	0.00	95.31	0.00
134	9,320	9,320	**5.76**	104.0	3.00	90.39	10.81	0.00	0.00	0.00	101.20	0.00
141	7,575	7,576	**8.74**	104.0	3.00	88.59	9.63	0.00	0.00	0.00	98.22	0.00
142	7,251	7,252	**9.36**	104.0	3.00	88.21	9.39	0.00	0.00	0.00	97.60	0.00
143	8,027	8,028	**7.92**	104.0	3.00	89.09	9.95	0.00	0.00	0.00	99.05	0.00
144	7,362	7,363	**9.15**	104.0	3.00	88.34	9.47	0.00	0.00	0.00	97.81	0.00
145	6,913	6,914	**10.04**	104.0	3.00	87.79	9.13	0.00	0.00	0.00	96.92	0.00
146	6,736	6,736	**10.40**	104.0	3.00	87.57	8.99	0.00	0.00	0.00	96.56	0.00

Sum 32.45

Noise sensitive area: H05 H05

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	7,607	7,608	**8.68**	104.0	3.00	88.63	9.65	0.00	0.00	0.00	98.28	0.00
2	7,320	7,321	**9.23**	104.0	3.00	88.29	9.44	0.00	0.00	0.00	97.73	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	6,723	6,724	**10.43**	104.0	3.00	87.55	8.98	0.00	0.00	0.00	96.53	0.00
4	5,279	5,280	**13.75**	104.0	3.00	85.45	7.76	0.00	0.00	0.00	93.21	0.00
5	5,454	5,455	**13.31**	104.0	3.00	85.74	7.91	0.00	0.00	0.00	93.65	0.00
6	6,241	6,242	**11.46**	104.0	3.00	86.91	8.59	0.00	0.00	0.00	95.50	0.00
7	5,127	5,129	**14.15**	104.0	3.00	85.20	7.62	0.00	0.00	0.00	92.82	0.00
8	8,243	8,244	**7.54**	104.0	3.00	89.32	10.10	0.00	0.00	0.00	99.43	0.00
9	7,207	7,208	**9.45**	104.0	3.00	88.16	9.36	0.00	0.00	0.00	97.51	0.00
10	7,290	7,292	**9.29**	104.0	3.00	88.26	9.42	0.00	0.00	0.00	97.68	0.00
11	8,941	8,943	**6.36**	104.0	3.00	90.03	10.57	0.00	0.00	0.00	100.60	0.00
12	8,714	8,715	**6.74**	104.0	3.00	89.81	10.42	0.00	0.00	0.00	100.23	0.00
13	8,288	8,289	**7.46**	104.0	3.00	89.37	10.13	0.00	0.00	0.00	99.50	0.00
14	7,961	7,963	**8.03**	104.0	3.00	89.02	9.91	0.00	0.00	0.00	98.93	0.00
15	7,138	7,139	**9.58**	104.0	3.00	88.07	9.30	0.00	0.00	0.00	97.38	0.00
16	6,725	6,727	**10.42**	104.0	3.00	87.56	8.98	0.00	0.00	0.00	96.54	0.00
17	9,175	9,176	**5.99**	104.0	3.00	90.25	10.72	0.00	0.00	0.00	100.98	0.00
18	9,428	9,429	**5.59**	104.0	3.00	90.49	10.88	0.00	0.00	0.00	101.37	0.00
19	8,315	8,317	**7.41**	104.0	3.00	89.40	10.15	0.00	0.00	0.00	99.55	0.00
20	7,320	7,321	**9.23**	104.0	3.00	88.29	9.44	0.00	0.00	0.00	97.73	0.00
21	4,842	4,843	**14.91**	104.0	3.00	84.70	7.35	0.00	0.00	0.00	92.05	0.00
22	4,142	4,143	**16.97**	104.0	3.00	83.35	6.64	0.00	0.00	0.00	89.99	0.00
23	3,758	3,759	**18.23**	104.0	3.00	82.50	6.23	0.00	0.00	0.00	88.73	0.00
24	4,388	4,389	**16.22**	104.0	3.00	83.85	6.90	0.00	0.00	0.00	90.74	0.00
25	2,394	2,396	**23.81**	104.0	3.00	78.59	4.57	0.00	0.00	0.00	83.16	0.00
26	4,826	4,827	**14.96**	104.0	3.00	84.67	7.33	0.00	0.00	0.00	92.00	0.00
27	3,223	3,225	**20.17**	104.0	3.00	81.17	5.62	0.00	0.00	0.00	86.79	0.00
28	4,190	4,192	**16.82**	104.0	3.00	83.45	6.69	0.00	0.00	0.00	90.14	0.00
29	3,695	3,696	**18.45**	104.0	3.00	82.36	6.16	0.00	0.00	0.00	88.52	0.00
30	3,308	3,309	**19.85**	104.0	3.00	81.39	5.72	0.00	0.00	0.00	87.11	0.00
31	3,974	3,975	**17.51**	104.0	3.00	82.99	6.46	0.00	0.00	0.00	89.45	0.00
32	1,936	1,937	**26.30**	104.0	3.00	76.74	3.92	0.00	0.00	0.00	80.66	0.00
33	2,704	2,705	**22.34**	104.0	3.00	79.64	4.98	0.00	0.00	0.00	84.62	0.00
34	4,832	4,834	**14.94**	104.0	3.00	84.69	7.34	0.00	0.00	0.00	92.02	0.00
35	5,380	5,382	**13.49**	104.0	3.00	85.62	7.85	0.00	0.00	0.00	93.47	0.00
36	5,642	5,644	**12.85**	104.0	3.00	86.03	8.08	0.00	0.00	0.00	94.11	0.00
37	4,576	4,578	**15.66**	104.0	3.00	84.21	7.09	0.00	0.00	0.00	91.30	0.00
38	2,801	2,802	**21.91**	104.0	3.00	79.95	5.10	0.00	0.00	0.00	85.05	0.00
39	3,486	3,489	**19.18**	104.0	3.00	81.85	5.93	0.00	0.00	0.00	87.78	0.00
40	5,499	5,500	**13.20**	104.0	3.00	85.81	7.95	0.00	0.00	0.00	93.76	0.00
41	3,770	3,773	**18.18**	104.0	3.00	82.53	6.25	0.00	0.00	0.00	88.78	0.00
43	4,435	4,437	**16.07**	104.0	3.00	83.94	6.95	0.00	0.00	0.00	90.89	0.00
44	4,106	4,109	**17.08**	104.0	3.00	83.27	6.61	0.00	0.00	0.00	89.88	0.00
45	3,913	3,916	**17.71**	104.0	3.00	82.86	6.40	0.00	0.00	0.00	89.26	0.00
46	4,989	4,991	**14.51**	104.0	3.00	84.96	7.49	0.00	0.00	0.00	92.45	0.00
48	1,721	1,723	**27.64**	104.0	3.00	75.73	3.60	0.00	0.00	0.00	79.33	0.00
49	885	888	**34.82**	104.0	3.00	69.97	2.17	0.00	0.00	0.00	72.14	0.00
50	5,635	5,636	**12.87**	104.0	3.00	86.02	8.08	0.00	0.00	0.00	94.10	0.00
51	1,332	1,334	**30.49**	104.0	3.00	73.50	2.97	0.00	0.00	0.00	76.48	0.00
52	1,631	1,633	**28.24**	104.0	3.00	75.26	3.46	0.00	0.00	0.00	78.72	0.00
53	608	613	**38.60**	104.0	3.00	66.75	1.61	0.00	0.00	0.00	68.37	0.00
55	1,139	1,142	**32.17**	104.0	3.00	72.15	2.64	0.00	0.00	0.00	74.79	0.00
56	1,423	1,426	**29.76**	104.0	3.00	74.08	3.13	0.00	0.00	0.00	77.21	0.00
57	1,796	1,797	**27.16**	104.0	3.00	76.09	3.71	0.00	0.00	0.00	79.80	0.00
58	2,508	2,509	**23.25**	104.0	3.00	78.99	4.72	0.00	0.00	0.00	83.71	0.00
59	1,722	1,724	**27.63**	104.0	3.00	75.73	3.60	0.00	0.00	0.00	79.33	0.00
60	3,218	3,220	**20.19**	104.0	3.00	81.16	5.61	0.00	0.00	0.00	86.77	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	3,565	3,566	**18.91**	104.0	3.00	82.04	6.01	0.00	0.00	0.00	88.06	0.00
62	4,252	4,253	**16.63**	104.0	3.00	83.57	6.76	0.00	0.00	0.00	90.33	0.00
63	5,281	5,282	**13.75**	104.0	3.00	85.46	7.76	0.00	0.00	0.00	93.21	0.00
64	6,617	6,618	**10.65**	104.0	3.00	87.41	8.90	0.00	0.00	0.00	96.31	0.00
65	7,006	7,007	**9.85**	104.0	3.00	87.91	9.20	0.00	0.00	0.00	97.11	0.00
66	5,746	5,747	**12.60**	104.0	3.00	86.19	8.17	0.00	0.00	0.00	94.36	0.00
67	6,118	6,119	**11.74**	104.0	3.00	86.73	8.49	0.00	0.00	0.00	95.22	0.00
68	6,596	6,597	**10.69**	104.0	3.00	87.39	8.88	0.00	0.00	0.00	96.27	0.00
69	7,055	7,055	**9.75**	104.0	3.00	87.97	9.24	0.00	0.00	0.00	97.21	0.00
70	8,448	8,448	**7.18**	104.0	3.00	89.54	10.24	0.00	0.00	0.00	99.78	0.00
71	6,985	6,986	**9.89**	104.0	3.00	87.88	9.19	0.00	0.00	0.00	97.07	0.00
72	5,670	5,671	**12.78**	104.0	3.00	86.07	8.11	0.00	0.00	0.00	94.18	0.00
73	5,909	5,910	**12.22**	104.0	3.00	86.43	8.31	0.00	0.00	0.00	94.75	0.00
74	5,369	5,371	**13.52**	104.0	3.00	85.60	7.84	0.00	0.00	0.00	93.44	0.00
75	4,142	4,143	**16.97**	104.0	3.00	83.35	6.64	0.00	0.00	0.00	89.99	0.00
76	1,808	1,810	**27.08**	104.0	3.00	76.15	3.73	0.00	0.00	0.00	79.89	0.00
77	945	948	**34.14**	104.0	3.00	70.53	2.29	0.00	0.00	0.00	72.82	0.00
78	7,061	7,062	**9.74**	104.0	3.00	87.98	9.24	0.00	0.00	0.00	97.22	0.00
80	2,872	2,873	**21.61**	104.0	3.00	80.17	5.19	0.00	0.00	0.00	85.36	0.00
81	8,595	8,597	**6.93**	104.0	3.00	89.69	10.34	0.00	0.00	0.00	100.03	0.00
82	2,127	2,128	**25.20**	104.0	3.00	77.56	4.20	0.00	0.00	0.00	81.76	0.00
83	5,681	5,682	**12.76**	104.0	3.00	86.09	8.12	0.00	0.00	0.00	94.21	0.00
85	872	876	**34.97**	104.0	3.00	69.85	2.15	0.00	0.00	0.00	72.00	0.00
86	2,603	2,604	**22.80**	104.0	3.00	79.31	4.85	0.00	0.00	0.00	84.16	0.00
87	7,157	7,158	**9.55**	104.0	3.00	88.10	9.32	0.00	0.00	0.00	97.41	0.00
89	6,143	6,144	**11.68**	104.0	3.00	86.77	8.51	0.00	0.00	0.00	95.28	0.00
90	2,736	2,738	**22.20**	104.0	3.00	79.75	5.02	0.00	0.00	0.00	84.77	0.00
91	4,667	4,669	**15.40**	104.0	3.00	84.38	7.18	0.00	0.00	0.00	91.56	0.00
92	7,343	7,344	**9.19**	104.0	3.00	88.32	9.46	0.00	0.00	0.00	97.78	0.00
94	7,570	7,572	**8.75**	104.0	3.00	88.58	9.63	0.00	0.00	0.00	98.21	0.00
95	8,519	8,520	**7.06**	104.0	3.00	89.61	10.29	0.00	0.00	0.00	99.90	0.00
97	6,497	6,499	**10.90**	104.0	3.00	87.26	8.80	0.00	0.00	0.00	96.06	0.00
98	7,917	7,918	**8.11**	104.0	3.00	88.97	9.88	0.00	0.00	0.00	98.85	0.00
99	6,765	6,765	**10.34**	104.0	3.00	87.61	9.01	0.00	0.00	0.00	96.62	0.00
100	3,503	3,506	**19.12**	104.0	3.00	81.90	5.95	0.00	0.00	0.00	87.84	0.00
101	9,003	9,004	**6.26**	104.0	3.00	90.09	10.61	0.00	0.00	0.00	100.70	0.00
102	4,168	4,171	**16.88**	104.0	3.00	83.41	6.67	0.00	0.00	0.00	90.08	0.00
103	9,713	9,714	**5.15**	104.0	3.00	90.75	11.06	0.00	0.00	0.00	101.81	0.00
104	3,937	3,939	**17.63**	104.0	3.00	82.91	6.43	0.00	0.00	0.00	89.33	0.00
107	7,744	7,745	**8.43**	104.0	3.00	88.78	9.75	0.00	0.00	0.00	98.53	0.00
108	6,893	6,894	**10.08**	104.0	3.00	87.77	9.12	0.00	0.00	0.00	96.88	0.00
109	2,037	2,039	**25.70**	104.0	3.00	77.19	4.07	0.00	0.00	0.00	81.26	0.00
110	1,716	1,718	**27.67**	104.0	3.00	75.70	3.59	0.00	0.00	0.00	79.29	0.00
111	1,698	1,700	**27.79**	104.0	3.00	75.61	3.56	0.00	0.00	0.00	79.17	0.00
113	8,024	8,026	**7.92**	104.0	3.00	89.09	9.95	0.00	0.00	0.00	99.04	0.00
114	627	632	**38.30**	104.0	3.00	67.01	1.65	0.00	0.00	0.00	68.67	0.00
115	7,985	7,986	**7.99**	104.0	3.00	89.05	9.92	0.00	0.00	0.00	98.97	0.00
116	5,057	5,060	**14.33**	104.0	3.00	85.08	7.55	0.00	0.00	0.00	92.63	0.00
118	2,501	2,503	**23.28**	104.0	3.00	78.97	4.71	0.00	0.00	0.00	83.68	0.00
119	6,127	6,128	**11.72**	104.0	3.00	86.75	8.50	0.00	0.00	0.00	95.24	0.00
120	9,427	9,428	**5.59**	104.0	3.00	90.49	10.88	0.00	0.00	0.00	101.37	0.00
121	5,954	5,956	**12.11**	104.0	3.00	86.50	8.35	0.00	0.00	0.00	94.85	0.00
125	5,497	5,498	**13.21**	104.0	3.00	85.80	7.95	0.00	0.00	0.00	93.76	0.00
126	3,263	3,265	**20.02**	104.0	3.00	81.28	5.67	0.00	0.00	0.00	86.94	0.00
127	3,178	3,180	**20.35**	104.0	3.00	81.05	5.56	0.00	0.00	0.00	86.61	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
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Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	2,970	2,972	**21.19**	104.0	3.00	80.46	5.31	0.00	0.00	0.00	85.78	0.00
129	7,027	7,028	**9.81**	104.0	3.00	87.94	9.22	0.00	0.00	0.00	97.15	0.00
130	7,309	7,310	**9.25**	104.0	3.00	88.28	9.43	0.00	0.00	0.00	97.71	0.00
131	7,728	7,729	**8.46**	104.0	3.00	88.76	9.74	0.00	0.00	0.00	98.50	0.00
132	8,023	8,023	**7.93**	104.0	3.00	89.09	9.95	0.00	0.00	0.00	99.04	0.00
133	2,976	2,978	**21.16**	104.0	3.00	80.48	5.32	0.00	0.00	0.00	85.80	0.00
134	8,249	8,250	**7.53**	104.0	3.00	89.33	10.11	0.00	0.00	0.00	99.44	0.00
141	6,284	6,286	**11.37**	104.0	3.00	86.97	8.63	0.00	0.00	0.00	95.60	0.00
142	4,357	4,360	**16.30**	104.0	3.00	83.79	6.87	0.00	0.00	0.00	90.66	0.00
143	6,858	6,860	**10.15**	104.0	3.00	87.73	9.09	0.00	0.00	0.00	96.81	0.00
144	3,822	3,824	**18.01**	104.0	3.00	82.65	6.30	0.00	0.00	0.00	88.95	0.00
145	2,555	2,556	**23.03**	104.0	3.00	79.15	4.78	0.00	0.00	0.00	83.93	0.00
146	2,390	2,392	**23.82**	104.0	3.00	78.57	4.56	0.00	0.00	0.00	83.14	0.00
Sum	45.61											

Noise sensitive area: H06 H06

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	6,572	6,573	**10.74**	104.0	3.00	87.36	8.86	0.00	0.00	0.00	96.22	0.00
2	6,260	6,261	**11.42**	104.0	3.00	86.93	8.61	0.00	0.00	0.00	95.54	0.00
3	5,664	5,665	**12.80**	104.0	3.00	86.06	8.10	0.00	0.00	0.00	94.16	0.00
4	4,174	4,175	**16.87**	104.0	3.00	83.41	6.68	0.00	0.00	0.00	90.09	0.00
5	4,408	4,409	**16.16**	104.0	3.00	83.89	6.92	0.00	0.00	0.00	90.80	0.00
6	5,207	5,209	**13.94**	104.0	3.00	85.34	7.69	0.00	0.00	0.00	93.03	0.00
7	4,341	4,344	**16.35**	104.0	3.00	83.76	6.85	0.00	0.00	0.00	90.61	0.00
8	7,198	7,199	**9.47**	104.0	3.00	88.15	9.35	0.00	0.00	0.00	97.49	0.00
9	6,198	6,200	**11.56**	104.0	3.00	86.85	8.56	0.00	0.00	0.00	95.41	0.00
10	6,334	6,336	**11.26**	104.0	3.00	87.04	8.67	0.00	0.00	0.00	95.71	0.00
11	7,991	7,993	**7.98**	104.0	3.00	89.05	9.93	0.00	0.00	0.00	98.98	0.00
12	7,760	7,762	**8.40**	104.0	3.00	88.80	9.76	0.00	0.00	0.00	98.56	0.00
13	7,355	7,357	**9.16**	104.0	3.00	88.33	9.47	0.00	0.00	0.00	97.80	0.00
14	7,054	7,056	**9.75**	104.0	3.00	87.97	9.24	0.00	0.00	0.00	97.21	0.00
15	6,249	6,251	**11.44**	104.0	3.00	86.92	8.60	0.00	0.00	0.00	95.52	0.00
16	5,830	5,832	**12.40**	104.0	3.00	86.32	8.25	0.00	0.00	0.00	94.56	0.00
17	8,222	8,223	**7.57**	104.0	3.00	89.30	10.09	0.00	0.00	0.00	99.39	0.00
18	8,491	8,492	**7.11**	104.0	3.00	89.58	10.27	0.00	0.00	0.00	99.85	0.00
19	7,420	7,422	**9.04**	104.0	3.00	88.41	9.52	0.00	0.00	0.00	97.93	0.00
20	6,484	6,485	**10.93**	104.0	3.00	87.24	8.79	0.00	0.00	0.00	96.03	0.00
21	3,789	3,791	**18.12**	104.0	3.00	82.57	6.26	0.00	0.00	0.00	88.84	0.00
22	3,049	3,051	**20.87**	104.0	3.00	80.69	5.41	0.00	0.00	0.00	86.10	0.00
23	2,670	2,672	**22.49**	104.0	3.00	79.54	4.93	0.00	0.00	0.00	84.47	0.00
24	3,291	3,293	**19.91**	104.0	3.00	81.35	5.70	0.00	0.00	0.00	87.05	0.00
25	1,876	1,878	**26.65**	104.0	3.00	76.47	3.83	0.00	0.00	0.00	80.31	0.00
26	3,896	3,898	**17.76**	104.0	3.00	82.82	6.38	0.00	0.00	0.00	89.20	0.00
27	2,636	2,637	**22.65**	104.0	3.00	79.42	4.89	0.00	0.00	0.00	84.31	0.00
28	3,612	3,615	**18.73**	104.0	3.00	82.16	6.07	0.00	0.00	0.00	88.23	0.00
29	2,694	2,696	**22.38**	104.0	3.00	79.61	4.96	0.00	0.00	0.00	84.58	0.00
30	2,236	2,238	**24.61**	104.0	3.00	78.00	4.35	0.00	0.00	0.00	82.35	0.00
31	2,837	2,838	**21.76**	104.0	3.00	80.06	5.15	0.00	0.00	0.00	85.21	0.00
32	1,390	1,393	**30.01**	104.0	3.00	73.88	3.07	0.00	0.00	0.00	76.95	0.00
33	1,669	1,671	**27.98**	104.0	3.00	75.46	3.52	0.00	0.00	0.00	78.98	0.00
34	4,082	4,084	**17.16**	104.0	3.00	83.22	6.58	0.00	0.00	0.00	89.80	0.00
35	4,563	4,565	**15.70**	104.0	3.00	84.19	7.07	0.00	0.00	0.00	91.26	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	4,796	4,799	**15.04**	104.0	3.00	84.62	7.30	0.00	0.00	0.00	91.93	0.00
37	3,871	3,873	**17.85**	104.0	3.00	82.76	6.35	0.00	0.00	0.00	89.12	0.00
38	2,278	2,280	**24.40**	104.0	3.00	78.16	4.41	0.00	0.00	0.00	82.57	0.00
39	3,123	3,125	**20.56**	104.0	3.00	80.90	5.50	0.00	0.00	0.00	86.40	0.00
40	5,150	5,151	**14.09**	104.0	3.00	85.24	7.64	0.00	0.00	0.00	92.87	0.00
41	3,454	3,457	**19.30**	104.0	3.00	81.77	5.89	0.00	0.00	0.00	87.66	0.00
43	3,854	3,857	**17.90**	104.0	3.00	82.72	6.34	0.00	0.00	0.00	89.06	0.00
44	3,871	3,874	**17.84**	104.0	3.00	82.76	6.36	0.00	0.00	0.00	89.12	0.00
45	3,753	3,756	**18.24**	104.0	3.00	82.49	6.23	0.00	0.00	0.00	88.72	0.00
46	4,590	4,591	**15.62**	104.0	3.00	84.24	7.10	0.00	0.00	0.00	91.34	0.00
48	1,690	1,692	**27.85**	104.0	3.00	75.57	3.55	0.00	0.00	0.00	79.12	0.00
49	650	654	**37.94**	104.0	3.00	67.32	1.70	0.00	0.00	0.00	69.02	0.00
50	4,692	4,694	**15.33**	104.0	3.00	84.43	7.20	0.00	0.00	0.00	91.63	0.00
51	582	587	**39.03**	104.0	3.00	66.38	1.56	0.00	0.00	0.00	67.94	0.00
52	713	717	**37.02**	104.0	3.00	68.11	1.83	0.00	0.00	0.00	69.94	0.00
53	873	877	**34.95**	104.0	3.00	69.86	2.15	0.00	0.00	0.00	72.01	0.00
55	2,253	2,254	**24.53**	104.0	3.00	78.06	4.37	0.00	0.00	0.00	82.43	0.00
56	2,549	2,551	**23.05**	104.0	3.00	79.13	4.77	0.00	0.00	0.00	83.91	0.00
57	2,799	2,800	**21.92**	104.0	3.00	79.94	5.10	0.00	0.00	0.00	85.04	0.00
58	1,685	1,687	**27.88**	104.0	3.00	75.54	3.54	0.00	0.00	0.00	79.08	0.00
59	2,854	2,855	**21.68**	104.0	3.00	80.11	5.17	0.00	0.00	0.00	85.28	0.00
60	4,349	4,350	**16.34**	104.0	3.00	83.77	6.86	0.00	0.00	0.00	90.63	0.00
61	4,698	4,699	**15.32**	104.0	3.00	84.44	7.21	0.00	0.00	0.00	91.64	0.00
62	5,221	5,222	**13.90**	104.0	3.00	85.36	7.70	0.00	0.00	0.00	93.06	0.00
63	6,182	6,183	**11.59**	104.0	3.00	86.82	8.54	0.00	0.00	0.00	95.37	0.00
64	7,557	7,557	**8.78**	104.0	3.00	88.57	9.62	0.00	0.00	0.00	98.18	0.00
65	7,987	7,988	**7.99**	104.0	3.00	89.05	9.92	0.00	0.00	0.00	98.97	0.00
66	5,353	5,354	**13.57**	104.0	3.00	85.57	7.82	0.00	0.00	0.00	93.40	0.00
67	7,125	7,126	**9.61**	104.0	3.00	88.06	9.29	0.00	0.00	0.00	97.35	0.00
68	7,621	7,622	**8.66**	104.0	3.00	88.64	9.66	0.00	0.00	0.00	98.30	0.00
69	8,016	8,017	**7.94**	104.0	3.00	89.08	9.94	0.00	0.00	0.00	99.02	0.00
70	7,630	7,631	**8.64**	104.0	3.00	88.65	9.67	0.00	0.00	0.00	98.32	0.00
71	6,032	6,034	**11.93**	104.0	3.00	86.61	8.42	0.00	0.00	0.00	95.03	0.00
72	4,564	4,565	**15.70**	104.0	3.00	84.19	7.07	0.00	0.00	0.00	91.26	0.00
73	4,883	4,885	**14.80**	104.0	3.00	84.78	7.39	0.00	0.00	0.00	92.16	0.00
74	4,453	4,455	**16.02**	104.0	3.00	83.98	6.96	0.00	0.00	0.00	90.94	0.00
75	3,218	3,220	**20.19**	104.0	3.00	81.16	5.61	0.00	0.00	0.00	86.77	0.00
76	2,541	2,543	**23.09**	104.0	3.00	79.11	4.76	0.00	0.00	0.00	83.87	0.00
77	1,527	1,529	**28.98**	104.0	3.00	74.69	3.29	0.00	0.00	0.00	77.98	0.00
78	6,264	6,265	**11.41**	104.0	3.00	86.94	8.61	0.00	0.00	0.00	95.55	0.00
80	3,993	3,995	**17.45**	104.0	3.00	83.03	6.49	0.00	0.00	0.00	89.51	0.00
81	7,699	7,700	**8.51**	104.0	3.00	88.73	9.72	0.00	0.00	0.00	98.45	0.00
82	1,155	1,158	**32.02**	104.0	3.00	72.27	2.67	0.00	0.00	0.00	74.94	0.00
83	6,635	6,636	**10.61**	104.0	3.00	87.44	8.91	0.00	0.00	0.00	96.35	0.00
85	489	495	**40.71**	104.0	3.00	64.89	1.36	0.00	0.00	0.00	66.25	0.00
86	3,718	3,719	**18.37**	104.0	3.00	82.41	6.19	0.00	0.00	0.00	88.59	0.00
87	8,151	8,152	**7.70**	104.0	3.00	89.22	10.04	0.00	0.00	0.00	99.26	0.00
89	7,071	7,072	**9.72**	104.0	3.00	87.99	9.25	0.00	0.00	0.00	97.24	0.00
90	3,669	3,671	**18.54**	104.0	3.00	82.29	6.13	0.00	0.00	0.00	88.43	0.00
91	5,603	5,604	**12.95**	104.0	3.00	85.97	8.05	0.00	0.00	0.00	94.02	0.00
92	8,236	8,237	**7.55**	104.0	3.00	89.31	10.10	0.00	0.00	0.00	99.41	0.00
94	6,638	6,640	**10.60**	104.0	3.00	87.44	8.92	0.00	0.00	0.00	96.36	0.00
95	7,526	7,528	**8.83**	104.0	3.00	88.53	9.59	0.00	0.00	0.00	98.13	0.00
97	5,673	5,675	**12.77**	104.0	3.00	86.08	8.11	0.00	0.00	0.00	94.19	0.00
98	6,959	6,961	**9.94**	104.0	3.00	87.85	9.17	0.00	0.00	0.00	97.02	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	5,671	5,672	**12.78**	104.0	3.00	86.08	8.11	0.00	0.00	0.00	94.18	0.00
100	3,375	3,377	**19.59**	104.0	3.00	81.57	5.80	0.00	0.00	0.00	87.37	0.00
101	8,095	8,097	**7.80**	104.0	3.00	89.17	10.00	0.00	0.00	0.00	99.17	0.00
102	3,841	3,844	**17.94**	104.0	3.00	82.70	6.32	0.00	0.00	0.00	89.02	0.00
103	8,770	8,771	**6.64**	104.0	3.00	89.86	10.46	0.00	0.00	0.00	100.32	0.00
104	3,479	3,481	**19.21**	104.0	3.00	81.83	5.92	0.00	0.00	0.00	87.75	0.00
107	6,892	6,894	**10.08**	104.0	3.00	87.77	9.11	0.00	0.00	0.00	96.88	0.00
108	5,767	5,768	**12.55**	104.0	3.00	86.22	8.19	0.00	0.00	0.00	94.41	0.00
109	3,171	3,172	**20.38**	104.0	3.00	81.03	5.56	0.00	0.00	0.00	86.58	0.00
110	1,946	1,947	**26.24**	104.0	3.00	76.79	3.94	0.00	0.00	0.00	80.73	0.00
111	2,270	2,271	**24.44**	104.0	3.00	78.13	4.40	0.00	0.00	0.00	82.52	0.00
113	7,154	7,155	**9.55**	104.0	3.00	88.09	9.32	0.00	0.00	0.00	97.41	0.00
114	746	750	**36.56**	104.0	3.00	68.50	1.90	0.00	0.00	0.00	70.40	0.00
115	6,940	6,941	**9.98**	104.0	3.00	87.83	9.15	0.00	0.00	0.00	96.98	0.00
116	4,488	4,490	**15.92**	104.0	3.00	84.05	7.00	0.00	0.00	0.00	91.04	0.00
118	3,639	3,640	**18.64**	104.0	3.00	82.22	6.10	0.00	0.00	0.00	88.32	0.00
119	5,187	5,189	**13.99**	104.0	3.00	85.30	7.67	0.00	0.00	0.00	92.97	0.00
120	8,519	8,520	**7.06**	104.0	3.00	89.61	10.29	0.00	0.00	0.00	99.90	0.00
121	5,086	5,088	**14.25**	104.0	3.00	85.13	7.58	0.00	0.00	0.00	92.71	0.00
125	6,428	6,428	**11.05**	104.0	3.00	87.16	8.75	0.00	0.00	0.00	95.91	0.00
126	3,588	3,590	**18.82**	104.0	3.00	82.10	6.04	0.00	0.00	0.00	88.14	0.00
127	3,579	3,581	**18.85**	104.0	3.00	82.08	6.03	0.00	0.00	0.00	88.11	0.00
128	3,445	3,447	**19.33**	104.0	3.00	81.75	5.88	0.00	0.00	0.00	87.63	0.00
129	6,446	6,447	**11.02**	104.0	3.00	87.19	8.76	0.00	0.00	0.00	95.95	0.00
130	6,808	6,809	**10.25**	104.0	3.00	87.66	9.05	0.00	0.00	0.00	96.71	0.00
131	7,200	7,201	**9.46**	104.0	3.00	88.15	9.35	0.00	0.00	0.00	97.50	0.00
132	7,455	7,455	**8.97**	104.0	3.00	88.45	9.54	0.00	0.00	0.00	97.99	0.00
133	2,659	2,661	**22.54**	104.0	3.00	79.50	4.92	0.00	0.00	0.00	84.42	0.00
134	7,412	7,413	**9.05**	104.0	3.00	88.40	9.51	0.00	0.00	0.00	97.91	0.00
141	5,445	5,448	**13.33**	104.0	3.00	85.72	7.91	0.00	0.00	0.00	93.63	0.00
142	3,966	3,969	**17.53**	104.0	3.00	82.97	6.46	0.00	0.00	0.00	89.43	0.00
143	6,009	6,012	**11.98**	104.0	3.00	86.58	8.40	0.00	0.00	0.00	94.98	0.00
144	3,760	3,762	**18.22**	104.0	3.00	82.51	6.23	0.00	0.00	0.00	88.74	0.00
145	3,391	3,393	**19.54**	104.0	3.00	81.61	5.82	0.00	0.00	0.00	87.43	0.00
146	3,155	3,157	**20.44**	104.0	3.00	80.99	5.54	0.00	0.00	0.00	86.52	0.00

Sum 47.07

Noise sensitive area: H07 H07

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	3,432	3,434	**19.38**	104.0	3.00	81.72	5.86	0.00	0.00	0.00	87.58	0.00
2	2,996	2,998	**21.08**	104.0	3.00	80.54	5.34	0.00	0.00	0.00	85.88	0.00
3	2,471	2,473	**23.42**	104.0	3.00	78.87	4.67	0.00	0.00	0.00	83.54	0.00
4	896	900	**34.68**	104.0	3.00	70.08	2.19	0.00	0.00	0.00	72.28	0.00
5	1,666	1,669	**28.00**	104.0	3.00	75.45	3.51	0.00	0.00	0.00	78.96	0.00
6	2,293	2,296	**24.31**	104.0	3.00	78.22	4.43	0.00	0.00	0.00	82.65	0.00
7	3,262	3,265	**20.02**	104.0	3.00	81.28	5.67	0.00	0.00	0.00	86.94	0.00
8	3,945	3,947	**17.60**	104.0	3.00	82.92	6.43	0.00	0.00	0.00	89.36	0.00
9	3,267	3,269	**20.00**	104.0	3.00	81.29	5.67	0.00	0.00	0.00	86.96	0.00
10	3,687	3,689	**18.47**	104.0	3.00	82.34	6.15	0.00	0.00	0.00	88.49	0.00
11	5,180	5,182	**14.01**	104.0	3.00	85.29	7.67	0.00	0.00	0.00	92.96	0.00
12	4,955	4,957	**14.60**	104.0	3.00	84.90	7.45	0.00	0.00	0.00	92.36	0.00
13	4,693	4,696	**15.33**	104.0	3.00	84.43	7.20	0.00	0.00	0.00	91.64	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	4,563	4,566	**15.70**	104.0	3.00	84.19	7.07	0.00	0.00	0.00	91.26	0.00
15	3,988	3,991	**17.46**	104.0	3.00	83.02	6.48	0.00	0.00	0.00	89.50	0.00
16	3,627	3,630	**18.68**	104.0	3.00	82.20	6.09	0.00	0.00	0.00	88.29	0.00
17	5,378	5,380	**13.50**	104.0	3.00	85.62	7.85	0.00	0.00	0.00	93.46	0.00
18	5,703	5,705	**12.70**	104.0	3.00	86.13	8.14	0.00	0.00	0.00	94.26	0.00
19	4,941	4,943	**14.64**	104.0	3.00	84.88	7.44	0.00	0.00	0.00	92.32	0.00
20	4,445	4,447	**16.05**	104.0	3.00	83.96	6.95	0.00	0.00	0.00	90.92	0.00
21	1,367	1,371	**30.19**	104.0	3.00	73.74	3.03	0.00	0.00	0.00	76.77	0.00
22	1,075	1,078	**32.78**	104.0	3.00	71.66	2.53	0.00	0.00	0.00	74.18	0.00
23	1,355	1,358	**30.29**	104.0	3.00	73.66	3.01	0.00	0.00	0.00	76.67	0.00
24	923	927	**34.38**	104.0	3.00	70.34	2.25	0.00	0.00	0.00	72.58	0.00
25	3,635	3,636	**18.66**	104.0	3.00	82.21	6.09	0.00	0.00	0.00	88.30	0.00
26	2,313	2,316	**24.21**	104.0	3.00	78.29	4.46	0.00	0.00	0.00	82.75	0.00
27	3,503	3,504	**19.13**	104.0	3.00	81.89	5.94	0.00	0.00	0.00	87.84	0.00
28	3,796	3,798	**18.10**	104.0	3.00	82.59	6.27	0.00	0.00	0.00	88.86	0.00
29	1,889	1,891	**26.58**	104.0	3.00	76.53	3.85	0.00	0.00	0.00	80.38	0.00
30	1,772	1,773	**27.31**	104.0	3.00	75.98	3.68	0.00	0.00	0.00	79.65	0.00
31	873	877	**34.96**	104.0	3.00	69.86	2.15	0.00	0.00	0.00	72.01	0.00
32	3,633	3,633	**18.67**	104.0	3.00	82.21	6.09	0.00	0.00	0.00	88.30	0.00
33	2,354	2,355	**24.01**	104.0	3.00	78.44	4.51	0.00	0.00	0.00	82.95	0.00
34	3,307	3,309	**19.85**	104.0	3.00	81.39	5.72	0.00	0.00	0.00	87.11	0.00
35	3,219	3,222	**20.19**	104.0	3.00	81.16	5.61	0.00	0.00	0.00	86.78	0.00
36	3,200	3,203	**20.26**	104.0	3.00	81.11	5.59	0.00	0.00	0.00	86.70	0.00
37	3,414	3,417	**19.45**	104.0	3.00	81.67	5.84	0.00	0.00	0.00	87.51	0.00
38	3,636	3,636	**18.65**	104.0	3.00	82.21	6.09	0.00	0.00	0.00	88.31	0.00
39	4,252	4,254	**16.63**	104.0	3.00	83.58	6.76	0.00	0.00	0.00	90.33	0.00
40	5,423	5,423	**13.39**	104.0	3.00	85.69	7.89	0.00	0.00	0.00	93.57	0.00
41	4,520	4,521	**15.83**	104.0	3.00	84.11	7.03	0.00	0.00	0.00	91.14	0.00
43	3,883	3,885	**17.81**	104.0	3.00	82.79	6.37	0.00	0.00	0.00	89.16	0.00
44	4,956	4,959	**14.60**	104.0	3.00	84.91	7.46	0.00	0.00	0.00	92.36	0.00
45	5,083	5,085	**14.26**	104.0	3.00	85.13	7.58	0.00	0.00	0.00	92.70	0.00
46	4,894	4,895	**14.77**	104.0	3.00	84.79	7.39	0.00	0.00	0.00	92.19	0.00
48	4,417	4,418	**16.13**	104.0	3.00	83.90	6.93	0.00	0.00	0.00	90.83	0.00
49	4,113	4,113	**17.07**	104.0	3.00	83.28	6.61	0.00	0.00	0.00	89.90	0.00
50	2,584	2,587	**22.88**	104.0	3.00	79.26	4.82	0.00	0.00	0.00	84.08	0.00
51	3,647	3,648	**18.61**	104.0	3.00	82.24	6.11	0.00	0.00	0.00	88.35	0.00
52	3,336	3,336	**19.75**	104.0	3.00	81.47	5.75	0.00	0.00	0.00	87.22	0.00
53	4,442	4,443	**16.06**	104.0	3.00	83.95	6.95	0.00	0.00	0.00	90.90	0.00
55	5,925	5,925	**12.18**	104.0	3.00	86.45	8.33	0.00	0.00	0.00	94.78	0.00
56	6,230	6,230	**11.49**	104.0	3.00	86.89	8.58	0.00	0.00	0.00	95.47	0.00
57	6,336	6,336	**11.26**	104.0	3.00	87.04	8.67	0.00	0.00	0.00	95.71	0.00
58	2,962	2,963	**21.23**	104.0	3.00	80.43	5.30	0.00	0.00	0.00	85.73	0.00
59	6,540	6,540	**10.81**	104.0	3.00	87.31	8.84	0.00	0.00	0.00	96.15	0.00
60	8,023	8,023	**7.93**	104.0	3.00	89.09	9.95	0.00	0.00	0.00	99.04	0.00
61	8,377	8,377	**7.31**	104.0	3.00	89.46	10.19	0.00	0.00	0.00	99.66	0.00
62	8,577	8,577	**6.97**	104.0	3.00	89.67	10.33	0.00	0.00	0.00	100.00	0.00
63	9,361	9,362	**5.69**	104.0	3.00	90.43	10.84	0.00	0.00	0.00	101.27	0.00
64	10,766	10,767	**3.64**	104.0	3.00	91.64	11.68	0.00	0.00	0.00	103.32	0.00
65	11,278	11,278	**2.95**	104.0	3.00	92.04	11.97	0.00	0.00	0.00	104.01	0.00
66	5,420	5,421	**13.40**	104.0	3.00	85.68	7.88	0.00	0.00	0.00	93.57	0.00
67	10,496	10,496	**4.01**	104.0	3.00	91.42	11.53	0.00	0.00	0.00	102.95	0.00
68	11,022	11,022	**3.29**	104.0	3.00	91.85	11.83	0.00	0.00	0.00	103.67	0.00
69	11,263	11,263	**2.97**	104.0	3.00	92.03	11.96	0.00	0.00	0.00	103.99	0.00
70	5,493	5,494	**13.22**	104.0	3.00	85.80	7.95	0.00	0.00	0.00	93.75	0.00
71	3,461	3,464	**19.27**	104.0	3.00	81.79	5.90	0.00	0.00	0.00	87.69	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	1,163	1,166	**31.95**	104.0	3.00	72.33	2.68	0.00	0.00	0.00	75.01	0.00
73	2,117	2,120	**25.25**	104.0	3.00	77.53	4.19	0.00	0.00	0.00	81.71	0.00
74	2,622	2,625	**22.71**	104.0	3.00	79.38	4.87	0.00	0.00	0.00	84.26	0.00
75	2,234	2,236	**24.62**	104.0	3.00	77.99	4.35	0.00	0.00	0.00	82.34	0.00
76	5,816	5,816	**12.44**	104.0	3.00	86.29	8.23	0.00	0.00	0.00	94.52	0.00
77	4,941	4,941	**14.65**	104.0	3.00	84.88	7.44	0.00	0.00	0.00	92.32	0.00
78	4,461	4,463	**16.00**	104.0	3.00	83.99	6.97	0.00	0.00	0.00	90.96	0.00
80	7,652	7,653	**8.60**	104.0	3.00	88.68	9.68	0.00	0.00	0.00	98.36	0.00
81	5,179	5,181	**14.01**	104.0	3.00	85.29	7.66	0.00	0.00	0.00	92.95	0.00
82	2,911	2,912	**21.44**	104.0	3.00	80.28	5.24	0.00	0.00	0.00	85.52	0.00
83	9,907	9,907	**4.87**	104.0	3.00	90.92	11.18	0.00	0.00	0.00	102.10	0.00
85	4,089	4,090	**17.14**	104.0	3.00	83.23	6.59	0.00	0.00	0.00	89.82	0.00
86	7,368	7,369	**9.14**	104.0	3.00	88.35	9.48	0.00	0.00	0.00	97.82	0.00
87	11,470	11,470	**2.70**	104.0	3.00	92.19	12.07	0.00	0.00	0.00	104.27	0.00
89	10,270	10,271	**4.33**	104.0	3.00	91.23	11.39	0.00	0.00	0.00	102.63	0.00
90	7,053	7,054	**9.75**	104.0	3.00	87.97	9.24	0.00	0.00	0.00	97.21	0.00
91	8,876	8,877	**6.47**	104.0	3.00	89.97	10.53	0.00	0.00	0.00	100.49	0.00
92	11,316	11,317	**2.90**	104.0	3.00	92.07	11.99	0.00	0.00	0.00	104.07	0.00
94	4,078	4,081	**17.17**	104.0	3.00	83.21	6.58	0.00	0.00	0.00	89.79	0.00
95	4,537	4,539	**15.78**	104.0	3.00	84.14	7.05	0.00	0.00	0.00	91.19	0.00
97	3,883	3,886	**17.80**	104.0	3.00	82.79	6.37	0.00	0.00	0.00	89.16	0.00
98	4,214	4,217	**16.74**	104.0	3.00	83.50	6.72	0.00	0.00	0.00	90.22	0.00
99	2,228	2,230	**24.66**	104.0	3.00	77.97	4.34	0.00	0.00	0.00	82.31	0.00
100	4,948	4,949	**14.62**	104.0	3.00	84.89	7.45	0.00	0.00	0.00	92.34	0.00
101	5,483	5,485	**13.24**	104.0	3.00	85.78	7.94	0.00	0.00	0.00	93.72	0.00
102	4,685	4,687	**15.35**	104.0	3.00	84.42	7.19	0.00	0.00	0.00	91.61	0.00
103	5,935	5,937	**12.16**	104.0	3.00	86.47	8.34	0.00	0.00	0.00	94.81	0.00
104	4,128	4,130	**17.01**	104.0	3.00	83.32	6.63	0.00	0.00	0.00	89.95	0.00
107	4,703	4,705	**15.30**	104.0	3.00	84.45	7.21	0.00	0.00	0.00	91.66	0.00
108	2,094	2,096	**25.38**	104.0	3.00	77.43	4.15	0.00	0.00	0.00	81.58	0.00
109	6,858	6,859	**10.15**	104.0	3.00	87.72	9.09	0.00	0.00	0.00	96.81	0.00
110	4,844	4,845	**14.91**	104.0	3.00	84.71	7.35	0.00	0.00	0.00	92.05	0.00
111	5,431	5,432	**13.37**	104.0	3.00	85.70	7.89	0.00	0.00	0.00	93.59	0.00
113	4,831	4,833	**14.94**	104.0	3.00	84.68	7.34	0.00	0.00	0.00	92.02	0.00
114	4,391	4,391	**16.21**	104.0	3.00	83.85	6.90	0.00	0.00	0.00	90.75	0.00
115	3,708	3,709	**18.40**	104.0	3.00	82.39	6.17	0.00	0.00	0.00	88.56	0.00
116	4,244	4,246	**16.65**	104.0	3.00	83.56	6.75	0.00	0.00	0.00	90.31	0.00
118	7,334	7,335	**9.20**	104.0	3.00	88.31	9.45	0.00	0.00	0.00	97.76	0.00
119	2,907	2,910	**21.45**	104.0	3.00	80.28	5.24	0.00	0.00	0.00	85.51	0.00
120	5,866	5,867	**12.32**	104.0	3.00	86.37	8.28	0.00	0.00	0.00	94.65	0.00
121	3,254	3,257	**20.05**	104.0	3.00	81.26	5.66	0.00	0.00	0.00	86.91	0.00
125	9,657	9,657	**5.24**	104.0	3.00	90.70	11.02	0.00	0.00	0.00	101.72	0.00
126	6,012	6,013	**11.98**	104.0	3.00	86.58	8.40	0.00	0.00	0.00	94.98	0.00
127	6,141	6,142	**11.69**	104.0	3.00	86.77	8.51	0.00	0.00	0.00	95.27	0.00
128	6,166	6,167	**11.63**	104.0	3.00	86.80	8.53	0.00	0.00	0.00	95.33	0.00
129	5,537	5,537	**13.11**	104.0	3.00	85.87	7.99	0.00	0.00	0.00	93.85	0.00
130	6,129	6,130	**11.71**	104.0	3.00	86.75	8.50	0.00	0.00	0.00	95.25	0.00
131	6,349	6,350	**11.23**	104.0	3.00	87.06	8.68	0.00	0.00	0.00	95.74	0.00
132	6,404	6,405	**11.11**	104.0	3.00	87.13	8.73	0.00	0.00	0.00	95.86	0.00
133	4,202	4,203	**16.79**	104.0	3.00	83.47	6.71	0.00	0.00	0.00	90.18	0.00
134	5,216	5,217	**13.92**	104.0	3.00	85.35	7.70	0.00	0.00	0.00	93.05	0.00
141	3,652	3,655	**18.59**	104.0	3.00	82.26	6.11	0.00	0.00	0.00	88.37	0.00
142	4,563	4,565	**15.70**	104.0	3.00	84.19	7.07	0.00	0.00	0.00	91.26	0.00
143	4,012	4,015	**17.38**	104.0	3.00	83.07	6.51	0.00	0.00	0.00	89.58	0.00
144	5,323	5,325	**13.64**	104.0	3.00	85.53	7.80	0.00	0.00	0.00	93.32	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	6,666	6,666	**10.55**	104.0	3.00	87.48	8.94	0.00	0.00	0.00	96.41	0.00
146	6,364	6,364	**11.19**	104.0	3.00	87.08	8.69	0.00	0.00	0.00	95.77	0.00
Sum	43.59											

Noise sensitive area: H08 H08

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	2,318	2,321	**24.18**	104.0	3.00	78.31	4.47	0.00	0.00	0.00	82.78	0.00
2	1,867	1,870	**26.70**	104.0	3.00	76.44	3.82	0.00	0.00	0.00	80.26	0.00
3	1,844	1,848	**26.84**	104.0	3.00	76.33	3.79	0.00	0.00	0.00	80.12	0.00
4	2,108	2,110	**25.31**	104.0	3.00	77.49	4.17	0.00	0.00	0.00	81.66	0.00
5	2,479	2,481	**23.39**	104.0	3.00	78.89	4.68	0.00	0.00	0.00	83.57	0.00
6	2,270	2,273	**24.43**	104.0	3.00	78.13	4.40	0.00	0.00	0.00	82.53	0.00
7	4,356	4,358	**16.31**	104.0	3.00	83.79	6.86	0.00	0.00	0.00	90.65	0.00
8	2,455	2,457	**23.50**	104.0	3.00	78.81	4.65	0.00	0.00	0.00	83.46	0.00
9	2,564	2,567	**22.98**	104.0	3.00	79.19	4.80	0.00	0.00	0.00	83.98	0.00
10	3,177	3,180	**20.35**	104.0	3.00	81.05	5.57	0.00	0.00	0.00	86.61	0.00
11	4,037	4,040	**17.30**	104.0	3.00	83.13	6.53	0.00	0.00	0.00	89.66	0.00
12	3,865	3,867	**17.86**	104.0	3.00	82.75	6.35	0.00	0.00	0.00	89.10	0.00
13	3,837	3,841	**17.95**	104.0	3.00	82.69	6.32	0.00	0.00	0.00	89.01	0.00
14	3,939	3,943	**17.62**	104.0	3.00	82.92	6.43	0.00	0.00	0.00	89.35	0.00
15	3,799	3,802	**18.09**	104.0	3.00	82.60	6.28	0.00	0.00	0.00	88.88	0.00
16	3,641	3,644	**18.63**	104.0	3.00	82.23	6.10	0.00	0.00	0.00	88.33	0.00
17	4,160	4,163	**16.91**	104.0	3.00	83.39	6.66	0.00	0.00	0.00	90.05	0.00
18	4,499	4,501	**15.89**	104.0	3.00	84.07	7.01	0.00	0.00	0.00	91.08	0.00
19	4,233	4,235	**16.69**	104.0	3.00	83.54	6.74	0.00	0.00	0.00	90.28	0.00
20	4,321	4,323	**16.42**	104.0	3.00	83.72	6.83	0.00	0.00	0.00	90.55	0.00
21	2,829	2,831	**21.79**	104.0	3.00	80.04	5.14	0.00	0.00	0.00	85.18	0.00
22	3,206	3,207	**20.24**	104.0	3.00	81.12	5.60	0.00	0.00	0.00	86.72	0.00
23	3,578	3,579	**18.86**	104.0	3.00	82.08	6.03	0.00	0.00	0.00	88.10	0.00
24	2,964	2,965	**21.22**	104.0	3.00	80.44	5.30	0.00	0.00	0.00	85.75	0.00
25	5,789	5,789	**12.50**	104.0	3.00	86.25	8.21	0.00	0.00	0.00	94.46	0.00
26	3,595	3,597	**18.79**	104.0	3.00	82.12	6.05	0.00	0.00	0.00	88.17	0.00
27	5,438	5,439	**13.35**	104.0	3.00	85.71	7.90	0.00	0.00	0.00	93.61	0.00
28	5,376	5,377	**13.51**	104.0	3.00	85.61	7.84	0.00	0.00	0.00	93.46	0.00
29	3,923	3,924	**17.68**	104.0	3.00	82.87	6.41	0.00	0.00	0.00	89.28	0.00
30	4,039	4,039	**17.30**	104.0	3.00	83.13	6.53	0.00	0.00	0.00	89.66	0.00
31	3,268	3,269	**20.00**	104.0	3.00	81.29	5.67	0.00	0.00	0.00	86.96	0.00
32	5,886	5,886	**12.27**	104.0	3.00	86.40	8.29	0.00	0.00	0.00	94.69	0.00
33	4,656	4,657	**15.44**	104.0	3.00	84.36	7.16	0.00	0.00	0.00	91.53	0.00
34	4,570	4,571	**15.68**	104.0	3.00	84.20	7.08	0.00	0.00	0.00	91.28	0.00
35	4,152	4,154	**16.94**	104.0	3.00	83.37	6.65	0.00	0.00	0.00	90.02	0.00
36	3,953	3,956	**17.57**	104.0	3.00	82.94	6.44	0.00	0.00	0.00	89.39	0.00
37	4,812	4,814	**15.00**	104.0	3.00	84.65	7.32	0.00	0.00	0.00	91.97	0.00
38	5,686	5,687	**12.74**	104.0	3.00	86.10	8.12	0.00	0.00	0.00	94.22	0.00
39	6,092	6,093	**11.80**	104.0	3.00	86.70	8.47	0.00	0.00	0.00	95.17	0.00
40	6,659	6,660	**10.56**	104.0	3.00	87.47	8.93	0.00	0.00	0.00	96.40	0.00
41	6,282	6,283	**11.37**	104.0	3.00	86.96	8.63	0.00	0.00	0.00	95.59	0.00
43	5,364	5,366	**13.54**	104.0	3.00	85.59	7.83	0.00	0.00	0.00	93.43	0.00
44	6,645	6,647	**10.59**	104.0	3.00	87.45	8.92	0.00	0.00	0.00	96.37	0.00
45	6,846	6,847	**10.17**	104.0	3.00	87.71	9.08	0.00	0.00	0.00	96.79	0.00
46	6,250	6,251	**11.44**	104.0	3.00	86.92	8.60	0.00	0.00	0.00	95.52	0.00
48	6,659	6,660	**10.56**	104.0	3.00	87.47	8.93	0.00	0.00	0.00	96.40	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	6,480	6,480	**10.94**	104.0	3.00	87.23	8.79	0.00	0.00	0.00	96.02	0.00
50	3,256	3,258	**20.04**	104.0	3.00	81.26	5.66	0.00	0.00	0.00	86.92	0.00
51	6,007	6,008	**11.99**	104.0	3.00	86.57	8.40	0.00	0.00	0.00	94.97	0.00
52	5,692	5,692	**12.73**	104.0	3.00	86.11	8.12	0.00	0.00	0.00	94.23	0.00
53	6,812	6,812	**10.24**	104.0	3.00	87.67	9.05	0.00	0.00	0.00	96.72	0.00
55	8,301	8,301	**7.44**	104.0	3.00	89.38	10.14	0.00	0.00	0.00	99.53	0.00
56	8,607	8,608	**6.91**	104.0	3.00	89.70	10.35	0.00	0.00	0.00	100.05	0.00
57	8,671	8,671	**6.81**	104.0	3.00	89.76	10.39	0.00	0.00	0.00	100.15	0.00
58	5,176	5,177	**14.02**	104.0	3.00	85.28	7.66	0.00	0.00	0.00	92.94	0.00
59	8,919	8,919	**6.40**	104.0	3.00	90.01	10.56	0.00	0.00	0.00	100.56	0.00
60	10,393	10,393	**4.16**	104.0	3.00	91.33	11.47	0.00	0.00	0.00	102.80	0.00
61	10,748	10,749	**3.66**	104.0	3.00	91.63	11.67	0.00	0.00	0.00	103.30	0.00
62	10,823	10,823	**3.56**	104.0	3.00	91.69	11.71	0.00	0.00	0.00	103.40	0.00
63	11,527	11,528	**2.62**	104.0	3.00	92.23	12.11	0.00	0.00	0.00	104.34	0.00
64	12,924	12,924	**0.90**	104.0	3.00	93.23	12.83	0.00	0.00	0.00	106.06	0.00
65	13,465	13,466	**0.28**	104.0	3.00	93.58	13.10	0.00	0.00	0.00	106.68	0.00
66	6,549	6,550	**10.79**	104.0	3.00	87.32	8.84	0.00	0.00	0.00	96.17	0.00
67	12,725	12,726	**1.14**	104.0	3.00	93.09	12.73	0.00	0.00	0.00	105.83	0.00
68	13,260	13,260	**0.51**	104.0	3.00	93.45	13.00	0.00	0.00	0.00	106.45	0.00
69	13,430	13,431	**0.32**	104.0	3.00	93.56	13.08	0.00	0.00	0.00	106.64	0.00
70	5,011	5,012	**14.45**	104.0	3.00	85.00	7.51	0.00	0.00	0.00	92.51	0.00
71	3,144	3,147	**20.48**	104.0	3.00	80.96	5.53	0.00	0.00	0.00	86.48	0.00
72	1,770	1,772	**27.32**	104.0	3.00	75.97	3.67	0.00	0.00	0.00	79.64	0.00
73	2,449	2,452	**23.53**	104.0	3.00	78.79	4.64	0.00	0.00	0.00	83.43	0.00
74	3,510	3,512	**19.10**	104.0	3.00	81.91	5.95	0.00	0.00	0.00	87.86	0.00
75	3,942	3,943	**17.61**	104.0	3.00	82.92	6.43	0.00	0.00	0.00	89.35	0.00
76	8,094	8,095	**7.80**	104.0	3.00	89.16	10.00	0.00	0.00	0.00	99.16	0.00
77	7,275	7,275	**9.32**	104.0	3.00	88.24	9.41	0.00	0.00	0.00	97.64	0.00
78	4,548	4,550	**15.74**	104.0	3.00	84.16	7.06	0.00	0.00	0.00	91.22	0.00
80	10,017	10,018	**4.70**	104.0	3.00	91.02	11.24	0.00	0.00	0.00	102.26	0.00
81	4,372	4,374	**16.26**	104.0	3.00	83.82	6.88	0.00	0.00	0.00	90.70	0.00
82	5,239	5,240	**13.86**	104.0	3.00	85.39	7.72	0.00	0.00	0.00	93.11	0.00
83	12,102	12,102	**1.89**	104.0	3.00	92.66	12.41	0.00	0.00	0.00	105.07	0.00
85	6,484	6,485	**10.93**	104.0	3.00	87.24	8.79	0.00	0.00	0.00	96.03	0.00
86	9,731	9,731	**5.13**	104.0	3.00	90.76	11.07	0.00	0.00	0.00	101.83	0.00
87	13,667	13,668	**0.05**	104.0	3.00	93.71	13.19	0.00	0.00	0.00	106.91	0.00
89	12,430	12,431	**1.49**	104.0	3.00	92.89	12.58	0.00	0.00	0.00	105.47	0.00
90	9,333	9,333	**5.74**	104.0	3.00	90.40	10.82	0.00	0.00	0.00	101.22	0.00
91	11,087	11,088	**3.20**	104.0	3.00	91.90	11.86	0.00	0.00	0.00	103.76	0.00
92	13,410	13,410	**0.34**	104.0	3.00	93.55	13.07	0.00	0.00	0.00	106.62	0.00
94	3,525	3,529	**19.04**	104.0	3.00	81.95	5.97	0.00	0.00	0.00	87.92	0.00
95	3,300	3,303	**19.87**	104.0	3.00	81.38	5.71	0.00	0.00	0.00	87.09	0.00
97	4,180	4,183	**16.85**	104.0	3.00	83.43	6.68	0.00	0.00	0.00	90.11	0.00
98	3,391	3,395	**19.53**	104.0	3.00	81.62	5.82	0.00	0.00	0.00	87.43	0.00
99	1,280	1,284	**30.91**	104.0	3.00	73.17	2.89	0.00	0.00	0.00	76.05	0.00
100	6,818	6,819	**10.23**	104.0	3.00	87.67	9.06	0.00	0.00	0.00	96.73	0.00
101	4,514	4,516	**15.84**	104.0	3.00	84.09	7.02	0.00	0.00	0.00	91.12	0.00
102	6,327	6,329	**11.27**	104.0	3.00	87.03	8.66	0.00	0.00	0.00	95.69	0.00
103	4,641	4,644	**15.47**	104.0	3.00	84.34	7.15	0.00	0.00	0.00	91.49	0.00
104	5,815	5,817	**12.44**	104.0	3.00	86.29	8.23	0.00	0.00	0.00	94.53	0.00
107	4,358	4,360	**16.30**	104.0	3.00	83.79	6.87	0.00	0.00	0.00	90.66	0.00
108	482	489	**40.83**	104.0	3.00	64.79	1.34	0.00	0.00	0.00	66.13	0.00
109	9,237	9,237	**5.89**	104.0	3.00	90.31	10.76	0.00	0.00	0.00	101.07	0.00
110	7,086	7,086	**9.69**	104.0	3.00	88.01	9.26	0.00	0.00	0.00	97.27	0.00
111	7,697	7,698	**8.52**	104.0	3.00	88.73	9.72	0.00	0.00	0.00	98.44	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	4,316	4,318	**16.43**	104.0	3.00	83.71	6.82	0.00	0.00	0.00	90.53	0.00
114	6,786	6,786	**10.30**	104.0	3.00	87.63	9.03	0.00	0.00	0.00	96.66	0.00
115	2,327	2,330	**24.14**	104.0	3.00	78.35	4.48	0.00	0.00	0.00	82.82	0.00
116	5,480	5,481	**13.25**	104.0	3.00	85.78	7.94	0.00	0.00	0.00	93.72	0.00
118	9,716	9,716	**5.15**	104.0	3.00	90.75	11.06	0.00	0.00	0.00	101.81	0.00
119	3,207	3,210	**20.23**	104.0	3.00	81.13	5.60	0.00	0.00	0.00	86.73	0.00
120	4,788	4,790	**15.06**	104.0	3.00	84.61	7.29	0.00	0.00	0.00	91.90	0.00
121	3,788	3,790	**18.12**	104.0	3.00	82.57	6.26	0.00	0.00	0.00	88.84	0.00
125	11,838	11,839	**2.22**	104.0	3.00	92.47	12.27	0.00	0.00	0.00	104.74	0.00
126	8,044	8,045	**7.89**	104.0	3.00	89.11	9.96	0.00	0.00	0.00	99.07	0.00
127	8,207	8,208	**7.60**	104.0	3.00	89.28	10.08	0.00	0.00	0.00	99.36	0.00
128	8,279	8,280	**7.47**	104.0	3.00	89.36	10.13	0.00	0.00	0.00	99.49	0.00
129	6,044	6,045	**11.91**	104.0	3.00	86.63	8.43	0.00	0.00	0.00	95.06	0.00
130	6,681	6,682	**10.52**	104.0	3.00	87.50	8.95	0.00	0.00	0.00	96.45	0.00
131	6,747	6,748	**10.38**	104.0	3.00	87.58	9.00	0.00	0.00	0.00	96.58	0.00
132	6,652	6,653	**10.58**	104.0	3.00	87.46	8.93	0.00	0.00	0.00	96.39	0.00
133	6,186	6,187	**11.59**	104.0	3.00	86.83	8.55	0.00	0.00	0.00	95.38	0.00
134	4,736	4,737	**15.21**	104.0	3.00	84.51	7.24	0.00	0.00	0.00	91.75	0.00
141	4,038	4,041	**17.30**	104.0	3.00	83.13	6.53	0.00	0.00	0.00	89.66	0.00
142	6,126	6,128	**11.72**	104.0	3.00	86.75	8.50	0.00	0.00	0.00	95.24	0.00
143	4,073	4,076	**17.19**	104.0	3.00	83.20	6.57	0.00	0.00	0.00	89.78	0.00
144	7,137	7,138	**9.59**	104.0	3.00	88.07	9.30	0.00	0.00	0.00	97.37	0.00
145	8,921	8,921	**6.40**	104.0	3.00	90.01	10.56	0.00	0.00	0.00	100.57	0.00
146	8,609	8,609	**6.91**	104.0	3.00	89.70	10.35	0.00	0.00	0.00	100.05	0.00

Sum 43.10

Noise sensitive area: H09 H09

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	2,119	2,122	**25.24**	104.0	3.00	77.53	4.19	0.00	0.00	0.00	81.72	0.00
2	2,223	2,226	**24.68**	104.0	3.00	77.95	4.33	0.00	0.00	0.00	82.28	0.00
3	2,798	2,800	**21.92**	104.0	3.00	79.94	5.10	0.00	0.00	0.00	85.04	0.00
4	4,221	4,222	**16.73**	104.0	3.00	83.51	6.72	0.00	0.00	0.00	90.23	0.00
5	4,067	4,068	**17.21**	104.0	3.00	83.19	6.56	0.00	0.00	0.00	89.75	0.00
6	3,349	3,351	**19.69**	104.0	3.00	81.50	5.77	0.00	0.00	0.00	87.27	0.00
7	5,325	5,327	**13.63**	104.0	3.00	85.53	7.80	0.00	0.00	0.00	93.33	0.00
8	1,511	1,515	**29.09**	104.0	3.00	74.61	3.27	0.00	0.00	0.00	77.88	0.00
9	2,646	2,649	**22.60**	104.0	3.00	79.46	4.90	0.00	0.00	0.00	84.37	0.00
10	3,006	3,010	**21.03**	104.0	3.00	80.57	5.36	0.00	0.00	0.00	85.93	0.00
11	2,508	2,512	**23.24**	104.0	3.00	79.00	4.72	0.00	0.00	0.00	83.73	0.00
12	2,490	2,495	**23.32**	104.0	3.00	78.94	4.70	0.00	0.00	0.00	83.64	0.00
13	2,817	2,822	**21.83**	104.0	3.00	80.01	5.12	0.00	0.00	0.00	85.14	0.00
14	3,185	3,189	**20.31**	104.0	3.00	81.07	5.58	0.00	0.00	0.00	86.65	0.00
15	3,652	3,655	**18.59**	104.0	3.00	82.26	6.11	0.00	0.00	0.00	88.37	0.00
16	3,805	3,807	**18.07**	104.0	3.00	82.61	6.28	0.00	0.00	0.00	88.90	0.00
17	2,470	2,475	**23.42**	104.0	3.00	78.87	4.67	0.00	0.00	0.00	83.54	0.00
18	2,716	2,719	**22.28**	104.0	3.00	79.69	4.99	0.00	0.00	0.00	84.68	0.00
19	3,237	3,240	**20.11**	104.0	3.00	81.21	5.64	0.00	0.00	0.00	86.85	0.00
20	4,024	4,026	**17.35**	104.0	3.00	83.10	6.52	0.00	0.00	0.00	89.62	0.00
21	4,654	4,655	**15.44**	104.0	3.00	84.36	7.16	0.00	0.00	0.00	91.52	0.00
22	5,339	5,339	**13.60**	104.0	3.00	85.55	7.81	0.00	0.00	0.00	93.36	0.00
23	5,720	5,721	**12.66**	104.0	3.00	86.15	8.15	0.00	0.00	0.00	94.30	0.00
24	5,096	5,097	**14.23**	104.0	3.00	85.15	7.59	0.00	0.00	0.00	92.73	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	7,605	7,605	**8.69**	104.0	3.00	88.62	9.65	0.00	0.00	0.00	98.27	0.00
26	4,978	4,979	**14.54**	104.0	3.00	84.94	7.48	0.00	0.00	0.00	92.42	0.00
27	7,025	7,026	**9.81**	104.0	3.00	87.93	9.22	0.00	0.00	0.00	97.15	0.00
28	6,594	6,595	**10.70**	104.0	3.00	87.38	8.88	0.00	0.00	0.00	96.26	0.00
29	5,837	5,837	**12.39**	104.0	3.00	86.32	8.25	0.00	0.00	0.00	94.57	0.00
30	6,168	6,168	**11.63**	104.0	3.00	86.80	8.53	0.00	0.00	0.00	95.33	0.00
31	5,681	5,682	**12.76**	104.0	3.00	86.09	8.12	0.00	0.00	0.00	94.20	0.00
32	7,840	7,840	**8.26**	104.0	3.00	88.89	9.82	0.00	0.00	0.00	98.71	0.00
33	6,777	6,777	**10.32**	104.0	3.00	87.62	9.02	0.00	0.00	0.00	96.64	0.00
34	5,641	5,642	**12.85**	104.0	3.00	86.03	8.08	0.00	0.00	0.00	94.11	0.00
35	5,033	5,035	**14.39**	104.0	3.00	85.04	7.53	0.00	0.00	0.00	92.57	0.00
36	4,734	4,736	**15.21**	104.0	3.00	84.51	7.24	0.00	0.00	0.00	91.75	0.00
37	5,956	5,957	**12.11**	104.0	3.00	86.50	8.35	0.00	0.00	0.00	94.85	0.00
38	7,380	7,381	**9.12**	104.0	3.00	88.36	9.48	0.00	0.00	0.00	97.85	0.00
39	7,493	7,494	**8.90**	104.0	3.00	88.49	9.57	0.00	0.00	0.00	98.06	0.00
40	7,309	7,310	**9.25**	104.0	3.00	88.28	9.43	0.00	0.00	0.00	97.71	0.00
41	7,572	7,573	**8.75**	104.0	3.00	88.59	9.63	0.00	0.00	0.00	98.21	0.00
43	6,482	6,484	**10.94**	104.0	3.00	87.24	8.79	0.00	0.00	0.00	96.03	0.00
44	7,810	7,811	**8.31**	104.0	3.00	88.85	9.80	0.00	0.00	0.00	98.65	0.00
45	8,076	8,077	**7.83**	104.0	3.00	89.14	9.99	0.00	0.00	0.00	99.13	0.00
46	7,092	7,093	**9.68**	104.0	3.00	88.02	9.27	0.00	0.00	0.00	97.28	0.00
48	8,548	8,549	**7.01**	104.0	3.00	89.64	10.31	0.00	0.00	0.00	99.95	0.00
49	8,641	8,641	**6.86**	104.0	3.00	89.73	10.37	0.00	0.00	0.00	100.10	0.00
50	4,270	4,271	**16.57**	104.0	3.00	83.61	6.78	0.00	0.00	0.00	90.39	0.00
51	8,166	8,166	**7.67**	104.0	3.00	89.24	10.05	0.00	0.00	0.00	99.29	0.00
52	7,854	7,854	**8.23**	104.0	3.00	88.90	9.83	0.00	0.00	0.00	98.73	0.00
53	8,973	8,973	**6.31**	104.0	3.00	90.06	10.59	0.00	0.00	0.00	100.65	0.00
55	10,448	10,448	**4.08**	104.0	3.00	91.38	11.50	0.00	0.00	0.00	102.88	0.00
56	10,755	10,755	**3.65**	104.0	3.00	91.63	11.68	0.00	0.00	0.00	103.31	0.00
57	10,675	10,676	**3.76**	104.0	3.00	91.57	11.63	0.00	0.00	0.00	103.20	0.00
58	7,127	7,127	**9.61**	104.0	3.00	88.06	9.29	0.00	0.00	0.00	97.35	0.00
59	11,066	11,066	**3.23**	104.0	3.00	91.88	11.85	0.00	0.00	0.00	103.73	0.00
60	12,478	12,479	**1.43**	104.0	3.00	92.92	12.61	0.00	0.00	0.00	105.53	0.00
61	12,835	12,835	**1.01**	104.0	3.00	93.17	12.79	0.00	0.00	0.00	105.95	0.00
62	12,566	12,567	**1.33**	104.0	3.00	92.98	12.65	0.00	0.00	0.00	105.64	0.00
63	13,097	13,097	**0.70**	104.0	3.00	93.34	12.92	0.00	0.00	0.00	106.26	0.00
64	14,445	14,445	**-0.79**	104.0	3.00	94.19	13.56	0.00	0.00	0.00	107.75	0.00
65	15,033	15,033	**-1.40**	104.0	3.00	94.54	13.82	0.00	0.00	0.00	108.36	0.00
66	7,095	7,096	**9.67**	104.0	3.00	88.02	9.27	0.00	0.00	0.00	97.29	0.00
67	14,393	14,394	**-0.74**	104.0	3.00	94.16	13.53	0.00	0.00	0.00	107.70	0.00
68	14,936	14,936	**-1.30**	104.0	3.00	94.48	13.78	0.00	0.00	0.00	108.26	0.00
69	14,960	14,960	**-1.33**	104.0	3.00	94.50	13.79	0.00	0.00	0.00	108.29	0.00
70	4,042	4,044	**17.29**	104.0	3.00	83.14	6.54	0.00	0.00	0.00	89.67	0.00
71	3,226	3,229	**20.16**	104.0	3.00	81.18	5.62	0.00	0.00	0.00	86.80	0.00
72	3,834	3,835	**17.97**	104.0	3.00	82.68	6.31	0.00	0.00	0.00	88.99	0.00
73	3,686	3,687	**18.48**	104.0	3.00	82.33	6.15	0.00	0.00	0.00	88.48	0.00
74	4,594	4,596	**15.61**	104.0	3.00	84.25	7.10	0.00	0.00	0.00	91.35	0.00
75	5,573	5,573	**13.02**	104.0	3.00	85.92	8.02	0.00	0.00	0.00	93.94	0.00
76	9,987	9,987	**4.75**	104.0	3.00	90.99	11.23	0.00	0.00	0.00	102.21	0.00
77	9,320	9,320	**5.76**	104.0	3.00	90.39	10.81	0.00	0.00	0.00	101.20	0.00
78	4,411	4,413	**16.15**	104.0	3.00	83.89	6.92	0.00	0.00	0.00	90.81	0.00
80	12,088	12,089	**1.91**	104.0	3.00	92.65	12.40	0.00	0.00	0.00	105.05	0.00
81	3,188	3,191	**20.30**	104.0	3.00	81.08	5.58	0.00	0.00	0.00	86.66	0.00
82	7,364	7,365	**9.15**	104.0	3.00	88.34	9.47	0.00	0.00	0.00	97.82	0.00
83	13,712	13,713	**0.00**	104.0	3.00	93.74	13.22	0.00	0.00	0.00	106.96	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	8,824	8,824	**6.56**	104.0	3.00	89.91	10.49	0.00	0.00	0.00	100.41	0.00
86	11,798	11,798	**2.27**	104.0	3.00	92.44	12.25	0.00	0.00	0.00	104.69	0.00
87	15,252	15,252	**-1.62**	104.0	3.00	94.67	13.92	0.00	0.00	0.00	108.59	0.00
89	13,967	13,967	**-0.28**	104.0	3.00	93.90	13.34	0.00	0.00	0.00	107.24	0.00
90	11,188	11,188	**3.07**	104.0	3.00	91.98	11.92	0.00	0.00	0.00	103.90	0.00
91	12,753	12,754	**1.10**	104.0	3.00	93.11	12.75	0.00	0.00	0.00	105.86	0.00
92	14,803	14,804	**-1.16**	104.0	3.00	94.41	13.72	0.00	0.00	0.00	108.13	0.00
94	3,081	3,085	**20.73**	104.0	3.00	80.78	5.45	0.00	0.00	0.00	86.23	0.00
95	2,015	2,020	**25.81**	104.0	3.00	77.11	4.04	0.00	0.00	0.00	81.15	0.00
97	4,410	4,413	**16.15**	104.0	3.00	83.89	6.92	0.00	0.00	0.00	90.82	0.00
98	2,668	2,672	**22.49**	104.0	3.00	79.54	4.93	0.00	0.00	0.00	84.47	0.00
99	2,717	2,719	**22.28**	104.0	3.00	79.69	4.99	0.00	0.00	0.00	84.68	0.00
100	8,180	8,181	**7.65**	104.0	3.00	89.26	10.06	0.00	0.00	0.00	99.32	0.00
101	3,057	3,061	**20.83**	104.0	3.00	80.72	5.42	0.00	0.00	0.00	86.14	0.00
102	7,475	7,477	**8.93**	104.0	3.00	88.47	9.56	0.00	0.00	0.00	98.03	0.00
103	2,694	2,697	**22.38**	104.0	3.00	79.62	4.97	0.00	0.00	0.00	84.58	0.00
104	7,080	7,081	**9.70**	104.0	3.00	88.00	9.26	0.00	0.00	0.00	97.26	0.00
107	3,779	3,782	**18.15**	104.0	3.00	82.55	6.25	0.00	0.00	0.00	88.81	0.00
108	2,832	2,833	**21.78**	104.0	3.00	80.05	5.14	0.00	0.00	0.00	85.18	0.00
109	11,377	11,377	**2.82**	104.0	3.00	92.12	12.02	0.00	0.00	0.00	104.14	0.00
110	8,951	8,952	**6.35**	104.0	3.00	90.04	10.58	0.00	0.00	0.00	100.62	0.00
111	9,581	9,581	**5.36**	104.0	3.00	90.63	10.98	0.00	0.00	0.00	101.61	0.00
113	3,540	3,543	**18.99**	104.0	3.00	81.99	5.99	0.00	0.00	0.00	87.97	0.00
114	9,117	9,117	**6.08**	104.0	3.00	90.20	10.68	0.00	0.00	0.00	100.88	0.00
115	1,721	1,724	**27.63**	104.0	3.00	75.73	3.60	0.00	0.00	0.00	79.33	0.00
116	6,322	6,323	**11.28**	104.0	3.00	87.02	8.66	0.00	0.00	0.00	95.68	0.00
118	11,863	11,863	**2.19**	104.0	3.00	92.48	12.29	0.00	0.00	0.00	104.77	0.00
119	3,904	3,906	**17.74**	104.0	3.00	82.83	6.39	0.00	0.00	0.00	89.23	0.00
120	3,099	3,102	**20.66**	104.0	3.00	80.83	5.47	0.00	0.00	0.00	86.30	0.00
121	4,423	4,425	**16.11**	104.0	3.00	83.92	6.93	0.00	0.00	0.00	90.85	0.00
125	13,429	13,429	**0.32**	104.0	3.00	93.56	13.08	0.00	0.00	0.00	106.64	0.00
126	9,531	9,532	**5.43**	104.0	3.00	90.58	10.95	0.00	0.00	0.00	101.53	0.00
127	9,736	9,736	**5.12**	104.0	3.00	90.77	11.07	0.00	0.00	0.00	101.84	0.00
128	9,875	9,876	**4.91**	104.0	3.00	90.89	11.16	0.00	0.00	0.00	102.05	0.00
129	5,988	5,989	**12.03**	104.0	3.00	86.55	8.38	0.00	0.00	0.00	94.93	0.00
130	6,562	6,563	**10.77**	104.0	3.00	87.34	8.85	0.00	0.00	0.00	96.20	0.00
131	6,443	6,443	**11.02**	104.0	3.00	87.18	8.76	0.00	0.00	0.00	95.94	0.00
132	6,191	6,192	**11.57**	104.0	3.00	86.84	8.55	0.00	0.00	0.00	95.39	0.00
133	7,750	7,750	**8.42**	104.0	3.00	88.79	9.76	0.00	0.00	0.00	98.54	0.00
134	3,853	3,855	**17.91**	104.0	3.00	82.72	6.33	0.00	0.00	0.00	89.06	0.00
141	4,419	4,421	**16.12**	104.0	3.00	83.91	6.93	0.00	0.00	0.00	90.84	0.00
142	7,213	7,214	**9.44**	104.0	3.00	88.16	9.36	0.00	0.00	0.00	97.52	0.00
143	4,088	4,091	**17.14**	104.0	3.00	83.24	6.59	0.00	0.00	0.00	89.82	0.00
144	8,401	8,402	**7.26**	104.0	3.00	89.49	10.21	0.00	0.00	0.00	99.70	0.00
145	10,737	10,738	**3.68**	104.0	3.00	91.62	11.67	0.00	0.00	0.00	103.28	0.00
146	10,415	10,416	**4.13**	104.0	3.00	91.35	11.48	0.00	0.00	0.00	102.83	0.00
Sum	38.50											

Noise sensitive area: H10 H10

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	7,868	7,869	**8.20**	104.0	3.00	88.92	9.84	0.00	0.00	0.00	98.76	0.00
2	7,623	7,624	**8.65**	104.0	3.00	88.64	9.66	0.00	0.00	0.00	98.31	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	7,032	7,033	**9.80**	104.0	3.00	87.94	9.22	0.00	0.00	0.00	97.17	0.00
4	5,694	5,694	**12.73**	104.0	3.00	86.11	8.13	0.00	0.00	0.00	94.24	0.00
5	5,757	5,758	**12.57**	104.0	3.00	86.21	8.18	0.00	0.00	0.00	94.39	0.00
6	6,514	6,515	**10.87**	104.0	3.00	87.28	8.82	0.00	0.00	0.00	96.09	0.00
7	5,140	5,142	**14.11**	104.0	3.00	85.22	7.63	0.00	0.00	0.00	92.85	0.00
8	8,516	8,516	**7.07**	104.0	3.00	89.61	10.29	0.00	0.00	0.00	99.89	0.00
9	7,432	7,433	**9.01**	104.0	3.00	88.42	9.52	0.00	0.00	0.00	97.95	0.00
10	7,447	7,448	**8.99**	104.0	3.00	88.44	9.54	0.00	0.00	0.00	97.98	0.00
11	9,074	9,076	**6.15**	104.0	3.00	90.16	10.66	0.00	0.00	0.00	100.82	0.00
12	8,852	8,853	**6.51**	104.0	3.00	89.94	10.51	0.00	0.00	0.00	100.45	0.00
13	8,405	8,407	**7.25**	104.0	3.00	89.49	10.21	0.00	0.00	0.00	99.71	0.00
14	8,051	8,053	**7.87**	104.0	3.00	89.12	9.97	0.00	0.00	0.00	99.09	0.00
15	7,217	7,219	**9.43**	104.0	3.00	88.17	9.36	0.00	0.00	0.00	97.53	0.00
16	6,818	6,820	**10.23**	104.0	3.00	87.68	9.06	0.00	0.00	0.00	96.73	0.00
17	9,309	9,311	**5.77**	104.0	3.00	90.38	10.81	0.00	0.00	0.00	101.19	0.00
18	9,541	9,542	**5.42**	104.0	3.00	90.59	10.95	0.00	0.00	0.00	101.55	0.00
19	8,388	8,390	**7.28**	104.0	3.00	89.47	10.20	0.00	0.00	0.00	99.68	0.00
20	7,341	7,342	**9.19**	104.0	3.00	88.32	9.46	0.00	0.00	0.00	97.77	0.00
21	5,167	5,168	**14.04**	104.0	3.00	85.27	7.65	0.00	0.00	0.00	92.92	0.00
22	4,551	4,552	**15.74**	104.0	3.00	84.16	7.06	0.00	0.00	0.00	91.22	0.00
23	4,167	4,168	**16.89**	104.0	3.00	83.40	6.67	0.00	0.00	0.00	90.07	0.00
24	4,799	4,799	**15.03**	104.0	3.00	84.62	7.30	0.00	0.00	0.00	91.93	0.00
25	2,365	2,367	**23.95**	104.0	3.00	78.48	4.53	0.00	0.00	0.00	83.01	0.00
26	4,994	4,995	**14.50**	104.0	3.00	84.97	7.49	0.00	0.00	0.00	92.46	0.00
27	3,157	3,159	**20.43**	104.0	3.00	80.99	5.54	0.00	0.00	0.00	86.53	0.00
28	4,057	4,059	**17.24**	104.0	3.00	83.17	6.55	0.00	0.00	0.00	89.72	0.00
29	3,984	3,985	**17.48**	104.0	3.00	83.01	6.47	0.00	0.00	0.00	89.48	0.00
30	3,704	3,705	**18.42**	104.0	3.00	82.38	6.17	0.00	0.00	0.00	88.55	0.00
31	4,512	4,513	**15.85**	104.0	3.00	84.09	7.02	0.00	0.00	0.00	91.11	0.00
32	2,011	2,013	**25.86**	104.0	3.00	77.08	4.03	0.00	0.00	0.00	81.11	0.00
33	3,082	3,083	**20.73**	104.0	3.00	80.78	5.45	0.00	0.00	0.00	86.23	0.00
34	4,822	4,824	**14.97**	104.0	3.00	84.67	7.33	0.00	0.00	0.00	91.99	0.00
35	5,417	5,419	**13.40**	104.0	3.00	85.68	7.88	0.00	0.00	0.00	93.56	0.00
36	5,702	5,704	**12.70**	104.0	3.00	86.12	8.13	0.00	0.00	0.00	94.26	0.00
37	4,534	4,536	**15.78**	104.0	3.00	84.13	7.04	0.00	0.00	0.00	91.18	0.00
38	2,724	2,726	**22.25**	104.0	3.00	79.71	5.00	0.00	0.00	0.00	84.71	0.00
39	3,229	3,231	**20.15**	104.0	3.00	81.19	5.63	0.00	0.00	0.00	86.81	0.00
40	5,147	5,149	**14.09**	104.0	3.00	85.23	7.63	0.00	0.00	0.00	92.87	0.00
41	3,461	3,464	**19.27**	104.0	3.00	81.79	5.90	0.00	0.00	0.00	87.69	0.00
43	4,295	4,297	**16.50**	104.0	3.00	83.66	6.80	0.00	0.00	0.00	90.47	0.00
44	3,721	3,724	**18.35**	104.0	3.00	82.42	6.19	0.00	0.00	0.00	88.61	0.00
45	3,485	3,489	**19.18**	104.0	3.00	81.85	5.93	0.00	0.00	0.00	87.78	0.00
46	4,688	4,690	**15.34**	104.0	3.00	84.42	7.20	0.00	0.00	0.00	91.62	0.00
48	1,472	1,475	**29.38**	104.0	3.00	74.37	3.21	0.00	0.00	0.00	77.58	0.00
49	1,258	1,261	**31.10**	104.0	3.00	73.01	2.85	0.00	0.00	0.00	75.86	0.00
50	5,799	5,801	**12.47**	104.0	3.00	86.27	8.22	0.00	0.00	0.00	94.49	0.00
51	1,721	1,722	**27.64**	104.0	3.00	75.72	3.60	0.00	0.00	0.00	79.32	0.00
52	2,034	2,036	**25.72**	104.0	3.00	77.17	4.06	0.00	0.00	0.00	81.24	0.00
53	940	943	**34.19**	104.0	3.00	70.49	2.28	0.00	0.00	0.00	72.77	0.00
55	662	666	**37.76**	104.0	3.00	67.47	1.73	0.00	0.00	0.00	69.20	0.00
56	954	958	**34.03**	104.0	3.00	70.63	2.30	0.00	0.00	0.00	72.93	0.00
57	1,011	1,014	**33.43**	104.0	3.00	71.12	2.41	0.00	0.00	0.00	73.53	0.00
58	2,702	2,703	**22.35**	104.0	3.00	79.64	4.97	0.00	0.00	0.00	84.61	0.00
59	1,256	1,259	**31.12**	104.0	3.00	73.00	2.84	0.00	0.00	0.00	75.85	0.00
60	2,674	2,676	**22.47**	104.0	3.00	79.55	4.94	0.00	0.00	0.00	84.49	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	3,031	3,032	**20.94**	104.0	3.00	80.64	5.39	0.00	0.00	0.00	86.02	0.00
62	3,449	3,450	**19.32**	104.0	3.00	81.76	5.88	0.00	0.00	0.00	87.64	0.00
63	4,452	4,453	**16.03**	104.0	3.00	83.97	6.96	0.00	0.00	0.00	90.94	0.00
64	5,803	5,804	**12.47**	104.0	3.00	86.27	8.22	0.00	0.00	0.00	94.50	0.00
65	6,213	6,214	**11.52**	104.0	3.00	86.87	8.57	0.00	0.00	0.00	95.44	0.00
66	5,419	5,420	**13.40**	104.0	3.00	85.68	7.88	0.00	0.00	0.00	93.56	0.00
67	5,342	5,343	**13.59**	104.0	3.00	85.56	7.81	0.00	0.00	0.00	93.37	0.00
68	5,834	5,835	**12.39**	104.0	3.00	86.32	8.25	0.00	0.00	0.00	94.57	0.00
69	6,251	6,252	**11.44**	104.0	3.00	86.92	8.60	0.00	0.00	0.00	95.52	0.00
70	8,437	8,438	**7.20**	104.0	3.00	89.52	10.24	0.00	0.00	0.00	99.76	0.00
71	7,140	7,142	**9.58**	104.0	3.00	88.08	9.31	0.00	0.00	0.00	97.38	0.00
72	6,080	6,080	**11.83**	104.0	3.00	86.68	8.46	0.00	0.00	0.00	95.14	0.00
73	6,176	6,177	**11.61**	104.0	3.00	86.82	8.54	0.00	0.00	0.00	95.36	0.00
74	5,509	5,510	**13.17**	104.0	3.00	85.82	7.96	0.00	0.00	0.00	93.79	0.00
75	4,326	4,327	**16.41**	104.0	3.00	83.72	6.83	0.00	0.00	0.00	90.56	0.00
76	987	991	**33.68**	104.0	3.00	70.92	2.37	0.00	0.00	0.00	73.28	0.00
77	532	537	**39.91**	104.0	3.00	65.60	1.45	0.00	0.00	0.00	67.05	0.00
78	7,046	7,048	**9.77**	104.0	3.00	87.96	9.23	0.00	0.00	0.00	97.19	0.00
80	2,293	2,296	**24.31**	104.0	3.00	78.22	4.43	0.00	0.00	0.00	82.65	0.00
81	8,668	8,669	**6.81**	104.0	3.00	89.76	10.39	0.00	0.00	0.00	100.15	0.00
82	2,492	2,493	**23.33**	104.0	3.00	78.93	4.70	0.00	0.00	0.00	83.63	0.00
83	4,873	4,874	**14.83**	104.0	3.00	84.76	7.38	0.00	0.00	0.00	92.13	0.00
85	1,667	1,668	**28.00**	104.0	3.00	75.45	3.51	0.00	0.00	0.00	78.96	0.00
86	2,006	2,008	**25.88**	104.0	3.00	77.06	4.02	0.00	0.00	0.00	81.08	0.00
87	6,372	6,373	**11.17**	104.0	3.00	87.09	8.70	0.00	0.00	0.00	95.79	0.00
89	5,324	5,325	**13.64**	104.0	3.00	85.53	7.80	0.00	0.00	0.00	93.32	0.00
90	1,911	1,913	**26.44**	104.0	3.00	76.64	3.89	0.00	0.00	0.00	80.52	0.00
91	3,849	3,851	**17.92**	104.0	3.00	82.71	6.33	0.00	0.00	0.00	89.04	0.00
92	6,514	6,515	**10.87**	104.0	3.00	87.28	8.82	0.00	0.00	0.00	96.09	0.00
94	7,694	7,695	**8.52**	104.0	3.00	88.72	9.72	0.00	0.00	0.00	98.44	0.00
95	8,711	8,712	**6.74**	104.0	3.00	89.80	10.42	0.00	0.00	0.00	100.22	0.00
97	6,519	6,521	**10.86**	104.0	3.00	87.29	8.82	0.00	0.00	0.00	96.11	0.00
98	8,068	8,070	**7.84**	104.0	3.00	89.14	9.98	0.00	0.00	0.00	99.12	0.00
99	7,137	7,138	**9.59**	104.0	3.00	88.07	9.30	0.00	0.00	0.00	97.37	0.00
100	3,077	3,080	**20.75**	104.0	3.00	80.77	5.44	0.00	0.00	0.00	86.21	0.00
101	9,084	9,085	**6.13**	104.0	3.00	90.17	10.66	0.00	0.00	0.00	100.83	0.00
102	3,846	3,849	**17.93**	104.0	3.00	82.71	6.33	0.00	0.00	0.00	89.04	0.00
103	9,831	9,833	**4.98**	104.0	3.00	90.85	11.13	0.00	0.00	0.00	101.99	0.00
104	3,723	3,725	**18.35**	104.0	3.00	82.42	6.19	0.00	0.00	0.00	88.62	0.00
107	7,776	7,777	**8.37**	104.0	3.00	88.82	9.77	0.00	0.00	0.00	98.59	0.00
108	7,352	7,353	**9.17**	104.0	3.00	88.33	9.46	0.00	0.00	0.00	97.79	0.00
109	1,560	1,563	**28.73**	104.0	3.00	74.88	3.35	0.00	0.00	0.00	78.23	0.00
110	1,260	1,262	**31.09**	104.0	3.00	73.02	2.85	0.00	0.00	0.00	75.88	0.00
111	978	982	**33.77**	104.0	3.00	70.84	2.35	0.00	0.00	0.00	73.19	0.00
113	8,073	8,075	**7.83**	104.0	3.00	89.14	9.99	0.00	0.00	0.00	99.13	0.00
114	1,462	1,464	**29.46**	104.0	3.00	74.31	3.19	0.00	0.00	0.00	77.50	0.00
115	8,259	8,259	**7.51**	104.0	3.00	89.34	10.11	0.00	0.00	0.00	99.45	0.00
116	4,885	4,888	**14.79**	104.0	3.00	84.78	7.39	0.00	0.00	0.00	92.17	0.00
118	2,045	2,047	**25.66**	104.0	3.00	77.22	4.08	0.00	0.00	0.00	81.31	0.00
119	6,280	6,281	**11.38**	104.0	3.00	86.96	8.62	0.00	0.00	0.00	95.59	0.00
120	9,506	9,507	**5.47**	104.0	3.00	90.56	10.93	0.00	0.00	0.00	101.49	0.00
121	6,031	6,033	**11.93**	104.0	3.00	86.61	8.42	0.00	0.00	0.00	95.03	0.00
125	4,678	4,679	**15.37**	104.0	3.00	84.40	7.19	0.00	0.00	0.00	91.59	0.00
126	2,570	2,573	**22.95**	104.0	3.00	79.21	4.80	0.00	0.00	0.00	84.01	0.00
127	2,449	2,452	**23.53**	104.0	3.00	78.79	4.64	0.00	0.00	0.00	83.43	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	2,213	2,216	**24.73**	104.0	3.00	77.91	4.32	0.00	0.00	0.00	82.23	0.00
129	6,820	6,821	**10.23**	104.0	3.00	87.68	9.06	0.00	0.00	0.00	96.74	0.00
130	7,035	7,036	**9.79**	104.0	3.00	87.95	9.22	0.00	0.00	0.00	97.17	0.00
131	7,469	7,469	**8.95**	104.0	3.00	88.47	9.55	0.00	0.00	0.00	98.02	0.00
132	7,792	7,793	**8.34**	104.0	3.00	88.83	9.79	0.00	0.00	0.00	98.62	0.00
133	2,726	2,728	**22.24**	104.0	3.00	79.72	5.00	0.00	0.00	0.00	84.72	0.00
134	8,260	8,261	**7.51**	104.0	3.00	89.34	10.11	0.00	0.00	0.00	99.46	0.00
141	6,323	6,325	**11.28**	104.0	3.00	87.02	8.66	0.00	0.00	0.00	95.68	0.00
142	4,073	4,076	**17.18**	104.0	3.00	83.21	6.57	0.00	0.00	0.00	89.78	0.00
143	6,898	6,900	**10.06**	104.0	3.00	87.78	9.12	0.00	0.00	0.00	96.90	0.00
144	3,334	3,337	**19.75**	104.0	3.00	81.47	5.75	0.00	0.00	0.00	87.22	0.00
145	1,708	1,711	**27.72**	104.0	3.00	75.66	3.58	0.00	0.00	0.00	79.24	0.00
146	1,548	1,551	**28.82**	104.0	3.00	74.81	3.33	0.00	0.00	0.00	78.14	0.00
Sum	46.38											

Noise sensitive area: H11 H11

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	9,170	9,171	**6.00**	104.0	3.00	90.25	10.72	0.00	0.00	0.00	100.97	0.00
2	8,962	8,962	**6.33**	104.0	3.00	90.05	10.58	0.00	0.00	0.00	100.63	0.00
3	8,379	8,380	**7.30**	104.0	3.00	89.47	10.20	0.00	0.00	0.00	99.66	0.00
4	7,120	7,120	**9.62**	104.0	3.00	88.05	9.29	0.00	0.00	0.00	97.34	0.00
5	7,113	7,114	**9.64**	104.0	3.00	88.04	9.28	0.00	0.00	0.00	97.33	0.00
6	7,839	7,840	**8.26**	104.0	3.00	88.89	9.82	0.00	0.00	0.00	98.71	0.00
7	6,251	6,253	**11.44**	104.0	3.00	86.92	8.60	0.00	0.00	0.00	95.52	0.00
8	9,822	9,823	**4.99**	104.0	3.00	90.84	11.13	0.00	0.00	0.00	101.97	0.00
9	8,708	8,709	**6.75**	104.0	3.00	89.80	10.42	0.00	0.00	0.00	100.22	0.00
10	8,659	8,660	**6.83**	104.0	3.00	89.75	10.39	0.00	0.00	0.00	100.14	0.00
11	10,245	10,247	**4.37**	104.0	3.00	91.21	11.38	0.00	0.00	0.00	102.59	0.00
12	10,031	10,032	**4.68**	104.0	3.00	91.03	11.25	0.00	0.00	0.00	102.28	0.00
13	9,567	9,568	**5.38**	104.0	3.00	90.62	10.97	0.00	0.00	0.00	101.59	0.00
14	9,188	9,189	**5.97**	104.0	3.00	90.27	10.73	0.00	0.00	0.00	101.00	0.00
15	8,354	8,355	**7.34**	104.0	3.00	89.44	10.18	0.00	0.00	0.00	99.62	0.00
16	7,975	7,976	**8.01**	104.0	3.00	89.04	9.92	0.00	0.00	0.00	98.95	0.00
17	10,480	10,481	**4.04**	104.0	3.00	91.41	11.52	0.00	0.00	0.00	102.93	0.00
18	10,687	10,688	**3.75**	104.0	3.00	91.58	11.64	0.00	0.00	0.00	103.22	0.00
19	9,502	9,503	**5.48**	104.0	3.00	90.56	10.93	0.00	0.00	0.00	101.49	0.00
20	8,411	8,412	**7.25**	104.0	3.00	89.50	10.22	0.00	0.00	0.00	99.72	0.00
21	6,545	6,546	**10.80**	104.0	3.00	87.32	8.84	0.00	0.00	0.00	96.16	0.00
22	5,984	5,985	**12.04**	104.0	3.00	86.54	8.38	0.00	0.00	0.00	94.92	0.00
23	5,605	5,606	**12.94**	104.0	3.00	85.97	8.05	0.00	0.00	0.00	94.02	0.00
24	6,230	6,231	**11.49**	104.0	3.00	86.89	8.58	0.00	0.00	0.00	95.47	0.00
25	3,587	3,588	**18.83**	104.0	3.00	82.10	6.04	0.00	0.00	0.00	88.14	0.00
26	6,257	6,258	**11.43**	104.0	3.00	86.93	8.61	0.00	0.00	0.00	95.53	0.00
27	4,278	4,279	**16.55**	104.0	3.00	83.63	6.78	0.00	0.00	0.00	90.41	0.00
28	5,045	5,047	**14.36**	104.0	3.00	85.06	7.54	0.00	0.00	0.00	92.60	0.00
29	5,359	5,360	**13.55**	104.0	3.00	85.58	7.83	0.00	0.00	0.00	93.41	0.00
30	5,143	5,143	**14.11**	104.0	3.00	85.23	7.63	0.00	0.00	0.00	92.85	0.00
31	5,995	5,996	**12.02**	104.0	3.00	86.56	8.39	0.00	0.00	0.00	94.94	0.00
32	3,343	3,344	**19.72**	104.0	3.00	81.49	5.76	0.00	0.00	0.00	87.24	0.00
33	4,523	4,524	**15.82**	104.0	3.00	84.11	7.03	0.00	0.00	0.00	91.14	0.00
34	5,917	5,919	**12.20**	104.0	3.00	86.44	8.32	0.00	0.00	0.00	94.77	0.00
35	6,545	6,547	**10.80**	104.0	3.00	87.32	8.84	0.00	0.00	0.00	96.16	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	6,846	6,848	**10.17**	104.0	3.00	87.71	9.08	0.00	0.00	0.00	96.79	0.00
37	5,606	5,607	**12.94**	104.0	3.00	85.98	8.05	0.00	0.00	0.00	94.03	0.00
38	3,869	3,870	**17.86**	104.0	3.00	82.75	6.35	0.00	0.00	0.00	89.10	0.00
39	4,116	4,118	**17.05**	104.0	3.00	83.29	6.62	0.00	0.00	0.00	89.91	0.00
40	5,756	5,757	**12.58**	104.0	3.00	86.20	8.18	0.00	0.00	0.00	94.39	0.00
41	4,252	4,254	**16.63**	104.0	3.00	83.58	6.76	0.00	0.00	0.00	90.33	0.00
43	5,260	5,262	**13.80**	104.0	3.00	85.42	7.74	0.00	0.00	0.00	93.16	0.00
44	4,367	4,370	**16.27**	104.0	3.00	83.81	6.88	0.00	0.00	0.00	90.69	0.00
45	4,079	4,082	**17.17**	104.0	3.00	83.22	6.58	0.00	0.00	0.00	89.80	0.00
46	5,406	5,407	**13.43**	104.0	3.00	85.66	7.87	0.00	0.00	0.00	93.53	0.00
48	2,636	2,638	**22.65**	104.0	3.00	79.42	4.89	0.00	0.00	0.00	84.31	0.00
49	2,750	2,752	**22.13**	104.0	3.00	79.79	5.04	0.00	0.00	0.00	84.83	0.00
50	7,043	7,044	**9.77**	104.0	3.00	87.96	9.23	0.00	0.00	0.00	97.19	0.00
51	3,201	3,201	**20.26**	104.0	3.00	81.11	5.59	0.00	0.00	0.00	86.70	0.00
52	3,509	3,509	**19.11**	104.0	3.00	81.90	5.95	0.00	0.00	0.00	87.85	0.00
53	2,438	2,439	**23.59**	104.0	3.00	78.74	4.63	0.00	0.00	0.00	83.37	0.00
55	1,141	1,144	**32.15**	104.0	3.00	72.17	2.64	0.00	0.00	0.00	74.81	0.00
56	965	968	**33.92**	104.0	3.00	70.72	2.32	0.00	0.00	0.00	73.04	0.00
57	509	516	**40.31**	104.0	3.00	65.25	1.40	0.00	0.00	0.00	66.65	0.00
58	4,061	4,062	**17.23**	104.0	3.00	83.17	6.56	0.00	0.00	0.00	89.73	0.00
59	855	860	**35.16**	104.0	3.00	69.69	2.12	0.00	0.00	0.00	71.80	0.00
60	1,363	1,366	**30.22**	104.0	3.00	73.71	3.03	0.00	0.00	0.00	76.74	0.00
61	1,703	1,706	**27.75**	104.0	3.00	75.64	3.57	0.00	0.00	0.00	79.21	0.00
62	2,051	2,053	**25.62**	104.0	3.00	77.25	4.09	0.00	0.00	0.00	81.34	0.00
63	3,141	3,143	**20.49**	104.0	3.00	80.95	5.52	0.00	0.00	0.00	86.47	0.00
64	4,419	4,421	**16.12**	104.0	3.00	83.91	6.93	0.00	0.00	0.00	90.84	0.00
65	4,781	4,782	**15.08**	104.0	3.00	84.59	7.29	0.00	0.00	0.00	91.88	0.00
66	6,058	6,059	**11.87**	104.0	3.00	86.65	8.44	0.00	0.00	0.00	95.09	0.00
67	3,885	3,886	**17.80**	104.0	3.00	82.79	6.37	0.00	0.00	0.00	89.16	0.00
68	4,362	4,363	**16.30**	104.0	3.00	83.80	6.87	0.00	0.00	0.00	90.66	0.00
69	4,839	4,841	**14.92**	104.0	3.00	84.70	7.34	0.00	0.00	0.00	92.04	0.00
70	9,453	9,453	**5.55**	104.0	3.00	90.51	10.90	0.00	0.00	0.00	101.41	0.00
71	8,355	8,357	**7.34**	104.0	3.00	89.44	10.18	0.00	0.00	0.00	99.62	0.00
72	7,501	7,501	**8.89**	104.0	3.00	88.50	9.57	0.00	0.00	0.00	98.08	0.00
73	7,501	7,502	**8.88**	104.0	3.00	88.50	9.57	0.00	0.00	0.00	98.08	0.00
74	6,736	6,737	**10.40**	104.0	3.00	87.57	8.99	0.00	0.00	0.00	96.56	0.00
75	5,618	5,619	**12.91**	104.0	3.00	85.99	8.06	0.00	0.00	0.00	94.05	0.00
76	1,254	1,258	**31.13**	104.0	3.00	72.99	2.84	0.00	0.00	0.00	75.83	0.00
77	1,905	1,907	**26.48**	104.0	3.00	76.61	3.88	0.00	0.00	0.00	80.48	0.00
78	8,079	8,080	**7.82**	104.0	3.00	89.15	9.99	0.00	0.00	0.00	99.14	0.00
80	974	979	**33.81**	104.0	3.00	70.81	2.34	0.00	0.00	0.00	73.15	0.00
81	9,778	9,779	**5.06**	104.0	3.00	90.81	11.10	0.00	0.00	0.00	101.91	0.00
82	3,942	3,943	**17.62**	104.0	3.00	82.92	6.43	0.00	0.00	0.00	89.35	0.00
83	3,478	3,480	**19.22**	104.0	3.00	81.83	5.92	0.00	0.00	0.00	87.75	0.00
85	3,105	3,106	**20.64**	104.0	3.00	80.84	5.48	0.00	0.00	0.00	86.32	0.00
86	709	715	**37.05**	104.0	3.00	68.08	1.83	0.00	0.00	0.00	69.91	0.00
87	4,926	4,927	**14.68**	104.0	3.00	84.85	7.43	0.00	0.00	0.00	92.28	0.00
89	3,960	3,962	**17.55**	104.0	3.00	82.96	6.45	0.00	0.00	0.00	89.41	0.00
90	746	752	**36.53**	104.0	3.00	68.53	1.90	0.00	0.00	0.00	70.43	0.00
91	2,498	2,500	**23.29**	104.0	3.00	78.96	4.71	0.00	0.00	0.00	83.67	0.00
92	5,184	5,185	**14.00**	104.0	3.00	85.30	7.67	0.00	0.00	0.00	92.96	0.00
94	8,870	8,871	**6.48**	104.0	3.00	89.96	10.52	0.00	0.00	0.00	100.48	0.00
95	9,944	9,945	**4.81**	104.0	3.00	90.95	11.20	0.00	0.00	0.00	102.15	0.00
97	7,604	7,606	**8.69**	104.0	3.00	88.62	9.65	0.00	0.00	0.00	98.27	0.00
98	9,268	9,269	**5.84**	104.0	3.00	90.34	10.78	0.00	0.00	0.00	101.12	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	8,528	8,529	**7.05**	104.0	3.00	89.62	10.30	0.00	0.00	0.00	99.91	0.00
100	3,719	3,721	**18.36**	104.0	3.00	82.41	6.19	0.00	0.00	0.00	88.60	0.00
101	10,199	10,200	**4.44**	104.0	3.00	91.17	11.35	0.00	0.00	0.00	102.53	0.00
102	4,585	4,587	**15.63**	104.0	3.00	84.23	7.10	0.00	0.00	0.00	91.33	0.00
103	10,981	10,982	**3.34**	104.0	3.00	91.81	11.80	0.00	0.00	0.00	103.62	0.00
104	4,629	4,631	**15.51**	104.0	3.00	84.31	7.14	0.00	0.00	0.00	91.45	0.00
107	8,851	8,852	**6.51**	104.0	3.00	89.94	10.51	0.00	0.00	0.00	100.45	0.00
108	8,793	8,794	**6.61**	104.0	3.00	89.88	10.47	0.00	0.00	0.00	100.36	0.00
109	819	824	**35.60**	104.0	3.00	69.32	2.05	0.00	0.00	0.00	71.37	0.00
110	2,256	2,257	**24.51**	104.0	3.00	78.07	4.38	0.00	0.00	0.00	82.45	0.00
111	1,642	1,644	**28.17**	104.0	3.00	75.32	3.48	0.00	0.00	0.00	78.80	0.00
113	9,164	9,166	**6.00**	104.0	3.00	90.24	10.72	0.00	0.00	0.00	100.96	0.00
114	2,856	2,857	**21.67**	104.0	3.00	80.12	5.17	0.00	0.00	0.00	85.29	0.00
115	9,568	9,569	**5.37**	104.0	3.00	90.62	10.97	0.00	0.00	0.00	101.59	0.00
116	5,781	5,783	**12.51**	104.0	3.00	86.24	8.20	0.00	0.00	0.00	94.45	0.00
118	1,061	1,066	**32.91**	104.0	3.00	71.55	2.50	0.00	0.00	0.00	74.05	0.00
119	7,505	7,506	**8.88**	104.0	3.00	88.51	9.58	0.00	0.00	0.00	98.09	0.00
120	10,614	10,615	**3.85**	104.0	3.00	91.52	11.60	0.00	0.00	0.00	103.11	0.00
121	7,185	7,187	**9.49**	104.0	3.00	88.13	9.34	0.00	0.00	0.00	97.47	0.00
125	3,318	3,320	**19.81**	104.0	3.00	81.42	5.73	0.00	0.00	0.00	87.15	0.00
126	2,670	2,672	**22.49**	104.0	3.00	79.54	4.93	0.00	0.00	0.00	84.47	0.00
127	2,451	2,454	**23.52**	104.0	3.00	78.80	4.65	0.00	0.00	0.00	83.44	0.00
128	2,162	2,165	**25.00**	104.0	3.00	77.71	4.25	0.00	0.00	0.00	81.96	0.00
129	7,602	7,602	**8.69**	104.0	3.00	88.62	9.65	0.00	0.00	0.00	98.27	0.00
130	7,705	7,706	**8.50**	104.0	3.00	88.74	9.72	0.00	0.00	0.00	98.46	0.00
131	8,152	8,152	**7.70**	104.0	3.00	89.23	10.04	0.00	0.00	0.00	99.26	0.00
132	8,513	8,514	**7.07**	104.0	3.00	89.60	10.29	0.00	0.00	0.00	99.89	0.00
133	3,676	3,677	**18.51**	104.0	3.00	82.31	6.14	0.00	0.00	0.00	88.45	0.00
134	9,304	9,305	**5.78**	104.0	3.00	90.37	10.80	0.00	0.00	0.00	101.18	0.00
141	7,432	7,434	**9.01**	104.0	3.00	88.42	9.52	0.00	0.00	0.00	97.95	0.00
142	4,854	4,857	**14.88**	104.0	3.00	84.73	7.36	0.00	0.00	0.00	92.09	0.00
143	7,997	7,999	**7.97**	104.0	3.00	89.06	9.93	0.00	0.00	0.00	98.99	0.00
144	3,829	3,831	**17.99**	104.0	3.00	82.67	6.31	0.00	0.00	0.00	88.98	0.00
145	977	982	**33.77**	104.0	3.00	70.84	2.35	0.00	0.00	0.00	73.19	0.00
146	1,156	1,161	**31.99**	104.0	3.00	72.29	2.67	0.00	0.00	0.00	74.97	0.00
Sum	46.85											

Noise sensitive area: H12 H12

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	11,403	11,403	**2.78**	104.0	3.00	92.14	12.04	0.00	0.00	0.00	104.18	0.00
2	11,175	11,176	**3.08**	104.0	3.00	91.97	11.91	0.00	0.00	0.00	103.88	0.00
3	10,587	10,587	**3.89**	104.0	3.00	91.50	11.58	0.00	0.00	0.00	103.08	0.00
4	9,254	9,255	**5.86**	104.0	3.00	90.33	10.77	0.00	0.00	0.00	101.10	0.00
5	9,313	9,314	**5.77**	104.0	3.00	90.38	10.81	0.00	0.00	0.00	101.19	0.00
6	10,059	10,060	**4.64**	104.0	3.00	91.05	11.27	0.00	0.00	0.00	102.32	0.00
7	8,519	8,520	**7.06**	104.0	3.00	89.61	10.29	0.00	0.00	0.00	99.90	0.00
8	12,054	12,054	**1.95**	104.0	3.00	92.62	12.39	0.00	0.00	0.00	105.01	0.00
9	10,950	10,951	**3.39**	104.0	3.00	91.79	11.79	0.00	0.00	0.00	103.58	0.00
10	10,918	10,919	**3.43**	104.0	3.00	91.76	11.77	0.00	0.00	0.00	103.53	0.00
11	12,512	12,513	**1.39**	104.0	3.00	92.95	12.62	0.00	0.00	0.00	105.57	0.00
12	12,296	12,297	**1.65**	104.0	3.00	92.80	12.51	0.00	0.00	0.00	105.31	0.00
13	11,833	11,834	**2.23**	104.0	3.00	92.46	12.27	0.00	0.00	0.00	104.73	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	11,456	11,457	**2.71**	104.0	3.00	92.18	12.07	0.00	0.00	0.00	104.25	0.00
15	10,621	10,623	**3.84**	104.0	3.00	91.52	11.60	0.00	0.00	0.00	103.12	0.00
16	10,241	10,242	**4.38**	104.0	3.00	91.21	11.38	0.00	0.00	0.00	102.59	0.00
17	12,746	12,747	**1.11**	104.0	3.00	93.11	12.74	0.00	0.00	0.00	105.85	0.00
18	12,955	12,956	**0.87**	104.0	3.00	93.25	12.85	0.00	0.00	0.00	106.10	0.00
19	11,770	11,771	**2.31**	104.0	3.00	92.42	12.24	0.00	0.00	0.00	104.65	0.00
20	10,677	10,678	**3.76**	104.0	3.00	91.57	11.63	0.00	0.00	0.00	103.20	0.00
21	8,729	8,729	**6.71**	104.0	3.00	89.82	10.43	0.00	0.00	0.00	100.25	0.00
22	8,110	8,111	**7.77**	104.0	3.00	89.18	10.01	0.00	0.00	0.00	99.19	0.00
23	7,726	7,726	**8.46**	104.0	3.00	88.76	9.74	0.00	0.00	0.00	98.50	0.00
24	8,359	8,359	**7.34**	104.0	3.00	89.44	10.18	0.00	0.00	0.00	99.62	0.00
25	5,830	5,831	**12.40**	104.0	3.00	86.31	8.24	0.00	0.00	0.00	94.56	0.00
26	8,500	8,501	**7.09**	104.0	3.00	89.59	10.28	0.00	0.00	0.00	99.87	0.00
27	6,542	6,543	**10.81**	104.0	3.00	87.32	8.84	0.00	0.00	0.00	96.15	0.00
28	7,310	7,311	**9.25**	104.0	3.00	88.28	9.43	0.00	0.00	0.00	97.71	0.00
29	7,543	7,544	**8.80**	104.0	3.00	88.55	9.61	0.00	0.00	0.00	98.16	0.00
30	7,264	7,264	**9.34**	104.0	3.00	88.22	9.40	0.00	0.00	0.00	97.62	0.00
31	8,017	8,018	**7.94**	104.0	3.00	89.08	9.95	0.00	0.00	0.00	99.03	0.00
32	5,545	5,545	**13.09**	104.0	3.00	85.88	8.00	0.00	0.00	0.00	93.87	0.00
33	6,642	6,643	**10.60**	104.0	3.00	87.45	8.92	0.00	0.00	0.00	96.36	0.00
34	8,185	8,186	**7.64**	104.0	3.00	89.26	10.06	0.00	0.00	0.00	99.33	0.00
35	8,813	8,814	**6.57**	104.0	3.00	89.90	10.49	0.00	0.00	0.00	100.39	0.00
36	9,113	9,114	**6.09**	104.0	3.00	90.19	10.68	0.00	0.00	0.00	100.88	0.00
37	7,874	7,875	**8.19**	104.0	3.00	88.93	9.84	0.00	0.00	0.00	98.77	0.00
38	6,129	6,129	**11.72**	104.0	3.00	86.75	8.50	0.00	0.00	0.00	95.25	0.00
39	6,376	6,377	**11.17**	104.0	3.00	87.09	8.70	0.00	0.00	0.00	95.80	0.00
40	7,921	7,922	**8.11**	104.0	3.00	88.98	9.88	0.00	0.00	0.00	98.85	0.00
41	6,495	6,496	**10.91**	104.0	3.00	87.25	8.80	0.00	0.00	0.00	96.05	0.00
43	7,523	7,524	**8.84**	104.0	3.00	88.53	9.59	0.00	0.00	0.00	98.12	0.00
44	6,573	6,575	**10.74**	104.0	3.00	87.36	8.86	0.00	0.00	0.00	96.22	0.00
45	6,276	6,277	**11.38**	104.0	3.00	86.96	8.62	0.00	0.00	0.00	95.58	0.00
46	7,615	7,616	**8.67**	104.0	3.00	88.63	9.66	0.00	0.00	0.00	98.29	0.00
48	4,880	4,881	**14.81**	104.0	3.00	84.77	7.38	0.00	0.00	0.00	92.15	0.00
49	4,788	4,789	**15.07**	104.0	3.00	84.60	7.29	0.00	0.00	0.00	91.90	0.00
50	9,294	9,294	**5.80**	104.0	3.00	90.36	10.80	0.00	0.00	0.00	101.16	0.00
51	5,263	5,264	**13.79**	104.0	3.00	85.43	7.74	0.00	0.00	0.00	93.17	0.00
52	5,580	5,580	**13.00**	104.0	3.00	85.93	8.03	0.00	0.00	0.00	93.96	0.00
53	4,455	4,455	**16.02**	104.0	3.00	83.98	6.96	0.00	0.00	0.00	90.94	0.00
55	2,964	2,965	**21.22**	104.0	3.00	80.44	5.30	0.00	0.00	0.00	85.74	0.00
56	2,657	2,658	**22.55**	104.0	3.00	79.49	4.92	0.00	0.00	0.00	84.41	0.00
57	2,739	2,740	**22.19**	104.0	3.00	79.75	5.02	0.00	0.00	0.00	84.77	0.00
58	6,253	6,254	**11.44**	104.0	3.00	86.92	8.60	0.00	0.00	0.00	95.52	0.00
59	2,346	2,348	**24.05**	104.0	3.00	78.41	4.50	0.00	0.00	0.00	82.91	0.00
60	910	915	**34.52**	104.0	3.00	70.22	2.22	0.00	0.00	0.00	72.45	0.00
61	566	572	**39.29**	104.0	3.00	66.14	1.53	0.00	0.00	0.00	67.67	0.00
62	2,368	2,370	**23.93**	104.0	3.00	78.50	4.53	0.00	0.00	0.00	83.03	0.00
63	3,316	3,318	**19.82**	104.0	3.00	81.42	5.73	0.00	0.00	0.00	87.15	0.00
64	4,011	4,012	**17.39**	104.0	3.00	83.07	6.50	0.00	0.00	0.00	89.57	0.00
65	4,068	4,070	**17.21**	104.0	3.00	83.19	6.57	0.00	0.00	0.00	89.76	0.00
66	8,230	8,231	**7.56**	104.0	3.00	89.31	10.09	0.00	0.00	0.00	99.40	0.00
67	3,164	3,165	**20.41**	104.0	3.00	81.01	5.55	0.00	0.00	0.00	86.56	0.00
68	3,420	3,421	**19.43**	104.0	3.00	81.68	5.85	0.00	0.00	0.00	87.53	0.00
69	4,231	4,232	**16.70**	104.0	3.00	83.53	6.74	0.00	0.00	0.00	90.27	0.00
70	11,713	11,713	**2.38**	104.0	3.00	92.37	12.21	0.00	0.00	0.00	104.58	0.00
71	10,614	10,615	**3.85**	104.0	3.00	91.52	11.60	0.00	0.00	0.00	103.11	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	9,641	9,642	**5.26**	104.0	3.00	90.68	11.02	0.00	0.00	0.00	101.70	0.00
73	9,721	9,721	**5.14**	104.0	3.00	90.75	11.06	0.00	0.00	0.00	101.82	0.00
74	8,990	8,991	**6.28**	104.0	3.00	90.08	10.60	0.00	0.00	0.00	100.68	0.00
75	7,849	7,850	**8.24**	104.0	3.00	88.90	9.83	0.00	0.00	0.00	98.72	0.00
76	3,522	3,523	**19.06**	104.0	3.00	81.94	5.97	0.00	0.00	0.00	87.90	0.00
77	4,059	4,060	**17.24**	104.0	3.00	83.17	6.55	0.00	0.00	0.00	89.73	0.00
78	10,344	10,344	**4.23**	104.0	3.00	91.29	11.44	0.00	0.00	0.00	102.73	0.00
80	1,305	1,308	**30.70**	104.0	3.00	73.33	2.93	0.00	0.00	0.00	76.26	0.00
81	12,046	12,047	**1.96**	104.0	3.00	92.62	12.38	0.00	0.00	0.00	105.00	0.00
82	6,051	6,051	**11.89**	104.0	3.00	86.64	8.43	0.00	0.00	0.00	95.07	0.00
83	3,220	3,221	**20.19**	104.0	3.00	81.16	5.61	0.00	0.00	0.00	86.78	0.00
85	4,875	4,876	**14.82**	104.0	3.00	84.76	7.38	0.00	0.00	0.00	92.14	0.00
86	1,592	1,594	**28.51**	104.0	3.00	75.05	3.40	0.00	0.00	0.00	78.45	0.00
87	4,110	4,111	**17.07**	104.0	3.00	83.28	6.61	0.00	0.00	0.00	89.89	0.00
89	3,724	3,725	**18.35**	104.0	3.00	82.42	6.19	0.00	0.00	0.00	88.62	0.00
90	2,578	2,580	**22.92**	104.0	3.00	79.23	4.81	0.00	0.00	0.00	84.05	0.00
91	2,769	2,771	**22.05**	104.0	3.00	79.85	5.06	0.00	0.00	0.00	84.91	0.00
92	4,882	4,883	**14.80**	104.0	3.00	84.77	7.38	0.00	0.00	0.00	92.16	0.00
94	11,135	11,136	**3.14**	104.0	3.00	91.93	11.89	0.00	0.00	0.00	103.83	0.00
95	12,200	12,201	**1.77**	104.0	3.00	92.73	12.46	0.00	0.00	0.00	105.19	0.00
97	9,872	9,874	**4.92**	104.0	3.00	90.89	11.16	0.00	0.00	0.00	102.05	0.00
98	11,530	11,531	**2.62**	104.0	3.00	92.24	12.11	0.00	0.00	0.00	104.35	0.00
99	10,701	10,702	**3.73**	104.0	3.00	91.59	11.65	0.00	0.00	0.00	103.23	0.00
100	5,939	5,940	**12.15**	104.0	3.00	86.48	8.34	0.00	0.00	0.00	94.81	0.00
101	12,467	12,468	**1.44**	104.0	3.00	92.92	12.60	0.00	0.00	0.00	105.52	0.00
102	6,812	6,814	**10.24**	104.0	3.00	87.67	9.05	0.00	0.00	0.00	96.72	0.00
103	13,248	13,249	**0.53**	104.0	3.00	93.44	12.99	0.00	0.00	0.00	106.44	0.00
104	6,887	6,889	**10.09**	104.0	3.00	87.76	9.11	0.00	0.00	0.00	96.87	0.00
107	11,118	11,119	**3.16**	104.0	3.00	91.92	11.88	0.00	0.00	0.00	103.80	0.00
108	10,904	10,904	**3.45**	104.0	3.00	91.75	11.76	0.00	0.00	0.00	103.51	0.00
109	2,028	2,030	**25.76**	104.0	3.00	77.15	4.06	0.00	0.00	0.00	81.20	0.00
110	4,516	4,517	**15.84**	104.0	3.00	84.10	7.02	0.00	0.00	0.00	91.12	0.00
111	3,909	3,910	**17.72**	104.0	3.00	82.84	6.39	0.00	0.00	0.00	89.24	0.00
113	11,432	11,433	**2.74**	104.0	3.00	92.16	12.05	0.00	0.00	0.00	104.22	0.00
114	4,580	4,581	**15.65**	104.0	3.00	84.22	7.09	0.00	0.00	0.00	91.31	0.00
115	11,798	11,798	**2.27**	104.0	3.00	92.44	12.25	0.00	0.00	0.00	104.69	0.00
116	8,032	8,033	**7.91**	104.0	3.00	89.10	9.96	0.00	0.00	0.00	99.05	0.00
118	1,552	1,554	**28.80**	104.0	3.00	74.83	3.33	0.00	0.00	0.00	78.16	0.00
119	9,761	9,761	**5.08**	104.0	3.00	90.79	11.09	0.00	0.00	0.00	101.88	0.00
120	12,882	12,883	**0.95**	104.0	3.00	93.20	12.81	0.00	0.00	0.00	106.01	0.00
121	9,451	9,452	**5.55**	104.0	3.00	90.51	10.90	0.00	0.00	0.00	101.41	0.00
125	3,258	3,259	**20.04**	104.0	3.00	81.26	5.66	0.00	0.00	0.00	86.92	0.00
126	4,758	4,759	**15.15**	104.0	3.00	84.55	7.26	0.00	0.00	0.00	91.81	0.00
127	4,518	4,520	**15.83**	104.0	3.00	84.10	7.03	0.00	0.00	0.00	91.13	0.00
128	4,245	4,247	**16.65**	104.0	3.00	83.56	6.75	0.00	0.00	0.00	90.31	0.00
129	9,810	9,810	**5.01**	104.0	3.00	90.83	11.12	0.00	0.00	0.00	101.95	0.00
130	9,870	9,870	**4.92**	104.0	3.00	90.89	11.16	0.00	0.00	0.00	102.04	0.00
131	10,317	10,318	**4.27**	104.0	3.00	91.27	11.42	0.00	0.00	0.00	102.69	0.00
132	10,692	10,693	**3.74**	104.0	3.00	91.58	11.64	0.00	0.00	0.00	103.22	0.00
133	5,943	5,944	**12.14**	104.0	3.00	86.48	8.34	0.00	0.00	0.00	94.82	0.00
134	11,568	11,569	**2.57**	104.0	3.00	92.27	12.13	0.00	0.00	0.00	104.39	0.00
141	9,701	9,702	**5.17**	104.0	3.00	90.74	11.05	0.00	0.00	0.00	101.79	0.00
142	7,088	7,090	**9.68**	104.0	3.00	88.01	9.27	0.00	0.00	0.00	97.28	0.00
143	10,265	10,267	**4.34**	104.0	3.00	91.23	11.39	0.00	0.00	0.00	102.62	0.00
144	6,001	6,002	**12.00**	104.0	3.00	86.57	8.39	0.00	0.00	0.00	94.96	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	3,031	3,033	**20.94**	104.0	3.00	80.64	5.39	0.00	0.00	0.00	86.02	0.00
146	3,311	3,312	**19.84**	104.0	3.00	81.40	5.72	0.00	0.00	0.00	87.12	0.00
Sum	42.49											

Noise sensitive area: H13 H13

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	12,359	12,360	**1.58**	104.0	3.00	92.84	12.55	0.00	0.00	0.00	105.39	0.00
2	12,125	12,125	**1.86**	104.0	3.00	92.67	12.42	0.00	0.00	0.00	105.10	0.00
3	11,534	11,535	**2.61**	104.0	3.00	92.24	12.11	0.00	0.00	0.00	104.35	0.00
4	10,178	10,178	**4.47**	104.0	3.00	91.15	11.34	0.00	0.00	0.00	102.49	0.00
5	10,260	10,260	**4.35**	104.0	3.00	91.22	11.39	0.00	0.00	0.00	102.61	0.00
6	11,012	11,013	**3.30**	104.0	3.00	91.84	11.82	0.00	0.00	0.00	103.66	0.00
7	9,493	9,494	**5.49**	104.0	3.00	90.55	10.92	0.00	0.00	0.00	101.47	0.00
8	13,010	13,010	**0.80**	104.0	3.00	93.29	12.87	0.00	0.00	0.00	106.16	0.00
9	11,912	11,912	**2.13**	104.0	3.00	92.52	12.31	0.00	0.00	0.00	104.83	0.00
10	11,887	11,888	**2.16**	104.0	3.00	92.50	12.30	0.00	0.00	0.00	104.80	0.00
11	13,484	13,485	**0.26**	104.0	3.00	93.60	13.11	0.00	0.00	0.00	106.70	0.00
12	13,268	13,269	**0.50**	104.0	3.00	93.46	13.00	0.00	0.00	0.00	106.46	0.00
13	12,806	12,807	**1.04**	104.0	3.00	93.15	12.77	0.00	0.00	0.00	105.92	0.00
14	12,430	12,431	**1.49**	104.0	3.00	92.89	12.58	0.00	0.00	0.00	105.47	0.00
15	11,595	11,596	**2.53**	104.0	3.00	92.29	12.14	0.00	0.00	0.00	104.43	0.00
16	11,214	11,215	**3.03**	104.0	3.00	92.00	11.93	0.00	0.00	0.00	103.93	0.00
17	13,719	13,720	**0.00**	104.0	3.00	93.75	13.22	0.00	0.00	0.00	106.97	0.00
18	13,929	13,930	**-0.23**	104.0	3.00	93.88	13.32	0.00	0.00	0.00	107.20	0.00
19	12,745	12,746	**1.11**	104.0	3.00	93.11	12.74	0.00	0.00	0.00	105.85	0.00
20	11,653	11,654	**2.46**	104.0	3.00	92.33	12.17	0.00	0.00	0.00	104.50	0.00
21	9,670	9,670	**5.22**	104.0	3.00	90.71	11.03	0.00	0.00	0.00	101.74	0.00
22	9,034	9,034	**6.21**	104.0	3.00	90.12	10.63	0.00	0.00	0.00	100.75	0.00
23	8,649	8,649	**6.84**	104.0	3.00	89.74	10.38	0.00	0.00	0.00	100.12	0.00
24	9,282	9,282	**5.82**	104.0	3.00	90.35	10.79	0.00	0.00	0.00	101.14	0.00
25	6,795	6,795	**10.28**	104.0	3.00	87.64	9.04	0.00	0.00	0.00	96.68	0.00
26	9,463	9,463	**5.54**	104.0	3.00	90.52	10.90	0.00	0.00	0.00	101.42	0.00
27	7,514	7,515	**8.86**	104.0	3.00	88.52	9.58	0.00	0.00	0.00	98.10	0.00
28	8,286	8,287	**7.46**	104.0	3.00	89.37	10.13	0.00	0.00	0.00	99.50	0.00
29	8,487	8,487	**7.12**	104.0	3.00	89.58	10.27	0.00	0.00	0.00	99.84	0.00
30	8,188	8,189	**7.63**	104.0	3.00	89.26	10.06	0.00	0.00	0.00	99.33	0.00
31	8,907	8,907	**6.42**	104.0	3.00	89.99	10.55	0.00	0.00	0.00	100.54	0.00
32	6,498	6,499	**10.90**	104.0	3.00	87.26	8.80	0.00	0.00	0.00	96.06	0.00
33	7,568	7,568	**8.76**	104.0	3.00	88.58	9.62	0.00	0.00	0.00	98.20	0.00
34	9,160	9,161	**6.01**	104.0	3.00	90.24	10.71	0.00	0.00	0.00	100.95	0.00
35	9,786	9,787	**5.04**	104.0	3.00	90.81	11.10	0.00	0.00	0.00	101.92	0.00
36	10,086	10,087	**4.60**	104.0	3.00	91.07	11.29	0.00	0.00	0.00	102.36	0.00
37	8,849	8,850	**6.51**	104.0	3.00	89.94	10.51	0.00	0.00	0.00	100.45	0.00
38	7,099	7,099	**9.66**	104.0	3.00	88.02	9.27	0.00	0.00	0.00	97.30	0.00
39	7,351	7,352	**9.17**	104.0	3.00	88.33	9.46	0.00	0.00	0.00	97.79	0.00
40	8,878	8,878	**6.47**	104.0	3.00	89.97	10.53	0.00	0.00	0.00	100.50	0.00
41	7,468	7,470	**8.95**	104.0	3.00	88.47	9.55	0.00	0.00	0.00	98.02	0.00
43	8,499	8,500	**7.10**	104.0	3.00	89.59	10.28	0.00	0.00	0.00	99.87	0.00
44	7,540	7,541	**8.81**	104.0	3.00	88.55	9.60	0.00	0.00	0.00	98.15	0.00
45	7,241	7,242	**9.38**	104.0	3.00	88.20	9.38	0.00	0.00	0.00	97.58	0.00
46	8,581	8,582	**6.96**	104.0	3.00	89.67	10.33	0.00	0.00	0.00	100.00	0.00
48	5,847	5,847	**12.36**	104.0	3.00	86.34	8.26	0.00	0.00	0.00	94.60	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	5,705	5,706	**12.70**	104.0	3.00	86.13	8.14	0.00	0.00	0.00	94.26	0.00
50	10,259	10,259	**4.35**	104.0	3.00	91.22	11.39	0.00	0.00	0.00	102.61	0.00
51	6,182	6,183	**11.60**	104.0	3.00	86.82	8.54	0.00	0.00	0.00	95.37	0.00
52	6,498	6,498	**10.90**	104.0	3.00	87.26	8.80	0.00	0.00	0.00	96.06	0.00
53	5,371	5,372	**13.52**	104.0	3.00	85.60	7.84	0.00	0.00	0.00	93.44	0.00
55	3,882	3,883	**17.81**	104.0	3.00	82.78	6.37	0.00	0.00	0.00	89.15	0.00
56	3,574	3,575	**18.87**	104.0	3.00	82.07	6.02	0.00	0.00	0.00	88.09	0.00
57	3,709	3,709	**18.40**	104.0	3.00	82.39	6.17	0.00	0.00	0.00	88.56	0.00
58	7,202	7,202	**9.46**	104.0	3.00	88.15	9.35	0.00	0.00	0.00	97.50	0.00
59	3,262	3,263	**20.02**	104.0	3.00	81.27	5.66	0.00	0.00	0.00	86.94	0.00
60	1,882	1,884	**26.62**	104.0	3.00	76.50	3.84	0.00	0.00	0.00	80.35	0.00
61	1,541	1,544	**28.87**	104.0	3.00	74.77	3.32	0.00	0.00	0.00	78.09	0.00
62	3,089	3,090	**20.71**	104.0	3.00	80.80	5.46	0.00	0.00	0.00	86.26	0.00
63	3,861	3,863	**17.88**	104.0	3.00	82.74	6.34	0.00	0.00	0.00	89.08	0.00
64	4,257	4,258	**16.61**	104.0	3.00	83.58	6.76	0.00	0.00	0.00	90.35	0.00
65	4,167	4,168	**16.89**	104.0	3.00	83.40	6.67	0.00	0.00	0.00	90.07	0.00
66	9,188	9,188	**5.97**	104.0	3.00	90.26	10.73	0.00	0.00	0.00	100.99	0.00
67	3,357	3,358	**19.66**	104.0	3.00	81.52	5.78	0.00	0.00	0.00	87.30	0.00
68	3,465	3,466	**19.27**	104.0	3.00	81.80	5.90	0.00	0.00	0.00	87.70	0.00
69	4,366	4,368	**16.28**	104.0	3.00	83.80	6.87	0.00	0.00	0.00	90.68	0.00
70	12,688	12,688	**1.18**	104.0	3.00	93.07	12.71	0.00	0.00	0.00	105.78	0.00
71	11,582	11,583	**2.55**	104.0	3.00	92.28	12.14	0.00	0.00	0.00	104.41	0.00
72	10,566	10,566	**3.92**	104.0	3.00	91.48	11.57	0.00	0.00	0.00	103.05	0.00
73	10,674	10,674	**3.77**	104.0	3.00	91.57	11.63	0.00	0.00	0.00	103.20	0.00
74	9,956	9,957	**4.79**	104.0	3.00	90.96	11.21	0.00	0.00	0.00	102.17	0.00
75	8,808	8,808	**6.58**	104.0	3.00	89.90	10.48	0.00	0.00	0.00	100.38	0.00
76	4,497	4,498	**15.89**	104.0	3.00	84.06	7.01	0.00	0.00	0.00	91.07	0.00
77	5,008	5,009	**14.46**	104.0	3.00	84.99	7.50	0.00	0.00	0.00	92.50	0.00
78	11,319	11,320	**2.89**	104.0	3.00	92.08	11.99	0.00	0.00	0.00	104.07	0.00
80	2,276	2,278	**24.40**	104.0	3.00	78.15	4.41	0.00	0.00	0.00	82.56	0.00
81	13,021	13,022	**0.79**	104.0	3.00	93.29	12.88	0.00	0.00	0.00	106.17	0.00
82	6,976	6,977	**9.91**	104.0	3.00	87.87	9.18	0.00	0.00	0.00	97.05	0.00
83	3,614	3,616	**18.73**	104.0	3.00	82.16	6.07	0.00	0.00	0.00	88.23	0.00
85	5,726	5,727	**12.65**	104.0	3.00	86.16	8.15	0.00	0.00	0.00	94.31	0.00
86	2,560	2,562	**23.00**	104.0	3.00	79.17	4.79	0.00	0.00	0.00	83.96	0.00
87	4,152	4,153	**16.94**	104.0	3.00	83.37	6.65	0.00	0.00	0.00	90.02	0.00
89	4,071	4,072	**17.20**	104.0	3.00	83.20	6.57	0.00	0.00	0.00	89.76	0.00
90	3,534	3,535	**19.01**	104.0	3.00	81.97	5.98	0.00	0.00	0.00	87.95	0.00
91	3,413	3,415	**19.45**	104.0	3.00	81.67	5.84	0.00	0.00	0.00	87.51	0.00
92	5,111	5,112	**14.19**	104.0	3.00	85.17	7.60	0.00	0.00	0.00	92.77	0.00
94	12,106	12,107	**1.89**	104.0	3.00	92.66	12.41	0.00	0.00	0.00	105.08	0.00
95	13,167	13,168	**0.62**	104.0	3.00	93.39	12.95	0.00	0.00	0.00	106.34	0.00
97	10,847	10,849	**3.53**	104.0	3.00	91.71	11.73	0.00	0.00	0.00	103.44	0.00
98	12,500	12,501	**1.40**	104.0	3.00	92.94	12.62	0.00	0.00	0.00	105.56	0.00
99	11,636	11,636	**2.48**	104.0	3.00	92.32	12.16	0.00	0.00	0.00	104.48	0.00
100	6,908	6,910	**10.05**	104.0	3.00	87.79	9.13	0.00	0.00	0.00	96.92	0.00
101	13,442	13,443	**0.31**	104.0	3.00	93.57	13.09	0.00	0.00	0.00	106.66	0.00
102	7,782	7,784	**8.36**	104.0	3.00	88.82	9.78	0.00	0.00	0.00	98.60	0.00
103	14,222	14,223	**-0.55**	104.0	3.00	94.06	13.45	0.00	0.00	0.00	107.51	0.00
104	7,863	7,864	**8.21**	104.0	3.00	88.91	9.84	0.00	0.00	0.00	98.75	0.00
107	12,094	12,095	**1.90**	104.0	3.00	92.65	12.41	0.00	0.00	0.00	105.06	0.00
108	11,816	11,816	**2.25**	104.0	3.00	92.45	12.26	0.00	0.00	0.00	104.71	0.00
109	2,948	2,949	**21.28**	104.0	3.00	80.39	5.28	0.00	0.00	0.00	85.68	0.00
110	5,487	5,488	**13.23**	104.0	3.00	85.79	7.94	0.00	0.00	0.00	93.73	0.00
111	4,883	4,884	**14.80**	104.0	3.00	84.78	7.38	0.00	0.00	0.00	92.16	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Calculated:
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DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	12,407	12,408	**1.52**	104.0	3.00	92.87	12.57	0.00	0.00	0.00	105.44	0.00
114	5,427	5,427	**13.38**	104.0	3.00	85.69	7.89	0.00	0.00	0.00	93.58	0.00
115	12,753	12,754	**1.10**	104.0	3.00	93.11	12.75	0.00	0.00	0.00	105.86	0.00
116	9,006	9,007	**6.26**	104.0	3.00	90.09	10.61	0.00	0.00	0.00	100.70	0.00
118	2,463	2,464	**23.47**	104.0	3.00	78.83	4.66	0.00	0.00	0.00	83.49	0.00
119	10,728	10,729	**3.69**	104.0	3.00	91.61	11.66	0.00	0.00	0.00	103.27	0.00
120	13,857	13,858	**-0.16**	104.0	3.00	93.83	13.28	0.00	0.00	0.00	107.12	0.00
121	10,424	10,425	**4.12**	104.0	3.00	91.36	11.49	0.00	0.00	0.00	102.85	0.00
125	3,725	3,727	**18.34**	104.0	3.00	82.43	6.19	0.00	0.00	0.00	88.62	0.00
126	5,708	5,709	**12.69**	104.0	3.00	86.13	8.14	0.00	0.00	0.00	94.27	0.00
127	5,467	5,468	**13.28**	104.0	3.00	85.76	7.93	0.00	0.00	0.00	93.68	0.00
128	5,198	5,199	**13.96**	104.0	3.00	85.32	7.68	0.00	0.00	0.00	93.00	0.00
129	10,774	10,775	**3.63**	104.0	3.00	91.65	11.69	0.00	0.00	0.00	103.34	0.00
130	10,823	10,824	**3.56**	104.0	3.00	91.69	11.72	0.00	0.00	0.00	103.40	0.00
131	11,271	11,272	**2.96**	104.0	3.00	92.04	11.97	0.00	0.00	0.00	104.01	0.00
132	11,649	11,649	**2.46**	104.0	3.00	92.33	12.17	0.00	0.00	0.00	104.50	0.00
133	6,918	6,919	**10.03**	104.0	3.00	87.80	9.13	0.00	0.00	0.00	96.94	0.00
134	12,544	12,544	**1.35**	104.0	3.00	92.97	12.64	0.00	0.00	0.00	105.61	0.00
141	10,675	10,676	**3.76**	104.0	3.00	91.57	11.63	0.00	0.00	0.00	103.20	0.00
142	8,060	8,061	**7.86**	104.0	3.00	89.13	9.98	0.00	0.00	0.00	99.10	0.00
143	11,240	11,241	**3.00**	104.0	3.00	92.02	11.95	0.00	0.00	0.00	103.97	0.00
144	6,962	6,963	**9.94**	104.0	3.00	87.86	9.17	0.00	0.00	0.00	97.02	0.00
145	3,994	3,995	**17.45**	104.0	3.00	83.03	6.49	0.00	0.00	0.00	89.52	0.00
146	4,279	4,280	**16.55**	104.0	3.00	83.63	6.79	0.00	0.00	0.00	90.41	0.00

Sum 36.05

Noise sensitive area: H14 H14

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	13,849	13,849	**-0.15**	104.0	3.00	93.83	13.28	0.00	0.00	0.00	107.11	0.00
2	13,612	13,612	**0.12**	104.0	3.00	93.68	13.17	0.00	0.00	0.00	106.85	0.00
3	13,021	13,021	**0.79**	104.0	3.00	93.29	12.88	0.00	0.00	0.00	106.17	0.00
4	11,651	11,652	**2.46**	104.0	3.00	92.33	12.17	0.00	0.00	0.00	104.50	0.00
5	11,746	11,746	**2.34**	104.0	3.00	92.40	12.22	0.00	0.00	0.00	104.62	0.00
6	12,500	12,501	**1.41**	104.0	3.00	92.94	12.62	0.00	0.00	0.00	105.56	0.00
7	10,976	10,977	**3.35**	104.0	3.00	91.81	11.80	0.00	0.00	0.00	103.61	0.00
8	14,499	14,499	**-0.85**	104.0	3.00	94.23	13.58	0.00	0.00	0.00	107.81	0.00
9	13,402	13,402	**0.35**	104.0	3.00	93.54	13.07	0.00	0.00	0.00	106.61	0.00
10	13,376	13,377	**0.38**	104.0	3.00	93.53	13.05	0.00	0.00	0.00	106.58	0.00
11	14,970	14,971	**-1.34**	104.0	3.00	94.50	13.79	0.00	0.00	0.00	108.30	0.00
12	14,755	14,755	**-1.11**	104.0	3.00	94.38	13.70	0.00	0.00	0.00	108.08	0.00
13	14,292	14,293	**-0.63**	104.0	3.00	94.10	13.49	0.00	0.00	0.00	107.59	0.00
14	13,913	13,914	**-0.22**	104.0	3.00	93.87	13.31	0.00	0.00	0.00	107.18	0.00
15	13,079	13,080	**0.72**	104.0	3.00	93.33	12.91	0.00	0.00	0.00	106.24	0.00
16	12,700	12,700	**1.17**	104.0	3.00	93.08	12.72	0.00	0.00	0.00	105.80	0.00
17	15,205	15,206	**-1.58**	104.0	3.00	94.64	13.90	0.00	0.00	0.00	108.54	0.00
18	15,413	15,413	**-1.78**	104.0	3.00	94.76	13.99	0.00	0.00	0.00	108.75	0.00
19	14,226	14,227	**-0.56**	104.0	3.00	94.06	13.46	0.00	0.00	0.00	107.52	0.00
20	13,130	13,131	**0.66**	104.0	3.00	93.37	12.93	0.00	0.00	0.00	106.30	0.00
21	11,153	11,154	**3.11**	104.0	3.00	91.95	11.90	0.00	0.00	0.00	103.85	0.00
22	10,508	10,508	**4.00**	104.0	3.00	91.43	11.53	0.00	0.00	0.00	102.96	0.00
23	10,123	10,123	**4.55**	104.0	3.00	91.11	11.31	0.00	0.00	0.00	102.41	0.00
24	10,756	10,756	**3.65**	104.0	3.00	91.63	11.68	0.00	0.00	0.00	103.31	0.00

To be continued on next page...

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20102130 - Merricourt ND Enxco

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DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	8,285	8,285	**7.46**	104.0	3.00	89.37	10.13	0.00	0.00	0.00	99.50	0.00
26	10,953	10,953	**3.38**	104.0	3.00	91.79	11.79	0.00	0.00	0.00	103.58	0.00
27	9,001	9,001	**6.27**	104.0	3.00	90.09	10.61	0.00	0.00	0.00	100.70	0.00
28	9,762	9,762	**5.08**	104.0	3.00	90.79	11.09	0.00	0.00	0.00	101.88	0.00
29	9,972	9,972	**4.77**	104.0	3.00	90.98	11.22	0.00	0.00	0.00	102.19	0.00
30	9,664	9,664	**5.23**	104.0	3.00	90.70	11.03	0.00	0.00	0.00	101.73	0.00
31	10,359	10,359	**4.21**	104.0	3.00	91.31	11.45	0.00	0.00	0.00	102.75	0.00
32	7,987	7,988	**7.99**	104.0	3.00	89.05	9.92	0.00	0.00	0.00	98.97	0.00
33	9,045	9,045	**6.20**	104.0	3.00	90.13	10.64	0.00	0.00	0.00	100.77	0.00
34	10,643	10,643	**3.81**	104.0	3.00	91.54	11.61	0.00	0.00	0.00	103.15	0.00
35	11,271	11,272	**2.96**	104.0	3.00	92.04	11.97	0.00	0.00	0.00	104.01	0.00
36	11,571	11,572	**2.56**	104.0	3.00	92.27	12.13	0.00	0.00	0.00	104.40	0.00
37	10,330	10,331	**4.25**	104.0	3.00	91.28	11.43	0.00	0.00	0.00	102.71	0.00
38	8,587	8,587	**6.95**	104.0	3.00	89.68	10.34	0.00	0.00	0.00	100.01	0.00
39	8,822	8,823	**6.56**	104.0	3.00	89.91	10.49	0.00	0.00	0.00	100.41	0.00
40	10,293	10,294	**4.30**	104.0	3.00	91.25	11.41	0.00	0.00	0.00	102.66	0.00
41	8,929	8,930	**6.38**	104.0	3.00	90.02	10.56	0.00	0.00	0.00	100.58	0.00
43	9,971	9,972	**4.77**	104.0	3.00	90.98	11.22	0.00	0.00	0.00	102.19	0.00
44	8,981	8,982	**6.30**	104.0	3.00	90.07	10.60	0.00	0.00	0.00	100.66	0.00
45	8,679	8,680	**6.79**	104.0	3.00	89.77	10.40	0.00	0.00	0.00	100.17	0.00
46	10,020	10,021	**4.70**	104.0	3.00	91.02	11.25	0.00	0.00	0.00	102.26	0.00
48	7,336	7,337	**9.20**	104.0	3.00	88.31	9.45	0.00	0.00	0.00	97.76	0.00
49	7,180	7,180	**9.51**	104.0	3.00	88.12	9.33	0.00	0.00	0.00	97.46	0.00
50	11,749	11,749	**2.34**	104.0	3.00	92.40	12.23	0.00	0.00	0.00	104.63	0.00
51	7,657	7,657	**8.59**	104.0	3.00	88.68	9.69	0.00	0.00	0.00	98.37	0.00
52	7,972	7,972	**8.02**	104.0	3.00	89.03	9.91	0.00	0.00	0.00	98.95	0.00
53	6,846	6,846	**10.17**	104.0	3.00	87.71	9.08	0.00	0.00	0.00	96.79	0.00
55	5,361	5,362	**13.55**	104.0	3.00	85.59	7.83	0.00	0.00	0.00	93.42	0.00
56	5,053	5,054	**14.34**	104.0	3.00	85.07	7.55	0.00	0.00	0.00	92.62	0.00
57	5,197	5,197	**13.97**	104.0	3.00	85.32	7.68	0.00	0.00	0.00	92.99	0.00
58	8,689	8,690	**6.78**	104.0	3.00	89.78	10.40	0.00	0.00	0.00	100.18	0.00
59	4,742	4,743	**15.19**	104.0	3.00	84.52	7.25	0.00	0.00	0.00	91.77	0.00
60	3,369	3,370	**19.62**	104.0	3.00	81.55	5.79	0.00	0.00	0.00	87.34	0.00
61	3,022	3,023	**20.98**	104.0	3.00	80.61	5.38	0.00	0.00	0.00	85.98	0.00
62	4,277	4,278	**16.55**	104.0	3.00	83.63	6.78	0.00	0.00	0.00	90.41	0.00
63	4,808	4,809	**15.01**	104.0	3.00	84.64	7.31	0.00	0.00	0.00	91.95	0.00
64	4,799	4,799	**15.03**	104.0	3.00	84.62	7.30	0.00	0.00	0.00	91.93	0.00
65	4,514	4,515	**15.85**	104.0	3.00	84.09	7.02	0.00	0.00	0.00	91.12	0.00
66	10,605	10,606	**3.86**	104.0	3.00	91.51	11.59	0.00	0.00	0.00	103.10	0.00
67	3,920	3,921	**17.69**	104.0	3.00	82.87	6.41	0.00	0.00	0.00	89.28	0.00
68	3,817	3,818	**18.03**	104.0	3.00	82.64	6.29	0.00	0.00	0.00	88.93	0.00
69	4,747	4,748	**15.18**	104.0	3.00	84.53	7.25	0.00	0.00	0.00	91.78	0.00
70	14,156	14,156	**-0.48**	104.0	3.00	94.02	13.42	0.00	0.00	0.00	107.44	0.00
71	13,072	13,072	**0.73**	104.0	3.00	93.33	12.90	0.00	0.00	0.00	106.23	0.00
72	12,040	12,041	**1.97**	104.0	3.00	92.61	12.38	0.00	0.00	0.00	104.99	0.00
73	12,162	12,163	**1.82**	104.0	3.00	92.70	12.44	0.00	0.00	0.00	105.14	0.00
74	11,446	11,447	**2.73**	104.0	3.00	92.17	12.06	0.00	0.00	0.00	104.24	0.00
75	10,298	10,298	**4.30**	104.0	3.00	91.25	11.41	0.00	0.00	0.00	102.67	0.00
76	5,978	5,978	**12.06**	104.0	3.00	86.53	8.37	0.00	0.00	0.00	94.90	0.00
77	6,497	6,497	**10.91**	104.0	3.00	87.25	8.80	0.00	0.00	0.00	96.06	0.00
78	12,792	12,793	**1.06**	104.0	3.00	93.14	12.77	0.00	0.00	0.00	105.90	0.00
80	3,763	3,764	**18.21**	104.0	3.00	82.51	6.24	0.00	0.00	0.00	88.75	0.00
81	14,501	14,502	**-0.85**	104.0	3.00	94.23	13.58	0.00	0.00	0.00	107.81	0.00
82	8,454	8,454	**7.17**	104.0	3.00	89.54	10.25	0.00	0.00	0.00	99.79	0.00
83	4,401	4,401	**16.18**	104.0	3.00	83.87	6.91	0.00	0.00	0.00	90.78	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	7,159	7,159	**9.55**	104.0	3.00	88.10	9.32	0.00	0.00	0.00	97.42	0.00
86	4,049	4,050	**17.27**	104.0	3.00	83.15	6.54	0.00	0.00	0.00	89.69	0.00
87	4,421	4,422	**16.12**	104.0	3.00	83.91	6.93	0.00	0.00	0.00	90.84	0.00
89	4,759	4,760	**15.14**	104.0	3.00	84.55	7.26	0.00	0.00	0.00	91.82	0.00
90	4,969	4,969	**14.57**	104.0	3.00	84.93	7.47	0.00	0.00	0.00	92.39	0.00
91	4,502	4,503	**15.88**	104.0	3.00	84.07	7.01	0.00	0.00	0.00	91.08	0.00
92	5,569	5,569	**13.03**	104.0	3.00	85.92	8.02	0.00	0.00	0.00	93.93	0.00
94	13,593	13,594	**0.14**	104.0	3.00	93.67	13.16	0.00	0.00	0.00	106.83	0.00
95	14,657	14,657	**-1.01**	104.0	3.00	94.32	13.65	0.00	0.00	0.00	107.97	0.00
97	12,327	12,328	**1.61**	104.0	3.00	92.82	12.53	0.00	0.00	0.00	105.35	0.00
98	13,989	13,989	**-0.30**	104.0	3.00	93.92	13.35	0.00	0.00	0.00	107.26	0.00
99	13,116	13,116	**0.68**	104.0	3.00	93.36	12.93	0.00	0.00	0.00	106.28	0.00
100	8,358	8,359	**7.34**	104.0	3.00	89.44	10.18	0.00	0.00	0.00	99.63	0.00
101	14,923	14,924	**-1.29**	104.0	3.00	94.48	13.77	0.00	0.00	0.00	108.25	0.00
102	9,233	9,234	**5.89**	104.0	3.00	90.31	10.76	0.00	0.00	0.00	101.07	0.00
103	15,706	15,707	**-2.08**	104.0	3.00	94.92	14.12	0.00	0.00	0.00	109.04	0.00
104	9,332	9,333	**5.74**	104.0	3.00	90.40	10.82	0.00	0.00	0.00	101.22	0.00
107	13,571	13,572	**0.16**	104.0	3.00	93.65	13.15	0.00	0.00	0.00	106.80	0.00
108	13,281	13,281	**0.49**	104.0	3.00	93.46	13.01	0.00	0.00	0.00	106.47	0.00
109	4,430	4,431	**16.09**	104.0	3.00	83.93	6.94	0.00	0.00	0.00	90.87	0.00
110	6,974	6,975	**9.91**	104.0	3.00	87.87	9.18	0.00	0.00	0.00	97.05	0.00
111	6,367	6,368	**11.19**	104.0	3.00	87.08	8.70	0.00	0.00	0.00	95.78	0.00
113	13,886	13,887	**-0.19**	104.0	3.00	93.85	13.30	0.00	0.00	0.00	107.15	0.00
114	6,857	6,858	**10.15**	104.0	3.00	87.72	9.09	0.00	0.00	0.00	96.81	0.00
115	14,242	14,243	**-0.57**	104.0	3.00	94.07	13.46	0.00	0.00	0.00	107.54	0.00
116	10,468	10,469	**4.05**	104.0	3.00	91.40	11.51	0.00	0.00	0.00	102.91	0.00
118	3,945	3,946	**17.61**	104.0	3.00	82.92	6.43	0.00	0.00	0.00	89.35	0.00
119	12,217	12,218	**1.75**	104.0	3.00	92.74	12.47	0.00	0.00	0.00	105.21	0.00
120	15,337	15,337	**-1.71**	104.0	3.00	94.72	13.96	0.00	0.00	0.00	108.67	0.00
121	11,910	11,911	**2.13**	104.0	3.00	92.52	12.31	0.00	0.00	0.00	104.83	0.00
125	4,590	4,591	**15.63**	104.0	3.00	84.24	7.10	0.00	0.00	0.00	91.34	0.00
126	7,121	7,122	**9.62**	104.0	3.00	88.05	9.29	0.00	0.00	0.00	97.34	0.00
127	6,878	6,879	**10.11**	104.0	3.00	87.75	9.10	0.00	0.00	0.00	96.85	0.00
128	6,618	6,619	**10.65**	104.0	3.00	87.42	8.90	0.00	0.00	0.00	96.32	0.00
129	12,207	12,207	**1.76**	104.0	3.00	92.73	12.47	0.00	0.00	0.00	105.20	0.00
130	12,231	12,231	**1.73**	104.0	3.00	92.75	12.48	0.00	0.00	0.00	105.23	0.00
131	12,678	12,678	**1.19**	104.0	3.00	93.06	12.71	0.00	0.00	0.00	105.77	0.00
132	13,062	13,062	**0.74**	104.0	3.00	93.32	12.90	0.00	0.00	0.00	106.22	0.00
133	8,397	8,397	**7.27**	104.0	3.00	89.48	10.21	0.00	0.00	0.00	99.69	0.00
134	14,016	14,017	**-0.33**	104.0	3.00	93.93	13.36	0.00	0.00	0.00	107.29	0.00
141	12,157	12,158	**1.82**	104.0	3.00	92.70	12.44	0.00	0.00	0.00	105.14	0.00
142	9,513	9,514	**5.46**	104.0	3.00	90.57	10.94	0.00	0.00	0.00	101.50	0.00
143	12,721	12,722	**1.14**	104.0	3.00	93.09	12.73	0.00	0.00	0.00	105.82	0.00
144	8,391	8,392	**7.28**	104.0	3.00	89.48	10.20	0.00	0.00	0.00	99.68	0.00
145	5,436	5,437	**13.36**	104.0	3.00	85.71	7.90	0.00	0.00	0.00	93.60	0.00
146	5,732	5,732	**12.64**	104.0	3.00	86.17	8.16	0.00	0.00	0.00	94.33	0.00
Sum	31.62											

Noise sensitive area: H15 H15

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	16,854	16,855	**-3.17**	104.0	3.00	95.53	14.60	0.00	0.00	0.00	110.13	0.00
2	16,618	16,619	**-2.95**	104.0	3.00	95.41	14.50	0.00	0.00	0.00	109.91	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	16,027	16,028	**-2.39**	104.0	3.00	95.10	14.25	0.00	0.00	0.00	109.35	0.00
4	14,651	14,652	**-1.01**	104.0	3.00	94.32	13.65	0.00	0.00	0.00	107.97	0.00
5	14,752	14,753	**-1.11**	104.0	3.00	94.38	13.70	0.00	0.00	0.00	108.07	0.00
6	15,507	15,507	**-1.88**	104.0	3.00	94.81	14.03	0.00	0.00	0.00	108.84	0.00
7	13,957	13,958	**-0.27**	104.0	3.00	93.90	13.33	0.00	0.00	0.00	107.23	0.00
8	17,505	17,505	**-3.76**	104.0	3.00	95.86	14.86	0.00	0.00	0.00	110.72	0.00
9	16,405	16,405	**-2.75**	104.0	3.00	95.30	14.41	0.00	0.00	0.00	109.71	0.00
10	16,371	16,371	**-2.72**	104.0	3.00	95.28	14.40	0.00	0.00	0.00	109.68	0.00
11	17,955	17,956	**-4.16**	104.0	3.00	96.08	15.03	0.00	0.00	0.00	111.12	0.00
12	17,742	17,742	**-3.97**	104.0	3.00	95.98	14.95	0.00	0.00	0.00	110.93	0.00
13	17,275	17,276	**-3.55**	104.0	3.00	95.75	14.77	0.00	0.00	0.00	110.51	0.00
14	16,892	16,892	**-3.20**	104.0	3.00	95.55	14.61	0.00	0.00	0.00	110.16	0.00
15	16,059	16,060	**-2.42**	104.0	3.00	95.12	14.27	0.00	0.00	0.00	109.38	0.00
16	15,685	15,685	**-2.05**	104.0	3.00	94.91	14.11	0.00	0.00	0.00	109.02	0.00
17	18,189	18,190	**-4.36**	104.0	3.00	96.20	15.12	0.00	0.00	0.00	111.32	0.00
18	18,391	18,391	**-4.53**	104.0	3.00	96.29	15.20	0.00	0.00	0.00	111.49	0.00
19	17,198	17,199	**-3.48**	104.0	3.00	95.71	14.73	0.00	0.00	0.00	110.44	0.00
20	16,094	16,095	**-2.45**	104.0	3.00	95.13	14.28	0.00	0.00	0.00	109.41	0.00
21	14,160	14,160	**-0.48**	104.0	3.00	94.02	13.43	0.00	0.00	0.00	107.45	0.00
22	13,509	13,509	**0.23**	104.0	3.00	93.61	13.12	0.00	0.00	0.00	106.73	0.00
23	13,124	13,124	**0.67**	104.0	3.00	93.36	12.93	0.00	0.00	0.00	106.29	0.00
24	13,756	13,757	**-0.04**	104.0	3.00	93.77	13.24	0.00	0.00	0.00	107.01	0.00
25	11,285	11,285	**2.94**	104.0	3.00	92.05	11.97	0.00	0.00	0.00	104.02	0.00
26	13,955	13,955	**-0.26**	104.0	3.00	93.89	13.33	0.00	0.00	0.00	107.22	0.00
27	11,990	11,990	**2.03**	104.0	3.00	92.58	12.35	0.00	0.00	0.00	104.93	0.00
28	12,727	12,727	**1.13**	104.0	3.00	93.09	12.73	0.00	0.00	0.00	105.83	0.00
29	12,979	12,979	**0.84**	104.0	3.00	93.26	12.86	0.00	0.00	0.00	106.12	0.00
30	12,666	12,666	**1.21**	104.0	3.00	93.05	12.70	0.00	0.00	0.00	105.75	0.00
31	13,340	13,341	**0.42**	104.0	3.00	93.50	13.04	0.00	0.00	0.00	106.54	0.00
32	10,993	10,993	**3.33**	104.0	3.00	91.82	11.81	0.00	0.00	0.00	103.63	0.00
33	12,048	12,048	**1.96**	104.0	3.00	92.62	12.38	0.00	0.00	0.00	105.00	0.00
34	13,622	13,622	**0.10**	104.0	3.00	93.69	13.17	0.00	0.00	0.00	106.86	0.00
35	14,254	14,254	**-0.59**	104.0	3.00	94.08	13.47	0.00	0.00	0.00	107.55	0.00
36	14,556	14,557	**-0.91**	104.0	3.00	94.26	13.61	0.00	0.00	0.00	107.87	0.00
37	13,307	13,307	**0.46**	104.0	3.00	93.48	13.02	0.00	0.00	0.00	106.50	0.00
38	11,580	11,581	**2.55**	104.0	3.00	92.27	12.13	0.00	0.00	0.00	104.41	0.00
39	11,780	11,781	**2.30**	104.0	3.00	92.42	12.24	0.00	0.00	0.00	104.67	0.00
40	13,152	13,153	**0.64**	104.0	3.00	93.38	12.94	0.00	0.00	0.00	106.32	0.00
41	11,868	11,868	**2.19**	104.0	3.00	92.49	12.29	0.00	0.00	0.00	104.78	0.00
43	12,930	12,931	**0.89**	104.0	3.00	93.23	12.83	0.00	0.00	0.00	106.07	0.00
44	11,888	11,889	**2.16**	104.0	3.00	92.50	12.30	0.00	0.00	0.00	104.80	0.00
45	11,583	11,584	**2.55**	104.0	3.00	92.28	12.14	0.00	0.00	0.00	104.41	0.00
46	12,919	12,920	**0.91**	104.0	3.00	93.22	12.83	0.00	0.00	0.00	106.05	0.00
48	10,335	10,336	**4.24**	104.0	3.00	91.29	11.43	0.00	0.00	0.00	102.72	0.00
49	10,182	10,182	**4.46**	104.0	3.00	91.16	11.34	0.00	0.00	0.00	102.50	0.00
50	14,749	14,749	**-1.11**	104.0	3.00	94.38	13.69	0.00	0.00	0.00	108.07	0.00
51	10,659	10,659	**3.79**	104.0	3.00	91.55	11.62	0.00	0.00	0.00	103.18	0.00
52	10,974	10,974	**3.35**	104.0	3.00	91.81	11.80	0.00	0.00	0.00	103.61	0.00
53	9,848	9,849	**4.95**	104.0	3.00	90.87	11.14	0.00	0.00	0.00	102.01	0.00
55	8,366	8,367	**7.32**	104.0	3.00	89.45	10.19	0.00	0.00	0.00	99.64	0.00
56	8,059	8,059	**7.86**	104.0	3.00	89.13	9.97	0.00	0.00	0.00	99.10	0.00
57	8,192	8,193	**7.63**	104.0	3.00	89.27	10.07	0.00	0.00	0.00	99.34	0.00
58	11,696	11,696	**2.40**	104.0	3.00	92.36	12.20	0.00	0.00	0.00	104.56	0.00
59	7,748	7,749	**8.42**	104.0	3.00	88.78	9.75	0.00	0.00	0.00	98.54	0.00
60	6,365	6,366	**11.19**	104.0	3.00	87.08	8.69	0.00	0.00	0.00	95.77	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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3100 DeMers Avenue
US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	6,014	6,014	**11.98**	104.0	3.00	86.58	8.40	0.00	0.00	0.00	94.99	0.00
62	6,973	6,974	**9.92**	104.0	3.00	87.87	9.18	0.00	0.00	0.00	97.05	0.00
63	7,205	7,206	**9.45**	104.0	3.00	88.15	9.35	0.00	0.00	0.00	97.51	0.00
64	6,697	6,697	**10.48**	104.0	3.00	87.52	8.96	0.00	0.00	0.00	96.48	0.00
65	6,196	6,196	**11.56**	104.0	3.00	86.84	8.55	0.00	0.00	0.00	95.40	0.00
66	13,467	13,467	**0.28**	104.0	3.00	93.59	13.10	0.00	0.00	0.00	106.68	0.00
67	5,992	5,992	**12.03**	104.0	3.00	86.55	8.38	0.00	0.00	0.00	94.94	0.00
68	5,651	5,652	**12.83**	104.0	3.00	86.04	8.09	0.00	0.00	0.00	94.13	0.00
69	6,434	6,435	**11.04**	104.0	3.00	87.17	8.75	0.00	0.00	0.00	95.92	0.00
70	17,100	17,100	**-3.39**	104.0	3.00	95.66	14.69	0.00	0.00	0.00	110.35	0.00
71	16,067	16,067	**-2.43**	104.0	3.00	95.12	14.27	0.00	0.00	0.00	109.39	0.00
72	15,041	15,041	**-1.41**	104.0	3.00	94.55	13.83	0.00	0.00	0.00	108.37	0.00
73	15,169	15,169	**-1.54**	104.0	3.00	94.62	13.88	0.00	0.00	0.00	108.50	0.00
74	14,444	14,445	**-0.79**	104.0	3.00	94.19	13.56	0.00	0.00	0.00	107.75	0.00
75	13,302	13,302	**0.47**	104.0	3.00	93.48	13.02	0.00	0.00	0.00	106.50	0.00
76	8,959	8,959	**6.33**	104.0	3.00	90.05	10.58	0.00	0.00	0.00	100.63	0.00
77	9,503	9,503	**5.48**	104.0	3.00	90.56	10.93	0.00	0.00	0.00	101.49	0.00
78	15,748	15,748	**-2.12**	104.0	3.00	94.94	14.13	0.00	0.00	0.00	109.08	0.00
80	6,759	6,760	**10.35**	104.0	3.00	87.60	9.01	0.00	0.00	0.00	96.61	0.00
81	17,472	17,472	**-3.73**	104.0	3.00	95.85	14.84	0.00	0.00	0.00	110.69	0.00
82	11,457	11,457	**2.71**	104.0	3.00	92.18	12.07	0.00	0.00	0.00	104.25	0.00
83	6,657	6,657	**10.57**	104.0	3.00	87.47	8.93	0.00	0.00	0.00	96.40	0.00
85	10,129	10,129	**4.54**	104.0	3.00	91.11	11.31	0.00	0.00	0.00	102.42	0.00
86	7,047	7,048	**9.77**	104.0	3.00	87.96	9.23	0.00	0.00	0.00	97.19	0.00
87	6,011	6,012	**11.98**	104.0	3.00	86.58	8.40	0.00	0.00	0.00	94.98	0.00
89	6,852	6,852	**10.16**	104.0	3.00	87.72	9.08	0.00	0.00	0.00	96.80	0.00
90	7,895	7,896	**8.15**	104.0	3.00	88.95	9.86	0.00	0.00	0.00	98.81	0.00
91	7,080	7,081	**9.70**	104.0	3.00	88.00	9.26	0.00	0.00	0.00	97.26	0.00
92	7,243	7,244	**9.38**	104.0	3.00	88.20	9.38	0.00	0.00	0.00	97.58	0.00
94	16,581	16,582	**-2.91**	104.0	3.00	95.39	14.48	0.00	0.00	0.00	109.88	0.00
95	17,654	17,655	**-3.89**	104.0	3.00	95.94	14.92	0.00	0.00	0.00	110.85	0.00
97	15,298	15,299	**-1.67**	104.0	3.00	94.69	13.94	0.00	0.00	0.00	108.63	0.00
98	16,981	16,981	**-3.28**	104.0	3.00	95.60	14.65	0.00	0.00	0.00	110.25	0.00
99	16,120	16,120	**-2.48**	104.0	3.00	95.15	14.29	0.00	0.00	0.00	109.44	0.00
100	11,283	11,283	**2.94**	104.0	3.00	92.05	11.97	0.00	0.00	0.00	104.02	0.00
101	17,894	17,895	**-4.10**	104.0	3.00	96.05	15.01	0.00	0.00	0.00	111.06	0.00
102	12,155	12,156	**1.83**	104.0	3.00	92.70	12.44	0.00	0.00	0.00	105.14	0.00
103	18,685	18,685	**-4.78**	104.0	3.00	96.43	15.31	0.00	0.00	0.00	111.74	0.00
104	12,287	12,287	**1.66**	104.0	3.00	92.79	12.51	0.00	0.00	0.00	105.30	0.00
107	16,535	16,535	**-2.87**	104.0	3.00	95.37	14.46	0.00	0.00	0.00	109.83	0.00
108	16,273	16,273	**-2.62**	104.0	3.00	95.23	14.36	0.00	0.00	0.00	109.59	0.00
109	7,437	7,437	**9.01**	104.0	3.00	88.43	9.53	0.00	0.00	0.00	97.96	0.00
110	9,967	9,967	**4.78**	104.0	3.00	90.97	11.21	0.00	0.00	0.00	102.19	0.00
111	9,353	9,354	**5.71**	104.0	3.00	90.42	10.84	0.00	0.00	0.00	101.25	0.00
113	16,853	16,854	**-3.17**	104.0	3.00	95.53	14.60	0.00	0.00	0.00	110.13	0.00
114	9,827	9,827	**4.98**	104.0	3.00	90.85	11.13	0.00	0.00	0.00	101.98	0.00
115	17,248	17,249	**-3.53**	104.0	3.00	95.74	14.75	0.00	0.00	0.00	110.49	0.00
116	13,406	13,407	**0.35**	104.0	3.00	93.55	13.07	0.00	0.00	0.00	106.61	0.00
118	6,951	6,952	**9.96**	104.0	3.00	87.84	9.16	0.00	0.00	0.00	97.00	0.00
119	15,215	15,215	**-1.59**	104.0	3.00	94.65	13.90	0.00	0.00	0.00	108.55	0.00
120	18,305	18,305	**-4.46**	104.0	3.00	96.25	15.17	0.00	0.00	0.00	111.42	0.00
121	14,896	14,897	**-1.26**	104.0	3.00	94.46	13.76	0.00	0.00	0.00	108.22	0.00
125	6,914	6,914	**10.04**	104.0	3.00	87.79	9.13	0.00	0.00	0.00	96.93	0.00
126	9,999	9,999	**4.73**	104.0	3.00	91.00	11.23	0.00	0.00	0.00	102.23	0.00
127	9,755	9,756	**5.09**	104.0	3.00	90.79	11.09	0.00	0.00	0.00	101.87	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	9,510	9,511	**5.46**	104.0	3.00	90.56	10.93	0.00	0.00	0.00	101.50	0.00
129	15,087	15,087	**-1.46**	104.0	3.00	94.57	13.85	0.00	0.00	0.00	108.42	0.00
130	15,067	15,068	**-1.44**	104.0	3.00	94.56	13.84	0.00	0.00	0.00	108.40	0.00
131	15,511	15,512	**-1.88**	104.0	3.00	94.81	14.03	0.00	0.00	0.00	108.84	0.00
132	15,905	15,905	**-2.27**	104.0	3.00	95.03	14.20	0.00	0.00	0.00	109.23	0.00
133	11,370	11,370	**2.83**	104.0	3.00	92.12	12.02	0.00	0.00	0.00	104.14	0.00
134	16,970	16,970	**-3.27**	104.0	3.00	95.59	14.64	0.00	0.00	0.00	110.24	0.00
141	15,134	15,135	**-1.50**	104.0	3.00	94.60	13.87	0.00	0.00	0.00	108.47	0.00
142	12,439	12,440	**1.48**	104.0	3.00	92.90	12.59	0.00	0.00	0.00	105.48	0.00
143	15,694	15,694	**-2.06**	104.0	3.00	94.91	14.11	0.00	0.00	0.00	109.03	0.00
144	11,283	11,284	**2.94**	104.0	3.00	92.05	11.97	0.00	0.00	0.00	104.02	0.00
145	8,367	8,368	**7.32**	104.0	3.00	89.45	10.19	0.00	0.00	0.00	99.64	0.00
146	8,674	8,674	**6.80**	104.0	3.00	89.76	10.39	0.00	0.00	0.00	100.16	0.00
Sum	25.88											

Noise sensitive area: H16 H16

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	15,708	15,708	**-2.08**	104.0	3.00	94.92	14.12	0.00	0.00	0.00	109.04	0.00
2	15,497	15,497	**-1.87**	104.0	3.00	94.81	14.03	0.00	0.00	0.00	108.83	0.00
3	14,912	14,912	**-1.28**	104.0	3.00	94.47	13.77	0.00	0.00	0.00	108.24	0.00
4	13,598	13,598	**0.13**	104.0	3.00	93.67	13.16	0.00	0.00	0.00	106.83	0.00
5	13,642	13,642	**0.08**	104.0	3.00	93.70	13.18	0.00	0.00	0.00	106.88	0.00
6	14,376	14,377	**-0.72**	104.0	3.00	94.15	13.53	0.00	0.00	0.00	107.68	0.00
7	12,734	12,735	**1.13**	104.0	3.00	93.10	12.74	0.00	0.00	0.00	105.84	0.00
8	16,361	16,361	**-2.71**	104.0	3.00	95.28	14.39	0.00	0.00	0.00	109.67	0.00
9	15,243	15,243	**-1.61**	104.0	3.00	94.66	13.91	0.00	0.00	0.00	108.58	0.00
10	15,174	15,175	**-1.55**	104.0	3.00	94.62	13.88	0.00	0.00	0.00	108.51	0.00
11	16,732	16,732	**-3.06**	104.0	3.00	95.47	14.55	0.00	0.00	0.00	110.02	0.00
12	16,523	16,524	**-2.86**	104.0	3.00	95.36	14.46	0.00	0.00	0.00	109.82	0.00
13	16,051	16,051	**-2.41**	104.0	3.00	95.11	14.26	0.00	0.00	0.00	109.37	0.00
14	15,658	15,658	**-2.03**	104.0	3.00	94.89	14.10	0.00	0.00	0.00	108.99	0.00
15	14,830	14,831	**-1.19**	104.0	3.00	94.42	13.73	0.00	0.00	0.00	108.16	0.00
16	14,466	14,467	**-0.81**	104.0	3.00	94.21	13.57	0.00	0.00	0.00	107.77	0.00
17	16,965	16,966	**-3.27**	104.0	3.00	95.59	14.64	0.00	0.00	0.00	110.23	0.00
18	17,154	17,154	**-3.44**	104.0	3.00	95.69	14.72	0.00	0.00	0.00	110.40	0.00
19	15,953	15,953	**-2.32**	104.0	3.00	95.06	14.22	0.00	0.00	0.00	109.28	0.00
20	14,838	14,838	**-1.20**	104.0	3.00	94.43	13.74	0.00	0.00	0.00	108.16	0.00
21	13,064	13,064	**0.74**	104.0	3.00	93.32	12.90	0.00	0.00	0.00	106.22	0.00
22	12,454	12,454	**1.46**	104.0	3.00	92.91	12.59	0.00	0.00	0.00	105.50	0.00
23	12,070	12,070	**1.93**	104.0	3.00	92.63	12.40	0.00	0.00	0.00	105.03	0.00
24	12,702	12,703	**1.16**	104.0	3.00	93.08	12.72	0.00	0.00	0.00	105.80	0.00
25	10,125	10,125	**4.55**	104.0	3.00	91.11	11.31	0.00	0.00	0.00	102.42	0.00
26	12,793	12,794	**1.06**	104.0	3.00	93.14	12.77	0.00	0.00	0.00	105.91	0.00
27	10,793	10,793	**3.60**	104.0	3.00	91.66	11.70	0.00	0.00	0.00	103.36	0.00
28	11,481	11,482	**2.68**	104.0	3.00	92.20	12.08	0.00	0.00	0.00	104.28	0.00
29	11,877	11,877	**2.17**	104.0	3.00	92.49	12.29	0.00	0.00	0.00	104.79	0.00
30	11,608	11,608	**2.52**	104.0	3.00	92.30	12.15	0.00	0.00	0.00	104.44	0.00
31	12,351	12,351	**1.59**	104.0	3.00	92.83	12.54	0.00	0.00	0.00	105.38	0.00
32	9,869	9,869	**4.92**	104.0	3.00	90.89	11.15	0.00	0.00	0.00	102.04	0.00
33	10,986	10,986	**3.34**	104.0	3.00	91.82	11.81	0.00	0.00	0.00	103.62	0.00
34	12,397	12,397	**1.53**	104.0	3.00	92.87	12.56	0.00	0.00	0.00	105.43	0.00
35	13,034	13,035	**0.77**	104.0	3.00	93.30	12.89	0.00	0.00	0.00	106.19	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	13,341	13,341	**0.42**	104.0	3.00	93.50	13.04	0.00	0.00	0.00	106.54	0.00
37	12,078	12,078	**1.92**	104.0	3.00	92.64	12.40	0.00	0.00	0.00	105.04	0.00
38	10,395	10,395	**4.16**	104.0	3.00	91.34	11.47	0.00	0.00	0.00	102.80	0.00
39	10,529	10,530	**3.97**	104.0	3.00	91.45	11.55	0.00	0.00	0.00	102.99	0.00
40	11,810	11,810	**2.26**	104.0	3.00	92.45	12.26	0.00	0.00	0.00	104.70	0.00
41	10,594	10,594	**3.88**	104.0	3.00	91.50	11.58	0.00	0.00	0.00	103.09	0.00
43	11,676	11,677	**2.43**	104.0	3.00	92.35	12.19	0.00	0.00	0.00	104.53	0.00
44	10,584	10,584	**3.89**	104.0	3.00	91.49	11.58	0.00	0.00	0.00	103.07	0.00
45	10,278	10,279	**4.32**	104.0	3.00	91.24	11.40	0.00	0.00	0.00	102.64	0.00
46	11,605	11,605	**2.52**	104.0	3.00	92.29	12.15	0.00	0.00	0.00	104.44	0.00
48	9,174	9,175	**5.99**	104.0	3.00	90.25	10.72	0.00	0.00	0.00	100.97	0.00
49	9,132	9,132	**6.06**	104.0	3.00	90.21	10.69	0.00	0.00	0.00	100.90	0.00
50	13,574	13,575	**0.16**	104.0	3.00	93.65	13.15	0.00	0.00	0.00	106.80	0.00
51	9,607	9,607	**5.32**	104.0	3.00	90.65	10.99	0.00	0.00	0.00	101.65	0.00
52	9,924	9,924	**4.84**	104.0	3.00	90.93	11.19	0.00	0.00	0.00	102.12	0.00
53	8,798	8,798	**6.60**	104.0	3.00	89.89	10.48	0.00	0.00	0.00	100.36	0.00
55	7,307	7,307	**9.26**	104.0	3.00	88.27	9.43	0.00	0.00	0.00	97.70	0.00
56	7,000	7,000	**9.86**	104.0	3.00	87.90	9.20	0.00	0.00	0.00	97.10	0.00
57	7,035	7,036	**9.79**	104.0	3.00	87.95	9.22	0.00	0.00	0.00	97.17	0.00
58	10,583	10,583	**3.89**	104.0	3.00	91.49	11.58	0.00	0.00	0.00	103.07	0.00
59	6,688	6,688	**10.50**	104.0	3.00	87.51	8.95	0.00	0.00	0.00	96.46	0.00
60	5,234	5,234	**13.87**	104.0	3.00	85.38	7.71	0.00	0.00	0.00	93.09	0.00
61	4,877	4,877	**14.82**	104.0	3.00	84.76	7.38	0.00	0.00	0.00	92.14	0.00
62	5,598	5,598	**12.96**	104.0	3.00	85.96	8.04	0.00	0.00	0.00	94.00	0.00
63	5,758	5,759	**12.57**	104.0	3.00	86.21	8.18	0.00	0.00	0.00	94.39	0.00
64	5,223	5,224	**13.90**	104.0	3.00	85.36	7.70	0.00	0.00	0.00	93.06	0.00
65	4,728	4,729	**15.23**	104.0	3.00	84.50	7.23	0.00	0.00	0.00	91.73	0.00
66	12,125	12,125	**1.86**	104.0	3.00	92.67	12.42	0.00	0.00	0.00	105.10	0.00
67	4,523	4,524	**15.82**	104.0	3.00	84.11	7.03	0.00	0.00	0.00	91.14	0.00
68	4,178	4,178	**16.86**	104.0	3.00	83.42	6.68	0.00	0.00	0.00	90.10	0.00
69	4,968	4,969	**14.57**	104.0	3.00	84.92	7.47	0.00	0.00	0.00	92.39	0.00
70	15,816	15,817	**-2.18**	104.0	3.00	94.98	14.16	0.00	0.00	0.00	109.15	0.00
71	14,873	14,874	**-1.24**	104.0	3.00	94.45	13.75	0.00	0.00	0.00	108.20	0.00
72	13,985	13,985	**-0.30**	104.0	3.00	93.91	13.34	0.00	0.00	0.00	107.26	0.00
73	14,038	14,038	**-0.35**	104.0	3.00	93.95	13.37	0.00	0.00	0.00	107.31	0.00
74	13,264	13,264	**0.51**	104.0	3.00	93.45	13.00	0.00	0.00	0.00	106.45	0.00
75	12,156	12,157	**1.83**	104.0	3.00	92.70	12.44	0.00	0.00	0.00	105.14	0.00
76	7,761	7,761	**8.40**	104.0	3.00	88.80	9.76	0.00	0.00	0.00	98.56	0.00
77	8,393	8,393	**7.28**	104.0	3.00	89.48	10.20	0.00	0.00	0.00	99.68	0.00
78	14,481	14,481	**-0.83**	104.0	3.00	94.22	13.57	0.00	0.00	0.00	107.79	0.00
80	5,622	5,622	**12.90**	104.0	3.00	86.00	8.06	0.00	0.00	0.00	94.06	0.00
81	16,223	16,224	**-2.58**	104.0	3.00	95.20	14.34	0.00	0.00	0.00	109.54	0.00
82	10,394	10,394	**4.16**	104.0	3.00	91.34	11.47	0.00	0.00	0.00	102.80	0.00
83	5,197	5,198	**13.97**	104.0	3.00	85.32	7.68	0.00	0.00	0.00	93.00	0.00
85	9,175	9,175	**5.99**	104.0	3.00	90.25	10.72	0.00	0.00	0.00	100.97	0.00
86	5,912	5,912	**12.21**	104.0	3.00	86.44	8.32	0.00	0.00	0.00	94.75	0.00
87	4,548	4,549	**15.75**	104.0	3.00	84.16	7.06	0.00	0.00	0.00	91.22	0.00
89	5,380	5,381	**13.50**	104.0	3.00	85.62	7.85	0.00	0.00	0.00	93.46	0.00
90	6,637	6,637	**10.61**	104.0	3.00	87.44	8.91	0.00	0.00	0.00	96.35	0.00
91	5,669	5,670	**12.79**	104.0	3.00	86.07	8.10	0.00	0.00	0.00	94.18	0.00
92	5,782	5,783	**12.52**	104.0	3.00	86.24	8.20	0.00	0.00	0.00	94.45	0.00
94	15,366	15,367	**-1.74**	104.0	3.00	94.73	13.97	0.00	0.00	0.00	108.70	0.00
95	16,464	16,465	**-2.80**	104.0	3.00	95.33	14.44	0.00	0.00	0.00	109.77	0.00
97	14,054	14,055	**-0.37**	104.0	3.00	93.96	13.38	0.00	0.00	0.00	107.33	0.00
98	15,776	15,776	**-2.14**	104.0	3.00	94.96	14.15	0.00	0.00	0.00	109.11	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	15,040	15,040	**-1.41**	104.0	3.00	94.55	13.83	0.00	0.00	0.00	108.37	0.00
100	9,996	9,997	**4.73**	104.0	3.00	91.00	11.23	0.00	0.00	0.00	102.23	0.00
101	16,645	16,646	**-2.97**	104.0	3.00	95.43	14.51	0.00	0.00	0.00	109.94	0.00
102	10,862	10,863	**3.50**	104.0	3.00	91.72	11.74	0.00	0.00	0.00	103.46	0.00
103	17,448	17,448	**-3.71**	104.0	3.00	95.84	14.83	0.00	0.00	0.00	110.67	0.00
104	11,029	11,029	**3.28**	104.0	3.00	91.85	11.83	0.00	0.00	0.00	103.68	0.00
107	15,278	15,278	**-1.65**	104.0	3.00	94.68	13.93	0.00	0.00	0.00	108.61	0.00
108	15,248	15,248	**-1.62**	104.0	3.00	94.66	13.92	0.00	0.00	0.00	108.58	0.00
109	6,370	6,371	**11.18**	104.0	3.00	87.08	8.70	0.00	0.00	0.00	95.78	0.00
110	8,787	8,787	**6.62**	104.0	3.00	89.88	10.47	0.00	0.00	0.00	100.35	0.00
111	8,163	8,163	**7.68**	104.0	3.00	89.24	10.05	0.00	0.00	0.00	99.28	0.00
113	15,600	15,601	**-1.97**	104.0	3.00	94.86	14.07	0.00	0.00	0.00	108.93	0.00
114	8,875	8,875	**6.47**	104.0	3.00	89.96	10.53	0.00	0.00	0.00	100.49	0.00
115	16,106	16,107	**-2.46**	104.0	3.00	95.14	14.29	0.00	0.00	0.00	109.43	0.00
116	12,126	12,126	**1.86**	104.0	3.00	92.67	12.42	0.00	0.00	0.00	105.10	0.00
118	5,889	5,890	**12.26**	104.0	3.00	86.40	8.30	0.00	0.00	0.00	94.70	0.00
119	14,030	14,030	**-0.34**	104.0	3.00	93.94	13.36	0.00	0.00	0.00	107.31	0.00
120	17,051	17,051	**-3.35**	104.0	3.00	95.64	14.68	0.00	0.00	0.00	110.31	0.00
121	13,682	13,683	**0.04**	104.0	3.00	93.72	13.20	0.00	0.00	0.00	106.92	0.00
125	5,459	5,460	**13.30**	104.0	3.00	85.74	7.92	0.00	0.00	0.00	93.66	0.00
126	8,682	8,682	**6.79**	104.0	3.00	89.77	10.40	0.00	0.00	0.00	100.17	0.00
127	8,440	8,441	**7.20**	104.0	3.00	89.53	10.24	0.00	0.00	0.00	99.76	0.00
128	8,207	8,208	**7.60**	104.0	3.00	89.28	10.08	0.00	0.00	0.00	99.36	0.00
129	13,753	13,753	**-0.04**	104.0	3.00	93.77	13.23	0.00	0.00	0.00	107.00	0.00
130	13,707	13,707	**0.01**	104.0	3.00	93.74	13.21	0.00	0.00	0.00	106.95	0.00
131	14,148	14,148	**-0.47**	104.0	3.00	94.01	13.42	0.00	0.00	0.00	107.43	0.00
132	14,546	14,547	**-0.90**	104.0	3.00	94.26	13.60	0.00	0.00	0.00	107.86	0.00
133	10,142	10,142	**4.52**	104.0	3.00	91.12	11.32	0.00	0.00	0.00	102.44	0.00
134	15,698	15,698	**-2.07**	104.0	3.00	94.92	14.11	0.00	0.00	0.00	109.03	0.00
141	13,900	13,901	**-0.20**	104.0	3.00	93.86	13.30	0.00	0.00	0.00	107.17	0.00
142	11,149	11,150	**3.12**	104.0	3.00	91.95	11.90	0.00	0.00	0.00	103.84	0.00
143	14,452	14,452	**-0.80**	104.0	3.00	94.20	13.56	0.00	0.00	0.00	107.76	0.00
144	9,970	9,970	**4.77**	104.0	3.00	90.97	11.22	0.00	0.00	0.00	102.19	0.00
145	7,108	7,108	**9.65**	104.0	3.00	88.04	9.28	0.00	0.00	0.00	97.32	0.00
146	7,423	7,423	**9.03**	104.0	3.00	88.41	9.52	0.00	0.00	0.00	97.93	0.00

Sum 28.55

Noise sensitive area: H17 H17

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	15,078	15,078	**-1.45**	104.0	3.00	94.57	13.84	0.00	0.00	0.00	108.41	0.00
2	14,908	14,908	**-1.27**	104.0	3.00	94.47	13.77	0.00	0.00	0.00	108.23	0.00
3	14,337	14,337	**-0.67**	104.0	3.00	94.13	13.51	0.00	0.00	0.00	107.64	0.00
4	13,129	13,129	**0.66**	104.0	3.00	93.36	12.93	0.00	0.00	0.00	106.30	0.00
5	13,085	13,085	**0.71**	104.0	3.00	93.34	12.91	0.00	0.00	0.00	106.25	0.00
6	13,781	13,782	**-0.07**	104.0	3.00	93.79	13.25	0.00	0.00	0.00	107.03	0.00
7	12,000	12,000	**2.02**	104.0	3.00	92.58	12.36	0.00	0.00	0.00	104.94	0.00
8	15,730	15,730	**-2.10**	104.0	3.00	94.93	14.13	0.00	0.00	0.00	109.06	0.00
9	14,591	14,591	**-0.94**	104.0	3.00	94.28	13.62	0.00	0.00	0.00	107.91	0.00
10	14,467	14,467	**-0.81**	104.0	3.00	94.21	13.57	0.00	0.00	0.00	107.77	0.00
11	15,969	15,970	**-2.33**	104.0	3.00	95.07	14.23	0.00	0.00	0.00	109.29	0.00
12	15,770	15,770	**-2.14**	104.0	3.00	94.96	14.14	0.00	0.00	0.00	109.10	0.00
13	15,289	15,290	**-1.66**	104.0	3.00	94.69	13.94	0.00	0.00	0.00	108.62	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	14,883	14,883	**-1.25**	104.0	3.00	94.45	13.76	0.00	0.00	0.00	108.21	0.00
15	14,069	14,069	**-0.39**	104.0	3.00	93.97	13.38	0.00	0.00	0.00	107.35	0.00
16	13,726	13,727	**-0.01**	104.0	3.00	93.75	13.22	0.00	0.00	0.00	106.97	0.00
17	16,200	16,200	**-2.55**	104.0	3.00	95.19	14.33	0.00	0.00	0.00	109.52	0.00
18	16,365	16,366	**-2.71**	104.0	3.00	95.28	14.39	0.00	0.00	0.00	109.67	0.00
19	15,156	15,157	**-1.53**	104.0	3.00	94.61	13.88	0.00	0.00	0.00	108.49	0.00
20	14,029	14,029	**-0.34**	104.0	3.00	93.94	13.36	0.00	0.00	0.00	107.31	0.00
21	12,535	12,535	**1.36**	104.0	3.00	92.96	12.64	0.00	0.00	0.00	105.60	0.00
22	11,995	11,995	**2.03**	104.0	3.00	92.58	12.36	0.00	0.00	0.00	104.94	0.00
23	11,617	11,617	**2.51**	104.0	3.00	92.30	12.15	0.00	0.00	0.00	104.46	0.00
24	12,241	12,241	**1.72**	104.0	3.00	92.76	12.48	0.00	0.00	0.00	105.24	0.00
25	9,530	9,530	**5.43**	104.0	3.00	90.58	10.95	0.00	0.00	0.00	101.53	0.00
26	12,163	12,163	**1.82**	104.0	3.00	92.70	12.44	0.00	0.00	0.00	105.14	0.00
27	10,124	10,125	**4.55**	104.0	3.00	91.11	11.31	0.00	0.00	0.00	102.42	0.00
28	10,720	10,721	**3.70**	104.0	3.00	91.60	11.66	0.00	0.00	0.00	103.26	0.00
29	11,352	11,353	**2.85**	104.0	3.00	92.10	12.01	0.00	0.00	0.00	104.11	0.00
30	11,154	11,155	**3.11**	104.0	3.00	91.95	11.90	0.00	0.00	0.00	103.85	0.00
31	11,988	11,988	**2.03**	104.0	3.00	92.58	12.35	0.00	0.00	0.00	104.93	0.00
32	9,339	9,339	**5.73**	104.0	3.00	90.41	10.83	0.00	0.00	0.00	101.23	0.00
33	10,535	10,535	**3.96**	104.0	3.00	91.45	11.55	0.00	0.00	0.00	103.00	0.00
34	11,662	11,663	**2.45**	104.0	3.00	92.34	12.18	0.00	0.00	0.00	104.52	0.00
35	12,303	12,304	**1.64**	104.0	3.00	92.80	12.52	0.00	0.00	0.00	105.32	0.00
36	12,614	12,614	**1.27**	104.0	3.00	93.02	12.68	0.00	0.00	0.00	105.69	0.00
37	11,339	11,339	**2.87**	104.0	3.00	92.09	12.00	0.00	0.00	0.00	104.10	0.00
38	9,754	9,754	**5.09**	104.0	3.00	90.78	11.08	0.00	0.00	0.00	101.87	0.00
39	9,768	9,769	**5.07**	104.0	3.00	90.80	11.09	0.00	0.00	0.00	101.89	0.00
40	10,854	10,854	**3.52**	104.0	3.00	91.71	11.73	0.00	0.00	0.00	103.44	0.00
41	9,788	9,789	**5.04**	104.0	3.00	90.81	11.11	0.00	0.00	0.00	101.92	0.00
43	10,896	10,896	**3.46**	104.0	3.00	91.75	11.76	0.00	0.00	0.00	103.50	0.00
44	9,719	9,720	**5.15**	104.0	3.00	90.75	11.06	0.00	0.00	0.00	101.82	0.00
45	9,415	9,415	**5.61**	104.0	3.00	90.48	10.87	0.00	0.00	0.00	101.35	0.00
46	10,709	10,710	**3.72**	104.0	3.00	91.60	11.65	0.00	0.00	0.00	103.25	0.00
48	8,596	8,596	**6.93**	104.0	3.00	89.69	10.34	0.00	0.00	0.00	100.03	0.00
49	8,733	8,734	**6.70**	104.0	3.00	89.82	10.43	0.00	0.00	0.00	100.26	0.00
50	12,916	12,916	**0.91**	104.0	3.00	93.22	12.83	0.00	0.00	0.00	106.05	0.00
51	9,197	9,197	**5.95**	104.0	3.00	90.27	10.74	0.00	0.00	0.00	101.01	0.00
52	9,509	9,509	**5.47**	104.0	3.00	90.56	10.93	0.00	0.00	0.00	101.50	0.00
53	8,408	8,408	**7.25**	104.0	3.00	89.49	10.22	0.00	0.00	0.00	99.71	0.00
55	6,945	6,946	**9.97**	104.0	3.00	87.83	9.16	0.00	0.00	0.00	96.99	0.00
56	6,650	6,650	**10.58**	104.0	3.00	87.46	8.92	0.00	0.00	0.00	96.38	0.00
57	6,521	6,521	**10.86**	104.0	3.00	87.29	8.82	0.00	0.00	0.00	96.11	0.00
58	10,058	10,058	**4.64**	104.0	3.00	91.05	11.27	0.00	0.00	0.00	102.32	0.00
59	6,349	6,349	**11.23**	104.0	3.00	87.05	8.68	0.00	0.00	0.00	95.74	0.00
60	4,853	4,854	**14.88**	104.0	3.00	84.72	7.36	0.00	0.00	0.00	92.08	0.00
61	4,511	4,512	**15.85**	104.0	3.00	84.09	7.02	0.00	0.00	0.00	91.11	0.00
62	4,669	4,670	**15.40**	104.0	3.00	84.39	7.18	0.00	0.00	0.00	91.56	0.00
63	4,585	4,586	**15.64**	104.0	3.00	84.23	7.09	0.00	0.00	0.00	91.32	0.00
64	3,838	3,838	**17.96**	104.0	3.00	82.68	6.32	0.00	0.00	0.00	89.00	0.00
65	3,292	3,293	**19.91**	104.0	3.00	81.35	5.70	0.00	0.00	0.00	87.05	0.00
66	11,166	11,167	**3.10**	104.0	3.00	91.96	11.91	0.00	0.00	0.00	103.87	0.00
67	3,251	3,252	**20.07**	104.0	3.00	81.24	5.65	0.00	0.00	0.00	86.89	0.00
68	2,825	2,825	**21.81**	104.0	3.00	80.02	5.13	0.00	0.00	0.00	85.15	0.00
69	3,525	3,526	**19.05**	104.0	3.00	81.95	5.97	0.00	0.00	0.00	87.91	0.00
70	14,952	14,952	**-1.32**	104.0	3.00	94.49	13.79	0.00	0.00	0.00	108.28	0.00
71	14,172	14,173	**-0.50**	104.0	3.00	94.03	13.43	0.00	0.00	0.00	107.46	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	13,508	13,508	**0.23**	104.0	3.00	93.61	13.12	0.00	0.00	0.00	106.73	0.00
73	13,445	13,445	**0.30**	104.0	3.00	93.57	13.09	0.00	0.00	0.00	106.66	0.00
74	12,597	12,598	**1.29**	104.0	3.00	93.01	12.67	0.00	0.00	0.00	105.67	0.00
75	11,558	11,559	**2.58**	104.0	3.00	92.26	12.12	0.00	0.00	0.00	104.38	0.00
76	7,150	7,150	**9.56**	104.0	3.00	88.09	9.31	0.00	0.00	0.00	97.40	0.00
77	7,916	7,916	**8.12**	104.0	3.00	88.97	9.87	0.00	0.00	0.00	98.84	0.00
78	13,655	13,656	**0.07**	104.0	3.00	93.71	13.19	0.00	0.00	0.00	106.89	0.00
80	5,205	5,206	**13.95**	104.0	3.00	85.33	7.69	0.00	0.00	0.00	93.02	0.00
81	15,419	15,419	**-1.79**	104.0	3.00	94.76	13.99	0.00	0.00	0.00	108.75	0.00
82	9,952	9,952	**4.80**	104.0	3.00	90.96	11.20	0.00	0.00	0.00	102.16	0.00
83	3,975	3,975	**17.51**	104.0	3.00	82.99	6.46	0.00	0.00	0.00	89.45	0.00
85	8,918	8,918	**6.40**	104.0	3.00	90.01	10.56	0.00	0.00	0.00	100.56	0.00
86	5,484	5,484	**13.24**	104.0	3.00	85.78	7.94	0.00	0.00	0.00	93.72	0.00
87	3,094	3,095	**20.69**	104.0	3.00	80.81	5.46	0.00	0.00	0.00	86.27	0.00
89	4,066	4,066	**17.22**	104.0	3.00	83.18	6.56	0.00	0.00	0.00	89.75	0.00
90	5,944	5,944	**12.14**	104.0	3.00	86.48	8.34	0.00	0.00	0.00	94.82	0.00
91	4,631	4,631	**15.51**	104.0	3.00	84.31	7.14	0.00	0.00	0.00	91.45	0.00
92	4,317	4,317	**16.43**	104.0	3.00	83.70	6.82	0.00	0.00	0.00	90.53	0.00
94	14,627	14,627	**-0.98**	104.0	3.00	94.30	13.64	0.00	0.00	0.00	107.94	0.00
95	15,760	15,760	**-2.13**	104.0	3.00	94.95	14.14	0.00	0.00	0.00	109.09	0.00
97	13,272	13,273	**0.50**	104.0	3.00	93.46	13.00	0.00	0.00	0.00	106.46	0.00
98	15,050	15,050	**-1.42**	104.0	3.00	94.55	13.83	0.00	0.00	0.00	108.38	0.00
99	14,518	14,518	**-0.87**	104.0	3.00	94.24	13.59	0.00	0.00	0.00	107.83	0.00
100	9,175	9,175	**5.99**	104.0	3.00	90.25	10.72	0.00	0.00	0.00	100.97	0.00
101	15,839	15,840	**-2.21**	104.0	3.00	94.99	14.17	0.00	0.00	0.00	109.17	0.00
102	10,019	10,019	**4.70**	104.0	3.00	91.02	11.25	0.00	0.00	0.00	102.26	0.00
103	16,658	16,659	**-2.99**	104.0	3.00	95.43	14.52	0.00	0.00	0.00	109.95	0.00
104	10,249	10,249	**4.37**	104.0	3.00	91.21	11.38	0.00	0.00	0.00	102.60	0.00
107	14,464	14,465	**-0.81**	104.0	3.00	94.21	13.57	0.00	0.00	0.00	107.77	0.00
108	14,804	14,804	**-1.17**	104.0	3.00	94.41	13.72	0.00	0.00	0.00	108.13	0.00
109	6,035	6,036	**11.93**	104.0	3.00	86.61	8.42	0.00	0.00	0.00	95.03	0.00
110	8,185	8,185	**7.64**	104.0	3.00	89.26	10.06	0.00	0.00	0.00	99.32	0.00
111	7,556	7,556	**8.78**	104.0	3.00	88.57	9.61	0.00	0.00	0.00	98.18	0.00
113	14,792	14,793	**-1.15**	104.0	3.00	94.40	13.71	0.00	0.00	0.00	108.12	0.00
114	8,628	8,628	**6.88**	104.0	3.00	89.72	10.36	0.00	0.00	0.00	100.08	0.00
115	15,481	15,481	**-1.85**	104.0	3.00	94.80	14.02	0.00	0.00	0.00	108.81	0.00
116	11,292	11,293	**2.93**	104.0	3.00	92.06	11.98	0.00	0.00	0.00	104.03	0.00
118	5,587	5,587	**12.99**	104.0	3.00	85.94	8.03	0.00	0.00	0.00	93.98	0.00
119	13,349	13,349	**0.41**	104.0	3.00	93.51	13.04	0.00	0.00	0.00	106.55	0.00
120	16,234	16,234	**-2.59**	104.0	3.00	95.21	14.34	0.00	0.00	0.00	109.55	0.00
121	12,955	12,955	**0.87**	104.0	3.00	93.25	12.85	0.00	0.00	0.00	106.10	0.00
125	4,259	4,260	**16.61**	104.0	3.00	83.59	6.76	0.00	0.00	0.00	90.35	0.00
126	7,818	7,818	**8.30**	104.0	3.00	88.86	9.80	0.00	0.00	0.00	98.67	0.00
127	7,583	7,584	**8.73**	104.0	3.00	88.60	9.63	0.00	0.00	0.00	98.23	0.00
128	7,381	7,381	**9.11**	104.0	3.00	88.36	9.49	0.00	0.00	0.00	97.85	0.00
129	12,800	12,801	**1.05**	104.0	3.00	93.14	12.77	0.00	0.00	0.00	105.91	0.00
130	12,699	12,699	**1.17**	104.0	3.00	93.08	12.72	0.00	0.00	0.00	105.79	0.00
131	13,132	13,132	**0.66**	104.0	3.00	93.37	12.93	0.00	0.00	0.00	106.30	0.00
132	13,538	13,538	**0.20**	104.0	3.00	93.63	13.13	0.00	0.00	0.00	106.76	0.00
133	9,429	9,429	**5.59**	104.0	3.00	90.49	10.88	0.00	0.00	0.00	101.37	0.00
134	14,855	14,855	**-1.22**	104.0	3.00	94.44	13.74	0.00	0.00	0.00	108.18	0.00
141	13,137	13,138	**0.65**	104.0	3.00	93.37	12.94	0.00	0.00	0.00	106.31	0.00
142	10,307	10,308	**4.28**	104.0	3.00	91.26	11.42	0.00	0.00	0.00	102.68	0.00
143	13,671	13,671	**0.05**	104.0	3.00	93.72	13.20	0.00	0.00	0.00	106.91	0.00
144	9,094	9,094	**6.12**	104.0	3.00	90.18	10.67	0.00	0.00	0.00	100.84	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	6,399	6,399	**11.12**	104.0	3.00	87.12	8.72	0.00	0.00	0.00	95.84	0.00
146	6,721	6,721	**10.43**	104.0	3.00	87.55	8.98	0.00	0.00	0.00	96.53	0.00
Sum	31.37											

Noise sensitive area: H18 H18

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	9,396	9,397	**5.64**	104.0	3.00	90.46	10.86	0.00	0.00	0.00	101.32	0.00
2	9,287	9,287	**5.81**	104.0	3.00	90.36	10.79	0.00	0.00	0.00	101.15	0.00
3	8,747	8,748	**6.68**	104.0	3.00	89.84	10.44	0.00	0.00	0.00	100.28	0.00
4	7,772	7,773	**8.38**	104.0	3.00	88.81	9.77	0.00	0.00	0.00	98.58	0.00
5	7,557	7,558	**8.78**	104.0	3.00	88.57	9.62	0.00	0.00	0.00	98.18	0.00
6	8,172	8,173	**7.66**	104.0	3.00	89.25	10.05	0.00	0.00	0.00	99.30	0.00
7	6,233	6,234	**11.48**	104.0	3.00	86.90	8.59	0.00	0.00	0.00	95.48	0.00
8	10,041	10,041	**4.67**	104.0	3.00	91.04	11.26	0.00	0.00	0.00	102.29	0.00
9	8,888	8,888	**6.45**	104.0	3.00	89.98	10.54	0.00	0.00	0.00	100.51	0.00
10	8,702	8,703	**6.76**	104.0	3.00	89.79	10.41	0.00	0.00	0.00	100.21	0.00
11	10,152	10,153	**4.51**	104.0	3.00	91.13	11.32	0.00	0.00	0.00	102.46	0.00
12	9,959	9,960	**4.79**	104.0	3.00	90.96	11.21	0.00	0.00	0.00	102.17	0.00
13	9,475	9,476	**5.52**	104.0	3.00	90.53	10.91	0.00	0.00	0.00	101.44	0.00
14	9,061	9,062	**6.17**	104.0	3.00	90.14	10.65	0.00	0.00	0.00	100.79	0.00
15	8,260	8,261	**7.51**	104.0	3.00	89.34	10.11	0.00	0.00	0.00	99.46	0.00
16	7,937	7,938	**8.08**	104.0	3.00	88.99	9.89	0.00	0.00	0.00	98.88	0.00
17	10,379	10,380	**4.18**	104.0	3.00	91.32	11.46	0.00	0.00	0.00	102.78	0.00
18	10,532	10,532	**3.96**	104.0	3.00	91.45	11.55	0.00	0.00	0.00	103.00	0.00
19	9,321	9,322	**5.76**	104.0	3.00	90.39	10.82	0.00	0.00	0.00	101.21	0.00
20	8,191	8,192	**7.63**	104.0	3.00	89.27	10.07	0.00	0.00	0.00	99.33	0.00
21	7,078	7,079	**9.71**	104.0	3.00	88.00	9.26	0.00	0.00	0.00	97.26	0.00
22	6,716	6,716	**10.44**	104.0	3.00	87.54	8.98	0.00	0.00	0.00	96.52	0.00
23	6,375	6,375	**11.17**	104.0	3.00	87.09	8.70	0.00	0.00	0.00	95.79	0.00
24	6,944	6,944	**9.98**	104.0	3.00	87.83	9.15	0.00	0.00	0.00	96.99	0.00
25	4,101	4,101	**17.10**	104.0	3.00	83.26	6.60	0.00	0.00	0.00	89.86	0.00
26	6,533	6,534	**10.83**	104.0	3.00	87.30	8.83	0.00	0.00	0.00	96.13	0.00
27	4,501	4,501	**15.89**	104.0	3.00	84.07	7.01	0.00	0.00	0.00	91.08	0.00
28	4,943	4,944	**14.64**	104.0	3.00	84.88	7.44	0.00	0.00	0.00	92.32	0.00
29	5,960	5,960	**12.10**	104.0	3.00	86.51	8.36	0.00	0.00	0.00	94.86	0.00
30	5,944	5,944	**12.14**	104.0	3.00	86.48	8.34	0.00	0.00	0.00	94.82	0.00
31	6,951	6,951	**9.96**	104.0	3.00	87.84	9.16	0.00	0.00	0.00	97.00	0.00
32	4,096	4,096	**17.12**	104.0	3.00	83.25	6.59	0.00	0.00	0.00	89.84	0.00
33	5,382	5,382	**13.49**	104.0	3.00	85.62	7.85	0.00	0.00	0.00	93.47	0.00
34	5,900	5,901	**12.24**	104.0	3.00	86.42	8.31	0.00	0.00	0.00	94.72	0.00
35	6,536	6,538	**10.82**	104.0	3.00	87.31	8.83	0.00	0.00	0.00	96.14	0.00
36	6,847	6,848	**10.17**	104.0	3.00	87.71	9.08	0.00	0.00	0.00	96.79	0.00
37	5,577	5,578	**13.01**	104.0	3.00	85.93	8.02	0.00	0.00	0.00	93.95	0.00
38	4,202	4,203	**16.79**	104.0	3.00	83.47	6.70	0.00	0.00	0.00	90.18	0.00
39	4,011	4,012	**17.39**	104.0	3.00	83.07	6.50	0.00	0.00	0.00	89.57	0.00
40	5,016	5,016	**14.44**	104.0	3.00	85.01	7.51	0.00	0.00	0.00	92.52	0.00
41	3,981	3,983	**17.49**	104.0	3.00	83.00	6.47	0.00	0.00	0.00	89.48	0.00
43	5,097	5,098	**14.23**	104.0	3.00	85.15	7.59	0.00	0.00	0.00	92.74	0.00
44	3,872	3,874	**17.84**	104.0	3.00	82.76	6.36	0.00	0.00	0.00	89.12	0.00
45	3,570	3,572	**18.88**	104.0	3.00	82.06	6.02	0.00	0.00	0.00	88.08	0.00
46	4,854	4,855	**14.88**	104.0	3.00	84.72	7.36	0.00	0.00	0.00	92.08	0.00
48	3,317	3,317	**19.82**	104.0	3.00	81.42	5.73	0.00	0.00	0.00	87.14	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	4,001	4,001	**17.43**	104.0	3.00	83.04	6.49	0.00	0.00	0.00	89.54	0.00
50	7,229	7,230	**9.41**	104.0	3.00	88.18	9.37	0.00	0.00	0.00	97.55	0.00
51	4,334	4,335	**16.38**	104.0	3.00	83.74	6.84	0.00	0.00	0.00	90.58	0.00
52	4,584	4,585	**15.64**	104.0	3.00	84.23	7.09	0.00	0.00	0.00	91.32	0.00
53	3,778	3,778	**18.16**	104.0	3.00	82.55	6.25	0.00	0.00	0.00	88.80	0.00
55	2,978	2,978	**21.16**	104.0	3.00	80.48	5.32	0.00	0.00	0.00	85.80	0.00
56	2,900	2,901	**21.49**	104.0	3.00	80.25	5.22	0.00	0.00	0.00	85.48	0.00
57	2,172	2,173	**24.96**	104.0	3.00	77.74	4.26	0.00	0.00	0.00	82.00	0.00
58	4,755	4,755	**15.16**	104.0	3.00	84.54	7.26	0.00	0.00	0.00	91.80	0.00
59	2,845	2,846	**21.72**	104.0	3.00	80.08	5.15	0.00	0.00	0.00	85.24	0.00
60	2,674	2,675	**22.48**	104.0	3.00	79.55	4.94	0.00	0.00	0.00	84.49	0.00
61	2,838	2,839	**21.75**	104.0	3.00	80.06	5.15	0.00	0.00	0.00	85.21	0.00
62	1,206	1,209	**31.56**	104.0	3.00	72.65	2.76	0.00	0.00	0.00	75.41	0.00
63	1,648	1,651	**28.12**	104.0	3.00	75.35	3.49	0.00	0.00	0.00	78.84	0.00
64	3,052	3,053	**20.86**	104.0	3.00	80.69	5.41	0.00	0.00	0.00	86.10	0.00
65	3,585	3,586	**18.83**	104.0	3.00	82.09	6.04	0.00	0.00	0.00	88.13	0.00
66	5,330	5,330	**13.63**	104.0	3.00	85.53	7.80	0.00	0.00	0.00	93.34	0.00
67	2,897	2,898	**21.50**	104.0	3.00	80.24	5.22	0.00	0.00	0.00	85.46	0.00
68	3,440	3,441	**19.36**	104.0	3.00	81.73	5.87	0.00	0.00	0.00	87.60	0.00
69	3,553	3,554	**18.95**	104.0	3.00	82.01	6.00	0.00	0.00	0.00	88.01	0.00
70	9,097	9,098	**6.11**	104.0	3.00	90.18	10.67	0.00	0.00	0.00	100.85	0.00
71	8,417	8,418	**7.24**	104.0	3.00	89.50	10.22	0.00	0.00	0.00	99.73	0.00
72	8,120	8,121	**7.75**	104.0	3.00	89.19	10.02	0.00	0.00	0.00	99.21	0.00
73	7,846	7,847	**8.24**	104.0	3.00	88.89	9.82	0.00	0.00	0.00	98.72	0.00
74	6,905	6,906	**10.05**	104.0	3.00	87.78	9.12	0.00	0.00	0.00	96.91	0.00
75	6,005	6,006	**12.00**	104.0	3.00	86.57	8.39	0.00	0.00	0.00	94.97	0.00
76	2,099	2,100	**25.36**	104.0	3.00	77.44	4.16	0.00	0.00	0.00	81.60	0.00
77	3,113	3,114	**20.61**	104.0	3.00	80.87	5.49	0.00	0.00	0.00	86.35	0.00
78	7,811	7,812	**8.31**	104.0	3.00	88.86	9.80	0.00	0.00	0.00	98.65	0.00
80	2,464	2,465	**23.46**	104.0	3.00	78.84	4.66	0.00	0.00	0.00	83.50	0.00
81	9,580	9,581	**5.36**	104.0	3.00	90.63	10.98	0.00	0.00	0.00	101.61	0.00
82	4,885	4,885	**14.80**	104.0	3.00	84.78	7.39	0.00	0.00	0.00	92.16	0.00
83	2,229	2,230	**24.65**	104.0	3.00	77.97	4.34	0.00	0.00	0.00	82.31	0.00
85	4,634	4,634	**15.50**	104.0	3.00	84.32	7.14	0.00	0.00	0.00	91.46	0.00
86	2,385	2,386	**23.86**	104.0	3.00	78.55	4.55	0.00	0.00	0.00	83.11	0.00
87	3,790	3,791	**18.12**	104.0	3.00	82.58	6.27	0.00	0.00	0.00	88.84	0.00
89	2,556	2,557	**23.02**	104.0	3.00	79.16	4.78	0.00	0.00	0.00	83.94	0.00
90	1,252	1,254	**31.16**	104.0	3.00	72.96	2.84	0.00	0.00	0.00	75.80	0.00
91	1,264	1,267	**31.05**	104.0	3.00	73.06	2.86	0.00	0.00	0.00	75.91	0.00
92	3,633	3,634	**18.67**	104.0	3.00	82.21	6.09	0.00	0.00	0.00	88.30	0.00
94	8,831	8,832	**6.54**	104.0	3.00	89.92	10.50	0.00	0.00	0.00	100.42	0.00
95	9,988	9,989	**4.74**	104.0	3.00	90.99	11.23	0.00	0.00	0.00	102.22	0.00
97	7,452	7,454	**8.98**	104.0	3.00	88.45	9.54	0.00	0.00	0.00	97.99	0.00
98	9,264	9,265	**5.85**	104.0	3.00	90.34	10.78	0.00	0.00	0.00	101.12	0.00
99	9,015	9,016	**6.24**	104.0	3.00	90.10	10.62	0.00	0.00	0.00	100.72	0.00
100	3,362	3,363	**19.64**	104.0	3.00	81.54	5.78	0.00	0.00	0.00	87.32	0.00
101	9,999	9,999	**4.73**	104.0	3.00	91.00	11.23	0.00	0.00	0.00	102.23	0.00
102	4,180	4,182	**16.85**	104.0	3.00	83.43	6.68	0.00	0.00	0.00	90.11	0.00
103	10,824	10,824	**3.56**	104.0	3.00	91.69	11.72	0.00	0.00	0.00	103.40	0.00
104	4,460	4,461	**16.00**	104.0	3.00	83.99	6.97	0.00	0.00	0.00	90.96	0.00
107	8,624	8,625	**6.89**	104.0	3.00	89.71	10.36	0.00	0.00	0.00	100.08	0.00
108	9,444	9,445	**5.57**	104.0	3.00	90.50	10.89	0.00	0.00	0.00	101.40	0.00
109	2,788	2,789	**21.97**	104.0	3.00	79.91	5.08	0.00	0.00	0.00	84.99	0.00
110	2,899	2,900	**21.49**	104.0	3.00	80.25	5.22	0.00	0.00	0.00	85.47	0.00
111	2,392	2,393	**23.82**	104.0	3.00	78.58	4.56	0.00	0.00	0.00	83.14	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	8,953	8,954	**6.34**	104.0	3.00	90.04	10.58	0.00	0.00	0.00	100.62	0.00
114	4,455	4,456	**16.02**	104.0	3.00	83.98	6.96	0.00	0.00	0.00	90.94	0.00
115	9,801	9,802	**5.02**	104.0	3.00	90.83	11.11	0.00	0.00	0.00	101.94	0.00
116	5,452	5,454	**13.32**	104.0	3.00	85.73	7.91	0.00	0.00	0.00	93.65	0.00
118	2,867	2,868	**21.63**	104.0	3.00	80.15	5.18	0.00	0.00	0.00	85.33	0.00
119	7,626	7,627	**8.65**	104.0	3.00	88.65	9.67	0.00	0.00	0.00	98.31	0.00
120	10,389	10,389	**4.17**	104.0	3.00	91.33	11.46	0.00	0.00	0.00	102.80	0.00
121	7,185	7,186	**9.49**	104.0	3.00	88.13	9.34	0.00	0.00	0.00	97.47	0.00
125	1,959	1,960	**26.16**	104.0	3.00	76.85	3.95	0.00	0.00	0.00	80.80	0.00
126	1,990	1,993	**25.97**	104.0	3.00	76.99	4.00	0.00	0.00	0.00	80.99	0.00
127	1,769	1,772	**27.32**	104.0	3.00	75.97	3.67	0.00	0.00	0.00	79.64	0.00
128	1,624	1,627	**28.29**	104.0	3.00	75.23	3.45	0.00	0.00	0.00	78.68	0.00
129	6,962	6,963	**9.94**	104.0	3.00	87.86	9.17	0.00	0.00	0.00	97.02	0.00
130	6,903	6,904	**10.06**	104.0	3.00	87.78	9.12	0.00	0.00	0.00	96.91	0.00
131	7,345	7,346	**9.18**	104.0	3.00	88.32	9.46	0.00	0.00	0.00	97.78	0.00
132	7,743	7,743	**8.43**	104.0	3.00	88.78	9.75	0.00	0.00	0.00	98.53	0.00
133	3,758	3,759	**18.23**	104.0	3.00	82.50	6.23	0.00	0.00	0.00	88.73	0.00
134	9,004	9,004	**6.26**	104.0	3.00	90.09	10.61	0.00	0.00	0.00	100.70	0.00
141	7,333	7,334	**9.20**	104.0	3.00	88.31	9.45	0.00	0.00	0.00	97.76	0.00
142	4,468	4,470	**15.98**	104.0	3.00	84.01	6.98	0.00	0.00	0.00	90.98	0.00
143	7,850	7,851	**8.24**	104.0	3.00	88.90	9.83	0.00	0.00	0.00	98.73	0.00
144	3,245	3,247	**20.09**	104.0	3.00	81.23	5.64	0.00	0.00	0.00	86.87	0.00
145	1,291	1,293	**30.82**	104.0	3.00	73.23	2.90	0.00	0.00	0.00	76.14	0.00
146	1,485	1,487	**29.29**	104.0	3.00	74.44	3.22	0.00	0.00	0.00	77.67	0.00

Sum 41.59

Noise sensitive area: H19 H19

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	4,120	4,121	**17.04**	104.0	3.00	83.30	6.62	0.00	0.00	0.00	89.92	0.00
2	3,948	3,949	**17.59**	104.0	3.00	82.93	6.44	0.00	0.00	0.00	89.37	0.00
3	3,388	3,390	**19.55**	104.0	3.00	81.60	5.81	0.00	0.00	0.00	87.42	0.00
4	2,506	2,507	**23.26**	104.0	3.00	78.98	4.72	0.00	0.00	0.00	83.70	0.00
5	2,184	2,186	**24.89**	104.0	3.00	77.79	4.28	0.00	0.00	0.00	82.07	0.00
6	2,823	2,825	**21.81**	104.0	3.00	80.02	5.13	0.00	0.00	0.00	85.15	0.00
7	1,414	1,420	**29.80**	104.0	3.00	74.04	3.12	0.00	0.00	0.00	77.16	0.00
8	4,773	4,774	**15.10**	104.0	3.00	84.58	7.28	0.00	0.00	0.00	91.86	0.00
9	3,649	3,651	**18.60**	104.0	3.00	82.25	6.11	0.00	0.00	0.00	88.36	0.00
10	3,621	3,624	**18.70**	104.0	3.00	82.18	6.08	0.00	0.00	0.00	88.26	0.00
11	5,247	5,249	**13.83**	104.0	3.00	85.40	7.73	0.00	0.00	0.00	93.13	0.00
12	5,024	5,026	**14.42**	104.0	3.00	85.02	7.52	0.00	0.00	0.00	92.54	0.00
13	4,580	4,583	**15.65**	104.0	3.00	84.22	7.09	0.00	0.00	0.00	91.31	0.00
14	4,236	4,238	**16.68**	104.0	3.00	83.54	6.74	0.00	0.00	0.00	90.29	0.00
15	3,406	3,409	**19.47**	104.0	3.00	81.65	5.83	0.00	0.00	0.00	87.49	0.00
16	2,999	3,002	**21.06**	104.0	3.00	80.55	5.35	0.00	0.00	0.00	85.90	0.00
17	5,482	5,484	**13.24**	104.0	3.00	85.78	7.94	0.00	0.00	0.00	93.72	0.00
18	5,718	5,720	**12.67**	104.0	3.00	86.15	8.15	0.00	0.00	0.00	94.30	0.00
19	4,583	4,585	**15.64**	104.0	3.00	84.23	7.09	0.00	0.00	0.00	91.32	0.00
20	3,585	3,587	**18.83**	104.0	3.00	82.09	6.04	0.00	0.00	0.00	88.13	0.00
21	1,749	1,751	**27.45**	104.0	3.00	75.87	3.64	0.00	0.00	0.00	79.51	0.00
22	1,696	1,697	**27.81**	104.0	3.00	75.59	3.56	0.00	0.00	0.00	79.15	0.00
23	1,539	1,541	**28.89**	104.0	3.00	74.76	3.31	0.00	0.00	0.00	78.07	0.00
24	1,844	1,845	**26.86**	104.0	3.00	76.32	3.78	0.00	0.00	0.00	80.11	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	1,479	1,480	**29.34**	104.0	3.00	74.41	3.21	0.00	0.00	0.00	77.62	0.00
26	1,202	1,206	**31.58**	104.0	3.00	72.63	2.75	0.00	0.00	0.00	75.38	0.00
27	874	878	**34.94**	104.0	3.00	69.87	2.15	0.00	0.00	0.00	72.02	0.00
28	1,093	1,099	**32.58**	104.0	3.00	71.82	2.56	0.00	0.00	0.00	74.38	0.00
29	919	922	**34.44**	104.0	3.00	70.29	2.24	0.00	0.00	0.00	72.53	0.00
30	1,406	1,408	**29.90**	104.0	3.00	73.97	3.10	0.00	0.00	0.00	77.06	0.00
31	2,345	2,346	**24.05**	104.0	3.00	78.41	4.50	0.00	0.00	0.00	82.91	0.00
32	1,832	1,833	**26.93**	104.0	3.00	76.27	3.77	0.00	0.00	0.00	80.03	0.00
33	1,475	1,476	**29.37**	104.0	3.00	74.38	3.21	0.00	0.00	0.00	77.59	0.00
34	1,165	1,171	**31.90**	104.0	3.00	72.37	2.69	0.00	0.00	0.00	75.06	0.00
35	1,647	1,652	**28.11**	104.0	3.00	75.36	3.49	0.00	0.00	0.00	78.85	0.00
36	1,904	1,909	**26.47**	104.0	3.00	76.61	3.88	0.00	0.00	0.00	80.49	0.00
37	1,009	1,016	**33.41**	104.0	3.00	71.14	2.41	0.00	0.00	0.00	73.55	0.00
38	1,210	1,212	**31.53**	104.0	3.00	72.67	2.76	0.00	0.00	0.00	75.43	0.00
39	1,529	1,533	**28.95**	104.0	3.00	74.71	3.30	0.00	0.00	0.00	78.01	0.00
40	2,830	2,831	**21.79**	104.0	3.00	80.04	5.14	0.00	0.00	0.00	85.18	0.00
41	1,767	1,771	**27.32**	104.0	3.00	75.97	3.67	0.00	0.00	0.00	79.64	0.00
43	1,250	1,256	**31.14**	104.0	3.00	72.98	2.84	0.00	0.00	0.00	75.82	0.00
44	2,195	2,200	**24.82**	104.0	3.00	77.85	4.30	0.00	0.00	0.00	82.15	0.00
45	2,336	2,339	**24.09**	104.0	3.00	78.38	4.49	0.00	0.00	0.00	82.87	0.00
46	2,254	2,257	**24.52**	104.0	3.00	78.07	4.38	0.00	0.00	0.00	82.45	0.00
48	2,427	2,428	**23.64**	104.0	3.00	78.71	4.61	0.00	0.00	0.00	83.32	0.00
49	2,855	2,856	**21.68**	104.0	3.00	80.11	5.17	0.00	0.00	0.00	85.28	0.00
50	1,986	1,989	**25.99**	104.0	3.00	76.97	4.00	0.00	0.00	0.00	80.97	0.00
51	2,453	2,454	**23.52**	104.0	3.00	78.80	4.65	0.00	0.00	0.00	83.44	0.00
52	2,220	2,221	**24.71**	104.0	3.00	77.93	4.33	0.00	0.00	0.00	82.26	0.00
53	3,144	3,145	**20.49**	104.0	3.00	80.95	5.52	0.00	0.00	0.00	86.47	0.00
55	4,487	4,487	**15.93**	104.0	3.00	84.04	7.00	0.00	0.00	0.00	91.04	0.00
56	4,781	4,782	**15.08**	104.0	3.00	84.59	7.29	0.00	0.00	0.00	91.88	0.00
57	4,571	4,572	**15.68**	104.0	3.00	84.20	7.08	0.00	0.00	0.00	91.28	0.00
58	1,252	1,253	**31.17**	104.0	3.00	72.96	2.83	0.00	0.00	0.00	75.79	0.00
59	5,079	5,079	**14.28**	104.0	3.00	85.12	7.57	0.00	0.00	0.00	92.69	0.00
60	6,398	6,398	**11.12**	104.0	3.00	87.12	8.72	0.00	0.00	0.00	95.84	0.00
61	6,749	6,750	**10.37**	104.0	3.00	87.59	9.00	0.00	0.00	0.00	96.59	0.00
62	6,405	6,405	**11.10**	104.0	3.00	87.13	8.73	0.00	0.00	0.00	95.86	0.00
63	7,006	7,007	**9.85**	104.0	3.00	87.91	9.20	0.00	0.00	0.00	97.11	0.00
64	8,389	8,389	**7.28**	104.0	3.00	89.47	10.20	0.00	0.00	0.00	99.68	0.00
65	8,950	8,951	**6.35**	104.0	3.00	90.04	10.58	0.00	0.00	0.00	100.61	0.00
66	2,910	2,912	**21.44**	104.0	3.00	80.28	5.24	0.00	0.00	0.00	85.52	0.00
67	8,260	8,261	**7.51**	104.0	3.00	89.34	10.11	0.00	0.00	0.00	99.45	0.00
68	8,801	8,802	**6.59**	104.0	3.00	89.89	10.48	0.00	0.00	0.00	100.37	0.00
69	8,900	8,900	**6.43**	104.0	3.00	89.99	10.54	0.00	0.00	0.00	100.53	0.00
70	4,720	4,721	**15.25**	104.0	3.00	84.48	7.23	0.00	0.00	0.00	91.71	0.00
71	3,315	3,318	**19.82**	104.0	3.00	81.42	5.73	0.00	0.00	0.00	87.15	0.00
72	2,810	2,811	**21.87**	104.0	3.00	79.98	5.11	0.00	0.00	0.00	85.09	0.00
73	2,489	2,491	**23.34**	104.0	3.00	78.93	4.70	0.00	0.00	0.00	83.62	0.00
74	1,685	1,689	**27.86**	104.0	3.00	75.55	3.55	0.00	0.00	0.00	79.10	0.00
75	638	643	**38.12**	104.0	3.00	67.16	1.68	0.00	0.00	0.00	68.84	0.00
76	3,836	3,837	**17.97**	104.0	3.00	82.68	6.32	0.00	0.00	0.00	88.99	0.00
77	3,299	3,300	**19.89**	104.0	3.00	81.37	5.71	0.00	0.00	0.00	87.08	0.00
78	3,343	3,345	**19.71**	104.0	3.00	81.49	5.76	0.00	0.00	0.00	87.25	0.00
80	6,003	6,004	**12.00**	104.0	3.00	86.57	8.39	0.00	0.00	0.00	94.96	0.00
81	4,863	4,865	**14.85**	104.0	3.00	84.74	7.37	0.00	0.00	0.00	92.11	0.00
82	1,790	1,791	**27.19**	104.0	3.00	76.06	3.70	0.00	0.00	0.00	79.77	0.00
83	7,602	7,603	**8.69**	104.0	3.00	88.62	9.65	0.00	0.00	0.00	98.27	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	3,414	3,414	**19.46**	104.0	3.00	81.67	5.84	0.00	0.00	0.00	87.51	0.00
86	5,716	5,716	**12.67**	104.0	3.00	86.14	8.15	0.00	0.00	0.00	94.29	0.00
87	9,161	9,161	**6.01**	104.0	3.00	90.24	10.71	0.00	0.00	0.00	100.95	0.00
89	7,899	7,900	**8.15**	104.0	3.00	88.95	9.86	0.00	0.00	0.00	98.81	0.00
90	5,020	5,020	**14.43**	104.0	3.00	85.01	7.51	0.00	0.00	0.00	92.53	0.00
91	6,615	6,616	**10.65**	104.0	3.00	87.41	8.90	0.00	0.00	0.00	96.31	0.00
92	8,843	8,843	**6.52**	104.0	3.00	89.93	10.51	0.00	0.00	0.00	100.44	0.00
94	3,867	3,870	**17.86**	104.0	3.00	82.75	6.35	0.00	0.00	0.00	89.10	0.00
95	4,895	4,896	**14.77**	104.0	3.00	84.80	7.40	0.00	0.00	0.00	92.19	0.00
97	2,764	2,768	**22.06**	104.0	3.00	79.84	5.06	0.00	0.00	0.00	84.90	0.00
98	4,241	4,244	**16.66**	104.0	3.00	83.55	6.75	0.00	0.00	0.00	90.30	0.00
99	3,642	3,643	**18.63**	104.0	3.00	82.23	6.10	0.00	0.00	0.00	88.33	0.00
100	2,251	2,254	**24.53**	104.0	3.00	78.06	4.37	0.00	0.00	0.00	82.43	0.00
101	5,275	5,276	**13.76**	104.0	3.00	85.45	7.75	0.00	0.00	0.00	93.20	0.00
102	1,926	1,931	**26.33**	104.0	3.00	76.72	3.91	0.00	0.00	0.00	80.63	0.00
103	6,007	6,009	**11.99**	104.0	3.00	86.58	8.40	0.00	0.00	0.00	94.97	0.00
104	1,368	1,373	**30.17**	104.0	3.00	73.75	3.04	0.00	0.00	0.00	76.79	0.00
107	4,006	4,008	**17.40**	104.0	3.00	83.06	6.50	0.00	0.00	0.00	89.56	0.00
108	4,120	4,120	**17.04**	104.0	3.00	83.30	6.62	0.00	0.00	0.00	89.92	0.00
109	5,372	5,373	**13.52**	104.0	3.00	85.60	7.84	0.00	0.00	0.00	93.44	0.00
110	2,806	2,807	**21.89**	104.0	3.00	79.97	5.11	0.00	0.00	0.00	85.07	0.00
111	3,432	3,433	**19.39**	104.0	3.00	81.71	5.86	0.00	0.00	0.00	87.57	0.00
113	4,287	4,289	**16.52**	104.0	3.00	83.65	6.79	0.00	0.00	0.00	90.44	0.00
114	3,632	3,633	**18.67**	104.0	3.00	82.20	6.09	0.00	0.00	0.00	88.29	0.00
115	4,522	4,523	**15.82**	104.0	3.00	84.11	7.03	0.00	0.00	0.00	91.14	0.00
116	1,796	1,801	**27.13**	104.0	3.00	76.11	3.72	0.00	0.00	0.00	79.83	0.00
118	5,850	5,851	**12.36**	104.0	3.00	86.34	8.26	0.00	0.00	0.00	94.61	0.00
119	2,457	2,460	**23.49**	104.0	3.00	78.82	4.65	0.00	0.00	0.00	83.47	0.00
120	5,698	5,700	**12.71**	104.0	3.00	86.12	8.13	0.00	0.00	0.00	94.25	0.00
121	2,220	2,223	**24.69**	104.0	3.00	77.94	4.33	0.00	0.00	0.00	82.27	0.00
125	7,328	7,329	**9.22**	104.0	3.00	88.30	9.45	0.00	0.00	0.00	97.75	0.00
126	3,476	3,478	**19.22**	104.0	3.00	81.83	5.91	0.00	0.00	0.00	87.74	0.00
127	3,652	3,653	**18.60**	104.0	3.00	82.25	6.11	0.00	0.00	0.00	88.37	0.00
128	3,752	3,753	**18.25**	104.0	3.00	82.49	6.22	0.00	0.00	0.00	88.71	0.00
129	3,626	3,627	**18.69**	104.0	3.00	82.19	6.08	0.00	0.00	0.00	88.27	0.00
130	4,077	4,078	**17.18**	104.0	3.00	83.21	6.57	0.00	0.00	0.00	89.78	0.00
131	4,424	4,425	**16.11**	104.0	3.00	83.92	6.93	0.00	0.00	0.00	90.85	0.00
132	4,628	4,629	**15.52**	104.0	3.00	84.31	7.14	0.00	0.00	0.00	91.45	0.00
133	1,624	1,626	**28.29**	104.0	3.00	75.22	3.45	0.00	0.00	0.00	78.67	0.00
134	4,515	4,516	**15.84**	104.0	3.00	84.09	7.02	0.00	0.00	0.00	91.12	0.00
141	2,547	2,551	**23.05**	104.0	3.00	79.13	4.78	0.00	0.00	0.00	83.91	0.00
142	1,826	1,832	**26.94**	104.0	3.00	76.26	3.76	0.00	0.00	0.00	80.02	0.00
143	3,120	3,124	**20.57**	104.0	3.00	80.89	5.50	0.00	0.00	0.00	86.39	0.00
144	2,597	2,600	**22.82**	104.0	3.00	79.30	4.84	0.00	0.00	0.00	84.14	0.00
145	4,567	4,568	**15.69**	104.0	3.00	84.19	7.08	0.00	0.00	0.00	91.27	0.00
146	4,245	4,246	**16.65**	104.0	3.00	83.56	6.75	0.00	0.00	0.00	90.31	0.00

Sum 46.54

Noise sensitive area: H20 H20

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	2,773	2,775	**22.03**	104.0	3.00	79.86	5.07	0.00	0.00	0.00	84.93	0.00
2	3,255	3,256	**20.05**	104.0	3.00	81.25	5.65	0.00	0.00	0.00	86.91	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	3,576	3,577	**18.87**	104.0	3.00	82.07	6.03	0.00	0.00	0.00	88.10	0.00
4	5,046	5,046	**14.36**	104.0	3.00	85.06	7.54	0.00	0.00	0.00	92.60	0.00
5	4,356	4,356	**16.32**	104.0	3.00	83.78	6.86	0.00	0.00	0.00	90.64	0.00
6	3,647	3,648	**18.61**	104.0	3.00	82.24	6.11	0.00	0.00	0.00	88.35	0.00
7	4,145	4,147	**16.96**	104.0	3.00	83.35	6.65	0.00	0.00	0.00	90.00	0.00
8	2,683	2,684	**22.44**	104.0	3.00	79.58	4.95	0.00	0.00	0.00	84.53	0.00
9	2,718	2,720	**22.27**	104.0	3.00	79.69	5.00	0.00	0.00	0.00	84.69	0.00
10	2,255	2,259	**24.50**	104.0	3.00	78.08	4.38	0.00	0.00	0.00	82.46	0.00
11	1,114	1,121	**32.36**	104.0	3.00	71.99	2.60	0.00	0.00	0.00	74.60	0.00
12	1,228	1,235	**31.33**	104.0	3.00	72.83	2.80	0.00	0.00	0.00	75.64	0.00
13	1,276	1,283	**30.91**	104.0	3.00	73.16	2.89	0.00	0.00	0.00	76.05	0.00
14	1,392	1,399	**29.97**	104.0	3.00	73.91	3.08	0.00	0.00	0.00	77.00	0.00
15	2,141	2,145	**25.11**	104.0	3.00	77.63	4.22	0.00	0.00	0.00	81.85	0.00
16	2,562	2,565	**22.99**	104.0	3.00	79.18	4.79	0.00	0.00	0.00	83.97	0.00
17	1,117	1,123	**32.34**	104.0	3.00	72.01	2.61	0.00	0.00	0.00	74.62	0.00
18	918	925	**34.40**	104.0	3.00	70.32	2.24	0.00	0.00	0.00	72.57	0.00
19	1,008	1,016	**33.41**	104.0	3.00	71.14	2.41	0.00	0.00	0.00	73.55	0.00
20	1,944	1,947	**26.24**	104.0	3.00	76.79	3.93	0.00	0.00	0.00	80.72	0.00
21	4,901	4,902	**14.75**	104.0	3.00	84.81	7.40	0.00	0.00	0.00	92.21	0.00
22	5,730	5,731	**12.64**	104.0	3.00	86.16	8.16	0.00	0.00	0.00	94.32	0.00
23	6,005	6,005	**12.00**	104.0	3.00	86.57	8.39	0.00	0.00	0.00	94.96	0.00
24	5,572	5,572	**13.02**	104.0	3.00	85.92	8.02	0.00	0.00	0.00	93.94	0.00
25	6,925	6,925	**10.01**	104.0	3.00	87.81	9.14	0.00	0.00	0.00	96.95	0.00
26	4,499	4,500	**15.89**	104.0	3.00	84.06	7.01	0.00	0.00	0.00	91.07	0.00
27	6,129	6,130	**11.71**	104.0	3.00	86.75	8.50	0.00	0.00	0.00	95.25	0.00
28	5,297	5,298	**13.71**	104.0	3.00	85.48	7.77	0.00	0.00	0.00	93.25	0.00
29	5,742	5,742	**12.61**	104.0	3.00	86.18	8.17	0.00	0.00	0.00	94.35	0.00
30	6,307	6,307	**11.32**	104.0	3.00	87.00	8.65	0.00	0.00	0.00	95.64	0.00
31	6,431	6,431	**11.05**	104.0	3.00	87.17	8.75	0.00	0.00	0.00	95.91	0.00
32	7,334	7,334	**9.20**	104.0	3.00	88.31	9.45	0.00	0.00	0.00	97.76	0.00
33	6,754	6,754	**10.36**	104.0	3.00	87.59	9.01	0.00	0.00	0.00	96.60	0.00
34	4,463	4,464	**16.00**	104.0	3.00	83.99	6.97	0.00	0.00	0.00	90.97	0.00
35	3,876	3,878	**17.83**	104.0	3.00	82.77	6.36	0.00	0.00	0.00	89.13	0.00
36	3,609	3,611	**18.74**	104.0	3.00	82.15	6.06	0.00	0.00	0.00	88.22	0.00
37	4,757	4,758	**15.15**	104.0	3.00	84.55	7.26	0.00	0.00	0.00	91.81	0.00
38	6,561	6,562	**10.77**	104.0	3.00	87.34	8.85	0.00	0.00	0.00	96.19	0.00
39	6,233	6,234	**11.48**	104.0	3.00	86.89	8.59	0.00	0.00	0.00	95.48	0.00
40	5,117	5,118	**14.17**	104.0	3.00	85.18	7.61	0.00	0.00	0.00	92.79	0.00
41	6,144	6,145	**11.68**	104.0	3.00	86.77	8.51	0.00	0.00	0.00	95.28	0.00
43	5,084	5,085	**14.26**	104.0	3.00	85.13	7.58	0.00	0.00	0.00	92.70	0.00
44	6,168	6,169	**11.63**	104.0	3.00	86.80	8.53	0.00	0.00	0.00	95.34	0.00
45	6,473	6,474	**10.96**	104.0	3.00	87.22	8.78	0.00	0.00	0.00	96.01	0.00
46	5,181	5,182	**14.01**	104.0	3.00	85.29	7.66	0.00	0.00	0.00	92.95	0.00
48	7,824	7,824	**8.29**	104.0	3.00	88.87	9.81	0.00	0.00	0.00	98.68	0.00
49	8,368	8,368	**7.32**	104.0	3.00	89.45	10.19	0.00	0.00	0.00	99.64	0.00
50	3,734	3,735	**18.31**	104.0	3.00	82.45	6.20	0.00	0.00	0.00	88.65	0.00
51	7,956	7,956	**8.05**	104.0	3.00	89.01	9.90	0.00	0.00	0.00	98.92	0.00
52	7,700	7,700	**8.51**	104.0	3.00	88.73	9.72	0.00	0.00	0.00	98.45	0.00
53	8,656	8,656	**6.83**	104.0	3.00	89.75	10.38	0.00	0.00	0.00	100.13	0.00
55	9,946	9,946	**4.81**	104.0	3.00	90.95	11.20	0.00	0.00	0.00	102.15	0.00
56	10,227	10,227	**4.40**	104.0	3.00	91.19	11.37	0.00	0.00	0.00	102.56	0.00
57	9,897	9,897	**4.88**	104.0	3.00	90.91	11.17	0.00	0.00	0.00	102.08	0.00
58	6,754	6,754	**10.37**	104.0	3.00	87.59	9.01	0.00	0.00	0.00	96.60	0.00
59	10,510	10,510	**3.99**	104.0	3.00	91.43	11.53	0.00	0.00	0.00	102.97	0.00
60	11,705	11,705	**2.39**	104.0	3.00	92.37	12.20	0.00	0.00	0.00	104.57	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	12,041	12,041	**1.97**	104.0	3.00	92.61	12.38	0.00	0.00	0.00	104.99	0.00
62	11,217	11,217	**3.03**	104.0	3.00	92.00	11.94	0.00	0.00	0.00	103.93	0.00
63	11,458	11,458	**2.71**	104.0	3.00	92.18	12.07	0.00	0.00	0.00	104.25	0.00
64	12,670	12,670	**1.20**	104.0	3.00	93.06	12.70	0.00	0.00	0.00	105.76	0.00
65	13,296	13,296	**0.47**	104.0	3.00	93.47	13.01	0.00	0.00	0.00	106.49	0.00
66	4,822	4,822	**14.97**	104.0	3.00	84.66	7.33	0.00	0.00	0.00	91.99	0.00
67	12,830	12,830	**1.01**	104.0	3.00	93.16	12.78	0.00	0.00	0.00	105.95	0.00
68	13,359	13,359	**0.40**	104.0	3.00	93.52	13.05	0.00	0.00	0.00	106.56	0.00
69	13,174	13,174	**0.61**	104.0	3.00	93.39	12.95	0.00	0.00	0.00	106.35	0.00
70	943	946	**34.16**	104.0	3.00	70.52	2.28	0.00	0.00	0.00	72.80	0.00
71	2,503	2,506	**23.27**	104.0	3.00	78.98	4.72	0.00	0.00	0.00	83.70	0.00
72	4,813	4,814	**15.00**	104.0	3.00	84.65	7.32	0.00	0.00	0.00	91.97	0.00
73	3,855	3,856	**17.90**	104.0	3.00	82.72	6.34	0.00	0.00	0.00	89.06	0.00
74	3,940	3,941	**17.62**	104.0	3.00	82.91	6.43	0.00	0.00	0.00	89.34	0.00
75	5,169	5,169	**14.04**	104.0	3.00	85.27	7.65	0.00	0.00	0.00	92.92	0.00
76	9,088	9,088	**6.13**	104.0	3.00	90.17	10.67	0.00	0.00	0.00	100.83	0.00
77	8,753	8,753	**6.67**	104.0	3.00	89.84	10.45	0.00	0.00	0.00	100.29	0.00
78	2,263	2,265	**24.47**	104.0	3.00	78.10	4.39	0.00	0.00	0.00	82.49	0.00
80	11,314	11,315	**2.90**	104.0	3.00	92.07	11.99	0.00	0.00	0.00	104.06	0.00
81	762	772	**36.26**	104.0	3.00	68.75	1.94	0.00	0.00	0.00	70.70	0.00
82	7,230	7,231	**9.41**	104.0	3.00	88.18	9.37	0.00	0.00	0.00	97.56	0.00
83	12,099	12,099	**1.90**	104.0	3.00	92.66	12.41	0.00	0.00	0.00	105.07	0.00
85	8,874	8,874	**6.47**	104.0	3.00	89.96	10.53	0.00	0.00	0.00	100.49	0.00
86	11,038	11,039	**3.27**	104.0	3.00	91.86	11.84	0.00	0.00	0.00	103.69	0.00
87	13,530	13,530	**0.21**	104.0	3.00	93.63	13.13	0.00	0.00	0.00	106.75	0.00
89	12,235	12,235	**1.73**	104.0	3.00	92.75	12.48	0.00	0.00	0.00	105.23	0.00
90	10,114	10,114	**4.56**	104.0	3.00	91.10	11.30	0.00	0.00	0.00	102.40	0.00
91	11,275	11,275	**2.95**	104.0	3.00	92.04	11.97	0.00	0.00	0.00	104.01	0.00
92	12,842	12,842	**1.00**	104.0	3.00	93.17	12.79	0.00	0.00	0.00	105.96	0.00
94	1,870	1,875	**26.67**	104.0	3.00	76.46	3.83	0.00	0.00	0.00	80.29	0.00
95	1,812	1,815	**27.04**	104.0	3.00	76.18	3.74	0.00	0.00	0.00	79.92	0.00
97	2,766	2,769	**22.06**	104.0	3.00	79.85	5.06	0.00	0.00	0.00	84.91	0.00
98	1,760	1,764	**27.37**	104.0	3.00	75.93	3.66	0.00	0.00	0.00	79.59	0.00
99	4,047	4,047	**17.28**	104.0	3.00	83.14	6.54	0.00	0.00	0.00	89.69	0.00
100	6,739	6,740	**10.39**	104.0	3.00	87.57	8.99	0.00	0.00	0.00	96.57	0.00
101	570	582	**39.11**	104.0	3.00	66.30	1.55	0.00	0.00	0.00	67.85	0.00
102	5,877	5,878	**12.29**	104.0	3.00	86.39	8.29	0.00	0.00	0.00	94.67	0.00
103	1,089	1,095	**32.62**	104.0	3.00	71.79	2.56	0.00	0.00	0.00	74.34	0.00
104	5,724	5,725	**12.65**	104.0	3.00	86.16	8.15	0.00	0.00	0.00	94.31	0.00
107	1,510	1,515	**29.08**	104.0	3.00	74.61	3.27	0.00	0.00	0.00	77.88	0.00
108	4,793	4,793	**15.05**	104.0	3.00	84.61	7.30	0.00	0.00	0.00	91.91	0.00
109	10,784	10,784	**3.61**	104.0	3.00	91.66	11.69	0.00	0.00	0.00	103.35	0.00
110	8,133	8,133	**7.73**	104.0	3.00	89.21	10.03	0.00	0.00	0.00	99.23	0.00
111	8,711	8,712	**6.74**	104.0	3.00	89.80	10.42	0.00	0.00	0.00	100.22	0.00
113	1,232	1,237	**31.30**	104.0	3.00	72.85	2.81	0.00	0.00	0.00	75.66	0.00
114	9,115	9,116	**6.08**	104.0	3.00	90.20	10.68	0.00	0.00	0.00	100.88	0.00
115	2,756	2,757	**22.11**	104.0	3.00	79.81	5.04	0.00	0.00	0.00	84.85	0.00
116	4,610	4,611	**15.57**	104.0	3.00	84.28	7.12	0.00	0.00	0.00	91.40	0.00
118	11,246	11,246	**2.99**	104.0	3.00	92.02	11.95	0.00	0.00	0.00	103.97	0.00
119	3,254	3,256	**20.05**	104.0	3.00	81.25	5.66	0.00	0.00	0.00	86.91	0.00
120	546	557	**39.55**	104.0	3.00	65.91	1.49	0.00	0.00	0.00	67.41	0.00
121	3,303	3,305	**19.86**	104.0	3.00	81.38	5.71	0.00	0.00	0.00	87.10	0.00
125	11,802	11,802	**2.27**	104.0	3.00	92.44	12.25	0.00	0.00	0.00	104.69	0.00
126	8,073	8,074	**7.84**	104.0	3.00	89.14	9.98	0.00	0.00	0.00	99.13	0.00
127	8,312	8,312	**7.42**	104.0	3.00	89.39	10.15	0.00	0.00	0.00	99.54	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	8,533	8,533	**7.04**	104.0	3.00	89.62	10.30	0.00	0.00	0.00	99.92	0.00
129	3,269	3,270	**20.00**	104.0	3.00	81.29	5.67	0.00	0.00	0.00	86.96	0.00
130	3,649	3,650	**18.61**	104.0	3.00	82.25	6.11	0.00	0.00	0.00	88.35	0.00
131	3,366	3,366	**19.63**	104.0	3.00	81.54	5.78	0.00	0.00	0.00	87.33	0.00
132	3,008	3,009	**21.04**	104.0	3.00	80.57	5.36	0.00	0.00	0.00	85.93	0.00
133	6,667	6,668	**10.54**	104.0	3.00	87.48	8.94	0.00	0.00	0.00	96.42	0.00
134	1,039	1,043	**33.14**	104.0	3.00	71.36	2.46	0.00	0.00	0.00	73.83	0.00
141	2,970	2,972	**21.19**	104.0	3.00	80.46	5.31	0.00	0.00	0.00	85.78	0.00
142	5,589	5,591	**12.98**	104.0	3.00	85.95	8.04	0.00	0.00	0.00	93.98	0.00
143	2,394	2,398	**23.79**	104.0	3.00	78.60	4.57	0.00	0.00	0.00	83.17	0.00
144	6,792	6,792	**10.29**	104.0	3.00	87.64	9.04	0.00	0.00	0.00	96.68	0.00
145	9,642	9,642	**5.26**	104.0	3.00	90.68	11.02	0.00	0.00	0.00	101.70	0.00
146	9,335	9,336	**5.74**	104.0	3.00	90.40	10.82	0.00	0.00	0.00	101.23	0.00
Sum	46.87											

Noise sensitive area: H21 H21

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	3,523	3,524	**19.05**	104.0	3.00	81.94	5.97	0.00	0.00	0.00	87.91	0.00
2	3,814	3,815	**18.04**	104.0	3.00	82.63	6.29	0.00	0.00	0.00	88.92	0.00
3	3,713	3,714	**18.38**	104.0	3.00	82.40	6.18	0.00	0.00	0.00	88.58	0.00
4	4,480	4,480	**15.95**	104.0	3.00	84.03	6.99	0.00	0.00	0.00	91.01	0.00
5	3,669	3,670	**18.54**	104.0	3.00	82.29	6.13	0.00	0.00	0.00	88.42	0.00
6	3,374	3,376	**19.60**	104.0	3.00	81.57	5.80	0.00	0.00	0.00	87.36	0.00
7	2,341	2,344	**24.07**	104.0	3.00	78.40	4.50	0.00	0.00	0.00	82.90	0.00
8	3,912	3,913	**17.71**	104.0	3.00	82.85	6.40	0.00	0.00	0.00	89.25	0.00
9	3,082	3,084	**20.73**	104.0	3.00	80.78	5.45	0.00	0.00	0.00	86.23	0.00
10	2,498	2,501	**23.29**	104.0	3.00	78.96	4.71	0.00	0.00	0.00	83.67	0.00
11	3,103	3,106	**20.64**	104.0	3.00	80.84	5.48	0.00	0.00	0.00	86.32	0.00
12	2,995	2,998	**21.08**	104.0	3.00	80.54	5.34	0.00	0.00	0.00	85.88	0.00
13	2,559	2,563	**22.99**	104.0	3.00	79.18	4.79	0.00	0.00	0.00	83.97	0.00
14	2,155	2,160	**25.03**	104.0	3.00	77.69	4.24	0.00	0.00	0.00	81.93	0.00
15	1,808	1,813	**27.06**	104.0	3.00	76.17	3.74	0.00	0.00	0.00	79.91	0.00
16	1,916	1,921	**26.40**	104.0	3.00	76.67	3.90	0.00	0.00	0.00	80.57	0.00
17	3,282	3,285	**19.94**	104.0	3.00	81.33	5.69	0.00	0.00	0.00	87.02	0.00
18	3,308	3,310	**19.84**	104.0	3.00	81.40	5.72	0.00	0.00	0.00	87.12	0.00
19	2,207	2,211	**24.76**	104.0	3.00	77.89	4.31	0.00	0.00	0.00	82.20	0.00
20	1,332	1,337	**30.46**	104.0	3.00	73.52	2.98	0.00	0.00	0.00	76.50	0.00
21	3,954	3,955	**17.58**	104.0	3.00	82.94	6.44	0.00	0.00	0.00	89.38	0.00
22	4,636	4,636	**15.49**	104.0	3.00	84.32	7.14	0.00	0.00	0.00	91.47	0.00
23	4,766	4,767	**15.13**	104.0	3.00	84.56	7.27	0.00	0.00	0.00	91.84	0.00
24	4,582	4,582	**15.65**	104.0	3.00	84.22	7.09	0.00	0.00	0.00	91.31	0.00
25	4,890	4,890	**14.78**	104.0	3.00	84.79	7.39	0.00	0.00	0.00	92.18	0.00
26	3,136	3,137	**20.52**	104.0	3.00	80.93	5.51	0.00	0.00	0.00	86.45	0.00
27	4,061	4,062	**17.23**	104.0	3.00	83.17	6.56	0.00	0.00	0.00	89.73	0.00
28	3,103	3,105	**20.65**	104.0	3.00	80.84	5.47	0.00	0.00	0.00	86.32	0.00
29	4,290	4,290	**16.52**	104.0	3.00	83.65	6.80	0.00	0.00	0.00	90.45	0.00
30	4,901	4,902	**14.75**	104.0	3.00	84.81	7.40	0.00	0.00	0.00	92.21	0.00
31	5,436	5,436	**13.36**	104.0	3.00	85.71	7.90	0.00	0.00	0.00	93.60	0.00
32	5,359	5,359	**13.55**	104.0	3.00	85.58	7.83	0.00	0.00	0.00	93.41	0.00
33	5,160	5,160	**14.06**	104.0	3.00	85.25	7.64	0.00	0.00	0.00	92.90	0.00
34	2,546	2,548	**23.07**	104.0	3.00	79.12	4.77	0.00	0.00	0.00	83.90	0.00
35	2,214	2,218	**24.72**	104.0	3.00	77.92	4.32	0.00	0.00	0.00	82.24	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	2,126	2,130	**25.20**	104.0	3.00	77.57	4.20	0.00	0.00	0.00	81.77	0.00
37	2,741	2,743	**22.17**	104.0	3.00	79.76	5.02	0.00	0.00	0.00	84.79	0.00
38	4,485	4,485	**15.93**	104.0	3.00	84.04	6.99	0.00	0.00	0.00	91.03	0.00
39	3,944	3,945	**17.61**	104.0	3.00	82.92	6.43	0.00	0.00	0.00	89.35	0.00
40	2,529	2,530	**23.15**	104.0	3.00	79.06	4.75	0.00	0.00	0.00	83.81	0.00
41	3,778	3,780	**18.16**	104.0	3.00	82.55	6.25	0.00	0.00	0.00	88.80	0.00
43	2,861	2,863	**21.65**	104.0	3.00	80.14	5.18	0.00	0.00	0.00	85.31	0.00
44	3,706	3,708	**18.41**	104.0	3.00	82.38	6.17	0.00	0.00	0.00	88.56	0.00
45	4,010	4,012	**17.39**	104.0	3.00	83.07	6.50	0.00	0.00	0.00	89.57	0.00
46	2,674	2,676	**22.47**	104.0	3.00	79.55	4.94	0.00	0.00	0.00	84.49	0.00
48	5,683	5,683	**12.75**	104.0	3.00	86.09	8.12	0.00	0.00	0.00	94.21	0.00
49	6,435	6,436	**11.04**	104.0	3.00	87.17	8.75	0.00	0.00	0.00	95.92	0.00
50	2,712	2,714	**22.30**	104.0	3.00	79.67	4.99	0.00	0.00	0.00	84.66	0.00
51	6,095	6,095	**11.79**	104.0	3.00	86.70	8.47	0.00	0.00	0.00	95.17	0.00
52	5,899	5,899	**12.24**	104.0	3.00	86.42	8.30	0.00	0.00	0.00	94.72	0.00
53	6,677	6,677	**10.53**	104.0	3.00	87.49	8.94	0.00	0.00	0.00	96.44	0.00
55	7,797	7,797	**8.33**	104.0	3.00	88.84	9.79	0.00	0.00	0.00	98.63	0.00
56	8,054	8,054	**7.87**	104.0	3.00	89.12	9.97	0.00	0.00	0.00	99.09	0.00
57	7,623	7,623	**8.66**	104.0	3.00	88.64	9.66	0.00	0.00	0.00	98.31	0.00
58	4,928	4,928	**14.68**	104.0	3.00	84.85	7.43	0.00	0.00	0.00	92.28	0.00
59	8,313	8,314	**7.42**	104.0	3.00	89.40	10.15	0.00	0.00	0.00	99.55	0.00
60	9,381	9,381	**5.66**	104.0	3.00	90.45	10.85	0.00	0.00	0.00	101.30	0.00
61	9,702	9,702	**5.17**	104.0	3.00	90.74	11.05	0.00	0.00	0.00	101.79	0.00
62	8,711	8,711	**6.74**	104.0	3.00	89.80	10.42	0.00	0.00	0.00	100.22	0.00
63	8,888	8,888	**6.45**	104.0	3.00	89.98	10.54	0.00	0.00	0.00	100.51	0.00
64	10,075	10,076	**4.62**	104.0	3.00	91.07	11.28	0.00	0.00	0.00	102.34	0.00
65	10,704	10,704	**3.72**	104.0	3.00	91.59	11.65	0.00	0.00	0.00	103.24	0.00
66	2,226	2,227	**24.67**	104.0	3.00	77.95	4.34	0.00	0.00	0.00	82.29	0.00
67	10,263	10,264	**4.35**	104.0	3.00	91.23	11.39	0.00	0.00	0.00	102.62	0.00
68	10,788	10,788	**3.61**	104.0	3.00	91.66	11.70	0.00	0.00	0.00	103.35	0.00
69	10,577	10,578	**3.90**	104.0	3.00	91.49	11.57	0.00	0.00	0.00	103.06	0.00
70	1,670	1,672	**27.97**	104.0	3.00	75.47	3.52	0.00	0.00	0.00	78.99	0.00
71	2,438	2,441	**23.58**	104.0	3.00	78.75	4.63	0.00	0.00	0.00	83.38	0.00
72	4,447	4,447	**16.05**	104.0	3.00	83.96	6.96	0.00	0.00	0.00	90.92	0.00
73	3,345	3,347	**19.71**	104.0	3.00	81.49	5.76	0.00	0.00	0.00	87.25	0.00
74	2,692	2,695	**22.39**	104.0	3.00	79.61	4.96	0.00	0.00	0.00	84.57	0.00
75	3,637	3,638	**18.65**	104.0	3.00	82.22	6.09	0.00	0.00	0.00	88.31	0.00
76	6,792	6,793	**10.29**	104.0	3.00	87.64	9.04	0.00	0.00	0.00	96.68	0.00
77	6,633	6,633	**10.62**	104.0	3.00	87.43	8.91	0.00	0.00	0.00	96.34	0.00
78	1,016	1,021	**33.36**	104.0	3.00	71.18	2.42	0.00	0.00	0.00	73.60	0.00
80	9,000	9,000	**6.27**	104.0	3.00	90.08	10.61	0.00	0.00	0.00	100.69	0.00
81	2,384	2,387	**23.85**	104.0	3.00	78.56	4.56	0.00	0.00	0.00	83.11	0.00
82	5,496	5,496	**13.21**	104.0	3.00	85.80	7.95	0.00	0.00	0.00	93.75	0.00
83	9,528	9,529	**5.44**	104.0	3.00	90.58	10.94	0.00	0.00	0.00	101.53	0.00
85	7,091	7,091	**9.68**	104.0	3.00	88.01	9.27	0.00	0.00	0.00	97.28	0.00
86	8,737	8,737	**6.70**	104.0	3.00	89.83	10.44	0.00	0.00	0.00	100.26	0.00
87	10,939	10,939	**3.40**	104.0	3.00	91.78	11.78	0.00	0.00	0.00	103.56	0.00
89	9,647	9,647	**5.26**	104.0	3.00	90.69	11.02	0.00	0.00	0.00	101.71	0.00
90	7,715	7,715	**8.48**	104.0	3.00	88.75	9.73	0.00	0.00	0.00	98.48	0.00
91	8,737	8,738	**6.70**	104.0	3.00	89.83	10.44	0.00	0.00	0.00	100.26	0.00
92	10,236	10,236	**4.38**	104.0	3.00	91.20	11.37	0.00	0.00	0.00	102.58	0.00
94	2,286	2,290	**24.34**	104.0	3.00	78.20	4.42	0.00	0.00	0.00	82.62	0.00
95	3,334	3,336	**19.75**	104.0	3.00	81.46	5.75	0.00	0.00	0.00	87.21	0.00
97	1,442	1,449	**29.58**	104.0	3.00	74.22	3.16	0.00	0.00	0.00	77.38	0.00
98	2,667	2,670	**22.50**	104.0	3.00	79.53	4.93	0.00	0.00	0.00	84.46	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	4,281	4,282	**16.54**	104.0	3.00	83.63	6.79	0.00	0.00	0.00	90.42	0.00
100	4,327	4,328	**16.40**	104.0	3.00	83.73	6.83	0.00	0.00	0.00	90.56	0.00
101	2,744	2,747	**22.16**	104.0	3.00	79.78	5.03	0.00	0.00	0.00	84.81	0.00
102	3,453	3,455	**19.30**	104.0	3.00	81.77	5.89	0.00	0.00	0.00	87.66	0.00
103	3,573	3,575	**18.87**	104.0	3.00	82.07	6.02	0.00	0.00	0.00	88.09	0.00
104	3,436	3,438	**19.37**	104.0	3.00	81.73	5.87	0.00	0.00	0.00	87.59	0.00
107	1,559	1,564	**28.72**	104.0	3.00	74.89	3.35	0.00	0.00	0.00	78.24	0.00
108	5,122	5,123	**14.16**	104.0	3.00	85.19	7.61	0.00	0.00	0.00	92.80	0.00
109	8,561	8,562	**6.99**	104.0	3.00	89.65	10.32	0.00	0.00	0.00	99.97	0.00
110	5,923	5,923	**12.19**	104.0	3.00	86.45	8.32	0.00	0.00	0.00	94.78	0.00
111	6,446	6,446	**11.02**	104.0	3.00	87.19	8.76	0.00	0.00	0.00	95.95	0.00
113	1,842	1,846	**26.85**	104.0	3.00	76.32	3.78	0.00	0.00	0.00	80.11	0.00
114	7,284	7,284	**9.30**	104.0	3.00	88.25	9.41	0.00	0.00	0.00	97.66	0.00
115	3,798	3,799	**18.09**	104.0	3.00	82.59	6.27	0.00	0.00	0.00	88.87	0.00
116	2,269	2,272	**24.43**	104.0	3.00	78.13	4.40	0.00	0.00	0.00	82.53	0.00
118	8,998	8,999	**6.27**	104.0	3.00	90.08	10.61	0.00	0.00	0.00	100.69	0.00
119	2,477	2,480	**23.39**	104.0	3.00	78.89	4.68	0.00	0.00	0.00	83.57	0.00
120	3,058	3,061	**20.83**	104.0	3.00	80.72	5.42	0.00	0.00	0.00	86.14	0.00
121	2,040	2,043	**25.68**	104.0	3.00	77.21	4.08	0.00	0.00	0.00	81.28	0.00
125	9,231	9,231	**5.90**	104.0	3.00	90.31	10.76	0.00	0.00	0.00	101.06	0.00
126	5,598	5,598	**12.96**	104.0	3.00	85.96	8.04	0.00	0.00	0.00	94.00	0.00
127	5,840	5,841	**12.38**	104.0	3.00	86.33	8.25	0.00	0.00	0.00	94.58	0.00
128	6,082	6,083	**11.82**	104.0	3.00	86.68	8.46	0.00	0.00	0.00	95.14	0.00
129	689	695	**37.34**	104.0	3.00	67.83	1.79	0.00	0.00	0.00	69.62	0.00
130	1,233	1,236	**31.32**	104.0	3.00	72.84	2.80	0.00	0.00	0.00	75.64	0.00
131	1,195	1,198	**31.65**	104.0	3.00	72.57	2.74	0.00	0.00	0.00	75.31	0.00
132	1,127	1,130	**32.29**	104.0	3.00	72.06	2.62	0.00	0.00	0.00	74.68	0.00
133	4,432	4,432	**16.09**	104.0	3.00	83.93	6.94	0.00	0.00	0.00	90.87	0.00
134	1,678	1,680	**27.92**	104.0	3.00	75.51	3.53	0.00	0.00	0.00	79.04	0.00
141	1,653	1,659	**28.07**	104.0	3.00	75.40	3.50	0.00	0.00	0.00	78.89	0.00
142	3,177	3,180	**20.35**	104.0	3.00	81.05	5.56	0.00	0.00	0.00	86.61	0.00
143	1,484	1,490	**29.27**	104.0	3.00	74.47	3.23	0.00	0.00	0.00	77.70	0.00
144	4,311	4,312	**16.45**	104.0	3.00	83.69	6.82	0.00	0.00	0.00	90.51	0.00
145	7,248	7,248	**9.37**	104.0	3.00	88.20	9.39	0.00	0.00	0.00	97.59	0.00
146	6,956	6,956	**9.95**	104.0	3.00	87.85	9.16	0.00	0.00	0.00	97.01	0.00

Sum 44.44

Noise sensitive area: H22 H22

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	3,275	3,276	**19.98**	104.0	3.00	81.31	5.68	0.00	0.00	0.00	86.99	0.00
2	3,488	3,489	**19.18**	104.0	3.00	81.85	5.93	0.00	0.00	0.00	87.78	0.00
3	3,289	3,290	**19.92**	104.0	3.00	81.34	5.70	0.00	0.00	0.00	87.04	0.00
4	3,867	3,867	**17.87**	104.0	3.00	82.75	6.35	0.00	0.00	0.00	89.10	0.00
5	3,063	3,064	**20.81**	104.0	3.00	80.73	5.43	0.00	0.00	0.00	86.15	0.00
6	2,876	2,878	**21.59**	104.0	3.00	80.18	5.19	0.00	0.00	0.00	85.38	0.00
7	1,624	1,628	**28.28**	104.0	3.00	75.23	3.45	0.00	0.00	0.00	78.68	0.00
8	3,757	3,757	**18.24**	104.0	3.00	82.50	6.23	0.00	0.00	0.00	88.73	0.00
9	2,781	2,783	**22.00**	104.0	3.00	79.89	5.08	0.00	0.00	0.00	84.97	0.00
10	2,264	2,267	**24.46**	104.0	3.00	78.11	4.39	0.00	0.00	0.00	82.50	0.00
11	3,247	3,249	**20.08**	104.0	3.00	81.24	5.65	0.00	0.00	0.00	86.88	0.00
12	3,095	3,097	**20.68**	104.0	3.00	80.82	5.47	0.00	0.00	0.00	86.29	0.00
13	2,619	2,622	**22.72**	104.0	3.00	79.37	4.87	0.00	0.00	0.00	84.24	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	2,188	2,192	**24.86**	104.0	3.00	77.82	4.29	0.00	0.00	0.00	82.10	0.00
15	1,589	1,594	**28.52**	104.0	3.00	75.05	3.40	0.00	0.00	0.00	78.44	0.00
16	1,537	1,541	**28.89**	104.0	3.00	74.76	3.31	0.00	0.00	0.00	78.07	0.00
17	3,455	3,457	**19.30**	104.0	3.00	81.77	5.89	0.00	0.00	0.00	87.66	0.00
18	3,548	3,550	**18.96**	104.0	3.00	82.00	6.00	0.00	0.00	0.00	88.00	0.00
19	2,357	2,360	**23.98**	104.0	3.00	78.46	4.52	0.00	0.00	0.00	82.98	0.00
20	1,267	1,271	**31.01**	104.0	3.00	73.08	2.87	0.00	0.00	0.00	75.95	0.00
21	3,294	3,295	**19.90**	104.0	3.00	81.36	5.70	0.00	0.00	0.00	87.06	0.00
22	3,946	3,946	**17.60**	104.0	3.00	82.92	6.43	0.00	0.00	0.00	89.36	0.00
23	4,062	4,063	**17.23**	104.0	3.00	83.18	6.56	0.00	0.00	0.00	89.73	0.00
24	3,904	3,904	**17.74**	104.0	3.00	82.83	6.39	0.00	0.00	0.00	89.22	0.00
25	4,210	4,211	**16.76**	104.0	3.00	83.49	6.71	0.00	0.00	0.00	90.20	0.00
26	2,441	2,443	**23.57**	104.0	3.00	78.76	4.63	0.00	0.00	0.00	83.39	0.00
27	3,382	3,382	**19.57**	104.0	3.00	81.58	5.80	0.00	0.00	0.00	87.39	0.00
28	2,445	2,447	**23.55**	104.0	3.00	78.77	4.64	0.00	0.00	0.00	83.41	0.00
29	3,576	3,577	**18.87**	104.0	3.00	82.07	6.03	0.00	0.00	0.00	88.10	0.00
30	4,187	4,188	**16.83**	104.0	3.00	83.44	6.69	0.00	0.00	0.00	90.13	0.00
31	4,747	4,747	**15.18**	104.0	3.00	84.53	7.25	0.00	0.00	0.00	91.78	0.00
32	4,671	4,672	**15.39**	104.0	3.00	84.39	7.18	0.00	0.00	0.00	91.57	0.00
33	4,443	4,443	**16.06**	104.0	3.00	83.95	6.95	0.00	0.00	0.00	90.90	0.00
34	1,832	1,835	**26.92**	104.0	3.00	76.27	3.77	0.00	0.00	0.00	80.04	0.00
35	1,509	1,513	**29.10**	104.0	3.00	74.60	3.27	0.00	0.00	0.00	77.87	0.00
36	1,453	1,458	**29.51**	104.0	3.00	74.27	3.18	0.00	0.00	0.00	77.45	0.00
37	2,039	2,041	**25.69**	104.0	3.00	77.20	4.07	0.00	0.00	0.00	81.27	0.00
38	3,810	3,811	**18.05**	104.0	3.00	82.62	6.29	0.00	0.00	0.00	88.91	0.00
39	3,328	3,329	**19.77**	104.0	3.00	81.45	5.74	0.00	0.00	0.00	87.19	0.00
40	2,196	2,197	**24.83**	104.0	3.00	77.84	4.29	0.00	0.00	0.00	82.13	0.00
41	3,196	3,198	**20.28**	104.0	3.00	81.10	5.59	0.00	0.00	0.00	86.68	0.00
43	2,209	2,211	**24.75**	104.0	3.00	77.89	4.31	0.00	0.00	0.00	82.21	0.00
44	3,187	3,189	**20.31**	104.0	3.00	81.07	5.58	0.00	0.00	0.00	86.65	0.00
45	3,492	3,494	**19.16**	104.0	3.00	81.87	5.93	0.00	0.00	0.00	87.80	0.00
46	2,197	2,199	**24.82**	104.0	3.00	77.84	4.30	0.00	0.00	0.00	82.14	0.00
48	5,030	5,030	**14.41**	104.0	3.00	85.03	7.52	0.00	0.00	0.00	92.56	0.00
49	5,746	5,746	**12.60**	104.0	3.00	86.19	8.17	0.00	0.00	0.00	94.36	0.00
50	2,092	2,094	**25.39**	104.0	3.00	77.42	4.15	0.00	0.00	0.00	81.57	0.00
51	5,396	5,396	**13.46**	104.0	3.00	85.64	7.86	0.00	0.00	0.00	93.50	0.00
52	5,193	5,193	**13.98**	104.0	3.00	85.31	7.68	0.00	0.00	0.00	92.98	0.00
53	5,995	5,995	**12.02**	104.0	3.00	86.56	8.39	0.00	0.00	0.00	94.94	0.00
55	7,154	7,154	**9.56**	104.0	3.00	88.09	9.31	0.00	0.00	0.00	97.41	0.00
56	7,418	7,418	**9.04**	104.0	3.00	88.41	9.51	0.00	0.00	0.00	97.92	0.00
57	7,017	7,017	**9.83**	104.0	3.00	87.92	9.21	0.00	0.00	0.00	97.13	0.00
58	4,221	4,221	**16.73**	104.0	3.00	83.51	6.72	0.00	0.00	0.00	90.23	0.00
59	7,684	7,684	**8.54**	104.0	3.00	88.71	9.71	0.00	0.00	0.00	98.42	0.00
60	8,798	8,798	**6.60**	104.0	3.00	89.89	10.48	0.00	0.00	0.00	100.36	0.00
61	9,125	9,125	**6.07**	104.0	3.00	90.21	10.69	0.00	0.00	0.00	100.89	0.00
62	8,233	8,233	**7.56**	104.0	3.00	89.31	10.10	0.00	0.00	0.00	99.41	0.00
63	8,483	8,483	**7.12**	104.0	3.00	89.57	10.27	0.00	0.00	0.00	99.84	0.00
64	9,717	9,718	**5.15**	104.0	3.00	90.75	11.06	0.00	0.00	0.00	101.81	0.00
65	10,340	10,340	**4.24**	104.0	3.00	91.29	11.44	0.00	0.00	0.00	102.73	0.00
66	1,929	1,930	**26.34**	104.0	3.00	76.71	3.91	0.00	0.00	0.00	80.62	0.00
67	9,851	9,852	**4.95**	104.0	3.00	90.87	11.14	0.00	0.00	0.00	102.01	0.00
68	10,383	10,383	**4.17**	104.0	3.00	91.33	11.46	0.00	0.00	0.00	102.79	0.00
69	10,226	10,226	**4.40**	104.0	3.00	91.19	11.37	0.00	0.00	0.00	102.56	0.00
70	2,053	2,054	**25.62**	104.0	3.00	77.25	4.09	0.00	0.00	0.00	81.34	0.00
71	2,122	2,125	**25.22**	104.0	3.00	77.55	4.19	0.00	0.00	0.00	81.74	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	3,871	3,872	**17.85**	104.0	3.00	82.76	6.35	0.00	0.00	0.00	89.11	0.00
73	2,795	2,796	**21.94**	104.0	3.00	79.93	5.09	0.00	0.00	0.00	85.02	0.00
74	2,029	2,032	**25.74**	104.0	3.00	77.16	4.06	0.00	0.00	0.00	81.22	0.00
75	2,923	2,923	**21.39**	104.0	3.00	80.32	5.25	0.00	0.00	0.00	85.57	0.00
76	6,192	6,192	**11.57**	104.0	3.00	86.84	8.55	0.00	0.00	0.00	95.39	0.00
77	5,979	5,979	**12.06**	104.0	3.00	86.53	8.37	0.00	0.00	0.00	94.91	0.00
78	856	861	**35.14**	104.0	3.00	69.70	2.12	0.00	0.00	0.00	71.82	0.00
80	8,412	8,412	**7.25**	104.0	3.00	89.50	10.22	0.00	0.00	0.00	99.72	0.00
81	2,590	2,592	**22.86**	104.0	3.00	79.27	4.83	0.00	0.00	0.00	84.10	0.00
82	4,785	4,785	**15.08**	104.0	3.00	84.60	7.29	0.00	0.00	0.00	91.89	0.00
83	9,123	9,123	**6.07**	104.0	3.00	90.20	10.69	0.00	0.00	0.00	100.89	0.00
85	6,387	6,387	**11.14**	104.0	3.00	87.11	8.71	0.00	0.00	0.00	95.82	0.00
86	8,143	8,144	**7.71**	104.0	3.00	89.22	10.03	0.00	0.00	0.00	99.25	0.00
87	10,572	10,572	**3.91**	104.0	3.00	91.48	11.57	0.00	0.00	0.00	103.05	0.00
89	9,274	9,274	**5.83**	104.0	3.00	90.35	10.78	0.00	0.00	0.00	101.13	0.00
90	7,164	7,164	**9.54**	104.0	3.00	88.10	9.32	0.00	0.00	0.00	97.43	0.00
91	8,290	8,291	**7.46**	104.0	3.00	89.37	10.13	0.00	0.00	0.00	99.51	0.00
92	9,932	9,932	**4.83**	104.0	3.00	90.94	11.19	0.00	0.00	0.00	102.13	0.00
94	2,162	2,166	**25.00**	104.0	3.00	77.71	4.25	0.00	0.00	0.00	81.96	0.00
95	3,319	3,321	**19.80**	104.0	3.00	81.43	5.73	0.00	0.00	0.00	87.16	0.00
97	946	955	**34.06**	104.0	3.00	70.60	2.30	0.00	0.00	0.00	72.90	0.00
98	2,594	2,597	**22.84**	104.0	3.00	79.29	4.84	0.00	0.00	0.00	84.12	0.00
99	3,843	3,844	**17.94**	104.0	3.00	82.70	6.32	0.00	0.00	0.00	89.02	0.00
100	3,775	3,776	**18.17**	104.0	3.00	82.54	6.25	0.00	0.00	0.00	88.79	0.00
101	2,994	2,996	**21.09**	104.0	3.00	80.53	5.34	0.00	0.00	0.00	85.87	0.00
102	2,905	2,907	**21.46**	104.0	3.00	80.27	5.23	0.00	0.00	0.00	85.50	0.00
103	3,832	3,834	**17.98**	104.0	3.00	82.67	6.31	0.00	0.00	0.00	88.99	0.00
104	2,815	2,817	**21.85**	104.0	3.00	80.00	5.12	0.00	0.00	0.00	85.11	0.00
107	1,648	1,652	**28.12**	104.0	3.00	75.36	3.49	0.00	0.00	0.00	78.85	0.00
108	4,668	4,668	**15.40**	104.0	3.00	84.38	7.18	0.00	0.00	0.00	91.56	0.00
109	7,941	7,941	**8.07**	104.0	3.00	89.00	9.89	0.00	0.00	0.00	98.89	0.00
110	5,290	5,291	**13.73**	104.0	3.00	85.47	7.77	0.00	0.00	0.00	93.24	0.00
111	5,834	5,834	**12.40**	104.0	3.00	86.32	8.25	0.00	0.00	0.00	94.57	0.00
113	1,975	1,979	**26.05**	104.0	3.00	76.93	3.98	0.00	0.00	0.00	80.91	0.00
114	6,585	6,585	**10.72**	104.0	3.00	87.37	8.87	0.00	0.00	0.00	96.24	0.00
115	3,602	3,603	**18.77**	104.0	3.00	82.13	6.06	0.00	0.00	0.00	88.19	0.00
116	1,658	1,662	**28.04**	104.0	3.00	75.41	3.50	0.00	0.00	0.00	78.92	0.00
118	8,386	8,386	**7.29**	104.0	3.00	89.47	10.20	0.00	0.00	0.00	99.67	0.00
119	1,942	1,945	**26.25**	104.0	3.00	76.78	3.93	0.00	0.00	0.00	80.71	0.00
120	3,362	3,364	**19.64**	104.0	3.00	81.54	5.78	0.00	0.00	0.00	87.32	0.00
121	1,427	1,431	**29.71**	104.0	3.00	74.12	3.13	0.00	0.00	0.00	77.25	0.00
125	8,827	8,827	**6.55**	104.0	3.00	89.92	10.50	0.00	0.00	0.00	100.41	0.00
126	5,092	5,093	**14.24**	104.0	3.00	85.14	7.58	0.00	0.00	0.00	92.72	0.00
127	5,332	5,333	**13.62**	104.0	3.00	85.54	7.80	0.00	0.00	0.00	93.34	0.00
128	5,559	5,560	**13.05**	104.0	3.00	85.90	8.01	0.00	0.00	0.00	93.91	0.00
129	931	934	**34.30**	104.0	3.00	70.41	2.26	0.00	0.00	0.00	72.66	0.00
130	1,565	1,567	**28.71**	104.0	3.00	74.90	3.35	0.00	0.00	0.00	78.26	0.00
131	1,709	1,711	**27.72**	104.0	3.00	75.66	3.58	0.00	0.00	0.00	79.24	0.00
132	1,763	1,764	**27.37**	104.0	3.00	75.93	3.66	0.00	0.00	0.00	79.59	0.00
133	3,799	3,800	**18.09**	104.0	3.00	82.60	6.27	0.00	0.00	0.00	88.87	0.00
134	1,963	1,965	**26.14**	104.0	3.00	76.87	3.96	0.00	0.00	0.00	80.83	0.00
141	1,093	1,101	**32.56**	104.0	3.00	71.84	2.57	0.00	0.00	0.00	74.40	0.00
142	2,619	2,622	**22.72**	104.0	3.00	79.37	4.87	0.00	0.00	0.00	84.24	0.00
143	1,165	1,172	**31.89**	104.0	3.00	72.38	2.69	0.00	0.00	0.00	75.07	0.00
144	3,808	3,810	**18.06**	104.0	3.00	82.62	6.29	0.00	0.00	0.00	88.90	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	6,693	6,694	**10.49**	104.0	3.00	87.51	8.96	0.00	0.00	0.00	96.47	0.00
146	6,393	6,394	**11.13**	104.0	3.00	87.11	8.72	0.00	0.00	0.00	95.83	0.00
Sum	45.12											

Noise sensitive area: H23 H23

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	4,124	4,125	**17.03**	104.0	3.00	83.31	6.62	0.00	0.00	0.00	89.93	0.00
2	4,268	4,269	**16.58**	104.0	3.00	83.61	6.77	0.00	0.00	0.00	90.38	0.00
3	3,970	3,971	**17.52**	104.0	3.00	82.98	6.46	0.00	0.00	0.00	89.44	0.00
4	4,195	4,196	**16.81**	104.0	3.00	83.46	6.70	0.00	0.00	0.00	90.15	0.00
5	3,447	3,448	**19.33**	104.0	3.00	81.75	5.88	0.00	0.00	0.00	87.63	0.00
6	3,476	3,478	**19.22**	104.0	3.00	81.83	5.91	0.00	0.00	0.00	87.74	0.00
7	1,603	1,607	**28.43**	104.0	3.00	75.12	3.42	0.00	0.00	0.00	78.54	0.00
8	4,656	4,656	**15.44**	104.0	3.00	84.36	7.16	0.00	0.00	0.00	91.52	0.00
9	3,605	3,607	**18.76**	104.0	3.00	82.14	6.06	0.00	0.00	0.00	88.20	0.00
10	3,153	3,156	**20.44**	104.0	3.00	80.98	5.54	0.00	0.00	0.00	86.52	0.00
11	4,243	4,245	**16.66**	104.0	3.00	83.56	6.75	0.00	0.00	0.00	90.30	0.00
12	4,087	4,089	**17.14**	104.0	3.00	83.23	6.59	0.00	0.00	0.00	89.82	0.00
13	3,608	3,610	**18.75**	104.0	3.00	82.15	6.06	0.00	0.00	0.00	88.21	0.00
14	3,176	3,179	**20.35**	104.0	3.00	81.05	5.56	0.00	0.00	0.00	86.61	0.00
15	2,516	2,520	**23.20**	104.0	3.00	79.03	4.73	0.00	0.00	0.00	83.76	0.00
16	2,368	2,371	**23.93**	104.0	3.00	78.50	4.53	0.00	0.00	0.00	83.03	0.00
17	4,452	4,453	**16.03**	104.0	3.00	83.97	6.96	0.00	0.00	0.00	90.94	0.00
18	4,544	4,546	**15.76**	104.0	3.00	84.15	7.05	0.00	0.00	0.00	91.21	0.00
19	3,355	3,357	**19.67**	104.0	3.00	81.52	5.77	0.00	0.00	0.00	87.29	0.00
20	2,254	2,257	**24.51**	104.0	3.00	78.07	4.38	0.00	0.00	0.00	82.45	0.00
21	3,505	3,506	**19.12**	104.0	3.00	81.90	5.95	0.00	0.00	0.00	87.84	0.00
22	3,995	3,995	**17.45**	104.0	3.00	83.03	6.49	0.00	0.00	0.00	89.52	0.00
23	4,017	4,017	**17.37**	104.0	3.00	83.08	6.51	0.00	0.00	0.00	89.59	0.00
24	4,015	4,015	**17.38**	104.0	3.00	83.07	6.51	0.00	0.00	0.00	89.58	0.00
25	3,625	3,625	**18.69**	104.0	3.00	82.19	6.08	0.00	0.00	0.00	88.27	0.00
26	2,551	2,552	**23.05**	104.0	3.00	79.14	4.78	0.00	0.00	0.00	83.92	0.00
27	2,811	2,812	**21.87**	104.0	3.00	79.98	5.11	0.00	0.00	0.00	85.09	0.00
28	1,829	1,831	**26.94**	104.0	3.00	76.26	3.76	0.00	0.00	0.00	80.02	0.00
29	3,446	3,447	**19.34**	104.0	3.00	81.75	5.88	0.00	0.00	0.00	87.63	0.00
30	4,030	4,031	**17.33**	104.0	3.00	83.11	6.52	0.00	0.00	0.00	89.63	0.00
31	4,780	4,780	**15.09**	104.0	3.00	84.59	7.28	0.00	0.00	0.00	91.87	0.00
32	4,111	4,112	**17.07**	104.0	3.00	83.28	6.61	0.00	0.00	0.00	89.89	0.00
33	4,148	4,149	**16.96**	104.0	3.00	83.36	6.65	0.00	0.00	0.00	90.01	0.00
34	1,623	1,626	**28.29**	104.0	3.00	75.22	3.45	0.00	0.00	0.00	78.67	0.00
35	1,676	1,680	**27.92**	104.0	3.00	75.51	3.53	0.00	0.00	0.00	79.04	0.00
36	1,805	1,809	**27.08**	104.0	3.00	76.15	3.73	0.00	0.00	0.00	79.88	0.00
37	1,672	1,675	**27.96**	104.0	3.00	75.48	3.52	0.00	0.00	0.00	79.00	0.00
38	3,211	3,211	**20.23**	104.0	3.00	81.13	5.60	0.00	0.00	0.00	86.74	0.00
39	2,571	2,572	**22.95**	104.0	3.00	79.21	4.80	0.00	0.00	0.00	84.01	0.00
40	1,199	1,201	**31.62**	104.0	3.00	72.59	2.74	0.00	0.00	0.00	75.34	0.00
41	2,374	2,377	**23.90**	104.0	3.00	78.52	4.54	0.00	0.00	0.00	83.06	0.00
43	1,585	1,588	**28.56**	104.0	3.00	75.02	3.39	0.00	0.00	0.00	78.41	0.00
44	2,280	2,283	**24.38**	104.0	3.00	78.17	4.41	0.00	0.00	0.00	82.58	0.00
45	2,583	2,586	**22.89**	104.0	3.00	79.25	4.82	0.00	0.00	0.00	84.07	0.00
46	1,249	1,252	**31.18**	104.0	3.00	72.95	2.83	0.00	0.00	0.00	75.78	0.00
48	4,345	4,345	**16.35**	104.0	3.00	83.76	6.85	0.00	0.00	0.00	90.61	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	5,183	5,183	**14.00**	104.0	3.00	85.29	7.67	0.00	0.00	0.00	92.96	0.00
50	2,517	2,519	**23.20**	104.0	3.00	79.02	4.73	0.00	0.00	0.00	83.76	0.00
51	4,888	4,889	**14.79**	104.0	3.00	84.78	7.39	0.00	0.00	0.00	92.17	0.00
52	4,730	4,730	**15.23**	104.0	3.00	84.50	7.24	0.00	0.00	0.00	91.73	0.00
53	5,397	5,397	**13.46**	104.0	3.00	85.64	7.86	0.00	0.00	0.00	93.50	0.00
55	6,434	6,434	**11.04**	104.0	3.00	87.17	8.75	0.00	0.00	0.00	95.92	0.00
56	6,681	6,682	**10.52**	104.0	3.00	87.50	8.95	0.00	0.00	0.00	96.45	0.00
57	6,221	6,221	**11.51**	104.0	3.00	86.88	8.58	0.00	0.00	0.00	95.45	0.00
58	3,786	3,786	**18.14**	104.0	3.00	82.56	6.26	0.00	0.00	0.00	88.82	0.00
59	6,932	6,932	**10.00**	104.0	3.00	87.82	9.14	0.00	0.00	0.00	96.96	0.00
60	7,965	7,965	**8.03**	104.0	3.00	89.02	9.91	0.00	0.00	0.00	98.93	0.00
61	8,283	8,283	**7.47**	104.0	3.00	89.36	10.13	0.00	0.00	0.00	99.49	0.00
62	7,293	7,294	**9.28**	104.0	3.00	88.26	9.42	0.00	0.00	0.00	97.68	0.00
63	7,506	7,506	**8.88**	104.0	3.00	88.51	9.58	0.00	0.00	0.00	98.09	0.00
64	8,727	8,728	**6.71**	104.0	3.00	89.82	10.43	0.00	0.00	0.00	100.25	0.00
65	9,351	9,351	**5.71**	104.0	3.00	90.42	10.83	0.00	0.00	0.00	101.25	0.00
66	945	948	**34.14**	104.0	3.00	70.53	2.28	0.00	0.00	0.00	72.82	0.00
67	8,877	8,878	**6.47**	104.0	3.00	89.97	10.53	0.00	0.00	0.00	100.49	0.00
68	9,407	9,407	**5.62**	104.0	3.00	90.47	10.87	0.00	0.00	0.00	101.34	0.00
69	9,234	9,235	**5.89**	104.0	3.00	90.31	10.76	0.00	0.00	0.00	101.07	0.00
70	3,011	3,012	**21.02**	104.0	3.00	80.58	5.36	0.00	0.00	0.00	85.94	0.00
71	2,962	2,964	**21.22**	104.0	3.00	80.44	5.30	0.00	0.00	0.00	85.74	0.00
72	4,288	4,289	**16.52**	104.0	3.00	83.65	6.79	0.00	0.00	0.00	90.44	0.00
73	3,311	3,312	**19.84**	104.0	3.00	81.40	5.72	0.00	0.00	0.00	87.12	0.00
74	2,330	2,333	**24.12**	104.0	3.00	78.36	4.48	0.00	0.00	0.00	82.84	0.00
75	2,821	2,822	**21.83**	104.0	3.00	80.01	5.12	0.00	0.00	0.00	85.14	0.00
76	5,388	5,389	**13.48**	104.0	3.00	85.63	7.85	0.00	0.00	0.00	93.48	0.00
77	5,291	5,291	**13.72**	104.0	3.00	85.47	7.77	0.00	0.00	0.00	93.24	0.00
78	1,845	1,847	**26.85**	104.0	3.00	76.33	3.79	0.00	0.00	0.00	80.12	0.00
80	7,586	7,586	**8.73**	104.0	3.00	88.60	9.64	0.00	0.00	0.00	98.24	0.00
81	3,586	3,588	**18.83**	104.0	3.00	82.10	6.04	0.00	0.00	0.00	88.14	0.00
82	4,381	4,382	**16.24**	104.0	3.00	83.83	6.89	0.00	0.00	0.00	90.72	0.00
83	8,146	8,147	**7.71**	104.0	3.00	89.22	10.04	0.00	0.00	0.00	99.26	0.00
85	5,900	5,900	**12.24**	104.0	3.00	86.42	8.30	0.00	0.00	0.00	94.72	0.00
86	7,326	7,326	**9.22**	104.0	3.00	88.30	9.44	0.00	0.00	0.00	97.74	0.00
87	9,584	9,584	**5.35**	104.0	3.00	90.63	10.98	0.00	0.00	0.00	101.61	0.00
89	8,287	8,288	**7.46**	104.0	3.00	89.37	10.13	0.00	0.00	0.00	99.50	0.00
90	6,290	6,291	**11.36**	104.0	3.00	86.97	8.63	0.00	0.00	0.00	95.61	0.00
91	7,332	7,332	**9.21**	104.0	3.00	88.30	9.45	0.00	0.00	0.00	97.75	0.00
92	8,935	8,935	**6.37**	104.0	3.00	90.02	10.57	0.00	0.00	0.00	100.59	0.00
94	3,108	3,111	**20.62**	104.0	3.00	80.86	5.48	0.00	0.00	0.00	86.34	0.00
95	4,285	4,287	**16.53**	104.0	3.00	83.64	6.79	0.00	0.00	0.00	90.43	0.00
97	1,753	1,758	**27.41**	104.0	3.00	75.90	3.65	0.00	0.00	0.00	79.55	0.00
98	3,549	3,551	**18.96**	104.0	3.00	82.01	6.00	0.00	0.00	0.00	88.01	0.00
99	4,489	4,490	**15.92**	104.0	3.00	84.05	7.00	0.00	0.00	0.00	91.04	0.00
100	2,906	2,907	**21.46**	104.0	3.00	80.27	5.23	0.00	0.00	0.00	85.50	0.00
101	3,988	3,990	**17.46**	104.0	3.00	83.02	6.48	0.00	0.00	0.00	89.50	0.00
102	2,034	2,038	**25.71**	104.0	3.00	77.18	4.07	0.00	0.00	0.00	81.25	0.00
103	4,827	4,829	**14.95**	104.0	3.00	84.68	7.33	0.00	0.00	0.00	92.01	0.00
104	2,078	2,081	**25.47**	104.0	3.00	77.36	4.13	0.00	0.00	0.00	81.49	0.00
107	2,645	2,647	**22.60**	104.0	3.00	79.46	4.90	0.00	0.00	0.00	84.36	0.00
108	5,271	5,271	**13.78**	104.0	3.00	85.44	7.75	0.00	0.00	0.00	93.18	0.00
109	7,171	7,171	**9.52**	104.0	3.00	88.11	9.33	0.00	0.00	0.00	97.44	0.00
110	4,553	4,554	**15.73**	104.0	3.00	84.17	7.06	0.00	0.00	0.00	91.23	0.00
111	5,052	5,053	**14.35**	104.0	3.00	85.07	7.54	0.00	0.00	0.00	92.62	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	2,973	2,975	**21.18**	104.0	3.00	80.47	5.32	0.00	0.00	0.00	85.79	0.00
114	6,065	6,065	**11.86**	104.0	3.00	86.66	8.44	0.00	0.00	0.00	95.10	0.00
115	4,479	4,480	**15.95**	104.0	3.00	84.03	6.99	0.00	0.00	0.00	91.01	0.00
116	951	958	**34.03**	104.0	3.00	70.63	2.30	0.00	0.00	0.00	72.93	0.00
118	7,599	7,600	**8.70**	104.0	3.00	88.62	9.65	0.00	0.00	0.00	98.26	0.00
119	2,552	2,554	**23.04**	104.0	3.00	79.14	4.78	0.00	0.00	0.00	83.92	0.00
120	4,350	4,351	**16.33**	104.0	3.00	83.77	6.86	0.00	0.00	0.00	90.63	0.00
121	1,961	1,964	**26.14**	104.0	3.00	76.86	3.96	0.00	0.00	0.00	80.82	0.00
125	7,849	7,850	**8.24**	104.0	3.00	88.90	9.83	0.00	0.00	0.00	98.72	0.00
126	4,172	4,173	**16.88**	104.0	3.00	83.41	6.67	0.00	0.00	0.00	90.08	0.00
127	4,415	4,415	**16.14**	104.0	3.00	83.90	6.92	0.00	0.00	0.00	90.82	0.00
128	4,656	4,656	**15.44**	104.0	3.00	84.36	7.16	0.00	0.00	0.00	91.52	0.00
129	1,027	1,030	**33.27**	104.0	3.00	71.26	2.44	0.00	0.00	0.00	73.70	0.00
130	1,400	1,402	**29.94**	104.0	3.00	73.94	3.09	0.00	0.00	0.00	77.02	0.00
131	1,766	1,768	**27.35**	104.0	3.00	75.95	3.67	0.00	0.00	0.00	79.62	0.00
132	2,026	2,028	**25.77**	104.0	3.00	77.14	4.05	0.00	0.00	0.00	81.19	0.00
133	3,073	3,074	**20.77**	104.0	3.00	80.75	5.44	0.00	0.00	0.00	86.19	0.00
134	2,946	2,947	**21.29**	104.0	3.00	80.39	5.28	0.00	0.00	0.00	85.67	0.00
141	1,790	1,795	**27.17**	104.0	3.00	76.08	3.71	0.00	0.00	0.00	79.79	0.00
142	1,764	1,769	**27.34**	104.0	3.00	75.95	3.67	0.00	0.00	0.00	79.62	0.00
143	2,074	2,078	**25.48**	104.0	3.00	77.35	4.13	0.00	0.00	0.00	81.48	0.00
144	2,885	2,887	**21.55**	104.0	3.00	80.21	5.21	0.00	0.00	0.00	85.41	0.00
145	5,824	5,824	**12.42**	104.0	3.00	86.30	8.24	0.00	0.00	0.00	94.54	0.00
146	5,534	5,535	**13.11**	104.0	3.00	85.86	7.99	0.00	0.00	0.00	93.85	0.00
Sum	44.31											

Noise sensitive area: H24 H24

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	6,348	6,349	**11.23**	104.0	3.00	87.05	8.68	0.00	0.00	0.00	95.73	0.00
2	6,351	6,352	**11.22**	104.0	3.00	87.06	8.68	0.00	0.00	0.00	95.74	0.00
3	5,897	5,897	**12.25**	104.0	3.00	86.41	8.30	0.00	0.00	0.00	94.72	0.00
4	5,411	5,411	**13.42**	104.0	3.00	85.67	7.87	0.00	0.00	0.00	93.54	0.00
5	4,916	4,916	**14.71**	104.0	3.00	84.83	7.42	0.00	0.00	0.00	92.25	0.00
6	5,322	5,322	**13.65**	104.0	3.00	85.52	7.79	0.00	0.00	0.00	93.32	0.00
7	3,165	3,167	**20.40**	104.0	3.00	81.01	5.55	0.00	0.00	0.00	86.56	0.00
8	6,958	6,958	**9.95**	104.0	3.00	87.85	9.17	0.00	0.00	0.00	97.02	0.00
9	5,818	5,819	**12.43**	104.0	3.00	86.30	8.23	0.00	0.00	0.00	94.53	0.00
10	5,510	5,512	**13.17**	104.0	3.00	85.83	7.96	0.00	0.00	0.00	93.79	0.00
11	6,815	6,816	**10.24**	104.0	3.00	87.67	9.05	0.00	0.00	0.00	96.72	0.00
12	6,640	6,641	**10.60**	104.0	3.00	87.44	8.92	0.00	0.00	0.00	96.36	0.00
13	6,154	6,155	**11.66**	104.0	3.00	86.78	8.52	0.00	0.00	0.00	95.30	0.00
14	5,727	5,728	**12.65**	104.0	3.00	86.16	8.16	0.00	0.00	0.00	94.32	0.00
15	4,974	4,976	**14.55**	104.0	3.00	84.94	7.47	0.00	0.00	0.00	92.41	0.00
16	4,710	4,712	**15.28**	104.0	3.00	84.46	7.22	0.00	0.00	0.00	91.68	0.00
17	7,034	7,035	**9.79**	104.0	3.00	87.94	9.22	0.00	0.00	0.00	97.17	0.00
18	7,153	7,154	**9.56**	104.0	3.00	88.09	9.31	0.00	0.00	0.00	97.41	0.00
19	5,948	5,950	**12.13**	104.0	3.00	86.49	8.35	0.00	0.00	0.00	94.84	0.00
20	4,822	4,824	**14.97**	104.0	3.00	84.67	7.33	0.00	0.00	0.00	91.99	0.00
21	4,631	4,632	**15.51**	104.0	3.00	84.31	7.14	0.00	0.00	0.00	91.45	0.00
22	4,651	4,651	**15.45**	104.0	3.00	84.35	7.16	0.00	0.00	0.00	91.51	0.00
23	4,447	4,447	**16.04**	104.0	3.00	83.96	6.96	0.00	0.00	0.00	90.92	0.00
24	4,805	4,805	**15.02**	104.0	3.00	84.63	7.31	0.00	0.00	0.00	91.94	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	2,643	2,644	**22.62**	104.0	3.00	79.44	4.90	0.00	0.00	0.00	84.34	0.00
26	3,800	3,800	**18.09**	104.0	3.00	82.60	6.28	0.00	0.00	0.00	88.87	0.00
27	2,291	2,292	**24.33**	104.0	3.00	78.20	4.43	0.00	0.00	0.00	82.63	0.00
28	2,019	2,021	**25.81**	104.0	3.00	77.11	4.04	0.00	0.00	0.00	81.15	0.00
29	3,848	3,848	**17.93**	104.0	3.00	82.71	6.33	0.00	0.00	0.00	89.03	0.00
30	4,181	4,181	**16.85**	104.0	3.00	83.43	6.68	0.00	0.00	0.00	90.11	0.00
31	5,229	5,229	**13.88**	104.0	3.00	85.37	7.71	0.00	0.00	0.00	93.08	0.00
32	3,053	3,053	**20.85**	104.0	3.00	80.70	5.41	0.00	0.00	0.00	86.11	0.00
33	3,899	3,900	**17.76**	104.0	3.00	82.82	6.38	0.00	0.00	0.00	89.20	0.00
34	2,881	2,883	**21.56**	104.0	3.00	80.20	5.20	0.00	0.00	0.00	85.40	0.00
35	3,443	3,445	**19.34**	104.0	3.00	81.74	5.88	0.00	0.00	0.00	87.62	0.00
36	3,733	3,735	**18.31**	104.0	3.00	82.45	6.20	0.00	0.00	0.00	88.65	0.00
37	2,601	2,602	**22.81**	104.0	3.00	79.31	4.84	0.00	0.00	0.00	84.15	0.00
38	2,362	2,362	**23.97**	104.0	3.00	78.47	4.52	0.00	0.00	0.00	82.99	0.00
39	1,520	1,522	**29.03**	104.0	3.00	74.65	3.28	0.00	0.00	0.00	77.93	0.00
40	1,531	1,533	**28.95**	104.0	3.00	74.71	3.30	0.00	0.00	0.00	78.01	0.00
41	1,211	1,215	**31.50**	104.0	3.00	72.69	2.77	0.00	0.00	0.00	75.46	0.00
43	2,045	2,048	**25.66**	104.0	3.00	77.22	4.08	0.00	0.00	0.00	81.31	0.00
44	767	776	**36.22**	104.0	3.00	68.80	1.95	0.00	0.00	0.00	70.75	0.00
45	685	694	**37.35**	104.0	3.00	67.83	1.78	0.00	0.00	0.00	69.62	0.00
46	1,430	1,432	**29.71**	104.0	3.00	74.12	3.14	0.00	0.00	0.00	77.26	0.00
48	2,777	2,777	**22.02**	104.0	3.00	79.87	5.07	0.00	0.00	0.00	84.94	0.00
49	3,874	3,874	**17.84**	104.0	3.00	82.76	6.36	0.00	0.00	0.00	89.12	0.00
50	4,287	4,288	**16.52**	104.0	3.00	83.65	6.79	0.00	0.00	0.00	90.44	0.00
51	3,815	3,816	**18.04**	104.0	3.00	82.63	6.29	0.00	0.00	0.00	88.92	0.00
52	3,833	3,833	**17.98**	104.0	3.00	82.67	6.31	0.00	0.00	0.00	88.98	0.00
53	3,939	3,939	**17.63**	104.0	3.00	82.91	6.43	0.00	0.00	0.00	89.34	0.00
55	4,471	4,471	**15.97**	104.0	3.00	84.01	6.98	0.00	0.00	0.00	90.99	0.00
56	4,649	4,649	**15.46**	104.0	3.00	84.35	7.16	0.00	0.00	0.00	91.50	0.00
57	4,029	4,029	**17.34**	104.0	3.00	83.10	6.52	0.00	0.00	0.00	89.63	0.00
58	3,237	3,238	**20.12**	104.0	3.00	81.20	5.63	0.00	0.00	0.00	86.84	0.00
59	4,836	4,836	**14.93**	104.0	3.00	84.69	7.34	0.00	0.00	0.00	92.03	0.00
60	5,602	5,602	**12.95**	104.0	3.00	85.97	8.05	0.00	0.00	0.00	94.01	0.00
61	5,888	5,888	**12.27**	104.0	3.00	86.40	8.29	0.00	0.00	0.00	94.69	0.00
62	4,690	4,690	**15.34**	104.0	3.00	84.42	7.20	0.00	0.00	0.00	91.62	0.00
63	4,869	4,869	**14.84**	104.0	3.00	84.75	7.37	0.00	0.00	0.00	92.12	0.00
64	6,111	6,112	**11.75**	104.0	3.00	86.72	8.48	0.00	0.00	0.00	95.21	0.00
65	6,730	6,730	**10.41**	104.0	3.00	87.56	8.99	0.00	0.00	0.00	96.55	0.00
66	1,846	1,847	**26.85**	104.0	3.00	76.33	3.79	0.00	0.00	0.00	80.11	0.00
67	6,240	6,240	**11.47**	104.0	3.00	86.90	8.59	0.00	0.00	0.00	95.49	0.00
68	6,770	6,770	**10.33**	104.0	3.00	87.61	9.02	0.00	0.00	0.00	96.63	0.00
69	6,622	6,623	**10.64**	104.0	3.00	87.42	8.90	0.00	0.00	0.00	96.32	0.00
70	5,649	5,649	**12.83**	104.0	3.00	86.04	8.09	0.00	0.00	0.00	94.13	0.00
71	5,255	5,257	**13.81**	104.0	3.00	85.41	7.73	0.00	0.00	0.00	93.15	0.00
72	5,668	5,668	**12.79**	104.0	3.00	86.07	8.10	0.00	0.00	0.00	94.17	0.00
73	5,041	5,042	**14.38**	104.0	3.00	85.05	7.53	0.00	0.00	0.00	92.59	0.00
74	3,978	3,980	**17.50**	104.0	3.00	83.00	6.47	0.00	0.00	0.00	89.47	0.00
75	3,537	3,538	**19.01**	104.0	3.00	81.97	5.98	0.00	0.00	0.00	87.96	0.00
76	3,226	3,226	**20.17**	104.0	3.00	81.17	5.62	0.00	0.00	0.00	86.79	0.00
77	3,546	3,546	**18.98**	104.0	3.00	81.99	5.99	0.00	0.00	0.00	87.99	0.00
78	4,424	4,425	**16.11**	104.0	3.00	83.92	6.93	0.00	0.00	0.00	90.85	0.00
80	5,249	5,250	**13.83**	104.0	3.00	85.40	7.73	0.00	0.00	0.00	93.13	0.00
81	6,194	6,195	**11.57**	104.0	3.00	86.84	8.55	0.00	0.00	0.00	95.39	0.00
82	3,752	3,752	**18.25**	104.0	3.00	82.49	6.22	0.00	0.00	0.00	88.71	0.00
83	5,509	5,510	**13.18**	104.0	3.00	85.82	7.96	0.00	0.00	0.00	93.79	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	4,727	4,727	**15.24**	104.0	3.00	84.49	7.23	0.00	0.00	0.00	91.73	0.00
86	5,020	5,021	**14.43**	104.0	3.00	85.02	7.51	0.00	0.00	0.00	92.53	0.00
87	6,961	6,961	**9.94**	104.0	3.00	87.85	9.17	0.00	0.00	0.00	97.02	0.00
89	5,662	5,663	**12.80**	104.0	3.00	86.06	8.10	0.00	0.00	0.00	94.16	0.00
90	3,856	3,857	**17.90**	104.0	3.00	82.72	6.34	0.00	0.00	0.00	89.06	0.00
91	4,702	4,703	**15.31**	104.0	3.00	84.45	7.21	0.00	0.00	0.00	91.66	0.00
92	6,374	6,375	**11.17**	104.0	3.00	87.09	8.70	0.00	0.00	0.00	95.79	0.00
94	5,567	5,569	**13.03**	104.0	3.00	85.92	8.02	0.00	0.00	0.00	93.93	0.00
95	6,753	6,754	**10.37**	104.0	3.00	87.59	9.01	0.00	0.00	0.00	96.60	0.00
97	4,157	4,159	**16.92**	104.0	3.00	83.38	6.66	0.00	0.00	0.00	90.04	0.00
98	6,012	6,013	**11.98**	104.0	3.00	86.58	8.40	0.00	0.00	0.00	94.98	0.00
99	6,296	6,296	**11.34**	104.0	3.00	86.98	8.64	0.00	0.00	0.00	95.62	0.00
100	1,015	1,019	**33.38**	104.0	3.00	71.17	2.42	0.00	0.00	0.00	73.58	0.00
101	6,604	6,605	**10.68**	104.0	3.00	87.40	8.89	0.00	0.00	0.00	96.29	0.00
102	1,068	1,075	**32.81**	104.0	3.00	71.63	2.52	0.00	0.00	0.00	74.15	0.00
103	7,440	7,441	**9.00**	104.0	3.00	88.43	9.53	0.00	0.00	0.00	97.96	0.00
104	1,605	1,608	**28.42**	104.0	3.00	75.13	3.42	0.00	0.00	0.00	78.55	0.00
107	5,240	5,241	**13.85**	104.0	3.00	85.39	7.72	0.00	0.00	0.00	93.11	0.00
108	6,918	6,918	**10.03**	104.0	3.00	87.80	9.13	0.00	0.00	0.00	96.93	0.00
109	5,011	5,011	**14.46**	104.0	3.00	85.00	7.51	0.00	0.00	0.00	92.50	0.00
110	2,744	2,744	**22.17**	104.0	3.00	79.77	5.03	0.00	0.00	0.00	84.79	0.00
111	3,004	3,005	**21.05**	104.0	3.00	80.56	5.35	0.00	0.00	0.00	85.91	0.00
113	5,571	5,572	**13.02**	104.0	3.00	85.92	8.02	0.00	0.00	0.00	93.94	0.00
114	4,768	4,768	**15.12**	104.0	3.00	84.57	7.27	0.00	0.00	0.00	91.84	0.00
115	6,742	6,743	**10.39**	104.0	3.00	87.58	9.00	0.00	0.00	0.00	96.57	0.00
116	2,151	2,154	**25.06**	104.0	3.00	77.66	4.23	0.00	0.00	0.00	81.90	0.00
118	5,374	5,374	**13.51**	104.0	3.00	85.61	7.84	0.00	0.00	0.00	93.45	0.00
119	4,576	4,577	**15.67**	104.0	3.00	84.21	7.09	0.00	0.00	0.00	91.30	0.00
120	6,978	6,978	**9.91**	104.0	3.00	87.88	9.18	0.00	0.00	0.00	97.06	0.00
121	4,041	4,042	**17.29**	104.0	3.00	83.13	6.54	0.00	0.00	0.00	89.67	0.00
125	5,213	5,213	**13.93**	104.0	3.00	85.34	7.69	0.00	0.00	0.00	93.04	0.00
126	1,677	1,679	**27.93**	104.0	3.00	75.50	3.53	0.00	0.00	0.00	79.03	0.00
127	1,915	1,917	**26.42**	104.0	3.00	76.65	3.89	0.00	0.00	0.00	80.54	0.00
128	2,192	2,193	**24.85**	104.0	3.00	77.82	4.29	0.00	0.00	0.00	82.11	0.00
129	3,477	3,478	**19.22**	104.0	3.00	81.83	5.91	0.00	0.00	0.00	87.74	0.00
130	3,451	3,452	**19.32**	104.0	3.00	81.76	5.88	0.00	0.00	0.00	87.65	0.00
131	3,898	3,899	**17.76**	104.0	3.00	82.82	6.38	0.00	0.00	0.00	89.20	0.00
132	4,285	4,285	**16.53**	104.0	3.00	83.64	6.79	0.00	0.00	0.00	90.43	0.00
133	1,806	1,807	**27.10**	104.0	3.00	76.14	3.73	0.00	0.00	0.00	79.86	0.00
134	5,577	5,578	**13.01**	104.0	3.00	85.93	8.02	0.00	0.00	0.00	93.95	0.00
141	4,087	4,089	**17.15**	104.0	3.00	83.23	6.59	0.00	0.00	0.00	89.82	0.00
142	1,280	1,286	**30.88**	104.0	3.00	73.19	2.89	0.00	0.00	0.00	76.08	0.00
143	4,540	4,542	**15.77**	104.0	3.00	84.14	7.05	0.00	0.00	0.00	91.20	0.00
144	636	643	**38.12**	104.0	3.00	67.16	1.68	0.00	0.00	0.00	68.84	0.00
145	3,417	3,418	**19.44**	104.0	3.00	81.68	5.84	0.00	0.00	0.00	87.52	0.00
146	3,174	3,175	**20.37**	104.0	3.00	81.03	5.56	0.00	0.00	0.00	86.59	0.00
Sum	45.39											

Noise sensitive area: H25 H25

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	11,484	11,484	**2.68**	104.0	3.00	92.20	12.08	0.00	0.00	0.00	104.28	0.00
2	11,435	11,436	**2.74**	104.0	3.00	92.17	12.06	0.00	0.00	0.00	104.22	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	10,931	10,932	**3.41**	104.0	3.00	91.77	11.78	0.00	0.00	0.00	103.55	0.00
4	10,108	10,108	**4.57**	104.0	3.00	91.09	11.30	0.00	0.00	0.00	102.39	0.00
5	9,807	9,808	**5.01**	104.0	3.00	90.83	11.12	0.00	0.00	0.00	101.95	0.00
6	10,350	10,351	**4.22**	104.0	3.00	91.30	11.44	0.00	0.00	0.00	102.74	0.00
7	8,277	8,278	**7.48**	104.0	3.00	89.36	10.13	0.00	0.00	0.00	99.49	0.00
8	12,110	12,110	**1.88**	104.0	3.00	92.66	12.42	0.00	0.00	0.00	105.08	0.00
9	10,959	10,960	**3.37**	104.0	3.00	91.80	11.79	0.00	0.00	0.00	103.59	0.00
10	10,689	10,690	**3.74**	104.0	3.00	91.58	11.64	0.00	0.00	0.00	103.22	0.00
11	11,998	11,999	**2.02**	104.0	3.00	92.58	12.36	0.00	0.00	0.00	104.94	0.00
12	11,827	11,828	**2.24**	104.0	3.00	92.46	12.27	0.00	0.00	0.00	104.73	0.00
13	11,342	11,342	**2.86**	104.0	3.00	92.09	12.00	0.00	0.00	0.00	104.10	0.00
14	10,913	10,914	**3.44**	104.0	3.00	91.76	11.77	0.00	0.00	0.00	103.53	0.00
15	10,165	10,166	**4.49**	104.0	3.00	91.14	11.33	0.00	0.00	0.00	102.48	0.00
16	9,893	9,894	**4.88**	104.0	3.00	90.91	11.17	0.00	0.00	0.00	102.08	0.00
17	12,214	12,215	**1.75**	104.0	3.00	92.74	12.47	0.00	0.00	0.00	105.21	0.00
18	12,319	12,320	**1.63**	104.0	3.00	92.81	12.52	0.00	0.00	0.00	105.34	0.00
19	11,123	11,123	**3.15**	104.0	3.00	91.92	11.88	0.00	0.00	0.00	103.81	0.00
20	10,003	10,004	**4.72**	104.0	3.00	91.00	11.24	0.00	0.00	0.00	102.24	0.00
21	9,379	9,379	**5.67**	104.0	3.00	90.44	10.85	0.00	0.00	0.00	101.29	0.00
22	9,098	9,098	**6.11**	104.0	3.00	90.18	10.67	0.00	0.00	0.00	100.85	0.00
23	8,774	8,775	**6.64**	104.0	3.00	89.86	10.46	0.00	0.00	0.00	100.33	0.00
24	9,316	9,316	**5.77**	104.0	3.00	90.38	10.81	0.00	0.00	0.00	101.20	0.00
25	6,492	6,493	**10.92**	104.0	3.00	87.25	8.80	0.00	0.00	0.00	96.05	0.00
26	8,731	8,732	**6.71**	104.0	3.00	89.82	10.43	0.00	0.00	0.00	100.26	0.00
27	6,769	6,770	**10.33**	104.0	3.00	87.61	9.02	0.00	0.00	0.00	96.63	0.00
28	7,016	7,017	**9.83**	104.0	3.00	87.92	9.21	0.00	0.00	0.00	97.13	0.00
29	8,315	8,315	**7.41**	104.0	3.00	89.40	10.15	0.00	0.00	0.00	99.55	0.00
30	8,361	8,361	**7.33**	104.0	3.00	89.44	10.18	0.00	0.00	0.00	99.63	0.00
31	9,391	9,391	**5.65**	104.0	3.00	90.45	10.86	0.00	0.00	0.00	101.31	0.00
32	6,543	6,543	**10.81**	104.0	3.00	87.32	8.84	0.00	0.00	0.00	96.15	0.00
33	7,822	7,822	**8.29**	104.0	3.00	88.87	9.81	0.00	0.00	0.00	98.67	0.00
34	7,963	7,964	**8.03**	104.0	3.00	89.02	9.91	0.00	0.00	0.00	98.93	0.00
35	8,572	8,572	**6.97**	104.0	3.00	89.66	10.33	0.00	0.00	0.00	99.99	0.00
36	8,874	8,875	**6.47**	104.0	3.00	89.96	10.53	0.00	0.00	0.00	100.49	0.00
37	7,651	7,652	**8.60**	104.0	3.00	88.68	9.68	0.00	0.00	0.00	98.36	0.00
38	6,531	6,532	**10.83**	104.0	3.00	87.30	8.83	0.00	0.00	0.00	96.13	0.00
39	6,161	6,162	**11.64**	104.0	3.00	86.79	8.53	0.00	0.00	0.00	95.32	0.00
40	6,589	6,589	**10.71**	104.0	3.00	87.38	8.88	0.00	0.00	0.00	96.25	0.00
41	6,041	6,042	**11.91**	104.0	3.00	86.62	8.43	0.00	0.00	0.00	95.05	0.00
43	7,120	7,121	**9.62**	104.0	3.00	88.05	9.29	0.00	0.00	0.00	97.34	0.00
44	5,796	5,798	**12.48**	104.0	3.00	86.27	8.22	0.00	0.00	0.00	94.48	0.00
45	5,527	5,529	**13.13**	104.0	3.00	85.85	7.98	0.00	0.00	0.00	93.83	0.00
46	6,617	6,617	**10.65**	104.0	3.00	87.41	8.90	0.00	0.00	0.00	96.31	0.00
48	5,775	5,776	**12.53**	104.0	3.00	86.23	8.20	0.00	0.00	0.00	94.43	0.00
49	6,492	6,492	**10.92**	104.0	3.00	87.25	8.80	0.00	0.00	0.00	96.04	0.00
50	9,353	9,354	**5.71**	104.0	3.00	90.42	10.84	0.00	0.00	0.00	101.25	0.00
51	6,823	6,823	**10.22**	104.0	3.00	87.68	9.06	0.00	0.00	0.00	96.74	0.00
52	7,068	7,068	**9.73**	104.0	3.00	87.99	9.25	0.00	0.00	0.00	97.23	0.00
53	6,263	6,263	**11.42**	104.0	3.00	86.94	8.61	0.00	0.00	0.00	95.55	0.00
55	5,321	5,322	**13.65**	104.0	3.00	85.52	7.79	0.00	0.00	0.00	93.31	0.00
56	5,176	5,176	**14.02**	104.0	3.00	85.28	7.66	0.00	0.00	0.00	92.94	0.00
57	4,533	4,533	**15.79**	104.0	3.00	84.13	7.04	0.00	0.00	0.00	91.17	0.00
58	7,171	7,171	**9.52**	104.0	3.00	88.11	9.33	0.00	0.00	0.00	97.44	0.00
59	5,035	5,036	**14.39**	104.0	3.00	85.04	7.53	0.00	0.00	0.00	92.57	0.00
60	4,232	4,233	**16.69**	104.0	3.00	83.53	6.74	0.00	0.00	0.00	90.27	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	4,188	4,188	**16.83**	104.0	3.00	83.44	6.69	0.00	0.00	0.00	90.13	0.00
62	2,248	2,249	**24.55**	104.0	3.00	78.04	4.37	0.00	0.00	0.00	82.41	0.00
63	1,113	1,116	**32.42**	104.0	3.00	71.95	2.59	0.00	0.00	0.00	74.55	0.00
64	1,056	1,059	**32.97**	104.0	3.00	71.50	2.49	0.00	0.00	0.00	73.99	0.00
65	1,680	1,682	**27.91**	104.0	3.00	75.52	3.53	0.00	0.00	0.00	79.05	0.00
66	6,880	6,881	**10.10**	104.0	3.00	87.75	9.11	0.00	0.00	0.00	96.86	0.00
67	1,706	1,708	**27.74**	104.0	3.00	75.65	3.58	0.00	0.00	0.00	79.23	0.00
68	2,043	2,045	**25.67**	104.0	3.00	77.21	4.08	0.00	0.00	0.00	81.29	0.00
69	1,509	1,511	**29.11**	104.0	3.00	74.59	3.26	0.00	0.00	0.00	77.85	0.00
70	10,759	10,760	**3.65**	104.0	3.00	91.64	11.68	0.00	0.00	0.00	103.31	0.00
71	10,425	10,426	**4.11**	104.0	3.00	91.36	11.49	0.00	0.00	0.00	102.85	0.00
72	10,436	10,437	**4.10**	104.0	3.00	91.37	11.49	0.00	0.00	0.00	102.86	0.00
73	10,039	10,040	**4.67**	104.0	3.00	91.03	11.26	0.00	0.00	0.00	102.29	0.00
74	9,031	9,032	**6.22**	104.0	3.00	90.12	10.63	0.00	0.00	0.00	100.74	0.00
75	8,275	8,275	**7.48**	104.0	3.00	89.36	10.12	0.00	0.00	0.00	99.48	0.00
76	4,586	4,586	**15.64**	104.0	3.00	84.23	7.09	0.00	0.00	0.00	91.32	0.00
77	5,600	5,601	**12.95**	104.0	3.00	85.96	8.04	0.00	0.00	0.00	94.01	0.00
78	9,600	9,601	**5.33**	104.0	3.00	90.65	10.99	0.00	0.00	0.00	101.64	0.00
80	4,235	4,236	**16.68**	104.0	3.00	83.54	6.74	0.00	0.00	0.00	90.28	0.00
81	11,360	11,361	**2.84**	104.0	3.00	92.11	12.02	0.00	0.00	0.00	104.12	0.00
82	7,348	7,349	**9.18**	104.0	3.00	88.32	9.46	0.00	0.00	0.00	97.79	0.00
83	1,200	1,203	**31.61**	104.0	3.00	72.60	2.75	0.00	0.00	0.00	75.35	0.00
85	7,104	7,104	**9.65**	104.0	3.00	88.03	9.28	0.00	0.00	0.00	97.31	0.00
86	4,306	4,307	**16.47**	104.0	3.00	83.68	6.81	0.00	0.00	0.00	90.50	0.00
87	1,916	1,917	**26.42**	104.0	3.00	76.65	3.89	0.00	0.00	0.00	80.55	0.00
89	837	841	**35.38**	104.0	3.00	69.50	2.08	0.00	0.00	0.00	71.58	0.00
90	3,569	3,570	**18.89**	104.0	3.00	82.05	6.02	0.00	0.00	0.00	88.07	0.00
91	1,766	1,768	**27.34**	104.0	3.00	75.95	3.67	0.00	0.00	0.00	79.62	0.00
92	1,207	1,210	**31.55**	104.0	3.00	72.66	2.76	0.00	0.00	0.00	75.42	0.00
94	10,757	10,758	**3.65**	104.0	3.00	91.63	11.68	0.00	0.00	0.00	103.31	0.00
95	11,942	11,942	**2.09**	104.0	3.00	92.54	12.33	0.00	0.00	0.00	104.87	0.00
97	9,347	9,348	**5.72**	104.0	3.00	90.41	10.83	0.00	0.00	0.00	101.25	0.00
98	11,201	11,202	**3.05**	104.0	3.00	91.99	11.93	0.00	0.00	0.00	103.91	0.00
99	11,255	11,256	**2.98**	104.0	3.00	92.03	11.96	0.00	0.00	0.00	103.98	0.00
100	5,447	5,448	**13.33**	104.0	3.00	85.72	7.91	0.00	0.00	0.00	93.63	0.00
101	11,764	11,764	**2.32**	104.0	3.00	92.41	12.23	0.00	0.00	0.00	104.64	0.00
102	6,130	6,131	**11.71**	104.0	3.00	86.75	8.50	0.00	0.00	0.00	95.25	0.00
103	12,603	12,603	**1.28**	104.0	3.00	93.01	12.67	0.00	0.00	0.00	105.68	0.00
104	6,533	6,534	**10.83**	104.0	3.00	87.30	8.83	0.00	0.00	0.00	96.13	0.00
107	10,412	10,413	**4.13**	104.0	3.00	91.35	11.48	0.00	0.00	0.00	102.83	0.00
108	11,754	11,754	**2.33**	104.0	3.00	92.40	12.23	0.00	0.00	0.00	104.63	0.00
109	4,876	4,877	**14.82**	104.0	3.00	84.76	7.38	0.00	0.00	0.00	92.14	0.00
110	5,368	5,369	**13.53**	104.0	3.00	85.60	7.84	0.00	0.00	0.00	93.43	0.00
111	4,882	4,883	**14.81**	104.0	3.00	84.77	7.38	0.00	0.00	0.00	92.16	0.00
113	10,742	10,743	**3.67**	104.0	3.00	91.62	11.67	0.00	0.00	0.00	103.29	0.00
114	6,910	6,910	**10.04**	104.0	3.00	87.79	9.13	0.00	0.00	0.00	96.92	0.00
115	11,884	11,885	**2.16**	104.0	3.00	92.50	12.30	0.00	0.00	0.00	104.80	0.00
116	7,334	7,336	**9.20**	104.0	3.00	88.31	9.45	0.00	0.00	0.00	97.76	0.00
118	4,759	4,760	**15.15**	104.0	3.00	84.55	7.26	0.00	0.00	0.00	91.82	0.00
119	9,699	9,700	**5.18**	104.0	3.00	90.74	11.05	0.00	0.00	0.00	101.79	0.00
120	12,122	12,122	**1.87**	104.0	3.00	92.67	12.42	0.00	0.00	0.00	105.09	0.00
121	9,196	9,197	**5.95**	104.0	3.00	90.27	10.74	0.00	0.00	0.00	101.01	0.00
125	1,107	1,110	**32.47**	104.0	3.00	71.91	2.58	0.00	0.00	0.00	74.49	0.00
126	4,162	4,164	**16.91**	104.0	3.00	83.39	6.66	0.00	0.00	0.00	90.05	0.00
127	4,003	4,004	**17.42**	104.0	3.00	83.05	6.50	0.00	0.00	0.00	89.55	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	3,961	3,962	**17.55**	104.0	3.00	82.96	6.45	0.00	0.00	0.00	89.41	0.00
129	8,465	8,465	**7.15**	104.0	3.00	89.55	10.25	0.00	0.00	0.00	99.81	0.00
130	8,239	8,240	**7.54**	104.0	3.00	89.32	10.10	0.00	0.00	0.00	99.42	0.00
131	8,644	8,645	**6.85**	104.0	3.00	89.73	10.37	0.00	0.00	0.00	100.11	0.00
132	9,057	9,058	**6.18**	104.0	3.00	90.14	10.65	0.00	0.00	0.00	100.79	0.00
133	6,020	6,020	**11.96**	104.0	3.00	86.59	8.41	0.00	0.00	0.00	95.00	0.00
134	10,717	10,717	**3.71**	104.0	3.00	91.60	11.65	0.00	0.00	0.00	103.26	0.00
141	9,271	9,272	**5.84**	104.0	3.00	90.34	10.78	0.00	0.00	0.00	101.13	0.00
142	6,398	6,400	**11.12**	104.0	3.00	87.12	8.72	0.00	0.00	0.00	95.85	0.00
143	9,731	9,732	**5.13**	104.0	3.00	90.76	11.07	0.00	0.00	0.00	101.83	0.00
144	5,202	5,203	**13.95**	104.0	3.00	85.33	7.68	0.00	0.00	0.00	93.01	0.00
145	3,749	3,750	**18.26**	104.0	3.00	82.48	6.22	0.00	0.00	0.00	88.70	0.00
146	3,972	3,973	**17.52**	104.0	3.00	82.98	6.46	0.00	0.00	0.00	89.44	0.00
Sum	42.28											

Noise sensitive area: H27 H27

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	15,641	15,641	**-2.01**	104.0	3.00	94.89	14.09	0.00	0.00	0.00	108.97	0.00
2	15,604	15,604	**-1.97**	104.0	3.00	94.86	14.07	0.00	0.00	0.00	108.94	0.00
3	15,105	15,105	**-1.47**	104.0	3.00	94.58	13.85	0.00	0.00	0.00	108.44	0.00
4	14,271	14,271	**-0.60**	104.0	3.00	94.09	13.48	0.00	0.00	0.00	107.57	0.00
5	13,983	13,983	**-0.29**	104.0	3.00	93.91	13.34	0.00	0.00	0.00	107.26	0.00
6	14,523	14,524	**-0.87**	104.0	3.00	94.24	13.59	0.00	0.00	0.00	107.83	0.00
7	12,435	12,436	**1.48**	104.0	3.00	92.89	12.58	0.00	0.00	0.00	105.48	0.00
8	16,261	16,261	**-2.61**	104.0	3.00	95.22	14.35	0.00	0.00	0.00	109.57	0.00
9	15,113	15,114	**-1.48**	104.0	3.00	94.59	13.86	0.00	0.00	0.00	108.45	0.00
10	14,821	14,821	**-1.18**	104.0	3.00	94.42	13.73	0.00	0.00	0.00	108.15	0.00
11	16,069	16,069	**-2.43**	104.0	3.00	95.12	14.27	0.00	0.00	0.00	109.39	0.00
12	15,908	15,909	**-2.27**	104.0	3.00	95.03	14.20	0.00	0.00	0.00	109.24	0.00
13	15,426	15,426	**-1.80**	104.0	3.00	94.77	13.99	0.00	0.00	0.00	108.76	0.00
14	14,995	14,996	**-1.36**	104.0	3.00	94.52	13.81	0.00	0.00	0.00	108.32	0.00
15	14,272	14,273	**-0.61**	104.0	3.00	94.09	13.48	0.00	0.00	0.00	107.57	0.00
16	14,020	14,021	**-0.33**	104.0	3.00	93.94	13.36	0.00	0.00	0.00	107.30	0.00
17	16,278	16,279	**-2.63**	104.0	3.00	95.23	14.36	0.00	0.00	0.00	109.59	0.00
18	16,359	16,360	**-2.71**	104.0	3.00	95.28	14.39	0.00	0.00	0.00	109.67	0.00
19	15,180	15,181	**-1.55**	104.0	3.00	94.63	13.89	0.00	0.00	0.00	108.51	0.00
20	14,076	14,077	**-0.39**	104.0	3.00	93.97	13.39	0.00	0.00	0.00	107.36	0.00
21	13,549	13,550	**0.19**	104.0	3.00	93.64	13.14	0.00	0.00	0.00	106.78	0.00
22	13,243	13,243	**0.53**	104.0	3.00	93.44	12.99	0.00	0.00	0.00	106.43	0.00
23	12,909	12,909	**0.92**	104.0	3.00	93.22	12.82	0.00	0.00	0.00	106.04	0.00
24	13,465	13,466	**0.28**	104.0	3.00	93.58	13.10	0.00	0.00	0.00	106.68	0.00
25	10,628	10,628	**3.83**	104.0	3.00	91.53	11.60	0.00	0.00	0.00	103.13	0.00
26	12,907	12,908	**0.92**	104.0	3.00	93.22	12.82	0.00	0.00	0.00	106.04	0.00
27	10,941	10,941	**3.40**	104.0	3.00	91.78	11.78	0.00	0.00	0.00	103.56	0.00
28	11,185	11,185	**3.07**	104.0	3.00	91.97	11.92	0.00	0.00	0.00	103.89	0.00
29	12,470	12,470	**1.44**	104.0	3.00	92.92	12.60	0.00	0.00	0.00	105.52	0.00
30	12,483	12,484	**1.43**	104.0	3.00	92.93	12.61	0.00	0.00	0.00	105.54	0.00
31	13,492	13,492	**0.25**	104.0	3.00	93.60	13.11	0.00	0.00	0.00	106.71	0.00
32	10,637	10,637	**3.82**	104.0	3.00	91.54	11.61	0.00	0.00	0.00	103.15	0.00
33	11,924	11,924	**2.12**	104.0	3.00	92.53	12.32	0.00	0.00	0.00	104.85	0.00
34	12,126	12,126	**1.86**	104.0	3.00	92.67	12.42	0.00	0.00	0.00	105.10	0.00
35	12,726	12,727	**1.13**	104.0	3.00	93.09	12.73	0.00	0.00	0.00	105.83	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	13,026	13,026	**0.78**	104.0	3.00	93.30	12.88	0.00	0.00	0.00	106.18	0.00
37	11,817	11,818	**2.25**	104.0	3.00	92.45	12.26	0.00	0.00	0.00	104.71	0.00
38	10,691	10,691	**3.74**	104.0	3.00	91.58	11.64	0.00	0.00	0.00	103.22	0.00
39	10,337	10,338	**4.24**	104.0	3.00	91.29	11.43	0.00	0.00	0.00	102.72	0.00
40	10,628	10,628	**3.83**	104.0	3.00	91.53	11.60	0.00	0.00	0.00	103.13	0.00
41	10,211	10,212	**4.42**	104.0	3.00	91.18	11.36	0.00	0.00	0.00	102.54	0.00
43	11,281	11,281	**2.94**	104.0	3.00	92.05	11.97	0.00	0.00	0.00	104.02	0.00
44	9,950	9,951	**4.80**	104.0	3.00	90.96	11.20	0.00	0.00	0.00	102.16	0.00
45	9,689	9,690	**5.19**	104.0	3.00	90.73	11.04	0.00	0.00	0.00	101.77	0.00
46	10,720	10,720	**3.70**	104.0	3.00	91.60	11.66	0.00	0.00	0.00	103.26	0.00
48	9,857	9,857	**4.94**	104.0	3.00	90.87	11.15	0.00	0.00	0.00	102.02	0.00
49	10,446	10,446	**4.08**	104.0	3.00	91.38	11.50	0.00	0.00	0.00	102.88	0.00
50	13,521	13,522	**0.22**	104.0	3.00	93.62	13.12	0.00	0.00	0.00	106.74	0.00
51	10,826	10,826	**3.56**	104.0	3.00	91.69	11.72	0.00	0.00	0.00	103.41	0.00
52	11,094	11,094	**3.19**	104.0	3.00	91.90	11.87	0.00	0.00	0.00	103.77	0.00
53	10,179	10,180	**4.47**	104.0	3.00	91.15	11.34	0.00	0.00	0.00	102.50	0.00
55	8,997	8,997	**6.27**	104.0	3.00	90.08	10.61	0.00	0.00	0.00	100.69	0.00
56	8,778	8,778	**6.63**	104.0	3.00	89.87	10.46	0.00	0.00	0.00	100.33	0.00
57	8,290	8,290	**7.46**	104.0	3.00	89.37	10.13	0.00	0.00	0.00	99.51	0.00
58	11,293	11,293	**2.93**	104.0	3.00	92.06	11.98	0.00	0.00	0.00	104.03	0.00
59	8,554	8,555	**7.00**	104.0	3.00	89.64	10.31	0.00	0.00	0.00	99.96	0.00
60	7,302	7,302	**9.27**	104.0	3.00	88.27	9.43	0.00	0.00	0.00	97.70	0.00
61	7,082	7,082	**9.70**	104.0	3.00	88.00	9.26	0.00	0.00	0.00	97.26	0.00
62	5,837	5,837	**12.39**	104.0	3.00	86.32	8.25	0.00	0.00	0.00	94.57	0.00
63	4,906	4,907	**14.74**	104.0	3.00	84.82	7.41	0.00	0.00	0.00	92.22	0.00
64	3,506	3,507	**19.12**	104.0	3.00	81.90	5.95	0.00	0.00	0.00	87.84	0.00
65	3,079	3,080	**20.75**	104.0	3.00	80.77	5.44	0.00	0.00	0.00	86.21	0.00
66	10,902	10,902	**3.45**	104.0	3.00	91.75	11.76	0.00	0.00	0.00	103.51	0.00
67	3,989	3,990	**17.46**	104.0	3.00	83.02	6.48	0.00	0.00	0.00	89.50	0.00
68	3,573	3,574	**18.88**	104.0	3.00	82.06	6.02	0.00	0.00	0.00	88.09	0.00
69	3,036	3,037	**20.92**	104.0	3.00	80.65	5.39	0.00	0.00	0.00	86.04	0.00
70	14,754	14,754	**-1.11**	104.0	3.00	94.38	13.70	0.00	0.00	0.00	108.08	0.00
71	14,564	14,565	**-0.92**	104.0	3.00	94.27	13.61	0.00	0.00	0.00	107.88	0.00
72	14,605	14,605	**-0.96**	104.0	3.00	94.29	13.63	0.00	0.00	0.00	107.92	0.00
73	14,214	14,214	**-0.54**	104.0	3.00	94.05	13.45	0.00	0.00	0.00	107.51	0.00
74	13,200	13,201	**0.58**	104.0	3.00	93.41	12.97	0.00	0.00	0.00	106.38	0.00
75	12,448	12,448	**1.47**	104.0	3.00	92.90	12.59	0.00	0.00	0.00	105.49	0.00
76	8,551	8,551	**7.01**	104.0	3.00	89.64	10.31	0.00	0.00	0.00	99.95	0.00
77	9,541	9,542	**5.42**	104.0	3.00	90.59	10.95	0.00	0.00	0.00	101.55	0.00
78	13,668	13,669	**0.05**	104.0	3.00	93.71	13.19	0.00	0.00	0.00	106.91	0.00
80	7,490	7,491	**8.90**	104.0	3.00	88.49	9.57	0.00	0.00	0.00	98.06	0.00
81	15,406	15,406	**-1.78**	104.0	3.00	94.75	13.99	0.00	0.00	0.00	108.74	0.00
82	11,419	11,420	**2.76**	104.0	3.00	92.15	12.05	0.00	0.00	0.00	104.20	0.00
83	4,417	4,417	**16.13**	104.0	3.00	83.90	6.93	0.00	0.00	0.00	90.83	0.00
85	10,945	10,945	**3.39**	104.0	3.00	91.78	11.78	0.00	0.00	0.00	103.57	0.00
86	7,677	7,677	**8.56**	104.0	3.00	88.70	9.70	0.00	0.00	0.00	98.41	0.00
87	2,943	2,944	**21.31**	104.0	3.00	80.38	5.28	0.00	0.00	0.00	85.65	0.00
89	3,999	4,000	**17.43**	104.0	3.00	83.04	6.49	0.00	0.00	0.00	89.53	0.00
90	7,383	7,383	**9.11**	104.0	3.00	88.37	9.49	0.00	0.00	0.00	97.85	0.00
91	5,451	5,452	**13.32**	104.0	3.00	85.73	7.91	0.00	0.00	0.00	93.64	0.00
92	2,969	2,970	**21.20**	104.0	3.00	80.46	5.31	0.00	0.00	0.00	85.76	0.00
94	14,868	14,869	**-1.23**	104.0	3.00	94.45	13.75	0.00	0.00	0.00	108.19	0.00
95	16,056	16,057	**-2.42**	104.0	3.00	95.11	14.26	0.00	0.00	0.00	109.38	0.00
97	13,458	13,459	**0.29**	104.0	3.00	93.58	13.09	0.00	0.00	0.00	106.67	0.00
98	15,314	15,314	**-1.69**	104.0	3.00	94.70	13.95	0.00	0.00	0.00	108.65	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	15,432	15,432	**-1.80**	104.0	3.00	94.77	14.00	0.00	0.00	0.00	108.77	0.00
100	9,622	9,622	**5.29**	104.0	3.00	90.67	11.00	0.00	0.00	0.00	101.67	0.00
101	15,798	15,799	**-2.17**	104.0	3.00	94.97	14.16	0.00	0.00	0.00	109.13	0.00
102	10,284	10,285	**4.31**	104.0	3.00	91.24	11.40	0.00	0.00	0.00	102.65	0.00
103	16,637	16,637	**-2.97**	104.0	3.00	95.42	14.51	0.00	0.00	0.00	109.93	0.00
104	10,703	10,703	**3.73**	104.0	3.00	91.59	11.65	0.00	0.00	0.00	103.24	0.00
107	14,471	14,472	**-0.82**	104.0	3.00	94.21	13.57	0.00	0.00	0.00	107.78	0.00
108	15,925	15,925	**-2.29**	104.0	3.00	95.04	14.21	0.00	0.00	0.00	109.25	0.00
109	8,309	8,309	**7.42**	104.0	3.00	89.39	10.15	0.00	0.00	0.00	99.54	0.00
110	9,436	9,437	**5.58**	104.0	3.00	90.50	10.89	0.00	0.00	0.00	101.38	0.00
111	8,895	8,895	**6.44**	104.0	3.00	89.98	10.54	0.00	0.00	0.00	100.52	0.00
113	14,798	14,799	**-1.16**	104.0	3.00	94.40	13.72	0.00	0.00	0.00	108.12	0.00
114	10,710	10,710	**3.72**	104.0	3.00	91.60	11.65	0.00	0.00	0.00	103.25	0.00
115	16,039	16,039	**-2.40**	104.0	3.00	95.10	14.26	0.00	0.00	0.00	109.36	0.00
116	11,461	11,462	**2.71**	104.0	3.00	92.19	12.07	0.00	0.00	0.00	104.26	0.00
118	8,017	8,017	**7.94**	104.0	3.00	89.08	9.94	0.00	0.00	0.00	99.03	0.00
119	13,857	13,858	**-0.16**	104.0	3.00	93.83	13.28	0.00	0.00	0.00	107.12	0.00
120	16,137	16,137	**-2.49**	104.0	3.00	95.16	14.30	0.00	0.00	0.00	109.46	0.00
121	13,343	13,343	**0.42**	104.0	3.00	93.51	13.04	0.00	0.00	0.00	106.54	0.00
125	4,633	4,634	**15.50**	104.0	3.00	84.32	7.14	0.00	0.00	0.00	91.46	0.00
126	8,334	8,335	**7.38**	104.0	3.00	89.42	10.17	0.00	0.00	0.00	99.58	0.00
127	8,167	8,167	**7.67**	104.0	3.00	89.24	10.05	0.00	0.00	0.00	99.29	0.00
128	8,104	8,104	**7.78**	104.0	3.00	89.17	10.01	0.00	0.00	0.00	99.18	0.00
129	12,421	12,421	**1.50**	104.0	3.00	92.88	12.58	0.00	0.00	0.00	105.46	0.00
130	12,112	12,112	**1.88**	104.0	3.00	92.66	12.42	0.00	0.00	0.00	105.08	0.00
131	12,482	12,482	**1.43**	104.0	3.00	92.93	12.61	0.00	0.00	0.00	105.53	0.00
132	12,891	12,891	**0.94**	104.0	3.00	93.21	12.81	0.00	0.00	0.00	106.02	0.00
133	10,190	10,191	**4.45**	104.0	3.00	91.16	11.35	0.00	0.00	0.00	102.51	0.00
134	14,738	14,738	**-1.10**	104.0	3.00	94.37	13.69	0.00	0.00	0.00	108.06	0.00
141	13,396	13,397	**0.36**	104.0	3.00	93.54	13.06	0.00	0.00	0.00	106.60	0.00
142	10,547	10,548	**3.94**	104.0	3.00	91.46	11.56	0.00	0.00	0.00	103.02	0.00
143	13,834	13,834	**-0.13**	104.0	3.00	93.82	13.27	0.00	0.00	0.00	107.09	0.00
144	9,367	9,367	**5.69**	104.0	3.00	90.43	10.84	0.00	0.00	0.00	101.28	0.00
145	7,683	7,684	**8.54**	104.0	3.00	88.71	9.71	0.00	0.00	0.00	98.42	0.00
146	7,955	7,956	**8.05**	104.0	3.00	89.01	9.90	0.00	0.00	0.00	98.92	0.00

Sum 30.70

Noise sensitive area: H28 H28

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	7,760	7,761	**8.40**	104.0	3.00	88.80	9.76	0.00	0.00	0.00	98.56	0.00
2	7,785	7,786	**8.36**	104.0	3.00	88.83	9.78	0.00	0.00	0.00	98.61	0.00
3	7,344	7,345	**9.18**	104.0	3.00	88.32	9.46	0.00	0.00	0.00	97.78	0.00
4	6,860	6,860	**10.15**	104.0	3.00	87.73	9.09	0.00	0.00	0.00	96.82	0.00
5	6,375	6,376	**11.17**	104.0	3.00	87.09	8.70	0.00	0.00	0.00	95.79	0.00
6	6,772	6,773	**10.33**	104.0	3.00	87.61	9.02	0.00	0.00	0.00	96.64	0.00
7	4,605	4,607	**15.58**	104.0	3.00	84.27	7.12	0.00	0.00	0.00	91.38	0.00
8	8,357	8,357	**7.34**	104.0	3.00	89.44	10.18	0.00	0.00	0.00	99.62	0.00
9	7,229	7,230	**9.41**	104.0	3.00	88.18	9.37	0.00	0.00	0.00	97.55	0.00
10	6,886	6,887	**10.09**	104.0	3.00	87.76	9.11	0.00	0.00	0.00	96.87	0.00
11	8,095	8,096	**7.80**	104.0	3.00	89.17	10.00	0.00	0.00	0.00	99.17	0.00
12	7,935	7,936	**8.08**	104.0	3.00	88.99	9.89	0.00	0.00	0.00	98.88	0.00
13	7,453	7,454	**8.97**	104.0	3.00	88.45	9.54	0.00	0.00	0.00	97.99	0.00

To be continued on next page...

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4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	7,022	7,023	**9.82**	104.0	3.00	87.93	9.22	0.00	0.00	0.00	97.15	0.00
15	6,311	6,313	**11.31**	104.0	3.00	87.01	8.65	0.00	0.00	0.00	95.66	0.00
16	6,081	6,083	**11.82**	104.0	3.00	86.68	8.46	0.00	0.00	0.00	95.14	0.00
17	8,305	8,306	**7.43**	104.0	3.00	89.39	10.15	0.00	0.00	0.00	99.53	0.00
18	8,393	8,394	**7.28**	104.0	3.00	89.48	10.21	0.00	0.00	0.00	99.68	0.00
19	7,208	7,209	**9.45**	104.0	3.00	88.16	9.36	0.00	0.00	0.00	97.51	0.00
20	6,102	6,104	**11.77**	104.0	3.00	86.71	8.48	0.00	0.00	0.00	95.19	0.00
21	6,081	6,082	**11.82**	104.0	3.00	86.68	8.46	0.00	0.00	0.00	95.14	0.00
22	6,058	6,059	**11.87**	104.0	3.00	86.65	8.44	0.00	0.00	0.00	95.09	0.00
23	5,828	5,829	**12.41**	104.0	3.00	86.31	8.24	0.00	0.00	0.00	94.56	0.00
24	6,225	6,226	**11.50**	104.0	3.00	86.88	8.58	0.00	0.00	0.00	95.46	0.00
25	3,815	3,816	**18.04**	104.0	3.00	82.63	6.29	0.00	0.00	0.00	88.92	0.00
26	5,259	5,260	**13.81**	104.0	3.00	85.42	7.74	0.00	0.00	0.00	93.16	0.00
27	3,647	3,648	**18.61**	104.0	3.00	82.24	6.11	0.00	0.00	0.00	88.35	0.00
28	3,477	3,479	**19.22**	104.0	3.00	81.83	5.92	0.00	0.00	0.00	87.74	0.00
29	5,247	5,248	**13.84**	104.0	3.00	85.40	7.73	0.00	0.00	0.00	93.13	0.00
30	5,524	5,525	**13.14**	104.0	3.00	85.85	7.98	0.00	0.00	0.00	93.82	0.00
31	6,590	6,590	**10.71**	104.0	3.00	87.38	8.88	0.00	0.00	0.00	96.25	0.00
32	4,135	4,136	**17.00**	104.0	3.00	83.33	6.63	0.00	0.00	0.00	89.97	0.00
33	5,168	5,169	**14.04**	104.0	3.00	85.27	7.65	0.00	0.00	0.00	92.92	0.00
34	4,332	4,334	**16.39**	104.0	3.00	83.74	6.84	0.00	0.00	0.00	90.58	0.00
35	4,875	4,877	**14.82**	104.0	3.00	84.76	7.38	0.00	0.00	0.00	92.14	0.00
36	5,156	5,158	**14.07**	104.0	3.00	85.25	7.64	0.00	0.00	0.00	92.89	0.00
37	4,057	4,059	**17.24**	104.0	3.00	83.17	6.55	0.00	0.00	0.00	89.72	0.00
38	3,623	3,624	**18.70**	104.0	3.00	82.18	6.08	0.00	0.00	0.00	88.26	0.00
39	2,883	2,886	**21.55**	104.0	3.00	80.20	5.20	0.00	0.00	0.00	85.41	0.00
40	2,656	2,657	**22.56**	104.0	3.00	79.49	4.91	0.00	0.00	0.00	84.40	0.00
41	2,619	2,622	**22.72**	104.0	3.00	79.37	4.87	0.00	0.00	0.00	84.24	0.00
43	3,501	3,503	**19.13**	104.0	3.00	81.89	5.94	0.00	0.00	0.00	87.83	0.00
44	2,213	2,218	**24.72**	104.0	3.00	77.92	4.32	0.00	0.00	0.00	82.24	0.00
45	2,051	2,056	**25.61**	104.0	3.00	77.26	4.09	0.00	0.00	0.00	81.35	0.00
46	2,776	2,778	**22.02**	104.0	3.00	79.87	5.07	0.00	0.00	0.00	84.94	0.00
48	3,639	3,640	**18.64**	104.0	3.00	82.22	6.10	0.00	0.00	0.00	88.32	0.00
49	4,732	4,733	**15.22**	104.0	3.00	84.50	7.24	0.00	0.00	0.00	91.74	0.00
50	5,734	5,735	**12.63**	104.0	3.00	86.17	8.16	0.00	0.00	0.00	94.33	0.00
51	4,800	4,800	**15.03**	104.0	3.00	84.62	7.30	0.00	0.00	0.00	91.93	0.00
52	4,892	4,893	**14.78**	104.0	3.00	84.79	7.39	0.00	0.00	0.00	92.18	0.00
53	4,703	4,704	**15.30**	104.0	3.00	84.45	7.21	0.00	0.00	0.00	91.66	0.00
55	4,794	4,794	**15.05**	104.0	3.00	84.61	7.30	0.00	0.00	0.00	91.91	0.00
56	4,888	4,888	**14.79**	104.0	3.00	84.78	7.39	0.00	0.00	0.00	92.17	0.00
57	4,156	4,156	**16.93**	104.0	3.00	83.37	6.66	0.00	0.00	0.00	90.03	0.00
58	4,479	4,479	**15.95**	104.0	3.00	84.02	6.99	0.00	0.00	0.00	91.01	0.00
59	4,992	4,993	**14.51**	104.0	3.00	84.97	7.49	0.00	0.00	0.00	92.46	0.00
60	5,371	5,371	**13.52**	104.0	3.00	85.60	7.84	0.00	0.00	0.00	93.44	0.00
61	5,594	5,594	**12.97**	104.0	3.00	85.95	8.04	0.00	0.00	0.00	93.99	0.00
62	3,988	3,989	**17.46**	104.0	3.00	83.02	6.48	0.00	0.00	0.00	89.50	0.00
63	3,858	3,859	**17.89**	104.0	3.00	82.73	6.34	0.00	0.00	0.00	89.07	0.00
64	4,947	4,948	**14.63**	104.0	3.00	84.89	7.45	0.00	0.00	0.00	92.33	0.00
65	5,580	5,580	**13.00**	104.0	3.00	85.93	8.03	0.00	0.00	0.00	93.96	0.00
66	2,937	2,938	**21.33**	104.0	3.00	80.36	5.27	0.00	0.00	0.00	85.63	0.00
67	5,227	5,228	**13.89**	104.0	3.00	85.37	7.71	0.00	0.00	0.00	93.07	0.00
68	5,729	5,730	**12.64**	104.0	3.00	86.16	8.16	0.00	0.00	0.00	94.32	0.00
69	5,442	5,443	**13.34**	104.0	3.00	85.72	7.90	0.00	0.00	0.00	93.62	0.00
70	6,812	6,813	**10.24**	104.0	3.00	87.67	9.05	0.00	0.00	0.00	96.72	0.00
71	6,645	6,646	**10.59**	104.0	3.00	87.45	8.92	0.00	0.00	0.00	96.37	0.00

To be continued on next page...

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DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	7,123	7,123	**9.62**	104.0	3.00	88.05	9.29	0.00	0.00	0.00	97.35	0.00
73	6,495	6,496	**10.91**	104.0	3.00	87.25	8.80	0.00	0.00	0.00	96.05	0.00
74	5,429	5,430	**13.37**	104.0	3.00	85.70	7.89	0.00	0.00	0.00	93.59	0.00
75	4,979	4,980	**14.54**	104.0	3.00	84.94	7.48	0.00	0.00	0.00	92.42	0.00
76	3,500	3,501	**19.14**	104.0	3.00	81.88	5.94	0.00	0.00	0.00	87.82	0.00
77	4,161	4,162	**16.91**	104.0	3.00	83.39	6.66	0.00	0.00	0.00	90.05	0.00
78	5,694	5,696	**12.72**	104.0	3.00	86.11	8.13	0.00	0.00	0.00	94.24	0.00
80	5,079	5,080	**14.28**	104.0	3.00	85.12	7.57	0.00	0.00	0.00	92.69	0.00
81	7,436	7,438	**9.01**	104.0	3.00	88.43	9.53	0.00	0.00	0.00	97.96	0.00
82	4,920	4,920	**14.70**	104.0	3.00	84.84	7.42	0.00	0.00	0.00	92.26	0.00
83	4,488	4,489	**15.92**	104.0	3.00	84.04	7.00	0.00	0.00	0.00	91.04	0.00
85	5,579	5,579	**13.01**	104.0	3.00	85.93	8.02	0.00	0.00	0.00	93.96	0.00
86	4,910	4,911	**14.73**	104.0	3.00	84.82	7.41	0.00	0.00	0.00	92.23	0.00
87	5,816	5,817	**12.43**	104.0	3.00	86.29	8.23	0.00	0.00	0.00	94.53	0.00
89	4,540	4,541	**15.77**	104.0	3.00	84.14	7.05	0.00	0.00	0.00	91.19	0.00
90	3,648	3,649	**18.61**	104.0	3.00	82.24	6.11	0.00	0.00	0.00	88.35	0.00
91	3,863	3,864	**17.88**	104.0	3.00	82.74	6.34	0.00	0.00	0.00	89.08	0.00
92	5,090	5,091	**14.24**	104.0	3.00	85.14	7.58	0.00	0.00	0.00	92.72	0.00
94	6,909	6,910	**10.04**	104.0	3.00	87.79	9.13	0.00	0.00	0.00	96.92	0.00
95	8,096	8,097	**7.79**	104.0	3.00	89.17	10.00	0.00	0.00	0.00	99.17	0.00
97	5,502	5,504	**13.19**	104.0	3.00	85.81	7.96	0.00	0.00	0.00	93.77	0.00
98	7,354	7,356	**9.16**	104.0	3.00	88.33	9.47	0.00	0.00	0.00	97.80	0.00
99	7,751	7,752	**8.42**	104.0	3.00	88.79	9.76	0.00	0.00	0.00	98.54	0.00
100	2,220	2,223	**24.69**	104.0	3.00	77.94	4.33	0.00	0.00	0.00	82.27	0.00
101	7,833	7,835	**8.27**	104.0	3.00	88.88	9.82	0.00	0.00	0.00	98.70	0.00
102	2,526	2,530	**23.15**	104.0	3.00	79.06	4.75	0.00	0.00	0.00	83.81	0.00
103	8,673	8,674	**6.80**	104.0	3.00	89.76	10.39	0.00	0.00	0.00	100.16	0.00
104	3,052	3,054	**20.85**	104.0	3.00	80.70	5.41	0.00	0.00	0.00	86.11	0.00
107	6,498	6,500	**10.90**	104.0	3.00	87.26	8.80	0.00	0.00	0.00	96.06	0.00
108	8,377	8,377	**7.31**	104.0	3.00	89.46	10.19	0.00	0.00	0.00	99.66	0.00
109	5,083	5,084	**14.26**	104.0	3.00	85.12	7.57	0.00	0.00	0.00	92.70	0.00
110	3,444	3,445	**19.34**	104.0	3.00	81.74	5.88	0.00	0.00	0.00	87.62	0.00
111	3,442	3,443	**19.35**	104.0	3.00	81.74	5.87	0.00	0.00	0.00	87.61	0.00
113	6,826	6,827	**10.21**	104.0	3.00	87.68	9.06	0.00	0.00	0.00	96.75	0.00
114	5,549	5,549	**13.08**	104.0	3.00	85.88	8.00	0.00	0.00	0.00	93.88	0.00
115	8,149	8,149	**7.70**	104.0	3.00	89.22	10.04	0.00	0.00	0.00	99.26	0.00
116	3,547	3,550	**18.96**	104.0	3.00	82.00	6.00	0.00	0.00	0.00	88.00	0.00
118	5,343	5,343	**13.59**	104.0	3.00	85.56	7.81	0.00	0.00	0.00	93.37	0.00
119	6,002	6,004	**12.00**	104.0	3.00	86.57	8.39	0.00	0.00	0.00	94.96	0.00
120	8,182	8,183	**7.64**	104.0	3.00	89.26	10.06	0.00	0.00	0.00	99.32	0.00
121	5,451	5,452	**13.32**	104.0	3.00	85.73	7.91	0.00	0.00	0.00	93.64	0.00
125	4,194	4,195	**16.81**	104.0	3.00	83.45	6.70	0.00	0.00	0.00	90.15	0.00
126	1,849	1,852	**26.82**	104.0	3.00	76.35	3.79	0.00	0.00	0.00	80.15	0.00
127	1,976	1,979	**26.05**	104.0	3.00	76.93	3.98	0.00	0.00	0.00	80.91	0.00
128	2,239	2,242	**24.59**	104.0	3.00	78.01	4.36	0.00	0.00	0.00	82.37	0.00
129	4,512	4,513	**15.85**	104.0	3.00	84.09	7.02	0.00	0.00	0.00	91.11	0.00
130	4,308	4,309	**16.46**	104.0	3.00	83.69	6.82	0.00	0.00	0.00	90.50	0.00
131	4,727	4,728	**15.24**	104.0	3.00	84.49	7.23	0.00	0.00	0.00	91.73	0.00
132	5,138	5,139	**14.12**	104.0	3.00	85.22	7.63	0.00	0.00	0.00	92.84	0.00
133	3,032	3,033	**20.94**	104.0	3.00	80.64	5.39	0.00	0.00	0.00	86.03	0.00
134	6,779	6,780	**10.31**	104.0	3.00	87.62	9.03	0.00	0.00	0.00	96.65	0.00
141	5,459	5,461	**13.30**	104.0	3.00	85.75	7.92	0.00	0.00	0.00	93.66	0.00
142	2,735	2,740	**22.19**	104.0	3.00	79.75	5.02	0.00	0.00	0.00	84.77	0.00
143	5,870	5,872	**12.31**	104.0	3.00	86.38	8.28	0.00	0.00	0.00	94.66	0.00
144	1,821	1,825	**26.99**	104.0	3.00	76.22	3.75	0.00	0.00	0.00	79.98	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	3,316	3,317	**19.82**	104.0	3.00	81.42	5.73	0.00	0.00	0.00	87.14	0.00
146	3,189	3,190	**20.31**	104.0	3.00	81.08	5.58	0.00	0.00	0.00	86.65	0.00
Sum	38.57											

Noise sensitive area: H29 H29

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	7,871	7,871	**8.20**	104.0	3.00	88.92	9.84	0.00	0.00	0.00	98.76	0.00
2	7,952	7,952	**8.05**	104.0	3.00	89.01	9.90	0.00	0.00	0.00	98.91	0.00
3	7,561	7,562	**8.77**	104.0	3.00	88.57	9.62	0.00	0.00	0.00	98.19	0.00
4	7,266	7,267	**9.34**	104.0	3.00	88.23	9.40	0.00	0.00	0.00	97.63	0.00
5	6,704	6,705	**10.47**	104.0	3.00	87.53	8.97	0.00	0.00	0.00	96.50	0.00
6	7,006	7,007	**9.85**	104.0	3.00	87.91	9.20	0.00	0.00	0.00	97.11	0.00
7	4,836	4,838	**14.93**	104.0	3.00	84.69	7.34	0.00	0.00	0.00	92.03	0.00
8	8,433	8,433	**7.21**	104.0	3.00	89.52	10.23	0.00	0.00	0.00	99.75	0.00
9	7,342	7,343	**9.19**	104.0	3.00	88.32	9.46	0.00	0.00	0.00	97.77	0.00
10	6,935	6,937	**9.99**	104.0	3.00	87.82	9.15	0.00	0.00	0.00	96.97	0.00
11	7,995	7,997	**7.97**	104.0	3.00	89.06	9.93	0.00	0.00	0.00	98.99	0.00
12	7,856	7,857	**8.22**	104.0	3.00	88.91	9.83	0.00	0.00	0.00	98.74	0.00
13	7,385	7,386	**9.10**	104.0	3.00	88.37	9.49	0.00	0.00	0.00	97.86	0.00
14	6,955	6,957	**9.95**	104.0	3.00	87.85	9.16	0.00	0.00	0.00	97.01	0.00
15	6,313	6,314	**11.30**	104.0	3.00	87.01	8.65	0.00	0.00	0.00	95.66	0.00
16	6,137	6,139	**11.69**	104.0	3.00	86.76	8.51	0.00	0.00	0.00	95.27	0.00
17	8,192	8,193	**7.63**	104.0	3.00	89.27	10.07	0.00	0.00	0.00	99.34	0.00
18	8,243	8,244	**7.54**	104.0	3.00	89.32	10.10	0.00	0.00	0.00	99.43	0.00
19	7,096	7,097	**9.67**	104.0	3.00	88.02	9.27	0.00	0.00	0.00	97.29	0.00
20	6,034	6,036	**11.93**	104.0	3.00	86.61	8.42	0.00	0.00	0.00	95.03	0.00
21	6,486	6,486	**10.93**	104.0	3.00	87.24	8.79	0.00	0.00	0.00	96.03	0.00
22	6,569	6,569	**10.75**	104.0	3.00	87.35	8.86	0.00	0.00	0.00	96.21	0.00
23	6,378	6,379	**11.16**	104.0	3.00	87.09	8.70	0.00	0.00	0.00	95.80	0.00
24	6,712	6,713	**10.45**	104.0	3.00	87.54	8.97	0.00	0.00	0.00	96.51	0.00
25	4,526	4,527	**15.81**	104.0	3.00	84.12	7.04	0.00	0.00	0.00	91.15	0.00
26	5,599	5,600	**12.96**	104.0	3.00	85.96	8.04	0.00	0.00	0.00	94.01	0.00
27	4,228	4,229	**16.70**	104.0	3.00	83.53	6.73	0.00	0.00	0.00	90.26	0.00
28	3,863	3,865	**17.87**	104.0	3.00	82.74	6.35	0.00	0.00	0.00	89.09	0.00
29	5,773	5,774	**12.54**	104.0	3.00	86.23	8.20	0.00	0.00	0.00	94.43	0.00
30	6,119	6,119	**11.74**	104.0	3.00	86.73	8.49	0.00	0.00	0.00	95.22	0.00
31	7,165	7,165	**9.53**	104.0	3.00	88.10	9.32	0.00	0.00	0.00	97.43	0.00
32	4,892	4,892	**14.78**	104.0	3.00	84.79	7.39	0.00	0.00	0.00	92.18	0.00
33	5,827	5,827	**12.41**	104.0	3.00	86.31	8.24	0.00	0.00	0.00	94.55	0.00
34	4,606	4,608	**15.58**	104.0	3.00	84.27	7.12	0.00	0.00	0.00	91.39	0.00
35	5,075	5,077	**14.28**	104.0	3.00	85.11	7.57	0.00	0.00	0.00	92.68	0.00
36	5,328	5,330	**13.63**	104.0	3.00	85.53	7.80	0.00	0.00	0.00	93.34	0.00
37	4,371	4,373	**16.27**	104.0	3.00	83.82	6.88	0.00	0.00	0.00	90.70	0.00
38	4,280	4,281	**16.55**	104.0	3.00	83.63	6.79	0.00	0.00	0.00	90.42	0.00
39	3,457	3,459	**19.29**	104.0	3.00	81.78	5.89	0.00	0.00	0.00	87.67	0.00
40	2,633	2,634	**22.66**	104.0	3.00	79.41	4.88	0.00	0.00	0.00	84.30	0.00
41	3,146	3,149	**20.47**	104.0	3.00	80.96	5.53	0.00	0.00	0.00	86.49	0.00
43	3,830	3,832	**17.98**	104.0	3.00	82.67	6.31	0.00	0.00	0.00	88.98	0.00
44	2,687	2,691	**22.40**	104.0	3.00	79.60	4.96	0.00	0.00	0.00	84.56	0.00
45	2,616	2,620	**22.73**	104.0	3.00	79.37	4.87	0.00	0.00	0.00	84.23	0.00
46	2,936	2,938	**21.33**	104.0	3.00	80.36	5.27	0.00	0.00	0.00	85.63	0.00
48	4,467	4,467	**15.99**	104.0	3.00	84.00	6.98	0.00	0.00	0.00	90.98	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	5,572	5,572	**13.02**	104.0	3.00	85.92	8.02	0.00	0.00	0.00	93.94	0.00
50	5,966	5,967	**12.08**	104.0	3.00	86.52	8.36	0.00	0.00	0.00	94.88	0.00
51	5,600	5,601	**12.95**	104.0	3.00	85.96	8.04	0.00	0.00	0.00	94.01	0.00
52	5,665	5,665	**12.80**	104.0	3.00	86.06	8.10	0.00	0.00	0.00	94.16	0.00
53	5,566	5,567	**13.04**	104.0	3.00	85.91	8.01	0.00	0.00	0.00	93.93	0.00
55	5,715	5,716	**12.67**	104.0	3.00	86.14	8.15	0.00	0.00	0.00	94.29	0.00
56	5,812	5,812	**12.45**	104.0	3.00	86.29	8.23	0.00	0.00	0.00	94.52	0.00
57	5,080	5,080	**14.27**	104.0	3.00	85.12	7.57	0.00	0.00	0.00	92.69	0.00
58	5,154	5,154	**14.08**	104.0	3.00	85.24	7.64	0.00	0.00	0.00	92.88	0.00
59	5,916	5,916	**12.20**	104.0	3.00	86.44	8.32	0.00	0.00	0.00	94.76	0.00
60	6,256	6,256	**11.43**	104.0	3.00	86.93	8.60	0.00	0.00	0.00	95.53	0.00
61	6,465	6,465	**10.97**	104.0	3.00	87.21	8.78	0.00	0.00	0.00	95.99	0.00
62	4,763	4,764	**15.13**	104.0	3.00	84.56	7.27	0.00	0.00	0.00	91.83	0.00
63	4,475	4,476	**15.96**	104.0	3.00	84.02	6.98	0.00	0.00	0.00	91.00	0.00
64	5,406	5,407	**13.43**	104.0	3.00	85.66	7.87	0.00	0.00	0.00	93.53	0.00
65	6,039	6,039	**11.92**	104.0	3.00	86.62	8.42	0.00	0.00	0.00	95.04	0.00
66	2,852	2,854	**21.69**	104.0	3.00	80.11	5.17	0.00	0.00	0.00	85.27	0.00
67	5,806	5,807	**12.46**	104.0	3.00	86.28	8.22	0.00	0.00	0.00	94.50	0.00
68	6,278	6,279	**11.38**	104.0	3.00	86.96	8.62	0.00	0.00	0.00	95.58	0.00
69	5,874	5,875	**12.30**	104.0	3.00	86.38	8.28	0.00	0.00	0.00	94.66	0.00
70	6,607	6,608	**10.67**	104.0	3.00	87.40	8.89	0.00	0.00	0.00	96.29	0.00
71	6,722	6,724	**10.43**	104.0	3.00	87.55	8.98	0.00	0.00	0.00	96.53	0.00
72	7,494	7,495	**8.90**	104.0	3.00	88.50	9.57	0.00	0.00	0.00	98.06	0.00
73	6,758	6,759	**10.36**	104.0	3.00	87.60	9.01	0.00	0.00	0.00	96.61	0.00
74	5,682	5,683	**12.75**	104.0	3.00	86.09	8.12	0.00	0.00	0.00	94.21	0.00
75	5,421	5,422	**13.40**	104.0	3.00	85.68	7.88	0.00	0.00	0.00	93.57	0.00
76	4,420	4,421	**16.12**	104.0	3.00	83.91	6.93	0.00	0.00	0.00	90.84	0.00
77	5,049	5,049	**14.36**	104.0	3.00	85.06	7.54	0.00	0.00	0.00	92.61	0.00
78	5,624	5,625	**12.89**	104.0	3.00	86.00	8.07	0.00	0.00	0.00	94.07	0.00
80	5,976	5,976	**12.06**	104.0	3.00	86.53	8.37	0.00	0.00	0.00	94.90	0.00
81	7,302	7,304	**9.26**	104.0	3.00	88.27	9.43	0.00	0.00	0.00	97.70	0.00
82	5,641	5,641	**12.85**	104.0	3.00	86.03	8.08	0.00	0.00	0.00	94.11	0.00
83	5,078	5,078	**14.28**	104.0	3.00	85.11	7.57	0.00	0.00	0.00	92.68	0.00
85	6,426	6,426	**11.06**	104.0	3.00	87.16	8.74	0.00	0.00	0.00	95.90	0.00
86	5,816	5,817	**12.44**	104.0	3.00	86.29	8.23	0.00	0.00	0.00	94.53	0.00
87	6,276	6,277	**11.39**	104.0	3.00	86.95	8.62	0.00	0.00	0.00	95.58	0.00
89	5,049	5,050	**14.35**	104.0	3.00	85.07	7.54	0.00	0.00	0.00	92.61	0.00
90	4,552	4,552	**15.74**	104.0	3.00	84.16	7.06	0.00	0.00	0.00	91.23	0.00
91	4,579	4,580	**15.66**	104.0	3.00	84.22	7.09	0.00	0.00	0.00	91.31	0.00
92	5,410	5,411	**13.42**	104.0	3.00	85.67	7.87	0.00	0.00	0.00	93.54	0.00
94	6,905	6,907	**10.05**	104.0	3.00	87.79	9.13	0.00	0.00	0.00	96.91	0.00
95	8,081	8,082	**7.82**	104.0	3.00	89.15	9.99	0.00	0.00	0.00	99.14	0.00
97	5,532	5,534	**13.12**	104.0	3.00	85.86	7.98	0.00	0.00	0.00	93.85	0.00
98	7,346	7,348	**9.18**	104.0	3.00	88.32	9.46	0.00	0.00	0.00	97.78	0.00
99	8,012	8,013	**7.94**	104.0	3.00	89.08	9.94	0.00	0.00	0.00	99.02	0.00
100	2,884	2,886	**21.55**	104.0	3.00	80.21	5.21	0.00	0.00	0.00	85.41	0.00
101	7,679	7,680	**8.55**	104.0	3.00	88.71	9.70	0.00	0.00	0.00	98.41	0.00
102	2,948	2,952	**21.27**	104.0	3.00	80.40	5.29	0.00	0.00	0.00	85.69	0.00
103	8,512	8,513	**7.07**	104.0	3.00	89.60	10.29	0.00	0.00	0.00	99.89	0.00
104	3,505	3,508	**19.11**	104.0	3.00	81.90	5.95	0.00	0.00	0.00	87.85	0.00
107	6,397	6,399	**11.12**	104.0	3.00	87.12	8.72	0.00	0.00	0.00	95.84	0.00
108	8,694	8,695	**6.77**	104.0	3.00	89.79	10.41	0.00	0.00	0.00	100.19	0.00
109	6,004	6,005	**12.00**	104.0	3.00	86.57	8.39	0.00	0.00	0.00	94.96	0.00
110	4,308	4,309	**16.46**	104.0	3.00	83.69	6.81	0.00	0.00	0.00	90.50	0.00
111	4,348	4,349	**16.34**	104.0	3.00	83.77	6.86	0.00	0.00	0.00	90.62	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	6,715	6,717	**10.44**	104.0	3.00	87.54	8.98	0.00	0.00	0.00	96.52	0.00
114	6,413	6,414	**11.09**	104.0	3.00	87.14	8.73	0.00	0.00	0.00	95.88	0.00
115	8,243	8,244	**7.54**	104.0	3.00	89.32	10.10	0.00	0.00	0.00	99.42	0.00
116	3,721	3,724	**18.35**	104.0	3.00	82.42	6.19	0.00	0.00	0.00	88.61	0.00
118	6,255	6,255	**11.43**	104.0	3.00	86.93	8.60	0.00	0.00	0.00	95.53	0.00
119	6,169	6,170	**11.62**	104.0	3.00	86.81	8.53	0.00	0.00	0.00	95.34	0.00
120	7,998	7,999	**7.97**	104.0	3.00	89.06	9.93	0.00	0.00	0.00	98.99	0.00
121	5,590	5,591	**12.98**	104.0	3.00	85.95	8.04	0.00	0.00	0.00	93.99	0.00
125	4,794	4,795	**15.05**	104.0	3.00	84.62	7.30	0.00	0.00	0.00	91.91	0.00
126	2,755	2,757	**22.11**	104.0	3.00	79.81	5.04	0.00	0.00	0.00	84.85	0.00
127	2,895	2,897	**21.50**	104.0	3.00	80.24	5.22	0.00	0.00	0.00	85.46	0.00
128	3,162	3,163	**20.41**	104.0	3.00	81.00	5.55	0.00	0.00	0.00	86.55	0.00
129	4,265	4,266	**16.59**	104.0	3.00	83.60	6.77	0.00	0.00	0.00	90.37	0.00
130	3,943	3,944	**17.61**	104.0	3.00	82.92	6.43	0.00	0.00	0.00	89.35	0.00
131	4,322	4,324	**16.42**	104.0	3.00	83.72	6.83	0.00	0.00	0.00	90.55	0.00
132	4,734	4,735	**15.21**	104.0	3.00	84.51	7.24	0.00	0.00	0.00	91.75	0.00
133	3,704	3,705	**18.41**	104.0	3.00	82.38	6.17	0.00	0.00	0.00	88.55	0.00
134	6,612	6,613	**10.66**	104.0	3.00	87.41	8.89	0.00	0.00	0.00	96.30	0.00
141	5,529	5,531	**13.12**	104.0	3.00	85.86	7.98	0.00	0.00	0.00	93.84	0.00
142	3,090	3,094	**20.69**	104.0	3.00	80.81	5.46	0.00	0.00	0.00	86.27	0.00
143	5,870	5,872	**12.31**	104.0	3.00	86.38	8.28	0.00	0.00	0.00	94.66	0.00
144	2,470	2,473	**23.42**	104.0	3.00	78.87	4.67	0.00	0.00	0.00	83.54	0.00
145	4,233	4,234	**16.69**	104.0	3.00	83.53	6.74	0.00	0.00	0.00	90.27	0.00
146	4,112	4,113	**17.07**	104.0	3.00	83.28	6.61	0.00	0.00	0.00	89.89	0.00
Sum	36.51											

Noise sensitive area: H30 H30

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	5,694	5,695	**12.72**	104.0	3.00	86.11	8.13	0.00	0.00	0.00	94.24	0.00
2	5,805	5,806	**12.46**	104.0	3.00	86.28	8.22	0.00	0.00	0.00	94.50	0.00
3	5,455	5,456	**13.31**	104.0	3.00	85.74	7.92	0.00	0.00	0.00	93.65	0.00
4	5,395	5,395	**13.46**	104.0	3.00	85.64	7.86	0.00	0.00	0.00	93.50	0.00
5	4,736	4,737	**15.21**	104.0	3.00	84.51	7.24	0.00	0.00	0.00	91.75	0.00
6	4,923	4,924	**14.69**	104.0	3.00	84.85	7.42	0.00	0.00	0.00	92.27	0.00
7	2,811	2,814	**21.86**	104.0	3.00	79.99	5.11	0.00	0.00	0.00	85.10	0.00
8	6,241	6,242	**11.46**	104.0	3.00	86.91	8.59	0.00	0.00	0.00	95.50	0.00
9	5,169	5,170	**14.04**	104.0	3.00	85.27	7.65	0.00	0.00	0.00	92.92	0.00
10	4,741	4,743	**15.19**	104.0	3.00	84.52	7.25	0.00	0.00	0.00	91.77	0.00
11	5,804	5,806	**12.46**	104.0	3.00	86.28	8.22	0.00	0.00	0.00	94.50	0.00
12	5,659	5,661	**12.81**	104.0	3.00	86.06	8.10	0.00	0.00	0.00	94.15	0.00
13	5,185	5,187	**13.99**	104.0	3.00	85.30	7.67	0.00	0.00	0.00	92.97	0.00
14	4,754	4,757	**15.15**	104.0	3.00	84.55	7.26	0.00	0.00	0.00	91.81	0.00
15	4,110	4,112	**17.07**	104.0	3.00	83.28	6.61	0.00	0.00	0.00	89.89	0.00
16	3,947	3,950	**17.59**	104.0	3.00	82.93	6.44	0.00	0.00	0.00	89.37	0.00
17	6,006	6,007	**11.99**	104.0	3.00	86.57	8.40	0.00	0.00	0.00	94.97	0.00
18	6,072	6,074	**11.84**	104.0	3.00	86.67	8.45	0.00	0.00	0.00	95.12	0.00
19	4,907	4,910	**14.73**	104.0	3.00	84.82	7.41	0.00	0.00	0.00	92.23	0.00
20	3,833	3,835	**17.97**	104.0	3.00	82.68	6.31	0.00	0.00	0.00	88.99	0.00
21	4,636	4,637	**15.49**	104.0	3.00	84.32	7.14	0.00	0.00	0.00	91.47	0.00
22	4,913	4,913	**14.72**	104.0	3.00	84.83	7.41	0.00	0.00	0.00	92.24	0.00
23	4,818	4,819	**14.98**	104.0	3.00	84.66	7.32	0.00	0.00	0.00	91.98	0.00
24	5,002	5,002	**14.48**	104.0	3.00	84.98	7.50	0.00	0.00	0.00	92.48	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	3,603	3,604	**18.77**	104.0	3.00	82.14	6.06	0.00	0.00	0.00	88.19	0.00
26	3,686	3,687	**18.48**	104.0	3.00	82.33	6.15	0.00	0.00	0.00	88.48	0.00
27	2,965	2,966	**21.21**	104.0	3.00	80.44	5.31	0.00	0.00	0.00	85.75	0.00
28	2,198	2,201	**24.81**	104.0	3.00	77.85	4.30	0.00	0.00	0.00	82.15	0.00
29	4,198	4,199	**16.80**	104.0	3.00	83.46	6.70	0.00	0.00	0.00	90.16	0.00
30	4,683	4,683	**15.36**	104.0	3.00	84.41	7.19	0.00	0.00	0.00	91.60	0.00
31	5,624	5,624	**12.90**	104.0	3.00	86.00	8.07	0.00	0.00	0.00	94.07	0.00
32	4,080	4,081	**17.17**	104.0	3.00	83.22	6.58	0.00	0.00	0.00	89.79	0.00
33	4,587	4,588	**15.63**	104.0	3.00	84.23	7.10	0.00	0.00	0.00	91.33	0.00
34	2,653	2,656	**22.57**	104.0	3.00	79.48	4.91	0.00	0.00	0.00	84.40	0.00
35	3,004	3,007	**21.05**	104.0	3.00	80.56	5.35	0.00	0.00	0.00	85.92	0.00
36	3,222	3,225	**20.17**	104.0	3.00	81.17	5.62	0.00	0.00	0.00	86.79	0.00
37	2,502	2,504	**23.27**	104.0	3.00	78.97	4.71	0.00	0.00	0.00	83.69	0.00
38	3,225	3,226	**20.17**	104.0	3.00	81.17	5.62	0.00	0.00	0.00	86.79	0.00
39	2,348	2,351	**24.03**	104.0	3.00	78.42	4.51	0.00	0.00	0.00	82.93	0.00
40	501	510	**40.42**	104.0	3.00	65.15	1.39	0.00	0.00	0.00	66.54	0.00
41	2,016	2,020	**25.81**	104.0	3.00	77.11	4.04	0.00	0.00	0.00	81.15	0.00
43	2,054	2,058	**25.59**	104.0	3.00	77.27	4.10	0.00	0.00	0.00	81.37	0.00
44	1,631	1,637	**28.22**	104.0	3.00	75.28	3.46	0.00	0.00	0.00	78.74	0.00
45	1,836	1,841	**26.88**	104.0	3.00	76.30	3.78	0.00	0.00	0.00	80.08	0.00
46	1,036	1,041	**33.15**	104.0	3.00	71.35	2.46	0.00	0.00	0.00	73.81	0.00
48	4,016	4,016	**17.38**	104.0	3.00	83.08	6.51	0.00	0.00	0.00	89.59	0.00
49	5,049	5,049	**14.36**	104.0	3.00	85.06	7.54	0.00	0.00	0.00	92.61	0.00
50	3,902	3,903	**17.75**	104.0	3.00	82.83	6.39	0.00	0.00	0.00	89.22	0.00
51	4,888	4,888	**14.79**	104.0	3.00	84.78	7.39	0.00	0.00	0.00	92.17	0.00
52	4,827	4,827	**14.96**	104.0	3.00	84.67	7.33	0.00	0.00	0.00	92.00	0.00
53	5,176	5,176	**14.02**	104.0	3.00	85.28	7.66	0.00	0.00	0.00	92.94	0.00
55	5,887	5,888	**12.27**	104.0	3.00	86.40	8.29	0.00	0.00	0.00	94.69	0.00
56	6,084	6,085	**11.82**	104.0	3.00	86.68	8.46	0.00	0.00	0.00	95.15	0.00
57	5,493	5,493	**13.22**	104.0	3.00	85.80	7.95	0.00	0.00	0.00	93.75	0.00
58	4,030	4,031	**17.33**	104.0	3.00	83.11	6.52	0.00	0.00	0.00	89.63	0.00
59	6,286	6,287	**11.36**	104.0	3.00	86.97	8.63	0.00	0.00	0.00	95.60	0.00
60	7,085	7,086	**9.69**	104.0	3.00	88.01	9.26	0.00	0.00	0.00	97.27	0.00
61	7,371	7,371	**9.13**	104.0	3.00	88.35	9.48	0.00	0.00	0.00	97.83	0.00
62	6,100	6,101	**11.78**	104.0	3.00	86.71	8.47	0.00	0.00	0.00	95.18	0.00
63	6,153	6,153	**11.66**	104.0	3.00	86.78	8.52	0.00	0.00	0.00	95.30	0.00
64	7,295	7,296	**9.28**	104.0	3.00	88.26	9.42	0.00	0.00	0.00	97.68	0.00
65	7,926	7,927	**8.10**	104.0	3.00	88.98	9.88	0.00	0.00	0.00	98.86	0.00
66	651	657	**37.90**	104.0	3.00	67.35	1.71	0.00	0.00	0.00	69.06	0.00
67	7,530	7,531	**8.83**	104.0	3.00	88.54	9.60	0.00	0.00	0.00	98.13	0.00
68	8,045	8,045	**7.89**	104.0	3.00	89.11	9.96	0.00	0.00	0.00	99.08	0.00
69	7,793	7,793	**8.34**	104.0	3.00	88.83	9.79	0.00	0.00	0.00	98.62	0.00
70	4,467	4,468	**15.98**	104.0	3.00	84.00	6.98	0.00	0.00	0.00	90.98	0.00
71	4,538	4,540	**15.77**	104.0	3.00	84.14	7.05	0.00	0.00	0.00	91.19	0.00
72	5,564	5,565	**13.04**	104.0	3.00	85.91	8.01	0.00	0.00	0.00	93.92	0.00
73	4,708	4,709	**15.29**	104.0	3.00	84.46	7.22	0.00	0.00	0.00	91.67	0.00
74	3,649	3,651	**18.60**	104.0	3.00	82.25	6.11	0.00	0.00	0.00	88.36	0.00
75	3,694	3,695	**18.45**	104.0	3.00	82.35	6.16	0.00	0.00	0.00	88.51	0.00
76	4,677	4,678	**15.38**	104.0	3.00	84.40	7.18	0.00	0.00	0.00	91.59	0.00
77	4,879	4,880	**14.81**	104.0	3.00	84.77	7.38	0.00	0.00	0.00	92.15	0.00
78	3,422	3,424	**19.42**	104.0	3.00	81.69	5.85	0.00	0.00	0.00	87.54	0.00
80	6,732	6,733	**10.41**	104.0	3.00	87.56	8.99	0.00	0.00	0.00	96.55	0.00
81	5,123	5,125	**14.16**	104.0	3.00	85.19	7.61	0.00	0.00	0.00	92.81	0.00
82	4,617	4,618	**15.55**	104.0	3.00	84.29	7.13	0.00	0.00	0.00	91.41	0.00
83	6,791	6,791	**10.29**	104.0	3.00	87.64	9.04	0.00	0.00	0.00	96.67	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	5,870	5,871	**12.31**	104.0	3.00	86.37	8.28	0.00	0.00	0.00	94.65	0.00
86	6,502	6,502	**10.90**	104.0	3.00	87.26	8.81	0.00	0.00	0.00	96.07	0.00
87	8,162	8,163	**7.68**	104.0	3.00	89.24	10.05	0.00	0.00	0.00	99.28	0.00
89	6,878	6,879	**10.11**	104.0	3.00	87.75	9.10	0.00	0.00	0.00	96.85	0.00
90	5,338	5,339	**13.60**	104.0	3.00	85.55	7.81	0.00	0.00	0.00	93.36	0.00
91	6,066	6,066	**11.86**	104.0	3.00	86.66	8.45	0.00	0.00	0.00	95.10	0.00
92	7,437	7,438	**9.01**	104.0	3.00	88.43	9.53	0.00	0.00	0.00	97.96	0.00
94	4,702	4,704	**15.30**	104.0	3.00	84.45	7.21	0.00	0.00	0.00	91.66	0.00
95	5,876	5,878	**12.29**	104.0	3.00	86.38	8.29	0.00	0.00	0.00	94.67	0.00
97	3,337	3,340	**19.73**	104.0	3.00	81.48	5.75	0.00	0.00	0.00	87.23	0.00
98	5,142	5,144	**14.11**	104.0	3.00	85.23	7.63	0.00	0.00	0.00	92.86	0.00
99	5,941	5,941	**12.14**	104.0	3.00	86.48	8.34	0.00	0.00	0.00	94.82	0.00
100	2,247	2,250	**24.55**	104.0	3.00	78.04	4.37	0.00	0.00	0.00	82.41	0.00
101	5,510	5,512	**13.17**	104.0	3.00	85.83	7.96	0.00	0.00	0.00	93.79	0.00
102	1,630	1,637	**28.22**	104.0	3.00	75.28	3.46	0.00	0.00	0.00	78.75	0.00
103	6,348	6,349	**11.23**	104.0	3.00	87.05	8.68	0.00	0.00	0.00	95.73	0.00
104	2,073	2,077	**25.49**	104.0	3.00	77.35	4.12	0.00	0.00	0.00	81.47	0.00
107	4,204	4,206	**16.78**	104.0	3.00	83.48	6.71	0.00	0.00	0.00	90.19	0.00
108	6,675	6,675	**10.53**	104.0	3.00	87.49	8.94	0.00	0.00	0.00	96.43	0.00
109	6,475	6,475	**10.95**	104.0	3.00	87.23	8.78	0.00	0.00	0.00	96.01	0.00
110	4,077	4,077	**17.18**	104.0	3.00	83.21	6.57	0.00	0.00	0.00	89.78	0.00
111	4,423	4,424	**16.11**	104.0	3.00	83.92	6.93	0.00	0.00	0.00	90.85	0.00
113	4,526	4,528	**15.81**	104.0	3.00	84.12	7.04	0.00	0.00	0.00	91.15	0.00
114	5,962	5,963	**12.09**	104.0	3.00	86.51	8.36	0.00	0.00	0.00	94.87	0.00
115	6,058	6,059	**11.87**	104.0	3.00	86.65	8.44	0.00	0.00	0.00	95.09	0.00
116	1,702	1,707	**27.74**	104.0	3.00	75.65	3.57	0.00	0.00	0.00	79.22	0.00
118	6,849	6,849	**10.17**	104.0	3.00	87.71	9.08	0.00	0.00	0.00	96.79	0.00
119	4,041	4,043	**17.29**	104.0	3.00	83.13	6.54	0.00	0.00	0.00	89.67	0.00
120	5,847	5,848	**12.36**	104.0	3.00	86.34	8.26	0.00	0.00	0.00	94.60	0.00
121	3,450	3,453	**19.31**	104.0	3.00	81.76	5.88	0.00	0.00	0.00	87.65	0.00
125	6,494	6,495	**10.91**	104.0	3.00	87.25	8.80	0.00	0.00	0.00	96.05	0.00
126	3,160	3,162	**20.42**	104.0	3.00	81.00	5.54	0.00	0.00	0.00	86.54	0.00
127	3,397	3,399	**19.51**	104.0	3.00	81.63	5.82	0.00	0.00	0.00	87.45	0.00
128	3,675	3,677	**18.51**	104.0	3.00	82.31	6.14	0.00	0.00	0.00	88.45	0.00
129	2,159	2,161	**25.03**	104.0	3.00	77.69	4.24	0.00	0.00	0.00	81.93	0.00
130	2,010	2,013	**25.85**	104.0	3.00	77.08	4.03	0.00	0.00	0.00	81.11	0.00
131	2,450	2,452	**23.53**	104.0	3.00	78.79	4.64	0.00	0.00	0.00	83.43	0.00
132	2,850	2,852	**21.70**	104.0	3.00	80.10	5.16	0.00	0.00	0.00	85.27	0.00
133	2,818	2,820	**21.84**	104.0	3.00	80.00	5.12	0.00	0.00	0.00	85.13	0.00
134	4,448	4,449	**16.04**	104.0	3.00	83.97	6.96	0.00	0.00	0.00	90.92	0.00
141	3,349	3,353	**19.69**	104.0	3.00	81.51	5.77	0.00	0.00	0.00	87.28	0.00
142	1,553	1,560	**28.76**	104.0	3.00	74.86	3.34	0.00	0.00	0.00	78.21	0.00
143	3,667	3,671	**18.54**	104.0	3.00	82.29	6.13	0.00	0.00	0.00	88.43	0.00
144	2,006	2,010	**25.87**	104.0	3.00	77.06	4.03	0.00	0.00	0.00	81.09	0.00
145	4,901	4,902	**14.75**	104.0	3.00	84.81	7.40	0.00	0.00	0.00	92.21	0.00
146	4,656	4,657	**15.44**	104.0	3.00	84.36	7.16	0.00	0.00	0.00	91.53	0.00

Sum 44.80

Noise sensitive area: H31 H31

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	4,171	4,172	**16.88**	104.0	3.00	83.41	6.67	0.00	0.00	0.00	90.08	0.00
2	4,537	4,538	**15.78**	104.0	3.00	84.14	7.05	0.00	0.00	0.00	91.18	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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EAPC Architects Engineers
3100 DeMers Avenue
US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	4,544	4,545	**15.76**	104.0	3.00	84.15	7.05	0.00	0.00	0.00	91.20	0.00
4	5,481	5,482	**13.25**	104.0	3.00	85.78	7.94	0.00	0.00	0.00	93.72	0.00
5	4,671	4,672	**15.39**	104.0	3.00	84.39	7.18	0.00	0.00	0.00	91.57	0.00
6	4,285	4,286	**16.53**	104.0	3.00	83.64	6.79	0.00	0.00	0.00	90.43	0.00
7	3,421	3,423	**19.42**	104.0	3.00	81.69	5.85	0.00	0.00	0.00	87.54	0.00
8	4,432	4,433	**16.09**	104.0	3.00	83.93	6.94	0.00	0.00	0.00	90.87	0.00
9	3,810	3,811	**18.05**	104.0	3.00	82.62	6.29	0.00	0.00	0.00	88.91	0.00
10	3,196	3,199	**20.27**	104.0	3.00	81.10	5.59	0.00	0.00	0.00	86.69	0.00
11	3,270	3,273	**19.99**	104.0	3.00	81.30	5.68	0.00	0.00	0.00	86.97	0.00
12	3,237	3,240	**20.12**	104.0	3.00	81.21	5.64	0.00	0.00	0.00	86.85	0.00
13	2,905	2,909	**21.45**	104.0	3.00	80.27	5.23	0.00	0.00	0.00	85.51	0.00
14	2,591	2,595	**22.84**	104.0	3.00	79.28	4.83	0.00	0.00	0.00	84.12	0.00
15	2,567	2,571	**22.96**	104.0	3.00	79.20	4.80	0.00	0.00	0.00	84.00	0.00
16	2,796	2,799	**21.93**	104.0	3.00	79.94	5.10	0.00	0.00	0.00	85.03	0.00
17	3,391	3,394	**19.53**	104.0	3.00	81.61	5.82	0.00	0.00	0.00	87.43	0.00
18	3,306	3,309	**19.85**	104.0	3.00	81.39	5.72	0.00	0.00	0.00	87.11	0.00
19	2,477	2,481	**23.39**	104.0	3.00	78.89	4.68	0.00	0.00	0.00	83.57	0.00
20	2,043	2,046	**25.66**	104.0	3.00	77.22	4.08	0.00	0.00	0.00	81.30	0.00
21	4,999	5,000	**14.49**	104.0	3.00	84.98	7.49	0.00	0.00	0.00	92.47	0.00
22	5,703	5,703	**12.71**	104.0	3.00	86.12	8.13	0.00	0.00	0.00	94.26	0.00
23	5,843	5,843	**12.37**	104.0	3.00	86.33	8.26	0.00	0.00	0.00	94.59	0.00
24	5,639	5,639	**12.86**	104.0	3.00	86.02	8.08	0.00	0.00	0.00	94.10	0.00
25	5,909	5,909	**12.22**	104.0	3.00	86.43	8.31	0.00	0.00	0.00	94.74	0.00
26	4,208	4,209	**16.77**	104.0	3.00	83.48	6.71	0.00	0.00	0.00	90.20	0.00
27	5,083	5,083	**14.27**	104.0	3.00	85.12	7.57	0.00	0.00	0.00	92.70	0.00
28	4,109	4,110	**17.08**	104.0	3.00	83.28	6.61	0.00	0.00	0.00	89.89	0.00
29	5,370	5,371	**13.52**	104.0	3.00	85.60	7.84	0.00	0.00	0.00	93.44	0.00
30	5,982	5,982	**12.05**	104.0	3.00	86.54	8.37	0.00	0.00	0.00	94.91	0.00
31	6,500	6,500	**10.90**	104.0	3.00	87.26	8.80	0.00	0.00	0.00	96.06	0.00
32	6,386	6,386	**11.15**	104.0	3.00	87.10	8.71	0.00	0.00	0.00	95.82	0.00
33	6,235	6,236	**11.48**	104.0	3.00	86.90	8.59	0.00	0.00	0.00	95.48	0.00
34	3,617	3,619	**18.72**	104.0	3.00	82.17	6.07	0.00	0.00	0.00	88.25	0.00
35	3,293	3,295	**19.90**	104.0	3.00	81.36	5.70	0.00	0.00	0.00	87.06	0.00
36	3,191	3,193	**20.30**	104.0	3.00	81.08	5.58	0.00	0.00	0.00	86.67	0.00
37	3,796	3,798	**18.10**	104.0	3.00	82.59	6.27	0.00	0.00	0.00	88.86	0.00
38	5,498	5,499	**13.20**	104.0	3.00	85.81	7.95	0.00	0.00	0.00	93.76	0.00
39	4,892	4,893	**14.78**	104.0	3.00	84.79	7.39	0.00	0.00	0.00	92.18	0.00
40	3,220	3,221	**20.19**	104.0	3.00	81.16	5.61	0.00	0.00	0.00	86.77	0.00
41	4,688	4,690	**15.34**	104.0	3.00	84.42	7.20	0.00	0.00	0.00	91.62	0.00
43	3,863	3,865	**17.87**	104.0	3.00	82.74	6.35	0.00	0.00	0.00	89.09	0.00
44	4,546	4,548	**15.75**	104.0	3.00	84.16	7.06	0.00	0.00	0.00	91.21	0.00
45	4,840	4,842	**14.92**	104.0	3.00	84.70	7.34	0.00	0.00	0.00	92.05	0.00
46	3,506	3,507	**19.12**	104.0	3.00	81.90	5.95	0.00	0.00	0.00	87.85	0.00
48	6,662	6,662	**10.56**	104.0	3.00	87.47	8.93	0.00	0.00	0.00	96.41	0.00
49	7,463	7,463	**8.96**	104.0	3.00	88.46	9.55	0.00	0.00	0.00	98.00	0.00
50	3,736	3,738	**18.30**	104.0	3.00	82.45	6.21	0.00	0.00	0.00	88.66	0.00
51	7,138	7,138	**9.59**	104.0	3.00	88.07	9.30	0.00	0.00	0.00	97.38	0.00
52	6,952	6,952	**9.96**	104.0	3.00	87.84	9.16	0.00	0.00	0.00	97.00	0.00
53	7,692	7,692	**8.53**	104.0	3.00	88.72	9.71	0.00	0.00	0.00	98.43	0.00
55	8,755	8,755	**6.67**	104.0	3.00	89.85	10.45	0.00	0.00	0.00	100.29	0.00
56	9,002	9,002	**6.27**	104.0	3.00	90.09	10.61	0.00	0.00	0.00	100.70	0.00
57	8,529	8,529	**7.05**	104.0	3.00	89.62	10.30	0.00	0.00	0.00	99.91	0.00
58	5,984	5,985	**12.04**	104.0	3.00	86.54	8.38	0.00	0.00	0.00	94.92	0.00
59	9,250	9,250	**5.87**	104.0	3.00	90.32	10.77	0.00	0.00	0.00	101.09	0.00
60	10,248	10,248	**4.37**	104.0	3.00	91.21	11.38	0.00	0.00	0.00	102.59	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	10,558	10,558	**3.93**	104.0	3.00	91.47	11.56	0.00	0.00	0.00	103.03	0.00
62	9,432	9,433	**5.58**	104.0	3.00	90.49	10.88	0.00	0.00	0.00	101.38	0.00
63	9,504	9,504	**5.47**	104.0	3.00	90.56	10.93	0.00	0.00	0.00	101.49	0.00
64	10,616	10,616	**3.85**	104.0	3.00	91.52	11.60	0.00	0.00	0.00	103.12	0.00
65	11,250	11,250	**2.98**	104.0	3.00	92.02	11.95	0.00	0.00	0.00	103.98	0.00
66	2,905	2,907	**21.46**	104.0	3.00	80.27	5.23	0.00	0.00	0.00	85.50	0.00
67	10,881	10,881	**3.48**	104.0	3.00	91.73	11.75	0.00	0.00	0.00	103.48	0.00
68	11,392	11,393	**2.80**	104.0	3.00	92.13	12.03	0.00	0.00	0.00	104.16	0.00
69	11,106	11,106	**3.18**	104.0	3.00	91.91	11.87	0.00	0.00	0.00	103.79	0.00
70	1,686	1,688	**27.87**	104.0	3.00	75.55	3.54	0.00	0.00	0.00	79.09	0.00
71	3,222	3,224	**20.18**	104.0	3.00	81.17	5.62	0.00	0.00	0.00	86.79	0.00
72	5,413	5,414	**13.41**	104.0	3.00	85.67	7.88	0.00	0.00	0.00	93.55	0.00
73	4,305	4,306	**16.47**	104.0	3.00	83.68	6.81	0.00	0.00	0.00	90.49	0.00
74	3,747	3,748	**18.27**	104.0	3.00	82.48	6.22	0.00	0.00	0.00	88.69	0.00
75	4,718	4,718	**15.26**	104.0	3.00	84.48	7.22	0.00	0.00	0.00	91.70	0.00
76	7,695	7,695	**8.52**	104.0	3.00	88.72	9.72	0.00	0.00	0.00	98.44	0.00
77	7,610	7,610	**8.68**	104.0	3.00	88.63	9.65	0.00	0.00	0.00	98.28	0.00
78	1,886	1,889	**26.59**	104.0	3.00	76.52	3.85	0.00	0.00	0.00	80.37	0.00
80	9,874	9,874	**4.91**	104.0	3.00	90.89	11.16	0.00	0.00	0.00	102.05	0.00
81	2,543	2,547	**23.07**	104.0	3.00	79.12	4.77	0.00	0.00	0.00	83.89	0.00
82	6,559	6,560	**10.77**	104.0	3.00	87.34	8.85	0.00	0.00	0.00	96.19	0.00
83	10,141	10,141	**4.52**	104.0	3.00	91.12	11.32	0.00	0.00	0.00	102.44	0.00
85	8,140	8,140	**7.72**	104.0	3.00	89.21	10.03	0.00	0.00	0.00	99.24	0.00
86	9,620	9,620	**5.30**	104.0	3.00	90.66	11.00	0.00	0.00	0.00	101.67	0.00
87	11,487	11,487	**2.67**	104.0	3.00	92.20	12.08	0.00	0.00	0.00	104.29	0.00
89	10,213	10,213	**4.42**	104.0	3.00	91.18	11.36	0.00	0.00	0.00	102.54	0.00
90	8,545	8,545	**7.02**	104.0	3.00	89.63	10.31	0.00	0.00	0.00	99.94	0.00
91	9,415	9,415	**5.61**	104.0	3.00	90.48	10.87	0.00	0.00	0.00	101.35	0.00
92	10,697	10,697	**3.73**	104.0	3.00	91.59	11.64	0.00	0.00	0.00	103.23	0.00
94	2,889	2,893	**21.52**	104.0	3.00	80.23	5.21	0.00	0.00	0.00	85.44	0.00
95	3,706	3,708	**18.41**	104.0	3.00	82.38	6.17	0.00	0.00	0.00	88.56	0.00
97	2,436	2,440	**23.59**	104.0	3.00	78.75	4.63	0.00	0.00	0.00	83.38	0.00
98	3,170	3,173	**20.38**	104.0	3.00	81.03	5.56	0.00	0.00	0.00	86.59	0.00
99	5,113	5,113	**14.19**	104.0	3.00	85.17	7.60	0.00	0.00	0.00	92.78	0.00
100	5,192	5,194	**13.98**	104.0	3.00	85.31	7.68	0.00	0.00	0.00	92.99	0.00
101	2,784	2,787	**21.98**	104.0	3.00	79.90	5.08	0.00	0.00	0.00	84.98	0.00
102	4,332	4,334	**16.38**	104.0	3.00	83.74	6.84	0.00	0.00	0.00	90.58	0.00
103	3,518	3,521	**19.07**	104.0	3.00	81.93	5.96	0.00	0.00	0.00	87.89	0.00
104	4,397	4,398	**16.19**	104.0	3.00	83.87	6.91	0.00	0.00	0.00	90.77	0.00
107	2,049	2,053	**25.62**	104.0	3.00	77.25	4.09	0.00	0.00	0.00	81.34	0.00
108	5,956	5,956	**12.11**	104.0	3.00	86.50	8.35	0.00	0.00	0.00	94.85	0.00
109	9,485	9,485	**5.50**	104.0	3.00	90.54	10.92	0.00	0.00	0.00	101.46	0.00
110	6,874	6,875	**10.12**	104.0	3.00	87.74	9.10	0.00	0.00	0.00	96.84	0.00
111	7,367	7,367	**9.14**	104.0	3.00	88.35	9.48	0.00	0.00	0.00	97.82	0.00
113	2,205	2,209	**24.77**	104.0	3.00	77.88	4.31	0.00	0.00	0.00	82.19	0.00
114	8,325	8,325	**7.40**	104.0	3.00	89.41	10.16	0.00	0.00	0.00	99.57	0.00
115	4,373	4,374	**16.26**	104.0	3.00	83.82	6.88	0.00	0.00	0.00	90.70	0.00
116	3,245	3,247	**20.09**	104.0	3.00	81.23	5.64	0.00	0.00	0.00	86.87	0.00
118	9,908	9,908	**4.86**	104.0	3.00	90.92	11.18	0.00	0.00	0.00	102.10	0.00
119	3,445	3,447	**19.33**	104.0	3.00	81.75	5.88	0.00	0.00	0.00	87.63	0.00
120	2,972	2,974	**21.18**	104.0	3.00	80.47	5.31	0.00	0.00	0.00	85.78	0.00
121	3,072	3,074	**20.77**	104.0	3.00	80.75	5.44	0.00	0.00	0.00	86.19	0.00
125	9,844	9,845	**4.96**	104.0	3.00	90.86	11.14	0.00	0.00	0.00	102.00	0.00
126	6,385	6,386	**11.15**	104.0	3.00	87.10	8.71	0.00	0.00	0.00	95.82	0.00
127	6,628	6,629	**10.63**	104.0	3.00	87.43	8.91	0.00	0.00	0.00	96.34	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	6,887	6,888	**10.09**	104.0	3.00	87.76	9.11	0.00	0.00	0.00	96.87	0.00
129	1,310	1,313	**30.66**	104.0	3.00	73.37	2.94	0.00	0.00	0.00	76.30	0.00
130	1,367	1,370	**30.20**	104.0	3.00	73.73	3.03	0.00	0.00	0.00	76.76	0.00
131	984	987	**33.72**	104.0	3.00	70.89	2.36	0.00	0.00	0.00	73.25	0.00
132	586	592	**38.95**	104.0	3.00	66.44	1.57	0.00	0.00	0.00	68.01	0.00
133	5,393	5,394	**13.46**	104.0	3.00	85.64	7.86	0.00	0.00	0.00	93.50	0.00
134	1,860	1,862	**26.75**	104.0	3.00	76.40	3.81	0.00	0.00	0.00	80.21	0.00
141	2,668	2,671	**22.49**	104.0	3.00	79.53	4.93	0.00	0.00	0.00	84.47	0.00
142	4,074	4,076	**17.18**	104.0	3.00	83.21	6.57	0.00	0.00	0.00	89.78	0.00
143	2,366	2,370	**23.94**	104.0	3.00	78.49	4.53	0.00	0.00	0.00	83.03	0.00
144	5,117	5,118	**14.17**	104.0	3.00	85.18	7.61	0.00	0.00	0.00	92.79	0.00
145	8,085	8,085	**7.82**	104.0	3.00	89.15	9.99	0.00	0.00	0.00	99.15	0.00
146	7,807	7,807	**8.32**	104.0	3.00	88.85	9.80	0.00	0.00	0.00	98.65	0.00
Sum	43.17											

Noise sensitive area: H32 H32

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	4,213	4,214	**16.75**	104.0	3.00	83.49	6.72	0.00	0.00	0.00	90.21	0.00
2	4,689	4,689	**15.34**	104.0	3.00	84.42	7.20	0.00	0.00	0.00	91.62	0.00
3	4,967	4,968	**14.57**	104.0	3.00	84.92	7.46	0.00	0.00	0.00	92.39	0.00
4	6,352	6,353	**11.22**	104.0	3.00	87.06	8.68	0.00	0.00	0.00	95.74	0.00
5	5,612	5,613	**12.92**	104.0	3.00	85.98	8.05	0.00	0.00	0.00	94.04	0.00
6	4,968	4,969	**14.57**	104.0	3.00	84.93	7.47	0.00	0.00	0.00	92.39	0.00
7	5,018	5,020	**14.43**	104.0	3.00	85.01	7.51	0.00	0.00	0.00	92.53	0.00
8	4,136	4,137	**16.99**	104.0	3.00	83.33	6.64	0.00	0.00	0.00	89.97	0.00
9	4,108	4,109	**17.08**	104.0	3.00	83.28	6.61	0.00	0.00	0.00	89.88	0.00
10	3,585	3,587	**18.83**	104.0	3.00	82.09	6.04	0.00	0.00	0.00	88.13	0.00
11	2,550	2,553	**23.04**	104.0	3.00	79.14	4.78	0.00	0.00	0.00	83.92	0.00
12	2,681	2,685	**22.43**	104.0	3.00	79.58	4.95	0.00	0.00	0.00	84.53	0.00
13	2,695	2,699	**22.37**	104.0	3.00	79.63	4.97	0.00	0.00	0.00	84.59	0.00
14	2,705	2,709	**22.32**	104.0	3.00	79.66	4.98	0.00	0.00	0.00	84.64	0.00
15	3,290	3,293	**19.91**	104.0	3.00	81.35	5.70	0.00	0.00	0.00	87.05	0.00
16	3,691	3,693	**18.46**	104.0	3.00	82.35	6.16	0.00	0.00	0.00	88.51	0.00
17	2,506	2,510	**23.25**	104.0	3.00	78.99	4.72	0.00	0.00	0.00	83.71	0.00
18	2,224	2,228	**24.67**	104.0	3.00	77.96	4.34	0.00	0.00	0.00	82.30	0.00
19	2,347	2,350	**24.03**	104.0	3.00	78.42	4.51	0.00	0.00	0.00	82.93	0.00
20	2,921	2,923	**21.39**	104.0	3.00	80.32	5.25	0.00	0.00	0.00	85.57	0.00
21	6,108	6,109	**11.76**	104.0	3.00	86.72	8.48	0.00	0.00	0.00	95.20	0.00
22	6,917	6,918	**10.03**	104.0	3.00	87.80	9.13	0.00	0.00	0.00	96.93	0.00
23	7,153	7,153	**9.56**	104.0	3.00	88.09	9.31	0.00	0.00	0.00	97.40	0.00
24	6,785	6,786	**10.30**	104.0	3.00	87.63	9.03	0.00	0.00	0.00	96.66	0.00
25	7,744	7,744	**8.43**	104.0	3.00	88.78	9.75	0.00	0.00	0.00	98.53	0.00
26	5,561	5,562	**13.05**	104.0	3.00	85.90	8.01	0.00	0.00	0.00	93.91	0.00
27	6,919	6,920	**10.02**	104.0	3.00	87.80	9.14	0.00	0.00	0.00	96.94	0.00
28	5,998	5,999	**12.01**	104.0	3.00	86.56	8.39	0.00	0.00	0.00	94.95	0.00
29	6,810	6,810	**10.25**	104.0	3.00	87.66	9.05	0.00	0.00	0.00	96.71	0.00
30	7,404	7,404	**9.07**	104.0	3.00	88.39	9.50	0.00	0.00	0.00	97.89	0.00
31	7,660	7,660	**8.59**	104.0	3.00	88.69	9.69	0.00	0.00	0.00	98.38	0.00
32	8,191	8,191	**7.63**	104.0	3.00	89.27	10.07	0.00	0.00	0.00	99.33	0.00
33	7,786	7,786	**8.35**	104.0	3.00	88.83	9.78	0.00	0.00	0.00	98.61	0.00
34	5,297	5,299	**13.71**	104.0	3.00	85.48	7.77	0.00	0.00	0.00	93.26	0.00
35	4,795	4,796	**15.04**	104.0	3.00	84.62	7.30	0.00	0.00	0.00	91.92	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	4,579	4,580	**15.66**	104.0	3.00	84.22	7.09	0.00	0.00	0.00	91.31	0.00
37	5,551	5,552	**13.07**	104.0	3.00	85.89	8.00	0.00	0.00	0.00	93.89	0.00
38	7,351	7,352	**9.17**	104.0	3.00	88.33	9.46	0.00	0.00	0.00	97.79	0.00
39	6,874	6,874	**10.12**	104.0	3.00	87.74	9.10	0.00	0.00	0.00	96.84	0.00
40	5,390	5,391	**13.47**	104.0	3.00	85.63	7.86	0.00	0.00	0.00	93.49	0.00
41	6,718	6,720	**10.44**	104.0	3.00	87.55	8.98	0.00	0.00	0.00	96.53	0.00
43	5,762	5,763	**12.56**	104.0	3.00	86.21	8.19	0.00	0.00	0.00	94.40	0.00
44	6,643	6,644	**10.59**	104.0	3.00	87.45	8.92	0.00	0.00	0.00	96.37	0.00
45	6,945	6,946	**9.97**	104.0	3.00	87.84	9.16	0.00	0.00	0.00	96.99	0.00
46	5,605	5,606	**12.94**	104.0	3.00	85.97	8.05	0.00	0.00	0.00	94.02	0.00
48	8,582	8,582	**6.96**	104.0	3.00	89.67	10.33	0.00	0.00	0.00	100.00	0.00
49	9,257	9,257	**5.86**	104.0	3.00	90.33	10.77	0.00	0.00	0.00	101.10	0.00
50	4,867	4,869	**14.84**	104.0	3.00	84.75	7.37	0.00	0.00	0.00	92.12	0.00
51	8,880	8,880	**6.46**	104.0	3.00	89.97	10.53	0.00	0.00	0.00	100.50	0.00
52	8,651	8,651	**6.84**	104.0	3.00	89.74	10.38	0.00	0.00	0.00	100.12	0.00
53	9,520	9,521	**5.45**	104.0	3.00	90.57	10.94	0.00	0.00	0.00	101.51	0.00
55	10,707	10,707	**3.72**	104.0	3.00	91.59	11.65	0.00	0.00	0.00	103.24	0.00
56	10,971	10,971	**3.36**	104.0	3.00	91.81	11.80	0.00	0.00	0.00	103.60	0.00
57	10,559	10,560	**3.93**	104.0	3.00	91.47	11.56	0.00	0.00	0.00	103.04	0.00
58	7,682	7,682	**8.55**	104.0	3.00	88.71	9.71	0.00	0.00	0.00	98.42	0.00
59	11,237	11,237	**3.00**	104.0	3.00	92.01	11.95	0.00	0.00	0.00	103.96	0.00
60	12,323	12,323	**1.62**	104.0	3.00	92.81	12.53	0.00	0.00	0.00	105.34	0.00
61	12,644	12,644	**1.23**	104.0	3.00	93.04	12.69	0.00	0.00	0.00	105.73	0.00
62	11,610	11,610	**2.51**	104.0	3.00	92.30	12.15	0.00	0.00	0.00	104.45	0.00
63	11,712	11,713	**2.38**	104.0	3.00	92.37	12.21	0.00	0.00	0.00	104.58	0.00
64	12,831	12,831	**1.01**	104.0	3.00	93.17	12.79	0.00	0.00	0.00	105.95	0.00
65	13,465	13,465	**0.28**	104.0	3.00	93.58	13.10	0.00	0.00	0.00	106.68	0.00
66	5,076	5,077	**14.28**	104.0	3.00	85.11	7.57	0.00	0.00	0.00	92.68	0.00
67	13,090	13,090	**0.71**	104.0	3.00	93.34	12.91	0.00	0.00	0.00	106.25	0.00
68	13,604	13,604	**0.13**	104.0	3.00	93.67	13.16	0.00	0.00	0.00	106.84	0.00
69	13,321	13,321	**0.44**	104.0	3.00	93.49	13.03	0.00	0.00	0.00	106.52	0.00
70	1,781	1,783	**27.25**	104.0	3.00	76.02	3.69	0.00	0.00	0.00	79.71	0.00
71	3,788	3,790	**18.13**	104.0	3.00	82.57	6.26	0.00	0.00	0.00	88.84	0.00
72	6,155	6,155	**11.66**	104.0	3.00	86.78	8.52	0.00	0.00	0.00	95.30	0.00
73	5,133	5,134	**14.13**	104.0	3.00	85.21	7.62	0.00	0.00	0.00	92.83	0.00
74	5,014	5,015	**14.45**	104.0	3.00	85.01	7.51	0.00	0.00	0.00	92.52	0.00
75	6,192	6,193	**11.57**	104.0	3.00	86.84	8.55	0.00	0.00	0.00	95.39	0.00
76	9,731	9,731	**5.13**	104.0	3.00	90.76	11.07	0.00	0.00	0.00	101.83	0.00
77	9,530	9,530	**5.43**	104.0	3.00	90.58	10.95	0.00	0.00	0.00	101.53	0.00
78	3,094	3,096	**20.68**	104.0	3.00	80.82	5.46	0.00	0.00	0.00	86.28	0.00
80	11,941	11,942	**2.09**	104.0	3.00	92.54	12.33	0.00	0.00	0.00	104.87	0.00
81	2,161	2,165	**25.00**	104.0	3.00	77.71	4.25	0.00	0.00	0.00	81.96	0.00
82	8,208	8,208	**7.60**	104.0	3.00	89.28	10.08	0.00	0.00	0.00	99.36	0.00
83	12,350	12,351	**1.59**	104.0	3.00	92.83	12.54	0.00	0.00	0.00	105.37	0.00
85	9,844	9,844	**4.96**	104.0	3.00	90.86	11.14	0.00	0.00	0.00	102.00	0.00
86	11,677	11,677	**2.43**	104.0	3.00	92.35	12.19	0.00	0.00	0.00	104.53	0.00
87	13,702	13,702	**0.02**	104.0	3.00	93.74	13.21	0.00	0.00	0.00	106.95	0.00
89	12,427	12,427	**1.49**	104.0	3.00	92.89	12.58	0.00	0.00	0.00	105.47	0.00
90	10,654	10,655	**3.79**	104.0	3.00	91.55	11.62	0.00	0.00	0.00	103.17	0.00
91	11,609	11,609	**2.52**	104.0	3.00	92.30	12.15	0.00	0.00	0.00	104.45	0.00
92	12,906	12,906	**0.92**	104.0	3.00	93.22	12.82	0.00	0.00	0.00	106.04	0.00
94	3,188	3,191	**20.30**	104.0	3.00	81.08	5.58	0.00	0.00	0.00	86.66	0.00
95	3,264	3,266	**20.01**	104.0	3.00	81.28	5.67	0.00	0.00	0.00	86.95	0.00
97	3,697	3,700	**18.43**	104.0	3.00	82.36	6.16	0.00	0.00	0.00	88.53	0.00
98	3,168	3,171	**20.39**	104.0	3.00	81.02	5.55	0.00	0.00	0.00	86.58	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	5,464	5,464	**13.29**	104.0	3.00	85.75	7.92	0.00	0.00	0.00	93.67	0.00
100	7,268	7,269	**9.33**	104.0	3.00	88.23	9.40	0.00	0.00	0.00	97.63	0.00
101	2,022	2,026	**25.78**	104.0	3.00	77.13	4.05	0.00	0.00	0.00	81.18	0.00
102	6,395	6,396	**11.12**	104.0	3.00	87.12	8.72	0.00	0.00	0.00	95.84	0.00
103	2,257	2,260	**24.50**	104.0	3.00	78.08	4.38	0.00	0.00	0.00	82.47	0.00
104	6,363	6,363	**11.20**	104.0	3.00	87.07	8.69	0.00	0.00	0.00	95.77	0.00
107	2,574	2,577	**22.93**	104.0	3.00	79.22	4.81	0.00	0.00	0.00	84.03	0.00
108	6,230	6,230	**11.49**	104.0	3.00	86.89	8.58	0.00	0.00	0.00	95.47	0.00
109	11,491	11,491	**2.67**	104.0	3.00	92.21	12.09	0.00	0.00	0.00	104.29	0.00
110	8,843	8,843	**6.52**	104.0	3.00	89.93	10.51	0.00	0.00	0.00	100.44	0.00
111	9,379	9,380	**5.67**	104.0	3.00	90.44	10.85	0.00	0.00	0.00	101.30	0.00
113	2,417	2,420	**23.68**	104.0	3.00	78.68	4.60	0.00	0.00	0.00	83.28	0.00
114	10,063	10,063	**4.64**	104.0	3.00	91.05	11.27	0.00	0.00	0.00	102.33	0.00
115	4,210	4,211	**16.76**	104.0	3.00	83.49	6.71	0.00	0.00	0.00	90.20	0.00
116	5,197	5,199	**13.96**	104.0	3.00	85.32	7.68	0.00	0.00	0.00	93.00	0.00
118	11,933	11,933	**2.10**	104.0	3.00	92.53	12.32	0.00	0.00	0.00	104.86	0.00
119	4,424	4,426	**16.11**	104.0	3.00	83.92	6.93	0.00	0.00	0.00	90.85	0.00
120	1,850	1,853	**26.81**	104.0	3.00	76.36	3.80	0.00	0.00	0.00	80.16	0.00
121	4,325	4,326	**16.41**	104.0	3.00	83.72	6.83	0.00	0.00	0.00	90.56	0.00
125	12,054	12,054	**1.95**	104.0	3.00	92.62	12.39	0.00	0.00	0.00	105.01	0.00
126	8,523	8,524	**7.06**	104.0	3.00	89.61	10.29	0.00	0.00	0.00	99.91	0.00
127	8,766	8,767	**6.65**	104.0	3.00	89.86	10.46	0.00	0.00	0.00	100.31	0.00
128	9,014	9,015	**6.24**	104.0	3.00	90.10	10.62	0.00	0.00	0.00	100.72	0.00
129	3,443	3,444	**19.34**	104.0	3.00	81.74	5.88	0.00	0.00	0.00	87.62	0.00
130	3,582	3,583	**18.85**	104.0	3.00	82.08	6.03	0.00	0.00	0.00	88.12	0.00
131	3,180	3,182	**20.34**	104.0	3.00	81.05	5.57	0.00	0.00	0.00	86.62	0.00
132	2,768	2,769	**22.06**	104.0	3.00	79.85	5.06	0.00	0.00	0.00	84.91	0.00
133	7,351	7,352	**9.17**	104.0	3.00	88.33	9.46	0.00	0.00	0.00	97.79	0.00
134	2,044	2,047	**25.66**	104.0	3.00	77.22	4.08	0.00	0.00	0.00	81.30	0.00
141	3,935	3,937	**17.63**	104.0	3.00	82.90	6.42	0.00	0.00	0.00	89.33	0.00
142	6,119	6,121	**11.73**	104.0	3.00	86.74	8.49	0.00	0.00	0.00	95.23	0.00
143	3,401	3,404	**19.49**	104.0	3.00	81.64	5.83	0.00	0.00	0.00	87.47	0.00
144	7,240	7,241	**9.39**	104.0	3.00	88.20	9.38	0.00	0.00	0.00	97.58	0.00
145	10,188	10,188	**4.45**	104.0	3.00	91.16	11.35	0.00	0.00	0.00	102.51	0.00
146	9,898	9,898	**4.88**	104.0	3.00	90.91	11.17	0.00	0.00	0.00	102.08	0.00
Sum	38.43											

Noise sensitive area: H33 H33

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	3,872	3,874	**17.84**	104.0	3.00	82.76	6.36	0.00	0.00	0.00	89.12	0.00
2	4,359	4,360	**16.30**	104.0	3.00	83.79	6.87	0.00	0.00	0.00	90.66	0.00
3	4,733	4,734	**15.22**	104.0	3.00	84.50	7.24	0.00	0.00	0.00	91.74	0.00
4	6,242	6,242	**11.46**	104.0	3.00	86.91	8.59	0.00	0.00	0.00	95.50	0.00
5	5,563	5,564	**13.04**	104.0	3.00	85.91	8.01	0.00	0.00	0.00	93.92	0.00
6	4,843	4,844	**14.91**	104.0	3.00	84.70	7.35	0.00	0.00	0.00	92.05	0.00
7	5,295	5,297	**13.71**	104.0	3.00	85.48	7.77	0.00	0.00	0.00	93.25	0.00
8	3,660	3,661	**18.57**	104.0	3.00	82.27	6.12	0.00	0.00	0.00	88.39	0.00
9	3,885	3,887	**17.80**	104.0	3.00	82.79	6.37	0.00	0.00	0.00	89.16	0.00
10	3,457	3,460	**19.29**	104.0	3.00	81.78	5.89	0.00	0.00	0.00	87.67	0.00
11	2,073	2,079	**25.48**	104.0	3.00	77.36	4.13	0.00	0.00	0.00	81.48	0.00
12	2,263	2,268	**24.46**	104.0	3.00	78.11	4.39	0.00	0.00	0.00	82.50	0.00
13	2,443	2,448	**23.55**	104.0	3.00	78.78	4.64	0.00	0.00	0.00	83.42	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	2,602	2,607	**22.79**	104.0	3.00	79.32	4.85	0.00	0.00	0.00	84.17	0.00
15	3,344	3,348	**19.70**	104.0	3.00	81.50	5.76	0.00	0.00	0.00	87.26	0.00
16	3,764	3,767	**18.20**	104.0	3.00	82.52	6.24	0.00	0.00	0.00	88.76	0.00
17	1,953	1,959	**26.17**	104.0	3.00	76.84	3.95	0.00	0.00	0.00	80.79	0.00
18	1,622	1,628	**28.28**	104.0	3.00	75.23	3.45	0.00	0.00	0.00	78.68	0.00
19	2,219	2,224	**24.69**	104.0	3.00	77.94	4.33	0.00	0.00	0.00	82.27	0.00
20	3,099	3,102	**20.66**	104.0	3.00	80.83	5.47	0.00	0.00	0.00	86.31	0.00
21	6,113	6,113	**11.75**	104.0	3.00	86.73	8.49	0.00	0.00	0.00	95.21	0.00
22	6,942	6,943	**9.98**	104.0	3.00	87.83	9.15	0.00	0.00	0.00	96.98	0.00
23	7,216	7,217	**9.43**	104.0	3.00	88.17	9.36	0.00	0.00	0.00	97.53	0.00
24	6,782	6,783	**10.30**	104.0	3.00	87.63	9.03	0.00	0.00	0.00	96.66	0.00
25	8,070	8,071	**7.84**	104.0	3.00	89.14	9.98	0.00	0.00	0.00	99.12	0.00
26	5,699	5,700	**12.71**	104.0	3.00	86.12	8.13	0.00	0.00	0.00	94.25	0.00
27	7,262	7,263	**9.34**	104.0	3.00	88.22	9.40	0.00	0.00	0.00	97.62	0.00
28	6,393	6,394	**11.13**	104.0	3.00	87.12	8.72	0.00	0.00	0.00	95.83	0.00
29	6,945	6,945	**9.97**	104.0	3.00	87.83	9.16	0.00	0.00	0.00	96.99	0.00
30	7,514	7,515	**8.86**	104.0	3.00	88.52	9.58	0.00	0.00	0.00	98.10	0.00
31	7,640	7,640	**8.62**	104.0	3.00	88.66	9.68	0.00	0.00	0.00	98.34	0.00
32	8,492	8,493	**7.11**	104.0	3.00	89.58	10.27	0.00	0.00	0.00	99.85	0.00
33	7,953	7,953	**8.05**	104.0	3.00	89.01	9.90	0.00	0.00	0.00	98.91	0.00
34	5,602	5,604	**12.95**	104.0	3.00	85.97	8.05	0.00	0.00	0.00	94.02	0.00
35	5,039	5,040	**14.38**	104.0	3.00	85.05	7.53	0.00	0.00	0.00	92.58	0.00
36	4,784	4,786	**15.07**	104.0	3.00	84.60	7.29	0.00	0.00	0.00	91.89	0.00
37	5,885	5,886	**12.27**	104.0	3.00	86.40	8.29	0.00	0.00	0.00	94.69	0.00
38	7,696	7,696	**8.52**	104.0	3.00	88.73	9.72	0.00	0.00	0.00	98.44	0.00
39	7,310	7,310	**9.25**	104.0	3.00	88.28	9.43	0.00	0.00	0.00	97.71	0.00
40	6,007	6,008	**11.99**	104.0	3.00	86.57	8.40	0.00	0.00	0.00	94.97	0.00
41	7,192	7,193	**9.48**	104.0	3.00	88.14	9.34	0.00	0.00	0.00	97.48	0.00
43	6,169	6,171	**11.62**	104.0	3.00	86.81	8.53	0.00	0.00	0.00	95.34	0.00
44	7,170	7,171	**9.52**	104.0	3.00	88.11	9.33	0.00	0.00	0.00	97.44	0.00
45	7,475	7,477	**8.93**	104.0	3.00	88.47	9.56	0.00	0.00	0.00	98.03	0.00
46	6,151	6,152	**11.66**	104.0	3.00	86.78	8.52	0.00	0.00	0.00	95.30	0.00
48	8,951	8,951	**6.35**	104.0	3.00	90.04	10.58	0.00	0.00	0.00	100.61	0.00
49	9,538	9,538	**5.42**	104.0	3.00	90.59	10.95	0.00	0.00	0.00	101.54	0.00
50	4,942	4,943	**14.64**	104.0	3.00	84.88	7.44	0.00	0.00	0.00	92.32	0.00
51	9,134	9,134	**6.05**	104.0	3.00	90.21	10.70	0.00	0.00	0.00	100.91	0.00
52	8,884	8,884	**6.46**	104.0	3.00	89.97	10.53	0.00	0.00	0.00	100.51	0.00
53	9,819	9,819	**5.00**	104.0	3.00	90.84	11.12	0.00	0.00	0.00	101.97	0.00
55	11,078	11,079	**3.21**	104.0	3.00	91.89	11.86	0.00	0.00	0.00	103.75	0.00
56	11,354	11,355	**2.85**	104.0	3.00	92.10	12.01	0.00	0.00	0.00	104.12	0.00
57	10,993	10,994	**3.33**	104.0	3.00	91.82	11.81	0.00	0.00	0.00	103.63	0.00
58	7,930	7,931	**8.09**	104.0	3.00	88.99	9.88	0.00	0.00	0.00	98.87	0.00
59	11,632	11,632	**2.49**	104.0	3.00	92.31	12.16	0.00	0.00	0.00	104.48	0.00
60	12,787	12,787	**1.06**	104.0	3.00	93.14	12.76	0.00	0.00	0.00	105.90	0.00
61	13,117	13,117	**0.68**	104.0	3.00	93.36	12.93	0.00	0.00	0.00	106.28	0.00
62	12,196	12,196	**1.78**	104.0	3.00	92.72	12.46	0.00	0.00	0.00	105.19	0.00
63	12,365	12,365	**1.57**	104.0	3.00	92.84	12.55	0.00	0.00	0.00	105.39	0.00
64	13,526	13,527	**0.21**	104.0	3.00	93.62	13.13	0.00	0.00	0.00	106.75	0.00
65	14,158	14,158	**-0.48**	104.0	3.00	94.02	13.42	0.00	0.00	0.00	107.44	0.00
66	5,699	5,700	**12.71**	104.0	3.00	86.12	8.13	0.00	0.00	0.00	94.25	0.00
67	13,742	13,742	**-0.03**	104.0	3.00	93.76	13.23	0.00	0.00	0.00	106.99	0.00
68	14,264	14,264	**-0.60**	104.0	3.00	94.08	13.47	0.00	0.00	0.00	107.56	0.00
69	14,023	14,023	**-0.34**	104.0	3.00	93.94	13.36	0.00	0.00	0.00	107.30	0.00
70	1,982	1,985	**26.02**	104.0	3.00	76.95	3.99	0.00	0.00	0.00	80.94	0.00
71	3,712	3,714	**18.38**	104.0	3.00	82.40	6.18	0.00	0.00	0.00	88.58	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	5,996	5,996	**12.02**	104.0	3.00	86.56	8.39	0.00	0.00	0.00	94.94	0.00
73	5,060	5,061	**14.32**	104.0	3.00	85.09	7.55	0.00	0.00	0.00	92.64	0.00
74	5,140	5,141	**14.11**	104.0	3.00	85.22	7.63	0.00	0.00	0.00	92.85	0.00
75	6,363	6,364	**11.19**	104.0	3.00	87.07	8.69	0.00	0.00	0.00	95.77	0.00
76	10,175	10,175	**4.47**	104.0	3.00	91.15	11.34	0.00	0.00	0.00	102.49	0.00
77	9,889	9,889	**4.89**	104.0	3.00	90.90	11.17	0.00	0.00	0.00	102.07	0.00
78	3,373	3,375	**19.60**	104.0	3.00	81.57	5.79	0.00	0.00	0.00	87.36	0.00
80	12,399	12,400	**1.53**	104.0	3.00	92.87	12.57	0.00	0.00	0.00	105.43	0.00
81	1,962	1,968	**26.12**	104.0	3.00	76.88	3.97	0.00	0.00	0.00	80.85	0.00
82	8,420	8,420	**7.23**	104.0	3.00	89.51	10.22	0.00	0.00	0.00	99.73	0.00
83	13,005	13,006	**0.81**	104.0	3.00	93.28	12.87	0.00	0.00	0.00	106.15	0.00
85	10,063	10,064	**4.63**	104.0	3.00	91.06	11.27	0.00	0.00	0.00	102.33	0.00
86	12,128	12,128	**1.86**	104.0	3.00	92.68	12.43	0.00	0.00	0.00	105.10	0.00
87	14,394	14,394	**-0.74**	104.0	3.00	94.16	13.53	0.00	0.00	0.00	107.70	0.00
89	13,108	13,109	**0.69**	104.0	3.00	93.35	12.92	0.00	0.00	0.00	106.27	0.00
90	11,160	11,161	**3.10**	104.0	3.00	91.95	11.90	0.00	0.00	0.00	103.86	0.00
91	12,224	12,224	**1.74**	104.0	3.00	92.74	12.48	0.00	0.00	0.00	105.22	0.00
92	13,641	13,641	**0.08**	104.0	3.00	93.70	13.18	0.00	0.00	0.00	106.88	0.00
94	3,077	3,081	**20.74**	104.0	3.00	80.77	5.45	0.00	0.00	0.00	86.22	0.00
95	2,809	2,813	**21.87**	104.0	3.00	79.98	5.11	0.00	0.00	0.00	85.10	0.00
97	3,921	3,925	**17.68**	104.0	3.00	82.88	6.41	0.00	0.00	0.00	89.29	0.00
98	2,926	2,930	**21.36**	104.0	3.00	80.34	5.26	0.00	0.00	0.00	85.60	0.00
99	5,172	5,173	**14.03**	104.0	3.00	85.27	7.66	0.00	0.00	0.00	92.93	0.00
100	7,770	7,771	**8.38**	104.0	3.00	88.81	9.77	0.00	0.00	0.00	98.58	0.00
101	1,659	1,666	**28.02**	104.0	3.00	75.43	3.51	0.00	0.00	0.00	78.94	0.00
102	6,898	6,899	**10.07**	104.0	3.00	87.78	9.12	0.00	0.00	0.00	96.90	0.00
103	1,550	1,556	**28.78**	104.0	3.00	74.84	3.34	0.00	0.00	0.00	78.18	0.00
104	6,797	6,798	**10.27**	104.0	3.00	87.65	9.04	0.00	0.00	0.00	96.69	0.00
107	2,683	2,687	**22.42**	104.0	3.00	79.58	4.95	0.00	0.00	0.00	84.54	0.00
108	5,874	5,875	**12.30**	104.0	3.00	86.38	8.28	0.00	0.00	0.00	94.66	0.00
109	11,899	11,899	**2.15**	104.0	3.00	92.51	12.31	0.00	0.00	0.00	104.82	0.00
110	9,244	9,244	**5.88**	104.0	3.00	90.32	10.77	0.00	0.00	0.00	101.08	0.00
111	9,808	9,808	**5.01**	104.0	3.00	90.83	11.12	0.00	0.00	0.00	101.95	0.00
113	2,430	2,434	**23.61**	104.0	3.00	78.73	4.62	0.00	0.00	0.00	83.35	0.00
114	10,301	10,301	**4.29**	104.0	3.00	91.26	11.41	0.00	0.00	0.00	102.67	0.00
115	3,783	3,785	**18.14**	104.0	3.00	82.56	6.26	0.00	0.00	0.00	88.82	0.00
116	5,653	5,654	**12.82**	104.0	3.00	86.05	8.09	0.00	0.00	0.00	94.14	0.00
118	12,354	12,354	**1.58**	104.0	3.00	92.84	12.54	0.00	0.00	0.00	105.38	0.00
119	4,464	4,466	**15.99**	104.0	3.00	84.00	6.97	0.00	0.00	0.00	90.97	0.00
120	1,324	1,331	**30.51**	104.0	3.00	73.48	2.97	0.00	0.00	0.00	76.45	0.00
121	4,489	4,491	**15.91**	104.0	3.00	84.05	7.00	0.00	0.00	0.00	91.05	0.00
125	12,708	12,708	**1.16**	104.0	3.00	93.08	12.72	0.00	0.00	0.00	105.80	0.00
126	9,072	9,072	**6.15**	104.0	3.00	90.15	10.66	0.00	0.00	0.00	100.81	0.00
127	9,313	9,314	**5.77**	104.0	3.00	90.38	10.81	0.00	0.00	0.00	101.19	0.00
128	9,548	9,548	**5.41**	104.0	3.00	90.60	10.96	0.00	0.00	0.00	101.56	0.00
129	4,076	4,077	**17.18**	104.0	3.00	83.21	6.57	0.00	0.00	0.00	89.78	0.00
130	4,316	4,317	**16.43**	104.0	3.00	83.70	6.82	0.00	0.00	0.00	90.53	0.00
131	3,949	3,951	**17.59**	104.0	3.00	82.93	6.44	0.00	0.00	0.00	89.37	0.00
132	3,546	3,547	**18.97**	104.0	3.00	82.00	5.99	0.00	0.00	0.00	87.99	0.00
133	7,763	7,764	**8.40**	104.0	3.00	88.80	9.77	0.00	0.00	0.00	98.57	0.00
134	2,170	2,172	**24.96**	104.0	3.00	77.74	4.26	0.00	0.00	0.00	82.00	0.00
141	4,138	4,141	**16.98**	104.0	3.00	83.34	6.64	0.00	0.00	0.00	89.98	0.00
142	6,613	6,615	**10.66**	104.0	3.00	87.41	8.90	0.00	0.00	0.00	96.31	0.00
143	3,567	3,571	**18.89**	104.0	3.00	82.06	6.02	0.00	0.00	0.00	88.07	0.00
144	7,784	7,785	**8.36**	104.0	3.00	88.83	9.78	0.00	0.00	0.00	98.61	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	10,690	10,690	**3.74**	104.0	3.00	91.58	11.64	0.00	0.00	0.00	103.22	0.00
146	10,389	10,390	**4.16**	104.0	3.00	91.33	11.46	0.00	0.00	0.00	102.80	0.00
Sum	39.53											

Noise sensitive area: H34 H34

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	6,642	6,643	**10.60**	104.0	3.00	87.45	8.92	0.00	0.00	0.00	96.37	0.00
2	7,119	7,120	**9.62**	104.0	3.00	88.05	9.29	0.00	0.00	0.00	97.34	0.00
3	7,391	7,393	**9.09**	104.0	3.00	88.38	9.49	0.00	0.00	0.00	97.87	0.00
4	8,732	8,732	**6.71**	104.0	3.00	89.82	10.43	0.00	0.00	0.00	100.26	0.00
5	7,968	7,969	**8.02**	104.0	3.00	89.03	9.91	0.00	0.00	0.00	98.94	0.00
6	7,364	7,365	**9.14**	104.0	3.00	88.34	9.47	0.00	0.00	0.00	97.82	0.00
7	7,113	7,114	**9.63**	104.0	3.00	88.04	9.28	0.00	0.00	0.00	97.33	0.00
8	6,537	6,538	**10.82**	104.0	3.00	87.31	8.83	0.00	0.00	0.00	96.14	0.00
9	6,534	6,535	**10.83**	104.0	3.00	87.30	8.83	0.00	0.00	0.00	96.14	0.00
10	5,996	5,998	**12.01**	104.0	3.00	86.56	8.39	0.00	0.00	0.00	94.95	0.00
11	4,937	4,939	**14.65**	104.0	3.00	84.87	7.44	0.00	0.00	0.00	92.31	0.00
12	5,089	5,091	**14.24**	104.0	3.00	85.14	7.58	0.00	0.00	0.00	92.72	0.00
13	5,126	5,129	**14.14**	104.0	3.00	85.20	7.62	0.00	0.00	0.00	92.82	0.00
14	5,122	5,125	**14.16**	104.0	3.00	85.19	7.61	0.00	0.00	0.00	92.81	0.00
15	5,636	5,639	**12.86**	104.0	3.00	86.02	8.08	0.00	0.00	0.00	94.10	0.00
16	6,013	6,015	**11.97**	104.0	3.00	86.59	8.40	0.00	0.00	0.00	94.99	0.00
17	4,858	4,861	**14.86**	104.0	3.00	84.73	7.36	0.00	0.00	0.00	92.10	0.00
18	4,544	4,547	**15.75**	104.0	3.00	84.15	7.05	0.00	0.00	0.00	91.21	0.00
19	4,772	4,775	**15.10**	104.0	3.00	84.58	7.28	0.00	0.00	0.00	91.86	0.00
20	5,206	5,209	**13.94**	104.0	3.00	85.33	7.69	0.00	0.00	0.00	93.02	0.00
21	8,426	8,427	**7.22**	104.0	3.00	89.51	10.23	0.00	0.00	0.00	99.74	0.00
22	9,211	9,211	**5.93**	104.0	3.00	90.29	10.74	0.00	0.00	0.00	101.03	0.00
23	9,413	9,414	**5.61**	104.0	3.00	90.48	10.87	0.00	0.00	0.00	101.35	0.00
24	9,100	9,100	**6.11**	104.0	3.00	90.18	10.67	0.00	0.00	0.00	100.85	0.00
25	9,688	9,688	**5.19**	104.0	3.00	90.72	11.04	0.00	0.00	0.00	101.77	0.00
26	7,784	7,785	**8.36**	104.0	3.00	88.83	9.78	0.00	0.00	0.00	98.61	0.00
27	8,861	8,861	**6.49**	104.0	3.00	89.95	10.52	0.00	0.00	0.00	100.47	0.00
28	7,889	7,890	**8.16**	104.0	3.00	88.94	9.86	0.00	0.00	0.00	98.80	0.00
29	9,010	9,011	**6.25**	104.0	3.00	90.10	10.62	0.00	0.00	0.00	100.71	0.00
30	9,618	9,618	**5.30**	104.0	3.00	90.66	11.00	0.00	0.00	0.00	101.66	0.00
31	9,978	9,979	**4.76**	104.0	3.00	90.98	11.22	0.00	0.00	0.00	102.20	0.00
32	10,163	10,163	**4.49**	104.0	3.00	91.14	11.33	0.00	0.00	0.00	102.47	0.00
33	9,936	9,936	**4.82**	104.0	3.00	90.94	11.20	0.00	0.00	0.00	102.14	0.00
34	7,346	7,348	**9.18**	104.0	3.00	88.32	9.46	0.00	0.00	0.00	97.78	0.00
35	6,935	6,937	**9.99**	104.0	3.00	87.82	9.15	0.00	0.00	0.00	96.97	0.00
36	6,767	6,768	**10.34**	104.0	3.00	87.61	9.02	0.00	0.00	0.00	96.63	0.00
37	7,552	7,553	**8.79**	104.0	3.00	88.56	9.61	0.00	0.00	0.00	98.17	0.00
38	9,278	9,279	**5.82**	104.0	3.00	90.35	10.79	0.00	0.00	0.00	101.14	0.00
39	8,662	8,663	**6.82**	104.0	3.00	89.75	10.39	0.00	0.00	0.00	100.14	0.00
40	6,867	6,868	**10.13**	104.0	3.00	87.74	9.09	0.00	0.00	0.00	96.83	0.00
41	8,443	8,445	**7.19**	104.0	3.00	89.53	10.24	0.00	0.00	0.00	99.77	0.00
43	7,644	7,645	**8.61**	104.0	3.00	88.67	9.68	0.00	0.00	0.00	98.35	0.00
44	8,260	8,262	**7.51**	104.0	3.00	89.34	10.12	0.00	0.00	0.00	99.46	0.00
45	8,543	8,544	**7.02**	104.0	3.00	89.63	10.31	0.00	0.00	0.00	99.94	0.00
46	7,234	7,235	**9.40**	104.0	3.00	88.19	9.38	0.00	0.00	0.00	97.57	0.00
48	10,440	10,440	**4.09**	104.0	3.00	91.37	11.49	0.00	0.00	0.00	102.87	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	11,240	11,240	**3.00**	104.0	3.00	92.02	11.95	0.00	0.00	0.00	103.96	0.00
50	7,158	7,159	**9.55**	104.0	3.00	88.10	9.32	0.00	0.00	0.00	97.42	0.00
51	10,906	10,906	**3.45**	104.0	3.00	91.75	11.76	0.00	0.00	0.00	103.52	0.00
52	10,709	10,709	**3.72**	104.0	3.00	91.60	11.65	0.00	0.00	0.00	103.25	0.00
53	11,472	11,473	**2.69**	104.0	3.00	92.19	12.08	0.00	0.00	0.00	104.27	0.00
55	12,522	12,522	**1.38**	104.0	3.00	92.95	12.63	0.00	0.00	0.00	105.58	0.00
56	12,762	12,762	**1.09**	104.0	3.00	93.12	12.75	0.00	0.00	0.00	105.87	0.00
57	12,260	12,260	**1.70**	104.0	3.00	92.77	12.49	0.00	0.00	0.00	105.26	0.00
58	9,738	9,738	**5.12**	104.0	3.00	90.77	11.07	0.00	0.00	0.00	101.84	0.00
59	13,002	13,002	**0.81**	104.0	3.00	93.28	12.87	0.00	0.00	0.00	106.15	0.00
60	13,935	13,936	**-0.24**	104.0	3.00	93.88	13.32	0.00	0.00	0.00	107.20	0.00
61	14,232	14,232	**-0.56**	104.0	3.00	94.07	13.46	0.00	0.00	0.00	107.52	0.00
62	12,942	12,943	**0.88**	104.0	3.00	93.24	12.84	0.00	0.00	0.00	106.08	0.00
63	12,851	12,851	**0.99**	104.0	3.00	93.18	12.79	0.00	0.00	0.00	105.97	0.00
64	13,808	13,808	**-0.10**	104.0	3.00	93.80	13.26	0.00	0.00	0.00	107.06	0.00
65	14,438	14,438	**-0.78**	104.0	3.00	94.19	13.55	0.00	0.00	0.00	107.74	0.00
66	6,563	6,564	**10.76**	104.0	3.00	87.34	8.85	0.00	0.00	0.00	96.20	0.00
67	14,204	14,204	**-0.53**	104.0	3.00	94.05	13.45	0.00	0.00	0.00	107.49	0.00
68	14,684	14,685	**-1.04**	104.0	3.00	94.34	13.67	0.00	0.00	0.00	108.00	0.00
69	14,264	14,265	**-0.60**	104.0	3.00	94.09	13.47	0.00	0.00	0.00	107.56	0.00
70	4,131	4,133	**17.01**	104.0	3.00	83.32	6.63	0.00	0.00	0.00	89.96	0.00
71	6,180	6,182	**11.60**	104.0	3.00	86.82	8.54	0.00	0.00	0.00	95.37	0.00
72	8,555	8,555	**7.00**	104.0	3.00	89.64	10.31	0.00	0.00	0.00	99.96	0.00
73	7,506	7,507	**8.87**	104.0	3.00	88.51	9.58	0.00	0.00	0.00	98.09	0.00
74	7,261	7,262	**9.34**	104.0	3.00	88.22	9.40	0.00	0.00	0.00	97.62	0.00
75	8,369	8,369	**7.32**	104.0	3.00	89.45	10.19	0.00	0.00	0.00	99.64	0.00
76	11,427	11,427	**2.75**	104.0	3.00	92.16	12.05	0.00	0.00	0.00	104.21	0.00
77	11,386	11,386	**2.81**	104.0	3.00	92.13	12.03	0.00	0.00	0.00	104.16	0.00
78	5,287	5,289	**13.73**	104.0	3.00	85.47	7.76	0.00	0.00	0.00	93.23	0.00
80	13,571	13,572	**0.16**	104.0	3.00	93.65	13.15	0.00	0.00	0.00	106.80	0.00
81	4,592	4,594	**15.61**	104.0	3.00	84.24	7.10	0.00	0.00	0.00	91.35	0.00
82	10,300	10,300	**4.29**	104.0	3.00	91.26	11.41	0.00	0.00	0.00	102.67	0.00
83	13,469	13,469	**0.28**	104.0	3.00	93.59	13.10	0.00	0.00	0.00	106.69	0.00
85	11,902	11,902	**2.14**	104.0	3.00	92.51	12.31	0.00	0.00	0.00	104.82	0.00
86	13,327	13,327	**0.44**	104.0	3.00	93.49	13.03	0.00	0.00	0.00	106.52	0.00
87	14,675	14,675	**-1.03**	104.0	3.00	94.33	13.66	0.00	0.00	0.00	107.99	0.00
89	13,458	13,458	**0.29**	104.0	3.00	93.58	13.09	0.00	0.00	0.00	106.67	0.00
90	12,202	12,203	**1.77**	104.0	3.00	92.73	12.46	0.00	0.00	0.00	105.19	0.00
91	12,860	12,861	**0.98**	104.0	3.00	93.19	12.80	0.00	0.00	0.00	105.99	0.00
92	13,735	13,735	**-0.02**	104.0	3.00	93.76	13.23	0.00	0.00	0.00	106.98	0.00
94	5,600	5,602	**12.95**	104.0	3.00	85.97	8.05	0.00	0.00	0.00	94.01	0.00
95	5,666	5,668	**12.79**	104.0	3.00	86.07	8.10	0.00	0.00	0.00	94.17	0.00
97	5,906	5,908	**12.22**	104.0	3.00	86.43	8.31	0.00	0.00	0.00	94.74	0.00
98	5,598	5,601	**12.95**	104.0	3.00	85.96	8.04	0.00	0.00	0.00	94.01	0.00
99	7,894	7,894	**8.16**	104.0	3.00	88.95	9.86	0.00	0.00	0.00	98.80	0.00
100	8,916	8,917	**6.40**	104.0	3.00	90.00	10.55	0.00	0.00	0.00	100.56	0.00
101	4,433	4,436	**16.08**	104.0	3.00	83.94	6.94	0.00	0.00	0.00	90.88	0.00
102	8,074	8,076	**7.83**	104.0	3.00	89.14	9.99	0.00	0.00	0.00	99.13	0.00
103	4,500	4,502	**15.88**	104.0	3.00	84.07	7.01	0.00	0.00	0.00	91.08	0.00
104	8,173	8,174	**7.66**	104.0	3.00	89.25	10.05	0.00	0.00	0.00	99.30	0.00
107	4,920	4,922	**14.70**	104.0	3.00	84.84	7.42	0.00	0.00	0.00	92.27	0.00
108	8,660	8,661	**6.83**	104.0	3.00	89.75	10.39	0.00	0.00	0.00	100.14	0.00
109	13,227	13,227	**0.55**	104.0	3.00	93.43	12.98	0.00	0.00	0.00	106.41	0.00
110	10,641	10,641	**3.81**	104.0	3.00	91.54	11.61	0.00	0.00	0.00	103.15	0.00
111	11,114	11,115	**3.16**	104.0	3.00	91.92	11.88	0.00	0.00	0.00	103.80	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

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DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	4,809	4,811	**15.00**	104.0	3.00	84.65	7.31	0.00	0.00	0.00	91.96	0.00
114	12,095	12,095	**1.90**	104.0	3.00	92.65	12.41	0.00	0.00	0.00	105.06	0.00
115	6,626	6,627	**10.63**	104.0	3.00	87.43	8.90	0.00	0.00	0.00	96.33	0.00
116	7,025	7,027	**9.81**	104.0	3.00	87.94	9.22	0.00	0.00	0.00	97.15	0.00
118	13,637	13,638	**0.09**	104.0	3.00	93.69	13.18	0.00	0.00	0.00	106.87	0.00
119	6,748	6,750	**10.37**	104.0	3.00	87.59	9.00	0.00	0.00	0.00	96.59	0.00
120	4,201	4,203	**16.78**	104.0	3.00	83.47	6.71	0.00	0.00	0.00	90.18	0.00
121	6,559	6,561	**10.77**	104.0	3.00	87.34	8.85	0.00	0.00	0.00	96.19	0.00
125	13,180	13,180	**0.61**	104.0	3.00	93.40	12.96	0.00	0.00	0.00	106.36	0.00
126	10,023	10,024	**4.69**	104.0	3.00	91.02	11.25	0.00	0.00	0.00	102.27	0.00
127	10,263	10,264	**4.34**	104.0	3.00	91.23	11.39	0.00	0.00	0.00	102.62	0.00
128	10,536	10,536	**3.96**	104.0	3.00	91.45	11.55	0.00	0.00	0.00	103.00	0.00
129	5,071	5,072	**14.30**	104.0	3.00	85.10	7.56	0.00	0.00	0.00	92.67	0.00
130	4,916	4,917	**14.71**	104.0	3.00	84.83	7.42	0.00	0.00	0.00	92.25	0.00
131	4,469	4,471	**15.98**	104.0	3.00	84.01	6.98	0.00	0.00	0.00	90.99	0.00
132	4,112	4,114	**17.06**	104.0	3.00	83.29	6.61	0.00	0.00	0.00	89.90	0.00
133	9,167	9,168	**6.00**	104.0	3.00	90.25	10.72	0.00	0.00	0.00	100.96	0.00
134	4,411	4,412	**16.15**	104.0	3.00	83.89	6.92	0.00	0.00	0.00	90.81	0.00
141	6,151	6,153	**11.66**	104.0	3.00	86.78	8.52	0.00	0.00	0.00	95.30	0.00
142	7,828	7,830	**8.28**	104.0	3.00	88.87	9.81	0.00	0.00	0.00	98.69	0.00
143	5,671	5,673	**12.78**	104.0	3.00	86.08	8.11	0.00	0.00	0.00	94.19	0.00
144	8,794	8,795	**6.60**	104.0	3.00	89.89	10.47	0.00	0.00	0.00	100.36	0.00
145	11,755	11,755	**2.33**	104.0	3.00	92.40	12.23	0.00	0.00	0.00	104.63	0.00
146	11,492	11,493	**2.67**	104.0	3.00	92.21	12.09	0.00	0.00	0.00	104.30	0.00

Sum 31.20

Noise sensitive area: H35 H35

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	6,451	6,451	**11.01**	104.0	3.00	87.19	8.76	0.00	0.00	0.00	95.96	0.00
2	6,881	6,882	**10.10**	104.0	3.00	87.75	9.11	0.00	0.00	0.00	96.86	0.00
3	7,003	7,004	**9.86**	104.0	3.00	87.91	9.20	0.00	0.00	0.00	97.11	0.00
4	8,086	8,086	**7.81**	104.0	3.00	89.15	9.99	0.00	0.00	0.00	99.15	0.00
5	7,280	7,281	**9.31**	104.0	3.00	88.24	9.41	0.00	0.00	0.00	97.65	0.00
6	6,826	6,827	**10.21**	104.0	3.00	87.68	9.06	0.00	0.00	0.00	96.75	0.00
7	6,035	6,036	**11.93**	104.0	3.00	86.62	8.42	0.00	0.00	0.00	95.04	0.00
8	6,537	6,537	**10.82**	104.0	3.00	87.31	8.83	0.00	0.00	0.00	96.14	0.00
9	6,195	6,195	**11.57**	104.0	3.00	86.84	8.55	0.00	0.00	0.00	95.40	0.00
10	5,591	5,593	**12.97**	104.0	3.00	85.95	8.04	0.00	0.00	0.00	93.99	0.00
11	5,048	5,049	**14.36**	104.0	3.00	85.06	7.54	0.00	0.00	0.00	92.61	0.00
12	5,122	5,124	**14.16**	104.0	3.00	85.19	7.61	0.00	0.00	0.00	92.80	0.00
13	4,977	4,979	**14.54**	104.0	3.00	84.94	7.48	0.00	0.00	0.00	92.42	0.00
14	4,812	4,814	**14.99**	104.0	3.00	84.65	7.32	0.00	0.00	0.00	91.97	0.00
15	5,056	5,058	**14.33**	104.0	3.00	85.08	7.55	0.00	0.00	0.00	92.63	0.00
16	5,352	5,354	**13.57**	104.0	3.00	85.57	7.82	0.00	0.00	0.00	93.40	0.00
17	5,059	5,061	**14.33**	104.0	3.00	85.08	7.55	0.00	0.00	0.00	92.64	0.00
18	4,821	4,822	**14.97**	104.0	3.00	84.66	7.33	0.00	0.00	0.00	91.99	0.00
19	4,550	4,552	**15.74**	104.0	3.00	84.16	7.06	0.00	0.00	0.00	91.22	0.00
20	4,548	4,550	**15.74**	104.0	3.00	84.16	7.06	0.00	0.00	0.00	91.22	0.00
21	7,632	7,633	**8.64**	104.0	3.00	88.65	9.67	0.00	0.00	0.00	98.32	0.00
22	8,342	8,342	**7.37**	104.0	3.00	89.43	10.17	0.00	0.00	0.00	99.60	0.00
23	8,477	8,478	**7.13**	104.0	3.00	89.57	10.26	0.00	0.00	0.00	99.83	0.00
24	8,276	8,277	**7.48**	104.0	3.00	89.36	10.13	0.00	0.00	0.00	99.48	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	8,358	8,358	**7.34**	104.0	3.00	89.44	10.18	0.00	0.00	0.00	99.62	0.00
26	6,846	6,846	**10.17**	104.0	3.00	87.71	9.08	0.00	0.00	0.00	96.79	0.00
27	7,551	7,552	**8.79**	104.0	3.00	88.56	9.61	0.00	0.00	0.00	98.17	0.00
28	6,569	6,570	**10.75**	104.0	3.00	87.35	8.86	0.00	0.00	0.00	96.21	0.00
29	7,992	7,993	**7.98**	104.0	3.00	89.05	9.93	0.00	0.00	0.00	98.98	0.00
30	8,603	8,603	**6.92**	104.0	3.00	89.69	10.35	0.00	0.00	0.00	100.04	0.00
31	9,139	9,139	**6.05**	104.0	3.00	90.22	10.70	0.00	0.00	0.00	100.92	0.00
32	8,847	8,848	**6.52**	104.0	3.00	89.94	10.51	0.00	0.00	0.00	100.45	0.00
33	8,824	8,824	**6.56**	104.0	3.00	89.91	10.49	0.00	0.00	0.00	100.41	0.00
34	6,205	6,206	**11.54**	104.0	3.00	86.86	8.56	0.00	0.00	0.00	95.42	0.00
35	5,925	5,926	**12.18**	104.0	3.00	86.46	8.33	0.00	0.00	0.00	94.78	0.00
36	5,830	5,831	**12.40**	104.0	3.00	86.31	8.25	0.00	0.00	0.00	94.56	0.00
37	6,350	6,351	**11.22**	104.0	3.00	87.06	8.68	0.00	0.00	0.00	95.74	0.00
38	7,944	7,944	**8.07**	104.0	3.00	89.00	9.89	0.00	0.00	0.00	98.89	0.00
39	7,231	7,231	**9.40**	104.0	3.00	88.18	9.37	0.00	0.00	0.00	97.56	0.00
40	5,296	5,296	**13.71**	104.0	3.00	85.48	7.77	0.00	0.00	0.00	93.25	0.00
41	6,972	6,973	**9.92**	104.0	3.00	87.87	9.18	0.00	0.00	0.00	97.04	0.00
43	6,326	6,327	**11.28**	104.0	3.00	87.02	8.66	0.00	0.00	0.00	95.69	0.00
44	6,722	6,723	**10.43**	104.0	3.00	87.55	8.98	0.00	0.00	0.00	96.53	0.00
45	6,984	6,985	**9.89**	104.0	3.00	87.88	9.19	0.00	0.00	0.00	97.07	0.00
46	5,742	5,743	**12.61**	104.0	3.00	86.18	8.17	0.00	0.00	0.00	94.35	0.00
48	9,018	9,019	**6.24**	104.0	3.00	90.10	10.62	0.00	0.00	0.00	100.72	0.00
49	9,914	9,914	**4.86**	104.0	3.00	90.92	11.18	0.00	0.00	0.00	102.11	0.00
50	6,363	6,364	**11.20**	104.0	3.00	87.07	8.69	0.00	0.00	0.00	95.77	0.00
51	9,629	9,629	**5.28**	104.0	3.00	90.67	11.01	0.00	0.00	0.00	101.68	0.00
52	9,470	9,470	**5.53**	104.0	3.00	90.53	10.91	0.00	0.00	0.00	101.43	0.00
53	10,113	10,113	**4.56**	104.0	3.00	91.10	11.30	0.00	0.00	0.00	102.40	0.00
55	11,034	11,034	**3.27**	104.0	3.00	91.85	11.83	0.00	0.00	0.00	103.69	0.00
56	11,253	11,253	**2.98**	104.0	3.00	92.03	11.96	0.00	0.00	0.00	103.98	0.00
57	10,697	10,697	**3.73**	104.0	3.00	91.59	11.64	0.00	0.00	0.00	103.23	0.00
58	8,518	8,518	**7.07**	104.0	3.00	89.61	10.29	0.00	0.00	0.00	99.90	0.00
59	11,473	11,473	**2.69**	104.0	3.00	92.19	12.08	0.00	0.00	0.00	104.27	0.00
60	12,301	12,302	**1.65**	104.0	3.00	92.80	12.52	0.00	0.00	0.00	105.31	0.00
61	12,582	12,582	**1.31**	104.0	3.00	93.00	12.66	0.00	0.00	0.00	105.65	0.00
62	11,184	11,185	**3.07**	104.0	3.00	91.97	11.92	0.00	0.00	0.00	103.89	0.00
63	11,027	11,027	**3.28**	104.0	3.00	91.85	11.83	0.00	0.00	0.00	103.68	0.00
64	11,938	11,939	**2.10**	104.0	3.00	92.54	12.33	0.00	0.00	0.00	104.87	0.00
65	12,566	12,566	**1.33**	104.0	3.00	92.98	12.65	0.00	0.00	0.00	105.64	0.00
66	5,013	5,013	**14.45**	104.0	3.00	85.00	7.51	0.00	0.00	0.00	92.51	0.00
67	12,366	12,366	**1.57**	104.0	3.00	92.84	12.55	0.00	0.00	0.00	105.39	0.00
68	12,836	12,836	**1.01**	104.0	3.00	93.17	12.79	0.00	0.00	0.00	105.96	0.00
69	12,387	12,387	**1.54**	104.0	3.00	92.86	12.56	0.00	0.00	0.00	105.42	0.00
70	3,740	3,741	**18.29**	104.0	3.00	82.46	6.21	0.00	0.00	0.00	88.67	0.00
71	5,689	5,691	**12.74**	104.0	3.00	86.10	8.12	0.00	0.00	0.00	94.23	0.00
72	7,989	7,989	**7.99**	104.0	3.00	89.05	9.93	0.00	0.00	0.00	98.97	0.00
73	6,885	6,885	**10.09**	104.0	3.00	87.76	9.11	0.00	0.00	0.00	96.87	0.00
74	6,384	6,385	**11.15**	104.0	3.00	87.10	8.71	0.00	0.00	0.00	95.81	0.00
75	7,339	7,339	**9.19**	104.0	3.00	88.31	9.45	0.00	0.00	0.00	97.77	0.00
76	9,872	9,872	**4.92**	104.0	3.00	90.89	11.16	0.00	0.00	0.00	102.04	0.00
77	9,946	9,946	**4.81**	104.0	3.00	90.95	11.20	0.00	0.00	0.00	102.15	0.00
78	4,479	4,480	**15.95**	104.0	3.00	84.03	6.99	0.00	0.00	0.00	91.02	0.00
80	11,951	11,951	**2.08**	104.0	3.00	92.55	12.33	0.00	0.00	0.00	104.88	0.00
81	4,473	4,475	**15.96**	104.0	3.00	84.02	6.98	0.00	0.00	0.00	91.00	0.00
82	9,107	9,107	**6.10**	104.0	3.00	90.19	10.68	0.00	0.00	0.00	100.87	0.00
83	11,636	11,636	**2.48**	104.0	3.00	92.32	12.16	0.00	0.00	0.00	104.48	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	10,641	10,641	**3.81**	104.0	3.00	91.54	11.61	0.00	0.00	0.00	103.15	0.00
86	11,720	11,720	**2.37**	104.0	3.00	92.38	12.21	0.00	0.00	0.00	104.59	0.00
87	12,801	12,802	**1.05**	104.0	3.00	93.15	12.77	0.00	0.00	0.00	105.92	0.00
89	11,602	11,602	**2.52**	104.0	3.00	92.29	12.15	0.00	0.00	0.00	104.44	0.00
90	10,550	10,550	**3.94**	104.0	3.00	91.47	11.56	0.00	0.00	0.00	103.02	0.00
91	11,073	11,073	**3.22**	104.0	3.00	91.89	11.86	0.00	0.00	0.00	103.74	0.00
92	11,839	11,839	**2.22**	104.0	3.00	92.47	12.27	0.00	0.00	0.00	104.74	0.00
94	5,226	5,228	**13.89**	104.0	3.00	85.37	7.71	0.00	0.00	0.00	93.07	0.00
95	5,692	5,693	**12.73**	104.0	3.00	86.11	8.13	0.00	0.00	0.00	94.23	0.00
97	5,060	5,062	**14.32**	104.0	3.00	85.09	7.55	0.00	0.00	0.00	92.64	0.00
98	5,377	5,379	**13.50**	104.0	3.00	85.61	7.85	0.00	0.00	0.00	93.46	0.00
99	7,557	7,557	**8.78**	104.0	3.00	88.57	9.62	0.00	0.00	0.00	98.18	0.00
100	7,378	7,379	**9.12**	104.0	3.00	88.36	9.48	0.00	0.00	0.00	97.84	0.00
101	4,493	4,494	**15.91**	104.0	3.00	84.05	7.00	0.00	0.00	0.00	91.06	0.00
102	6,583	6,584	**10.72**	104.0	3.00	87.37	8.87	0.00	0.00	0.00	96.24	0.00
103	4,895	4,896	**14.77**	104.0	3.00	84.80	7.40	0.00	0.00	0.00	92.19	0.00
104	6,775	6,776	**10.32**	104.0	3.00	87.62	9.02	0.00	0.00	0.00	96.64	0.00
107	4,410	4,412	**16.15**	104.0	3.00	83.89	6.92	0.00	0.00	0.00	90.81	0.00
108	8,385	8,385	**7.29**	104.0	3.00	89.47	10.20	0.00	0.00	0.00	99.67	0.00
109	11,676	11,676	**2.43**	104.0	3.00	92.35	12.19	0.00	0.00	0.00	104.53	0.00
110	9,169	9,169	**6.00**	104.0	3.00	90.25	10.72	0.00	0.00	0.00	100.96	0.00
111	9,590	9,590	**5.34**	104.0	3.00	90.64	10.98	0.00	0.00	0.00	101.62	0.00
113	4,431	4,433	**16.09**	104.0	3.00	83.93	6.94	0.00	0.00	0.00	90.88	0.00
114	10,803	10,803	**3.59**	104.0	3.00	91.67	11.70	0.00	0.00	0.00	103.37	0.00
115	6,552	6,552	**10.79**	104.0	3.00	87.33	8.85	0.00	0.00	0.00	96.17	0.00
116	5,692	5,693	**12.73**	104.0	3.00	86.11	8.13	0.00	0.00	0.00	94.23	0.00
118	12,061	12,061	**1.94**	104.0	3.00	92.63	12.39	0.00	0.00	0.00	105.02	0.00
119	6,042	6,043	**11.91**	104.0	3.00	86.63	8.43	0.00	0.00	0.00	95.05	0.00
120	4,434	4,435	**16.08**	104.0	3.00	83.94	6.94	0.00	0.00	0.00	90.88	0.00
121	5,704	5,705	**12.70**	104.0	3.00	86.13	8.14	0.00	0.00	0.00	94.26	0.00
125	11,350	11,350	**2.85**	104.0	3.00	92.10	12.01	0.00	0.00	0.00	104.11	0.00
126	8,376	8,376	**7.31**	104.0	3.00	89.46	10.19	0.00	0.00	0.00	99.65	0.00
127	8,610	8,611	**6.91**	104.0	3.00	89.70	10.35	0.00	0.00	0.00	100.05	0.00
128	8,891	8,892	**6.44**	104.0	3.00	89.98	10.54	0.00	0.00	0.00	100.52	0.00
129	3,736	3,737	**18.30**	104.0	3.00	82.45	6.21	0.00	0.00	0.00	88.66	0.00
130	3,402	3,403	**19.50**	104.0	3.00	81.64	5.83	0.00	0.00	0.00	87.47	0.00
131	2,985	2,987	**21.13**	104.0	3.00	80.50	5.33	0.00	0.00	0.00	85.83	0.00
132	2,728	2,729	**22.24**	104.0	3.00	79.72	5.01	0.00	0.00	0.00	84.73	0.00
133	7,743	7,743	**8.43**	104.0	3.00	88.78	9.75	0.00	0.00	0.00	98.53	0.00
134	4,012	4,013	**17.39**	104.0	3.00	83.07	6.51	0.00	0.00	0.00	89.58	0.00
141	5,296	5,298	**13.71**	104.0	3.00	85.48	7.77	0.00	0.00	0.00	93.25	0.00
142	6,366	6,368	**11.19**	104.0	3.00	87.08	8.70	0.00	0.00	0.00	95.78	0.00
143	4,941	4,943	**14.64**	104.0	3.00	84.88	7.44	0.00	0.00	0.00	92.32	0.00
144	7,203	7,203	**9.46**	104.0	3.00	88.15	9.35	0.00	0.00	0.00	97.50	0.00
145	10,118	10,118	**4.56**	104.0	3.00	91.10	11.30	0.00	0.00	0.00	102.41	0.00
146	9,875	9,875	**4.91**	104.0	3.00	90.89	11.16	0.00	0.00	0.00	102.05	0.00

Sum 33.00

Noise sensitive area: H36 H36

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	8,717	8,718	**6.73**	104.0	3.00	89.81	10.42	0.00	0.00	0.00	100.23	0.00
2	8,859	8,860	**6.50**	104.0	3.00	89.95	10.52	0.00	0.00	0.00	100.47	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	8,527	8,527	**7.05**	104.0	3.00	89.62	10.30	0.00	0.00	0.00	99.91	0.00
4	8,412	8,412	**7.25**	104.0	3.00	89.50	10.22	0.00	0.00	0.00	99.72	0.00
5	7,790	7,791	**8.35**	104.0	3.00	88.83	9.78	0.00	0.00	0.00	98.62	0.00
6	7,998	7,998	**7.97**	104.0	3.00	89.06	9.93	0.00	0.00	0.00	98.99	0.00
7	5,874	5,875	**12.30**	104.0	3.00	86.38	8.28	0.00	0.00	0.00	94.66	0.00
8	9,232	9,232	**5.90**	104.0	3.00	90.31	10.76	0.00	0.00	0.00	101.06	0.00
9	8,201	8,202	**7.61**	104.0	3.00	89.28	10.07	0.00	0.00	0.00	99.35	0.00
10	7,732	7,733	**8.45**	104.0	3.00	88.77	9.74	0.00	0.00	0.00	98.51	0.00
11	8,585	8,586	**6.95**	104.0	3.00	89.68	10.34	0.00	0.00	0.00	100.01	0.00
12	8,475	8,476	**7.14**	104.0	3.00	89.56	10.26	0.00	0.00	0.00	99.83	0.00
13	8,028	8,029	**7.91**	104.0	3.00	89.09	9.95	0.00	0.00	0.00	99.05	0.00
14	7,610	7,611	**8.68**	104.0	3.00	88.63	9.65	0.00	0.00	0.00	98.28	0.00
15	7,067	7,069	**9.73**	104.0	3.00	87.99	9.25	0.00	0.00	0.00	97.24	0.00
16	6,960	6,961	**9.94**	104.0	3.00	87.85	9.17	0.00	0.00	0.00	97.02	0.00
17	8,760	8,761	**6.66**	104.0	3.00	89.85	10.45	0.00	0.00	0.00	100.30	0.00
18	8,760	8,761	**6.66**	104.0	3.00	89.85	10.45	0.00	0.00	0.00	100.30	0.00
19	7,689	7,690	**8.53**	104.0	3.00	88.72	9.71	0.00	0.00	0.00	98.43	0.00
20	6,714	6,715	**10.45**	104.0	3.00	87.54	8.97	0.00	0.00	0.00	96.52	0.00
21	7,638	7,639	**8.63**	104.0	3.00	88.66	9.67	0.00	0.00	0.00	98.34	0.00
22	7,801	7,802	**8.33**	104.0	3.00	88.84	9.79	0.00	0.00	0.00	98.64	0.00
23	7,640	7,640	**8.62**	104.0	3.00	88.66	9.68	0.00	0.00	0.00	98.34	0.00
24	7,927	7,927	**8.10**	104.0	3.00	88.98	9.88	0.00	0.00	0.00	98.86	0.00
25	5,882	5,883	**12.28**	104.0	3.00	86.39	8.29	0.00	0.00	0.00	94.68	0.00
26	6,712	6,713	**10.45**	104.0	3.00	87.54	8.97	0.00	0.00	0.00	96.51	0.00
27	5,531	5,531	**13.12**	104.0	3.00	85.86	7.98	0.00	0.00	0.00	93.84	0.00
28	5,054	5,055	**14.34**	104.0	3.00	85.07	7.55	0.00	0.00	0.00	92.62	0.00
29	7,025	7,025	**9.81**	104.0	3.00	87.93	9.22	0.00	0.00	0.00	97.15	0.00
30	7,410	7,410	**9.06**	104.0	3.00	88.40	9.51	0.00	0.00	0.00	97.90	0.00
31	8,437	8,437	**7.20**	104.0	3.00	89.52	10.24	0.00	0.00	0.00	99.76	0.00
32	6,261	6,261	**11.42**	104.0	3.00	86.93	8.61	0.00	0.00	0.00	95.54	0.00
33	7,154	7,155	**9.55**	104.0	3.00	88.09	9.32	0.00	0.00	0.00	97.41	0.00
34	5,688	5,690	**12.74**	104.0	3.00	86.10	8.12	0.00	0.00	0.00	94.22	0.00
35	6,077	6,078	**11.83**	104.0	3.00	86.68	8.46	0.00	0.00	0.00	95.13	0.00
36	6,296	6,297	**11.34**	104.0	3.00	86.98	8.64	0.00	0.00	0.00	95.62	0.00
37	5,494	5,495	**13.21**	104.0	3.00	85.80	7.95	0.00	0.00	0.00	93.75	0.00
38	5,617	5,618	**12.91**	104.0	3.00	85.99	8.06	0.00	0.00	0.00	94.05	0.00
39	4,767	4,768	**15.12**	104.0	3.00	84.57	7.27	0.00	0.00	0.00	91.84	0.00
40	3,568	3,569	**18.89**	104.0	3.00	82.05	6.02	0.00	0.00	0.00	88.07	0.00
41	4,441	4,442	**16.06**	104.0	3.00	83.95	6.95	0.00	0.00	0.00	90.90	0.00
43	4,981	4,982	**14.53**	104.0	3.00	84.95	7.48	0.00	0.00	0.00	92.43	0.00
44	3,971	3,973	**17.52**	104.0	3.00	82.98	6.46	0.00	0.00	0.00	89.44	0.00
45	3,941	3,943	**17.62**	104.0	3.00	82.92	6.43	0.00	0.00	0.00	89.35	0.00
46	4,004	4,005	**17.41**	104.0	3.00	83.05	6.50	0.00	0.00	0.00	89.55	0.00
48	5,846	5,846	**12.37**	104.0	3.00	86.34	8.26	0.00	0.00	0.00	94.60	0.00
49	6,951	6,951	**9.96**	104.0	3.00	87.84	9.16	0.00	0.00	0.00	97.00	0.00
50	6,976	6,976	**9.91**	104.0	3.00	87.87	9.18	0.00	0.00	0.00	97.05	0.00
51	6,978	6,978	**9.91**	104.0	3.00	87.87	9.18	0.00	0.00	0.00	97.05	0.00
52	7,036	7,036	**9.79**	104.0	3.00	87.95	9.23	0.00	0.00	0.00	97.17	0.00
53	6,942	6,942	**9.98**	104.0	3.00	87.83	9.15	0.00	0.00	0.00	96.98	0.00
55	7,029	7,030	**9.80**	104.0	3.00	87.94	9.22	0.00	0.00	0.00	97.16	0.00
56	7,105	7,105	**9.65**	104.0	3.00	88.03	9.28	0.00	0.00	0.00	97.31	0.00
57	6,357	6,357	**11.21**	104.0	3.00	87.06	8.69	0.00	0.00	0.00	95.75	0.00
58	6,493	6,493	**10.91**	104.0	3.00	87.25	8.80	0.00	0.00	0.00	96.05	0.00
59	7,185	7,186	**9.49**	104.0	3.00	88.13	9.34	0.00	0.00	0.00	97.47	0.00
60	7,375	7,376	**9.12**	104.0	3.00	88.36	9.48	0.00	0.00	0.00	97.84	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	7,548	7,548	**8.80**	104.0	3.00	88.56	9.61	0.00	0.00	0.00	98.17	0.00
62	5,689	5,690	**12.74**	104.0	3.00	86.10	8.12	0.00	0.00	0.00	94.22	0.00
63	5,165	5,165	**14.05**	104.0	3.00	85.26	7.65	0.00	0.00	0.00	92.91	0.00
64	5,814	5,815	**12.44**	104.0	3.00	86.29	8.23	0.00	0.00	0.00	94.52	0.00
65	6,420	6,421	**11.07**	104.0	3.00	87.15	8.74	0.00	0.00	0.00	95.89	0.00
66	3,702	3,703	**18.42**	104.0	3.00	82.37	6.17	0.00	0.00	0.00	88.54	0.00
67	6,383	6,383	**11.15**	104.0	3.00	87.10	8.71	0.00	0.00	0.00	95.81	0.00
68	6,791	6,792	**10.29**	104.0	3.00	87.64	9.04	0.00	0.00	0.00	96.67	0.00
69	6,221	6,222	**11.51**	104.0	3.00	86.88	8.58	0.00	0.00	0.00	95.45	0.00
70	7,087	7,088	**9.69**	104.0	3.00	88.01	9.26	0.00	0.00	0.00	97.27	0.00
71	7,555	7,556	**8.78**	104.0	3.00	88.57	9.61	0.00	0.00	0.00	98.18	0.00
72	8,607	8,608	**6.91**	104.0	3.00	89.70	10.35	0.00	0.00	0.00	100.05	0.00
73	7,781	7,782	**8.36**	104.0	3.00	88.82	9.78	0.00	0.00	0.00	98.60	0.00
74	6,718	6,718	**10.44**	104.0	3.00	87.55	8.98	0.00	0.00	0.00	96.52	0.00
75	6,618	6,618	**10.65**	104.0	3.00	87.41	8.90	0.00	0.00	0.00	96.31	0.00
76	5,743	5,743	**12.61**	104.0	3.00	86.18	8.17	0.00	0.00	0.00	94.35	0.00
77	6,415	6,415	**11.08**	104.0	3.00	87.14	8.73	0.00	0.00	0.00	95.88	0.00
78	6,315	6,316	**11.30**	104.0	3.00	87.01	8.65	0.00	0.00	0.00	95.66	0.00
80	7,130	7,130	**9.60**	104.0	3.00	88.06	9.30	0.00	0.00	0.00	97.36	0.00
81	7,861	7,862	**8.22**	104.0	3.00	88.91	9.84	0.00	0.00	0.00	98.75	0.00
82	6,997	6,997	**9.87**	104.0	3.00	87.90	9.19	0.00	0.00	0.00	97.09	0.00
83	5,699	5,699	**12.71**	104.0	3.00	86.12	8.13	0.00	0.00	0.00	94.25	0.00
85	7,804	7,805	**8.32**	104.0	3.00	88.85	9.79	0.00	0.00	0.00	98.64	0.00
86	6,999	6,999	**9.86**	104.0	3.00	87.90	9.20	0.00	0.00	0.00	97.10	0.00
87	6,650	6,651	**10.58**	104.0	3.00	87.46	8.92	0.00	0.00	0.00	96.38	0.00
89	5,549	5,550	**13.08**	104.0	3.00	85.89	8.00	0.00	0.00	0.00	93.88	0.00
90	5,740	5,741	**12.62**	104.0	3.00	86.18	8.17	0.00	0.00	0.00	94.35	0.00
91	5,418	5,418	**13.40**	104.0	3.00	85.68	7.88	0.00	0.00	0.00	93.56	0.00
92	5,608	5,609	**12.93**	104.0	3.00	85.98	8.05	0.00	0.00	0.00	94.03	0.00
94	7,640	7,641	**8.62**	104.0	3.00	88.66	9.68	0.00	0.00	0.00	98.34	0.00
95	8,776	8,777	**6.63**	104.0	3.00	89.87	10.46	0.00	0.00	0.00	100.33	0.00
97	6,343	6,344	**11.24**	104.0	3.00	87.05	8.68	0.00	0.00	0.00	95.72	0.00
98	8,065	8,066	**7.85**	104.0	3.00	89.13	9.98	0.00	0.00	0.00	99.11	0.00
99	9,016	9,016	**6.24**	104.0	3.00	90.10	10.62	0.00	0.00	0.00	100.72	0.00
100	4,238	4,239	**16.67**	104.0	3.00	83.55	6.74	0.00	0.00	0.00	90.29	0.00
101	8,201	8,202	**7.61**	104.0	3.00	89.28	10.07	0.00	0.00	0.00	99.35	0.00
102	4,194	4,197	**16.81**	104.0	3.00	83.46	6.70	0.00	0.00	0.00	90.16	0.00
103	9,008	9,009	**6.25**	104.0	3.00	90.09	10.61	0.00	0.00	0.00	100.71	0.00
104	4,751	4,752	**15.17**	104.0	3.00	84.54	7.26	0.00	0.00	0.00	91.80	0.00
107	7,024	7,025	**9.81**	104.0	3.00	87.93	9.22	0.00	0.00	0.00	97.15	0.00
108	9,746	9,746	**5.11**	104.0	3.00	90.78	11.08	0.00	0.00	0.00	101.86	0.00
109	7,247	7,247	**9.37**	104.0	3.00	88.20	9.39	0.00	0.00	0.00	97.59	0.00
110	5,683	5,683	**12.75**	104.0	3.00	86.09	8.12	0.00	0.00	0.00	94.21	0.00
111	5,698	5,699	**12.72**	104.0	3.00	86.12	8.13	0.00	0.00	0.00	94.25	0.00
113	7,321	7,322	**9.23**	104.0	3.00	88.29	9.44	0.00	0.00	0.00	97.73	0.00
114	7,789	7,789	**8.35**	104.0	3.00	88.83	9.78	0.00	0.00	0.00	98.61	0.00
115	9,066	9,066	**6.16**	104.0	3.00	90.15	10.65	0.00	0.00	0.00	100.80	0.00
116	4,753	4,755	**15.16**	104.0	3.00	84.54	7.26	0.00	0.00	0.00	91.80	0.00
118	7,457	7,457	**8.97**	104.0	3.00	88.45	9.54	0.00	0.00	0.00	97.99	0.00
119	7,109	7,110	**9.64**	104.0	3.00	88.04	9.28	0.00	0.00	0.00	97.32	0.00
120	8,472	8,473	**7.14**	104.0	3.00	89.56	10.26	0.00	0.00	0.00	99.82	0.00
121	6,517	6,518	**10.86**	104.0	3.00	87.28	8.82	0.00	0.00	0.00	96.10	0.00
125	5,443	5,444	**13.34**	104.0	3.00	85.72	7.90	0.00	0.00	0.00	93.62	0.00
126	4,105	4,106	**17.09**	104.0	3.00	83.27	6.60	0.00	0.00	0.00	89.87	0.00
127	4,225	4,226	**16.71**	104.0	3.00	83.52	6.73	0.00	0.00	0.00	90.25	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

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Description:
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4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	4,478	4,480	**15.95**	104.0	3.00	84.02	6.99	0.00	0.00	0.00	91.01	0.00
129	4,794	4,795	**15.05**	104.0	3.00	84.62	7.30	0.00	0.00	0.00	91.91	0.00
130	4,323	4,324	**16.41**	104.0	3.00	83.72	6.83	0.00	0.00	0.00	90.55	0.00
131	4,611	4,612	**15.56**	104.0	3.00	84.28	7.12	0.00	0.00	0.00	91.40	0.00
132	4,996	4,996	**14.50**	104.0	3.00	84.97	7.49	0.00	0.00	0.00	92.46	0.00
133	5,052	5,053	**14.35**	104.0	3.00	85.07	7.54	0.00	0.00	0.00	92.62	0.00
134	7,145	7,146	**9.57**	104.0	3.00	88.08	9.31	0.00	0.00	0.00	97.39	0.00
141	6,385	6,387	**11.14**	104.0	3.00	87.11	8.71	0.00	0.00	0.00	95.82	0.00
142	4,289	4,292	**16.51**	104.0	3.00	83.65	6.80	0.00	0.00	0.00	90.45	0.00
143	6,636	6,637	**10.61**	104.0	3.00	87.44	8.91	0.00	0.00	0.00	96.35	0.00
144	3,826	3,828	**18.00**	104.0	3.00	82.66	6.31	0.00	0.00	0.00	88.96	0.00
145	5,470	5,471	**13.27**	104.0	3.00	85.76	7.93	0.00	0.00	0.00	93.69	0.00
146	5,386	5,387	**13.48**	104.0	3.00	85.63	7.85	0.00	0.00	0.00	93.48	0.00
Sum	33.26											

Noise sensitive area: H37 H37

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	11,340	11,340	**2.87**	104.0	3.00	92.09	12.00	0.00	0.00	0.00	104.10	0.00
2	11,434	11,435	**2.74**	104.0	3.00	92.16	12.06	0.00	0.00	0.00	104.22	0.00
3	11,048	11,049	**3.25**	104.0	3.00	91.87	11.84	0.00	0.00	0.00	103.71	0.00
4	10,701	10,701	**3.73**	104.0	3.00	91.59	11.65	0.00	0.00	0.00	103.23	0.00
5	10,173	10,173	**4.48**	104.0	3.00	91.15	11.34	0.00	0.00	0.00	102.49	0.00
6	10,493	10,493	**4.02**	104.0	3.00	91.42	11.53	0.00	0.00	0.00	102.94	0.00
7	8,322	8,323	**7.40**	104.0	3.00	89.41	10.16	0.00	0.00	0.00	99.56	0.00
8	11,887	11,887	**2.16**	104.0	3.00	92.50	12.30	0.00	0.00	0.00	104.80	0.00
9	10,813	10,814	**3.57**	104.0	3.00	91.68	11.71	0.00	0.00	0.00	103.39	0.00
10	10,385	10,386	**4.17**	104.0	3.00	91.33	11.46	0.00	0.00	0.00	102.79	0.00
11	11,333	11,333	**2.87**	104.0	3.00	92.09	12.00	0.00	0.00	0.00	104.09	0.00
12	11,213	11,214	**3.03**	104.0	3.00	92.00	11.93	0.00	0.00	0.00	103.93	0.00
13	10,757	10,757	**3.65**	104.0	3.00	91.63	11.68	0.00	0.00	0.00	103.31	0.00
14	10,332	10,333	**4.25**	104.0	3.00	91.28	11.43	0.00	0.00	0.00	102.72	0.00
15	9,742	9,743	**5.11**	104.0	3.00	90.77	11.08	0.00	0.00	0.00	101.85	0.00
16	9,594	9,595	**5.34**	104.0	3.00	90.64	10.99	0.00	0.00	0.00	101.63	0.00
17	11,514	11,515	**2.64**	104.0	3.00	92.23	12.10	0.00	0.00	0.00	104.32	0.00
18	11,526	11,527	**2.62**	104.0	3.00	92.23	12.11	0.00	0.00	0.00	104.34	0.00
19	10,434	10,434	**4.10**	104.0	3.00	91.37	11.49	0.00	0.00	0.00	102.86	0.00
20	9,423	9,424	**5.60**	104.0	3.00	90.48	10.88	0.00	0.00	0.00	101.36	0.00
21	9,920	9,920	**4.85**	104.0	3.00	90.93	11.19	0.00	0.00	0.00	102.12	0.00
22	9,922	9,922	**4.84**	104.0	3.00	90.93	11.19	0.00	0.00	0.00	102.12	0.00
23	9,690	9,690	**5.19**	104.0	3.00	90.73	11.05	0.00	0.00	0.00	101.77	0.00
24	10,087	10,088	**4.60**	104.0	3.00	91.08	11.29	0.00	0.00	0.00	102.36	0.00
25	7,609	7,609	**8.68**	104.0	3.00	88.63	9.65	0.00	0.00	0.00	98.28	0.00
26	9,061	9,061	**6.17**	104.0	3.00	90.14	10.65	0.00	0.00	0.00	100.79	0.00
27	7,508	7,509	**8.87**	104.0	3.00	88.51	9.58	0.00	0.00	0.00	98.09	0.00
28	7,297	7,298	**9.27**	104.0	3.00	88.26	9.42	0.00	0.00	0.00	97.69	0.00
29	9,111	9,111	**6.09**	104.0	3.00	90.19	10.68	0.00	0.00	0.00	100.87	0.00
30	9,376	9,376	**5.67**	104.0	3.00	90.44	10.85	0.00	0.00	0.00	101.29	0.00
31	10,445	10,445	**4.09**	104.0	3.00	91.38	11.50	0.00	0.00	0.00	102.88	0.00
32	7,866	7,866	**8.21**	104.0	3.00	88.91	9.84	0.00	0.00	0.00	98.75	0.00
33	8,988	8,988	**6.29**	104.0	3.00	90.07	10.60	0.00	0.00	0.00	100.67	0.00
34	8,084	8,085	**7.82**	104.0	3.00	89.15	9.99	0.00	0.00	0.00	99.15	0.00
35	8,562	8,563	**6.99**	104.0	3.00	89.65	10.32	0.00	0.00	0.00	99.97	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	8,815	8,816	**6.57**	104.0	3.00	89.91	10.49	0.00	0.00	0.00	100.39	0.00
37	7,838	7,839	**8.26**	104.0	3.00	88.88	9.82	0.00	0.00	0.00	98.70	0.00
38	7,459	7,460	**8.96**	104.0	3.00	88.45	9.54	0.00	0.00	0.00	98.00	0.00
39	6,747	6,748	**10.38**	104.0	3.00	87.58	9.00	0.00	0.00	0.00	96.58	0.00
40	6,103	6,104	**11.77**	104.0	3.00	86.71	8.48	0.00	0.00	0.00	95.19	0.00
41	6,480	6,481	**10.94**	104.0	3.00	87.23	8.79	0.00	0.00	0.00	96.02	0.00
43	7,288	7,289	**9.29**	104.0	3.00	88.25	9.42	0.00	0.00	0.00	97.67	0.00
44	6,058	6,059	**11.87**	104.0	3.00	86.65	8.44	0.00	0.00	0.00	95.09	0.00
45	5,914	5,915	**12.21**	104.0	3.00	86.44	8.32	0.00	0.00	0.00	94.76	0.00
46	6,423	6,424	**11.07**	104.0	3.00	87.16	8.74	0.00	0.00	0.00	95.90	0.00
48	7,248	7,249	**9.37**	104.0	3.00	88.21	9.39	0.00	0.00	0.00	97.59	0.00
49	8,254	8,254	**7.52**	104.0	3.00	89.33	10.11	0.00	0.00	0.00	99.44	0.00
50	9,453	9,453	**5.55**	104.0	3.00	90.51	10.90	0.00	0.00	0.00	101.41	0.00
51	8,428	8,429	**7.22**	104.0	3.00	89.52	10.23	0.00	0.00	0.00	99.74	0.00
52	8,578	8,578	**6.96**	104.0	3.00	89.67	10.33	0.00	0.00	0.00	100.00	0.00
53	8,137	8,137	**7.72**	104.0	3.00	89.21	10.03	0.00	0.00	0.00	99.24	0.00
55	7,703	7,703	**8.51**	104.0	3.00	88.73	9.72	0.00	0.00	0.00	98.45	0.00
56	7,665	7,665	**8.58**	104.0	3.00	88.69	9.69	0.00	0.00	0.00	98.38	0.00
57	6,911	6,911	**10.04**	104.0	3.00	87.79	9.13	0.00	0.00	0.00	96.92	0.00
58	8,293	8,293	**7.45**	104.0	3.00	89.37	10.14	0.00	0.00	0.00	99.51	0.00
59	7,630	7,631	**8.64**	104.0	3.00	88.65	9.67	0.00	0.00	0.00	98.32	0.00
60	7,257	7,257	**9.35**	104.0	3.00	88.22	9.39	0.00	0.00	0.00	97.61	0.00
61	7,302	7,302	**9.27**	104.0	3.00	88.27	9.43	0.00	0.00	0.00	97.70	0.00
62	5,253	5,254	**13.82**	104.0	3.00	85.41	7.73	0.00	0.00	0.00	93.14	0.00
63	4,284	4,285	**16.53**	104.0	3.00	83.64	6.79	0.00	0.00	0.00	90.43	0.00
64	4,227	4,228	**16.71**	104.0	3.00	83.52	6.73	0.00	0.00	0.00	90.25	0.00
65	4,700	4,700	**15.31**	104.0	3.00	84.44	7.21	0.00	0.00	0.00	91.65	0.00
66	6,297	6,298	**11.34**	104.0	3.00	86.98	8.64	0.00	0.00	0.00	95.62	0.00
67	5,045	5,046	**14.37**	104.0	3.00	85.06	7.54	0.00	0.00	0.00	92.60	0.00
68	5,276	5,277	**13.76**	104.0	3.00	85.45	7.75	0.00	0.00	0.00	93.20	0.00
69	4,462	4,462	**16.00**	104.0	3.00	83.99	6.97	0.00	0.00	0.00	90.96	0.00
70	9,857	9,857	**4.94**	104.0	3.00	90.87	11.15	0.00	0.00	0.00	102.02	0.00
71	10,184	10,185	**4.46**	104.0	3.00	91.16	11.34	0.00	0.00	0.00	102.50	0.00
72	10,948	10,948	**3.39**	104.0	3.00	91.79	11.79	0.00	0.00	0.00	103.57	0.00
73	10,242	10,242	**4.38**	104.0	3.00	91.21	11.38	0.00	0.00	0.00	102.59	0.00
74	9,166	9,167	**6.00**	104.0	3.00	90.24	10.72	0.00	0.00	0.00	100.96	0.00
75	8,829	8,830	**6.55**	104.0	3.00	89.92	10.50	0.00	0.00	0.00	100.42	0.00
76	6,585	6,585	**10.72**	104.0	3.00	87.37	8.87	0.00	0.00	0.00	96.24	0.00
77	7,501	7,501	**8.89**	104.0	3.00	88.50	9.57	0.00	0.00	0.00	98.08	0.00
78	9,018	9,018	**6.24**	104.0	3.00	90.10	10.62	0.00	0.00	0.00	100.72	0.00
80	7,146	7,147	**9.57**	104.0	3.00	88.08	9.31	0.00	0.00	0.00	97.39	0.00
81	10,616	10,616	**3.85**	104.0	3.00	91.52	11.60	0.00	0.00	0.00	103.12	0.00
82	8,682	8,682	**6.79**	104.0	3.00	89.77	10.40	0.00	0.00	0.00	100.17	0.00
83	4,562	4,563	**15.71**	104.0	3.00	84.19	7.07	0.00	0.00	0.00	91.26	0.00
85	9,042	9,042	**6.20**	104.0	3.00	90.13	10.64	0.00	0.00	0.00	100.76	0.00
86	7,124	7,125	**9.61**	104.0	3.00	88.06	9.29	0.00	0.00	0.00	97.35	0.00
87	4,889	4,890	**14.79**	104.0	3.00	84.79	7.39	0.00	0.00	0.00	92.18	0.00
89	4,190	4,190	**16.82**	104.0	3.00	83.45	6.69	0.00	0.00	0.00	90.14	0.00
90	6,036	6,037	**11.93**	104.0	3.00	86.62	8.42	0.00	0.00	0.00	95.04	0.00
91	4,819	4,819	**14.98**	104.0	3.00	84.66	7.32	0.00	0.00	0.00	91.98	0.00
92	3,669	3,670	**18.54**	104.0	3.00	82.29	6.13	0.00	0.00	0.00	88.42	0.00
94	10,327	10,328	**4.25**	104.0	3.00	91.28	11.43	0.00	0.00	0.00	102.71	0.00
95	11,485	11,486	**2.68**	104.0	3.00	92.20	12.08	0.00	0.00	0.00	104.29	0.00
97	8,982	8,983	**6.30**	104.0	3.00	90.07	10.60	0.00	0.00	0.00	100.67	0.00
98	10,762	10,762	**3.64**	104.0	3.00	91.64	11.68	0.00	0.00	0.00	103.32	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	11,498	11,498	**2.66**	104.0	3.00	92.21	12.09	0.00	0.00	0.00	104.30	0.00
100	6,072	6,072	**11.84**	104.0	3.00	86.67	8.45	0.00	0.00	0.00	95.12	0.00
101	10,965	10,966	**3.37**	104.0	3.00	91.80	11.80	0.00	0.00	0.00	103.60	0.00
102	6,355	6,356	**11.21**	104.0	3.00	87.06	8.69	0.00	0.00	0.00	95.75	0.00
103	11,779	11,779	**2.30**	104.0	3.00	92.42	12.24	0.00	0.00	0.00	104.66	0.00
104	6,897	6,898	**10.07**	104.0	3.00	87.77	9.12	0.00	0.00	0.00	96.89	0.00
107	9,755	9,756	**5.09**	104.0	3.00	90.79	11.09	0.00	0.00	0.00	101.87	0.00
108	12,169	12,170	**1.81**	104.0	3.00	92.71	12.45	0.00	0.00	0.00	105.15	0.00
109	7,573	7,573	**8.75**	104.0	3.00	88.59	9.63	0.00	0.00	0.00	98.21	0.00
110	6,949	6,949	**9.97**	104.0	3.00	87.84	9.16	0.00	0.00	0.00	97.00	0.00
111	6,712	6,713	**10.45**	104.0	3.00	87.54	8.97	0.00	0.00	0.00	96.51	0.00
113	10,060	10,061	**4.64**	104.0	3.00	91.05	11.27	0.00	0.00	0.00	102.32	0.00
114	8,938	8,938	**6.37**	104.0	3.00	90.02	10.57	0.00	0.00	0.00	100.59	0.00
115	11,705	11,706	**2.39**	104.0	3.00	92.37	12.20	0.00	0.00	0.00	104.57	0.00
116	7,209	7,210	**9.45**	104.0	3.00	88.16	9.36	0.00	0.00	0.00	97.52	0.00
118	7,609	7,609	**8.68**	104.0	3.00	88.63	9.65	0.00	0.00	0.00	98.28	0.00
119	9,654	9,654	**5.24**	104.0	3.00	90.69	11.02	0.00	0.00	0.00	101.72	0.00
120	11,245	11,246	**2.99**	104.0	3.00	92.02	11.95	0.00	0.00	0.00	103.97	0.00
121	9,072	9,073	**6.15**	104.0	3.00	90.15	10.66	0.00	0.00	0.00	100.81	0.00
125	4,416	4,417	**16.13**	104.0	3.00	83.90	6.92	0.00	0.00	0.00	90.83	0.00
126	5,322	5,323	**13.64**	104.0	3.00	85.52	7.80	0.00	0.00	0.00	93.32	0.00
127	5,316	5,316	**13.66**	104.0	3.00	85.51	7.79	0.00	0.00	0.00	93.30	0.00
128	5,461	5,462	**13.29**	104.0	3.00	85.75	7.92	0.00	0.00	0.00	93.67	0.00
129	7,543	7,543	**8.81**	104.0	3.00	88.55	9.60	0.00	0.00	0.00	98.16	0.00
130	7,097	7,097	**9.67**	104.0	3.00	88.02	9.27	0.00	0.00	0.00	97.29	0.00
131	7,393	7,394	**9.09**	104.0	3.00	88.38	9.49	0.00	0.00	0.00	97.87	0.00
132	7,778	7,779	**8.37**	104.0	3.00	88.82	9.78	0.00	0.00	0.00	98.59	0.00
133	6,868	6,868	**10.13**	104.0	3.00	87.74	9.10	0.00	0.00	0.00	96.83	0.00
134	9,904	9,905	**4.87**	104.0	3.00	90.92	11.18	0.00	0.00	0.00	102.09	0.00
141	8,995	8,996	**6.27**	104.0	3.00	90.08	10.61	0.00	0.00	0.00	100.69	0.00
142	6,532	6,534	**10.83**	104.0	3.00	87.30	8.83	0.00	0.00	0.00	96.13	0.00
143	9,303	9,304	**5.79**	104.0	3.00	90.37	10.80	0.00	0.00	0.00	101.18	0.00
144	5,681	5,682	**12.76**	104.0	3.00	86.09	8.12	0.00	0.00	0.00	94.20	0.00
145	5,975	5,976	**12.06**	104.0	3.00	86.53	8.37	0.00	0.00	0.00	94.90	0.00
146	6,045	6,045	**11.91**	104.0	3.00	86.63	8.43	0.00	0.00	0.00	95.06	0.00

Sum 30.90

Noise sensitive area: H38 H38

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	14,288	14,288	**-0.62**	104.0	3.00	94.10	13.48	0.00	0.00	0.00	107.58	0.00
2	14,288	14,288	**-0.62**	104.0	3.00	94.10	13.48	0.00	0.00	0.00	107.58	0.00
3	13,817	13,817	**-0.11**	104.0	3.00	93.81	13.26	0.00	0.00	0.00	107.07	0.00
4	13,112	13,112	**0.68**	104.0	3.00	93.35	12.92	0.00	0.00	0.00	106.28	0.00
5	12,753	12,753	**1.10**	104.0	3.00	93.11	12.75	0.00	0.00	0.00	105.86	0.00
6	13,237	13,238	**0.54**	104.0	3.00	93.44	12.99	0.00	0.00	0.00	106.42	0.00
7	11,103	11,103	**3.18**	104.0	3.00	91.91	11.87	0.00	0.00	0.00	103.78	0.00
8	14,891	14,891	**-1.26**	104.0	3.00	94.46	13.76	0.00	0.00	0.00	108.22	0.00
9	13,757	13,757	**-0.05**	104.0	3.00	93.77	13.24	0.00	0.00	0.00	107.01	0.00
10	13,424	13,425	**0.33**	104.0	3.00	93.56	13.08	0.00	0.00	0.00	106.63	0.00
11	14,594	14,595	**-0.95**	104.0	3.00	94.28	13.63	0.00	0.00	0.00	107.91	0.00
12	14,445	14,446	**-0.79**	104.0	3.00	94.19	13.56	0.00	0.00	0.00	107.75	0.00
13	13,967	13,968	**-0.28**	104.0	3.00	93.90	13.34	0.00	0.00	0.00	107.24	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	13,536	13,536	**0.20**	104.0	3.00	93.63	13.13	0.00	0.00	0.00	106.76	0.00
15	12,845	12,846	**0.99**	104.0	3.00	93.18	12.79	0.00	0.00	0.00	105.97	0.00
16	12,620	12,620	**1.26**	104.0	3.00	93.02	12.68	0.00	0.00	0.00	105.70	0.00
17	14,797	14,797	**-1.16**	104.0	3.00	94.40	13.72	0.00	0.00	0.00	108.12	0.00
18	14,858	14,859	**-1.22**	104.0	3.00	94.44	13.74	0.00	0.00	0.00	108.18	0.00
19	13,698	13,699	**0.02**	104.0	3.00	93.73	13.21	0.00	0.00	0.00	106.94	0.00
20	12,614	12,614	**1.27**	104.0	3.00	93.02	12.68	0.00	0.00	0.00	105.69	0.00
21	12,364	12,364	**1.57**	104.0	3.00	92.84	12.55	0.00	0.00	0.00	105.39	0.00
22	12,139	12,139	**1.85**	104.0	3.00	92.68	12.43	0.00	0.00	0.00	105.12	0.00
23	11,829	11,829	**2.24**	104.0	3.00	92.46	12.27	0.00	0.00	0.00	104.73	0.00
24	12,349	12,349	**1.59**	104.0	3.00	92.83	12.54	0.00	0.00	0.00	105.37	0.00
25	9,554	9,554	**5.40**	104.0	3.00	90.60	10.96	0.00	0.00	0.00	101.56	0.00
26	11,653	11,653	**2.46**	104.0	3.00	92.33	12.17	0.00	0.00	0.00	104.50	0.00
27	9,763	9,763	**5.08**	104.0	3.00	90.79	11.09	0.00	0.00	0.00	101.88	0.00
28	9,891	9,892	**4.89**	104.0	3.00	90.91	11.17	0.00	0.00	0.00	102.07	0.00
29	11,343	11,343	**2.86**	104.0	3.00	92.09	12.01	0.00	0.00	0.00	104.10	0.00
30	11,427	11,427	**2.75**	104.0	3.00	92.16	12.05	0.00	0.00	0.00	104.21	0.00
31	12,470	12,470	**1.44**	104.0	3.00	92.92	12.60	0.00	0.00	0.00	105.52	0.00
32	9,632	9,632	**5.28**	104.0	3.00	90.67	11.01	0.00	0.00	0.00	101.68	0.00
33	10,904	10,904	**3.45**	104.0	3.00	91.75	11.76	0.00	0.00	0.00	103.51	0.00
34	10,808	10,808	**3.58**	104.0	3.00	91.68	11.71	0.00	0.00	0.00	103.38	0.00
35	11,384	11,384	**2.81**	104.0	3.00	92.13	12.03	0.00	0.00	0.00	104.15	0.00
36	11,674	11,675	**2.43**	104.0	3.00	92.34	12.19	0.00	0.00	0.00	104.53	0.00
37	10,511	10,511	**3.99**	104.0	3.00	91.43	11.54	0.00	0.00	0.00	102.97	0.00
38	9,561	9,561	**5.39**	104.0	3.00	90.61	10.96	0.00	0.00	0.00	101.57	0.00
39	9,103	9,103	**6.10**	104.0	3.00	90.18	10.68	0.00	0.00	0.00	100.86	0.00
40	9,163	9,163	**6.01**	104.0	3.00	90.24	10.71	0.00	0.00	0.00	100.95	0.00
41	8,937	8,938	**6.37**	104.0	3.00	90.02	10.57	0.00	0.00	0.00	100.59	0.00
43	9,962	9,963	**4.78**	104.0	3.00	90.97	11.21	0.00	0.00	0.00	102.18	0.00
44	8,629	8,630	**6.88**	104.0	3.00	89.72	10.36	0.00	0.00	0.00	100.08	0.00
45	8,390	8,391	**7.28**	104.0	3.00	89.48	10.20	0.00	0.00	0.00	99.68	0.00
46	9,313	9,314	**5.77**	104.0	3.00	90.38	10.81	0.00	0.00	0.00	101.19	0.00
48	8,872	8,872	**6.48**	104.0	3.00	89.96	10.53	0.00	0.00	0.00	100.49	0.00
49	9,599	9,599	**5.33**	104.0	3.00	90.64	10.99	0.00	0.00	0.00	101.63	0.00
50	12,214	12,215	**1.75**	104.0	3.00	92.74	12.47	0.00	0.00	0.00	105.21	0.00
51	9,931	9,931	**4.83**	104.0	3.00	90.94	11.19	0.00	0.00	0.00	102.13	0.00
52	10,173	10,173	**4.48**	104.0	3.00	91.15	11.34	0.00	0.00	0.00	102.49	0.00
53	9,367	9,367	**5.69**	104.0	3.00	90.43	10.84	0.00	0.00	0.00	101.28	0.00
55	8,359	8,359	**7.34**	104.0	3.00	89.44	10.18	0.00	0.00	0.00	99.63	0.00
56	8,185	8,185	**7.64**	104.0	3.00	89.26	10.06	0.00	0.00	0.00	99.32	0.00
57	7,590	7,591	**8.72**	104.0	3.00	88.61	9.64	0.00	0.00	0.00	98.24	0.00
58	10,241	10,241	**4.38**	104.0	3.00	91.21	11.38	0.00	0.00	0.00	102.58	0.00
59	8,009	8,009	**7.95**	104.0	3.00	89.07	9.94	0.00	0.00	0.00	99.01	0.00
60	6,967	6,967	**9.93**	104.0	3.00	87.86	9.17	0.00	0.00	0.00	97.03	0.00
61	6,822	6,823	**10.22**	104.0	3.00	87.68	9.06	0.00	0.00	0.00	96.74	0.00
62	5,183	5,183	**14.00**	104.0	3.00	85.29	7.67	0.00	0.00	0.00	92.96	0.00
63	4,093	4,093	**17.13**	104.0	3.00	83.24	6.59	0.00	0.00	0.00	89.83	0.00
64	2,866	2,867	**21.63**	104.0	3.00	80.15	5.18	0.00	0.00	0.00	85.33	0.00
65	2,755	2,756	**22.12**	104.0	3.00	79.80	5.04	0.00	0.00	0.00	84.85	0.00
66	9,421	9,421	**5.60**	104.0	3.00	90.48	10.88	0.00	0.00	0.00	101.36	0.00
67	3,652	3,653	**18.60**	104.0	3.00	82.25	6.11	0.00	0.00	0.00	88.36	0.00
68	3,444	3,445	**19.34**	104.0	3.00	81.74	5.88	0.00	0.00	0.00	87.62	0.00
69	2,583	2,584	**22.90**	104.0	3.00	79.25	4.82	0.00	0.00	0.00	84.07	0.00
70	13,227	13,227	**0.55**	104.0	3.00	93.43	12.98	0.00	0.00	0.00	106.41	0.00
71	13,181	13,182	**0.60**	104.0	3.00	93.40	12.96	0.00	0.00	0.00	106.36	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	13,425	13,425	**0.33**	104.0	3.00	93.56	13.08	0.00	0.00	0.00	106.64	0.00
73	12,941	12,941	**0.88**	104.0	3.00	93.24	12.84	0.00	0.00	0.00	106.08	0.00
74	11,899	11,899	**2.15**	104.0	3.00	92.51	12.31	0.00	0.00	0.00	104.82	0.00
75	11,249	11,250	**2.99**	104.0	3.00	92.02	11.95	0.00	0.00	0.00	103.98	0.00
76	7,692	7,692	**8.53**	104.0	3.00	88.72	9.71	0.00	0.00	0.00	98.43	0.00
77	8,706	8,706	**6.75**	104.0	3.00	89.80	10.42	0.00	0.00	0.00	100.21	0.00
78	12,203	12,204	**1.77**	104.0	3.00	92.73	12.46	0.00	0.00	0.00	105.19	0.00
80	7,068	7,069	**9.73**	104.0	3.00	87.99	9.25	0.00	0.00	0.00	97.24	0.00
81	13,913	13,913	**-0.22**	104.0	3.00	93.87	13.31	0.00	0.00	0.00	107.18	0.00
82	10,444	10,444	**4.09**	104.0	3.00	91.38	11.50	0.00	0.00	0.00	102.87	0.00
83	3,789	3,789	**18.13**	104.0	3.00	82.57	6.26	0.00	0.00	0.00	88.83	0.00
85	10,197	10,197	**4.44**	104.0	3.00	91.17	11.35	0.00	0.00	0.00	102.52	0.00
86	7,199	7,199	**9.47**	104.0	3.00	88.15	9.35	0.00	0.00	0.00	97.49	0.00
87	2,755	2,756	**22.11**	104.0	3.00	79.81	5.04	0.00	0.00	0.00	84.85	0.00
89	3,280	3,281	**19.96**	104.0	3.00	81.32	5.69	0.00	0.00	0.00	87.01	0.00
90	6,634	6,635	**10.61**	104.0	3.00	87.44	8.91	0.00	0.00	0.00	96.35	0.00
91	4,728	4,728	**15.23**	104.0	3.00	84.49	7.23	0.00	0.00	0.00	91.73	0.00
92	2,044	2,045	**25.67**	104.0	3.00	77.22	4.08	0.00	0.00	0.00	81.29	0.00
94	13,442	13,443	**0.31**	104.0	3.00	93.57	13.09	0.00	0.00	0.00	106.66	0.00
95	14,629	14,630	**-0.98**	104.0	3.00	94.30	13.64	0.00	0.00	0.00	107.95	0.00
97	12,039	12,040	**1.97**	104.0	3.00	92.61	12.38	0.00	0.00	0.00	104.99	0.00
98	13,888	13,888	**-0.19**	104.0	3.00	93.85	13.30	0.00	0.00	0.00	107.15	0.00
99	14,181	14,181	**-0.51**	104.0	3.00	94.03	13.44	0.00	0.00	0.00	107.47	0.00
100	8,378	8,378	**7.30**	104.0	3.00	89.46	10.19	0.00	0.00	0.00	99.66	0.00
101	14,295	14,295	**-0.63**	104.0	3.00	94.10	13.49	0.00	0.00	0.00	107.59	0.00
102	8,962	8,963	**6.33**	104.0	3.00	90.05	10.58	0.00	0.00	0.00	100.63	0.00
103	15,129	15,130	**-1.50**	104.0	3.00	94.60	13.86	0.00	0.00	0.00	108.46	0.00
104	9,421	9,422	**5.60**	104.0	3.00	90.48	10.88	0.00	0.00	0.00	101.36	0.00
107	12,994	12,994	**0.82**	104.0	3.00	93.28	12.87	0.00	0.00	0.00	106.14	0.00
108	14,730	14,730	**-1.09**	104.0	3.00	94.36	13.69	0.00	0.00	0.00	108.05	0.00
109	7,810	7,810	**8.31**	104.0	3.00	88.85	9.80	0.00	0.00	0.00	98.65	0.00
110	8,469	8,470	**7.15**	104.0	3.00	89.56	10.26	0.00	0.00	0.00	99.81	0.00
111	7,991	7,991	**7.98**	104.0	3.00	89.05	9.93	0.00	0.00	0.00	98.98	0.00
113	13,317	13,317	**0.45**	104.0	3.00	93.49	13.02	0.00	0.00	0.00	106.51	0.00
114	9,994	9,994	**4.74**	104.0	3.00	90.99	11.23	0.00	0.00	0.00	102.22	0.00
115	14,680	14,680	**-1.04**	104.0	3.00	94.33	13.66	0.00	0.00	0.00	108.00	0.00
116	10,078	10,079	**4.61**	104.0	3.00	91.07	11.28	0.00	0.00	0.00	102.35	0.00
118	7,607	7,607	**8.69**	104.0	3.00	88.62	9.65	0.00	0.00	0.00	98.28	0.00
119	12,516	12,517	**1.39**	104.0	3.00	92.95	12.63	0.00	0.00	0.00	105.58	0.00
120	14,618	14,618	**-0.97**	104.0	3.00	94.30	13.64	0.00	0.00	0.00	107.93	0.00
121	11,978	11,979	**2.05**	104.0	3.00	92.57	12.35	0.00	0.00	0.00	104.92	0.00
125	3,912	3,913	**17.72**	104.0	3.00	82.85	6.40	0.00	0.00	0.00	89.25	0.00
126	7,177	7,178	**9.51**	104.0	3.00	88.12	9.33	0.00	0.00	0.00	97.45	0.00
127	7,043	7,044	**9.78**	104.0	3.00	87.96	9.23	0.00	0.00	0.00	97.19	0.00
128	7,032	7,033	**9.80**	104.0	3.00	87.94	9.22	0.00	0.00	0.00	97.16	0.00
129	10,885	10,885	**3.48**	104.0	3.00	91.74	11.75	0.00	0.00	0.00	103.49	0.00
130	10,538	10,538	**3.96**	104.0	3.00	91.46	11.55	0.00	0.00	0.00	103.01	0.00
131	10,890	10,890	**3.47**	104.0	3.00	91.74	11.75	0.00	0.00	0.00	103.49	0.00
132	11,295	11,295	**2.93**	104.0	3.00	92.06	11.98	0.00	0.00	0.00	104.04	0.00
133	9,022	9,023	**6.23**	104.0	3.00	90.11	10.62	0.00	0.00	0.00	100.73	0.00
134	13,229	13,229	**0.55**	104.0	3.00	93.43	12.98	0.00	0.00	0.00	106.41	0.00
141	11,997	11,998	**2.02**	104.0	3.00	92.58	12.36	0.00	0.00	0.00	104.94	0.00
142	9,208	9,209	**5.93**	104.0	3.00	90.28	10.74	0.00	0.00	0.00	101.03	0.00
143	12,403	12,404	**1.52**	104.0	3.00	92.87	12.57	0.00	0.00	0.00	105.44	0.00
144	8,080	8,081	**7.82**	104.0	3.00	89.15	9.99	0.00	0.00	0.00	99.14	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	6,848	6,848	**10.17**	104.0	3.00	87.71	9.08	0.00	0.00	0.00	96.79	0.00
146	7,078	7,079	**9.71**	104.0	3.00	88.00	9.26	0.00	0.00	0.00	97.26	0.00
Sum	32.74											

Noise sensitive area: H39 H39

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	16,815	16,816	**-3.13**	104.0	3.00	95.51	14.58	0.00	0.00	0.00	110.09	0.00
2	16,803	16,804	**-3.12**	104.0	3.00	95.51	14.57	0.00	0.00	0.00	110.08	0.00
3	16,321	16,322	**-2.67**	104.0	3.00	95.26	14.38	0.00	0.00	0.00	109.63	0.00
4	15,555	15,555	**-1.93**	104.0	3.00	94.84	14.05	0.00	0.00	0.00	108.89	0.00
5	15,231	15,231	**-1.60**	104.0	3.00	94.65	13.91	0.00	0.00	0.00	108.56	0.00
6	15,740	15,741	**-2.11**	104.0	3.00	94.94	14.13	0.00	0.00	0.00	109.07	0.00
7	13,621	13,622	**0.11**	104.0	3.00	93.68	13.17	0.00	0.00	0.00	106.86	0.00
8	17,424	17,424	**-3.69**	104.0	3.00	95.82	14.82	0.00	0.00	0.00	110.65	0.00
9	16,285	16,286	**-2.64**	104.0	3.00	95.24	14.36	0.00	0.00	0.00	109.60	0.00
10	15,963	15,963	**-2.33**	104.0	3.00	95.06	14.23	0.00	0.00	0.00	109.29	0.00
11	17,145	17,146	**-3.43**	104.0	3.00	95.68	14.71	0.00	0.00	0.00	110.40	0.00
12	16,995	16,996	**-3.30**	104.0	3.00	95.61	14.65	0.00	0.00	0.00	110.26	0.00
13	16,517	16,518	**-2.85**	104.0	3.00	95.36	14.46	0.00	0.00	0.00	109.82	0.00
14	16,085	16,086	**-2.44**	104.0	3.00	95.13	14.28	0.00	0.00	0.00	109.41	0.00
15	15,390	15,391	**-1.76**	104.0	3.00	94.75	13.98	0.00	0.00	0.00	108.72	0.00
16	15,159	15,160	**-1.53**	104.0	3.00	94.61	13.88	0.00	0.00	0.00	108.49	0.00
17	17,348	17,349	**-3.62**	104.0	3.00	95.79	14.79	0.00	0.00	0.00	110.58	0.00
18	17,410	17,411	**-3.67**	104.0	3.00	95.82	14.82	0.00	0.00	0.00	110.64	0.00
19	16,250	16,251	**-2.60**	104.0	3.00	95.22	14.35	0.00	0.00	0.00	109.56	0.00
20	15,163	15,164	**-1.53**	104.0	3.00	94.62	13.88	0.00	0.00	0.00	108.50	0.00
21	14,820	14,820	**-1.18**	104.0	3.00	94.42	13.73	0.00	0.00	0.00	108.14	0.00
22	14,550	14,550	**-0.90**	104.0	3.00	94.26	13.60	0.00	0.00	0.00	107.86	0.00
23	14,225	14,225	**-0.56**	104.0	3.00	94.06	13.46	0.00	0.00	0.00	107.52	0.00
24	14,768	14,768	**-1.13**	104.0	3.00	94.39	13.70	0.00	0.00	0.00	108.09	0.00
25	11,942	11,943	**2.09**	104.0	3.00	92.54	12.33	0.00	0.00	0.00	104.87	0.00
26	14,141	14,141	**-0.46**	104.0	3.00	94.01	13.42	0.00	0.00	0.00	107.43	0.00
27	12,211	12,211	**1.76**	104.0	3.00	92.74	12.47	0.00	0.00	0.00	105.20	0.00
28	12,394	12,394	**1.53**	104.0	3.00	92.86	12.56	0.00	0.00	0.00	105.43	0.00
29	13,766	13,766	**-0.05**	104.0	3.00	93.78	13.24	0.00	0.00	0.00	107.02	0.00
30	13,808	13,808	**-0.10**	104.0	3.00	93.80	13.26	0.00	0.00	0.00	107.06	0.00
31	14,831	14,831	**-1.19**	104.0	3.00	94.42	13.73	0.00	0.00	0.00	108.15	0.00
32	11,977	11,977	**2.05**	104.0	3.00	92.57	12.35	0.00	0.00	0.00	104.91	0.00
33	13,261	13,261	**0.51**	104.0	3.00	93.45	13.00	0.00	0.00	0.00	106.45	0.00
34	13,321	13,321	**0.44**	104.0	3.00	93.49	13.03	0.00	0.00	0.00	106.52	0.00
35	13,906	13,907	**-0.21**	104.0	3.00	93.86	13.31	0.00	0.00	0.00	107.17	0.00
36	14,199	14,200	**-0.53**	104.0	3.00	94.05	13.44	0.00	0.00	0.00	107.49	0.00
37	13,019	13,020	**0.79**	104.0	3.00	93.29	12.88	0.00	0.00	0.00	106.17	0.00
38	11,982	11,982	**2.04**	104.0	3.00	92.57	12.35	0.00	0.00	0.00	104.92	0.00
39	11,578	11,578	**2.56**	104.0	3.00	92.27	12.13	0.00	0.00	0.00	104.41	0.00
40	11,712	11,712	**2.38**	104.0	3.00	92.37	12.21	0.00	0.00	0.00	104.58	0.00
41	11,430	11,430	**2.75**	104.0	3.00	92.16	12.05	0.00	0.00	0.00	104.21	0.00
43	12,474	12,475	**1.44**	104.0	3.00	92.92	12.60	0.00	0.00	0.00	105.53	0.00
44	11,140	11,140	**3.13**	104.0	3.00	91.94	11.89	0.00	0.00	0.00	103.83	0.00
45	10,892	10,892	**3.47**	104.0	3.00	91.74	11.75	0.00	0.00	0.00	103.50	0.00
46	11,851	11,852	**2.21**	104.0	3.00	92.48	12.28	0.00	0.00	0.00	104.76	0.00
48	11,201	11,201	**3.05**	104.0	3.00	91.99	11.93	0.00	0.00	0.00	103.91	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	11,831	11,832	**2.23**	104.0	3.00	92.46	12.27	0.00	0.00	0.00	104.73	0.00
50	14,725	14,725	**-1.08**	104.0	3.00	94.36	13.68	0.00	0.00	0.00	108.05	0.00
51	12,199	12,200	**1.77**	104.0	3.00	92.73	12.46	0.00	0.00	0.00	105.19	0.00
52	12,461	12,461	**1.45**	104.0	3.00	92.91	12.60	0.00	0.00	0.00	105.51	0.00
53	11,572	11,572	**2.56**	104.0	3.00	92.27	12.13	0.00	0.00	0.00	104.40	0.00
55	10,419	10,419	**4.12**	104.0	3.00	91.36	11.48	0.00	0.00	0.00	102.84	0.00
56	10,205	10,206	**4.43**	104.0	3.00	91.18	11.36	0.00	0.00	0.00	102.53	0.00
57	9,701	9,701	**5.17**	104.0	3.00	90.74	11.05	0.00	0.00	0.00	101.79	0.00
58	12,617	12,617	**1.27**	104.0	3.00	93.02	12.68	0.00	0.00	0.00	105.70	0.00
59	9,987	9,988	**4.75**	104.0	3.00	90.99	11.23	0.00	0.00	0.00	102.22	0.00
60	8,747	8,747	**6.68**	104.0	3.00	89.84	10.44	0.00	0.00	0.00	100.28	0.00
61	8,528	8,529	**7.05**	104.0	3.00	89.62	10.30	0.00	0.00	0.00	99.91	0.00
62	7,245	7,245	**9.38**	104.0	3.00	88.20	9.38	0.00	0.00	0.00	97.58	0.00
63	6,272	6,273	**11.39**	104.0	3.00	86.95	8.62	0.00	0.00	0.00	95.57	0.00
64	4,889	4,889	**14.79**	104.0	3.00	84.79	7.39	0.00	0.00	0.00	92.18	0.00
65	4,503	4,504	**15.88**	104.0	3.00	84.07	7.01	0.00	0.00	0.00	91.09	0.00
66	11,972	11,972	**2.06**	104.0	3.00	92.56	12.34	0.00	0.00	0.00	104.91	0.00
67	5,424	5,424	**13.39**	104.0	3.00	85.69	7.89	0.00	0.00	0.00	93.57	0.00
68	5,018	5,019	**14.44**	104.0	3.00	85.01	7.51	0.00	0.00	0.00	92.52	0.00
69	4,442	4,443	**16.06**	104.0	3.00	83.95	6.95	0.00	0.00	0.00	90.90	0.00
70	15,778	15,778	**-2.15**	104.0	3.00	94.96	14.15	0.00	0.00	0.00	109.11	0.00
71	15,717	15,717	**-2.09**	104.0	3.00	94.93	14.12	0.00	0.00	0.00	109.05	0.00
72	15,879	15,880	**-2.24**	104.0	3.00	95.02	14.19	0.00	0.00	0.00	109.21	0.00
73	15,439	15,439	**-1.81**	104.0	3.00	94.77	14.00	0.00	0.00	0.00	108.77	0.00
74	14,407	14,407	**-0.75**	104.0	3.00	94.17	13.54	0.00	0.00	0.00	107.71	0.00
75	13,711	13,711	**0.01**	104.0	3.00	93.74	13.21	0.00	0.00	0.00	106.96	0.00
76	9,928	9,928	**4.83**	104.0	3.00	90.94	11.19	0.00	0.00	0.00	102.13	0.00
77	10,927	10,927	**3.42**	104.0	3.00	91.77	11.77	0.00	0.00	0.00	103.54	0.00
78	14,753	14,754	**-1.11**	104.0	3.00	94.38	13.70	0.00	0.00	0.00	108.08	0.00
80	8,932	8,932	**6.38**	104.0	3.00	90.02	10.56	0.00	0.00	0.00	100.58	0.00
81	16,464	16,465	**-2.81**	104.0	3.00	95.33	14.44	0.00	0.00	0.00	109.77	0.00
82	12,771	12,771	**1.08**	104.0	3.00	93.12	12.75	0.00	0.00	0.00	105.88	0.00
83	5,817	5,817	**12.43**	104.0	3.00	86.29	8.23	0.00	0.00	0.00	94.53	0.00
85	12,352	12,353	**1.58**	104.0	3.00	92.84	12.54	0.00	0.00	0.00	105.38	0.00
86	9,115	9,115	**6.08**	104.0	3.00	90.20	10.68	0.00	0.00	0.00	100.88	0.00
87	4,379	4,380	**16.25**	104.0	3.00	83.83	6.89	0.00	0.00	0.00	90.72	0.00
89	5,375	5,376	**13.51**	104.0	3.00	85.61	7.84	0.00	0.00	0.00	93.45	0.00
90	8,781	8,781	**6.63**	104.0	3.00	89.87	10.47	0.00	0.00	0.00	100.34	0.00
91	6,843	6,844	**10.18**	104.0	3.00	87.71	9.08	0.00	0.00	0.00	96.78	0.00
92	4,261	4,262	**16.60**	104.0	3.00	83.59	6.77	0.00	0.00	0.00	90.36	0.00
94	15,987	15,988	**-2.35**	104.0	3.00	95.08	14.24	0.00	0.00	0.00	109.31	0.00
95	17,175	17,175	**-3.46**	104.0	3.00	95.70	14.73	0.00	0.00	0.00	110.42	0.00
97	14,582	14,583	**-0.93**	104.0	3.00	94.28	13.62	0.00	0.00	0.00	107.90	0.00
98	16,433	16,433	**-2.78**	104.0	3.00	95.31	14.42	0.00	0.00	0.00	109.74	0.00
99	16,670	16,670	**-3.00**	104.0	3.00	95.44	14.52	0.00	0.00	0.00	109.96	0.00
100	10,855	10,856	**3.51**	104.0	3.00	91.71	11.73	0.00	0.00	0.00	103.45	0.00
101	16,846	16,847	**-3.16**	104.0	3.00	95.53	14.59	0.00	0.00	0.00	110.12	0.00
102	11,474	11,475	**2.69**	104.0	3.00	92.19	12.08	0.00	0.00	0.00	104.27	0.00
103	17,681	17,682	**-3.91**	104.0	3.00	95.95	14.93	0.00	0.00	0.00	110.88	0.00
104	11,918	11,918	**2.12**	104.0	3.00	92.52	12.32	0.00	0.00	0.00	104.84	0.00
107	15,545	15,545	**-1.92**	104.0	3.00	94.83	14.05	0.00	0.00	0.00	108.88	0.00
108	17,193	17,193	**-3.48**	104.0	3.00	95.71	14.73	0.00	0.00	0.00	110.44	0.00
109	9,746	9,746	**5.11**	104.0	3.00	90.78	11.08	0.00	0.00	0.00	101.86	0.00
110	10,785	10,786	**3.61**	104.0	3.00	91.66	11.69	0.00	0.00	0.00	103.35	0.00
111	10,261	10,261	**4.35**	104.0	3.00	91.22	11.39	0.00	0.00	0.00	102.61	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	15,868	15,869	**-2.23**	104.0	3.00	95.01	14.19	0.00	0.00	0.00	109.20	0.00
114	12,123	12,123	**1.87**	104.0	3.00	92.67	12.42	0.00	0.00	0.00	105.10	0.00
115	17,209	17,210	**-3.49**	104.0	3.00	95.72	14.74	0.00	0.00	0.00	110.45	0.00
116	12,611	12,612	**1.27**	104.0	3.00	93.02	12.67	0.00	0.00	0.00	105.69	0.00
118	9,460	9,460	**5.54**	104.0	3.00	90.52	10.90	0.00	0.00	0.00	101.42	0.00
119	15,039	15,039	**-1.41**	104.0	3.00	94.54	13.82	0.00	0.00	0.00	108.37	0.00
120	17,169	17,169	**-3.46**	104.0	3.00	95.70	14.72	0.00	0.00	0.00	110.42	0.00
121	14,508	14,508	**-0.86**	104.0	3.00	94.23	13.59	0.00	0.00	0.00	107.82	0.00
125	6,017	6,018	**11.97**	104.0	3.00	86.59	8.41	0.00	0.00	0.00	94.99	0.00
126	9,607	9,608	**5.32**	104.0	3.00	90.65	10.99	0.00	0.00	0.00	101.65	0.00
127	9,454	9,454	**5.55**	104.0	3.00	90.51	10.90	0.00	0.00	0.00	101.41	0.00
128	9,411	9,412	**5.62**	104.0	3.00	90.47	10.87	0.00	0.00	0.00	101.35	0.00
129	13,435	13,436	**0.31**	104.0	3.00	93.57	13.08	0.00	0.00	0.00	106.65	0.00
130	13,082	13,082	**0.72**	104.0	3.00	93.33	12.91	0.00	0.00	0.00	106.24	0.00
131	13,429	13,429	**0.32**	104.0	3.00	93.56	13.08	0.00	0.00	0.00	106.64	0.00
132	13,832	13,832	**-0.13**	104.0	3.00	93.82	13.27	0.00	0.00	0.00	107.09	0.00
133	11,464	11,464	**2.70**	104.0	3.00	92.19	12.07	0.00	0.00	0.00	104.26	0.00
134	15,781	15,781	**-2.15**	104.0	3.00	94.96	14.15	0.00	0.00	0.00	109.11	0.00
141	14,536	14,536	**-0.89**	104.0	3.00	94.25	13.60	0.00	0.00	0.00	107.85	0.00
142	11,726	11,727	**2.36**	104.0	3.00	92.38	12.21	0.00	0.00	0.00	104.60	0.00
143	14,948	14,949	**-1.31**	104.0	3.00	94.49	13.78	0.00	0.00	0.00	108.28	0.00
144	10,576	10,577	**3.90**	104.0	3.00	91.49	11.57	0.00	0.00	0.00	103.06	0.00
145	9,063	9,063	**6.17**	104.0	3.00	90.15	10.65	0.00	0.00	0.00	100.80	0.00
146	9,325	9,326	**5.75**	104.0	3.00	90.39	10.82	0.00	0.00	0.00	101.21	0.00
Sum	26.98											

Noise sensitive area: H40 H40

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	19,128	19,129	**-5.15**	104.0	3.00	96.63	15.48	0.00	0.00	0.00	112.11	0.00
2	19,154	19,154	**-5.17**	104.0	3.00	96.65	15.49	0.00	0.00	0.00	112.13	0.00
3	18,700	18,701	**-4.79**	104.0	3.00	96.44	15.32	0.00	0.00	0.00	111.75	0.00
4	18,038	18,038	**-4.23**	104.0	3.00	96.12	15.06	0.00	0.00	0.00	111.19	0.00
5	17,663	17,663	**-3.90**	104.0	3.00	95.94	14.92	0.00	0.00	0.00	110.86	0.00
6	18,123	18,124	**-4.30**	104.0	3.00	96.16	15.10	0.00	0.00	0.00	111.26	0.00
7	15,970	15,971	**-2.33**	104.0	3.00	95.07	14.23	0.00	0.00	0.00	109.30	0.00
8	19,716	19,716	**-5.63**	104.0	3.00	96.90	15.69	0.00	0.00	0.00	112.59	0.00
9	18,597	18,597	**-4.71**	104.0	3.00	96.39	15.28	0.00	0.00	0.00	111.67	0.00
10	18,231	18,231	**-4.39**	104.0	3.00	96.22	15.14	0.00	0.00	0.00	111.36	0.00
11	19,305	19,306	**-5.29**	104.0	3.00	96.71	15.54	0.00	0.00	0.00	112.26	0.00
12	19,172	19,172	**-5.18**	104.0	3.00	96.65	15.49	0.00	0.00	0.00	112.15	0.00
13	18,703	18,704	**-4.80**	104.0	3.00	96.44	15.32	0.00	0.00	0.00	111.76	0.00
14	18,274	18,274	**-4.43**	104.0	3.00	96.24	15.16	0.00	0.00	0.00	111.39	0.00
15	17,625	17,626	**-3.87**	104.0	3.00	95.92	14.90	0.00	0.00	0.00	110.83	0.00
16	17,428	17,428	**-3.69**	104.0	3.00	95.83	14.83	0.00	0.00	0.00	110.65	0.00
17	19,496	19,497	**-5.45**	104.0	3.00	96.80	15.61	0.00	0.00	0.00	112.41	0.00
18	19,527	19,528	**-5.47**	104.0	3.00	96.81	15.62	0.00	0.00	0.00	112.44	0.00
19	18,405	18,405	**-4.54**	104.0	3.00	96.30	15.21	0.00	0.00	0.00	111.50	0.00
20	17,354	17,354	**-3.62**	104.0	3.00	95.79	14.80	0.00	0.00	0.00	110.58	0.00
21	17,287	17,287	**-3.56**	104.0	3.00	95.75	14.77	0.00	0.00	0.00	110.52	0.00
22	17,071	17,071	**-3.37**	104.0	3.00	95.65	14.68	0.00	0.00	0.00	110.33	0.00
23	16,760	16,760	**-3.08**	104.0	3.00	95.49	14.56	0.00	0.00	0.00	110.04	0.00
24	17,280	17,280	**-3.56**	104.0	3.00	95.75	14.77	0.00	0.00	0.00	110.52	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	14,484	14,484	**-0.83**	104.0	3.00	94.22	13.57	0.00	0.00	0.00	107.79	0.00
26	16,557	16,558	**-2.89**	104.0	3.00	95.38	14.47	0.00	0.00	0.00	109.85	0.00
27	14,690	14,690	**-1.05**	104.0	3.00	94.34	13.67	0.00	0.00	0.00	108.01	0.00
28	14,785	14,786	**-1.15**	104.0	3.00	94.40	13.71	0.00	0.00	0.00	108.11	0.00
29	16,274	16,274	**-2.62**	104.0	3.00	95.23	14.36	0.00	0.00	0.00	109.59	0.00
30	16,357	16,357	**-2.70**	104.0	3.00	95.27	14.39	0.00	0.00	0.00	109.66	0.00
31	17,396	17,396	**-3.66**	104.0	3.00	95.81	14.81	0.00	0.00	0.00	110.62	0.00
32	14,552	14,552	**-0.90**	104.0	3.00	94.26	13.61	0.00	0.00	0.00	107.86	0.00
33	15,829	15,829	**-2.20**	104.0	3.00	94.99	14.17	0.00	0.00	0.00	109.16	0.00
34	15,685	15,686	**-2.06**	104.0	3.00	94.91	14.11	0.00	0.00	0.00	109.02	0.00
35	16,244	16,244	**-2.60**	104.0	3.00	95.21	14.34	0.00	0.00	0.00	109.56	0.00
36	16,527	16,527	**-2.86**	104.0	3.00	95.36	14.46	0.00	0.00	0.00	109.83	0.00
37	15,396	15,396	**-1.77**	104.0	3.00	94.75	13.98	0.00	0.00	0.00	108.73	0.00
38	14,492	14,492	**-0.84**	104.0	3.00	94.22	13.58	0.00	0.00	0.00	107.80	0.00
39	14,020	14,020	**-0.33**	104.0	3.00	93.94	13.36	0.00	0.00	0.00	107.30	0.00
40	13,933	13,933	**-0.24**	104.0	3.00	93.88	13.32	0.00	0.00	0.00	107.20	0.00
41	13,843	13,843	**-0.14**	104.0	3.00	93.82	13.28	0.00	0.00	0.00	107.10	0.00
43	14,843	14,843	**-1.21**	104.0	3.00	94.43	13.74	0.00	0.00	0.00	108.17	0.00
44	13,515	13,516	**0.22**	104.0	3.00	93.62	13.12	0.00	0.00	0.00	106.74	0.00
45	13,288	13,289	**0.48**	104.0	3.00	93.47	13.01	0.00	0.00	0.00	106.48	0.00
46	14,139	14,139	**-0.46**	104.0	3.00	94.01	13.42	0.00	0.00	0.00	107.42	0.00
48	13,786	13,787	**-0.08**	104.0	3.00	93.79	13.25	0.00	0.00	0.00	107.04	0.00
49	14,469	14,470	**-0.82**	104.0	3.00	94.21	13.57	0.00	0.00	0.00	107.78	0.00
50	17,092	17,092	**-3.39**	104.0	3.00	95.66	14.69	0.00	0.00	0.00	110.35	0.00
51	14,821	14,821	**-1.18**	104.0	3.00	94.42	13.73	0.00	0.00	0.00	108.15	0.00
52	15,073	15,073	**-1.44**	104.0	3.00	94.56	13.84	0.00	0.00	0.00	108.40	0.00
53	14,221	14,221	**-0.55**	104.0	3.00	94.06	13.45	0.00	0.00	0.00	107.51	0.00
55	13,108	13,108	**0.69**	104.0	3.00	93.35	12.92	0.00	0.00	0.00	106.27	0.00
56	12,902	12,902	**0.93**	104.0	3.00	93.21	12.82	0.00	0.00	0.00	106.03	0.00
57	12,376	12,376	**1.56**	104.0	3.00	92.85	12.55	0.00	0.00	0.00	105.41	0.00
58	15,170	15,170	**-1.54**	104.0	3.00	94.62	13.88	0.00	0.00	0.00	108.50	0.00
59	12,690	12,690	**1.18**	104.0	3.00	93.07	12.71	0.00	0.00	0.00	105.78	0.00
60	11,465	11,465	**2.70**	104.0	3.00	92.19	12.07	0.00	0.00	0.00	104.26	0.00
61	11,247	11,248	**2.99**	104.0	3.00	92.02	11.95	0.00	0.00	0.00	103.97	0.00
62	9,922	9,923	**4.84**	104.0	3.00	90.93	11.19	0.00	0.00	0.00	102.12	0.00
63	8,910	8,911	**6.41**	104.0	3.00	90.00	10.55	0.00	0.00	0.00	100.55	0.00
64	7,554	7,554	**8.78**	104.0	3.00	88.56	9.61	0.00	0.00	0.00	98.18	0.00
65	7,206	7,206	**9.45**	104.0	3.00	88.15	9.35	0.00	0.00	0.00	97.51	0.00
66	14,169	14,169	**-0.49**	104.0	3.00	94.03	13.43	0.00	0.00	0.00	107.46	0.00
67	8,133	8,133	**7.73**	104.0	3.00	89.21	10.03	0.00	0.00	0.00	99.23	0.00
68	7,736	7,736	**8.45**	104.0	3.00	88.77	9.75	0.00	0.00	0.00	98.52	0.00
69	7,129	7,130	**9.60**	104.0	3.00	88.06	9.30	0.00	0.00	0.00	97.36	0.00
70	17,866	17,866	**-4.08**	104.0	3.00	96.04	15.00	0.00	0.00	0.00	111.04	0.00
71	18,002	18,002	**-4.20**	104.0	3.00	96.11	15.05	0.00	0.00	0.00	111.16	0.00
72	18,347	18,347	**-4.49**	104.0	3.00	96.27	15.18	0.00	0.00	0.00	111.46	0.00
73	17,834	17,834	**-4.05**	104.0	3.00	96.03	14.99	0.00	0.00	0.00	111.01	0.00
74	16,781	16,781	**-3.10**	104.0	3.00	95.50	14.57	0.00	0.00	0.00	110.06	0.00
75	16,171	16,171	**-2.53**	104.0	3.00	95.17	14.31	0.00	0.00	0.00	109.49	0.00
76	12,560	12,561	**1.33**	104.0	3.00	92.98	12.65	0.00	0.00	0.00	105.63	0.00
77	13,568	13,568	**0.17**	104.0	3.00	93.65	13.15	0.00	0.00	0.00	106.80	0.00
78	16,944	16,944	**-3.25**	104.0	3.00	95.58	14.63	0.00	0.00	0.00	110.21	0.00
80	11,645	11,645	**2.47**	104.0	3.00	92.32	12.17	0.00	0.00	0.00	104.49	0.00
81	18,601	18,601	**-4.71**	104.0	3.00	96.39	15.28	0.00	0.00	0.00	111.67	0.00
82	15,360	15,360	**-1.73**	104.0	3.00	94.73	13.97	0.00	0.00	0.00	108.69	0.00
83	8,492	8,492	**7.11**	104.0	3.00	89.58	10.27	0.00	0.00	0.00	99.85	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	15,020	15,020	**-1.39**	104.0	3.00	94.53	13.82	0.00	0.00	0.00	108.35	0.00
86	11,824	11,824	**2.24**	104.0	3.00	92.46	12.27	0.00	0.00	0.00	104.72	0.00
87	7,090	7,091	**9.68**	104.0	3.00	88.01	9.27	0.00	0.00	0.00	97.28	0.00
89	8,030	8,030	**7.91**	104.0	3.00	89.09	9.95	0.00	0.00	0.00	99.05	0.00
90	11,443	11,443	**2.73**	104.0	3.00	92.17	12.06	0.00	0.00	0.00	104.23	0.00
91	9,505	9,505	**5.47**	104.0	3.00	90.56	10.93	0.00	0.00	0.00	101.49	0.00
92	6,860	6,861	**10.15**	104.0	3.00	87.73	9.09	0.00	0.00	0.00	96.82	0.00
94	18,220	18,221	**-4.38**	104.0	3.00	96.21	15.14	0.00	0.00	0.00	111.35	0.00
95	19,399	19,399	**-5.37**	104.0	3.00	96.76	15.58	0.00	0.00	0.00	112.33	0.00
97	16,833	16,833	**-3.15**	104.0	3.00	95.52	14.59	0.00	0.00	0.00	110.11	0.00
98	18,663	18,663	**-4.76**	104.0	3.00	96.42	15.30	0.00	0.00	0.00	111.72	0.00
99	19,081	19,081	**-5.11**	104.0	3.00	96.61	15.46	0.00	0.00	0.00	112.07	0.00
100	13,294	13,295	**0.47**	104.0	3.00	93.47	13.01	0.00	0.00	0.00	106.49	0.00
101	18,964	18,964	**-5.01**	104.0	3.00	96.56	15.42	0.00	0.00	0.00	111.97	0.00
102	13,846	13,847	**-0.14**	104.0	3.00	93.83	13.28	0.00	0.00	0.00	107.11	0.00
103	19,786	19,787	**-5.68**	104.0	3.00	96.93	15.72	0.00	0.00	0.00	112.64	0.00
104	14,322	14,322	**-0.66**	104.0	3.00	94.12	13.50	0.00	0.00	0.00	107.62	0.00
107	17,711	17,712	**-3.94**	104.0	3.00	95.97	14.94	0.00	0.00	0.00	110.90	0.00
108	19,647	19,648	**-5.57**	104.0	3.00	96.87	15.67	0.00	0.00	0.00	112.53	0.00
109	12,453	12,454	**1.46**	104.0	3.00	92.91	12.59	0.00	0.00	0.00	105.50	0.00
110	13,379	13,379	**0.38**	104.0	3.00	93.53	13.05	0.00	0.00	0.00	106.58	0.00
111	12,878	12,879	**0.96**	104.0	3.00	93.20	12.81	0.00	0.00	0.00	106.01	0.00
113	18,026	18,026	**-4.22**	104.0	3.00	96.12	15.06	0.00	0.00	0.00	111.18	0.00
114	14,798	14,798	**-1.16**	104.0	3.00	94.40	13.72	0.00	0.00	0.00	108.12	0.00
115	19,514	19,514	**-5.46**	104.0	3.00	96.81	15.62	0.00	0.00	0.00	112.42	0.00
116	14,917	14,917	**-1.28**	104.0	3.00	94.47	13.77	0.00	0.00	0.00	108.24	0.00
118	12,175	12,175	**1.80**	104.0	3.00	92.71	12.45	0.00	0.00	0.00	105.16	0.00
119	17,373	17,373	**-3.64**	104.0	3.00	95.80	14.80	0.00	0.00	0.00	110.60	0.00
120	19,259	19,259	**-5.26**	104.0	3.00	96.69	15.52	0.00	0.00	0.00	112.22	0.00
121	16,820	16,821	**-3.14**	104.0	3.00	95.52	14.58	0.00	0.00	0.00	110.10	0.00
125	8,676	8,676	**6.80**	104.0	3.00	89.77	10.40	0.00	0.00	0.00	100.16	0.00
126	12,109	12,109	**1.88**	104.0	3.00	92.66	12.42	0.00	0.00	0.00	105.08	0.00
127	11,974	11,975	**2.05**	104.0	3.00	92.57	12.35	0.00	0.00	0.00	104.91	0.00
128	11,959	11,959	**2.07**	104.0	3.00	92.55	12.34	0.00	0.00	0.00	104.89	0.00
129	15,534	15,534	**-1.91**	104.0	3.00	94.83	14.04	0.00	0.00	0.00	108.87	0.00
130	15,117	15,118	**-1.49**	104.0	3.00	94.59	13.86	0.00	0.00	0.00	108.45	0.00
131	15,426	15,426	**-1.80**	104.0	3.00	94.76	13.99	0.00	0.00	0.00	108.76	0.00
132	15,813	15,813	**-2.18**	104.0	3.00	94.98	14.16	0.00	0.00	0.00	109.14	0.00
133	13,951	13,952	**-0.26**	104.0	3.00	93.89	13.33	0.00	0.00	0.00	107.22	0.00
134	17,898	17,898	**-4.11**	104.0	3.00	96.06	15.01	0.00	0.00	0.00	111.07	0.00
141	16,810	16,810	**-3.13**	104.0	3.00	95.51	14.58	0.00	0.00	0.00	110.09	0.00
142	14,082	14,083	**-0.40**	104.0	3.00	93.97	13.39	0.00	0.00	0.00	107.36	0.00
143	17,182	17,182	**-3.47**	104.0	3.00	95.70	14.73	0.00	0.00	0.00	110.43	0.00
144	12,985	12,985	**0.83**	104.0	3.00	93.27	12.86	0.00	0.00	0.00	106.13	0.00
145	11,702	11,702	**2.40**	104.0	3.00	92.37	12.20	0.00	0.00	0.00	104.57	0.00
146	11,952	11,952	**2.08**	104.0	3.00	92.55	12.33	0.00	0.00	0.00	104.88	0.00

Sum 22.23

Noise sensitive area: H41 H41

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	18,299	18,299	**-4.45**	104.0	3.00	96.25	15.17	0.00	0.00	0.00	111.41	0.00
2	18,337	18,338	**-4.48**	104.0	3.00	96.27	15.18	0.00	0.00	0.00	111.45	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	17,894	17,894	**-4.10**	104.0	3.00	96.05	15.01	0.00	0.00	0.00	111.06	0.00
4	17,277	17,277	**-3.55**	104.0	3.00	95.75	14.77	0.00	0.00	0.00	110.52	0.00
5	16,879	16,879	**-3.19**	104.0	3.00	95.55	14.61	0.00	0.00	0.00	110.15	0.00
6	17,319	17,320	**-3.59**	104.0	3.00	95.77	14.78	0.00	0.00	0.00	110.55	0.00
7	15,158	15,159	**-1.53**	104.0	3.00	94.61	13.88	0.00	0.00	0.00	108.49	0.00
8	18,880	18,880	**-4.94**	104.0	3.00	96.52	15.38	0.00	0.00	0.00	111.90	0.00
9	17,768	17,768	**-3.99**	104.0	3.00	95.99	14.96	0.00	0.00	0.00	110.95	0.00
10	17,390	17,390	**-3.66**	104.0	3.00	95.81	14.81	0.00	0.00	0.00	110.62	0.00
11	18,435	18,435	**-4.57**	104.0	3.00	96.31	15.22	0.00	0.00	0.00	111.53	0.00
12	18,305	18,306	**-4.46**	104.0	3.00	96.25	15.17	0.00	0.00	0.00	111.42	0.00
13	17,839	17,840	**-4.05**	104.0	3.00	96.03	14.99	0.00	0.00	0.00	111.02	0.00
14	17,411	17,412	**-3.67**	104.0	3.00	95.82	14.82	0.00	0.00	0.00	110.64	0.00
15	16,775	16,776	**-3.10**	104.0	3.00	95.49	14.56	0.00	0.00	0.00	110.06	0.00
16	16,587	16,588	**-2.92**	104.0	3.00	95.40	14.49	0.00	0.00	0.00	109.88	0.00
17	18,623	18,623	**-4.73**	104.0	3.00	96.40	15.29	0.00	0.00	0.00	111.69	0.00
18	18,647	18,648	**-4.75**	104.0	3.00	96.41	15.30	0.00	0.00	0.00	111.71	0.00
19	17,534	17,535	**-3.78**	104.0	3.00	95.88	14.87	0.00	0.00	0.00	110.75	0.00
20	16,493	16,494	**-2.83**	104.0	3.00	95.35	14.45	0.00	0.00	0.00	109.79	0.00
21	16,519	16,519	**-2.86**	104.0	3.00	95.36	14.46	0.00	0.00	0.00	109.82	0.00
22	16,331	16,331	**-2.68**	104.0	3.00	95.26	14.38	0.00	0.00	0.00	109.64	0.00
23	16,029	16,029	**-2.39**	104.0	3.00	95.10	14.25	0.00	0.00	0.00	109.35	0.00
24	16,536	16,536	**-2.87**	104.0	3.00	95.37	14.47	0.00	0.00	0.00	109.83	0.00
25	13,762	13,762	**-0.05**	104.0	3.00	93.77	13.24	0.00	0.00	0.00	107.01	0.00
26	15,769	15,769	**-2.14**	104.0	3.00	94.96	14.14	0.00	0.00	0.00	109.10	0.00
27	13,934	13,934	**-0.24**	104.0	3.00	93.88	13.32	0.00	0.00	0.00	107.20	0.00
28	13,991	13,992	**-0.30**	104.0	3.00	93.92	13.35	0.00	0.00	0.00	107.26	0.00
29	15,529	15,529	**-1.90**	104.0	3.00	94.82	14.04	0.00	0.00	0.00	108.86	0.00
30	15,634	15,634	**-2.00**	104.0	3.00	94.88	14.08	0.00	0.00	0.00	108.97	0.00
31	16,683	16,683	**-3.01**	104.0	3.00	95.45	14.53	0.00	0.00	0.00	109.97	0.00
32	13,852	13,852	**-0.15**	104.0	3.00	93.83	13.28	0.00	0.00	0.00	107.11	0.00
33	15,120	15,121	**-1.49**	104.0	3.00	94.59	13.86	0.00	0.00	0.00	108.45	0.00
34	14,879	14,880	**-1.24**	104.0	3.00	94.45	13.75	0.00	0.00	0.00	108.21	0.00
35	15,427	15,428	**-1.80**	104.0	3.00	94.77	14.00	0.00	0.00	0.00	108.76	0.00
36	15,706	15,707	**-2.08**	104.0	3.00	94.92	14.12	0.00	0.00	0.00	109.04	0.00
37	14,595	14,595	**-0.95**	104.0	3.00	94.28	13.63	0.00	0.00	0.00	107.91	0.00
38	13,752	13,752	**-0.04**	104.0	3.00	93.77	13.23	0.00	0.00	0.00	107.00	0.00
39	13,249	13,249	**0.53**	104.0	3.00	93.44	12.99	0.00	0.00	0.00	106.44	0.00
40	13,086	13,087	**0.71**	104.0	3.00	93.34	12.91	0.00	0.00	0.00	106.25	0.00
41	13,059	13,060	**0.74**	104.0	3.00	93.32	12.90	0.00	0.00	0.00	106.22	0.00
43	14,040	14,041	**-0.36**	104.0	3.00	93.95	13.37	0.00	0.00	0.00	107.32	0.00
44	12,719	12,719	**1.14**	104.0	3.00	93.09	12.73	0.00	0.00	0.00	105.82	0.00
45	12,500	12,500	**1.41**	104.0	3.00	92.94	12.62	0.00	0.00	0.00	105.56	0.00
46	13,311	13,311	**0.46**	104.0	3.00	93.48	13.02	0.00	0.00	0.00	106.51	0.00
48	13,095	13,095	**0.70**	104.0	3.00	93.34	12.92	0.00	0.00	0.00	106.26	0.00
49	13,820	13,820	**-0.11**	104.0	3.00	93.81	13.27	0.00	0.00	0.00	107.08	0.00
50	16,284	16,285	**-2.63**	104.0	3.00	95.24	14.36	0.00	0.00	0.00	109.60	0.00
51	14,156	14,156	**-0.48**	104.0	3.00	94.02	13.42	0.00	0.00	0.00	107.44	0.00
52	14,398	14,398	**-0.74**	104.0	3.00	94.17	13.54	0.00	0.00	0.00	107.70	0.00
53	13,583	13,583	**0.15**	104.0	3.00	93.66	13.15	0.00	0.00	0.00	106.81	0.00
55	12,526	12,527	**1.37**	104.0	3.00	92.96	12.63	0.00	0.00	0.00	105.59	0.00
56	12,334	12,334	**1.61**	104.0	3.00	92.82	12.53	0.00	0.00	0.00	105.35	0.00
57	11,775	11,775	**2.30**	104.0	3.00	92.42	12.24	0.00	0.00	0.00	104.66	0.00
58	14,452	14,453	**-0.80**	104.0	3.00	94.20	13.56	0.00	0.00	0.00	107.76	0.00
59	12,137	12,137	**1.85**	104.0	3.00	92.68	12.43	0.00	0.00	0.00	105.11	0.00
60	10,972	10,973	**3.36**	104.0	3.00	91.81	11.80	0.00	0.00	0.00	103.61	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	10,777	10,777	**3.62**	104.0	3.00	91.65	11.69	0.00	0.00	0.00	103.34	0.00
62	9,335	9,335	**5.74**	104.0	3.00	90.40	10.82	0.00	0.00	0.00	101.23	0.00
63	8,285	8,285	**7.47**	104.0	3.00	89.37	10.13	0.00	0.00	0.00	99.50	0.00
64	6,968	6,969	**9.93**	104.0	3.00	87.86	9.17	0.00	0.00	0.00	97.04	0.00
65	6,680	6,680	**10.52**	104.0	3.00	87.50	8.95	0.00	0.00	0.00	96.44	0.00
66	13,316	13,316	**0.45**	104.0	3.00	93.49	13.02	0.00	0.00	0.00	106.51	0.00
67	7,615	7,616	**8.67**	104.0	3.00	88.63	9.66	0.00	0.00	0.00	98.29	0.00
68	7,260	7,260	**9.35**	104.0	3.00	88.22	9.40	0.00	0.00	0.00	97.61	0.00
69	6,578	6,578	**10.73**	104.0	3.00	87.36	8.87	0.00	0.00	0.00	96.23	0.00
70	16,982	16,982	**-3.29**	104.0	3.00	95.60	14.65	0.00	0.00	0.00	110.25	0.00
71	17,166	17,166	**-3.45**	104.0	3.00	95.69	14.72	0.00	0.00	0.00	110.41	0.00
72	17,578	17,579	**-3.82**	104.0	3.00	95.90	14.89	0.00	0.00	0.00	110.79	0.00
73	17,036	17,036	**-3.33**	104.0	3.00	95.63	14.67	0.00	0.00	0.00	110.30	0.00
74	15,976	15,977	**-2.34**	104.0	3.00	95.07	14.23	0.00	0.00	0.00	109.30	0.00
75	15,402	15,402	**-1.77**	104.0	3.00	94.75	13.98	0.00	0.00	0.00	108.74	0.00
76	11,911	11,912	**2.13**	104.0	3.00	92.52	12.31	0.00	0.00	0.00	104.83	0.00
77	12,924	12,924	**0.90**	104.0	3.00	93.23	12.83	0.00	0.00	0.00	106.06	0.00
78	16,084	16,084	**-2.44**	104.0	3.00	95.13	14.28	0.00	0.00	0.00	109.40	0.00
80	11,127	11,127	**3.15**	104.0	3.00	91.93	11.89	0.00	0.00	0.00	103.81	0.00
81	17,726	17,726	**-3.95**	104.0	3.00	95.97	14.94	0.00	0.00	0.00	110.92	0.00
82	14,667	14,667	**-1.02**	104.0	3.00	94.33	13.66	0.00	0.00	0.00	107.98	0.00
83	7,910	7,911	**8.13**	104.0	3.00	88.96	9.87	0.00	0.00	0.00	98.83	0.00
85	14,402	14,403	**-0.74**	104.0	3.00	94.17	13.54	0.00	0.00	0.00	107.71	0.00
86	11,289	11,289	**2.93**	104.0	3.00	92.05	11.98	0.00	0.00	0.00	104.03	0.00
87	6,589	6,590	**10.71**	104.0	3.00	87.38	8.88	0.00	0.00	0.00	96.25	0.00
89	7,428	7,428	**9.02**	104.0	3.00	88.42	9.52	0.00	0.00	0.00	97.94	0.00
90	10,829	10,829	**3.55**	104.0	3.00	91.69	11.72	0.00	0.00	0.00	103.41	0.00
91	8,900	8,901	**6.43**	104.0	3.00	89.99	10.54	0.00	0.00	0.00	100.53	0.00
92	6,223	6,223	**11.50**	104.0	3.00	86.88	8.58	0.00	0.00	0.00	95.46	0.00
94	17,369	17,369	**-3.64**	104.0	3.00	95.80	14.80	0.00	0.00	0.00	110.60	0.00
95	18,544	18,545	**-4.66**	104.0	3.00	96.36	15.26	0.00	0.00	0.00	111.62	0.00
97	15,988	15,989	**-2.35**	104.0	3.00	95.08	14.24	0.00	0.00	0.00	109.31	0.00
98	17,810	17,810	**-4.03**	104.0	3.00	96.01	14.98	0.00	0.00	0.00	110.99	0.00
99	18,287	18,287	**-4.44**	104.0	3.00	96.24	15.16	0.00	0.00	0.00	111.40	0.00
100	12,524	12,524	**1.38**	104.0	3.00	92.95	12.63	0.00	0.00	0.00	105.58	0.00
101	18,085	18,085	**-4.27**	104.0	3.00	96.15	15.08	0.00	0.00	0.00	111.23	0.00
102	13,047	13,048	**0.76**	104.0	3.00	93.31	12.89	0.00	0.00	0.00	106.20	0.00
103	18,904	18,904	**-4.96**	104.0	3.00	96.53	15.39	0.00	0.00	0.00	111.92	0.00
104	13,534	13,534	**0.20**	104.0	3.00	93.63	13.13	0.00	0.00	0.00	106.76	0.00
107	16,844	16,845	**-3.16**	104.0	3.00	95.53	14.59	0.00	0.00	0.00	110.12	0.00
108	18,871	18,871	**-4.93**	104.0	3.00	96.52	15.38	0.00	0.00	0.00	111.90	0.00
109	11,914	11,914	**2.13**	104.0	3.00	92.52	12.31	0.00	0.00	0.00	104.83	0.00
110	12,694	12,694	**1.17**	104.0	3.00	93.07	12.72	0.00	0.00	0.00	105.79	0.00
111	12,215	12,215	**1.75**	104.0	3.00	92.74	12.47	0.00	0.00	0.00	105.21	0.00
113	17,157	17,157	**-3.44**	104.0	3.00	95.69	14.72	0.00	0.00	0.00	110.41	0.00
114	14,191	14,191	**-0.52**	104.0	3.00	94.04	13.44	0.00	0.00	0.00	107.48	0.00
115	18,681	18,681	**-4.78**	104.0	3.00	96.43	15.31	0.00	0.00	0.00	111.74	0.00
116	14,092	14,093	**-0.41**	104.0	3.00	93.98	13.39	0.00	0.00	0.00	107.37	0.00
118	11,662	11,662	**2.45**	104.0	3.00	92.34	12.18	0.00	0.00	0.00	104.51	0.00
119	16,553	16,553	**-2.89**	104.0	3.00	95.38	14.47	0.00	0.00	0.00	109.85	0.00
120	18,373	18,374	**-4.52**	104.0	3.00	96.28	15.19	0.00	0.00	0.00	111.48	0.00
121	15,994	15,995	**-2.36**	104.0	3.00	95.08	14.24	0.00	0.00	0.00	109.32	0.00
125	8,073	8,073	**7.84**	104.0	3.00	89.14	9.98	0.00	0.00	0.00	99.12	0.00
126	11,372	11,372	**2.82**	104.0	3.00	92.12	12.02	0.00	0.00	0.00	104.14	0.00
127	11,248	11,249	**2.99**	104.0	3.00	92.02	11.95	0.00	0.00	0.00	103.98	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	11,248	11,249	**2.99**	104.0	3.00	92.02	11.95	0.00	0.00	0.00	103.98	0.00
129	14,655	14,656	**-1.01**	104.0	3.00	94.32	13.65	0.00	0.00	0.00	107.97	0.00
130	14,228	14,228	**-0.56**	104.0	3.00	94.06	13.46	0.00	0.00	0.00	107.52	0.00
131	14,528	14,529	**-0.88**	104.0	3.00	94.24	13.60	0.00	0.00	0.00	107.84	0.00
132	14,913	14,913	**-1.28**	104.0	3.00	94.47	13.77	0.00	0.00	0.00	108.24	0.00
133	13,201	13,202	**0.58**	104.0	3.00	93.41	12.97	0.00	0.00	0.00	106.38	0.00
134	17,020	17,020	**-3.32**	104.0	3.00	95.62	14.66	0.00	0.00	0.00	110.28	0.00
141	15,972	15,973	**-2.34**	104.0	3.00	95.07	14.23	0.00	0.00	0.00	109.30	0.00
142	13,277	13,278	**0.49**	104.0	3.00	93.46	13.01	0.00	0.00	0.00	106.47	0.00
143	16,332	16,333	**-2.68**	104.0	3.00	95.26	14.38	0.00	0.00	0.00	109.64	0.00
144	12,203	12,203	**1.77**	104.0	3.00	92.73	12.46	0.00	0.00	0.00	105.19	0.00
145	11,062	11,062	**3.24**	104.0	3.00	91.88	11.85	0.00	0.00	0.00	103.73	0.00
146	11,299	11,299	**2.92**	104.0	3.00	92.06	11.98	0.00	0.00	0.00	104.04	0.00
Sum	23.17											

Noise sensitive area: H42 H42

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	13,361	13,361	**0.40**	104.0	3.00	93.52	13.05	0.00	0.00	0.00	106.56	0.00
2	13,487	13,487	**0.26**	104.0	3.00	93.60	13.11	0.00	0.00	0.00	106.71	0.00
3	13,129	13,130	**0.66**	104.0	3.00	93.37	12.93	0.00	0.00	0.00	106.30	0.00
4	12,857	12,857	**0.98**	104.0	3.00	93.18	12.80	0.00	0.00	0.00	105.98	0.00
5	12,304	12,304	**1.64**	104.0	3.00	92.80	12.52	0.00	0.00	0.00	105.32	0.00
6	12,585	12,585	**1.30**	104.0	3.00	93.00	12.66	0.00	0.00	0.00	105.66	0.00
7	10,425	10,426	**4.11**	104.0	3.00	91.36	11.49	0.00	0.00	0.00	102.85	0.00
8	13,882	13,882	**-0.18**	104.0	3.00	93.85	13.30	0.00	0.00	0.00	107.14	0.00
9	12,841	12,842	**1.00**	104.0	3.00	93.17	12.79	0.00	0.00	0.00	105.96	0.00
10	12,381	12,382	**1.55**	104.0	3.00	92.86	12.56	0.00	0.00	0.00	105.41	0.00
11	13,206	13,207	**0.58**	104.0	3.00	93.42	12.97	0.00	0.00	0.00	106.39	0.00
12	13,105	13,106	**0.69**	104.0	3.00	93.35	12.92	0.00	0.00	0.00	106.27	0.00
13	12,666	12,667	**1.21**	104.0	3.00	93.05	12.70	0.00	0.00	0.00	105.76	0.00
14	12,252	12,252	**1.71**	104.0	3.00	92.76	12.49	0.00	0.00	0.00	105.25	0.00
15	11,718	11,719	**2.37**	104.0	3.00	92.38	12.21	0.00	0.00	0.00	104.59	0.00
16	11,604	11,605	**2.52**	104.0	3.00	92.29	12.15	0.00	0.00	0.00	104.44	0.00
17	13,373	13,374	**0.38**	104.0	3.00	93.52	13.05	0.00	0.00	0.00	106.58	0.00
18	13,352	13,353	**0.41**	104.0	3.00	93.51	13.04	0.00	0.00	0.00	106.55	0.00
19	12,316	12,317	**1.63**	104.0	3.00	92.81	12.52	0.00	0.00	0.00	105.33	0.00
20	11,361	11,362	**2.84**	104.0	3.00	92.11	12.02	0.00	0.00	0.00	104.12	0.00
21	12,075	12,076	**1.93**	104.0	3.00	92.64	12.40	0.00	0.00	0.00	105.04	0.00
22	12,103	12,103	**1.89**	104.0	3.00	92.66	12.41	0.00	0.00	0.00	105.07	0.00
23	11,877	11,877	**2.17**	104.0	3.00	92.49	12.29	0.00	0.00	0.00	104.79	0.00
24	12,264	12,264	**1.69**	104.0	3.00	92.77	12.50	0.00	0.00	0.00	105.27	0.00
25	9,803	9,804	**5.02**	104.0	3.00	90.83	11.11	0.00	0.00	0.00	101.94	0.00
26	11,198	11,198	**3.05**	104.0	3.00	91.98	11.93	0.00	0.00	0.00	103.91	0.00
27	9,696	9,696	**5.18**	104.0	3.00	90.73	11.05	0.00	0.00	0.00	101.78	0.00
28	9,450	9,451	**5.56**	104.0	3.00	90.51	10.90	0.00	0.00	0.00	101.41	0.00
29	11,294	11,294	**2.93**	104.0	3.00	92.06	11.98	0.00	0.00	0.00	104.04	0.00
30	11,568	11,568	**2.57**	104.0	3.00	92.27	12.13	0.00	0.00	0.00	104.39	0.00
31	12,636	12,636	**1.24**	104.0	3.00	93.03	12.69	0.00	0.00	0.00	105.72	0.00
32	10,056	10,057	**4.65**	104.0	3.00	91.05	11.27	0.00	0.00	0.00	102.32	0.00
33	11,183	11,183	**3.07**	104.0	3.00	91.97	11.92	0.00	0.00	0.00	103.89	0.00
34	10,204	10,205	**4.43**	104.0	3.00	91.18	11.36	0.00	0.00	0.00	102.53	0.00
35	10,653	10,654	**3.79**	104.0	3.00	91.55	11.62	0.00	0.00	0.00	103.17	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	10,892	10,893	**3.47**	104.0	3.00	91.74	11.75	0.00	0.00	0.00	103.50	0.00
37	9,971	9,972	**4.77**	104.0	3.00	90.98	11.22	0.00	0.00	0.00	102.19	0.00
38	9,653	9,653	**5.25**	104.0	3.00	90.69	11.02	0.00	0.00	0.00	101.72	0.00
39	8,932	8,932	**6.38**	104.0	3.00	90.02	10.56	0.00	0.00	0.00	100.58	0.00
40	8,160	8,160	**7.68**	104.0	3.00	89.23	10.04	0.00	0.00	0.00	99.28	0.00
41	8,657	8,658	**6.83**	104.0	3.00	89.75	10.38	0.00	0.00	0.00	100.13	0.00
43	9,427	9,428	**5.59**	104.0	3.00	90.49	10.88	0.00	0.00	0.00	101.37	0.00
44	8,227	8,228	**7.56**	104.0	3.00	89.31	10.09	0.00	0.00	0.00	99.40	0.00
45	8,094	8,095	**7.80**	104.0	3.00	89.16	10.00	0.00	0.00	0.00	99.16	0.00
46	8,525	8,526	**7.05**	104.0	3.00	89.61	10.30	0.00	0.00	0.00	99.91	0.00
48	9,428	9,429	**5.59**	104.0	3.00	90.49	10.88	0.00	0.00	0.00	101.37	0.00
49	10,417	10,417	**4.13**	104.0	3.00	91.35	11.48	0.00	0.00	0.00	102.84	0.00
50	11,549	11,550	**2.59**	104.0	3.00	92.25	12.12	0.00	0.00	0.00	104.37	0.00
51	10,606	10,606	**3.86**	104.0	3.00	91.51	11.59	0.00	0.00	0.00	103.10	0.00
52	10,762	10,763	**3.64**	104.0	3.00	91.64	11.68	0.00	0.00	0.00	103.32	0.00
53	10,286	10,286	**4.31**	104.0	3.00	91.24	11.40	0.00	0.00	0.00	102.65	0.00
55	9,753	9,754	**5.09**	104.0	3.00	90.78	11.08	0.00	0.00	0.00	101.87	0.00
56	9,687	9,687	**5.19**	104.0	3.00	90.72	11.04	0.00	0.00	0.00	101.77	0.00
57	8,951	8,951	**6.35**	104.0	3.00	90.04	10.58	0.00	0.00	0.00	100.61	0.00
58	10,488	10,488	**4.03**	104.0	3.00	91.41	11.52	0.00	0.00	0.00	102.94	0.00
59	9,620	9,621	**5.30**	104.0	3.00	90.66	11.00	0.00	0.00	0.00	101.67	0.00
60	9,061	9,061	**6.17**	104.0	3.00	90.14	10.65	0.00	0.00	0.00	100.79	0.00
61	9,049	9,049	**6.19**	104.0	3.00	90.13	10.64	0.00	0.00	0.00	100.77	0.00
62	7,037	7,037	**9.79**	104.0	3.00	87.95	9.23	0.00	0.00	0.00	97.17	0.00
63	5,952	5,953	**12.12**	104.0	3.00	86.49	8.35	0.00	0.00	0.00	94.84	0.00
64	5,435	5,436	**13.36**	104.0	3.00	85.70	7.90	0.00	0.00	0.00	93.60	0.00
65	5,715	5,716	**12.67**	104.0	3.00	86.14	8.15	0.00	0.00	0.00	94.29	0.00
66	8,325	8,325	**7.40**	104.0	3.00	89.41	10.16	0.00	0.00	0.00	99.57	0.00
67	6,336	6,336	**11.25**	104.0	3.00	87.04	8.67	0.00	0.00	0.00	95.71	0.00
68	6,400	6,401	**11.11**	104.0	3.00	87.12	8.72	0.00	0.00	0.00	95.85	0.00
69	5,477	5,478	**13.26**	104.0	3.00	85.77	7.93	0.00	0.00	0.00	93.71	0.00
70	11,678	11,679	**2.43**	104.0	3.00	92.35	12.19	0.00	0.00	0.00	104.54	0.00
71	12,199	12,200	**1.77**	104.0	3.00	92.73	12.46	0.00	0.00	0.00	105.19	0.00
72	13,092	13,092	**0.71**	104.0	3.00	93.34	12.91	0.00	0.00	0.00	106.26	0.00
73	12,347	12,347	**1.59**	104.0	3.00	92.83	12.54	0.00	0.00	0.00	105.37	0.00
74	11,273	11,273	**2.95**	104.0	3.00	92.04	11.97	0.00	0.00	0.00	104.01	0.00
75	10,994	10,995	**3.33**	104.0	3.00	91.82	11.81	0.00	0.00	0.00	103.64	0.00
76	8,696	8,697	**6.77**	104.0	3.00	89.79	10.41	0.00	0.00	0.00	100.20	0.00
77	9,640	9,640	**5.27**	104.0	3.00	90.68	11.01	0.00	0.00	0.00	101.70	0.00
78	10,964	10,965	**3.37**	104.0	3.00	91.80	11.80	0.00	0.00	0.00	103.60	0.00
80	9,008	9,008	**6.26**	104.0	3.00	90.09	10.61	0.00	0.00	0.00	100.71	0.00
81	12,476	12,477	**1.43**	104.0	3.00	92.92	12.61	0.00	0.00	0.00	105.53	0.00
82	10,875	10,875	**3.49**	104.0	3.00	91.73	11.74	0.00	0.00	0.00	103.47	0.00
83	6,049	6,050	**11.90**	104.0	3.00	86.63	8.43	0.00	0.00	0.00	95.07	0.00
85	11,189	11,189	**3.07**	104.0	3.00	91.98	11.92	0.00	0.00	0.00	103.90	0.00
86	9,027	9,027	**6.22**	104.0	3.00	90.11	10.63	0.00	0.00	0.00	100.74	0.00
87	5,839	5,840	**12.38**	104.0	3.00	86.33	8.25	0.00	0.00	0.00	94.58	0.00
89	5,579	5,579	**13.01**	104.0	3.00	85.93	8.03	0.00	0.00	0.00	93.96	0.00
90	8,035	8,035	**7.90**	104.0	3.00	89.10	9.96	0.00	0.00	0.00	99.06	0.00
91	6,567	6,567	**10.76**	104.0	3.00	87.35	8.86	0.00	0.00	0.00	96.21	0.00
92	4,648	4,649	**15.46**	104.0	3.00	84.35	7.16	0.00	0.00	0.00	91.50	0.00
94	12,290	12,291	**1.66**	104.0	3.00	92.79	12.51	0.00	0.00	0.00	105.30	0.00
95	13,422	13,422	**0.33**	104.0	3.00	93.56	13.08	0.00	0.00	0.00	106.63	0.00
97	10,988	10,989	**3.33**	104.0	3.00	91.82	11.81	0.00	0.00	0.00	103.63	0.00
98	12,714	12,715	**1.15**	104.0	3.00	93.09	12.73	0.00	0.00	0.00	105.81	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	13,597	13,597	**0.13**	104.0	3.00	93.67	13.16	0.00	0.00	0.00	106.83	0.00
100	8,262	8,263	**7.50**	104.0	3.00	89.34	10.12	0.00	0.00	0.00	99.46	0.00
101	12,800	12,800	**1.05**	104.0	3.00	93.14	12.77	0.00	0.00	0.00	105.91	0.00
102	8,516	8,517	**7.07**	104.0	3.00	89.61	10.29	0.00	0.00	0.00	99.89	0.00
103	13,588	13,589	**0.14**	104.0	3.00	93.66	13.16	0.00	0.00	0.00	106.82	0.00
104	9,064	9,065	**6.16**	104.0	3.00	90.15	10.65	0.00	0.00	0.00	100.80	0.00
107	11,662	11,663	**2.45**	104.0	3.00	92.34	12.18	0.00	0.00	0.00	104.52	0.00
108	14,292	14,292	**-0.63**	104.0	3.00	94.10	13.49	0.00	0.00	0.00	107.59	0.00
109	9,528	9,529	**5.44**	104.0	3.00	90.58	10.94	0.00	0.00	0.00	101.53	0.00
110	9,118	9,118	**6.08**	104.0	3.00	90.20	10.69	0.00	0.00	0.00	100.88	0.00
111	8,851	8,851	**6.51**	104.0	3.00	89.94	10.51	0.00	0.00	0.00	100.45	0.00
113	11,953	11,954	**2.08**	104.0	3.00	92.55	12.33	0.00	0.00	0.00	104.88	0.00
114	11,071	11,071	**3.22**	104.0	3.00	91.88	11.85	0.00	0.00	0.00	103.74	0.00
115	13,714	13,714	**0.00**	104.0	3.00	93.74	13.22	0.00	0.00	0.00	106.96	0.00
116	9,304	9,305	**5.78**	104.0	3.00	90.37	10.80	0.00	0.00	0.00	101.18	0.00
118	9,504	9,504	**5.47**	104.0	3.00	90.56	10.93	0.00	0.00	0.00	101.49	0.00
119	11,720	11,721	**2.37**	104.0	3.00	92.38	12.21	0.00	0.00	0.00	104.59	0.00
120	13,046	13,046	**0.76**	104.0	3.00	93.31	12.89	0.00	0.00	0.00	106.20	0.00
121	11,132	11,132	**3.14**	104.0	3.00	91.93	11.89	0.00	0.00	0.00	103.82	0.00
125	5,987	5,988	**12.04**	104.0	3.00	86.55	8.38	0.00	0.00	0.00	94.92	0.00
126	7,504	7,505	**8.88**	104.0	3.00	88.51	9.58	0.00	0.00	0.00	98.08	0.00
127	7,486	7,487	**8.91**	104.0	3.00	88.49	9.56	0.00	0.00	0.00	98.05	0.00
128	7,617	7,618	**8.67**	104.0	3.00	88.64	9.66	0.00	0.00	0.00	98.30	0.00
129	9,427	9,427	**5.59**	104.0	3.00	90.49	10.88	0.00	0.00	0.00	101.37	0.00
130	8,920	8,921	**6.40**	104.0	3.00	90.01	10.56	0.00	0.00	0.00	100.57	0.00
131	9,161	9,162	**6.01**	104.0	3.00	90.24	10.71	0.00	0.00	0.00	100.95	0.00
132	9,518	9,519	**5.45**	104.0	3.00	90.57	10.94	0.00	0.00	0.00	101.51	0.00
133	9,061	9,062	**6.17**	104.0	3.00	90.14	10.65	0.00	0.00	0.00	100.79	0.00
134	11,757	11,757	**2.33**	104.0	3.00	92.41	12.23	0.00	0.00	0.00	104.64	0.00
141	11,022	11,023	**3.29**	104.0	3.00	91.85	11.83	0.00	0.00	0.00	103.67	0.00
142	8,680	8,681	**6.79**	104.0	3.00	89.77	10.40	0.00	0.00	0.00	100.17	0.00
143	11,286	11,287	**2.94**	104.0	3.00	92.05	11.97	0.00	0.00	0.00	104.03	0.00
144	7,868	7,869	**8.20**	104.0	3.00	88.92	9.84	0.00	0.00	0.00	98.76	0.00
145	8,031	8,031	**7.91**	104.0	3.00	89.10	9.95	0.00	0.00	0.00	99.05	0.00
146	8,132	8,133	**7.73**	104.0	3.00	89.20	10.03	0.00	0.00	0.00	99.23	0.00

Sum 27.39

Noise sensitive area: H43 H43

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	12,958	12,959	**0.86**	104.0	3.00	93.25	12.85	0.00	0.00	0.00	106.10	0.00
2	13,098	13,099	**0.70**	104.0	3.00	93.34	12.92	0.00	0.00	0.00	106.26	0.00
3	12,756	12,756	**1.10**	104.0	3.00	93.11	12.75	0.00	0.00	0.00	105.86	0.00
4	12,538	12,538	**1.36**	104.0	3.00	92.96	12.64	0.00	0.00	0.00	105.60	0.00
5	11,964	11,964	**2.06**	104.0	3.00	92.56	12.34	0.00	0.00	0.00	104.90	0.00
6	12,218	12,218	**1.75**	104.0	3.00	92.74	12.47	0.00	0.00	0.00	105.21	0.00
7	10,070	10,071	**4.62**	104.0	3.00	91.06	11.28	0.00	0.00	0.00	102.34	0.00
8	13,468	13,468	**0.28**	104.0	3.00	93.59	13.10	0.00	0.00	0.00	106.68	0.00
9	12,442	12,443	**1.48**	104.0	3.00	92.90	12.59	0.00	0.00	0.00	105.49	0.00
10	11,969	11,970	**2.06**	104.0	3.00	92.56	12.34	0.00	0.00	0.00	104.90	0.00
11	12,754	12,755	**1.10**	104.0	3.00	93.11	12.75	0.00	0.00	0.00	105.86	0.00
12	12,659	12,660	**1.21**	104.0	3.00	93.05	12.70	0.00	0.00	0.00	105.75	0.00
13	12,225	12,226	**1.74**	104.0	3.00	92.75	12.48	0.00	0.00	0.00	105.22	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	11,814	11,815	**2.25**	104.0	3.00	92.45	12.26	0.00	0.00	0.00	104.71	0.00
15	11,300	11,301	**2.92**	104.0	3.00	92.06	11.98	0.00	0.00	0.00	104.05	0.00
16	11,200	11,201	**3.05**	104.0	3.00	91.99	11.93	0.00	0.00	0.00	103.91	0.00
17	12,917	12,917	**0.91**	104.0	3.00	93.22	12.83	0.00	0.00	0.00	106.05	0.00
18	12,888	12,888	**0.94**	104.0	3.00	93.20	12.81	0.00	0.00	0.00	106.02	0.00
19	11,868	11,869	**2.18**	104.0	3.00	92.49	12.29	0.00	0.00	0.00	104.78	0.00
20	10,931	10,932	**3.41**	104.0	3.00	91.77	11.78	0.00	0.00	0.00	103.55	0.00
21	11,757	11,757	**2.33**	104.0	3.00	92.41	12.23	0.00	0.00	0.00	104.64	0.00
22	11,817	11,817	**2.25**	104.0	3.00	92.45	12.26	0.00	0.00	0.00	104.71	0.00
23	11,605	11,605	**2.52**	104.0	3.00	92.29	12.15	0.00	0.00	0.00	104.44	0.00
24	11,970	11,971	**2.06**	104.0	3.00	92.56	12.34	0.00	0.00	0.00	104.91	0.00
25	9,578	9,578	**5.36**	104.0	3.00	90.63	10.98	0.00	0.00	0.00	101.60	0.00
26	10,864	10,865	**3.50**	104.0	3.00	91.72	11.74	0.00	0.00	0.00	103.46	0.00
27	9,427	9,428	**5.59**	104.0	3.00	90.49	10.88	0.00	0.00	0.00	101.37	0.00
28	9,134	9,135	**6.05**	104.0	3.00	90.21	10.70	0.00	0.00	0.00	100.91	0.00
29	11,013	11,013	**3.30**	104.0	3.00	91.84	11.82	0.00	0.00	0.00	103.66	0.00
30	11,310	11,310	**2.91**	104.0	3.00	92.07	11.99	0.00	0.00	0.00	104.06	0.00
31	12,373	12,374	**1.56**	104.0	3.00	92.85	12.55	0.00	0.00	0.00	105.40	0.00
32	9,853	9,853	**4.95**	104.0	3.00	90.87	11.14	0.00	0.00	0.00	102.02	0.00
33	10,947	10,948	**3.39**	104.0	3.00	91.79	11.79	0.00	0.00	0.00	103.57	0.00
34	9,859	9,860	**4.94**	104.0	3.00	90.88	11.15	0.00	0.00	0.00	102.03	0.00
35	10,289	10,290	**4.31**	104.0	3.00	91.25	11.41	0.00	0.00	0.00	102.65	0.00
36	10,520	10,521	**3.98**	104.0	3.00	91.44	11.54	0.00	0.00	0.00	102.98	0.00
37	9,637	9,638	**5.27**	104.0	3.00	90.68	11.01	0.00	0.00	0.00	101.69	0.00
38	9,407	9,408	**5.62**	104.0	3.00	90.47	10.87	0.00	0.00	0.00	101.34	0.00
39	8,658	8,659	**6.83**	104.0	3.00	89.75	10.38	0.00	0.00	0.00	100.13	0.00
40	7,786	7,786	**8.35**	104.0	3.00	88.83	9.78	0.00	0.00	0.00	98.61	0.00
41	8,373	8,374	**7.31**	104.0	3.00	89.46	10.19	0.00	0.00	0.00	99.65	0.00
43	9,099	9,100	**6.11**	104.0	3.00	90.18	10.67	0.00	0.00	0.00	100.85	0.00
44	7,932	7,933	**8.09**	104.0	3.00	88.99	9.89	0.00	0.00	0.00	98.87	0.00
45	7,816	7,817	**8.30**	104.0	3.00	88.86	9.80	0.00	0.00	0.00	98.66	0.00
46	8,175	8,175	**7.66**	104.0	3.00	89.25	10.06	0.00	0.00	0.00	99.31	0.00
48	9,251	9,251	**5.87**	104.0	3.00	90.32	10.77	0.00	0.00	0.00	101.09	0.00
49	10,265	10,265	**4.34**	104.0	3.00	91.23	11.39	0.00	0.00	0.00	102.62	0.00
50	11,187	11,188	**3.07**	104.0	3.00	91.97	11.92	0.00	0.00	0.00	103.89	0.00
51	10,432	10,432	**4.10**	104.0	3.00	91.37	11.49	0.00	0.00	0.00	102.86	0.00
52	10,574	10,575	**3.90**	104.0	3.00	91.49	11.57	0.00	0.00	0.00	103.06	0.00
53	10,150	10,151	**4.51**	104.0	3.00	91.13	11.32	0.00	0.00	0.00	102.45	0.00
55	9,696	9,696	**5.18**	104.0	3.00	90.73	11.05	0.00	0.00	0.00	101.78	0.00
56	9,647	9,647	**5.26**	104.0	3.00	90.69	11.02	0.00	0.00	0.00	101.71	0.00
57	8,899	8,900	**6.43**	104.0	3.00	89.99	10.54	0.00	0.00	0.00	100.53	0.00
58	10,254	10,255	**4.36**	104.0	3.00	91.22	11.39	0.00	0.00	0.00	102.60	0.00
59	9,598	9,598	**5.33**	104.0	3.00	90.64	10.99	0.00	0.00	0.00	101.63	0.00
60	9,122	9,122	**6.07**	104.0	3.00	90.20	10.69	0.00	0.00	0.00	100.89	0.00
61	9,132	9,132	**6.06**	104.0	3.00	90.21	10.69	0.00	0.00	0.00	100.91	0.00
62	7,098	7,099	**9.67**	104.0	3.00	88.02	9.27	0.00	0.00	0.00	97.30	0.00
63	6,046	6,047	**11.90**	104.0	3.00	86.63	8.43	0.00	0.00	0.00	95.06	0.00
64	5,653	5,653	**12.83**	104.0	3.00	86.05	8.09	0.00	0.00	0.00	94.14	0.00
65	5,982	5,983	**12.05**	104.0	3.00	86.54	8.38	0.00	0.00	0.00	94.91	0.00
66	7,937	7,937	**8.08**	104.0	3.00	88.99	9.89	0.00	0.00	0.00	98.88	0.00
67	6,543	6,544	**10.81**	104.0	3.00	87.32	8.84	0.00	0.00	0.00	96.15	0.00
68	6,650	6,650	**10.58**	104.0	3.00	87.46	8.92	0.00	0.00	0.00	96.38	0.00
69	5,741	5,742	**12.61**	104.0	3.00	86.18	8.17	0.00	0.00	0.00	94.35	0.00
70	11,216	11,216	**3.03**	104.0	3.00	92.00	11.94	0.00	0.00	0.00	103.93	0.00
71	11,796	11,797	**2.28**	104.0	3.00	92.44	12.25	0.00	0.00	0.00	104.69	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	12,762	12,762	**1.09**	104.0	3.00	93.12	12.75	0.00	0.00	0.00	105.87	0.00
73	11,989	11,989	**2.03**	104.0	3.00	92.58	12.35	0.00	0.00	0.00	104.93	0.00
74	10,917	10,918	**3.43**	104.0	3.00	91.76	11.77	0.00	0.00	0.00	103.53	0.00
75	10,688	10,689	**3.75**	104.0	3.00	91.58	11.64	0.00	0.00	0.00	103.22	0.00
76	8,595	8,596	**6.93**	104.0	3.00	89.69	10.34	0.00	0.00	0.00	100.03	0.00
77	9,515	9,515	**5.46**	104.0	3.00	90.57	10.94	0.00	0.00	0.00	101.50	0.00
78	10,538	10,539	**3.95**	104.0	3.00	91.46	11.55	0.00	0.00	0.00	103.01	0.00
80	9,045	9,046	**6.19**	104.0	3.00	90.13	10.64	0.00	0.00	0.00	100.77	0.00
81	12,021	12,022	**1.99**	104.0	3.00	92.60	12.37	0.00	0.00	0.00	104.97	0.00
82	10,663	10,663	**3.78**	104.0	3.00	91.56	11.62	0.00	0.00	0.00	103.18	0.00
83	6,200	6,201	**11.56**	104.0	3.00	86.85	8.56	0.00	0.00	0.00	95.41	0.00
85	11,055	11,055	**3.24**	104.0	3.00	91.87	11.85	0.00	0.00	0.00	103.72	0.00
86	9,046	9,047	**6.19**	104.0	3.00	90.13	10.64	0.00	0.00	0.00	100.77	0.00
87	6,122	6,123	**11.73**	104.0	3.00	86.74	8.49	0.00	0.00	0.00	95.23	0.00
89	5,752	5,752	**12.59**	104.0	3.00	86.20	8.18	0.00	0.00	0.00	94.37	0.00
90	8,005	8,005	**7.96**	104.0	3.00	89.07	9.94	0.00	0.00	0.00	99.00	0.00
91	6,638	6,639	**10.61**	104.0	3.00	87.44	8.91	0.00	0.00	0.00	96.36	0.00
92	4,907	4,907	**14.74**	104.0	3.00	84.82	7.41	0.00	0.00	0.00	92.22	0.00
94	11,867	11,868	**2.19**	104.0	3.00	92.49	12.29	0.00	0.00	0.00	104.78	0.00
95	12,988	12,988	**0.83**	104.0	3.00	93.27	12.86	0.00	0.00	0.00	106.13	0.00
97	10,583	10,585	**3.89**	104.0	3.00	91.49	11.58	0.00	0.00	0.00	103.07	0.00
98	12,287	12,288	**1.66**	104.0	3.00	92.79	12.51	0.00	0.00	0.00	105.30	0.00
99	13,233	13,234	**0.54**	104.0	3.00	93.43	12.98	0.00	0.00	0.00	106.42	0.00
100	8,007	8,007	**7.95**	104.0	3.00	89.07	9.94	0.00	0.00	0.00	99.01	0.00
101	12,338	12,339	**1.60**	104.0	3.00	92.83	12.53	0.00	0.00	0.00	105.36	0.00
102	8,210	8,212	**7.59**	104.0	3.00	89.29	10.08	0.00	0.00	0.00	99.37	0.00
103	13,120	13,121	**0.67**	104.0	3.00	93.36	12.93	0.00	0.00	0.00	106.29	0.00
104	8,764	8,765	**6.65**	104.0	3.00	89.85	10.45	0.00	0.00	0.00	100.31	0.00
107	11,222	11,223	**3.02**	104.0	3.00	92.00	11.94	0.00	0.00	0.00	103.94	0.00
108	13,943	13,943	**-0.25**	104.0	3.00	93.89	13.32	0.00	0.00	0.00	107.21	0.00
109	9,524	9,524	**5.44**	104.0	3.00	90.58	10.94	0.00	0.00	0.00	101.52	0.00
110	8,958	8,959	**6.34**	104.0	3.00	90.04	10.58	0.00	0.00	0.00	100.63	0.00
111	8,726	8,726	**6.72**	104.0	3.00	89.82	10.43	0.00	0.00	0.00	100.25	0.00
113	11,508	11,509	**2.65**	104.0	3.00	92.22	12.10	0.00	0.00	0.00	104.32	0.00
114	10,951	10,951	**3.39**	104.0	3.00	91.79	11.79	0.00	0.00	0.00	103.58	0.00
115	13,305	13,305	**0.46**	104.0	3.00	93.48	13.02	0.00	0.00	0.00	106.50	0.00
116	8,947	8,948	**6.35**	104.0	3.00	90.03	10.57	0.00	0.00	0.00	100.61	0.00
118	9,528	9,528	**5.44**	104.0	3.00	90.58	10.94	0.00	0.00	0.00	101.53	0.00
119	11,341	11,342	**2.86**	104.0	3.00	92.09	12.00	0.00	0.00	0.00	104.10	0.00
120	12,576	12,576	**1.31**	104.0	3.00	92.99	12.66	0.00	0.00	0.00	105.65	0.00
121	10,750	10,751	**3.66**	104.0	3.00	91.63	11.67	0.00	0.00	0.00	103.30	0.00
125	6,112	6,113	**11.75**	104.0	3.00	86.73	8.49	0.00	0.00	0.00	95.21	0.00
126	7,326	7,326	**9.22**	104.0	3.00	88.30	9.44	0.00	0.00	0.00	97.74	0.00
127	7,325	7,326	**9.22**	104.0	3.00	88.30	9.44	0.00	0.00	0.00	97.74	0.00
128	7,475	7,475	**8.93**	104.0	3.00	88.47	9.56	0.00	0.00	0.00	98.03	0.00
129	8,986	8,986	**6.29**	104.0	3.00	90.07	10.60	0.00	0.00	0.00	100.67	0.00
130	8,465	8,466	**7.15**	104.0	3.00	89.55	10.25	0.00	0.00	0.00	99.81	0.00
131	8,693	8,693	**6.77**	104.0	3.00	89.78	10.41	0.00	0.00	0.00	100.19	0.00
132	9,043	9,043	**6.20**	104.0	3.00	90.13	10.64	0.00	0.00	0.00	100.76	0.00
133	8,815	8,816	**6.57**	104.0	3.00	89.91	10.49	0.00	0.00	0.00	100.39	0.00
134	11,302	11,302	**2.92**	104.0	3.00	92.06	11.98	0.00	0.00	0.00	104.05	0.00
141	10,626	10,627	**3.83**	104.0	3.00	91.53	11.60	0.00	0.00	0.00	103.13	0.00
142	8,361	8,363	**7.33**	104.0	3.00	89.45	10.18	0.00	0.00	0.00	99.63	0.00
143	10,872	10,873	**3.49**	104.0	3.00	91.73	11.74	0.00	0.00	0.00	103.47	0.00
144	7,606	7,607	**8.69**	104.0	3.00	88.62	9.65	0.00	0.00	0.00	98.27	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	7,968	7,969	**8.02**	104.0	3.00	89.03	9.91	0.00	0.00	0.00	98.94	0.00
146	8,049	8,049	**7.88**	104.0	3.00	89.11	9.97	0.00	0.00	0.00	99.08	0.00
Sum	27.44											

Noise sensitive area: H44 H44

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	11,085	11,085	**3.20**	104.0	3.00	91.89	11.86	0.00	0.00	0.00	103.76	0.00
2	11,346	11,347	**2.86**	104.0	3.00	92.10	12.01	0.00	0.00	0.00	104.10	0.00
3	11,153	11,154	**3.11**	104.0	3.00	91.95	11.90	0.00	0.00	0.00	103.85	0.00
4	11,417	11,418	**2.76**	104.0	3.00	92.15	12.05	0.00	0.00	0.00	104.20	0.00
5	10,696	10,697	**3.73**	104.0	3.00	91.59	11.64	0.00	0.00	0.00	103.23	0.00
6	10,704	10,704	**3.72**	104.0	3.00	91.59	11.65	0.00	0.00	0.00	103.24	0.00
7	8,794	8,795	**6.60**	104.0	3.00	89.88	10.47	0.00	0.00	0.00	100.36	0.00
8	11,468	11,468	**2.70**	104.0	3.00	92.19	12.07	0.00	0.00	0.00	104.26	0.00
9	10,624	10,625	**3.83**	104.0	3.00	91.53	11.60	0.00	0.00	0.00	103.13	0.00
10	10,058	10,059	**4.64**	104.0	3.00	91.05	11.27	0.00	0.00	0.00	102.32	0.00
11	10,410	10,411	**4.13**	104.0	3.00	91.35	11.48	0.00	0.00	0.00	102.83	0.00
12	10,373	10,374	**4.19**	104.0	3.00	91.32	11.46	0.00	0.00	0.00	102.77	0.00
13	10,014	10,016	**4.71**	104.0	3.00	91.01	11.24	0.00	0.00	0.00	102.26	0.00
14	9,657	9,658	**5.24**	104.0	3.00	90.70	11.03	0.00	0.00	0.00	101.72	0.00
15	9,365	9,366	**5.69**	104.0	3.00	90.43	10.84	0.00	0.00	0.00	101.27	0.00
16	9,399	9,400	**5.63**	104.0	3.00	90.46	10.86	0.00	0.00	0.00	101.33	0.00
17	10,524	10,525	**3.97**	104.0	3.00	91.44	11.54	0.00	0.00	0.00	102.99	0.00
18	10,412	10,413	**4.13**	104.0	3.00	91.35	11.48	0.00	0.00	0.00	102.83	0.00
19	9,600	9,602	**5.32**	104.0	3.00	90.65	10.99	0.00	0.00	0.00	101.64	0.00
20	8,897	8,898	**6.43**	104.0	3.00	89.99	10.54	0.00	0.00	0.00	100.53	0.00
21	10,684	10,685	**3.75**	104.0	3.00	91.58	11.64	0.00	0.00	0.00	103.21	0.00
22	11,008	11,008	**3.31**	104.0	3.00	91.83	11.82	0.00	0.00	0.00	103.65	0.00
23	10,910	10,911	**3.44**	104.0	3.00	91.76	11.76	0.00	0.00	0.00	103.52	0.00
24	11,091	11,091	**3.20**	104.0	3.00	91.90	11.87	0.00	0.00	0.00	103.77	0.00
25	9,393	9,394	**5.64**	104.0	3.00	90.46	10.86	0.00	0.00	0.00	101.32	0.00
26	9,721	9,722	**5.14**	104.0	3.00	90.75	11.06	0.00	0.00	0.00	101.82	0.00
27	8,933	8,933	**6.38**	104.0	3.00	90.02	10.57	0.00	0.00	0.00	100.59	0.00
28	8,282	8,283	**7.47**	104.0	3.00	89.36	10.13	0.00	0.00	0.00	99.49	0.00
29	10,289	10,289	**4.31**	104.0	3.00	91.25	11.41	0.00	0.00	0.00	102.65	0.00
30	10,750	10,750	**3.66**	104.0	3.00	91.63	11.67	0.00	0.00	0.00	103.30	0.00
31	11,716	11,717	**2.38**	104.0	3.00	92.38	12.21	0.00	0.00	0.00	104.58	0.00
32	9,805	9,805	**5.02**	104.0	3.00	90.83	11.12	0.00	0.00	0.00	101.94	0.00
33	10,581	10,581	**3.89**	104.0	3.00	91.49	11.58	0.00	0.00	0.00	103.07	0.00
34	8,698	8,699	**6.76**	104.0	3.00	89.79	10.41	0.00	0.00	0.00	100.20	0.00
35	8,920	8,921	**6.40**	104.0	3.00	90.01	10.56	0.00	0.00	0.00	100.57	0.00
36	9,061	9,062	**6.17**	104.0	3.00	90.14	10.65	0.00	0.00	0.00	100.79	0.00
37	8,584	8,585	**6.95**	104.0	3.00	89.67	10.33	0.00	0.00	0.00	100.01	0.00
38	9,088	9,088	**6.13**	104.0	3.00	90.17	10.67	0.00	0.00	0.00	100.84	0.00
39	8,203	8,204	**7.61**	104.0	3.00	89.28	10.08	0.00	0.00	0.00	99.36	0.00
40	6,579	6,580	**10.73**	104.0	3.00	87.36	8.87	0.00	0.00	0.00	96.23	0.00
41	7,861	7,863	**8.21**	104.0	3.00	88.91	9.84	0.00	0.00	0.00	98.75	0.00
43	8,150	8,151	**7.70**	104.0	3.00	89.22	10.04	0.00	0.00	0.00	99.26	0.00
44	7,392	7,393	**9.09**	104.0	3.00	88.38	9.49	0.00	0.00	0.00	97.87	0.00
45	7,425	7,426	**9.03**	104.0	3.00	88.42	9.52	0.00	0.00	0.00	97.93	0.00
46	7,130	7,131	**9.60**	104.0	3.00	88.06	9.30	0.00	0.00	0.00	97.36	0.00
48	9,445	9,446	**5.56**	104.0	3.00	90.50	10.89	0.00	0.00	0.00	101.40	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	10,554	10,554	**3.93**	104.0	3.00	91.47	11.56	0.00	0.00	0.00	103.03	0.00
50	9,773	9,774	**5.06**	104.0	3.00	90.80	11.10	0.00	0.00	0.00	101.90	0.00
51	10,551	10,551	**3.94**	104.0	3.00	91.47	11.56	0.00	0.00	0.00	103.02	0.00
52	10,584	10,584	**3.89**	104.0	3.00	91.49	11.58	0.00	0.00	0.00	103.07	0.00
53	10,559	10,559	**3.93**	104.0	3.00	91.47	11.56	0.00	0.00	0.00	103.04	0.00
55	10,642	10,642	**3.81**	104.0	3.00	91.54	11.61	0.00	0.00	0.00	103.15	0.00
56	10,703	10,704	**3.72**	104.0	3.00	91.59	11.65	0.00	0.00	0.00	103.24	0.00
57	9,947	9,947	**4.81**	104.0	3.00	90.95	11.20	0.00	0.00	0.00	102.16	0.00
58	9,955	9,955	**4.79**	104.0	3.00	90.96	11.21	0.00	0.00	0.00	102.17	0.00
59	10,766	10,766	**3.64**	104.0	3.00	91.64	11.68	0.00	0.00	0.00	103.32	0.00
60	10,806	10,806	**3.58**	104.0	3.00	91.67	11.71	0.00	0.00	0.00	103.38	0.00
61	10,934	10,935	**3.41**	104.0	3.00	91.78	11.78	0.00	0.00	0.00	103.55	0.00
62	8,951	8,952	**6.35**	104.0	3.00	90.04	10.58	0.00	0.00	0.00	100.62	0.00
63	8,179	8,180	**7.65**	104.0	3.00	89.26	10.06	0.00	0.00	0.00	99.31	0.00
64	8,370	8,370	**7.32**	104.0	3.00	89.45	10.19	0.00	0.00	0.00	99.64	0.00
65	8,870	8,870	**6.48**	104.0	3.00	89.96	10.52	0.00	0.00	0.00	100.48	0.00
66	6,579	6,580	**10.73**	104.0	3.00	87.36	8.87	0.00	0.00	0.00	96.23	0.00
67	9,140	9,141	**6.04**	104.0	3.00	90.22	10.70	0.00	0.00	0.00	100.92	0.00
68	9,420	9,420	**5.60**	104.0	3.00	90.48	10.88	0.00	0.00	0.00	101.36	0.00
69	8,634	8,635	**6.87**	104.0	3.00	89.73	10.37	0.00	0.00	0.00	100.09	0.00
70	8,825	8,826	**6.55**	104.0	3.00	89.92	10.49	0.00	0.00	0.00	100.41	0.00
71	9,968	9,969	**4.77**	104.0	3.00	90.97	11.21	0.00	0.00	0.00	102.19	0.00
72	11,538	11,538	**2.61**	104.0	3.00	92.24	12.11	0.00	0.00	0.00	104.35	0.00
73	10,562	10,562	**3.92**	104.0	3.00	91.48	11.57	0.00	0.00	0.00	103.04	0.00
74	9,579	9,580	**5.36**	104.0	3.00	90.63	10.98	0.00	0.00	0.00	101.60	0.00
75	9,787	9,788	**5.04**	104.0	3.00	90.81	11.10	0.00	0.00	0.00	101.92	0.00
76	9,363	9,363	**5.69**	104.0	3.00	90.43	10.84	0.00	0.00	0.00	101.27	0.00
77	10,041	10,042	**4.67**	104.0	3.00	91.04	11.26	0.00	0.00	0.00	102.29	0.00
78	8,564	8,565	**6.99**	104.0	3.00	89.65	10.32	0.00	0.00	0.00	99.98	0.00
80	10,602	10,602	**3.87**	104.0	3.00	91.51	11.59	0.00	0.00	0.00	103.10	0.00
81	9,682	9,684	**5.20**	104.0	3.00	90.72	11.04	0.00	0.00	0.00	101.76	0.00
82	10,496	10,496	**4.01**	104.0	3.00	91.42	11.53	0.00	0.00	0.00	102.95	0.00
83	8,577	8,578	**6.96**	104.0	3.00	89.67	10.33	0.00	0.00	0.00	100.00	0.00
85	11,410	11,410	**2.77**	104.0	3.00	92.15	12.04	0.00	0.00	0.00	104.19	0.00
86	10,501	10,502	**4.01**	104.0	3.00	91.43	11.53	0.00	0.00	0.00	102.96	0.00
87	9,064	9,065	**6.16**	104.0	3.00	90.15	10.65	0.00	0.00	0.00	100.80	0.00
89	8,272	8,272	**7.49**	104.0	3.00	89.35	10.12	0.00	0.00	0.00	99.47	0.00
90	9,266	9,266	**5.84**	104.0	3.00	90.34	10.78	0.00	0.00	0.00	101.12	0.00
91	8,593	8,593	**6.94**	104.0	3.00	89.68	10.34	0.00	0.00	0.00	100.02	0.00
92	7,849	7,850	**8.24**	104.0	3.00	88.90	9.83	0.00	0.00	0.00	98.72	0.00
94	9,848	9,849	**4.95**	104.0	3.00	90.87	11.14	0.00	0.00	0.00	102.01	0.00
95	10,816	10,817	**3.57**	104.0	3.00	91.68	11.71	0.00	0.00	0.00	103.39	0.00
97	8,815	8,817	**6.57**	104.0	3.00	89.91	10.49	0.00	0.00	0.00	100.40	0.00
98	10,207	10,208	**4.42**	104.0	3.00	91.18	11.36	0.00	0.00	0.00	102.54	0.00
99	11,699	11,700	**2.40**	104.0	3.00	92.36	12.20	0.00	0.00	0.00	104.56	0.00
100	7,765	7,766	**8.39**	104.0	3.00	88.80	9.77	0.00	0.00	0.00	98.57	0.00
101	9,913	9,914	**4.85**	104.0	3.00	90.93	11.18	0.00	0.00	0.00	102.11	0.00
102	7,552	7,553	**8.79**	104.0	3.00	88.56	9.61	0.00	0.00	0.00	98.17	0.00
103	10,594	10,595	**3.88**	104.0	3.00	91.50	11.58	0.00	0.00	0.00	103.09	0.00
104	8,081	8,082	**7.82**	104.0	3.00	89.15	9.99	0.00	0.00	0.00	99.14	0.00
107	9,070	9,071	**6.15**	104.0	3.00	90.15	10.65	0.00	0.00	0.00	100.81	0.00
108	12,506	12,506	**1.40**	104.0	3.00	92.94	12.62	0.00	0.00	0.00	105.56	0.00
109	10,804	10,804	**3.59**	104.0	3.00	91.67	11.70	0.00	0.00	0.00	103.38	0.00
110	9,302	9,302	**5.79**	104.0	3.00	90.37	10.80	0.00	0.00	0.00	101.17	0.00
111	9,326	9,327	**5.75**	104.0	3.00	90.39	10.82	0.00	0.00	0.00	101.21	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	9,292	9,294	**5.80**	104.0	3.00	90.36	10.80	0.00	0.00	0.00	101.16	0.00
114	11,406	11,406	**2.78**	104.0	3.00	92.14	12.04	0.00	0.00	0.00	104.18	0.00
115	11,363	11,363	**2.84**	104.0	3.00	92.11	12.02	0.00	0.00	0.00	104.13	0.00
116	7,753	7,754	**8.41**	104.0	3.00	88.79	9.76	0.00	0.00	0.00	98.55	0.00
118	10,974	10,974	**3.35**	104.0	3.00	91.81	11.80	0.00	0.00	0.00	103.61	0.00
119	9,765	9,766	**5.08**	104.0	3.00	90.79	11.09	0.00	0.00	0.00	101.89	0.00
120	10,053	10,054	**4.65**	104.0	3.00	91.05	11.27	0.00	0.00	0.00	102.31	0.00
121	9,189	9,190	**5.96**	104.0	3.00	90.27	10.73	0.00	0.00	0.00	101.00	0.00
125	8,382	8,383	**7.30**	104.0	3.00	89.47	10.20	0.00	0.00	0.00	99.67	0.00
126	7,733	7,734	**8.45**	104.0	3.00	88.77	9.74	0.00	0.00	0.00	98.51	0.00
127	7,850	7,851	**8.24**	104.0	3.00	88.90	9.83	0.00	0.00	0.00	98.73	0.00
128	8,099	8,100	**7.79**	104.0	3.00	89.17	10.00	0.00	0.00	0.00	99.17	0.00
129	6,976	6,977	**9.91**	104.0	3.00	87.87	9.18	0.00	0.00	0.00	97.05	0.00
130	6,351	6,352	**11.22**	104.0	3.00	87.06	8.68	0.00	0.00	0.00	95.74	0.00
131	6,401	6,402	**11.11**	104.0	3.00	87.13	8.72	0.00	0.00	0.00	95.85	0.00
132	6,640	6,641	**10.60**	104.0	3.00	87.45	8.92	0.00	0.00	0.00	96.36	0.00
133	8,554	8,555	**7.00**	104.0	3.00	89.64	10.31	0.00	0.00	0.00	99.96	0.00
134	8,987	8,988	**6.29**	104.0	3.00	90.07	10.60	0.00	0.00	0.00	100.67	0.00
141	8,938	8,940	**6.37**	104.0	3.00	90.03	10.57	0.00	0.00	0.00	100.60	0.00
142	7,573	7,575	**8.75**	104.0	3.00	88.59	9.63	0.00	0.00	0.00	98.22	0.00
143	8,995	8,996	**6.27**	104.0	3.00	90.08	10.61	0.00	0.00	0.00	100.69	0.00
144	7,364	7,365	**9.14**	104.0	3.00	88.34	9.47	0.00	0.00	0.00	97.82	0.00
145	9,038	9,039	**6.21**	104.0	3.00	90.12	10.63	0.00	0.00	0.00	100.76	0.00
146	8,980	8,981	**6.30**	104.0	3.00	90.07	10.60	0.00	0.00	0.00	100.66	0.00

Sum 27.16

Noise sensitive area: H45 H45

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	13,826	13,827	**-0.12**	104.0	3.00	93.81	13.27	0.00	0.00	0.00	107.08	0.00
2	14,000	14,000	**-0.31**	104.0	3.00	93.92	13.35	0.00	0.00	0.00	107.27	0.00
3	13,693	13,693	**0.03**	104.0	3.00	93.73	13.21	0.00	0.00	0.00	106.94	0.00
4	13,583	13,583	**0.15**	104.0	3.00	93.66	13.15	0.00	0.00	0.00	106.81	0.00
5	12,973	12,973	**0.85**	104.0	3.00	93.26	12.86	0.00	0.00	0.00	106.12	0.00
6	13,172	13,172	**0.61**	104.0	3.00	93.39	12.95	0.00	0.00	0.00	106.35	0.00
7	11,057	11,058	**3.24**	104.0	3.00	91.87	11.85	0.00	0.00	0.00	103.72	0.00
8	14,304	14,304	**-0.64**	104.0	3.00	94.11	13.49	0.00	0.00	0.00	107.60	0.00
9	13,321	13,321	**0.44**	104.0	3.00	93.49	13.03	0.00	0.00	0.00	106.52	0.00
10	12,818	12,819	**1.03**	104.0	3.00	93.16	12.78	0.00	0.00	0.00	105.94	0.00
11	13,479	13,479	**0.27**	104.0	3.00	93.59	13.10	0.00	0.00	0.00	106.70	0.00
12	13,402	13,403	**0.35**	104.0	3.00	93.54	13.07	0.00	0.00	0.00	106.61	0.00
13	12,989	12,989	**0.83**	104.0	3.00	93.27	12.86	0.00	0.00	0.00	106.14	0.00
14	12,590	12,591	**1.30**	104.0	3.00	93.00	12.66	0.00	0.00	0.00	105.67	0.00
15	12,136	12,137	**1.85**	104.0	3.00	92.68	12.43	0.00	0.00	0.00	105.11	0.00
16	12,072	12,073	**1.93**	104.0	3.00	92.64	12.40	0.00	0.00	0.00	105.03	0.00
17	13,627	13,627	**0.10**	104.0	3.00	93.69	13.17	0.00	0.00	0.00	106.86	0.00
18	13,569	13,569	**0.16**	104.0	3.00	93.65	13.15	0.00	0.00	0.00	106.80	0.00
19	12,610	12,611	**1.27**	104.0	3.00	93.02	12.67	0.00	0.00	0.00	105.69	0.00
20	11,735	11,736	**2.35**	104.0	3.00	92.39	12.22	0.00	0.00	0.00	104.61	0.00
21	12,806	12,806	**1.04**	104.0	3.00	93.15	12.77	0.00	0.00	0.00	105.92	0.00
22	12,918	12,918	**0.91**	104.0	3.00	93.22	12.83	0.00	0.00	0.00	106.05	0.00
23	12,724	12,725	**1.14**	104.0	3.00	93.09	12.73	0.00	0.00	0.00	105.82	0.00
24	13,059	13,059	**0.75**	104.0	3.00	93.32	12.90	0.00	0.00	0.00	106.22	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	10,762	10,762	**3.64**	104.0	3.00	91.64	11.68	0.00	0.00	0.00	103.32	0.00
26	11,890	11,890	**2.16**	104.0	3.00	92.50	12.30	0.00	0.00	0.00	104.80	0.00
27	10,561	10,561	**3.92**	104.0	3.00	91.47	11.56	0.00	0.00	0.00	103.04	0.00
28	10,198	10,198	**4.44**	104.0	3.00	91.17	11.35	0.00	0.00	0.00	102.52	0.00
29	12,122	12,122	**1.87**	104.0	3.00	92.67	12.42	0.00	0.00	0.00	105.09	0.00
30	12,451	12,451	**1.47**	104.0	3.00	92.90	12.59	0.00	0.00	0.00	105.50	0.00
31	13,505	13,506	**0.24**	104.0	3.00	93.61	13.12	0.00	0.00	0.00	106.73	0.00
32	11,059	11,059	**3.24**	104.0	3.00	91.87	11.85	0.00	0.00	0.00	103.72	0.00
33	12,116	12,117	**1.87**	104.0	3.00	92.67	12.42	0.00	0.00	0.00	105.09	0.00
34	10,869	10,870	**3.50**	104.0	3.00	91.72	11.74	0.00	0.00	0.00	103.47	0.00
35	11,257	11,258	**2.97**	104.0	3.00	92.03	11.96	0.00	0.00	0.00	103.99	0.00
36	11,470	11,471	**2.69**	104.0	3.00	92.19	12.08	0.00	0.00	0.00	104.27	0.00
37	10,667	10,667	**3.77**	104.0	3.00	91.56	11.63	0.00	0.00	0.00	103.19	0.00
38	10,569	10,569	**3.91**	104.0	3.00	91.48	11.57	0.00	0.00	0.00	103.05	0.00
39	9,788	9,789	**5.04**	104.0	3.00	90.81	11.11	0.00	0.00	0.00	101.92	0.00
40	8,750	8,750	**6.68**	104.0	3.00	89.84	10.45	0.00	0.00	0.00	100.29	0.00
41	9,488	9,489	**5.50**	104.0	3.00	90.54	10.92	0.00	0.00	0.00	101.46	0.00
43	10,143	10,144	**4.52**	104.0	3.00	91.12	11.32	0.00	0.00	0.00	102.44	0.00
44	9,035	9,036	**6.21**	104.0	3.00	90.12	10.63	0.00	0.00	0.00	100.75	0.00
45	8,943	8,944	**6.36**	104.0	3.00	90.03	10.57	0.00	0.00	0.00	100.60	0.00
46	9,183	9,183	**5.97**	104.0	3.00	90.26	10.73	0.00	0.00	0.00	100.99	0.00
48	10,484	10,484	**4.03**	104.0	3.00	91.41	11.52	0.00	0.00	0.00	102.93	0.00
49	11,517	11,517	**2.63**	104.0	3.00	92.23	12.10	0.00	0.00	0.00	104.33	0.00
50	12,155	12,156	**1.83**	104.0	3.00	92.70	12.44	0.00	0.00	0.00	105.14	0.00
51	11,665	11,665	**2.44**	104.0	3.00	92.34	12.18	0.00	0.00	0.00	104.52	0.00
52	11,794	11,795	**2.28**	104.0	3.00	92.43	12.25	0.00	0.00	0.00	104.68	0.00
53	11,414	11,414	**2.77**	104.0	3.00	92.15	12.04	0.00	0.00	0.00	104.19	0.00
55	11,001	11,001	**3.32**	104.0	3.00	91.83	11.82	0.00	0.00	0.00	103.64	0.00
56	10,958	10,958	**3.38**	104.0	3.00	91.79	11.79	0.00	0.00	0.00	103.59	0.00
57	10,207	10,207	**4.43**	104.0	3.00	91.18	11.36	0.00	0.00	0.00	102.54	0.00
58	11,428	11,428	**2.75**	104.0	3.00	92.16	12.05	0.00	0.00	0.00	104.21	0.00
59	10,914	10,914	**3.44**	104.0	3.00	91.76	11.77	0.00	0.00	0.00	103.53	0.00
60	10,444	10,445	**4.09**	104.0	3.00	91.38	11.50	0.00	0.00	0.00	102.87	0.00
61	10,452	10,452	**4.08**	104.0	3.00	91.38	11.50	0.00	0.00	0.00	102.89	0.00
62	8,420	8,420	**7.23**	104.0	3.00	89.51	10.22	0.00	0.00	0.00	99.73	0.00
63	7,363	7,363	**9.15**	104.0	3.00	88.34	9.47	0.00	0.00	0.00	97.81	0.00
64	6,913	6,913	**10.04**	104.0	3.00	87.79	9.13	0.00	0.00	0.00	96.92	0.00
65	7,203	7,203	**9.46**	104.0	3.00	88.15	9.35	0.00	0.00	0.00	97.50	0.00
66	8,870	8,870	**6.48**	104.0	3.00	89.96	10.52	0.00	0.00	0.00	100.48	0.00
67	7,811	7,811	**8.31**	104.0	3.00	88.85	9.80	0.00	0.00	0.00	98.65	0.00
68	7,886	7,886	**8.17**	104.0	3.00	88.94	9.85	0.00	0.00	0.00	98.79	0.00
69	6,964	6,964	**9.93**	104.0	3.00	87.86	9.17	0.00	0.00	0.00	97.03	0.00
70	11,912	11,912	**2.13**	104.0	3.00	92.52	12.31	0.00	0.00	0.00	104.83	0.00
71	12,666	12,667	**1.21**	104.0	3.00	93.05	12.70	0.00	0.00	0.00	105.76	0.00
72	13,787	13,787	**-0.08**	104.0	3.00	93.79	13.25	0.00	0.00	0.00	107.04	0.00
73	12,962	12,962	**0.86**	104.0	3.00	93.25	12.85	0.00	0.00	0.00	106.10	0.00
74	11,900	11,901	**2.14**	104.0	3.00	92.51	12.31	0.00	0.00	0.00	104.82	0.00
75	11,761	11,762	**2.32**	104.0	3.00	92.41	12.23	0.00	0.00	0.00	104.64	0.00
76	9,882	9,882	**4.90**	104.0	3.00	90.90	11.16	0.00	0.00	0.00	102.06	0.00
77	10,786	10,786	**3.61**	104.0	3.00	91.66	11.69	0.00	0.00	0.00	103.35	0.00
78	11,355	11,356	**2.85**	104.0	3.00	92.10	12.01	0.00	0.00	0.00	104.12	0.00
80	10,368	10,369	**4.19**	104.0	3.00	91.31	11.45	0.00	0.00	0.00	102.77	0.00
81	12,742	12,743	**1.12**	104.0	3.00	93.11	12.74	0.00	0.00	0.00	105.85	0.00
82	11,860	11,860	**2.20**	104.0	3.00	92.48	12.28	0.00	0.00	0.00	104.77	0.00
83	7,498	7,498	**8.89**	104.0	3.00	88.50	9.57	0.00	0.00	0.00	98.07	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	12,318	12,319	**1.63**	104.0	3.00	92.81	12.52	0.00	0.00	0.00	105.34	0.00
86	10,369	10,369	**4.19**	104.0	3.00	91.31	11.45	0.00	0.00	0.00	102.77	0.00
87	7,327	7,327	**9.22**	104.0	3.00	88.30	9.45	0.00	0.00	0.00	97.74	0.00
89	7,039	7,039	**9.78**	104.0	3.00	87.95	9.23	0.00	0.00	0.00	97.18	0.00
90	9,320	9,320	**5.76**	104.0	3.00	90.39	10.81	0.00	0.00	0.00	101.20	0.00
91	7,959	7,959	**8.04**	104.0	3.00	89.02	9.90	0.00	0.00	0.00	98.92	0.00
92	6,134	6,135	**11.70**	104.0	3.00	86.76	8.50	0.00	0.00	0.00	95.26	0.00
94	12,685	12,686	**1.18**	104.0	3.00	93.07	12.71	0.00	0.00	0.00	105.78	0.00
95	13,769	13,770	**-0.06**	104.0	3.00	93.78	13.24	0.00	0.00	0.00	107.02	0.00
97	11,457	11,458	**2.71**	104.0	3.00	92.18	12.07	0.00	0.00	0.00	104.25	0.00
98	13,091	13,091	**0.71**	104.0	3.00	93.34	12.91	0.00	0.00	0.00	106.25	0.00
99	14,191	14,191	**-0.52**	104.0	3.00	94.04	13.44	0.00	0.00	0.00	107.48	0.00
100	9,162	9,163	**6.01**	104.0	3.00	90.24	10.71	0.00	0.00	0.00	100.95	0.00
101	13,033	13,033	**0.78**	104.0	3.00	93.30	12.89	0.00	0.00	0.00	106.19	0.00
102	9,297	9,298	**5.79**	104.0	3.00	90.37	10.80	0.00	0.00	0.00	101.17	0.00
103	13,785	13,786	**-0.08**	104.0	3.00	93.79	13.25	0.00	0.00	0.00	107.04	0.00
104	9,854	9,855	**4.94**	104.0	3.00	90.87	11.15	0.00	0.00	0.00	102.02	0.00
107	11,994	11,995	**2.03**	104.0	3.00	92.58	12.36	0.00	0.00	0.00	104.94	0.00
108	14,928	14,928	**-1.29**	104.0	3.00	94.48	13.78	0.00	0.00	0.00	108.26	0.00
109	10,843	10,843	**3.53**	104.0	3.00	91.70	11.73	0.00	0.00	0.00	103.43	0.00
110	10,206	10,206	**4.43**	104.0	3.00	91.18	11.36	0.00	0.00	0.00	102.53	0.00
111	9,999	9,999	**4.73**	104.0	3.00	91.00	11.23	0.00	0.00	0.00	102.23	0.00
113	12,263	12,264	**1.69**	104.0	3.00	92.77	12.50	0.00	0.00	0.00	105.27	0.00
114	12,224	12,224	**1.74**	104.0	3.00	92.74	12.48	0.00	0.00	0.00	105.22	0.00
115	14,156	14,157	**-0.48**	104.0	3.00	94.02	13.42	0.00	0.00	0.00	107.44	0.00
116	9,936	9,937	**4.82**	104.0	3.00	90.95	11.20	0.00	0.00	0.00	102.14	0.00
118	10,851	10,851	**3.52**	104.0	3.00	91.71	11.73	0.00	0.00	0.00	103.44	0.00
119	12,272	12,273	**1.68**	104.0	3.00	92.78	12.50	0.00	0.00	0.00	105.28	0.00
120	13,238	13,239	**0.54**	104.0	3.00	93.44	12.99	0.00	0.00	0.00	106.42	0.00
121	11,679	11,679	**2.43**	104.0	3.00	92.35	12.19	0.00	0.00	0.00	104.54	0.00
125	7,420	7,421	**9.04**	104.0	3.00	88.41	9.51	0.00	0.00	0.00	97.92	0.00
126	8,563	8,564	**6.99**	104.0	3.00	89.65	10.32	0.00	0.00	0.00	99.97	0.00
127	8,577	8,577	**6.97**	104.0	3.00	89.67	10.33	0.00	0.00	0.00	100.00	0.00
128	8,739	8,739	**6.69**	104.0	3.00	89.83	10.44	0.00	0.00	0.00	100.27	0.00
129	9,770	9,771	**5.07**	104.0	3.00	90.80	11.09	0.00	0.00	0.00	101.89	0.00
130	9,210	9,211	**5.93**	104.0	3.00	90.29	10.74	0.00	0.00	0.00	101.03	0.00
131	9,388	9,388	**5.65**	104.0	3.00	90.45	10.86	0.00	0.00	0.00	101.31	0.00
132	9,708	9,708	**5.16**	104.0	3.00	90.74	11.06	0.00	0.00	0.00	101.80	0.00
133	9,979	9,980	**4.76**	104.0	3.00	90.98	11.22	0.00	0.00	0.00	102.20	0.00
134	12,024	12,024	**1.99**	104.0	3.00	92.60	12.37	0.00	0.00	0.00	104.97	0.00
141	11,521	11,522	**2.63**	104.0	3.00	92.23	12.10	0.00	0.00	0.00	104.33	0.00
142	9,425	9,427	**5.59**	104.0	3.00	90.49	10.88	0.00	0.00	0.00	101.37	0.00
143	11,720	11,721	**2.37**	104.0	3.00	92.38	12.21	0.00	0.00	0.00	104.59	0.00
144	8,755	8,755	**6.67**	104.0	3.00	89.85	10.45	0.00	0.00	0.00	100.29	0.00
145	9,273	9,274	**5.83**	104.0	3.00	90.35	10.78	0.00	0.00	0.00	101.13	0.00
146	9,345	9,345	**5.72**	104.0	3.00	90.41	10.83	0.00	0.00	0.00	101.24	0.00

Sum 25.46

Noise sensitive area: H46 H46

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	19,533	19,533	**-5.48**	104.0	3.00	96.82	15.63	0.00	0.00	0.00	112.44	0.00
2	19,578	19,578	**-5.52**	104.0	3.00	96.84	15.64	0.00	0.00	0.00	112.48	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	19,140	19,140	**-5.16**	104.0	3.00	96.64	15.48	0.00	0.00	0.00	112.12	0.00
4	18,538	18,538	**-4.66**	104.0	3.00	96.36	15.26	0.00	0.00	0.00	111.62	0.00
5	18,134	18,134	**-4.31**	104.0	3.00	96.17	15.10	0.00	0.00	0.00	111.27	0.00
6	18,567	18,567	**-4.68**	104.0	3.00	96.37	15.27	0.00	0.00	0.00	111.64	0.00
7	16,402	16,403	**-2.75**	104.0	3.00	95.30	14.41	0.00	0.00	0.00	109.71	0.00
8	20,109	20,109	**-5.94**	104.0	3.00	97.07	15.83	0.00	0.00	0.00	112.90	0.00
9	19,002	19,002	**-5.04**	104.0	3.00	96.58	15.43	0.00	0.00	0.00	112.01	0.00
10	18,616	18,616	**-4.72**	104.0	3.00	96.40	15.29	0.00	0.00	0.00	111.68	0.00
11	19,635	19,636	**-5.56**	104.0	3.00	96.86	15.66	0.00	0.00	0.00	112.52	0.00
12	19,510	19,510	**-5.46**	104.0	3.00	96.81	15.62	0.00	0.00	0.00	112.42	0.00
13	19,047	19,048	**-5.08**	104.0	3.00	96.60	15.45	0.00	0.00	0.00	112.04	0.00
14	18,620	18,621	**-4.73**	104.0	3.00	96.40	15.29	0.00	0.00	0.00	111.69	0.00
15	17,995	17,996	**-4.19**	104.0	3.00	96.10	15.05	0.00	0.00	0.00	111.15	0.00
16	17,815	17,815	**-4.03**	104.0	3.00	96.02	14.98	0.00	0.00	0.00	110.99	0.00
17	19,820	19,821	**-5.71**	104.0	3.00	96.94	15.73	0.00	0.00	0.00	112.67	0.00
18	19,837	19,837	**-5.72**	104.0	3.00	96.95	15.74	0.00	0.00	0.00	112.68	0.00
19	18,735	18,735	**-4.82**	104.0	3.00	96.45	15.33	0.00	0.00	0.00	111.78	0.00
20	17,704	17,704	**-3.93**	104.0	3.00	95.96	14.93	0.00	0.00	0.00	110.90	0.00
21	17,778	17,779	**-4.00**	104.0	3.00	96.00	14.96	0.00	0.00	0.00	110.96	0.00
22	17,596	17,596	**-3.84**	104.0	3.00	95.91	14.89	0.00	0.00	0.00	110.80	0.00
23	17,295	17,295	**-3.57**	104.0	3.00	95.76	14.77	0.00	0.00	0.00	110.53	0.00
24	17,800	17,800	**-4.02**	104.0	3.00	96.01	14.97	0.00	0.00	0.00	110.98	0.00
25	15,028	15,029	**-1.40**	104.0	3.00	94.54	13.82	0.00	0.00	0.00	108.36	0.00
26	17,023	17,023	**-3.32**	104.0	3.00	95.62	14.66	0.00	0.00	0.00	110.28	0.00
27	15,196	15,196	**-1.57**	104.0	3.00	94.63	13.89	0.00	0.00	0.00	108.53	0.00
28	15,243	15,244	**-1.61**	104.0	3.00	94.66	13.91	0.00	0.00	0.00	108.58	0.00
29	16,793	16,793	**-3.11**	104.0	3.00	95.50	14.57	0.00	0.00	0.00	110.07	0.00
30	16,901	16,901	**-3.21**	104.0	3.00	95.56	14.61	0.00	0.00	0.00	110.17	0.00
31	17,950	17,950	**-4.15**	104.0	3.00	96.08	15.03	0.00	0.00	0.00	111.11	0.00
32	15,119	15,119	**-1.49**	104.0	3.00	94.59	13.86	0.00	0.00	0.00	108.45	0.00
33	16,388	16,388	**-2.73**	104.0	3.00	95.29	14.40	0.00	0.00	0.00	109.69	0.00
34	16,126	16,126	**-2.48**	104.0	3.00	95.15	14.29	0.00	0.00	0.00	109.45	0.00
35	16,669	16,670	**-3.00**	104.0	3.00	95.44	14.52	0.00	0.00	0.00	109.96	0.00
36	16,946	16,946	**-3.25**	104.0	3.00	95.58	14.63	0.00	0.00	0.00	110.21	0.00
37	15,844	15,845	**-2.21**	104.0	3.00	95.00	14.17	0.00	0.00	0.00	109.17	0.00
38	15,017	15,017	**-1.38**	104.0	3.00	94.53	13.81	0.00	0.00	0.00	108.35	0.00
39	14,508	14,508	**-0.86**	104.0	3.00	94.23	13.59	0.00	0.00	0.00	107.82	0.00
40	14,311	14,311	**-0.65**	104.0	3.00	94.11	13.50	0.00	0.00	0.00	107.61	0.00
41	14,315	14,316	**-0.65**	104.0	3.00	94.12	13.50	0.00	0.00	0.00	107.61	0.00
43	15,289	15,289	**-1.66**	104.0	3.00	94.69	13.93	0.00	0.00	0.00	108.62	0.00
44	13,970	13,971	**-0.28**	104.0	3.00	93.90	13.34	0.00	0.00	0.00	107.24	0.00
45	13,755	13,755	**-0.04**	104.0	3.00	93.77	13.24	0.00	0.00	0.00	107.00	0.00
46	14,547	14,547	**-0.90**	104.0	3.00	94.26	13.60	0.00	0.00	0.00	107.86	0.00
48	14,362	14,362	**-0.70**	104.0	3.00	94.14	13.52	0.00	0.00	0.00	107.66	0.00
49	15,084	15,084	**-1.45**	104.0	3.00	94.57	13.84	0.00	0.00	0.00	108.41	0.00
50	17,530	17,530	**-3.78**	104.0	3.00	95.88	14.87	0.00	0.00	0.00	110.74	0.00
51	15,421	15,421	**-1.79**	104.0	3.00	94.76	13.99	0.00	0.00	0.00	108.76	0.00
52	15,665	15,665	**-2.03**	104.0	3.00	94.90	14.10	0.00	0.00	0.00	109.00	0.00
53	14,845	14,845	**-1.21**	104.0	3.00	94.43	13.74	0.00	0.00	0.00	108.17	0.00
55	13,776	13,776	**-0.07**	104.0	3.00	93.78	13.25	0.00	0.00	0.00	107.03	0.00
56	13,579	13,579	**0.15**	104.0	3.00	93.66	13.15	0.00	0.00	0.00	106.81	0.00
57	13,029	13,029	**0.78**	104.0	3.00	93.30	12.88	0.00	0.00	0.00	106.18	0.00
58	15,719	15,719	**-2.09**	104.0	3.00	94.93	14.12	0.00	0.00	0.00	109.05	0.00
59	13,377	13,377	**0.38**	104.0	3.00	93.53	13.05	0.00	0.00	0.00	106.58	0.00
60	12,189	12,190	**1.78**	104.0	3.00	92.72	12.46	0.00	0.00	0.00	105.18	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	11,984	11,984	**2.04**	104.0	3.00	92.57	12.35	0.00	0.00	0.00	104.92	0.00
62	10,584	10,585	**3.89**	104.0	3.00	91.49	11.58	0.00	0.00	0.00	103.07	0.00
63	9,542	9,543	**5.41**	104.0	3.00	90.59	10.95	0.00	0.00	0.00	101.55	0.00
64	8,215	8,216	**7.59**	104.0	3.00	89.29	10.08	0.00	0.00	0.00	99.38	0.00
65	7,906	7,906	**8.14**	104.0	3.00	88.96	9.87	0.00	0.00	0.00	98.83	0.00
66	14,535	14,535	**-0.88**	104.0	3.00	94.25	13.60	0.00	0.00	0.00	107.85	0.00
67	8,839	8,840	**6.53**	104.0	3.00	89.93	10.50	0.00	0.00	0.00	100.43	0.00
68	8,466	8,466	**7.15**	104.0	3.00	89.55	10.25	0.00	0.00	0.00	99.81	0.00
69	7,813	7,814	**8.30**	104.0	3.00	88.86	9.80	0.00	0.00	0.00	98.66	0.00
70	18,168	18,169	**-4.34**	104.0	3.00	96.19	15.12	0.00	0.00	0.00	111.30	0.00
71	18,395	18,396	**-4.53**	104.0	3.00	96.29	15.20	0.00	0.00	0.00	111.50	0.00
72	18,838	18,838	**-4.91**	104.0	3.00	96.50	15.37	0.00	0.00	0.00	111.87	0.00
73	18,285	18,285	**-4.44**	104.0	3.00	96.24	15.16	0.00	0.00	0.00	111.40	0.00
74	17,223	17,224	**-3.51**	104.0	3.00	95.72	14.74	0.00	0.00	0.00	110.47	0.00
75	16,662	16,662	**-2.99**	104.0	3.00	95.43	14.52	0.00	0.00	0.00	109.95	0.00
76	13,175	13,175	**0.61**	104.0	3.00	93.39	12.96	0.00	0.00	0.00	106.35	0.00
77	14,187	14,187	**-0.51**	104.0	3.00	94.04	13.44	0.00	0.00	0.00	107.48	0.00
78	17,296	17,296	**-3.57**	104.0	3.00	95.76	14.77	0.00	0.00	0.00	110.53	0.00
80	12,355	12,355	**1.58**	104.0	3.00	92.84	12.54	0.00	0.00	0.00	105.38	0.00
81	18,922	18,923	**-4.98**	104.0	3.00	96.54	15.40	0.00	0.00	0.00	111.94	0.00
82	15,934	15,934	**-2.30**	104.0	3.00	95.05	14.21	0.00	0.00	0.00	109.26	0.00
83	9,157	9,157	**6.02**	104.0	3.00	90.24	10.71	0.00	0.00	0.00	100.95	0.00
85	15,661	15,661	**-2.03**	104.0	3.00	94.90	14.10	0.00	0.00	0.00	108.99	0.00
86	12,523	12,523	**1.38**	104.0	3.00	92.95	12.63	0.00	0.00	0.00	105.58	0.00
87	7,805	7,806	**8.32**	104.0	3.00	88.85	9.79	0.00	0.00	0.00	98.64	0.00
89	8,679	8,680	**6.79**	104.0	3.00	89.77	10.40	0.00	0.00	0.00	100.17	0.00
90	12,085	12,085	**1.91**	104.0	3.00	92.65	12.40	0.00	0.00	0.00	105.05	0.00
91	10,154	10,154	**4.50**	104.0	3.00	91.13	11.33	0.00	0.00	0.00	102.46	0.00
92	7,482	7,482	**8.92**	104.0	3.00	88.48	9.56	0.00	0.00	0.00	98.04	0.00
94	18,588	18,588	**-4.70**	104.0	3.00	96.38	15.27	0.00	0.00	0.00	111.66	0.00
95	19,759	19,760	**-5.66**	104.0	3.00	96.92	15.71	0.00	0.00	0.00	112.62	0.00
97	17,213	17,213	**-3.50**	104.0	3.00	95.72	14.74	0.00	0.00	0.00	110.46	0.00
98	19,027	19,028	**-5.07**	104.0	3.00	96.59	15.44	0.00	0.00	0.00	112.03	0.00
99	19,538	19,538	**-5.48**	104.0	3.00	96.82	15.63	0.00	0.00	0.00	112.44	0.00
100	13,783	13,784	**-0.07**	104.0	3.00	93.79	13.25	0.00	0.00	0.00	107.04	0.00
101	19,276	19,276	**-5.27**	104.0	3.00	96.70	15.53	0.00	0.00	0.00	112.23	0.00
102	14,297	14,298	**-0.63**	104.0	3.00	94.11	13.49	0.00	0.00	0.00	107.59	0.00
103	20,090	20,091	**-5.92**	104.0	3.00	97.06	15.83	0.00	0.00	0.00	112.89	0.00
104	14,788	14,788	**-1.15**	104.0	3.00	94.40	13.71	0.00	0.00	0.00	108.11	0.00
107	18,049	18,050	**-4.24**	104.0	3.00	96.13	15.07	0.00	0.00	0.00	111.20	0.00
108	20,127	20,127	**-5.95**	104.0	3.00	97.08	15.84	0.00	0.00	0.00	112.91	0.00
109	13,150	13,150	**0.64**	104.0	3.00	93.38	12.94	0.00	0.00	0.00	106.32	0.00
110	13,961	13,961	**-0.27**	104.0	3.00	93.90	13.33	0.00	0.00	0.00	107.23	0.00
111	13,480	13,480	**0.26**	104.0	3.00	93.59	13.10	0.00	0.00	0.00	106.70	0.00
113	18,359	18,360	**-4.50**	104.0	3.00	96.28	15.19	0.00	0.00	0.00	111.47	0.00
114	15,447	15,447	**-1.82**	104.0	3.00	94.78	14.00	0.00	0.00	0.00	108.78	0.00
115	19,913	19,913	**-5.78**	104.0	3.00	96.98	15.76	0.00	0.00	0.00	112.75	0.00
116	15,330	15,331	**-1.70**	104.0	3.00	94.71	13.95	0.00	0.00	0.00	108.66	0.00
118	12,888	12,888	**0.95**	104.0	3.00	93.20	12.81	0.00	0.00	0.00	106.02	0.00
119	17,793	17,793	**-4.01**	104.0	3.00	96.00	14.97	0.00	0.00	0.00	110.97	0.00
120	19,557	19,557	**-5.50**	104.0	3.00	96.83	15.63	0.00	0.00	0.00	112.46	0.00
121	17,231	17,231	**-3.51**	104.0	3.00	95.73	14.75	0.00	0.00	0.00	110.47	0.00
125	9,325	9,325	**5.75**	104.0	3.00	90.39	10.82	0.00	0.00	0.00	101.21	0.00
126	12,638	12,638	**1.24**	104.0	3.00	93.03	12.69	0.00	0.00	0.00	105.72	0.00
127	12,515	12,515	**1.39**	104.0	3.00	92.95	12.63	0.00	0.00	0.00	105.57	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	12,516	12,516	**1.39**	104.0	3.00	92.95	12.63	0.00	0.00	0.00	105.57	0.00
129	15,850	15,850	**-2.22**	104.0	3.00	95.00	14.18	0.00	0.00	0.00	109.18	0.00
130	15,408	15,408	**-1.78**	104.0	3.00	94.76	13.99	0.00	0.00	0.00	108.74	0.00
131	15,698	15,698	**-2.07**	104.0	3.00	94.92	14.11	0.00	0.00	0.00	109.03	0.00
132	16,078	16,078	**-2.44**	104.0	3.00	95.12	14.27	0.00	0.00	0.00	109.40	0.00
133	14,465	14,465	**-0.81**	104.0	3.00	94.21	13.57	0.00	0.00	0.00	107.77	0.00
134	18,213	18,213	**-4.38**	104.0	3.00	96.21	15.13	0.00	0.00	0.00	111.34	0.00
141	17,201	17,202	**-3.49**	104.0	3.00	95.71	14.74	0.00	0.00	0.00	110.45	0.00
142	14,525	14,525	**-0.87**	104.0	3.00	94.24	13.59	0.00	0.00	0.00	107.84	0.00
143	17,553	17,553	**-3.80**	104.0	3.00	95.89	14.88	0.00	0.00	0.00	110.76	0.00
144	13,459	13,460	**0.29**	104.0	3.00	93.58	13.09	0.00	0.00	0.00	106.67	0.00
145	12,324	12,324	**1.62**	104.0	3.00	92.81	12.53	0.00	0.00	0.00	105.34	0.00
146	12,562	12,563	**1.33**	104.0	3.00	92.98	12.65	0.00	0.00	0.00	105.63	0.00

Sum 21.36

Noise sensitive area: H48 H48

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	16,891	16,892	**-3.20**	104.0	3.00	95.55	14.61	0.00	0.00	0.00	110.16	0.00
2	17,028	17,028	**-3.33**	104.0	3.00	95.62	14.67	0.00	0.00	0.00	110.29	0.00
3	16,677	16,678	**-3.00**	104.0	3.00	95.44	14.52	0.00	0.00	0.00	109.97	0.00
4	16,402	16,402	**-2.75**	104.0	3.00	95.30	14.41	0.00	0.00	0.00	109.71	0.00
5	15,855	15,856	**-2.22**	104.0	3.00	95.00	14.18	0.00	0.00	0.00	109.18	0.00
6	16,135	16,135	**-2.49**	104.0	3.00	95.16	14.30	0.00	0.00	0.00	109.45	0.00
7	13,977	13,978	**-0.29**	104.0	3.00	93.91	13.34	0.00	0.00	0.00	107.25	0.00
8	17,401	17,401	**-3.66**	104.0	3.00	95.81	14.82	0.00	0.00	0.00	110.63	0.00
9	16,375	16,375	**-2.72**	104.0	3.00	95.28	14.40	0.00	0.00	0.00	109.68	0.00
10	15,903	15,903	**-2.27**	104.0	3.00	95.03	14.20	0.00	0.00	0.00	109.23	0.00
11	16,663	16,664	**-2.99**	104.0	3.00	95.44	14.52	0.00	0.00	0.00	109.95	0.00
12	16,574	16,575	**-2.91**	104.0	3.00	95.39	14.48	0.00	0.00	0.00	109.87	0.00
13	16,146	16,147	**-2.50**	104.0	3.00	95.16	14.30	0.00	0.00	0.00	109.46	0.00
14	15,738	15,738	**-2.11**	104.0	3.00	94.94	14.13	0.00	0.00	0.00	109.07	0.00
15	15,233	15,233	**-1.60**	104.0	3.00	94.66	13.91	0.00	0.00	0.00	108.57	0.00
16	15,133	15,134	**-1.50**	104.0	3.00	94.60	13.87	0.00	0.00	0.00	108.47	0.00
17	16,821	16,821	**-3.14**	104.0	3.00	95.52	14.58	0.00	0.00	0.00	110.10	0.00
18	16,780	16,780	**-3.10**	104.0	3.00	95.50	14.57	0.00	0.00	0.00	110.06	0.00
19	15,783	15,783	**-2.15**	104.0	3.00	94.96	14.15	0.00	0.00	0.00	109.11	0.00
20	14,860	14,860	**-1.22**	104.0	3.00	94.44	13.74	0.00	0.00	0.00	108.19	0.00
21	15,621	15,621	**-1.99**	104.0	3.00	94.87	14.08	0.00	0.00	0.00	108.95	0.00
22	15,628	15,628	**-2.00**	104.0	3.00	94.88	14.08	0.00	0.00	0.00	108.96	0.00
23	15,392	15,392	**-1.76**	104.0	3.00	94.75	13.98	0.00	0.00	0.00	108.73	0.00
24	15,795	15,795	**-2.16**	104.0	3.00	94.97	14.15	0.00	0.00	0.00	109.12	0.00
25	13,272	13,272	**0.50**	104.0	3.00	93.46	13.00	0.00	0.00	0.00	106.46	0.00
26	14,748	14,748	**-1.11**	104.0	3.00	94.37	13.69	0.00	0.00	0.00	108.07	0.00
27	13,210	13,211	**0.57**	104.0	3.00	93.42	12.97	0.00	0.00	0.00	106.39	0.00
28	12,996	12,996	**0.82**	104.0	3.00	93.28	12.87	0.00	0.00	0.00	106.14	0.00
29	14,817	14,817	**-1.18**	104.0	3.00	94.42	13.73	0.00	0.00	0.00	108.14	0.00
30	15,068	15,068	**-1.44**	104.0	3.00	94.56	13.84	0.00	0.00	0.00	108.40	0.00
31	16,139	16,139	**-2.50**	104.0	3.00	95.16	14.30	0.00	0.00	0.00	109.46	0.00
32	13,494	13,494	**0.25**	104.0	3.00	93.60	13.11	0.00	0.00	0.00	106.71	0.00
33	14,659	14,659	**-1.01**	104.0	3.00	94.32	13.65	0.00	0.00	0.00	107.98	0.00
34	13,756	13,756	**-0.04**	104.0	3.00	93.77	13.24	0.00	0.00	0.00	107.01	0.00
35	14,203	14,204	**-0.53**	104.0	3.00	94.05	13.45	0.00	0.00	0.00	107.49	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	14,440	14,440	**-0.78**	104.0	3.00	94.19	13.55	0.00	0.00	0.00	107.75	0.00
37	13,522	13,522	**0.22**	104.0	3.00	93.62	13.12	0.00	0.00	0.00	106.74	0.00
38	13,146	13,146	**0.65**	104.0	3.00	93.38	12.94	0.00	0.00	0.00	106.32	0.00
39	12,452	12,453	**1.46**	104.0	3.00	92.91	12.59	0.00	0.00	0.00	105.50	0.00
40	11,707	11,707	**2.39**	104.0	3.00	92.37	12.20	0.00	0.00	0.00	104.57	0.00
41	12,187	12,187	**1.79**	104.0	3.00	92.72	12.46	0.00	0.00	0.00	105.17	0.00
43	12,977	12,977	**0.84**	104.0	3.00	93.26	12.86	0.00	0.00	0.00	106.12	0.00
44	11,764	11,764	**2.32**	104.0	3.00	92.41	12.23	0.00	0.00	0.00	104.64	0.00
45	11,621	11,621	**2.50**	104.0	3.00	92.30	12.16	0.00	0.00	0.00	104.46	0.00
46	12,077	12,078	**1.92**	104.0	3.00	92.64	12.40	0.00	0.00	0.00	105.04	0.00
48	12,828	12,828	**1.02**	104.0	3.00	93.16	12.78	0.00	0.00	0.00	105.95	0.00
49	13,763	13,763	**-0.05**	104.0	3.00	93.77	13.24	0.00	0.00	0.00	107.01	0.00
50	15,100	15,100	**-1.47**	104.0	3.00	94.58	13.85	0.00	0.00	0.00	108.43	0.00
51	13,992	13,992	**-0.30**	104.0	3.00	93.92	13.35	0.00	0.00	0.00	107.27	0.00
52	14,171	14,171	**-0.50**	104.0	3.00	94.03	13.43	0.00	0.00	0.00	107.46	0.00
53	13,600	13,600	**0.13**	104.0	3.00	93.67	13.16	0.00	0.00	0.00	106.83	0.00
55	12,895	12,895	**0.94**	104.0	3.00	93.21	12.82	0.00	0.00	0.00	106.03	0.00
56	12,784	12,784	**1.07**	104.0	3.00	93.13	12.76	0.00	0.00	0.00	105.89	0.00
57	12,090	12,090	**1.91**	104.0	3.00	92.65	12.41	0.00	0.00	0.00	105.05	0.00
58	13,963	13,964	**-0.27**	104.0	3.00	93.90	13.33	0.00	0.00	0.00	107.23	0.00
59	12,669	12,669	**1.20**	104.0	3.00	93.06	12.70	0.00	0.00	0.00	105.76	0.00
60	11,860	11,860	**2.20**	104.0	3.00	92.48	12.28	0.00	0.00	0.00	104.77	0.00
61	11,772	11,772	**2.31**	104.0	3.00	92.42	12.24	0.00	0.00	0.00	104.65	0.00
62	9,906	9,906	**4.87**	104.0	3.00	90.92	11.18	0.00	0.00	0.00	102.09	0.00
63	8,768	8,769	**6.65**	104.0	3.00	89.86	10.46	0.00	0.00	0.00	100.32	0.00
64	7,833	7,833	**8.27**	104.0	3.00	88.88	9.81	0.00	0.00	0.00	98.69	0.00
65	7,860	7,860	**8.22**	104.0	3.00	88.91	9.83	0.00	0.00	0.00	98.74	0.00
66	11,865	11,865	**2.19**	104.0	3.00	92.49	12.29	0.00	0.00	0.00	104.77	0.00
67	8,701	8,701	**6.76**	104.0	3.00	89.79	10.41	0.00	0.00	0.00	100.20	0.00
68	8,565	8,566	**6.98**	104.0	3.00	89.66	10.32	0.00	0.00	0.00	99.98	0.00
69	7,662	7,662	**8.58**	104.0	3.00	88.69	9.69	0.00	0.00	0.00	98.38	0.00
70	15,112	15,113	**-1.48**	104.0	3.00	94.59	13.86	0.00	0.00	0.00	108.44	0.00
71	15,729	15,729	**-2.10**	104.0	3.00	94.93	14.13	0.00	0.00	0.00	109.06	0.00
72	16,641	16,641	**-2.97**	104.0	3.00	95.42	14.51	0.00	0.00	0.00	109.93	0.00
73	15,899	15,899	**-2.26**	104.0	3.00	95.03	14.20	0.00	0.00	0.00	109.23	0.00
74	14,824	14,825	**-1.19**	104.0	3.00	94.42	13.73	0.00	0.00	0.00	108.15	0.00
75	14,534	14,535	**-0.88**	104.0	3.00	94.25	13.60	0.00	0.00	0.00	107.85	0.00
76	11,957	11,957	**2.07**	104.0	3.00	92.55	12.34	0.00	0.00	0.00	104.89	0.00
77	12,940	12,940	**0.88**	104.0	3.00	93.24	12.84	0.00	0.00	0.00	106.08	0.00
78	14,469	14,469	**-0.81**	104.0	3.00	94.21	13.57	0.00	0.00	0.00	107.78	0.00
80	11,889	11,889	**2.16**	104.0	3.00	92.50	12.30	0.00	0.00	0.00	104.80	0.00
81	15,929	15,929	**-2.29**	104.0	3.00	95.04	14.21	0.00	0.00	0.00	109.25	0.00
82	14,319	14,319	**-0.66**	104.0	3.00	94.12	13.50	0.00	0.00	0.00	107.62	0.00
83	8,663	8,663	**6.82**	104.0	3.00	89.75	10.39	0.00	0.00	0.00	100.14	0.00
85	14,493	14,494	**-0.84**	104.0	3.00	94.22	13.58	0.00	0.00	0.00	107.80	0.00
86	11,964	11,964	**2.06**	104.0	3.00	92.56	12.34	0.00	0.00	0.00	104.90	0.00
87	7,888	7,888	**8.17**	104.0	3.00	88.94	9.85	0.00	0.00	0.00	98.79	0.00
89	8,144	8,145	**7.71**	104.0	3.00	89.22	10.03	0.00	0.00	0.00	99.25	0.00
90	11,136	11,136	**3.14**	104.0	3.00	91.93	11.89	0.00	0.00	0.00	103.83	0.00
91	9,424	9,424	**5.60**	104.0	3.00	90.48	10.88	0.00	0.00	0.00	101.36	0.00
92	6,961	6,962	**9.94**	104.0	3.00	87.85	9.17	0.00	0.00	0.00	97.02	0.00
94	15,798	15,799	**-2.17**	104.0	3.00	94.97	14.16	0.00	0.00	0.00	109.13	0.00
95	16,913	16,914	**-3.22**	104.0	3.00	95.56	14.62	0.00	0.00	0.00	110.18	0.00
97	14,517	14,517	**-0.87**	104.0	3.00	94.24	13.59	0.00	0.00	0.00	107.83	0.00
98	16,216	16,217	**-2.57**	104.0	3.00	95.20	14.33	0.00	0.00	0.00	109.53	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	17,148	17,148	**-3.44**	104.0	3.00	95.68	14.71	0.00	0.00	0.00	110.40	0.00
100	11,770	11,770	**2.31**	104.0	3.00	92.42	12.24	0.00	0.00	0.00	104.65	0.00
101	16,236	16,236	**-2.59**	104.0	3.00	95.21	14.34	0.00	0.00	0.00	109.55	0.00
102	12,058	12,058	**1.95**	104.0	3.00	92.63	12.39	0.00	0.00	0.00	105.01	0.00
103	17,004	17,005	**-3.31**	104.0	3.00	95.61	14.66	0.00	0.00	0.00	110.27	0.00
104	12,603	12,603	**1.28**	104.0	3.00	93.01	12.67	0.00	0.00	0.00	105.68	0.00
107	15,145	15,145	**-1.51**	104.0	3.00	94.61	13.87	0.00	0.00	0.00	108.48	0.00
108	17,844	17,844	**-4.06**	104.0	3.00	96.03	14.99	0.00	0.00	0.00	111.02	0.00
109	12,527	12,527	**1.37**	104.0	3.00	92.96	12.63	0.00	0.00	0.00	105.59	0.00
110	12,490	12,490	**1.42**	104.0	3.00	92.93	12.61	0.00	0.00	0.00	105.54	0.00
111	12,159	12,159	**1.82**	104.0	3.00	92.70	12.44	0.00	0.00	0.00	105.14	0.00
113	15,426	15,427	**-1.80**	104.0	3.00	94.77	13.99	0.00	0.00	0.00	108.76	0.00
114	14,347	14,347	**-0.69**	104.0	3.00	94.14	13.51	0.00	0.00	0.00	107.65	0.00
115	17,238	17,239	**-3.52**	104.0	3.00	95.73	14.75	0.00	0.00	0.00	110.48	0.00
116	12,856	12,856	**0.98**	104.0	3.00	93.18	12.80	0.00	0.00	0.00	105.98	0.00
118	12,416	12,416	**1.51**	104.0	3.00	92.88	12.57	0.00	0.00	0.00	105.45	0.00
119	15,266	15,266	**-1.64**	104.0	3.00	94.67	13.92	0.00	0.00	0.00	108.60	0.00
120	16,458	16,459	**-2.80**	104.0	3.00	95.33	14.43	0.00	0.00	0.00	109.76	0.00
121	14,676	14,677	**-1.03**	104.0	3.00	94.33	13.66	0.00	0.00	0.00	107.99	0.00
125	8,697	8,698	**6.76**	104.0	3.00	89.79	10.41	0.00	0.00	0.00	100.20	0.00
126	10,921	10,921	**3.43**	104.0	3.00	91.77	11.77	0.00	0.00	0.00	103.54	0.00
127	10,876	10,877	**3.49**	104.0	3.00	91.73	11.75	0.00	0.00	0.00	103.47	0.00
128	10,975	10,975	**3.35**	104.0	3.00	91.81	11.80	0.00	0.00	0.00	103.61	0.00
129	12,909	12,909	**0.92**	104.0	3.00	93.22	12.82	0.00	0.00	0.00	106.04	0.00
130	12,377	12,377	**1.56**	104.0	3.00	92.85	12.55	0.00	0.00	0.00	105.41	0.00
131	12,585	12,585	**1.30**	104.0	3.00	93.00	12.66	0.00	0.00	0.00	105.66	0.00
132	12,922	12,922	**0.90**	104.0	3.00	93.23	12.83	0.00	0.00	0.00	106.06	0.00
133	12,556	12,556	**1.34**	104.0	3.00	92.98	12.65	0.00	0.00	0.00	105.62	0.00
134	15,209	15,209	**-1.58**	104.0	3.00	94.64	13.90	0.00	0.00	0.00	108.54	0.00
141	14,558	14,558	**-0.91**	104.0	3.00	94.26	13.61	0.00	0.00	0.00	107.87	0.00
142	12,227	12,228	**1.74**	104.0	3.00	92.75	12.48	0.00	0.00	0.00	105.22	0.00
143	14,805	14,805	**-1.17**	104.0	3.00	94.41	13.72	0.00	0.00	0.00	108.13	0.00
144	11,383	11,384	**2.81**	104.0	3.00	92.13	12.03	0.00	0.00	0.00	104.15	0.00
145	11,215	11,215	**3.03**	104.0	3.00	92.00	11.93	0.00	0.00	0.00	103.93	0.00
146	11,363	11,364	**2.84**	104.0	3.00	92.11	12.02	0.00	0.00	0.00	104.13	0.00

Sum 22.73

Noise sensitive area: H49 H49

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	17,034	17,034	**-3.33**	104.0	3.00	95.63	14.67	0.00	0.00	0.00	110.29	0.00
2	17,169	17,169	**-3.46**	104.0	3.00	95.69	14.72	0.00	0.00	0.00	110.42	0.00
3	16,816	16,816	**-3.13**	104.0	3.00	95.51	14.58	0.00	0.00	0.00	110.09	0.00
4	16,533	16,533	**-2.87**	104.0	3.00	95.37	14.46	0.00	0.00	0.00	109.83	0.00
5	15,990	15,990	**-2.35**	104.0	3.00	95.08	14.24	0.00	0.00	0.00	109.31	0.00
6	16,273	16,273	**-2.62**	104.0	3.00	95.23	14.36	0.00	0.00	0.00	109.58	0.00
7	14,114	14,114	**-0.44**	104.0	3.00	93.99	13.40	0.00	0.00	0.00	107.40	0.00
8	17,545	17,545	**-3.79**	104.0	3.00	95.88	14.87	0.00	0.00	0.00	110.76	0.00
9	16,517	16,517	**-2.85**	104.0	3.00	95.36	14.46	0.00	0.00	0.00	109.82	0.00
10	16,046	16,047	**-2.41**	104.0	3.00	95.11	14.26	0.00	0.00	0.00	109.37	0.00
11	16,812	16,812	**-3.13**	104.0	3.00	95.51	14.58	0.00	0.00	0.00	110.09	0.00
12	16,722	16,722	**-3.05**	104.0	3.00	95.47	14.54	0.00	0.00	0.00	110.01	0.00
13	16,293	16,294	**-2.64**	104.0	3.00	95.24	14.36	0.00	0.00	0.00	109.60	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	15,885	15,885	**-2.25**	104.0	3.00	95.02	14.19	0.00	0.00	0.00	109.21	0.00
15	15,377	15,378	**-1.75**	104.0	3.00	94.74	13.97	0.00	0.00	0.00	108.71	0.00
16	15,276	15,277	**-1.65**	104.0	3.00	94.68	13.93	0.00	0.00	0.00	108.61	0.00
17	16,970	16,970	**-3.27**	104.0	3.00	95.59	14.64	0.00	0.00	0.00	110.24	0.00
18	16,929	16,930	**-3.24**	104.0	3.00	95.57	14.63	0.00	0.00	0.00	110.20	0.00
19	15,931	15,931	**-2.29**	104.0	3.00	95.04	14.21	0.00	0.00	0.00	109.26	0.00
20	15,006	15,006	**-1.37**	104.0	3.00	94.53	13.81	0.00	0.00	0.00	108.34	0.00
21	15,752	15,752	**-2.12**	104.0	3.00	94.95	14.14	0.00	0.00	0.00	109.08	0.00
22	15,755	15,755	**-2.12**	104.0	3.00	94.95	14.14	0.00	0.00	0.00	109.08	0.00
23	15,517	15,517	**-1.89**	104.0	3.00	94.82	14.03	0.00	0.00	0.00	108.85	0.00
24	15,922	15,922	**-2.29**	104.0	3.00	95.04	14.21	0.00	0.00	0.00	109.25	0.00
25	13,391	13,391	**0.37**	104.0	3.00	93.54	13.06	0.00	0.00	0.00	106.60	0.00
26	14,882	14,882	**-1.25**	104.0	3.00	94.45	13.75	0.00	0.00	0.00	108.21	0.00
27	13,336	13,336	**0.43**	104.0	3.00	93.50	13.03	0.00	0.00	0.00	106.53	0.00
28	13,127	13,127	**0.67**	104.0	3.00	93.36	12.93	0.00	0.00	0.00	106.30	0.00
29	14,943	14,943	**-1.31**	104.0	3.00	94.49	13.78	0.00	0.00	0.00	108.27	0.00
30	15,191	15,191	**-1.56**	104.0	3.00	94.63	13.89	0.00	0.00	0.00	108.52	0.00
31	16,262	16,262	**-2.61**	104.0	3.00	95.22	14.35	0.00	0.00	0.00	109.57	0.00
32	13,609	13,609	**0.12**	104.0	3.00	93.68	13.17	0.00	0.00	0.00	106.84	0.00
33	14,779	14,779	**-1.14**	104.0	3.00	94.39	13.71	0.00	0.00	0.00	108.10	0.00
34	13,891	13,891	**-0.19**	104.0	3.00	93.85	13.30	0.00	0.00	0.00	107.15	0.00
35	14,341	14,341	**-0.68**	104.0	3.00	94.13	13.51	0.00	0.00	0.00	107.64	0.00
36	14,579	14,579	**-0.93**	104.0	3.00	94.27	13.62	0.00	0.00	0.00	107.89	0.00
37	13,655	13,656	**0.07**	104.0	3.00	93.71	13.19	0.00	0.00	0.00	106.89	0.00
38	13,268	13,268	**0.51**	104.0	3.00	93.46	13.00	0.00	0.00	0.00	106.46	0.00
39	12,578	12,579	**1.31**	104.0	3.00	92.99	12.66	0.00	0.00	0.00	105.65	0.00
40	11,846	11,846	**2.21**	104.0	3.00	92.47	12.28	0.00	0.00	0.00	104.75	0.00
41	12,315	12,315	**1.63**	104.0	3.00	92.81	12.52	0.00	0.00	0.00	105.33	0.00
43	13,110	13,110	**0.69**	104.0	3.00	93.35	12.92	0.00	0.00	0.00	106.28	0.00
44	11,893	11,894	**2.15**	104.0	3.00	92.51	12.30	0.00	0.00	0.00	104.81	0.00
45	11,748	11,748	**2.34**	104.0	3.00	92.40	12.22	0.00	0.00	0.00	104.62	0.00
46	12,214	12,214	**1.75**	104.0	3.00	92.74	12.47	0.00	0.00	0.00	105.21	0.00
48	12,940	12,940	**0.88**	104.0	3.00	93.24	12.84	0.00	0.00	0.00	106.08	0.00
49	13,870	13,870	**-0.17**	104.0	3.00	93.84	13.29	0.00	0.00	0.00	107.13	0.00
50	15,237	15,238	**-1.61**	104.0	3.00	94.66	13.91	0.00	0.00	0.00	108.57	0.00
51	14,103	14,103	**-0.42**	104.0	3.00	93.99	13.40	0.00	0.00	0.00	107.39	0.00
52	14,284	14,284	**-0.62**	104.0	3.00	94.10	13.48	0.00	0.00	0.00	107.58	0.00
53	13,705	13,705	**0.01**	104.0	3.00	93.74	13.21	0.00	0.00	0.00	106.95	0.00
55	12,988	12,988	**0.83**	104.0	3.00	93.27	12.86	0.00	0.00	0.00	106.13	0.00
56	12,874	12,874	**0.96**	104.0	3.00	93.19	12.81	0.00	0.00	0.00	106.00	0.00
57	12,184	12,184	**1.79**	104.0	3.00	92.72	12.45	0.00	0.00	0.00	105.17	0.00
58	14,083	14,083	**-0.40**	104.0	3.00	93.97	13.39	0.00	0.00	0.00	107.36	0.00
59	12,757	12,757	**1.10**	104.0	3.00	93.11	12.75	0.00	0.00	0.00	105.86	0.00
60	11,934	11,934	**2.10**	104.0	3.00	92.54	12.32	0.00	0.00	0.00	104.86	0.00
61	11,842	11,842	**2.22**	104.0	3.00	92.47	12.27	0.00	0.00	0.00	104.74	0.00
62	9,986	9,986	**4.75**	104.0	3.00	90.99	11.23	0.00	0.00	0.00	102.21	0.00
63	8,848	8,849	**6.51**	104.0	3.00	89.94	10.51	0.00	0.00	0.00	100.45	0.00
64	7,895	7,896	**8.16**	104.0	3.00	88.95	9.86	0.00	0.00	0.00	98.81	0.00
65	7,911	7,911	**8.13**	104.0	3.00	88.96	9.87	0.00	0.00	0.00	98.83	0.00
66	12,006	12,006	**2.01**	104.0	3.00	92.59	12.36	0.00	0.00	0.00	104.95	0.00
67	8,759	8,759	**6.66**	104.0	3.00	89.85	10.45	0.00	0.00	0.00	100.30	0.00
68	8,615	8,615	**6.90**	104.0	3.00	89.70	10.35	0.00	0.00	0.00	100.06	0.00
69	7,715	7,715	**8.48**	104.0	3.00	88.75	9.73	0.00	0.00	0.00	98.48	0.00
70	15,262	15,262	**-1.63**	104.0	3.00	94.67	13.92	0.00	0.00	0.00	108.60	0.00
71	15,871	15,872	**-2.24**	104.0	3.00	95.01	14.19	0.00	0.00	0.00	109.20	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	16,774	16,774	**-3.09**	104.0	3.00	95.49	14.56	0.00	0.00	0.00	110.06	0.00
73	16,035	16,036	**-2.40**	104.0	3.00	95.10	14.26	0.00	0.00	0.00	109.36	0.00
74	14,961	14,961	**-1.33**	104.0	3.00	94.50	13.79	0.00	0.00	0.00	108.29	0.00
75	14,664	14,664	**-1.02**	104.0	3.00	94.33	13.66	0.00	0.00	0.00	107.98	0.00
76	12,058	12,059	**1.95**	104.0	3.00	92.63	12.39	0.00	0.00	0.00	105.02	0.00
77	13,044	13,044	**0.76**	104.0	3.00	93.31	12.89	0.00	0.00	0.00	106.20	0.00
78	14,614	14,614	**-0.97**	104.0	3.00	94.30	13.63	0.00	0.00	0.00	107.93	0.00
80	11,967	11,967	**2.06**	104.0	3.00	92.56	12.34	0.00	0.00	0.00	104.90	0.00
81	16,077	16,078	**-2.44**	104.0	3.00	95.12	14.27	0.00	0.00	0.00	109.40	0.00
82	14,436	14,436	**-0.78**	104.0	3.00	94.19	13.55	0.00	0.00	0.00	107.74	0.00
83	8,733	8,733	**6.71**	104.0	3.00	89.82	10.43	0.00	0.00	0.00	100.26	0.00
85	14,597	14,597	**-0.95**	104.0	3.00	94.29	13.63	0.00	0.00	0.00	107.91	0.00
86	12,045	12,045	**1.96**	104.0	3.00	92.62	12.38	0.00	0.00	0.00	105.00	0.00
87	7,935	7,935	**8.08**	104.0	3.00	88.99	9.89	0.00	0.00	0.00	98.88	0.00
89	8,214	8,214	**7.59**	104.0	3.00	89.29	10.08	0.00	0.00	0.00	99.37	0.00
90	11,228	11,228	**3.01**	104.0	3.00	92.01	11.94	0.00	0.00	0.00	103.95	0.00
91	9,505	9,505	**5.47**	104.0	3.00	90.56	10.93	0.00	0.00	0.00	101.49	0.00
92	7,024	7,024	**9.81**	104.0	3.00	87.93	9.22	0.00	0.00	0.00	97.15	0.00
94	15,943	15,944	**-2.31**	104.0	3.00	95.05	14.22	0.00	0.00	0.00	109.27	0.00
95	17,060	17,060	**-3.36**	104.0	3.00	95.64	14.68	0.00	0.00	0.00	110.32	0.00
97	14,659	14,660	**-1.02**	104.0	3.00	94.32	13.65	0.00	0.00	0.00	107.98	0.00
98	16,362	16,362	**-2.71**	104.0	3.00	95.28	14.39	0.00	0.00	0.00	109.67	0.00
99	17,285	17,285	**-3.56**	104.0	3.00	95.75	14.77	0.00	0.00	0.00	110.52	0.00
100	11,894	11,894	**2.15**	104.0	3.00	92.51	12.30	0.00	0.00	0.00	104.81	0.00
101	16,385	16,385	**-2.73**	104.0	3.00	95.29	14.40	0.00	0.00	0.00	109.69	0.00
102	12,188	12,189	**1.79**	104.0	3.00	92.72	12.46	0.00	0.00	0.00	105.18	0.00
103	17,155	17,155	**-3.44**	104.0	3.00	95.69	14.72	0.00	0.00	0.00	110.41	0.00
104	12,732	12,733	**1.13**	104.0	3.00	93.10	12.74	0.00	0.00	0.00	105.83	0.00
107	15,292	15,292	**-1.66**	104.0	3.00	94.69	13.94	0.00	0.00	0.00	108.63	0.00
108	17,979	17,979	**-4.18**	104.0	3.00	96.10	15.04	0.00	0.00	0.00	111.14	0.00
109	12,611	12,611	**1.27**	104.0	3.00	93.02	12.67	0.00	0.00	0.00	105.69	0.00
110	12,600	12,600	**1.29**	104.0	3.00	93.01	12.67	0.00	0.00	0.00	105.68	0.00
111	12,264	12,264	**1.69**	104.0	3.00	92.77	12.50	0.00	0.00	0.00	105.27	0.00
113	15,574	15,574	**-1.95**	104.0	3.00	94.85	14.06	0.00	0.00	0.00	108.91	0.00
114	14,448	14,448	**-0.79**	104.0	3.00	94.20	13.56	0.00	0.00	0.00	107.75	0.00
115	17,382	17,382	**-3.65**	104.0	3.00	95.80	14.81	0.00	0.00	0.00	110.61	0.00
116	12,992	12,993	**0.82**	104.0	3.00	93.27	12.87	0.00	0.00	0.00	106.14	0.00
118	12,495	12,495	**1.41**	104.0	3.00	92.93	12.62	0.00	0.00	0.00	105.55	0.00
119	15,405	15,406	**-1.78**	104.0	3.00	94.75	13.99	0.00	0.00	0.00	108.74	0.00
120	16,609	16,609	**-2.94**	104.0	3.00	95.41	14.50	0.00	0.00	0.00	109.90	0.00
121	14,816	14,816	**-1.18**	104.0	3.00	94.41	13.73	0.00	0.00	0.00	108.14	0.00
125	8,772	8,772	**6.64**	104.0	3.00	89.86	10.46	0.00	0.00	0.00	100.32	0.00
126	11,036	11,036	**3.27**	104.0	3.00	91.86	11.84	0.00	0.00	0.00	103.69	0.00
127	10,989	10,989	**3.33**	104.0	3.00	91.82	11.81	0.00	0.00	0.00	103.63	0.00
128	11,085	11,085	**3.20**	104.0	3.00	91.89	11.86	0.00	0.00	0.00	103.76	0.00
129	13,056	13,056	**0.75**	104.0	3.00	93.32	12.90	0.00	0.00	0.00	106.21	0.00
130	12,525	12,525	**1.38**	104.0	3.00	92.96	12.63	0.00	0.00	0.00	105.59	0.00
131	12,735	12,735	**1.13**	104.0	3.00	93.10	12.74	0.00	0.00	0.00	105.84	0.00
132	13,073	13,073	**0.73**	104.0	3.00	93.33	12.90	0.00	0.00	0.00	106.23	0.00
133	12,678	12,678	**1.19**	104.0	3.00	93.06	12.71	0.00	0.00	0.00	105.77	0.00
134	15,357	15,358	**-1.73**	104.0	3.00	94.73	13.96	0.00	0.00	0.00	108.69	0.00
141	14,699	14,700	**-1.06**	104.0	3.00	94.35	13.67	0.00	0.00	0.00	108.02	0.00
142	12,359	12,360	**1.58**	104.0	3.00	92.84	12.55	0.00	0.00	0.00	105.39	0.00
143	14,949	14,949	**-1.32**	104.0	3.00	94.49	13.78	0.00	0.00	0.00	108.28	0.00
144	11,509	11,509	**2.64**	104.0	3.00	92.22	12.10	0.00	0.00	0.00	104.32	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	11,312	11,312	**2.90**	104.0	3.00	92.07	11.99	0.00	0.00	0.00	104.06	0.00
146	11,464	11,464	**2.70**	104.0	3.00	92.19	12.07	0.00	0.00	0.00	104.26	0.00
Sum	22.60											

Noise sensitive area: H52 H52

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	12,330	12,331	**1.61**	104.0	3.00	92.82	12.53	0.00	0.00	0.00	105.35	0.00
2	12,607	12,607	**1.28**	104.0	3.00	93.01	12.67	0.00	0.00	0.00	105.68	0.00
3	12,432	12,433	**1.49**	104.0	3.00	92.89	12.58	0.00	0.00	0.00	105.47	0.00
4	12,732	12,733	**1.13**	104.0	3.00	93.10	12.74	0.00	0.00	0.00	105.83	0.00
5	12,005	12,005	**2.01**	104.0	3.00	92.59	12.36	0.00	0.00	0.00	104.95	0.00
6	11,993	11,994	**2.03**	104.0	3.00	92.58	12.36	0.00	0.00	0.00	104.93	0.00
7	10,108	10,109	**4.57**	104.0	3.00	91.09	11.30	0.00	0.00	0.00	102.39	0.00
8	12,691	12,691	**1.18**	104.0	3.00	93.07	12.71	0.00	0.00	0.00	105.78	0.00
9	11,880	11,881	**2.17**	104.0	3.00	92.50	12.30	0.00	0.00	0.00	104.79	0.00
10	11,305	11,306	**2.91**	104.0	3.00	92.07	11.98	0.00	0.00	0.00	104.05	0.00
11	11,574	11,575	**2.56**	104.0	3.00	92.27	12.13	0.00	0.00	0.00	104.40	0.00
12	11,551	11,552	**2.59**	104.0	3.00	92.25	12.12	0.00	0.00	0.00	104.37	0.00
13	11,211	11,212	**3.04**	104.0	3.00	91.99	11.93	0.00	0.00	0.00	103.93	0.00
14	10,866	10,868	**3.50**	104.0	3.00	91.72	11.74	0.00	0.00	0.00	103.46	0.00
15	10,613	10,615	**3.85**	104.0	3.00	91.52	11.60	0.00	0.00	0.00	103.11	0.00
16	10,665	10,666	**3.78**	104.0	3.00	91.56	11.63	0.00	0.00	0.00	103.19	0.00
17	11,677	11,678	**2.43**	104.0	3.00	92.35	12.19	0.00	0.00	0.00	104.53	0.00
18	11,545	11,546	**2.60**	104.0	3.00	92.25	12.12	0.00	0.00	0.00	104.36	0.00
19	10,789	10,790	**3.61**	104.0	3.00	91.66	11.70	0.00	0.00	0.00	103.36	0.00
20	10,135	10,136	**4.53**	104.0	3.00	91.12	11.31	0.00	0.00	0.00	102.43	0.00
21	12,003	12,003	**2.02**	104.0	3.00	92.59	12.36	0.00	0.00	0.00	104.95	0.00
22	12,333	12,333	**1.61**	104.0	3.00	92.82	12.53	0.00	0.00	0.00	105.35	0.00
23	12,237	12,237	**1.73**	104.0	3.00	92.75	12.48	0.00	0.00	0.00	105.24	0.00
24	12,415	12,415	**1.51**	104.0	3.00	92.88	12.57	0.00	0.00	0.00	105.45	0.00
25	10,706	10,707	**3.72**	104.0	3.00	91.59	11.65	0.00	0.00	0.00	103.24	0.00
26	11,039	11,040	**3.27**	104.0	3.00	91.86	11.84	0.00	0.00	0.00	103.70	0.00
27	10,256	10,256	**4.36**	104.0	3.00	91.22	11.39	0.00	0.00	0.00	102.61	0.00
28	9,609	9,610	**5.31**	104.0	3.00	90.65	11.00	0.00	0.00	0.00	101.65	0.00
29	11,616	11,616	**2.51**	104.0	3.00	92.30	12.15	0.00	0.00	0.00	104.46	0.00
30	12,077	12,077	**1.92**	104.0	3.00	92.64	12.40	0.00	0.00	0.00	105.04	0.00
31	13,043	13,043	**0.76**	104.0	3.00	93.31	12.89	0.00	0.00	0.00	106.20	0.00
32	11,112	11,112	**3.17**	104.0	3.00	91.92	11.88	0.00	0.00	0.00	103.79	0.00
33	11,904	11,904	**2.14**	104.0	3.00	92.51	12.31	0.00	0.00	0.00	104.82	0.00
34	10,018	10,019	**4.70**	104.0	3.00	91.02	11.25	0.00	0.00	0.00	102.26	0.00
35	10,229	10,230	**4.39**	104.0	3.00	91.20	11.37	0.00	0.00	0.00	102.57	0.00
36	10,363	10,364	**4.20**	104.0	3.00	91.31	11.45	0.00	0.00	0.00	102.76	0.00
37	9,908	9,909	**4.86**	104.0	3.00	90.92	11.18	0.00	0.00	0.00	102.10	0.00
38	10,406	10,406	**4.14**	104.0	3.00	91.35	11.47	0.00	0.00	0.00	102.82	0.00
39	9,523	9,524	**5.44**	104.0	3.00	90.58	10.94	0.00	0.00	0.00	101.52	0.00
40	7,904	7,905	**8.14**	104.0	3.00	88.96	9.87	0.00	0.00	0.00	98.82	0.00
41	9,182	9,183	**5.98**	104.0	3.00	90.26	10.73	0.00	0.00	0.00	100.99	0.00
43	9,476	9,477	**5.52**	104.0	3.00	90.53	10.91	0.00	0.00	0.00	101.45	0.00
44	8,712	8,713	**6.74**	104.0	3.00	89.80	10.42	0.00	0.00	0.00	100.22	0.00
45	8,739	8,740	**6.69**	104.0	3.00	89.83	10.44	0.00	0.00	0.00	100.27	0.00
46	8,457	8,457	**7.17**	104.0	3.00	89.54	10.25	0.00	0.00	0.00	99.79	0.00
48	10,734	10,734	**3.68**	104.0	3.00	91.62	11.66	0.00	0.00	0.00	103.28	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	11,841	11,842	**2.22**	104.0	3.00	92.47	12.27	0.00	0.00	0.00	104.74	0.00
50	11,075	11,076	**3.22**	104.0	3.00	91.89	11.86	0.00	0.00	0.00	103.74	0.00
51	11,851	11,851	**2.21**	104.0	3.00	92.48	12.28	0.00	0.00	0.00	104.75	0.00
52	11,891	11,891	**2.16**	104.0	3.00	92.50	12.30	0.00	0.00	0.00	104.81	0.00
53	11,836	11,836	**2.23**	104.0	3.00	92.46	12.27	0.00	0.00	0.00	104.74	0.00
55	11,860	11,860	**2.20**	104.0	3.00	92.48	12.28	0.00	0.00	0.00	104.77	0.00
56	11,907	11,907	**2.14**	104.0	3.00	92.52	12.31	0.00	0.00	0.00	104.83	0.00
57	11,145	11,145	**3.12**	104.0	3.00	91.94	11.90	0.00	0.00	0.00	103.84	0.00
58	11,275	11,275	**2.95**	104.0	3.00	92.04	11.97	0.00	0.00	0.00	104.01	0.00
59	11,954	11,954	**2.08**	104.0	3.00	92.55	12.33	0.00	0.00	0.00	104.88	0.00
60	11,906	11,906	**2.14**	104.0	3.00	92.52	12.31	0.00	0.00	0.00	104.82	0.00
61	12,012	12,012	**2.00**	104.0	3.00	92.59	12.36	0.00	0.00	0.00	104.96	0.00
62	9,995	9,996	**4.73**	104.0	3.00	91.00	11.23	0.00	0.00	0.00	102.23	0.00
63	9,147	9,148	**6.03**	104.0	3.00	90.23	10.70	0.00	0.00	0.00	100.93	0.00
64	9,179	9,180	**5.98**	104.0	3.00	90.26	10.72	0.00	0.00	0.00	100.98	0.00
65	9,629	9,630	**5.28**	104.0	3.00	90.67	11.01	0.00	0.00	0.00	101.68	0.00
66	7,900	7,901	**8.15**	104.0	3.00	88.95	9.86	0.00	0.00	0.00	98.82	0.00
67	9,998	9,999	**4.73**	104.0	3.00	91.00	11.23	0.00	0.00	0.00	102.23	0.00
68	10,226	10,227	**4.40**	104.0	3.00	91.19	11.37	0.00	0.00	0.00	102.56	0.00
69	9,388	9,389	**5.65**	104.0	3.00	90.45	10.86	0.00	0.00	0.00	101.31	0.00
70	9,996	9,997	**4.73**	104.0	3.00	91.00	11.23	0.00	0.00	0.00	102.23	0.00
71	11,227	11,228	**3.01**	104.0	3.00	92.01	11.94	0.00	0.00	0.00	103.95	0.00
72	12,846	12,847	**0.99**	104.0	3.00	93.18	12.79	0.00	0.00	0.00	105.97	0.00
73	11,859	11,860	**2.20**	104.0	3.00	92.48	12.28	0.00	0.00	0.00	104.77	0.00
74	10,887	10,888	**3.47**	104.0	3.00	91.74	11.75	0.00	0.00	0.00	103.49	0.00
75	11,113	11,113	**3.17**	104.0	3.00	91.92	11.88	0.00	0.00	0.00	103.79	0.00
76	10,593	10,593	**3.88**	104.0	3.00	91.50	11.58	0.00	0.00	0.00	103.08	0.00
77	11,304	11,304	**2.91**	104.0	3.00	92.06	11.98	0.00	0.00	0.00	104.05	0.00
78	9,814	9,815	**5.00**	104.0	3.00	90.84	11.12	0.00	0.00	0.00	101.96	0.00
80	11,724	11,724	**2.37**	104.0	3.00	92.38	12.21	0.00	0.00	0.00	104.59	0.00
81	10,855	10,856	**3.51**	104.0	3.00	91.71	11.73	0.00	0.00	0.00	103.45	0.00
82	11,811	11,811	**2.26**	104.0	3.00	92.45	12.26	0.00	0.00	0.00	104.70	0.00
83	9,489	9,490	**5.50**	104.0	3.00	90.55	10.92	0.00	0.00	0.00	101.47	0.00
85	12,696	12,696	**1.17**	104.0	3.00	93.07	12.72	0.00	0.00	0.00	105.79	0.00
86	11,640	11,641	**2.48**	104.0	3.00	92.32	12.17	0.00	0.00	0.00	104.49	0.00
87	9,807	9,807	**5.01**	104.0	3.00	90.83	11.12	0.00	0.00	0.00	101.95	0.00
89	9,139	9,139	**6.04**	104.0	3.00	90.22	10.70	0.00	0.00	0.00	100.92	0.00
90	10,425	10,425	**4.11**	104.0	3.00	91.36	11.49	0.00	0.00	0.00	102.85	0.00
91	9,609	9,609	**5.31**	104.0	3.00	90.65	10.99	0.00	0.00	0.00	101.65	0.00
92	8,573	8,574	**6.97**	104.0	3.00	89.66	10.33	0.00	0.00	0.00	99.99	0.00
94	11,080	11,081	**3.21**	104.0	3.00	91.89	11.86	0.00	0.00	0.00	103.75	0.00
95	12,013	12,014	**2.00**	104.0	3.00	92.59	12.37	0.00	0.00	0.00	104.96	0.00
97	10,090	10,091	**4.59**	104.0	3.00	91.08	11.29	0.00	0.00	0.00	102.37	0.00
98	11,426	11,427	**2.75**	104.0	3.00	92.16	12.05	0.00	0.00	0.00	104.21	0.00
99	12,983	12,983	**0.83**	104.0	3.00	93.27	12.86	0.00	0.00	0.00	106.13	0.00
100	9,073	9,074	**6.15**	104.0	3.00	90.16	10.66	0.00	0.00	0.00	100.81	0.00
101	11,064	11,065	**3.23**	104.0	3.00	91.88	11.85	0.00	0.00	0.00	103.73	0.00
102	8,876	8,877	**6.47**	104.0	3.00	89.97	10.53	0.00	0.00	0.00	100.49	0.00
103	11,712	11,713	**2.38**	104.0	3.00	92.37	12.21	0.00	0.00	0.00	104.58	0.00
104	9,406	9,407	**5.62**	104.0	3.00	90.47	10.87	0.00	0.00	0.00	101.34	0.00
107	10,286	10,287	**4.31**	104.0	3.00	91.25	11.40	0.00	0.00	0.00	102.65	0.00
108	13,795	13,796	**-0.09**	104.0	3.00	93.79	13.25	0.00	0.00	0.00	107.05	0.00
109	11,975	11,975	**2.05**	104.0	3.00	92.57	12.35	0.00	0.00	0.00	104.91	0.00
110	10,577	10,577	**3.90**	104.0	3.00	91.49	11.57	0.00	0.00	0.00	103.06	0.00
111	10,576	10,576	**3.90**	104.0	3.00	91.49	11.57	0.00	0.00	0.00	103.06	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	10,495	10,496	**4.01**	104.0	3.00	91.42	11.53	0.00	0.00	0.00	102.95	0.00
114	12,683	12,683	**1.19**	104.0	3.00	93.06	12.71	0.00	0.00	0.00	105.78	0.00
115	12,596	12,596	**1.29**	104.0	3.00	93.00	12.67	0.00	0.00	0.00	105.67	0.00
116	9,075	9,076	**6.15**	104.0	3.00	90.16	10.66	0.00	0.00	0.00	100.82	0.00
118	12,119	12,119	**1.87**	104.0	3.00	92.67	12.42	0.00	0.00	0.00	105.09	0.00
119	11,053	11,054	**3.25**	104.0	3.00	91.87	11.85	0.00	0.00	0.00	103.72	0.00
120	11,177	11,178	**3.08**	104.0	3.00	91.97	11.91	0.00	0.00	0.00	103.88	0.00
121	10,482	10,483	**4.03**	104.0	3.00	91.41	11.52	0.00	0.00	0.00	102.93	0.00
125	9,319	9,320	**5.76**	104.0	3.00	90.39	10.81	0.00	0.00	0.00	101.20	0.00
126	8,987	8,988	**6.29**	104.0	3.00	90.07	10.60	0.00	0.00	0.00	100.67	0.00
127	9,093	9,094	**6.12**	104.0	3.00	90.17	10.67	0.00	0.00	0.00	100.84	0.00
128	9,333	9,334	**5.74**	104.0	3.00	90.40	10.82	0.00	0.00	0.00	101.22	0.00
129	8,239	8,239	**7.54**	104.0	3.00	89.32	10.10	0.00	0.00	0.00	99.42	0.00
130	7,608	7,608	**8.68**	104.0	3.00	88.63	9.65	0.00	0.00	0.00	98.28	0.00
131	7,628	7,629	**8.65**	104.0	3.00	88.65	9.67	0.00	0.00	0.00	98.32	0.00
132	7,841	7,842	**8.25**	104.0	3.00	88.89	9.82	0.00	0.00	0.00	98.71	0.00
133	9,868	9,868	**4.92**	104.0	3.00	90.88	11.15	0.00	0.00	0.00	102.04	0.00
134	10,173	10,173	**4.48**	104.0	3.00	91.15	11.34	0.00	0.00	0.00	102.49	0.00
141	10,221	10,222	**4.41**	104.0	3.00	91.19	11.37	0.00	0.00	0.00	102.56	0.00
142	8,900	8,901	**6.43**	104.0	3.00	89.99	10.54	0.00	0.00	0.00	100.53	0.00
143	10,255	10,256	**4.36**	104.0	3.00	91.22	11.39	0.00	0.00	0.00	102.61	0.00
144	8,670	8,670	**6.81**	104.0	3.00	89.76	10.39	0.00	0.00	0.00	100.15	0.00
145	10,224	10,225	**4.40**	104.0	3.00	91.19	11.37	0.00	0.00	0.00	102.56	0.00
146	10,185	10,185	**4.46**	104.0	3.00	91.16	11.34	0.00	0.00	0.00	102.50	0.00

Sum 25.25

Noise sensitive area: H53 H53

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	3,916	3,918	**17.70**	104.0	3.00	82.86	6.40	0.00	0.00	0.00	89.26	0.00
2	3,700	3,702	**18.43**	104.0	3.00	82.37	6.17	0.00	0.00	0.00	88.53	0.00
3	4,039	4,041	**17.30**	104.0	3.00	83.13	6.53	0.00	0.00	0.00	89.66	0.00
4	4,742	4,743	**15.19**	104.0	3.00	84.52	7.25	0.00	0.00	0.00	91.77	0.00
5	5,020	5,021	**14.43**	104.0	3.00	85.02	7.51	0.00	0.00	0.00	92.53	0.00
6	4,596	4,598	**15.60**	104.0	3.00	84.25	7.11	0.00	0.00	0.00	91.36	0.00
7	6,771	6,772	**10.33**	104.0	3.00	87.61	9.02	0.00	0.00	0.00	96.63	0.00
8	3,568	3,569	**18.89**	104.0	3.00	82.05	6.02	0.00	0.00	0.00	88.07	0.00
9	4,395	4,397	**16.20**	104.0	3.00	83.86	6.90	0.00	0.00	0.00	90.77	0.00
10	4,943	4,945	**14.64**	104.0	3.00	84.88	7.44	0.00	0.00	0.00	92.33	0.00
11	4,950	4,952	**14.62**	104.0	3.00	84.90	7.45	0.00	0.00	0.00	92.35	0.00
12	4,887	4,889	**14.79**	104.0	3.00	84.79	7.39	0.00	0.00	0.00	92.17	0.00
13	5,117	5,119	**14.17**	104.0	3.00	85.18	7.61	0.00	0.00	0.00	92.79	0.00
14	5,408	5,410	**13.42**	104.0	3.00	85.66	7.87	0.00	0.00	0.00	93.54	0.00
15	5,637	5,639	**12.86**	104.0	3.00	86.02	8.08	0.00	0.00	0.00	94.10	0.00
16	5,642	5,644	**12.85**	104.0	3.00	86.03	8.08	0.00	0.00	0.00	94.11	0.00
17	4,947	4,949	**14.62**	104.0	3.00	84.89	7.45	0.00	0.00	0.00	92.34	0.00
18	5,215	5,217	**13.92**	104.0	3.00	85.35	7.70	0.00	0.00	0.00	93.05	0.00
19	5,555	5,557	**13.06**	104.0	3.00	85.90	8.01	0.00	0.00	0.00	93.90	0.00
20	6,104	6,106	**11.77**	104.0	3.00	86.71	8.48	0.00	0.00	0.00	95.19	0.00
21	5,440	5,441	**13.35**	104.0	3.00	85.71	7.90	0.00	0.00	0.00	93.62	0.00
22	5,841	5,841	**12.38**	104.0	3.00	86.33	8.25	0.00	0.00	0.00	94.58	0.00
23	6,210	6,210	**11.53**	104.0	3.00	86.86	8.57	0.00	0.00	0.00	95.43	0.00
24	5,600	5,601	**12.95**	104.0	3.00	85.96	8.04	0.00	0.00	0.00	94.01	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	8,424	8,424	**7.23**	104.0	3.00	89.51	10.23	0.00	0.00	0.00	99.74	0.00
26	6,123	6,124	**11.73**	104.0	3.00	86.74	8.49	0.00	0.00	0.00	95.24	0.00
27	8,047	8,048	**7.88**	104.0	3.00	89.11	9.97	0.00	0.00	0.00	99.08	0.00
28	7,900	7,901	**8.15**	104.0	3.00	88.95	9.86	0.00	0.00	0.00	98.82	0.00
29	6,557	6,558	**10.78**	104.0	3.00	87.33	8.85	0.00	0.00	0.00	96.18	0.00
30	6,668	6,668	**10.54**	104.0	3.00	87.48	8.94	0.00	0.00	0.00	96.42	0.00
31	5,839	5,840	**12.38**	104.0	3.00	86.33	8.25	0.00	0.00	0.00	94.58	0.00
32	8,521	8,521	**7.06**	104.0	3.00	89.61	10.29	0.00	0.00	0.00	99.90	0.00
33	7,282	7,283	**9.30**	104.0	3.00	88.25	9.41	0.00	0.00	0.00	97.66	0.00
34	7,028	7,029	**9.80**	104.0	3.00	87.94	9.22	0.00	0.00	0.00	97.16	0.00
35	6,525	6,526	**10.84**	104.0	3.00	87.29	8.82	0.00	0.00	0.00	96.12	0.00
36	6,276	6,277	**11.39**	104.0	3.00	86.96	8.62	0.00	0.00	0.00	95.58	0.00
37	7,301	7,302	**9.27**	104.0	3.00	88.27	9.43	0.00	0.00	0.00	97.70	0.00
38	8,312	8,312	**7.42**	104.0	3.00	89.39	10.15	0.00	0.00	0.00	99.54	0.00
39	8,672	8,673	**6.80**	104.0	3.00	89.76	10.39	0.00	0.00	0.00	100.16	0.00
40	9,006	9,007	**6.26**	104.0	3.00	90.09	10.61	0.00	0.00	0.00	100.70	0.00
41	8,838	8,839	**6.53**	104.0	3.00	89.93	10.50	0.00	0.00	0.00	100.43	0.00
43	7,857	7,859	**8.22**	104.0	3.00	88.91	9.83	0.00	0.00	0.00	98.74	0.00
44	9,173	9,174	**5.99**	104.0	3.00	90.25	10.72	0.00	0.00	0.00	100.97	0.00
45	9,393	9,394	**5.64**	104.0	3.00	90.46	10.86	0.00	0.00	0.00	101.32	0.00
46	8,665	8,666	**6.82**	104.0	3.00	89.76	10.39	0.00	0.00	0.00	100.14	0.00
48	9,296	9,296	**5.80**	104.0	3.00	90.37	10.80	0.00	0.00	0.00	101.16	0.00
49	9,084	9,084	**6.13**	104.0	3.00	90.17	10.66	0.00	0.00	0.00	100.83	0.00
50	5,638	5,639	**12.86**	104.0	3.00	86.02	8.08	0.00	0.00	0.00	94.10	0.00
51	8,616	8,616	**6.90**	104.0	3.00	89.71	10.36	0.00	0.00	0.00	100.06	0.00
52	8,302	8,303	**7.43**	104.0	3.00	89.38	10.14	0.00	0.00	0.00	99.53	0.00
53	9,414	9,414	**5.61**	104.0	3.00	90.48	10.87	0.00	0.00	0.00	101.35	0.00
55	10,897	10,897	**3.46**	104.0	3.00	91.75	11.76	0.00	0.00	0.00	103.50	0.00
56	11,202	11,202	**3.05**	104.0	3.00	91.99	11.93	0.00	0.00	0.00	103.91	0.00
57	11,293	11,294	**2.93**	104.0	3.00	92.06	11.98	0.00	0.00	0.00	104.03	0.00
58	7,813	7,813	**8.31**	104.0	3.00	88.86	9.80	0.00	0.00	0.00	98.66	0.00
59	11,511	11,512	**2.64**	104.0	3.00	92.22	12.10	0.00	0.00	0.00	104.32	0.00
60	12,995	12,995	**0.82**	104.0	3.00	93.28	12.87	0.00	0.00	0.00	106.14	0.00
61	13,349	13,349	**0.41**	104.0	3.00	93.51	13.04	0.00	0.00	0.00	106.55	0.00
62	13,459	13,460	**0.29**	104.0	3.00	93.58	13.09	0.00	0.00	0.00	106.67	0.00
63	14,156	14,157	**-0.48**	104.0	3.00	94.02	13.42	0.00	0.00	0.00	107.44	0.00
64	15,550	15,551	**-1.92**	104.0	3.00	94.83	14.05	0.00	0.00	0.00	108.88	0.00
65	16,096	16,097	**-2.45**	104.0	3.00	95.13	14.28	0.00	0.00	0.00	109.42	0.00
66	8,850	8,850	**6.51**	104.0	3.00	89.94	10.51	0.00	0.00	0.00	100.45	0.00
67	15,361	15,361	**-1.73**	104.0	3.00	94.73	13.97	0.00	0.00	0.00	108.70	0.00
68	15,896	15,896	**-2.26**	104.0	3.00	95.03	14.20	0.00	0.00	0.00	109.22	0.00
69	16,058	16,058	**-2.42**	104.0	3.00	95.11	14.27	0.00	0.00	0.00	109.38	0.00
70	6,389	6,390	**11.14**	104.0	3.00	87.11	8.71	0.00	0.00	0.00	95.82	0.00
71	5,055	5,057	**14.34**	104.0	3.00	85.08	7.55	0.00	0.00	0.00	92.63	0.00
72	4,391	4,392	**16.21**	104.0	3.00	83.85	6.90	0.00	0.00	0.00	90.75	0.00
73	4,863	4,864	**14.86**	104.0	3.00	84.74	7.37	0.00	0.00	0.00	92.10	0.00
74	5,933	5,935	**12.16**	104.0	3.00	86.47	8.33	0.00	0.00	0.00	94.80	0.00
75	6,540	6,541	**10.81**	104.0	3.00	87.31	8.84	0.00	0.00	0.00	96.15	0.00
76	10,729	10,729	**3.69**	104.0	3.00	91.61	11.66	0.00	0.00	0.00	103.27	0.00
77	9,897	9,897	**4.88**	104.0	3.00	90.91	11.17	0.00	0.00	0.00	102.08	0.00
78	6,438	6,439	**11.03**	104.0	3.00	87.18	8.75	0.00	0.00	0.00	95.93	0.00
80	12,624	12,624	**1.26**	104.0	3.00	93.02	12.68	0.00	0.00	0.00	105.70	0.00
81	5,566	5,568	**13.03**	104.0	3.00	85.91	8.02	0.00	0.00	0.00	93.93	0.00
82	7,860	7,861	**8.22**	104.0	3.00	88.91	9.83	0.00	0.00	0.00	98.74	0.00
83	14,735	14,735	**-1.09**	104.0	3.00	94.37	13.69	0.00	0.00	0.00	108.06	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	9,027	9,027	**6.23**	104.0	3.00	90.11	10.63	0.00	0.00	0.00	100.74	0.00
86	12,339	12,339	**1.60**	104.0	3.00	92.83	12.54	0.00	0.00	0.00	105.36	0.00
87	16,300	16,300	**-2.65**	104.0	3.00	95.24	14.37	0.00	0.00	0.00	109.61	0.00
89	15,057	15,058	**-1.43**	104.0	3.00	94.56	13.83	0.00	0.00	0.00	108.39	0.00
90	11,968	11,968	**2.06**	104.0	3.00	92.56	12.34	0.00	0.00	0.00	104.90	0.00
91	13,722	13,722	**-0.01**	104.0	3.00	93.75	13.22	0.00	0.00	0.00	106.97	0.00
92	16,021	16,021	**-2.38**	104.0	3.00	95.09	14.25	0.00	0.00	0.00	109.34	0.00
94	5,160	5,162	**14.06**	104.0	3.00	85.26	7.65	0.00	0.00	0.00	92.90	0.00
95	4,339	4,341	**16.36**	104.0	3.00	83.75	6.85	0.00	0.00	0.00	90.60	0.00
97	6,251	6,253	**11.44**	104.0	3.00	86.92	8.60	0.00	0.00	0.00	95.52	0.00
98	4,832	4,834	**14.94**	104.0	3.00	84.69	7.34	0.00	0.00	0.00	92.02	0.00
99	3,606	3,608	**18.76**	104.0	3.00	82.14	6.06	0.00	0.00	0.00	88.21	0.00
100	9,397	9,397	**5.64**	104.0	3.00	90.46	10.86	0.00	0.00	0.00	101.32	0.00
101	5,505	5,507	**13.18**	104.0	3.00	85.82	7.96	0.00	0.00	0.00	93.78	0.00
102	8,846	8,847	**6.52**	104.0	3.00	89.94	10.51	0.00	0.00	0.00	100.44	0.00
103	5,208	5,210	**13.93**	104.0	3.00	85.34	7.69	0.00	0.00	0.00	93.03	0.00
104	8,359	8,360	**7.34**	104.0	3.00	89.44	10.18	0.00	0.00	0.00	99.63	0.00
107	5,969	5,970	**12.08**	104.0	3.00	86.52	8.36	0.00	0.00	0.00	94.88	0.00
108	3,067	3,068	**20.79**	104.0	3.00	80.74	5.43	0.00	0.00	0.00	86.17	0.00
109	11,829	11,830	**2.23**	104.0	3.00	92.46	12.27	0.00	0.00	0.00	104.73	0.00
110	9,722	9,722	**5.14**	104.0	3.00	90.76	11.06	0.00	0.00	0.00	101.82	0.00
111	10,333	10,333	**4.25**	104.0	3.00	91.28	11.43	0.00	0.00	0.00	102.72	0.00
113	5,795	5,796	**12.48**	104.0	3.00	86.26	8.22	0.00	0.00	0.00	94.48	0.00
114	9,328	9,329	**5.75**	104.0	3.00	90.40	10.82	0.00	0.00	0.00	101.22	0.00
115	3,644	3,646	**18.62**	104.0	3.00	82.24	6.10	0.00	0.00	0.00	88.34	0.00
116	7,878	7,880	**8.18**	104.0	3.00	88.93	9.85	0.00	0.00	0.00	98.78	0.00
118	12,305	12,305	**1.64**	104.0	3.00	92.80	12.52	0.00	0.00	0.00	105.32	0.00
119	5,446	5,448	**13.33**	104.0	3.00	85.72	7.91	0.00	0.00	0.00	93.63	0.00
120	5,593	5,595	**12.97**	104.0	3.00	85.96	8.04	0.00	0.00	0.00	93.99	0.00
121	6,036	6,038	**11.92**	104.0	3.00	86.62	8.42	0.00	0.00	0.00	95.04	0.00
125	14,470	14,470	**-0.82**	104.0	3.00	94.21	13.57	0.00	0.00	0.00	107.78	0.00
126	10,654	10,654	**3.79**	104.0	3.00	91.55	11.62	0.00	0.00	0.00	103.17	0.00
127	10,824	10,824	**3.56**	104.0	3.00	91.69	11.72	0.00	0.00	0.00	103.40	0.00
128	10,904	10,905	**3.45**	104.0	3.00	91.75	11.76	0.00	0.00	0.00	103.51	0.00
129	8,034	8,035	**7.90**	104.0	3.00	89.10	9.96	0.00	0.00	0.00	99.06	0.00
130	8,651	8,652	**6.84**	104.0	3.00	89.74	10.38	0.00	0.00	0.00	100.12	0.00
131	8,611	8,611	**6.91**	104.0	3.00	89.70	10.35	0.00	0.00	0.00	100.05	0.00
132	8,418	8,418	**7.24**	104.0	3.00	89.50	10.22	0.00	0.00	0.00	99.73	0.00
133	8,798	8,798	**6.60**	104.0	3.00	89.89	10.48	0.00	0.00	0.00	100.36	0.00
134	6,163	6,164	**11.64**	104.0	3.00	86.80	8.53	0.00	0.00	0.00	95.32	0.00
141	6,178	6,180	**11.60**	104.0	3.00	86.82	8.54	0.00	0.00	0.00	95.36	0.00
142	8,623	8,624	**6.89**	104.0	3.00	89.71	10.36	0.00	0.00	0.00	100.08	0.00
143	6,022	6,024	**11.95**	104.0	3.00	86.60	8.41	0.00	0.00	0.00	95.01	0.00
144	9,696	9,697	**5.18**	104.0	3.00	90.73	11.05	0.00	0.00	0.00	101.78	0.00
145	11,557	11,558	**2.58**	104.0	3.00	92.26	12.12	0.00	0.00	0.00	104.38	0.00
146	11,245	11,246	**2.99**	104.0	3.00	92.02	11.95	0.00	0.00	0.00	103.97	0.00
Sum	32.61											

Noise sensitive area: H54 H54

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	11,502	11,503	**2.65**	104.0	3.00	92.22	12.09	0.00	0.00	0.00	104.31	0.00
2	11,261	11,261	**2.97**	104.0	3.00	92.03	11.96	0.00	0.00	0.00	103.99	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	10,669	10,670	**3.77**	104.0	3.00	91.56	11.63	0.00	0.00	0.00	103.19	0.00
4	9,303	9,303	**5.79**	104.0	3.00	90.37	10.80	0.00	0.00	0.00	101.18	0.00
5	9,394	9,395	**5.64**	104.0	3.00	90.46	10.86	0.00	0.00	0.00	101.32	0.00
6	10,151	10,152	**4.51**	104.0	3.00	91.13	11.32	0.00	0.00	0.00	102.46	0.00
7	8,671	8,672	**6.81**	104.0	3.00	89.76	10.39	0.00	0.00	0.00	100.16	0.00
8	12,151	12,152	**1.83**	104.0	3.00	92.69	12.44	0.00	0.00	0.00	105.13	0.00
9	11,060	11,060	**3.24**	104.0	3.00	91.88	11.85	0.00	0.00	0.00	103.72	0.00
10	11,048	11,049	**3.25**	104.0	3.00	91.87	11.84	0.00	0.00	0.00	103.71	0.00
11	12,654	12,655	**1.22**	104.0	3.00	93.05	12.70	0.00	0.00	0.00	105.74	0.00
12	12,436	12,437	**1.48**	104.0	3.00	92.89	12.59	0.00	0.00	0.00	105.48	0.00
13	11,978	11,979	**2.05**	104.0	3.00	92.57	12.35	0.00	0.00	0.00	104.92	0.00
14	11,607	11,608	**2.52**	104.0	3.00	92.29	12.15	0.00	0.00	0.00	104.44	0.00
15	10,771	10,773	**3.63**	104.0	3.00	91.65	11.69	0.00	0.00	0.00	103.33	0.00
16	10,385	10,386	**4.17**	104.0	3.00	91.33	11.46	0.00	0.00	0.00	102.79	0.00
17	12,889	12,890	**0.94**	104.0	3.00	93.20	12.81	0.00	0.00	0.00	106.02	0.00
18	13,105	13,106	**0.69**	104.0	3.00	93.35	12.92	0.00	0.00	0.00	106.27	0.00
19	11,928	11,929	**2.11**	104.0	3.00	92.53	12.32	0.00	0.00	0.00	104.85	0.00
20	10,844	10,845	**3.53**	104.0	3.00	91.70	11.73	0.00	0.00	0.00	103.43	0.00
21	8,801	8,802	**6.59**	104.0	3.00	89.89	10.48	0.00	0.00	0.00	100.37	0.00
22	8,159	8,159	**7.68**	104.0	3.00	89.23	10.04	0.00	0.00	0.00	99.28	0.00
23	7,774	7,774	**8.38**	104.0	3.00	88.81	9.77	0.00	0.00	0.00	98.59	0.00
24	8,407	8,407	**7.25**	104.0	3.00	89.49	10.21	0.00	0.00	0.00	99.71	0.00
25	5,951	5,951	**12.12**	104.0	3.00	86.49	8.35	0.00	0.00	0.00	94.84	0.00
26	8,613	8,614	**6.90**	104.0	3.00	89.70	10.35	0.00	0.00	0.00	100.06	0.00
27	6,686	6,686	**10.51**	104.0	3.00	87.50	8.95	0.00	0.00	0.00	96.46	0.00
28	7,483	7,484	**8.92**	104.0	3.00	88.48	9.56	0.00	0.00	0.00	98.04	0.00
29	7,620	7,621	**8.66**	104.0	3.00	88.64	9.66	0.00	0.00	0.00	98.30	0.00
30	7,314	7,314	**9.24**	104.0	3.00	88.28	9.44	0.00	0.00	0.00	97.72	0.00
31	8,028	8,029	**7.92**	104.0	3.00	89.09	9.95	0.00	0.00	0.00	99.05	0.00
32	5,640	5,641	**12.86**	104.0	3.00	86.03	8.08	0.00	0.00	0.00	94.11	0.00
33	6,695	6,695	**10.49**	104.0	3.00	87.51	8.96	0.00	0.00	0.00	96.47	0.00
34	8,340	8,341	**7.37**	104.0	3.00	89.42	10.17	0.00	0.00	0.00	99.59	0.00
35	8,962	8,963	**6.33**	104.0	3.00	90.05	10.58	0.00	0.00	0.00	100.63	0.00
36	9,258	9,260	**5.85**	104.0	3.00	90.33	10.78	0.00	0.00	0.00	101.11	0.00
37	8,033	8,034	**7.91**	104.0	3.00	89.10	9.96	0.00	0.00	0.00	99.06	0.00
38	6,266	6,266	**11.41**	104.0	3.00	86.94	8.61	0.00	0.00	0.00	95.55	0.00
39	6,560	6,561	**10.77**	104.0	3.00	87.34	8.85	0.00	0.00	0.00	96.19	0.00
40	8,162	8,162	**7.68**	104.0	3.00	89.24	10.05	0.00	0.00	0.00	99.28	0.00
41	6,695	6,696	**10.49**	104.0	3.00	87.52	8.96	0.00	0.00	0.00	96.48	0.00
43	7,702	7,703	**8.51**	104.0	3.00	88.73	9.72	0.00	0.00	0.00	98.45	0.00
44	6,795	6,797	**10.28**	104.0	3.00	87.65	9.04	0.00	0.00	0.00	96.69	0.00
45	6,501	6,503	**10.89**	104.0	3.00	87.26	8.81	0.00	0.00	0.00	96.07	0.00
46	7,836	7,837	**8.26**	104.0	3.00	88.88	9.82	0.00	0.00	0.00	98.70	0.00
48	5,006	5,007	**14.47**	104.0	3.00	84.99	7.50	0.00	0.00	0.00	92.49	0.00
49	4,830	4,831	**14.95**	104.0	3.00	84.68	7.33	0.00	0.00	0.00	92.01	0.00
50	9,413	9,413	**5.61**	104.0	3.00	90.47	10.87	0.00	0.00	0.00	101.35	0.00
51	5,307	5,308	**13.68**	104.0	3.00	85.50	7.78	0.00	0.00	0.00	93.28	0.00
52	5,623	5,623	**12.90**	104.0	3.00	86.00	8.06	0.00	0.00	0.00	94.06	0.00
53	4,496	4,497	**15.90**	104.0	3.00	84.06	7.01	0.00	0.00	0.00	91.06	0.00
55	3,009	3,010	**21.03**	104.0	3.00	80.57	5.36	0.00	0.00	0.00	85.93	0.00
56	2,702	2,703	**22.35**	104.0	3.00	79.64	4.97	0.00	0.00	0.00	84.61	0.00
57	2,884	2,885	**21.55**	104.0	3.00	80.20	5.20	0.00	0.00	0.00	85.41	0.00
58	6,339	6,340	**11.25**	104.0	3.00	87.04	8.67	0.00	0.00	0.00	95.71	0.00
59	2,390	2,392	**23.83**	104.0	3.00	78.57	4.56	0.00	0.00	0.00	83.14	0.00
60	1,093	1,097	**32.60**	104.0	3.00	71.80	2.56	0.00	0.00	0.00	74.36	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 11:06 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	809	813	**35.73**	104.0	3.00	69.20	2.03	0.00	0.00	0.00	71.23	0.00
62	2,739	2,741	**22.18**	104.0	3.00	79.76	5.02	0.00	0.00	0.00	84.78	0.00
63	3,697	3,699	**18.44**	104.0	3.00	82.36	6.16	0.00	0.00	0.00	88.52	0.00
64	4,375	4,376	**16.26**	104.0	3.00	83.82	6.88	0.00	0.00	0.00	90.71	0.00
65	4,412	4,413	**16.15**	104.0	3.00	83.89	6.92	0.00	0.00	0.00	90.81	0.00
66	8,468	8,469	**7.15**	104.0	3.00	89.56	10.26	0.00	0.00	0.00	99.81	0.00
67	3,518	3,519	**19.07**	104.0	3.00	81.93	5.96	0.00	0.00	0.00	87.89	0.00
68	3,750	3,751	**18.26**	104.0	3.00	82.48	6.22	0.00	0.00	0.00	88.70	0.00
69	4,581	4,582	**15.65**	104.0	3.00	84.22	7.09	0.00	0.00	0.00	91.31	0.00
70	11,894	11,895	**2.15**	104.0	3.00	92.51	12.30	0.00	0.00	0.00	104.81	0.00
71	10,742	10,743	**3.67**	104.0	3.00	91.62	11.67	0.00	0.00	0.00	103.29	0.00
72	9,691	9,692	**5.19**	104.0	3.00	90.73	11.05	0.00	0.00	0.00	101.77	0.00
73	9,813	9,814	**5.00**	104.0	3.00	90.84	11.12	0.00	0.00	0.00	101.96	0.00
74	9,113	9,114	**6.08**	104.0	3.00	90.19	10.68	0.00	0.00	0.00	100.88	0.00
75	7,953	7,954	**8.05**	104.0	3.00	89.01	9.90	0.00	0.00	0.00	98.91	0.00
76	3,694	3,695	**18.45**	104.0	3.00	82.35	6.16	0.00	0.00	0.00	88.51	0.00
77	4,149	4,150	**16.95**	104.0	3.00	83.36	6.65	0.00	0.00	0.00	90.01	0.00
78	10,518	10,519	**3.98**	104.0	3.00	91.44	11.54	0.00	0.00	0.00	102.98	0.00
80	1,472	1,474	**29.39**	104.0	3.00	74.37	3.20	0.00	0.00	0.00	77.58	0.00
81	12,205	12,206	**1.76**	104.0	3.00	92.73	12.47	0.00	0.00	0.00	105.20	0.00
82	6,103	6,103	**11.77**	104.0	3.00	86.71	8.48	0.00	0.00	0.00	95.19	0.00
83	3,596	3,597	**18.79**	104.0	3.00	82.12	6.05	0.00	0.00	0.00	88.17	0.00
85	4,850	4,851	**14.89**	104.0	3.00	84.72	7.35	0.00	0.00	0.00	92.07	0.00
86	1,742	1,744	**27.50**	104.0	3.00	75.83	3.63	0.00	0.00	0.00	79.46	0.00
87	4,443	4,444	**16.05**	104.0	3.00	83.96	6.95	0.00	0.00	0.00	90.91	0.00
89	4,098	4,099	**17.11**	104.0	3.00	83.25	6.60	0.00	0.00	0.00	89.85	0.00
90	2,836	2,837	**21.76**	104.0	3.00	80.06	5.14	0.00	0.00	0.00	85.20	0.00
91	3,147	3,148	**20.47**	104.0	3.00	80.96	5.53	0.00	0.00	0.00	86.49	0.00
92	5,247	5,247	**13.84**	104.0	3.00	85.40	7.73	0.00	0.00	0.00	93.12	0.00
94	11,275	11,276	**2.95**	104.0	3.00	92.04	11.97	0.00	0.00	0.00	104.01	0.00
95	12,324	12,324	**1.62**	104.0	3.00	92.82	12.53	0.00	0.00	0.00	105.34	0.00
97	10,034	10,035	**4.68**	104.0	3.00	91.03	11.25	0.00	0.00	0.00	102.28	0.00
98	11,664	11,665	**2.44**	104.0	3.00	92.34	12.18	0.00	0.00	0.00	104.52	0.00
99	10,764	10,765	**3.64**	104.0	3.00	91.64	11.68	0.00	0.00	0.00	103.32	0.00
100	6,153	6,154	**11.66**	104.0	3.00	86.78	8.52	0.00	0.00	0.00	95.30	0.00
101	12,625	12,626	**1.25**	104.0	3.00	93.03	12.68	0.00	0.00	0.00	105.71	0.00
102	7,023	7,024	**9.81**	104.0	3.00	87.93	9.22	0.00	0.00	0.00	97.15	0.00
103	13,398	13,398	**0.36**	104.0	3.00	93.54	13.06	0.00	0.00	0.00	106.61	0.00
104	7,072	7,073	**9.72**	104.0	3.00	87.99	9.25	0.00	0.00	0.00	97.25	0.00
107	11,284	11,285	**2.94**	104.0	3.00	92.05	11.97	0.00	0.00	0.00	104.02	0.00
108	10,938	10,939	**3.40**	104.0	3.00	91.78	11.78	0.00	0.00	0.00	103.56	0.00
109	2,078	2,080	**25.47**	104.0	3.00	77.36	4.13	0.00	0.00	0.00	81.49	0.00
110	4,660	4,660	**15.43**	104.0	3.00	84.37	7.17	0.00	0.00	0.00	91.54	0.00
111	4,068	4,069	**17.21**	104.0	3.00	83.19	6.56	0.00	0.00	0.00	89.76	0.00
113	11,595	11,596	**2.53**	104.0	3.00	92.29	12.14	0.00	0.00	0.00	104.43	0.00
114	4,551	4,551	**15.74**	104.0	3.00	84.16	7.06	0.00	0.00	0.00	91.22	0.00
115	11,895	11,895	**2.15**	104.0	3.00	92.51	12.30	0.00	0.00	0.00	104.81	0.00
116	8,226	8,227	**7.57**	104.0	3.00	89.30	10.09	0.00	0.00	0.00	99.40	0.00
118	1,593	1,595	**28.51**	104.0	3.00	75.06	3.40	0.00	0.00	0.00	78.45	0.00
119	9,885	9,886	**4.90**	104.0	3.00	90.90	11.16	0.00	0.00	0.00	102.07	0.00
120	13,042	13,043	**0.76**	104.0	3.00	93.31	12.89	0.00	0.00	0.00	106.20	0.00
121	9,595	9,596	**5.33**	104.0	3.00	90.64	10.99	0.00	0.00	0.00	101.63	0.00
125	3,638	3,639	**18.65**	104.0	3.00	82.22	6.10	0.00	0.00	0.00	88.32	0.00
126	5,012	5,013	**14.45**	104.0	3.00	85.00	7.51	0.00	0.00	0.00	92.51	0.00
127	4,776	4,777	**15.10**	104.0	3.00	84.58	7.28	0.00	0.00	0.00	91.87	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

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DECIBEL - Detailed results

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	4,497	4,499	**15.89**	104.0	3.00	84.06	7.01	0.00	0.00	0.00	91.07	0.00
129	10,033	10,033	**4.68**	104.0	3.00	91.03	11.25	0.00	0.00	0.00	102.28	0.00
130	10,112	10,113	**4.56**	104.0	3.00	91.10	11.30	0.00	0.00	0.00	102.40	0.00
131	10,560	10,560	**3.92**	104.0	3.00	91.47	11.56	0.00	0.00	0.00	103.04	0.00
132	10,929	10,930	**3.41**	104.0	3.00	91.77	11.78	0.00	0.00	0.00	103.55	0.00
133	6,112	6,113	**11.75**	104.0	3.00	86.73	8.49	0.00	0.00	0.00	95.21	0.00
134	11,743	11,743	**2.34**	104.0	3.00	92.40	12.22	0.00	0.00	0.00	104.62	0.00
141	9,856	9,857	**4.94**	104.0	3.00	90.88	11.15	0.00	0.00	0.00	102.02	0.00
142	7,295	7,297	**9.28**	104.0	3.00	88.26	9.42	0.00	0.00	0.00	97.68	0.00
143	10,424	10,425	**4.11**	104.0	3.00	91.36	11.49	0.00	0.00	0.00	102.85	0.00
144	6,236	6,237	**11.47**	104.0	3.00	86.90	8.59	0.00	0.00	0.00	95.49	0.00
145	3,273	3,274	**19.98**	104.0	3.00	81.30	5.68	0.00	0.00	0.00	86.98	0.00
146	3,537	3,538	**19.00**	104.0	3.00	81.98	5.98	0.00	0.00	0.00	87.96	0.00

Sum 40.38

Project:
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DECIBEL - Assumptions for noise calculation

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

Noise calculation model:
ISO 9613-2 General
Wind speed:
9.0 m/s
Ground attenuation:
None
Meteorological coefficient, C0:
0.0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Pure and Impulse tone penalty are added to WTG source noise
Height above ground level, when no value in NSA object:
1.5 m Allow override of model height with height from NSA object
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0.0 dB(A)
Octave data required
Air absorption

63 [db/km]	125 [db/km]	250 [db/km]	500 [db/km]	1,000 [db/km]	2,000 [db/km]	4,000 [db/km]	8,000 [db/km]
0.1	0.4	1.0	1.9	3.7	9.7	32.8	117.0

WTG: GE WIND ENERGY GE 1.5sle 60Hz 1500 77.0 !O!
Noise: Man. 8m/s 09-2002

Source	Source/Date	Creator	Edited
Manufacturer	9/17/2002	USER	3/27/2009 10:15 AM

					Octave data							
Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]
From Windcat	80.0	9.0	104.0	No	85.1	94.0	97.2	98.6	97.9	94.5	87.3	77.0

NSA: H01-H01
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H02-H02
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H03-H03
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

Project:
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DECIBEL - Assumptions for noise calculation

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

NSA: H04-H04
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H05-H05
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H06-H06
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H07-H07
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H08-H08
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H09-H09
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H10-H10
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H11-H11
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

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DECIBEL - Assumptions for noise calculation

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

NSA: H12-H12
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H13-H13
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H14-H14
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H15-H15
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H16-H16
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H17-H17
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H18-H18
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H19-H19
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

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DECIBEL - Assumptions for noise calculation

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

NSA: H20-H20
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H21-H21
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H22-H22
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H23-H23
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H24-H24
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H25-H25
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H27-H27
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H28-H28
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

Project:
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DECIBEL - Assumptions for noise calculation

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

NSA: H29-H29
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H30-H30
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H31-H31
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H32-H32
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H33-H33
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H34-H34
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H35-H35
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H36-H36
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

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DECIBEL - Assumptions for noise calculation

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

NSA: H37-H37
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H38-H38
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H39-H39
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H40-H40
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H41-H41
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H42-H42
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H43-H43
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H44-H44
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

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DECIBEL - Assumptions for noise calculation

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

NSA: H45-H45
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H46-H46
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H48-H48
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H49-H49
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H52-H52
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H53-H53
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H54-H54
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

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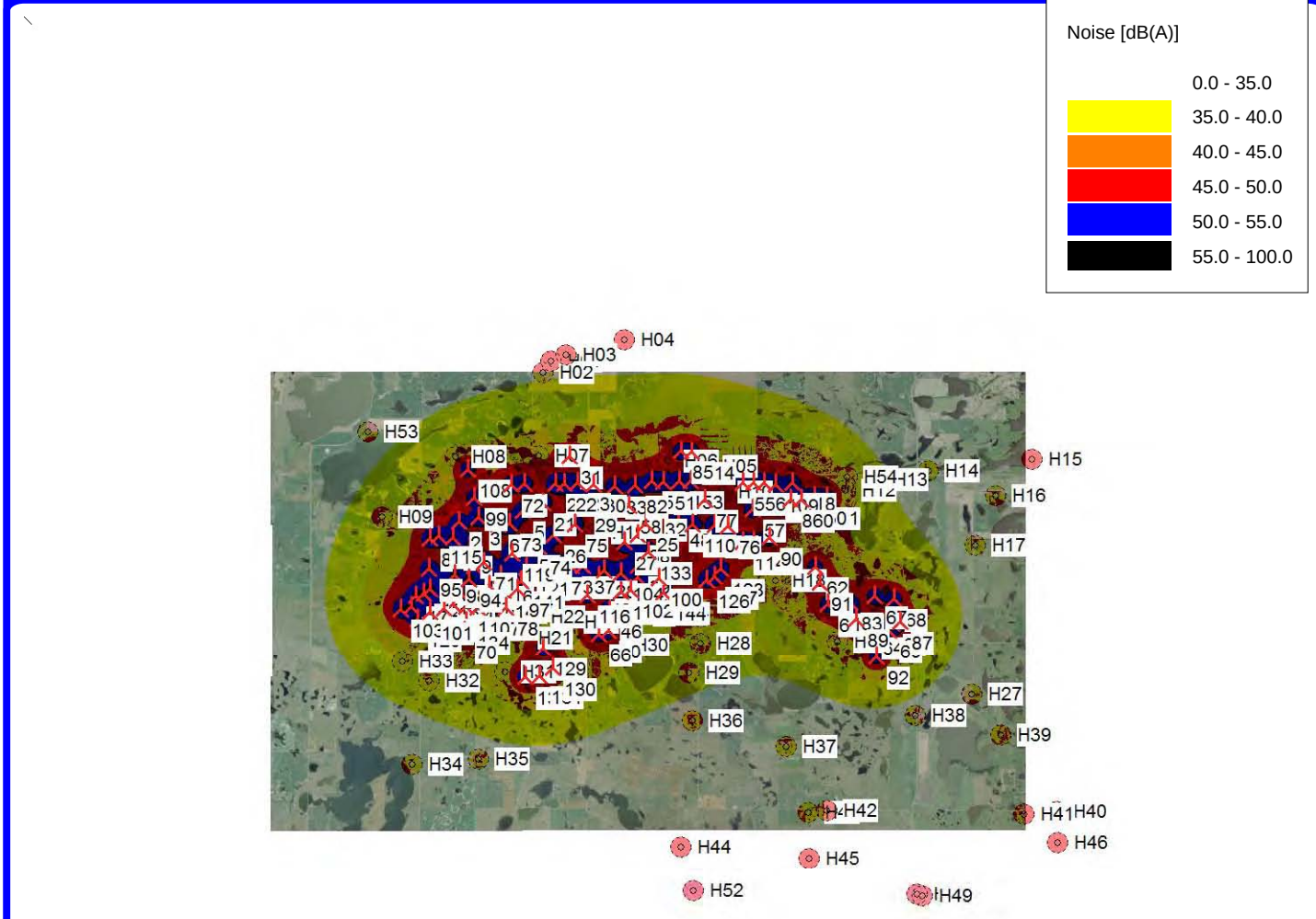
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DECIBEL - Map 9.0 m/s

Calculation: Merricourt ND No Att. 125 WTGs (v5f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

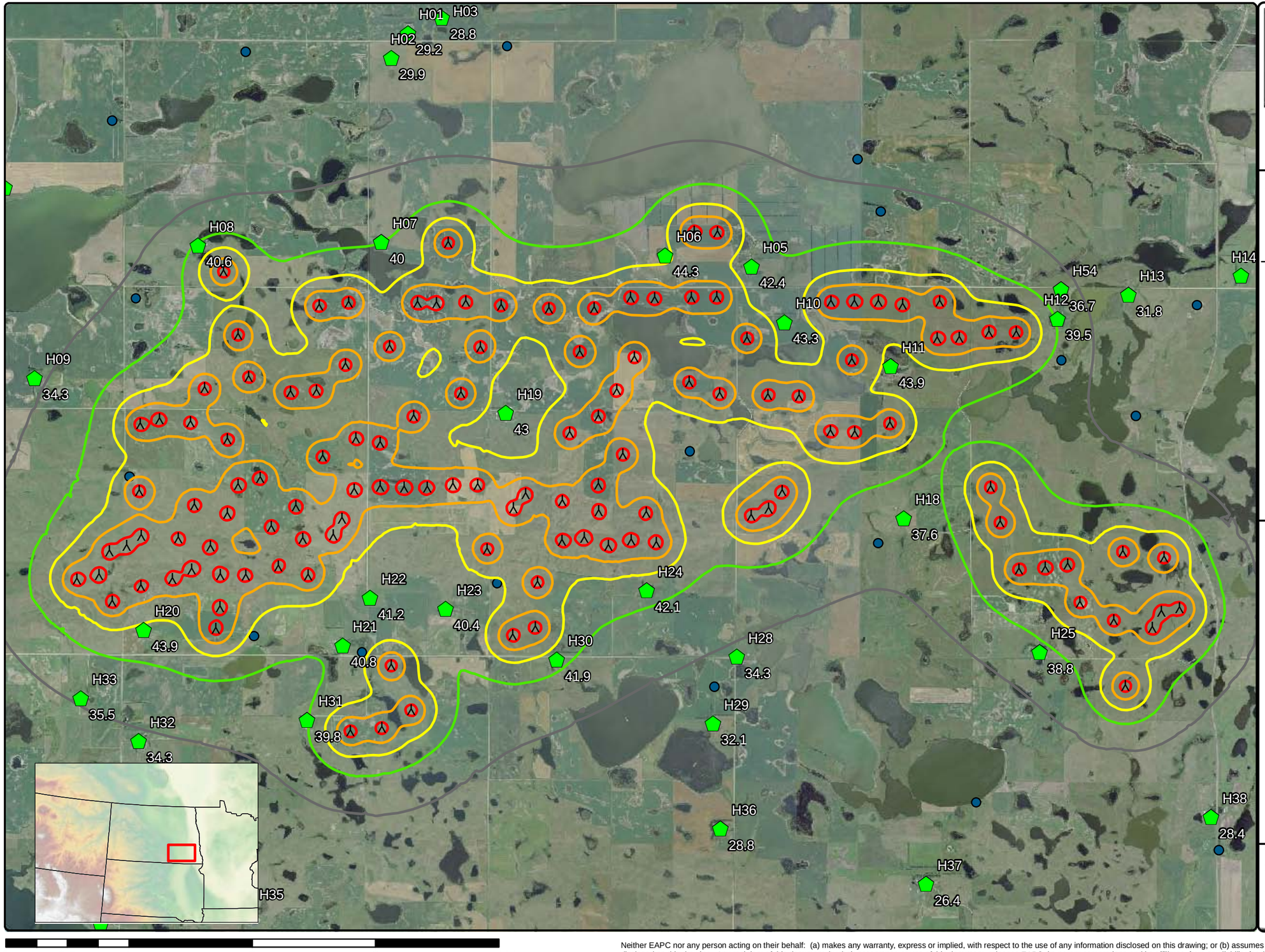


Map: , Print scale 1:200,000, Map center UTM NAD 83 Zone: 14 East: 497,074 North: 5,106,074
Noise calculation model: ISO 9613-2 General. Wind speed: 9.0 m/s

New WTG
Noise sensitive area
Height above sea level from active line object
35.0 dB(A)
40.0 dB(A)
45.0 dB(A)
50.0 dB(A)
55.0 dB(A)

Appendix C: Realistic Noise Map

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Merricourt, ND
Realistic Noise
GE 1.5sle 187.5 MW

Client

Chris Sternhagen
enXco

Project Description

Realistic noise scenario for 187.5 MW GE 1.5sle layout (v15f). Assumes turbines at loudest level (104 dB(A)) and Alternative attenuation within WindPRO.

Location: Merricourt, ND

Project #: 20102130

Issue Dates

1	Original	2010.04.23
#	*Description*	*Date*

Drawn By: BS | *Checked By: JH*

Legend

- Potential Occupied Residence
- GE 1.5sle WTG

Realistic Noise Scenario (dB(A))

- 35
- 40
- 45
- 50
- 55
- Other Building Sites (non occupied)

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Appendix D: Realistic Noise WindPRO Report

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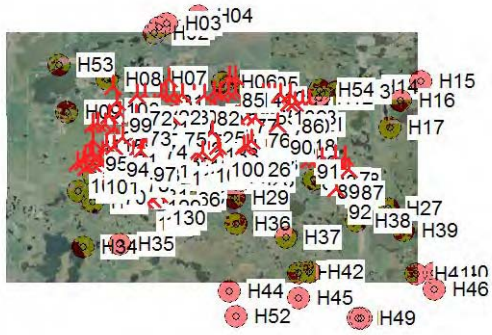
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DECIBEL - Main Result

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)

Noise calculation model:
ISO 9613-2 General
Wind speed:
9.0 m/s
Ground attenuation:
Alternative
Meteorological coefficient, C0:
0.0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Pure and Impulse tone penalty are added to WTG source noise
Height above ground level, when no value in NSA object:
1.5 m Don't allow override of model height with height from NSA object
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0.0 dB(A)



Scale 1:400,000
New WTG
Noise sensitive area

WTGs

	UTM NAD83 Zone: 14 East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	Wind speed	Hub height	LwA,ref	Pure tones	Octave data
	UTM NAD83 Zone: 14		[m]					[kW]	[m]	[m]			[m/s]	[m]	[dB(A)]		
1	490,965	5,108,120	640.1		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
2	491,148	5,108,571	632.3		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
3	491,727	5,108,716	640.1		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
4	493,034	5,109,690	608.5		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
5	492,992	5,108,880	621.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
6	492,273	5,108,516	643.1		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
7	494,058	5,107,274	661.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
8	490,312	5,108,098	626.5		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
9	491,450	5,107,902	650.3		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
10	491,587	5,107,303	673.6		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
11	490,133	5,106,507	676.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
12	490,322	5,106,643	676.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
13	490,807	5,106,607	685.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
14	491,225	5,106,500	685.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
15	492,019	5,106,760	679.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
16	492,343	5,107,028	673.0		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
17	489,908	5,106,439	673.6		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
18	489,773	5,106,126	667.0		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
19	490,981	5,106,204	673.2		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
20	492,111	5,106,244	661.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
21	493,565	5,109,117	624.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
22	494,178	5,109,682	606.6		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
23	494,563	5,109,697	608.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
24	493,930	5,109,687	606.6		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
25	496,532	5,108,542	603.5		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
26	493,882	5,108,206	632.9		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
27	495,917	5,107,986	614.9		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
28	495,345	5,107,187	649.1		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
29	494,752	5,109,105	609.6		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
30	495,024	5,109,653	595.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
31	494,330	5,110,469	606.6		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
32	496,764	5,108,977	600.5		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
33	495,645	5,109,612	594.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
34	494,394	5,107,309	652.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
35	493,754	5,107,275	663.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
36	493,443	5,107,280	664.5		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
37	494,718	5,107,307	649.2		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
38	496,292	5,108,204	606.6		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
39	496,291	5,107,310	638.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
40	495,470	5,105,445	624.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
41	496,298	5,106,965	658.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
43	495,183	5,107,002	658.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
44	496,423	5,106,509	673.6		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
45	496,720	5,106,582	667.5		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
46	495,497	5,106,032	635.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
48	497,477	5,108,649	600.5		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
49	497,506	5,109,758	594.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
50	493,125	5,107,917	648.9		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes

To be continued on next page...

Project:
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DECIBEL - Main Result

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)

...continued from previous page

	UTM NAD83 Zone: 14				WTG type							Noise data						
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Creator	Name	Wind speed	Hub height	LwA,ref	Pure tones	Octave data
	UTM NAD83 Zone: 14		[m]					[kW]	[m]	[m]			[m/s]	[m]	[dB(A)]		
51	497,029	5,109,742	591.3		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
52	496,713	5,109,755	591.3		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
53	497,840	5,109,759	599.9		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
55	499,330	5,109,696	595.1		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
56	499,638	5,109,702	600.5		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
57	499,602	5,108,937	597.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
58	496,048	5,109,045	595.2		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
59	499,950	5,109,699	603.9		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
60	501,393	5,109,304	612.1		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
61	501,750	5,109,300	606.1		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
62	501,414	5,107,279	615.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
63	501,784	5,106,203	624.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
64	503,022	5,105,538	621.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
65	503,647	5,105,647	621.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
66	495,174	5,105,339	618.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
67	503,142	5,106,435	618.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
68	503,679	5,106,358	612.1		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
69	503,527	5,105,436	621.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
70	491,296	5,105,430	626.0		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
71	491,878	5,107,400	667.5		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
72	492,646	5,109,647	612.6		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
73	492,611	5,108,539	635.3		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
74	493,444	5,107,858	652.3		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
75	494,498	5,108,503	613.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
76	498,913	5,108,467	606.5		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
77	498,235	5,109,222	594.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
78	492,503	5,106,122	646.1		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
80	501,006	5,109,227	614.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
81	490,731	5,106,077	671.6		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
82	496,237	5,109,617	594.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
83	502,422	5,106,264	621.2		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
85	497,544	5,110,614	594.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
86	500,716	5,109,217	610.0		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
87	503,880	5,105,693	618.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
89	502,583	5,105,769	623.6		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
90	500,101	5,108,112	611.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
91	501,541	5,106,814	618.9		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
92	503,174	5,104,680	618.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
94	491,447	5,106,932	680.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
95	490,296	5,107,226	660.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
97	492,829	5,106,648	682.9		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
98	491,016	5,107,045	675.9		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
99	491,587	5,109,269	624.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
100	496,917	5,106,943	648.0		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
101	490,319	5,105,984	667.5		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
102	496,106	5,106,616	677.3		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
103	489,484	5,106,071	665.0		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
104	495,824	5,107,098	649.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
107	491,687	5,106,123	667.5		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
108	491,399	5,110,092	610.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
109	500,266	5,109,661	607.2		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
110	497,878	5,108,500	601.9		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
111	498,507	5,108,481	607.1		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
113	491,356	5,106,130	667.5		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
114	497,846	5,110,606	594.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
115	490,562	5,108,163	627.9		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
116	494,841	5,106,468	667.5		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
118	500,750	5,109,701	609.6		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
119	492,694	5,107,675	658.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
120	489,947	5,105,780	658.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
121	493,103	5,107,245	665.3		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
125	502,127	5,106,227	621.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
126	498,288	5,106,902	637.0		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
127	498,513	5,106,995	637.0		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
128	498,692	5,107,222	636.3		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
129	493,588	5,104,945	627.9		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
130	493,847	5,104,363	627.9		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
131	493,464	5,104,131	624.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
132	493,053	5,104,089	624.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
133	496,614	5,107,707	618.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
134	491,350	5,105,709	633.4		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
141	492,945	5,106,864	681.9		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
142	495,820	5,106,577	682.8		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
143	492,433	5,106,601	682.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
144	497,049	5,106,551	649.3		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes
145	499,643	5,107,997	615.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Main Result

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)

...continued from previous page

	UTM NAD83 Zone: 14				WTG type							Noise data						
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Creator	Name	Wind speed	Hub height	LwA,ref	Pure tones	Octave data
	UTM NAD83 Zone: 14		[m]					[kW]	[m]	[m]			[m/s]	[m]	[dB(A)]		
146	499,321	5,108,008	615.7		Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	USER	Man. 8m/s 09-2002	9.0	80.0	104.0	0 dB	Yes

Calculation Results

Sound Level

Noise sensitive area		UTM NAD83 Zone: 14				Demands		Sound Level	Demands fulfilled ?		
No.	Name	East	North	Z	Imission height	Noise	Distance	From WTGs	Noise	Distance	All
				[m]	[m]	[dB(A)]	[m]	[dB(A)]			
H01	H01	493,803	5,113,211	618.9	1.5	45.0	427	29.2	Yes	Yes	Yes
H02	H02	493,587	5,112,886	609.6	1.5	45.0	427	29.9	Yes	Yes	Yes
H03	H03	494,248	5,113,411	621.8	1.5	45.0	427	28.8	Yes	Yes	Yes
H04	H04	495,928	5,113,827	614.9	1.5	45.0	427	28.0	Yes	Yes	Yes
H05	H05	498,292	5,110,165	596.6	1.5	45.0	427	42.4	Yes	Yes	Yes
H06	H06	497,162	5,110,309	594.4	1.5	45.0	427	44.3	Yes	Yes	Yes
H07	H07	493,457	5,110,480	605.6	1.5	45.0	427	40.0	Yes	Yes	Yes
H08	H08	491,062	5,110,436	603.5	1.5	45.0	427	40.6	Yes	Yes	Yes
H09	H09	488,929	5,108,707	604.5	1.5	45.0	427	34.3	Yes	Yes	Yes
H10	H10	498,722	5,109,435	595.5	1.5	45.0	427	43.3	Yes	Yes	Yes
H11	H11	500,105	5,108,858	594.4	1.5	45.0	427	43.9	Yes	Yes	Yes
H12	H12	502,286	5,109,481	602.3	1.5	45.0	427	39.5	Yes	Yes	Yes
H13	H13	503,211	5,109,791	600.5	1.5	45.0	427	31.8	Yes	Yes	Yes
H14	H14	504,680	5,110,041	606.0	1.5	45.0	427	27.2	Yes	Yes	Yes
H15	H15	507,670	5,110,359	606.7	1.5	45.0	427	21.2	Yes	Yes	Yes
H16	H16	506,627	5,109,318	620.5	1.5	45.0	427	24.0	Yes	Yes	Yes
H17	H17	506,041	5,107,907	627.0	1.5	45.0	427	26.8	Yes	Yes	Yes
H18	H18	500,278	5,106,873	617.0	1.5	45.0	427	37.6	Yes	Yes	Yes
H19	H19	495,083	5,108,248	614.0	1.5	45.0	427	43.0	Yes	Yes	Yes
H20	H20	490,353	5,105,415	626.5	1.5	45.0	427	43.9	Yes	Yes	Yes
H21	H21	492,952	5,105,211	621.8	1.5	45.0	427	40.8	Yes	Yes	Yes
H22	H22	493,309	5,105,833	630.6	1.5	45.0	427	41.2	Yes	Yes	Yes
H23	H23	494,296	5,105,689	627.7	1.5	45.0	427	40.4	Yes	Yes	Yes
H24	H24	496,923	5,105,928	632.1	1.5	45.0	427	42.1	Yes	Yes	Yes
H25	H25	502,051	5,105,123	615.7	1.5	45.0	427	38.8	Yes	Yes	Yes
H27	H27	505,934	5,103,586	618.0	1.5	45.0	427	25.9	Yes	Yes	Yes
H28	H28	498,098	5,105,063	607.6	1.5	45.0	427	34.3	Yes	Yes	Yes
H29	H29	497,786	5,104,193	607.1	1.5	45.0	427	32.1	Yes	Yes	Yes
H30	H30	495,745	5,105,026	609.6	1.5	45.0	427	41.9	Yes	Yes	Yes
H31	H31	492,486	5,104,236	621.1	1.5	45.0	427	39.8	Yes	Yes	Yes
H32	H32	490,288	5,103,962	618.7	1.5	45.0	427	34.3	Yes	Yes	Yes
H33	H33	489,534	5,104,522	603.7	1.5	45.0	427	35.5	Yes	Yes	Yes
H34	H34	489,793	5,101,582	593.7	1.5	45.0	427	26.6	Yes	Yes	Yes
H35	H35	491,713	5,101,713	621.7	1.5	45.0	427	28.4	Yes	Yes	Yes
H36	H36	497,884	5,102,817	617.3	1.5	45.0	427	28.8	Yes	Yes	Yes
H37	H37	500,571	5,102,094	622.1	1.5	45.0	427	26.4	Yes	Yes	Yes
H38	H38	504,292	5,102,969	620.4	1.5	45.0	427	28.4	Yes	Yes	Yes
H39	H39	506,783	5,102,415	609.6	1.5	45.0	427	22.3	Yes	Yes	Yes
H40	H40	508,385	5,100,218	620.8	1.5	45.0	427	17.4	Yes	Yes	Yes
H41	H41	507,435	5,100,145	622.4	1.5	45.0	427	18.4	Yes	Yes	Yes
H42	H42	501,763	5,100,251	609.8	1.5	45.0	427	22.8	Yes	Yes	Yes
H43	H43	501,209	5,100,184	605.5	1.5	45.0	427	22.7	Yes	Yes	Yes
H44	H44	497,551	5,099,204	595.7	1.5	45.0	427	22.4	Yes	Yes	Yes
H45	H45	501,233	5,098,861	606.6	1.5	45.0	427	20.8	Yes	Yes	Yes
H46	H46	508,413	5,099,339	629.6	1.5	45.0	427	16.7	Yes	Yes	Yes
H48	H48	504,352	5,097,819	638.6	1.5	45.0	427	17.9	Yes	Yes	Yes
H49	H49	504,504	5,097,783	640.1	1.5	45.0	427	17.8	Yes	Yes	Yes

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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DECIBEL - Main Result

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)

...continued from previous page

Noise sensitive area		UTM NAD83 Zone: 14				Demands		Sound Level	Demands fulfilled ?		
No.	Name	East	North	Z [m]	Imission height [m]	Noise [dB(A)]	Distance [m]	From WTGs [dB(A)]	Noise	Distance	All
H52	H52	497,897	5,097,923	600.5	1.5	45.0	427	20.5	Yes	Yes	Yes
H53	H53	488,536	5,111,192	603.5	1.5	45.0	427	28.2	Yes	Yes	Yes
H54	H54	502,335	5,109,859	603.5	1.5	45.0	427	36.7	Yes	Yes	Yes

Distances (m)

WTG	H01	H02	H03	H04	H05	H06	H07	H08	H09	H10	H11	H12	H13	H14	H15	H16	H17	H18	H19	H20	H21	H22
1	5829	5440	6227	7563	7607	6572	3432	2318	2119	7868	9170	11403	12359	13849	16854	15708	15078	9396	4120	2773	3523	3275
2	5346	4957	5748	7105	7320	6260	2996	1867	2223	7623	8962	11175	12125	13612	16618	15497	14908	9287	3948	3255	3814	3488
3	4951	4566	5329	6616	6723	5664	2471	1844	2798	7032	8379	10587	11534	13021	16027	14912	14337	8747	3388	3576	3713	3289
4	3604	3244	3914	5049	5279	4174	896	2108	4221	5694	7120	9254	10178	11651	14651	13598	13129	7772	2506	5046	4480	3867
5	4406	4050	4702	5753	5454	4408	1666	2479	4067	5757	7113	9313	10260	11746	14752	13642	13085	7557	2184	4356	3669	3063
6	4938	4563	5278	6447	6241	5207	2293	2270	3349	6514	7839	10059	11012	12500	15507	14376	13781	8172	2823	3647	3374	2876
7	5942	5632	6140	6815	5127	4341	3262	4356	5325	5140	6251	8519	9493	10976	13957	12734	12000	6233	1414	4145	2341	1624
8	6191	5801	6612	8023	8243	7198	3945	2455	1511	8516	9822	12054	13010	14499	17505	16361	15730	10041	4773	2683	3912	3757
9	5807	5423	6179	7427	7207	6198	3267	2564	2646	7432	8708	10950	11912	13402	16405	15243	14591	8888	3649	2718	3082	2781
10	6310	5930	6662	7836	7290	6334	3687	3177	3006	7447	8659	10918	11887	13376	16371	15174	14467	8702	3621	2255	2498	2264
11	7643	7254	8037	9336	8941	7991	5180	4037	2508	9074	10245	12512	13484	14970	17955	16732	15969	10152	5247	1114	3103	3247
12	7433	7045	7824	9112	8714	7760	4955	3865	2490	8852	10031	12296	13268	14755	17742	16523	15770	9959	5024	1228	2995	3095
13	7252	6867	7625	8852	8288	7355	4693	3837	2817	8405	9567	11833	12806	14292	17275	16051	15289	9475	4580	1276	2559	2619
14	7189	6809	7543	8707	7961	7054	4563	3939	3185	8051	9188	11456	12430	13913	16892	15658	14883	9061	4236	1392	2155	2188
15	6693	6324	7015	8076	7138	6249	3988	3799	3652	7217	8354	10621	11595	13079	16059	14830	14069	8260	3406	2141	1808	1589
16	6353	5989	6661	7686	6725	5830	3627	3641	3805	6818	7975	10241	11214	12700	15685	14466	13726	7937	2999	2562	1916	1537
17	7812	7423	8212	9530	9175	8222	5378	4160	2470	9309	10480	12746	13719	15205	18189	16965	16200	10379	5482	1117	3282	3455
18	8151	7762	8550	9858	9428	8491	5703	4499	2716	9541	10687	12955	13929	15413	18391	17154	16365	10532	5718	918	3308	3548
19	7554	7172	7913	9088	8315	7420	4941	4233	3237	8388	9502	11770	12745	14226	17198	15953	15156	9321	4583	1008	2207	2357
20	7170	6804	7479	8490	7320	6484	4445	4321	4024	7341	8411	10677	11653	13130	16094	14838	14029	8191	3585	1944	1332	1267
21	4101	3769	4348	5270	4842	3789	1367	2829	4654	5167	6545	8729	9670	11153	14160	13064	12535	7078	1749	4901	3954	3294
22	3549	3258	3730	4499	4142	3049	1075	3206	5339	4551	5984	8110	9034	10508	13509	12454	11995	6716	1696	5730	4636	3946
23	3595	3335	3727	4350	3758	2670	1355	3578	5720	4167	5605	7726	8649	10123	13124	12070	11617	6375	1539	6005	4766	4062
24	3526	3217	3738	4597	4388	3291	923	2964	5096	4799	6230	8359	9282	10756	13756	12702	12241	6944	1844	5572	4582	3904
25	5408	5248	5378	5319	2394	1876	3635	5789	7605	2365	3587	5830	6795	8285	11285	10125	9530	4101	1479	6925	4890	4210
26	5006	4689	5218	5982	4826	3896	2313	3595	4978	4994	6257	8500	9463	10953	13955	12793	12163	6533	1202	4499	3136	2441
27	5636	5426	5676	5841	3223	2636	3503	5438	7025	3157	4278	6542	7514	9001	11990	10793	10124	4501	874	6129	4061	3382
28	6218	5964	6320	6666	4190	3612	3796	5376	6594	4057	5045	7310	8286	9762	12727	11481	10720	4943	1093	5297	3103	2445
29	4214	3956	4335	4866	3695	2694	1889	3923	5837	3984	5359	7543	8487	9972	12979	11877	11352	5960	919	5742	4290	3576
30	3762	3538	3837	4271	3308	2236	1772	4039	6168	3704	5143	7264	8188	9664	12666	11608	11154	5944	1406	6307	4901	4187
31	2792	2529	2943	3719	3974	2837	873	3268	5681	4512	5995	8017	8907	10359	13340	12351	11988	6951	2345	6431	5436	4747
32	5167	5037	5098	4922	1936	1390	3633	5886	7840	2011	3343	5545	6498	7987	10993	9869	9339	4096	1832	7334	5359	4671
33	4043	3867	4048	4225	2704	1669	2354	4656	6777	3082	4523	6642	7568	9045	12048	10986	10535	5382	1475	6754	5160	4443
34	5932	5635	6104	6696	4832	4082	3307	4570	5641	4822	5917	8185	9160	10643	13622	12397	11662	5900	1165	4463	2546	1832
35	5936	5613	6156	6903	5380	4563	3219	4152	5033	5417	6545	8813	9786	11271	14254	13034	12303	6536	1647	3876	2214	1509
36	5942	5608	6184	7003	5642	4796	3200	3953	4734	5702	6846	9113	10086	11571	14556	13341	12614	6847	1904	3609	2126	1453
37	5974	5692	6122	6631	4576	3871	3414	4812	5956	4534	5606	7874	8849	10330	13307	12078	11339	5577	1009	4757	2741	2039
38	5592	5407	5594	5635	2801	2278	3636	5686	7380	2724	3869	6129	7099	8587	11580	10395	9754	4202	1210	6561	4485	3810
39	6404	6197	6434	6527	3486	3123	4252	6092	7493	3229	4116	6376	7351	8822	11780	10529	9768	4011	1529	6233	3944	3328
40	7943	7676	8059	8395	5499	5150	5423	6659	7309	5147	5756	7921	8878	10293	13152	11810	10854	5016	2830	5117	2529	2196
41	6726	6512	6764	6872	3770	3454	4520	6282	7572	3461	4252	6495	7468	8929	11868	10594	9788	3981	1767	6144	3778	3196
43	6361	6097	6477	6866	4435	3854	3883	5364	6482	4295	5260	7523	8499	9971	12930	11676	10896	5097	1250	5084	2861	2209
44	7196	6979	7237	7335	4106	3871	4956	6645	7810	3721	4367	6573	7540	8981	11888	10584	9719	3872	2195	6168	3706	3187
45	7242	7040	7263	7288	3913	3753	5083	6846	8076	3485	4079	6276	7241	8679	11583	10278	9415	3570	2336	6473	4010	3492
46	7376	7115	7484	7807	4989	4590	4894	6250	7092	4688	5406	7615	8581	10020	12919	11605	10709	4854	2254	5181	2674	2197
48	5857	5752	5754	5405	1721	1690	4417	6659	8548	1472	2636	4880	5847	7336	10335	9174	8596	3317	2427	7824	5683	5030
49	5063	5014	4895	4364	885	650	4113	6480	8641	1258	2750	4788	5705	7180	10182	9132	8733	4001	2855	8368	6435	5746
50	5337	4990	5608	6541	5635	4692	2584	3256	4270	5799	7043	9294	10259	11749	14749	13574	12916	7229	1986	3734	2712	2092
51	4737	4662	4604	4231	1332	582	3647	6007	8166	1721	3201	5263	6182	7657	10659	9607	9197	4334	2453	7956	6095	5396
52	4518	4424	4409	4147	1631	713	3336	5692	7854	2034	3509	5580	6498	7972	10974	9924	9509	4584	2220	7700	5899	5193
53	5312	5279	5122	4495	608	873	4442	6812	8973	940	2438	4455	5371	6846	9848	8798	8408	3778	3144	8656	6677	5995
55	6550	6569	6295	5352	1139	2253	5925	8301	10448	662	1141	2964	3882	5361	8366	7307	6945	2978	4487	9946	7797	7154
56	6809	6838	6543	5548	1423	2549	6230	8607	10755	954	965	2657	3574	5053	8059	7000	6650	2900	4781	10227	8054	7418
57	7204	7195	6977	6116	1796	2799	6336	8671	10675	1011	509	2739	3709	5197	8192	7035	6521	2172	4571	9897	7623	7017
58	4732	4562	4723	4784	2508	1685	2962	5176	7127	2702	4061	6253	7202	8689	11696	10583	10058	4755	1252	6754	4928	4221

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Project:

20102130 - Merricourt ND Enxco

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Description:

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Calculated:
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DECIBEL - Main Result

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)

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WTG	H01	H02	H03	H04	H05	H06	H07	H08	H09	H10	H11	H12	H13	H14	H15	H16	H17	H18	H19	H20	H21	H22
59	7080	7117	6804	5763	1722	2854	6540	8919	11066	1256	855	2346	3262	4742	7748	6688	6349	2845	5079	10510	8313	7684
60	8537	8589	8241	7094	3218	4349	8023	10393	12478	2674	1363	910	1882	3369	6365	5234	4853	2674	6398	11705	9381	8798
61	8857	8916	8555	7375	3565	4698	8377	10748	12835	3031	1703	566	1541	3022	6014	4877	4511	2838	6749	12041	9702	9125
62	9650	9628	9431	8542	4252	5221	8577	10823	12566	3449	2051	2368	3089	4277	6973	5598	4669	1206	6405	11217	8711	8233
63	10621	10576	10428	9613	5281	6182	9361	11527	13097	4452	3141	3316	3861	4808	7205	5758	4585	1648	7006	11458	8888	8483
64	11994	11959	11788	10910	6617	7557	10766	12924	14445	5803	4419	4011	4257	4799	6697	5223	3838	3052	8389	12670	10075	9717
65	12414	12394	12191	11247	7006	7987	11278	13465	15033	6213	4781	4068	4167	4514	6196	4728	3292	3585	8950	13296	10704	10340
66	7991	7712	8125	8521	5746	5353	5420	6549	7095	5419	6058	8230	9188	10605	13467	12125	11166	5330	2910	4822	2226	1929
67	11538	11529	11303	10329	6118	7125	10496	12725	14393	5342	3885	3164	3357	3920	5992	4523	3251	2897	8260	12830	10263	9851
68	12021	12019	11777	10764	6596	7621	11022	13260	14936	5834	4362	3420	3465	3817	5651	4178	2825	3440	8801	13359	10788	10383
69	12450	12422	12235	11321	7055	8016	11263	13430	14960	6251	4839	4231	4366	4747	6434	4968	3525	3553	8900	13174	10577	10226
70	8175	7800	8509	9590	8448	7630	5493	5011	4042	8437	9453	11713	12688	14156	17100	15816	14952	9097	4720	943	1670	2053
71	6122	5746	6461	7597	6985	6032	3461	3144	3226	7140	8355	10614	11582	13072	16067	14873	14172	8417	3315	2503	2438	2122
72	3747	3373	4091	5315	5670	4564	1163	1770	3834	6080	7501	9641	10566	12040	15041	13985	13508	8120	2810	4813	4447	3871
73	4822	4455	5140	6242	5909	4883	2117	2449	3686	6176	7501	9721	10674	12162	15169	14038	13445	7846	2489	3855	3345	2795
74	5365	5030	5611	6465	5369	4453	2622	3510	4594	5509	6736	8990	9956	11446	14444	13264	12597	6905	1685	3940	2692	2029
75	4759	4477	4914	5513	4142	3218	2234	3942	5573	4326	5618	7849	8808	10298	13302	12156	11558	6005	638	5169	3637	2923
76	6973	6921	6797	6135	1808	2541	5816	8094	9987	987	1254	3522	4497	5978	8959	7761	7150	2099	3836	9088	6792	6192
77	5963	5919	5783	5151	945	1527	4941	7275	9320	532	1905	4059	5008	6497	9503	8393	7916	3113	3299	8753	6633	5979
78	7207	6850	7495	8432	7061	6264	4461	4548	4411	7046	8079	10344	11319	12792	15748	14481	13655	7811	3343	2263	1016	856
80	8231	8272	7948	6852	2872	3993	7652	10017	12088	2293	974	1305	2276	3763	6759	5622	5205	2464	6003	11314	9000	8412
81	7767	7384	8134	9331	8595	7699	5179	4372	3188	8668	9778	12046	13021	14501	17472	16223	15419	9580	4863	762	2384	2590
82	4341	4208	4284	4221	2127	1155	2911	5239	7364	2492	3942	6051	6976	8454	11457	10394	9952	4885	1790	7230	5496	4785
83	11070	11041	10858	9969	5681	6635	9907	12102	13712	4873	3478	3220	3614	4401	6657	5197	3975	2229	7602	12099	9528	9123
85	4554	4563	4323	3597	872	489	4089	6484	8824	1667	3105	4875	5726	7159	10129	9175	8918	4634	3414	8874	7091	6387
86	7984	8018	7709	6647	2603	3718	7368	9731	11798	2006	709	1592	2560	4049	7047	5912	5484	2385	5716	11038	8737	8143
87	12572	12557	12343	11375	7157	8151	11470	13667	15252	6372	4926	4110	4152	4421	6011	4548	3094	3790	9161	13530	10939	10572
89	11510	11471	11308	10451	6143	7071	10270	12430	13967	5324	3960	3724	4071	4759	6852	5380	4066	2556	7899	12235	9647	9274
90	8103	8076	7895	7076	2736	3669	7053	9333	11188	1911	746	2578	3534	4969	7895	6637	5944	1252	5020	10114	7715	7164
91	10040	10007	9834	8983	4667	5603	8876	11087	12753	3849	2498	2769	3413	4502	7080	5669	4631	1264	6615	11275	8737	8290
92	12673	12619	12486	11669	7343	8236	11316	13410	14803	6514	5184	4882	5111	5569	7243	5782	4317	3633	8843	12842	10236	9932
94	6706	6327	7059	8223	7570	6638	4078	3525	3081	7694	8870	11135	12106	13593	16581	15366	14627	8831	3867	1870	2286	2162
95	6937	6547	7340	8677	8519	7526	4537	3300	2015	8711	9944	12200	13167	14657	17654	16464	15760	9988	4895	1812	3334	3319
97	6635	6284	6910	7819	6497	5673	3883	4180	4410	6519	7604	9872	10847	12327	15298	14054	13272	7452	2764	2766	1442	946
98	6767	6382	7139	8374	7917	6959	4214	3391	2668	8068	9268	11530	12500	13989	16981	15776	15050	9264	4241	1760	2667	2594
99	4522	4133	4923	6294	6765	5671	2228	1280	2717	7137	8528	10701	11636	13116	16120	15040	14518	9015	3642	4047	4281	3843
100	6999	6812	6997	6955	3503	3375	4948	6818	8180	3077	3719	5939	6908	8358	11283	9996	9175	3362	2251	6739	4327	3775
101	8023	7637	8402	9642	9003	8095	5483	4514	3057	9084	10199	12467	13442	14923	17894	16645	15839	9999	5275	570	2744	2994
102	6986	6757	7044	7213	4168	3841	4685	6327	7475	3846	4585	6812	7782	9233	12155	10862	10019	4180	1926	5877	3453	2905
103	8345	7955	8751	10084	9713	8770	5935	4641	2694	9831	10981	13248	14222	15706	18685	17448	16658	10824	6007	1089	3573	3832
104	6438	6205	6507	6730	3937	3479	4128	5815	7080	3723	4629	6887	7863	9332	12287	11029	10249	4460	1368	5724	3436	2815
107	7397	7025	7725	8794	7744	6892	4703	4358	3779	7776	8851	11118	12094	13571	16535	15278	14464	8624	4006	1510	1559	1648
108	3938	3549	4374	5870	6893	5767	2094	482	2832	7352	8793	10904	11816	13281	16273	15248	14804	9444	4120	4793	5122	4668
109	7374	7417	7091	6014	2037	3171	6858	9237	11377	1560	819	2028	2948	4430	7437	6370	6035	2788	5372	10784	8561	7941
110	6229	6136	6107	5673	1716	1946	4844	7086	8951	1260	2256	4516	5487	6974	9967	8787	8185	2899	2806	8133	5923	5290
111	6671	6604	6515	5936	1698	2270	5431	7697	9581	978	1642	3909	4883	6367	9353	8163	7556	2392	3432	8711	6446	5834
113	7492	7115	7834	8952	8024	7154	4831	4316	3540	8073	9164	11432	12407	13886	16853	15600	14792	8953	4287	1232	1842	1975
114	4810	4831	4562	3749	627	746	4391	6786	9117	1462	2856	4580	5427	6857	9827	8875	8628	4455	3632	9115	7284	6585
115	5999	5609	6413	7802	7985	6940	3708	2327	1721	8259	9568	11798	12753	14242	17248	16106	15481	9801	4522	2756	3798	3602
116	6822	6539	6968	7439	5057	4488	4244	5480	6322	4885	5781	8032	9006	10468	13406	12126	11292	5452	1796	4610	2269	1658
118	7783	7839	7486	6346	2501	3639	7334	9716	11863	2045	1061	1552	2463	3945	6951	5889	5587	2867	5850	11246	8998	8386
119	5646	5287	5943	6950	6127	5187	2907	3207	3904	6280	7505	9761	10728	12217	15215	14030	13349	7626	2457	3254	2477	1942
120	8372	7984	8760	10026	9427	8519	5866	4788	3099	9506	10614	12882	13857	15337	18305	17051	16234	10389	5698	546	3058	3362
121	6007	5662	6271	7163	5954	5086	3254	3788	4423	6031	7185	9451	10424	11910	14896	13682	12955	7185	2220	3303	2040	1427
125	10866	10829	10662	9808	5497	6428	9657	11838	13429	4678	3318	3258	3725	4590	6914	5459	4259	1959	7328	11802	9231	8827
126	7741	7610	7661	7316	3263	3588	6012	8044	9531	2570	2670	4758	5708	7121	9999	8682	7818	1990	3476	8073	5598	5092
127	7799	7679	7704	7305	3178	3579	6141	8207	9736	2449	2451	4518	5467	6878	9755	8440	7583	1769	3652	8312	5840	5332
128	7731	7625	7619	7160	2970	3445	6166	8279	9875	2213	2162	4245	5198	6618	9510	8207	7381	1624	3752	8533	6082	5559
129	8269	7941	8492	9185	7027	6446	5537	6044	5988	6820	7602	9810	10774	12207	15087	13753	12800	6962	3626	3269	689	931
130	8848	8527	9057	9690	7309	6808	6129	6681	6562	7035	7705	9870	10823	12231	15067	13707	12699	6903	4077	3649	1233	1565
131	9086	8756	9313	10004	7728	7200	6349	6747	6443	7469	8152	10317	11271	12678	15511	14148	13132	7345	4424	3366	1195	1709
132	9153	8813	9398	10154	8023	7455	6404	6652	6191	7792	8513	10692	11649	13062	15905	14546	13538	7743	4628	3008	1127	1763
133	6180	5999	6175	6158	2976	2659	4202	6186	7750	2726	3676	5943	6918	8397	11370	10142	9429	3758	1624	6667	4432	3799
134	7893	7518	8229	9320	8249	7412	5216	4736	3853	8260	9304	11568	12544	14016	16970	15698	14855	9004	4515	1039	1678	1963
141	6405	6056	6675	7575	6284	5445	3652	4038	4419	6323	7432	9701	10675	12157	15134	13900	13137	7333	2547	2970	1653	1093
142	6934	6693	7012	7251	4357	3966	4563	6126	7213	4073	4854	7088	8060	9513	12439	11149	10307	4468	1826	5589	3177	2619

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

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DECIBEL - Main Result

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)

...continued from previous page

WTG	H01	H02	H03	H04	H05	H06	H07	H08	H09	H10	H11	H12	H13	H14	H15	H16	H17	H18	H19	H20	H21	H22
143	6750	6390	7048	8027	6858	6009	4012	4073	4088	6898	7997	10265	11240	12721	15694	14452	13671	7850	3120	2394	1484	1165
144	7409	7219	7410	7362	3822	3760	5323	7137	8401	3334	3829	6001	6962	8391	11283	9970	9094	3245	2597	6792	4311	3808
145	7829	7783	7643	6913	2555	3391	6666	8921	10737	1708	977	3031	3994	5436	8367	7108	6399	1291	4567	9642	7248	6693
146	7584	7528	7411	6736	2390	3155	6364	8609	10415	1548	1156	3311	4279	5732	8674	7423	6721	1485	4245	9335	6956	6393

WTG	H23	H24	H25	H27	H28	H29	H30	H31	H32	H33	H34	H35	H36	H37	H38	H39	H40	H41	H42	H43	H44	H45
1	4124	6348	11484	15641	7760	7871	5694	4171	4213	3872	6642	6451	8717	11340	14288	16815	19128	18299	13361	12958	11085	13826
2	4268	6351	11435	15604	7785	7952	5805	4537	4689	4359	7119	6881	8859	11434	14288	16803	19154	18337	13487	13098	11346	14000
3	3970	5897	10931	15105	7344	7561	5455	4544	4967	4733	7391	7003	8527	11048	13817	16321	18700	17894	13129	12756	11153	13693
4	4195	5411	10108	14271	6860	7266	5395	5481	6352	6242	8732	8086	8412	10701	13112	15555	18038	17277	12857	12538	11417	13583
5	3447	4916	9807	13983	6375	6704	4736	4671	5612	5563	7968	7280	7790	10173	12753	15231	17663	16879	12304	11964	10696	12973
6	3476	5322	10350	14523	6772	7006	4923	4285	4968	4843	7364	6826	7998	10493	13237	15740	18123	17319	12585	12218	10704	13172
7	1603	3165	8277	12435	4605	4836	2811	3421	5018	5295	7113	6035	5874	8322	11103	13621	15970	15158	10425	10070	8794	11057
8	4656	6958	12110	16261	8357	8433	6241	4432	4136	3660	6537	6537	9232	11887	14891	17424	19716	18880	13882	13468	11468	14304
9	3605	5818	10959	15113	7229	7342	5169	3810	4108	3885	6534	6195	8201	10813	13757	16285	18597	17768	12841	12442	10624	13321
10	3153	5510	10689	14821	6886	6935	4741	3196	3585	3457	5996	5591	7732	10385	13424	15963	18231	17390	12381	11969	10058	12818
11	4243	6815	11998	16069	8095	7995	5804	3270	2550	2073	4937	5048	8585	11333	14594	17145	19305	18435	13206	12754	10410	13479
12	4087	6640	11827	15908	7935	7856	5659	3237	2681	2263	5089	5122	8475	11213	14445	16995	19172	18305	13105	12659	10373	13402
13	3608	6154	11342	15426	7453	7385	5185	2905	2695	2443	5126	4977	8028	10757	13967	16517	18703	17840	12666	12225	10014	12989
14	3176	5727	10913	14995	7022	6955	4754	2591	2705	2602	5122	4812	7610	10332	13536	16085	18274	17411	12252	11814	9657	12590
15	2516	4974	10165	14272	6311	6313	4110	2567	3290	3344	5636	5056	7067	9742	12845	15390	17625	16775	11718	11300	9365	12136
16	2368	4710	9893	14020	6081	6137	3947	2796	3691	3764	6013	5352	6960	9594	12620	15159	17428	16587	11604	11200	9399	12072
17	4452	7034	12214	16278	8305	8192	6006	3391	2506	1953	4858	5059	8760	11514	14797	17348	19496	18623	13373	12917	10524	13627
18	4544	7153	12319	16359	8393	8243	6072	3306	2224	1622	4544	4821	8760	11526	14858	17410	19527	18647	13352	12888	10412	13569
19	3355	5948	11123	15180	7208	7096	4907	2477	2347	2219	4772	4550	7689	10434	13698	16250	18405	17534	12316	11868	9600	12610
20	2254	4822	10003	14076	6102	6034	3833	2043	2921	3099	5206	4548	6714	9423	12614	15163	17354	16493	11361	10931	8897	11735
21	3505	4631	9379	13549	6081	6486	4636	4999	6108	6113	8426	7632	7638	9920	12364	14820	17287	16519	12075	11757	10684	12806
22	3995	4651	9098	13243	6058	6569	4913	5703	6917	6942	9211	8342	7801	9922	12139	14550	17071	16331	12103	11817	11008	12918
23	4017	4447	8774	12909	5828	6378	4818	5843	7153	7216	9413	8477	7640	9690	11829	14225	16760	16029	11877	11605	10910	12724
24	4015	4805	9316	13465	6225	6712	5002	5639	6785	6782	9100	8276	7927	10087	12349	14768	17280	16536	12264	11970	11091	13059
25	3625	2643	6492	10628	3815	4526	3603	5909	7744	8070	9688	8358	5882	7609	9554	11942	14484	13762	9803	9578	9393	10762
26	2551	3800	8731	12907	5259	5599	3686	4208	5561	5699	7784	6846	6712	9061	11653	14141	16557	15769	11198	10864	9721	11890
27	2811	2291	6769	10941	3647	4228	2965	5083	6919	7262	8861	7551	5531	7508	9763	12211	14690	13934	9696	9427	8933	10561
28	1829	2019	7016	11185	3477	3863	2198	4109	5998	6393	7889	6569	5054	7297	9891	12394	14785	13991	9450	9134	8282	10198
29	3446	3848	8315	12470	5247	5773	4198	5370	6810	6945	9010	7992	7025	9111	11343	13766	16274	15529	11294	11013	10289	12122
30	4030	4181	8361	12483	5524	6119	4683	5982	7404	7514	9618	8603	7410	9376	11427	13808	16357	15634	11568	11310	10750	12451
31	4780	5229	9391	13492	6590	7165	5624	6500	7660	7640	9978	9139	8437	10445	12470	14831	17396	16683	12636	12373	11716	13505
32	4111	3053	6543	10637	4135	4892	4080	6386	8191	8492	10163	8847	6261	7866	9632	11977	14552	13852	10056	9853	9805	11059
33	4148	3899	7822	11924	5168	5827	4587	6235	7786	7953	9936	8824	7154	8988	10904	13261	15829	15120	11183	10947	10581	12116
34	1623	2881	7963	12126	4332	4606	2653	3617	5297	5602	7346	6205	5688	8084	10808	13321	15685	14879	10204	9859	8698	10869
35	1676	3443	8572	12726	4875	5075	3004	3293	4795	5039	6935	5925	6077	8562	11384	13906	16244	15427	10653	10289	8920	11257
36	1805	3733	8874	13026	5156	5328	3222	3191	4579	4784	6767	5830	6296	8815	11674	14199	16527	15706	10892	10520	9061	11470
37	1672	2601	7651	11817	4057	4371	2502	3796	5551	5885	7552	6350	5494	7838	10511	13019	15396	14595	9971	9637	8584	10667
38	3211	2362	6531	10691	3623	4280	3225	5498	7351	7696	9278	7944	5617	7459	9561	11982	14492	13752	9653	9407	9088	10569
39	2571	1520	6161	10337	2883	3457	2348	4892	6874	7310	8662	7231	4767	6747	9103	11578	14020	13249	8932	8658	8203	9788
40	1199	1531	6589	10628	2656	2633	501	3220	5390	6007	6867	5296	3568	6103	9163	11712	13933	13086	8160	7786	6579	8750
41	2374	1211	6041	10211	2619	3146	2016	4688	6718	7192	8443	6972	4441	6480	8937	11430	13843	13059	8657	8373	7861	9488
43	1585	2045	7120	11281	3501	3830	2054	3863	5762	6169	7644	6326	4981	7288	9962	12474	14843	14040	9427	9099	8150	10143
44	2280	767	5796	9950	2213	2687	1631	4546	6643	7170	8260	6722	3971	6058	8629	11140	13515	12719	8227	7932	7392	9035
45	2583	685	5527	9689	2051	2616	1836	4840	6945	7475	8543	6984	3941	5914	8390	10892	13288	12500	8094	7816	7425	8943
46	1249	1430	6617	10720	2776	2936	1036	3506	5605	6151	7234	5742	4004	6423	9313	11851	14139	13311	8525	8175	7130	9183
48	4345	2777	5775	9857	3639	4467	4016	6662	8582	8951	10440	9018	5846	7248	8872	11201	13786	13095	9428	9251	9445	10484
49	5183	3874	6492	10446	4732	5572	5049	7463	9257	9538	11240	9914	6951	8254	9599	11831	14469	13820	10417	10265	10554	11517
50	2517	4287	9353	13521	5734	5966	3902	3736	4867	4942	7158	6363	6976	9453	12214	14725	17092	16284	11549	11187	9773	12155
51	4888	3815	6823	10826	4800	5600	4888	7138	8880	9134	10906	9629	6978	8428	9931	12199	14821	14156	10606	10432	10551	11665
52	4730	3833	7068	11094	4892	5665	4827	6952	8651	8884	10709	9470	7036	8578	10173	12461	15073	14398	10762	10574	10584	11794
53	5397	3939	6263	10179	4703	5566	5176	7692	9520	9819	11472	10113	6942	8137	9367	11572	14221	13583	10286	10150	10559	11414
55	6434	4471	5321	8997	4794	5715	5887	8755	10707	11078	12522	11034	7029	7703	8359	10419	13108	12526	9753	9696	10642	11001
56	6681	4649	5176	8778	4888	5812	6084	9002	10971	11354	12762	11253	7105	7665	8185	10205	12902	12334	9687	9647	10703	10958
57	6221	4029	4533	8290	4156	5080	5493	8529	10559	10993	12260	10697	6357	6911	7590	9701	12376	11775	8951	8899	9947	10207
58	3786	3237	7171	11293	4479	5154	4030	5984	7682	7930	9738	8518	6493	8293	10241	12617	15170	14452	10488	10254	9955	11428
59	6932	4836	5035	8554	4992	5916	6286	9250	11237	11632	13002	11473	7185	7630	8009	9987	12690	12137	9620	9598	10766	10914
60	7965	5602	4232	7302	5371	6256	7085	10248	12323	12787	13935	12301	7375	7257	6967	8747	11465	10972	9061	9122	10806	10444
61	8283	5888	4188	7082	5594	6465	7371	10558	12644	13117	14232	12582	7548	7302	6822	8528	11247	10777	9049	9132	10934	10452

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Calculated:
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DECIBEL - Main Result

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)

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WTG	H23	H24	H25	H27	H28	H29	H30	H31	H32	H33	H34	H35	H36	H37	H38	H39	H40	H41	H42	H43	H44	H45
62	7293	4690	2248	5837	3988	4763	6100	9432	11610	12196	12942	11184	5689	5253	5183	7245	9922	9335	7037	7098	8951	8420
63	7506	4869	1113	4906	3858	4475	6153	9504	11712	12365	12851	11027	5165	4284	4093	6272	8910	8285	5952	6046	8179	7363
64	8727	6111	1056	3506	4947	5406	7295	10616	12831	13526	13808	11938	5814	4227	2866	4889	7554	6968	5435	5653	8370	6913
65	9351	6730	1680	3079	5580	6039	7926	11250	13465	14158	14438	12566	6420	4700	2755	4503	7206	6680	5715	5982	8870	7203
66	945	1846	6880	10902	2937	2852	651	2905	5076	5699	6563	5013	3702	6297	9421	11972	14169	13316	8325	7937	6579	8870
67	8877	6240	1706	3989	5227	5806	7530	10881	13090	13742	14204	12366	6383	5045	3652	5424	8133	7615	6336	6543	9140	7811
68	9407	6770	2043	3573	5729	6278	8045	11392	13604	14264	14684	12836	6791	5276	3444	5018	7736	7260	6400	6650	9420	7886
69	9234	6622	1509	3036	5442	5874	7793	11106	13321	14023	14264	12387	6221	4462	2583	4442	7129	6578	5477	5741	8634	6964
70	3011	5649	10759	14754	6812	6607	4467	1686	1781	1982	4131	3740	7087	9857	13227	15778	17866	16982	11678	11216	8825	11912
71	2962	5255	10425	14564	6645	6722	4538	3222	3788	3712	6180	5689	7555	10184	13181	15717	18002	17166	12199	11796	9968	12666
72	4288	5668	10437	14605	7123	7494	5564	5413	6155	5996	8555	7989	8607	10948	13425	15879	18347	17578	13092	12762	11538	13787
73	3311	5041	10039	14214	6495	6758	4708	4305	5133	5060	7506	6885	7781	10242	12941	15439	17834	17036	12347	11989	10562	12962
74	2330	3978	9031	13200	5429	5682	3649	3747	5014	5140	7261	6384	6718	9166	11899	14407	16781	15976	11273	10917	9579	11900
75	2821	3537	8275	12448	4979	5421	3694	4718	6192	6363	8369	7339	6618	8829	11249	13711	16171	15402	10994	10688	9787	11761
76	5388	3226	4586	8551	3500	4420	4677	7695	9731	10175	11427	9872	5743	6585	7692	9928	12560	11911	8696	8595	9363	9882
77	5291	3546	5600	9541	4161	5049	4879	7610	9530	9889	11386	9946	6415	7501	8706	10927	13568	12924	9640	9515	10041	10786
78	1845	4424	9600	13668	5694	5624	3422	1886	3094	3373	5287	4479	6315	9018	12203	14753	16944	16084	10964	10538	8564	11355
80	7586	5249	4235	7490	5079	5976	6732	9874	11941	12399	13571	11951	7130	7146	7068	8932	11645	11127	9008	9045	10602	10368
81	3586	6194	11360	15406	7436	7302	5123	2543	2161	1962	4592	4473	7861	10616	13913	16464	18601	17726	12476	12021	9682	12742
82	4381	3752	7348	11419	4920	5641	4617	6559	8208	8420	10300	9107	6997	8682	10444	12771	15360	14667	10875	10663	10496	11860
83	8146	5509	1200	4417	4488	5078	6791	10141	12350	13005	13469	11636	5699	4562	3789	5817	8492	7910	6049	6200	8577	7498
85	5900	4727	7104	10945	5579	6426	5870	8140	9844	10063	11902	10641	7804	9042	10197	12352	15020	14402	11189	11055	11410	12318
86	7326	5020	4306	7677	4910	5816	6502	9620	11677	12128	13327	11720	6999	7124	7199	9115	11824	11289	9027	9046	10501	10369
87	9584	6961	1916	2943	5816	6276	8162	11487	13702	14394	14675	12801	6650	4889	2755	4379	7090	6589	5839	6122	9064	7327
89	8287	5662	837	3999	4540	5049	6878	10213	12427	13108	13458	11602	5549	4190	3280	5375	8030	7428	5579	5752	8272	7039
90	6290	3856	3569	7383	3648	4552	5338	8545	10654	11160	12202	10550	5740	6036	6634	8781	11443	10829	8035	8005	9266	9320
91	7332	4702	1766	5451	3863	4579	6066	9415	11609	12224	12860	11073	5418	4819	4728	6843	9505	8900	6567	6638	8593	7959
92	8935	6374	1207	2969	5090	5410	7437	10697	12906	13641	13735	11839	5608	3669	2044	4261	6860	6223	4648	4907	7849	6134
94	3108	5567	10757	14868	6909	6905	4702	2889	3188	3077	5600	5226	7640	10327	13442	15987	18220	17369	12290	11867	9848	12685
95	4285	6753	11942	16056	8096	8081	5876	3706	3264	2809	5666	5692	8776	11485	14629	17175	19399	18544	13422	12988	10816	13769
97	1753	4157	9347	13458	5502	5532	3337	2436	3697	3921	5906	5060	6343	8982	12039	14582	16833	15988	10988	10583	8815	11457
98	3549	6012	11201	15314	7354	7346	5142	3170	3168	2926	5598	5377	8065	10762	13888	16433	18663	17810	12714	12287	10207	13091
99	4489	6296	11255	15432	7751	8012	5941	5113	5464	5172	7894	7557	9016	11498	14181	16670	19081	18287	13597	13233	11699	14191
100	2906	1015	5447	9622	2220	2884	2247	5192	7268	7770	8916	7378	4238	6072	8378	10855	13294	12524	8262	8007	7765	9162
101	3988	6604	11764	15798	7833	7679	5510	2784	2022	1659	4433	4493	8201	10965	14295	16846	18964	18085	12800	12338	9913	13033
102	2034	1068	6130	10284	2526	2948	1630	4332	6395	6898	8074	6583	4194	6355	8962	11474	13846	13047	8516	8210	7552	9297
103	4827	7440	12603	16637	8673	8512	6348	3518	2257	1550	4500	4895	9008	11779	15129	17681	19786	18904	13588	13120	10594	13785
104	2078	1605	6533	10703	3052	3505	2073	4397	6363	6797	8173	6775	4751	6897	9421	11918	14322	13534	9064	8764	8081	9854
107	2645	5240	10412	14471	6498	6397	4204	2049	2574	2683	4920	4410	7024	9755	12994	15545	17711	16844	11662	11222	9070	11994
108	5271	6918	11754	15925	8377	8694	6675	5956	6230	5874	8660	8385	9746	12169	14730	17193	19647	18871	14292	13943	12506	14928
109	7171	5011	4876	8309	5083	6004	6475	9485	11491	11899	13227	11676	7247	7573	7810	9746	12453	11914	9528	9524	10804	10843
110	4553	2744	5368	9436	3444	4308	4077	6874	8843	9244	10641	9169	5683	6949	8469	10785	13379	12694	9118	8958	9302	10206
111	5052	3004	4882	8895	3442	4348	4423	7367	9379	9808	11114	9590	5698	6712	7991	10261	12878	12215	8851	8726	9326	9999
113	2973	5571	10742	14798	6826	6715	4526	2205	2417	2430	4809	4431	7321	10060	13317	15868	18026	17157	11953	11508	9292	12263
114	6065	4768	6910	10710	5549	6413	5962	8325	10063	10301	12095	10803	7789	8938	9994	12123	14798	14191	11071	10951	11406	12224
115	4479	6742	11884	16039	8149	8243	6058	4373	4210	3783	6626	6552	9066	11705	14680	17209	19514	18681	13714	13305	11363	14156
116	951	2151	7334	11461	3547	3721	1702	3245	5197	5653	7025	5692	4753	7209	10078	12611	14917	14092	9304	8947	7753	9936
118	7599	5374	4759	8017	5343	6255	6849	9908	11933	12354	13637	12061	7457	7609	7607	9460	12175	11662	9504	9528	10974	10851
119	2552	4576	9699	13857	6002	6169	4041	3445	4424	4464	6748	6042	7109	9654	12516	15039	17373	16553	11720	11341	9765	12272
120	4350	6978	12122	16137	8182	7998	5847	2972	1850	1324	4201	4434	8472	11245	14618	17169	19259	18373	13046	12576	10053	13238
121	1961	4041	9196	13343	5451	5590	3450	3072	4325	4489	6559	5704	6517	9072	11978	14508	16820	15994	11132	10750	9189	11679
125	7849	5213	1107	4633	4194	4794	6494	9844	12054	12708	13180	11350	5443	4416	3912	6017	8676	8073	5987	6112	8382	7420
126	4172	1677	4162	8334	1849	2755	3160	6385	8523	9072	10023	8376	4105	5322	7177	9607	12109	11372	7504	7326	7733	8563
127	4415	1915	4003	8167	1976	2895	3397	6628	8766	9313	10263	8610	4225	5316	7043	9454	11974	11248	7486	7325	7850	8577
128	4656	2192	3961	8104	2239	3162	3675	6887	9014	9548	10536	8891	4478	5461	7032	9411	11959	11248	7617	7475	8099	8739
129	1027	3477	8465	12421	4512	4265	2159	1310	3443	4076	5071	3736	4794	7543	10885	13435	15534	14655	9427	8986	6976	9770
130	1400	3451	8239	12112	4308	3943	2010	1367	3582	4316	4916	3402	4323	7097	10538	13082	15117	14228	8920	8465	6351	9210
131	1766	3898	8644	12482	4727	4322	2450	984	3180	3949	4469	2985	4611	7393	10890	13429	15426	14528	9161	8693	6401	9388
132	2026	4285	9057	12891	5138	4734	2850	586	2768	3546	4112	2728	4996	7778	11295	13832	15813	14913	9518	9043	6640	9708
133	3073	1806	6020	10190	3032	3704	2818	5393	7351	7763	9167	7743	5052	6868	9022	11464	13951	13201	9061	8815	8554	9979
134	2946	5577	10717	14738	6779	6612	4448	1860	2044	2170	4411	4012	7145	9904	13229	15781	17898	17020	11757	11302	8987	12024
141	1790	4087	9271	13396	5459	5529	3349	2668	3935	4138	6151	5296	6385	8995	11997	14536	16810	15972	11022	10626	8938	11521
142	1764	1280	6398	10547	2735	3090	1553	4074	6119	6613	7828	6366	4289	6532	9208	11726	14082	13277	8680	8361	7573	9425

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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DECIBEL - Main Result

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)

...continued from previous page

WTG	H23	H24	H25	H27	H28	H29	H30	H31	H32	H33	H34	H35	H36	H37	H38	H39	H40	H41	H42	H43	H44	H45
143	2074	4540	9731	13834	5870	5870	3667	2366	3401	3567	5671	4941	6636	9303	12403	14948	17182	16332	11286	10872	8995	11720
144	2885	636	5202	9367	1821	2470	2006	5117	7240	7784	8794	7203	3826	5681	8080	10576	12985	12203	7868	7606	7364	8755
145	5824	3417	3749	7683	3316	4233	4901	8085	10188	10690	11755	10118	5470	5975	6848	9063	11702	11062	8031	7968	9038	9273
146	5534	3174	3972	7955	3189	4112	4656	7807	9898	10389	11492	9875	5386	6045	7078	9325	11952	11299	8132	8049	8980	9345

WTG	H46	H48	H49	H52	H53	H54
1	19533	16891	17034	12330	3916	11502
2	19578	17028	17169	12607	3700	11261
3	19140	16677	16816	12432	4039	10669
4	18538	16402	16533	12732	4742	9303
5	18134	15855	15990	12005	5020	9394
6	18567	16135	16273	11993	4596	10151
7	16402	13977	14114	10108	6771	8671
8	20109	17401	17545	12691	3568	12151
9	19002	16375	16517	11880	4395	11060
10	18616	15903	16046	11305	4943	11048
11	19635	16663	16812	11574	4950	12654
12	19510	16574	16722	11551	4887	12436
13	19047	16146	16293	11211	5117	11978
14	18620	15738	15885	10866	5408	11607
15	17995	15233	15377	10613	5637	10771
16	17815	15133	15276	10665	5642	10385
17	19820	16821	16970	11677	4947	12889
18	19837	16780	16929	11545	5215	13105
19	18735	15783	15931	10789	5555	11928
20	17704	14860	15006	10135	6104	10844
21	17778	15621	15752	12003	5440	8801
22	17596	15628	15755	12333	5841	8159
23	17295	15392	15517	12237	6210	7774
24	17800	15795	15922	12415	5600	8407
25	15028	13272	13391	10706	8424	5951
26	17023	14748	14882	11039	6123	8613
27	15196	13210	13336	10256	8047	6686
28	15243	12996	13127	9609	7900	7483
29	16793	14817	14943	11616	6557	7620
30	16901	15068	15191	12077	6668	7314
31	17950	16139	16262	13043	5839	8028
32	15119	13494	13609	11112	8521	5640
33	16388	14659	14779	11904	7282	6695
34	16126	13756	13891	10018	7028	8340
35	16669	14203	14341	10229	6525	8962
36	16946	14440	14579	10363	6276	9258
37	15844	13522	13655	9908	7301	8033
38	15017	13146	13268	10406	8312	6266
39	14508	12452	12578	9523	8672	6560
40	14311	11707	11846	7904	9006	8162
41	14315	12187	12315	9182	8838	6695
43	15289	12977	13110	9476	7857	7702
44	13970	11764	11893	8712	9173	6795
45	13755	11621	11748	8739	9393	6501
46	14547	12077	12214	8457	8665	7836
48	14362	12828	12940	10734	9296	5006
49	15084	13763	13870	11841	9084	4830
50	17530	15100	15237	11075	5638	9413
51	15421	13992	14103	11851	8616	5307
52	15665	14171	14284	11891	8302	5623
53	14845	13600	13705	11836	9414	4496
55	13776	12895	12988	11860	10897	3009

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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DECIBEL - Main Result

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)

...continued from previous page

WTG	H46	H48	H49	H52	H53	H54
56	13579	12784	12874	11907	11202	2702
57	13029	12090	12184	11145	11293	2884
58	15719	13963	14083	11275	7813	6339
59	13377	12669	12757	11954	11511	2390
60	12189	11860	11934	11906	12995	1093
61	11984	11772	11842	12012	13349	809
62	10584	9906	9986	9995	13459	2739
63	9542	8768	8848	9147	14156	3697
64	8215	7833	7895	9179	15550	4375
65	7906	7860	7911	9629	16096	4412
66	14535	11865	12006	7900	8850	8468
67	8839	8701	8759	9998	15361	3518
68	8466	8565	8615	10226	15896	3750
69	7813	7662	7715	9388	16058	4581
70	18168	15112	15262	9996	6389	11894
71	18395	15729	15871	11227	5055	10742
72	18838	16641	16774	12846	4391	9691
73	18285	15899	16035	11859	4863	9813
74	17223	14825	14961	10887	5933	9113
75	16662	14534	14664	11113	6540	7953
76	13175	11957	12058	10593	10729	3694
77	14187	12940	13044	11304	9897	4149
78	17296	14469	14614	9814	6438	10518
80	12355	11889	11967	11724	12624	1472
81	18922	15929	16077	10855	5566	12205
82	15934	14319	14436	11811	7860	6103
83	9157	8663	8733	9489	14735	3596
85	15661	14493	14597	12696	9027	4850
86	12523	11964	12045	11640	12339	1742
87	7805	7888	7935	9807	16300	4443
89	8679	8144	8214	9139	15057	4098
90	12085	11136	11228	10425	11968	2836
91	10154	9424	9505	9609	13722	3147
92	7482	6961	7024	8573	16021	5247
94	18588	15798	15943	11080	5160	11275
95	19759	16913	17060	12013	4339	12324
97	17213	14517	14659	10090	6251	10034
98	19027	16216	16362	11426	4832	11664
99	19538	17148	17285	12983	3606	10764
100	13783	11770	11894	9073	9397	6153
101	19276	16236	16385	11064	5505	12625
102	14297	12058	12188	8876	8846	7023
103	20090	17004	17155	11712	5208	13398
104	14788	12603	12732	9406	8359	7072
107	18049	15145	15292	10286	5969	11284
108	20127	17844	17979	13795	3067	10938
109	13150	12527	12611	11975	11829	2078
110	13961	12490	12600	10577	9722	4660
111	13480	12159	12264	10576	10333	4068
113	18359	15426	15574	10495	5795	11595
114	15447	14347	14448	12683	9328	4551
115	19913	17238	17382	12596	3644	11895
116	15330	12856	12992	9075	7878	8226
118	12888	12416	12495	12119	12305	1593
119	17793	15266	15405	11053	5446	9885
120	19557	16458	16609	11177	5593	13042
121	17231	14676	14816	10482	6036	9595

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

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DECIBEL - Main Result

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)

...continued from previous page

WTG	H46	H48	H49	H52	H53	H54
125	9325	8697	8772	9319	14470	3638
126	12638	10921	11036	8987	10654	5012
127	12515	10876	10989	9093	10824	4776
128	12516	10975	11085	9333	10904	4497
129	15850	12909	13056	8239	8034	10033
130	15408	12377	12525	7608	8651	10112
131	15698	12585	12735	7628	8611	10560
132	16078	12922	13073	7841	8418	10929
133	14465	12556	12678	9868	8798	6112
134	18213	15209	15357	10173	6163	11743
141	17201	14558	14699	10221	6178	9856
142	14525	12227	12359	8900	8623	7295
143	17553	14805	14949	10255	6022	10424
144	13459	11383	11509	8670	9696	6236
145	12324	11215	11312	10224	11557	3273
146	12562	11363	11464	10185	11245	3537

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20102130 - Merricourt ND Enxco

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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

Assumptions

Calculated L(DW) = LWA,ref + K + Dc - (Adiv + Aatm + Agr + Abar + Amisc) - Cmet
(when calculated with ground attenuation, then Dc = Domega)

LWA,ref:	Sound pressure level at WTG
K:	Pure tone
Dc:	Directivity correction
Adiv:	the attenuation due to geometrical divergence
Aatm:	the attenuation due to atmospheric absorption
Agr:	the attenuation due to ground effect
Abar:	the attenuation due to a barrier
Amisc:	the attenuation due to miscellaneous other effects
Cmet:	Meteorological correction

Calculation Results

Noise sensitive area: H01 H01

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	5,829	5,829	57.9	Yes	**7.95**	104.0	3.01	86.31	8.24	4.46	0.00	0.00	99.02	0.00
2	5,346	5,347	56.3	Yes	**9.15**	104.0	3.01	85.56	7.82	4.44	0.00	0.00	97.82	0.00
3	4,951	4,952	59.7	Yes	**10.24**	104.0	3.01	84.90	7.45	4.39	0.00	0.00	96.73	0.00
4	3,604	3,605	47.8	Yes	**14.43**	104.0	3.01	82.14	6.06	4.35	0.00	0.00	92.54	0.00
5	4,406	4,407	53.4	Yes	**11.79**	104.0	3.01	83.88	6.91	4.39	0.00	0.00	95.18	0.00
6	4,938	4,939	61.0	Yes	**10.28**	104.0	3.01	84.87	7.44	4.38	0.00	0.00	96.69	0.00
7	5,942	5,944	67.3	Yes	**7.73**	104.0	3.01	86.48	8.34	4.41	0.00	0.00	99.24	0.00
8	6,191	6,192	53.5	Yes	**7.08**	104.0	3.01	86.84	8.55	4.51	0.00	0.00	99.89	0.00
9	5,807	5,808	60.8	Yes	**8.02**	104.0	3.01	86.28	8.23	4.44	0.00	0.00	98.95	0.00
10	6,310	6,311	67.5	Yes	**6.88**	104.0	3.01	87.00	8.65	4.44	0.00	0.00	100.09	0.00
11	7,643	7,644	67.0	Yes	**4.13**	104.0	3.01	88.67	9.68	4.50	0.00	0.00	102.85	0.00
12	7,433	7,435	67.5	Yes	**4.53**	104.0	3.01	88.43	9.53	4.49	0.00	0.00	102.44	0.00
13	7,252	7,253	68.8	Yes	**4.89**	104.0	3.01	88.21	9.39	4.48	0.00	0.00	102.08	0.00
14	7,189	7,191	66.7	Yes	**5.01**	104.0	3.01	88.14	9.34	4.48	0.00	0.00	101.96	0.00
15	6,693	6,695	67.1	Yes	**6.04**	104.0	3.01	87.51	8.96	4.46	0.00	0.00	100.93	0.00
16	6,353	6,354	66.9	Yes	**6.78**	104.0	3.01	87.06	8.69	4.44	0.00	0.00	100.19	0.00
17	7,812	7,813	65.3	Yes	**3.80**	104.0	3.01	88.86	9.80	4.52	0.00	0.00	103.17	0.00
18	8,151	8,152	60.0	Yes	**3.16**	104.0	3.01	89.23	10.04	4.55	0.00	0.00	103.81	0.00
19	7,554	7,555	58.2	Yes	**4.26**	104.0	3.01	88.56	9.61	4.54	0.00	0.00	102.72	0.00
20	7,170	7,171	55.0	Yes	**5.00**	104.0	3.01	88.11	9.33	4.54	0.00	0.00	101.98	0.00
21	4,101	4,102	55.1	Yes	**12.77**	104.0	3.01	83.26	6.60	4.34	0.00	0.00	94.20	0.00
22	3,549	3,550	46.6	Yes	**14.62**	104.0	3.01	82.00	6.00	4.35	0.00	0.00	92.35	0.00
23	3,595	3,596	48.1	Yes	**14.47**	104.0	3.01	82.12	6.05	4.34	0.00	0.00	92.51	0.00
24	3,526	3,527	46.8	Yes	**14.71**	104.0	3.01	81.95	5.97	4.35	0.00	0.00	92.26	0.00
25	5,408	5,408	51.1	Yes	**8.96**	104.0	3.01	85.66	7.87	4.48	0.00	0.00	98.01	0.00
26	5,006	5,006	57.9	Yes	**10.07**	104.0	3.01	84.99	7.50	4.41	0.00	0.00	96.90	0.00
27	5,636	5,637	55.0	Yes	**8.41**	104.0	3.01	86.02	8.08	4.47	0.00	0.00	98.56	0.00
28	6,218	6,219	63.8	Yes	**7.07**	104.0	3.01	86.87	8.57	4.45	0.00	0.00	99.90	0.00
29	4,214	4,215	48.5	Yes	**12.35**	104.0	3.01	83.50	6.72	4.41	0.00	0.00	94.62	0.00
30	3,762	3,762	44.3	Yes	**13.83**	104.0	3.01	82.51	6.23	4.40	0.00	0.00	93.14	0.00
31	2,792	2,793	46.6	Yes	**17.73**	104.0	3.01	79.92	5.09	4.23	0.00	0.00	89.24	0.00
32	5,167	5,167	50.3	Yes	**9.59**	104.0	3.01	85.26	7.65	4.47	0.00	0.00	97.38	0.00
33	4,043	4,043	44.8	Yes	**12.88**	104.0	3.01	83.13	6.54	4.42	0.00	0.00	94.09	0.00
34	5,932	5,933	64.0	Yes	**7.74**	104.0	3.01	86.46	8.33	4.43	0.00	0.00	99.23	0.00
35	5,936	5,937	66.3	Yes	**7.74**	104.0	3.01	86.47	8.34	4.42	0.00	0.00	99.23	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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3100 DeMers Avenue
US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	5,942	5,943	65.8	Yes	**7.73**	104.0	3.01	86.48	8.34	4.42	0.00	0.00	99.24	0.00
37	5,974	5,975	62.9	Yes	**7.63**	104.0	3.01	86.53	8.37	4.44	0.00	0.00	99.34	0.00
38	5,592	5,592	52.2	Yes	**8.50**	104.0	3.01	85.95	8.04	4.48	0.00	0.00	98.47	0.00
39	6,404	6,405	65.0	Yes	**6.66**	104.0	3.01	87.13	8.73	4.45	0.00	0.00	100.31	0.00
40	7,943	7,943	42.1	Yes	**3.46**	104.0	3.01	89.00	9.89	4.62	0.00	0.00	103.51	0.00
41	6,726	6,727	72.1	Yes	**6.00**	104.0	3.01	87.56	8.98	4.43	0.00	0.00	100.98	0.00
43	6,361	6,362	66.5	Yes	**6.77**	104.0	3.01	87.07	8.69	4.44	0.00	0.00	100.21	0.00
44	7,196	7,197	75.7	Yes	**5.04**	104.0	3.01	88.14	9.35	4.44	0.00	0.00	101.93	0.00
45	7,242	7,244	74.1	Yes	**4.94**	104.0	3.01	88.20	9.38	4.45	0.00	0.00	102.03	0.00
46	7,376	7,377	48.5	Yes	**4.56**	104.0	3.01	88.36	9.48	4.58	0.00	0.00	102.42	0.00
48	5,857	5,858	51.7	Yes	**7.85**	104.0	3.01	86.35	8.27	4.50	0.00	0.00	99.12	0.00
49	5,063	5,063	48.5	Yes	**9.86**	104.0	3.01	85.09	7.55	4.47	0.00	0.00	97.12	0.00
50	5,337	5,338	62.4	Yes	**9.21**	104.0	3.01	85.55	7.81	4.40	0.00	0.00	97.76	0.00
51	4,737	4,737	46.4	Yes	**10.75**	104.0	3.01	84.51	7.24	4.47	0.00	0.00	96.22	0.00
52	4,518	4,518	45.5	Yes	**11.39**	104.0	3.01	84.10	7.03	4.46	0.00	0.00	95.58	0.00
53	5,312	5,312	51.1	Yes	**9.21**	104.0	3.01	85.51	7.78	4.47	0.00	0.00	97.76	0.00
55	6,550	6,550	49.1	Yes	**6.26**	104.0	3.01	87.33	8.84	4.54	0.00	0.00	100.71	0.00
56	6,809	6,809	51.5	Yes	**5.72**	104.0	3.01	87.66	9.05	4.54	0.00	0.00	101.25	0.00
57	7,204	7,204	50.5	Yes	**4.91**	104.0	3.01	88.15	9.35	4.56	0.00	0.00	102.07	0.00
58	4,732	4,733	46.7	Yes	**10.77**	104.0	3.01	84.50	7.24	4.46	0.00	0.00	96.20	0.00
59	7,080	7,080	52.8	Yes	**5.17**	104.0	3.01	88.00	9.26	4.55	0.00	0.00	101.80	0.00
60	8,537	8,537	54.8	Yes	**2.46**	104.0	3.01	89.63	10.30	4.58	0.00	0.00	104.51	0.00
61	8,857	8,857	51.7	Yes	**1.91**	104.0	3.01	89.95	10.52	4.60	0.00	0.00	105.06	0.00
62	9,650	9,650	57.7	Yes	**0.67**	104.0	3.01	90.69	11.02	4.60	0.00	0.00	106.31	0.00
63	10,621	10,621	60.0	Yes	**-0.76**	104.0	3.01	91.52	11.60	4.61	0.00	0.00	107.73	0.00
64	11,994	11,995	56.7	Yes	**-2.60**	104.0	3.01	92.58	12.36	4.64	0.00	0.00	109.57	0.00
65	12,414	12,415	58.1	Yes	**-3.12**	104.0	3.01	92.88	12.57	4.64	0.00	0.00	110.09	0.00
66	7,991	7,991	39.3	Yes	**3.36**	104.0	3.01	89.05	9.93	4.63	0.00	0.00	103.61	0.00
67	11,538	11,539	58.3	Yes	**-2.01**	104.0	3.01	92.24	12.11	4.63	0.00	0.00	108.98	0.00
68	12,021	12,021	55.6	Yes	**-2.64**	104.0	3.01	92.60	12.37	4.64	0.00	0.00	109.61	0.00
69	12,450	12,450	56.8	Yes	**-3.17**	104.0	3.01	92.90	12.59	4.64	0.00	0.00	110.14	0.00
70	8,175	8,175	34.8	Yes	**3.01**	104.0	3.01	89.25	10.06	4.65	0.00	0.00	103.96	0.00
71	6,122	6,123	65.4	Yes	**7.30**	104.0	3.01	86.74	8.49	4.44	0.00	0.00	99.67	0.00
72	3,747	3,748	49.5	Yes	**13.93**	104.0	3.01	82.48	6.22	4.35	0.00	0.00	93.04	0.00
73	4,822	4,823	58.7	Yes	**10.60**	104.0	3.01	84.67	7.33	4.38	0.00	0.00	96.38	0.00
74	5,365	5,366	64.3	Yes	**9.15**	104.0	3.01	85.59	7.83	4.39	0.00	0.00	97.82	0.00
75	4,759	4,760	49.6	Yes	**10.71**	104.0	3.01	84.55	7.26	4.44	0.00	0.00	96.26	0.00
76	6,973	6,973	54.8	Yes	**5.40**	104.0	3.01	87.87	9.18	4.53	0.00	0.00	101.58	0.00
77	5,963	5,963	48.7	Yes	**7.58**	104.0	3.01	86.51	8.36	4.52	0.00	0.00	99.39	0.00
78	7,207	7,208	46.7	Yes	**4.88**	104.0	3.01	88.16	9.36	4.58	0.00	0.00	102.09	0.00
80	8,231	8,232	56.4	Yes	**3.00**	104.0	3.01	89.31	10.09	4.57	0.00	0.00	103.97	0.00
81	7,767	7,768	57.5	Yes	**3.85**	104.0	3.01	88.81	9.77	4.55	0.00	0.00	103.12	0.00
82	4,341	4,341	45.8	Yes	**11.93**	104.0	3.01	83.75	6.85	4.44	0.00	0.00	95.04	0.00
83	11,070	11,070	58.3	Yes	**-1.39**	104.0	3.01	91.88	11.85	4.62	0.00	0.00	108.36	0.00
85	4,554	4,554	47.5	Yes	**11.30**	104.0	3.01	84.17	7.06	4.44	0.00	0.00	95.68	0.00
86	7,984	7,984	55.3	Yes	**3.44**	104.0	3.01	89.04	9.92	4.56	0.00	0.00	103.53	0.00
87	12,572	12,573	56.8	Yes	**-3.32**	104.0	3.01	92.99	12.65	4.65	0.00	0.00	110.29	0.00
89	11,510	11,510	58.4	Yes	**-1.97**	104.0	3.01	92.22	12.10	4.63	0.00	0.00	108.95	0.00
90	8,103	8,104	57.8	Yes	**3.24**	104.0	3.01	89.17	10.01	4.56	0.00	0.00	103.74	0.00
91	10,040	10,040	58.5	Yes	**0.08**	104.0	3.01	91.03	11.26	4.60	0.00	0.00	106.89	0.00
92	12,673	12,673	54.0	Yes	**-3.45**	104.0	3.01	93.06	12.71	4.66	0.00	0.00	110.42	0.00
94	6,706	6,708	67.4	Yes	**6.01**	104.0	3.01	87.53	8.97	4.46	0.00	0.00	100.96	0.00
95	6,937	6,938	64.5	Yes	**5.52**	104.0	3.01	87.82	9.15	4.48	0.00	0.00	101.46	0.00
97	6,635	6,636	69.7	Yes	**6.18**	104.0	3.01	87.44	8.91	4.44	0.00	0.00	100.79	0.00
98	6,767	6,768	67.3	Yes	**5.89**	104.0	3.01	87.61	9.02	4.46	0.00	0.00	101.09	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	4,522	4,523	54.5	Yes	**11.44**	104.0	3.01	84.11	7.03	4.39	0.00	0.00	95.53	0.00
100	6,999	7,000	68.3	Yes	**5.41**	104.0	3.01	87.90	9.20	4.47	0.00	0.00	101.57	0.00
101	8,023	8,024	56.4	Yes	**3.37**	104.0	3.01	89.09	9.95	4.56	0.00	0.00	103.60	0.00
102	6,986	6,987	77.3	Yes	**5.48**	104.0	3.01	87.89	9.19	4.42	0.00	0.00	101.50	0.00
103	8,345	8,346	59.1	Yes	**2.81**	104.0	3.01	89.43	10.17	4.56	0.00	0.00	104.16	0.00
104	6,438	6,439	67.0	Yes	**6.60**	104.0	3.01	87.18	8.75	4.45	0.00	0.00	100.38	0.00
107	7,397	7,398	56.7	Yes	**4.55**	104.0	3.01	88.38	9.50	4.54	0.00	0.00	102.42	0.00
108	3,938	3,939	49.2	Yes	**13.27**	104.0	3.01	82.91	6.43	4.37	0.00	0.00	93.71	0.00
109	7,374	7,374	53.8	Yes	**4.59**	104.0	3.01	88.35	9.48	4.55	0.00	0.00	102.39	0.00
110	6,229	6,229	52.8	Yes	**6.99**	104.0	3.01	86.89	8.58	4.51	0.00	0.00	99.98	0.00
111	6,671	6,671	55.8	Yes	**6.03**	104.0	3.01	87.48	8.94	4.51	0.00	0.00	100.94	0.00
113	7,492	7,493	55.9	Yes	**4.37**	104.0	3.01	88.49	9.57	4.55	0.00	0.00	102.61	0.00
114	4,810	4,810	47.7	Yes	**10.55**	104.0	3.01	84.64	7.31	4.46	0.00	0.00	96.42	0.00
115	5,999	6,000	53.9	Yes	**7.53**	104.0	3.01	86.56	8.39	4.49	0.00	0.00	99.45	0.00
116	6,822	6,824	66.2	Yes	**5.76**	104.0	3.01	87.68	9.06	4.47	0.00	0.00	101.21	0.00
118	7,783	7,784	54.4	Yes	**3.81**	104.0	3.01	88.82	9.78	4.56	0.00	0.00	103.16	0.00
119	5,646	5,647	65.0	Yes	**8.44**	104.0	3.01	86.04	8.09	4.41	0.00	0.00	98.53	0.00
120	8,372	8,373	52.7	Yes	**2.74**	104.0	3.01	89.46	10.19	4.59	0.00	0.00	104.23	0.00
121	6,007	6,008	66.1	Yes	**7.58**	104.0	3.01	86.57	8.40	4.42	0.00	0.00	99.40	0.00
125	10,866	10,866	58.6	Yes	**-1.11**	104.0	3.01	91.72	11.74	4.62	0.00	0.00	108.08	0.00
126	7,741	7,741	65.4	Yes	**3.93**	104.0	3.01	88.78	9.75	4.51	0.00	0.00	103.04	0.00
127	7,799	7,800	66.3	Yes	**3.83**	104.0	3.01	88.84	9.79	4.51	0.00	0.00	103.14	0.00
128	7,731	7,732	66.3	Yes	**3.96**	104.0	3.01	88.77	9.74	4.51	0.00	0.00	103.02	0.00
129	8,269	8,269	39.1	Yes	**2.86**	104.0	3.01	89.35	10.12	4.64	0.00	0.00	104.11	0.00
130	8,848	8,849	39.8	No	**1.72**	104.0	3.01	89.94	10.51	4.80	0.00	0.00	105.25	0.00
131	9,086	9,087	37.8	Yes	**1.48**	104.0	3.01	90.17	10.66	4.66	0.00	0.00	105.49	0.00
132	9,153	9,153	36.8	No	**1.23**	104.0	3.01	90.23	10.71	4.80	0.00	0.00	105.74	0.00
133	6,180	6,181	57.4	Yes	**7.13**	104.0	3.01	86.82	8.54	4.48	0.00	0.00	99.85	0.00
134	7,893	7,893	38.4	Yes	**3.54**	104.0	3.01	88.95	9.86	4.63	0.00	0.00	103.44	0.00
141	6,405	6,406	70.8	Yes	**6.69**	104.0	3.01	87.13	8.73	4.42	0.00	0.00	100.28	0.00
142	6,934	6,935	77.4	Yes	**5.58**	104.0	3.01	87.82	9.15	4.42	0.00	0.00	101.39	0.00
143	6,750	6,752	68.1	Yes	**5.92**	104.0	3.01	87.59	9.00	4.46	0.00	0.00	101.05	0.00
144	7,409	7,410	65.9	Yes	**4.57**	104.0	3.01	88.40	9.51	4.50	0.00	0.00	102.40	0.00
145	7,829	7,829	59.4	Yes	**3.74**	104.0	3.01	88.87	9.81	4.54	0.00	0.00	103.23	0.00
146	7,584	7,585	58.7	Yes	**4.20**	104.0	3.01	88.60	9.64	4.54	0.00	0.00	102.77	0.00
Sum	29.17													

Noise sensitive area: H02 H02

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	5,440	5,441	53.4	Yes	**8.89**	104.0	3.01	85.71	7.90	4.47	0.00	0.00	98.08	0.00
2	4,957	4,958	52.0	Yes	**10.17**	104.0	3.01	84.91	7.45	4.44	0.00	0.00	96.80	0.00
3	4,566	4,567	55.2	Yes	**11.32**	104.0	3.01	84.19	7.08	4.39	0.00	0.00	95.66	0.00
4	3,244	3,244	44.4	Yes	**15.78**	104.0	3.01	81.22	5.64	4.33	0.00	0.00	91.20	0.00
5	4,050	4,051	50.0	Yes	**12.90**	104.0	3.01	83.15	6.55	4.38	0.00	0.00	94.08	0.00
6	4,563	4,565	56.6	Yes	**11.33**	104.0	3.01	84.19	7.07	4.38	0.00	0.00	95.64	0.00
7	5,632	5,633	62.7	Yes	**8.46**	104.0	3.01	86.02	8.07	4.42	0.00	0.00	98.51	0.00
8	5,801	5,802	49.2	Yes	**7.97**	104.0	3.01	86.27	8.22	4.51	0.00	0.00	99.00	0.00
9	5,423	5,424	55.9	Yes	**8.95**	104.0	3.01	85.69	7.89	4.45	0.00	0.00	98.02	0.00
10	5,930	5,932	62.7	Yes	**7.74**	104.0	3.01	86.46	8.33	4.44	0.00	0.00	99.24	0.00
11	7,254	7,256	62.1	Yes	**4.86**	104.0	3.01	88.21	9.39	4.51	0.00	0.00	102.11	0.00
12	7,045	7,047	62.6	Yes	**5.28**	104.0	3.01	87.96	9.23	4.50	0.00	0.00	101.69	0.00
13	6,867	6,869	63.4	Yes	**5.65**	104.0	3.01	87.74	9.10	4.49	0.00	0.00	101.32	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	6,809	6,811	61.6	Yes	**5.77**	104.0	3.01	87.66	9.05	4.49	0.00	0.00	101.21	0.00
15	6,324	6,325	62.1	Yes	**6.82**	104.0	3.01	87.02	8.66	4.47	0.00	0.00	100.15	0.00
16	5,989	5,990	61.8	Yes	**7.59**	104.0	3.01	86.55	8.38	4.45	0.00	0.00	99.38	0.00
17	7,423	7,424	60.3	Yes	**4.52**	104.0	3.01	88.41	9.52	4.52	0.00	0.00	102.45	0.00
18	7,762	7,763	55.0	Yes	**3.85**	104.0	3.01	88.80	9.76	4.56	0.00	0.00	103.12	0.00
19	7,172	7,174	52.9	Yes	**4.98**	104.0	3.01	88.11	9.33	4.55	0.00	0.00	101.99	0.00
20	6,804	6,805	49.7	Yes	**5.72**	104.0	3.01	87.66	9.05	4.55	0.00	0.00	101.25	0.00
21	3,769	3,770	51.3	Yes	**13.87**	104.0	3.01	82.53	6.24	4.34	0.00	0.00	93.10	0.00
22	3,258	3,259	43.2	Yes	**15.70**	104.0	3.01	81.26	5.66	4.35	0.00	0.00	91.27	0.00
23	3,335	3,336	44.6	Yes	**15.42**	104.0	3.01	81.46	5.75	4.34	0.00	0.00	91.56	0.00
24	3,217	3,218	43.0	Yes	**15.87**	104.0	3.01	81.15	5.61	4.34	0.00	0.00	91.11	0.00
25	5,248	5,249	48.1	Yes	**9.36**	104.0	3.01	85.40	7.73	4.49	0.00	0.00	97.61	0.00
26	4,689	4,690	53.7	Yes	**10.94**	104.0	3.01	84.42	7.20	4.41	0.00	0.00	96.03	0.00
27	5,426	5,426	51.3	Yes	**8.92**	104.0	3.01	85.69	7.89	4.48	0.00	0.00	98.06	0.00
28	5,964	5,965	58.7	Yes	**7.64**	104.0	3.01	86.51	8.36	4.46	0.00	0.00	99.34	0.00
29	3,956	3,957	44.4	Yes	**13.16**	104.0	3.01	82.95	6.45	4.42	0.00	0.00	93.81	0.00
30	3,538	3,539	40.6	Yes	**14.60**	104.0	3.01	81.98	5.98	4.41	0.00	0.00	92.37	0.00
31	2,529	2,530	43.5	Yes	**18.95**	104.0	3.01	79.06	4.75	4.21	0.00	0.00	88.02	0.00
32	5,037	5,038	46.8	Yes	**9.91**	104.0	3.01	85.04	7.53	4.48	0.00	0.00	97.06	0.00
33	3,867	3,868	42.0	Yes	**13.45**	104.0	3.01	82.75	6.35	4.43	0.00	0.00	93.53	0.00
34	5,635	5,636	59.8	Yes	**8.44**	104.0	3.01	86.02	8.08	4.44	0.00	0.00	98.53	0.00
35	5,613	5,615	61.5	Yes	**8.50**	104.0	3.01	85.99	8.06	4.43	0.00	0.00	98.47	0.00
36	5,608	5,609	61.2	Yes	**8.51**	104.0	3.01	85.98	8.05	4.43	0.00	0.00	98.46	0.00
37	5,692	5,694	58.4	Yes	**8.29**	104.0	3.01	86.11	8.13	4.45	0.00	0.00	98.68	0.00
38	5,407	5,408	48.6	Yes	**8.95**	104.0	3.01	85.66	7.87	4.49	0.00	0.00	98.03	0.00
39	6,197	6,198	60.9	Yes	**7.11**	104.0	3.01	86.85	8.56	4.47	0.00	0.00	99.87	0.00
40	7,676	7,676	37.1	Yes	**3.93**	104.0	3.01	88.70	9.70	4.64	0.00	0.00	103.04	0.00
41	6,512	6,513	67.7	Yes	**6.44**	104.0	3.01	87.28	8.81	4.45	0.00	0.00	100.54	0.00
43	6,097	6,098	61.5	Yes	**7.34**	104.0	3.01	86.70	8.47	4.46	0.00	0.00	99.63	0.00
44	6,979	6,981	70.9	Yes	**5.46**	104.0	3.01	87.88	9.18	4.45	0.00	0.00	101.51	0.00
45	7,040	7,041	69.5	Yes	**5.33**	104.0	3.01	87.95	9.23	4.46	0.00	0.00	101.64	0.00
46	7,115	7,116	43.1	Yes	**5.05**	104.0	3.01	88.04	9.29	4.59	0.00	0.00	101.92	0.00
48	5,752	5,752	48.0	Yes	**8.08**	104.0	3.01	86.20	8.18	4.52	0.00	0.00	98.89	0.00
49	5,014	5,015	45.3	Yes	**9.97**	104.0	3.01	85.00	7.51	4.49	0.00	0.00	97.01	0.00
50	4,990	4,992	58.6	Yes	**10.12**	104.0	3.01	84.97	7.49	4.40	0.00	0.00	96.85	0.00
51	4,662	4,662	42.9	Yes	**10.95**	104.0	3.01	84.37	7.17	4.49	0.00	0.00	96.03	0.00
52	4,424	4,425	42.2	Yes	**11.65**	104.0	3.01	83.92	6.93	4.47	0.00	0.00	95.33	0.00
53	5,279	5,279	47.8	Yes	**9.27**	104.0	3.01	85.45	7.75	4.49	0.00	0.00	97.70	0.00
55	6,569	6,570	46.0	Yes	**6.20**	104.0	3.01	87.35	8.86	4.56	0.00	0.00	100.77	0.00
56	6,838	6,838	48.4	Yes	**5.64**	104.0	3.01	87.70	9.07	4.56	0.00	0.00	101.33	0.00
57	7,195	7,196	47.0	Yes	**4.91**	104.0	3.01	88.14	9.35	4.58	0.00	0.00	102.07	0.00
58	4,562	4,562	43.7	Yes	**11.24**	104.0	3.01	84.18	7.07	4.47	0.00	0.00	95.73	0.00
59	7,117	7,117	49.7	Yes	**5.08**	104.0	3.01	88.05	9.29	4.56	0.00	0.00	101.89	0.00
60	8,589	8,589	51.5	Yes	**2.36**	104.0	3.01	89.68	10.34	4.60	0.00	0.00	104.61	0.00
61	8,916	8,916	48.3	Yes	**1.80**	104.0	3.01	90.00	10.55	4.62	0.00	0.00	105.17	0.00
62	9,628	9,628	54.0	Yes	**0.69**	104.0	3.01	90.67	11.01	4.61	0.00	0.00	106.29	0.00
63	10,576	10,576	55.1	Yes	**-0.71**	104.0	3.01	91.49	11.57	4.62	0.00	0.00	107.68	0.00
64	11,959	11,959	52.6	Yes	**-2.57**	104.0	3.01	92.55	12.34	4.65	0.00	0.00	109.54	0.00
65	12,394	12,394	54.0	Yes	**-3.11**	104.0	3.01	92.86	12.56	4.65	0.00	0.00	110.08	0.00
66	7,712	7,713	34.5	Yes	**3.85**	104.0	3.01	88.74	9.73	4.65	0.00	0.00	103.12	0.00
67	11,529	11,529	54.0	Yes	**-2.01**	104.0	3.01	92.24	12.11	4.64	0.00	0.00	108.98	0.00
68	12,019	12,020	51.2	Yes	**-2.65**	104.0	3.01	92.60	12.37	4.65	0.00	0.00	109.62	0.00
69	12,422	12,422	52.7	Yes	**-3.15**	104.0	3.01	92.88	12.58	4.66	0.00	0.00	110.12	0.00
70	7,800	7,801	29.5	Yes	**3.67**	104.0	3.01	88.84	9.79	4.67	0.00	0.00	103.30	0.00
71	5,746	5,748	60.5	Yes	**8.17**	104.0	3.01	86.19	8.17	4.44	0.00	0.00	98.80	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	3,373	3,374	45.5	Yes	**15.28**	104.0	3.01	81.56	5.79	4.34	0.00	0.00	91.69	0.00
73	4,455	4,456	54.6	Yes	**11.65**	104.0	3.01	83.98	6.96	4.38	0.00	0.00	95.33	0.00
74	5,030	5,032	59.9	Yes	**10.02**	104.0	3.01	85.03	7.52	4.39	0.00	0.00	96.95	0.00
75	4,477	4,477	45.6	Yes	**11.51**	104.0	3.01	84.02	6.99	4.45	0.00	0.00	95.46	0.00
76	6,921	6,921	51.3	Yes	**5.49**	104.0	3.01	87.80	9.14	4.55	0.00	0.00	101.49	0.00
77	5,919	5,919	45.4	Yes	**7.67**	104.0	3.01	86.44	8.32	4.54	0.00	0.00	99.30	0.00
78	6,850	6,851	41.8	Yes	**5.58**	104.0	3.01	87.72	9.08	4.59	0.00	0.00	101.39	0.00
80	8,272	8,273	53.4	Yes	**2.92**	104.0	3.01	89.35	10.12	4.58	0.00	0.00	104.06	0.00
81	7,384	7,385	52.0	Yes	**4.56**	104.0	3.01	88.37	9.49	4.56	0.00	0.00	102.42	0.00
82	4,208	4,209	42.7	Yes	**12.32**	104.0	3.01	83.48	6.71	4.45	0.00	0.00	94.65	0.00
83	11,041	11,042	54.3	Yes	**-1.36**	104.0	3.01	91.86	11.84	4.63	0.00	0.00	108.33	0.00
85	4,563	4,563	44.9	Yes	**11.25**	104.0	3.01	84.19	7.07	4.46	0.00	0.00	95.72	0.00
86	8,018	8,018	52.2	Yes	**3.37**	104.0	3.01	89.08	9.95	4.58	0.00	0.00	103.61	0.00
87	12,557	12,558	52.6	Yes	**-3.31**	104.0	3.01	92.98	12.65	4.66	0.00	0.00	110.28	0.00
89	11,471	11,471	54.0	Yes	**-1.94**	104.0	3.01	92.19	12.08	4.64	0.00	0.00	108.91	0.00
90	8,076	8,076	54.3	Yes	**3.27**	104.0	3.01	89.14	9.99	4.57	0.00	0.00	103.70	0.00
91	10,007	10,007	54.6	Yes	**0.11**	104.0	3.01	91.01	11.24	4.61	0.00	0.00	106.86	0.00
92	12,619	12,620	49.2	Yes	**-3.39**	104.0	3.01	93.02	12.68	4.67	0.00	0.00	110.37	0.00
94	6,327	6,329	62.4	Yes	**6.82**	104.0	3.01	87.03	8.66	4.46	0.00	0.00	100.15	0.00
95	6,547	6,549	59.8	Yes	**6.32**	104.0	3.01	87.32	8.84	4.49	0.00	0.00	100.65	0.00
97	6,284	6,286	65.2	Yes	**6.93**	104.0	3.01	86.97	8.63	4.45	0.00	0.00	100.04	0.00
98	6,382	6,383	62.1	Yes	**6.69**	104.0	3.01	87.10	8.71	4.47	0.00	0.00	100.28	0.00
99	4,133	4,134	50.5	Yes	**12.63**	104.0	3.01	83.33	6.63	4.38	0.00	0.00	94.34	0.00
100	6,812	6,813	64.0	Yes	**5.77**	104.0	3.01	87.67	9.05	4.48	0.00	0.00	101.20	0.00
101	7,637	7,638	51.3	Yes	**4.07**	104.0	3.01	88.66	9.67	4.57	0.00	0.00	102.90	0.00
102	6,757	6,759	71.7	Yes	**5.93**	104.0	3.01	87.60	9.01	4.44	0.00	0.00	101.05	0.00
103	7,955	7,956	54.1	Yes	**3.49**	104.0	3.01	89.01	9.90	4.57	0.00	0.00	103.48	0.00
104	6,205	6,206	61.5	Yes	**7.09**	104.0	3.01	86.86	8.56	4.46	0.00	0.00	99.88	0.00
107	7,025	7,026	51.2	Yes	**5.27**	104.0	3.01	87.93	9.22	4.55	0.00	0.00	101.70	0.00
108	3,549	3,550	45.2	Yes	**14.61**	104.0	3.01	82.00	6.00	4.36	0.00	0.00	92.36	0.00
109	7,417	7,417	50.8	Yes	**4.49**	104.0	3.01	88.40	9.51	4.57	0.00	0.00	102.48	0.00
110	6,136	6,136	49.0	Yes	**7.18**	104.0	3.01	86.76	8.50	4.53	0.00	0.00	99.79	0.00
111	6,604	6,604	52.1	Yes	**6.16**	104.0	3.01	87.40	8.89	4.53	0.00	0.00	100.81	0.00
113	7,115	7,116	50.6	Yes	**5.08**	104.0	3.01	88.04	9.29	4.56	0.00	0.00	101.89	0.00
114	4,831	4,831	45.1	Yes	**10.48**	104.0	3.01	84.68	7.33	4.48	0.00	0.00	96.50	0.00
115	5,609	5,610	49.5	Yes	**8.44**	104.0	3.01	85.98	8.05	4.50	0.00	0.00	98.53	0.00
116	6,539	6,541	61.3	Yes	**6.34**	104.0	3.01	87.31	8.84	4.48	0.00	0.00	100.63	0.00
118	7,839	7,840	51.3	Yes	**3.69**	104.0	3.01	88.89	9.82	4.58	0.00	0.00	103.28	0.00
119	5,287	5,289	60.8	Yes	**9.33**	104.0	3.01	85.47	7.76	4.41	0.00	0.00	97.64	0.00
120	7,984	7,985	47.8	Yes	**3.41**	104.0	3.01	89.05	9.92	4.60	0.00	0.00	103.56	0.00
121	5,662	5,663	61.9	Yes	**8.38**	104.0	3.01	86.06	8.10	4.43	0.00	0.00	98.59	0.00
125	10,829	10,830	54.5	Yes	**-1.07**	104.0	3.01	91.69	11.72	4.63	0.00	0.00	108.04	0.00
126	7,610	7,610	61.0	Yes	**4.16**	104.0	3.01	88.63	9.65	4.53	0.00	0.00	102.81	0.00
127	7,679	7,680	61.9	Yes	**4.04**	104.0	3.01	88.71	9.70	4.53	0.00	0.00	102.94	0.00
128	7,625	7,626	62.2	Yes	**4.14**	104.0	3.01	88.65	9.67	4.52	0.00	0.00	102.83	0.00
129	7,941	7,942	33.9	Yes	**3.43**	104.0	3.01	89.00	9.89	4.65	0.00	0.00	103.54	0.00
130	8,527	8,528	34.5	No	**2.26**	104.0	3.01	89.62	10.30	4.80	0.00	0.00	104.71	0.00
131	8,756	8,756	32.7	No	**1.88**	104.0	3.01	89.85	10.45	4.80	0.00	0.00	105.10	0.00
132	8,813	8,814	31.9	No	**1.78**	104.0	3.01	89.90	10.49	4.80	0.00	0.00	105.19	0.00
133	5,999	5,999	53.6	Yes	**7.53**	104.0	3.01	86.56	8.39	4.50	0.00	0.00	99.45	0.00
134	7,518	7,518	33.2	Yes	**4.21**	104.0	3.01	88.52	9.59	4.65	0.00	0.00	102.76	0.00
141	6,056	6,058	66.7	Yes	**7.46**	104.0	3.01	86.65	8.44	4.42	0.00	0.00	99.51	0.00
142	6,693	6,694	71.5	Yes	**6.06**	104.0	3.01	87.51	8.96	4.44	0.00	0.00	100.91	0.00
143	6,390	6,392	63.3	Yes	**6.68**	104.0	3.01	87.11	8.72	4.46	0.00	0.00	100.29	0.00
144	7,219	7,220	61.2	Yes	**4.93**	104.0	3.01	88.17	9.36	4.51	0.00	0.00	102.05	0.00

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Project:
20102130 - Merricourt ND Enxco

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Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	7,783	7,784	55.5	Yes	**3.81**	104.0	3.01	88.82	9.78	4.56	0.00	0.00	103.16	0.00
146	7,528	7,529	55.0	Yes	**4.29**	104.0	3.01	88.53	9.59	4.55	0.00	0.00	102.68	0.00
Sum	29.94													

Noise sensitive area: H03 H03

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	6,227	6,228	58.8	Yes	**7.03**	104.0	3.01	86.89	8.58	4.48	0.00	0.00	99.95	0.00
2	5,748	5,748	56.8	Yes	**8.14**	104.0	3.01	86.19	8.17	4.46	0.00	0.00	98.83	0.00
3	5,329	5,330	60.5	Yes	**9.22**	104.0	3.01	85.53	7.80	4.41	0.00	0.00	97.75	0.00
4	3,914	3,915	47.7	Yes	**13.34**	104.0	3.01	82.85	6.40	4.38	0.00	0.00	93.64	0.00
5	4,702	4,703	54.0	Yes	**10.91**	104.0	3.01	84.45	7.21	4.41	0.00	0.00	96.06	0.00
6	5,278	5,279	61.8	Yes	**9.36**	104.0	3.01	85.45	7.75	4.40	0.00	0.00	97.61	0.00
7	6,140	6,141	68.5	Yes	**7.28**	104.0	3.01	86.76	8.51	4.42	0.00	0.00	99.69	0.00
8	6,612	6,613	54.2	Yes	**6.15**	104.0	3.01	87.41	8.89	4.52	0.00	0.00	100.82	0.00
9	6,179	6,180	61.9	Yes	**7.15**	104.0	3.01	86.82	8.54	4.46	0.00	0.00	99.82	0.00
10	6,662	6,664	68.5	Yes	**6.11**	104.0	3.01	87.47	8.93	4.45	0.00	0.00	100.86	0.00
11	8,037	8,038	68.3	Yes	**3.40**	104.0	3.01	89.10	9.96	4.51	0.00	0.00	103.57	0.00
12	7,824	7,825	68.2	Yes	**3.79**	104.0	3.01	88.87	9.81	4.50	0.00	0.00	103.18	0.00
13	7,625	7,626	70.1	Yes	**4.17**	104.0	3.01	88.65	9.67	4.49	0.00	0.00	102.80	0.00
14	7,543	7,545	67.9	Yes	**4.32**	104.0	3.01	88.55	9.61	4.49	0.00	0.00	102.65	0.00
15	7,015	7,016	68.8	Yes	**5.38**	104.0	3.01	87.92	9.21	4.47	0.00	0.00	101.60	0.00
16	6,661	6,662	68.2	Yes	**6.12**	104.0	3.01	87.47	8.93	4.45	0.00	0.00	100.86	0.00
17	8,212	8,213	66.2	Yes	**3.07**	104.0	3.01	89.29	10.08	4.53	0.00	0.00	103.90	0.00
18	8,550	8,551	61.2	Yes	**2.46**	104.0	3.01	89.64	10.31	4.56	0.00	0.00	104.51	0.00
19	7,913	7,914	59.0	Yes	**3.59**	104.0	3.01	88.97	9.87	4.55	0.00	0.00	103.39	0.00
20	7,479	7,480	56.7	Yes	**4.39**	104.0	3.01	88.48	9.56	4.54	0.00	0.00	102.58	0.00
21	4,348	4,349	56.4	Yes	**11.99**	104.0	3.01	83.77	6.86	4.36	0.00	0.00	94.98	0.00
22	3,730	3,730	47.6	Yes	**13.98**	104.0	3.01	82.43	6.20	4.36	0.00	0.00	93.00	0.00
23	3,727	3,728	49.9	Yes	**14.00**	104.0	3.01	82.43	6.20	4.34	0.00	0.00	92.97	0.00
24	3,738	3,738	47.9	Yes	**13.95**	104.0	3.01	82.45	6.21	4.36	0.00	0.00	93.02	0.00
25	5,378	5,378	52.4	Yes	**9.05**	104.0	3.01	85.61	7.85	4.47	0.00	0.00	97.93	0.00
26	5,218	5,219	59.3	Yes	**9.51**	104.0	3.01	85.35	7.70	4.41	0.00	0.00	97.46	0.00
27	5,676	5,676	56.1	Yes	**8.32**	104.0	3.01	86.08	8.11	4.46	0.00	0.00	98.65	0.00
28	6,320	6,321	66.7	Yes	**6.86**	104.0	3.01	87.02	8.66	4.44	0.00	0.00	100.11	0.00
29	4,335	4,336	50.5	Yes	**11.99**	104.0	3.01	83.74	6.84	4.40	0.00	0.00	94.99	0.00
30	3,837	3,838	44.7	Yes	**13.57**	104.0	3.01	82.68	6.32	4.40	0.00	0.00	93.40	0.00
31	2,943	2,944	48.0	Yes	**17.07**	104.0	3.01	80.38	5.28	4.24	0.00	0.00	89.90	0.00
32	5,098	5,098	52.1	Yes	**9.78**	104.0	3.01	85.15	7.59	4.45	0.00	0.00	97.19	0.00
33	4,048	4,048	45.3	Yes	**12.87**	104.0	3.01	83.14	6.54	4.42	0.00	0.00	94.11	0.00
34	6,104	6,105	66.2	Yes	**7.35**	104.0	3.01	86.71	8.48	4.43	0.00	0.00	99.62	0.00
35	6,156	6,157	68.3	Yes	**7.24**	104.0	3.01	86.79	8.52	4.42	0.00	0.00	99.73	0.00
36	6,184	6,185	67.8	Yes	**7.17**	104.0	3.01	86.83	8.55	4.43	0.00	0.00	99.80	0.00
37	6,122	6,123	64.9	Yes	**7.30**	104.0	3.01	86.74	8.49	4.44	0.00	0.00	99.67	0.00
38	5,594	5,594	53.2	Yes	**8.50**	104.0	3.01	85.95	8.04	4.48	0.00	0.00	98.47	0.00
39	6,434	6,435	66.3	Yes	**6.60**	104.0	3.01	87.17	8.75	4.45	0.00	0.00	100.37	0.00
40	8,059	8,060	45.4	Yes	**3.26**	104.0	3.01	89.13	9.97	4.61	0.00	0.00	103.71	0.00
41	6,764	6,765	73.7	Yes	**5.92**	104.0	3.01	87.61	9.01	4.43	0.00	0.00	101.05	0.00
43	6,477	6,478	69.5	Yes	**6.52**	104.0	3.01	87.23	8.79	4.43	0.00	0.00	100.45	0.00
44	7,237	7,238	77.4	Yes	**4.97**	104.0	3.01	88.19	9.38	4.44	0.00	0.00	102.01	0.00
45	7,263	7,264	75.7	Yes	**4.91**	104.0	3.01	88.22	9.40	4.44	0.00	0.00	102.07	0.00
46	7,484	7,485	51.6	Yes	**4.36**	104.0	3.01	88.48	9.56	4.56	0.00	0.00	102.61	0.00
48	5,754	5,754	53.8	Yes	**8.11**	104.0	3.01	86.20	8.18	4.48	0.00	0.00	98.86	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	4,895	4,895	50.0	Yes	**10.33**	104.0	3.01	84.80	7.40	4.45	0.00	0.00	96.64	0.00
50	5,608	5,609	64.2	Yes	**8.53**	104.0	3.01	85.98	8.05	4.41	0.00	0.00	98.44	0.00
51	4,604	4,604	48.5	Yes	**11.16**	104.0	3.01	84.26	7.11	4.44	0.00	0.00	95.82	0.00
52	4,409	4,410	47.6	Yes	**11.74**	104.0	3.01	83.89	6.92	4.43	0.00	0.00	95.24	0.00
53	5,122	5,123	52.4	Yes	**9.72**	104.0	3.01	85.19	7.61	4.45	0.00	0.00	97.25	0.00
55	6,295	6,295	50.2	Yes	**6.83**	104.0	3.01	86.98	8.64	4.53	0.00	0.00	100.14	0.00
56	6,543	6,543	52.6	Yes	**6.29**	104.0	3.01	87.32	8.84	4.53	0.00	0.00	100.68	0.00
57	6,977	6,977	51.7	Yes	**5.37**	104.0	3.01	87.87	9.18	4.55	0.00	0.00	101.60	0.00
58	4,723	4,723	47.5	Yes	**10.80**	104.0	3.01	84.48	7.23	4.46	0.00	0.00	96.17	0.00
59	6,804	6,804	53.9	Yes	**5.74**	104.0	3.01	87.66	9.05	4.53	0.00	0.00	101.23	0.00
60	8,241	8,242	56.3	Yes	**2.98**	104.0	3.01	89.32	10.10	4.57	0.00	0.00	103.99	0.00
61	8,555	8,555	53.1	Yes	**2.43**	104.0	3.01	89.64	10.31	4.59	0.00	0.00	104.55	0.00
62	9,431	9,432	58.9	Yes	**1.01**	104.0	3.01	90.49	10.88	4.59	0.00	0.00	105.96	0.00
63	10,428	10,428	61.5	Yes	**-0.48**	104.0	3.01	91.36	11.49	4.60	0.00	0.00	107.45	0.00
64	11,788	11,789	58.1	Yes	**-2.34**	104.0	3.01	92.43	12.25	4.63	0.00	0.00	109.31	0.00
65	12,191	12,191	59.9	Yes	**-2.84**	104.0	3.01	92.72	12.46	4.63	0.00	0.00	109.81	0.00
66	8,125	8,125	41.6	Yes	**3.13**	104.0	3.01	89.20	10.02	4.63	0.00	0.00	103.84	0.00
67	11,303	11,304	59.9	Yes	**-1.70**	104.0	3.01	92.06	11.98	4.62	0.00	0.00	108.67	0.00
68	11,777	11,777	57.3	Yes	**-2.32**	104.0	3.01	92.42	12.24	4.63	0.00	0.00	109.30	0.00
69	12,235	12,235	58.3	Yes	**-2.90**	104.0	3.01	92.75	12.48	4.64	0.00	0.00	109.87	0.00
70	8,509	8,510	36.9	Yes	**2.44**	104.0	3.01	89.60	10.28	4.65	0.00	0.00	104.54	0.00
71	6,461	6,463	66.7	Yes	**6.54**	104.0	3.01	87.21	8.77	4.45	0.00	0.00	100.43	0.00
72	4,091	4,091	49.4	Yes	**12.76**	104.0	3.01	83.24	6.59	4.39	0.00	0.00	94.21	0.00
73	5,140	5,141	59.4	Yes	**9.72**	104.0	3.01	85.22	7.63	4.41	0.00	0.00	97.25	0.00
74	5,611	5,612	65.9	Yes	**8.54**	104.0	3.01	85.98	8.05	4.40	0.00	0.00	98.44	0.00
75	4,914	4,915	51.1	Yes	**10.28**	104.0	3.01	84.83	7.41	4.45	0.00	0.00	96.69	0.00
76	6,797	6,798	56.1	Yes	**5.77**	104.0	3.01	87.65	9.04	4.52	0.00	0.00	101.21	0.00
77	5,783	5,783	50.0	Yes	**8.02**	104.0	3.01	86.24	8.20	4.51	0.00	0.00	98.95	0.00
78	7,495	7,496	49.4	Yes	**4.33**	104.0	3.01	88.50	9.57	4.58	0.00	0.00	102.64	0.00
80	7,948	7,949	57.6	Yes	**3.52**	104.0	3.01	89.01	9.90	4.55	0.00	0.00	103.46	0.00
81	8,134	8,135	58.4	Yes	**3.18**	104.0	3.01	89.21	10.03	4.56	0.00	0.00	103.79	0.00
82	4,284	4,284	47.3	Yes	**12.12**	104.0	3.01	83.64	6.79	4.42	0.00	0.00	94.85	0.00
83	10,858	10,858	59.5	Yes	**-1.09**	104.0	3.01	91.72	11.73	4.61	0.00	0.00	108.06	0.00
85	4,323	4,323	48.3	Yes	**12.01**	104.0	3.01	83.72	6.83	4.42	0.00	0.00	94.96	0.00
86	7,709	7,709	56.2	Yes	**3.96**	104.0	3.01	88.74	9.73	4.55	0.00	0.00	103.02	0.00
87	12,343	12,343	58.4	Yes	**-3.03**	104.0	3.01	92.83	12.54	4.64	0.00	0.00	110.00	0.00
89	11,308	11,308	59.6	Yes	**-1.70**	104.0	3.01	92.07	11.99	4.62	0.00	0.00	108.67	0.00
90	7,895	7,896	59.1	Yes	**3.62**	104.0	3.01	88.95	9.86	4.55	0.00	0.00	103.35	0.00
91	9,834	9,834	59.8	Yes	**0.39**	104.0	3.01	90.85	11.13	4.59	0.00	0.00	106.58	0.00
92	12,486	12,486	56.1	Yes	**-3.21**	104.0	3.01	92.93	12.61	4.65	0.00	0.00	110.19	0.00
94	7,059	7,060	68.5	Yes	**5.28**	104.0	3.01	87.98	9.24	4.47	0.00	0.00	101.69	0.00
95	7,340	7,341	65.0	Yes	**4.70**	104.0	3.01	88.31	9.46	4.50	0.00	0.00	102.27	0.00
97	6,910	6,912	71.2	Yes	**5.60**	104.0	3.01	87.79	9.13	4.45	0.00	0.00	101.37	0.00
98	7,139	7,141	68.6	Yes	**5.12**	104.0	3.01	88.07	9.30	4.47	0.00	0.00	101.85	0.00
99	4,923	4,924	54.8	Yes	**10.28**	104.0	3.01	84.85	7.42	4.42	0.00	0.00	96.69	0.00
100	6,997	6,998	69.8	Yes	**5.42**	104.0	3.01	87.90	9.20	4.46	0.00	0.00	101.55	0.00
101	8,402	8,403	57.7	Yes	**2.71**	104.0	3.01	89.49	10.21	4.57	0.00	0.00	104.27	0.00
102	7,044	7,046	79.0	Yes	**5.36**	104.0	3.01	87.96	9.23	4.42	0.00	0.00	101.61	0.00
103	8,751	8,751	59.7	Yes	**2.12**	104.0	3.01	89.84	10.45	4.57	0.00	0.00	104.85	0.00
104	6,507	6,508	68.5	Yes	**6.45**	104.0	3.01	87.27	8.81	4.44	0.00	0.00	100.52	0.00
107	7,725	7,726	58.6	Yes	**3.93**	104.0	3.01	88.76	9.74	4.54	0.00	0.00	103.04	0.00
108	4,374	4,375	49.8	Yes	**11.86**	104.0	3.01	83.82	6.88	4.41	0.00	0.00	95.11	0.00
109	7,091	7,091	55.0	Yes	**5.16**	104.0	3.01	88.01	9.27	4.54	0.00	0.00	101.82	0.00
110	6,107	6,107	55.0	Yes	**7.28**	104.0	3.01	86.72	8.48	4.49	0.00	0.00	99.69	0.00
111	6,515	6,515	57.3	Yes	**6.38**	104.0	3.01	87.28	8.82	4.50	0.00	0.00	100.59	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	7,834	7,835	57.5	Yes	**3.72**	104.0	3.01	88.88	9.82	4.55	0.00	0.00	103.25	0.00
114	4,562	4,562	48.6	Yes	**11.28**	104.0	3.01	84.18	7.07	4.44	0.00	0.00	95.69	0.00
115	6,413	6,414	54.1	Yes	**6.58**	104.0	3.01	87.14	8.73	4.51	0.00	0.00	100.39	0.00
116	6,968	6,969	68.6	Yes	**5.47**	104.0	3.01	87.86	9.17	4.46	0.00	0.00	101.50	0.00
118	7,486	7,486	55.8	Yes	**4.38**	104.0	3.01	88.49	9.56	4.55	0.00	0.00	102.59	0.00
119	5,943	5,944	66.0	Yes	**7.73**	104.0	3.01	86.48	8.34	4.42	0.00	0.00	99.25	0.00
120	8,760	8,760	53.2	Yes	**2.08**	104.0	3.01	89.85	10.45	4.59	0.00	0.00	104.90	0.00
121	6,271	6,273	67.9	Yes	**6.97**	104.0	3.01	86.95	8.62	4.43	0.00	0.00	100.00	0.00
125	10,662	10,663	59.8	Yes	**-0.82**	104.0	3.01	91.56	11.62	4.61	0.00	0.00	107.79	0.00
126	7,661	7,661	68.2	Yes	**4.10**	104.0	3.01	88.69	9.69	4.50	0.00	0.00	102.87	0.00
127	7,704	7,705	68.0	Yes	**4.02**	104.0	3.01	88.74	9.72	4.50	0.00	0.00	102.96	0.00
128	7,619	7,620	68.7	Yes	**4.18**	104.0	3.01	88.64	9.66	4.49	0.00	0.00	102.79	0.00
129	8,492	8,492	41.3	Yes	**2.49**	104.0	3.01	89.58	10.27	4.63	0.00	0.00	104.49	0.00
130	9,057	9,057	42.5	Yes	**1.55**	104.0	3.01	90.14	10.65	4.64	0.00	0.00	105.43	0.00
131	9,313	9,313	39.9	No	**0.98**	104.0	3.01	90.38	10.81	4.80	0.00	0.00	105.99	0.00
132	9,398	9,399	39.4	Yes	**0.99**	104.0	3.01	90.46	10.86	4.66	0.00	0.00	105.98	0.00
133	6,175	6,176	58.7	Yes	**7.15**	104.0	3.01	86.81	8.54	4.48	0.00	0.00	99.83	0.00
134	8,229	8,230	40.7	Yes	**2.94**	104.0	3.01	89.31	10.09	4.63	0.00	0.00	104.03	0.00
141	6,675	6,677	72.8	Yes	**6.11**	104.0	3.01	87.49	8.94	4.43	0.00	0.00	100.86	0.00
142	7,012	7,014	79.9	Yes	**5.43**	104.0	3.01	87.92	9.21	4.41	0.00	0.00	101.54	0.00
143	7,048	7,049	69.5	Yes	**5.31**	104.0	3.01	87.96	9.23	4.46	0.00	0.00	101.66	0.00
144	7,410	7,411	67.6	Yes	**4.58**	104.0	3.01	88.40	9.51	4.49	0.00	0.00	102.39	0.00
145	7,643	7,643	60.9	Yes	**4.10**	104.0	3.01	88.67	9.68	4.53	0.00	0.00	102.87	0.00
146	7,411	7,412	59.9	Yes	**4.54**	104.0	3.01	88.40	9.51	4.52	0.00	0.00	102.43	0.00
Sum	28.80													

Noise sensitive area: H04 H04

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	7,563	7,564	54.8	Yes	**4.22**	104.0	3.01	88.57	9.62	4.55	0.00	0.00	102.75	0.00
2	7,105	7,105	53.0	Yes	**5.12**	104.0	3.01	88.03	9.28	4.55	0.00	0.00	101.85	0.00
3	6,616	6,617	56.8	Yes	**6.15**	104.0	3.01	87.41	8.90	4.51	0.00	0.00	100.82	0.00
4	5,049	5,049	44.3	Yes	**9.87**	104.0	3.01	85.06	7.54	4.50	0.00	0.00	97.11	0.00
5	5,753	5,753	51.1	Yes	**8.10**	104.0	3.01	86.20	8.18	4.50	0.00	0.00	98.87	0.00
6	6,447	6,448	59.4	Yes	**6.54**	104.0	3.01	87.19	8.76	4.49	0.00	0.00	100.44	0.00
7	6,815	6,816	68.7	Yes	**5.79**	104.0	3.01	87.67	9.05	4.46	0.00	0.00	101.18	0.00
8	8,023	8,023	49.6	Yes	**3.35**	104.0	3.01	89.09	9.95	4.59	0.00	0.00	103.63	0.00
9	7,427	7,428	58.4	Yes	**4.50**	104.0	3.01	88.42	9.52	4.53	0.00	0.00	102.47	0.00
10	7,836	7,837	66.7	Yes	**3.76**	104.0	3.01	88.88	9.82	4.51	0.00	0.00	103.21	0.00
11	9,336	9,337	63.6	Yes	**1.18**	104.0	3.01	90.40	10.82	4.57	0.00	0.00	105.80	0.00
12	9,112	9,114	64.1	Yes	**1.54**	104.0	3.01	90.19	10.68	4.56	0.00	0.00	105.44	0.00
13	8,852	8,853	67.1	Yes	**1.98**	104.0	3.01	89.94	10.51	4.54	0.00	0.00	105.00	0.00
14	8,707	8,708	67.0	Yes	**2.22**	104.0	3.01	89.80	10.42	4.54	0.00	0.00	104.75	0.00
15	8,076	8,077	67.7	Yes	**3.33**	104.0	3.01	89.15	9.99	4.51	0.00	0.00	103.65	0.00
16	7,686	7,687	67.1	Yes	**4.04**	104.0	3.01	88.72	9.71	4.50	0.00	0.00	102.93	0.00
17	9,530	9,531	62.3	Yes	**0.87**	104.0	3.01	90.58	10.95	4.58	0.00	0.00	106.11	0.00
18	9,858	9,859	57.1	Yes	**0.34**	104.0	3.01	90.88	11.15	4.60	0.00	0.00	106.63	0.00
19	9,088	9,089	58.0	Yes	**1.55**	104.0	3.01	90.17	10.67	4.58	0.00	0.00	105.42	0.00
20	8,489	8,490	55.6	Yes	**2.55**	104.0	3.01	89.58	10.27	4.58	0.00	0.00	104.43	0.00
21	5,270	5,270	53.4	Yes	**9.33**	104.0	3.01	85.44	7.75	4.45	0.00	0.00	97.64	0.00
22	4,499	4,500	45.8	Yes	**11.45**	104.0	3.01	84.06	7.01	4.45	0.00	0.00	95.53	0.00
23	4,350	4,350	48.2	Yes	**11.92**	104.0	3.01	83.77	6.86	4.42	0.00	0.00	95.05	0.00
24	4,597	4,597	44.7	Yes	**11.15**	104.0	3.01	84.25	7.11	4.47	0.00	0.00	95.82	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	5,319	5,320	54.3	Yes	**9.21**	104.0	3.01	85.52	7.79	4.45	0.00	0.00	97.76	0.00
26	5,982	5,983	57.6	Yes	**7.59**	104.0	3.01	86.54	8.38	4.47	0.00	0.00	99.38	0.00
27	5,841	5,842	58.7	Yes	**7.93**	104.0	3.01	86.33	8.25	4.46	0.00	0.00	99.04	0.00
28	6,666	6,667	70.1	Yes	**6.12**	104.0	3.01	87.48	8.94	4.44	0.00	0.00	100.86	0.00
29	4,866	4,867	50.5	Yes	**10.41**	104.0	3.01	84.74	7.37	4.45	0.00	0.00	96.56	0.00
30	4,271	4,271	45.9	Yes	**12.15**	104.0	3.01	83.61	6.78	4.43	0.00	0.00	94.82	0.00
31	3,719	3,720	44.7	Yes	**13.99**	104.0	3.01	82.41	6.19	4.39	0.00	0.00	92.99	0.00
32	4,922	4,922	53.5	Yes	**10.28**	104.0	3.01	84.84	7.42	4.43	0.00	0.00	96.69	0.00
33	4,225	4,225	49.3	Yes	**12.33**	104.0	3.01	83.52	6.73	4.40	0.00	0.00	94.65	0.00
34	6,696	6,697	67.0	Yes	**6.03**	104.0	3.01	87.52	8.96	4.46	0.00	0.00	100.94	0.00
35	6,903	6,904	67.6	Yes	**5.60**	104.0	3.01	87.78	9.12	4.47	0.00	0.00	101.37	0.00
36	7,003	7,004	67.1	Yes	**5.39**	104.0	3.01	87.91	9.20	4.47	0.00	0.00	101.58	0.00
37	6,631	6,632	68.6	Yes	**6.18**	104.0	3.01	87.43	8.91	4.45	0.00	0.00	100.79	0.00
38	5,635	5,635	55.3	Yes	**8.41**	104.0	3.01	86.02	8.07	4.47	0.00	0.00	98.56	0.00
39	6,527	6,528	68.2	Yes	**6.41**	104.0	3.01	87.30	8.83	4.44	0.00	0.00	100.57	0.00
40	8,395	8,395	48.8	Yes	**2.68**	104.0	3.01	89.48	10.21	4.60	0.00	0.00	104.29	0.00
41	6,872	6,873	75.4	Yes	**5.70**	104.0	3.01	87.74	9.10	4.43	0.00	0.00	101.27	0.00
43	6,866	6,867	73.4	Yes	**5.71**	104.0	3.01	87.73	9.09	4.44	0.00	0.00	101.26	0.00
44	7,335	7,336	79.2	Yes	**4.78**	104.0	3.01	88.31	9.45	4.43	0.00	0.00	102.19	0.00
45	7,288	7,289	77.3	Yes	**4.86**	104.0	3.01	88.25	9.42	4.44	0.00	0.00	102.11	0.00
46	7,807	7,808	55.2	Yes	**3.77**	104.0	3.01	88.85	9.80	4.56	0.00	0.00	103.21	0.00
48	5,405	5,405	53.8	Yes	**8.99**	104.0	3.01	85.66	7.87	4.46	0.00	0.00	97.99	0.00
49	4,364	4,365	50.0	Yes	**11.89**	104.0	3.01	83.80	6.87	4.41	0.00	0.00	95.08	0.00
50	6,541	6,542	61.5	Yes	**6.34**	104.0	3.01	87.31	8.84	4.48	0.00	0.00	100.63	0.00
51	4,231	4,231	48.8	Yes	**12.30**	104.0	3.01	83.53	6.73	4.41	0.00	0.00	94.67	0.00
52	4,147	4,147	48.6	Yes	**12.57**	104.0	3.01	83.36	6.65	4.40	0.00	0.00	94.40	0.00
53	4,495	4,495	52.8	Yes	**11.51**	104.0	3.01	84.06	7.00	4.40	0.00	0.00	95.46	0.00
55	5,352	5,352	50.6	Yes	**9.10**	104.0	3.01	85.57	7.82	4.48	0.00	0.00	97.87	0.00
56	5,548	5,548	52.7	Yes	**8.61**	104.0	3.01	85.88	8.00	4.48	0.00	0.00	98.36	0.00
57	6,116	6,117	51.7	Yes	**7.24**	104.0	3.01	86.73	8.49	4.51	0.00	0.00	99.73	0.00
58	4,784	4,784	50.3	Yes	**10.65**	104.0	3.01	84.60	7.29	4.44	0.00	0.00	96.33	0.00
59	5,763	5,764	53.7	Yes	**8.09**	104.0	3.01	86.21	8.19	4.48	0.00	0.00	98.88	0.00
60	7,094	7,094	55.0	Yes	**5.15**	104.0	3.01	88.02	9.27	4.54	0.00	0.00	101.82	0.00
61	7,375	7,375	51.3	Yes	**4.57**	104.0	3.01	88.36	9.48	4.56	0.00	0.00	102.40	0.00
62	8,542	8,543	58.3	Yes	**2.47**	104.0	3.01	89.63	10.31	4.57	0.00	0.00	104.51	0.00
63	9,613	9,614	60.1	Yes	**0.73**	104.0	3.01	90.66	11.00	4.59	0.00	0.00	106.24	0.00
64	10,910	10,911	57.0	Yes	**-1.17**	104.0	3.01	91.76	11.76	4.62	0.00	0.00	108.14	0.00
65	11,247	11,247	58.2	Yes	**-1.63**	104.0	3.01	92.02	11.95	4.62	0.00	0.00	108.60	0.00
66	8,521	8,522	45.2	Yes	**2.45**	104.0	3.01	89.61	10.29	4.62	0.00	0.00	104.52	0.00
67	10,329	10,329	57.4	Yes	**-0.35**	104.0	3.01	91.28	11.43	4.61	0.00	0.00	107.32	0.00
68	10,764	10,764	53.7	Yes	**-0.98**	104.0	3.01	91.64	11.68	4.63	0.00	0.00	107.95	0.00
69	11,321	11,321	57.8	Yes	**-1.72**	104.0	3.01	92.08	11.99	4.63	0.00	0.00	108.70	0.00
70	9,590	9,590	35.5	Yes	**0.68**	104.0	3.01	90.64	10.98	4.67	0.00	0.00	106.29	0.00
71	7,597	7,598	65.2	Yes	**4.21**	104.0	3.01	88.61	9.64	4.51	0.00	0.00	102.77	0.00
72	5,315	5,315	45.5	Yes	**9.17**	104.0	3.01	85.51	7.79	4.51	0.00	0.00	97.81	0.00
73	6,242	6,243	56.5	Yes	**6.98**	104.0	3.01	86.91	8.59	4.49	0.00	0.00	99.99	0.00
74	6,465	6,466	64.4	Yes	**6.52**	104.0	3.01	87.21	8.78	4.46	0.00	0.00	100.45	0.00
75	5,513	5,513	51.0	Yes	**8.69**	104.0	3.01	85.83	7.97	4.48	0.00	0.00	98.28	0.00
76	6,135	6,136	55.7	Yes	**7.22**	104.0	3.01	86.76	8.50	4.49	0.00	0.00	99.75	0.00
77	5,151	5,151	49.7	Yes	**9.63**	104.0	3.01	85.24	7.64	4.47	0.00	0.00	97.34	0.00
78	8,432	8,433	48.6	Yes	**2.62**	104.0	3.01	89.52	10.23	4.60	0.00	0.00	104.35	0.00
80	6,852	6,852	56.5	Yes	**5.65**	104.0	3.01	87.72	9.08	4.52	0.00	0.00	101.32	0.00
81	9,331	9,332	56.3	Yes	**1.16**	104.0	3.01	90.40	10.82	4.59	0.00	0.00	105.82	0.00
82	4,221	4,222	49.7	Yes	**12.34**	104.0	3.01	83.51	6.72	4.40	0.00	0.00	94.63	0.00
83	9,969	9,969	58.6	Yes	**0.18**	104.0	3.01	90.97	11.21	4.60	0.00	0.00	106.79	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	3,597	3,597	50.3	Yes	**14.48**	104.0	3.01	82.12	6.05	4.32	0.00	0.00	92.49	0.00
86	6,647	6,647	55.1	Yes	**6.08**	104.0	3.01	87.45	8.92	4.52	0.00	0.00	100.89	0.00
87	11,375	11,376	56.1	Yes	**-1.80**	104.0	3.01	92.12	12.02	4.63	0.00	0.00	108.77	0.00
89	10,451	10,451	58.1	Yes	**-0.52**	104.0	3.01	91.38	11.50	4.61	0.00	0.00	107.49	0.00
90	7,076	7,077	58.5	Yes	**5.20**	104.0	3.01	88.00	9.26	4.52	0.00	0.00	101.77	0.00
91	8,983	8,983	58.7	Yes	**1.73**	104.0	3.01	90.07	10.60	4.58	0.00	0.00	105.24	0.00
92	11,669	11,670	54.3	Yes	**-2.19**	104.0	3.01	92.34	12.18	4.64	0.00	0.00	109.17	0.00
94	8,223	8,224	67.3	Yes	**3.06**	104.0	3.01	89.30	10.09	4.52	0.00	0.00	103.91	0.00
95	8,677	8,678	61.0	Yes	**2.25**	104.0	3.01	89.77	10.40	4.56	0.00	0.00	104.73	0.00
97	7,819	7,821	70.2	Yes	**3.81**	104.0	3.01	88.86	9.81	4.49	0.00	0.00	103.16	0.00
98	8,374	8,375	65.6	Yes	**2.79**	104.0	3.01	89.46	10.19	4.53	0.00	0.00	104.19	0.00
99	6,294	6,295	51.1	Yes	**6.83**	104.0	3.01	86.98	8.64	4.52	0.00	0.00	100.14	0.00
100	6,955	6,956	71.8	Yes	**5.51**	104.0	3.01	87.85	9.16	4.45	0.00	0.00	101.46	0.00
101	9,642	9,643	54.3	Yes	**0.66**	104.0	3.01	90.68	11.02	4.61	0.00	0.00	106.31	0.00
102	7,213	7,215	81.8	Yes	**5.03**	104.0	3.01	88.16	9.36	4.41	0.00	0.00	101.94	0.00
103	10,084	10,085	55.6	Yes	**0.00**	104.0	3.01	91.07	11.28	4.61	0.00	0.00	106.97	0.00
104	6,730	6,731	71.8	Yes	**5.99**	104.0	3.01	87.56	8.99	4.44	0.00	0.00	100.99	0.00
107	8,794	8,795	57.5	Yes	**2.04**	104.0	3.01	89.88	10.47	4.58	0.00	0.00	104.94	0.00
108	5,870	5,871	44.7	Yes	**7.78**	104.0	3.01	86.37	8.28	4.54	0.00	0.00	99.19	0.00
109	6,014	6,015	54.6	Yes	**7.49**	104.0	3.01	86.58	8.40	4.49	0.00	0.00	99.48	0.00
110	5,673	5,673	54.0	Yes	**8.31**	104.0	3.01	86.08	8.11	4.48	0.00	0.00	98.66	0.00
111	5,936	5,936	56.0	Yes	**7.69**	104.0	3.01	86.47	8.34	4.48	0.00	0.00	99.28	0.00
113	8,952	8,953	57.3	Yes	**1.77**	104.0	3.01	90.04	10.58	4.58	0.00	0.00	105.20	0.00
114	3,749	3,749	50.4	Yes	**13.93**	104.0	3.01	82.48	6.22	4.34	0.00	0.00	93.04	0.00
115	7,802	7,803	50.1	Yes	**3.75**	104.0	3.01	88.84	9.79	4.58	0.00	0.00	103.22	0.00
116	7,439	7,440	72.5	Yes	**4.54**	104.0	3.01	88.43	9.53	4.47	0.00	0.00	102.43	0.00
118	6,346	6,347	55.0	Yes	**6.74**	104.0	3.01	87.05	8.68	4.50	0.00	0.00	100.23	0.00
119	6,950	6,951	64.8	Yes	**5.49**	104.0	3.01	87.84	9.16	4.48	0.00	0.00	101.48	0.00
120	10,026	10,027	49.8	Yes	**0.07**	104.0	3.01	91.02	11.25	4.63	0.00	0.00	106.90	0.00
121	7,163	7,164	66.5	Yes	**5.06**	104.0	3.01	88.10	9.32	4.48	0.00	0.00	101.91	0.00
125	9,808	9,808	58.5	Yes	**0.43**	104.0	3.01	90.83	11.12	4.60	0.00	0.00	106.55	0.00
126	7,316	7,317	67.0	Yes	**4.76**	104.0	3.01	88.29	9.44	4.49	0.00	0.00	102.21	0.00
127	7,305	7,305	67.1	Yes	**4.78**	104.0	3.01	88.27	9.43	4.49	0.00	0.00	102.19	0.00
128	7,160	7,161	67.2	Yes	**5.07**	104.0	3.01	88.10	9.32	4.48	0.00	0.00	101.90	0.00
129	9,185	9,186	43.4	Yes	**1.34**	104.0	3.01	90.26	10.73	4.64	0.00	0.00	105.63	0.00
130	9,690	9,691	44.9	Yes	**0.56**	104.0	3.01	90.73	11.05	4.64	0.00	0.00	106.41	0.00
131	10,004	10,005	42.1	Yes	**0.08**	104.0	3.01	91.00	11.24	4.66	0.00	0.00	106.90	0.00
132	10,154	10,154	39.5	No	**-0.29**	104.0	3.01	91.13	11.33	4.80	0.00	0.00	107.26	0.00
133	6,158	6,159	60.2	Yes	**7.19**	104.0	3.01	86.79	8.52	4.47	0.00	0.00	99.78	0.00
134	9,320	9,320	39.3	Yes	**1.11**	104.0	3.01	90.39	10.81	4.66	0.00	0.00	105.86	0.00
141	7,575	7,576	71.6	Yes	**4.28**	104.0	3.01	88.59	9.63	4.48	0.00	0.00	102.70	0.00
142	7,251	7,252	83.7	Yes	**4.97**	104.0	3.01	88.21	9.39	4.41	0.00	0.00	102.01	0.00
143	8,027	8,028	68.1	Yes	**3.42**	104.0	3.01	89.09	9.95	4.51	0.00	0.00	103.56	0.00
144	7,362	7,363	69.7	Yes	**4.68**	104.0	3.01	88.34	9.47	4.48	0.00	0.00	102.29	0.00
145	6,913	6,914	60.5	Yes	**5.55**	104.0	3.01	87.79	9.13	4.50	0.00	0.00	101.43	0.00
146	6,736	6,736	60.1	Yes	**5.92**	104.0	3.01	87.57	8.99	4.50	0.00	0.00	101.06	0.00
Sum	28.00													

Noise sensitive area: H05 H05

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	7,607	7,608	48.6	Yes	**4.11**	104.0	3.01	88.63	9.65	4.58	0.00	0.00	102.86	0.00
2	7,320	7,321	48.0	Yes	**4.66**	104.0	3.01	88.29	9.44	4.58	0.00	0.00	102.31	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	6,723	6,724	53.8	Yes	**5.91**	104.0	3.01	87.55	8.98	4.53	0.00	0.00	101.06	0.00
4	5,279	5,280	45.5	Yes	**9.26**	104.0	3.01	85.45	7.76	4.51	0.00	0.00	97.71	0.00
5	5,454	5,455	49.3	Yes	**8.83**	104.0	3.01	85.74	7.91	4.49	0.00	0.00	98.14	0.00
6	6,241	6,242	56.6	Yes	**6.98**	104.0	3.01	86.91	8.59	4.49	0.00	0.00	99.99	0.00
7	5,127	5,129	61.2	Yes	**9.76**	104.0	3.01	85.20	7.62	4.39	0.00	0.00	97.21	0.00
8	8,243	8,244	41.4	Yes	**2.92**	104.0	3.01	89.32	10.10	4.63	0.00	0.00	104.05	0.00
9	7,207	7,208	52.5	Yes	**4.91**	104.0	3.01	88.16	9.36	4.55	0.00	0.00	102.06	0.00
10	7,290	7,292	58.5	Yes	**4.77**	104.0	3.01	88.26	9.42	4.53	0.00	0.00	102.20	0.00
11	8,941	8,943	48.3	Yes	**1.76**	104.0	3.01	90.03	10.57	4.62	0.00	0.00	105.22	0.00
12	8,714	8,715	49.9	Yes	**2.14**	104.0	3.01	89.81	10.42	4.61	0.00	0.00	104.83	0.00
13	8,288	8,289	54.5	Yes	**2.89**	104.0	3.01	89.37	10.13	4.58	0.00	0.00	104.08	0.00
14	7,961	7,963	55.0	Yes	**3.48**	104.0	3.01	89.02	9.91	4.56	0.00	0.00	103.49	0.00
15	7,138	7,139	56.4	Yes	**5.06**	104.0	3.01	88.07	9.30	4.53	0.00	0.00	101.91	0.00
16	6,725	6,727	57.0	Yes	**5.92**	104.0	3.01	87.56	8.98	4.51	0.00	0.00	101.05	0.00
17	9,175	9,176	46.0	Yes	**1.37**	104.0	3.01	90.25	10.72	4.63	0.00	0.00	105.60	0.00
18	9,428	9,429	40.2	Yes	**0.95**	104.0	3.01	90.49	10.88	4.65	0.00	0.00	106.03	0.00
19	8,315	8,317	45.5	Yes	**2.81**	104.0	3.01	89.40	10.15	4.61	0.00	0.00	104.17	0.00
20	7,320	7,321	42.1	Yes	**4.64**	104.0	3.01	88.29	9.44	4.60	0.00	0.00	102.34	0.00
21	4,842	4,843	52.9	Yes	**10.50**	104.0	3.01	84.70	7.35	4.43	0.00	0.00	96.48	0.00
22	4,142	4,143	46.7	Yes	**12.57**	104.0	3.01	83.35	6.64	4.41	0.00	0.00	94.40	0.00
23	3,758	3,759	49.0	Yes	**13.89**	104.0	3.01	82.50	6.23	4.35	0.00	0.00	93.09	0.00
24	4,388	4,389	46.2	Yes	**11.79**	104.0	3.01	83.85	6.90	4.44	0.00	0.00	95.18	0.00
25	2,394	2,396	43.9	Yes	**19.64**	104.0	3.01	78.59	4.57	4.17	0.00	0.00	87.33	0.00
26	4,826	4,827	54.8	Yes	**10.56**	104.0	3.01	84.67	7.33	4.41	0.00	0.00	96.42	0.00
27	3,223	3,225	47.2	Yes	**15.88**	104.0	3.01	81.17	5.62	4.30	0.00	0.00	91.09	0.00
28	4,190	4,192	57.1	Yes	**12.50**	104.0	3.01	83.45	6.69	4.34	0.00	0.00	94.48	0.00
29	3,695	3,696	49.0	Yes	**14.11**	104.0	3.01	82.36	6.16	4.35	0.00	0.00	92.86	0.00
30	3,308	3,309	43.8	Yes	**15.51**	104.0	3.01	81.39	5.72	4.35	0.00	0.00	91.46	0.00
31	3,974	3,975	47.3	Yes	**13.13**	104.0	3.01	82.99	6.46	4.39	0.00	0.00	93.84	0.00
32	1,936	1,937	44.0	Yes	**22.29**	104.0	3.01	76.74	3.92	4.02	0.00	0.00	84.68	0.00
33	2,704	2,705	42.4	Yes	**18.09**	104.0	3.01	79.64	4.98	4.26	0.00	0.00	88.88	0.00
34	4,832	4,834	57.1	Yes	**10.55**	104.0	3.01	84.69	7.34	4.40	0.00	0.00	96.42	0.00
35	5,380	5,382	60.1	Yes	**9.09**	104.0	3.01	85.62	7.85	4.42	0.00	0.00	97.89	0.00
36	5,642	5,644	59.1	Yes	**8.41**	104.0	3.01	86.03	8.08	4.44	0.00	0.00	98.56	0.00
37	4,576	4,578	55.6	Yes	**11.29**	104.0	3.01	84.21	7.09	4.39	0.00	0.00	95.69	0.00
38	2,801	2,802	44.5	Yes	**17.66**	104.0	3.01	79.95	5.10	4.26	0.00	0.00	89.31	0.00
39	3,486	3,489	55.1	Yes	**14.93**	104.0	3.01	81.85	5.93	4.26	0.00	0.00	92.04	0.00
40	5,499	5,500	31.8	Yes	**8.61**	104.0	3.01	85.81	7.95	4.60	0.00	0.00	98.37	0.00
41	3,770	3,773	61.0	Yes	**13.95**	104.0	3.01	82.53	6.25	4.25	0.00	0.00	93.03	0.00
43	4,435	4,437	59.6	Yes	**11.74**	104.0	3.01	83.94	6.95	4.34	0.00	0.00	95.23	0.00
44	4,106	4,109	62.4	Yes	**12.81**	104.0	3.01	83.27	6.61	4.28	0.00	0.00	94.16	0.00
45	3,913	3,916	61.7	Yes	**13.45**	104.0	3.01	82.86	6.40	4.26	0.00	0.00	93.52	0.00
46	4,989	4,991	36.8	Yes	**9.97**	104.0	3.01	84.96	7.49	4.55	0.00	0.00	97.00	0.00
48	1,721	1,723	43.0	Yes	**23.70**	104.0	3.01	75.73	3.60	3.94	0.00	0.00	83.27	0.00
49	885	888	38.7	Yes	**31.54**	104.0	3.01	69.97	2.17	3.29	0.00	0.00	75.43	0.00
50	5,635	5,636	57.3	Yes	**8.42**	104.0	3.01	86.02	8.08	4.45	0.00	0.00	98.55	0.00
51	1,332	1,334	39.5	Yes	**26.72**	104.0	3.01	73.50	2.97	3.78	0.00	0.00	80.25	0.00
52	1,631	1,633	40.3	Yes	**24.30**	104.0	3.01	75.26	3.46	3.95	0.00	0.00	82.67	0.00
53	608	613	40.3	Yes	**36.10**	104.0	3.01	66.75	1.61	2.50	0.00	0.00	70.87	0.00
55	1,139	1,142	40.0	Yes	**28.59**	104.0	3.01	72.15	2.64	3.59	0.00	0.00	78.38	0.00
56	1,423	1,426	41.8	Yes	**25.97**	104.0	3.01	74.08	3.13	3.79	0.00	0.00	81.00	0.00
57	1,796	1,797	42.1	Yes	**23.17**	104.0	3.01	76.09	3.71	4.00	0.00	0.00	83.80	0.00
58	2,508	2,509	42.8	Yes	**19.05**	104.0	3.01	78.99	4.72	4.22	0.00	0.00	87.93	0.00
59	1,722	1,724	42.0	Yes	**23.68**	104.0	3.01	75.73	3.60	3.96	0.00	0.00	83.30	0.00
60	3,218	3,220	40.7	Yes	**15.84**	104.0	3.01	81.16	5.61	4.37	0.00	0.00	91.14	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	3,565	3,566	37.3	Yes	**14.47**	104.0	3.01	82.04	6.01	4.44	0.00	0.00	92.50	0.00
62	4,252	4,253	45.6	Yes	**12.21**	104.0	3.01	83.57	6.76	4.43	0.00	0.00	94.76	0.00
63	5,281	5,282	46.5	Yes	**9.26**	104.0	3.01	85.46	7.76	4.50	0.00	0.00	97.71	0.00
64	6,617	6,618	41.9	Yes	**6.08**	104.0	3.01	87.41	8.90	4.58	0.00	0.00	100.90	0.00
65	7,006	7,007	45.2	Yes	**5.28**	104.0	3.01	87.91	9.20	4.58	0.00	0.00	101.69	0.00
66	5,746	5,747	28.4	No	**7.81**	104.0	3.01	86.19	8.17	4.80	0.00	0.00	99.16	0.00
67	6,118	6,119	45.8	Yes	**7.20**	104.0	3.01	86.73	8.49	4.54	0.00	0.00	99.77	0.00
68	6,596	6,597	43.5	Yes	**6.13**	104.0	3.01	87.39	8.88	4.58	0.00	0.00	100.84	0.00
69	7,055	7,055	43.0	Yes	**5.17**	104.0	3.01	87.97	9.24	4.59	0.00	0.00	101.80	0.00
70	8,448	8,448	24.5	No	**2.39**	104.0	3.01	89.54	10.24	4.80	0.00	0.00	104.58	0.00
71	6,985	6,986	57.5	Yes	**5.38**	104.0	3.01	87.88	9.19	4.52	0.00	0.00	101.59	0.00
72	5,670	5,671	46.5	Yes	**8.27**	104.0	3.01	86.07	8.11	4.52	0.00	0.00	98.70	0.00
73	5,909	5,910	54.4	Yes	**7.74**	104.0	3.01	86.43	8.31	4.49	0.00	0.00	99.23	0.00
74	5,369	5,371	59.4	Yes	**9.11**	104.0	3.01	85.60	7.84	4.42	0.00	0.00	97.86	0.00
75	4,142	4,143	48.6	Yes	**12.58**	104.0	3.01	83.35	6.64	4.40	0.00	0.00	94.39	0.00
76	1,808	1,810	45.5	Yes	**23.15**	104.0	3.01	76.15	3.73	3.94	0.00	0.00	83.82	0.00
77	945	948	39.8	Yes	**30.80**	104.0	3.01	70.53	2.28	3.35	0.00	0.00	76.17	0.00
78	7,061	7,062	35.8	Yes	**5.12**	104.0	3.01	87.98	9.24	4.63	0.00	0.00	101.85	0.00
80	2,872	2,873	44.2	Yes	**17.34**	104.0	3.01	80.17	5.19	4.27	0.00	0.00	89.63	0.00
81	8,595	8,597	43.8	Yes	**2.32**	104.0	3.01	89.69	10.34	4.63	0.00	0.00	104.66	0.00
82	2,127	2,128	42.3	Yes	**21.10**	104.0	3.01	77.56	4.20	4.12	0.00	0.00	85.88	0.00
83	5,681	5,682	44.3	Yes	**8.23**	104.0	3.01	86.09	8.12	4.53	0.00	0.00	98.74	0.00
85	872	876	41.5	Yes	**31.82**	104.0	3.01	69.85	2.15	3.16	0.00	0.00	75.15	0.00
86	2,603	2,604	44.8	Yes	**18.60**	104.0	3.01	79.31	4.85	4.21	0.00	0.00	88.37	0.00
87	7,157	7,158	43.6	Yes	**4.97**	104.0	3.01	88.10	9.32	4.59	0.00	0.00	102.01	0.00
89	6,143	6,144	43.6	Yes	**7.13**	104.0	3.01	86.77	8.51	4.56	0.00	0.00	99.84	0.00
90	2,736	2,738	48.6	Yes	**18.01**	104.0	3.01	79.75	5.02	4.19	0.00	0.00	88.96	0.00
91	4,667	4,669	45.6	Yes	**10.95**	104.0	3.01	84.38	7.18	4.47	0.00	0.00	96.03	0.00
92	7,343	7,344	40.1	Yes	**4.58**	104.0	3.01	88.32	9.46	4.61	0.00	0.00	102.39	0.00
94	7,570	7,572	56.7	Yes	**4.22**	104.0	3.01	88.58	9.63	4.54	0.00	0.00	102.75	0.00
95	8,519	8,520	49.4	Yes	**2.47**	104.0	3.01	89.61	10.29	4.60	0.00	0.00	104.50	0.00
97	6,497	6,499	58.6	Yes	**6.42**	104.0	3.01	87.26	8.80	4.49	0.00	0.00	100.55	0.00
98	7,917	7,918	54.8	Yes	**3.56**	104.0	3.01	88.97	9.88	4.56	0.00	0.00	103.41	0.00
99	6,765	6,765	50.0	Yes	**5.80**	104.0	3.01	87.61	9.01	4.55	0.00	0.00	101.17	0.00
100	3,503	3,506	57.5	Yes	**14.89**	104.0	3.01	81.90	5.95	4.24	0.00	0.00	92.08	0.00
101	9,003	9,004	40.1	Yes	**1.62**	104.0	3.01	90.09	10.61	4.65	0.00	0.00	105.35	0.00
102	4,168	4,171	64.5	Yes	**12.62**	104.0	3.01	83.41	6.67	4.27	0.00	0.00	94.35	0.00
103	9,713	9,714	38.4	Yes	**0.50**	104.0	3.01	90.75	11.06	4.67	0.00	0.00	106.47	0.00
104	3,937	3,939	58.7	Yes	**13.35**	104.0	3.01	82.91	6.43	4.29	0.00	0.00	93.62	0.00
107	7,744	7,745	44.2	Yes	**3.83**	104.0	3.01	88.78	9.75	4.61	0.00	0.00	103.14	0.00
108	6,893	6,894	44.9	Yes	**5.51**	104.0	3.01	87.77	9.12	4.58	0.00	0.00	101.46	0.00
109	2,037	2,039	42.2	Yes	**21.62**	104.0	3.01	77.19	4.07	4.09	0.00	0.00	85.35	0.00
110	1,716	1,718	43.6	Yes	**23.75**	104.0	3.01	75.70	3.59	3.93	0.00	0.00	83.22	0.00
111	1,698	1,700	45.7	Yes	**23.92**	104.0	3.01	75.61	3.56	3.88	0.00	0.00	83.05	0.00
113	8,024	8,026	43.6	Yes	**3.32**	104.0	3.01	89.09	9.95	4.61	0.00	0.00	103.66	0.00
114	627	632	41.6	Yes	**35.80**	104.0	3.01	67.01	1.65	2.50	0.00	0.00	71.17	0.00
115	7,985	7,986	42.5	Yes	**3.38**	104.0	3.01	89.05	9.92	4.62	0.00	0.00	103.59	0.00
116	5,057	5,060	57.0	Yes	**9.92**	104.0	3.01	85.08	7.55	4.42	0.00	0.00	97.05	0.00
118	2,501	2,503	41.7	Yes	**19.06**	104.0	3.01	78.97	4.71	4.23	0.00	0.00	87.91	0.00
119	6,127	6,128	58.2	Yes	**7.25**	104.0	3.01	86.75	8.50	4.48	0.00	0.00	99.72	0.00
120	9,427	9,428	34.4	Yes	**0.93**	104.0	3.01	90.49	10.88	4.68	0.00	0.00	106.05	0.00
121	5,954	5,956	58.4	Yes	**7.65**	104.0	3.01	86.50	8.35	4.47	0.00	0.00	99.32	0.00
125	5,497	5,498	44.4	Yes	**8.69**	104.0	3.01	85.80	7.95	4.52	0.00	0.00	98.28	0.00
126	3,263	3,265	51.7	Yes	**15.77**	104.0	3.01	81.28	5.67	4.26	0.00	0.00	91.20	0.00
127	3,178	3,180	51.9	Yes	**16.12**	104.0	3.01	81.05	5.56	4.24	0.00	0.00	90.86	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	2,970	2,972	52.5	Yes	**17.00**	104.0	3.01	80.46	5.31	4.20	0.00	0.00	89.97	0.00
129	7,027	7,028	31.7	No	**5.02**	104.0	3.01	87.94	9.22	4.80	0.00	0.00	101.95	0.00
130	7,309	7,310	31.9	No	**4.46**	104.0	3.01	88.28	9.43	4.80	0.00	0.00	102.51	0.00
131	7,728	7,729	29.9	No	**3.67**	104.0	3.01	88.76	9.74	4.80	0.00	0.00	103.30	0.00
132	8,023	8,023	29.6	No	**3.14**	104.0	3.01	89.09	9.95	4.80	0.00	0.00	103.84	0.00
133	2,976	2,978	48.9	Yes	**16.94**	104.0	3.01	80.48	5.32	4.24	0.00	0.00	90.04	0.00
134	8,249	8,250	26.5	No	**2.74**	104.0	3.01	89.33	10.11	4.80	0.00	0.00	104.24	0.00
141	6,284	6,286	61.1	Yes	**6.91**	104.0	3.01	86.97	8.63	4.47	0.00	0.00	100.06	0.00
142	4,357	4,360	65.3	Yes	**12.03**	104.0	3.01	83.79	6.87	4.29	0.00	0.00	94.95	0.00
143	6,858	6,860	56.6	Yes	**5.64**	104.0	3.01	87.73	9.09	4.52	0.00	0.00	101.33	0.00
144	3,822	3,824	52.9	Yes	**13.69**	104.0	3.01	82.65	6.30	4.33	0.00	0.00	93.28	0.00
145	2,555	2,556	50.6	Yes	**18.91**	104.0	3.01	79.15	4.78	4.12	0.00	0.00	88.06	0.00
146	2,390	2,392	50.4	Yes	**19.76**	104.0	3.01	78.57	4.56	4.08	0.00	0.00	87.22	0.00

Sum 42.42

Noise sensitive area: H06 H06

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	6,572	6,573	45.6	Yes	**6.19**	104.0	3.01	87.36	8.86	4.56	0.00	0.00	100.78	0.00
2	6,260	6,261	46.8	Yes	**6.89**	104.0	3.01	86.93	8.61	4.55	0.00	0.00	100.09	0.00
3	5,664	5,665	52.6	Yes	**8.32**	104.0	3.01	86.06	8.10	4.48	0.00	0.00	98.65	0.00
4	4,174	4,175	43.7	Yes	**12.44**	104.0	3.01	83.41	6.68	4.44	0.00	0.00	94.53	0.00
5	4,408	4,409	47.5	Yes	**11.74**	104.0	3.01	83.89	6.92	4.43	0.00	0.00	95.24	0.00
6	5,207	5,209	54.0	Yes	**9.50**	104.0	3.01	85.34	7.69	4.45	0.00	0.00	97.47	0.00
7	4,341	4,344	60.8	Yes	**12.04**	104.0	3.01	83.76	6.85	4.32	0.00	0.00	94.93	0.00
8	7,198	7,199	39.5	Yes	**4.87**	104.0	3.01	88.15	9.35	4.61	0.00	0.00	102.11	0.00
9	6,198	6,200	50.0	Yes	**7.04**	104.0	3.01	86.85	8.56	4.53	0.00	0.00	99.93	0.00
10	6,334	6,336	56.2	Yes	**6.77**	104.0	3.01	87.04	8.67	4.50	0.00	0.00	100.20	0.00
11	7,991	7,993	46.0	Yes	**3.39**	104.0	3.01	89.05	9.93	4.60	0.00	0.00	103.59	0.00
12	7,760	7,762	47.6	Yes	**3.82**	104.0	3.01	88.80	9.76	4.59	0.00	0.00	103.15	0.00
13	7,355	7,357	52.6	Yes	**4.62**	104.0	3.01	88.33	9.47	4.56	0.00	0.00	102.36	0.00
14	7,054	7,056	53.1	Yes	**5.22**	104.0	3.01	87.97	9.24	4.54	0.00	0.00	101.75	0.00
15	6,249	6,251	54.0	Yes	**6.95**	104.0	3.01	86.92	8.60	4.51	0.00	0.00	100.02	0.00
16	5,830	5,832	54.6	Yes	**7.93**	104.0	3.01	86.32	8.25	4.48	0.00	0.00	99.04	0.00
17	8,222	8,223	43.8	Yes	**2.96**	104.0	3.01	89.30	10.09	4.62	0.00	0.00	104.01	0.00
18	8,491	8,492	38.6	Yes	**2.47**	104.0	3.01	89.58	10.27	4.64	0.00	0.00	104.50	0.00
19	7,420	7,422	43.0	Yes	**4.44**	104.0	3.01	88.41	9.52	4.60	0.00	0.00	102.53	0.00
20	6,484	6,485	40.0	Yes	**6.35**	104.0	3.01	87.24	8.79	4.59	0.00	0.00	100.62	0.00
21	3,789	3,791	51.6	Yes	**13.80**	104.0	3.01	82.57	6.26	4.34	0.00	0.00	93.17	0.00
22	3,049	3,051	45.4	Yes	**16.58**	104.0	3.01	80.69	5.41	4.29	0.00	0.00	90.39	0.00
23	2,670	2,672	48.3	Yes	**18.32**	104.0	3.01	79.54	4.93	4.18	0.00	0.00	88.65	0.00
24	3,291	3,293	44.7	Yes	**15.59**	104.0	3.01	81.35	5.70	4.34	0.00	0.00	91.39	0.00
25	1,876	1,878	45.3	Yes	**22.69**	104.0	3.01	76.47	3.83	3.97	0.00	0.00	84.28	0.00
26	3,896	3,898	53.5	Yes	**13.44**	104.0	3.01	82.82	6.38	4.33	0.00	0.00	93.53	0.00
27	2,636	2,637	48.6	Yes	**18.49**	104.0	3.01	79.42	4.89	4.17	0.00	0.00	88.48	0.00
28	3,612	3,615	56.5	Yes	**14.48**	104.0	3.01	82.16	6.07	4.27	0.00	0.00	92.50	0.00
29	2,694	2,696	48.3	Yes	**18.21**	104.0	3.01	79.61	4.96	4.19	0.00	0.00	88.76	0.00
30	2,236	2,238	44.2	Yes	**20.50**	104.0	3.01	78.00	4.35	4.12	0.00	0.00	86.47	0.00
31	2,837	2,838	46.4	Yes	**17.53**	104.0	3.01	80.06	5.15	4.24	0.00	0.00	89.45	0.00
32	1,390	1,393	46.0	Yes	**26.36**	104.0	3.01	73.88	3.07	3.66	0.00	0.00	80.61	0.00
33	1,669	1,671	42.8	Yes	**24.07**	104.0	3.01	75.46	3.52	3.92	0.00	0.00	82.90	0.00
34	4,082	4,084	57.6	Yes	**12.85**	104.0	3.01	83.22	6.58	4.32	0.00	0.00	94.12	0.00
35	4,563	4,565	58.4	Yes	**11.35**	104.0	3.01	84.19	7.07	4.36	0.00	0.00	95.63	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	4,796	4,799	57.6	Yes	**10.66**	104.0	3.01	84.62	7.30	4.39	0.00	0.00	96.32	0.00
37	3,871	3,873	55.9	Yes	**13.55**	104.0	3.01	82.76	6.35	4.31	0.00	0.00	93.42	0.00
38	2,278	2,280	45.4	Yes	**20.29**	104.0	3.01	78.16	4.41	4.12	0.00	0.00	86.68	0.00
39	3,123	3,125	54.7	Yes	**16.37**	104.0	3.01	80.90	5.50	4.20	0.00	0.00	90.60	0.00
40	5,150	5,151	30.5	No	**9.30**	104.0	3.01	85.24	7.64	4.80	0.00	0.00	97.67	0.00
41	3,454	3,457	60.4	Yes	**15.11**	104.0	3.01	81.77	5.89	4.20	0.00	0.00	91.87	0.00
43	3,854	3,857	58.7	Yes	**13.63**	104.0	3.01	82.72	6.34	4.28	0.00	0.00	93.34	0.00
44	3,871	3,874	62.0	Yes	**13.60**	104.0	3.01	82.76	6.36	4.25	0.00	0.00	93.37	0.00
45	3,753	3,756	61.7	Yes	**14.01**	104.0	3.01	82.49	6.23	4.24	0.00	0.00	92.96	0.00
46	4,590	4,591	37.3	Yes	**11.11**	104.0	3.01	84.24	7.10	4.52	0.00	0.00	95.86	0.00
48	1,690	1,692	45.5	Yes	**23.98**	104.0	3.01	75.57	3.55	3.88	0.00	0.00	82.99	0.00
49	650	654	40.8	Yes	**35.33**	104.0	3.01	67.32	1.70	2.62	0.00	0.00	71.64	0.00
50	4,692	4,694	55.3	Yes	**10.94**	104.0	3.01	84.43	7.20	4.40	0.00	0.00	96.03	0.00
51	582	587	41.4	Yes	**36.71**	104.0	3.01	66.38	1.56	2.33	0.00	0.00	70.26	0.00
52	713	717	41.8	Yes	**34.25**	104.0	3.01	68.11	1.83	2.77	0.00	0.00	72.72	0.00
53	873	877	42.6	Yes	**31.84**	104.0	3.01	69.86	2.15	3.12	0.00	0.00	75.13	0.00
55	2,253	2,254	39.3	Yes	**20.33**	104.0	3.01	78.06	4.37	4.20	0.00	0.00	86.64	0.00
56	2,549	2,551	41.5	Yes	**18.82**	104.0	3.01	79.13	4.77	4.24	0.00	0.00	88.15	0.00
57	2,799	2,800	40.7	Yes	**17.63**	104.0	3.01	79.94	5.10	4.30	0.00	0.00	89.34	0.00
58	1,685	1,687	43.7	Yes	**23.98**	104.0	3.01	75.54	3.54	3.91	0.00	0.00	82.99	0.00
59	2,854	2,855	42.3	Yes	**17.40**	104.0	3.01	80.11	5.17	4.29	0.00	0.00	89.57	0.00
60	4,349	4,350	42.1	Yes	**11.88**	104.0	3.01	83.77	6.86	4.47	0.00	0.00	95.10	0.00
61	4,698	4,699	38.4	Yes	**10.81**	104.0	3.01	84.44	7.21	4.52	0.00	0.00	96.17	0.00
62	5,221	5,222	45.5	Yes	**9.41**	104.0	3.01	85.36	7.70	4.50	0.00	0.00	97.56	0.00
63	6,182	6,183	45.8	Yes	**7.06**	104.0	3.01	86.82	8.54	4.55	0.00	0.00	99.92	0.00
64	7,557	7,557	41.8	Yes	**4.18**	104.0	3.01	88.57	9.62	4.61	0.00	0.00	102.79	0.00
65	7,987	7,988	44.0	Yes	**3.39**	104.0	3.01	89.05	9.92	4.61	0.00	0.00	103.58	0.00
66	5,353	5,354	28.2	No	**8.78**	104.0	3.01	85.57	7.82	4.80	0.00	0.00	98.20	0.00
67	7,125	7,126	44.6	Yes	**5.04**	104.0	3.01	88.06	9.29	4.59	0.00	0.00	101.94	0.00
68	7,621	7,622	41.8	Yes	**4.06**	104.0	3.01	88.64	9.66	4.61	0.00	0.00	102.92	0.00
69	8,016	8,017	42.1	Yes	**3.33**	104.0	3.01	89.08	9.94	4.62	0.00	0.00	103.65	0.00
70	7,630	7,631	21.6	No	**3.85**	104.0	3.01	88.65	9.67	4.80	0.00	0.00	103.12	0.00
71	6,032	6,034	55.3	Yes	**7.45**	104.0	3.01	86.61	8.42	4.49	0.00	0.00	99.52	0.00
72	4,564	4,565	44.5	Yes	**11.24**	104.0	3.01	84.19	7.07	4.47	0.00	0.00	95.73	0.00
73	4,883	4,885	52.2	Yes	**10.38**	104.0	3.01	84.78	7.39	4.43	0.00	0.00	96.60	0.00
74	4,453	4,455	57.8	Yes	**11.67**	104.0	3.01	83.98	6.96	4.36	0.00	0.00	95.30	0.00
75	3,218	3,220	47.8	Yes	**15.91**	104.0	3.01	81.16	5.61	4.29	0.00	0.00	91.06	0.00
76	2,541	2,543	44.2	Yes	**18.90**	104.0	3.01	79.11	4.76	4.20	0.00	0.00	88.08	0.00
77	1,527	1,529	39.2	Yes	**25.07**	104.0	3.01	74.69	3.29	3.92	0.00	0.00	81.90	0.00
78	6,264	6,265	33.8	Yes	**6.81**	104.0	3.01	86.94	8.61	4.62	0.00	0.00	100.17	0.00
80	3,993	3,995	45.8	Yes	**13.05**	104.0	3.01	83.03	6.49	4.41	0.00	0.00	93.92	0.00
81	7,699	7,700	41.3	Yes	**3.91**	104.0	3.01	88.73	9.72	4.62	0.00	0.00	103.07	0.00
82	1,155	1,158	43.1	Yes	**28.52**	104.0	3.01	72.27	2.67	3.51	0.00	0.00	78.46	0.00
83	6,635	6,636	44.2	Yes	**6.05**	104.0	3.01	87.44	8.91	4.57	0.00	0.00	100.92	0.00
85	489	495	40.7	Yes	**38.82**	104.0	3.01	64.89	1.36	1.90	0.00	0.00	68.15	0.00
86	3,718	3,719	45.5	Yes	**14.00**	104.0	3.01	82.41	6.19	4.38	0.00	0.00	92.98	0.00
87	8,151	8,152	42.7	Yes	**3.09**	104.0	3.01	89.22	10.04	4.62	0.00	0.00	103.89	0.00
89	7,071	7,072	43.9	Yes	**5.14**	104.0	3.01	87.99	9.25	4.59	0.00	0.00	101.83	0.00
90	3,669	3,671	48.1	Yes	**14.19**	104.0	3.01	82.29	6.13	4.35	0.00	0.00	92.78	0.00
91	5,603	5,604	45.4	Yes	**8.43**	104.0	3.01	85.97	8.05	4.52	0.00	0.00	98.54	0.00
92	8,236	8,237	39.3	Yes	**2.92**	104.0	3.01	89.31	10.10	4.64	0.00	0.00	104.05	0.00
94	6,638	6,640	54.8	Yes	**6.09**	104.0	3.01	87.44	8.92	4.52	0.00	0.00	100.88	0.00
95	7,526	7,528	47.4	Yes	**4.26**	104.0	3.01	88.53	9.59	4.59	0.00	0.00	102.71	0.00
97	5,673	5,675	56.9	Yes	**8.33**	104.0	3.01	86.08	8.11	4.46	0.00	0.00	98.65	0.00
98	6,959	6,961	52.3	Yes	**5.41**	104.0	3.01	87.85	9.17	4.54	0.00	0.00	101.56	0.00

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Project:
20102130 - Merricourt ND Enxco

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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	5,671	5,672	47.7	Yes	**8.28**	104.0	3.01	86.08	8.11	4.51	0.00	0.00	98.70	0.00
100	3,375	3,377	58.3	Yes	**15.39**	104.0	3.01	81.57	5.80	4.21	0.00	0.00	91.58	0.00
101	8,095	8,097	38.1	Yes	**3.17**	104.0	3.01	89.17	10.00	4.64	0.00	0.00	103.81	0.00
102	3,841	3,844	63.9	Yes	**13.72**	104.0	3.01	82.70	6.32	4.23	0.00	0.00	93.25	0.00
103	8,770	8,771	36.3	Yes	**1.99**	104.0	3.01	89.86	10.46	4.66	0.00	0.00	104.98	0.00
104	3,479	3,481	58.4	Yes	**14.99**	104.0	3.01	81.83	5.92	4.23	0.00	0.00	91.98	0.00
107	6,892	6,894	42.5	Yes	**5.50**	104.0	3.01	87.77	9.11	4.59	0.00	0.00	101.47	0.00
108	5,767	5,768	43.2	Yes	**8.02**	104.0	3.01	86.22	8.19	4.54	0.00	0.00	98.96	0.00
109	3,171	3,172	42.8	Yes	**16.05**	104.0	3.01	81.03	5.56	4.34	0.00	0.00	90.92	0.00
110	1,946	1,947	45.3	Yes	**22.24**	104.0	3.01	76.79	3.94	4.00	0.00	0.00	84.73	0.00
111	2,270	2,271	45.5	Yes	**20.34**	104.0	3.01	78.13	4.40	4.11	0.00	0.00	86.64	0.00
113	7,154	7,155	41.2	Yes	**4.96**	104.0	3.01	88.09	9.32	4.60	0.00	0.00	102.01	0.00
114	746	750	40.7	Yes	**33.66**	104.0	3.01	68.50	1.90	2.91	0.00	0.00	73.31	0.00
115	6,940	6,941	40.5	Yes	**5.39**	104.0	3.01	87.83	9.15	4.60	0.00	0.00	101.58	0.00
116	4,488	4,490	55.2	Yes	**11.55**	104.0	3.01	84.05	7.00	4.38	0.00	0.00	95.43	0.00
118	3,639	3,640	42.6	Yes	**14.25**	104.0	3.01	82.22	6.10	4.40	0.00	0.00	92.72	0.00
119	5,187	5,189	56.1	Yes	**9.57**	104.0	3.01	85.30	7.67	4.43	0.00	0.00	97.40	0.00
120	8,519	8,520	32.5	Yes	**2.40**	104.0	3.01	89.61	10.29	4.67	0.00	0.00	104.57	0.00
121	5,086	5,088	56.4	Yes	**9.84**	104.0	3.01	85.13	7.58	4.42	0.00	0.00	97.13	0.00
125	6,428	6,428	44.5	Yes	**6.50**	104.0	3.01	87.16	8.75	4.56	0.00	0.00	100.47	0.00
126	3,588	3,590	52.6	Yes	**14.53**	104.0	3.01	82.10	6.04	4.30	0.00	0.00	92.44	0.00
127	3,579	3,581	52.6	Yes	**14.56**	104.0	3.01	82.08	6.03	4.30	0.00	0.00	92.41	0.00
128	3,445	3,447	54.1	Yes	**15.08**	104.0	3.01	81.75	5.88	4.26	0.00	0.00	91.89	0.00
129	6,446	6,447	29.8	Yes	**6.38**	104.0	3.01	87.19	8.76	4.64	0.00	0.00	100.59	0.00
130	6,808	6,809	30.4	No	**5.46**	104.0	3.01	87.66	9.05	4.80	0.00	0.00	101.51	0.00
131	7,200	7,201	28.8	No	**4.67**	104.0	3.01	88.15	9.35	4.80	0.00	0.00	102.30	0.00
132	7,455	7,455	28.4	No	**4.18**	104.0	3.01	88.45	9.54	4.80	0.00	0.00	102.79	0.00
133	2,659	2,661	49.5	Yes	**18.39**	104.0	3.01	79.50	4.92	4.16	0.00	0.00	88.58	0.00
134	7,412	7,413	24.3	Yes	**4.37**	104.0	3.01	88.40	9.51	4.69	0.00	0.00	102.60	0.00
141	5,445	5,448	59.3	Yes	**8.91**	104.0	3.01	85.72	7.91	4.43	0.00	0.00	98.06	0.00
142	3,966	3,969	65.6	Yes	**13.30**	104.0	3.01	82.97	6.46	4.24	0.00	0.00	93.67	0.00
143	6,009	6,012	54.8	Yes	**7.50**	104.0	3.01	86.58	8.40	4.49	0.00	0.00	99.47	0.00
144	3,760	3,762	54.8	Yes	**13.93**	104.0	3.01	82.51	6.23	4.30	0.00	0.00	93.04	0.00
145	3,391	3,393	49.0	Yes	**15.24**	104.0	3.01	81.61	5.82	4.31	0.00	0.00	91.73	0.00
146	3,155	3,157	46.8	Yes	**16.16**	104.0	3.01	80.99	5.54	4.29	0.00	0.00	90.82	0.00

Sum 44.33

Noise sensitive area: H07 H07

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	3,432	3,434	44.7	Yes	**15.04**	104.0	3.01	81.72	5.86	4.36	0.00	0.00	91.93	0.00
2	2,996	2,998	45.7	Yes	**16.81**	104.0	3.01	80.54	5.34	4.28	0.00	0.00	90.16	0.00
3	2,471	2,473	49.6	Yes	**19.32**	104.0	3.01	78.87	4.67	4.11	0.00	0.00	87.65	0.00
4	896	900	42.8	Yes	**31.54**	104.0	3.01	70.08	2.19	3.15	0.00	0.00	75.43	0.00
5	1,666	1,669	47.0	Yes	**24.18**	104.0	3.01	75.45	3.51	3.83	0.00	0.00	82.80	0.00
6	2,293	2,296	51.9	Yes	**20.29**	104.0	3.01	78.22	4.43	4.03	0.00	0.00	86.68	0.00
7	3,262	3,265	53.5	Yes	**15.79**	104.0	3.01	81.28	5.67	4.24	0.00	0.00	91.18	0.00
8	3,945	3,947	40.5	Yes	**13.16**	104.0	3.01	82.92	6.43	4.45	0.00	0.00	93.81	0.00
9	3,267	3,269	46.4	Yes	**15.70**	104.0	3.01	81.29	5.67	4.31	0.00	0.00	91.28	0.00
10	3,687	3,689	51.4	Yes	**14.16**	104.0	3.01	82.34	6.15	4.32	0.00	0.00	92.82	0.00
11	5,180	5,182	47.2	Yes	**9.53**	104.0	3.01	85.29	7.67	4.49	0.00	0.00	97.45	0.00
12	4,955	4,957	47.9	Yes	**10.14**	104.0	3.01	84.90	7.45	4.47	0.00	0.00	96.83	0.00
13	4,693	4,696	49.2	Yes	**10.89**	104.0	3.01	84.43	7.20	4.44	0.00	0.00	96.08	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	4,563	4,566	48.2	Yes	**11.27**	104.0	3.01	84.19	7.07	4.44	0.00	0.00	95.70	0.00
15	3,988	3,991	50.7	Yes	**13.10**	104.0	3.01	83.02	6.48	4.37	0.00	0.00	93.87	0.00
16	3,627	3,630	50.8	Yes	**14.37**	104.0	3.01	82.20	6.09	4.32	0.00	0.00	92.61	0.00
17	5,378	5,380	46.6	Yes	**9.00**	104.0	3.01	85.62	7.85	4.50	0.00	0.00	97.97	0.00
18	5,703	5,705	40.1	Yes	**8.15**	104.0	3.01	86.13	8.14	4.56	0.00	0.00	98.82	0.00
19	4,941	4,943	38.2	Yes	**10.11**	104.0	3.01	84.88	7.44	4.54	0.00	0.00	96.86	0.00
20	4,445	4,447	37.1	Yes	**11.54**	104.0	3.01	83.96	6.95	4.51	0.00	0.00	95.43	0.00
21	1,367	1,371	49.4	Yes	**26.64**	104.0	3.01	73.74	3.03	3.56	0.00	0.00	80.33	0.00
22	1,075	1,078	41.8	Yes	**29.33**	104.0	3.01	71.66	2.53	3.46	0.00	0.00	77.64	0.00
23	1,355	1,358	42.2	Yes	**26.57**	104.0	3.01	73.66	3.01	3.73	0.00	0.00	80.40	0.00
24	923	927	42.1	Yes	**31.16**	104.0	3.01	70.34	2.25	3.22	0.00	0.00	75.81	0.00
25	3,635	3,636	44.3	Yes	**14.28**	104.0	3.01	82.21	6.09	4.38	0.00	0.00	92.69	0.00
26	2,313	2,316	49.1	Yes	**20.15**	104.0	3.01	78.29	4.46	4.07	0.00	0.00	86.83	0.00
27	3,503	3,504	44.0	Yes	**14.77**	104.0	3.01	81.89	5.94	4.37	0.00	0.00	92.21	0.00
28	3,796	3,798	51.9	Yes	**13.78**	104.0	3.01	82.59	6.27	4.33	0.00	0.00	93.20	0.00
29	1,889	1,891	41.3	Yes	**22.54**	104.0	3.01	76.53	3.85	4.05	0.00	0.00	84.43	0.00
30	1,772	1,773	36.6	Yes	**23.23**	104.0	3.01	75.98	3.68	4.09	0.00	0.00	83.74	0.00
31	873	877	41.4	Yes	**31.80**	104.0	3.01	69.86	2.15	3.16	0.00	0.00	75.17	0.00
32	3,633	3,633	45.0	Yes	**14.30**	104.0	3.01	82.21	6.09	4.38	0.00	0.00	92.67	0.00
33	2,354	2,355	39.0	Yes	**19.79**	104.0	3.01	78.44	4.51	4.23	0.00	0.00	87.18	0.00
34	3,307	3,309	52.1	Yes	**15.60**	104.0	3.01	81.39	5.72	4.26	0.00	0.00	91.37	0.00
35	3,219	3,222	51.9	Yes	**15.95**	104.0	3.01	81.16	5.61	4.25	0.00	0.00	91.03	0.00
36	3,200	3,203	51.9	Yes	**16.02**	104.0	3.01	81.11	5.59	4.25	0.00	0.00	90.95	0.00
37	3,414	3,417	52.4	Yes	**15.18**	104.0	3.01	81.67	5.84	4.28	0.00	0.00	91.79	0.00
38	3,636	3,636	42.8	Yes	**14.27**	104.0	3.01	82.21	6.09	4.40	0.00	0.00	92.70	0.00
39	4,252	4,254	51.6	Yes	**12.25**	104.0	3.01	83.58	6.76	4.39	0.00	0.00	94.72	0.00
40	5,423	5,423	28.4	Yes	**8.78**	104.0	3.01	85.69	7.89	4.62	0.00	0.00	98.19	0.00
41	4,520	4,521	56.8	Yes	**11.47**	104.0	3.01	84.11	7.03	4.37	0.00	0.00	95.51	0.00
43	3,883	3,885	54.7	Yes	**13.50**	104.0	3.01	82.79	6.37	4.32	0.00	0.00	93.47	0.00
44	4,956	4,959	58.0	Yes	**10.21**	104.0	3.01	84.91	7.46	4.40	0.00	0.00	96.76	0.00
45	5,083	5,085	56.9	Yes	**9.85**	104.0	3.01	85.13	7.58	4.42	0.00	0.00	97.12	0.00
46	4,894	4,895	33.7	Yes	**10.22**	104.0	3.01	84.79	7.39	4.57	0.00	0.00	96.75	0.00
48	4,417	4,418	45.5	Yes	**11.69**	104.0	3.01	83.90	6.93	4.45	0.00	0.00	95.28	0.00
49	4,113	4,113	43.7	Yes	**12.64**	104.0	3.01	83.28	6.61	4.44	0.00	0.00	94.33	0.00
50	2,584	2,587	51.9	Yes	**18.78**	104.0	3.01	79.26	4.82	4.11	0.00	0.00	88.19	0.00
51	3,647	3,648	41.5	Yes	**14.21**	104.0	3.01	82.24	6.11	4.41	0.00	0.00	92.76	0.00
52	3,336	3,336	40.8	Yes	**15.37**	104.0	3.01	81.47	5.75	4.38	0.00	0.00	91.60	0.00
53	4,442	4,443	46.5	Yes	**11.63**	104.0	3.01	83.95	6.95	4.44	0.00	0.00	95.35	0.00
55	5,925	5,925	44.1	Yes	**7.65**	104.0	3.01	86.45	8.33	4.55	0.00	0.00	99.33	0.00
56	6,230	6,230	46.6	Yes	**6.95**	104.0	3.01	86.89	8.58	4.54	0.00	0.00	100.02	0.00
57	6,336	6,336	45.9	Yes	**6.71**	104.0	3.01	87.04	8.67	4.55	0.00	0.00	100.26	0.00
58	2,962	2,963	40.9	Yes	**16.91**	104.0	3.01	80.43	5.30	4.33	0.00	0.00	90.06	0.00
59	6,540	6,540	48.1	Yes	**6.28**	104.0	3.01	87.31	8.84	4.55	0.00	0.00	100.70	0.00
60	8,023	8,023	50.4	Yes	**3.35**	104.0	3.01	89.09	9.95	4.59	0.00	0.00	103.62	0.00
61	8,377	8,377	46.6	No	**2.52**	104.0	3.01	89.46	10.19	4.80	0.00	0.00	104.46	0.00
62	8,577	8,577	48.8	Yes	**2.37**	104.0	3.01	89.67	10.33	4.61	0.00	0.00	104.60	0.00
63	9,361	9,362	48.5	Yes	**1.08**	104.0	3.01	90.43	10.84	4.62	0.00	0.00	105.89	0.00
64	10,766	10,767	45.2	Yes	**-1.01**	104.0	3.01	91.64	11.68	4.66	0.00	0.00	107.98	0.00
65	11,278	11,278	46.3	No	**-1.84**	104.0	3.01	92.04	11.97	4.80	0.00	0.00	108.81	0.00
66	5,420	5,421	24.6	Yes	**8.76**	104.0	3.01	85.68	7.88	4.65	0.00	0.00	98.21	0.00
67	10,496	10,496	47.9	No	**-0.78**	104.0	3.01	91.42	11.53	4.80	0.00	0.00	107.75	0.00
68	11,022	11,022	44.9	No	**-1.50**	104.0	3.01	91.85	11.83	4.80	0.00	0.00	108.47	0.00
69	11,263	11,263	45.0	No	**-1.82**	104.0	3.01	92.03	11.96	4.80	0.00	0.00	108.79	0.00
70	5,493	5,494	18.4	No	**8.43**	104.0	3.01	85.80	7.95	4.80	0.00	0.00	98.55	0.00
71	3,461	3,464	51.3	Yes	**14.99**	104.0	3.01	81.79	5.90	4.29	0.00	0.00	91.98	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	1,163	1,166	42.6	Yes	**28.42**	104.0	3.01	72.33	2.68	3.54	0.00	0.00	78.55	0.00
73	2,117	2,120	50.6	Yes	**21.28**	104.0	3.01	77.53	4.19	3.98	0.00	0.00	85.69	0.00
74	2,622	2,625	53.5	Yes	**18.61**	104.0	3.01	79.38	4.87	4.10	0.00	0.00	88.36	0.00
75	2,234	2,236	43.5	Yes	**20.50**	104.0	3.01	77.99	4.35	4.13	0.00	0.00	86.47	0.00
76	5,816	5,816	49.0	Yes	**7.93**	104.0	3.01	86.29	8.23	4.51	0.00	0.00	99.04	0.00
77	4,941	4,941	43.7	Yes	**10.16**	104.0	3.01	84.88	7.44	4.50	0.00	0.00	96.81	0.00
78	4,461	4,463	29.6	Yes	**11.44**	104.0	3.01	83.99	6.97	4.57	0.00	0.00	95.54	0.00
80	7,652	7,653	53.0	Yes	**4.05**	104.0	3.01	88.68	9.68	4.56	0.00	0.00	102.93	0.00
81	5,179	5,181	36.9	Yes	**9.46**	104.0	3.01	85.29	7.66	4.56	0.00	0.00	97.51	0.00
82	2,911	2,912	40.6	Yes	**17.13**	104.0	3.01	80.28	5.24	4.32	0.00	0.00	89.84	0.00
83	9,907	9,907	47.2	Yes	**0.24**	104.0	3.01	90.92	11.18	4.64	0.00	0.00	106.73	0.00
85	4,089	4,090	43.8	Yes	**12.72**	104.0	3.01	83.23	6.59	4.43	0.00	0.00	94.25	0.00
86	7,368	7,369	51.5	Yes	**4.59**	104.0	3.01	88.35	9.48	4.56	0.00	0.00	102.39	0.00
87	11,470	11,470	45.4	No	**-2.09**	104.0	3.01	92.19	12.07	4.80	0.00	0.00	109.07	0.00
89	10,270	10,271	46.6	Yes	**-0.30**	104.0	3.01	91.23	11.39	4.65	0.00	0.00	107.27	0.00
90	7,053	7,054	51.2	Yes	**5.21**	104.0	3.01	87.97	9.24	4.55	0.00	0.00	101.76	0.00
91	8,876	8,877	47.9	Yes	**1.86**	104.0	3.01	89.97	10.53	4.62	0.00	0.00	105.11	0.00
92	11,316	11,317	42.8	Yes	**-1.76**	104.0	3.01	92.07	11.99	4.67	0.00	0.00	108.74	0.00
94	4,078	4,081	50.0	Yes	**12.80**	104.0	3.01	83.21	6.58	4.38	0.00	0.00	94.17	0.00
95	4,537	4,539	48.0	Yes	**11.35**	104.0	3.01	84.14	7.05	4.44	0.00	0.00	95.62	0.00
97	3,883	3,886	53.2	Yes	**13.48**	104.0	3.01	82.79	6.37	4.33	0.00	0.00	93.49	0.00
98	4,214	4,217	49.8	Yes	**12.36**	104.0	3.01	83.50	6.72	4.40	0.00	0.00	94.61	0.00
99	2,228	2,230	45.5	Yes	**20.57**	104.0	3.01	77.97	4.34	4.10	0.00	0.00	86.41	0.00
100	4,948	4,949	53.8	Yes	**10.20**	104.0	3.01	84.89	7.45	4.43	0.00	0.00	96.77	0.00
101	5,483	5,485	35.7	Yes	**8.67**	104.0	3.01	85.78	7.94	4.58	0.00	0.00	98.30	0.00
102	4,685	4,687	60.1	Yes	**11.00**	104.0	3.01	84.42	7.19	4.36	0.00	0.00	95.98	0.00
103	5,935	5,937	39.6	Yes	**7.59**	104.0	3.01	86.47	8.34	4.57	0.00	0.00	99.38	0.00
104	4,128	4,130	52.7	Yes	**12.66**	104.0	3.01	83.32	6.63	4.36	0.00	0.00	94.31	0.00
107	4,703	4,705	39.1	Yes	**10.79**	104.0	3.01	84.45	7.21	4.52	0.00	0.00	96.18	0.00
108	2,094	2,096	41.9	Yes	**21.28**	104.0	3.01	77.43	4.15	4.11	0.00	0.00	85.69	0.00
109	6,858	6,859	49.3	Yes	**5.60**	104.0	3.01	87.72	9.09	4.56	0.00	0.00	101.37	0.00
110	4,844	4,845	46.0	Yes	**10.44**	104.0	3.01	84.71	7.35	4.48	0.00	0.00	96.53	0.00
111	5,431	5,432	49.7	Yes	**8.89**	104.0	3.01	85.70	7.89	4.49	0.00	0.00	98.08	0.00
113	4,831	4,833	38.7	Yes	**10.43**	104.0	3.01	84.68	7.34	4.53	0.00	0.00	96.55	0.00
114	4,391	4,391	44.0	Yes	**11.76**	104.0	3.01	83.85	6.90	4.46	0.00	0.00	95.21	0.00
115	3,708	3,709	41.1	Yes	**13.99**	104.0	3.01	82.39	6.17	4.42	0.00	0.00	92.98	0.00
116	4,244	4,246	52.0	Yes	**12.28**	104.0	3.01	83.56	6.75	4.38	0.00	0.00	94.69	0.00
118	7,334	7,335	49.6	Yes	**4.64**	104.0	3.01	88.31	9.45	4.57	0.00	0.00	102.33	0.00
119	2,907	2,910	51.8	Yes	**17.27**	104.0	3.01	80.28	5.24	4.19	0.00	0.00	89.70	0.00
120	5,866	5,867	32.1	Yes	**7.71**	104.0	3.01	86.37	8.28	4.61	0.00	0.00	99.26	0.00
121	3,254	3,257	52.6	Yes	**15.81**	104.0	3.01	81.26	5.66	4.25	0.00	0.00	91.16	0.00
125	9,657	9,657	47.1	Yes	**0.62**	104.0	3.01	90.70	11.02	4.63	0.00	0.00	106.36	0.00
126	6,012	6,013	54.1	Yes	**7.50**	104.0	3.01	86.58	8.40	4.49	0.00	0.00	99.48	0.00
127	6,141	6,142	55.8	Yes	**7.21**	104.0	3.01	86.77	8.51	4.49	0.00	0.00	99.77	0.00
128	6,166	6,167	56.6	Yes	**7.15**	104.0	3.01	86.80	8.53	4.49	0.00	0.00	99.82	0.00
129	5,537	5,537	23.7	No	**8.32**	104.0	3.01	85.87	7.99	4.80	0.00	0.00	98.65	0.00
130	6,129	6,130	25.0	No	**6.92**	104.0	3.01	86.75	8.50	4.80	0.00	0.00	100.05	0.00
131	6,349	6,350	23.9	No	**6.44**	104.0	3.01	87.06	8.68	4.80	0.00	0.00	100.54	0.00
132	6,404	6,405	22.6	No	**6.32**	104.0	3.01	87.13	8.73	4.80	0.00	0.00	100.66	0.00
133	4,202	4,203	47.0	Yes	**12.38**	104.0	3.01	83.47	6.71	4.42	0.00	0.00	94.59	0.00
134	5,216	5,217	21.8	Yes	**9.27**	104.0	3.01	85.35	7.70	4.66	0.00	0.00	97.70	0.00
141	3,652	3,655	55.2	Yes	**14.31**	104.0	3.01	82.26	6.11	4.28	0.00	0.00	92.66	0.00
142	4,563	4,565	61.3	Yes	**11.37**	104.0	3.01	84.19	7.07	4.34	0.00	0.00	95.60	0.00
143	4,012	4,015	50.4	Yes	**13.02**	104.0	3.01	83.07	6.51	4.37	0.00	0.00	93.95	0.00
144	5,323	5,325	49.4	Yes	**9.17**	104.0	3.01	85.53	7.80	4.48	0.00	0.00	97.81	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	6,666	6,666	51.9	Yes	**6.02**	104.0	3.01	87.48	8.94	4.53	0.00	0.00	100.95	0.00
146	6,364	6,364	51.7	Yes	**6.68**	104.0	3.01	87.08	8.69	4.52	0.00	0.00	100.29	0.00
Sum	39.97													

Noise sensitive area: H08 H08

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	2,318	2,321	48.1	Yes	**20.10**	104.0	3.01	78.31	4.47	4.09	0.00	0.00	86.87	0.00
2	1,867	1,870	46.8	Yes	**22.77**	104.0	3.01	76.44	3.82	3.94	0.00	0.00	84.20	0.00
3	1,844	1,848	48.8	Yes	**22.96**	104.0	3.01	76.33	3.79	3.89	0.00	0.00	84.01	0.00
4	2,108	2,110	37.6	Yes	**21.13**	104.0	3.01	77.49	4.17	4.19	0.00	0.00	85.85	0.00
5	2,479	2,481	42.5	Yes	**19.18**	104.0	3.01	78.89	4.68	4.21	0.00	0.00	87.79	0.00
6	2,270	2,273	47.4	Yes	**20.35**	104.0	3.01	78.13	4.40	4.08	0.00	0.00	86.62	0.00
7	4,356	4,358	45.6	Yes	**11.88**	104.0	3.01	83.79	6.86	4.44	0.00	0.00	95.09	0.00
8	2,455	2,457	44.9	Yes	**19.34**	104.0	3.01	78.81	4.65	4.17	0.00	0.00	87.64	0.00
9	2,564	2,567	48.6	Yes	**18.84**	104.0	3.01	79.19	4.80	4.15	0.00	0.00	88.13	0.00
10	3,177	3,180	52.3	Yes	**16.12**	104.0	3.01	81.05	5.57	4.24	0.00	0.00	90.85	0.00
11	4,037	4,040	53.0	Yes	**12.96**	104.0	3.01	83.13	6.53	4.35	0.00	0.00	94.01	0.00
12	3,865	3,867	54.8	Yes	**13.56**	104.0	3.01	82.75	6.35	4.32	0.00	0.00	93.41	0.00
13	3,837	3,841	54.7	Yes	**13.65**	104.0	3.01	82.69	6.32	4.31	0.00	0.00	93.32	0.00
14	3,939	3,943	50.2	Yes	**13.26**	104.0	3.01	82.92	6.43	4.37	0.00	0.00	93.71	0.00
15	3,799	3,802	47.1	Yes	**13.72**	104.0	3.01	82.60	6.28	4.38	0.00	0.00	93.25	0.00
16	3,641	3,644	48.1	Yes	**14.29**	104.0	3.01	82.23	6.10	4.35	0.00	0.00	92.68	0.00
17	4,160	4,163	51.2	Yes	**12.54**	104.0	3.01	83.39	6.66	4.38	0.00	0.00	94.43	0.00
18	4,499	4,501	45.3	Yes	**11.44**	104.0	3.01	84.07	7.01	4.46	0.00	0.00	95.53	0.00
19	4,233	4,235	42.1	Yes	**12.24**	104.0	3.01	83.54	6.74	4.46	0.00	0.00	94.74	0.00
20	4,321	4,323	34.0	Yes	**11.89**	104.0	3.01	83.72	6.83	4.53	0.00	0.00	95.08	0.00
21	2,829	2,831	44.6	Yes	**17.54**	104.0	3.01	80.04	5.14	4.26	0.00	0.00	89.44	0.00
22	3,206	3,207	39.8	Yes	**15.88**	104.0	3.01	81.12	5.60	4.38	0.00	0.00	91.09	0.00
23	3,578	3,579	40.9	Yes	**14.46**	104.0	3.01	82.08	6.03	4.41	0.00	0.00	92.51	0.00
24	2,964	2,965	39.5	Yes	**16.88**	104.0	3.01	80.44	5.30	4.34	0.00	0.00	90.09	0.00
25	5,789	5,789	38.3	No	**7.71**	104.0	3.01	86.25	8.21	4.80	0.00	0.00	99.26	0.00
26	3,595	3,597	44.3	Yes	**14.43**	104.0	3.01	82.12	6.05	4.38	0.00	0.00	92.55	0.00
27	5,438	5,439	39.2	Yes	**8.81**	104.0	3.01	85.71	7.90	4.55	0.00	0.00	98.16	0.00
28	5,376	5,377	45.6	Yes	**9.01**	104.0	3.01	85.61	7.84	4.51	0.00	0.00	97.97	0.00
29	3,923	3,924	38.7	Yes	**13.23**	104.0	3.01	82.87	6.41	4.46	0.00	0.00	93.75	0.00
30	4,039	4,039	35.1	Yes	**12.81**	104.0	3.01	83.13	6.53	4.50	0.00	0.00	94.16	0.00
31	3,268	3,269	40.6	Yes	**15.64**	104.0	3.01	81.29	5.67	4.38	0.00	0.00	91.34	0.00
32	5,886	5,886	40.2	No	**7.48**	104.0	3.01	86.40	8.29	4.80	0.00	0.00	99.49	0.00
33	4,656	4,657	36.2	Yes	**10.91**	104.0	3.01	84.36	7.16	4.53	0.00	0.00	96.06	0.00
34	4,570	4,571	44.1	Yes	**11.22**	104.0	3.01	84.20	7.08	4.47	0.00	0.00	95.75	0.00
35	4,152	4,154	45.9	Yes	**12.53**	104.0	3.01	83.37	6.65	4.42	0.00	0.00	94.45	0.00
36	3,953	3,956	47.2	Yes	**13.19**	104.0	3.01	82.94	6.44	4.39	0.00	0.00	93.78	0.00
37	4,812	4,814	44.1	Yes	**10.52**	104.0	3.01	84.65	7.32	4.49	0.00	0.00	96.45	0.00
38	5,686	5,687	38.5	No	**7.95**	104.0	3.01	86.10	8.12	4.80	0.00	0.00	99.02	0.00
39	6,092	6,093	46.4	Yes	**7.27**	104.0	3.01	86.70	8.47	4.54	0.00	0.00	99.71	0.00
40	6,659	6,660	17.7	Yes	**5.86**	104.0	3.01	87.47	8.93	4.71	0.00	0.00	101.11	0.00
41	6,282	6,283	52.2	Yes	**6.86**	104.0	3.01	86.96	8.63	4.52	0.00	0.00	100.11	0.00
43	5,364	5,366	46.8	Yes	**9.04**	104.0	3.01	85.59	7.83	4.50	0.00	0.00	97.93	0.00
44	6,645	6,647	51.1	Yes	**6.06**	104.0	3.01	87.45	8.92	4.54	0.00	0.00	100.91	0.00
45	6,846	6,847	51.4	Yes	**5.64**	104.0	3.01	87.71	9.08	4.54	0.00	0.00	101.33	0.00
46	6,250	6,251	24.8	Yes	**6.79**	104.0	3.01	86.92	8.60	4.66	0.00	0.00	100.18	0.00
48	6,659	6,660	39.9	No	**5.77**	104.0	3.01	87.47	8.93	4.80	0.00	0.00	101.20	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	6,480	6,480	39.5	No	**6.15**	104.0	3.01	87.23	8.79	4.80	0.00	0.00	100.82	0.00
50	3,256	3,258	45.9	Yes	**15.74**	104.0	3.01	81.26	5.66	4.32	0.00	0.00	91.24	0.00
51	6,007	6,008	37.4	No	**7.20**	104.0	3.01	86.57	8.40	4.80	0.00	0.00	99.77	0.00
52	5,692	5,692	36.8	No	**7.94**	104.0	3.01	86.11	8.12	4.80	0.00	0.00	99.03	0.00
53	6,812	6,812	42.5	No	**5.46**	104.0	3.01	87.67	9.05	4.80	0.00	0.00	101.52	0.00
55	8,301	8,301	40.7	No	**2.65**	104.0	3.01	89.38	10.14	4.80	0.00	0.00	104.33	0.00
56	8,607	8,608	43.3	No	**2.12**	104.0	3.01	89.70	10.35	4.80	0.00	0.00	104.85	0.00
57	8,671	8,671	42.5	No	**2.02**	104.0	3.01	89.76	10.39	4.80	0.00	0.00	104.95	0.00
58	5,176	5,177	35.8	No	**9.23**	104.0	3.01	85.28	7.66	4.80	0.00	0.00	97.74	0.00
59	8,919	8,919	45.0	No	**1.61**	104.0	3.01	90.01	10.56	4.80	0.00	0.00	105.36	0.00
60	10,393	10,393	48.1	No	**-0.63**	104.0	3.01	91.33	11.47	4.80	0.00	0.00	107.60	0.00
61	10,748	10,749	44.6	No	**-1.13**	104.0	3.01	91.63	11.67	4.80	0.00	0.00	108.10	0.00
62	10,823	10,823	43.7	No	**-1.23**	104.0	3.01	91.69	11.71	4.80	0.00	0.00	108.20	0.00
63	11,527	11,528	43.7	No	**-2.17**	104.0	3.01	92.23	12.11	4.80	0.00	0.00	109.14	0.00
64	12,924	12,924	41.0	No	**-3.89**	104.0	3.01	93.23	12.83	4.80	0.00	0.00	110.86	0.00
65	13,465	13,466	41.7	No	**-4.51**	104.0	3.01	93.58	13.10	4.80	0.00	0.00	111.48	0.00
66	6,549	6,550	14.4	No	**6.00**	104.0	3.01	87.32	8.84	4.80	0.00	0.00	100.97	0.00
67	12,725	12,726	43.4	No	**-3.65**	104.0	3.01	93.09	12.73	4.80	0.00	0.00	110.63	0.00
68	13,260	13,260	40.4	No	**-4.28**	104.0	3.01	93.45	13.00	4.80	0.00	0.00	111.25	0.00
69	13,430	13,431	40.7	No	**-4.47**	104.0	3.01	93.56	13.08	4.80	0.00	0.00	111.44	0.00
70	5,011	5,012	16.7	No	**9.66**	104.0	3.01	85.00	7.51	4.80	0.00	0.00	97.31	0.00
71	3,144	3,147	48.7	Yes	**16.22**	104.0	3.01	80.96	5.53	4.27	0.00	0.00	90.75	0.00
72	1,770	1,772	39.8	Yes	**23.30**	104.0	3.01	75.97	3.67	4.03	0.00	0.00	83.67	0.00
73	2,449	2,452	45.2	Yes	**19.37**	104.0	3.01	78.79	4.64	4.17	0.00	0.00	87.60	0.00
74	3,510	3,512	47.0	Yes	**14.76**	104.0	3.01	81.91	5.95	4.34	0.00	0.00	92.21	0.00
75	3,942	3,943	38.5	Yes	**13.16**	104.0	3.01	82.92	6.43	4.47	0.00	0.00	93.81	0.00
76	8,094	8,095	44.5	No	**3.01**	104.0	3.01	89.16	10.00	4.80	0.00	0.00	103.96	0.00
77	7,275	7,275	39.9	No	**4.53**	104.0	3.01	88.24	9.41	4.80	0.00	0.00	102.44	0.00
78	4,548	4,550	25.2	Yes	**11.14**	104.0	3.01	84.16	7.06	4.61	0.00	0.00	95.83	0.00
80	10,017	10,018	50.4	No	**-0.09**	104.0	3.01	91.02	11.24	4.80	0.00	0.00	107.06	0.00
81	4,372	4,374	42.2	Yes	**11.80**	104.0	3.01	83.82	6.88	4.47	0.00	0.00	95.17	0.00
82	5,239	5,240	37.4	Yes	**9.31**	104.0	3.01	85.39	7.72	4.56	0.00	0.00	97.66	0.00
83	12,102	12,102	42.5	No	**-2.90**	104.0	3.01	92.66	12.41	4.80	0.00	0.00	109.87	0.00
85	6,484	6,485	39.9	Yes	**6.35**	104.0	3.01	87.24	8.79	4.59	0.00	0.00	100.62	0.00
86	9,731	9,731	48.6	No	**0.34**	104.0	3.01	90.76	11.07	4.80	0.00	0.00	106.63	0.00
87	13,667	13,668	40.8	No	**-4.74**	104.0	3.01	93.71	13.19	4.80	0.00	0.00	111.71	0.00
89	12,430	12,431	42.2	No	**-3.30**	104.0	3.01	92.89	12.58	4.80	0.00	0.00	110.27	0.00
90	9,333	9,333	46.2	No	**0.95**	104.0	3.01	90.40	10.82	4.80	0.00	0.00	106.02	0.00
91	11,087	11,088	43.1	No	**-1.59**	104.0	3.01	91.90	11.86	4.80	0.00	0.00	108.56	0.00
92	13,410	13,410	38.0	No	**-4.45**	104.0	3.01	93.55	13.07	4.80	0.00	0.00	111.42	0.00
94	3,525	3,529	50.9	Yes	**14.74**	104.0	3.01	81.95	5.97	4.31	0.00	0.00	92.23	0.00
95	3,300	3,303	53.1	Yes	**15.63**	104.0	3.01	81.38	5.71	4.25	0.00	0.00	91.34	0.00
97	4,180	4,183	45.3	Yes	**12.43**	104.0	3.01	83.43	6.68	4.43	0.00	0.00	94.54	0.00
98	3,391	3,395	53.8	Yes	**15.28**	104.0	3.01	81.62	5.82	4.26	0.00	0.00	91.69	0.00
99	1,280	1,284	45.3	Yes	**27.33**	104.0	3.01	73.17	2.89	3.58	0.00	0.00	79.64	0.00
100	6,818	6,819	48.1	Yes	**5.68**	104.0	3.01	87.67	9.06	4.56	0.00	0.00	101.29	0.00
101	4,514	4,516	45.2	Yes	**11.39**	104.0	3.01	84.09	7.02	4.46	0.00	0.00	95.58	0.00
102	6,327	6,329	53.3	Yes	**6.77**	104.0	3.01	87.03	8.66	4.51	0.00	0.00	100.20	0.00
103	4,641	4,644	44.6	Yes	**11.01**	104.0	3.01	84.34	7.15	4.47	0.00	0.00	95.96	0.00
104	5,815	5,817	47.2	Yes	**7.92**	104.0	3.01	86.29	8.23	4.52	0.00	0.00	99.05	0.00
107	4,358	4,360	37.1	Yes	**11.81**	104.0	3.01	83.79	6.87	4.51	0.00	0.00	95.17	0.00
108	482	489	44.4	Yes	**39.23**	104.0	3.01	64.79	1.34	1.60	0.00	0.00	67.73	0.00
109	9,237	9,237	46.4	No	**1.10**	104.0	3.01	90.31	10.76	4.80	0.00	0.00	105.87	0.00
110	7,086	7,086	40.4	No	**4.90**	104.0	3.01	88.01	9.26	4.80	0.00	0.00	102.07	0.00
111	7,697	7,698	44.2	No	**3.73**	104.0	3.01	88.73	9.72	4.80	0.00	0.00	103.24	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	4,316	4,318	37.2	Yes	**11.94**	104.0	3.01	83.71	6.82	4.51	0.00	0.00	95.04	0.00
114	6,786	6,786	40.1	Yes	**5.71**	104.0	3.01	87.63	9.03	4.60	0.00	0.00	101.26	0.00
115	2,327	2,330	44.8	Yes	**20.01**	104.0	3.01	78.35	4.48	4.14	0.00	0.00	86.97	0.00
116	5,480	5,481	40.5	Yes	**8.71**	104.0	3.01	85.78	7.94	4.55	0.00	0.00	98.26	0.00
118	9,716	9,716	47.0	No	**0.36**	104.0	3.01	90.75	11.06	4.80	0.00	0.00	106.61	0.00
119	3,207	3,210	44.8	Yes	**15.92**	104.0	3.01	81.13	5.60	4.32	0.00	0.00	91.05	0.00
120	4,788	4,790	38.2	Yes	**10.54**	104.0	3.01	84.61	7.29	4.53	0.00	0.00	96.43	0.00
121	3,788	3,790	43.5	Yes	**13.73**	104.0	3.01	82.57	6.26	4.41	0.00	0.00	93.25	0.00
125	11,838	11,839	42.5	No	**-2.57**	104.0	3.01	92.47	12.27	4.80	0.00	0.00	109.54	0.00
126	8,044	8,045	47.8	No	**3.10**	104.0	3.01	89.11	9.96	4.80	0.00	0.00	103.87	0.00
127	8,207	8,208	49.7	No	**2.81**	104.0	3.01	89.28	10.08	4.80	0.00	0.00	104.16	0.00
128	8,279	8,280	51.4	No	**2.68**	104.0	3.01	89.36	10.13	4.80	0.00	0.00	104.29	0.00
129	6,044	6,045	16.5	No	**7.12**	104.0	3.01	86.63	8.43	4.80	0.00	0.00	99.86	0.00
130	6,681	6,682	17.9	No	**5.73**	104.0	3.01	87.50	8.95	4.80	0.00	0.00	101.25	0.00
131	6,747	6,748	19.9	No	**5.59**	104.0	3.01	87.58	9.00	4.80	0.00	0.00	101.38	0.00
132	6,652	6,653	19.5	No	**5.79**	104.0	3.01	87.46	8.93	4.80	0.00	0.00	101.19	0.00
133	6,186	6,187	41.6	Yes	**7.02**	104.0	3.01	86.83	8.55	4.57	0.00	0.00	99.95	0.00
134	4,736	4,737	19.5	Yes	**10.56**	104.0	3.01	84.51	7.24	4.66	0.00	0.00	96.41	0.00
141	4,038	4,041	47.7	Yes	**12.91**	104.0	3.01	83.13	6.53	4.40	0.00	0.00	94.06	0.00
142	6,126	6,128	54.2	Yes	**7.23**	104.0	3.01	86.75	8.50	4.50	0.00	0.00	99.74	0.00
143	4,073	4,076	48.1	Yes	**12.80**	104.0	3.01	83.20	6.57	4.40	0.00	0.00	94.17	0.00
144	7,137	7,138	43.7	Yes	**5.01**	104.0	3.01	88.07	9.30	4.59	0.00	0.00	101.97	0.00
145	8,921	8,921	46.3	No	**1.61**	104.0	3.01	90.01	10.56	4.80	0.00	0.00	105.37	0.00
146	8,609	8,609	46.0	No	**2.12**	104.0	3.01	89.70	10.35	4.80	0.00	0.00	104.85	0.00

Sum 40.64

Noise sensitive area: H09 H09

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	2,119	2,122	45.0	Yes	**21.18**	104.0	3.01	77.53	4.19	4.07	0.00	0.00	85.80	0.00
2	2,223	2,226	43.8	Yes	**20.56**	104.0	3.01	77.95	4.33	4.13	0.00	0.00	86.41	0.00
3	2,798	2,800	46.4	Yes	**17.70**	104.0	3.01	79.94	5.10	4.23	0.00	0.00	89.27	0.00
4	4,221	4,222	35.7	Yes	**12.23**	104.0	3.01	83.51	6.72	4.51	0.00	0.00	94.75	0.00
5	4,067	4,068	35.1	Yes	**12.72**	104.0	3.01	83.19	6.56	4.51	0.00	0.00	94.26	0.00
6	3,349	3,352	43.0	Yes	**15.34**	104.0	3.01	81.50	5.77	4.36	0.00	0.00	91.63	0.00
7	5,325	5,327	34.4	Yes	**9.06**	104.0	3.01	85.53	7.80	4.58	0.00	0.00	97.91	0.00
8	1,511	1,514	40.7	Yes	**25.22**	104.0	3.01	74.61	3.27	3.88	0.00	0.00	81.75	0.00
9	2,646	2,649	44.5	Yes	**18.38**	104.0	3.01	79.46	4.90	4.23	0.00	0.00	88.59	0.00
10	3,006	3,010	49.3	Yes	**16.80**	104.0	3.01	80.57	5.36	4.24	0.00	0.00	90.17	0.00
11	2,508	2,512	40.8	Yes	**19.00**	104.0	3.01	79.00	4.72	4.24	0.00	0.00	87.97	0.00
12	2,490	2,495	41.0	Yes	**19.09**	104.0	3.01	78.94	4.70	4.24	0.00	0.00	87.88	0.00
13	2,817	2,822	44.1	Yes	**17.57**	104.0	3.01	80.01	5.12	4.27	0.00	0.00	89.40	0.00
14	3,185	3,189	41.6	Yes	**15.97**	104.0	3.01	81.07	5.58	4.35	0.00	0.00	91.00	0.00
15	3,652	3,655	41.9	Yes	**14.19**	104.0	3.01	82.26	6.11	4.41	0.00	0.00	92.78	0.00
16	3,805	3,807	41.2	Yes	**13.65**	104.0	3.01	82.61	6.28	4.43	0.00	0.00	93.33	0.00
17	2,470	2,475	40.0	Yes	**19.18**	104.0	3.01	78.87	4.67	4.25	0.00	0.00	87.79	0.00
18	2,716	2,719	36.4	Yes	**17.95**	104.0	3.01	79.69	4.99	4.34	0.00	0.00	89.03	0.00
19	3,237	3,240	32.6	Yes	**15.67**	104.0	3.01	81.21	5.64	4.46	0.00	0.00	91.30	0.00
20	4,024	4,026	27.9	Yes	**12.79**	104.0	3.01	83.10	6.52	4.56	0.00	0.00	94.18	0.00
21	4,654	4,655	40.2	Yes	**10.95**	104.0	3.01	84.36	7.16	4.51	0.00	0.00	96.03	0.00
22	5,339	5,339	35.5	Yes	**9.04**	104.0	3.01	85.55	7.81	4.57	0.00	0.00	97.93	0.00
23	5,720	5,721	36.5	Yes	**8.09**	104.0	3.01	86.15	8.15	4.58	0.00	0.00	98.88	0.00
24	5,096	5,097	35.6	Yes	**9.68**	104.0	3.01	85.15	7.59	4.56	0.00	0.00	97.29	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	7,605	7,605	28.9	No	**3.90**	104.0	3.01	88.62	9.65	4.80	0.00	0.00	103.07	0.00
26	4,978	4,979	31.2	Yes	**9.97**	104.0	3.01	84.94	7.48	4.59	0.00	0.00	97.01	0.00
27	7,025	7,026	23.7	No	**5.02**	104.0	3.01	87.93	9.22	4.80	0.00	0.00	101.95	0.00
28	6,594	6,595	28.3	Yes	**6.06**	104.0	3.01	87.38	8.88	4.65	0.00	0.00	100.92	0.00
29	5,837	5,837	32.3	Yes	**7.79**	104.0	3.01	86.32	8.25	4.61	0.00	0.00	99.19	0.00
30	6,168	6,168	30.2	No	**6.84**	104.0	3.01	86.80	8.53	4.80	0.00	0.00	100.13	0.00
31	5,681	5,682	38.0	Yes	**8.20**	104.0	3.01	86.09	8.12	4.57	0.00	0.00	98.78	0.00
32	7,840	7,840	30.8	No	**3.47**	104.0	3.01	88.89	9.82	4.80	0.00	0.00	103.51	0.00
33	6,777	6,777	30.6	No	**5.53**	104.0	3.01	87.62	9.02	4.80	0.00	0.00	101.44	0.00
34	5,641	5,642	30.5	Yes	**8.25**	104.0	3.01	86.03	8.08	4.62	0.00	0.00	98.73	0.00
35	5,033	5,035	35.8	Yes	**9.85**	104.0	3.01	85.04	7.53	4.56	0.00	0.00	97.13	0.00
36	4,734	4,736	36.9	Yes	**10.69**	104.0	3.01	84.51	7.24	4.53	0.00	0.00	96.28	0.00
37	5,956	5,957	29.0	Yes	**7.48**	104.0	3.01	86.50	8.35	4.63	0.00	0.00	99.49	0.00
38	7,380	7,381	24.8	No	**4.33**	104.0	3.01	88.36	9.48	4.80	0.00	0.00	102.65	0.00
39	7,493	7,494	27.4	No	**4.11**	104.0	3.01	88.49	9.57	4.80	0.00	0.00	102.86	0.00
40	7,309	7,310	10.2	No	**4.46**	104.0	3.01	88.28	9.43	4.80	0.00	0.00	102.51	0.00
41	7,572	7,573	31.8	Yes	**4.10**	104.0	3.01	88.59	9.63	4.66	0.00	0.00	102.87	0.00
43	6,482	6,484	30.5	Yes	**6.31**	104.0	3.01	87.24	8.79	4.64	0.00	0.00	100.67	0.00
44	7,810	7,811	30.5	Yes	**3.65**	104.0	3.01	88.85	9.80	4.67	0.00	0.00	103.32	0.00
45	8,076	8,077	29.5	Yes	**3.17**	104.0	3.01	89.14	9.99	4.68	0.00	0.00	103.81	0.00
46	7,092	7,093	10.2	No	**4.89**	104.0	3.01	88.02	9.27	4.80	0.00	0.00	102.08	0.00
48	8,548	8,549	30.0	No	**2.22**	104.0	3.01	89.64	10.31	4.80	0.00	0.00	104.75	0.00
49	8,641	8,641	33.9	No	**2.07**	104.0	3.01	89.73	10.37	4.80	0.00	0.00	104.90	0.00
50	4,270	4,271	36.7	Yes	**12.08**	104.0	3.01	83.61	6.78	4.51	0.00	0.00	94.89	0.00
51	8,166	8,166	31.7	No	**2.88**	104.0	3.01	89.24	10.05	4.80	0.00	0.00	104.09	0.00
52	7,854	7,855	31.3	No	**3.44**	104.0	3.01	88.90	9.83	4.80	0.00	0.00	103.53	0.00
53	8,973	8,973	36.8	No	**1.52**	104.0	3.01	90.06	10.59	4.80	0.00	0.00	105.45	0.00
55	10,448	10,448	35.2	No	**-0.71**	104.0	3.01	91.38	11.50	4.80	0.00	0.00	107.68	0.00
56	10,755	10,755	37.9	No	**-1.14**	104.0	3.01	91.63	11.68	4.80	0.00	0.00	108.11	0.00
57	10,675	10,676	33.8	No	**-1.03**	104.0	3.01	91.57	11.63	4.80	0.00	0.00	108.00	0.00
58	7,127	7,127	27.5	No	**4.82**	104.0	3.01	88.06	9.29	4.80	0.00	0.00	102.15	0.00
59	11,066	11,066	39.7	No	**-1.56**	104.0	3.01	91.88	11.85	4.80	0.00	0.00	108.53	0.00
60	12,478	12,479	42.9	No	**-3.36**	104.0	3.01	92.92	12.61	4.80	0.00	0.00	110.33	0.00
61	12,835	12,835	39.7	No	**-3.78**	104.0	3.01	93.17	12.79	4.80	0.00	0.00	110.75	0.00
62	12,566	12,567	28.8	No	**-3.46**	104.0	3.01	92.98	12.65	4.80	0.00	0.00	110.44	0.00
63	13,097	13,097	24.3	No	**-4.09**	104.0	3.01	93.34	12.92	4.80	0.00	0.00	111.06	0.00
64	14,445	14,445	22.2	No	**-5.58**	104.0	3.01	94.19	13.56	4.80	0.00	0.00	112.55	0.00
65	15,033	15,033	23.6	No	**-6.19**	104.0	3.01	94.54	13.82	4.80	0.00	0.00	113.16	0.00
66	7,095	7,096	8.9	No	**4.88**	104.0	3.01	88.02	9.27	4.80	0.00	0.00	102.09	0.00
67	14,393	14,394	26.3	No	**-5.52**	104.0	3.01	94.16	13.53	4.80	0.00	0.00	112.50	0.00
68	14,936	14,936	23.5	No	**-6.09**	104.0	3.01	94.48	13.78	4.80	0.00	0.00	113.06	0.00
69	14,960	14,960	22.6	No	**-6.12**	104.0	3.01	94.50	13.79	4.80	0.00	0.00	113.09	0.00
70	4,042	4,044	8.9	No	**12.50**	104.0	3.01	83.14	6.54	4.80	0.00	0.00	94.47	0.00
71	3,226	3,229	45.2	Yes	**15.85**	104.0	3.01	81.18	5.62	4.32	0.00	0.00	91.13	0.00
72	3,834	3,835	38.1	Yes	**13.52**	104.0	3.01	82.68	6.31	4.46	0.00	0.00	93.45	0.00
73	3,686	3,687	38.2	Yes	**14.04**	104.0	3.01	82.33	6.15	4.45	0.00	0.00	92.93	0.00
74	4,594	4,596	37.1	Yes	**11.10**	104.0	3.01	84.25	7.10	4.52	0.00	0.00	95.88	0.00
75	5,573	5,573	28.1	No	**8.23**	104.0	3.01	85.92	8.02	4.80	0.00	0.00	98.74	0.00
76	9,987	9,987	33.4	No	**-0.04**	104.0	3.01	90.99	11.23	4.80	0.00	0.00	107.01	0.00
77	9,320	9,320	32.0	No	**0.97**	104.0	3.01	90.39	10.81	4.80	0.00	0.00	106.00	0.00
78	4,411	4,412	19.0	Yes	**11.51**	104.0	3.01	83.89	6.92	4.65	0.00	0.00	95.47	0.00
80	12,088	12,089	44.5	No	**-2.88**	104.0	3.01	92.65	12.40	4.80	0.00	0.00	109.85	0.00
81	3,188	3,191	31.4	Yes	**15.85**	104.0	3.01	81.08	5.58	4.46	0.00	0.00	91.12	0.00
82	7,364	7,365	31.5	No	**4.36**	104.0	3.01	88.34	9.47	4.80	0.00	0.00	102.62	0.00
83	13,712	13,713	24.7	No	**-4.79**	104.0	3.01	93.74	13.22	4.80	0.00	0.00	111.76	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	8,824	8,824	35.5	No	**1.77**	104.0	3.01	89.91	10.49	4.80	0.00	0.00	105.21	0.00
86	11,798	11,798	42.3	No	**-2.52**	104.0	3.01	92.44	12.25	4.80	0.00	0.00	109.49	0.00
87	15,252	15,252	22.7	No	**-6.41**	104.0	3.01	94.67	13.92	4.80	0.00	0.00	113.39	0.00
89	13,967	13,967	23.1	No	**-5.07**	104.0	3.01	93.90	13.34	4.80	0.00	0.00	112.04	0.00
90	11,188	11,188	33.9	No	**-1.72**	104.0	3.01	91.98	11.92	4.80	0.00	0.00	108.69	0.00
91	12,753	12,754	25.9	No	**-3.69**	104.0	3.01	93.11	12.75	4.80	0.00	0.00	110.66	0.00
92	14,803	14,804	17.7	No	**-5.95**	104.0	3.01	94.41	13.72	4.80	0.00	0.00	112.93	0.00
94	3,081	3,085	45.8	Yes	**16.45**	104.0	3.01	80.78	5.45	4.29	0.00	0.00	90.53	0.00
95	2,015	2,020	41.1	Yes	**21.72**	104.0	3.01	77.11	4.04	4.10	0.00	0.00	85.25	0.00
97	4,410	4,413	39.7	Yes	**11.66**	104.0	3.01	83.89	6.92	4.49	0.00	0.00	95.31	0.00
98	2,668	2,672	47.6	Yes	**18.31**	104.0	3.01	79.54	4.93	4.19	0.00	0.00	88.66	0.00
99	2,717	2,719	45.3	Yes	**18.06**	104.0	3.01	79.69	4.99	4.23	0.00	0.00	88.91	0.00
100	8,180	8,181	28.4	No	**2.86**	104.0	3.01	89.26	10.06	4.80	0.00	0.00	104.12	0.00
101	3,057	3,061	31.6	Yes	**16.39**	104.0	3.01	80.72	5.42	4.45	0.00	0.00	90.58	0.00
102	7,475	7,477	33.5	Yes	**4.29**	104.0	3.01	88.47	9.56	4.65	0.00	0.00	102.68	0.00
103	2,694	2,697	38.1	Yes	**18.07**	104.0	3.01	79.62	4.97	4.32	0.00	0.00	88.90	0.00
104	7,080	7,081	28.6	Yes	**5.05**	104.0	3.01	88.00	9.26	4.66	0.00	0.00	101.92	0.00
107	3,779	3,782	29.0	Yes	**13.62**	104.0	3.01	82.55	6.25	4.54	0.00	0.00	93.35	0.00
108	2,832	2,833	43.5	Yes	**17.51**	104.0	3.01	80.05	5.14	4.27	0.00	0.00	89.46	0.00
109	11,377	11,377	41.1	No	**-1.97**	104.0	3.01	92.12	12.02	4.80	0.00	0.00	108.94	0.00
110	8,951	8,952	30.5	No	**1.56**	104.0	3.01	90.04	10.58	4.80	0.00	0.00	105.42	0.00
111	9,581	9,581	33.7	No	**0.57**	104.0	3.01	90.63	10.98	4.80	0.00	0.00	106.41	0.00
113	3,540	3,543	28.1	Yes	**14.47**	104.0	3.01	81.99	5.99	4.53	0.00	0.00	92.50	0.00
114	9,117	9,117	35.9	No	**1.29**	104.0	3.01	90.20	10.68	4.80	0.00	0.00	105.68	0.00
115	1,721	1,724	41.4	Yes	**23.66**	104.0	3.01	75.73	3.60	3.98	0.00	0.00	83.31	0.00
116	6,322	6,323	27.5	Yes	**6.64**	104.0	3.01	87.02	8.66	4.65	0.00	0.00	100.33	0.00
118	11,863	11,863	42.2	No	**-2.60**	104.0	3.01	92.48	12.29	4.80	0.00	0.00	109.57	0.00
119	3,904	3,906	40.3	Yes	**13.30**	104.0	3.01	82.83	6.39	4.45	0.00	0.00	93.67	0.00
120	3,099	3,102	28.8	Yes	**16.19**	104.0	3.01	80.83	5.47	4.48	0.00	0.00	90.79	0.00
121	4,423	4,425	38.4	Yes	**11.62**	104.0	3.01	83.92	6.93	4.50	0.00	0.00	95.35	0.00
125	13,429	13,429	24.0	No	**-4.47**	104.0	3.01	93.56	13.08	4.80	0.00	0.00	111.44	0.00
126	9,531	9,532	26.0	No	**0.64**	104.0	3.01	90.58	10.95	4.80	0.00	0.00	106.33	0.00
127	9,736	9,736	28.6	No	**0.33**	104.0	3.01	90.77	11.07	4.80	0.00	0.00	106.64	0.00
128	9,875	9,876	32.4	No	**0.12**	104.0	3.01	90.89	11.16	4.80	0.00	0.00	106.85	0.00
129	5,988	5,989	16.8	No	**7.24**	104.0	3.01	86.55	8.38	4.80	0.00	0.00	99.73	0.00
130	6,562	6,563	18.0	No	**5.98**	104.0	3.01	87.34	8.85	4.80	0.00	0.00	101.00	0.00
131	6,443	6,443	16.0	No	**6.23**	104.0	3.01	87.18	8.76	4.80	0.00	0.00	100.74	0.00
132	6,191	6,192	15.4	No	**6.78**	104.0	3.01	86.84	8.55	4.80	0.00	0.00	100.19	0.00
133	7,750	7,750	24.5	No	**3.63**	104.0	3.01	88.79	9.76	4.80	0.00	0.00	103.34	0.00
134	3,853	3,855	12.7	No	**13.12**	104.0	3.01	82.72	6.33	4.80	0.00	0.00	93.86	0.00
141	4,419	4,421	41.2	Yes	**11.65**	104.0	3.01	83.91	6.93	4.48	0.00	0.00	95.32	0.00
142	7,213	7,214	35.6	Yes	**4.82**	104.0	3.01	88.16	9.36	4.63	0.00	0.00	102.16	0.00
143	4,088	4,091	40.2	Yes	**12.68**	104.0	3.01	83.24	6.59	4.46	0.00	0.00	94.29	0.00
144	8,401	8,402	20.9	No	**2.47**	104.0	3.01	89.49	10.21	4.80	0.00	0.00	104.50	0.00
145	10,737	10,738	33.9	No	**-1.11**	104.0	3.01	91.62	11.67	4.80	0.00	0.00	108.08	0.00
146	10,415	10,416	33.7	No	**-0.66**	104.0	3.01	91.35	11.48	4.80	0.00	0.00	107.63	0.00

Sum 34.25

Noise sensitive area: H10 H10

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	7,868	7,869	45.7	Yes	**3.61**	104.0	3.01	88.92	9.84	4.60	0.00	0.00	103.36	0.00
2	7,623	7,624	47.3	Yes	**4.08**	104.0	3.01	88.64	9.66	4.59	0.00	0.00	102.90	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	7,032	7,033	53.5	Yes	**5.27**	104.0	3.01	87.94	9.22	4.54	0.00	0.00	101.71	0.00
4	5,694	5,694	44.9	Yes	**8.21**	104.0	3.01	86.11	8.13	4.53	0.00	0.00	98.77	0.00
5	5,757	5,758	49.3	Yes	**8.08**	104.0	3.01	86.21	8.18	4.51	0.00	0.00	98.89	0.00
6	6,514	6,515	55.4	Yes	**6.37**	104.0	3.01	87.28	8.82	4.51	0.00	0.00	100.60	0.00
7	5,140	5,142	58.2	Yes	**9.71**	104.0	3.01	85.22	7.63	4.41	0.00	0.00	97.27	0.00
8	8,516	8,516	38.8	Yes	**2.43**	104.0	3.01	89.61	10.29	4.64	0.00	0.00	104.54	0.00
9	7,432	7,433	49.4	Yes	**4.45**	104.0	3.01	88.42	9.52	4.57	0.00	0.00	102.52	0.00
10	7,447	7,448	54.4	Yes	**4.44**	104.0	3.01	88.44	9.54	4.55	0.00	0.00	102.53	0.00
11	9,074	9,076	43.7	Yes	**1.52**	104.0	3.01	90.16	10.66	4.64	0.00	0.00	105.45	0.00
12	8,852	8,853	45.2	Yes	**1.89**	104.0	3.01	89.94	10.51	4.63	0.00	0.00	105.08	0.00
13	8,405	8,407	50.6	Yes	**2.67**	104.0	3.01	89.49	10.21	4.59	0.00	0.00	104.30	0.00
14	8,051	8,053	50.4	Yes	**3.30**	104.0	3.01	89.12	9.97	4.59	0.00	0.00	103.68	0.00
15	7,217	7,219	51.9	Yes	**4.88**	104.0	3.01	88.17	9.36	4.56	0.00	0.00	102.09	0.00
16	6,818	6,820	53.1	Yes	**5.70**	104.0	3.01	87.68	9.06	4.53	0.00	0.00	101.27	0.00
17	9,309	9,311	41.2	Yes	**1.14**	104.0	3.01	90.38	10.81	4.65	0.00	0.00	105.84	0.00
18	9,541	9,542	36.0	Yes	**0.75**	104.0	3.01	90.59	10.95	4.67	0.00	0.00	106.22	0.00
19	8,388	8,390	41.0	Yes	**2.66**	104.0	3.01	89.47	10.20	4.63	0.00	0.00	104.31	0.00
20	7,341	7,342	38.3	Yes	**4.58**	104.0	3.01	88.32	9.46	4.62	0.00	0.00	102.40	0.00
21	5,167	5,168	52.3	Yes	**9.60**	104.0	3.01	85.27	7.65	4.45	0.00	0.00	97.37	0.00
22	4,551	4,552	46.0	Yes	**11.29**	104.0	3.01	84.16	7.06	4.46	0.00	0.00	95.68	0.00
23	4,167	4,168	48.2	Yes	**12.50**	104.0	3.01	83.40	6.67	4.41	0.00	0.00	94.47	0.00
24	4,799	4,799	45.4	Yes	**10.57**	104.0	3.01	84.62	7.30	4.48	0.00	0.00	96.40	0.00
25	2,365	2,367	45.7	Yes	**19.82**	104.0	3.01	78.48	4.53	4.14	0.00	0.00	87.15	0.00
26	4,994	4,995	52.8	Yes	**10.07**	104.0	3.01	84.97	7.49	4.44	0.00	0.00	96.90	0.00
27	3,157	3,159	47.9	Yes	**16.16**	104.0	3.01	80.99	5.54	4.28	0.00	0.00	90.81	0.00
28	4,057	4,059	55.2	Yes	**12.91**	104.0	3.01	83.17	6.55	4.34	0.00	0.00	94.06	0.00
29	3,984	3,985	48.0	Yes	**13.10**	104.0	3.01	83.01	6.47	4.39	0.00	0.00	93.87	0.00
30	3,704	3,705	42.9	Yes	**14.02**	104.0	3.01	82.38	6.17	4.40	0.00	0.00	92.95	0.00
31	4,512	4,513	46.8	Yes	**11.42**	104.0	3.01	84.09	7.02	4.45	0.00	0.00	95.56	0.00
32	2,011	2,013	44.7	Yes	**21.83**	104.0	3.01	77.08	4.03	4.04	0.00	0.00	85.14	0.00
33	3,082	3,083	41.8	Yes	**16.41**	104.0	3.01	80.78	5.45	4.34	0.00	0.00	90.56	0.00
34	4,822	4,824	54.9	Yes	**10.57**	104.0	3.01	84.67	7.33	4.41	0.00	0.00	96.41	0.00
35	5,417	5,419	57.6	Yes	**8.97**	104.0	3.01	85.68	7.88	4.44	0.00	0.00	98.00	0.00
36	5,702	5,704	56.1	Yes	**8.25**	104.0	3.01	86.12	8.13	4.46	0.00	0.00	98.72	0.00
37	4,534	4,536	54.4	Yes	**11.40**	104.0	3.01	84.13	7.04	4.39	0.00	0.00	95.57	0.00
38	2,724	2,725	45.7	Yes	**18.03**	104.0	3.01	79.71	5.00	4.23	0.00	0.00	88.94	0.00
39	3,229	3,231	53.5	Yes	**15.93**	104.0	3.01	81.19	5.63	4.23	0.00	0.00	91.05	0.00
40	5,147	5,149	28.6	Yes	**9.49**	104.0	3.01	85.23	7.63	4.61	0.00	0.00	97.48	0.00
41	3,461	3,464	58.8	Yes	**15.06**	104.0	3.01	81.79	5.90	4.22	0.00	0.00	91.91	0.00
43	4,295	4,297	56.7	Yes	**12.16**	104.0	3.01	83.66	6.80	4.35	0.00	0.00	94.82	0.00
44	3,721	3,724	58.0	Yes	**14.09**	104.0	3.01	82.42	6.19	4.27	0.00	0.00	92.88	0.00
45	3,485	3,489	57.7	Yes	**14.96**	104.0	3.01	81.85	5.93	4.23	0.00	0.00	92.01	0.00
46	4,688	4,690	33.6	Yes	**10.80**	104.0	3.01	84.42	7.20	4.56	0.00	0.00	96.18	0.00
48	1,472	1,475	44.0	Yes	**25.62**	104.0	3.01	74.37	3.21	3.77	0.00	0.00	81.35	0.00
49	1,258	1,261	38.8	Yes	**27.38**	104.0	3.01	73.01	2.85	3.74	0.00	0.00	79.60	0.00
50	5,799	5,801	54.7	Yes	**8.00**	104.0	3.01	86.27	8.22	4.48	0.00	0.00	98.97	0.00
51	1,721	1,722	39.1	Yes	**23.63**	104.0	3.01	75.72	3.60	4.02	0.00	0.00	83.34	0.00
52	2,034	2,036	39.7	Yes	**21.60**	104.0	3.01	77.17	4.06	4.13	0.00	0.00	85.37	0.00
53	940	943	41.2	Yes	**30.91**	104.0	3.01	70.49	2.28	3.29	0.00	0.00	76.06	0.00
55	662	666	41.6	Yes	**35.15**	104.0	3.01	67.47	1.73	2.62	0.00	0.00	71.82	0.00
56	954	958	43.5	Yes	**30.82**	104.0	3.01	70.62	2.30	3.23	0.00	0.00	76.16	0.00
57	1,011	1,014	42.7	Yes	**30.10**	104.0	3.01	71.12	2.41	3.34	0.00	0.00	76.87	0.00
58	2,702	2,703	42.2	Yes	**18.09**	104.0	3.01	79.64	4.97	4.27	0.00	0.00	88.88	0.00
59	1,256	1,259	43.9	Yes	**27.53**	104.0	3.01	73.00	2.84	3.60	0.00	0.00	79.44	0.00
60	2,674	2,676	42.9	Yes	**18.23**	104.0	3.01	79.55	4.94	4.25	0.00	0.00	88.74	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	3,031	3,032	38.8	Yes	**16.59**	104.0	3.01	80.64	5.39	4.36	0.00	0.00	90.38	0.00
62	3,449	3,450	43.8	Yes	**14.97**	104.0	3.01	81.76	5.88	4.37	0.00	0.00	92.01	0.00
63	4,452	4,453	44.7	Yes	**11.58**	104.0	3.01	83.97	6.96	4.46	0.00	0.00	95.39	0.00
64	5,803	5,804	39.7	Yes	**7.91**	104.0	3.01	86.27	8.22	4.57	0.00	0.00	99.06	0.00
65	6,213	6,214	42.6	Yes	**6.97**	104.0	3.01	86.87	8.57	4.57	0.00	0.00	100.00	0.00
66	5,419	5,420	25.5	No	**8.61**	104.0	3.01	85.68	7.88	4.80	0.00	0.00	98.36	0.00
67	5,342	5,343	43.5	Yes	**9.08**	104.0	3.01	85.56	7.81	4.52	0.00	0.00	97.89	0.00
68	5,834	5,835	41.0	Yes	**7.84**	104.0	3.01	86.32	8.25	4.56	0.00	0.00	99.13	0.00
69	6,251	6,252	40.3	Yes	**6.87**	104.0	3.01	86.92	8.60	4.58	0.00	0.00	100.10	0.00
70	8,437	8,438	21.2	No	**2.41**	104.0	3.01	89.52	10.24	4.80	0.00	0.00	104.56	0.00
71	7,140	7,142	53.7	Yes	**5.05**	104.0	3.01	88.08	9.31	4.54	0.00	0.00	101.93	0.00
72	6,080	6,080	46.0	Yes	**7.29**	104.0	3.01	86.68	8.46	4.54	0.00	0.00	99.68	0.00
73	6,176	6,177	52.9	Yes	**7.11**	104.0	3.01	86.82	8.54	4.51	0.00	0.00	99.86	0.00
74	5,509	5,510	56.8	Yes	**8.74**	104.0	3.01	85.82	7.96	4.45	0.00	0.00	98.24	0.00
75	4,326	4,327	47.0	Yes	**11.99**	104.0	3.01	83.72	6.83	4.43	0.00	0.00	94.98	0.00
76	987	991	46.2	Yes	**30.50**	104.0	3.01	70.92	2.37	3.19	0.00	0.00	76.47	0.00
77	532	537	41.0	Yes	**37.80**	104.0	3.01	65.60	1.45	2.12	0.00	0.00	69.17	0.00
78	7,046	7,048	31.5	Yes	**5.13**	104.0	3.01	87.96	9.23	4.65	0.00	0.00	101.84	0.00
80	2,293	2,296	46.9	Yes	**20.22**	104.0	3.01	78.22	4.43	4.10	0.00	0.00	86.75	0.00
81	8,668	8,669	39.4	Yes	**2.18**	104.0	3.01	89.76	10.39	4.65	0.00	0.00	104.80	0.00
82	2,492	2,493	41.9	Yes	**19.12**	104.0	3.01	78.93	4.70	4.22	0.00	0.00	87.86	0.00
83	4,873	4,874	42.2	Yes	**10.33**	104.0	3.01	84.76	7.38	4.50	0.00	0.00	96.64	0.00
85	1,667	1,668	39.4	Yes	**24.02**	104.0	3.01	75.45	3.51	3.99	0.00	0.00	82.95	0.00
86	2,006	2,008	46.9	Yes	**21.89**	104.0	3.01	77.06	4.02	4.00	0.00	0.00	85.08	0.00
87	6,372	6,373	41.2	Yes	**6.61**	104.0	3.01	87.09	8.70	4.58	0.00	0.00	100.37	0.00
89	5,324	5,325	41.6	Yes	**9.11**	104.0	3.01	85.53	7.80	4.53	0.00	0.00	97.86	0.00
90	1,911	1,913	49.1	Yes	**22.53**	104.0	3.01	76.64	3.89	3.92	0.00	0.00	84.44	0.00
91	3,849	3,851	43.8	Yes	**13.52**	104.0	3.01	82.71	6.33	4.41	0.00	0.00	93.45	0.00
92	6,514	6,515	38.5	Yes	**6.28**	104.0	3.01	87.28	8.82	4.60	0.00	0.00	100.69	0.00
94	7,694	7,695	52.9	Yes	**3.97**	104.0	3.01	88.72	9.72	4.57	0.00	0.00	103.01	0.00
95	8,711	8,712	45.5	Yes	**2.13**	104.0	3.01	89.80	10.42	4.62	0.00	0.00	104.84	0.00
97	6,519	6,521	54.6	Yes	**6.35**	104.0	3.01	87.29	8.82	4.51	0.00	0.00	100.62	0.00
98	8,068	8,070	50.5	Yes	**3.27**	104.0	3.01	89.14	9.98	4.59	0.00	0.00	103.71	0.00
99	7,137	7,138	49.1	Yes	**5.03**	104.0	3.01	88.07	9.30	4.57	0.00	0.00	101.94	0.00
100	3,077	3,080	53.8	Yes	**16.55**	104.0	3.01	80.77	5.44	4.20	0.00	0.00	90.42	0.00
101	9,084	9,085	35.7	Yes	**1.48**	104.0	3.01	90.17	10.66	4.67	0.00	0.00	105.50	0.00
102	3,846	3,849	61.5	Yes	**13.68**	104.0	3.01	82.71	6.33	4.25	0.00	0.00	93.29	0.00
103	9,831	9,833	34.0	Yes	**0.30**	104.0	3.01	90.85	11.13	4.68	0.00	0.00	106.67	0.00
104	3,723	3,725	55.0	Yes	**14.06**	104.0	3.01	82.42	6.19	4.30	0.00	0.00	92.91	0.00
107	7,776	7,777	39.7	Yes	**3.76**	104.0	3.01	88.82	9.77	4.63	0.00	0.00	103.22	0.00
108	7,352	7,353	44.2	Yes	**4.58**	104.0	3.01	88.33	9.46	4.60	0.00	0.00	102.39	0.00
109	1,560	1,563	44.1	Yes	**24.91**	104.0	3.01	74.88	3.35	3.83	0.00	0.00	82.06	0.00
110	1,260	1,262	45.2	Yes	**27.53**	104.0	3.01	73.02	2.85	3.57	0.00	0.00	79.44	0.00
111	978	982	44.7	Yes	**30.55**	104.0	3.01	70.84	2.35	3.22	0.00	0.00	76.42	0.00
113	8,073	8,075	39.7	Yes	**3.21**	104.0	3.01	89.14	9.99	4.63	0.00	0.00	103.76	0.00
114	1,462	1,464	39.6	Yes	**25.60**	104.0	3.01	74.31	3.19	3.87	0.00	0.00	81.37	0.00
115	8,259	8,259	40.1	Yes	**2.89**	104.0	3.01	89.34	10.11	4.63	0.00	0.00	104.09	0.00
116	4,885	4,888	52.0	Yes	**10.37**	104.0	3.01	84.78	7.39	4.44	0.00	0.00	96.61	0.00
118	2,045	2,047	43.1	Yes	**21.59**	104.0	3.01	77.22	4.08	4.08	0.00	0.00	85.38	0.00
119	6,280	6,281	55.0	Yes	**6.88**	104.0	3.01	86.96	8.62	4.50	0.00	0.00	100.09	0.00
120	9,506	9,507	30.3	Yes	**0.79**	104.0	3.01	90.56	10.93	4.69	0.00	0.00	106.18	0.00
121	6,031	6,033	54.6	Yes	**7.45**	104.0	3.01	86.61	8.42	4.49	0.00	0.00	99.52	0.00
125	4,678	4,679	42.4	Yes	**10.89**	104.0	3.01	84.40	7.19	4.49	0.00	0.00	96.08	0.00
126	2,570	2,573	47.4	Yes	**18.79**	104.0	3.01	79.21	4.80	4.17	0.00	0.00	88.18	0.00
127	2,449	2,452	47.4	Yes	**19.40**	104.0	3.01	78.79	4.64	4.14	0.00	0.00	87.57	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	2,213	2,216	49.0	Yes	**20.70**	104.0	3.01	77.91	4.32	4.04	0.00	0.00	86.28	0.00
129	6,820	6,821	27.0	No	**5.44**	104.0	3.01	87.68	9.06	4.80	0.00	0.00	101.54	0.00
130	7,035	7,036	29.8	No	**5.00**	104.0	3.01	87.95	9.22	4.80	0.00	0.00	101.97	0.00
131	7,469	7,469	28.1	No	**4.16**	104.0	3.01	88.47	9.55	4.80	0.00	0.00	102.82	0.00
132	7,792	7,793	26.7	No	**3.55**	104.0	3.01	88.83	9.79	4.80	0.00	0.00	103.42	0.00
133	2,726	2,728	47.9	Yes	**18.05**	104.0	3.01	79.72	5.00	4.20	0.00	0.00	88.92	0.00
134	8,260	8,261	23.4	No	**2.72**	104.0	3.01	89.34	10.11	4.80	0.00	0.00	104.26	0.00
141	6,323	6,325	58.0	Yes	**6.80**	104.0	3.01	87.02	8.66	4.49	0.00	0.00	100.17	0.00
142	4,073	4,076	62.1	Yes	**12.91**	104.0	3.01	83.21	6.57	4.28	0.00	0.00	94.06	0.00
143	6,898	6,900	53.0	Yes	**5.54**	104.0	3.01	87.78	9.12	4.54	0.00	0.00	101.44	0.00
144	3,334	3,337	49.6	Yes	**15.46**	104.0	3.01	81.47	5.75	4.29	0.00	0.00	91.51	0.00
145	1,708	1,711	50.4	Yes	**23.94**	104.0	3.01	75.66	3.58	3.79	0.00	0.00	83.03	0.00
146	1,548	1,551	50.5	Yes	**25.15**	104.0	3.01	74.81	3.33	3.68	0.00	0.00	81.82	0.00

Sum 43.29

Noise sensitive area: H11 H11

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	9,170	9,171	44.3	Yes	**1.37**	104.0	3.01	90.25	10.72	4.64	0.00	0.00	105.60	0.00
2	8,962	8,962	46.3	Yes	**1.72**	104.0	3.01	90.05	10.58	4.62	0.00	0.00	105.26	0.00
3	8,379	8,380	52.9	Yes	**2.73**	104.0	3.01	89.47	10.20	4.59	0.00	0.00	104.25	0.00
4	7,120	7,120	45.8	No	**4.83**	104.0	3.01	88.05	9.29	4.80	0.00	0.00	102.14	0.00
5	7,113	7,114	49.0	Yes	**5.08**	104.0	3.01	88.04	9.28	4.57	0.00	0.00	101.89	0.00
6	7,839	7,841	53.9	Yes	**3.70**	104.0	3.01	88.89	9.82	4.57	0.00	0.00	103.27	0.00
7	6,251	6,253	54.2	Yes	**6.94**	104.0	3.01	86.92	8.60	4.50	0.00	0.00	100.03	0.00
8	9,822	9,823	36.9	Yes	**0.33**	104.0	3.01	90.84	11.13	4.67	0.00	0.00	106.64	0.00
9	8,708	8,709	47.1	Yes	**2.14**	104.0	3.01	89.80	10.42	4.62	0.00	0.00	104.83	0.00
10	8,659	8,660	51.5	Yes	**2.24**	104.0	3.01	89.75	10.39	4.60	0.00	0.00	104.73	0.00
11	10,245	10,247	40.3	Yes	**-0.29**	104.0	3.01	91.21	11.38	4.67	0.00	0.00	107.26	0.00
12	10,031	10,032	41.7	Yes	**0.03**	104.0	3.01	91.03	11.25	4.66	0.00	0.00	106.94	0.00
13	9,567	9,568	47.2	Yes	**0.75**	104.0	3.01	90.62	10.97	4.63	0.00	0.00	106.22	0.00
14	9,188	9,189	47.1	Yes	**1.35**	104.0	3.01	90.27	10.73	4.63	0.00	0.00	105.62	0.00
15	8,354	8,355	48.6	Yes	**2.75**	104.0	3.01	89.44	10.18	4.60	0.00	0.00	104.22	0.00
16	7,975	7,976	49.7	Yes	**3.43**	104.0	3.01	89.04	9.92	4.59	0.00	0.00	103.54	0.00
17	10,480	10,481	37.8	Yes	**-0.63**	104.0	3.01	91.41	11.52	4.68	0.00	0.00	107.60	0.00
18	10,687	10,688	32.5	Yes	**-0.94**	104.0	3.01	91.58	11.64	4.70	0.00	0.00	107.91	0.00
19	9,502	9,503	37.6	Yes	**0.82**	104.0	3.01	90.56	10.93	4.67	0.00	0.00	106.15	0.00
20	8,411	8,412	35.9	Yes	**2.60**	104.0	3.01	89.50	10.22	4.65	0.00	0.00	104.37	0.00
21	6,545	6,546	52.0	Yes	**6.28**	104.0	3.01	87.32	8.84	4.53	0.00	0.00	100.69	0.00
22	5,984	5,985	46.5	Yes	**7.52**	104.0	3.01	86.54	8.38	4.54	0.00	0.00	99.45	0.00
23	5,605	5,606	48.3	Yes	**8.44**	104.0	3.01	85.97	8.05	4.51	0.00	0.00	98.53	0.00
24	6,230	6,231	46.1	Yes	**6.95**	104.0	3.01	86.89	8.58	4.55	0.00	0.00	100.02	0.00
25	3,587	3,588	42.9	Yes	**14.44**	104.0	3.01	82.10	6.04	4.39	0.00	0.00	92.53	0.00
26	6,257	6,258	50.7	Yes	**6.91**	104.0	3.01	86.93	8.61	4.52	0.00	0.00	100.06	0.00
27	4,278	4,279	43.1	Yes	**12.11**	104.0	3.01	83.63	6.78	4.46	0.00	0.00	94.87	0.00
28	5,045	5,047	51.8	Yes	**9.92**	104.0	3.01	85.06	7.54	4.45	0.00	0.00	97.05	0.00
29	5,359	5,360	47.3	Yes	**9.06**	104.0	3.01	85.58	7.83	4.50	0.00	0.00	97.91	0.00
30	5,143	5,143	42.7	Yes	**9.60**	104.0	3.01	85.23	7.63	4.52	0.00	0.00	97.37	0.00
31	5,995	5,996	46.5	No	**7.23**	104.0	3.01	86.56	8.39	4.80	0.00	0.00	99.74	0.00
32	3,343	3,344	44.7	Yes	**15.38**	104.0	3.01	81.49	5.76	4.34	0.00	0.00	91.59	0.00
33	4,523	4,524	41.6	Yes	**11.34**	104.0	3.01	84.11	7.03	4.49	0.00	0.00	95.63	0.00
34	5,917	5,919	51.2	Yes	**7.70**	104.0	3.01	86.44	8.32	4.51	0.00	0.00	99.27	0.00
35	6,545	6,547	53.4	Yes	**6.29**	104.0	3.01	87.32	8.84	4.52	0.00	0.00	100.68	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	6,846	6,848	52.8	Yes	**5.64**	104.0	3.01	87.71	9.08	4.54	0.00	0.00	101.33	0.00
37	5,606	5,607	50.7	Yes	**8.46**	104.0	3.01	85.98	8.05	4.49	0.00	0.00	98.52	0.00
38	3,869	3,870	41.5	Yes	**13.43**	104.0	3.01	82.75	6.35	4.43	0.00	0.00	93.54	0.00
39	4,116	4,118	50.0	Yes	**12.68**	104.0	3.01	83.29	6.62	4.39	0.00	0.00	94.30	0.00
40	5,756	5,757	27.9	Yes	**7.95**	104.0	3.01	86.20	8.18	4.63	0.00	0.00	99.02	0.00
41	4,252	4,254	55.0	Yes	**12.28**	104.0	3.01	83.58	6.76	4.36	0.00	0.00	94.69	0.00
43	5,260	5,262	53.6	Yes	**9.36**	104.0	3.01	85.42	7.74	4.45	0.00	0.00	97.61	0.00
44	4,367	4,370	55.4	Yes	**11.92**	104.0	3.01	83.81	6.88	4.37	0.00	0.00	95.06	0.00
45	4,079	4,082	54.2	Yes	**12.83**	104.0	3.01	83.22	6.58	4.35	0.00	0.00	94.14	0.00
46	5,406	5,407	30.9	Yes	**8.84**	104.0	3.01	85.66	7.87	4.60	0.00	0.00	98.13	0.00
48	2,636	2,638	42.1	Yes	**18.40**	104.0	3.01	79.42	4.89	4.25	0.00	0.00	88.57	0.00
49	2,750	2,752	39.5	Yes	**17.84**	104.0	3.01	79.79	5.04	4.31	0.00	0.00	89.14	0.00
50	7,043	7,044	52.6	Yes	**5.24**	104.0	3.01	87.96	9.23	4.55	0.00	0.00	101.73	0.00
51	3,201	3,201	38.9	Yes	**15.89**	104.0	3.01	81.11	5.59	4.38	0.00	0.00	91.08	0.00
52	3,509	3,509	39.3	Yes	**14.70**	104.0	3.01	81.90	5.95	4.42	0.00	0.00	92.27	0.00
53	2,438	2,439	42.1	Yes	**19.39**	104.0	3.01	78.74	4.63	4.21	0.00	0.00	87.58	0.00
55	1,141	1,144	40.9	Yes	**28.59**	104.0	3.01	72.17	2.64	3.57	0.00	0.00	78.38	0.00
56	965	968	42.3	Yes	**30.64**	104.0	3.01	70.72	2.32	3.29	0.00	0.00	76.33	0.00
57	509	516	39.6	Yes	**38.22**	104.0	3.01	65.25	1.40	2.10	0.00	0.00	68.75	0.00
58	4,061	4,062	41.6	Yes	**12.79**	104.0	3.01	83.17	6.56	4.45	0.00	0.00	94.18	0.00
59	855	860	42.9	Yes	**32.10**	104.0	3.01	69.69	2.12	3.07	0.00	0.00	74.87	0.00
60	1,363	1,366	40.5	Yes	**26.45**	104.0	3.01	73.71	3.03	3.78	0.00	0.00	80.52	0.00
61	1,703	1,706	37.5	Yes	**23.72**	104.0	3.01	75.64	3.57	4.04	0.00	0.00	83.25	0.00
62	2,051	2,053	40.4	Yes	**21.51**	104.0	3.01	77.25	4.09	4.13	0.00	0.00	85.46	0.00
63	3,141	3,143	40.3	Yes	**16.14**	104.0	3.01	80.95	5.52	4.36	0.00	0.00	90.83	0.00
64	4,419	4,421	36.5	Yes	**11.62**	104.0	3.01	83.91	6.93	4.52	0.00	0.00	95.36	0.00
65	4,781	4,782	40.5	Yes	**10.58**	104.0	3.01	84.59	7.29	4.51	0.00	0.00	96.39	0.00
66	6,058	6,059	24.1	No	**7.08**	104.0	3.01	86.65	8.44	4.80	0.00	0.00	99.89	0.00
67	3,885	3,887	41.2	Yes	**13.37**	104.0	3.01	82.79	6.37	4.44	0.00	0.00	93.60	0.00
68	4,362	4,363	39.2	Yes	**11.81**	104.0	3.01	83.80	6.87	4.49	0.00	0.00	95.16	0.00
69	4,839	4,841	39.0	Yes	**10.41**	104.0	3.01	84.70	7.34	4.52	0.00	0.00	96.57	0.00
70	9,453	9,453	20.4	No	**0.76**	104.0	3.01	90.51	10.90	4.80	0.00	0.00	106.21	0.00
71	8,355	8,357	50.9	Yes	**2.76**	104.0	3.01	89.44	10.18	4.59	0.00	0.00	104.21	0.00
72	7,501	7,501	46.9	No	**4.10**	104.0	3.01	88.50	9.57	4.80	0.00	0.00	102.88	0.00
73	7,501	7,502	51.4	Yes	**4.33**	104.0	3.01	88.50	9.57	4.57	0.00	0.00	102.64	0.00
74	6,736	6,737	54.7	Yes	**5.89**	104.0	3.01	87.57	8.99	4.52	0.00	0.00	101.08	0.00
75	5,618	5,619	45.7	Yes	**8.40**	104.0	3.01	85.99	8.06	4.52	0.00	0.00	98.58	0.00
76	1,254	1,258	47.2	Yes	**27.63**	104.0	3.01	72.99	2.84	3.51	0.00	0.00	79.34	0.00
77	1,905	1,907	40.5	Yes	**22.42**	104.0	3.01	76.61	3.88	4.07	0.00	0.00	84.55	0.00
78	8,079	8,080	29.5	Yes	**3.16**	104.0	3.01	89.15	9.99	4.68	0.00	0.00	103.81	0.00
80	974	979	44.5	Yes	**30.59**	104.0	3.01	70.81	2.34	3.23	0.00	0.00	76.38	0.00
81	9,778	9,779	36.3	Yes	**0.39**	104.0	3.01	90.81	11.10	4.67	0.00	0.00	106.58	0.00
82	3,942	3,943	41.2	Yes	**13.18**	104.0	3.01	82.92	6.43	4.44	0.00	0.00	93.79	0.00
83	3,478	3,480	38.9	Yes	**14.81**	104.0	3.01	81.83	5.92	4.42	0.00	0.00	92.16	0.00
85	3,105	3,106	39.7	Yes	**16.29**	104.0	3.01	80.84	5.48	4.36	0.00	0.00	90.68	0.00
86	709	715	44.4	Yes	**34.42**	104.0	3.01	68.08	1.83	2.64	0.00	0.00	72.55	0.00
87	4,926	4,927	39.1	Yes	**10.16**	104.0	3.01	84.85	7.43	4.53	0.00	0.00	96.81	0.00
89	3,960	3,962	37.6	Yes	**13.09**	104.0	3.01	82.96	6.45	4.48	0.00	0.00	93.88	0.00
90	746	752	44.4	Yes	**33.80**	104.0	3.01	68.53	1.90	2.74	0.00	0.00	73.17	0.00
91	2,498	2,500	40.0	Yes	**19.05**	104.0	3.01	78.96	4.71	4.25	0.00	0.00	87.92	0.00
92	5,184	5,185	34.4	Yes	**9.44**	104.0	3.01	85.30	7.67	4.57	0.00	0.00	97.54	0.00
94	8,870	8,871	49.3	Yes	**1.88**	104.0	3.01	89.96	10.52	4.61	0.00	0.00	105.10	0.00
95	9,944	9,945	42.2	Yes	**0.16**	104.0	3.01	90.95	11.20	4.66	0.00	0.00	106.81	0.00
97	7,604	7,606	51.1	Yes	**4.13**	104.0	3.01	88.62	9.65	4.57	0.00	0.00	102.85	0.00
98	9,268	9,269	47.2	Yes	**1.22**	104.0	3.01	90.34	10.78	4.63	0.00	0.00	105.75	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	8,528	8,529	48.2	No	**2.26**	104.0	3.01	89.62	10.30	4.80	0.00	0.00	104.71	0.00
100	3,719	3,721	52.0	Yes	**14.05**	104.0	3.01	82.41	6.19	4.32	0.00	0.00	92.92	0.00
101	10,199	10,200	32.8	Yes	**-0.24**	104.0	3.01	91.17	11.35	4.69	0.00	0.00	107.22	0.00
102	4,585	4,587	57.3	Yes	**11.27**	104.0	3.01	84.23	7.10	4.37	0.00	0.00	95.70	0.00
103	10,981	10,982	30.4	Yes	**-1.35**	104.0	3.01	91.81	11.80	4.71	0.00	0.00	108.32	0.00
104	4,629	4,631	51.7	Yes	**11.10**	104.0	3.01	84.31	7.14	4.42	0.00	0.00	95.87	0.00
107	8,851	8,852	37.8	Yes	**1.86**	104.0	3.01	89.94	10.51	4.65	0.00	0.00	105.11	0.00
108	8,793	8,794	44.4	No	**1.82**	104.0	3.01	89.88	10.47	4.80	0.00	0.00	105.16	0.00
109	819	824	42.5	Yes	**32.59**	104.0	3.01	69.32	2.05	3.01	0.00	0.00	74.38	0.00
110	2,256	2,257	41.0	Yes	**20.34**	104.0	3.01	78.07	4.38	4.18	0.00	0.00	86.63	0.00
111	1,642	1,644	44.6	Yes	**24.31**	104.0	3.01	75.32	3.48	3.87	0.00	0.00	82.66	0.00
113	9,164	9,166	36.1	Yes	**1.35**	104.0	3.01	90.24	10.72	4.67	0.00	0.00	105.62	0.00
114	2,856	2,857	39.7	Yes	**17.36**	104.0	3.01	80.12	5.17	4.32	0.00	0.00	89.61	0.00
115	9,568	9,569	38.5	Yes	**0.72**	104.0	3.01	90.62	10.97	4.66	0.00	0.00	106.25	0.00
116	5,781	5,783	46.7	Yes	**8.00**	104.0	3.01	86.24	8.20	4.52	0.00	0.00	98.97	0.00
118	1,061	1,066	40.8	Yes	**29.44**	104.0	3.01	71.55	2.50	3.48	0.00	0.00	77.53	0.00
119	7,505	7,506	52.5	Yes	**4.32**	104.0	3.01	88.51	9.58	4.56	0.00	0.00	102.65	0.00
120	10,614	10,615	28.0	Yes	**-0.85**	104.0	3.01	91.52	11.60	4.71	0.00	0.00	107.82	0.00
121	7,185	7,187	51.5	Yes	**4.95**	104.0	3.01	88.13	9.34	4.56	0.00	0.00	102.03	0.00
125	3,318	3,320	38.0	Yes	**15.41**	104.0	3.01	81.42	5.73	4.41	0.00	0.00	91.56	0.00
126	2,670	2,672	43.0	Yes	**18.25**	104.0	3.01	79.54	4.93	4.25	0.00	0.00	88.72	0.00
127	2,451	2,454	43.6	Yes	**19.34**	104.0	3.01	78.80	4.65	4.19	0.00	0.00	87.63	0.00
128	2,162	2,165	46.1	Yes	**20.94**	104.0	3.01	77.71	4.25	4.07	0.00	0.00	86.03	0.00
129	7,602	7,602	26.7	No	**3.91**	104.0	3.01	88.62	9.65	4.80	0.00	0.00	103.07	0.00
130	7,705	7,706	29.4	No	**3.71**	104.0	3.01	88.74	9.72	4.80	0.00	0.00	103.26	0.00
131	8,152	8,152	27.8	No	**2.91**	104.0	3.01	89.23	10.04	4.80	0.00	0.00	104.06	0.00
132	8,513	8,514	27.1	No	**2.28**	104.0	3.01	89.60	10.29	4.80	0.00	0.00	104.69	0.00
133	3,676	3,677	45.1	Yes	**14.14**	104.0	3.01	82.31	6.14	4.38	0.00	0.00	92.83	0.00
134	9,304	9,305	22.5	No	**0.99**	104.0	3.01	90.37	10.80	4.80	0.00	0.00	105.98	0.00
141	7,432	7,434	54.0	Yes	**4.47**	104.0	3.01	88.42	9.52	4.55	0.00	0.00	102.50	0.00
142	4,854	4,857	58.1	Yes	**10.49**	104.0	3.01	84.73	7.36	4.39	0.00	0.00	96.48	0.00
143	7,997	7,999	49.1	Yes	**3.39**	104.0	3.01	89.06	9.93	4.59	0.00	0.00	103.58	0.00
144	3,829	3,831	45.4	Yes	**13.60**	104.0	3.01	82.67	6.31	4.40	0.00	0.00	93.37	0.00
145	977	982	46.3	Yes	**30.61**	104.0	3.01	70.84	2.35	3.17	0.00	0.00	76.36	0.00
146	1,156	1,161	46.1	Yes	**28.58**	104.0	3.01	72.29	2.67	3.43	0.00	0.00	78.40	0.00

Sum 43.89

Noise sensitive area: H12 H12

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	11,403	11,403	51.5	No	**-2.01**	104.0	3.01	92.14	12.04	4.80	0.00	0.00	108.98	0.00
2	11,175	11,176	51.7	No	**-1.71**	104.0	3.01	91.97	11.91	4.80	0.00	0.00	108.68	0.00
3	10,587	10,587	57.2	Yes	**-0.72**	104.0	3.01	91.50	11.58	4.62	0.00	0.00	107.69	0.00
4	9,254	9,255	46.0	No	**1.07**	104.0	3.01	90.33	10.77	4.80	0.00	0.00	105.90	0.00
5	9,313	9,314	51.6	No	**0.98**	104.0	3.01	90.38	10.81	4.80	0.00	0.00	105.99	0.00
6	10,059	10,060	59.0	Yes	**0.05**	104.0	3.01	91.05	11.27	4.60	0.00	0.00	106.92	0.00
7	8,519	8,520	61.0	Yes	**2.52**	104.0	3.01	89.61	10.29	4.56	0.00	0.00	104.46	0.00
8	12,054	12,054	44.1	No	**-2.84**	104.0	3.01	92.62	12.39	4.80	0.00	0.00	109.81	0.00
9	10,950	10,951	54.8	No	**-1.40**	104.0	3.01	91.79	11.79	4.80	0.00	0.00	108.38	0.00
10	10,918	10,919	60.3	Yes	**-1.17**	104.0	3.01	91.76	11.77	4.61	0.00	0.00	108.15	0.00
11	12,512	12,513	50.3	No	**-3.40**	104.0	3.01	92.95	12.62	4.80	0.00	0.00	110.37	0.00
12	12,296	12,297	51.7	No	**-3.14**	104.0	3.01	92.80	12.51	4.80	0.00	0.00	110.11	0.00
13	11,833	11,834	57.0	Yes	**-2.40**	104.0	3.01	92.46	12.27	4.64	0.00	0.00	109.37	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	11,456	11,457	56.9	Yes	**-1.91**	104.0	3.01	92.18	12.07	4.63	0.00	0.00	108.88	0.00
15	10,621	10,623	58.0	Yes	**-0.77**	104.0	3.01	91.52	11.60	4.61	0.00	0.00	107.74	0.00
16	10,241	10,242	58.4	Yes	**-0.22**	104.0	3.01	91.21	11.38	4.61	0.00	0.00	107.19	0.00
17	12,746	12,747	47.9	No	**-3.68**	104.0	3.01	93.11	12.74	4.80	0.00	0.00	110.65	0.00
18	12,955	12,956	42.7	Yes	**-3.81**	104.0	3.01	93.25	12.85	4.69	0.00	0.00	110.78	0.00
19	11,770	11,771	47.8	Yes	**-2.34**	104.0	3.01	92.42	12.24	4.66	0.00	0.00	109.32	0.00
20	10,677	10,678	45.7	Yes	**-0.88**	104.0	3.01	91.57	11.63	4.65	0.00	0.00	107.86	0.00
21	8,729	8,729	53.6	Yes	**2.13**	104.0	3.01	89.82	10.43	4.59	0.00	0.00	104.84	0.00
22	8,110	8,111	45.8	No	**2.98**	104.0	3.01	89.18	10.01	4.80	0.00	0.00	103.99	0.00
23	7,726	7,726	47.3	Yes	**3.88**	104.0	3.01	88.76	9.74	4.59	0.00	0.00	103.09	0.00
24	8,359	8,359	45.6	No	**2.55**	104.0	3.01	89.44	10.18	4.80	0.00	0.00	104.42	0.00
25	5,830	5,831	43.7	Yes	**7.87**	104.0	3.01	86.31	8.24	4.54	0.00	0.00	99.10	0.00
26	8,500	8,501	55.0	Yes	**2.53**	104.0	3.01	89.59	10.28	4.58	0.00	0.00	104.45	0.00
27	6,542	6,543	46.5	Yes	**6.26**	104.0	3.01	87.32	8.84	4.56	0.00	0.00	100.71	0.00
28	7,310	7,311	57.7	Yes	**4.73**	104.0	3.01	88.28	9.43	4.53	0.00	0.00	102.24	0.00
29	7,543	7,544	47.7	Yes	**4.23**	104.0	3.01	88.55	9.61	4.58	0.00	0.00	102.74	0.00
30	7,264	7,264	41.2	No	**4.55**	104.0	3.01	88.22	9.40	4.80	0.00	0.00	102.42	0.00
31	8,017	8,018	45.9	Yes	**3.34**	104.0	3.01	89.08	9.95	4.60	0.00	0.00	103.63	0.00
32	5,545	5,545	43.0	Yes	**8.56**	104.0	3.01	85.88	8.00	4.54	0.00	0.00	98.41	0.00
33	6,642	6,643	39.8	Yes	**6.01**	104.0	3.01	87.45	8.92	4.60	0.00	0.00	100.96	0.00
34	8,185	8,186	57.6	Yes	**3.09**	104.0	3.01	89.26	10.06	4.56	0.00	0.00	103.89	0.00
35	8,813	8,814	60.5	Yes	**2.02**	104.0	3.01	89.90	10.49	4.57	0.00	0.00	104.96	0.00
36	9,113	9,114	60.0	Yes	**1.52**	104.0	3.01	90.19	10.68	4.58	0.00	0.00	105.45	0.00
37	7,874	7,875	56.9	Yes	**3.65**	104.0	3.01	88.93	9.84	4.55	0.00	0.00	103.32	0.00
38	6,129	6,129	43.6	Yes	**7.17**	104.0	3.01	86.75	8.50	4.56	0.00	0.00	99.80	0.00
39	6,376	6,377	55.1	Yes	**6.67**	104.0	3.01	87.09	8.70	4.51	0.00	0.00	100.30	0.00
40	7,921	7,922	33.5	Yes	**3.46**	104.0	3.01	88.98	9.88	4.66	0.00	0.00	103.51	0.00
41	6,495	6,497	60.3	Yes	**6.43**	104.0	3.01	87.25	8.80	4.48	0.00	0.00	100.54	0.00
43	7,523	7,524	60.2	Yes	**4.32**	104.0	3.01	88.53	9.59	4.53	0.00	0.00	102.65	0.00
44	6,573	6,575	61.1	Yes	**6.27**	104.0	3.01	87.36	8.86	4.48	0.00	0.00	100.70	0.00
45	6,276	6,277	59.4	Yes	**6.92**	104.0	3.01	86.96	8.62	4.48	0.00	0.00	100.05	0.00
46	7,615	7,616	37.6	Yes	**4.05**	104.0	3.01	88.63	9.66	4.63	0.00	0.00	102.92	0.00
48	4,880	4,881	41.4	Yes	**10.31**	104.0	3.01	84.77	7.38	4.51	0.00	0.00	96.66	0.00
49	4,788	4,789	37.0	Yes	**10.54**	104.0	3.01	84.60	7.29	4.54	0.00	0.00	96.43	0.00
50	9,294	9,294	58.4	Yes	**1.22**	104.0	3.01	90.36	10.80	4.59	0.00	0.00	105.75	0.00
51	5,263	5,264	36.4	Yes	**9.24**	104.0	3.01	85.43	7.74	4.56	0.00	0.00	97.73	0.00
52	5,580	5,580	37.0	Yes	**8.44**	104.0	3.01	85.93	8.03	4.57	0.00	0.00	98.53	0.00
53	4,455	4,455	39.4	Yes	**11.53**	104.0	3.01	83.98	6.96	4.50	0.00	0.00	95.44	0.00
55	2,964	2,965	34.2	Yes	**16.82**	104.0	3.01	80.44	5.30	4.41	0.00	0.00	90.15	0.00
56	2,657	2,658	36.0	Yes	**18.23**	104.0	3.01	79.49	4.92	4.34	0.00	0.00	88.74	0.00
57	2,739	2,740	36.2	Yes	**17.85**	104.0	3.01	79.75	5.02	4.35	0.00	0.00	89.12	0.00
58	6,253	6,254	40.7	Yes	**6.87**	104.0	3.01	86.92	8.60	4.58	0.00	0.00	100.10	0.00
59	2,346	2,348	37.4	Yes	**19.80**	104.0	3.01	78.41	4.50	4.25	0.00	0.00	87.17	0.00
60	910	915	41.2	Yes	**31.28**	104.0	3.01	70.23	2.22	3.24	0.00	0.00	75.69	0.00
61	566	572	40.7	Yes	**36.99**	104.0	3.01	66.14	1.53	2.31	0.00	0.00	69.98	0.00
62	2,368	2,370	44.1	Yes	**19.78**	104.0	3.01	78.50	4.53	4.16	0.00	0.00	87.19	0.00
63	3,316	3,318	46.3	Yes	**15.50**	104.0	3.01	81.42	5.73	4.32	0.00	0.00	91.47	0.00
64	4,011	4,012	48.1	Yes	**13.01**	104.0	3.01	83.07	6.50	4.39	0.00	0.00	93.96	0.00
65	4,068	4,070	48.5	Yes	**12.82**	104.0	3.01	83.19	6.57	4.39	0.00	0.00	94.15	0.00
66	8,230	8,231	30.2	Yes	**2.89**	104.0	3.01	89.31	10.09	4.67	0.00	0.00	104.08	0.00
67	3,164	3,165	48.0	Yes	**16.13**	104.0	3.01	81.01	5.55	4.28	0.00	0.00	90.84	0.00
68	3,420	3,421	46.2	Yes	**15.10**	104.0	3.01	81.68	5.85	4.34	0.00	0.00	91.87	0.00
69	4,231	4,232	46.7	Yes	**12.28**	104.0	3.01	83.53	6.74	4.42	0.00	0.00	94.69	0.00
70	11,713	11,713	28.9	No	**-2.41**	104.0	3.01	92.37	12.21	4.80	0.00	0.00	109.38	0.00
71	10,614	10,615	59.2	Yes	**-0.75**	104.0	3.01	91.52	11.60	4.61	0.00	0.00	107.72	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	9,641	9,642	47.5	No	**0.47**	104.0	3.01	90.68	11.02	4.80	0.00	0.00	106.50	0.00
73	9,721	9,721	56.1	Yes	**0.55**	104.0	3.01	90.75	11.06	4.60	0.00	0.00	106.42	0.00
74	8,990	8,991	60.3	Yes	**1.72**	104.0	3.01	90.08	10.60	4.57	0.00	0.00	105.25	0.00
75	7,849	7,850	48.6	No	**3.45**	104.0	3.01	88.90	9.83	4.80	0.00	0.00	103.52	0.00
76	3,522	3,523	45.0	Yes	**14.70**	104.0	3.01	81.94	5.97	4.36	0.00	0.00	92.27	0.00
77	4,059	4,060	37.2	Yes	**12.76**	104.0	3.01	83.17	6.55	4.49	0.00	0.00	94.21	0.00
78	10,344	10,344	38.9	Yes	**-0.43**	104.0	3.01	91.29	11.44	4.67	0.00	0.00	107.40	0.00
80	1,305	1,308	40.7	Yes	**26.98**	104.0	3.01	73.33	2.93	3.73	0.00	0.00	79.99	0.00
81	12,046	12,047	46.5	Yes	**-2.70**	104.0	3.01	92.62	12.38	4.67	0.00	0.00	109.67	0.00
82	6,051	6,051	39.3	Yes	**7.32**	104.0	3.01	86.64	8.43	4.58	0.00	0.00	99.65	0.00
83	3,220	3,221	47.5	Yes	**15.90**	104.0	3.01	81.16	5.61	4.30	0.00	0.00	91.07	0.00
85	4,875	4,876	37.0	Yes	**10.29**	104.0	3.01	84.76	7.38	4.54	0.00	0.00	96.68	0.00
86	1,592	1,594	37.3	Yes	**24.53**	104.0	3.01	75.05	3.40	4.00	0.00	0.00	82.45	0.00
87	4,110	4,111	47.7	Yes	**12.68**	104.0	3.01	83.28	6.61	4.40	0.00	0.00	94.29	0.00
89	3,724	3,725	46.9	Yes	**13.99**	104.0	3.01	82.42	6.19	4.37	0.00	0.00	92.99	0.00
90	2,578	2,580	44.6	Yes	**18.72**	104.0	3.01	79.23	4.81	4.21	0.00	0.00	88.25	0.00
91	2,769	2,771	45.2	Yes	**17.82**	104.0	3.01	79.85	5.06	4.24	0.00	0.00	89.15	0.00
92	4,882	4,883	44.0	Yes	**10.32**	104.0	3.01	84.77	7.38	4.49	0.00	0.00	96.65	0.00
94	11,135	11,136	58.7	Yes	**-1.47**	104.0	3.01	91.93	11.89	4.62	0.00	0.00	108.45	0.00
95	12,200	12,201	51.3	No	**-3.02**	104.0	3.01	92.73	12.46	4.80	0.00	0.00	109.99	0.00
97	9,872	9,874	60.6	Yes	**0.33**	104.0	3.01	90.89	11.16	4.59	0.00	0.00	106.64	0.00
98	11,530	11,531	56.7	Yes	**-2.01**	104.0	3.01	92.24	12.11	4.63	0.00	0.00	108.98	0.00
99	10,701	10,702	51.8	No	**-1.06**	104.0	3.01	91.59	11.65	4.80	0.00	0.00	108.03	0.00
100	5,939	5,940	55.4	Yes	**7.68**	104.0	3.01	86.48	8.34	4.48	0.00	0.00	99.30	0.00
101	12,467	12,468	43.0	Yes	**-3.23**	104.0	3.01	92.92	12.60	4.68	0.00	0.00	110.20	0.00
102	6,812	6,814	63.6	Yes	**5.77**	104.0	3.01	87.67	9.05	4.48	0.00	0.00	101.20	0.00
103	13,248	13,249	40.6	Yes	**-4.16**	104.0	3.01	93.44	12.99	4.70	0.00	0.00	111.13	0.00
104	6,887	6,889	57.8	Yes	**5.58**	104.0	3.01	87.76	9.11	4.51	0.00	0.00	101.39	0.00
107	11,118	11,119	47.6	Yes	**-1.48**	104.0	3.01	91.92	11.88	4.65	0.00	0.00	108.46	0.00
108	10,904	10,904	46.2	No	**-1.34**	104.0	3.01	91.75	11.76	4.80	0.00	0.00	108.31	0.00
109	2,028	2,030	38.9	Yes	**21.62**	104.0	3.01	77.15	4.06	4.14	0.00	0.00	85.35	0.00
110	4,516	4,517	41.0	Yes	**11.36**	104.0	3.01	84.10	7.02	4.49	0.00	0.00	95.61	0.00
111	3,909	3,910	44.1	Yes	**13.32**	104.0	3.01	82.84	6.39	4.41	0.00	0.00	93.65	0.00
113	11,432	11,433	46.3	Yes	**-1.91**	104.0	3.01	92.16	12.05	4.66	0.00	0.00	108.88	0.00
114	4,580	4,581	36.4	Yes	**11.14**	104.0	3.01	84.22	7.09	4.53	0.00	0.00	95.84	0.00
115	11,798	11,798	45.4	No	**-2.52**	104.0	3.01	92.44	12.25	4.80	0.00	0.00	109.49	0.00
116	8,032	8,033	54.6	Yes	**3.35**	104.0	3.01	89.10	9.96	4.57	0.00	0.00	103.62	0.00
118	1,552	1,554	40.9	Yes	**24.91**	104.0	3.01	74.83	3.33	3.90	0.00	0.00	82.06	0.00
119	9,761	9,761	59.5	Yes	**0.50**	104.0	3.01	90.79	11.09	4.59	0.00	0.00	106.47	0.00
120	12,882	12,883	38.1	Yes	**-3.74**	104.0	3.01	93.20	12.81	4.70	0.00	0.00	110.71	0.00
121	9,451	9,452	59.1	Yes	**0.98**	104.0	3.01	90.51	10.90	4.59	0.00	0.00	106.00	0.00
125	3,258	3,259	45.7	Yes	**15.73**	104.0	3.01	81.26	5.66	4.32	0.00	0.00	91.24	0.00
126	4,758	4,759	46.6	Yes	**10.69**	104.0	3.01	84.55	7.26	4.47	0.00	0.00	96.28	0.00
127	4,518	4,520	47.4	Yes	**11.40**	104.0	3.01	84.10	7.03	4.44	0.00	0.00	95.57	0.00
128	4,245	4,246	49.5	Yes	**12.26**	104.0	3.01	83.56	6.75	4.40	0.00	0.00	94.71	0.00
129	9,810	9,810	33.5	Yes	**0.34**	104.0	3.01	90.83	11.12	4.68	0.00	0.00	106.64	0.00
130	9,870	9,870	35.4	Yes	**0.25**	104.0	3.01	90.89	11.16	4.68	0.00	0.00	106.72	0.00
131	10,317	10,318	33.8	Yes	**-0.41**	104.0	3.01	91.27	11.42	4.69	0.00	0.00	107.38	0.00
132	10,692	10,693	33.3	Yes	**-0.94**	104.0	3.01	91.58	11.64	4.69	0.00	0.00	107.92	0.00
133	5,943	5,944	48.6	Yes	**7.63**	104.0	3.01	86.48	8.34	4.52	0.00	0.00	99.34	0.00
134	11,568	11,569	31.5	Yes	**-2.13**	104.0	3.01	92.27	12.13	4.71	0.00	0.00	109.10	0.00
141	9,701	9,702	62.8	Yes	**0.60**	104.0	3.01	90.74	11.05	4.58	0.00	0.00	106.37	0.00
142	7,088	7,090	65.2	Yes	**5.21**	104.0	3.01	88.01	9.27	4.49	0.00	0.00	101.77	0.00
143	10,265	10,267	58.8	Yes	**-0.25**	104.0	3.01	91.23	11.39	4.61	0.00	0.00	107.23	0.00
144	6,001	6,002	49.9	Yes	**7.50**	104.0	3.01	86.57	8.39	4.52	0.00	0.00	99.47	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	3,031	3,033	46.5	Yes	**16.67**	104.0	3.01	80.64	5.39	4.28	0.00	0.00	90.30	0.00
146	3,311	3,312	46.4	Yes	**15.53**	104.0	3.01	81.40	5.72	4.32	0.00	0.00	91.44	0.00
Sum	39.46													

Noise sensitive area: H13 H13

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	12,359	12,360	51.7	Yes	**-3.07**	104.0	3.01	92.84	12.55	4.66	0.00	0.00	110.04	0.00
2	12,125	12,125	51.8	Yes	**-2.78**	104.0	3.01	92.67	12.42	4.65	0.00	0.00	109.75	0.00
3	11,534	11,535	57.2	Yes	**-2.01**	104.0	3.01	92.24	12.11	4.63	0.00	0.00	108.98	0.00
4	10,178	10,178	45.1	Yes	**-0.17**	104.0	3.01	91.15	11.34	4.65	0.00	0.00	107.14	0.00
5	10,260	10,260	51.1	Yes	**-0.27**	104.0	3.01	91.22	11.39	4.63	0.00	0.00	107.24	0.00
6	11,012	11,013	58.8	Yes	**-1.31**	104.0	3.01	91.84	11.82	4.62	0.00	0.00	108.28	0.00
7	9,493	9,494	61.2	Yes	**0.92**	104.0	3.01	90.55	10.92	4.58	0.00	0.00	106.05	0.00
8	13,010	13,010	44.3	Yes	**-3.87**	104.0	3.01	93.29	12.87	4.68	0.00	0.00	110.84	0.00
9	11,912	11,912	55.5	Yes	**-2.50**	104.0	3.01	92.52	12.31	4.64	0.00	0.00	109.47	0.00
10	11,887	11,888	61.3	Yes	**-2.45**	104.0	3.01	92.50	12.30	4.62	0.00	0.00	109.43	0.00
11	13,484	13,485	51.8	Yes	**-4.40**	104.0	3.01	93.60	13.11	4.67	0.00	0.00	111.37	0.00
12	13,268	13,269	53.2	Yes	**-4.15**	104.0	3.01	93.46	13.00	4.66	0.00	0.00	111.12	0.00
13	12,806	12,807	58.4	Yes	**-3.59**	104.0	3.01	93.15	12.77	4.64	0.00	0.00	110.57	0.00
14	12,430	12,431	58.2	Yes	**-3.14**	104.0	3.01	92.89	12.58	4.64	0.00	0.00	110.11	0.00
15	11,595	11,596	59.1	Yes	**-2.08**	104.0	3.01	92.29	12.14	4.63	0.00	0.00	109.06	0.00
16	11,214	11,215	59.4	Yes	**-1.58**	104.0	3.01	92.00	11.93	4.62	0.00	0.00	108.55	0.00
17	13,719	13,720	49.4	Yes	**-4.67**	104.0	3.01	93.75	13.22	4.68	0.00	0.00	111.64	0.00
18	13,929	13,930	44.2	Yes	**-4.92**	104.0	3.01	93.88	13.32	4.69	0.00	0.00	111.89	0.00
19	12,745	12,746	49.2	Yes	**-3.55**	104.0	3.01	93.11	12.74	4.67	0.00	0.00	110.52	0.00
20	11,653	11,654	47.1	Yes	**-2.19**	104.0	3.01	92.33	12.17	4.66	0.00	0.00	109.17	0.00
21	9,670	9,670	53.3	Yes	**0.62**	104.0	3.01	90.71	11.03	4.61	0.00	0.00	106.35	0.00
22	9,034	9,034	44.8	Yes	**1.59**	104.0	3.01	90.12	10.63	4.63	0.00	0.00	105.38	0.00
23	8,649	8,649	46.2	Yes	**2.24**	104.0	3.01	89.74	10.38	4.62	0.00	0.00	104.73	0.00
24	9,282	9,282	44.6	Yes	**1.19**	104.0	3.01	90.35	10.79	4.64	0.00	0.00	105.78	0.00
25	6,795	6,795	43.0	Yes	**5.71**	104.0	3.01	87.64	9.04	4.58	0.00	0.00	101.27	0.00
26	9,463	9,463	54.9	Yes	**0.94**	104.0	3.01	90.52	10.90	4.60	0.00	0.00	106.03	0.00
27	7,514	7,515	45.8	Yes	**4.28**	104.0	3.01	88.52	9.58	4.59	0.00	0.00	102.69	0.00
28	8,286	8,287	57.9	Yes	**2.91**	104.0	3.01	89.37	10.13	4.56	0.00	0.00	104.06	0.00
29	8,487	8,487	47.0	Yes	**2.52**	104.0	3.01	89.58	10.27	4.61	0.00	0.00	104.46	0.00
30	8,188	8,189	40.1	Yes	**3.01**	104.0	3.01	89.26	10.06	4.63	0.00	0.00	103.96	0.00
31	8,907	8,907	45.0	Yes	**1.80**	104.0	3.01	89.99	10.55	4.63	0.00	0.00	105.17	0.00
32	6,498	6,499	42.1	Yes	**6.33**	104.0	3.01	87.26	8.80	4.58	0.00	0.00	100.64	0.00
33	7,568	7,568	38.9	Yes	**4.14**	104.0	3.01	88.58	9.62	4.62	0.00	0.00	102.83	0.00
34	9,160	9,161	57.7	Yes	**1.44**	104.0	3.01	90.24	10.71	4.59	0.00	0.00	105.54	0.00
35	9,786	9,787	60.8	Yes	**0.47**	104.0	3.01	90.81	11.10	4.59	0.00	0.00	106.51	0.00
36	10,086	10,087	60.6	Yes	**0.02**	104.0	3.01	91.07	11.29	4.60	0.00	0.00	106.96	0.00
37	8,849	8,850	56.9	Yes	**1.94**	104.0	3.01	89.94	10.51	4.58	0.00	0.00	105.03	0.00
38	7,099	7,099	42.9	Yes	**5.08**	104.0	3.01	88.02	9.27	4.59	0.00	0.00	101.89	0.00
39	7,351	7,352	55.2	Yes	**4.64**	104.0	3.01	88.33	9.46	4.54	0.00	0.00	102.34	0.00
40	8,878	8,878	34.2	Yes	**1.81**	104.0	3.01	89.97	10.53	4.67	0.00	0.00	105.16	0.00
41	7,468	7,470	60.8	Yes	**4.43**	104.0	3.01	88.47	9.55	4.52	0.00	0.00	102.54	0.00
43	8,499	8,500	60.7	Yes	**2.55**	104.0	3.01	89.59	10.28	4.56	0.00	0.00	104.42	0.00
44	7,540	7,541	62.1	Yes	**4.30**	104.0	3.01	88.55	9.60	4.52	0.00	0.00	102.67	0.00
45	7,241	7,242	60.1	Yes	**4.88**	104.0	3.01	88.20	9.38	4.52	0.00	0.00	102.10	0.00
46	8,581	8,582	38.8	Yes	**2.32**	104.0	3.01	89.67	10.33	4.65	0.00	0.00	104.65	0.00
48	5,847	5,847	40.8	Yes	**7.81**	104.0	3.01	86.34	8.26	4.56	0.00	0.00	99.16	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	5,705	5,706	36.3	Yes	**8.13**	104.0	3.01	86.13	8.14	4.58	0.00	0.00	98.85	0.00
50	10,259	10,259	58.7	Yes	**-0.24**	104.0	3.01	91.22	11.39	4.61	0.00	0.00	107.22	0.00
51	6,182	6,183	35.7	Yes	**7.00**	104.0	3.01	86.82	8.54	4.60	0.00	0.00	99.97	0.00
52	6,498	6,498	36.1	Yes	**6.30**	104.0	3.01	87.26	8.80	4.61	0.00	0.00	100.67	0.00
53	5,371	5,372	38.8	Yes	**8.98**	104.0	3.01	85.60	7.84	4.55	0.00	0.00	97.99	0.00
55	3,882	3,883	34.9	Yes	**13.33**	104.0	3.01	82.78	6.37	4.49	0.00	0.00	93.64	0.00
56	3,574	3,575	37.0	Yes	**14.44**	104.0	3.01	82.07	6.02	4.45	0.00	0.00	92.54	0.00
57	3,709	3,709	36.3	Yes	**13.95**	104.0	3.01	82.39	6.17	4.47	0.00	0.00	93.03	0.00
58	7,202	7,202	40.0	Yes	**4.86**	104.0	3.01	88.15	9.35	4.61	0.00	0.00	102.11	0.00
59	3,262	3,263	38.7	Yes	**15.64**	104.0	3.01	81.27	5.66	4.40	0.00	0.00	91.33	0.00
60	1,882	1,884	43.9	Yes	**22.63**	104.0	3.01	76.50	3.84	4.00	0.00	0.00	84.35	0.00
61	1,541	1,544	43.0	Yes	**25.04**	104.0	3.01	74.77	3.32	3.84	0.00	0.00	81.93	0.00
62	3,089	3,090	45.5	Yes	**16.42**	104.0	3.01	80.80	5.46	4.30	0.00	0.00	90.55	0.00
63	3,861	3,863	47.3	Yes	**13.51**	104.0	3.01	82.74	6.34	4.38	0.00	0.00	93.46	0.00
64	4,257	4,258	46.4	Yes	**12.20**	104.0	3.01	83.58	6.76	4.43	0.00	0.00	94.78	0.00
65	4,167	4,168	45.7	Yes	**12.48**	104.0	3.01	83.40	6.67	4.43	0.00	0.00	94.49	0.00
66	9,188	9,188	30.9	Yes	**1.29**	104.0	3.01	90.26	10.73	4.69	0.00	0.00	105.68	0.00
67	3,357	3,358	47.2	Yes	**15.36**	104.0	3.01	81.52	5.78	4.32	0.00	0.00	91.62	0.00
68	3,465	3,466	42.3	Yes	**14.89**	104.0	3.01	81.80	5.90	4.38	0.00	0.00	92.08	0.00
69	4,366	4,368	45.7	Yes	**11.85**	104.0	3.01	83.80	6.87	4.44	0.00	0.00	95.12	0.00
70	12,688	12,688	30.0	No	**-3.61**	104.0	3.01	93.07	12.71	4.80	0.00	0.00	110.58	0.00
71	11,582	11,583	60.1	Yes	**-2.06**	104.0	3.01	92.28	12.14	4.62	0.00	0.00	109.04	0.00
72	10,566	10,566	46.6	Yes	**-0.72**	104.0	3.01	91.48	11.57	4.65	0.00	0.00	107.70	0.00
73	10,674	10,674	55.7	Yes	**-0.85**	104.0	3.01	91.57	11.63	4.62	0.00	0.00	107.82	0.00
74	9,956	9,957	60.6	Yes	**0.21**	104.0	3.01	90.96	11.21	4.59	0.00	0.00	106.76	0.00
75	8,808	8,808	47.8	Yes	**1.98**	104.0	3.01	89.90	10.48	4.62	0.00	0.00	105.00	0.00
76	4,497	4,498	44.1	Yes	**11.44**	104.0	3.01	84.06	7.01	4.47	0.00	0.00	95.53	0.00
77	5,008	5,009	37.3	Yes	**9.93**	104.0	3.01	84.99	7.50	4.55	0.00	0.00	97.04	0.00
78	11,319	11,320	40.3	Yes	**-1.78**	104.0	3.01	92.08	11.99	4.68	0.00	0.00	108.75	0.00
80	2,276	2,278	43.6	Yes	**20.27**	104.0	3.01	78.15	4.41	4.14	0.00	0.00	86.70	0.00
81	13,021	13,022	47.9	Yes	**-3.88**	104.0	3.01	93.29	12.88	4.67	0.00	0.00	110.85	0.00
82	6,976	6,977	38.5	Yes	**5.31**	104.0	3.01	87.87	9.18	4.61	0.00	0.00	101.66	0.00
83	3,614	3,616	48.3	Yes	**14.39**	104.0	3.01	82.16	6.07	4.34	0.00	0.00	92.58	0.00
85	5,726	5,727	36.4	Yes	**8.08**	104.0	3.01	86.16	8.15	4.58	0.00	0.00	98.90	0.00
86	2,560	2,562	40.2	Yes	**18.75**	104.0	3.01	79.17	4.79	4.26	0.00	0.00	88.22	0.00
87	4,152	4,153	44.1	Yes	**12.51**	104.0	3.01	83.37	6.65	4.44	0.00	0.00	94.46	0.00
89	4,071	4,072	48.8	Yes	**12.82**	104.0	3.01	83.20	6.57	4.39	0.00	0.00	94.15	0.00
90	3,534	3,535	45.0	Yes	**14.66**	104.0	3.01	81.97	5.98	4.37	0.00	0.00	92.31	0.00
91	3,413	3,415	47.1	Yes	**15.14**	104.0	3.01	81.67	5.84	4.33	0.00	0.00	91.84	0.00
92	5,111	5,112	42.7	Yes	**9.68**	104.0	3.01	85.17	7.60	4.52	0.00	0.00	97.29	0.00
94	12,106	12,107	59.9	Yes	**-2.74**	104.0	3.01	92.66	12.41	4.63	0.00	0.00	109.71	0.00
95	13,167	13,168	52.6	Yes	**-4.03**	104.0	3.01	93.39	12.95	4.66	0.00	0.00	111.01	0.00
97	10,847	10,849	61.7	Yes	**-1.07**	104.0	3.01	91.71	11.73	4.61	0.00	0.00	108.04	0.00
98	12,500	12,501	58.0	Yes	**-3.23**	104.0	3.01	92.94	12.62	4.64	0.00	0.00	110.20	0.00
99	11,636	11,636	51.5	Yes	**-2.16**	104.0	3.01	92.32	12.16	4.65	0.00	0.00	109.13	0.00
100	6,908	6,910	56.0	Yes	**5.53**	104.0	3.01	87.79	9.13	4.52	0.00	0.00	101.44	0.00
101	13,442	13,443	44.5	Yes	**-4.37**	104.0	3.01	93.57	13.09	4.69	0.00	0.00	111.34	0.00
102	7,782	7,784	64.5	Yes	**3.85**	104.0	3.01	88.82	9.78	4.52	0.00	0.00	103.12	0.00
103	14,222	14,223	42.1	Yes	**-5.24**	104.0	3.01	94.06	13.45	4.70	0.00	0.00	112.21	0.00
104	7,863	7,864	58.1	Yes	**3.68**	104.0	3.01	88.91	9.84	4.55	0.00	0.00	103.30	0.00
107	12,094	12,095	49.1	Yes	**-2.75**	104.0	3.01	92.65	12.41	4.66	0.00	0.00	109.72	0.00
108	11,816	11,816	45.2	Yes	**-2.41**	104.0	3.01	92.45	12.26	4.67	0.00	0.00	109.38	0.00
109	2,948	2,949	40.5	Yes	**16.96**	104.0	3.01	80.39	5.28	4.33	0.00	0.00	90.01	0.00
110	5,487	5,488	40.1	Yes	**8.69**	104.0	3.01	85.79	7.94	4.55	0.00	0.00	98.28	0.00
111	4,883	4,884	43.3	Yes	**10.31**	104.0	3.01	84.78	7.38	4.50	0.00	0.00	96.66	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	12,407	12,408	47.7	Yes	**-3.14**	104.0	3.01	92.87	12.57	4.67	0.00	0.00	110.11	0.00
114	5,427	5,427	35.8	Yes	**8.82**	104.0	3.01	85.69	7.89	4.57	0.00	0.00	98.16	0.00
115	12,753	12,754	45.5	Yes	**-3.57**	104.0	3.01	93.11	12.75	4.68	0.00	0.00	110.54	0.00
116	9,006	9,007	55.7	Yes	**1.68**	104.0	3.01	90.09	10.61	4.59	0.00	0.00	105.29	0.00
118	2,463	2,464	42.4	Yes	**19.27**	104.0	3.01	78.83	4.66	4.21	0.00	0.00	87.70	0.00
119	10,728	10,729	60.2	Yes	**-0.91**	104.0	3.01	91.61	11.66	4.61	0.00	0.00	107.88	0.00
120	13,857	13,858	39.5	Yes	**-4.85**	104.0	3.01	93.83	13.28	4.70	0.00	0.00	111.82	0.00
121	10,424	10,425	59.8	Yes	**-0.48**	104.0	3.01	91.36	11.49	4.60	0.00	0.00	107.45	0.00
125	3,725	3,727	47.6	Yes	**13.99**	104.0	3.01	82.43	6.19	4.36	0.00	0.00	92.98	0.00
126	5,708	5,709	47.5	Yes	**8.19**	104.0	3.01	86.13	8.14	4.52	0.00	0.00	98.79	0.00
127	5,467	5,468	48.5	Yes	**8.79**	104.0	3.01	85.76	7.93	4.50	0.00	0.00	98.18	0.00
128	5,198	5,199	50.0	Yes	**9.50**	104.0	3.01	85.32	7.68	4.47	0.00	0.00	97.47	0.00
129	10,774	10,775	34.2	Yes	**-1.06**	104.0	3.01	91.65	11.69	4.69	0.00	0.00	108.03	0.00
130	10,823	10,824	36.1	Yes	**-1.12**	104.0	3.01	91.69	11.72	4.69	0.00	0.00	108.09	0.00
131	11,271	11,272	34.5	Yes	**-1.73**	104.0	3.01	92.04	11.97	4.70	0.00	0.00	108.70	0.00
132	11,649	11,649	33.8	Yes	**-2.23**	104.0	3.01	92.33	12.17	4.70	0.00	0.00	109.20	0.00
133	6,918	6,919	48.1	Yes	**5.47**	104.0	3.01	87.80	9.13	4.56	0.00	0.00	101.50	0.00
134	12,544	12,544	32.7	Yes	**-3.35**	104.0	3.01	92.97	12.64	4.71	0.00	0.00	110.32	0.00
141	10,675	10,676	63.7	Yes	**-0.82**	104.0	3.01	91.57	11.63	4.60	0.00	0.00	107.80	0.00
142	8,060	8,061	66.2	Yes	**3.35**	104.0	3.01	89.13	9.98	4.52	0.00	0.00	103.62	0.00
143	11,240	11,241	60.0	Yes	**-1.61**	104.0	3.01	92.02	11.95	4.62	0.00	0.00	108.58	0.00
144	6,962	6,963	50.7	Yes	**5.40**	104.0	3.01	87.86	9.17	4.55	0.00	0.00	101.58	0.00
145	3,994	3,995	46.7	Yes	**13.06**	104.0	3.01	83.03	6.49	4.40	0.00	0.00	93.92	0.00
146	4,279	4,280	46.7	Yes	**12.13**	104.0	3.01	83.63	6.79	4.43	0.00	0.00	94.84	0.00

Sum 31.84

Noise sensitive area: H14 H14

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	13,849	13,849	55.1	Yes	**-4.80**	104.0	3.01	93.83	13.28	4.66	0.00	0.00	111.77	0.00
2	13,612	13,612	54.8	Yes	**-4.54**	104.0	3.01	93.68	13.17	4.66	0.00	0.00	111.51	0.00
3	13,021	13,021	60.0	Yes	**-3.84**	104.0	3.01	93.29	12.88	4.64	0.00	0.00	110.82	0.00
4	11,651	11,652	47.1	Yes	**-2.19**	104.0	3.01	92.33	12.17	4.66	0.00	0.00	109.16	0.00
5	11,746	11,746	53.4	Yes	**-2.29**	104.0	3.01	92.40	12.22	4.65	0.00	0.00	109.27	0.00
6	12,500	12,501	61.7	Yes	**-3.22**	104.0	3.01	92.94	12.62	4.63	0.00	0.00	110.19	0.00
7	10,976	10,977	65.2	Yes	**-1.24**	104.0	3.01	91.81	11.80	4.60	0.00	0.00	108.21	0.00
8	14,499	14,499	47.9	Yes	**-5.52**	104.0	3.01	94.23	13.58	4.69	0.00	0.00	112.50	0.00
9	13,402	13,402	59.1	Yes	**-4.29**	104.0	3.01	93.54	13.07	4.65	0.00	0.00	111.26	0.00
10	13,376	13,377	65.3	Yes	**-4.24**	104.0	3.01	93.53	13.05	4.63	0.00	0.00	111.21	0.00
11	14,970	14,971	56.6	Yes	**-6.00**	104.0	3.01	94.50	13.79	4.67	0.00	0.00	112.97	0.00
12	14,755	14,755	57.9	Yes	**-5.77**	104.0	3.01	94.38	13.70	4.67	0.00	0.00	112.74	0.00
13	14,292	14,293	63.2	Yes	**-5.27**	104.0	3.01	94.10	13.49	4.65	0.00	0.00	112.24	0.00
14	13,913	13,914	63.3	Yes	**-4.85**	104.0	3.01	93.87	13.31	4.65	0.00	0.00	111.82	0.00
15	13,079	13,080	63.9	Yes	**-3.90**	104.0	3.01	93.33	12.91	4.63	0.00	0.00	110.87	0.00
16	12,700	12,700	63.7	Yes	**-3.45**	104.0	3.01	93.08	12.72	4.63	0.00	0.00	110.42	0.00
17	15,205	15,206	54.3	Yes	**-6.24**	104.0	3.01	94.64	13.90	4.68	0.00	0.00	113.22	0.00
18	15,413	15,413	49.4	Yes	**-6.47**	104.0	3.01	94.76	13.99	4.69	0.00	0.00	113.44	0.00
19	14,226	14,227	54.5	Yes	**-5.22**	104.0	3.01	94.06	13.46	4.67	0.00	0.00	112.19	0.00
20	13,130	13,131	51.8	Yes	**-3.99**	104.0	3.01	93.37	12.93	4.67	0.00	0.00	110.97	0.00
21	11,153	11,154	55.5	Yes	**-1.51**	104.0	3.01	91.95	11.90	4.63	0.00	0.00	108.48	0.00
22	10,508	10,508	46.6	Yes	**-0.64**	104.0	3.01	91.43	11.53	4.65	0.00	0.00	107.61	0.00
23	10,123	10,123	47.9	Yes	**-0.08**	104.0	3.01	91.11	11.31	4.64	0.00	0.00	107.05	0.00
24	10,756	10,756	46.5	Yes	**-0.99**	104.0	3.01	91.63	11.68	4.65	0.00	0.00	107.96	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	8,285	8,285	45.0	Yes	**2.86**	104.0	3.01	89.37	10.13	4.62	0.00	0.00	104.11	0.00
26	10,953	10,953	57.5	Yes	**-1.23**	104.0	3.01	91.79	11.79	4.62	0.00	0.00	108.20	0.00
27	9,001	9,001	48.4	Yes	**1.66**	104.0	3.01	90.09	10.61	4.62	0.00	0.00	105.31	0.00
28	9,762	9,762	61.1	Yes	**0.51**	104.0	3.01	90.79	11.09	4.59	0.00	0.00	106.47	0.00
29	9,972	9,972	48.9	Yes	**0.15**	104.0	3.01	90.98	11.22	4.63	0.00	0.00	106.83	0.00
30	9,664	9,664	41.8	Yes	**0.59**	104.0	3.01	90.70	11.03	4.65	0.00	0.00	106.38	0.00
31	10,359	10,359	46.9	Yes	**-0.43**	104.0	3.01	91.31	11.45	4.65	0.00	0.00	107.40	0.00
32	7,987	7,988	44.1	Yes	**3.39**	104.0	3.01	89.05	9.92	4.61	0.00	0.00	103.58	0.00
33	9,045	9,045	40.6	Yes	**1.56**	104.0	3.01	90.13	10.64	4.65	0.00	0.00	105.41	0.00
34	10,643	10,643	61.6	Yes	**-0.78**	104.0	3.01	91.54	11.61	4.60	0.00	0.00	107.76	0.00
35	11,271	11,272	64.8	Yes	**-1.64**	104.0	3.01	92.04	11.97	4.60	0.00	0.00	108.61	0.00
36	11,571	11,572	64.5	Yes	**-2.04**	104.0	3.01	92.27	12.13	4.61	0.00	0.00	109.01	0.00
37	10,330	10,331	60.7	Yes	**-0.34**	104.0	3.01	91.28	11.43	4.60	0.00	0.00	107.31	0.00
38	8,587	8,587	45.2	Yes	**2.34**	104.0	3.01	89.68	10.34	4.62	0.00	0.00	104.63	0.00
39	8,822	8,823	57.6	Yes	**1.99**	104.0	3.01	89.91	10.49	4.58	0.00	0.00	104.98	0.00
40	10,293	10,294	39.5	Yes	**-0.36**	104.0	3.01	91.25	11.41	4.67	0.00	0.00	107.33	0.00
41	8,929	8,930	63.1	Yes	**1.83**	104.0	3.01	90.02	10.56	4.56	0.00	0.00	105.14	0.00
43	9,971	9,972	63.7	Yes	**0.20**	104.0	3.01	90.98	11.22	4.58	0.00	0.00	106.78	0.00
44	8,981	8,982	64.5	Yes	**1.75**	104.0	3.01	90.07	10.60	4.56	0.00	0.00	105.22	0.00
45	8,679	8,680	62.7	Yes	**2.25**	104.0	3.01	89.77	10.40	4.55	0.00	0.00	104.72	0.00
46	10,020	10,021	41.8	Yes	**0.05**	104.0	3.01	91.02	11.25	4.66	0.00	0.00	106.92	0.00
48	7,336	7,337	42.8	Yes	**4.61**	104.0	3.01	88.31	9.45	4.60	0.00	0.00	102.36	0.00
49	7,180	7,180	38.4	Yes	**4.90**	104.0	3.01	88.12	9.33	4.62	0.00	0.00	102.07	0.00
50	11,749	11,749	61.7	Yes	**-2.27**	104.0	3.01	92.40	12.23	4.62	0.00	0.00	109.25	0.00
51	7,657	7,657	37.5	Yes	**3.97**	104.0	3.01	88.68	9.69	4.63	0.00	0.00	103.00	0.00
52	7,972	7,972	37.9	Yes	**3.39**	104.0	3.01	89.03	9.91	4.64	0.00	0.00	103.58	0.00
53	6,846	6,846	40.9	Yes	**5.59**	104.0	3.01	87.71	9.08	4.60	0.00	0.00	101.38	0.00
55	5,361	5,362	37.5	Yes	**9.00**	104.0	3.01	85.59	7.83	4.56	0.00	0.00	97.98	0.00
56	5,053	5,054	39.8	Yes	**9.82**	104.0	3.01	85.07	7.55	4.53	0.00	0.00	97.15	0.00
57	5,197	5,197	38.9	Yes	**9.43**	104.0	3.01	85.32	7.68	4.54	0.00	0.00	97.54	0.00
58	8,689	8,690	41.9	Yes	**2.15**	104.0	3.01	89.78	10.40	4.64	0.00	0.00	104.82	0.00
59	4,742	4,743	41.5	Yes	**10.70**	104.0	3.01	84.52	7.25	4.50	0.00	0.00	96.27	0.00
60	3,369	3,370	46.2	Yes	**15.30**	104.0	3.01	81.55	5.79	4.33	0.00	0.00	91.67	0.00
61	3,022	3,023	44.1	Yes	**16.69**	104.0	3.01	80.61	5.38	4.30	0.00	0.00	90.29	0.00
62	4,277	4,278	47.1	Yes	**12.14**	104.0	3.01	83.63	6.78	4.42	0.00	0.00	94.83	0.00
63	4,808	4,809	46.0	Yes	**10.54**	104.0	3.01	84.64	7.31	4.47	0.00	0.00	96.43	0.00
64	4,799	4,799	46.8	Yes	**10.58**	104.0	3.01	84.62	7.30	4.47	0.00	0.00	96.39	0.00
65	4,514	4,515	47.3	Yes	**11.41**	104.0	3.01	84.09	7.02	4.44	0.00	0.00	95.56	0.00
66	10,605	10,606	35.8	Yes	**-0.81**	104.0	3.01	91.51	11.59	4.68	0.00	0.00	107.79	0.00
67	3,920	3,921	44.9	Yes	**13.29**	104.0	3.01	82.87	6.41	4.41	0.00	0.00	93.68	0.00
68	3,817	3,818	43.4	Yes	**13.63**	104.0	3.01	82.64	6.29	4.41	0.00	0.00	93.34	0.00
69	4,747	4,748	46.6	Yes	**10.72**	104.0	3.01	84.53	7.25	4.47	0.00	0.00	96.25	0.00
70	14,156	14,156	33.5	Yes	**-5.19**	104.0	3.01	94.02	13.42	4.72	0.00	0.00	112.16	0.00
71	13,072	13,072	63.9	Yes	**-3.89**	104.0	3.01	93.33	12.90	4.63	0.00	0.00	110.87	0.00
72	12,040	12,041	48.7	Yes	**-2.68**	104.0	3.01	92.61	12.38	4.66	0.00	0.00	109.66	0.00
73	12,162	12,163	58.5	Yes	**-2.81**	104.0	3.01	92.70	12.44	4.64	0.00	0.00	109.78	0.00
74	11,446	11,447	63.6	Yes	**-1.87**	104.0	3.01	92.17	12.06	4.61	0.00	0.00	108.85	0.00
75	10,298	10,298	50.1	Yes	**-0.33**	104.0	3.01	91.25	11.41	4.63	0.00	0.00	107.30	0.00
76	5,978	5,978	46.2	Yes	**7.53**	104.0	3.01	86.53	8.37	4.54	0.00	0.00	99.44	0.00
77	6,497	6,497	39.5	Yes	**6.32**	104.0	3.01	87.25	8.80	4.59	0.00	0.00	100.65	0.00
78	12,792	12,793	44.3	Yes	**-3.61**	104.0	3.01	93.14	12.77	4.68	0.00	0.00	110.59	0.00
80	3,763	3,764	46.6	Yes	**13.85**	104.0	3.01	82.51	6.24	4.38	0.00	0.00	93.13	0.00
81	14,501	14,502	53.2	Yes	**-5.51**	104.0	3.01	94.23	13.58	4.68	0.00	0.00	112.49	0.00
82	8,454	8,454	40.2	Yes	**2.55**	104.0	3.01	89.54	10.25	4.64	0.00	0.00	104.43	0.00
83	4,401	4,402	45.7	Yes	**11.75**	104.0	3.01	83.87	6.91	4.45	0.00	0.00	95.23	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	7,159	7,159	38.1	Yes	**4.94**	104.0	3.01	88.10	9.32	4.62	0.00	0.00	102.03	0.00
86	4,049	4,050	43.5	Yes	**12.85**	104.0	3.01	83.15	6.54	4.43	0.00	0.00	94.13	0.00
87	4,421	4,422	46.3	Yes	**11.69**	104.0	3.01	83.91	6.93	4.44	0.00	0.00	95.28	0.00
89	4,759	4,760	46.0	Yes	**10.69**	104.0	3.01	84.55	7.26	4.47	0.00	0.00	96.29	0.00
90	4,969	4,969	46.8	Yes	**10.10**	104.0	3.01	84.93	7.47	4.48	0.00	0.00	96.87	0.00
91	4,502	4,503	46.4	Yes	**11.44**	104.0	3.01	84.07	7.01	4.45	0.00	0.00	95.53	0.00
92	5,569	5,569	43.6	Yes	**8.51**	104.0	3.01	85.92	8.02	4.53	0.00	0.00	98.47	0.00
94	13,593	13,594	64.4	Yes	**-4.49**	104.0	3.01	93.67	13.16	4.64	0.00	0.00	111.46	0.00
95	14,657	14,657	56.7	Yes	**-5.67**	104.0	3.01	94.32	13.65	4.67	0.00	0.00	112.64	0.00
97	12,327	12,328	66.6	Yes	**-2.99**	104.0	3.01	92.82	12.53	4.62	0.00	0.00	109.96	0.00
98	13,989	13,989	62.2	Yes	**-4.94**	104.0	3.01	93.92	13.35	4.65	0.00	0.00	111.91	0.00
99	13,116	13,116	53.7	Yes	**-3.97**	104.0	3.01	93.36	12.93	4.66	0.00	0.00	110.94	0.00
100	8,358	8,359	58.8	Yes	**2.79**	104.0	3.01	89.44	10.18	4.56	0.00	0.00	104.19	0.00
101	14,923	14,924	49.8	Yes	**-5.96**	104.0	3.01	94.48	13.77	4.69	0.00	0.00	112.94	0.00
102	9,233	9,234	68.1	Yes	**1.36**	104.0	3.01	90.31	10.76	4.55	0.00	0.00	105.62	0.00
103	15,706	15,707	47.3	Yes	**-6.76**	104.0	3.01	94.92	14.12	4.70	0.00	0.00	113.74	0.00
104	9,332	9,333	60.6	Yes	**1.17**	104.0	3.01	90.40	10.82	4.58	0.00	0.00	105.80	0.00
107	13,571	13,572	53.8	Yes	**-4.49**	104.0	3.01	93.65	13.15	4.67	0.00	0.00	111.47	0.00
108	13,281	13,281	47.8	Yes	**-4.18**	104.0	3.01	93.46	13.01	4.68	0.00	0.00	111.15	0.00
109	4,430	4,431	43.3	Yes	**11.64**	104.0	3.01	83.93	6.94	4.47	0.00	0.00	95.34	0.00
110	6,974	6,975	42.6	Yes	**5.33**	104.0	3.01	87.87	9.18	4.59	0.00	0.00	101.64	0.00
111	6,367	6,368	45.9	Yes	**6.64**	104.0	3.01	87.08	8.70	4.55	0.00	0.00	100.33	0.00
113	13,886	13,887	52.9	Yes	**-4.85**	104.0	3.01	93.85	13.30	4.67	0.00	0.00	111.82	0.00
114	6,857	6,858	37.8	Yes	**5.55**	104.0	3.01	87.72	9.09	4.61	0.00	0.00	101.42	0.00
115	14,242	14,243	49.0	Yes	**-5.25**	104.0	3.01	94.07	13.46	4.68	0.00	0.00	112.22	0.00
116	10,468	10,469	58.9	Yes	**-0.54**	104.0	3.01	91.40	11.51	4.61	0.00	0.00	107.52	0.00
118	3,945	3,946	44.9	Yes	**13.21**	104.0	3.01	82.92	6.43	4.41	0.00	0.00	93.77	0.00
119	12,217	12,218	63.5	Yes	**-2.86**	104.0	3.01	92.74	12.47	4.62	0.00	0.00	109.84	0.00
120	15,337	15,337	45.0	Yes	**-6.40**	104.0	3.01	94.72	13.96	4.70	0.00	0.00	113.37	0.00
121	11,910	11,911	63.7	Yes	**-2.48**	104.0	3.01	92.52	12.31	4.62	0.00	0.00	109.45	0.00
125	4,590	4,591	45.5	Yes	**11.17**	104.0	3.01	84.24	7.10	4.46	0.00	0.00	95.80	0.00
126	7,121	7,122	51.6	Yes	**5.08**	104.0	3.01	88.05	9.29	4.55	0.00	0.00	101.90	0.00
127	6,878	6,879	52.6	Yes	**5.58**	104.0	3.01	87.75	9.10	4.54	0.00	0.00	101.39	0.00
128	6,618	6,619	53.2	Yes	**6.13**	104.0	3.01	87.42	8.90	4.53	0.00	0.00	100.84	0.00
129	12,207	12,207	37.9	Yes	**-2.92**	104.0	3.01	92.73	12.47	4.69	0.00	0.00	109.89	0.00
130	12,231	12,231	42.8	No	**-3.06**	104.0	3.01	92.75	12.48	4.80	0.00	0.00	110.03	0.00
131	12,678	12,678	41.3	No	**-3.60**	104.0	3.01	93.06	12.71	4.80	0.00	0.00	110.57	0.00
132	13,062	13,062	40.0	No	**-4.05**	104.0	3.01	93.32	12.90	4.80	0.00	0.00	111.02	0.00
133	8,397	8,397	50.9	Yes	**2.69**	104.0	3.01	89.48	10.21	4.59	0.00	0.00	104.28	0.00
134	14,016	14,017	36.8	Yes	**-5.03**	104.0	3.01	93.93	13.36	4.71	0.00	0.00	112.00	0.00
141	12,157	12,158	68.4	Yes	**-2.78**	104.0	3.01	92.70	12.44	4.61	0.00	0.00	109.75	0.00
142	9,513	9,514	69.8	Yes	**0.92**	104.0	3.01	90.57	10.94	4.55	0.00	0.00	106.05	0.00
143	12,721	12,722	64.9	Yes	**-3.48**	104.0	3.01	93.09	12.73	4.63	0.00	0.00	110.45	0.00
144	8,391	8,392	53.6	Yes	**2.71**	104.0	3.01	89.48	10.20	4.58	0.00	0.00	104.26	0.00
145	5,436	5,437	48.6	Yes	**8.87**	104.0	3.01	85.71	7.90	4.50	0.00	0.00	98.10	0.00
146	5,732	5,732	48.6	Yes	**8.13**	104.0	3.01	86.17	8.16	4.51	0.00	0.00	98.84	0.00
Sum	27.17													

Noise sensitive area: H15 H15

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	16,854	16,855	55.9	Yes	**-7.85**	104.0	3.01	95.53	14.60	4.69	0.00	0.00	114.82	0.00
2	16,618	16,619	55.1	Yes	**-7.63**	104.0	3.01	95.41	14.50	4.69	0.00	0.00	114.60	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	16,027	16,028	60.1	Yes	**-7.05**	104.0	3.01	95.10	14.25	4.67	0.00	0.00	114.02	0.00
4	14,651	14,652	46.7	Yes	**-5.69**	104.0	3.01	94.32	13.65	4.69	0.00	0.00	112.66	0.00
5	14,752	14,753	52.9	Yes	**-5.78**	104.0	3.01	94.38	13.70	4.68	0.00	0.00	112.75	0.00
6	15,507	15,507	61.7	Yes	**-6.53**	104.0	3.01	94.81	14.03	4.66	0.00	0.00	113.51	0.00
7	13,957	13,958	66.3	Yes	**-4.89**	104.0	3.01	93.90	13.33	4.64	0.00	0.00	111.87	0.00
8	17,505	17,505	48.7	Yes	**-8.45**	104.0	3.01	95.86	14.86	4.71	0.00	0.00	115.43	0.00
9	16,405	16,405	59.9	Yes	**-7.41**	104.0	3.01	95.30	14.41	4.68	0.00	0.00	114.39	0.00
10	16,371	16,371	67.0	Yes	**-7.37**	104.0	3.01	95.28	14.40	4.66	0.00	0.00	114.34	0.00
11	17,955	17,956	59.6	Yes	**-8.83**	104.0	3.01	96.08	15.03	4.69	0.00	0.00	115.80	0.00
12	17,742	17,742	60.8	Yes	**-8.64**	104.0	3.01	95.98	14.95	4.68	0.00	0.00	115.61	0.00
13	17,275	17,276	66.1	Yes	**-8.21**	104.0	3.01	95.75	14.77	4.67	0.00	0.00	115.18	0.00
14	16,892	16,892	66.2	Yes	**-7.86**	104.0	3.01	95.55	14.61	4.67	0.00	0.00	114.83	0.00
15	16,059	16,060	66.4	Yes	**-7.07**	104.0	3.01	95.12	14.27	4.66	0.00	0.00	114.04	0.00
16	15,685	15,685	65.7	Yes	**-6.70**	104.0	3.01	94.91	14.11	4.66	0.00	0.00	113.67	0.00
17	18,189	18,190	57.4	Yes	**-9.04**	104.0	3.01	96.20	15.12	4.69	0.00	0.00	116.01	0.00
18	18,391	18,391	52.6	Yes	**-9.22**	104.0	3.01	96.29	15.20	4.70	0.00	0.00	116.20	0.00
19	17,198	17,199	56.7	Yes	**-8.16**	104.0	3.01	95.71	14.73	4.69	0.00	0.00	115.13	0.00
20	16,094	16,095	53.2	Yes	**-7.13**	104.0	3.01	95.13	14.28	4.69	0.00	0.00	114.10	0.00
21	14,160	14,160	54.9	Yes	**-5.14**	104.0	3.01	94.02	13.43	4.67	0.00	0.00	112.11	0.00
22	13,509	13,509	46.0	Yes	**-4.44**	104.0	3.01	93.61	13.12	4.68	0.00	0.00	111.41	0.00
23	13,124	13,124	47.2	Yes	**-4.00**	104.0	3.01	93.36	12.93	4.68	0.00	0.00	110.97	0.00
24	13,756	13,757	46.0	Yes	**-4.72**	104.0	3.01	93.77	13.24	4.69	0.00	0.00	111.69	0.00
25	11,285	11,285	43.9	Yes	**-1.72**	104.0	3.01	92.05	11.97	4.67	0.00	0.00	108.69	0.00
26	13,955	13,955	56.9	Yes	**-4.91**	104.0	3.01	93.89	13.33	4.66	0.00	0.00	111.89	0.00
27	11,990	11,990	48.0	Yes	**-2.62**	104.0	3.01	92.58	12.35	4.66	0.00	0.00	109.59	0.00
28	12,727	12,727	60.3	Yes	**-3.49**	104.0	3.01	93.09	12.73	4.64	0.00	0.00	110.47	0.00
29	12,979	12,979	48.0	Yes	**-3.83**	104.0	3.01	93.26	12.86	4.67	0.00	0.00	110.80	0.00
30	12,666	12,666	41.0	Yes	**-3.47**	104.0	3.01	93.05	12.70	4.69	0.00	0.00	110.44	0.00
31	13,340	13,341	45.5	Yes	**-4.25**	104.0	3.01	93.50	13.04	4.68	0.00	0.00	111.22	0.00
32	10,993	10,993	42.8	Yes	**-1.33**	104.0	3.01	91.82	11.81	4.67	0.00	0.00	108.30	0.00
33	12,048	12,048	39.7	Yes	**-2.72**	104.0	3.01	92.62	12.38	4.69	0.00	0.00	109.69	0.00
34	13,622	13,622	62.5	Yes	**-4.53**	104.0	3.01	93.69	13.17	4.64	0.00	0.00	111.50	0.00
35	14,254	14,254	66.0	Yes	**-5.22**	104.0	3.01	94.08	13.47	4.64	0.00	0.00	112.19	0.00
36	14,556	14,557	65.8	Yes	**-5.54**	104.0	3.01	94.26	13.61	4.65	0.00	0.00	112.52	0.00
37	13,307	13,307	61.3	Yes	**-4.17**	104.0	3.01	93.48	13.02	4.64	0.00	0.00	111.15	0.00
38	11,580	11,581	44.8	Yes	**-2.11**	104.0	3.01	92.27	12.13	4.67	0.00	0.00	109.08	0.00
39	11,780	11,781	56.6	Yes	**-2.33**	104.0	3.01	92.42	12.24	4.64	0.00	0.00	109.30	0.00
40	13,152	13,153	43.3	Yes	**-4.04**	104.0	3.01	93.38	12.94	4.69	0.00	0.00	111.01	0.00
41	11,868	11,868	62.9	Yes	**-2.42**	104.0	3.01	92.49	12.29	4.62	0.00	0.00	109.40	0.00
43	12,930	12,931	63.2	Yes	**-3.73**	104.0	3.01	93.23	12.83	4.63	0.00	0.00	110.70	0.00
44	11,888	11,889	64.7	Yes	**-2.44**	104.0	3.01	92.50	12.30	4.61	0.00	0.00	109.42	0.00
45	11,583	11,584	62.8	Yes	**-2.06**	104.0	3.01	92.28	12.14	4.62	0.00	0.00	109.03	0.00
46	12,919	12,920	43.3	Yes	**-3.77**	104.0	3.01	93.22	12.83	4.69	0.00	0.00	110.74	0.00
48	10,335	10,336	41.8	Yes	**-0.41**	104.0	3.01	91.29	11.43	4.66	0.00	0.00	107.38	0.00
49	10,182	10,182	38.0	Yes	**-0.20**	104.0	3.01	91.16	11.34	4.67	0.00	0.00	107.17	0.00
50	14,749	14,749	61.9	Yes	**-5.76**	104.0	3.01	94.38	13.69	4.66	0.00	0.00	112.73	0.00
51	10,659	10,659	37.0	Yes	**-0.89**	104.0	3.01	91.55	11.62	4.68	0.00	0.00	107.86	0.00
52	10,974	10,974	37.3	Yes	**-1.32**	104.0	3.01	91.81	11.80	4.68	0.00	0.00	108.29	0.00
53	9,848	9,849	40.6	Yes	**0.30**	104.0	3.01	90.87	11.14	4.66	0.00	0.00	106.67	0.00
55	8,366	8,367	37.4	Yes	**2.69**	104.0	3.01	89.45	10.19	4.65	0.00	0.00	104.29	0.00
56	8,059	8,059	39.8	Yes	**3.24**	104.0	3.01	89.13	9.97	4.63	0.00	0.00	103.73	0.00
57	8,192	8,193	38.7	Yes	**3.00**	104.0	3.01	89.27	10.07	4.64	0.00	0.00	103.97	0.00
58	11,696	11,696	40.7	Yes	**-2.27**	104.0	3.01	92.36	12.20	4.68	0.00	0.00	109.24	0.00
59	7,748	7,749	41.6	Yes	**3.82**	104.0	3.01	88.78	9.75	4.62	0.00	0.00	103.16	0.00
60	6,365	6,366	45.5	Yes	**6.64**	104.0	3.01	87.08	8.69	4.56	0.00	0.00	100.33	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	6,014	6,014	42.8	Yes	**7.43**	104.0	3.01	86.58	8.40	4.56	0.00	0.00	99.54	0.00
62	6,973	6,974	42.6	Yes	**5.33**	104.0	3.01	87.87	9.18	4.59	0.00	0.00	101.64	0.00
63	7,205	7,206	44.2	No	**4.66**	104.0	3.01	88.15	9.35	4.80	0.00	0.00	102.31	0.00
64	6,697	6,697	40.0	No	**5.69**	104.0	3.01	87.52	8.96	4.80	0.00	0.00	101.28	0.00
65	6,196	6,196	38.2	No	**6.77**	104.0	3.01	86.84	8.55	4.80	0.00	0.00	100.20	0.00
66	13,467	13,467	40.1	Yes	**-4.41**	104.0	3.01	93.59	13.10	4.70	0.00	0.00	111.38	0.00
67	5,992	5,992	40.1	No	**7.24**	104.0	3.01	86.55	8.38	4.80	0.00	0.00	99.74	0.00
68	5,651	5,652	35.2	No	**8.04**	104.0	3.01	86.04	8.09	4.80	0.00	0.00	98.93	0.00
69	6,434	6,435	37.4	No	**6.25**	104.0	3.01	87.17	8.75	4.80	0.00	0.00	100.72	0.00
70	17,100	17,100	34.4	No	**-8.18**	104.0	3.01	95.66	14.69	4.80	0.00	0.00	115.15	0.00
71	16,067	16,067	65.4	Yes	**-7.08**	104.0	3.01	95.12	14.27	4.66	0.00	0.00	114.05	0.00
72	15,041	15,041	48.4	Yes	**-6.09**	104.0	3.01	94.55	13.83	4.69	0.00	0.00	113.06	0.00
73	15,169	15,169	58.3	Yes	**-6.20**	104.0	3.01	94.62	13.88	4.67	0.00	0.00	113.17	0.00
74	14,444	14,445	63.8	Yes	**-5.43**	104.0	3.01	94.19	13.56	4.65	0.00	0.00	112.40	0.00
75	13,302	13,302	49.1	Yes	**-4.20**	104.0	3.01	93.48	13.02	4.67	0.00	0.00	111.17	0.00
76	8,959	8,959	44.8	Yes	**1.71**	104.0	3.01	90.05	10.58	4.63	0.00	0.00	105.26	0.00
77	9,503	9,503	38.5	Yes	**0.82**	104.0	3.01	90.56	10.93	4.66	0.00	0.00	106.15	0.00
78	15,748	15,748	45.2	Yes	**-6.81**	104.0	3.01	94.94	14.13	4.70	0.00	0.00	113.78	0.00
80	6,759	6,760	46.5	Yes	**5.80**	104.0	3.01	87.60	9.01	4.57	0.00	0.00	101.18	0.00
81	17,472	17,472	55.4	Yes	**-8.41**	104.0	3.01	95.85	14.84	4.69	0.00	0.00	115.38	0.00
82	11,457	11,457	39.4	Yes	**-1.96**	104.0	3.01	92.18	12.07	4.68	0.00	0.00	108.93	0.00
83	6,657	6,657	42.2	No	**5.78**	104.0	3.01	87.47	8.93	4.80	0.00	0.00	101.20	0.00
85	10,129	10,129	37.1	Yes	**-0.13**	104.0	3.01	91.11	11.31	4.68	0.00	0.00	107.10	0.00
86	7,047	7,048	43.7	Yes	**5.19**	104.0	3.01	87.96	9.23	4.59	0.00	0.00	101.78	0.00
87	6,011	6,012	35.4	No	**7.19**	104.0	3.01	86.58	8.40	4.80	0.00	0.00	99.78	0.00
89	6,852	6,852	42.0	No	**5.37**	104.0	3.01	87.72	9.08	4.80	0.00	0.00	101.60	0.00
90	7,895	7,896	45.3	Yes	**3.56**	104.0	3.01	88.95	9.86	4.60	0.00	0.00	103.41	0.00
91	7,080	7,081	42.4	No	**4.91**	104.0	3.01	88.00	9.26	4.80	0.00	0.00	102.06	0.00
92	7,243	7,244	35.1	No	**4.59**	104.0	3.01	88.20	9.38	4.80	0.00	0.00	102.38	0.00
94	16,581	16,582	66.7	Yes	**-7.57**	104.0	3.01	95.39	14.48	4.66	0.00	0.00	114.54	0.00
95	17,654	17,655	58.5	Yes	**-8.57**	104.0	3.01	95.94	14.92	4.69	0.00	0.00	115.54	0.00
97	15,298	15,299	67.8	Yes	**-6.31**	104.0	3.01	94.69	13.94	4.65	0.00	0.00	113.28	0.00
98	16,981	16,981	64.4	Yes	**-7.95**	104.0	3.01	95.60	14.65	4.67	0.00	0.00	114.92	0.00
99	16,120	16,120	53.5	Yes	**-7.15**	104.0	3.01	95.15	14.29	4.69	0.00	0.00	114.13	0.00
100	11,283	11,283	57.7	Yes	**-1.67**	104.0	3.01	92.05	11.97	4.63	0.00	0.00	108.65	0.00
101	17,894	17,895	52.2	Yes	**-8.79**	104.0	3.01	96.05	15.01	4.70	0.00	0.00	115.76	0.00
102	12,155	12,156	67.5	Yes	**-2.77**	104.0	3.01	92.70	12.44	4.61	0.00	0.00	109.75	0.00
103	18,685	18,685	50.6	Yes	**-9.48**	104.0	3.01	96.43	15.31	4.71	0.00	0.00	116.45	0.00
104	12,287	12,287	59.8	Yes	**-2.96**	104.0	3.01	92.79	12.51	4.63	0.00	0.00	109.93	0.00
107	16,535	16,535	55.4	Yes	**-7.55**	104.0	3.01	95.37	14.46	4.69	0.00	0.00	114.52	0.00
108	16,273	16,273	47.1	Yes	**-7.31**	104.0	3.01	95.23	14.36	4.70	0.00	0.00	114.29	0.00
109	7,437	7,437	43.2	Yes	**4.42**	104.0	3.01	88.43	9.53	4.60	0.00	0.00	102.56	0.00
110	9,967	9,967	42.3	Yes	**0.13**	104.0	3.01	90.97	11.21	4.66	0.00	0.00	106.84	0.00
111	9,353	9,354	44.9	Yes	**1.08**	104.0	3.01	90.42	10.84	4.64	0.00	0.00	105.89	0.00
113	16,853	16,854	54.7	Yes	**-7.85**	104.0	3.01	95.53	14.60	4.69	0.00	0.00	114.82	0.00
114	9,827	9,827	36.8	Yes	**0.32**	104.0	3.01	90.85	11.13	4.67	0.00	0.00	106.65	0.00
115	17,248	17,249	49.8	Yes	**-8.22**	104.0	3.01	95.74	14.75	4.70	0.00	0.00	115.19	0.00
116	13,406	13,407	59.8	Yes	**-4.29**	104.0	3.01	93.55	13.07	4.65	0.00	0.00	111.26	0.00
118	6,951	6,952	44.6	Yes	**5.39**	104.0	3.01	87.84	9.16	4.58	0.00	0.00	101.58	0.00
119	15,215	15,215	64.4	Yes	**-6.23**	104.0	3.01	94.65	13.90	4.66	0.00	0.00	113.20	0.00
120	18,305	18,305	47.3	Yes	**-9.16**	104.0	3.01	96.25	15.17	4.71	0.00	0.00	116.13	0.00
121	14,896	14,897	65.2	Yes	**-5.90**	104.0	3.01	94.46	13.76	4.65	0.00	0.00	112.87	0.00
125	6,914	6,914	42.5	No	**5.25**	104.0	3.01	87.79	9.13	4.80	0.00	0.00	101.73	0.00
126	9,999	9,999	51.9	Yes	**0.12**	104.0	3.01	91.00	11.23	4.62	0.00	0.00	106.86	0.00
127	9,755	9,756	52.6	Yes	**0.49**	104.0	3.01	90.79	11.09	4.62	0.00	0.00	106.49	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	9,510	9,511	53.0	Yes	**0.86**	104.0	3.01	90.56	10.93	4.61	0.00	0.00	106.11	0.00
129	15,087	15,087	41.8	Yes	**-6.15**	104.0	3.01	94.57	13.85	4.71	0.00	0.00	113.12	0.00
130	15,067	15,068	45.8	No	**-6.23**	104.0	3.01	94.56	13.84	4.80	0.00	0.00	113.20	0.00
131	15,511	15,512	44.2	No	**-6.67**	104.0	3.01	94.81	14.03	4.80	0.00	0.00	113.64	0.00
132	15,905	15,905	43.6	No	**-7.06**	104.0	3.01	95.03	14.20	4.80	0.00	0.00	114.03	0.00
133	11,370	11,370	49.9	Yes	**-1.81**	104.0	3.01	92.12	12.02	4.65	0.00	0.00	108.79	0.00
134	16,970	16,970	37.8	Yes	**-7.99**	104.0	3.01	95.59	14.64	4.72	0.00	0.00	114.96	0.00
141	15,134	15,135	70.2	Yes	**-6.14**	104.0	3.01	94.60	13.87	4.64	0.00	0.00	113.11	0.00
142	12,439	12,440	69.7	Yes	**-3.12**	104.0	3.01	92.90	12.59	4.61	0.00	0.00	110.09	0.00
143	15,694	15,694	66.7	Yes	**-6.71**	104.0	3.01	94.91	14.11	4.66	0.00	0.00	113.68	0.00
144	11,283	11,284	54.1	Yes	**-1.69**	104.0	3.01	92.05	11.97	4.64	0.00	0.00	108.66	0.00
145	8,367	8,368	47.1	Yes	**2.72**	104.0	3.01	89.45	10.19	4.61	0.00	0.00	104.25	0.00
146	8,674	8,674	47.4	Yes	**2.20**	104.0	3.01	89.76	10.39	4.61	0.00	0.00	104.77	0.00

Sum 21.20

Noise sensitive area: H16 H16

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	15,708	15,708	60.1	No	**-6.87**	104.0	3.01	94.92	14.12	4.80	0.00	0.00	113.84	0.00
2	15,497	15,497	60.0	No	**-6.66**	104.0	3.01	94.81	14.03	4.80	0.00	0.00	113.63	0.00
3	14,912	14,912	65.1	No	**-6.07**	104.0	3.01	94.47	13.77	4.80	0.00	0.00	113.04	0.00
4	13,598	13,598	51.9	No	**-4.66**	104.0	3.01	93.67	13.16	4.80	0.00	0.00	111.63	0.00
5	13,642	13,642	58.4	No	**-4.71**	104.0	3.01	93.70	13.18	4.80	0.00	0.00	111.68	0.00
6	14,376	14,377	66.5	No	**-5.51**	104.0	3.01	94.15	13.53	4.80	0.00	0.00	112.48	0.00
7	12,734	12,735	68.5	Yes	**-3.48**	104.0	3.01	93.10	12.74	4.62	0.00	0.00	110.45	0.00
8	16,361	16,361	52.8	No	**-7.50**	104.0	3.01	95.28	14.39	4.80	0.00	0.00	114.47	0.00
9	15,243	15,243	63.7	No	**-6.40**	104.0	3.01	94.66	13.91	4.80	0.00	0.00	113.38	0.00
10	15,174	15,175	70.1	Yes	**-6.18**	104.0	3.01	94.62	13.88	4.64	0.00	0.00	113.15	0.00
11	16,732	16,732	60.6	Yes	**-7.72**	104.0	3.01	95.47	14.55	4.68	0.00	0.00	114.69	0.00
12	16,523	16,524	61.9	Yes	**-7.52**	104.0	3.01	95.36	14.46	4.67	0.00	0.00	114.49	0.00
13	16,051	16,051	67.0	Yes	**-7.06**	104.0	3.01	95.11	14.26	4.66	0.00	0.00	114.03	0.00
14	15,658	15,658	66.4	Yes	**-6.67**	104.0	3.01	94.89	14.10	4.66	0.00	0.00	113.65	0.00
15	14,830	14,831	67.3	Yes	**-5.83**	104.0	3.01	94.42	13.73	4.65	0.00	0.00	112.80	0.00
16	14,466	14,467	67.7	Yes	**-5.44**	104.0	3.01	94.21	13.57	4.64	0.00	0.00	112.42	0.00
17	16,965	16,966	58.3	Yes	**-7.94**	104.0	3.01	95.59	14.64	4.68	0.00	0.00	114.92	0.00
18	17,154	17,154	52.6	Yes	**-8.13**	104.0	3.01	95.69	14.72	4.70	0.00	0.00	115.10	0.00
19	15,953	15,953	57.2	Yes	**-6.98**	104.0	3.01	95.06	14.22	4.68	0.00	0.00	113.96	0.00
20	14,838	14,838	54.0	Yes	**-5.87**	104.0	3.01	94.43	13.74	4.68	0.00	0.00	112.84	0.00
21	13,064	13,064	60.2	No	**-4.05**	104.0	3.01	93.32	12.90	4.80	0.00	0.00	111.02	0.00
22	12,454	12,454	51.1	No	**-3.33**	104.0	3.01	92.91	12.59	4.80	0.00	0.00	110.30	0.00
23	12,070	12,070	52.3	No	**-2.86**	104.0	3.01	92.63	12.40	4.80	0.00	0.00	109.83	0.00
24	12,702	12,703	51.1	No	**-3.63**	104.0	3.01	93.08	12.72	4.80	0.00	0.00	110.60	0.00
25	10,125	10,125	49.5	No	**-0.24**	104.0	3.01	91.11	11.31	4.80	0.00	0.00	107.22	0.00
26	12,793	12,794	61.9	No	**-3.73**	104.0	3.01	93.14	12.77	4.80	0.00	0.00	110.71	0.00
27	10,793	10,793	53.2	No	**-1.19**	104.0	3.01	91.66	11.70	4.80	0.00	0.00	108.16	0.00
28	11,481	11,482	62.6	Yes	**-1.92**	104.0	3.01	92.20	12.08	4.61	0.00	0.00	108.90	0.00
29	11,877	11,877	53.4	No	**-2.62**	104.0	3.01	92.49	12.29	4.80	0.00	0.00	109.59	0.00
30	11,608	11,608	46.0	No	**-2.27**	104.0	3.01	92.30	12.15	4.80	0.00	0.00	109.24	0.00
31	12,351	12,351	51.1	No	**-3.20**	104.0	3.01	92.83	12.54	4.80	0.00	0.00	110.18	0.00
32	9,869	9,869	48.2	No	**0.13**	104.0	3.01	90.89	11.15	4.80	0.00	0.00	106.84	0.00
33	10,986	10,986	44.6	No	**-1.45**	104.0	3.01	91.82	11.81	4.80	0.00	0.00	108.42	0.00
34	12,397	12,397	64.7	Yes	**-3.08**	104.0	3.01	92.87	12.56	4.62	0.00	0.00	110.05	0.00
35	13,034	13,035	68.7	Yes	**-3.84**	104.0	3.01	93.30	12.89	4.62	0.00	0.00	110.81	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	13,341	13,341	68.5	Yes	**-4.19**	104.0	3.01	93.50	13.04	4.63	0.00	0.00	111.17	0.00
37	12,078	12,078	63.4	Yes	**-2.69**	104.0	3.01	92.64	12.40	4.62	0.00	0.00	109.66	0.00
38	10,395	10,395	50.0	No	**-0.63**	104.0	3.01	91.34	11.47	4.80	0.00	0.00	107.60	0.00
39	10,529	10,530	59.6	Yes	**-0.63**	104.0	3.01	91.45	11.55	4.61	0.00	0.00	107.60	0.00
40	11,810	11,810	49.6	Yes	**-2.39**	104.0	3.01	92.45	12.26	4.66	0.00	0.00	109.36	0.00
41	10,594	10,594	65.7	Yes	**-0.70**	104.0	3.01	91.50	11.58	4.59	0.00	0.00	107.67	0.00
43	11,676	11,677	65.5	Yes	**-2.17**	104.0	3.01	92.35	12.19	4.61	0.00	0.00	109.14	0.00
44	10,584	10,584	67.5	Yes	**-0.68**	104.0	3.01	91.49	11.58	4.58	0.00	0.00	107.65	0.00
45	10,278	10,279	65.9	Yes	**-0.25**	104.0	3.01	91.24	11.40	4.58	0.00	0.00	107.22	0.00
46	11,605	11,605	47.6	Yes	**-2.13**	104.0	3.01	92.29	12.15	4.66	0.00	0.00	109.10	0.00
48	9,174	9,175	47.4	No	**1.20**	104.0	3.01	90.25	10.72	4.80	0.00	0.00	105.77	0.00
49	9,132	9,132	42.4	No	**1.27**	104.0	3.01	90.21	10.69	4.80	0.00	0.00	105.70	0.00
50	13,574	13,575	66.4	Yes	**-4.47**	104.0	3.01	93.65	13.15	4.63	0.00	0.00	111.44	0.00
51	9,607	9,607	41.6	No	**0.53**	104.0	3.01	90.65	10.99	4.80	0.00	0.00	106.45	0.00
52	9,924	9,924	42.0	No	**0.05**	104.0	3.01	90.93	11.19	4.80	0.00	0.00	106.92	0.00
53	8,798	8,798	44.9	No	**1.81**	104.0	3.01	89.89	10.48	4.80	0.00	0.00	105.16	0.00
55	7,307	7,307	40.6	No	**4.47**	104.0	3.01	88.27	9.43	4.80	0.00	0.00	102.50	0.00
56	7,000	7,000	42.7	No	**5.07**	104.0	3.01	87.90	9.20	4.80	0.00	0.00	101.90	0.00
57	7,035	7,036	42.9	No	**5.00**	104.0	3.01	87.95	9.22	4.80	0.00	0.00	101.97	0.00
58	10,583	10,583	46.0	No	**-0.90**	104.0	3.01	91.49	11.58	4.80	0.00	0.00	107.87	0.00
59	6,688	6,688	44.2	No	**5.71**	104.0	3.01	87.51	8.95	4.80	0.00	0.00	101.26	0.00
60	5,234	5,234	47.6	Yes	**9.39**	104.0	3.01	85.38	7.71	4.49	0.00	0.00	97.58	0.00
61	4,877	4,877	44.5	Yes	**10.34**	104.0	3.01	84.76	7.38	4.49	0.00	0.00	96.63	0.00
62	5,598	5,598	49.5	Yes	**8.47**	104.0	3.01	85.96	8.04	4.50	0.00	0.00	98.50	0.00
63	5,758	5,759	51.6	Yes	**8.09**	104.0	3.01	86.21	8.18	4.49	0.00	0.00	98.88	0.00
64	5,223	5,224	47.2	Yes	**9.42**	104.0	3.01	85.36	7.70	4.49	0.00	0.00	97.56	0.00
65	4,728	4,729	46.0	Yes	**10.77**	104.0	3.01	84.50	7.23	4.47	0.00	0.00	96.20	0.00
66	12,125	12,125	46.4	Yes	**-2.79**	104.0	3.01	92.67	12.42	4.67	0.00	0.00	109.77	0.00
67	4,523	4,524	47.5	Yes	**11.39**	104.0	3.01	84.11	7.03	4.44	0.00	0.00	95.58	0.00
68	4,178	4,178	42.4	Yes	**12.42**	104.0	3.01	83.42	6.68	4.45	0.00	0.00	94.55	0.00
69	4,968	4,969	45.3	Yes	**10.09**	104.0	3.01	84.92	7.47	4.49	0.00	0.00	96.88	0.00
70	15,816	15,817	36.0	No	**-6.97**	104.0	3.01	94.98	14.16	4.80	0.00	0.00	113.95	0.00
71	14,873	14,874	68.6	Yes	**-5.87**	104.0	3.01	94.45	13.75	4.64	0.00	0.00	112.84	0.00
72	13,985	13,985	53.7	No	**-5.08**	104.0	3.01	93.91	13.34	4.80	0.00	0.00	112.06	0.00
73	14,038	14,038	63.2	No	**-5.14**	104.0	3.01	93.95	13.37	4.80	0.00	0.00	112.11	0.00
74	13,264	13,264	68.1	Yes	**-4.11**	104.0	3.01	93.45	13.00	4.63	0.00	0.00	111.08	0.00
75	12,156	12,157	54.5	No	**-2.96**	104.0	3.01	92.70	12.44	4.80	0.00	0.00	109.94	0.00
76	7,761	7,761	50.0	Yes	**3.83**	104.0	3.01	88.80	9.76	4.58	0.00	0.00	103.14	0.00
77	8,393	8,393	42.6	No	**2.49**	104.0	3.01	89.48	10.20	4.80	0.00	0.00	104.48	0.00
78	14,481	14,481	45.9	Yes	**-5.51**	104.0	3.01	94.22	13.57	4.69	0.00	0.00	112.48	0.00
80	5,622	5,622	49.0	Yes	**8.41**	104.0	3.01	86.00	8.06	4.50	0.00	0.00	98.56	0.00
81	16,223	16,224	56.2	Yes	**-7.25**	104.0	3.01	95.20	14.34	4.68	0.00	0.00	114.22	0.00
82	10,394	10,394	44.1	No	**-0.63**	104.0	3.01	91.34	11.47	4.80	0.00	0.00	107.60	0.00
83	5,197	5,198	48.8	Yes	**9.50**	104.0	3.01	85.32	7.68	4.48	0.00	0.00	97.48	0.00
85	9,175	9,175	42.4	No	**1.20**	104.0	3.01	90.25	10.72	4.80	0.00	0.00	105.77	0.00
86	5,912	5,912	46.5	Yes	**7.69**	104.0	3.01	86.44	8.32	4.53	0.00	0.00	99.28	0.00
87	4,548	4,549	42.6	Yes	**11.28**	104.0	3.01	84.16	7.06	4.48	0.00	0.00	95.70	0.00
89	5,380	5,381	49.4	Yes	**9.02**	104.0	3.01	85.62	7.85	4.49	0.00	0.00	97.95	0.00
90	6,637	6,637	49.5	Yes	**6.07**	104.0	3.01	87.44	8.91	4.55	0.00	0.00	100.90	0.00
91	5,669	5,670	49.7	Yes	**8.30**	104.0	3.01	86.07	8.10	4.50	0.00	0.00	98.68	0.00
92	5,782	5,783	42.2	Yes	**7.97**	104.0	3.01	86.24	8.20	4.55	0.00	0.00	99.00	0.00
94	15,366	15,367	68.5	Yes	**-6.38**	104.0	3.01	94.73	13.97	4.65	0.00	0.00	113.35	0.00
95	16,464	16,465	61.0	Yes	**-7.47**	104.0	3.01	95.33	14.44	4.67	0.00	0.00	114.44	0.00
97	14,054	14,055	68.8	Yes	**-4.99**	104.0	3.01	93.96	13.38	4.63	0.00	0.00	111.97	0.00
98	15,776	15,776	67.1	Yes	**-6.79**	104.0	3.01	94.96	14.15	4.66	0.00	0.00	113.76	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	15,040	15,040	58.9	No	**-6.20**	104.0	3.01	94.55	13.83	4.80	0.00	0.00	113.17	0.00
100	9,996	9,997	60.1	Yes	**0.15**	104.0	3.01	91.00	11.23	4.60	0.00	0.00	106.82	0.00
101	16,645	16,646	53.2	Yes	**-7.66**	104.0	3.01	95.43	14.51	4.69	0.00	0.00	114.63	0.00
102	10,862	10,863	69.1	Yes	**-1.07**	104.0	3.01	91.72	11.74	4.58	0.00	0.00	108.04	0.00
103	17,448	17,448	50.6	Yes	**-8.40**	104.0	3.01	95.84	14.83	4.70	0.00	0.00	115.37	0.00
104	11,029	11,029	62.8	Yes	**-1.32**	104.0	3.01	91.85	11.83	4.61	0.00	0.00	108.29	0.00
107	15,278	15,278	56.2	Yes	**-6.31**	104.0	3.01	94.68	13.93	4.67	0.00	0.00	113.29	0.00
108	15,248	15,248	52.8	No	**-6.41**	104.0	3.01	94.66	13.92	4.80	0.00	0.00	113.38	0.00
109	6,370	6,371	45.7	No	**6.39**	104.0	3.01	87.08	8.70	4.80	0.00	0.00	100.58	0.00
110	8,787	8,787	47.6	No	**1.83**	104.0	3.01	89.88	10.47	4.80	0.00	0.00	105.15	0.00
111	8,163	8,163	50.3	Yes	**3.10**	104.0	3.01	89.24	10.05	4.59	0.00	0.00	103.87	0.00
113	15,600	15,601	55.6	Yes	**-6.64**	104.0	3.01	94.86	14.07	4.68	0.00	0.00	113.61	0.00
114	8,875	8,875	41.8	No	**1.68**	104.0	3.01	89.96	10.53	4.80	0.00	0.00	105.29	0.00
115	16,106	16,107	54.1	No	**-7.25**	104.0	3.01	95.14	14.29	4.80	0.00	0.00	114.23	0.00
116	12,126	12,126	60.5	Yes	**-2.76**	104.0	3.01	92.67	12.42	4.63	0.00	0.00	109.73	0.00
118	5,889	5,890	46.8	No	**7.47**	104.0	3.01	86.40	8.30	4.80	0.00	0.00	99.50	0.00
119	14,030	14,030	68.1	Yes	**-4.97**	104.0	3.01	93.94	13.36	4.63	0.00	0.00	111.94	0.00
120	17,051	17,051	48.7	Yes	**-8.04**	104.0	3.01	95.64	14.68	4.70	0.00	0.00	115.01	0.00
121	13,682	13,683	68.0	Yes	**-4.58**	104.0	3.01	93.72	13.20	4.63	0.00	0.00	111.55	0.00
125	5,459	5,460	49.8	Yes	**8.82**	104.0	3.01	85.74	7.92	4.49	0.00	0.00	98.15	0.00
126	8,682	8,682	56.2	Yes	**2.22**	104.0	3.01	89.77	10.40	4.58	0.00	0.00	104.75	0.00
127	8,440	8,441	56.8	Yes	**2.64**	104.0	3.01	89.53	10.24	4.57	0.00	0.00	104.34	0.00
128	8,207	8,208	56.8	Yes	**3.05**	104.0	3.01	89.28	10.08	4.56	0.00	0.00	103.93	0.00
129	13,753	13,753	49.3	Yes	**-4.71**	104.0	3.01	93.77	13.23	4.68	0.00	0.00	111.68	0.00
130	13,707	13,707	52.2	Yes	**-4.65**	104.0	3.01	93.74	13.21	4.67	0.00	0.00	111.62	0.00
131	14,148	14,148	50.7	Yes	**-5.14**	104.0	3.01	94.01	13.42	4.68	0.00	0.00	112.11	0.00
132	14,546	14,547	50.0	Yes	**-5.57**	104.0	3.01	94.26	13.60	4.68	0.00	0.00	112.54	0.00
133	10,142	10,142	52.9	Yes	**-0.09**	104.0	3.01	91.12	11.32	4.62	0.00	0.00	107.06	0.00
134	15,698	15,698	38.7	Yes	**-6.77**	104.0	3.01	94.92	14.11	4.72	0.00	0.00	113.75	0.00
141	13,900	13,901	71.4	Yes	**-4.82**	104.0	3.01	93.86	13.30	4.63	0.00	0.00	111.79	0.00
142	11,149	11,150	71.0	Yes	**-1.46**	104.0	3.01	91.95	11.90	4.58	0.00	0.00	108.43	0.00
143	14,452	14,452	67.3	Yes	**-5.43**	104.0	3.01	94.20	13.56	4.64	0.00	0.00	112.40	0.00
144	9,970	9,970	58.0	Yes	**0.18**	104.0	3.01	90.97	11.22	4.60	0.00	0.00	106.79	0.00
145	7,108	7,108	51.3	Yes	**5.10**	104.0	3.01	88.04	9.28	4.55	0.00	0.00	101.87	0.00
146	7,423	7,423	51.3	Yes	**4.48**	104.0	3.01	88.41	9.52	4.56	0.00	0.00	102.49	0.00

Sum 24.00

Noise sensitive area: H17 H17

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	15,078	15,078	56.9	No	**-6.24**	104.0	3.01	94.57	13.84	4.80	0.00	0.00	113.21	0.00
2	14,908	14,908	59.4	No	**-6.06**	104.0	3.01	94.47	13.77	4.80	0.00	0.00	113.03	0.00
3	14,337	14,337	66.0	No	**-5.46**	104.0	3.01	94.13	13.51	4.80	0.00	0.00	112.44	0.00
4	13,129	13,129	58.7	No	**-4.12**	104.0	3.01	93.36	12.93	4.80	0.00	0.00	111.10	0.00
5	13,085	13,085	60.5	No	**-4.07**	104.0	3.01	93.34	12.91	4.80	0.00	0.00	111.05	0.00
6	13,781	13,782	66.7	No	**-4.86**	104.0	3.01	93.79	13.25	4.80	0.00	0.00	111.83	0.00
7	12,000	12,000	65.1	No	**-2.77**	104.0	3.01	92.58	12.36	4.80	0.00	0.00	109.74	0.00
8	15,730	15,730	49.3	No	**-6.89**	104.0	3.01	94.93	14.13	4.80	0.00	0.00	113.86	0.00
9	14,591	14,591	60.6	No	**-5.73**	104.0	3.01	94.28	13.62	4.80	0.00	0.00	112.71	0.00
10	14,467	14,467	65.2	No	**-5.60**	104.0	3.01	94.21	13.57	4.80	0.00	0.00	112.57	0.00
11	15,969	15,970	53.4	No	**-7.12**	104.0	3.01	95.07	14.23	4.80	0.00	0.00	114.09	0.00
12	15,770	15,770	55.0	No	**-6.93**	104.0	3.01	94.96	14.14	4.80	0.00	0.00	113.90	0.00
13	15,289	15,290	60.1	No	**-6.45**	104.0	3.01	94.69	13.94	4.80	0.00	0.00	113.42	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	14,883	14,883	59.5	No	**-6.04**	104.0	3.01	94.45	13.76	4.80	0.00	0.00	113.01	0.00
15	14,069	14,069	61.0	No	**-5.18**	104.0	3.01	93.97	13.38	4.80	0.00	0.00	112.15	0.00
16	13,726	13,727	62.3	No	**-4.80**	104.0	3.01	93.75	13.22	4.80	0.00	0.00	111.77	0.00
17	16,200	16,200	51.0	No	**-7.34**	104.0	3.01	95.19	14.33	4.80	0.00	0.00	114.32	0.00
18	16,365	16,366	46.4	No	**-7.50**	104.0	3.01	95.28	14.39	4.80	0.00	0.00	114.47	0.00
19	15,156	15,156	51.1	No	**-6.32**	104.0	3.01	94.61	13.88	4.80	0.00	0.00	113.29	0.00
20	14,029	14,029	48.0	No	**-5.13**	104.0	3.01	93.94	13.36	4.80	0.00	0.00	112.11	0.00
21	12,535	12,535	64.1	No	**-3.43**	104.0	3.01	92.96	12.64	4.80	0.00	0.00	110.40	0.00
22	11,995	11,995	58.2	No	**-2.76**	104.0	3.01	92.58	12.36	4.80	0.00	0.00	109.74	0.00
23	11,617	11,617	59.2	No	**-2.28**	104.0	3.01	92.30	12.15	4.80	0.00	0.00	109.26	0.00
24	12,241	12,241	58.1	No	**-3.07**	104.0	3.01	92.76	12.48	4.80	0.00	0.00	110.04	0.00
25	9,530	9,530	51.7	No	**0.64**	104.0	3.01	90.58	10.95	4.80	0.00	0.00	106.33	0.00
26	12,163	12,163	61.2	No	**-2.97**	104.0	3.01	92.70	12.44	4.80	0.00	0.00	109.94	0.00
27	10,124	10,125	52.6	No	**-0.24**	104.0	3.01	91.11	11.31	4.80	0.00	0.00	107.22	0.00
28	10,720	10,721	59.7	No	**-1.09**	104.0	3.01	91.60	11.66	4.80	0.00	0.00	108.06	0.00
29	11,352	11,353	58.1	No	**-1.94**	104.0	3.01	92.10	12.01	4.80	0.00	0.00	108.91	0.00
30	11,154	11,155	53.0	No	**-1.68**	104.0	3.01	91.95	11.90	4.80	0.00	0.00	108.65	0.00
31	11,988	11,988	57.1	No	**-2.75**	104.0	3.01	92.58	12.35	4.80	0.00	0.00	109.73	0.00
32	9,339	9,339	53.7	No	**0.94**	104.0	3.01	90.41	10.83	4.80	0.00	0.00	106.03	0.00
33	10,535	10,535	51.7	No	**-0.83**	104.0	3.01	91.45	11.55	4.80	0.00	0.00	107.80	0.00
34	11,662	11,663	61.8	No	**-2.34**	104.0	3.01	92.34	12.18	4.80	0.00	0.00	109.32	0.00
35	12,303	12,304	65.1	No	**-3.15**	104.0	3.01	92.80	12.52	4.80	0.00	0.00	110.12	0.00
36	12,614	12,614	64.8	No	**-3.52**	104.0	3.01	93.02	12.68	4.80	0.00	0.00	110.49	0.00
37	11,339	11,339	60.6	No	**-1.92**	104.0	3.01	92.09	12.00	4.80	0.00	0.00	108.89	0.00
38	9,754	9,754	50.7	No	**0.30**	104.0	3.01	90.78	11.08	4.80	0.00	0.00	106.67	0.00
39	9,768	9,769	57.5	No	**0.28**	104.0	3.01	90.80	11.09	4.80	0.00	0.00	106.69	0.00
40	10,854	10,854	52.0	No	**-1.27**	104.0	3.01	91.71	11.73	4.80	0.00	0.00	108.24	0.00
41	9,788	9,789	63.4	No	**0.25**	104.0	3.01	90.81	11.11	4.80	0.00	0.00	106.72	0.00
43	10,896	10,896	62.1	No	**-1.33**	104.0	3.01	91.75	11.76	4.80	0.00	0.00	108.30	0.00
44	9,719	9,720	69.3	No	**0.36**	104.0	3.01	90.75	11.06	4.80	0.00	0.00	106.62	0.00
45	9,415	9,415	67.4	No	**0.82**	104.0	3.01	90.48	10.87	4.80	0.00	0.00	106.15	0.00
46	10,709	10,710	53.0	No	**-1.07**	104.0	3.01	91.60	11.65	4.80	0.00	0.00	108.05	0.00
48	8,596	8,596	51.0	No	**2.14**	104.0	3.01	89.69	10.34	4.80	0.00	0.00	104.83	0.00
49	8,733	8,734	48.9	No	**1.91**	104.0	3.01	89.82	10.43	4.80	0.00	0.00	105.06	0.00
50	12,916	12,916	64.1	No	**-3.88**	104.0	3.01	93.22	12.83	4.80	0.00	0.00	110.85	0.00
51	9,197	9,197	48.7	No	**1.16**	104.0	3.01	90.27	10.74	4.80	0.00	0.00	105.81	0.00
52	9,509	9,509	49.2	No	**0.68**	104.0	3.01	90.56	10.93	4.80	0.00	0.00	106.30	0.00
53	8,408	8,408	50.9	No	**2.46**	104.0	3.01	89.49	10.22	4.80	0.00	0.00	104.51	0.00
55	6,945	6,946	44.7	No	**5.18**	104.0	3.01	87.83	9.16	4.80	0.00	0.00	101.79	0.00
56	6,650	6,650	46.4	No	**5.79**	104.0	3.01	87.46	8.92	4.80	0.00	0.00	101.18	0.00
57	6,521	6,521	49.2	No	**6.07**	104.0	3.01	87.29	8.82	4.80	0.00	0.00	100.91	0.00
58	10,058	10,058	51.3	No	**-0.15**	104.0	3.01	91.05	11.27	4.80	0.00	0.00	107.12	0.00
59	6,349	6,349	47.7	No	**6.44**	104.0	3.01	87.05	8.68	4.80	0.00	0.00	100.54	0.00
60	4,853	4,854	52.4	No	**10.09**	104.0	3.01	84.72	7.36	4.80	0.00	0.00	96.88	0.00
61	4,511	4,512	49.3	No	**11.06**	104.0	3.01	84.09	7.02	4.80	0.00	0.00	95.91	0.00
62	4,669	4,670	49.9	No	**10.61**	104.0	3.01	84.39	7.18	4.80	0.00	0.00	96.36	0.00
63	4,585	4,586	52.2	No	**10.85**	104.0	3.01	84.23	7.09	4.80	0.00	0.00	96.12	0.00
64	3,838	3,838	47.8	Yes	**13.60**	104.0	3.01	82.68	6.32	4.37	0.00	0.00	93.37	0.00
65	3,292	3,293	46.5	Yes	**15.60**	104.0	3.01	81.35	5.70	4.32	0.00	0.00	91.37	0.00
66	11,166	11,167	48.9	No	**-1.69**	104.0	3.01	91.96	11.91	4.80	0.00	0.00	108.67	0.00
67	3,251	3,252	49.8	Yes	**15.80**	104.0	3.01	81.24	5.65	4.28	0.00	0.00	91.17	0.00
68	2,825	2,825	43.6	Yes	**17.55**	104.0	3.01	80.02	5.13	4.27	0.00	0.00	89.42	0.00
69	3,525	3,526	45.9	Yes	**14.70**	104.0	3.01	81.95	5.97	4.35	0.00	0.00	92.27	0.00
70	14,952	14,952	43.6	No	**-6.11**	104.0	3.01	94.49	13.79	4.80	0.00	0.00	113.08	0.00
71	14,172	14,173	64.1	No	**-5.29**	104.0	3.01	94.03	13.43	4.80	0.00	0.00	112.26	0.00

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Project:
20102130 - Merricourt ND Enxco

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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	13,508	13,508	60.1	No	**-4.56**	104.0	3.01	93.61	13.12	4.80	0.00	0.00	111.53	0.00
73	13,445	13,445	63.9	No	**-4.49**	104.0	3.01	93.57	13.09	4.80	0.00	0.00	111.46	0.00
74	12,597	12,598	66.0	No	**-3.50**	104.0	3.01	93.01	12.67	4.80	0.00	0.00	110.47	0.00
75	11,558	11,559	56.0	No	**-2.21**	104.0	3.01	92.26	12.12	4.80	0.00	0.00	109.18	0.00
76	7,150	7,150	53.4	No	**4.77**	104.0	3.01	88.09	9.31	4.80	0.00	0.00	102.20	0.00
77	7,916	7,916	49.5	No	**3.33**	104.0	3.01	88.97	9.87	4.80	0.00	0.00	103.64	0.00
78	13,655	13,656	42.4	No	**-4.72**	104.0	3.01	93.71	13.19	4.80	0.00	0.00	111.69	0.00
80	5,205	5,206	53.7	No	**9.16**	104.0	3.01	85.33	7.69	4.80	0.00	0.00	97.82	0.00
81	15,419	15,419	50.9	No	**-6.58**	104.0	3.01	94.76	13.99	4.80	0.00	0.00	113.55	0.00
82	9,952	9,952	51.3	No	**0.01**	104.0	3.01	90.96	11.20	4.80	0.00	0.00	106.96	0.00
83	3,975	3,975	50.6	Yes	**13.16**	104.0	3.01	82.99	6.46	4.36	0.00	0.00	93.82	0.00
85	8,918	8,918	46.1	No	**1.61**	104.0	3.01	90.01	10.56	4.80	0.00	0.00	105.36	0.00
86	5,484	5,484	51.4	No	**8.45**	104.0	3.01	85.78	7.94	4.80	0.00	0.00	98.52	0.00
87	3,094	3,095	44.6	Yes	**16.39**	104.0	3.01	80.81	5.46	4.31	0.00	0.00	90.58	0.00
89	4,066	4,066	51.2	Yes	**12.86**	104.0	3.01	83.18	6.56	4.37	0.00	0.00	94.12	0.00
90	5,944	5,944	53.0	No	**7.35**	104.0	3.01	86.48	8.34	4.80	0.00	0.00	99.62	0.00
91	4,631	4,631	51.2	No	**10.72**	104.0	3.01	84.31	7.14	4.80	0.00	0.00	96.25	0.00
92	4,317	4,317	44.4	No	**11.65**	104.0	3.01	83.70	6.82	4.80	0.00	0.00	95.33	0.00
94	14,627	14,627	62.5	No	**-5.77**	104.0	3.01	94.30	13.64	4.80	0.00	0.00	112.74	0.00
95	15,760	15,760	55.5	No	**-6.92**	104.0	3.01	94.95	14.14	4.80	0.00	0.00	113.89	0.00
97	13,272	13,273	62.6	No	**-4.29**	104.0	3.01	93.46	13.00	4.80	0.00	0.00	111.26	0.00
98	15,050	15,050	60.8	No	**-6.21**	104.0	3.01	94.55	13.83	4.80	0.00	0.00	113.18	0.00
99	14,518	14,518	62.1	No	**-5.66**	104.0	3.01	94.24	13.59	4.80	0.00	0.00	112.63	0.00
100	9,175	9,175	59.7	No	**1.20**	104.0	3.01	90.25	10.72	4.80	0.00	0.00	105.77	0.00
101	15,839	15,840	48.5	No	**-7.00**	104.0	3.01	94.99	14.17	4.80	0.00	0.00	113.97	0.00
102	10,019	10,019	68.4	No	**-0.09**	104.0	3.01	91.02	11.25	4.80	0.00	0.00	107.06	0.00
103	16,658	16,659	44.7	No	**-7.78**	104.0	3.01	95.43	14.52	4.80	0.00	0.00	114.75	0.00
104	10,249	10,249	59.8	No	**-0.42**	104.0	3.01	91.21	11.38	4.80	0.00	0.00	107.40	0.00
107	14,464	14,465	51.1	No	**-5.60**	104.0	3.01	94.21	13.57	4.80	0.00	0.00	112.57	0.00
108	14,804	14,804	58.7	No	**-5.96**	104.0	3.01	94.41	13.72	4.80	0.00	0.00	112.93	0.00
109	6,035	6,036	49.2	No	**7.14**	104.0	3.01	86.61	8.42	4.80	0.00	0.00	99.83	0.00
110	8,185	8,185	50.4	No	**2.85**	104.0	3.01	89.26	10.06	4.80	0.00	0.00	104.12	0.00
111	7,556	7,556	53.4	No	**3.99**	104.0	3.01	88.57	9.61	4.80	0.00	0.00	102.98	0.00
113	14,792	14,793	50.1	No	**-5.94**	104.0	3.01	94.40	13.71	4.80	0.00	0.00	112.92	0.00
114	8,628	8,628	45.9	No	**2.09**	104.0	3.01	89.72	10.36	4.80	0.00	0.00	104.88	0.00
115	15,481	15,481	50.8	No	**-6.64**	104.0	3.01	94.80	14.02	4.80	0.00	0.00	113.61	0.00
116	11,292	11,293	57.8	No	**-1.86**	104.0	3.01	92.06	11.98	4.80	0.00	0.00	108.83	0.00
118	5,587	5,587	51.1	No	**8.20**	104.0	3.01	85.94	8.03	4.80	0.00	0.00	98.78	0.00
119	13,349	13,349	64.7	No	**-4.38**	104.0	3.01	93.51	13.04	4.80	0.00	0.00	111.35	0.00
120	16,234	16,234	46.5	No	**-7.38**	104.0	3.01	95.21	14.34	4.80	0.00	0.00	114.35	0.00
121	12,955	12,955	63.9	No	**-3.92**	104.0	3.01	93.25	12.85	4.80	0.00	0.00	110.90	0.00
125	4,259	4,260	50.6	No	**11.82**	104.0	3.01	83.59	6.76	4.80	0.00	0.00	95.15	0.00
126	7,818	7,818	57.5	No	**3.51**	104.0	3.01	88.86	9.80	4.80	0.00	0.00	103.47	0.00
127	7,583	7,584	58.0	No	**3.94**	104.0	3.01	88.60	9.63	4.80	0.00	0.00	103.03	0.00
128	7,381	7,381	57.8	No	**4.32**	104.0	3.01	88.36	9.49	4.80	0.00	0.00	102.65	0.00
129	12,800	12,801	52.6	No	**-3.74**	104.0	3.01	93.14	12.77	4.80	0.00	0.00	110.71	0.00
130	12,699	12,699	55.5	No	**-3.62**	104.0	3.01	93.08	12.72	4.80	0.00	0.00	110.59	0.00
131	13,132	13,132	54.1	No	**-4.13**	104.0	3.01	93.37	12.93	4.80	0.00	0.00	111.10	0.00
132	13,538	13,538	53.5	No	**-4.59**	104.0	3.01	93.63	13.13	4.80	0.00	0.00	111.56	0.00
133	9,429	9,429	52.3	No	**0.80**	104.0	3.01	90.49	10.88	4.80	0.00	0.00	106.17	0.00
134	14,855	14,855	41.5	No	**-6.01**	104.0	3.01	94.44	13.74	4.80	0.00	0.00	112.98	0.00
141	13,137	13,138	65.6	No	**-4.14**	104.0	3.01	93.37	12.94	4.80	0.00	0.00	111.11	0.00
142	10,307	10,308	69.8	No	**-0.51**	104.0	3.01	91.26	11.42	4.80	0.00	0.00	107.48	0.00
143	13,671	13,671	61.0	No	**-4.74**	104.0	3.01	93.72	13.20	4.80	0.00	0.00	111.71	0.00
144	9,094	9,094	60.5	No	**1.33**	104.0	3.01	90.18	10.67	4.80	0.00	0.00	105.64	0.00

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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	6,399	6,399	53.9	No	**6.33**	104.0	3.01	87.12	8.72	4.80	0.00	0.00	100.64	0.00
146	6,721	6,721	53.6	No	**5.64**	104.0	3.01	87.55	8.98	4.80	0.00	0.00	101.33	0.00
Sum	26.84													

Noise sensitive area: H18 H18

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	9,396	9,397	33.8	Yes	**0.97**	104.0	3.01	90.46	10.86	4.68	0.00	0.00	106.00	0.00
2	9,287	9,287	36.8	No	**1.02**	104.0	3.01	90.36	10.79	4.80	0.00	0.00	105.95	0.00
3	8,747	8,748	44.8	Yes	**2.07**	104.0	3.01	89.84	10.44	4.63	0.00	0.00	104.91	0.00
4	7,772	7,773	43.4	No	**3.59**	104.0	3.01	88.81	9.77	4.80	0.00	0.00	103.38	0.00
5	7,557	7,558	43.4	No	**3.99**	104.0	3.01	88.57	9.62	4.80	0.00	0.00	102.98	0.00
6	8,172	8,173	45.8	Yes	**3.06**	104.0	3.01	89.25	10.05	4.61	0.00	0.00	103.91	0.00
7	6,233	6,234	43.9	Yes	**6.93**	104.0	3.01	86.90	8.59	4.56	0.00	0.00	100.04	0.00
8	10,041	10,041	26.3	No	**-0.12**	104.0	3.01	91.04	11.26	4.80	0.00	0.00	107.09	0.00
9	8,888	8,888	37.3	Yes	**1.80**	104.0	3.01	89.98	10.54	4.66	0.00	0.00	105.17	0.00
10	8,702	8,703	39.5	Yes	**2.12**	104.0	3.01	89.79	10.41	4.65	0.00	0.00	104.85	0.00
11	10,152	10,153	26.8	No	**-0.28**	104.0	3.01	91.13	11.32	4.80	0.00	0.00	107.26	0.00
12	9,959	9,960	27.8	Yes	**0.09**	104.0	3.01	90.96	11.21	4.71	0.00	0.00	106.88	0.00
13	9,475	9,476	32.9	Yes	**0.85**	104.0	3.01	90.53	10.91	4.68	0.00	0.00	106.13	0.00
14	9,061	9,062	33.4	Yes	**1.50**	104.0	3.01	90.14	10.65	4.67	0.00	0.00	105.47	0.00
15	8,260	8,261	33.3	Yes	**2.85**	104.0	3.01	89.34	10.11	4.66	0.00	0.00	104.12	0.00
16	7,937	7,938	35.7	Yes	**3.44**	104.0	3.01	88.99	9.89	4.65	0.00	0.00	103.53	0.00
17	10,379	10,380	25.1	No	**-0.61**	104.0	3.01	91.32	11.46	4.80	0.00	0.00	107.58	0.00
18	10,532	10,532	26.4	No	**-0.83**	104.0	3.01	91.45	11.55	4.80	0.00	0.00	107.80	0.00
19	9,321	9,322	30.8	No	**0.97**	104.0	3.01	90.39	10.82	4.80	0.00	0.00	106.01	0.00
20	8,191	8,192	28.1	No	**2.84**	104.0	3.01	89.27	10.07	4.80	0.00	0.00	104.13	0.00
21	7,078	7,079	49.0	Yes	**5.15**	104.0	3.01	88.00	9.26	4.56	0.00	0.00	101.82	0.00
22	6,716	6,716	44.1	Yes	**5.88**	104.0	3.01	87.54	8.98	4.58	0.00	0.00	101.09	0.00
23	6,375	6,375	46.1	Yes	**6.63**	104.0	3.01	87.09	8.70	4.55	0.00	0.00	100.34	0.00
24	6,944	6,944	43.6	Yes	**5.40**	104.0	3.01	87.83	9.15	4.59	0.00	0.00	101.57	0.00
25	4,101	4,101	37.9	Yes	**12.63**	104.0	3.01	83.26	6.60	4.48	0.00	0.00	94.34	0.00
26	6,533	6,534	43.2	Yes	**6.26**	104.0	3.01	87.30	8.83	4.57	0.00	0.00	100.71	0.00
27	4,501	4,501	37.5	Yes	**11.38**	104.0	3.01	84.07	7.01	4.52	0.00	0.00	95.59	0.00
28	4,943	4,944	41.1	Yes	**10.13**	104.0	3.01	84.88	7.44	4.52	0.00	0.00	96.84	0.00
29	5,960	5,960	43.8	Yes	**7.56**	104.0	3.01	86.51	8.36	4.55	0.00	0.00	99.41	0.00
30	5,944	5,944	41.0	No	**7.35**	104.0	3.01	86.48	8.34	4.80	0.00	0.00	99.62	0.00
31	6,951	6,951	48.1	No	**5.17**	104.0	3.01	87.84	9.16	4.80	0.00	0.00	101.80	0.00
32	4,096	4,096	39.0	Yes	**12.66**	104.0	3.01	83.25	6.59	4.47	0.00	0.00	94.32	0.00
33	5,382	5,382	40.1	No	**8.70**	104.0	3.01	85.62	7.85	4.80	0.00	0.00	98.27	0.00
34	5,900	5,901	41.3	Yes	**7.69**	104.0	3.01	86.42	8.31	4.56	0.00	0.00	99.29	0.00
35	6,536	6,538	43.1	Yes	**6.25**	104.0	3.01	87.31	8.83	4.58	0.00	0.00	100.72	0.00
36	6,847	6,848	42.1	Yes	**5.59**	104.0	3.01	87.71	9.08	4.59	0.00	0.00	101.38	0.00
37	5,577	5,578	41.0	Yes	**8.47**	104.0	3.01	85.93	8.02	4.55	0.00	0.00	98.50	0.00
38	4,202	4,203	36.4	Yes	**12.29**	104.0	3.01	83.47	6.70	4.50	0.00	0.00	94.68	0.00
39	4,011	4,012	42.5	Yes	**12.96**	104.0	3.01	83.07	6.50	4.44	0.00	0.00	94.01	0.00
40	5,016	5,016	43.9	Yes	**9.95**	104.0	3.01	85.01	7.51	4.50	0.00	0.00	97.02	0.00
41	3,981	3,983	45.3	Yes	**13.08**	104.0	3.01	83.00	6.47	4.41	0.00	0.00	93.89	0.00
43	5,097	5,098	40.7	Yes	**9.71**	104.0	3.01	85.15	7.59	4.53	0.00	0.00	97.26	0.00
44	3,872	3,875	53.5	Yes	**13.52**	104.0	3.01	82.76	6.36	4.33	0.00	0.00	93.45	0.00
45	3,570	3,572	52.2	Yes	**14.59**	104.0	3.01	82.06	6.02	4.30	0.00	0.00	92.38	0.00
46	4,854	4,855	40.2	Yes	**10.37**	104.0	3.01	84.72	7.36	4.52	0.00	0.00	96.60	0.00
48	3,317	3,317	35.9	Yes	**15.40**	104.0	3.01	81.42	5.73	4.43	0.00	0.00	91.57	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	4,001	4,001	38.6	No	**12.64**	104.0	3.01	83.04	6.49	4.80	0.00	0.00	94.34	0.00
50	7,229	7,230	43.1	Yes	**4.82**	104.0	3.01	88.18	9.37	4.60	0.00	0.00	102.15	0.00
51	4,334	4,335	38.7	No	**11.59**	104.0	3.01	83.74	6.84	4.80	0.00	0.00	95.38	0.00
52	4,584	4,585	39.0	No	**10.85**	104.0	3.01	84.23	7.09	4.80	0.00	0.00	96.12	0.00
53	3,778	3,778	41.7	No	**13.37**	104.0	3.01	82.55	6.25	4.80	0.00	0.00	93.60	0.00
55	2,978	2,978	41.8	Yes	**16.85**	104.0	3.01	80.48	5.32	4.32	0.00	0.00	90.12	0.00
56	2,900	2,901	44.1	Yes	**17.22**	104.0	3.01	80.25	5.22	4.28	0.00	0.00	89.76	0.00
57	2,172	2,173	39.2	Yes	**20.79**	104.0	3.01	77.74	4.26	4.18	0.00	0.00	86.18	0.00
58	4,755	4,755	36.9	Yes	**10.63**	104.0	3.01	84.54	7.26	4.54	0.00	0.00	96.34	0.00
59	2,845	2,846	45.7	Yes	**17.48**	104.0	3.01	80.08	5.15	4.25	0.00	0.00	89.49	0.00
60	2,674	2,676	46.7	Yes	**18.28**	104.0	3.01	79.55	4.94	4.20	0.00	0.00	88.69	0.00
61	2,838	2,839	44.4	Yes	**17.50**	104.0	3.01	80.06	5.15	4.26	0.00	0.00	89.48	0.00
62	1,206	1,209	42.5	Yes	**27.98**	104.0	3.01	72.65	2.76	3.59	0.00	0.00	78.99	0.00
63	1,648	1,651	45.0	Yes	**24.27**	104.0	3.01	75.35	3.49	3.86	0.00	0.00	82.70	0.00
64	3,052	3,053	41.6	Yes	**16.53**	104.0	3.01	80.69	5.41	4.33	0.00	0.00	90.44	0.00
65	3,585	3,586	42.7	Yes	**14.45**	104.0	3.01	82.09	6.04	4.39	0.00	0.00	92.52	0.00
66	5,330	5,330	40.9	Yes	**9.10**	104.0	3.01	85.53	7.80	4.54	0.00	0.00	97.87	0.00
67	2,897	2,898	42.7	Yes	**17.21**	104.0	3.01	80.24	5.22	4.30	0.00	0.00	89.76	0.00
68	3,440	3,441	39.9	Yes	**14.96**	104.0	3.01	81.73	5.87	4.40	0.00	0.00	92.01	0.00
69	3,553	3,554	41.1	Yes	**14.55**	104.0	3.01	82.01	6.00	4.40	0.00	0.00	92.42	0.00
70	9,097	9,098	32.8	No	**1.32**	104.0	3.01	90.18	10.67	4.80	0.00	0.00	105.65	0.00
71	8,417	8,418	39.7	Yes	**2.61**	104.0	3.01	89.50	10.22	4.64	0.00	0.00	104.36	0.00
72	8,120	8,121	44.5	No	**2.96**	104.0	3.01	89.19	10.02	4.80	0.00	0.00	104.01	0.00
73	7,846	7,847	43.7	Yes	**3.64**	104.0	3.01	88.89	9.82	4.61	0.00	0.00	103.33	0.00
74	6,905	6,906	45.4	Yes	**5.49**	104.0	3.01	87.78	9.12	4.58	0.00	0.00	101.48	0.00
75	6,005	6,006	39.7	No	**7.21**	104.0	3.01	86.57	8.39	4.80	0.00	0.00	99.77	0.00
76	2,099	2,100	36.5	Yes	**21.17**	104.0	3.01	77.44	4.16	4.20	0.00	0.00	85.80	0.00
77	3,113	3,114	36.1	Yes	**16.22**	104.0	3.01	80.87	5.49	4.40	0.00	0.00	90.75	0.00
78	7,811	7,812	26.7	No	**3.52**	104.0	3.01	88.86	9.80	4.80	0.00	0.00	103.45	0.00
80	2,464	2,465	48.1	Yes	**19.34**	104.0	3.01	78.84	4.66	4.13	0.00	0.00	87.63	0.00
81	9,580	9,581	33.3	No	**0.57**	104.0	3.01	90.63	10.98	4.80	0.00	0.00	106.41	0.00
82	4,885	4,885	40.1	No	**10.01**	104.0	3.01	84.78	7.39	4.80	0.00	0.00	96.96	0.00
83	2,229	2,230	42.7	Yes	**20.52**	104.0	3.01	77.97	4.34	4.14	0.00	0.00	86.45	0.00
85	4,634	4,634	42.8	No	**10.71**	104.0	3.01	84.32	7.14	4.80	0.00	0.00	96.26	0.00
86	2,385	2,386	46.8	Yes	**19.74**	104.0	3.01	78.55	4.55	4.13	0.00	0.00	87.23	0.00
87	3,790	3,791	42.4	Yes	**13.71**	104.0	3.01	82.58	6.27	4.42	0.00	0.00	93.26	0.00
89	2,556	2,557	43.0	Yes	**18.81**	104.0	3.01	79.16	4.78	4.22	0.00	0.00	88.16	0.00
90	1,252	1,254	39.6	Yes	**27.46**	104.0	3.01	72.96	2.84	3.71	0.00	0.00	79.51	0.00
91	1,264	1,267	43.9	Yes	**27.45**	104.0	3.01	73.06	2.86	3.61	0.00	0.00	79.52	0.00
92	3,633	3,634	43.2	Yes	**14.28**	104.0	3.01	82.21	6.09	4.39	0.00	0.00	92.69	0.00
94	8,831	8,832	34.6	Yes	**1.89**	104.0	3.01	89.92	10.50	4.67	0.00	0.00	105.09	0.00
95	9,988	9,989	28.4	Yes	**0.05**	104.0	3.01	90.99	11.23	4.70	0.00	0.00	106.92	0.00
97	7,452	7,454	35.9	Yes	**4.35**	104.0	3.01	88.45	9.54	4.64	0.00	0.00	102.62	0.00
98	9,264	9,265	33.0	Yes	**1.18**	104.0	3.01	90.34	10.78	4.68	0.00	0.00	105.79	0.00
99	9,015	9,016	44.6	No	**1.45**	104.0	3.01	90.10	10.62	4.80	0.00	0.00	105.52	0.00
100	3,362	3,364	44.0	Yes	**15.30**	104.0	3.01	81.54	5.78	4.35	0.00	0.00	91.67	0.00
101	9,999	9,999	32.9	No	**-0.06**	104.0	3.01	91.00	11.23	4.80	0.00	0.00	107.03	0.00
102	4,180	4,182	49.7	Yes	**12.47**	104.0	3.01	83.43	6.68	4.39	0.00	0.00	94.51	0.00
103	10,824	10,824	25.8	No	**-1.23**	104.0	3.01	91.69	11.72	4.80	0.00	0.00	108.20	0.00
104	4,460	4,461	42.2	Yes	**11.54**	104.0	3.01	83.99	6.97	4.48	0.00	0.00	95.44	0.00
107	8,624	8,625	34.0	Yes	**2.23**	104.0	3.01	89.71	10.36	4.67	0.00	0.00	104.74	0.00
108	9,444	9,445	43.7	No	**0.78**	104.0	3.01	90.50	10.89	4.80	0.00	0.00	106.20	0.00
109	2,788	2,789	46.7	Yes	**17.75**	104.0	3.01	79.91	5.08	4.23	0.00	0.00	89.22	0.00
110	2,899	2,900	35.3	Yes	**17.12**	104.0	3.01	80.25	5.22	4.38	0.00	0.00	89.86	0.00
111	2,392	2,393	36.8	Yes	**19.56**	104.0	3.01	78.58	4.56	4.27	0.00	0.00	87.42	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	8,953	8,954	32.2	No	**1.55**	104.0	3.01	90.04	10.58	4.80	0.00	0.00	105.42	0.00
114	4,455	4,456	43.4	No	**11.23**	104.0	3.01	83.98	6.96	4.80	0.00	0.00	95.74	0.00
115	9,801	9,802	27.7	No	**0.23**	104.0	3.01	90.83	11.11	4.80	0.00	0.00	106.74	0.00
116	5,452	5,454	36.5	Yes	**8.75**	104.0	3.01	85.73	7.91	4.57	0.00	0.00	98.22	0.00
118	2,867	2,868	46.1	Yes	**17.39**	104.0	3.01	80.15	5.18	4.25	0.00	0.00	89.58	0.00
119	7,626	7,627	42.8	Yes	**4.05**	104.0	3.01	88.65	9.67	4.61	0.00	0.00	102.92	0.00
120	10,389	10,389	35.2	No	**-0.62**	104.0	3.01	91.33	11.46	4.80	0.00	0.00	107.60	0.00
121	7,185	7,186	40.3	Yes	**4.90**	104.0	3.01	88.13	9.34	4.61	0.00	0.00	102.08	0.00
125	1,959	1,960	43.5	Yes	**22.13**	104.0	3.01	76.85	3.95	4.04	0.00	0.00	84.84	0.00
126	1,990	1,993	46.9	Yes	**21.99**	104.0	3.01	76.99	4.00	3.99	0.00	0.00	84.98	0.00
127	1,769	1,772	47.0	Yes	**23.44**	104.0	3.01	75.97	3.67	3.89	0.00	0.00	83.53	0.00
128	1,624	1,627	44.6	Yes	**24.44**	104.0	3.01	75.23	3.45	3.86	0.00	0.00	82.53	0.00
129	6,962	6,963	44.2	Yes	**5.36**	104.0	3.01	87.86	9.17	4.58	0.00	0.00	101.61	0.00
130	6,903	6,904	47.9	Yes	**5.50**	104.0	3.01	87.78	9.12	4.56	0.00	0.00	101.47	0.00
131	7,345	7,346	46.4	Yes	**4.61**	104.0	3.01	88.32	9.46	4.58	0.00	0.00	102.36	0.00
132	7,743	7,743	45.5	Yes	**3.84**	104.0	3.01	88.78	9.75	4.60	0.00	0.00	103.13	0.00
133	3,758	3,759	37.6	Yes	**13.78**	104.0	3.01	82.50	6.23	4.46	0.00	0.00	93.19	0.00
134	9,004	9,004	30.4	No	**1.47**	104.0	3.01	90.09	10.61	4.80	0.00	0.00	105.50	0.00
141	7,333	7,334	38.8	Yes	**4.59**	104.0	3.01	88.31	9.45	4.62	0.00	0.00	102.38	0.00
142	4,468	4,470	50.0	Yes	**11.57**	104.0	3.01	84.01	6.98	4.42	0.00	0.00	95.40	0.00
143	7,850	7,851	34.2	Yes	**3.59**	104.0	3.01	88.90	9.83	4.65	0.00	0.00	103.38	0.00
144	3,245	3,247	47.3	Yes	**15.80**	104.0	3.01	81.23	5.64	4.30	0.00	0.00	91.18	0.00
145	1,291	1,293	38.2	Yes	**27.05**	104.0	3.01	73.23	2.90	3.78	0.00	0.00	79.92	0.00
146	1,485	1,487	37.4	Yes	**25.37**	104.0	3.01	74.44	3.22	3.94	0.00	0.00	81.60	0.00

Sum 37.62

Noise sensitive area: H19 H19

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	4,120	4,121	31.8	Yes	**12.52**	104.0	3.01	83.30	6.62	4.54	0.00	0.00	94.46	0.00
2	3,948	3,949	35.0	Yes	**13.11**	104.0	3.01	82.93	6.44	4.50	0.00	0.00	93.86	0.00
3	3,388	3,390	43.0	Yes	**15.19**	104.0	3.01	81.60	5.81	4.37	0.00	0.00	91.78	0.00
4	2,506	2,507	42.6	Yes	**19.06**	104.0	3.01	78.98	4.72	4.22	0.00	0.00	87.92	0.00
5	2,184	2,186	42.7	Yes	**20.77**	104.0	3.01	77.79	4.28	4.13	0.00	0.00	86.20	0.00
6	2,823	2,825	43.6	Yes	**17.55**	104.0	3.01	80.02	5.13	4.27	0.00	0.00	89.42	0.00
7	1,414	1,420	45.8	Yes	**26.12**	104.0	3.01	74.04	3.12	3.69	0.00	0.00	80.85	0.00
8	4,773	4,774	25.9	Yes	**10.50**	104.0	3.01	84.58	7.28	4.62	0.00	0.00	96.47	0.00
9	3,649	3,651	33.8	Yes	**14.13**	104.0	3.01	82.25	6.11	4.48	0.00	0.00	92.84	0.00
10	3,621	3,624	38.2	Yes	**14.27**	104.0	3.01	82.18	6.08	4.44	0.00	0.00	92.70	0.00
11	5,247	5,249	28.2	No	**9.04**	104.0	3.01	85.40	7.73	4.80	0.00	0.00	97.93	0.00
12	5,024	5,026	29.5	No	**9.63**	104.0	3.01	85.02	7.52	4.80	0.00	0.00	97.34	0.00
13	4,580	4,583	34.6	Yes	**11.12**	104.0	3.01	84.22	7.09	4.54	0.00	0.00	95.86	0.00
14	4,236	4,238	34.9	Yes	**12.17**	104.0	3.01	83.54	6.74	4.52	0.00	0.00	94.80	0.00
15	3,406	3,409	35.0	Yes	**15.03**	104.0	3.01	81.65	5.83	4.45	0.00	0.00	91.94	0.00
16	2,999	3,002	36.5	Yes	**16.69**	104.0	3.01	80.55	5.35	4.38	0.00	0.00	90.28	0.00
17	5,482	5,484	26.2	No	**8.45**	104.0	3.01	85.78	7.94	4.80	0.00	0.00	98.52	0.00
18	5,718	5,720	22.4	No	**7.88**	104.0	3.01	86.15	8.15	4.80	0.00	0.00	99.10	0.00
19	4,583	4,585	25.4	Yes	**11.04**	104.0	3.01	84.23	7.09	4.61	0.00	0.00	95.93	0.00
20	3,585	3,587	20.5	Yes	**14.24**	104.0	3.01	82.09	6.04	4.61	0.00	0.00	92.74	0.00
21	1,749	1,751	47.4	Yes	**23.59**	104.0	3.01	75.87	3.64	3.87	0.00	0.00	83.38	0.00
22	1,696	1,697	41.4	Yes	**23.86**	104.0	3.01	75.59	3.56	3.96	0.00	0.00	83.12	0.00
23	1,539	1,541	43.2	Yes	**25.07**	104.0	3.01	74.76	3.31	3.84	0.00	0.00	81.91	0.00
24	1,844	1,845	41.6	Yes	**22.84**	104.0	3.01	76.32	3.78	4.03	0.00	0.00	84.13	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	1,479	1,480	43.7	Yes	**25.57**	104.0	3.01	74.41	3.21	3.78	0.00	0.00	81.40	0.00
26	1,202	1,206	42.3	Yes	**28.00**	104.0	3.01	72.62	2.75	3.59	0.00	0.00	78.97	0.00
27	874	878	38.8	Yes	**31.68**	104.0	3.01	69.87	2.15	3.27	0.00	0.00	75.29	0.00
28	1,093	1,099	40.9	Yes	**29.08**	104.0	3.01	71.82	2.56	3.51	0.00	0.00	77.89	0.00
29	919	922	44.1	Yes	**31.30**	104.0	3.01	70.29	2.24	3.14	0.00	0.00	75.67	0.00
30	1,406	1,408	43.3	Yes	**26.17**	104.0	3.01	73.97	3.10	3.74	0.00	0.00	80.81	0.00
31	2,345	2,346	43.7	Yes	**19.90**	104.0	3.01	78.41	4.50	4.16	0.00	0.00	87.07	0.00
32	1,832	1,833	45.6	Yes	**22.99**	104.0	3.01	76.27	3.77	3.95	0.00	0.00	83.98	0.00
33	1,475	1,476	44.5	Yes	**25.62**	104.0	3.01	74.38	3.21	3.76	0.00	0.00	81.35	0.00
34	1,165	1,171	42.4	Yes	**28.36**	104.0	3.01	72.37	2.69	3.55	0.00	0.00	78.61	0.00
35	1,647	1,652	40.7	Yes	**24.17**	104.0	3.01	75.36	3.49	3.95	0.00	0.00	82.80	0.00
36	1,904	1,909	39.2	Yes	**22.38**	104.0	3.01	76.61	3.88	4.09	0.00	0.00	84.59	0.00
37	1,009	1,016	41.6	Yes	**30.04**	104.0	3.01	71.14	2.41	3.38	0.00	0.00	76.93	0.00
38	1,210	1,212	41.4	Yes	**27.92**	104.0	3.01	72.67	2.76	3.62	0.00	0.00	79.05	0.00
39	1,529	1,533	43.2	Yes	**25.13**	104.0	3.01	74.71	3.30	3.83	0.00	0.00	81.84	0.00
40	2,830	2,831	17.6	No	**17.00**	104.0	3.01	80.04	5.14	4.80	0.00	0.00	89.98	0.00
41	1,767	1,771	46.8	Yes	**23.44**	104.0	3.01	75.97	3.67	3.89	0.00	0.00	83.53	0.00
43	1,250	1,256	42.0	Yes	**27.50**	104.0	3.01	72.98	2.84	3.65	0.00	0.00	79.47	0.00
44	2,195	2,200	43.7	Yes	**20.71**	104.0	3.01	77.85	4.30	4.12	0.00	0.00	86.26	0.00
45	2,336	2,339	43.0	Yes	**19.93**	104.0	3.01	78.38	4.49	4.17	0.00	0.00	87.04	0.00
46	2,254	2,257	18.2	Yes	**20.00**	104.0	3.01	78.07	4.38	4.52	0.00	0.00	86.97	0.00
48	2,427	2,428	45.0	Yes	**19.49**	104.0	3.01	78.71	4.61	4.17	0.00	0.00	87.48	0.00
49	2,855	2,856	47.5	Yes	**17.46**	104.0	3.01	80.11	5.17	4.23	0.00	0.00	89.51	0.00
50	1,986	1,989	40.2	Yes	**21.90**	104.0	3.01	76.97	4.00	4.11	0.00	0.00	85.08	0.00
51	2,453	2,454	46.1	Yes	**19.37**	104.0	3.01	78.80	4.65	4.16	0.00	0.00	87.60	0.00
52	2,220	2,221	45.8	Yes	**20.62**	104.0	3.01	77.93	4.33	4.09	0.00	0.00	86.35	0.00
53	3,144	3,145	50.0	Yes	**16.24**	104.0	3.01	80.95	5.52	4.26	0.00	0.00	90.73	0.00
55	4,487	4,487	47.2	Yes	**11.50**	104.0	3.01	84.04	7.00	4.44	0.00	0.00	95.48	0.00
56	4,781	4,782	50.0	Yes	**10.65**	104.0	3.01	84.59	7.29	4.44	0.00	0.00	96.32	0.00
57	4,571	4,572	46.5	Yes	**11.24**	104.0	3.01	84.20	7.08	4.45	0.00	0.00	95.73	0.00
58	1,252	1,253	43.0	Yes	**27.56**	104.0	3.01	72.96	2.83	3.62	0.00	0.00	79.41	0.00
59	5,079	5,079	51.6	Yes	**9.83**	104.0	3.01	85.12	7.57	4.45	0.00	0.00	97.14	0.00
60	6,398	6,398	53.2	Yes	**6.61**	104.0	3.01	87.12	8.72	4.52	0.00	0.00	100.36	0.00
61	6,749	6,750	49.8	Yes	**5.84**	104.0	3.01	87.59	9.00	4.55	0.00	0.00	101.14	0.00
62	6,405	6,405	42.3	Yes	**6.54**	104.0	3.01	87.13	8.73	4.57	0.00	0.00	100.43	0.00
63	7,006	7,007	42.1	Yes	**5.26**	104.0	3.01	87.91	9.20	4.60	0.00	0.00	101.71	0.00
64	8,389	8,389	40.0	Yes	**2.66**	104.0	3.01	89.47	10.20	4.64	0.00	0.00	104.31	0.00
65	8,950	8,951	40.3	Yes	**1.71**	104.0	3.01	90.04	10.58	4.65	0.00	0.00	105.26	0.00
66	2,910	2,912	15.5	No	**16.65**	104.0	3.01	80.28	5.24	4.80	0.00	0.00	90.32	0.00
67	8,260	8,261	41.1	Yes	**2.89**	104.0	3.01	89.34	10.11	4.63	0.00	0.00	104.09	0.00
68	8,801	8,802	38.2	Yes	**1.95**	104.0	3.01	89.89	10.48	4.65	0.00	0.00	105.02	0.00
69	8,900	8,900	39.9	Yes	**1.79**	104.0	3.01	89.99	10.54	4.65	0.00	0.00	105.18	0.00
70	4,720	4,721	10.2	No	**10.46**	104.0	3.01	84.48	7.23	4.80	0.00	0.00	96.51	0.00
71	3,315	3,318	37.6	Yes	**15.41**	104.0	3.01	81.42	5.73	4.41	0.00	0.00	91.56	0.00
72	2,810	2,811	41.3	Yes	**17.59**	104.0	3.01	79.98	5.11	4.30	0.00	0.00	89.39	0.00
73	2,489	2,491	42.2	Yes	**19.13**	104.0	3.01	78.93	4.70	4.22	0.00	0.00	87.84	0.00
74	1,685	1,689	42.3	Yes	**23.94**	104.0	3.01	75.55	3.55	3.94	0.00	0.00	83.04	0.00
75	638	643	40.4	Yes	**35.53**	104.0	3.01	67.16	1.68	2.60	0.00	0.00	71.44	0.00
76	3,836	3,837	45.8	Yes	**13.59**	104.0	3.01	82.68	6.32	4.39	0.00	0.00	93.39	0.00
77	3,299	3,300	45.7	Yes	**15.57**	104.0	3.01	81.37	5.71	4.33	0.00	0.00	91.40	0.00
78	3,343	3,345	16.2	No	**14.92**	104.0	3.01	81.49	5.76	4.80	0.00	0.00	92.05	0.00
80	6,003	6,004	55.4	Yes	**7.53**	104.0	3.01	86.57	8.39	4.49	0.00	0.00	99.45	0.00
81	4,863	4,865	24.4	Yes	**10.23**	104.0	3.01	84.74	7.37	4.63	0.00	0.00	96.74	0.00
82	1,790	1,791	45.6	Yes	**23.28**	104.0	3.01	76.06	3.70	3.93	0.00	0.00	83.69	0.00
83	7,602	7,603	40.6	Yes	**4.09**	104.0	3.01	88.62	9.65	4.62	0.00	0.00	102.89	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	3,414	3,414	48.9	Yes	**15.16**	104.0	3.01	81.67	5.84	4.31	0.00	0.00	91.82	0.00
86	5,716	5,716	53.8	Yes	**8.21**	104.0	3.01	86.14	8.15	4.48	0.00	0.00	98.77	0.00
87	9,161	9,161	39.4	Yes	**1.37**	104.0	3.01	90.24	10.71	4.65	0.00	0.00	105.60	0.00
89	7,899	7,900	41.1	Yes	**3.54**	104.0	3.01	88.95	9.86	4.62	0.00	0.00	103.44	0.00
90	5,020	5,020	46.6	Yes	**9.96**	104.0	3.01	85.01	7.51	4.48	0.00	0.00	97.01	0.00
91	6,615	6,616	41.1	Yes	**6.08**	104.0	3.01	87.41	8.90	4.59	0.00	0.00	100.90	0.00
92	8,843	8,843	38.5	No	**1.73**	104.0	3.01	89.93	10.51	4.80	0.00	0.00	105.24	0.00
94	3,867	3,870	36.3	Yes	**13.39**	104.0	3.01	82.75	6.35	4.48	0.00	0.00	93.58	0.00
95	4,895	4,896	31.3	Yes	**10.20**	104.0	3.01	84.80	7.40	4.58	0.00	0.00	96.78	0.00
97	2,764	2,768	36.1	Yes	**17.72**	104.0	3.01	79.84	5.06	4.35	0.00	0.00	89.25	0.00
98	4,241	4,244	34.1	Yes	**12.14**	104.0	3.01	83.55	6.75	4.53	0.00	0.00	94.83	0.00
99	3,642	3,643	42.7	Yes	**14.24**	104.0	3.01	82.23	6.10	4.40	0.00	0.00	92.73	0.00
100	2,251	2,254	42.8	Yes	**20.39**	104.0	3.01	78.06	4.37	4.15	0.00	0.00	86.58	0.00
101	5,275	5,276	21.4	No	**8.97**	104.0	3.01	85.45	7.75	4.80	0.00	0.00	98.00	0.00
102	1,926	1,931	46.0	Yes	**22.36**	104.0	3.01	76.72	3.91	3.98	0.00	0.00	84.61	0.00
103	6,007	6,009	20.6	No	**7.20**	104.0	3.01	86.58	8.40	4.80	0.00	0.00	99.77	0.00
104	1,368	1,373	42.6	Yes	**26.45**	104.0	3.01	73.75	3.04	3.73	0.00	0.00	80.52	0.00
107	4,006	4,008	24.5	Yes	**12.82**	104.0	3.01	83.06	6.50	4.59	0.00	0.00	94.15	0.00
108	4,120	4,120	41.3	Yes	**12.60**	104.0	3.01	83.30	6.62	4.46	0.00	0.00	94.38	0.00
109	5,372	5,373	53.1	Yes	**9.07**	104.0	3.01	85.60	7.84	4.46	0.00	0.00	97.91	0.00
110	2,806	2,807	45.1	Yes	**17.65**	104.0	3.01	79.97	5.11	4.25	0.00	0.00	89.32	0.00
111	3,432	3,433	46.9	Yes	**15.06**	104.0	3.01	81.71	5.86	4.33	0.00	0.00	91.91	0.00
113	4,287	4,289	24.0	Yes	**11.92**	104.0	3.01	83.65	6.79	4.61	0.00	0.00	95.05	0.00
114	3,632	3,633	48.9	Yes	**14.34**	104.0	3.01	82.20	6.09	4.34	0.00	0.00	92.63	0.00
115	4,522	4,523	26.8	Yes	**11.24**	104.0	3.01	84.11	7.03	4.60	0.00	0.00	95.74	0.00
116	1,796	1,801	37.4	Yes	**23.06**	104.0	3.01	76.11	3.72	4.09	0.00	0.00	83.92	0.00
118	5,850	5,851	53.9	Yes	**7.88**	104.0	3.01	86.34	8.26	4.49	0.00	0.00	99.09	0.00
119	2,457	2,460	39.0	Yes	**19.24**	104.0	3.01	78.82	4.65	4.26	0.00	0.00	87.73	0.00
120	5,698	5,700	17.2	No	**7.92**	104.0	3.01	86.12	8.13	4.80	0.00	0.00	99.05	0.00
121	2,220	2,223	38.3	Yes	**20.49**	104.0	3.01	77.94	4.33	4.21	0.00	0.00	86.48	0.00
125	7,328	7,329	40.8	Yes	**4.62**	104.0	3.01	88.30	9.45	4.61	0.00	0.00	102.36	0.00
126	3,476	3,478	44.6	Yes	**14.87**	104.0	3.01	81.83	5.91	4.36	0.00	0.00	92.10	0.00
127	3,652	3,653	46.6	Yes	**14.24**	104.0	3.01	82.25	6.11	4.36	0.00	0.00	92.73	0.00
128	3,752	3,753	49.0	Yes	**13.91**	104.0	3.01	82.49	6.22	4.35	0.00	0.00	93.07	0.00
129	3,626	3,627	21.3	No	**13.90**	104.0	3.01	82.19	6.08	4.80	0.00	0.00	93.07	0.00
130	4,077	4,078	24.2	No	**12.39**	104.0	3.01	83.21	6.57	4.80	0.00	0.00	94.58	0.00
131	4,424	4,425	23.9	No	**11.32**	104.0	3.01	83.92	6.93	4.80	0.00	0.00	95.65	0.00
132	4,628	4,629	23.5	No	**10.73**	104.0	3.01	84.31	7.14	4.80	0.00	0.00	96.25	0.00
133	1,624	1,626	40.7	Yes	**24.36**	104.0	3.01	75.22	3.45	3.94	0.00	0.00	82.61	0.00
134	4,515	4,516	9.3	No	**11.05**	104.0	3.01	84.09	7.02	4.80	0.00	0.00	95.92	0.00
141	2,547	2,551	39.3	Yes	**18.79**	104.0	3.01	79.13	4.78	4.27	0.00	0.00	88.18	0.00
142	1,826	1,832	45.8	Yes	**23.01**	104.0	3.01	76.26	3.76	3.94	0.00	0.00	83.97	0.00
143	3,120	3,124	34.5	Yes	**16.16**	104.0	3.01	80.89	5.50	4.42	0.00	0.00	90.81	0.00
144	2,597	2,600	35.7	Yes	**18.50**	104.0	3.01	79.30	4.84	4.33	0.00	0.00	88.47	0.00
145	4,567	4,568	47.2	Yes	**11.26**	104.0	3.01	84.19	7.08	4.45	0.00	0.00	95.72	0.00
146	4,245	4,246	47.7	Yes	**12.25**	104.0	3.01	83.56	6.75	4.42	0.00	0.00	94.72	0.00
Sum	42.97													

Noise sensitive area: H20 H20

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	2,773	2,775	18.3	No	**17.24**	104.0	3.01	79.86	5.07	4.80	0.00	0.00	89.73	0.00
2	3,255	3,256	16.9	No	**15.26**	104.0	3.01	81.25	5.65	4.80	0.00	0.00	91.71	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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EAPC Architects Engineers
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US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	3,576	3,577	18.1	No	**14.08**	104.0	3.01	82.07	6.03	4.80	0.00	0.00	92.90	0.00
4	5,046	5,046	8.9	No	**9.57**	104.0	3.01	85.06	7.54	4.80	0.00	0.00	97.40	0.00
5	4,356	4,356	8.8	No	**11.53**	104.0	3.01	83.78	6.86	4.80	0.00	0.00	95.44	0.00
6	3,647	3,648	14.3	No	**13.82**	104.0	3.01	82.24	6.11	4.80	0.00	0.00	93.15	0.00
7	4,145	4,147	25.4	Yes	**12.38**	104.0	3.01	83.35	6.65	4.59	0.00	0.00	94.59	0.00
8	2,683	2,684	14.6	No	**17.65**	104.0	3.01	79.58	4.95	4.80	0.00	0.00	89.33	0.00
9	2,718	2,720	16.9	No	**17.49**	104.0	3.01	79.69	5.00	4.80	0.00	0.00	89.49	0.00
10	2,255	2,259	24.9	No	**19.71**	104.0	3.01	78.08	4.38	4.80	0.00	0.00	87.26	0.00
11	1,114	1,121	38.6	Yes	**28.76**	104.0	3.01	71.99	2.60	3.61	0.00	0.00	78.21	0.00
12	1,228	1,235	35.9	Yes	**27.54**	104.0	3.01	72.83	2.80	3.80	0.00	0.00	79.44	0.00
13	1,276	1,283	38.0	Yes	**27.14**	104.0	3.01	73.16	2.89	3.78	0.00	0.00	79.83	0.00
14	1,392	1,399	40.2	Yes	**26.17**	104.0	3.01	73.91	3.08	3.81	0.00	0.00	80.81	0.00
15	2,141	2,145	39.8	Yes	**20.96**	104.0	3.01	77.63	4.22	4.16	0.00	0.00	86.01	0.00
16	2,562	2,565	32.8	Yes	**18.64**	104.0	3.01	79.18	4.79	4.36	0.00	0.00	88.34	0.00
17	1,117	1,123	40.8	Yes	**28.81**	104.0	3.01	72.01	2.61	3.55	0.00	0.00	78.16	0.00
18	918	925	40.5	Yes	**31.12**	104.0	3.01	70.33	2.24	3.28	0.00	0.00	75.85	0.00
19	1,008	1,016	42.8	Yes	**30.08**	104.0	3.01	71.14	2.41	3.34	0.00	0.00	76.89	0.00
20	1,944	1,947	44.2	Yes	**22.23**	104.0	3.01	76.79	3.93	4.02	0.00	0.00	84.74	0.00
21	4,901	4,902	15.3	No	**9.96**	104.0	3.01	84.81	7.40	4.80	0.00	0.00	97.01	0.00
22	5,730	5,731	12.1	No	**7.85**	104.0	3.01	86.16	8.16	4.80	0.00	0.00	99.12	0.00
23	6,005	6,005	14.9	No	**7.21**	104.0	3.01	86.57	8.39	4.80	0.00	0.00	99.76	0.00
24	5,572	5,572	11.3	No	**8.23**	104.0	3.01	85.92	8.02	4.80	0.00	0.00	98.74	0.00
25	6,925	6,925	10.3	No	**5.22**	104.0	3.01	87.81	9.14	4.80	0.00	0.00	101.75	0.00
26	4,499	4,500	13.8	No	**11.10**	104.0	3.01	84.06	7.01	4.80	0.00	0.00	95.87	0.00
27	6,129	6,130	9.9	No	**6.92**	104.0	3.01	86.75	8.50	4.80	0.00	0.00	100.05	0.00
28	5,297	5,298	25.3	Yes	**9.08**	104.0	3.01	85.48	7.77	4.64	0.00	0.00	97.89	0.00
29	5,742	5,742	11.9	No	**7.82**	104.0	3.01	86.18	8.17	4.80	0.00	0.00	99.15	0.00
30	6,307	6,307	9.7	No	**6.53**	104.0	3.01	87.00	8.65	4.80	0.00	0.00	100.44	0.00
31	6,431	6,431	16.9	No	**6.26**	104.0	3.01	87.17	8.75	4.80	0.00	0.00	100.71	0.00
32	7,334	7,334	13.1	No	**4.41**	104.0	3.01	88.31	9.45	4.80	0.00	0.00	102.56	0.00
33	6,754	6,754	11.4	No	**5.57**	104.0	3.01	87.59	9.01	4.80	0.00	0.00	101.40	0.00
34	4,463	4,464	22.4	Yes	**11.38**	104.0	3.01	83.99	6.97	4.63	0.00	0.00	95.60	0.00
35	3,876	3,878	26.4	Yes	**13.27**	104.0	3.01	82.77	6.36	4.57	0.00	0.00	93.70	0.00
36	3,609	3,611	27.1	Yes	**14.21**	104.0	3.01	82.15	6.06	4.54	0.00	0.00	92.76	0.00
37	4,757	4,758	21.5	No	**10.36**	104.0	3.01	84.55	7.26	4.80	0.00	0.00	96.61	0.00
38	6,561	6,562	8.8	No	**5.98**	104.0	3.01	87.34	8.85	4.80	0.00	0.00	100.99	0.00
39	6,233	6,234	22.8	Yes	**6.82**	104.0	3.01	86.89	8.59	4.68	0.00	0.00	100.16	0.00
40	5,117	5,118	43.1	Yes	**9.67**	104.0	3.01	85.18	7.61	4.51	0.00	0.00	97.30	0.00
41	6,144	6,145	32.0	Yes	**7.07**	104.0	3.01	86.77	8.51	4.62	0.00	0.00	99.90	0.00
43	5,084	5,085	31.4	Yes	**9.68**	104.0	3.01	85.13	7.58	4.59	0.00	0.00	97.29	0.00
44	6,168	6,169	49.6	Yes	**7.11**	104.0	3.01	86.80	8.53	4.53	0.00	0.00	99.86	0.00
45	6,473	6,474	44.8	Yes	**6.40**	104.0	3.01	87.22	8.78	4.56	0.00	0.00	100.57	0.00
46	5,181	5,182	42.7	Yes	**9.50**	104.0	3.01	85.29	7.66	4.52	0.00	0.00	97.47	0.00
48	7,824	7,824	13.2	No	**3.50**	104.0	3.01	88.87	9.81	4.80	0.00	0.00	103.48	0.00
49	8,368	8,368	17.7	No	**2.53**	104.0	3.01	89.45	10.19	4.80	0.00	0.00	104.44	0.00
50	3,734	3,736	19.2	No	**13.52**	104.0	3.01	82.45	6.20	4.80	0.00	0.00	93.45	0.00
51	7,956	7,956	15.1	No	**3.26**	104.0	3.01	89.01	9.90	4.80	0.00	0.00	103.72	0.00
52	7,700	7,700	14.0	No	**3.72**	104.0	3.01	88.73	9.72	4.80	0.00	0.00	103.25	0.00
53	8,656	8,656	21.0	No	**2.04**	104.0	3.01	89.75	10.38	4.80	0.00	0.00	104.93	0.00
55	9,946	9,946	21.1	No	**0.02**	104.0	3.01	90.95	11.20	4.80	0.00	0.00	106.95	0.00
56	10,227	10,227	24.5	No	**-0.39**	104.0	3.01	91.19	11.37	4.80	0.00	0.00	107.36	0.00
57	9,897	9,897	19.3	No	**0.09**	104.0	3.01	90.91	11.17	4.80	0.00	0.00	106.88	0.00
58	6,754	6,754	9.3	No	**5.58**	104.0	3.01	87.59	9.01	4.80	0.00	0.00	101.40	0.00
59	10,510	10,510	26.7	No	**-0.79**	104.0	3.01	91.43	11.53	4.80	0.00	0.00	107.77	0.00
60	11,705	11,705	31.3	No	**-2.40**	104.0	3.01	92.37	12.20	4.80	0.00	0.00	109.37	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	12,041	12,041	28.8	No	**-2.82**	104.0	3.01	92.61	12.38	4.80	0.00	0.00	109.79	0.00
62	11,217	11,217	27.6	No	**-1.76**	104.0	3.01	92.00	11.94	4.80	0.00	0.00	108.73	0.00
63	11,458	11,458	45.2	Yes	**-1.94**	104.0	3.01	92.18	12.07	4.67	0.00	0.00	108.92	0.00
64	12,670	12,670	47.6	Yes	**-3.46**	104.0	3.01	93.06	12.70	4.67	0.00	0.00	110.43	0.00
65	13,296	13,296	47.0	Yes	**-4.20**	104.0	3.01	93.47	13.01	4.68	0.00	0.00	111.17	0.00
66	4,822	4,822	40.9	Yes	**10.47**	104.0	3.01	84.66	7.33	4.51	0.00	0.00	96.50	0.00
67	12,830	12,830	42.2	Yes	**-3.66**	104.0	3.01	93.16	12.78	4.69	0.00	0.00	110.64	0.00
68	13,359	13,359	39.4	Yes	**-4.29**	104.0	3.01	93.52	13.05	4.70	0.00	0.00	111.26	0.00
69	13,174	13,174	48.0	Yes	**-4.05**	104.0	3.01	93.39	12.95	4.68	0.00	0.00	111.03	0.00
70	943	946	41.3	Yes	**30.88**	104.0	3.01	70.52	2.28	3.29	0.00	0.00	76.09	0.00
71	2,503	2,506	22.8	No	**18.48**	104.0	3.01	78.98	4.72	4.80	0.00	0.00	88.50	0.00
72	4,813	4,814	10.2	No	**10.21**	104.0	3.01	84.65	7.32	4.80	0.00	0.00	96.77	0.00
73	3,855	3,856	11.4	No	**13.11**	104.0	3.01	82.72	6.34	4.80	0.00	0.00	93.86	0.00
74	3,940	3,941	21.3	No	**12.83**	104.0	3.01	82.91	6.43	4.80	0.00	0.00	94.14	0.00
75	5,169	5,169	7.8	No	**9.25**	104.0	3.01	85.27	7.65	4.80	0.00	0.00	97.72	0.00
76	9,088	9,088	19.8	No	**1.34**	104.0	3.01	90.17	10.67	4.80	0.00	0.00	105.63	0.00
77	8,753	8,753	16.0	No	**1.88**	104.0	3.01	89.84	10.45	4.80	0.00	0.00	105.09	0.00
78	2,263	2,265	42.9	Yes	**20.33**	104.0	3.01	78.10	4.39	4.15	0.00	0.00	86.64	0.00
80	11,314	11,315	32.0	No	**-1.89**	104.0	3.01	92.07	11.99	4.80	0.00	0.00	108.86	0.00
81	762	772	45.3	Yes	**33.51**	104.0	3.01	68.75	1.94	2.76	0.00	0.00	73.46	0.00
82	7,230	7,231	13.0	No	**4.62**	104.0	3.01	88.18	9.37	4.80	0.00	0.00	102.36	0.00
83	12,099	12,099	43.5	Yes	**-2.77**	104.0	3.01	92.66	12.41	4.68	0.00	0.00	109.74	0.00
85	8,874	8,874	21.5	No	**1.68**	104.0	3.01	89.96	10.53	4.80	0.00	0.00	105.29	0.00
86	11,038	11,039	29.1	No	**-1.52**	104.0	3.01	91.86	11.84	4.80	0.00	0.00	108.49	0.00
87	13,530	13,530	45.3	Yes	**-4.47**	104.0	3.01	93.63	13.13	4.69	0.00	0.00	111.44	0.00
89	12,235	12,235	47.0	Yes	**-2.93**	104.0	3.01	92.75	12.48	4.67	0.00	0.00	109.90	0.00
90	10,114	10,114	21.0	No	**-0.23**	104.0	3.01	91.10	11.30	4.80	0.00	0.00	107.20	0.00
91	11,275	11,275	37.6	Yes	**-1.72**	104.0	3.01	92.04	11.97	4.69	0.00	0.00	108.70	0.00
92	12,842	12,842	49.3	Yes	**-3.66**	104.0	3.01	93.17	12.79	4.67	0.00	0.00	110.63	0.00
94	1,870	1,875	31.3	Yes	**22.46**	104.0	3.01	76.46	3.83	4.23	0.00	0.00	84.52	0.00
95	1,812	1,815	25.6	No	**22.25**	104.0	3.01	76.18	3.74	4.80	0.00	0.00	84.72	0.00
97	2,766	2,769	43.3	Yes	**17.80**	104.0	3.01	79.85	5.06	4.27	0.00	0.00	89.17	0.00
98	1,760	1,764	27.7	Yes	**23.12**	104.0	3.01	75.93	3.66	4.26	0.00	0.00	83.85	0.00
99	4,047	4,047	17.6	No	**12.49**	104.0	3.01	83.14	6.54	4.80	0.00	0.00	94.49	0.00
100	6,739	6,740	27.7	Yes	**5.74**	104.0	3.01	87.57	8.99	4.66	0.00	0.00	101.23	0.00
101	570	582	44.9	Yes	**37.02**	104.0	3.01	66.30	1.55	2.10	0.00	0.00	69.95	0.00
102	5,877	5,878	46.9	Yes	**7.77**	104.0	3.01	86.39	8.29	4.53	0.00	0.00	99.20	0.00
103	1,089	1,095	37.3	Yes	**29.00**	104.0	3.01	71.79	2.56	3.62	0.00	0.00	77.97	0.00
104	5,724	5,725	27.3	Yes	**8.03**	104.0	3.01	86.16	8.15	4.64	0.00	0.00	98.95	0.00
107	1,510	1,515	48.7	Yes	**25.40**	104.0	3.01	74.61	3.27	3.69	0.00	0.00	81.57	0.00
108	4,793	4,793	19.6	No	**10.26**	104.0	3.01	84.61	7.30	4.80	0.00	0.00	96.71	0.00
109	10,784	10,784	28.3	No	**-1.18**	104.0	3.01	91.66	11.69	4.80	0.00	0.00	108.15	0.00
110	8,133	8,133	14.2	No	**2.94**	104.0	3.01	89.21	10.03	4.80	0.00	0.00	104.03	0.00
111	8,711	8,712	19.4	No	**1.95**	104.0	3.01	89.80	10.42	4.80	0.00	0.00	105.02	0.00
113	1,232	1,237	47.3	Yes	**27.83**	104.0	3.01	72.85	2.81	3.48	0.00	0.00	79.14	0.00
114	9,115	9,116	22.2	No	**1.29**	104.0	3.01	90.20	10.68	4.80	0.00	0.00	105.68	0.00
115	2,756	2,757	17.6	No	**17.32**	104.0	3.01	79.81	5.04	4.80	0.00	0.00	89.65	0.00
116	4,610	4,611	46.9	Yes	**11.12**	104.0	3.01	84.28	7.12	4.45	0.00	0.00	95.85	0.00
118	11,246	11,246	29.9	No	**-1.80**	104.0	3.01	92.02	11.95	4.80	0.00	0.00	108.77	0.00
119	3,254	3,256	22.5	No	**15.26**	104.0	3.01	81.25	5.66	4.80	0.00	0.00	91.71	0.00
120	546	557	45.3	Yes	**37.62**	104.0	3.01	65.92	1.49	1.94	0.00	0.00	69.35	0.00
121	3,303	3,305	27.0	Yes	**15.35**	104.0	3.01	81.38	5.71	4.52	0.00	0.00	91.62	0.00
125	11,802	11,802	43.7	Yes	**-2.39**	104.0	3.01	92.44	12.25	4.67	0.00	0.00	109.37	0.00
126	8,073	8,074	27.3	Yes	**3.16**	104.0	3.01	89.14	9.98	4.68	0.00	0.00	103.81	0.00
127	8,312	8,312	26.5	Yes	**2.74**	104.0	3.01	89.39	10.15	4.69	0.00	0.00	104.24	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	8,533	8,533	25.6	No	**2.25**	104.0	3.01	89.62	10.30	4.80	0.00	0.00	104.72	0.00
129	3,269	3,270	44.9	Yes	**15.68**	104.0	3.01	81.29	5.67	4.33	0.00	0.00	91.29	0.00
130	3,649	3,650	45.7	Yes	**14.25**	104.0	3.01	82.25	6.11	4.37	0.00	0.00	92.73	0.00
131	3,366	3,366	44.1	Yes	**15.29**	104.0	3.01	81.54	5.78	4.35	0.00	0.00	91.68	0.00
132	3,008	3,009	43.6	Yes	**16.74**	104.0	3.01	80.57	5.36	4.30	0.00	0.00	90.23	0.00
133	6,667	6,668	14.9	No	**5.76**	104.0	3.01	87.48	8.94	4.80	0.00	0.00	101.22	0.00
134	1,039	1,043	41.9	Yes	**29.73**	104.0	3.01	71.36	2.46	3.41	0.00	0.00	77.24	0.00
141	2,970	2,973	39.2	Yes	**16.85**	104.0	3.01	80.46	5.31	4.35	0.00	0.00	90.12	0.00
142	5,589	5,591	51.1	Yes	**8.50**	104.0	3.01	85.95	8.04	4.49	0.00	0.00	98.47	0.00
143	2,394	2,398	45.1	Yes	**19.65**	104.0	3.01	78.60	4.57	4.16	0.00	0.00	87.32	0.00
144	6,792	6,792	38.3	Yes	**5.69**	104.0	3.01	87.64	9.04	4.61	0.00	0.00	101.28	0.00
145	9,642	9,642	21.8	No	**0.47**	104.0	3.01	90.68	11.02	4.80	0.00	0.00	106.50	0.00
146	9,335	9,336	21.6	No	**0.95**	104.0	3.01	90.40	10.82	4.80	0.00	0.00	106.03	0.00
Sum	43.92													

Noise sensitive area: H21 H21

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	3,523	3,524	19.9	No	**14.26**	104.0	3.01	81.94	5.97	4.80	0.00	0.00	92.71	0.00
2	3,814	3,815	16.5	No	**13.25**	104.0	3.01	82.63	6.29	4.80	0.00	0.00	93.72	0.00
3	3,713	3,714	22.6	No	**13.59**	104.0	3.01	82.40	6.18	4.80	0.00	0.00	93.38	0.00
4	4,480	4,480	13.8	No	**11.16**	104.0	3.01	84.03	6.99	4.80	0.00	0.00	95.81	0.00
5	3,669	3,670	13.1	No	**13.75**	104.0	3.01	82.29	6.13	4.80	0.00	0.00	93.22	0.00
6	3,374	3,375	21.0	No	**14.81**	104.0	3.01	81.57	5.80	4.80	0.00	0.00	92.16	0.00
7	2,341	2,344	29.9	Yes	**19.71**	104.0	3.01	78.40	4.50	4.36	0.00	0.00	87.26	0.00
8	3,912	3,913	16.7	No	**12.92**	104.0	3.01	82.85	6.40	4.80	0.00	0.00	94.05	0.00
9	3,082	3,084	22.8	No	**15.94**	104.0	3.01	80.78	5.45	4.80	0.00	0.00	91.03	0.00
10	2,498	2,501	36.7	Yes	**19.00**	104.0	3.01	78.96	4.71	4.30	0.00	0.00	87.97	0.00
11	3,103	3,105	44.7	Yes	**16.35**	104.0	3.01	80.84	5.48	4.31	0.00	0.00	90.63	0.00
12	2,995	2,998	41.7	Yes	**16.77**	104.0	3.01	80.54	5.34	4.32	0.00	0.00	90.20	0.00
13	2,559	2,563	46.0	Yes	**18.82**	104.0	3.01	79.18	4.79	4.19	0.00	0.00	88.15	0.00
14	2,155	2,160	51.4	Yes	**21.06**	104.0	3.01	77.69	4.24	3.98	0.00	0.00	85.91	0.00
15	1,808	1,813	46.7	Yes	**23.15**	104.0	3.01	76.17	3.74	3.92	0.00	0.00	83.82	0.00
16	1,916	1,921	39.3	Yes	**22.31**	104.0	3.01	76.67	3.90	4.10	0.00	0.00	84.66	0.00
17	3,282	3,285	43.6	Yes	**15.61**	104.0	3.01	81.33	5.69	4.35	0.00	0.00	91.37	0.00
18	3,308	3,310	47.1	Yes	**15.54**	104.0	3.01	81.40	5.72	4.31	0.00	0.00	91.43	0.00
19	2,207	2,211	51.4	Yes	**20.77**	104.0	3.01	77.89	4.31	4.00	0.00	0.00	86.21	0.00
20	1,332	1,337	50.4	Yes	**26.97**	104.0	3.01	73.52	2.98	3.50	0.00	0.00	80.00	0.00
21	3,954	3,955	18.8	No	**12.79**	104.0	3.01	82.94	6.44	4.80	0.00	0.00	94.18	0.00
22	4,636	4,636	16.3	No	**10.70**	104.0	3.01	84.32	7.14	4.80	0.00	0.00	96.27	0.00
23	4,766	4,767	17.9	No	**10.34**	104.0	3.01	84.56	7.27	4.80	0.00	0.00	96.64	0.00
24	4,582	4,582	15.6	No	**10.86**	104.0	3.01	84.22	7.09	4.80	0.00	0.00	96.11	0.00
25	4,890	4,890	17.1	No	**9.99**	104.0	3.01	84.79	7.39	4.80	0.00	0.00	96.98	0.00
26	3,136	3,137	16.7	No	**15.73**	104.0	3.01	80.93	5.51	4.80	0.00	0.00	91.24	0.00
27	4,061	4,062	16.5	No	**12.44**	104.0	3.01	83.17	6.56	4.80	0.00	0.00	94.53	0.00
28	3,103	3,105	30.6	Yes	**16.19**	104.0	3.01	80.84	5.47	4.46	0.00	0.00	90.78	0.00
29	4,290	4,290	14.9	No	**11.73**	104.0	3.01	83.65	6.80	4.80	0.00	0.00	95.25	0.00
30	4,901	4,902	12.7	No	**9.96**	104.0	3.01	84.81	7.40	4.80	0.00	0.00	97.01	0.00
31	5,436	5,436	21.0	No	**8.57**	104.0	3.01	85.71	7.90	4.80	0.00	0.00	98.40	0.00
32	5,359	5,359	19.6	No	**8.76**	104.0	3.01	85.58	7.83	4.80	0.00	0.00	98.21	0.00
33	5,160	5,160	17.3	No	**9.27**	104.0	3.01	85.25	7.64	4.80	0.00	0.00	97.70	0.00
34	2,546	2,548	27.3	Yes	**18.64**	104.0	3.01	79.12	4.77	4.43	0.00	0.00	88.33	0.00
35	2,214	2,218	31.0	Yes	**20.41**	104.0	3.01	77.92	4.32	4.32	0.00	0.00	86.56	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	2,126	2,130	32.1	Yes	**20.92**	104.0	3.01	77.57	4.20	4.28	0.00	0.00	86.05	0.00
37	2,741	2,743	29.1	Yes	**17.75**	104.0	3.01	79.76	5.02	4.44	0.00	0.00	89.23	0.00
38	4,485	4,485	15.6	No	**11.14**	104.0	3.01	84.04	6.99	4.80	0.00	0.00	95.83	0.00
39	3,944	3,945	25.0	Yes	**13.04**	104.0	3.01	82.92	6.43	4.58	0.00	0.00	93.94	0.00
40	2,529	2,530	43.0	Yes	**18.94**	104.0	3.01	79.06	4.75	4.22	0.00	0.00	88.03	0.00
41	3,778	3,780	33.5	Yes	**13.67**	104.0	3.01	82.55	6.25	4.50	0.00	0.00	93.30	0.00
43	2,861	2,863	36.8	Yes	**17.30**	104.0	3.01	80.14	5.18	4.36	0.00	0.00	89.68	0.00
44	3,706	3,708	53.3	Yes	**14.11**	104.0	3.01	82.38	6.17	4.31	0.00	0.00	92.87	0.00
45	4,010	4,012	49.0	Yes	**13.02**	104.0	3.01	83.07	6.50	4.38	0.00	0.00	93.95	0.00
46	2,674	2,676	43.4	Yes	**18.24**	104.0	3.01	79.55	4.94	4.24	0.00	0.00	88.73	0.00
48	5,683	5,683	19.8	No	**7.96**	104.0	3.01	86.09	8.12	4.80	0.00	0.00	99.01	0.00
49	6,435	6,436	23.4	No	**6.25**	104.0	3.01	87.17	8.75	4.80	0.00	0.00	100.72	0.00
50	2,712	2,714	22.5	No	**17.51**	104.0	3.01	79.67	4.99	4.80	0.00	0.00	89.46	0.00
51	6,095	6,095	20.9	No	**7.00**	104.0	3.01	86.70	8.47	4.80	0.00	0.00	99.97	0.00
52	5,899	5,899	20.2	No	**7.45**	104.0	3.01	86.42	8.30	4.80	0.00	0.00	99.52	0.00
53	6,677	6,677	26.0	No	**5.74**	104.0	3.01	87.49	8.94	4.80	0.00	0.00	101.24	0.00
55	7,797	7,797	26.3	No	**3.54**	104.0	3.01	88.84	9.79	4.80	0.00	0.00	103.43	0.00
56	8,054	8,054	28.8	No	**3.08**	104.0	3.01	89.12	9.97	4.80	0.00	0.00	103.89	0.00
57	7,623	7,623	21.0	No	**3.87**	104.0	3.01	88.64	9.66	4.80	0.00	0.00	103.11	0.00
58	4,928	4,928	15.4	No	**9.89**	104.0	3.01	84.85	7.43	4.80	0.00	0.00	97.08	0.00
59	8,313	8,314	30.0	No	**2.63**	104.0	3.01	89.40	10.15	4.80	0.00	0.00	104.35	0.00
60	9,381	9,381	32.2	No	**0.87**	104.0	3.01	90.45	10.85	4.80	0.00	0.00	106.10	0.00
61	9,702	9,702	29.4	No	**0.38**	104.0	3.01	90.74	11.05	4.80	0.00	0.00	106.59	0.00
62	8,711	8,711	37.0	Yes	**2.10**	104.0	3.01	89.80	10.42	4.66	0.00	0.00	104.88	0.00
63	8,888	8,888	46.5	Yes	**1.84**	104.0	3.01	89.98	10.54	4.62	0.00	0.00	105.13	0.00
64	10,075	10,076	48.4	Yes	**-0.01**	104.0	3.01	91.07	11.28	4.64	0.00	0.00	106.98	0.00
65	10,704	10,704	47.8	Yes	**-0.91**	104.0	3.01	91.59	11.65	4.65	0.00	0.00	107.89	0.00
66	2,226	2,227	40.4	Yes	**20.50**	104.0	3.01	77.95	4.34	4.18	0.00	0.00	86.47	0.00
67	10,263	10,264	43.4	Yes	**-0.30**	104.0	3.01	91.23	11.39	4.66	0.00	0.00	107.27	0.00
68	10,788	10,788	40.5	Yes	**-1.05**	104.0	3.01	91.66	11.70	4.67	0.00	0.00	108.03	0.00
69	10,577	10,578	48.5	Yes	**-0.73**	104.0	3.01	91.49	11.57	4.64	0.00	0.00	107.71	0.00
70	1,670	1,672	42.3	Yes	**24.05**	104.0	3.01	75.47	3.52	3.93	0.00	0.00	82.92	0.00
71	2,438	2,441	31.8	Yes	**19.24**	104.0	3.01	78.75	4.63	4.35	0.00	0.00	87.74	0.00
72	4,447	4,447	14.5	No	**11.26**	104.0	3.01	83.96	6.96	4.80	0.00	0.00	95.72	0.00
73	3,345	3,347	16.7	No	**14.92**	104.0	3.01	81.49	5.76	4.80	0.00	0.00	92.05	0.00
74	2,692	2,695	23.9	Yes	**17.90**	104.0	3.01	79.61	4.96	4.50	0.00	0.00	89.07	0.00
75	3,637	3,638	11.1	No	**13.86**	104.0	3.01	82.22	6.09	4.80	0.00	0.00	93.11	0.00
76	6,792	6,793	20.9	No	**5.50**	104.0	3.01	87.64	9.04	4.80	0.00	0.00	101.48	0.00
77	6,633	6,633	22.1	No	**5.83**	104.0	3.01	87.43	8.91	4.80	0.00	0.00	101.14	0.00
78	1,016	1,021	45.7	Yes	**30.12**	104.0	3.01	71.18	2.42	3.25	0.00	0.00	76.85	0.00
80	9,000	9,000	33.4	No	**1.48**	104.0	3.01	90.08	10.61	4.80	0.00	0.00	105.49	0.00
81	2,384	2,387	52.4	Yes	**19.81**	104.0	3.01	78.56	4.56	4.05	0.00	0.00	87.16	0.00
82	5,496	5,496	19.2	No	**8.42**	104.0	3.01	85.80	7.95	4.80	0.00	0.00	98.55	0.00
83	9,528	9,529	44.6	Yes	**0.81**	104.0	3.01	90.58	10.94	4.64	0.00	0.00	106.17	0.00
85	7,091	7,091	27.2	No	**4.89**	104.0	3.01	88.01	9.27	4.80	0.00	0.00	102.08	0.00
86	8,737	8,737	30.7	No	**1.91**	104.0	3.01	89.83	10.44	4.80	0.00	0.00	105.06	0.00
87	10,939	10,939	46.0	Yes	**-1.24**	104.0	3.01	91.78	11.78	4.66	0.00	0.00	108.22	0.00
89	9,647	9,647	48.2	Yes	**0.64**	104.0	3.01	90.69	11.02	4.63	0.00	0.00	106.34	0.00
90	7,715	7,715	23.7	No	**3.69**	104.0	3.01	88.75	9.73	4.80	0.00	0.00	103.28	0.00
91	8,737	8,738	41.9	Yes	**2.07**	104.0	3.01	89.83	10.44	4.64	0.00	0.00	104.90	0.00
92	10,236	10,236	49.1	Yes	**-0.24**	104.0	3.01	91.20	11.37	4.64	0.00	0.00	107.21	0.00
94	2,286	2,290	44.4	Yes	**20.21**	104.0	3.01	78.20	4.42	4.14	0.00	0.00	86.76	0.00
95	3,334	3,336	29.6	Yes	**15.26**	104.0	3.01	81.46	5.75	4.50	0.00	0.00	91.71	0.00
97	1,442	1,449	48.8	Yes	**25.95**	104.0	3.01	74.22	3.16	3.64	0.00	0.00	81.03	0.00
98	2,667	2,670	39.5	Yes	**18.22**	104.0	3.01	79.53	4.93	4.29	0.00	0.00	88.75	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	4,281	4,282	17.6	No	**11.75**	104.0	3.01	83.63	6.79	4.80	0.00	0.00	95.22	0.00
100	4,327	4,328	31.9	Yes	**11.86**	104.0	3.01	83.73	6.83	4.55	0.00	0.00	95.11	0.00
101	2,744	2,747	51.1	Yes	**18.00**	104.0	3.01	79.78	5.03	4.16	0.00	0.00	88.97	0.00
102	3,453	3,455	50.6	Yes	**15.02**	104.0	3.01	81.77	5.89	4.30	0.00	0.00	91.96	0.00
103	3,573	3,575	47.1	Yes	**14.53**	104.0	3.01	82.07	6.02	4.35	0.00	0.00	92.44	0.00
104	3,436	3,438	30.3	Yes	**14.88**	104.0	3.01	81.73	5.87	4.50	0.00	0.00	92.09	0.00
107	1,559	1,564	53.0	Yes	**25.10**	104.0	3.01	74.89	3.35	3.63	0.00	0.00	81.87	0.00
108	5,122	5,123	15.8	No	**9.37**	104.0	3.01	85.19	7.61	4.80	0.00	0.00	97.60	0.00
109	8,561	8,562	30.7	No	**2.20**	104.0	3.01	89.65	10.32	4.80	0.00	0.00	104.77	0.00
110	5,923	5,923	19.2	No	**7.40**	104.0	3.01	86.45	8.32	4.80	0.00	0.00	99.58	0.00
111	6,446	6,446	21.2	No	**6.23**	104.0	3.01	87.19	8.76	4.80	0.00	0.00	100.75	0.00
113	1,842	1,846	52.3	Yes	**23.04**	104.0	3.01	76.32	3.78	3.83	0.00	0.00	83.94	0.00
114	7,284	7,284	27.8	No	**4.51**	104.0	3.01	88.25	9.41	4.80	0.00	0.00	102.46	0.00
115	3,798	3,799	16.1	No	**13.30**	104.0	3.01	82.59	6.27	4.80	0.00	0.00	93.67	0.00
116	2,269	2,272	49.3	Yes	**20.39**	104.0	3.01	78.13	4.40	4.06	0.00	0.00	86.59	0.00
118	8,998	8,999	31.8	No	**1.48**	104.0	3.01	90.08	10.61	4.80	0.00	0.00	105.49	0.00
119	2,477	2,480	26.9	Yes	**18.97**	104.0	3.01	78.89	4.68	4.43	0.00	0.00	88.00	0.00
120	3,058	3,061	51.8	Yes	**16.61**	104.0	3.01	80.72	5.42	4.22	0.00	0.00	90.36	0.00
121	2,040	2,043	30.8	Yes	**21.41**	104.0	3.01	77.21	4.08	4.28	0.00	0.00	85.57	0.00
125	9,231	9,231	44.9	Yes	**1.27**	104.0	3.01	90.31	10.76	4.63	0.00	0.00	105.70	0.00
126	5,598	5,598	33.9	Yes	**8.38**	104.0	3.01	85.96	8.04	4.59	0.00	0.00	98.60	0.00
127	5,840	5,841	33.5	Yes	**7.78**	104.0	3.01	86.33	8.25	4.60	0.00	0.00	99.19	0.00
128	6,082	6,083	31.6	Yes	**7.21**	104.0	3.01	86.68	8.46	4.62	0.00	0.00	99.76	0.00
129	689	695	42.8	Yes	**34.70**	104.0	3.01	67.83	1.79	2.65	0.00	0.00	72.27	0.00
130	1,233	1,236	41.9	Yes	**27.70**	104.0	3.01	72.84	2.80	3.63	0.00	0.00	79.28	0.00
131	1,195	1,198	40.1	Yes	**28.02**	104.0	3.01	72.57	2.74	3.65	0.00	0.00	78.95	0.00
132	1,127	1,129	39.1	Yes	**28.69**	104.0	3.01	72.06	2.62	3.60	0.00	0.00	78.28	0.00
133	4,432	4,432	18.9	No	**11.30**	104.0	3.01	83.93	6.94	4.80	0.00	0.00	95.67	0.00
134	1,678	1,680	42.5	Yes	**24.00**	104.0	3.01	75.51	3.53	3.93	0.00	0.00	82.97	0.00
141	1,653	1,659	40.7	Yes	**24.12**	104.0	3.01	75.40	3.50	3.96	0.00	0.00	82.85	0.00
142	3,177	3,180	53.9	Yes	**16.14**	104.0	3.01	81.05	5.56	4.22	0.00	0.00	90.83	0.00
143	1,484	1,490	50.7	Yes	**25.65**	104.0	3.01	74.47	3.23	3.63	0.00	0.00	81.33	0.00
144	4,311	4,312	42.1	Yes	**11.99**	104.0	3.01	83.69	6.82	4.47	0.00	0.00	94.98	0.00
145	7,248	7,248	25.1	No	**4.58**	104.0	3.01	88.20	9.39	4.80	0.00	0.00	102.39	0.00
146	6,956	6,956	24.6	No	**5.16**	104.0	3.01	87.85	9.16	4.80	0.00	0.00	101.81	0.00
Sum	40.81													

Noise sensitive area: H22 H22

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	3,275	3,276	15.4	No	**15.19**	104.0	3.01	81.31	5.68	4.80	0.00	0.00	91.79	0.00
2	3,488	3,489	13.7	No	**14.39**	104.0	3.01	81.85	5.93	4.80	0.00	0.00	92.58	0.00
3	3,289	3,290	17.3	No	**15.13**	104.0	3.01	81.34	5.70	4.80	0.00	0.00	91.84	0.00
4	3,867	3,867	18.8	No	**13.08**	104.0	3.01	82.75	6.35	4.80	0.00	0.00	93.90	0.00
5	3,063	3,064	17.4	No	**16.02**	104.0	3.01	80.73	5.43	4.80	0.00	0.00	90.95	0.00
6	2,876	2,878	18.5	No	**16.80**	104.0	3.01	80.18	5.19	4.80	0.00	0.00	90.18	0.00
7	1,624	1,628	22.4	Yes	**23.96**	104.0	3.01	75.23	3.45	4.33	0.00	0.00	83.01	0.00
8	3,757	3,757	11.9	No	**13.45**	104.0	3.01	82.50	6.23	4.80	0.00	0.00	93.53	0.00
9	2,781	2,783	17.8	No	**17.21**	104.0	3.01	79.89	5.08	4.80	0.00	0.00	89.77	0.00
10	2,264	2,267	28.5	No	**19.67**	104.0	3.01	78.11	4.39	4.80	0.00	0.00	87.30	0.00
11	3,247	3,249	36.5	Yes	**15.67**	104.0	3.01	81.24	5.65	4.42	0.00	0.00	91.30	0.00
12	3,095	3,097	35.6	Yes	**16.28**	104.0	3.01	80.82	5.47	4.41	0.00	0.00	90.69	0.00
13	2,619	2,622	41.4	Yes	**18.47**	104.0	3.01	79.37	4.87	4.26	0.00	0.00	88.50	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	2,188	2,192	46.1	Yes	**20.79**	104.0	3.01	77.82	4.29	4.08	0.00	0.00	86.18	0.00
15	1,589	1,594	35.6	Yes	**24.50**	104.0	3.01	75.05	3.40	4.03	0.00	0.00	82.48	0.00
16	1,537	1,541	27.6	Yes	**24.72**	104.0	3.01	74.76	3.31	4.18	0.00	0.00	82.26	0.00
17	3,455	3,457	36.3	Yes	**14.87**	104.0	3.01	81.77	5.89	4.44	0.00	0.00	92.10	0.00
18	3,548	3,550	41.6	Yes	**14.57**	104.0	3.01	82.00	6.00	4.40	0.00	0.00	92.40	0.00
19	2,357	2,360	45.0	Yes	**19.85**	104.0	3.01	78.46	4.52	4.15	0.00	0.00	87.13	0.00
20	1,267	1,271	44.2	Yes	**27.42**	104.0	3.01	73.08	2.87	3.60	0.00	0.00	79.55	0.00
21	3,294	3,295	20.8	No	**15.11**	104.0	3.01	81.36	5.70	4.80	0.00	0.00	91.86	0.00
22	3,946	3,946	18.6	No	**12.81**	104.0	3.01	82.92	6.43	4.80	0.00	0.00	94.16	0.00
23	4,062	4,063	20.5	No	**12.44**	104.0	3.01	83.18	6.56	4.80	0.00	0.00	94.53	0.00
24	3,904	3,904	18.3	No	**12.95**	104.0	3.01	82.83	6.39	4.80	0.00	0.00	94.02	0.00
25	4,210	4,211	18.4	No	**11.97**	104.0	3.01	83.49	6.71	4.80	0.00	0.00	95.00	0.00
26	2,441	2,443	14.4	No	**18.78**	104.0	3.01	78.76	4.63	4.80	0.00	0.00	88.19	0.00
27	3,382	3,382	15.5	No	**14.78**	104.0	3.01	81.58	5.80	4.80	0.00	0.00	92.19	0.00
28	2,445	2,447	24.7	Yes	**19.11**	104.0	3.01	78.77	4.64	4.45	0.00	0.00	87.86	0.00
29	3,576	3,577	16.1	No	**14.08**	104.0	3.01	82.07	6.03	4.80	0.00	0.00	92.90	0.00
30	4,187	4,188	15.3	No	**12.04**	104.0	3.01	83.44	6.69	4.80	0.00	0.00	94.93	0.00
31	4,747	4,747	24.4	No	**10.39**	104.0	3.01	84.53	7.25	4.80	0.00	0.00	96.58	0.00
32	4,671	4,672	21.4	No	**10.60**	104.0	3.01	84.39	7.18	4.80	0.00	0.00	96.37	0.00
33	4,443	4,443	20.6	No	**11.27**	104.0	3.01	83.95	6.95	4.80	0.00	0.00	95.70	0.00
34	1,832	1,835	20.7	No	**22.13**	104.0	3.01	76.27	3.77	4.80	0.00	0.00	84.84	0.00
35	1,509	1,513	24.6	Yes	**24.86**	104.0	3.01	74.60	3.27	4.24	0.00	0.00	82.11	0.00
36	1,453	1,458	27.0	Yes	**25.36**	104.0	3.01	74.27	3.18	4.16	0.00	0.00	81.61	0.00
37	2,039	2,041	22.5	Yes	**21.28**	104.0	3.01	77.20	4.07	4.42	0.00	0.00	85.69	0.00
38	3,810	3,811	15.5	No	**13.26**	104.0	3.01	82.62	6.29	4.80	0.00	0.00	93.71	0.00
39	3,328	3,329	22.4	No	**14.99**	104.0	3.01	81.45	5.74	4.80	0.00	0.00	91.99	0.00
40	2,196	2,197	43.4	Yes	**20.72**	104.0	3.01	77.84	4.29	4.12	0.00	0.00	86.25	0.00
41	3,196	3,198	26.7	Yes	**15.77**	104.0	3.01	81.10	5.59	4.51	0.00	0.00	91.20	0.00
43	2,209	2,211	29.7	Yes	**20.43**	104.0	3.01	77.89	4.31	4.34	0.00	0.00	86.55	0.00
44	3,187	3,189	44.6	Yes	**16.00**	104.0	3.01	81.07	5.58	4.32	0.00	0.00	90.97	0.00
45	3,492	3,494	39.7	Yes	**14.76**	104.0	3.01	81.87	5.93	4.41	0.00	0.00	92.21	0.00
46	2,197	2,199	41.5	Yes	**20.68**	104.0	3.01	77.84	4.30	4.15	0.00	0.00	86.29	0.00
48	5,030	5,030	21.8	No	**9.62**	104.0	3.01	85.03	7.52	4.80	0.00	0.00	97.36	0.00
49	5,746	5,746	26.6	No	**7.81**	104.0	3.01	86.19	8.17	4.80	0.00	0.00	99.16	0.00
50	2,092	2,094	21.8	No	**20.60**	104.0	3.01	77.42	4.15	4.80	0.00	0.00	86.37	0.00
51	5,396	5,396	23.4	No	**8.67**	104.0	3.01	85.64	7.86	4.80	0.00	0.00	98.30	0.00
52	5,193	5,193	23.1	No	**9.19**	104.0	3.01	85.31	7.68	4.80	0.00	0.00	97.78	0.00
53	5,995	5,995	29.8	No	**7.23**	104.0	3.01	86.56	8.39	4.80	0.00	0.00	99.74	0.00
55	7,154	7,154	30.1	No	**4.77**	104.0	3.01	88.09	9.31	4.80	0.00	0.00	102.21	0.00
56	7,418	7,418	33.1	No	**4.25**	104.0	3.01	88.41	9.51	4.80	0.00	0.00	102.72	0.00
57	7,017	7,017	25.3	No	**5.04**	104.0	3.01	87.92	9.21	4.80	0.00	0.00	101.93	0.00
58	4,221	4,221	16.7	No	**11.94**	104.0	3.01	83.51	6.72	4.80	0.00	0.00	95.03	0.00
59	7,684	7,684	35.1	No	**3.75**	104.0	3.01	88.71	9.71	4.80	0.00	0.00	103.22	0.00
60	8,798	8,798	36.0	No	**1.81**	104.0	3.01	89.89	10.48	4.80	0.00	0.00	105.16	0.00
61	9,125	9,125	32.5	No	**1.28**	104.0	3.01	90.21	10.69	4.80	0.00	0.00	105.69	0.00
62	8,233	8,233	30.8	No	**2.77**	104.0	3.01	89.31	10.10	4.80	0.00	0.00	104.21	0.00
63	8,483	8,483	46.5	Yes	**2.52**	104.0	3.01	89.57	10.27	4.61	0.00	0.00	104.45	0.00
64	9,717	9,718	48.2	Yes	**0.53**	104.0	3.01	90.75	11.06	4.63	0.00	0.00	106.44	0.00
65	10,340	10,340	47.4	Yes	**-0.40**	104.0	3.01	91.29	11.44	4.64	0.00	0.00	107.37	0.00
66	1,929	1,930	40.9	Yes	**22.28**	104.0	3.01	76.71	3.91	4.07	0.00	0.00	84.70	0.00
67	9,851	9,852	43.9	Yes	**0.31**	104.0	3.01	90.87	11.14	4.65	0.00	0.00	106.66	0.00
68	10,383	10,383	41.0	Yes	**-0.48**	104.0	3.01	91.33	11.46	4.67	0.00	0.00	107.45	0.00
69	10,226	10,226	48.7	Yes	**-0.23**	104.0	3.01	91.19	11.37	4.64	0.00	0.00	107.20	0.00
70	2,053	2,054	41.0	Yes	**21.51**	104.0	3.01	77.25	4.09	4.11	0.00	0.00	85.46	0.00
71	2,122	2,125	24.9	No	**20.43**	104.0	3.01	77.55	4.19	4.80	0.00	0.00	86.54	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	3,871	3,872	18.2	No	**13.06**	104.0	3.01	82.76	6.35	4.80	0.00	0.00	93.91	0.00
73	2,795	2,796	16.2	No	**17.15**	104.0	3.01	79.93	5.09	4.80	0.00	0.00	89.82	0.00
74	2,029	2,032	21.6	No	**20.95**	104.0	3.01	77.16	4.06	4.80	0.00	0.00	86.02	0.00
75	2,923	2,923	10.4	No	**16.60**	104.0	3.01	80.32	5.25	4.80	0.00	0.00	90.37	0.00
76	6,192	6,192	24.0	No	**6.78**	104.0	3.01	86.84	8.55	4.80	0.00	0.00	100.19	0.00
77	5,979	5,979	25.6	No	**7.27**	104.0	3.01	86.53	8.37	4.80	0.00	0.00	99.71	0.00
78	856	861	39.5	Yes	**31.94**	104.0	3.01	69.70	2.12	3.21	0.00	0.00	75.03	0.00
80	8,412	8,412	37.3	No	**2.46**	104.0	3.01	89.50	10.22	4.80	0.00	0.00	104.52	0.00
81	2,590	2,592	48.6	Yes	**18.71**	104.0	3.01	79.27	4.83	4.16	0.00	0.00	88.26	0.00
82	4,785	4,785	22.0	No	**10.29**	104.0	3.01	84.60	7.29	4.80	0.00	0.00	96.69	0.00
83	9,123	9,123	44.7	Yes	**1.45**	104.0	3.01	90.20	10.69	4.63	0.00	0.00	105.52	0.00
85	6,387	6,387	31.0	No	**6.35**	104.0	3.01	87.11	8.71	4.80	0.00	0.00	100.62	0.00
86	8,143	8,144	34.8	No	**2.92**	104.0	3.01	89.22	10.03	4.80	0.00	0.00	104.05	0.00
87	10,572	10,572	45.7	Yes	**-0.73**	104.0	3.01	91.48	11.57	4.65	0.00	0.00	107.71	0.00
89	9,274	9,274	47.7	Yes	**1.22**	104.0	3.01	90.35	10.78	4.62	0.00	0.00	105.76	0.00
90	7,164	7,164	22.6	No	**4.75**	104.0	3.01	88.10	9.32	4.80	0.00	0.00	102.23	0.00
91	8,290	8,291	39.2	Yes	**2.83**	104.0	3.01	89.37	10.13	4.64	0.00	0.00	104.15	0.00
92	9,932	9,932	50.5	Yes	**0.21**	104.0	3.01	90.94	11.19	4.63	0.00	0.00	106.76	0.00
94	2,162	2,166	33.2	Yes	**20.73**	104.0	3.01	77.71	4.25	4.27	0.00	0.00	86.24	0.00
95	3,319	3,321	25.1	No	**15.01**	104.0	3.01	81.43	5.73	4.80	0.00	0.00	91.96	0.00
97	946	955	38.1	Yes	**30.66**	104.0	3.01	70.60	2.30	3.42	0.00	0.00	76.32	0.00
98	2,594	2,597	30.1	No	**18.05**	104.0	3.01	79.29	4.84	4.80	0.00	0.00	88.92	0.00
99	3,843	3,844	15.7	No	**13.15**	104.0	3.01	82.70	6.32	4.80	0.00	0.00	93.82	0.00
100	3,775	3,776	22.1	Yes	**13.58**	104.0	3.01	82.54	6.25	4.60	0.00	0.00	93.39	0.00
101	2,994	2,996	47.0	Yes	**16.84**	104.0	3.01	80.53	5.34	4.26	0.00	0.00	90.14	0.00
102	2,905	2,907	40.6	Yes	**17.15**	104.0	3.01	80.27	5.23	4.32	0.00	0.00	89.82	0.00
103	3,832	3,834	40.8	Yes	**13.55**	104.0	3.01	82.67	6.31	4.44	0.00	0.00	93.42	0.00
104	2,815	2,817	25.4	Yes	**17.37**	104.0	3.01	80.00	5.12	4.49	0.00	0.00	89.61	0.00
107	1,648	1,652	49.1	Yes	**24.35**	104.0	3.01	75.36	3.49	3.78	0.00	0.00	82.63	0.00
108	4,668	4,668	16.7	No	**10.61**	104.0	3.01	84.38	7.18	4.80	0.00	0.00	96.36	0.00
109	7,941	7,941	35.7	No	**3.28**	104.0	3.01	89.00	9.89	4.80	0.00	0.00	103.69	0.00
110	5,290	5,291	21.9	No	**8.94**	104.0	3.01	85.47	7.77	4.80	0.00	0.00	98.04	0.00
111	5,834	5,834	24.5	No	**7.61**	104.0	3.01	86.32	8.25	4.80	0.00	0.00	99.37	0.00
113	1,975	1,979	47.0	Yes	**22.08**	104.0	3.01	76.93	3.98	3.98	0.00	0.00	84.89	0.00
114	6,585	6,585	31.2	No	**5.93**	104.0	3.01	87.37	8.87	4.80	0.00	0.00	101.04	0.00
115	3,602	3,603	11.9	No	**13.98**	104.0	3.01	82.13	6.06	4.80	0.00	0.00	92.99	0.00
116	1,658	1,662	44.0	Yes	**24.16**	104.0	3.01	75.41	3.50	3.89	0.00	0.00	82.81	0.00
118	8,386	8,386	36.8	No	**2.50**	104.0	3.01	89.47	10.20	4.80	0.00	0.00	104.47	0.00
119	1,942	1,945	22.0	No	**21.46**	104.0	3.01	76.78	3.93	4.80	0.00	0.00	85.51	0.00
120	3,362	3,364	47.9	Yes	**15.34**	104.0	3.01	81.54	5.78	4.31	0.00	0.00	91.63	0.00
121	1,427	1,431	25.7	Yes	**25.54**	104.0	3.01	74.12	3.13	4.18	0.00	0.00	81.43	0.00
125	8,827	8,827	44.9	Yes	**1.93**	104.0	3.01	89.92	10.50	4.63	0.00	0.00	105.04	0.00
126	5,092	5,093	25.0	Yes	**9.62**	104.0	3.01	85.14	7.58	4.63	0.00	0.00	97.36	0.00
127	5,332	5,333	24.3	Yes	**8.98**	104.0	3.01	85.54	7.80	4.64	0.00	0.00	97.99	0.00
128	5,559	5,560	24.0	No	**8.26**	104.0	3.01	85.90	8.01	4.80	0.00	0.00	98.71	0.00
129	931	934	45.2	Yes	**31.18**	104.0	3.01	70.41	2.26	3.12	0.00	0.00	75.79	0.00
130	1,565	1,567	45.0	Yes	**24.90**	104.0	3.01	74.90	3.35	3.81	0.00	0.00	82.07	0.00
131	1,709	1,711	46.0	Yes	**23.85**	104.0	3.01	75.66	3.58	3.88	0.00	0.00	83.12	0.00
132	1,763	1,764	43.8	Yes	**23.43**	104.0	3.01	75.93	3.66	3.95	0.00	0.00	83.54	0.00
133	3,799	3,800	18.0	No	**13.30**	104.0	3.01	82.60	6.27	4.80	0.00	0.00	93.67	0.00
134	1,963	1,965	41.3	Yes	**22.07**	104.0	3.01	76.87	3.96	4.08	0.00	0.00	84.90	0.00
141	1,093	1,101	35.7	Yes	**28.89**	104.0	3.01	71.84	2.57	3.68	0.00	0.00	78.08	0.00
142	2,619	2,622	44.5	Yes	**18.51**	104.0	3.01	79.37	4.87	4.22	0.00	0.00	88.46	0.00
143	1,165	1,172	42.2	Yes	**28.34**	104.0	3.01	72.38	2.69	3.56	0.00	0.00	78.63	0.00
144	3,808	3,810	34.9	Yes	**13.58**	104.0	3.01	82.62	6.29	4.49	0.00	0.00	93.39	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	6,693	6,694	23.1	No	**5.70**	104.0	3.01	87.51	8.96	4.80	0.00	0.00	101.27	0.00
146	6,393	6,394	22.8	No	**6.34**	104.0	3.01	87.11	8.72	4.80	0.00	0.00	100.63	0.00
Sum	41.22													

Noise sensitive area: H23 H23

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	4,124	4,125	17.6	No	**12.24**	104.0	3.01	83.31	6.62	4.80	0.00	0.00	94.73	0.00
2	4,268	4,269	15.3	No	**11.79**	104.0	3.01	83.61	6.77	4.80	0.00	0.00	95.18	0.00
3	3,970	3,971	19.4	No	**12.73**	104.0	3.01	82.98	6.46	4.80	0.00	0.00	94.24	0.00
4	4,195	4,196	17.3	No	**12.02**	104.0	3.01	83.46	6.70	4.80	0.00	0.00	94.95	0.00
5	3,447	3,448	15.0	No	**14.54**	104.0	3.01	81.75	5.88	4.80	0.00	0.00	92.43	0.00
6	3,476	3,478	19.4	No	**14.43**	104.0	3.01	81.83	5.91	4.80	0.00	0.00	92.54	0.00
7	1,603	1,607	27.2	Yes	**24.22**	104.0	3.01	75.12	3.42	4.22	0.00	0.00	82.75	0.00
8	4,656	4,656	12.4	No	**10.65**	104.0	3.01	84.36	7.16	4.80	0.00	0.00	96.32	0.00
9	3,605	3,607	20.5	No	**13.97**	104.0	3.01	82.14	6.06	4.80	0.00	0.00	93.00	0.00
10	3,153	3,156	31.0	Yes	**15.99**	104.0	3.01	80.98	5.54	4.46	0.00	0.00	90.98	0.00
11	4,243	4,245	41.3	Yes	**12.20**	104.0	3.01	83.56	6.75	4.47	0.00	0.00	94.77	0.00
12	4,087	4,089	39.9	Yes	**12.69**	104.0	3.01	83.23	6.59	4.47	0.00	0.00	94.28	0.00
13	3,608	3,610	45.5	Yes	**14.39**	104.0	3.01	82.15	6.06	4.37	0.00	0.00	92.58	0.00
14	3,176	3,179	49.6	Yes	**16.10**	104.0	3.01	81.05	5.56	4.27	0.00	0.00	90.88	0.00
15	2,516	2,520	40.8	Yes	**18.97**	104.0	3.01	79.03	4.73	4.25	0.00	0.00	88.01	0.00
16	2,368	2,371	33.3	Yes	**19.62**	104.0	3.01	78.50	4.53	4.32	0.00	0.00	87.35	0.00
17	4,452	4,453	40.8	Yes	**11.55**	104.0	3.01	83.97	6.96	4.49	0.00	0.00	95.42	0.00
18	4,544	4,546	45.8	Yes	**11.31**	104.0	3.01	84.15	7.05	4.46	0.00	0.00	95.66	0.00
19	3,355	3,357	49.3	Yes	**15.38**	104.0	3.01	81.52	5.77	4.30	0.00	0.00	91.59	0.00
20	2,254	2,257	46.9	Yes	**20.43**	104.0	3.01	78.07	4.38	4.09	0.00	0.00	86.54	0.00
21	3,505	3,506	20.9	No	**14.33**	104.0	3.01	81.90	5.95	4.80	0.00	0.00	92.64	0.00
22	3,995	3,995	21.7	No	**12.66**	104.0	3.01	83.03	6.49	4.80	0.00	0.00	94.32	0.00
23	4,017	4,017	24.2	No	**12.58**	104.0	3.01	83.08	6.51	4.80	0.00	0.00	94.39	0.00
24	4,015	4,015	20.6	No	**12.59**	104.0	3.01	83.07	6.51	4.80	0.00	0.00	94.38	0.00
25	3,625	3,625	20.1	No	**13.90**	104.0	3.01	82.19	6.08	4.80	0.00	0.00	93.07	0.00
26	2,551	2,552	16.9	No	**18.26**	104.0	3.01	79.14	4.78	4.80	0.00	0.00	88.72	0.00
27	2,811	2,812	17.1	No	**17.08**	104.0	3.01	79.98	5.11	4.80	0.00	0.00	89.89	0.00
28	1,829	1,831	26.5	Yes	**22.65**	104.0	3.01	76.26	3.76	4.30	0.00	0.00	84.32	0.00
29	3,446	3,447	21.4	No	**14.55**	104.0	3.01	81.75	5.88	4.80	0.00	0.00	92.43	0.00
30	4,030	4,031	20.8	No	**12.54**	104.0	3.01	83.11	6.52	4.80	0.00	0.00	94.43	0.00
31	4,780	4,780	26.9	No	**10.30**	104.0	3.01	84.59	7.28	4.80	0.00	0.00	96.67	0.00
32	4,111	4,112	22.7	No	**12.28**	104.0	3.01	83.28	6.61	4.80	0.00	0.00	94.69	0.00
33	4,148	4,149	22.7	No	**12.17**	104.0	3.01	83.36	6.65	4.80	0.00	0.00	94.81	0.00
34	1,623	1,626	24.2	Yes	**24.01**	104.0	3.01	75.22	3.45	4.29	0.00	0.00	82.96	0.00
35	1,676	1,680	27.4	Yes	**23.70**	104.0	3.01	75.51	3.53	4.24	0.00	0.00	83.28	0.00
36	1,805	1,809	27.0	Yes	**22.81**	104.0	3.01	76.15	3.73	4.29	0.00	0.00	84.17	0.00
37	1,672	1,675	25.9	Yes	**23.70**	104.0	3.01	75.48	3.52	4.27	0.00	0.00	83.27	0.00
38	3,211	3,211	17.4	No	**15.44**	104.0	3.01	81.13	5.60	4.80	0.00	0.00	91.54	0.00
39	2,571	2,572	20.1	No	**18.16**	104.0	3.01	79.21	4.80	4.80	0.00	0.00	88.81	0.00
40	1,199	1,201	43.7	Yes	**28.09**	104.0	3.01	72.59	2.74	3.54	0.00	0.00	78.88	0.00
41	2,374	2,377	28.1	Yes	**19.52**	104.0	3.01	78.52	4.54	4.40	0.00	0.00	87.46	0.00
43	1,585	1,588	32.0	Yes	**24.46**	104.0	3.01	75.02	3.39	4.11	0.00	0.00	82.51	0.00
44	2,280	2,283	48.9	Yes	**20.32**	104.0	3.01	78.17	4.41	4.07	0.00	0.00	86.65	0.00
45	2,583	2,586	44.4	Yes	**18.69**	104.0	3.01	79.25	4.82	4.21	0.00	0.00	88.29	0.00
46	1,249	1,252	41.8	Yes	**27.54**	104.0	3.01	72.95	2.83	3.65	0.00	0.00	79.43	0.00
48	4,345	4,345	19.8	No	**11.56**	104.0	3.01	83.76	6.85	4.80	0.00	0.00	95.41	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	5,183	5,183	27.8	No	**9.21**	104.0	3.01	85.29	7.67	4.80	0.00	0.00	97.76	0.00
50	2,517	2,519	20.2	No	**18.41**	104.0	3.01	79.02	4.73	4.80	0.00	0.00	88.56	0.00
51	4,888	4,889	25.3	No	**10.00**	104.0	3.01	84.78	7.39	4.80	0.00	0.00	96.97	0.00
52	4,730	4,730	24.9	No	**10.44**	104.0	3.01	84.50	7.24	4.80	0.00	0.00	96.53	0.00
53	5,397	5,397	31.3	No	**8.67**	104.0	3.01	85.64	7.86	4.80	0.00	0.00	98.30	0.00
55	6,434	6,434	28.8	No	**6.25**	104.0	3.01	87.17	8.75	4.80	0.00	0.00	100.72	0.00
56	6,681	6,682	30.8	No	**5.73**	104.0	3.01	87.50	8.95	4.80	0.00	0.00	101.25	0.00
57	6,221	6,221	24.3	No	**6.72**	104.0	3.01	86.88	8.58	4.80	0.00	0.00	100.25	0.00
58	3,786	3,786	18.5	No	**13.35**	104.0	3.01	82.56	6.26	4.80	0.00	0.00	93.62	0.00
59	6,932	6,932	32.2	No	**5.21**	104.0	3.01	87.82	9.14	4.80	0.00	0.00	101.76	0.00
60	7,965	7,965	36.1	No	**3.24**	104.0	3.01	89.02	9.91	4.80	0.00	0.00	103.73	0.00
61	8,283	8,283	32.8	No	**2.68**	104.0	3.01	89.36	10.13	4.80	0.00	0.00	104.29	0.00
62	7,293	7,294	37.1	No	**4.49**	104.0	3.01	88.26	9.42	4.80	0.00	0.00	102.48	0.00
63	7,506	7,506	48.0	Yes	**4.30**	104.0	3.01	88.51	9.58	4.58	0.00	0.00	102.67	0.00
64	8,727	8,728	49.1	Yes	**2.12**	104.0	3.01	89.82	10.43	4.61	0.00	0.00	104.86	0.00
65	9,351	9,351	48.3	Yes	**1.10**	104.0	3.01	90.42	10.83	4.62	0.00	0.00	105.88	0.00
66	945	948	41.7	Yes	**30.87**	104.0	3.01	70.53	2.28	3.28	0.00	0.00	76.10	0.00
67	8,877	8,878	45.1	Yes	**1.85**	104.0	3.01	89.97	10.53	4.63	0.00	0.00	105.12	0.00
68	9,407	9,407	42.1	Yes	**0.99**	104.0	3.01	90.47	10.87	4.65	0.00	0.00	105.99	0.00
69	9,234	9,235	49.4	Yes	**1.29**	104.0	3.01	90.31	10.76	4.62	0.00	0.00	105.69	0.00
70	3,011	3,012	42.4	Yes	**16.71**	104.0	3.01	80.58	5.36	4.32	0.00	0.00	90.26	0.00
71	2,962	2,964	28.7	Yes	**16.76**	104.0	3.01	80.44	5.30	4.47	0.00	0.00	90.21	0.00
72	4,288	4,289	17.9	No	**11.73**	104.0	3.01	83.65	6.79	4.80	0.00	0.00	95.24	0.00
73	3,311	3,312	19.0	No	**15.05**	104.0	3.01	81.40	5.72	4.80	0.00	0.00	91.92	0.00
74	2,330	2,333	22.0	No	**19.33**	104.0	3.01	78.36	4.48	4.80	0.00	0.00	87.64	0.00
75	2,821	2,822	16.0	No	**17.04**	104.0	3.01	80.01	5.12	4.80	0.00	0.00	89.94	0.00
76	5,388	5,389	23.2	No	**8.69**	104.0	3.01	85.63	7.85	4.80	0.00	0.00	98.28	0.00
77	5,291	5,291	23.3	No	**8.93**	104.0	3.01	85.47	7.77	4.80	0.00	0.00	98.04	0.00
78	1,845	1,847	42.7	Yes	**22.85**	104.0	3.01	76.33	3.79	4.01	0.00	0.00	84.12	0.00
80	7,586	7,586	37.4	No	**3.94**	104.0	3.01	88.60	9.64	4.80	0.00	0.00	103.04	0.00
81	3,586	3,588	52.4	Yes	**14.53**	104.0	3.01	82.10	6.04	4.30	0.00	0.00	92.44	0.00
82	4,381	4,382	23.7	No	**11.45**	104.0	3.01	83.83	6.89	4.80	0.00	0.00	95.52	0.00
83	8,146	8,147	46.1	Yes	**3.11**	104.0	3.01	89.22	10.04	4.61	0.00	0.00	103.86	0.00
85	5,900	5,900	32.4	No	**7.45**	104.0	3.01	86.42	8.30	4.80	0.00	0.00	99.52	0.00
86	7,326	7,326	34.7	No	**4.43**	104.0	3.01	88.30	9.44	4.80	0.00	0.00	102.54	0.00
87	9,584	9,584	46.6	Yes	**0.73**	104.0	3.01	90.63	10.98	4.63	0.00	0.00	106.24	0.00
89	8,287	8,288	48.8	Yes	**2.87**	104.0	3.01	89.37	10.13	4.60	0.00	0.00	104.10	0.00
90	6,290	6,291	24.6	No	**6.57**	104.0	3.01	86.97	8.63	4.80	0.00	0.00	100.41	0.00
91	7,332	7,332	42.9	Yes	**4.62**	104.0	3.01	88.30	9.45	4.60	0.00	0.00	102.35	0.00
92	8,935	8,935	50.8	Yes	**1.78**	104.0	3.01	90.02	10.57	4.61	0.00	0.00	105.20	0.00
94	3,108	3,111	38.5	Yes	**16.26**	104.0	3.01	80.86	5.48	4.38	0.00	0.00	90.72	0.00
95	4,285	4,287	27.1	Yes	**11.95**	104.0	3.01	83.64	6.79	4.58	0.00	0.00	95.02	0.00
97	1,753	1,758	45.6	Yes	**23.51**	104.0	3.01	75.90	3.65	3.91	0.00	0.00	83.46	0.00
98	3,549	3,551	34.3	Yes	**14.50**	104.0	3.01	82.01	6.00	4.47	0.00	0.00	92.48	0.00
99	4,489	4,490	16.3	No	**11.13**	104.0	3.01	84.05	7.00	4.80	0.00	0.00	95.84	0.00
100	2,906	2,907	27.2	Yes	**16.99**	104.0	3.01	80.27	5.23	4.48	0.00	0.00	89.98	0.00
101	3,988	3,990	50.7	Yes	**13.11**	104.0	3.01	83.02	6.48	4.37	0.00	0.00	93.86	0.00
102	2,034	2,038	45.4	Yes	**21.69**	104.0	3.01	77.18	4.07	4.04	0.00	0.00	85.28	0.00
103	4,827	4,829	44.9	Yes	**10.48**	104.0	3.01	84.68	7.33	4.48	0.00	0.00	96.49	0.00
104	2,078	2,081	22.5	Yes	**21.05**	104.0	3.01	77.36	4.13	4.43	0.00	0.00	85.92	0.00
107	2,645	2,647	52.2	Yes	**18.49**	104.0	3.01	79.46	4.90	4.12	0.00	0.00	88.48	0.00
108	5,271	5,271	17.9	No	**8.99**	104.0	3.01	85.44	7.75	4.80	0.00	0.00	97.98	0.00
109	7,171	7,171	33.6	No	**4.73**	104.0	3.01	88.11	9.33	4.80	0.00	0.00	102.24	0.00
110	4,553	4,554	19.7	No	**10.94**	104.0	3.01	84.17	7.06	4.80	0.00	0.00	96.03	0.00
111	5,052	5,053	22.4	No	**9.56**	104.0	3.01	85.07	7.54	4.80	0.00	0.00	97.42	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	2,973	2,975	50.6	Yes	**16.97**	104.0	3.01	80.47	5.32	4.22	0.00	0.00	90.00	0.00
114	6,065	6,065	32.6	No	**7.07**	104.0	3.01	86.66	8.44	4.80	0.00	0.00	99.90	0.00
115	4,479	4,480	12.1	No	**11.16**	104.0	3.01	84.03	6.99	4.80	0.00	0.00	95.81	0.00
116	951	958	44.6	Yes	**30.85**	104.0	3.01	70.63	2.30	3.19	0.00	0.00	76.12	0.00
118	7,599	7,600	35.6	No	**3.91**	104.0	3.01	88.62	9.65	4.80	0.00	0.00	103.06	0.00
119	2,552	2,554	24.5	No	**18.25**	104.0	3.01	79.14	4.78	4.80	0.00	0.00	88.72	0.00
120	4,350	4,351	50.7	Yes	**11.94**	104.0	3.01	83.77	6.86	4.40	0.00	0.00	95.03	0.00
121	1,961	1,964	28.2	Yes	**21.84**	104.0	3.01	76.86	3.96	4.31	0.00	0.00	85.13	0.00
125	7,849	7,850	46.3	Yes	**3.65**	104.0	3.01	88.90	9.83	4.60	0.00	0.00	103.32	0.00
126	4,172	4,173	31.3	Yes	**12.34**	104.0	3.01	83.41	6.67	4.54	0.00	0.00	94.63	0.00
127	4,415	4,415	31.1	Yes	**11.59**	104.0	3.01	83.90	6.92	4.56	0.00	0.00	95.38	0.00
128	4,656	4,656	29.6	Yes	**10.86**	104.0	3.01	84.36	7.16	4.58	0.00	0.00	96.11	0.00
129	1,027	1,030	45.4	Yes	**30.00**	104.0	3.01	71.26	2.44	3.28	0.00	0.00	76.97	0.00
130	1,400	1,402	45.2	Yes	**26.26**	104.0	3.01	73.94	3.09	3.69	0.00	0.00	80.71	0.00
131	1,766	1,768	44.7	Yes	**23.42**	104.0	3.01	75.95	3.67	3.93	0.00	0.00	83.55	0.00
132	2,026	2,028	44.9	Yes	**21.74**	104.0	3.01	77.14	4.05	4.04	0.00	0.00	85.23	0.00
133	3,073	3,074	15.4	No	**15.98**	104.0	3.01	80.75	5.44	4.80	0.00	0.00	90.99	0.00
134	2,946	2,947	43.0	Yes	**17.00**	104.0	3.01	80.39	5.28	4.30	0.00	0.00	89.97	0.00
141	1,790	1,795	40.5	Yes	**23.15**	104.0	3.01	76.08	3.71	4.03	0.00	0.00	83.82	0.00
142	1,764	1,769	48.8	Yes	**23.50**	104.0	3.01	75.95	3.67	3.85	0.00	0.00	83.48	0.00
143	2,074	2,079	46.5	Yes	**21.46**	104.0	3.01	77.36	4.13	4.03	0.00	0.00	85.51	0.00
144	2,885	2,887	38.7	Yes	**17.22**	104.0	3.01	80.21	5.21	4.34	0.00	0.00	89.76	0.00
145	5,824	5,824	25.8	No	**7.63**	104.0	3.01	86.30	8.24	4.80	0.00	0.00	99.34	0.00
146	5,534	5,535	26.0	No	**8.32**	104.0	3.01	85.86	7.99	4.80	0.00	0.00	98.65	0.00

Sum 40.41

Noise sensitive area: H24 H24

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	6,348	6,349	18.9	No	**6.44**	104.0	3.01	87.05	8.68	4.80	0.00	0.00	100.53	0.00
2	6,351	6,352	18.3	No	**6.43**	104.0	3.01	87.06	8.68	4.80	0.00	0.00	100.54	0.00
3	5,897	5,897	24.3	No	**7.46**	104.0	3.01	86.41	8.30	4.80	0.00	0.00	99.52	0.00
4	5,411	5,411	28.3	No	**8.63**	104.0	3.01	85.67	7.87	4.80	0.00	0.00	98.34	0.00
5	4,916	4,916	25.0	No	**9.92**	104.0	3.01	84.83	7.42	4.80	0.00	0.00	97.05	0.00
6	5,322	5,322	25.5	No	**8.86**	104.0	3.01	85.52	7.79	4.80	0.00	0.00	98.12	0.00
7	3,165	3,167	28.5	No	**15.61**	104.0	3.01	81.01	5.55	4.80	0.00	0.00	91.36	0.00
8	6,958	6,958	13.7	No	**5.16**	104.0	3.01	87.85	9.17	4.80	0.00	0.00	101.82	0.00
9	5,818	5,819	22.7	No	**7.64**	104.0	3.01	86.30	8.23	4.80	0.00	0.00	99.33	0.00
10	5,510	5,512	30.7	Yes	**8.57**	104.0	3.01	85.83	7.96	4.61	0.00	0.00	98.40	0.00
11	6,815	6,816	42.1	Yes	**5.66**	104.0	3.01	87.67	9.05	4.59	0.00	0.00	101.31	0.00
12	6,640	6,641	39.7	Yes	**6.02**	104.0	3.01	87.44	8.92	4.60	0.00	0.00	100.96	0.00
13	6,154	6,155	45.6	Yes	**7.12**	104.0	3.01	86.78	8.52	4.55	0.00	0.00	99.85	0.00
14	5,727	5,728	49.0	Yes	**8.15**	104.0	3.01	86.16	8.16	4.51	0.00	0.00	98.82	0.00
15	4,974	4,976	38.5	Yes	**10.03**	104.0	3.01	84.94	7.47	4.54	0.00	0.00	96.95	0.00
16	4,710	4,712	31.8	Yes	**10.72**	104.0	3.01	84.46	7.22	4.57	0.00	0.00	96.25	0.00
17	7,034	7,035	41.9	Yes	**5.21**	104.0	3.01	87.94	9.22	4.60	0.00	0.00	101.77	0.00
18	7,153	7,154	47.0	Yes	**4.99**	104.0	3.01	88.09	9.31	4.58	0.00	0.00	101.98	0.00
19	5,948	5,950	50.7	Yes	**7.63**	104.0	3.01	86.49	8.35	4.51	0.00	0.00	99.35	0.00
20	4,822	4,824	46.5	Yes	**10.51**	104.0	3.01	84.67	7.33	4.47	0.00	0.00	96.47	0.00
21	4,631	4,632	31.9	No	**10.72**	104.0	3.01	84.31	7.14	4.80	0.00	0.00	96.25	0.00
22	4,651	4,651	31.5	No	**10.66**	104.0	3.01	84.35	7.16	4.80	0.00	0.00	96.31	0.00
23	4,447	4,447	33.7	No	**11.26**	104.0	3.01	83.96	6.96	4.80	0.00	0.00	95.72	0.00
24	4,805	4,805	30.3	No	**10.23**	104.0	3.01	84.63	7.31	4.80	0.00	0.00	96.74	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	2,643	2,644	27.7	No	**17.83**	104.0	3.01	79.44	4.90	4.80	0.00	0.00	89.14	0.00
26	3,800	3,800	24.9	No	**13.30**	104.0	3.01	82.60	6.28	4.80	0.00	0.00	93.67	0.00
27	2,291	2,292	21.8	No	**19.54**	104.0	3.01	78.20	4.43	4.80	0.00	0.00	87.43	0.00
28	2,019	2,021	24.0	Yes	**21.43**	104.0	3.01	77.11	4.04	4.39	0.00	0.00	85.55	0.00
29	3,848	3,848	30.4	No	**13.14**	104.0	3.01	82.71	6.33	4.80	0.00	0.00	93.83	0.00
30	4,181	4,181	31.0	No	**12.06**	104.0	3.01	83.43	6.68	4.80	0.00	0.00	94.91	0.00
31	5,229	5,229	38.2	No	**9.09**	104.0	3.01	85.37	7.71	4.80	0.00	0.00	97.88	0.00
32	3,053	3,053	32.8	No	**16.06**	104.0	3.01	80.70	5.41	4.80	0.00	0.00	90.91	0.00
33	3,899	3,900	31.3	No	**12.97**	104.0	3.01	82.82	6.38	4.80	0.00	0.00	94.00	0.00
34	2,881	2,883	24.8	No	**16.77**	104.0	3.01	80.20	5.20	4.80	0.00	0.00	90.20	0.00
35	3,443	3,445	28.7	No	**14.55**	104.0	3.01	81.74	5.88	4.80	0.00	0.00	92.42	0.00
36	3,733	3,735	28.6	Yes	**13.78**	104.0	3.01	82.45	6.20	4.54	0.00	0.00	93.19	0.00
37	2,601	2,602	23.9	No	**18.02**	104.0	3.01	79.31	4.84	4.80	0.00	0.00	88.95	0.00
38	2,362	2,362	23.2	No	**19.18**	104.0	3.01	78.47	4.52	4.80	0.00	0.00	87.79	0.00
39	1,520	1,522	24.3	Yes	**24.79**	104.0	3.01	74.65	3.28	4.25	0.00	0.00	82.18	0.00
40	1,531	1,533	47.4	Yes	**25.23**	104.0	3.01	74.71	3.30	3.74	0.00	0.00	81.75	0.00
41	1,211	1,215	30.7	Yes	**27.58**	104.0	3.01	72.69	2.77	3.93	0.00	0.00	79.39	0.00
43	2,045	2,047	27.3	Yes	**21.32**	104.0	3.01	77.22	4.08	4.34	0.00	0.00	85.65	0.00
44	767	776	44.7	Yes	**33.43**	104.0	3.01	68.80	1.95	2.80	0.00	0.00	73.54	0.00
45	685	694	44.0	Yes	**34.77**	104.0	3.01	67.83	1.78	2.59	0.00	0.00	72.20	0.00
46	1,430	1,432	44.7	Yes	**25.99**	104.0	3.01	74.12	3.14	3.73	0.00	0.00	80.98	0.00
48	2,777	2,777	32.2	No	**17.23**	104.0	3.01	79.87	5.07	4.80	0.00	0.00	89.74	0.00
49	3,874	3,874	39.1	No	**13.05**	104.0	3.01	82.76	6.36	4.80	0.00	0.00	93.92	0.00
50	4,287	4,288	24.4	No	**11.73**	104.0	3.01	83.65	6.79	4.80	0.00	0.00	95.24	0.00
51	3,815	3,816	36.4	No	**13.25**	104.0	3.01	82.63	6.29	4.80	0.00	0.00	93.72	0.00
52	3,833	3,833	34.8	No	**13.19**	104.0	3.01	82.67	6.31	4.80	0.00	0.00	93.78	0.00
53	3,939	3,939	40.4	No	**12.84**	104.0	3.01	82.91	6.43	4.80	0.00	0.00	94.14	0.00
55	4,471	4,471	38.4	No	**11.18**	104.0	3.01	84.01	6.98	4.80	0.00	0.00	95.79	0.00
56	4,649	4,649	41.6	No	**10.67**	104.0	3.01	84.35	7.16	4.80	0.00	0.00	96.30	0.00
57	4,029	4,029	36.0	No	**12.55**	104.0	3.01	83.10	6.52	4.80	0.00	0.00	94.43	0.00
58	3,237	3,238	27.6	No	**15.33**	104.0	3.01	81.20	5.63	4.80	0.00	0.00	91.64	0.00
59	4,836	4,836	43.3	No	**10.14**	104.0	3.01	84.69	7.34	4.80	0.00	0.00	96.83	0.00
60	5,602	5,602	43.6	Yes	**8.43**	104.0	3.01	85.97	8.05	4.53	0.00	0.00	98.55	0.00
61	5,888	5,888	40.5	Yes	**7.71**	104.0	3.01	86.40	8.29	4.57	0.00	0.00	99.26	0.00
62	4,690	4,690	48.3	Yes	**10.90**	104.0	3.01	84.42	7.20	4.45	0.00	0.00	96.07	0.00
63	4,869	4,869	53.3	Yes	**10.43**	104.0	3.01	84.75	7.37	4.43	0.00	0.00	96.55	0.00
64	6,111	6,112	51.9	Yes	**7.25**	104.0	3.01	86.72	8.48	4.51	0.00	0.00	99.72	0.00
65	6,730	6,730	51.3	Yes	**5.88**	104.0	3.01	87.56	8.99	4.54	0.00	0.00	101.09	0.00
66	1,846	1,847	44.7	Yes	**22.89**	104.0	3.01	76.33	3.79	3.97	0.00	0.00	84.08	0.00
67	6,240	6,240	50.2	Yes	**6.95**	104.0	3.01	86.90	8.59	4.53	0.00	0.00	100.02	0.00
68	6,770	6,770	46.8	Yes	**5.78**	104.0	3.01	87.61	9.02	4.56	0.00	0.00	101.19	0.00
69	6,622	6,623	51.7	Yes	**6.12**	104.0	3.01	87.42	8.90	4.53	0.00	0.00	100.86	0.00
70	5,649	5,649	44.1	Yes	**8.31**	104.0	3.01	86.04	8.09	4.53	0.00	0.00	98.66	0.00
71	5,255	5,257	28.5	Yes	**9.21**	104.0	3.01	85.41	7.73	4.61	0.00	0.00	97.76	0.00
72	5,668	5,668	28.8	No	**8.00**	104.0	3.01	86.07	8.10	4.80	0.00	0.00	98.97	0.00
73	5,041	5,042	24.1	No	**9.59**	104.0	3.01	85.05	7.53	4.80	0.00	0.00	97.39	0.00
74	3,978	3,980	26.5	No	**12.71**	104.0	3.01	83.00	6.47	4.80	0.00	0.00	94.27	0.00
75	3,537	3,538	22.5	No	**14.22**	104.0	3.01	81.97	5.98	4.80	0.00	0.00	92.76	0.00
76	3,226	3,226	34.8	No	**15.38**	104.0	3.01	81.17	5.62	4.80	0.00	0.00	91.59	0.00
77	3,546	3,546	35.0	No	**14.19**	104.0	3.01	81.99	5.99	4.80	0.00	0.00	92.79	0.00
78	4,424	4,425	43.3	Yes	**11.65**	104.0	3.01	83.92	6.93	4.47	0.00	0.00	95.32	0.00
80	5,249	5,250	45.4	Yes	**9.34**	104.0	3.01	85.40	7.73	4.50	0.00	0.00	97.63	0.00
81	6,194	6,195	53.2	Yes	**7.07**	104.0	3.01	86.84	8.55	4.51	0.00	0.00	99.90	0.00
82	3,752	3,752	32.5	No	**13.46**	104.0	3.01	82.49	6.22	4.80	0.00	0.00	93.51	0.00
83	5,509	5,510	51.0	Yes	**8.70**	104.0	3.01	85.82	7.96	4.48	0.00	0.00	98.27	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	4,727	4,727	43.0	No	**10.45**	104.0	3.01	84.49	7.23	4.80	0.00	0.00	96.53	0.00
86	5,020	5,021	43.5	Yes	**9.94**	104.0	3.01	85.02	7.51	4.50	0.00	0.00	97.03	0.00
87	6,961	6,961	49.6	Yes	**5.39**	104.0	3.01	87.85	9.17	4.56	0.00	0.00	101.58	0.00
89	5,662	5,663	52.6	Yes	**8.33**	104.0	3.01	86.06	8.10	4.48	0.00	0.00	98.64	0.00
90	3,856	3,857	34.4	Yes	**13.42**	104.0	3.01	82.72	6.34	4.50	0.00	0.00	93.56	0.00
91	4,702	4,703	50.6	Yes	**10.88**	104.0	3.01	84.45	7.21	4.43	0.00	0.00	96.09	0.00
92	6,374	6,375	53.4	Yes	**6.67**	104.0	3.01	87.09	8.70	4.51	0.00	0.00	100.31	0.00
94	5,567	5,569	35.5	Yes	**8.46**	104.0	3.01	85.92	8.02	4.58	0.00	0.00	98.51	0.00
95	6,753	6,754	23.5	Yes	**5.69**	104.0	3.01	87.59	9.01	4.68	0.00	0.00	101.28	0.00
97	4,157	4,159	43.1	Yes	**12.49**	104.0	3.01	83.38	6.66	4.45	0.00	0.00	94.48	0.00
98	6,012	6,013	31.3	Yes	**7.37**	104.0	3.01	86.58	8.40	4.62	0.00	0.00	99.61	0.00
99	6,296	6,296	24.7	No	**6.55**	104.0	3.01	86.98	8.64	4.80	0.00	0.00	100.42	0.00
100	1,015	1,019	35.2	Yes	**29.78**	104.0	3.01	71.17	2.42	3.61	0.00	0.00	77.19	0.00
101	6,604	6,605	52.7	Yes	**6.16**	104.0	3.01	87.40	8.89	4.53	0.00	0.00	100.81	0.00
102	1,068	1,075	44.0	Yes	**29.44**	104.0	3.01	71.63	2.52	3.39	0.00	0.00	77.54	0.00
103	7,440	7,441	46.6	Yes	**4.42**	104.0	3.01	88.43	9.53	4.59	0.00	0.00	102.55	0.00
104	1,605	1,608	24.7	Yes	**24.15**	104.0	3.01	75.13	3.42	4.27	0.00	0.00	82.82	0.00
107	5,240	5,241	52.8	Yes	**9.41**	104.0	3.01	85.39	7.72	4.46	0.00	0.00	97.56	0.00
108	6,918	6,918	28.1	No	**5.24**	104.0	3.01	87.80	9.13	4.80	0.00	0.00	101.73	0.00
109	5,011	5,011	45.1	No	**9.67**	104.0	3.01	85.00	7.51	4.80	0.00	0.00	97.30	0.00
110	2,744	2,744	31.7	No	**17.38**	104.0	3.01	79.77	5.03	4.80	0.00	0.00	89.59	0.00
111	3,004	3,005	35.0	No	**16.26**	104.0	3.01	80.56	5.35	4.80	0.00	0.00	90.71	0.00
113	5,571	5,572	51.4	Yes	**8.55**	104.0	3.01	85.92	8.02	4.49	0.00	0.00	98.42	0.00
114	4,768	4,768	41.7	No	**10.33**	104.0	3.01	84.57	7.27	4.80	0.00	0.00	96.64	0.00
115	6,742	6,743	14.2	No	**5.60**	104.0	3.01	87.58	9.00	4.80	0.00	0.00	101.37	0.00
116	2,151	2,154	45.9	Yes	**21.01**	104.0	3.01	77.66	4.23	4.07	0.00	0.00	85.97	0.00
118	5,374	5,374	45.6	No	**8.72**	104.0	3.01	85.61	7.84	4.80	0.00	0.00	98.25	0.00
119	4,576	4,577	26.1	No	**10.88**	104.0	3.01	84.21	7.09	4.80	0.00	0.00	96.10	0.00
120	6,978	6,978	52.8	Yes	**5.37**	104.0	3.01	87.88	9.18	4.54	0.00	0.00	101.60	0.00
121	4,041	4,042	29.0	Yes	**12.75**	104.0	3.01	83.13	6.54	4.56	0.00	0.00	94.22	0.00
125	5,213	5,213	51.4	Yes	**9.47**	104.0	3.01	85.34	7.69	4.46	0.00	0.00	97.50	0.00
126	1,677	1,679	43.3	Yes	**24.03**	104.0	3.01	75.50	3.53	3.91	0.00	0.00	82.94	0.00
127	1,915	1,917	44.0	Yes	**22.42**	104.0	3.01	76.65	3.89	4.01	0.00	0.00	84.55	0.00
128	2,192	2,193	41.7	Yes	**20.71**	104.0	3.01	77.82	4.29	4.15	0.00	0.00	86.26	0.00
129	3,477	3,478	49.0	Yes	**14.91**	104.0	3.01	81.83	5.91	4.32	0.00	0.00	92.06	0.00
130	3,451	3,452	50.8	Yes	**15.03**	104.0	3.01	81.76	5.88	4.30	0.00	0.00	91.94	0.00
131	3,898	3,899	49.3	Yes	**13.40**	104.0	3.01	82.82	6.38	4.37	0.00	0.00	93.57	0.00
132	4,285	4,285	48.7	Yes	**12.13**	104.0	3.01	83.64	6.79	4.41	0.00	0.00	94.84	0.00
133	1,806	1,807	23.5	No	**22.31**	104.0	3.01	76.14	3.73	4.80	0.00	0.00	84.66	0.00
134	5,577	5,578	44.4	Yes	**8.49**	104.0	3.01	85.93	8.02	4.53	0.00	0.00	98.48	0.00
141	4,087	4,089	38.6	Yes	**12.68**	104.0	3.01	83.23	6.59	4.48	0.00	0.00	94.29	0.00
142	1,280	1,286	47.9	Yes	**27.38**	104.0	3.01	73.19	2.89	3.52	0.00	0.00	79.60	0.00
143	4,540	4,542	44.1	Yes	**11.31**	104.0	3.01	84.14	7.05	4.47	0.00	0.00	95.66	0.00
144	636	643	42.9	Yes	**35.67**	104.0	3.01	67.16	1.68	2.47	0.00	0.00	71.30	0.00
145	3,417	3,418	35.2	Yes	**15.00**	104.0	3.01	81.68	5.84	4.45	0.00	0.00	91.97	0.00
146	3,174	3,175	35.4	Yes	**15.96**	104.0	3.01	81.03	5.56	4.42	0.00	0.00	91.01	0.00
Sum	42.09													

Noise sensitive area: H25 H25

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	11,484	11,484	28.9	No	**-2.11**	104.0	3.01	92.20	12.08	4.80	0.00	0.00	109.08	0.00
2	11,435	11,436	30.0	No	**-2.05**	104.0	3.01	92.17	12.06	4.80	0.00	0.00	109.02	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	10,931	10,932	38.3	Yes	**-1.26**	104.0	3.01	91.77	11.78	4.68	0.00	0.00	108.23	0.00
4	10,108	10,108	39.2	Yes	**-0.09**	104.0	3.01	91.09	11.30	4.67	0.00	0.00	107.06	0.00
5	9,807	9,808	38.5	Yes	**0.36**	104.0	3.01	90.83	11.12	4.67	0.00	0.00	106.61	0.00
6	10,350	10,351	40.0	Yes	**-0.44**	104.0	3.01	91.30	11.44	4.67	0.00	0.00	107.41	0.00
7	8,277	8,278	45.4	Yes	**2.87**	104.0	3.01	89.36	10.13	4.61	0.00	0.00	104.10	0.00
8	12,110	12,110	20.9	No	**-2.91**	104.0	3.01	92.66	12.42	4.80	0.00	0.00	109.88	0.00
9	10,959	10,960	33.2	Yes	**-1.31**	104.0	3.01	91.80	11.79	4.70	0.00	0.00	108.29	0.00
10	10,689	10,690	42.7	Yes	**-0.91**	104.0	3.01	91.58	11.64	4.66	0.00	0.00	107.88	0.00
11	11,998	11,999	54.6	Yes	**-2.61**	104.0	3.01	92.58	12.36	4.64	0.00	0.00	109.59	0.00
12	11,827	11,828	52.5	Yes	**-2.40**	104.0	3.01	92.46	12.27	4.65	0.00	0.00	109.37	0.00
13	11,342	11,342	58.3	Yes	**-1.75**	104.0	3.01	92.09	12.00	4.62	0.00	0.00	108.72	0.00
14	10,913	10,914	61.2	Yes	**-1.16**	104.0	3.01	91.76	11.77	4.61	0.00	0.00	108.14	0.00
15	10,165	10,166	52.6	Yes	**-0.13**	104.0	3.01	91.14	11.33	4.62	0.00	0.00	107.10	0.00
16	9,893	9,894	45.3	Yes	**0.25**	104.0	3.01	90.91	11.17	4.64	0.00	0.00	106.72	0.00
17	12,214	12,215	54.2	Yes	**-2.89**	104.0	3.01	92.74	12.47	4.65	0.00	0.00	109.86	0.00
18	12,319	12,320	56.7	Yes	**-3.01**	104.0	3.01	92.81	12.52	4.64	0.00	0.00	109.98	0.00
19	11,123	11,123	60.0	Yes	**-1.45**	104.0	3.01	91.92	11.88	4.62	0.00	0.00	108.42	0.00
20	10,003	10,004	56.0	Yes	**0.12**	104.0	3.01	91.00	11.24	4.61	0.00	0.00	106.85	0.00
21	9,379	9,379	44.4	Yes	**1.04**	104.0	3.01	90.44	10.85	4.64	0.00	0.00	105.93	0.00
22	9,098	9,098	39.7	Yes	**1.47**	104.0	3.01	90.18	10.67	4.65	0.00	0.00	105.50	0.00
23	8,774	8,775	42.0	Yes	**2.01**	104.0	3.01	89.86	10.46	4.64	0.00	0.00	104.96	0.00
24	9,316	9,316	39.4	Yes	**1.12**	104.0	3.01	90.38	10.81	4.66	0.00	0.00	105.85	0.00
25	6,492	6,493	35.3	Yes	**6.31**	104.0	3.01	87.25	8.80	4.61	0.00	0.00	100.66	0.00
26	8,731	8,732	39.3	Yes	**2.07**	104.0	3.01	89.82	10.43	4.65	0.00	0.00	104.90	0.00
27	6,769	6,770	37.2	Yes	**5.73**	104.0	3.01	87.61	9.02	4.61	0.00	0.00	101.24	0.00
28	7,016	7,017	44.6	Yes	**5.25**	104.0	3.01	87.92	9.21	4.58	0.00	0.00	101.72	0.00
29	8,315	8,315	40.2	Yes	**2.79**	104.0	3.01	89.40	10.15	4.64	0.00	0.00	104.18	0.00
30	8,361	8,361	36.1	No	**2.54**	104.0	3.01	89.44	10.18	4.80	0.00	0.00	104.43	0.00
31	9,391	9,391	43.2	No	**0.86**	104.0	3.01	90.45	10.86	4.80	0.00	0.00	106.11	0.00
32	6,543	6,543	35.5	No	**6.02**	104.0	3.01	87.32	8.84	4.80	0.00	0.00	100.95	0.00
33	7,822	7,822	35.1	No	**3.50**	104.0	3.01	88.87	9.81	4.80	0.00	0.00	103.47	0.00
34	7,963	7,964	43.0	Yes	**3.43**	104.0	3.01	89.02	9.91	4.62	0.00	0.00	103.55	0.00
35	8,572	8,572	44.1	Yes	**2.36**	104.0	3.01	89.66	10.33	4.62	0.00	0.00	104.61	0.00
36	8,874	8,875	43.0	Yes	**1.85**	104.0	3.01	89.96	10.53	4.63	0.00	0.00	105.13	0.00
37	7,651	7,652	43.0	Yes	**4.00**	104.0	3.01	88.68	9.68	4.61	0.00	0.00	102.97	0.00
38	6,531	6,532	35.4	Yes	**6.23**	104.0	3.01	87.30	8.83	4.62	0.00	0.00	100.74	0.00
39	6,161	6,162	44.7	Yes	**7.10**	104.0	3.01	86.79	8.53	4.55	0.00	0.00	99.87	0.00
40	6,589	6,589	49.5	Yes	**6.18**	104.0	3.01	87.38	8.88	4.54	0.00	0.00	100.80	0.00
41	6,041	6,042	52.6	Yes	**7.42**	104.0	3.01	86.62	8.43	4.50	0.00	0.00	99.55	0.00
43	7,120	7,121	47.8	Yes	**5.06**	104.0	3.01	88.05	9.29	4.57	0.00	0.00	101.91	0.00
44	5,796	5,798	64.8	Yes	**8.07**	104.0	3.01	86.27	8.22	4.42	0.00	0.00	98.90	0.00
45	5,527	5,529	63.1	Yes	**8.73**	104.0	3.01	85.85	7.98	4.41	0.00	0.00	98.24	0.00
46	6,617	6,617	50.3	Yes	**6.12**	104.0	3.01	87.41	8.90	4.54	0.00	0.00	100.85	0.00
48	5,775	5,776	33.7	No	**7.74**	104.0	3.01	86.23	8.20	4.80	0.00	0.00	99.23	0.00
49	6,492	6,492	34.4	No	**6.13**	104.0	3.01	87.25	8.80	4.80	0.00	0.00	100.84	0.00
50	9,353	9,354	39.8	Yes	**1.06**	104.0	3.01	90.42	10.84	4.65	0.00	0.00	105.91	0.00
51	6,823	6,823	34.1	No	**5.43**	104.0	3.01	87.68	9.06	4.80	0.00	0.00	101.54	0.00
52	7,068	7,068	34.0	No	**4.94**	104.0	3.01	87.99	9.25	4.80	0.00	0.00	102.03	0.00
53	6,263	6,263	38.0	No	**6.63**	104.0	3.01	86.94	8.61	4.80	0.00	0.00	100.35	0.00
55	5,321	5,322	37.0	No	**8.86**	104.0	3.01	85.52	7.79	4.80	0.00	0.00	98.11	0.00
56	5,176	5,176	39.3	No	**9.23**	104.0	3.01	85.28	7.66	4.80	0.00	0.00	97.74	0.00
57	4,533	4,533	35.2	Yes	**11.27**	104.0	3.01	84.13	7.04	4.53	0.00	0.00	95.70	0.00
58	7,171	7,171	33.1	No	**4.73**	104.0	3.01	88.11	9.33	4.80	0.00	0.00	102.24	0.00
59	5,035	5,036	40.9	No	**9.60**	104.0	3.01	85.04	7.53	4.80	0.00	0.00	97.37	0.00
60	4,232	4,233	42.3	Yes	**12.24**	104.0	3.01	83.53	6.74	4.46	0.00	0.00	94.73	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	4,188	4,188	40.0	Yes	**12.37**	104.0	3.01	83.44	6.69	4.47	0.00	0.00	94.60	0.00
62	2,248	2,249	38.2	Yes	**20.35**	104.0	3.01	78.04	4.37	4.22	0.00	0.00	86.63	0.00
63	1,113	1,116	42.2	Yes	**28.93**	104.0	3.01	71.95	2.59	3.49	0.00	0.00	78.04	0.00
64	1,056	1,059	44.9	Yes	**29.64**	104.0	3.01	71.50	2.49	3.34	0.00	0.00	77.33	0.00
65	1,680	1,682	42.6	Yes	**23.99**	104.0	3.01	75.52	3.53	3.93	0.00	0.00	82.98	0.00
66	6,880	6,881	47.0	Yes	**5.55**	104.0	3.01	87.75	9.11	4.57	0.00	0.00	101.43	0.00
67	1,706	1,708	42.1	Yes	**23.79**	104.0	3.01	75.65	3.58	3.95	0.00	0.00	83.18	0.00
68	2,043	2,045	41.7	Yes	**21.58**	104.0	3.01	77.21	4.08	4.10	0.00	0.00	85.39	0.00
69	1,509	1,511	43.9	Yes	**25.32**	104.0	3.01	74.59	3.26	3.80	0.00	0.00	81.65	0.00
70	10,759	10,760	46.6	Yes	**-1.00**	104.0	3.01	91.64	11.68	4.65	0.00	0.00	107.97	0.00
71	10,425	10,426	40.0	Yes	**-0.54**	104.0	3.01	91.36	11.49	4.67	0.00	0.00	107.52	0.00
72	10,436	10,437	39.6	Yes	**-0.56**	104.0	3.01	91.37	11.49	4.67	0.00	0.00	107.53	0.00
73	10,039	10,040	38.6	Yes	**0.01**	104.0	3.01	91.03	11.26	4.67	0.00	0.00	106.96	0.00
74	9,031	9,032	42.5	Yes	**1.59**	104.0	3.01	90.12	10.63	4.64	0.00	0.00	105.38	0.00
75	8,275	8,275	36.4	Yes	**2.84**	104.0	3.01	89.36	10.12	4.65	0.00	0.00	104.13	0.00
76	4,586	4,586	35.4	Yes	**11.11**	104.0	3.01	84.23	7.09	4.54	0.00	0.00	95.86	0.00
77	5,600	5,601	32.9	No	**8.16**	104.0	3.01	85.96	8.04	4.80	0.00	0.00	98.81	0.00
78	9,600	9,601	50.7	Yes	**0.72**	104.0	3.01	90.65	10.99	4.62	0.00	0.00	106.26	0.00
80	4,235	4,236	43.8	Yes	**12.25**	104.0	3.01	83.54	6.74	4.45	0.00	0.00	94.72	0.00
81	11,360	11,361	61.6	Yes	**-1.77**	104.0	3.01	92.11	12.02	4.62	0.00	0.00	108.74	0.00
82	7,348	7,349	35.5	No	**4.39**	104.0	3.01	88.32	9.46	4.80	0.00	0.00	102.59	0.00
83	1,200	1,203	42.3	Yes	**28.03**	104.0	3.01	72.60	2.75	3.59	0.00	0.00	78.94	0.00
85	7,104	7,104	38.7	No	**4.87**	104.0	3.01	88.03	9.28	4.80	0.00	0.00	102.11	0.00
86	4,306	4,307	41.5	Yes	**12.01**	104.0	3.01	83.68	6.81	4.47	0.00	0.00	94.97	0.00
87	1,916	1,917	40.6	Yes	**22.35**	104.0	3.01	76.65	3.89	4.07	0.00	0.00	84.62	0.00
89	837	841	46.1	Yes	**32.49**	104.0	3.01	69.50	2.08	2.90	0.00	0.00	74.48	0.00
90	3,569	3,570	38.2	Yes	**14.47**	104.0	3.01	82.05	6.02	4.43	0.00	0.00	92.50	0.00
91	1,766	1,768	39.2	Yes	**23.32**	104.0	3.01	75.95	3.67	4.04	0.00	0.00	83.66	0.00
92	1,207	1,210	44.1	Yes	**28.01**	104.0	3.01	72.66	2.76	3.54	0.00	0.00	78.96	0.00
94	10,757	10,758	49.4	Yes	**-0.98**	104.0	3.01	91.63	11.68	4.64	0.00	0.00	107.96	0.00
95	11,942	11,942	35.3	Yes	**-2.60**	104.0	3.01	92.54	12.33	4.70	0.00	0.00	109.57	0.00
97	9,347	9,348	57.3	Yes	**1.13**	104.0	3.01	90.41	10.83	4.59	0.00	0.00	105.84	0.00
98	11,201	11,202	44.8	Yes	**-1.61**	104.0	3.01	91.99	11.93	4.66	0.00	0.00	108.58	0.00
99	11,255	11,256	37.7	Yes	**-1.70**	104.0	3.01	92.03	11.96	4.69	0.00	0.00	108.67	0.00
100	5,447	5,448	51.2	Yes	**8.86**	104.0	3.01	85.73	7.91	4.48	0.00	0.00	98.11	0.00
101	11,764	11,764	60.0	Yes	**-2.30**	104.0	3.01	92.41	12.23	4.63	0.00	0.00	109.27	0.00
102	6,130	6,131	63.2	Yes	**7.27**	104.0	3.01	86.75	8.50	4.45	0.00	0.00	99.70	0.00
103	12,603	12,603	55.7	Yes	**-3.36**	104.0	3.01	93.01	12.67	4.65	0.00	0.00	110.33	0.00
104	6,533	6,534	46.6	Yes	**6.28**	104.0	3.01	87.30	8.83	4.56	0.00	0.00	100.69	0.00
107	10,412	10,413	60.6	Yes	**-0.46**	104.0	3.01	91.35	11.48	4.60	0.00	0.00	107.43	0.00
108	11,754	11,754	38.2	Yes	**-2.35**	104.0	3.01	92.40	12.23	4.69	0.00	0.00	109.32	0.00
109	4,876	4,877	41.7	No	**10.03**	104.0	3.01	84.76	7.38	4.80	0.00	0.00	96.94	0.00
110	5,368	5,369	34.0	No	**8.74**	104.0	3.01	85.60	7.84	4.80	0.00	0.00	98.23	0.00
111	4,882	4,883	35.6	No	**10.02**	104.0	3.01	84.77	7.38	4.80	0.00	0.00	96.96	0.00
113	10,742	10,743	59.6	Yes	**-0.93**	104.0	3.01	91.62	11.67	4.61	0.00	0.00	107.90	0.00
114	6,910	6,910	39.0	No	**5.25**	104.0	3.01	87.79	9.13	4.80	0.00	0.00	101.72	0.00
115	11,884	11,885	22.3	No	**-2.63**	104.0	3.01	92.50	12.30	4.80	0.00	0.00	109.60	0.00
116	7,334	7,336	57.2	Yes	**4.68**	104.0	3.01	88.31	9.45	4.53	0.00	0.00	102.29	0.00
118	4,759	4,760	41.0	No	**10.36**	104.0	3.01	84.55	7.26	4.80	0.00	0.00	96.62	0.00
119	9,699	9,700	40.2	Yes	**0.53**	104.0	3.01	90.74	11.05	4.66	0.00	0.00	106.44	0.00
120	12,122	12,122	57.9	Yes	**-2.76**	104.0	3.01	92.67	12.42	4.64	0.00	0.00	109.73	0.00
121	9,196	9,197	41.7	Yes	**1.32**	104.0	3.01	90.27	10.74	4.65	0.00	0.00	105.65	0.00
125	1,107	1,110	41.5	Yes	**28.97**	104.0	3.01	71.91	2.58	3.51	0.00	0.00	78.00	0.00
126	4,162	4,164	50.3	Yes	**12.53**	104.0	3.01	83.39	6.66	4.39	0.00	0.00	94.44	0.00
127	4,003	4,004	50.2	Yes	**13.05**	104.0	3.01	83.05	6.50	4.37	0.00	0.00	93.92	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	3,961	3,962	48.8	Yes	**13.18**	104.0	3.01	82.96	6.45	4.38	0.00	0.00	93.79	0.00
129	8,465	8,465	50.9	Yes	**2.57**	104.0	3.01	89.55	10.25	4.60	0.00	0.00	104.40	0.00
130	8,239	8,240	52.3	Yes	**2.97**	104.0	3.01	89.32	10.10	4.58	0.00	0.00	104.00	0.00
131	8,644	8,645	50.1	Yes	**2.26**	104.0	3.01	89.73	10.37	4.60	0.00	0.00	104.71	0.00
132	9,057	9,058	49.5	Yes	**1.57**	104.0	3.01	90.14	10.65	4.61	0.00	0.00	105.40	0.00
133	6,020	6,020	39.1	Yes	**7.39**	104.0	3.01	86.59	8.41	4.58	0.00	0.00	99.58	0.00
134	10,717	10,717	48.1	Yes	**-0.93**	104.0	3.01	91.60	11.65	4.65	0.00	0.00	107.90	0.00
141	9,271	9,272	52.8	Yes	**1.24**	104.0	3.01	90.34	10.78	4.61	0.00	0.00	105.73	0.00
142	6,398	6,400	64.8	Yes	**6.67**	104.0	3.01	87.12	8.72	4.45	0.00	0.00	100.30	0.00
143	9,731	9,732	57.8	Yes	**0.54**	104.0	3.01	90.76	11.07	4.60	0.00	0.00	106.43	0.00
144	5,202	5,203	56.1	Yes	**9.53**	104.0	3.01	85.33	7.68	4.43	0.00	0.00	97.44	0.00
145	3,749	3,750	39.2	Yes	**13.83**	104.0	3.01	82.48	6.22	4.44	0.00	0.00	93.14	0.00
146	3,972	3,973	38.4	Yes	**13.06**	104.0	3.01	82.98	6.46	4.47	0.00	0.00	93.91	0.00

Sum 38.75

Noise sensitive area: H27 H27

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	15,641	15,641	36.9	No	**-6.80**	104.0	3.01	94.89	14.09	4.80	0.00	0.00	113.77	0.00
2	15,604	15,604	36.6	No	**-6.76**	104.0	3.01	94.86	14.07	4.80	0.00	0.00	113.74	0.00
3	15,105	15,105	43.7	No	**-6.26**	104.0	3.01	94.58	13.85	4.80	0.00	0.00	113.24	0.00
4	14,271	14,271	40.8	No	**-5.39**	104.0	3.01	94.09	13.48	4.80	0.00	0.00	112.37	0.00
5	13,983	13,983	41.8	No	**-5.08**	104.0	3.01	93.91	13.34	4.80	0.00	0.00	112.06	0.00
6	14,523	14,524	45.6	No	**-5.66**	104.0	3.01	94.24	13.59	4.80	0.00	0.00	112.63	0.00
7	12,435	12,436	54.1	No	**-3.31**	104.0	3.01	92.89	12.58	4.80	0.00	0.00	110.28	0.00
8	16,261	16,261	30.0	No	**-7.40**	104.0	3.01	95.22	14.35	4.80	0.00	0.00	114.37	0.00
9	15,113	15,114	42.2	No	**-6.27**	104.0	3.01	94.59	13.86	4.80	0.00	0.00	113.25	0.00
10	14,821	14,821	55.6	No	**-5.97**	104.0	3.01	94.42	13.73	4.80	0.00	0.00	112.95	0.00
11	16,069	16,069	65.8	No	**-7.22**	104.0	3.01	95.12	14.27	4.80	0.00	0.00	114.19	0.00
12	15,908	15,909	64.1	No	**-7.06**	104.0	3.01	95.03	14.20	4.80	0.00	0.00	114.04	0.00
13	15,426	15,426	69.4	No	**-6.59**	104.0	3.01	94.77	13.99	4.80	0.00	0.00	113.56	0.00
14	14,995	14,996	71.5	No	**-6.15**	104.0	3.01	94.52	13.81	4.80	0.00	0.00	113.12	0.00
15	14,272	14,273	64.6	No	**-5.40**	104.0	3.01	94.09	13.48	4.80	0.00	0.00	112.37	0.00
16	14,020	14,021	57.9	No	**-5.12**	104.0	3.01	93.94	13.36	4.80	0.00	0.00	112.10	0.00
17	16,278	16,279	64.9	No	**-7.42**	104.0	3.01	95.23	14.36	4.80	0.00	0.00	114.39	0.00
18	16,359	16,360	65.6	No	**-7.50**	104.0	3.01	95.28	14.39	4.80	0.00	0.00	114.47	0.00
19	15,180	15,181	68.7	No	**-6.34**	104.0	3.01	94.63	13.89	4.80	0.00	0.00	113.31	0.00
20	14,076	14,077	63.8	No	**-5.18**	104.0	3.01	93.97	13.39	4.80	0.00	0.00	112.16	0.00
21	13,549	13,550	46.8	No	**-4.60**	104.0	3.01	93.64	13.14	4.80	0.00	0.00	111.58	0.00
22	13,243	13,243	40.6	No	**-4.26**	104.0	3.01	93.44	12.99	4.80	0.00	0.00	111.23	0.00
23	12,909	12,909	42.3	No	**-3.87**	104.0	3.01	93.22	12.82	4.80	0.00	0.00	110.84	0.00
24	13,465	13,466	40.5	No	**-4.51**	104.0	3.01	93.58	13.10	4.80	0.00	0.00	111.48	0.00
25	10,628	10,628	36.8	No	**-0.96**	104.0	3.01	91.53	11.60	4.80	0.00	0.00	107.93	0.00
26	12,907	12,908	44.1	No	**-3.87**	104.0	3.01	93.22	12.82	4.80	0.00	0.00	110.84	0.00
27	10,941	10,941	40.2	No	**-1.39**	104.0	3.01	91.78	11.78	4.80	0.00	0.00	108.36	0.00
28	11,185	11,185	51.6	No	**-1.72**	104.0	3.01	91.97	11.92	4.80	0.00	0.00	108.69	0.00
29	12,470	12,470	41.4	No	**-3.35**	104.0	3.01	92.92	12.60	4.80	0.00	0.00	110.32	0.00
30	12,483	12,484	36.2	No	**-3.36**	104.0	3.01	92.93	12.61	4.80	0.00	0.00	110.34	0.00
31	13,492	13,492	42.9	No	**-4.54**	104.0	3.01	93.60	13.11	4.80	0.00	0.00	111.51	0.00
32	10,637	10,637	35.9	No	**-0.97**	104.0	3.01	91.54	11.61	4.80	0.00	0.00	107.95	0.00
33	11,924	11,924	35.1	No	**-2.67**	104.0	3.01	92.53	12.32	4.80	0.00	0.00	109.65	0.00
34	12,126	12,126	50.5	No	**-2.93**	104.0	3.01	92.67	12.42	4.80	0.00	0.00	109.90	0.00
35	12,726	12,727	53.4	No	**-3.65**	104.0	3.01	93.09	12.73	4.80	0.00	0.00	110.63	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	13,026	13,026	53.1	No	**-4.01**	104.0	3.01	93.30	12.88	4.80	0.00	0.00	110.98	0.00
37	11,817	11,818	49.9	No	**-2.54**	104.0	3.01	92.45	12.26	4.80	0.00	0.00	109.51	0.00
38	10,691	10,691	37.5	No	**-1.05**	104.0	3.01	91.58	11.64	4.80	0.00	0.00	108.02	0.00
39	10,337	10,338	49.6	No	**-0.55**	104.0	3.01	91.29	11.43	4.80	0.00	0.00	107.52	0.00
40	10,628	10,628	52.6	No	**-0.96**	104.0	3.01	91.53	11.60	4.80	0.00	0.00	107.93	0.00
41	10,211	10,212	58.7	No	**-0.37**	104.0	3.01	91.18	11.36	4.80	0.00	0.00	107.34	0.00
43	11,281	11,281	55.6	No	**-1.85**	104.0	3.01	92.05	11.97	4.80	0.00	0.00	108.82	0.00
44	9,950	9,951	69.8	No	**0.01**	104.0	3.01	90.96	11.20	4.80	0.00	0.00	106.96	0.00
45	9,689	9,690	66.9	No	**0.40**	104.0	3.01	90.73	11.04	4.80	0.00	0.00	106.57	0.00
46	10,720	10,720	54.1	No	**-1.09**	104.0	3.01	91.60	11.66	4.80	0.00	0.00	108.06	0.00
48	9,857	9,857	34.5	No	**0.15**	104.0	3.01	90.87	11.15	4.80	0.00	0.00	106.82	0.00
49	10,446	10,446	36.3	No	**-0.71**	104.0	3.01	91.38	11.50	4.80	0.00	0.00	107.68	0.00
50	13,521	13,522	47.1	No	**-4.57**	104.0	3.01	93.62	13.12	4.80	0.00	0.00	111.54	0.00
51	10,826	10,826	33.6	No	**-1.23**	104.0	3.01	91.69	11.72	4.80	0.00	0.00	108.21	0.00
52	11,094	11,094	34.0	No	**-1.60**	104.0	3.01	91.90	11.87	4.80	0.00	0.00	108.57	0.00
53	10,179	10,180	39.4	No	**-0.32**	104.0	3.01	91.15	11.34	4.80	0.00	0.00	107.30	0.00
55	8,997	8,997	38.8	No	**1.48**	104.0	3.01	90.08	10.61	4.80	0.00	0.00	105.49	0.00
56	8,778	8,778	41.7	No	**1.84**	104.0	3.01	89.87	10.46	4.80	0.00	0.00	105.13	0.00
57	8,290	8,290	37.1	No	**2.67**	104.0	3.01	89.37	10.13	4.80	0.00	0.00	104.31	0.00
58	11,293	11,293	33.8	No	**-1.86**	104.0	3.01	92.06	11.98	4.80	0.00	0.00	108.83	0.00
59	8,554	8,555	42.4	No	**2.21**	104.0	3.01	89.64	10.31	4.80	0.00	0.00	104.76	0.00
60	7,302	7,302	46.2	No	**4.48**	104.0	3.01	88.27	9.43	4.80	0.00	0.00	102.50	0.00
61	7,082	7,082	42.0	No	**4.91**	104.0	3.01	88.00	9.26	4.80	0.00	0.00	102.06	0.00
62	5,837	5,837	42.3	No	**7.60**	104.0	3.01	86.32	8.25	4.80	0.00	0.00	99.37	0.00
63	4,906	4,907	45.2	No	**9.95**	104.0	3.01	84.82	7.41	4.80	0.00	0.00	97.02	0.00
64	3,506	3,507	44.3	No	**14.33**	104.0	3.01	81.90	5.95	4.80	0.00	0.00	92.64	0.00
65	3,079	3,080	45.8	No	**15.96**	104.0	3.01	80.77	5.44	4.80	0.00	0.00	91.01	0.00
66	10,902	10,902	49.7	No	**-1.34**	104.0	3.01	91.75	11.76	4.80	0.00	0.00	108.31	0.00
67	3,989	3,990	44.5	No	**12.67**	104.0	3.01	83.02	6.48	4.80	0.00	0.00	94.30	0.00
68	3,573	3,574	39.4	No	**14.09**	104.0	3.01	82.06	6.02	4.80	0.00	0.00	92.89	0.00
69	3,036	3,037	45.2	No	**16.13**	104.0	3.01	80.65	5.39	4.80	0.00	0.00	90.84	0.00
70	14,754	14,754	51.3	No	**-5.90**	104.0	3.01	94.38	13.70	4.80	0.00	0.00	112.88	0.00
71	14,564	14,565	52.4	No	**-5.71**	104.0	3.01	94.27	13.61	4.80	0.00	0.00	112.68	0.00
72	14,605	14,605	41.8	No	**-5.75**	104.0	3.01	94.29	13.63	4.80	0.00	0.00	112.72	0.00
73	14,214	14,214	43.5	No	**-5.33**	104.0	3.01	94.05	13.45	4.80	0.00	0.00	112.31	0.00
74	13,200	13,201	49.7	No	**-4.21**	104.0	3.01	93.41	12.97	4.80	0.00	0.00	111.18	0.00
75	12,448	12,448	39.3	No	**-3.32**	104.0	3.01	92.90	12.59	4.80	0.00	0.00	110.29	0.00
76	8,551	8,551	37.0	No	**2.22**	104.0	3.01	89.64	10.31	4.80	0.00	0.00	104.75	0.00
77	9,541	9,542	34.9	No	**0.63**	104.0	3.01	90.59	10.95	4.80	0.00	0.00	106.35	0.00
78	13,668	13,669	57.7	No	**-4.74**	104.0	3.01	93.71	13.19	4.80	0.00	0.00	111.71	0.00
80	7,490	7,491	46.9	No	**4.12**	104.0	3.01	88.49	9.57	4.80	0.00	0.00	102.86	0.00
81	15,406	15,406	69.4	No	**-6.57**	104.0	3.01	94.75	13.99	4.80	0.00	0.00	113.54	0.00
82	11,419	11,420	34.9	No	**-2.03**	104.0	3.01	92.15	12.05	4.80	0.00	0.00	109.00	0.00
83	4,417	4,417	43.9	No	**11.34**	104.0	3.01	83.90	6.93	4.80	0.00	0.00	95.63	0.00
85	10,945	10,945	39.2	No	**-1.40**	104.0	3.01	91.78	11.78	4.80	0.00	0.00	108.37	0.00
86	7,677	7,677	44.4	No	**3.77**	104.0	3.01	88.70	9.70	4.80	0.00	0.00	103.21	0.00
87	2,943	2,944	44.1	No	**16.52**	104.0	3.01	80.38	5.28	4.80	0.00	0.00	90.45	0.00
89	3,999	4,000	44.7	No	**12.64**	104.0	3.01	83.04	6.49	4.80	0.00	0.00	94.33	0.00
90	7,383	7,383	39.7	No	**4.32**	104.0	3.01	88.37	9.49	4.80	0.00	0.00	102.65	0.00
91	5,451	5,452	41.7	No	**8.53**	104.0	3.01	85.73	7.91	4.80	0.00	0.00	98.44	0.00
92	2,969	2,970	44.3	No	**16.41**	104.0	3.01	80.46	5.31	4.80	0.00	0.00	90.56	0.00
94	14,868	14,869	62.3	No	**-6.02**	104.0	3.01	94.45	13.75	4.80	0.00	0.00	112.99	0.00
95	16,056	16,057	48.9	No	**-7.21**	104.0	3.01	95.11	14.26	4.80	0.00	0.00	114.18	0.00
97	13,458	13,459	68.2	No	**-4.50**	104.0	3.01	93.58	13.09	4.80	0.00	0.00	111.47	0.00
98	15,314	15,314	58.1	No	**-6.48**	104.0	3.01	94.70	13.95	4.80	0.00	0.00	113.45	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	15,432	15,432	41.4	No	**-6.59**	104.0	3.01	94.77	14.00	4.80	0.00	0.00	113.57	0.00
100	9,622	9,622	55.5	No	**0.50**	104.0	3.01	90.67	11.00	4.80	0.00	0.00	106.47	0.00
101	15,798	15,799	67.7	No	**-6.96**	104.0	3.01	94.97	14.16	4.80	0.00	0.00	113.93	0.00
102	10,284	10,285	69.5	No	**-0.48**	104.0	3.01	91.24	11.40	4.80	0.00	0.00	107.45	0.00
103	16,637	16,637	64.4	No	**-7.76**	104.0	3.01	95.42	14.51	4.80	0.00	0.00	114.73	0.00
104	10,703	10,703	53.3	No	**-1.06**	104.0	3.01	91.59	11.65	4.80	0.00	0.00	108.04	0.00
107	14,471	14,472	68.1	No	**-5.61**	104.0	3.01	94.21	13.57	4.80	0.00	0.00	112.58	0.00
108	15,925	15,925	40.4	No	**-7.08**	104.0	3.01	95.04	14.21	4.80	0.00	0.00	114.05	0.00
109	8,309	8,309	43.1	No	**2.63**	104.0	3.01	89.39	10.15	4.80	0.00	0.00	104.34	0.00
110	9,436	9,437	34.7	No	**0.79**	104.0	3.01	90.50	10.89	4.80	0.00	0.00	106.18	0.00
111	8,895	8,895	37.2	No	**1.65**	104.0	3.01	89.98	10.54	4.80	0.00	0.00	105.32	0.00
113	14,798	14,799	67.6	No	**-5.95**	104.0	3.01	94.40	13.72	4.80	0.00	0.00	112.92	0.00
114	10,710	10,710	39.9	No	**-1.07**	104.0	3.01	91.60	11.65	4.80	0.00	0.00	108.05	0.00
115	16,039	16,039	30.5	No	**-7.19**	104.0	3.01	95.10	14.26	4.80	0.00	0.00	114.16	0.00
116	11,461	11,462	65.2	No	**-2.08**	104.0	3.01	92.19	12.07	4.80	0.00	0.00	109.06	0.00
118	8,017	8,017	44.4	No	**3.15**	104.0	3.01	89.08	9.94	4.80	0.00	0.00	103.83	0.00
119	13,857	13,858	48.7	No	**-4.95**	104.0	3.01	93.83	13.28	4.80	0.00	0.00	111.92	0.00
120	16,137	16,137	64.8	No	**-7.28**	104.0	3.01	95.16	14.30	4.80	0.00	0.00	114.26	0.00
121	13,343	13,343	53.2	No	**-4.37**	104.0	3.01	93.51	13.04	4.80	0.00	0.00	111.34	0.00
125	4,633	4,634	42.9	No	**10.71**	104.0	3.01	84.32	7.14	4.80	0.00	0.00	96.26	0.00
126	8,334	8,335	52.7	No	**2.59**	104.0	3.01	89.42	10.17	4.80	0.00	0.00	104.38	0.00
127	8,167	8,167	52.7	No	**2.88**	104.0	3.01	89.24	10.05	4.80	0.00	0.00	104.09	0.00
128	8,104	8,104	51.9	No	**2.99**	104.0	3.01	89.17	10.01	4.80	0.00	0.00	103.98	0.00
129	12,421	12,421	54.8	No	**-3.29**	104.0	3.01	92.88	12.58	4.80	0.00	0.00	110.26	0.00
130	12,112	12,112	54.4	No	**-2.91**	104.0	3.01	92.66	12.42	4.80	0.00	0.00	109.88	0.00
131	12,482	12,482	51.8	No	**-3.36**	104.0	3.01	92.93	12.61	4.80	0.00	0.00	110.33	0.00
132	12,891	12,891	51.1	No	**-3.85**	104.0	3.01	93.21	12.81	4.80	0.00	0.00	110.82	0.00
133	10,190	10,191	42.2	No	**-0.34**	104.0	3.01	91.16	11.35	4.80	0.00	0.00	107.31	0.00
134	14,738	14,738	53.9	No	**-5.89**	104.0	3.01	94.37	13.69	4.80	0.00	0.00	112.86	0.00
141	13,396	13,397	64.7	No	**-4.43**	104.0	3.01	93.54	13.06	4.80	0.00	0.00	111.40	0.00
142	10,547	10,548	71.9	No	**-0.85**	104.0	3.01	91.46	11.56	4.80	0.00	0.00	107.82	0.00
143	13,834	13,834	68.7	No	**-4.92**	104.0	3.01	93.82	13.27	4.80	0.00	0.00	111.89	0.00
144	9,367	9,367	58.8	No	**0.90**	104.0	3.01	90.43	10.84	4.80	0.00	0.00	106.08	0.00
145	7,683	7,684	40.7	No	**3.75**	104.0	3.01	88.71	9.71	4.80	0.00	0.00	103.22	0.00
146	7,955	7,956	40.6	No	**3.26**	104.0	3.01	89.01	9.90	4.80	0.00	0.00	103.72	0.00

Sum 25.91

Noise sensitive area: H28 H28

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	7,760	7,761	18.2	No	**3.61**	104.0	3.01	88.80	9.76	4.80	0.00	0.00	103.36	0.00
2	7,785	7,786	16.1	No	**3.57**	104.0	3.01	88.83	9.78	4.80	0.00	0.00	103.41	0.00
3	7,344	7,345	20.5	No	**4.39**	104.0	3.01	88.32	9.46	4.80	0.00	0.00	102.58	0.00
4	6,860	6,860	21.0	No	**5.36**	104.0	3.01	87.73	9.09	4.80	0.00	0.00	101.62	0.00
5	6,375	6,376	19.0	No	**6.38**	104.0	3.01	87.09	8.70	4.80	0.00	0.00	100.59	0.00
6	6,772	6,773	22.1	No	**5.54**	104.0	3.01	87.61	9.02	4.80	0.00	0.00	101.44	0.00
7	4,605	4,607	34.5	Yes	**11.04**	104.0	3.01	84.27	7.12	4.54	0.00	0.00	95.93	0.00
8	8,357	8,357	11.2	No	**2.55**	104.0	3.01	89.44	10.18	4.80	0.00	0.00	104.42	0.00
9	7,229	7,230	23.1	No	**4.62**	104.0	3.01	88.18	9.37	4.80	0.00	0.00	102.35	0.00
10	6,886	6,887	35.3	Yes	**5.48**	104.0	3.01	87.76	9.11	4.63	0.00	0.00	101.50	0.00
11	8,095	8,096	47.8	Yes	**3.21**	104.0	3.01	89.17	10.00	4.60	0.00	0.00	103.76	0.00
12	7,935	7,936	45.8	Yes	**3.49**	104.0	3.01	88.99	9.89	4.60	0.00	0.00	103.48	0.00
13	7,453	7,454	51.3	Yes	**4.42**	104.0	3.01	88.45	9.54	4.57	0.00	0.00	102.55	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	7,022	7,023	54.6	Yes	**5.29**	104.0	3.01	87.93	9.22	4.53	0.00	0.00	101.68	0.00
15	6,311	6,313	46.3	Yes	**6.77**	104.0	3.01	87.01	8.65	4.55	0.00	0.00	100.21	0.00
16	6,081	6,083	38.4	Yes	**7.25**	104.0	3.01	86.68	8.46	4.58	0.00	0.00	99.73	0.00
17	8,305	8,306	47.1	Yes	**2.83**	104.0	3.01	89.39	10.15	4.61	0.00	0.00	104.14	0.00
18	8,393	8,394	49.9	Yes	**2.69**	104.0	3.01	89.48	10.21	4.60	0.00	0.00	104.28	0.00
19	7,208	7,209	53.8	Yes	**4.91**	104.0	3.01	88.16	9.36	4.55	0.00	0.00	102.06	0.00
20	6,102	6,104	50.0	Yes	**7.26**	104.0	3.01	86.71	8.48	4.52	0.00	0.00	99.71	0.00
21	6,081	6,082	25.8	No	**7.03**	104.0	3.01	86.68	8.46	4.80	0.00	0.00	99.94	0.00
22	6,058	6,059	24.7	No	**7.09**	104.0	3.01	86.65	8.44	4.80	0.00	0.00	99.89	0.00
23	5,828	5,829	27.6	No	**7.62**	104.0	3.01	86.31	8.24	4.80	0.00	0.00	99.36	0.00
24	6,225	6,226	23.8	No	**6.71**	104.0	3.01	86.88	8.58	4.80	0.00	0.00	100.26	0.00
25	3,815	3,816	26.6	No	**13.25**	104.0	3.01	82.63	6.29	4.80	0.00	0.00	93.72	0.00
26	5,259	5,260	21.7	No	**9.02**	104.0	3.01	85.42	7.74	4.80	0.00	0.00	97.96	0.00
27	3,647	3,648	22.5	No	**13.82**	104.0	3.01	82.24	6.11	4.80	0.00	0.00	93.15	0.00
28	3,477	3,479	28.8	Yes	**14.71**	104.0	3.01	81.83	5.92	4.52	0.00	0.00	92.26	0.00
29	5,247	5,248	25.0	No	**9.05**	104.0	3.01	85.40	7.73	4.80	0.00	0.00	97.93	0.00
30	5,524	5,525	24.9	No	**8.35**	104.0	3.01	85.85	7.98	4.80	0.00	0.00	98.62	0.00
31	6,590	6,590	31.9	No	**5.92**	104.0	3.01	87.38	8.88	4.80	0.00	0.00	101.05	0.00
32	4,135	4,136	29.4	No	**12.21**	104.0	3.01	83.33	6.63	4.80	0.00	0.00	94.77	0.00
33	5,168	5,169	26.6	No	**9.25**	104.0	3.01	85.27	7.65	4.80	0.00	0.00	97.72	0.00
34	4,332	4,334	28.3	Yes	**11.82**	104.0	3.01	83.74	6.84	4.58	0.00	0.00	95.15	0.00
35	4,875	4,877	34.4	Yes	**10.27**	104.0	3.01	84.76	7.38	4.56	0.00	0.00	96.70	0.00
36	5,156	5,158	34.0	Yes	**9.51**	104.0	3.01	85.25	7.64	4.58	0.00	0.00	97.47	0.00
37	4,057	4,059	27.3	Yes	**12.68**	104.0	3.01	83.17	6.55	4.57	0.00	0.00	94.29	0.00
38	3,623	3,624	23.5	No	**13.91**	104.0	3.01	82.18	6.08	4.80	0.00	0.00	93.06	0.00
39	2,883	2,886	31.8	Yes	**17.14**	104.0	3.01	80.20	5.20	4.42	0.00	0.00	89.83	0.00
40	2,656	2,657	46.3	Yes	**18.36**	104.0	3.01	79.49	4.91	4.20	0.00	0.00	88.61	0.00
41	2,619	2,622	41.0	Yes	**18.47**	104.0	3.01	79.37	4.87	4.26	0.00	0.00	88.51	0.00
43	3,501	3,503	33.9	Yes	**14.67**	104.0	3.01	81.89	5.94	4.47	0.00	0.00	92.30	0.00
44	2,213	2,218	54.2	Yes	**20.77**	104.0	3.01	77.92	4.32	3.96	0.00	0.00	86.20	0.00
45	2,051	2,056	55.2	Yes	**21.74**	104.0	3.01	77.26	4.09	3.88	0.00	0.00	85.23	0.00
46	2,776	2,778	45.4	Yes	**17.79**	104.0	3.01	79.87	5.07	4.24	0.00	0.00	89.18	0.00
48	3,639	3,640	28.9	No	**13.85**	104.0	3.01	82.22	6.10	4.80	0.00	0.00	93.12	0.00
49	4,732	4,733	31.5	No	**10.43**	104.0	3.01	84.50	7.24	4.80	0.00	0.00	96.54	0.00
50	5,734	5,735	24.6	No	**7.84**	104.0	3.01	86.17	8.16	4.80	0.00	0.00	99.13	0.00
51	4,800	4,800	30.0	No	**10.24**	104.0	3.01	84.62	7.30	4.80	0.00	0.00	96.73	0.00
52	4,892	4,893	29.6	No	**9.99**	104.0	3.01	84.79	7.39	4.80	0.00	0.00	96.98	0.00
53	4,703	4,704	33.8	No	**10.51**	104.0	3.01	84.45	7.21	4.80	0.00	0.00	96.46	0.00
55	4,794	4,794	33.4	Yes	**10.50**	104.0	3.01	84.61	7.30	4.56	0.00	0.00	96.48	0.00
56	4,888	4,888	35.9	Yes	**10.25**	104.0	3.01	84.78	7.39	4.55	0.00	0.00	96.72	0.00
57	4,156	4,156	32.0	Yes	**12.40**	104.0	3.01	83.37	6.66	4.54	0.00	0.00	94.57	0.00
58	4,479	4,479	24.5	No	**11.16**	104.0	3.01	84.02	6.99	4.80	0.00	0.00	95.81	0.00
59	4,992	4,993	37.9	Yes	**9.98**	104.0	3.01	84.97	7.49	4.54	0.00	0.00	97.00	0.00
60	5,371	5,371	40.1	Yes	**8.99**	104.0	3.01	85.60	7.84	4.55	0.00	0.00	97.99	0.00
61	5,594	5,594	37.5	Yes	**8.41**	104.0	3.01	85.95	8.04	4.57	0.00	0.00	98.56	0.00
62	3,988	3,989	40.8	Yes	**13.02**	104.0	3.01	83.02	6.48	4.45	0.00	0.00	93.95	0.00
63	3,858	3,859	44.9	Yes	**13.50**	104.0	3.01	82.73	6.34	4.40	0.00	0.00	93.47	0.00
64	4,947	4,948	43.4	Yes	**10.14**	104.0	3.01	84.89	7.45	4.50	0.00	0.00	96.83	0.00
65	5,580	5,580	42.3	Yes	**8.47**	104.0	3.01	85.93	8.03	4.54	0.00	0.00	98.50	0.00
66	2,937	2,938	43.4	Yes	**17.04**	104.0	3.01	80.36	5.27	4.30	0.00	0.00	89.93	0.00
67	5,227	5,228	40.5	Yes	**9.36**	104.0	3.01	85.37	7.71	4.54	0.00	0.00	97.61	0.00
68	5,729	5,730	37.3	Yes	**8.07**	104.0	3.01	86.16	8.16	4.58	0.00	0.00	98.90	0.00
69	5,442	5,443	43.1	Yes	**8.82**	104.0	3.01	85.72	7.90	4.53	0.00	0.00	98.15	0.00
70	6,812	6,813	41.0	Yes	**5.66**	104.0	3.01	87.67	9.05	4.60	0.00	0.00	101.31	0.00
71	6,645	6,646	31.5	Yes	**5.96**	104.0	3.01	87.45	8.92	4.64	0.00	0.00	101.01	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	7,123	7,123	20.9	No	**4.83**	104.0	3.01	88.05	9.29	4.80	0.00	0.00	102.15	0.00
73	6,495	6,496	19.6	No	**6.12**	104.0	3.01	87.25	8.80	4.80	0.00	0.00	100.85	0.00
74	5,429	5,430	26.2	No	**8.58**	104.0	3.01	85.70	7.89	4.80	0.00	0.00	98.39	0.00
75	4,979	4,980	19.2	No	**9.75**	104.0	3.01	84.94	7.48	4.80	0.00	0.00	97.22	0.00
76	3,500	3,501	33.2	Yes	**14.67**	104.0	3.01	81.88	5.94	4.48	0.00	0.00	92.30	0.00
77	4,161	4,162	30.4	No	**12.12**	104.0	3.01	83.39	6.66	4.80	0.00	0.00	94.85	0.00
78	5,694	5,696	45.1	Yes	**8.20**	104.0	3.01	86.11	8.13	4.53	0.00	0.00	98.77	0.00
80	5,079	5,080	41.8	Yes	**9.77**	104.0	3.01	85.12	7.57	4.52	0.00	0.00	97.21	0.00
81	7,436	7,438	55.4	Yes	**4.47**	104.0	3.01	88.43	9.53	4.55	0.00	0.00	102.50	0.00
82	4,920	4,920	28.1	No	**9.91**	104.0	3.01	84.84	7.42	4.80	0.00	0.00	97.06	0.00
83	4,488	4,489	42.0	Yes	**11.45**	104.0	3.01	84.04	7.00	4.48	0.00	0.00	95.52	0.00
85	5,579	5,579	33.7	No	**8.22**	104.0	3.01	85.93	8.02	4.80	0.00	0.00	98.76	0.00
86	4,910	4,911	39.8	Yes	**10.22**	104.0	3.01	84.82	7.41	4.52	0.00	0.00	96.76	0.00
87	5,816	5,817	40.5	Yes	**7.88**	104.0	3.01	86.29	8.23	4.56	0.00	0.00	99.09	0.00
89	4,540	4,541	43.9	Yes	**11.31**	104.0	3.01	84.14	7.05	4.47	0.00	0.00	95.66	0.00
90	3,648	3,649	36.7	Yes	**14.16**	104.0	3.01	82.24	6.11	4.46	0.00	0.00	92.81	0.00
91	3,863	3,864	42.4	Yes	**13.46**	104.0	3.01	82.74	6.34	4.42	0.00	0.00	93.51	0.00
92	5,090	5,091	43.9	Yes	**9.75**	104.0	3.01	85.14	7.58	4.51	0.00	0.00	97.22	0.00
94	6,909	6,910	43.1	Yes	**5.47**	104.0	3.01	87.79	9.13	4.59	0.00	0.00	101.51	0.00
95	8,096	8,097	29.3	Yes	**3.13**	104.0	3.01	89.17	10.00	4.68	0.00	0.00	103.84	0.00
97	5,502	5,504	51.2	Yes	**8.72**	104.0	3.01	85.81	7.96	4.48	0.00	0.00	98.26	0.00
98	7,354	7,356	38.4	Yes	**4.55**	104.0	3.01	88.33	9.47	4.62	0.00	0.00	102.42	0.00
99	7,751	7,752	17.7	No	**3.63**	104.0	3.01	88.79	9.76	4.80	0.00	0.00	103.34	0.00
100	2,220	2,223	41.8	Yes	**20.54**	104.0	3.01	77.94	4.33	4.16	0.00	0.00	86.43	0.00
101	7,833	7,835	53.6	Yes	**3.71**	104.0	3.01	88.88	9.82	4.57	0.00	0.00	103.26	0.00
102	2,526	2,530	51.7	Yes	**19.06**	104.0	3.01	79.06	4.75	4.10	0.00	0.00	87.91	0.00
103	8,673	8,674	48.9	Yes	**2.21**	104.0	3.01	89.76	10.39	4.61	0.00	0.00	104.77	0.00
104	3,052	3,054	32.1	Yes	**16.42**	104.0	3.01	80.70	5.41	4.44	0.00	0.00	90.55	0.00
107	6,498	6,500	54.8	Yes	**6.40**	104.0	3.01	87.26	8.80	4.51	0.00	0.00	100.57	0.00
108	8,377	8,377	19.1	No	**2.52**	104.0	3.01	89.46	10.19	4.80	0.00	0.00	104.46	0.00
109	5,083	5,084	39.1	Yes	**9.74**	104.0	3.01	85.12	7.57	4.54	0.00	0.00	97.24	0.00
110	3,444	3,445	29.3	No	**14.55**	104.0	3.01	81.74	5.88	4.80	0.00	0.00	92.42	0.00
111	3,442	3,443	33.5	Yes	**14.89**	104.0	3.01	81.74	5.87	4.47	0.00	0.00	92.08	0.00
113	6,826	6,827	53.8	Yes	**5.69**	104.0	3.01	87.68	9.06	4.53	0.00	0.00	101.28	0.00
114	5,549	5,549	33.1	No	**8.29**	104.0	3.01	85.88	8.00	4.80	0.00	0.00	98.68	0.00
115	8,149	8,149	12.0	No	**2.91**	104.0	3.01	89.22	10.04	4.80	0.00	0.00	104.06	0.00
116	3,547	3,550	51.1	Yes	**14.66**	104.0	3.01	82.00	6.00	4.31	0.00	0.00	92.31	0.00
118	5,343	5,343	39.7	Yes	**9.06**	104.0	3.01	85.56	7.81	4.55	0.00	0.00	97.92	0.00
119	6,002	6,004	28.5	Yes	**7.37**	104.0	3.01	86.57	8.39	4.64	0.00	0.00	99.60	0.00
120	8,182	8,183	52.1	Yes	**3.07**	104.0	3.01	89.26	10.06	4.58	0.00	0.00	103.90	0.00
121	5,451	5,452	33.9	Yes	**8.74**	104.0	3.01	85.73	7.91	4.59	0.00	0.00	98.23	0.00
125	4,194	4,195	42.6	Yes	**12.37**	104.0	3.01	83.45	6.70	4.45	0.00	0.00	94.60	0.00
126	1,849	1,852	50.2	Yes	**22.96**	104.0	3.01	76.35	3.79	3.87	0.00	0.00	84.02	0.00
127	1,976	1,979	50.1	Yes	**22.13**	104.0	3.01	76.93	3.98	3.93	0.00	0.00	84.84	0.00
128	2,239	2,242	48.3	Yes	**20.54**	104.0	3.01	78.01	4.36	4.06	0.00	0.00	86.43	0.00
129	4,512	4,513	45.8	Yes	**11.41**	104.0	3.01	84.09	7.02	4.45	0.00	0.00	95.56	0.00
130	4,308	4,309	47.1	Yes	**12.04**	104.0	3.01	83.69	6.82	4.43	0.00	0.00	94.93	0.00
131	4,727	4,728	44.7	Yes	**10.77**	104.0	3.01	84.49	7.23	4.48	0.00	0.00	96.20	0.00
132	5,138	5,139	43.8	Yes	**9.62**	104.0	3.01	85.22	7.63	4.51	0.00	0.00	97.35	0.00
133	3,032	3,033	27.7	Yes	**16.46**	104.0	3.01	80.64	5.39	4.49	0.00	0.00	90.51	0.00
134	6,779	6,780	42.7	Yes	**5.74**	104.0	3.01	87.62	9.03	4.59	0.00	0.00	101.24	0.00
141	5,459	5,461	46.0	Yes	**8.80**	104.0	3.01	85.75	7.92	4.51	0.00	0.00	98.18	0.00
142	2,735	2,740	55.0	Yes	**18.09**	104.0	3.01	79.75	5.02	4.11	0.00	0.00	88.89	0.00
143	5,870	5,872	51.6	Yes	**7.82**	104.0	3.01	86.38	8.28	4.50	0.00	0.00	99.16	0.00
144	1,821	1,825	48.0	Yes	**23.10**	104.0	3.01	76.22	3.75	3.90	0.00	0.00	83.87	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	3,316	3,317	37.5	Yes	**15.42**	104.0	3.01	81.42	5.73	4.41	0.00	0.00	91.56	0.00
146	3,189	3,190	37.7	Yes	**15.92**	104.0	3.01	81.08	5.58	4.40	0.00	0.00	91.05	0.00
Sum	34.30													

Noise sensitive area: H29 H29

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	7,871	7,871	24.8	No	**3.41**	104.0	3.01	88.92	9.84	4.80	0.00	0.00	103.56	0.00
2	7,952	7,952	21.4	No	**3.26**	104.0	3.01	89.01	9.90	4.80	0.00	0.00	103.71	0.00
3	7,561	7,562	25.7	No	**3.98**	104.0	3.01	88.57	9.62	4.80	0.00	0.00	102.99	0.00
4	7,266	7,267	21.0	No	**4.55**	104.0	3.01	88.23	9.40	4.80	0.00	0.00	102.43	0.00
5	6,704	6,705	23.0	No	**5.68**	104.0	3.01	87.53	8.97	4.80	0.00	0.00	101.30	0.00
6	7,006	7,007	28.3	Yes	**5.20**	104.0	3.01	87.91	9.20	4.66	0.00	0.00	101.78	0.00
7	4,836	4,838	44.7	Yes	**10.45**	104.0	3.01	84.69	7.34	4.49	0.00	0.00	96.52	0.00
8	8,433	8,433	19.5	No	**2.42**	104.0	3.01	89.52	10.23	4.80	0.00	0.00	104.55	0.00
9	7,342	7,343	30.5	Yes	**4.54**	104.0	3.01	88.32	9.46	4.66	0.00	0.00	102.43	0.00
10	6,935	6,937	45.3	Yes	**5.42**	104.0	3.01	87.82	9.15	4.58	0.00	0.00	101.55	0.00
11	7,995	7,997	54.8	Yes	**3.42**	104.0	3.01	89.06	9.93	4.57	0.00	0.00	103.56	0.00
12	7,856	7,857	53.6	Yes	**3.67**	104.0	3.01	88.91	9.83	4.57	0.00	0.00	103.30	0.00
13	7,385	7,386	59.6	Yes	**4.59**	104.0	3.01	88.37	9.49	4.53	0.00	0.00	102.38	0.00
14	6,955	6,957	62.5	Yes	**5.47**	104.0	3.01	87.85	9.16	4.49	0.00	0.00	101.51	0.00
15	6,313	6,314	55.7	Yes	**6.81**	104.0	3.01	87.01	8.65	4.50	0.00	0.00	100.16	0.00
16	6,137	6,139	48.3	Yes	**7.17**	104.0	3.01	86.76	8.51	4.53	0.00	0.00	99.80	0.00
17	8,192	8,193	54.5	Yes	**3.06**	104.0	3.01	89.27	10.07	4.57	0.00	0.00	103.91	0.00
18	8,243	8,244	54.7	Yes	**2.97**	104.0	3.01	89.32	10.10	4.57	0.00	0.00	104.00	0.00
19	7,096	7,097	59.7	Yes	**5.17**	104.0	3.01	88.02	9.27	4.51	0.00	0.00	101.81	0.00
20	6,034	6,036	56.1	Yes	**7.45**	104.0	3.01	86.61	8.42	4.48	0.00	0.00	99.52	0.00
21	6,486	6,486	27.1	No	**6.14**	104.0	3.01	87.24	8.79	4.80	0.00	0.00	100.83	0.00
22	6,569	6,569	23.4	No	**5.96**	104.0	3.01	87.35	8.86	4.80	0.00	0.00	101.01	0.00
23	6,378	6,379	26.0	No	**6.37**	104.0	3.01	87.09	8.70	4.80	0.00	0.00	100.60	0.00
24	6,712	6,713	22.4	No	**5.66**	104.0	3.01	87.54	8.97	4.80	0.00	0.00	101.31	0.00
25	4,526	4,527	25.8	No	**11.02**	104.0	3.01	84.12	7.04	4.80	0.00	0.00	95.95	0.00
26	5,599	5,600	27.5	No	**8.17**	104.0	3.01	85.96	8.04	4.80	0.00	0.00	98.81	0.00
27	4,228	4,229	23.1	No	**11.91**	104.0	3.01	83.53	6.73	4.80	0.00	0.00	95.06	0.00
28	3,863	3,865	37.1	Yes	**13.41**	104.0	3.01	82.74	6.35	4.47	0.00	0.00	93.56	0.00
29	5,773	5,774	24.0	No	**7.75**	104.0	3.01	86.23	8.20	4.80	0.00	0.00	99.23	0.00
30	6,119	6,119	22.1	No	**6.95**	104.0	3.01	86.73	8.49	4.80	0.00	0.00	100.02	0.00
31	7,165	7,165	28.0	No	**4.74**	104.0	3.01	88.10	9.32	4.80	0.00	0.00	102.23	0.00
32	4,892	4,892	27.7	No	**9.99**	104.0	3.01	84.79	7.39	4.80	0.00	0.00	96.98	0.00
33	5,827	5,827	24.0	No	**7.62**	104.0	3.01	86.31	8.24	4.80	0.00	0.00	99.35	0.00
34	4,606	4,608	40.6	Yes	**11.09**	104.0	3.01	84.27	7.12	4.50	0.00	0.00	95.88	0.00
35	5,075	5,077	43.0	Yes	**9.78**	104.0	3.01	85.11	7.57	4.51	0.00	0.00	97.19	0.00
36	5,328	5,330	42.3	Yes	**9.11**	104.0	3.01	85.53	7.80	4.53	0.00	0.00	97.86	0.00
37	4,371	4,373	37.4	Yes	**11.77**	104.0	3.01	83.82	6.88	4.51	0.00	0.00	95.20	0.00
38	4,280	4,281	23.9	No	**11.76**	104.0	3.01	83.63	6.79	4.80	0.00	0.00	95.22	0.00
39	3,457	3,459	33.9	Yes	**14.84**	104.0	3.01	81.78	5.89	4.46	0.00	0.00	92.13	0.00
40	2,633	2,635	50.1	Yes	**18.52**	104.0	3.01	79.41	4.88	4.15	0.00	0.00	88.45	0.00
41	3,146	3,149	45.0	Yes	**16.17**	104.0	3.01	80.96	5.53	4.31	0.00	0.00	90.80	0.00
43	3,830	3,832	44.1	Yes	**13.59**	104.0	3.01	82.67	6.31	4.41	0.00	0.00	93.38	0.00
44	2,687	2,691	60.0	Yes	**18.38**	104.0	3.01	79.60	4.96	4.04	0.00	0.00	88.59	0.00
45	2,616	2,620	57.3	Yes	**18.69**	104.0	3.01	79.37	4.87	4.05	0.00	0.00	88.28	0.00
46	2,936	2,938	50.8	Yes	**17.13**	104.0	3.01	80.36	5.27	4.21	0.00	0.00	89.84	0.00
48	4,467	4,467	28.7	No	**11.20**	104.0	3.01	84.00	6.98	4.80	0.00	0.00	95.78	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	5,572	5,572	30.3	No	**8.23**	104.0	3.01	85.92	8.02	4.80	0.00	0.00	98.74	0.00
50	5,966	5,967	32.6	Yes	**7.48**	104.0	3.01	86.52	8.36	4.61	0.00	0.00	99.49	0.00
51	5,600	5,601	28.8	No	**8.16**	104.0	3.01	85.96	8.04	4.80	0.00	0.00	98.81	0.00
52	5,665	5,665	27.4	No	**8.01**	104.0	3.01	86.06	8.10	4.80	0.00	0.00	98.96	0.00
53	5,566	5,567	32.9	No	**8.25**	104.0	3.01	85.91	8.01	4.80	0.00	0.00	98.73	0.00
55	5,715	5,716	32.9	Yes	**8.08**	104.0	3.01	86.14	8.15	4.60	0.00	0.00	98.89	0.00
56	5,812	5,812	35.6	Yes	**7.86**	104.0	3.01	86.29	8.23	4.59	0.00	0.00	99.11	0.00
57	5,080	5,080	32.4	Yes	**9.70**	104.0	3.01	85.12	7.57	4.58	0.00	0.00	97.27	0.00
58	5,154	5,154	22.5	No	**9.29**	104.0	3.01	85.24	7.64	4.80	0.00	0.00	97.68	0.00
59	5,916	5,916	37.8	Yes	**7.63**	104.0	3.01	86.44	8.32	4.58	0.00	0.00	99.34	0.00
60	6,256	6,256	40.3	Yes	**6.86**	104.0	3.01	86.93	8.60	4.58	0.00	0.00	100.11	0.00
61	6,465	6,465	38.0	Yes	**6.39**	104.0	3.01	87.21	8.78	4.60	0.00	0.00	100.59	0.00
62	4,763	4,764	41.5	Yes	**10.64**	104.0	3.01	84.56	7.27	4.50	0.00	0.00	96.33	0.00
63	4,475	4,476	45.4	Yes	**11.52**	104.0	3.01	84.02	6.98	4.45	0.00	0.00	95.46	0.00
64	5,406	5,407	45.4	Yes	**8.93**	104.0	3.01	85.66	7.87	4.51	0.00	0.00	98.04	0.00
65	6,039	6,039	44.3	Yes	**7.38**	104.0	3.01	86.62	8.42	4.55	0.00	0.00	99.59	0.00
66	2,852	2,854	46.3	Yes	**17.45**	104.0	3.01	80.11	5.17	4.24	0.00	0.00	89.52	0.00
67	5,806	5,807	41.3	Yes	**7.91**	104.0	3.01	86.28	8.22	4.56	0.00	0.00	99.06	0.00
68	6,278	6,279	38.7	Yes	**6.80**	104.0	3.01	86.96	8.62	4.59	0.00	0.00	100.17	0.00
69	5,874	5,875	45.2	Yes	**7.77**	104.0	3.01	86.38	8.28	4.54	0.00	0.00	99.20	0.00
70	6,607	6,608	43.2	Yes	**6.10**	104.0	3.01	87.40	8.89	4.58	0.00	0.00	100.87	0.00
71	6,722	6,724	41.6	Yes	**5.85**	104.0	3.01	87.55	8.98	4.59	0.00	0.00	101.12	0.00
72	7,494	7,495	22.2	No	**4.11**	104.0	3.01	88.50	9.57	4.80	0.00	0.00	102.86	0.00
73	6,758	6,759	26.7	No	**5.57**	104.0	3.01	87.60	9.01	4.80	0.00	0.00	101.41	0.00
74	5,682	5,683	36.2	Yes	**8.18**	104.0	3.01	86.09	8.12	4.58	0.00	0.00	98.79	0.00
75	5,421	5,422	20.9	No	**8.61**	104.0	3.01	85.68	7.88	4.80	0.00	0.00	98.37	0.00
76	4,420	4,421	33.7	Yes	**11.59**	104.0	3.01	83.91	6.93	4.54	0.00	0.00	95.38	0.00
77	5,049	5,049	29.2	No	**9.57**	104.0	3.01	85.06	7.54	4.80	0.00	0.00	97.41	0.00
78	5,624	5,625	50.3	Yes	**8.41**	104.0	3.01	86.00	8.07	4.49	0.00	0.00	98.56	0.00
80	5,976	5,976	42.1	Yes	**7.51**	104.0	3.01	86.53	8.37	4.56	0.00	0.00	99.46	0.00
81	7,302	7,304	59.9	Yes	**4.75**	104.0	3.01	88.27	9.43	4.52	0.00	0.00	102.22	0.00
82	5,641	5,641	25.9	No	**8.06**	104.0	3.01	86.03	8.08	4.80	0.00	0.00	98.91	0.00
83	5,078	5,078	42.8	Yes	**9.78**	104.0	3.01	85.11	7.57	4.51	0.00	0.00	97.20	0.00
85	6,426	6,426	32.5	No	**6.27**	104.0	3.01	87.16	8.74	4.80	0.00	0.00	100.70	0.00
86	5,816	5,817	39.8	Yes	**7.88**	104.0	3.01	86.29	8.23	4.57	0.00	0.00	99.09	0.00
87	6,276	6,277	42.4	Yes	**6.83**	104.0	3.01	86.95	8.62	4.57	0.00	0.00	100.15	0.00
89	5,049	5,050	45.1	Yes	**9.87**	104.0	3.01	85.07	7.54	4.50	0.00	0.00	97.10	0.00
90	4,552	4,552	37.6	Yes	**11.23**	104.0	3.01	84.16	7.06	4.52	0.00	0.00	95.74	0.00
91	4,579	4,580	42.7	Yes	**11.18**	104.0	3.01	84.22	7.09	4.48	0.00	0.00	95.79	0.00
92	5,410	5,411	45.6	Yes	**8.92**	104.0	3.01	85.67	7.87	4.51	0.00	0.00	98.05	0.00
94	6,905	6,907	52.9	Yes	**5.52**	104.0	3.01	87.79	9.13	4.54	0.00	0.00	101.45	0.00
95	8,081	8,082	39.1	Yes	**3.20**	104.0	3.01	89.15	9.99	4.64	0.00	0.00	103.78	0.00
97	5,532	5,534	60.5	Yes	**8.70**	104.0	3.01	85.86	7.98	4.43	0.00	0.00	98.27	0.00
98	7,346	7,348	48.5	Yes	**4.61**	104.0	3.01	88.32	9.46	4.58	0.00	0.00	102.36	0.00
99	8,012	8,013	21.7	No	**3.15**	104.0	3.01	89.08	9.94	4.80	0.00	0.00	103.82	0.00
100	2,884	2,886	45.7	Yes	**17.30**	104.0	3.01	80.21	5.21	4.26	0.00	0.00	89.67	0.00
101	7,679	7,680	57.6	Yes	**4.02**	104.0	3.01	88.71	9.70	4.54	0.00	0.00	102.96	0.00
102	2,948	2,952	59.2	Yes	**17.17**	104.0	3.01	80.40	5.29	4.11	0.00	0.00	89.80	0.00
103	8,512	8,513	53.8	Yes	**2.50**	104.0	3.01	89.60	10.29	4.58	0.00	0.00	104.47	0.00
104	3,505	3,508	39.2	Yes	**14.71**	104.0	3.01	81.90	5.95	4.42	0.00	0.00	92.27	0.00
107	6,397	6,399	60.1	Yes	**6.65**	104.0	3.01	87.12	8.72	4.48	0.00	0.00	100.32	0.00
108	8,694	8,695	20.8	No	**1.98**	104.0	3.01	89.79	10.41	4.80	0.00	0.00	104.99	0.00
109	6,004	6,005	38.9	Yes	**7.43**	104.0	3.01	86.57	8.39	4.58	0.00	0.00	99.54	0.00
110	4,308	4,309	29.4	Yes	**11.90**	104.0	3.01	83.69	6.81	4.57	0.00	0.00	95.07	0.00
111	4,348	4,349	34.1	Yes	**11.82**	104.0	3.01	83.77	6.86	4.53	0.00	0.00	95.16	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	6,715	6,717	59.2	Yes	**5.95**	104.0	3.01	87.54	8.98	4.50	0.00	0.00	101.02	0.00
114	6,413	6,414	32.0	No	**6.30**	104.0	3.01	87.14	8.73	4.80	0.00	0.00	100.68	0.00
115	8,243	8,244	19.5	No	**2.75**	104.0	3.01	89.32	10.10	4.80	0.00	0.00	104.22	0.00
116	3,721	3,724	58.5	Yes	**14.10**	104.0	3.01	82.42	6.19	4.26	0.00	0.00	92.87	0.00
118	6,255	6,255	39.8	Yes	**6.86**	104.0	3.01	86.93	8.60	4.58	0.00	0.00	100.11	0.00
119	6,169	6,170	36.3	Yes	**7.03**	104.0	3.01	86.81	8.53	4.60	0.00	0.00	99.94	0.00
120	7,998	7,999	55.4	Yes	**3.42**	104.0	3.01	89.06	9.93	4.56	0.00	0.00	103.56	0.00
121	5,590	5,591	42.7	Yes	**8.45**	104.0	3.01	85.95	8.04	4.54	0.00	0.00	98.53	0.00
125	4,794	4,795	43.4	Yes	**10.57**	104.0	3.01	84.62	7.30	4.49	0.00	0.00	96.41	0.00
126	2,755	2,757	50.8	Yes	**17.95**	104.0	3.01	79.81	5.04	4.17	0.00	0.00	89.02	0.00
127	2,895	2,897	50.9	Yes	**17.32**	104.0	3.01	80.24	5.22	4.20	0.00	0.00	89.66	0.00
128	3,162	3,163	49.4	Yes	**16.16**	104.0	3.01	81.00	5.55	4.27	0.00	0.00	90.81	0.00
129	4,265	4,266	48.5	Yes	**12.19**	104.0	3.01	83.60	6.77	4.41	0.00	0.00	94.78	0.00
130	3,943	3,944	46.9	Yes	**13.23**	104.0	3.01	82.92	6.43	4.39	0.00	0.00	93.74	0.00
131	4,322	4,324	43.3	Yes	**11.97**	104.0	3.01	83.72	6.83	4.46	0.00	0.00	95.00	0.00
132	4,734	4,735	42.2	Yes	**10.73**	104.0	3.01	84.51	7.24	4.50	0.00	0.00	96.24	0.00
133	3,704	3,705	29.2	Yes	**13.89**	104.0	3.01	82.38	6.17	4.53	0.00	0.00	93.08	0.00
134	6,612	6,613	45.4	Yes	**6.10**	104.0	3.01	87.41	8.89	4.57	0.00	0.00	100.87	0.00
141	5,529	5,531	55.8	Yes	**8.68**	104.0	3.01	85.86	7.98	4.46	0.00	0.00	98.29	0.00
142	3,090	3,094	62.9	Yes	**16.60**	104.0	3.01	80.81	5.46	4.10	0.00	0.00	90.38	0.00
143	5,870	5,872	60.5	Yes	**7.87**	104.0	3.01	86.38	8.28	4.45	0.00	0.00	99.10	0.00
144	2,470	2,473	51.6	Yes	**19.35**	104.0	3.01	78.87	4.67	4.09	0.00	0.00	87.62	0.00
145	4,233	4,234	38.8	Yes	**12.21**	104.0	3.01	83.53	6.74	4.49	0.00	0.00	94.76	0.00
146	4,112	4,113	38.9	Yes	**12.60**	104.0	3.01	83.28	6.61	4.48	0.00	0.00	94.37	0.00

Sum 32.13

Noise sensitive area: H30 H30

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	5,694	5,695	15.4	No	**7.94**	104.0	3.01	86.11	8.13	4.80	0.00	0.00	99.04	0.00
2	5,805	5,806	13.9	No	**7.67**	104.0	3.01	86.28	8.22	4.80	0.00	0.00	99.30	0.00
3	5,455	5,456	17.0	No	**8.52**	104.0	3.01	85.74	7.92	4.80	0.00	0.00	98.45	0.00
4	5,395	5,395	16.4	No	**8.67**	104.0	3.01	85.64	7.86	4.80	0.00	0.00	98.30	0.00
5	4,736	4,737	13.5	No	**10.42**	104.0	3.01	84.51	7.24	4.80	0.00	0.00	96.55	0.00
6	4,923	4,924	18.4	No	**9.90**	104.0	3.01	84.85	7.42	4.80	0.00	0.00	97.07	0.00
7	2,811	2,814	30.8	Yes	**17.45**	104.0	3.01	79.99	5.11	4.43	0.00	0.00	89.53	0.00
8	6,241	6,242	11.4	No	**6.67**	104.0	3.01	86.91	8.59	4.80	0.00	0.00	100.30	0.00
9	5,169	5,170	19.7	No	**9.25**	104.0	3.01	85.27	7.65	4.80	0.00	0.00	97.72	0.00
10	4,741	4,743	34.3	Yes	**10.65**	104.0	3.01	84.52	7.25	4.55	0.00	0.00	96.32	0.00
11	5,804	5,806	44.4	Yes	**7.93**	104.0	3.01	86.28	8.22	4.54	0.00	0.00	99.04	0.00
12	5,659	5,661	43.4	Yes	**8.28**	104.0	3.01	86.06	8.10	4.54	0.00	0.00	98.69	0.00
13	5,185	5,187	49.0	Yes	**9.53**	104.0	3.01	85.30	7.67	4.48	0.00	0.00	97.45	0.00
14	4,754	4,757	52.6	Yes	**10.74**	104.0	3.01	84.55	7.26	4.42	0.00	0.00	96.23	0.00
15	4,110	4,112	44.7	Yes	**12.65**	104.0	3.01	83.28	6.61	4.43	0.00	0.00	94.32	0.00
16	3,947	3,950	37.3	Yes	**13.13**	104.0	3.01	82.93	6.44	4.48	0.00	0.00	93.85	0.00
17	6,006	6,007	44.8	Yes	**7.46**	104.0	3.01	86.57	8.40	4.55	0.00	0.00	99.52	0.00
18	6,072	6,074	47.1	Yes	**7.32**	104.0	3.01	86.67	8.45	4.54	0.00	0.00	99.66	0.00
19	4,907	4,910	51.2	Yes	**10.30**	104.0	3.01	84.82	7.41	4.44	0.00	0.00	96.67	0.00
20	3,833	3,835	47.6	Yes	**13.61**	104.0	3.01	82.68	6.31	4.38	0.00	0.00	93.36	0.00
21	4,636	4,637	21.8	No	**10.70**	104.0	3.01	84.32	7.14	4.80	0.00	0.00	96.27	0.00
22	4,913	4,913	18.6	No	**9.93**	104.0	3.01	84.83	7.41	4.80	0.00	0.00	97.04	0.00
23	4,818	4,819	19.9	No	**10.19**	104.0	3.01	84.66	7.32	4.80	0.00	0.00	96.78	0.00
24	5,002	5,002	19.0	No	**9.69**	104.0	3.01	84.98	7.50	4.80	0.00	0.00	97.28	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

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Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	3,603	3,604	16.5	No	**13.98**	104.0	3.01	82.14	6.06	4.80	0.00	0.00	92.99	0.00
26	3,686	3,687	19.5	No	**13.69**	104.0	3.01	82.33	6.15	4.80	0.00	0.00	93.28	0.00
27	2,965	2,966	17.1	No	**16.42**	104.0	3.01	80.44	5.31	4.80	0.00	0.00	90.55	0.00
28	2,198	2,201	27.7	Yes	**20.45**	104.0	3.01	77.85	4.30	4.37	0.00	0.00	86.52	0.00
29	4,198	4,199	17.6	No	**12.01**	104.0	3.01	83.46	6.70	4.80	0.00	0.00	94.96	0.00
30	4,683	4,683	17.0	No	**10.57**	104.0	3.01	84.41	7.19	4.80	0.00	0.00	96.40	0.00
31	5,624	5,624	22.3	No	**8.11**	104.0	3.01	86.00	8.07	4.80	0.00	0.00	98.87	0.00
32	4,080	4,081	18.6	No	**12.38**	104.0	3.01	83.22	6.58	4.80	0.00	0.00	94.59	0.00
33	4,587	4,588	17.8	No	**10.84**	104.0	3.01	84.23	7.10	4.80	0.00	0.00	96.13	0.00
34	2,653	2,656	28.8	Yes	**18.15**	104.0	3.01	79.48	4.91	4.43	0.00	0.00	88.82	0.00
35	3,004	3,007	30.2	Yes	**16.60**	104.0	3.01	80.56	5.35	4.46	0.00	0.00	90.37	0.00
36	3,222	3,225	30.1	Yes	**15.70**	104.0	3.01	81.17	5.62	4.48	0.00	0.00	91.27	0.00
37	2,502	2,504	28.8	Yes	**18.88**	104.0	3.01	78.97	4.71	4.41	0.00	0.00	88.09	0.00
38	3,225	3,226	14.8	No	**15.38**	104.0	3.01	81.17	5.62	4.80	0.00	0.00	91.59	0.00
39	2,348	2,351	25.9	Yes	**19.62**	104.0	3.01	78.42	4.51	4.42	0.00	0.00	87.35	0.00
40	501	510	41.3	Yes	**38.48**	104.0	3.01	65.15	1.39	1.95	0.00	0.00	68.49	0.00
41	2,016	2,020	37.1	Yes	**21.65**	104.0	3.01	77.11	4.04	4.17	0.00	0.00	85.32	0.00
43	2,054	2,058	34.0	Yes	**21.37**	104.0	3.01	77.27	4.10	4.23	0.00	0.00	85.60	0.00
44	1,631	1,637	53.8	Yes	**24.56**	104.0	3.01	75.28	3.46	3.67	0.00	0.00	82.42	0.00
45	1,836	1,841	50.3	Yes	**23.03**	104.0	3.01	76.30	3.78	3.86	0.00	0.00	83.94	0.00
46	1,036	1,041	43.4	Yes	**29.80**	104.0	3.01	71.35	2.46	3.36	0.00	0.00	77.17	0.00
48	4,016	4,016	19.2	No	**12.59**	104.0	3.01	83.08	6.51	4.80	0.00	0.00	94.39	0.00
49	5,049	5,049	23.6	No	**9.57**	104.0	3.01	85.06	7.54	4.80	0.00	0.00	97.41	0.00
50	3,902	3,903	20.6	No	**12.96**	104.0	3.01	82.83	6.39	4.80	0.00	0.00	94.02	0.00
51	4,888	4,888	20.1	No	**10.00**	104.0	3.01	84.78	7.39	4.80	0.00	0.00	96.97	0.00
52	4,827	4,827	19.4	No	**10.17**	104.0	3.01	84.67	7.33	4.80	0.00	0.00	96.80	0.00
53	5,176	5,176	26.2	No	**9.23**	104.0	3.01	85.28	7.66	4.80	0.00	0.00	97.74	0.00
55	5,887	5,888	26.2	No	**7.48**	104.0	3.01	86.40	8.29	4.80	0.00	0.00	99.49	0.00
56	6,084	6,085	28.8	No	**7.03**	104.0	3.01	86.68	8.46	4.80	0.00	0.00	99.95	0.00
57	5,493	5,493	24.8	No	**8.43**	104.0	3.01	85.80	7.95	4.80	0.00	0.00	98.55	0.00
58	4,030	4,031	16.5	No	**12.54**	104.0	3.01	83.11	6.52	4.80	0.00	0.00	94.43	0.00
59	6,286	6,287	31.1	No	**6.57**	104.0	3.01	86.97	8.63	4.80	0.00	0.00	100.40	0.00
60	7,085	7,086	33.0	No	**4.90**	104.0	3.01	88.01	9.26	4.80	0.00	0.00	102.07	0.00
61	7,371	7,371	30.3	No	**4.34**	104.0	3.01	88.35	9.48	4.80	0.00	0.00	102.63	0.00
62	6,100	6,101	39.7	Yes	**7.21**	104.0	3.01	86.71	8.47	4.58	0.00	0.00	99.76	0.00
63	6,153	6,153	46.5	Yes	**7.13**	104.0	3.01	86.78	8.52	4.54	0.00	0.00	99.84	0.00
64	7,295	7,296	45.6	Yes	**4.70**	104.0	3.01	88.26	9.42	4.59	0.00	0.00	102.27	0.00
65	7,926	7,927	44.8	Yes	**3.50**	104.0	3.01	88.98	9.88	4.61	0.00	0.00	103.47	0.00
66	651	657	38.5	Yes	**35.16**	104.0	3.01	67.35	1.71	2.75	0.00	0.00	71.81	0.00
67	7,530	7,531	42.4	Yes	**4.23**	104.0	3.01	88.54	9.60	4.61	0.00	0.00	102.74	0.00
68	8,045	8,045	39.4	Yes	**3.26**	104.0	3.01	89.11	9.96	4.63	0.00	0.00	103.71	0.00
69	7,793	7,793	45.4	Yes	**3.75**	104.0	3.01	88.83	9.79	4.60	0.00	0.00	103.22	0.00
70	4,467	4,468	37.8	Yes	**11.48**	104.0	3.01	84.00	6.98	4.51	0.00	0.00	95.49	0.00
71	4,538	4,540	30.7	Yes	**11.21**	104.0	3.01	84.14	7.05	4.57	0.00	0.00	95.76	0.00
72	5,564	5,565	15.8	No	**8.25**	104.0	3.01	85.91	8.01	4.80	0.00	0.00	98.72	0.00
73	4,708	4,709	15.5	No	**10.50**	104.0	3.01	84.46	7.22	4.80	0.00	0.00	96.47	0.00
74	3,649	3,651	23.0	Yes	**14.03**	104.0	3.01	82.25	6.11	4.58	0.00	0.00	92.94	0.00
75	3,694	3,695	14.9	No	**13.66**	104.0	3.01	82.35	6.16	4.80	0.00	0.00	93.31	0.00
76	4,677	4,678	25.0	No	**10.59**	104.0	3.01	84.40	7.18	4.80	0.00	0.00	96.39	0.00
77	4,879	4,880	21.8	No	**10.02**	104.0	3.01	84.77	7.38	4.80	0.00	0.00	96.95	0.00
78	3,422	3,424	42.1	Yes	**15.05**	104.0	3.01	81.69	5.85	4.38	0.00	0.00	91.92	0.00
80	6,732	6,733	34.5	No	**5.62**	104.0	3.01	87.56	8.99	4.80	0.00	0.00	101.35	0.00
81	5,123	5,125	52.9	Yes	**9.72**	104.0	3.01	85.19	7.61	4.45	0.00	0.00	97.25	0.00
82	4,617	4,618	21.1	No	**10.76**	104.0	3.01	84.29	7.13	4.80	0.00	0.00	96.21	0.00
83	6,791	6,791	44.1	Yes	**5.72**	104.0	3.01	87.64	9.04	4.58	0.00	0.00	101.25	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	5,870	5,871	26.6	No	**7.52**	104.0	3.01	86.37	8.28	4.80	0.00	0.00	99.45	0.00
86	6,502	6,502	32.4	No	**6.11**	104.0	3.01	87.26	8.81	4.80	0.00	0.00	100.87	0.00
87	8,162	8,163	43.0	Yes	**3.07**	104.0	3.01	89.24	10.05	4.62	0.00	0.00	103.90	0.00
89	6,878	6,879	46.6	Yes	**5.55**	104.0	3.01	87.75	9.10	4.57	0.00	0.00	101.42	0.00
90	5,338	5,339	27.2	Yes	**8.99**	104.0	3.01	85.55	7.81	4.63	0.00	0.00	97.98	0.00
91	6,066	6,066	42.7	Yes	**7.31**	104.0	3.01	86.66	8.45	4.56	0.00	0.00	99.66	0.00
92	7,437	7,438	46.1	Yes	**4.43**	104.0	3.01	88.43	9.53	4.59	0.00	0.00	102.54	0.00
94	4,702	4,704	42.0	Yes	**10.82**	104.0	3.01	84.45	7.21	4.49	0.00	0.00	96.15	0.00
95	5,876	5,878	28.7	No	**7.50**	104.0	3.01	86.38	8.29	4.80	0.00	0.00	99.47	0.00
97	3,337	3,340	50.1	Yes	**15.45**	104.0	3.01	81.48	5.75	4.29	0.00	0.00	91.52	0.00
98	5,142	5,144	37.6	Yes	**9.57**	104.0	3.01	85.23	7.63	4.55	0.00	0.00	97.41	0.00
99	5,941	5,941	12.8	No	**7.35**	104.0	3.01	86.48	8.34	4.80	0.00	0.00	99.62	0.00
100	2,247	2,250	34.6	Yes	**20.29**	104.0	3.01	78.04	4.37	4.27	0.00	0.00	86.68	0.00
101	5,510	5,512	50.9	Yes	**8.70**	104.0	3.01	85.83	7.96	4.49	0.00	0.00	98.28	0.00
102	1,630	1,637	51.6	Yes	**24.51**	104.0	3.01	75.28	3.46	3.72	0.00	0.00	82.46	0.00
103	6,348	6,349	46.1	Yes	**6.69**	104.0	3.01	87.05	8.68	4.55	0.00	0.00	100.29	0.00
104	2,073	2,077	30.2	Yes	**21.20**	104.0	3.01	77.35	4.12	4.30	0.00	0.00	85.77	0.00
107	4,204	4,206	52.3	Yes	**12.41**	104.0	3.01	83.48	6.71	4.38	0.00	0.00	94.56	0.00
108	6,675	6,675	12.7	No	**5.74**	104.0	3.01	87.49	8.94	4.80	0.00	0.00	101.23	0.00
109	6,475	6,475	32.9	No	**6.16**	104.0	3.01	87.23	8.78	4.80	0.00	0.00	100.81	0.00
110	4,077	4,077	20.3	No	**12.39**	104.0	3.01	83.21	6.57	4.80	0.00	0.00	94.58	0.00
111	4,423	4,424	25.1	No	**11.32**	104.0	3.01	83.92	6.93	4.80	0.00	0.00	95.65	0.00
113	4,526	4,528	51.3	Yes	**11.40**	104.0	3.01	84.12	7.04	4.41	0.00	0.00	95.57	0.00
114	5,962	5,963	27.3	No	**7.31**	104.0	3.01	86.51	8.36	4.80	0.00	0.00	99.67	0.00
115	6,058	6,059	11.1	No	**7.08**	104.0	3.01	86.65	8.44	4.80	0.00	0.00	99.89	0.00
116	1,702	1,707	46.8	Yes	**23.89**	104.0	3.01	75.65	3.57	3.86	0.00	0.00	83.08	0.00
118	6,849	6,849	34.1	No	**5.38**	104.0	3.01	87.71	9.08	4.80	0.00	0.00	101.59	0.00
119	4,041	4,043	25.0	Yes	**12.71**	104.0	3.01	83.13	6.54	4.59	0.00	0.00	94.26	0.00
120	5,847	5,848	49.3	Yes	**7.86**	104.0	3.01	86.34	8.26	4.51	0.00	0.00	99.11	0.00
121	3,450	3,453	30.9	Yes	**14.83**	104.0	3.01	81.76	5.88	4.49	0.00	0.00	92.14	0.00
125	6,494	6,495	44.5	Yes	**6.36**	104.0	3.01	87.25	8.80	4.57	0.00	0.00	100.62	0.00
126	3,160	3,162	39.7	Yes	**16.06**	104.0	3.01	81.00	5.54	4.37	0.00	0.00	90.91	0.00
127	3,397	3,399	40.1	Yes	**15.13**	104.0	3.01	81.63	5.82	4.40	0.00	0.00	91.85	0.00
128	3,675	3,677	37.4	Yes	**14.07**	104.0	3.01	82.31	6.14	4.45	0.00	0.00	92.90	0.00
129	2,159	2,161	40.9	Yes	**20.89**	104.0	3.01	77.69	4.24	4.15	0.00	0.00	86.09	0.00
130	2,010	2,013	41.8	Yes	**21.78**	104.0	3.01	77.08	4.03	4.09	0.00	0.00	85.19	0.00
131	2,450	2,452	39.4	Yes	**19.29**	104.0	3.01	78.79	4.64	4.25	0.00	0.00	87.68	0.00
132	2,850	2,852	39.0	Yes	**17.37**	104.0	3.01	80.10	5.16	4.33	0.00	0.00	89.60	0.00
133	2,818	2,820	18.2	No	**17.05**	104.0	3.01	80.00	5.12	4.80	0.00	0.00	89.93	0.00
134	4,448	4,449	40.0	Yes	**11.56**	104.0	3.01	83.97	6.96	4.49	0.00	0.00	95.42	0.00
141	3,349	3,353	44.1	Yes	**15.34**	104.0	3.01	81.51	5.77	4.35	0.00	0.00	91.63	0.00
142	1,553	1,560	55.3	Yes	**25.18**	104.0	3.01	74.86	3.34	3.58	0.00	0.00	81.79	0.00
143	3,667	3,671	50.0	Yes	**14.21**	104.0	3.01	82.29	6.13	4.33	0.00	0.00	92.76	0.00
144	2,006	2,010	44.3	Yes	**21.84**	104.0	3.01	77.06	4.03	4.04	0.00	0.00	85.13	0.00
145	4,901	4,902	27.9	Yes	**10.16**	104.0	3.01	84.81	7.40	4.61	0.00	0.00	96.81	0.00
146	4,656	4,657	27.7	Yes	**10.85**	104.0	3.01	84.36	7.16	4.60	0.00	0.00	96.12	0.00
Sum	41.88													

Noise sensitive area: H31 H31

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	4,171	4,172	25.8	Yes	**12.30**	104.0	3.01	83.41	6.67	4.59	0.00	0.00	94.67	0.00
2	4,537	4,538	22.2	No	**10.99**	104.0	3.01	84.14	7.05	4.80	0.00	0.00	95.98	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	4,544	4,545	26.1	No	**10.97**	104.0	3.01	84.15	7.05	4.80	0.00	0.00	96.00	0.00
4	5,481	5,482	17.2	No	**8.46**	104.0	3.01	85.78	7.94	4.80	0.00	0.00	98.52	0.00
5	4,671	4,672	19.0	No	**10.60**	104.0	3.01	84.39	7.18	4.80	0.00	0.00	96.37	0.00
6	4,285	4,286	27.1	No	**11.74**	104.0	3.01	83.64	6.79	4.80	0.00	0.00	95.23	0.00
7	3,421	3,423	39.6	Yes	**15.03**	104.0	3.01	81.69	5.85	4.40	0.00	0.00	91.94	0.00
8	4,432	4,433	21.0	No	**11.30**	104.0	3.01	83.93	6.94	4.80	0.00	0.00	95.67	0.00
9	3,810	3,811	29.9	Yes	**13.53**	104.0	3.01	82.62	6.29	4.53	0.00	0.00	93.44	0.00
10	3,196	3,199	43.9	Yes	**15.95**	104.0	3.01	81.10	5.59	4.33	0.00	0.00	91.02	0.00
11	3,270	3,273	52.6	Yes	**15.75**	104.0	3.01	81.30	5.68	4.25	0.00	0.00	91.22	0.00
12	3,237	3,240	50.5	Yes	**15.86**	104.0	3.01	81.21	5.64	4.27	0.00	0.00	91.11	0.00
13	2,905	2,909	56.3	Yes	**17.33**	104.0	3.01	80.27	5.23	4.14	0.00	0.00	89.65	0.00
14	2,591	2,595	59.5	Yes	**18.84**	104.0	3.01	79.28	4.83	4.01	0.00	0.00	88.13	0.00
15	2,567	2,570	54.1	Yes	**18.89**	104.0	3.01	79.20	4.80	4.08	0.00	0.00	88.08	0.00
16	2,796	2,799	47.1	Yes	**17.71**	104.0	3.01	79.94	5.10	4.22	0.00	0.00	89.26	0.00
17	3,391	3,394	52.9	Yes	**15.27**	104.0	3.01	81.61	5.82	4.27	0.00	0.00	91.70	0.00
18	3,306	3,309	54.9	Yes	**15.63**	104.0	3.01	81.39	5.72	4.23	0.00	0.00	91.34	0.00
19	2,477	2,481	58.6	Yes	**19.41**	104.0	3.01	78.89	4.68	3.99	0.00	0.00	87.57	0.00
20	2,043	2,046	53.1	Yes	**21.76**	104.0	3.01	77.22	4.08	3.91	0.00	0.00	85.21	0.00
21	4,999	5,000	22.1	No	**9.70**	104.0	3.01	84.98	7.49	4.80	0.00	0.00	97.27	0.00
22	5,703	5,703	18.6	No	**7.92**	104.0	3.01	86.12	8.13	4.80	0.00	0.00	99.06	0.00
23	5,843	5,843	20.4	No	**7.58**	104.0	3.01	86.33	8.26	4.80	0.00	0.00	99.39	0.00
24	5,639	5,639	17.6	No	**8.07**	104.0	3.01	86.02	8.08	4.80	0.00	0.00	98.90	0.00
25	5,909	5,909	20.3	No	**7.43**	104.0	3.01	86.43	8.31	4.80	0.00	0.00	99.54	0.00
26	4,208	4,209	23.5	Yes	**12.17**	104.0	3.01	83.48	6.71	4.61	0.00	0.00	94.80	0.00
27	5,083	5,083	21.3	No	**9.48**	104.0	3.01	85.12	7.57	4.80	0.00	0.00	97.50	0.00
28	4,109	4,110	37.3	Yes	**12.60**	104.0	3.01	83.28	6.61	4.49	0.00	0.00	94.38	0.00
29	5,370	5,371	18.6	No	**8.73**	104.0	3.01	85.60	7.84	4.80	0.00	0.00	98.24	0.00
30	5,982	5,982	15.2	No	**7.26**	104.0	3.01	86.54	8.37	4.80	0.00	0.00	99.71	0.00
31	6,500	6,500	22.3	No	**6.11**	104.0	3.01	87.26	8.80	4.80	0.00	0.00	100.86	0.00
32	6,386	6,386	21.2	No	**6.36**	104.0	3.01	87.10	8.71	4.80	0.00	0.00	100.62	0.00
33	6,235	6,236	18.6	No	**6.69**	104.0	3.01	86.90	8.59	4.80	0.00	0.00	100.28	0.00
34	3,617	3,619	36.3	Yes	**14.27**	104.0	3.01	82.17	6.07	4.46	0.00	0.00	92.70	0.00
35	3,293	3,295	40.6	Yes	**15.53**	104.0	3.01	81.36	5.70	4.38	0.00	0.00	91.44	0.00
36	3,191	3,193	41.3	Yes	**15.95**	104.0	3.01	81.08	5.58	4.36	0.00	0.00	91.02	0.00
37	3,796	3,798	37.0	Yes	**13.64**	104.0	3.01	82.59	6.27	4.47	0.00	0.00	93.33	0.00
38	5,498	5,499	20.0	No	**8.41**	104.0	3.01	85.81	7.95	4.80	0.00	0.00	98.56	0.00
39	4,892	4,893	31.3	No	**9.99**	104.0	3.01	84.79	7.39	4.80	0.00	0.00	96.98	0.00
40	3,220	3,221	42.4	No	**15.40**	104.0	3.01	81.16	5.61	4.80	0.00	0.00	91.57	0.00
41	4,688	4,690	42.2	No	**10.55**	104.0	3.01	84.42	7.20	4.80	0.00	0.00	96.42	0.00
43	3,863	3,865	43.4	Yes	**13.47**	104.0	3.01	82.74	6.35	4.42	0.00	0.00	93.50	0.00
44	4,546	4,548	59.0	No	**10.96**	104.0	3.01	84.16	7.06	4.80	0.00	0.00	96.01	0.00
45	4,840	4,842	55.5	No	**10.13**	104.0	3.01	84.70	7.34	4.80	0.00	0.00	96.85	0.00
46	3,506	3,507	45.2	No	**14.33**	104.0	3.01	81.90	5.95	4.80	0.00	0.00	92.65	0.00
48	6,662	6,662	21.3	No	**5.77**	104.0	3.01	87.47	8.93	4.80	0.00	0.00	101.21	0.00
49	7,463	7,463	23.6	No	**4.17**	104.0	3.01	88.46	9.55	4.80	0.00	0.00	102.80	0.00
50	3,736	3,738	30.4	Yes	**13.79**	104.0	3.01	82.45	6.21	4.52	0.00	0.00	93.18	0.00
51	7,138	7,138	21.5	No	**4.80**	104.0	3.01	88.07	9.30	4.80	0.00	0.00	102.18	0.00
52	6,952	6,952	21.3	No	**5.17**	104.0	3.01	87.84	9.16	4.80	0.00	0.00	101.80	0.00
53	7,692	7,692	27.3	No	**3.74**	104.0	3.01	88.72	9.71	4.80	0.00	0.00	103.23	0.00
55	8,755	8,755	25.5	No	**1.88**	104.0	3.01	89.85	10.45	4.80	0.00	0.00	105.09	0.00
56	9,002	9,002	27.7	No	**1.48**	104.0	3.01	90.09	10.61	4.80	0.00	0.00	105.50	0.00
57	8,529	8,529	23.5	No	**2.26**	104.0	3.01	89.62	10.30	4.80	0.00	0.00	104.71	0.00
58	5,984	5,985	18.0	No	**7.25**	104.0	3.01	86.54	8.38	4.80	0.00	0.00	99.72	0.00
59	9,250	9,250	29.5	No	**1.08**	104.0	3.01	90.32	10.77	4.80	0.00	0.00	105.89	0.00
60	10,248	10,248	34.7	No	**-0.42**	104.0	3.01	91.21	11.38	4.80	0.00	0.00	107.39	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	10,558	10,558	31.6	No	**-0.86**	104.0	3.01	91.47	11.56	4.80	0.00	0.00	107.83	0.00
62	9,432	9,433	41.4	No	**0.79**	104.0	3.01	90.49	10.88	4.80	0.00	0.00	106.18	0.00
63	9,504	9,504	49.8	No	**0.68**	104.0	3.01	90.56	10.93	4.80	0.00	0.00	106.29	0.00
64	10,616	10,616	49.4	No	**-0.94**	104.0	3.01	91.52	11.60	4.80	0.00	0.00	107.92	0.00
65	11,250	11,250	48.8	No	**-1.81**	104.0	3.01	92.02	11.95	4.80	0.00	0.00	108.78	0.00
66	2,905	2,906	39.3	No	**16.67**	104.0	3.01	80.27	5.23	4.80	0.00	0.00	90.30	0.00
67	10,881	10,881	46.4	No	**-1.31**	104.0	3.01	91.73	11.75	4.80	0.00	0.00	108.28	0.00
68	11,392	11,393	43.4	No	**-1.99**	104.0	3.01	92.13	12.03	4.80	0.00	0.00	108.96	0.00
69	11,106	11,106	49.5	No	**-1.61**	104.0	3.01	91.91	11.87	4.80	0.00	0.00	108.59	0.00
70	1,686	1,688	43.5	Yes	**23.97**	104.0	3.01	75.55	3.54	3.91	0.00	0.00	83.00	0.00
71	3,222	3,224	41.0	Yes	**15.82**	104.0	3.01	81.17	5.62	4.37	0.00	0.00	91.15	0.00
72	5,413	5,414	17.3	No	**8.62**	104.0	3.01	85.67	7.88	4.80	0.00	0.00	98.35	0.00
73	4,305	4,306	22.7	No	**11.68**	104.0	3.01	83.68	6.81	4.80	0.00	0.00	95.29	0.00
74	3,747	3,748	31.5	Yes	**13.77**	104.0	3.01	82.48	6.22	4.51	0.00	0.00	93.21	0.00
75	4,718	4,718	16.8	No	**10.47**	104.0	3.01	84.48	7.22	4.80	0.00	0.00	96.50	0.00
76	7,695	7,695	24.5	No	**3.73**	104.0	3.01	88.72	9.72	4.80	0.00	0.00	103.24	0.00
77	7,610	7,610	22.0	No	**3.89**	104.0	3.01	88.63	9.65	4.80	0.00	0.00	103.08	0.00
78	1,886	1,889	48.1	Yes	**22.67**	104.0	3.01	76.52	3.85	3.93	0.00	0.00	84.30	0.00
80	9,874	9,874	36.0	No	**0.12**	104.0	3.01	90.89	11.16	4.80	0.00	0.00	106.85	0.00
81	2,543	2,547	58.3	Yes	**19.07**	104.0	3.01	79.12	4.77	4.02	0.00	0.00	87.91	0.00
82	6,559	6,560	21.2	No	**5.98**	104.0	3.01	87.34	8.85	4.80	0.00	0.00	100.99	0.00
83	10,141	10,141	47.8	No	**-0.27**	104.0	3.01	91.12	11.32	4.80	0.00	0.00	107.24	0.00
85	8,140	8,140	27.1	No	**2.93**	104.0	3.01	89.21	10.03	4.80	0.00	0.00	104.04	0.00
86	9,620	9,620	33.6	No	**0.51**	104.0	3.01	90.66	11.00	4.80	0.00	0.00	106.47	0.00
87	11,487	11,487	47.1	No	**-2.12**	104.0	3.01	92.20	12.08	4.80	0.00	0.00	109.09	0.00
89	10,213	10,213	49.4	No	**-0.37**	104.0	3.01	91.18	11.36	4.80	0.00	0.00	107.34	0.00
90	8,545	8,545	28.5	No	**2.23**	104.0	3.01	89.63	10.31	4.80	0.00	0.00	104.74	0.00
91	9,415	9,415	44.9	No	**0.82**	104.0	3.01	90.48	10.87	4.80	0.00	0.00	106.15	0.00
92	10,697	10,697	49.5	No	**-1.06**	104.0	3.01	91.59	11.64	4.80	0.00	0.00	108.03	0.00
94	2,889	2,893	51.6	Yes	**17.34**	104.0	3.01	80.23	5.21	4.19	0.00	0.00	89.63	0.00
95	3,706	3,708	38.3	Yes	**13.97**	104.0	3.01	82.38	6.17	4.45	0.00	0.00	93.00	0.00
97	2,436	2,440	58.3	Yes	**19.61**	104.0	3.01	78.75	4.63	3.98	0.00	0.00	87.36	0.00
98	3,170	3,173	47.0	Yes	**16.09**	104.0	3.01	81.03	5.56	4.29	0.00	0.00	90.88	0.00
99	5,113	5,113	20.8	No	**9.40**	104.0	3.01	85.17	7.60	4.80	0.00	0.00	97.58	0.00
100	5,192	5,194	39.8	No	**9.19**	104.0	3.01	85.31	7.68	4.80	0.00	0.00	97.79	0.00
101	2,784	2,787	57.9	Yes	**17.90**	104.0	3.01	79.90	5.08	4.09	0.00	0.00	89.07	0.00
102	4,332	4,334	56.7	No	**11.59**	104.0	3.01	83.74	6.84	4.80	0.00	0.00	95.38	0.00
103	3,518	3,521	52.6	Yes	**14.79**	104.0	3.01	81.93	5.96	4.29	0.00	0.00	92.18	0.00
104	4,397	4,398	36.9	No	**11.40**	104.0	3.01	83.87	6.91	4.80	0.00	0.00	95.57	0.00
107	2,049	2,053	57.9	Yes	**21.80**	104.0	3.01	77.25	4.09	3.83	0.00	0.00	85.17	0.00
108	5,956	5,956	18.0	No	**7.32**	104.0	3.01	86.50	8.35	4.80	0.00	0.00	99.65	0.00
109	9,485	9,485	31.5	No	**0.71**	104.0	3.01	90.54	10.92	4.80	0.00	0.00	106.26	0.00
110	6,874	6,874	20.6	No	**5.33**	104.0	3.01	87.74	9.10	4.80	0.00	0.00	101.64	0.00
111	7,367	7,367	24.3	No	**4.35**	104.0	3.01	88.35	9.48	4.80	0.00	0.00	102.62	0.00
113	2,205	2,209	57.9	Yes	**20.88**	104.0	3.01	77.88	4.31	3.90	0.00	0.00	86.10	0.00
114	8,325	8,325	27.5	No	**2.61**	104.0	3.01	89.41	10.16	4.80	0.00	0.00	104.37	0.00
115	4,373	4,374	22.9	No	**11.47**	104.0	3.01	83.82	6.88	4.80	0.00	0.00	95.50	0.00
116	3,245	3,247	54.7	Yes	**15.87**	104.0	3.01	81.23	5.64	4.22	0.00	0.00	91.10	0.00
118	9,908	9,908	33.2	No	**0.07**	104.0	3.01	90.92	11.18	4.80	0.00	0.00	106.90	0.00
119	3,445	3,447	35.9	Yes	**14.90**	104.0	3.01	81.75	5.88	4.44	0.00	0.00	92.07	0.00
120	2,972	2,974	55.1	Yes	**17.02**	104.0	3.01	80.47	5.31	4.17	0.00	0.00	89.95	0.00
121	3,072	3,074	39.7	Yes	**16.42**	104.0	3.01	80.75	5.44	4.36	0.00	0.00	90.55	0.00
125	9,844	9,845	48.1	No	**0.17**	104.0	3.01	90.86	11.14	4.80	0.00	0.00	106.80	0.00
126	6,385	6,386	41.3	No	**6.36**	104.0	3.01	87.10	8.71	4.80	0.00	0.00	100.62	0.00
127	6,628	6,629	41.0	No	**5.84**	104.0	3.01	87.43	8.91	4.80	0.00	0.00	101.14	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	6,887	6,888	39.0	No	**5.30**	104.0	3.01	87.76	9.11	4.80	0.00	0.00	101.67	0.00
129	1,310	1,313	41.6	Yes	**26.96**	104.0	3.01	73.37	2.94	3.71	0.00	0.00	80.01	0.00
130	1,367	1,370	41.1	Yes	**26.44**	104.0	3.01	73.73	3.03	3.77	0.00	0.00	80.53	0.00
131	984	987	37.6	Yes	**30.24**	104.0	3.01	70.89	2.36	3.48	0.00	0.00	76.73	0.00
132	586	591	36.7	Yes	**36.34**	104.0	3.01	66.44	1.57	2.63	0.00	0.00	70.63	0.00
133	5,393	5,394	22.8	No	**8.67**	104.0	3.01	85.64	7.86	4.80	0.00	0.00	98.30	0.00
134	1,860	1,862	45.9	Yes	**22.81**	104.0	3.01	76.40	3.81	3.95	0.00	0.00	84.16	0.00
141	2,668	2,671	53.5	Yes	**18.39**	104.0	3.01	79.53	4.93	4.12	0.00	0.00	88.58	0.00
142	4,074	4,076	60.2	No	**12.39**	104.0	3.01	83.21	6.57	4.80	0.00	0.00	94.58	0.00
143	2,366	2,370	57.7	Yes	**19.98**	104.0	3.01	78.49	4.53	3.97	0.00	0.00	86.99	0.00
144	5,117	5,118	48.1	No	**9.38**	104.0	3.01	85.18	7.61	4.80	0.00	0.00	97.59	0.00
145	8,085	8,085	29.7	No	**3.03**	104.0	3.01	89.15	9.99	4.80	0.00	0.00	103.95	0.00
146	7,807	7,807	29.7	No	**3.53**	104.0	3.01	88.85	9.80	4.80	0.00	0.00	103.45	0.00

Sum 39.75

Noise sensitive area: H32 H32

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	4,213	4,214	27.6	No	**11.96**	104.0	3.01	83.49	6.72	4.80	0.00	0.00	95.01	0.00
2	4,689	4,689	24.0	No	**10.55**	104.0	3.01	84.42	7.20	4.80	0.00	0.00	96.42	0.00
3	4,967	4,968	25.3	No	**9.78**	104.0	3.01	84.92	7.46	4.80	0.00	0.00	97.19	0.00
4	6,352	6,353	15.5	No	**6.43**	104.0	3.01	87.06	8.68	4.80	0.00	0.00	100.54	0.00
5	5,612	5,613	18.9	No	**8.13**	104.0	3.01	85.98	8.05	4.80	0.00	0.00	98.84	0.00
6	4,968	4,969	25.7	No	**9.78**	104.0	3.01	84.93	7.47	4.80	0.00	0.00	97.19	0.00
7	5,018	5,020	41.8	Yes	**9.93**	104.0	3.01	85.01	7.51	4.52	0.00	0.00	97.04	0.00
8	4,136	4,137	23.5	No	**12.20**	104.0	3.01	83.33	6.64	4.80	0.00	0.00	94.77	0.00
9	4,108	4,109	29.6	Yes	**12.54**	104.0	3.01	83.28	6.61	4.55	0.00	0.00	94.44	0.00
10	3,585	3,587	42.8	Yes	**14.45**	104.0	3.01	82.09	6.04	4.39	0.00	0.00	92.53	0.00
11	2,550	2,553	57.3	Yes	**19.02**	104.0	3.01	79.14	4.78	4.03	0.00	0.00	87.95	0.00
12	2,681	2,685	54.1	Yes	**18.33**	104.0	3.01	79.58	4.95	4.11	0.00	0.00	88.64	0.00
13	2,695	2,699	57.6	Yes	**18.31**	104.0	3.01	79.63	4.97	4.07	0.00	0.00	88.66	0.00
14	2,705	2,709	59.2	Yes	**18.28**	104.0	3.01	79.66	4.98	4.05	0.00	0.00	88.69	0.00
15	3,290	3,293	53.7	Yes	**15.68**	104.0	3.01	81.35	5.70	4.24	0.00	0.00	91.29	0.00
16	3,691	3,693	46.9	Yes	**14.10**	104.0	3.01	82.35	6.16	4.37	0.00	0.00	92.87	0.00
17	2,506	2,510	55.8	Yes	**19.22**	104.0	3.01	78.99	4.72	4.04	0.00	0.00	87.75	0.00
18	2,224	2,228	56.3	Yes	**20.74**	104.0	3.01	77.96	4.34	3.93	0.00	0.00	86.23	0.00
19	2,347	2,350	59.3	Yes	**20.11**	104.0	3.01	78.42	4.51	3.94	0.00	0.00	86.86	0.00
20	2,921	2,923	54.5	Yes	**17.24**	104.0	3.01	80.32	5.25	4.16	0.00	0.00	89.73	0.00
21	6,108	6,109	21.8	No	**6.97**	104.0	3.01	86.72	8.48	4.80	0.00	0.00	100.00	0.00
22	6,917	6,918	16.8	No	**5.24**	104.0	3.01	87.80	9.13	4.80	0.00	0.00	101.73	0.00
23	7,153	7,153	19.1	No	**4.77**	104.0	3.01	88.09	9.31	4.80	0.00	0.00	102.20	0.00
24	6,785	6,786	15.8	No	**5.51**	104.0	3.01	87.63	9.03	4.80	0.00	0.00	101.46	0.00
25	7,744	7,744	18.7	No	**3.64**	104.0	3.01	88.78	9.75	4.80	0.00	0.00	103.33	0.00
26	5,561	5,562	23.0	No	**8.26**	104.0	3.01	85.90	8.01	4.80	0.00	0.00	98.71	0.00
27	6,919	6,920	21.1	No	**5.24**	104.0	3.01	87.80	9.14	4.80	0.00	0.00	101.74	0.00
28	5,998	5,999	38.8	Yes	**7.44**	104.0	3.01	86.56	8.39	4.58	0.00	0.00	99.53	0.00
29	6,810	6,810	16.7	No	**5.46**	104.0	3.01	87.66	9.05	4.80	0.00	0.00	101.51	0.00
30	7,404	7,404	12.7	No	**4.28**	104.0	3.01	88.39	9.50	4.80	0.00	0.00	102.69	0.00
31	7,660	7,660	19.8	No	**3.80**	104.0	3.01	88.69	9.69	4.80	0.00	0.00	103.18	0.00
32	8,191	8,191	18.5	No	**2.84**	104.0	3.01	89.27	10.07	4.80	0.00	0.00	104.13	0.00
33	7,786	7,786	14.9	No	**3.56**	104.0	3.01	88.83	9.78	4.80	0.00	0.00	103.41	0.00
34	5,297	5,299	36.8	Yes	**9.15**	104.0	3.01	85.48	7.77	4.56	0.00	0.00	97.82	0.00
35	4,795	4,796	42.2	Yes	**10.55**	104.0	3.01	84.62	7.30	4.50	0.00	0.00	96.42	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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3100 DeMers Avenue
US-GRAND FORKS, ND 58201
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	4,579	4,580	41.9	Yes	**11.18**	104.0	3.01	84.22	7.09	4.49	0.00	0.00	95.79	0.00
37	5,551	5,552	36.3	Yes	**8.50**	104.0	3.01	85.89	8.00	4.58	0.00	0.00	98.47	0.00
38	7,351	7,352	18.8	No	**4.38**	104.0	3.01	88.33	9.46	4.80	0.00	0.00	102.59	0.00
39	6,874	6,874	34.4	Yes	**5.50**	104.0	3.01	87.74	9.10	4.63	0.00	0.00	101.47	0.00
40	5,390	5,391	42.2	Yes	**8.95**	104.0	3.01	85.63	7.86	4.53	0.00	0.00	98.02	0.00
41	6,718	6,720	43.6	Yes	**5.87**	104.0	3.01	87.55	8.98	4.58	0.00	0.00	101.10	0.00
43	5,762	5,763	45.2	Yes	**8.04**	104.0	3.01	86.21	8.19	4.53	0.00	0.00	98.93	0.00
44	6,643	6,644	59.3	Yes	**6.11**	104.0	3.01	87.45	8.92	4.50	0.00	0.00	100.86	0.00
45	6,945	6,946	55.4	Yes	**5.45**	104.0	3.01	87.84	9.16	4.53	0.00	0.00	101.52	0.00
46	5,605	5,606	45.5	Yes	**8.43**	104.0	3.01	85.97	8.05	4.52	0.00	0.00	98.55	0.00
48	8,582	8,582	21.2	No	**2.17**	104.0	3.01	89.67	10.33	4.80	0.00	0.00	104.80	0.00
49	9,257	9,257	20.3	No	**1.07**	104.0	3.01	90.33	10.77	4.80	0.00	0.00	105.90	0.00
50	4,867	4,868	31.0	Yes	**10.27**	104.0	3.01	84.75	7.37	4.58	0.00	0.00	96.70	0.00
51	8,880	8,880	18.7	No	**1.67**	104.0	3.01	89.97	10.53	4.80	0.00	0.00	105.30	0.00
52	8,651	8,651	17.6	No	**2.05**	104.0	3.01	89.74	10.38	4.80	0.00	0.00	104.92	0.00
53	9,520	9,521	23.6	No	**0.66**	104.0	3.01	90.57	10.94	4.80	0.00	0.00	106.31	0.00
55	10,707	10,707	25.1	No	**-1.07**	104.0	3.01	91.59	11.65	4.80	0.00	0.00	108.04	0.00
56	10,971	10,971	28.0	No	**-1.43**	104.0	3.01	91.81	11.80	4.80	0.00	0.00	108.40	0.00
57	10,559	10,560	22.1	No	**-0.86**	104.0	3.01	91.47	11.56	4.80	0.00	0.00	107.84	0.00
58	7,682	7,682	15.4	No	**3.76**	104.0	3.01	88.71	9.71	4.80	0.00	0.00	103.22	0.00
59	11,237	11,237	29.9	No	**-1.79**	104.0	3.01	92.01	11.95	4.80	0.00	0.00	108.76	0.00
60	12,323	12,323	32.1	No	**-3.17**	104.0	3.01	92.81	12.53	4.80	0.00	0.00	110.14	0.00
61	12,644	12,644	29.3	No	**-3.56**	104.0	3.01	93.04	12.69	4.80	0.00	0.00	110.53	0.00
62	11,610	11,610	38.9	Yes	**-2.16**	104.0	3.01	92.30	12.15	4.69	0.00	0.00	109.13	0.00
63	11,712	11,713	47.9	Yes	**-2.27**	104.0	3.01	92.37	12.21	4.66	0.00	0.00	109.24	0.00
64	12,831	12,831	47.6	Yes	**-3.65**	104.0	3.01	93.17	12.79	4.67	0.00	0.00	110.62	0.00
65	13,465	13,465	47.2	Yes	**-4.39**	104.0	3.01	93.58	13.10	4.68	0.00	0.00	111.36	0.00
66	5,076	5,077	39.3	Yes	**9.76**	104.0	3.01	85.11	7.57	4.54	0.00	0.00	97.22	0.00
67	13,090	13,090	44.7	Yes	**-3.96**	104.0	3.01	93.34	12.91	4.68	0.00	0.00	110.94	0.00
68	13,604	13,604	41.9	Yes	**-4.56**	104.0	3.01	93.67	13.16	4.70	0.00	0.00	111.53	0.00
69	13,321	13,321	47.7	Yes	**-4.22**	104.0	3.01	93.49	13.03	4.68	0.00	0.00	111.20	0.00
70	1,781	1,783	42.9	Yes	**23.29**	104.0	3.01	76.02	3.69	3.97	0.00	0.00	83.68	0.00
71	3,788	3,790	40.7	Yes	**13.70**	104.0	3.01	82.57	6.26	4.43	0.00	0.00	93.27	0.00
72	6,155	6,155	15.0	No	**6.87**	104.0	3.01	86.78	8.52	4.80	0.00	0.00	100.10	0.00
73	5,133	5,134	23.4	No	**9.34**	104.0	3.01	85.21	7.62	4.80	0.00	0.00	97.63	0.00
74	5,014	5,015	32.6	Yes	**9.88**	104.0	3.01	85.01	7.51	4.58	0.00	0.00	97.09	0.00
75	6,192	6,193	16.6	No	**6.78**	104.0	3.01	86.84	8.55	4.80	0.00	0.00	100.19	0.00
76	9,731	9,731	23.3	No	**0.34**	104.0	3.01	90.76	11.07	4.80	0.00	0.00	106.63	0.00
77	9,530	9,530	21.8	No	**0.64**	104.0	3.01	90.58	10.95	4.80	0.00	0.00	106.33	0.00
78	3,094	3,096	49.4	Yes	**16.44**	104.0	3.01	80.81	5.46	4.25	0.00	0.00	90.53	0.00
80	11,941	11,942	33.3	No	**-2.70**	104.0	3.01	92.54	12.33	4.80	0.00	0.00	109.67	0.00
81	2,161	2,165	60.9	Yes	**21.18**	104.0	3.01	77.71	4.25	3.84	0.00	0.00	85.79	0.00
82	8,208	8,208	17.0	No	**2.81**	104.0	3.01	89.28	10.08	4.80	0.00	0.00	104.16	0.00
83	12,350	12,351	46.1	Yes	**-3.08**	104.0	3.01	92.83	12.54	4.67	0.00	0.00	110.05	0.00
85	9,844	9,844	23.2	No	**0.17**	104.0	3.01	90.86	11.14	4.80	0.00	0.00	106.80	0.00
86	11,677	11,677	30.6	No	**-2.36**	104.0	3.01	92.35	12.19	4.80	0.00	0.00	109.33	0.00
87	13,702	13,702	45.5	Yes	**-4.66**	104.0	3.01	93.74	13.21	4.69	0.00	0.00	111.63	0.00
89	12,427	12,427	47.8	Yes	**-3.16**	104.0	3.01	92.89	12.58	4.67	0.00	0.00	110.14	0.00
90	10,654	10,655	26.5	No	**-1.00**	104.0	3.01	91.55	11.62	4.80	0.00	0.00	107.97	0.00
91	11,609	11,609	42.1	Yes	**-2.15**	104.0	3.01	92.30	12.15	4.68	0.00	0.00	109.12	0.00
92	12,906	12,906	47.2	Yes	**-3.74**	104.0	3.01	93.22	12.82	4.68	0.00	0.00	110.71	0.00
94	3,188	3,191	50.3	Yes	**16.05**	104.0	3.01	81.08	5.58	4.26	0.00	0.00	90.92	0.00
95	3,264	3,266	40.7	Yes	**15.65**	104.0	3.01	81.28	5.67	4.37	0.00	0.00	91.32	0.00
97	3,697	3,700	59.2	Yes	**14.19**	104.0	3.01	82.36	6.16	4.25	0.00	0.00	92.78	0.00
98	3,168	3,171	46.0	Yes	**16.09**	104.0	3.01	81.02	5.55	4.30	0.00	0.00	90.88	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	5,464	5,464	21.5	No	**8.50**	104.0	3.01	85.75	7.92	4.80	0.00	0.00	98.47	0.00
100	7,268	7,269	40.7	Yes	**4.73**	104.0	3.01	88.23	9.40	4.61	0.00	0.00	102.24	0.00
101	2,022	2,026	60.7	Yes	**22.02**	104.0	3.01	77.13	4.05	3.77	0.00	0.00	84.96	0.00
102	6,395	6,396	58.6	Yes	**6.65**	104.0	3.01	87.12	8.72	4.49	0.00	0.00	100.33	0.00
103	2,257	2,260	57.2	Yes	**20.57**	104.0	3.01	78.08	4.38	3.93	0.00	0.00	86.40	0.00
104	6,363	6,363	40.1	Yes	**6.62**	104.0	3.01	87.07	8.69	4.58	0.00	0.00	100.35	0.00
107	2,574	2,577	57.6	Yes	**18.90**	104.0	3.01	79.22	4.81	4.03	0.00	0.00	88.07	0.00
108	6,230	6,230	20.2	No	**6.70**	104.0	3.01	86.89	8.58	4.80	0.00	0.00	100.27	0.00
109	11,491	11,491	31.1	No	**-2.12**	104.0	3.01	92.21	12.09	4.80	0.00	0.00	109.09	0.00
110	8,843	8,843	21.9	No	**1.73**	104.0	3.01	89.93	10.51	4.80	0.00	0.00	105.24	0.00
111	9,379	9,380	24.3	No	**0.88**	104.0	3.01	90.44	10.85	4.80	0.00	0.00	106.10	0.00
113	2,417	2,420	57.3	Yes	**19.71**	104.0	3.01	78.68	4.60	3.99	0.00	0.00	87.27	0.00
114	10,063	10,063	24.4	No	**-0.15**	104.0	3.01	91.05	11.27	4.80	0.00	0.00	107.13	0.00
115	4,210	4,211	25.8	No	**11.97**	104.0	3.01	83.49	6.71	4.80	0.00	0.00	95.00	0.00
116	5,197	5,199	56.6	Yes	**9.54**	104.0	3.01	85.32	7.68	4.43	0.00	0.00	97.43	0.00
118	11,933	11,933	31.9	No	**-2.69**	104.0	3.01	92.53	12.32	4.80	0.00	0.00	109.66	0.00
119	4,424	4,426	35.4	Yes	**11.59**	104.0	3.01	83.92	6.93	4.53	0.00	0.00	95.38	0.00
120	1,850	1,853	59.5	Yes	**23.12**	104.0	3.01	76.36	3.80	3.70	0.00	0.00	83.85	0.00
121	4,325	4,326	41.6	Yes	**11.94**	104.0	3.01	83.72	6.83	4.47	0.00	0.00	95.03	0.00
125	12,054	12,054	46.3	Yes	**-2.71**	104.0	3.01	92.62	12.39	4.67	0.00	0.00	109.68	0.00
126	8,523	8,524	40.1	Yes	**2.43**	104.0	3.01	89.61	10.29	4.64	0.00	0.00	104.55	0.00
127	8,766	8,767	39.6	Yes	**2.01**	104.0	3.01	89.86	10.46	4.65	0.00	0.00	104.96	0.00
128	9,014	9,015	37.8	Yes	**1.60**	104.0	3.01	90.10	10.62	4.66	0.00	0.00	105.37	0.00
129	3,443	3,444	44.0	Yes	**14.99**	104.0	3.01	81.74	5.88	4.36	0.00	0.00	91.98	0.00
130	3,582	3,583	44.9	Yes	**14.48**	104.0	3.01	82.08	6.03	4.37	0.00	0.00	92.49	0.00
131	3,180	3,182	43.7	Yes	**16.02**	104.0	3.01	81.05	5.57	4.33	0.00	0.00	90.95	0.00
132	2,768	2,769	44.7	Yes	**17.82**	104.0	3.01	79.85	5.06	4.25	0.00	0.00	89.15	0.00
133	7,351	7,352	25.4	Yes	**4.50**	104.0	3.01	88.33	9.46	4.68	0.00	0.00	102.47	0.00
134	2,044	2,047	44.9	Yes	**21.62**	104.0	3.01	77.22	4.08	4.05	0.00	0.00	85.35	0.00
141	3,935	3,937	55.3	Yes	**13.32**	104.0	3.01	82.90	6.42	4.32	0.00	0.00	93.65	0.00
142	6,119	6,121	61.9	Yes	**7.29**	104.0	3.01	86.74	8.49	4.46	0.00	0.00	99.68	0.00
143	3,401	3,404	58.6	Yes	**15.29**	104.0	3.01	81.64	5.83	4.21	0.00	0.00	91.68	0.00
144	7,240	7,241	47.6	Yes	**4.82**	104.0	3.01	88.20	9.38	4.58	0.00	0.00	102.15	0.00
145	10,188	10,188	28.3	No	**-0.34**	104.0	3.01	91.16	11.35	4.80	0.00	0.00	107.31	0.00
146	9,898	9,898	28.1	No	**0.09**	104.0	3.01	90.91	11.17	4.80	0.00	0.00	106.88	0.00
Sum	34.31													

Noise sensitive area: H33 H33

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	3,872	3,874	19.8	No	**13.05**	104.0	3.01	82.76	6.36	4.80	0.00	0.00	93.92	0.00
2	4,359	4,360	17.0	No	**11.52**	104.0	3.01	83.79	6.87	4.80	0.00	0.00	95.46	0.00
3	4,733	4,734	19.0	No	**10.43**	104.0	3.01	84.50	7.24	4.80	0.00	0.00	96.54	0.00
4	6,242	6,242	3.9	No	**6.67**	104.0	3.01	86.91	8.59	4.80	0.00	0.00	100.30	0.00
5	5,563	5,564	5.7	No	**8.25**	104.0	3.01	85.91	8.01	4.80	0.00	0.00	98.72	0.00
6	4,843	4,844	13.8	No	**10.12**	104.0	3.01	84.70	7.35	4.80	0.00	0.00	96.85	0.00
7	5,295	5,297	29.5	Yes	**9.11**	104.0	3.01	85.48	7.77	4.61	0.00	0.00	97.86	0.00
8	3,660	3,661	13.4	No	**13.78**	104.0	3.01	82.27	6.12	4.80	0.00	0.00	93.19	0.00
9	3,885	3,887	20.3	No	**13.01**	104.0	3.01	82.79	6.37	4.80	0.00	0.00	93.96	0.00
10	3,457	3,460	30.3	Yes	**14.80**	104.0	3.01	81.78	5.89	4.50	0.00	0.00	92.17	0.00
11	2,073	2,079	44.1	Yes	**21.42**	104.0	3.01	77.36	4.13	4.07	0.00	0.00	85.56	0.00
12	2,263	2,268	42.5	Yes	**20.31**	104.0	3.01	78.11	4.39	4.16	0.00	0.00	86.66	0.00
13	2,443	2,448	46.4	Yes	**19.41**	104.0	3.01	78.78	4.64	4.15	0.00	0.00	87.57	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	2,602	2,607	48.2	Yes	**18.63**	104.0	3.01	79.32	4.85	4.17	0.00	0.00	88.34	0.00
15	3,344	3,348	44.6	Yes	**15.37**	104.0	3.01	81.50	5.76	4.35	0.00	0.00	91.60	0.00
16	3,764	3,767	37.0	Yes	**13.75**	104.0	3.01	82.52	6.24	4.46	0.00	0.00	93.22	0.00
17	1,953	1,959	45.2	Yes	**22.17**	104.0	3.01	76.84	3.95	4.01	0.00	0.00	84.80	0.00
18	1,622	1,628	48.7	Yes	**24.52**	104.0	3.01	75.23	3.45	3.77	0.00	0.00	82.45	0.00
19	2,219	2,224	49.4	Yes	**20.66**	104.0	3.01	77.94	4.33	4.04	0.00	0.00	86.31	0.00
20	3,099	3,102	46.0	Yes	**16.37**	104.0	3.01	80.83	5.47	4.29	0.00	0.00	90.60	0.00
21	6,113	6,113	11.0	No	**6.96**	104.0	3.01	86.73	8.49	4.80	0.00	0.00	100.01	0.00
22	6,942	6,943	6.0	No	**5.19**	104.0	3.01	87.83	9.15	4.80	0.00	0.00	101.78	0.00
23	7,216	7,217	8.9	No	**4.64**	104.0	3.01	88.17	9.36	4.80	0.00	0.00	102.33	0.00
24	6,782	6,783	5.1	No	**5.52**	104.0	3.01	87.63	9.03	4.80	0.00	0.00	101.46	0.00
25	8,070	8,071	7.3	No	**3.05**	104.0	3.01	89.14	9.98	4.80	0.00	0.00	103.92	0.00
26	5,699	5,700	12.3	No	**7.92**	104.0	3.01	86.12	8.13	4.80	0.00	0.00	99.05	0.00
27	7,262	7,263	8.9	No	**4.55**	104.0	3.01	88.22	9.40	4.80	0.00	0.00	102.42	0.00
28	6,393	6,394	26.3	No	**6.34**	104.0	3.01	87.12	8.72	4.80	0.00	0.00	100.63	0.00
29	6,945	6,945	6.9	No	**5.18**	104.0	3.01	87.83	9.16	4.80	0.00	0.00	101.79	0.00
30	7,514	7,515	3.9	No	**4.07**	104.0	3.01	88.52	9.58	4.80	0.00	0.00	102.90	0.00
31	7,640	7,640	9.0	No	**3.83**	104.0	3.01	88.66	9.68	4.80	0.00	0.00	103.14	0.00
32	8,492	8,493	8.2	No	**2.32**	104.0	3.01	89.58	10.27	4.80	0.00	0.00	104.65	0.00
33	7,953	7,953	4.5	No	**3.26**	104.0	3.01	89.01	9.90	4.80	0.00	0.00	103.71	0.00
34	5,602	5,604	25.8	No	**8.16**	104.0	3.01	85.97	8.05	4.80	0.00	0.00	98.82	0.00
35	5,039	5,040	29.3	Yes	**9.79**	104.0	3.01	85.05	7.53	4.60	0.00	0.00	97.18	0.00
36	4,784	4,786	30.1	Yes	**10.50**	104.0	3.01	84.60	7.29	4.59	0.00	0.00	96.48	0.00
37	5,885	5,886	24.1	No	**7.48**	104.0	3.01	86.40	8.29	4.80	0.00	0.00	99.49	0.00
38	7,696	7,696	6.7	No	**3.73**	104.0	3.01	88.73	9.72	4.80	0.00	0.00	103.24	0.00
39	7,310	7,310	22.9	No	**4.46**	104.0	3.01	88.28	9.43	4.80	0.00	0.00	102.51	0.00
40	6,007	6,008	35.4	No	**7.20**	104.0	3.01	86.57	8.40	4.80	0.00	0.00	99.77	0.00
41	7,192	7,193	32.7	No	**4.69**	104.0	3.01	88.14	9.34	4.80	0.00	0.00	102.28	0.00
43	6,169	6,171	33.2	No	**6.83**	104.0	3.01	86.81	8.53	4.80	0.00	0.00	100.14	0.00
44	7,170	7,171	50.0	No	**4.73**	104.0	3.01	88.11	9.33	4.80	0.00	0.00	102.24	0.00
45	7,475	7,477	45.8	No	**4.14**	104.0	3.01	88.47	9.56	4.80	0.00	0.00	102.83	0.00
46	6,151	6,152	38.2	No	**6.87**	104.0	3.01	86.78	8.52	4.80	0.00	0.00	100.10	0.00
48	8,951	8,951	8.8	No	**1.56**	104.0	3.01	90.04	10.58	4.80	0.00	0.00	105.41	0.00
49	9,538	9,538	9.9	No	**0.63**	104.0	3.01	90.59	10.95	4.80	0.00	0.00	106.34	0.00
50	4,942	4,943	20.5	No	**9.85**	104.0	3.01	84.88	7.44	4.80	0.00	0.00	97.12	0.00
51	9,134	9,134	7.5	No	**1.26**	104.0	3.01	90.21	10.70	4.80	0.00	0.00	105.71	0.00
52	8,884	8,884	7.0	No	**1.67**	104.0	3.01	89.97	10.53	4.80	0.00	0.00	105.31	0.00
53	9,819	9,819	13.7	No	**0.21**	104.0	3.01	90.84	11.12	4.80	0.00	0.00	106.77	0.00
55	11,078	11,079	13.9	No	**-1.58**	104.0	3.01	91.89	11.86	4.80	0.00	0.00	108.55	0.00
56	11,354	11,355	16.9	No	**-1.94**	104.0	3.01	92.10	12.01	4.80	0.00	0.00	108.92	0.00
57	10,993	10,994	13.1	No	**-1.46**	104.0	3.01	91.82	11.81	4.80	0.00	0.00	108.43	0.00
58	7,930	7,931	3.5	No	**3.30**	104.0	3.01	88.99	9.88	4.80	0.00	0.00	103.67	0.00
59	11,632	11,632	19.3	No	**-2.30**	104.0	3.01	92.31	12.16	4.80	0.00	0.00	109.28	0.00
60	12,787	12,787	23.5	No	**-3.73**	104.0	3.01	93.14	12.76	4.80	0.00	0.00	110.70	0.00
61	13,117	13,117	20.5	No	**-4.11**	104.0	3.01	93.36	12.93	4.80	0.00	0.00	111.08	0.00
62	12,196	12,196	28.2	No	**-3.01**	104.0	3.01	92.72	12.46	4.80	0.00	0.00	109.99	0.00
63	12,365	12,365	37.8	No	**-3.22**	104.0	3.01	92.84	12.55	4.80	0.00	0.00	110.19	0.00
64	13,526	13,527	38.9	No	**-4.58**	104.0	3.01	93.62	13.13	4.80	0.00	0.00	111.55	0.00
65	14,158	14,158	38.6	No	**-5.27**	104.0	3.01	94.02	13.42	4.80	0.00	0.00	112.24	0.00
66	5,699	5,700	32.4	No	**7.92**	104.0	3.01	86.12	8.13	4.80	0.00	0.00	99.05	0.00
67	13,742	13,742	34.7	No	**-4.82**	104.0	3.01	93.76	13.23	4.80	0.00	0.00	111.79	0.00
68	14,264	14,264	31.7	No	**-5.39**	104.0	3.01	94.08	13.47	4.80	0.00	0.00	112.36	0.00
69	14,023	14,023	38.9	No	**-5.13**	104.0	3.01	93.94	13.36	4.80	0.00	0.00	112.10	0.00
70	1,982	1,985	37.6	Yes	**21.88**	104.0	3.01	76.95	3.99	4.15	0.00	0.00	85.10	0.00
71	3,712	3,714	27.2	Yes	**13.84**	104.0	3.01	82.40	6.18	4.55	0.00	0.00	93.13	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	5,996	5,996	6.1	No	**7.23**	104.0	3.01	86.56	8.39	4.80	0.00	0.00	99.74	0.00
73	5,060	5,061	10.0	No	**9.53**	104.0	3.01	85.09	7.55	4.80	0.00	0.00	97.44	0.00
74	5,140	5,141	21.5	No	**9.32**	104.0	3.01	85.22	7.63	4.80	0.00	0.00	97.65	0.00
75	6,363	6,364	5.3	No	**6.41**	104.0	3.01	87.07	8.69	4.80	0.00	0.00	100.57	0.00
76	10,175	10,175	14.4	No	**-0.32**	104.0	3.01	91.15	11.34	4.80	0.00	0.00	107.29	0.00
77	9,889	9,889	10.0	No	**0.10**	104.0	3.01	90.90	11.17	4.80	0.00	0.00	106.87	0.00
78	3,373	3,375	41.0	Yes	**15.23**	104.0	3.01	81.57	5.79	4.38	0.00	0.00	91.74	0.00
80	12,399	12,400	24.5	No	**-3.26**	104.0	3.01	92.87	12.57	4.80	0.00	0.00	110.23	0.00
81	1,962	1,968	52.0	Yes	**22.23**	104.0	3.01	76.88	3.97	3.89	0.00	0.00	84.74	0.00
82	8,420	8,420	6.5	No	**2.44**	104.0	3.01	89.51	10.22	4.80	0.00	0.00	104.53	0.00
83	13,005	13,006	36.0	No	**-3.98**	104.0	3.01	93.28	12.87	4.80	0.00	0.00	110.95	0.00
85	10,063	10,064	13.1	No	**-0.15**	104.0	3.01	91.06	11.27	4.80	0.00	0.00	107.13	0.00
86	12,128	12,128	21.9	No	**-2.93**	104.0	3.01	92.68	12.43	4.80	0.00	0.00	109.90	0.00
87	14,394	14,394	37.0	No	**-5.53**	104.0	3.01	94.16	13.53	4.80	0.00	0.00	112.50	0.00
89	13,108	13,109	39.4	No	**-4.10**	104.0	3.01	93.35	12.92	4.80	0.00	0.00	111.07	0.00
90	11,160	11,161	15.5	No	**-1.69**	104.0	3.01	91.95	11.90	4.80	0.00	0.00	108.66	0.00
91	12,224	12,224	33.2	No	**-3.05**	104.0	3.01	92.74	12.48	4.80	0.00	0.00	110.02	0.00
92	13,641	13,641	39.9	No	**-4.71**	104.0	3.01	93.70	13.18	4.80	0.00	0.00	111.68	0.00
94	3,077	3,081	38.1	Yes	**16.38**	104.0	3.01	80.77	5.45	4.38	0.00	0.00	90.60	0.00
95	2,809	2,813	28.8	Yes	**17.43**	104.0	3.01	79.98	5.11	4.45	0.00	0.00	89.55	0.00
97	3,921	3,925	48.0	Yes	**13.30**	104.0	3.01	82.88	6.41	4.38	0.00	0.00	93.67	0.00
98	2,926	2,930	35.1	Yes	**16.98**	104.0	3.01	80.34	5.26	4.39	0.00	0.00	89.99	0.00
99	5,172	5,173	15.2	No	**9.24**	104.0	3.01	85.27	7.66	4.80	0.00	0.00	97.73	0.00
100	7,770	7,771	28.3	No	**3.59**	104.0	3.01	88.81	9.77	4.80	0.00	0.00	103.38	0.00
101	1,659	1,666	54.4	Yes	**24.35**	104.0	3.01	75.43	3.51	3.68	0.00	0.00	82.62	0.00
102	6,898	6,899	47.3	Yes	**5.51**	104.0	3.01	87.78	9.12	4.57	0.00	0.00	101.46	0.00
103	1,550	1,556	49.4	Yes	**25.09**	104.0	3.01	74.84	3.34	3.71	0.00	0.00	81.89	0.00
104	6,797	6,798	28.3	No	**5.48**	104.0	3.01	87.65	9.04	4.80	0.00	0.00	101.49	0.00
107	2,683	2,687	50.9	Yes	**18.28**	104.0	3.01	79.58	4.95	4.15	0.00	0.00	88.69	0.00
108	5,874	5,875	14.7	No	**7.51**	104.0	3.01	86.38	8.28	4.80	0.00	0.00	99.46	0.00
109	11,899	11,899	21.3	No	**-2.64**	104.0	3.01	92.51	12.31	4.80	0.00	0.00	109.62	0.00
110	9,244	9,244	10.6	No	**1.09**	104.0	3.01	90.32	10.77	4.80	0.00	0.00	105.88	0.00
111	9,808	9,808	14.4	No	**0.22**	104.0	3.01	90.83	11.12	4.80	0.00	0.00	106.75	0.00
113	2,430	2,434	50.5	Yes	**19.54**	104.0	3.01	78.73	4.62	4.09	0.00	0.00	87.44	0.00
114	10,301	10,301	13.7	No	**-0.50**	104.0	3.01	91.26	11.41	4.80	0.00	0.00	107.47	0.00
115	3,783	3,785	13.8	No	**13.35**	104.0	3.01	82.56	6.26	4.80	0.00	0.00	93.62	0.00
116	5,653	5,654	46.3	Yes	**8.31**	104.0	3.01	86.05	8.09	4.52	0.00	0.00	98.66	0.00
118	12,354	12,354	22.4	No	**-3.21**	104.0	3.01	92.84	12.54	4.80	0.00	0.00	110.18	0.00
119	4,464	4,466	24.9	No	**11.20**	104.0	3.01	84.00	6.97	4.80	0.00	0.00	95.77	0.00
120	1,324	1,331	51.1	Yes	**27.05**	104.0	3.01	73.48	2.97	3.48	0.00	0.00	79.92	0.00
121	4,489	4,491	30.9	Yes	**11.36**	104.0	3.01	84.05	7.00	4.57	0.00	0.00	95.61	0.00
125	12,708	12,708	36.2	No	**-3.63**	104.0	3.01	93.08	12.72	4.80	0.00	0.00	110.60	0.00
126	9,072	9,072	29.6	No	**1.36**	104.0	3.01	90.15	10.66	4.80	0.00	0.00	105.61	0.00
127	9,313	9,314	28.7	No	**0.98**	104.0	3.01	90.38	10.81	4.80	0.00	0.00	105.99	0.00
128	9,548	9,548	25.9	No	**0.62**	104.0	3.01	90.60	10.96	4.80	0.00	0.00	106.36	0.00
129	4,076	4,077	37.1	Yes	**12.70**	104.0	3.01	83.21	6.57	4.49	0.00	0.00	94.27	0.00
130	4,316	4,317	37.6	No	**11.65**	104.0	3.01	83.70	6.82	4.80	0.00	0.00	95.33	0.00
131	3,949	3,951	36.0	No	**12.80**	104.0	3.01	82.93	6.44	4.80	0.00	0.00	94.17	0.00
132	3,546	3,547	37.5	Yes	**14.54**	104.0	3.01	82.00	5.99	4.44	0.00	0.00	92.43	0.00
133	7,763	7,764	13.4	No	**3.61**	104.0	3.01	88.80	9.77	4.80	0.00	0.00	103.37	0.00
134	2,170	2,172	39.7	Yes	**20.80**	104.0	3.01	77.74	4.26	4.17	0.00	0.00	86.17	0.00
141	4,138	4,141	43.1	Yes	**12.55**	104.0	3.01	83.34	6.64	4.44	0.00	0.00	94.43	0.00
142	6,613	6,615	50.9	Yes	**6.13**	104.0	3.01	87.41	8.90	4.54	0.00	0.00	100.84	0.00
143	3,567	3,571	49.3	Yes	**14.57**	104.0	3.01	82.06	6.02	4.33	0.00	0.00	92.40	0.00
144	7,784	7,785	38.5	No	**3.57**	104.0	3.01	88.83	9.78	4.80	0.00	0.00	103.41	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	10,690	10,690	16.8	No	**-1.05**	104.0	3.01	91.58	11.64	4.80	0.00	0.00	108.02	0.00
146	10,389	10,390	16.5	No	**-0.62**	104.0	3.01	91.33	11.46	4.80	0.00	0.00	107.60	0.00
Sum	35.49													

Noise sensitive area: H34 H34

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	6,642	6,643	28.4	No	**5.81**	104.0	3.01	87.45	8.92	4.80	0.00	0.00	101.17	0.00
2	7,119	7,120	23.8	No	**4.83**	104.0	3.01	88.05	9.29	4.80	0.00	0.00	102.14	0.00
3	7,391	7,393	25.6	No	**4.30**	104.0	3.01	88.38	9.49	4.80	0.00	0.00	102.67	0.00
4	8,732	8,732	12.9	No	**1.92**	104.0	3.01	89.82	10.43	4.80	0.00	0.00	105.06	0.00
5	7,968	7,969	17.4	No	**3.23**	104.0	3.01	89.03	9.91	4.80	0.00	0.00	103.74	0.00
6	7,364	7,365	28.0	Yes	**4.48**	104.0	3.01	88.34	9.47	4.67	0.00	0.00	102.49	0.00
7	7,113	7,114	39.6	No	**4.85**	104.0	3.01	88.04	9.28	4.80	0.00	0.00	102.13	0.00
8	6,537	6,538	24.4	No	**6.03**	104.0	3.01	87.31	8.83	4.80	0.00	0.00	100.94	0.00
9	6,534	6,535	32.1	Yes	**6.20**	104.0	3.01	87.30	8.83	4.63	0.00	0.00	100.77	0.00
10	5,996	5,998	46.5	Yes	**7.49**	104.0	3.01	86.56	8.39	4.54	0.00	0.00	99.48	0.00
11	4,937	4,939	57.5	Yes	**10.26**	104.0	3.01	84.87	7.44	4.40	0.00	0.00	96.71	0.00
12	5,089	5,091	55.9	Yes	**9.83**	104.0	3.01	85.14	7.58	4.43	0.00	0.00	97.14	0.00
13	5,126	5,129	58.9	Yes	**9.75**	104.0	3.01	85.20	7.62	4.41	0.00	0.00	97.23	0.00
14	5,122	5,125	60.2	Yes	**9.77**	104.0	3.01	85.19	7.61	4.40	0.00	0.00	97.21	0.00
15	5,636	5,639	54.7	Yes	**8.40**	104.0	3.01	86.02	8.08	4.47	0.00	0.00	98.57	0.00
16	6,013	6,015	49.3	Yes	**7.46**	104.0	3.01	86.59	8.40	4.52	0.00	0.00	99.51	0.00
17	4,858	4,861	57.1	Yes	**10.48**	104.0	3.01	84.73	7.36	4.40	0.00	0.00	96.50	0.00
18	4,544	4,547	58.2	Yes	**11.40**	104.0	3.01	84.15	7.05	4.36	0.00	0.00	95.57	0.00
19	4,772	4,775	57.8	Yes	**10.73**	104.0	3.01	84.58	7.28	4.39	0.00	0.00	96.25	0.00
20	5,206	5,209	51.6	Yes	**9.49**	104.0	3.01	85.33	7.69	4.46	0.00	0.00	97.49	0.00
21	8,426	8,427	20.6	No	**2.43**	104.0	3.01	89.51	10.23	4.80	0.00	0.00	104.54	0.00
22	9,211	9,211	12.9	No	**1.14**	104.0	3.01	90.29	10.74	4.80	0.00	0.00	105.83	0.00
23	9,413	9,414	14.6	No	**0.82**	104.0	3.01	90.48	10.87	4.80	0.00	0.00	106.15	0.00
24	9,100	9,100	12.6	No	**1.32**	104.0	3.01	90.18	10.67	4.80	0.00	0.00	105.65	0.00
25	9,688	9,688	13.8	No	**0.40**	104.0	3.01	90.72	11.04	4.80	0.00	0.00	106.57	0.00
26	7,784	7,785	23.0	No	**3.57**	104.0	3.01	88.83	9.78	4.80	0.00	0.00	103.41	0.00
27	8,861	8,861	17.4	No	**1.70**	104.0	3.01	89.95	10.52	4.80	0.00	0.00	105.27	0.00
28	7,889	7,890	35.0	No	**3.37**	104.0	3.01	88.94	9.86	4.80	0.00	0.00	103.60	0.00
29	9,010	9,011	14.3	No	**1.46**	104.0	3.01	90.10	10.62	4.80	0.00	0.00	105.51	0.00
30	9,618	9,618	8.9	No	**0.51**	104.0	3.01	90.66	11.00	4.80	0.00	0.00	106.46	0.00
31	9,978	9,979	14.5	No	**-0.03**	104.0	3.01	90.98	11.22	4.80	0.00	0.00	107.00	0.00
32	10,163	10,163	13.6	No	**-0.30**	104.0	3.01	91.14	11.33	4.80	0.00	0.00	107.27	0.00
33	9,936	9,936	9.1	No	**0.03**	104.0	3.01	90.94	11.20	4.80	0.00	0.00	106.94	0.00
34	7,346	7,348	35.4	No	**4.39**	104.0	3.01	88.32	9.46	4.80	0.00	0.00	102.58	0.00
35	6,935	6,937	40.9	No	**5.20**	104.0	3.01	87.82	9.15	4.80	0.00	0.00	101.77	0.00
36	6,767	6,768	42.3	No	**5.55**	104.0	3.01	87.61	9.02	4.80	0.00	0.00	101.43	0.00
37	7,552	7,553	35.2	No	**4.00**	104.0	3.01	88.56	9.61	4.80	0.00	0.00	102.97	0.00
38	9,278	9,279	14.5	No	**1.03**	104.0	3.01	90.35	10.79	4.80	0.00	0.00	105.94	0.00
39	8,662	8,663	27.8	No	**2.03**	104.0	3.01	89.75	10.39	4.80	0.00	0.00	104.94	0.00
40	6,867	6,868	30.6	No	**5.34**	104.0	3.01	87.74	9.09	4.80	0.00	0.00	101.63	0.00
41	8,443	8,445	39.2	No	**2.40**	104.0	3.01	89.53	10.24	4.80	0.00	0.00	104.57	0.00
43	7,644	7,645	41.0	No	**3.83**	104.0	3.01	88.67	9.68	4.80	0.00	0.00	103.15	0.00
44	8,260	8,262	51.7	No	**2.72**	104.0	3.01	89.34	10.12	4.80	0.00	0.00	104.26	0.00
45	8,543	8,544	48.1	No	**2.23**	104.0	3.01	89.63	10.31	4.80	0.00	0.00	104.74	0.00
46	7,234	7,236	35.7	No	**4.61**	104.0	3.01	88.19	9.38	4.80	0.00	0.00	102.37	0.00
48	10,440	10,440	12.2	No	**-0.70**	104.0	3.01	91.37	11.49	4.80	0.00	0.00	107.67	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	11,240	11,240	13.6	No	**-1.79**	104.0	3.01	92.02	11.95	4.80	0.00	0.00	108.76	0.00
50	7,158	7,159	31.5	Yes	**4.91**	104.0	3.01	88.10	9.32	4.65	0.00	0.00	102.07	0.00
51	10,906	10,906	12.0	No	**-1.34**	104.0	3.01	91.75	11.76	4.80	0.00	0.00	108.32	0.00
52	10,709	10,709	11.2	No	**-1.07**	104.0	3.01	91.60	11.65	4.80	0.00	0.00	108.05	0.00
53	11,472	11,473	16.7	No	**-2.10**	104.0	3.01	92.19	12.08	4.80	0.00	0.00	109.07	0.00
55	12,522	12,522	13.9	No	**-3.41**	104.0	3.01	92.95	12.63	4.80	0.00	0.00	110.38	0.00
56	12,762	12,762	16.9	No	**-3.70**	104.0	3.01	93.12	12.75	4.80	0.00	0.00	110.67	0.00
57	12,260	12,260	14.5	No	**-3.09**	104.0	3.01	92.77	12.49	4.80	0.00	0.00	110.06	0.00
58	9,738	9,738	9.9	No	**0.33**	104.0	3.01	90.77	11.07	4.80	0.00	0.00	106.64	0.00
59	13,002	13,002	18.9	No	**-3.98**	104.0	3.01	93.28	12.87	4.80	0.00	0.00	110.95	0.00
60	13,935	13,936	23.5	No	**-5.03**	104.0	3.01	93.88	13.32	4.80	0.00	0.00	112.00	0.00
61	14,232	14,232	20.4	No	**-5.35**	104.0	3.01	94.07	13.46	4.80	0.00	0.00	112.32	0.00
62	12,942	12,943	29.9	No	**-3.91**	104.0	3.01	93.24	12.84	4.80	0.00	0.00	110.88	0.00
63	12,851	12,851	35.1	No	**-3.80**	104.0	3.01	93.18	12.79	4.80	0.00	0.00	110.77	0.00
64	13,808	13,808	34.3	No	**-4.89**	104.0	3.01	93.80	13.26	4.80	0.00	0.00	111.86	0.00
65	14,438	14,438	34.0	No	**-5.57**	104.0	3.01	94.19	13.55	4.80	0.00	0.00	112.54	0.00
66	6,563	6,564	27.9	No	**5.97**	104.0	3.01	87.34	8.85	4.80	0.00	0.00	101.00	0.00
67	14,204	14,204	31.7	No	**-5.32**	104.0	3.01	94.05	13.45	4.80	0.00	0.00	112.29	0.00
68	14,684	14,685	28.6	No	**-5.83**	104.0	3.01	94.34	13.67	4.80	0.00	0.00	112.80	0.00
69	14,264	14,265	34.0	No	**-5.39**	104.0	3.01	94.09	13.47	4.80	0.00	0.00	112.36	0.00
70	4,131	4,133	39.0	Yes	**12.54**	104.0	3.01	83.32	6.63	4.48	0.00	0.00	94.43	0.00
71	6,180	6,182	44.1	Yes	**7.05**	104.0	3.01	86.82	8.54	4.56	0.00	0.00	99.92	0.00
72	8,555	8,555	13.8	No	**2.21**	104.0	3.01	89.64	10.31	4.80	0.00	0.00	104.76	0.00
73	7,506	7,507	23.8	Yes	**4.19**	104.0	3.01	88.51	9.58	4.69	0.00	0.00	102.78	0.00
74	7,261	7,262	33.8	No	**4.55**	104.0	3.01	88.22	9.40	4.80	0.00	0.00	102.42	0.00
75	8,369	8,369	14.4	No	**2.53**	104.0	3.01	89.45	10.19	4.80	0.00	0.00	104.44	0.00
76	11,427	11,427	17.0	No	**-2.04**	104.0	3.01	92.16	12.05	4.80	0.00	0.00	109.01	0.00
77	11,386	11,386	11.4	No	**-1.98**	104.0	3.01	92.13	12.03	4.80	0.00	0.00	108.96	0.00
78	5,287	5,289	44.3	Yes	**9.23**	104.0	3.01	85.47	7.76	4.51	0.00	0.00	97.75	0.00
80	13,571	13,572	24.9	No	**-4.63**	104.0	3.01	93.65	13.15	4.80	0.00	0.00	111.60	0.00
81	4,592	4,594	58.4	Yes	**11.26**	104.0	3.01	84.24	7.10	4.37	0.00	0.00	95.71	0.00
82	10,300	10,300	10.9	No	**-0.50**	104.0	3.01	91.26	11.41	4.80	0.00	0.00	107.47	0.00
83	13,469	13,469	33.0	No	**-4.51**	104.0	3.01	93.59	13.10	4.80	0.00	0.00	111.49	0.00
85	11,902	11,902	15.6	No	**-2.65**	104.0	3.01	92.51	12.31	4.80	0.00	0.00	109.62	0.00
86	13,327	13,327	22.6	No	**-4.35**	104.0	3.01	93.49	13.03	4.80	0.00	0.00	111.32	0.00
87	14,675	14,675	32.4	No	**-5.82**	104.0	3.01	94.33	13.66	4.80	0.00	0.00	112.79	0.00
89	13,458	13,458	34.5	No	**-4.50**	104.0	3.01	93.58	13.09	4.80	0.00	0.00	111.47	0.00
90	12,202	12,203	20.2	No	**-3.02**	104.0	3.01	92.73	12.46	4.80	0.00	0.00	109.99	0.00
91	12,860	12,861	32.4	No	**-3.81**	104.0	3.01	93.19	12.80	4.80	0.00	0.00	110.79	0.00
92	13,735	13,735	32.5	No	**-4.81**	104.0	3.01	93.76	13.23	4.80	0.00	0.00	111.78	0.00
94	5,600	5,602	53.1	Yes	**8.48**	104.0	3.01	85.97	8.05	4.48	0.00	0.00	98.49	0.00
95	5,666	5,668	43.7	Yes	**8.26**	104.0	3.01	86.07	8.10	4.54	0.00	0.00	98.71	0.00
97	5,906	5,908	57.9	Yes	**7.77**	104.0	3.01	86.43	8.31	4.47	0.00	0.00	99.21	0.00
98	5,598	5,601	49.1	Yes	**8.46**	104.0	3.01	85.96	8.04	4.50	0.00	0.00	98.51	0.00
99	7,894	7,894	19.9	No	**3.37**	104.0	3.01	88.95	9.86	4.80	0.00	0.00	103.60	0.00
100	8,916	8,917	35.5	No	**1.61**	104.0	3.01	90.00	10.55	4.80	0.00	0.00	105.36	0.00
101	4,433	4,436	58.1	Yes	**11.74**	104.0	3.01	83.94	6.94	4.35	0.00	0.00	95.24	0.00
102	8,074	8,076	51.8	No	**3.04**	104.0	3.01	89.14	9.99	4.80	0.00	0.00	103.93	0.00
103	4,500	4,502	59.0	Yes	**11.54**	104.0	3.01	84.07	7.01	4.35	0.00	0.00	95.43	0.00
104	8,173	8,174	33.8	No	**2.87**	104.0	3.01	89.25	10.05	4.80	0.00	0.00	104.10	0.00
107	4,920	4,923	55.4	Yes	**10.29**	104.0	3.01	84.84	7.42	4.42	0.00	0.00	96.68	0.00
108	8,660	8,661	15.9	No	**2.04**	104.0	3.01	89.75	10.39	4.80	0.00	0.00	104.94	0.00
109	13,227	13,227	20.9	No	**-4.24**	104.0	3.01	93.43	12.98	4.80	0.00	0.00	111.21	0.00
110	10,641	10,641	12.5	No	**-0.98**	104.0	3.01	91.54	11.61	4.80	0.00	0.00	107.95	0.00
111	11,114	11,115	16.5	No	**-1.62**	104.0	3.01	91.92	11.88	4.80	0.00	0.00	108.60	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	4,809	4,811	55.9	Yes	**10.61**	104.0	3.01	84.65	7.31	4.40	0.00	0.00	96.36	0.00
114	12,095	12,095	16.2	No	**-2.89**	104.0	3.01	92.65	12.41	4.80	0.00	0.00	109.86	0.00
115	6,626	6,627	25.0	No	**5.84**	104.0	3.01	87.43	8.90	4.80	0.00	0.00	101.13	0.00
116	7,025	7,027	49.2	No	**5.02**	104.0	3.01	87.94	9.22	4.80	0.00	0.00	101.95	0.00
118	13,637	13,638	22.8	No	**-4.70**	104.0	3.01	93.69	13.18	4.80	0.00	0.00	111.67	0.00
119	6,748	6,750	38.3	Yes	**5.78**	104.0	3.01	87.59	9.00	4.61	0.00	0.00	101.20	0.00
120	4,201	4,203	56.5	Yes	**12.45**	104.0	3.01	83.47	6.71	4.34	0.00	0.00	94.52	0.00
121	6,559	6,561	43.3	Yes	**6.21**	104.0	3.01	87.34	8.85	4.57	0.00	0.00	100.77	0.00
125	13,180	13,180	33.3	No	**-4.18**	104.0	3.01	93.40	12.96	4.80	0.00	0.00	111.16	0.00
126	10,023	10,024	33.9	No	**-0.10**	104.0	3.01	91.02	11.25	4.80	0.00	0.00	107.07	0.00
127	10,263	10,264	34.0	No	**-0.45**	104.0	3.01	91.23	11.39	4.80	0.00	0.00	107.42	0.00
128	10,536	10,536	32.2	No	**-0.83**	104.0	3.01	91.45	11.55	4.80	0.00	0.00	107.80	0.00
129	5,071	5,072	33.2	No	**9.51**	104.0	3.01	85.10	7.56	4.80	0.00	0.00	97.47	0.00
130	4,916	4,917	32.6	No	**9.92**	104.0	3.01	84.83	7.42	4.80	0.00	0.00	97.05	0.00
131	4,469	4,471	31.5	No	**11.19**	104.0	3.01	84.01	6.98	4.80	0.00	0.00	95.79	0.00
132	4,112	4,114	32.6	No	**12.28**	104.0	3.01	83.29	6.61	4.80	0.00	0.00	94.70	0.00
133	9,167	9,168	18.1	No	**1.21**	104.0	3.01	90.25	10.72	4.80	0.00	0.00	105.76	0.00
134	4,411	4,413	41.9	Yes	**11.68**	104.0	3.01	83.89	6.92	4.48	0.00	0.00	95.29	0.00
141	6,151	6,153	55.1	Yes	**7.18**	104.0	3.01	86.78	8.52	4.49	0.00	0.00	99.80	0.00
142	7,828	7,830	54.9	No	**3.49**	104.0	3.01	88.87	9.81	4.80	0.00	0.00	103.49	0.00
143	5,671	5,673	57.9	Yes	**8.34**	104.0	3.01	86.08	8.11	4.45	0.00	0.00	98.64	0.00
144	8,794	8,795	39.8	No	**1.81**	104.0	3.01	89.89	10.47	4.80	0.00	0.00	105.16	0.00
145	11,755	11,755	21.9	No	**-2.46**	104.0	3.01	92.40	12.23	4.80	0.00	0.00	109.43	0.00
146	11,492	11,493	21.6	No	**-2.12**	104.0	3.01	92.21	12.09	4.80	0.00	0.00	109.10	0.00

Sum 26.63

Noise sensitive area: H35 H35

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	6,451	6,451	35.2	No	**6.22**	104.0	3.01	87.19	8.76	4.80	0.00	0.00	100.76	0.00
2	6,881	6,882	31.3	No	**5.31**	104.0	3.01	87.75	9.11	4.80	0.00	0.00	101.66	0.00
3	7,003	7,004	34.6	No	**5.07**	104.0	3.01	87.91	9.20	4.80	0.00	0.00	101.91	0.00
4	8,086	8,086	21.6	No	**3.02**	104.0	3.01	89.15	9.99	4.80	0.00	0.00	103.95	0.00
5	7,280	7,281	25.8	No	**4.52**	104.0	3.01	88.24	9.41	4.80	0.00	0.00	102.45	0.00
6	6,826	6,827	37.0	No	**5.43**	104.0	3.01	87.68	9.06	4.80	0.00	0.00	101.55	0.00
7	6,035	6,036	47.8	Yes	**7.41**	104.0	3.01	86.62	8.42	4.53	0.00	0.00	99.57	0.00
8	6,537	6,537	29.5	No	**6.03**	104.0	3.01	87.31	8.83	4.80	0.00	0.00	100.94	0.00
9	6,195	6,196	40.8	No	**6.78**	104.0	3.01	86.84	8.55	4.80	0.00	0.00	100.20	0.00
10	5,591	5,593	54.2	No	**8.18**	104.0	3.01	85.95	8.04	4.80	0.00	0.00	98.79	0.00
11	5,048	5,049	61.1	No	**9.57**	104.0	3.01	85.06	7.54	4.80	0.00	0.00	97.41	0.00
12	5,122	5,124	59.5	No	**9.37**	104.0	3.01	85.19	7.61	4.80	0.00	0.00	97.60	0.00
13	4,977	4,979	63.0	No	**9.75**	104.0	3.01	84.94	7.48	4.80	0.00	0.00	97.22	0.00
14	4,812	4,814	66.5	No	**10.20**	104.0	3.01	84.65	7.32	4.80	0.00	0.00	96.77	0.00
15	5,056	5,058	62.6	No	**9.54**	104.0	3.01	85.08	7.55	4.80	0.00	0.00	97.43	0.00
16	5,352	5,354	55.9	No	**8.78**	104.0	3.01	85.57	7.82	4.80	0.00	0.00	98.20	0.00
17	5,059	5,061	61.4	No	**9.54**	104.0	3.01	85.08	7.55	4.80	0.00	0.00	97.44	0.00
18	4,821	4,822	61.5	No	**10.18**	104.0	3.01	84.66	7.33	4.80	0.00	0.00	96.79	0.00
19	4,550	4,552	61.8	No	**10.95**	104.0	3.01	84.16	7.06	4.80	0.00	0.00	96.02	0.00
20	4,548	4,550	57.4	No	**10.95**	104.0	3.01	84.16	7.06	4.80	0.00	0.00	96.02	0.00
21	7,632	7,633	29.2	No	**3.85**	104.0	3.01	88.65	9.67	4.80	0.00	0.00	103.12	0.00
22	8,342	8,342	22.8	No	**2.58**	104.0	3.01	89.43	10.17	4.80	0.00	0.00	104.40	0.00
23	8,477	8,478	24.1	No	**2.34**	104.0	3.01	89.57	10.26	4.80	0.00	0.00	104.63	0.00
24	8,276	8,277	22.2	No	**2.69**	104.0	3.01	89.36	10.13	4.80	0.00	0.00	104.28	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	8,358	8,358	24.8	No	**2.55**	104.0	3.01	89.44	10.18	4.80	0.00	0.00	104.42	0.00
26	6,846	6,846	31.7	No	**5.38**	104.0	3.01	87.71	9.08	4.80	0.00	0.00	101.59	0.00
27	7,551	7,552	28.0	Yes	**4.13**	104.0	3.01	88.56	9.61	4.67	0.00	0.00	102.85	0.00
28	6,569	6,570	45.0	Yes	**6.19**	104.0	3.01	87.35	8.86	4.57	0.00	0.00	100.78	0.00
29	7,992	7,993	23.1	No	**3.19**	104.0	3.01	89.05	9.93	4.80	0.00	0.00	103.78	0.00
30	8,603	8,603	18.5	No	**2.13**	104.0	3.01	89.69	10.35	4.80	0.00	0.00	104.84	0.00
31	9,139	9,139	25.0	No	**1.26**	104.0	3.01	90.22	10.70	4.80	0.00	0.00	105.72	0.00
32	8,847	8,848	24.7	No	**1.73**	104.0	3.01	89.94	10.51	4.80	0.00	0.00	105.25	0.00
33	8,824	8,824	22.2	No	**1.77**	104.0	3.01	89.91	10.49	4.80	0.00	0.00	105.21	0.00
34	6,205	6,206	45.0	Yes	**7.00**	104.0	3.01	86.86	8.56	4.55	0.00	0.00	99.97	0.00
35	5,925	5,926	48.9	Yes	**7.67**	104.0	3.01	86.46	8.33	4.52	0.00	0.00	99.30	0.00
36	5,830	5,831	50.0	Yes	**7.90**	104.0	3.01	86.31	8.25	4.51	0.00	0.00	99.07	0.00
37	6,350	6,351	44.4	Yes	**6.67**	104.0	3.01	87.06	8.68	4.56	0.00	0.00	100.30	0.00
38	7,944	7,944	25.0	No	**3.28**	104.0	3.01	89.00	9.89	4.80	0.00	0.00	103.69	0.00
39	7,231	7,231	39.8	Yes	**4.80**	104.0	3.01	88.18	9.37	4.61	0.00	0.00	102.17	0.00
40	5,296	5,296	42.4	Yes	**9.20**	104.0	3.01	85.48	7.77	4.53	0.00	0.00	97.78	0.00
41	6,972	6,973	51.2	Yes	**5.38**	104.0	3.01	87.87	9.18	4.55	0.00	0.00	101.59	0.00
43	6,326	6,327	51.0	Yes	**6.76**	104.0	3.01	87.02	8.66	4.52	0.00	0.00	100.21	0.00
44	6,722	6,723	63.5	Yes	**5.96**	104.0	3.01	87.55	8.98	4.48	0.00	0.00	101.01	0.00
45	6,984	6,985	60.6	Yes	**5.40**	104.0	3.01	87.88	9.19	4.50	0.00	0.00	101.57	0.00
46	5,742	5,743	46.8	Yes	**8.10**	104.0	3.01	86.18	8.17	4.52	0.00	0.00	98.87	0.00
48	9,018	9,019	24.7	No	**1.45**	104.0	3.01	90.10	10.62	4.80	0.00	0.00	105.52	0.00
49	9,914	9,914	25.2	No	**0.07**	104.0	3.01	90.92	11.18	4.80	0.00	0.00	106.91	0.00
50	6,363	6,364	39.9	No	**6.41**	104.0	3.01	87.07	8.69	4.80	0.00	0.00	100.57	0.00
51	9,629	9,629	23.4	No	**0.49**	104.0	3.01	90.67	11.01	4.80	0.00	0.00	106.48	0.00
52	9,470	9,470	23.1	No	**0.74**	104.0	3.01	90.53	10.91	4.80	0.00	0.00	106.23	0.00
53	10,113	10,113	28.4	No	**-0.23**	104.0	3.01	91.10	11.30	4.80	0.00	0.00	107.20	0.00
55	11,034	11,034	27.6	No	**-1.52**	104.0	3.01	91.85	11.83	4.80	0.00	0.00	108.49	0.00
56	11,253	11,253	31.0	No	**-1.81**	104.0	3.01	92.03	11.96	4.80	0.00	0.00	108.78	0.00
57	10,697	10,697	29.0	No	**-1.06**	104.0	3.01	91.59	11.64	4.80	0.00	0.00	108.03	0.00
58	8,518	8,518	21.4	No	**2.28**	104.0	3.01	89.61	10.29	4.80	0.00	0.00	104.70	0.00
59	11,473	11,473	33.5	No	**-2.10**	104.0	3.01	92.19	12.08	4.80	0.00	0.00	109.07	0.00
60	12,301	12,302	38.9	No	**-3.14**	104.0	3.01	92.80	12.52	4.80	0.00	0.00	110.11	0.00
61	12,582	12,582	36.5	No	**-3.48**	104.0	3.01	93.00	12.66	4.80	0.00	0.00	110.45	0.00
62	11,184	11,185	44.3	Yes	**-1.58**	104.0	3.01	91.97	11.92	4.67	0.00	0.00	108.56	0.00
63	11,027	11,027	48.3	No	**-1.51**	104.0	3.01	91.85	11.83	4.80	0.00	0.00	108.48	0.00
64	11,938	11,939	47.5	No	**-2.69**	104.0	3.01	92.54	12.33	4.80	0.00	0.00	109.67	0.00
65	12,566	12,566	47.2	No	**-3.46**	104.0	3.01	92.98	12.65	4.80	0.00	0.00	110.44	0.00
66	5,013	5,013	39.0	Yes	**9.93**	104.0	3.01	85.00	7.51	4.53	0.00	0.00	97.04	0.00
67	12,366	12,366	45.2	No	**-3.22**	104.0	3.01	92.84	12.55	4.80	0.00	0.00	110.19	0.00
68	12,836	12,836	42.5	No	**-3.78**	104.0	3.01	93.17	12.79	4.80	0.00	0.00	110.76	0.00
69	12,387	12,387	47.4	No	**-3.25**	104.0	3.01	92.86	12.56	4.80	0.00	0.00	110.22	0.00
70	3,740	3,741	43.6	No	**13.50**	104.0	3.01	82.46	6.21	4.80	0.00	0.00	93.47	0.00
71	5,689	5,691	51.7	No	**7.95**	104.0	3.01	86.10	8.12	4.80	0.00	0.00	99.03	0.00
72	7,989	7,989	23.2	No	**3.20**	104.0	3.01	89.05	9.93	4.80	0.00	0.00	103.77	0.00
73	6,885	6,885	31.9	No	**5.30**	104.0	3.01	87.76	9.11	4.80	0.00	0.00	101.67	0.00
74	6,384	6,385	41.1	No	**6.36**	104.0	3.01	87.10	8.71	4.80	0.00	0.00	100.61	0.00
75	7,339	7,339	23.0	No	**4.40**	104.0	3.01	88.31	9.45	4.80	0.00	0.00	102.57	0.00
76	9,872	9,872	31.1	No	**0.13**	104.0	3.01	90.89	11.16	4.80	0.00	0.00	106.84	0.00
77	9,946	9,946	24.9	No	**0.02**	104.0	3.01	90.95	11.20	4.80	0.00	0.00	106.95	0.00
78	4,479	4,480	49.9	No	**11.16**	104.0	3.01	84.03	6.99	4.80	0.00	0.00	95.82	0.00
80	11,951	11,951	40.0	No	**-2.71**	104.0	3.01	92.55	12.33	4.80	0.00	0.00	109.68	0.00
81	4,473	4,475	61.3	No	**11.17**	104.0	3.01	84.02	6.98	4.80	0.00	0.00	95.80	0.00
82	9,107	9,107	23.2	No	**1.31**	104.0	3.01	90.19	10.68	4.80	0.00	0.00	105.67	0.00
83	11,636	11,636	46.4	No	**-2.31**	104.0	3.01	92.32	12.16	4.80	0.00	0.00	109.28	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	10,641	10,641	27.9	No	**-0.98**	104.0	3.01	91.54	11.61	4.80	0.00	0.00	107.95	0.00
86	11,720	11,720	37.6	No	**-2.42**	104.0	3.01	92.38	12.21	4.80	0.00	0.00	109.39	0.00
87	12,801	12,802	45.6	No	**-3.74**	104.0	3.01	93.15	12.77	4.80	0.00	0.00	110.72	0.00
89	11,602	11,602	48.1	No	**-2.27**	104.0	3.01	92.29	12.15	4.80	0.00	0.00	109.24	0.00
90	10,550	10,550	36.1	Yes	**-0.74**	104.0	3.01	91.47	11.56	4.68	0.00	0.00	107.71	0.00
91	11,073	11,073	46.0	No	**-1.57**	104.0	3.01	91.89	11.86	4.80	0.00	0.00	108.54	0.00
92	11,839	11,839	46.2	No	**-2.57**	104.0	3.01	92.47	12.27	4.80	0.00	0.00	109.54	0.00
94	5,226	5,228	61.4	No	**9.10**	104.0	3.01	85.37	7.71	4.80	0.00	0.00	97.87	0.00
95	5,692	5,693	47.7	No	**7.94**	104.0	3.01	86.11	8.13	4.80	0.00	0.00	99.03	0.00
97	5,060	5,062	64.2	Yes	**9.97**	104.0	3.01	85.09	7.55	4.37	0.00	0.00	97.01	0.00
98	5,377	5,379	55.2	No	**8.71**	104.0	3.01	85.61	7.85	4.80	0.00	0.00	98.26	0.00
99	7,557	7,557	28.2	No	**3.99**	104.0	3.01	88.57	9.62	4.80	0.00	0.00	102.98	0.00
100	7,378	7,379	47.5	Yes	**4.55**	104.0	3.01	88.36	9.48	4.58	0.00	0.00	102.42	0.00
101	4,493	4,494	61.3	No	**11.12**	104.0	3.01	84.05	7.00	4.80	0.00	0.00	95.86	0.00
102	6,583	6,584	63.3	Yes	**6.26**	104.0	3.01	87.37	8.87	4.47	0.00	0.00	100.71	0.00
103	4,895	4,896	61.7	No	**9.98**	104.0	3.01	84.80	7.40	4.80	0.00	0.00	96.99	0.00
104	6,775	6,776	44.7	Yes	**5.76**	104.0	3.01	87.62	9.02	4.58	0.00	0.00	101.22	0.00
107	4,410	4,412	61.6	No	**11.36**	104.0	3.01	83.89	6.92	4.80	0.00	0.00	95.61	0.00
108	8,385	8,385	24.1	No	**2.50**	104.0	3.01	89.47	10.20	4.80	0.00	0.00	104.47	0.00
109	11,676	11,676	35.8	No	**-2.36**	104.0	3.01	92.35	12.19	4.80	0.00	0.00	109.33	0.00
110	9,169	9,169	26.2	No	**1.21**	104.0	3.01	90.25	10.72	4.80	0.00	0.00	105.76	0.00
111	9,590	9,590	30.4	No	**0.55**	104.0	3.01	90.64	10.98	4.80	0.00	0.00	106.42	0.00
113	4,431	4,433	61.7	No	**11.30**	104.0	3.01	83.93	6.94	4.80	0.00	0.00	95.68	0.00
114	10,803	10,803	27.9	No	**-1.20**	104.0	3.01	91.67	11.70	4.80	0.00	0.00	108.17	0.00
115	6,552	6,552	29.7	No	**6.00**	104.0	3.01	87.33	8.85	4.80	0.00	0.00	100.97	0.00
116	5,692	5,693	59.2	Yes	**8.29**	104.0	3.01	86.11	8.13	4.45	0.00	0.00	98.68	0.00
118	12,061	12,061	37.7	No	**-2.85**	104.0	3.01	92.63	12.39	4.80	0.00	0.00	109.82	0.00
119	6,042	6,043	44.2	No	**7.12**	104.0	3.01	86.63	8.43	4.80	0.00	0.00	99.85	0.00
120	4,434	4,435	59.8	No	**11.29**	104.0	3.01	83.94	6.94	4.80	0.00	0.00	95.68	0.00
121	5,704	5,705	50.1	No	**7.91**	104.0	3.01	86.13	8.14	4.80	0.00	0.00	99.06	0.00
125	11,350	11,350	46.6	No	**-1.94**	104.0	3.01	92.10	12.01	4.80	0.00	0.00	108.91	0.00
126	8,376	8,376	48.8	Yes	**2.72**	104.0	3.01	89.46	10.19	4.60	0.00	0.00	104.26	0.00
127	8,610	8,611	48.9	Yes	**2.31**	104.0	3.01	89.70	10.35	4.61	0.00	0.00	104.66	0.00
128	8,891	8,892	47.5	Yes	**1.84**	104.0	3.01	89.98	10.54	4.62	0.00	0.00	105.14	0.00
129	3,736	3,737	42.8	Yes	**13.91**	104.0	3.01	82.45	6.21	4.41	0.00	0.00	93.07	0.00
130	3,402	3,403	42.3	Yes	**15.13**	104.0	3.01	81.64	5.83	4.37	0.00	0.00	91.84	0.00
131	2,985	2,987	41.0	Yes	**16.81**	104.0	3.01	80.50	5.33	4.33	0.00	0.00	90.16	0.00
132	2,728	2,729	41.1	Yes	**17.96**	104.0	3.01	79.72	5.01	4.28	0.00	0.00	89.01	0.00
133	7,743	7,743	30.1	No	**3.64**	104.0	3.01	88.78	9.75	4.80	0.00	0.00	103.33	0.00
134	4,012	4,013	46.9	No	**12.60**	104.0	3.01	83.07	6.51	4.80	0.00	0.00	94.38	0.00
141	5,296	5,298	61.6	Yes	**9.31**	104.0	3.01	85.48	7.77	4.40	0.00	0.00	97.66	0.00
142	6,366	6,368	66.6	Yes	**6.75**	104.0	3.01	87.08	8.70	4.44	0.00	0.00	100.22	0.00
143	4,941	4,943	64.2	Yes	**10.30**	104.0	3.01	84.88	7.44	4.36	0.00	0.00	96.68	0.00
144	7,203	7,203	52.9	Yes	**4.92**	104.0	3.01	88.15	9.35	4.55	0.00	0.00	102.05	0.00
145	10,118	10,118	37.2	Yes	**-0.11**	104.0	3.01	91.10	11.30	4.67	0.00	0.00	107.08	0.00
146	9,875	9,875	36.6	Yes	**0.25**	104.0	3.01	90.89	11.16	4.67	0.00	0.00	106.72	0.00
Sum	28.38													

Noise sensitive area: H36 H36

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	8,717	8,718	37.0	Yes	**2.08**	104.0	3.01	89.81	10.42	4.66	0.00	0.00	104.89	0.00
2	8,859	8,860	33.9	No	**1.71**	104.0	3.01	89.95	10.52	4.80	0.00	0.00	105.27	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	8,527	8,527	36.6	No	**2.26**	104.0	3.01	89.62	10.30	4.80	0.00	0.00	104.71	0.00
4	8,412	8,412	30.9	No	**2.46**	104.0	3.01	89.50	10.22	4.80	0.00	0.00	104.52	0.00
5	7,790	7,791	33.2	Yes	**3.70**	104.0	3.01	88.83	9.78	4.65	0.00	0.00	103.27	0.00
6	7,998	7,998	39.1	Yes	**3.35**	104.0	3.01	89.06	9.93	4.63	0.00	0.00	103.63	0.00
7	5,874	5,875	56.3	Yes	**7.83**	104.0	3.01	86.38	8.28	4.47	0.00	0.00	99.14	0.00
8	9,232	9,232	30.6	No	**1.11**	104.0	3.01	90.31	10.76	4.80	0.00	0.00	105.86	0.00
9	8,201	8,202	42.9	Yes	**3.00**	104.0	3.01	89.28	10.07	4.62	0.00	0.00	103.97	0.00
10	7,732	7,733	56.3	Yes	**3.91**	104.0	3.01	88.77	9.74	4.55	0.00	0.00	103.06	0.00
11	8,585	8,586	60.9	Yes	**2.40**	104.0	3.01	89.68	10.34	4.56	0.00	0.00	104.57	0.00
12	8,475	8,476	59.8	Yes	**2.59**	104.0	3.01	89.56	10.26	4.56	0.00	0.00	104.38	0.00
13	8,028	8,029	65.7	Yes	**3.40**	104.0	3.01	89.09	9.95	4.52	0.00	0.00	103.57	0.00
14	7,610	7,611	68.7	Yes	**4.20**	104.0	3.01	88.63	9.65	4.49	0.00	0.00	102.78	0.00
15	7,067	7,069	64.6	Yes	**5.25**	104.0	3.01	87.99	9.25	4.49	0.00	0.00	101.73	0.00
16	6,960	6,961	59.6	Yes	**5.44**	104.0	3.01	87.85	9.17	4.51	0.00	0.00	101.53	0.00
17	8,760	8,761	59.1	Yes	**2.10**	104.0	3.01	89.85	10.45	4.57	0.00	0.00	104.87	0.00
18	8,760	8,761	58.9	Yes	**2.10**	104.0	3.01	89.85	10.45	4.57	0.00	0.00	104.87	0.00
19	7,689	7,690	63.5	Yes	**4.02**	104.0	3.01	88.72	9.71	4.52	0.00	0.00	102.95	0.00
20	6,714	6,715	61.2	Yes	**5.97**	104.0	3.01	87.54	8.97	4.49	0.00	0.00	101.00	0.00
21	7,638	7,639	38.0	No	**3.84**	104.0	3.01	88.66	9.67	4.80	0.00	0.00	103.14	0.00
22	7,801	7,802	32.2	No	**3.54**	104.0	3.01	88.84	9.79	4.80	0.00	0.00	103.44	0.00
23	7,640	7,640	34.3	No	**3.83**	104.0	3.01	88.66	9.68	4.80	0.00	0.00	103.14	0.00
24	7,927	7,927	32.1	No	**3.31**	104.0	3.01	88.98	9.88	4.80	0.00	0.00	103.66	0.00
25	5,882	5,883	34.5	Yes	**7.69**	104.0	3.01	86.39	8.29	4.60	0.00	0.00	99.28	0.00
26	6,712	6,713	40.4	Yes	**5.87**	104.0	3.01	87.54	8.97	4.59	0.00	0.00	101.11	0.00
27	5,531	5,531	34.8	Yes	**8.55**	104.0	3.01	85.86	7.98	4.59	0.00	0.00	98.42	0.00
28	5,054	5,055	52.5	Yes	**9.90**	104.0	3.01	85.07	7.55	4.45	0.00	0.00	97.07	0.00
29	7,025	7,025	33.9	No	**5.02**	104.0	3.01	87.93	9.22	4.80	0.00	0.00	101.95	0.00
30	7,410	7,410	31.0	No	**4.27**	104.0	3.01	88.40	9.51	4.80	0.00	0.00	102.70	0.00
31	8,437	8,437	35.1	No	**2.41**	104.0	3.01	89.52	10.24	4.80	0.00	0.00	104.56	0.00
32	6,261	6,261	35.3	No	**6.63**	104.0	3.01	86.93	8.61	4.80	0.00	0.00	100.34	0.00
33	7,154	7,155	30.4	No	**4.77**	104.0	3.01	88.09	9.32	4.80	0.00	0.00	102.21	0.00
34	5,688	5,690	53.0	Yes	**8.27**	104.0	3.01	86.10	8.12	4.48	0.00	0.00	98.71	0.00
35	6,077	6,078	55.0	Yes	**7.35**	104.0	3.01	86.68	8.46	4.49	0.00	0.00	99.62	0.00
36	6,296	6,297	54.8	Yes	**6.85**	104.0	3.01	86.98	8.64	4.50	0.00	0.00	100.12	0.00
37	5,494	5,495	51.4	Yes	**8.74**	104.0	3.01	85.80	7.95	4.48	0.00	0.00	98.23	0.00
38	5,617	5,618	32.5	No	**8.12**	104.0	3.01	85.99	8.06	4.80	0.00	0.00	98.85	0.00
39	4,767	4,768	47.2	Yes	**10.67**	104.0	3.01	84.57	7.27	4.46	0.00	0.00	96.30	0.00
40	3,568	3,569	55.6	Yes	**14.63**	104.0	3.01	82.05	6.02	4.27	0.00	0.00	92.34	0.00
41	4,441	4,442	58.5	Yes	**11.72**	104.0	3.01	83.95	6.95	4.35	0.00	0.00	95.25	0.00
43	4,981	4,982	58.4	Yes	**10.15**	104.0	3.01	84.95	7.48	4.40	0.00	0.00	96.83	0.00
44	3,971	3,973	72.6	Yes	**13.35**	104.0	3.01	82.98	6.46	4.18	0.00	0.00	93.62	0.00
45	3,941	3,943	68.4	Yes	**13.42**	104.0	3.01	82.92	6.43	4.21	0.00	0.00	93.55	0.00
46	4,004	4,005	58.2	Yes	**13.12**	104.0	3.01	83.05	6.50	4.30	0.00	0.00	93.85	0.00
48	5,846	5,846	36.3	Yes	**7.79**	104.0	3.01	86.34	8.26	4.59	0.00	0.00	99.18	0.00
49	6,951	6,951	36.6	Yes	**5.35**	104.0	3.01	87.84	9.16	4.62	0.00	0.00	101.62	0.00
50	6,976	6,976	43.8	Yes	**5.33**	104.0	3.01	87.87	9.18	4.59	0.00	0.00	101.64	0.00
51	6,978	6,978	35.1	No	**5.12**	104.0	3.01	87.87	9.18	4.80	0.00	0.00	101.85	0.00
52	7,036	7,036	33.6	No	**5.00**	104.0	3.01	87.95	9.23	4.80	0.00	0.00	101.97	0.00
53	6,942	6,942	39.2	Yes	**5.38**	104.0	3.01	87.83	9.15	4.61	0.00	0.00	101.59	0.00
55	7,029	7,030	38.7	Yes	**5.20**	104.0	3.01	87.94	9.22	4.61	0.00	0.00	101.77	0.00
56	7,105	7,105	41.9	Yes	**5.06**	104.0	3.01	88.03	9.28	4.60	0.00	0.00	101.91	0.00
57	6,357	6,357	39.1	Yes	**6.63**	104.0	3.01	87.06	8.69	4.59	0.00	0.00	100.34	0.00
58	6,493	6,493	29.6	No	**6.13**	104.0	3.01	87.25	8.80	4.80	0.00	0.00	100.85	0.00
59	7,185	7,186	43.6	Yes	**4.91**	104.0	3.01	88.13	9.34	4.59	0.00	0.00	102.06	0.00
60	7,375	7,376	46.0	Yes	**4.55**	104.0	3.01	88.36	9.48	4.59	0.00	0.00	102.42	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	7,548	7,548	43.3	Yes	**4.20**	104.0	3.01	88.56	9.61	4.60	0.00	0.00	102.77	0.00
62	5,689	5,690	47.4	Yes	**8.23**	104.0	3.01	86.10	8.12	4.52	0.00	0.00	98.74	0.00
63	5,165	5,165	51.9	Yes	**9.60**	104.0	3.01	85.26	7.65	4.46	0.00	0.00	97.37	0.00
64	5,814	5,815	51.3	Yes	**7.95**	104.0	3.01	86.29	8.23	4.50	0.00	0.00	99.02	0.00
65	6,420	6,421	50.5	Yes	**6.55**	104.0	3.01	87.15	8.74	4.53	0.00	0.00	100.42	0.00
66	3,702	3,703	51.6	Yes	**14.11**	104.0	3.01	82.37	6.17	4.32	0.00	0.00	92.86	0.00
67	6,383	6,383	47.6	Yes	**6.62**	104.0	3.01	87.10	8.71	4.55	0.00	0.00	100.35	0.00
68	6,791	6,792	45.0	Yes	**5.72**	104.0	3.01	87.64	9.04	4.57	0.00	0.00	101.25	0.00
69	6,221	6,222	51.0	Yes	**7.00**	104.0	3.01	86.88	8.58	4.52	0.00	0.00	99.97	0.00
70	7,087	7,088	42.8	Yes	**5.10**	104.0	3.01	88.01	9.26	4.59	0.00	0.00	101.87	0.00
71	7,555	7,556	53.6	Yes	**4.23**	104.0	3.01	88.57	9.61	4.56	0.00	0.00	102.74	0.00
72	8,607	8,608	31.7	No	**2.12**	104.0	3.01	89.70	10.35	4.80	0.00	0.00	104.85	0.00
73	7,781	7,782	36.0	Yes	**3.73**	104.0	3.01	88.82	9.78	4.64	0.00	0.00	103.24	0.00
74	6,718	6,718	46.8	Yes	**5.89**	104.0	3.01	87.55	8.98	4.56	0.00	0.00	101.09	0.00
75	6,618	6,618	32.8	No	**5.86**	104.0	3.01	87.41	8.90	4.80	0.00	0.00	101.11	0.00
76	5,743	5,743	41.4	Yes	**8.07**	104.0	3.01	86.18	8.17	4.55	0.00	0.00	98.91	0.00
77	6,415	6,415	36.5	Yes	**6.49**	104.0	3.01	87.14	8.73	4.61	0.00	0.00	100.48	0.00
78	6,315	6,316	54.6	Yes	**6.81**	104.0	3.01	87.01	8.65	4.51	0.00	0.00	100.17	0.00
80	7,130	7,130	47.8	Yes	**5.04**	104.0	3.01	88.06	9.30	4.57	0.00	0.00	101.93	0.00
81	7,861	7,862	63.0	Yes	**3.70**	104.0	3.01	88.91	9.84	4.53	0.00	0.00	103.27	0.00
82	6,997	6,997	32.9	No	**5.08**	104.0	3.01	87.90	9.19	4.80	0.00	0.00	101.89	0.00
83	5,699	5,699	49.3	Yes	**8.22**	104.0	3.01	86.12	8.13	4.50	0.00	0.00	98.75	0.00
85	7,804	7,805	38.3	No	**3.53**	104.0	3.01	88.85	9.79	4.80	0.00	0.00	103.44	0.00
86	6,999	6,999	45.9	Yes	**5.30**	104.0	3.01	87.90	9.20	4.58	0.00	0.00	101.67	0.00
87	6,650	6,651	48.7	Yes	**6.04**	104.0	3.01	87.46	8.92	4.55	0.00	0.00	100.93	0.00
89	5,549	5,550	51.2	Yes	**8.60**	104.0	3.01	85.89	8.00	4.49	0.00	0.00	98.37	0.00
90	5,740	5,741	44.1	Yes	**8.09**	104.0	3.01	86.18	8.17	4.54	0.00	0.00	98.88	0.00
91	5,418	5,418	48.3	Yes	**8.92**	104.0	3.01	85.68	7.88	4.50	0.00	0.00	98.05	0.00
92	5,608	5,609	51.4	Yes	**8.46**	104.0	3.01	85.98	8.05	4.49	0.00	0.00	98.52	0.00
94	7,640	7,641	62.0	Yes	**4.11**	104.0	3.01	88.66	9.68	4.52	0.00	0.00	102.86	0.00
95	8,776	8,777	49.6	Yes	**2.04**	104.0	3.01	89.87	10.46	4.61	0.00	0.00	104.94	0.00
97	6,343	6,344	69.7	Yes	**6.82**	104.0	3.01	87.05	8.68	4.43	0.00	0.00	100.15	0.00
98	8,065	8,066	58.2	Yes	**3.31**	104.0	3.01	89.13	9.98	4.55	0.00	0.00	103.67	0.00
99	9,016	9,016	30.3	No	**1.45**	104.0	3.01	90.10	10.62	4.80	0.00	0.00	105.52	0.00
100	4,238	4,239	57.0	Yes	**12.34**	104.0	3.01	83.55	6.74	4.34	0.00	0.00	94.63	0.00
101	8,201	8,202	60.7	Yes	**3.07**	104.0	3.01	89.28	10.07	4.55	0.00	0.00	103.90	0.00
102	4,194	4,197	72.4	Yes	**12.60**	104.0	3.01	83.46	6.70	4.21	0.00	0.00	94.37	0.00
103	9,008	9,009	57.2	Yes	**1.68**	104.0	3.01	90.09	10.61	4.58	0.00	0.00	105.29	0.00
104	4,751	4,752	53.5	Yes	**10.76**	104.0	3.01	84.54	7.26	4.42	0.00	0.00	96.21	0.00
107	7,024	7,025	63.7	Yes	**5.33**	104.0	3.01	87.93	9.22	4.49	0.00	0.00	101.64	0.00
108	9,746	9,746	27.3	No	**0.32**	104.0	3.01	90.78	11.08	4.80	0.00	0.00	106.66	0.00
109	7,247	7,247	44.9	Yes	**4.80**	104.0	3.01	88.20	9.39	4.59	0.00	0.00	102.18	0.00
110	5,683	5,683	37.1	Yes	**8.19**	104.0	3.01	86.09	8.12	4.58	0.00	0.00	98.79	0.00
111	5,698	5,699	41.6	Yes	**8.18**	104.0	3.01	86.12	8.13	4.55	0.00	0.00	98.80	0.00
113	7,321	7,322	62.7	Yes	**4.73**	104.0	3.01	88.29	9.44	4.51	0.00	0.00	102.24	0.00
114	7,789	7,789	37.8	Yes	**3.72**	104.0	3.01	88.83	9.78	4.63	0.00	0.00	103.25	0.00
115	9,066	9,066	31.0	No	**1.37**	104.0	3.01	90.15	10.65	4.80	0.00	0.00	105.60	0.00
116	4,753	4,755	68.7	Yes	**10.86**	104.0	3.01	84.54	7.26	4.31	0.00	0.00	96.11	0.00
118	7,457	7,457	45.3	Yes	**4.39**	104.0	3.01	88.45	9.54	4.59	0.00	0.00	102.59	0.00
119	7,109	7,110	49.0	Yes	**5.09**	104.0	3.01	88.04	9.28	4.56	0.00	0.00	101.88	0.00
120	8,472	8,473	57.0	Yes	**2.58**	104.0	3.01	89.56	10.26	4.57	0.00	0.00	104.39	0.00
121	6,517	6,518	55.5	Yes	**6.36**	104.0	3.01	87.28	8.82	4.51	0.00	0.00	100.61	0.00
125	5,443	5,444	50.2	Yes	**8.86**	104.0	3.01	85.72	7.90	4.49	0.00	0.00	98.11	0.00
126	4,105	4,106	58.6	Yes	**12.79**	104.0	3.01	83.27	6.60	4.31	0.00	0.00	94.19	0.00
127	4,225	4,226	58.7	Yes	**12.40**	104.0	3.01	83.52	6.73	4.33	0.00	0.00	94.57	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	4,478	4,480	57.2	Yes	**11.60**	104.0	3.01	84.02	6.99	4.36	0.00	0.00	95.38	0.00
129	4,794	4,795	48.0	Yes	**10.60**	104.0	3.01	84.62	7.30	4.46	0.00	0.00	96.37	0.00
130	4,323	4,324	45.9	Yes	**11.99**	104.0	3.01	83.72	6.83	4.44	0.00	0.00	94.98	0.00
131	4,611	4,612	43.1	Yes	**11.09**	104.0	3.01	84.28	7.12	4.48	0.00	0.00	95.88	0.00
132	4,996	4,996	42.2	Yes	**10.00**	104.0	3.01	84.97	7.49	4.51	0.00	0.00	96.98	0.00
133	5,052	5,053	39.6	Yes	**9.82**	104.0	3.01	85.07	7.54	4.53	0.00	0.00	97.15	0.00
134	7,145	7,146	46.8	Yes	**5.01**	104.0	3.01	88.08	9.31	4.58	0.00	0.00	101.97	0.00
141	6,385	6,387	67.4	Yes	**6.71**	104.0	3.01	87.11	8.71	4.44	0.00	0.00	100.26	0.00
142	4,289	4,292	76.4	Yes	**12.33**	104.0	3.01	83.65	6.80	4.19	0.00	0.00	94.64	0.00
143	6,636	6,637	68.9	Yes	**6.17**	104.0	3.01	87.44	8.91	4.45	0.00	0.00	100.80	0.00
144	3,826	3,828	61.7	Yes	**13.76**	104.0	3.01	82.66	6.31	4.25	0.00	0.00	93.21	0.00
145	5,470	5,471	46.3	Yes	**8.77**	104.0	3.01	85.76	7.93	4.51	0.00	0.00	98.20	0.00
146	5,386	5,387	46.3	Yes	**8.99**	104.0	3.01	85.63	7.85	4.51	0.00	0.00	97.99	0.00
Sum	28.81													

Noise sensitive area: H37 H37

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	11,340	11,340	42.7	Yes	**-1.80**	104.0	3.01	92.09	12.00	4.67	0.00	0.00	108.77	0.00
2	11,434	11,435	38.5	Yes	**-1.93**	104.0	3.01	92.16	12.06	4.69	0.00	0.00	108.91	0.00
3	11,048	11,049	42.2	Yes	**-1.41**	104.0	3.01	91.87	11.84	4.67	0.00	0.00	108.38	0.00
4	10,701	10,701	34.1	No	**-1.06**	104.0	3.01	91.59	11.65	4.80	0.00	0.00	108.03	0.00
5	10,173	10,173	36.3	No	**-0.31**	104.0	3.01	91.15	11.34	4.80	0.00	0.00	107.29	0.00
6	10,493	10,493	44.7	Yes	**-0.63**	104.0	3.01	91.42	11.53	4.66	0.00	0.00	107.60	0.00
7	8,322	8,323	60.1	Yes	**2.86**	104.0	3.01	89.41	10.16	4.55	0.00	0.00	104.12	0.00
8	11,887	11,887	37.3	No	**-2.63**	104.0	3.01	92.50	12.30	4.80	0.00	0.00	109.60	0.00
9	10,813	10,814	48.4	Yes	**-1.06**	104.0	3.01	91.68	11.71	4.65	0.00	0.00	108.04	0.00
10	10,385	10,386	63.5	Yes	**-0.41**	104.0	3.01	91.33	11.46	4.59	0.00	0.00	107.38	0.00
11	11,333	11,333	68.4	Yes	**-1.71**	104.0	3.01	92.09	12.00	4.59	0.00	0.00	108.68	0.00
12	11,213	11,214	68.0	Yes	**-1.55**	104.0	3.01	92.00	11.93	4.59	0.00	0.00	108.52	0.00
13	10,757	10,757	74.1	Yes	**-0.90**	104.0	3.01	91.63	11.68	4.57	0.00	0.00	107.88	0.00
14	10,332	10,333	76.2	Yes	**-0.29**	104.0	3.01	91.28	11.43	4.55	0.00	0.00	107.27	0.00
15	9,742	9,743	71.9	Yes	**0.57**	104.0	3.01	90.77	11.08	4.55	0.00	0.00	106.40	0.00
16	9,594	9,595	66.1	Yes	**0.78**	104.0	3.01	90.64	10.99	4.57	0.00	0.00	106.19	0.00
17	11,514	11,515	66.5	Yes	**-1.96**	104.0	3.01	92.23	12.10	4.60	0.00	0.00	108.93	0.00
18	11,526	11,527	64.8	Yes	**-1.98**	104.0	3.01	92.23	12.11	4.61	0.00	0.00	108.95	0.00
19	10,434	10,434	70.7	Yes	**-0.46**	104.0	3.01	91.37	11.49	4.57	0.00	0.00	107.43	0.00
20	9,423	9,424	67.9	Yes	**1.05**	104.0	3.01	90.48	10.88	4.55	0.00	0.00	105.92	0.00
21	9,920	9,920	41.0	No	**0.06**	104.0	3.01	90.93	11.19	4.80	0.00	0.00	106.92	0.00
22	9,922	9,922	37.5	No	**0.05**	104.0	3.01	90.93	11.19	4.80	0.00	0.00	106.92	0.00
23	9,690	9,690	41.0	Yes	**0.54**	104.0	3.01	90.73	11.05	4.66	0.00	0.00	106.43	0.00
24	10,087	10,088	36.2	No	**-0.19**	104.0	3.01	91.08	11.29	4.80	0.00	0.00	107.16	0.00
25	7,609	7,609	42.8	Yes	**4.08**	104.0	3.01	88.63	9.65	4.61	0.00	0.00	102.89	0.00
26	9,061	9,061	42.0	Yes	**1.54**	104.0	3.01	90.14	10.65	4.64	0.00	0.00	105.43	0.00
27	7,508	7,509	41.3	Yes	**4.27**	104.0	3.01	88.51	9.58	4.61	0.00	0.00	102.70	0.00
28	7,297	7,298	53.0	Yes	**4.73**	104.0	3.01	88.26	9.42	4.55	0.00	0.00	102.24	0.00
29	9,111	9,111	39.0	Yes	**1.45**	104.0	3.01	90.19	10.68	4.65	0.00	0.00	105.53	0.00
30	9,376	9,376	38.1	No	**0.88**	104.0	3.01	90.44	10.85	4.80	0.00	0.00	106.09	0.00
31	10,445	10,445	43.8	No	**-0.70**	104.0	3.01	91.38	11.50	4.80	0.00	0.00	107.68	0.00
32	7,866	7,866	43.0	Yes	**3.61**	104.0	3.01	88.91	9.84	4.61	0.00	0.00	103.37	0.00
33	8,988	8,988	39.7	Yes	**1.65**	104.0	3.01	90.07	10.60	4.65	0.00	0.00	105.32	0.00
34	8,084	8,085	55.0	Yes	**3.26**	104.0	3.01	89.15	9.99	4.57	0.00	0.00	103.71	0.00
35	8,562	8,563	59.6	Yes	**2.44**	104.0	3.01	89.65	10.32	4.56	0.00	0.00	104.54	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	8,815	8,816	59.6	Yes	**2.01**	104.0	3.01	89.91	10.49	4.57	0.00	0.00	104.96	0.00
37	7,838	7,839	52.3	Yes	**3.70**	104.0	3.01	88.88	9.82	4.57	0.00	0.00	103.28	0.00
38	7,459	7,460	41.1	Yes	**4.36**	104.0	3.01	88.45	9.54	4.61	0.00	0.00	102.61	0.00
39	6,747	6,748	52.6	Yes	**5.85**	104.0	3.01	87.58	9.00	4.53	0.00	0.00	101.12	0.00
40	6,103	6,104	55.8	Yes	**7.29**	104.0	3.01	86.71	8.48	4.49	0.00	0.00	99.68	0.00
41	6,480	6,481	61.8	Yes	**6.48**	104.0	3.01	87.23	8.79	4.47	0.00	0.00	100.49	0.00
43	7,288	7,289	58.8	Yes	**4.78**	104.0	3.01	88.25	9.42	4.53	0.00	0.00	102.20	0.00
44	6,058	6,059	72.6	Yes	**7.49**	104.0	3.01	86.65	8.44	4.39	0.00	0.00	99.48	0.00
45	5,914	5,915	71.5	Yes	**7.83**	104.0	3.01	86.44	8.32	4.39	0.00	0.00	99.14	0.00
46	6,423	6,424	58.4	Yes	**6.59**	104.0	3.01	87.16	8.74	4.49	0.00	0.00	100.39	0.00
48	7,248	7,249	42.2	Yes	**4.78**	104.0	3.01	88.21	9.39	4.60	0.00	0.00	102.19	0.00
49	8,254	8,254	41.1	Yes	**2.90**	104.0	3.01	89.33	10.11	4.63	0.00	0.00	104.07	0.00
50	9,453	9,453	49.3	Yes	**0.94**	104.0	3.01	90.51	10.90	4.62	0.00	0.00	106.03	0.00
51	8,428	8,429	40.0	Yes	**2.59**	104.0	3.01	89.52	10.23	4.64	0.00	0.00	104.38	0.00
52	8,578	8,578	41.0	Yes	**2.34**	104.0	3.01	89.67	10.33	4.64	0.00	0.00	104.63	0.00
53	8,137	8,137	43.2	Yes	**3.11**	104.0	3.01	89.21	10.03	4.62	0.00	0.00	103.86	0.00
55	7,703	7,703	41.5	Yes	**3.90**	104.0	3.01	88.73	9.72	4.62	0.00	0.00	103.07	0.00
56	7,665	7,665	43.9	Yes	**3.98**	104.0	3.01	88.69	9.69	4.60	0.00	0.00	102.99	0.00
57	6,911	6,911	41.1	Yes	**5.45**	104.0	3.01	87.79	9.13	4.60	0.00	0.00	101.52	0.00
58	8,293	8,293	38.9	Yes	**2.82**	104.0	3.01	89.37	10.14	4.64	0.00	0.00	104.15	0.00
59	7,630	7,631	45.4	Yes	**4.06**	104.0	3.01	88.65	9.67	4.60	0.00	0.00	102.92	0.00
60	7,257	7,257	48.2	Yes	**4.79**	104.0	3.01	88.22	9.39	4.57	0.00	0.00	102.18	0.00
61	7,302	7,302	45.0	Yes	**4.69**	104.0	3.01	88.27	9.43	4.59	0.00	0.00	102.29	0.00
62	5,253	5,254	48.1	Yes	**9.34**	104.0	3.01	85.41	7.73	4.49	0.00	0.00	97.63	0.00
63	4,284	4,285	52.5	Yes	**12.16**	104.0	3.01	83.64	6.79	4.38	0.00	0.00	94.81	0.00
64	4,227	4,228	51.6	Yes	**12.34**	104.0	3.01	83.52	6.73	4.38	0.00	0.00	94.64	0.00
65	4,700	4,700	49.2	Yes	**10.88**	104.0	3.01	84.44	7.21	4.44	0.00	0.00	96.09	0.00
66	6,297	6,298	53.4	Yes	**6.84**	104.0	3.01	86.98	8.64	4.51	0.00	0.00	100.13	0.00
67	5,045	5,046	50.5	Yes	**9.92**	104.0	3.01	85.06	7.54	4.46	0.00	0.00	97.06	0.00
68	5,276	5,277	46.2	Yes	**9.27**	104.0	3.01	85.45	7.75	4.50	0.00	0.00	97.70	0.00
69	4,462	4,462	49.8	Yes	**11.59**	104.0	3.01	83.99	6.97	4.42	0.00	0.00	95.38	0.00
70	9,857	9,857	47.9	Yes	**0.32**	104.0	3.01	90.87	11.15	4.63	0.00	0.00	106.66	0.00
71	10,184	10,185	60.1	Yes	**-0.13**	104.0	3.01	91.16	11.34	4.60	0.00	0.00	107.10	0.00
72	10,948	10,948	34.7	No	**-1.40**	104.0	3.01	91.79	11.79	4.80	0.00	0.00	108.37	0.00
73	10,242	10,242	42.4	Yes	**-0.27**	104.0	3.01	91.21	11.38	4.66	0.00	0.00	107.25	0.00
74	9,166	9,167	52.3	Yes	**1.41**	104.0	3.01	90.24	10.72	4.61	0.00	0.00	105.57	0.00
75	8,829	8,830	35.5	No	**1.76**	104.0	3.01	89.92	10.50	4.80	0.00	0.00	105.22	0.00
76	6,585	6,585	44.6	Yes	**6.16**	104.0	3.01	87.37	8.87	4.57	0.00	0.00	100.81	0.00
77	7,501	7,501	39.5	Yes	**4.28**	104.0	3.01	88.50	9.57	4.62	0.00	0.00	102.70	0.00
78	9,018	9,018	61.3	Yes	**1.68**	104.0	3.01	90.10	10.62	4.57	0.00	0.00	105.29	0.00
80	7,146	7,147	49.8	Yes	**5.02**	104.0	3.01	88.08	9.31	4.56	0.00	0.00	101.95	0.00
81	10,616	10,616	69.7	Yes	**-0.72**	104.0	3.01	91.52	11.60	4.58	0.00	0.00	107.69	0.00
82	8,682	8,682	41.5	Yes	**2.16**	104.0	3.01	89.77	10.40	4.64	0.00	0.00	104.81	0.00
83	4,562	4,563	51.4	Yes	**11.30**	104.0	3.01	84.19	7.07	4.42	0.00	0.00	95.67	0.00
85	9,042	9,042	41.7	Yes	**1.57**	104.0	3.01	90.13	10.64	4.64	0.00	0.00	105.40	0.00
86	7,124	7,125	47.7	Yes	**5.05**	104.0	3.01	88.06	9.29	4.57	0.00	0.00	101.92	0.00
87	4,889	4,890	48.1	Yes	**10.33**	104.0	3.01	84.79	7.39	4.46	0.00	0.00	96.64	0.00
89	4,190	4,190	53.9	Yes	**12.47**	104.0	3.01	83.45	6.69	4.36	0.00	0.00	94.50	0.00
90	6,036	6,037	46.4	Yes	**7.40**	104.0	3.01	86.62	8.42	4.54	0.00	0.00	99.57	0.00
91	4,819	4,819	49.2	Yes	**10.54**	104.0	3.01	84.66	7.32	4.45	0.00	0.00	96.43	0.00
92	3,669	3,670	50.8	Yes	**14.22**	104.0	3.01	82.29	6.13	4.33	0.00	0.00	92.75	0.00
94	10,327	10,328	69.5	Yes	**-0.31**	104.0	3.01	91.28	11.43	4.57	0.00	0.00	107.28	0.00
95	11,485	11,486	57.5	Yes	**-1.94**	104.0	3.01	92.20	12.08	4.63	0.00	0.00	108.92	0.00
97	8,982	8,983	75.5	Yes	**1.79**	104.0	3.01	90.07	10.60	4.51	0.00	0.00	105.18	0.00
98	10,762	10,762	65.6	Yes	**-0.94**	104.0	3.01	91.64	11.68	4.59	0.00	0.00	107.91	0.00

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Project:
20102130 - Merricourt ND Enxco

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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	11,498	11,498	36.6	Yes	**-2.02**	104.0	3.01	92.21	12.09	4.69	0.00	0.00	108.99	0.00
100	6,072	6,072	62.0	Yes	**7.40**	104.0	3.01	86.67	8.45	4.45	0.00	0.00	99.57	0.00
101	10,965	10,966	66.5	Yes	**-1.22**	104.0	3.01	91.80	11.80	4.59	0.00	0.00	108.19	0.00
102	6,355	6,356	73.1	Yes	**6.81**	104.0	3.01	87.06	8.69	4.41	0.00	0.00	100.16	0.00
103	11,779	11,779	62.9	Yes	**-2.31**	104.0	3.01	92.42	12.24	4.62	0.00	0.00	109.28	0.00
104	6,897	6,898	54.8	Yes	**5.55**	104.0	3.01	87.77	9.12	4.53	0.00	0.00	101.42	0.00
107	9,755	9,756	70.8	Yes	**0.55**	104.0	3.01	90.79	11.09	4.55	0.00	0.00	106.42	0.00
108	12,169	12,170	32.6	No	**-2.98**	104.0	3.01	92.71	12.45	4.80	0.00	0.00	109.95	0.00
109	7,573	7,573	46.9	Yes	**4.17**	104.0	3.01	88.59	9.63	4.59	0.00	0.00	102.80	0.00
110	6,949	6,949	41.7	Yes	**5.38**	104.0	3.01	87.84	9.16	4.60	0.00	0.00	101.59	0.00
111	6,712	6,713	44.4	Yes	**5.89**	104.0	3.01	87.54	8.97	4.57	0.00	0.00	101.09	0.00
113	10,060	10,061	69.8	Yes	**0.09**	104.0	3.01	91.05	11.27	4.56	0.00	0.00	106.89	0.00
114	8,938	8,938	41.6	Yes	**1.74**	104.0	3.01	90.02	10.57	4.64	0.00	0.00	105.23	0.00
115	11,705	11,706	37.5	Yes	**-2.29**	104.0	3.01	92.37	12.20	4.69	0.00	0.00	109.26	0.00
116	7,209	7,210	70.3	Yes	**4.99**	104.0	3.01	88.16	9.36	4.47	0.00	0.00	101.98	0.00
118	7,609	7,609	47.2	Yes	**4.10**	104.0	3.01	88.63	9.65	4.59	0.00	0.00	102.87	0.00
119	9,654	9,654	53.9	Yes	**0.65**	104.0	3.01	90.69	11.02	4.61	0.00	0.00	106.33	0.00
120	11,245	11,246	61.8	Yes	**-1.61**	104.0	3.01	92.02	11.95	4.61	0.00	0.00	108.58	0.00
121	9,072	9,073	60.2	Yes	**1.59**	104.0	3.01	90.15	10.66	4.57	0.00	0.00	105.38	0.00
125	4,416	4,417	51.1	Yes	**11.74**	104.0	3.01	83.90	6.92	4.40	0.00	0.00	95.23	0.00
126	5,322	5,323	61.7	Yes	**9.25**	104.0	3.01	85.52	7.80	4.40	0.00	0.00	97.72	0.00
127	5,316	5,316	60.9	Yes	**9.26**	104.0	3.01	85.51	7.79	4.41	0.00	0.00	97.71	0.00
128	5,461	5,462	59.4	Yes	**8.88**	104.0	3.01	85.75	7.92	4.43	0.00	0.00	98.10	0.00
129	7,543	7,543	53.6	Yes	**4.26**	104.0	3.01	88.55	9.60	4.56	0.00	0.00	102.71	0.00
130	7,097	7,097	50.4	Yes	**5.12**	104.0	3.01	88.02	9.27	4.56	0.00	0.00	101.85	0.00
131	7,393	7,394	46.9	Yes	**4.52**	104.0	3.01	88.38	9.49	4.58	0.00	0.00	102.46	0.00
132	7,778	7,779	45.8	Yes	**3.78**	104.0	3.01	88.82	9.78	4.60	0.00	0.00	103.19	0.00
133	6,868	6,868	46.9	Yes	**5.57**	104.0	3.01	87.74	9.10	4.57	0.00	0.00	101.40	0.00
134	9,904	9,905	52.8	Yes	**0.26**	104.0	3.01	90.92	11.18	4.62	0.00	0.00	106.71	0.00
141	8,995	8,996	72.3	Yes	**1.76**	104.0	3.01	90.08	10.61	4.53	0.00	0.00	105.21	0.00
142	6,532	6,534	75.7	Yes	**6.43**	104.0	3.01	87.30	8.83	4.41	0.00	0.00	100.54	0.00
143	9,303	9,304	75.3	Yes	**1.27**	104.0	3.01	90.37	10.80	4.52	0.00	0.00	105.70	0.00
144	5,681	5,682	64.6	Yes	**8.36**	104.0	3.01	86.09	8.12	4.41	0.00	0.00	98.62	0.00
145	5,975	5,976	48.5	Yes	**7.55**	104.0	3.01	86.53	8.37	4.52	0.00	0.00	99.42	0.00
146	6,045	6,045	48.1	Yes	**7.39**	104.0	3.01	86.63	8.43	4.53	0.00	0.00	99.58	0.00

Sum 26.43

Noise sensitive area: H38 H38

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	14,288	14,288	40.8	Yes	**-5.31**	104.0	3.01	94.10	13.48	4.70	0.00	0.00	112.29	0.00
2	14,288	14,288	36.8	No	**-5.41**	104.0	3.01	94.10	13.48	4.80	0.00	0.00	112.38	0.00
3	13,817	13,817	42.9	Yes	**-4.80**	104.0	3.01	93.81	13.26	4.69	0.00	0.00	111.77	0.00
4	13,112	13,112	40.5	Yes	**-4.00**	104.0	3.01	93.35	12.92	4.69	0.00	0.00	110.97	0.00
5	12,753	12,753	40.4	Yes	**-3.58**	104.0	3.01	93.11	12.75	4.69	0.00	0.00	110.55	0.00
6	13,237	13,238	45.4	Yes	**-4.13**	104.0	3.01	93.44	12.99	4.68	0.00	0.00	111.11	0.00
7	11,103	11,103	57.2	Yes	**-1.43**	104.0	3.01	91.91	11.87	4.62	0.00	0.00	108.41	0.00
8	14,891	14,891	34.0	No	**-6.05**	104.0	3.01	94.46	13.76	4.80	0.00	0.00	113.02	0.00
9	13,757	13,757	46.7	Yes	**-4.72**	104.0	3.01	93.77	13.24	4.68	0.00	0.00	111.69	0.00
10	13,424	13,425	60.5	Yes	**-4.31**	104.0	3.01	93.56	13.08	4.65	0.00	0.00	111.28	0.00
11	14,594	14,595	68.9	Yes	**-5.58**	104.0	3.01	94.28	13.63	4.64	0.00	0.00	112.55	0.00
12	14,445	14,446	68.0	Yes	**-5.42**	104.0	3.01	94.19	13.56	4.64	0.00	0.00	112.39	0.00
13	13,967	13,968	73.3	Yes	**-4.89**	104.0	3.01	93.90	13.34	4.62	0.00	0.00	111.86	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	13,536	13,536	75.3	Yes	**-4.40**	104.0	3.01	93.63	13.13	4.61	0.00	0.00	111.37	0.00
15	12,845	12,846	69.4	Yes	**-3.61**	104.0	3.01	93.18	12.79	4.62	0.00	0.00	110.58	0.00
16	12,620	12,620	63.0	Yes	**-3.36**	104.0	3.01	93.02	12.68	4.63	0.00	0.00	110.33	0.00
17	14,797	14,797	68.3	Yes	**-5.79**	104.0	3.01	94.40	13.72	4.64	0.00	0.00	112.76	0.00
18	14,858	14,859	68.0	Yes	**-5.86**	104.0	3.01	94.44	13.74	4.64	0.00	0.00	112.83	0.00
19	13,698	13,699	71.7	Yes	**-4.59**	104.0	3.01	93.73	13.21	4.62	0.00	0.00	111.56	0.00
20	12,614	12,614	67.0	Yes	**-3.34**	104.0	3.01	93.02	12.68	4.62	0.00	0.00	110.31	0.00
21	12,364	12,364	46.3	Yes	**-3.09**	104.0	3.01	92.84	12.55	4.67	0.00	0.00	110.06	0.00
22	12,139	12,139	42.1	Yes	**-2.83**	104.0	3.01	92.68	12.43	4.68	0.00	0.00	109.80	0.00
23	11,829	11,829	44.2	Yes	**-2.43**	104.0	3.01	92.46	12.27	4.67	0.00	0.00	109.40	0.00
24	12,349	12,349	41.8	Yes	**-3.09**	104.0	3.01	92.83	12.54	4.68	0.00	0.00	110.06	0.00
25	9,554	9,554	39.2	Yes	**0.75**	104.0	3.01	90.60	10.96	4.66	0.00	0.00	106.22	0.00
26	11,653	11,653	44.9	Yes	**-2.20**	104.0	3.01	92.33	12.17	4.67	0.00	0.00	109.17	0.00
27	9,763	9,763	41.8	Yes	**0.44**	104.0	3.01	90.79	11.09	4.65	0.00	0.00	106.54	0.00
28	9,891	9,892	53.9	Yes	**0.28**	104.0	3.01	90.91	11.17	4.61	0.00	0.00	106.69	0.00
29	11,343	11,343	42.9	Yes	**-1.80**	104.0	3.01	92.09	12.01	4.67	0.00	0.00	108.77	0.00
30	11,427	11,427	38.2	Yes	**-1.92**	104.0	3.01	92.16	12.05	4.69	0.00	0.00	108.90	0.00
31	12,470	12,470	44.2	Yes	**-3.23**	104.0	3.01	92.92	12.60	4.68	0.00	0.00	110.20	0.00
32	9,632	9,632	37.9	Yes	**0.62**	104.0	3.01	90.67	11.01	4.67	0.00	0.00	106.35	0.00
33	10,904	10,904	36.5	Yes	**-1.23**	104.0	3.01	91.75	11.76	4.69	0.00	0.00	108.20	0.00
34	10,808	10,808	52.8	Yes	**-1.04**	104.0	3.01	91.68	11.71	4.63	0.00	0.00	108.02	0.00
35	11,384	11,384	57.2	Yes	**-1.81**	104.0	3.01	92.13	12.03	4.63	0.00	0.00	108.78	0.00
36	11,674	11,675	57.7	Yes	**-2.19**	104.0	3.01	92.34	12.19	4.63	0.00	0.00	109.16	0.00
37	10,511	10,511	52.1	Yes	**-0.63**	104.0	3.01	91.43	11.54	4.63	0.00	0.00	107.60	0.00
38	9,561	9,561	39.8	Yes	**0.74**	104.0	3.01	90.61	10.96	4.66	0.00	0.00	106.23	0.00
39	9,103	9,103	51.5	Yes	**1.51**	104.0	3.01	90.18	10.68	4.61	0.00	0.00	105.47	0.00
40	9,163	9,163	55.0	Yes	**1.42**	104.0	3.01	90.24	10.71	4.60	0.00	0.00	105.55	0.00
41	8,937	8,938	61.9	Yes	**1.82**	104.0	3.01	90.02	10.57	4.56	0.00	0.00	105.16	0.00
43	9,962	9,963	58.3	Yes	**0.19**	104.0	3.01	90.97	11.21	4.60	0.00	0.00	106.78	0.00
44	8,629	8,630	73.2	Yes	**2.38**	104.0	3.01	89.72	10.36	4.51	0.00	0.00	104.60	0.00
45	8,390	8,391	70.2	Yes	**2.78**	104.0	3.01	89.48	10.20	4.51	0.00	0.00	104.19	0.00
46	9,313	9,314	58.5	Yes	**1.19**	104.0	3.01	90.38	10.81	4.59	0.00	0.00	105.78	0.00
48	8,872	8,872	36.4	Yes	**1.83**	104.0	3.01	89.96	10.53	4.66	0.00	0.00	105.15	0.00
49	9,599	9,599	35.4	Yes	**0.66**	104.0	3.01	90.64	10.99	4.67	0.00	0.00	106.31	0.00
50	12,214	12,215	47.7	Yes	**-2.90**	104.0	3.01	92.74	12.47	4.67	0.00	0.00	109.88	0.00
51	9,931	9,931	34.8	Yes	**0.16**	104.0	3.01	90.94	11.19	4.68	0.00	0.00	106.81	0.00
52	10,173	10,173	35.1	Yes	**-0.20**	104.0	3.01	91.15	11.34	4.68	0.00	0.00	107.17	0.00
53	9,367	9,367	39.2	Yes	**1.04**	104.0	3.01	90.43	10.84	4.66	0.00	0.00	105.93	0.00
55	8,359	8,359	37.2	Yes	**2.70**	104.0	3.01	89.44	10.18	4.65	0.00	0.00	104.27	0.00
56	8,185	8,185	39.2	Yes	**3.01**	104.0	3.01	89.26	10.06	4.64	0.00	0.00	103.96	0.00
57	7,590	7,591	36.5	Yes	**4.09**	104.0	3.01	88.61	9.64	4.64	0.00	0.00	102.88	0.00
58	10,241	10,241	35.7	Yes	**-0.29**	104.0	3.01	91.21	11.38	4.68	0.00	0.00	107.27	0.00
59	8,009	8,009	40.2	Yes	**3.33**	104.0	3.01	89.07	9.94	4.63	0.00	0.00	103.64	0.00
60	6,967	6,967	44.7	Yes	**5.36**	104.0	3.01	87.86	9.17	4.58	0.00	0.00	101.61	0.00
61	6,822	6,823	42.2	No	**5.43**	104.0	3.01	87.68	9.06	4.80	0.00	0.00	101.54	0.00
62	5,183	5,183	40.8	Yes	**9.48**	104.0	3.01	85.29	7.67	4.53	0.00	0.00	97.49	0.00
63	4,093	4,093	47.3	Yes	**12.73**	104.0	3.01	83.24	6.59	4.41	0.00	0.00	94.24	0.00
64	2,866	2,867	42.2	Yes	**17.35**	104.0	3.01	80.15	5.18	4.30	0.00	0.00	89.63	0.00
65	2,755	2,756	41.3	Yes	**17.84**	104.0	3.01	79.80	5.04	4.29	0.00	0.00	89.13	0.00
66	9,421	9,421	52.4	Yes	**1.00**	104.0	3.01	90.48	10.88	4.61	0.00	0.00	105.97	0.00
67	3,652	3,653	41.9	Yes	**14.20**	104.0	3.01	82.25	6.11	4.41	0.00	0.00	92.77	0.00
68	3,444	3,445	38.5	Yes	**14.94**	104.0	3.01	81.74	5.88	4.42	0.00	0.00	92.04	0.00
69	2,583	2,584	41.4	Yes	**18.66**	104.0	3.01	79.25	4.82	4.25	0.00	0.00	88.32	0.00
70	13,227	13,227	53.2	Yes	**-4.10**	104.0	3.01	93.43	12.98	4.66	0.00	0.00	111.07	0.00
71	13,181	13,182	56.7	Yes	**-4.04**	104.0	3.01	93.40	12.96	4.65	0.00	0.00	111.01	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	13,425	13,425	40.6	Yes	**-4.36**	104.0	3.01	93.56	13.08	4.70	0.00	0.00	111.33	0.00
73	12,941	12,941	43.1	Yes	**-3.79**	104.0	3.01	93.24	12.84	4.69	0.00	0.00	110.77	0.00
74	11,899	11,899	50.4	Yes	**-2.50**	104.0	3.01	92.51	12.31	4.66	0.00	0.00	109.47	0.00
75	11,249	11,250	39.6	Yes	**-1.68**	104.0	3.01	92.02	11.95	4.68	0.00	0.00	108.66	0.00
76	7,692	7,692	38.1	Yes	**3.91**	104.0	3.01	88.72	9.71	4.63	0.00	0.00	103.07	0.00
77	8,706	8,706	34.5	Yes	**2.10**	104.0	3.01	89.80	10.42	4.67	0.00	0.00	104.88	0.00
78	12,203	12,204	60.6	Yes	**-2.85**	104.0	3.01	92.73	12.46	4.63	0.00	0.00	109.83	0.00
80	7,068	7,069	44.0	Yes	**5.15**	104.0	3.01	87.99	9.25	4.59	0.00	0.00	101.82	0.00
81	13,913	13,913	72.3	Yes	**-4.83**	104.0	3.01	93.87	13.31	4.62	0.00	0.00	111.80	0.00
82	10,444	10,444	36.8	Yes	**-0.58**	104.0	3.01	91.38	11.50	4.68	0.00	0.00	107.55	0.00
83	3,789	3,789	42.0	Yes	**13.72**	104.0	3.01	82.57	6.26	4.42	0.00	0.00	93.26	0.00
85	10,197	10,197	39.3	Yes	**-0.22**	104.0	3.01	91.17	11.35	4.67	0.00	0.00	107.19	0.00
86	7,199	7,199	41.6	Yes	**4.87**	104.0	3.01	88.15	9.35	4.60	0.00	0.00	102.10	0.00
87	2,755	2,756	40.7	Yes	**17.83**	104.0	3.01	79.81	5.04	4.29	0.00	0.00	89.14	0.00
89	3,280	3,281	44.2	Yes	**15.63**	104.0	3.01	81.32	5.69	4.34	0.00	0.00	91.35	0.00
90	6,634	6,635	41.4	Yes	**6.04**	104.0	3.01	87.44	8.91	4.59	0.00	0.00	100.93	0.00
91	4,728	4,728	43.1	Yes	**10.75**	104.0	3.01	84.49	7.23	4.49	0.00	0.00	96.22	0.00
92	2,044	2,045	42.3	Yes	**21.59**	104.0	3.01	77.22	4.08	4.09	0.00	0.00	85.38	0.00
94	13,442	13,443	67.2	Yes	**-4.31**	104.0	3.01	93.57	13.09	4.63	0.00	0.00	111.29	0.00
95	14,629	14,630	54.2	Yes	**-5.65**	104.0	3.01	94.30	13.64	4.67	0.00	0.00	112.62	0.00
97	12,039	12,040	73.0	Yes	**-2.61**	104.0	3.01	92.61	12.38	4.59	0.00	0.00	109.59	0.00
98	13,888	13,888	63.2	Yes	**-4.82**	104.0	3.01	93.85	13.30	4.65	0.00	0.00	111.80	0.00
99	14,181	14,181	39.7	Yes	**-5.20**	104.0	3.01	94.03	13.44	4.70	0.00	0.00	112.17	0.00
100	8,378	8,378	58.0	Yes	**2.75**	104.0	3.01	89.46	10.19	4.56	0.00	0.00	104.22	0.00
101	14,295	14,295	70.0	Yes	**-5.25**	104.0	3.01	94.10	13.49	4.63	0.00	0.00	112.23	0.00
102	8,962	8,963	72.7	Yes	**1.82**	104.0	3.01	90.05	10.58	4.52	0.00	0.00	105.16	0.00
103	15,129	15,130	66.9	Yes	**-6.14**	104.0	3.01	94.60	13.86	4.65	0.00	0.00	113.11	0.00
104	9,421	9,422	55.9	Yes	**1.01**	104.0	3.01	90.48	10.88	4.60	0.00	0.00	105.96	0.00
107	12,994	12,994	70.9	Yes	**-3.78**	104.0	3.01	93.28	12.87	4.61	0.00	0.00	110.76	0.00
108	14,730	14,730	38.6	Yes	**-5.79**	104.0	3.01	94.36	13.69	4.71	0.00	0.00	112.76	0.00
109	7,810	7,810	41.2	No	**3.52**	104.0	3.01	88.85	9.80	4.80	0.00	0.00	103.45	0.00
110	8,469	8,470	36.9	Yes	**2.51**	104.0	3.01	89.56	10.26	4.65	0.00	0.00	104.47	0.00
111	7,991	7,991	38.4	Yes	**3.36**	104.0	3.01	89.05	9.93	4.64	0.00	0.00	103.61	0.00
113	13,317	13,317	70.5	Yes	**-4.16**	104.0	3.01	93.49	13.02	4.62	0.00	0.00	111.13	0.00
114	9,994	9,994	39.4	Yes	**0.08**	104.0	3.01	90.99	11.23	4.67	0.00	0.00	106.89	0.00
115	14,680	14,680	34.9	Yes	**-5.75**	104.0	3.01	94.33	13.66	4.72	0.00	0.00	112.72	0.00
116	10,078	10,079	69.5	Yes	**0.06**	104.0	3.01	91.07	11.28	4.57	0.00	0.00	106.91	0.00
118	7,607	7,607	41.4	No	**3.90**	104.0	3.01	88.62	9.65	4.80	0.00	0.00	103.08	0.00
119	12,516	12,517	51.8	Yes	**-3.26**	104.0	3.01	92.95	12.63	4.66	0.00	0.00	110.24	0.00
120	14,618	14,618	66.8	Yes	**-5.61**	104.0	3.01	94.30	13.64	4.64	0.00	0.00	112.58	0.00
121	11,978	11,979	58.1	Yes	**-2.58**	104.0	3.01	92.57	12.35	4.63	0.00	0.00	109.55	0.00
125	3,912	3,913	44.2	Yes	**13.31**	104.0	3.01	82.85	6.40	4.41	0.00	0.00	93.66	0.00
126	7,177	7,178	56.0	Yes	**4.98**	104.0	3.01	88.12	9.33	4.53	0.00	0.00	101.99	0.00
127	7,043	7,044	55.5	Yes	**5.25**	104.0	3.01	87.96	9.23	4.53	0.00	0.00	101.72	0.00
128	7,032	7,033	53.5	Yes	**5.27**	104.0	3.01	87.94	9.22	4.54	0.00	0.00	101.71	0.00
129	10,885	10,885	56.5	Yes	**-1.14**	104.0	3.01	91.74	11.75	4.62	0.00	0.00	108.11	0.00
130	10,538	10,538	55.6	Yes	**-0.65**	104.0	3.01	91.46	11.55	4.62	0.00	0.00	107.63	0.00
131	10,890	10,890	53.1	Yes	**-1.16**	104.0	3.01	91.74	11.75	4.63	0.00	0.00	108.13	0.00
132	11,295	11,295	52.3	Yes	**-1.71**	104.0	3.01	92.06	11.98	4.64	0.00	0.00	108.68	0.00
133	9,022	9,023	44.6	Yes	**1.61**	104.0	3.01	90.11	10.62	4.63	0.00	0.00	105.36	0.00
134	13,229	13,229	55.9	Yes	**-4.10**	104.0	3.01	93.43	12.98	4.66	0.00	0.00	111.07	0.00
141	11,997	11,998	69.8	Yes	**-2.57**	104.0	3.01	92.58	12.36	4.60	0.00	0.00	109.54	0.00
142	9,208	9,209	75.6	Yes	**1.42**	104.0	3.01	90.28	10.74	4.52	0.00	0.00	105.55	0.00
143	12,403	12,404	73.3	Yes	**-3.07**	104.0	3.01	92.87	12.57	4.60	0.00	0.00	110.04	0.00
144	8,080	8,081	62.1	Yes	**3.29**	104.0	3.01	89.15	9.99	4.54	0.00	0.00	103.68	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	6,848	6,848	42.8	Yes	**5.59**	104.0	3.01	87.71	9.08	4.59	0.00	0.00	101.38	0.00
146	7,078	7,079	41.7	Yes	**5.12**	104.0	3.01	88.00	9.26	4.60	0.00	0.00	101.86	0.00
Sum	28.41													

Noise sensitive area: H39 H39

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	16,815	16,816	36.8	No	**-7.92**	104.0	3.01	95.51	14.58	4.80	0.00	0.00	114.89	0.00
2	16,803	16,804	33.6	No	**-7.91**	104.0	3.01	95.51	14.57	4.80	0.00	0.00	114.88	0.00
3	16,321	16,322	40.0	No	**-7.46**	104.0	3.01	95.26	14.38	4.80	0.00	0.00	114.43	0.00
4	15,555	15,555	35.7	No	**-6.72**	104.0	3.01	94.84	14.05	4.80	0.00	0.00	113.69	0.00
5	15,231	15,231	37.2	No	**-6.39**	104.0	3.01	94.65	13.91	4.80	0.00	0.00	113.36	0.00
6	15,740	15,741	42.2	No	**-6.90**	104.0	3.01	94.94	14.13	4.80	0.00	0.00	113.87	0.00
7	13,621	13,622	53.0	No	**-4.68**	104.0	3.01	93.68	13.17	4.80	0.00	0.00	111.66	0.00
8	17,424	17,424	30.6	No	**-8.48**	104.0	3.01	95.82	14.82	4.80	0.00	0.00	115.45	0.00
9	16,285	16,286	42.6	No	**-7.43**	104.0	3.01	95.24	14.36	4.80	0.00	0.00	114.40	0.00
10	15,963	15,963	56.8	No	**-7.12**	104.0	3.01	95.06	14.23	4.80	0.00	0.00	114.09	0.00
11	17,145	17,146	65.4	No	**-8.22**	104.0	3.01	95.68	14.71	4.80	0.00	0.00	115.20	0.00
12	16,995	16,996	64.6	No	**-8.09**	104.0	3.01	95.61	14.65	4.80	0.00	0.00	115.06	0.00
13	16,517	16,518	69.8	No	**-7.64**	104.0	3.01	95.36	14.46	4.80	0.00	0.00	114.62	0.00
14	16,085	16,086	71.6	No	**-7.23**	104.0	3.01	95.13	14.28	4.80	0.00	0.00	114.21	0.00
15	15,390	15,391	65.9	No	**-6.55**	104.0	3.01	94.75	13.98	4.80	0.00	0.00	113.52	0.00
16	15,159	15,160	59.3	No	**-6.32**	104.0	3.01	94.61	13.88	4.80	0.00	0.00	113.29	0.00
17	17,348	17,349	64.8	No	**-8.41**	104.0	3.01	95.79	14.79	4.80	0.00	0.00	115.38	0.00
18	17,410	17,411	64.3	No	**-8.46**	104.0	3.01	95.82	14.82	4.80	0.00	0.00	115.44	0.00
19	16,250	16,251	67.7	No	**-7.39**	104.0	3.01	95.22	14.35	4.80	0.00	0.00	114.36	0.00
20	15,163	15,164	62.8	No	**-6.32**	104.0	3.01	94.62	13.88	4.80	0.00	0.00	113.30	0.00
21	14,820	14,820	42.0	No	**-5.97**	104.0	3.01	94.42	13.73	4.80	0.00	0.00	112.94	0.00
22	14,550	14,550	35.8	No	**-5.69**	104.0	3.01	94.26	13.60	4.80	0.00	0.00	112.66	0.00
23	14,225	14,225	37.6	No	**-5.34**	104.0	3.01	94.06	13.46	4.80	0.00	0.00	112.32	0.00
24	14,768	14,768	35.7	No	**-5.92**	104.0	3.01	94.39	13.70	4.80	0.00	0.00	112.89	0.00
25	11,942	11,943	32.5	No	**-2.70**	104.0	3.01	92.54	12.33	4.80	0.00	0.00	109.67	0.00
26	14,141	14,141	40.6	No	**-5.25**	104.0	3.01	94.01	13.42	4.80	0.00	0.00	112.23	0.00
27	12,211	12,211	36.4	No	**-3.03**	104.0	3.01	92.74	12.47	4.80	0.00	0.00	110.00	0.00
28	12,394	12,394	49.4	No	**-3.26**	104.0	3.01	92.86	12.56	4.80	0.00	0.00	110.23	0.00
29	13,766	13,766	36.7	No	**-4.84**	104.0	3.01	93.78	13.24	4.80	0.00	0.00	111.82	0.00
30	13,808	13,808	31.5	No	**-4.89**	104.0	3.01	93.80	13.26	4.80	0.00	0.00	111.86	0.00
31	14,831	14,831	38.3	No	**-5.98**	104.0	3.01	94.42	13.73	4.80	0.00	0.00	112.95	0.00
32	11,977	11,977	32.1	No	**-2.74**	104.0	3.01	92.57	12.35	4.80	0.00	0.00	109.71	0.00
33	13,261	13,261	30.8	No	**-4.28**	104.0	3.01	93.45	13.00	4.80	0.00	0.00	111.25	0.00
34	13,321	13,321	49.0	No	**-4.35**	104.0	3.01	93.49	13.03	4.80	0.00	0.00	111.32	0.00
35	13,906	13,907	53.2	No	**-5.00**	104.0	3.01	93.86	13.31	4.80	0.00	0.00	111.97	0.00
36	14,199	14,200	53.4	No	**-5.32**	104.0	3.01	94.05	13.44	4.80	0.00	0.00	112.29	0.00
37	13,019	13,020	48.0	No	**-4.00**	104.0	3.01	93.29	12.88	4.80	0.00	0.00	110.97	0.00
38	11,982	11,982	33.4	No	**-2.75**	104.0	3.01	92.57	12.35	4.80	0.00	0.00	109.72	0.00
39	11,578	11,578	47.0	No	**-2.23**	104.0	3.01	92.27	12.13	4.80	0.00	0.00	109.21	0.00
40	11,712	11,712	50.0	No	**-2.41**	104.0	3.01	92.37	12.21	4.80	0.00	0.00	109.38	0.00
41	11,430	11,430	56.5	No	**-2.04**	104.0	3.01	92.16	12.05	4.80	0.00	0.00	109.01	0.00
43	12,474	12,475	54.1	No	**-3.35**	104.0	3.01	92.92	12.60	4.80	0.00	0.00	110.33	0.00
44	11,140	11,140	67.6	No	**-1.66**	104.0	3.01	91.94	11.89	4.80	0.00	0.00	108.63	0.00
45	10,892	10,892	64.5	No	**-1.32**	104.0	3.01	91.74	11.75	4.80	0.00	0.00	108.30	0.00
46	11,851	11,852	52.9	No	**-2.58**	104.0	3.01	92.48	12.28	4.80	0.00	0.00	109.56	0.00
48	11,201	11,201	30.8	No	**-1.74**	104.0	3.01	91.99	11.93	4.80	0.00	0.00	108.71	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	11,831	11,832	31.5	No	**-2.56**	104.0	3.01	92.46	12.27	4.80	0.00	0.00	109.53	0.00
50	14,725	14,725	44.6	No	**-5.87**	104.0	3.01	94.36	13.68	4.80	0.00	0.00	112.85	0.00
51	12,199	12,200	29.5	No	**-3.02**	104.0	3.01	92.73	12.46	4.80	0.00	0.00	109.99	0.00
52	12,461	12,461	29.4	No	**-3.34**	104.0	3.01	92.91	12.60	4.80	0.00	0.00	110.31	0.00
53	11,572	11,572	34.2	No	**-2.23**	104.0	3.01	92.27	12.13	4.80	0.00	0.00	109.20	0.00
55	10,419	10,419	34.0	No	**-0.67**	104.0	3.01	91.36	11.48	4.80	0.00	0.00	107.64	0.00
56	10,205	10,206	37.0	No	**-0.36**	104.0	3.01	91.18	11.36	4.80	0.00	0.00	107.33	0.00
57	9,701	9,701	31.1	No	**0.38**	104.0	3.01	90.74	11.05	4.80	0.00	0.00	106.59	0.00
58	12,617	12,617	29.4	No	**-3.52**	104.0	3.01	93.02	12.68	4.80	0.00	0.00	110.50	0.00
59	9,987	9,988	38.6	No	**-0.04**	104.0	3.01	90.99	11.23	4.80	0.00	0.00	107.02	0.00
60	8,747	8,747	42.4	No	**1.89**	104.0	3.01	89.84	10.44	4.80	0.00	0.00	105.08	0.00
61	8,528	8,529	38.0	No	**2.26**	104.0	3.01	89.62	10.30	4.80	0.00	0.00	104.71	0.00
62	7,245	7,245	37.5	No	**4.59**	104.0	3.01	88.20	9.38	4.80	0.00	0.00	102.38	0.00
63	6,272	6,273	42.4	No	**6.61**	104.0	3.01	86.95	8.62	4.80	0.00	0.00	100.37	0.00
64	4,889	4,889	41.2	No	**10.00**	104.0	3.01	84.79	7.39	4.80	0.00	0.00	96.98	0.00
65	4,503	4,504	43.5	Yes	**11.42**	104.0	3.01	84.07	7.01	4.47	0.00	0.00	95.56	0.00
66	11,972	11,972	47.3	No	**-2.73**	104.0	3.01	92.56	12.34	4.80	0.00	0.00	109.71	0.00
67	5,424	5,424	42.6	No	**8.60**	104.0	3.01	85.69	7.89	4.80	0.00	0.00	98.37	0.00
68	5,018	5,019	37.9	No	**9.65**	104.0	3.01	85.01	7.51	4.80	0.00	0.00	97.32	0.00
69	4,442	4,443	42.2	Yes	**11.59**	104.0	3.01	83.95	6.95	4.48	0.00	0.00	95.38	0.00
70	15,778	15,778	48.6	No	**-6.94**	104.0	3.01	94.96	14.15	4.80	0.00	0.00	113.91	0.00
71	15,717	15,717	53.2	No	**-6.88**	104.0	3.01	94.93	14.12	4.80	0.00	0.00	113.85	0.00
72	15,879	15,880	36.5	No	**-7.03**	104.0	3.01	95.02	14.19	4.80	0.00	0.00	114.01	0.00
73	15,439	15,439	39.8	No	**-6.60**	104.0	3.01	94.77	14.00	4.80	0.00	0.00	113.57	0.00
74	14,407	14,407	46.9	No	**-5.54**	104.0	3.01	94.17	13.54	4.80	0.00	0.00	112.51	0.00
75	13,711	13,711	35.0	No	**-4.78**	104.0	3.01	93.74	13.21	4.80	0.00	0.00	111.76	0.00
76	9,928	9,928	33.9	No	**0.04**	104.0	3.01	90.94	11.19	4.80	0.00	0.00	106.93	0.00
77	10,927	10,927	30.4	No	**-1.37**	104.0	3.01	91.77	11.77	4.80	0.00	0.00	108.34	0.00
78	14,753	14,754	56.2	No	**-5.90**	104.0	3.01	94.38	13.70	4.80	0.00	0.00	112.88	0.00
80	8,932	8,932	43.5	No	**1.59**	104.0	3.01	90.02	10.56	4.80	0.00	0.00	105.38	0.00
81	16,464	16,465	68.2	No	**-7.59**	104.0	3.01	95.33	14.44	4.80	0.00	0.00	114.57	0.00
82	12,771	12,771	30.7	No	**-3.71**	104.0	3.01	93.12	12.75	4.80	0.00	0.00	110.68	0.00
83	5,817	5,817	40.2	No	**7.64**	104.0	3.01	86.29	8.23	4.80	0.00	0.00	99.33	0.00
85	12,352	12,353	33.0	No	**-3.20**	104.0	3.01	92.84	12.54	4.80	0.00	0.00	110.18	0.00
86	9,115	9,115	41.0	No	**1.29**	104.0	3.01	90.20	10.68	4.80	0.00	0.00	105.68	0.00
87	4,379	4,380	43.2	Yes	**11.79**	104.0	3.01	83.83	6.89	4.46	0.00	0.00	95.18	0.00
89	5,375	5,376	41.9	No	**8.72**	104.0	3.01	85.61	7.84	4.80	0.00	0.00	98.25	0.00
90	8,781	8,781	35.2	No	**1.84**	104.0	3.01	89.87	10.47	4.80	0.00	0.00	105.14	0.00
91	6,843	6,844	37.8	No	**5.39**	104.0	3.01	87.71	9.08	4.80	0.00	0.00	101.58	0.00
92	4,261	4,262	39.4	No	**11.81**	104.0	3.01	83.59	6.77	4.80	0.00	0.00	95.16	0.00
94	15,987	15,988	64.0	No	**-7.14**	104.0	3.01	95.08	14.24	4.80	0.00	0.00	114.11	0.00
95	17,175	17,175	51.1	No	**-8.25**	104.0	3.01	95.70	14.73	4.80	0.00	0.00	115.22	0.00
97	14,582	14,583	69.2	No	**-5.72**	104.0	3.01	94.28	13.62	4.80	0.00	0.00	112.70	0.00
98	16,433	16,433	60.1	No	**-7.56**	104.0	3.01	95.31	14.42	4.80	0.00	0.00	114.54	0.00
99	16,670	16,670	36.2	No	**-7.79**	104.0	3.01	95.44	14.52	4.80	0.00	0.00	114.76	0.00
100	10,855	10,856	53.1	No	**-1.27**	104.0	3.01	91.71	11.73	4.80	0.00	0.00	108.25	0.00
101	16,846	16,847	66.0	No	**-7.95**	104.0	3.01	95.53	14.59	4.80	0.00	0.00	114.92	0.00
102	11,474	11,475	67.5	No	**-2.10**	104.0	3.01	92.19	12.08	4.80	0.00	0.00	109.07	0.00
103	17,681	17,682	63.1	No	**-8.70**	104.0	3.01	95.95	14.93	4.80	0.00	0.00	115.68	0.00
104	11,918	11,918	51.1	No	**-2.67**	104.0	3.01	92.52	12.32	4.80	0.00	0.00	109.64	0.00
107	15,545	15,545	66.7	No	**-6.71**	104.0	3.01	94.83	14.05	4.80	0.00	0.00	113.68	0.00
108	17,193	17,193	35.0	No	**-8.27**	104.0	3.01	95.71	14.73	4.80	0.00	0.00	115.24	0.00
109	9,746	9,746	39.7	No	**0.32**	104.0	3.01	90.78	11.08	4.80	0.00	0.00	106.66	0.00
110	10,785	10,786	31.0	No	**-1.18**	104.0	3.01	91.66	11.69	4.80	0.00	0.00	108.15	0.00
111	10,261	10,261	33.5	No	**-0.44**	104.0	3.01	91.22	11.39	4.80	0.00	0.00	107.41	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	15,868	15,869	66.3	No	**-7.02**	104.0	3.01	95.01	14.19	4.80	0.00	0.00	114.00	0.00
114	12,123	12,123	33.5	No	**-2.92**	104.0	3.01	92.67	12.42	4.80	0.00	0.00	109.90	0.00
115	17,209	17,210	31.0	No	**-8.28**	104.0	3.01	95.72	14.74	4.80	0.00	0.00	115.25	0.00
116	12,611	12,612	64.5	No	**-3.52**	104.0	3.01	93.02	12.67	4.80	0.00	0.00	110.49	0.00
118	9,460	9,460	40.7	No	**0.75**	104.0	3.01	90.52	10.90	4.80	0.00	0.00	106.22	0.00
119	15,039	15,039	48.0	No	**-6.20**	104.0	3.01	94.54	13.82	4.80	0.00	0.00	113.17	0.00
120	17,169	17,169	62.6	No	**-8.25**	104.0	3.01	95.70	14.72	4.80	0.00	0.00	115.22	0.00
121	14,508	14,508	53.9	No	**-5.65**	104.0	3.01	94.23	13.59	4.80	0.00	0.00	112.62	0.00
125	6,017	6,018	40.1	No	**7.18**	104.0	3.01	86.59	8.41	4.80	0.00	0.00	99.79	0.00
126	9,607	9,608	48.9	No	**0.53**	104.0	3.01	90.65	10.99	4.80	0.00	0.00	106.45	0.00
127	9,454	9,454	48.7	No	**0.76**	104.0	3.01	90.51	10.90	4.80	0.00	0.00	106.21	0.00
128	9,411	9,412	47.5	No	**0.83**	104.0	3.01	90.47	10.87	4.80	0.00	0.00	106.15	0.00
129	13,435	13,436	51.5	No	**-4.48**	104.0	3.01	93.57	13.08	4.80	0.00	0.00	111.45	0.00
130	13,082	13,082	50.6	No	**-4.07**	104.0	3.01	93.33	12.91	4.80	0.00	0.00	111.04	0.00
131	13,429	13,429	48.3	No	**-4.47**	104.0	3.01	93.56	13.08	4.80	0.00	0.00	111.44	0.00
132	13,832	13,832	47.8	No	**-4.92**	104.0	3.01	93.82	13.27	4.80	0.00	0.00	111.89	0.00
133	11,464	11,464	38.6	No	**-2.09**	104.0	3.01	92.19	12.07	4.80	0.00	0.00	109.06	0.00
134	15,781	15,781	51.5	No	**-6.94**	104.0	3.01	94.96	14.15	4.80	0.00	0.00	113.91	0.00
141	14,536	14,536	65.7	No	**-5.68**	104.0	3.01	94.25	13.60	4.80	0.00	0.00	112.65	0.00
142	11,726	11,727	70.4	No	**-2.43**	104.0	3.01	92.38	12.21	4.80	0.00	0.00	109.40	0.00
143	14,948	14,949	69.5	No	**-6.10**	104.0	3.01	94.49	13.78	4.80	0.00	0.00	113.08	0.00
144	10,576	10,577	56.0	No	**-0.89**	104.0	3.01	91.49	11.57	4.80	0.00	0.00	107.86	0.00
145	9,063	9,063	37.8	No	**1.38**	104.0	3.01	90.15	10.65	4.80	0.00	0.00	105.60	0.00
146	9,325	9,326	37.4	No	**0.96**	104.0	3.01	90.39	10.82	4.80	0.00	0.00	106.01	0.00

Sum 22.27

Noise sensitive area: H40 H40

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	19,128	19,129	45.0	No	**-9.94**	104.0	3.01	96.63	15.48	4.80	0.00	0.00	116.91	0.00
2	19,154	19,154	41.6	No	**-9.96**	104.0	3.01	96.65	15.49	4.80	0.00	0.00	116.93	0.00
3	18,700	18,701	46.5	No	**-9.58**	104.0	3.01	96.44	15.32	4.80	0.00	0.00	116.55	0.00
4	18,038	18,038	40.4	No	**-9.02**	104.0	3.01	96.12	15.06	4.80	0.00	0.00	115.99	0.00
5	17,663	17,663	42.7	No	**-8.69**	104.0	3.01	95.94	14.92	4.80	0.00	0.00	115.66	0.00
6	18,123	18,124	48.6	No	**-9.09**	104.0	3.01	96.16	15.10	4.80	0.00	0.00	116.06	0.00
7	15,970	15,971	61.2	No	**-7.12**	104.0	3.01	95.07	14.23	4.80	0.00	0.00	114.10	0.00
8	19,716	19,716	38.2	No	**-10.42**	104.0	3.01	96.90	15.69	4.80	0.00	0.00	117.39	0.00
9	18,597	18,597	50.7	No	**-9.49**	104.0	3.01	96.39	15.28	4.80	0.00	0.00	116.47	0.00
10	18,231	18,231	64.1	No	**-9.18**	104.0	3.01	96.22	15.14	4.80	0.00	0.00	116.16	0.00
11	19,305	19,306	70.3	No	**-10.08**	104.0	3.01	96.71	15.54	4.80	0.00	0.00	117.06	0.00
12	19,172	19,172	69.7	No	**-9.97**	104.0	3.01	96.65	15.49	4.80	0.00	0.00	116.95	0.00
13	18,703	18,704	75.2	No	**-9.58**	104.0	3.01	96.44	15.32	4.80	0.00	0.00	116.56	0.00
14	18,274	18,274	76.5	No	**-9.22**	104.0	3.01	96.24	15.16	4.80	0.00	0.00	116.19	0.00
15	17,625	17,626	71.6	No	**-8.65**	104.0	3.01	95.92	14.90	4.80	0.00	0.00	115.63	0.00
16	17,428	17,428	65.6	No	**-8.48**	104.0	3.01	95.83	14.83	4.80	0.00	0.00	115.45	0.00
17	19,496	19,497	69.0	No	**-10.24**	104.0	3.01	96.80	15.61	4.80	0.00	0.00	117.21	0.00
18	19,527	19,528	66.8	No	**-10.26**	104.0	3.01	96.81	15.62	4.80	0.00	0.00	117.24	0.00
19	18,405	18,405	71.1	No	**-9.33**	104.0	3.01	96.30	15.21	4.80	0.00	0.00	116.30	0.00
20	17,354	17,354	66.5	No	**-8.41**	104.0	3.01	95.79	14.80	4.80	0.00	0.00	115.38	0.00
21	17,287	17,287	46.6	No	**-8.35**	104.0	3.01	95.75	14.77	4.80	0.00	0.00	115.32	0.00
22	17,071	17,071	41.6	No	**-8.16**	104.0	3.01	95.65	14.68	4.80	0.00	0.00	115.13	0.00
23	16,760	16,760	43.3	No	**-7.87**	104.0	3.01	95.49	14.56	4.80	0.00	0.00	114.84	0.00
24	17,280	17,280	41.4	No	**-8.35**	104.0	3.01	95.75	14.77	4.80	0.00	0.00	115.32	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	14,484	14,484	38.5	No	**-5.62**	104.0	3.01	94.22	13.57	4.80	0.00	0.00	112.59	0.00
26	16,557	16,558	46.9	No	**-7.68**	104.0	3.01	95.38	14.47	4.80	0.00	0.00	114.65	0.00
27	14,690	14,690	42.6	No	**-5.84**	104.0	3.01	94.34	13.67	4.80	0.00	0.00	112.81	0.00
28	14,785	14,786	56.7	No	**-5.94**	104.0	3.01	94.40	13.71	4.80	0.00	0.00	112.91	0.00
29	16,274	16,274	42.5	No	**-7.41**	104.0	3.01	95.23	14.36	4.80	0.00	0.00	114.39	0.00
30	16,357	16,357	36.7	No	**-7.49**	104.0	3.01	95.27	14.39	4.80	0.00	0.00	114.46	0.00
31	17,396	17,396	42.6	No	**-8.45**	104.0	3.01	95.81	14.81	4.80	0.00	0.00	115.42	0.00
32	14,552	14,552	37.0	No	**-5.69**	104.0	3.01	94.26	13.61	4.80	0.00	0.00	112.66	0.00
33	15,829	15,829	35.3	No	**-6.99**	104.0	3.01	94.99	14.17	4.80	0.00	0.00	113.96	0.00
34	15,685	15,686	57.0	No	**-6.84**	104.0	3.01	94.91	14.11	4.80	0.00	0.00	113.82	0.00
35	16,244	16,244	61.5	No	**-7.39**	104.0	3.01	95.21	14.34	4.80	0.00	0.00	114.36	0.00
36	16,527	16,527	61.3	No	**-7.65**	104.0	3.01	95.36	14.46	4.80	0.00	0.00	114.63	0.00
37	15,396	15,397	55.4	No	**-6.56**	104.0	3.01	94.75	13.98	4.80	0.00	0.00	113.53	0.00
38	14,492	14,492	39.9	No	**-5.63**	104.0	3.01	94.22	13.58	4.80	0.00	0.00	112.60	0.00
39	14,020	14,020	53.2	No	**-5.12**	104.0	3.01	93.94	13.36	4.80	0.00	0.00	112.10	0.00
40	13,933	13,933	51.1	No	**-5.03**	104.0	3.01	93.88	13.32	4.80	0.00	0.00	112.00	0.00
41	13,843	13,843	63.4	No	**-4.93**	104.0	3.01	93.82	13.28	4.80	0.00	0.00	111.90	0.00
43	14,843	14,843	61.7	No	**-6.00**	104.0	3.01	94.43	13.74	4.80	0.00	0.00	112.97	0.00
44	13,515	13,516	73.7	No	**-4.57**	104.0	3.01	93.62	13.12	4.80	0.00	0.00	111.54	0.00
45	13,288	13,289	70.4	No	**-4.31**	104.0	3.01	93.47	13.01	4.80	0.00	0.00	111.28	0.00
46	14,139	14,139	55.4	No	**-5.25**	104.0	3.01	94.01	13.42	4.80	0.00	0.00	112.22	0.00
48	13,786	13,787	36.1	No	**-4.87**	104.0	3.01	93.79	13.25	4.80	0.00	0.00	111.84	0.00
49	14,469	14,470	34.8	No	**-5.61**	104.0	3.01	94.21	13.57	4.80	0.00	0.00	112.58	0.00
50	17,092	17,092	52.3	No	**-8.18**	104.0	3.01	95.66	14.69	4.80	0.00	0.00	115.15	0.00
51	14,821	14,821	33.5	No	**-5.97**	104.0	3.01	94.42	13.73	4.80	0.00	0.00	112.95	0.00
52	15,073	15,073	33.8	No	**-6.23**	104.0	3.01	94.56	13.84	4.80	0.00	0.00	113.20	0.00
53	14,221	14,221	38.1	No	**-5.34**	104.0	3.01	94.06	13.45	4.80	0.00	0.00	112.31	0.00
55	13,108	13,108	36.2	No	**-4.10**	104.0	3.01	93.35	12.92	4.80	0.00	0.00	111.07	0.00
56	12,902	12,902	39.2	No	**-3.86**	104.0	3.01	93.21	12.82	4.80	0.00	0.00	110.83	0.00
57	12,376	12,376	34.6	No	**-3.23**	104.0	3.01	92.85	12.55	4.80	0.00	0.00	110.21	0.00
58	15,170	15,170	34.7	No	**-6.33**	104.0	3.01	94.62	13.88	4.80	0.00	0.00	113.30	0.00
59	12,690	12,690	40.6	No	**-3.61**	104.0	3.01	93.07	12.71	4.80	0.00	0.00	110.58	0.00
60	11,465	11,465	45.2	No	**-2.09**	104.0	3.01	92.19	12.07	4.80	0.00	0.00	109.06	0.00
61	11,247	11,248	40.8	No	**-1.80**	104.0	3.01	92.02	11.95	4.80	0.00	0.00	108.77	0.00
62	9,922	9,923	41.9	No	**0.05**	104.0	3.01	90.93	11.19	4.80	0.00	0.00	106.92	0.00
63	8,910	8,911	46.4	No	**1.62**	104.0	3.01	90.00	10.55	4.80	0.00	0.00	105.35	0.00
64	7,554	7,554	45.2	No	**3.99**	104.0	3.01	88.56	9.61	4.80	0.00	0.00	102.98	0.00
65	7,206	7,206	44.4	No	**4.66**	104.0	3.01	88.15	9.35	4.80	0.00	0.00	102.31	0.00
66	14,169	14,169	48.2	No	**-5.28**	104.0	3.01	94.03	13.43	4.80	0.00	0.00	112.26	0.00
67	8,133	8,133	42.5	No	**2.94**	104.0	3.01	89.21	10.03	4.80	0.00	0.00	104.03	0.00
68	7,736	7,736	40.7	No	**3.66**	104.0	3.01	88.77	9.75	4.80	0.00	0.00	103.32	0.00
69	7,129	7,130	45.5	No	**4.81**	104.0	3.01	88.06	9.30	4.80	0.00	0.00	102.16	0.00
70	17,866	17,866	48.3	No	**-8.87**	104.0	3.01	96.04	15.00	4.80	0.00	0.00	115.84	0.00
71	18,002	18,002	60.7	No	**-8.99**	104.0	3.01	96.11	15.05	4.80	0.00	0.00	115.96	0.00
72	18,347	18,347	40.6	No	**-9.28**	104.0	3.01	96.27	15.18	4.80	0.00	0.00	116.26	0.00
73	17,834	17,834	46.1	No	**-8.84**	104.0	3.01	96.03	14.99	4.80	0.00	0.00	115.81	0.00
74	16,781	16,781	54.6	No	**-7.89**	104.0	3.01	95.50	14.57	4.80	0.00	0.00	114.86	0.00
75	16,171	16,171	40.3	No	**-7.32**	104.0	3.01	95.17	14.31	4.80	0.00	0.00	114.29	0.00
76	12,560	12,561	38.2	No	**-3.46**	104.0	3.01	92.98	12.65	4.80	0.00	0.00	110.43	0.00
77	13,568	13,568	34.1	No	**-4.62**	104.0	3.01	93.65	13.15	4.80	0.00	0.00	111.60	0.00
78	16,944	16,944	59.4	No	**-8.04**	104.0	3.01	95.58	14.63	4.80	0.00	0.00	115.01	0.00
80	11,645	11,645	44.9	No	**-2.32**	104.0	3.01	92.32	12.17	4.80	0.00	0.00	109.29	0.00
81	18,601	18,601	70.7	No	**-9.50**	104.0	3.01	96.39	15.28	4.80	0.00	0.00	116.47	0.00
82	15,360	15,360	35.4	No	**-6.52**	104.0	3.01	94.73	13.97	4.80	0.00	0.00	113.49	0.00
83	8,492	8,492	44.9	No	**2.32**	104.0	3.01	89.58	10.27	4.80	0.00	0.00	104.65	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	15,020	15,020	36.3	No	**-6.18**	104.0	3.01	94.53	13.82	4.80	0.00	0.00	113.15	0.00
86	11,824	11,824	42.0	No	**-2.55**	104.0	3.01	92.46	12.27	4.80	0.00	0.00	109.52	0.00
87	7,090	7,091	42.7	No	**4.89**	104.0	3.01	88.01	9.27	4.80	0.00	0.00	102.08	0.00
89	8,030	8,030	45.5	No	**3.12**	104.0	3.01	89.09	9.95	4.80	0.00	0.00	103.85	0.00
90	11,443	11,443	39.8	No	**-2.06**	104.0	3.01	92.17	12.06	4.80	0.00	0.00	109.03	0.00
91	9,505	9,505	42.6	No	**0.68**	104.0	3.01	90.56	10.93	4.80	0.00	0.00	106.29	0.00
92	6,860	6,861	43.5	No	**5.36**	104.0	3.01	87.73	9.09	4.80	0.00	0.00	101.62	0.00
94	18,220	18,221	70.5	No	**-9.17**	104.0	3.01	96.21	15.14	4.80	0.00	0.00	116.15	0.00
95	19,399	19,399	58.5	No	**-10.16**	104.0	3.01	96.76	15.58	4.80	0.00	0.00	117.13	0.00
97	16,833	16,833	74.0	No	**-7.94**	104.0	3.01	95.52	14.59	4.80	0.00	0.00	114.91	0.00
98	18,663	18,663	67.0	No	**-9.55**	104.0	3.01	96.42	15.30	4.80	0.00	0.00	116.52	0.00
99	19,081	19,081	41.6	No	**-9.90**	104.0	3.01	96.61	15.46	4.80	0.00	0.00	116.87	0.00
100	13,294	13,295	59.2	No	**-4.32**	104.0	3.01	93.47	13.01	4.80	0.00	0.00	111.29	0.00
101	18,964	18,964	67.9	No	**-9.80**	104.0	3.01	96.56	15.42	4.80	0.00	0.00	116.77	0.00
102	13,846	13,847	74.0	No	**-4.93**	104.0	3.01	93.83	13.28	4.80	0.00	0.00	111.91	0.00
103	19,786	19,787	65.2	No	**-10.47**	104.0	3.01	96.93	15.72	4.80	0.00	0.00	117.44	0.00
104	14,322	14,322	57.8	No	**-5.45**	104.0	3.01	94.12	13.50	4.80	0.00	0.00	112.42	0.00
107	17,711	17,712	69.8	No	**-8.73**	104.0	3.01	95.97	14.94	4.80	0.00	0.00	115.70	0.00
108	19,647	19,648	38.9	No	**-10.36**	104.0	3.01	96.87	15.67	4.80	0.00	0.00	117.33	0.00
109	12,453	12,454	41.2	No	**-3.33**	104.0	3.01	92.91	12.59	4.80	0.00	0.00	110.30	0.00
110	13,379	13,379	36.4	No	**-4.41**	104.0	3.01	93.53	13.05	4.80	0.00	0.00	111.38	0.00
111	12,878	12,879	38.5	No	**-3.83**	104.0	3.01	93.20	12.81	4.80	0.00	0.00	110.81	0.00
113	18,026	18,026	69.5	No	**-9.01**	104.0	3.01	96.12	15.06	4.80	0.00	0.00	115.98	0.00
114	14,798	14,798	36.2	No	**-5.95**	104.0	3.01	94.40	13.72	4.80	0.00	0.00	112.92	0.00
115	19,514	19,514	38.7	No	**-10.25**	104.0	3.01	96.81	15.62	4.80	0.00	0.00	117.22	0.00
116	14,917	14,917	68.9	No	**-6.07**	104.0	3.01	94.47	13.77	4.80	0.00	0.00	113.04	0.00
118	12,175	12,175	42.9	No	**-2.99**	104.0	3.01	92.71	12.45	4.80	0.00	0.00	109.96	0.00
119	17,373	17,373	56.4	No	**-8.43**	104.0	3.01	95.80	14.80	4.80	0.00	0.00	115.40	0.00
120	19,259	19,259	63.1	No	**-10.05**	104.0	3.01	96.69	15.52	4.80	0.00	0.00	117.02	0.00
121	16,820	16,821	61.3	No	**-7.93**	104.0	3.01	95.52	14.58	4.80	0.00	0.00	114.90	0.00
125	8,676	8,676	44.4	No	**2.01**	104.0	3.01	89.77	10.40	4.80	0.00	0.00	104.96	0.00
126	12,109	12,109	55.8	No	**-2.91**	104.0	3.01	92.66	12.42	4.80	0.00	0.00	109.88	0.00
127	11,974	11,975	55.3	No	**-2.74**	104.0	3.01	92.57	12.35	4.80	0.00	0.00	109.71	0.00
128	11,959	11,959	53.3	No	**-2.72**	104.0	3.01	92.55	12.34	4.80	0.00	0.00	109.69	0.00
129	15,534	15,534	51.2	No	**-6.69**	104.0	3.01	94.83	14.04	4.80	0.00	0.00	113.67	0.00
130	15,117	15,118	49.4	No	**-6.28**	104.0	3.01	94.59	13.86	4.80	0.00	0.00	113.25	0.00
131	15,426	15,426	46.2	No	**-6.59**	104.0	3.01	94.76	13.99	4.80	0.00	0.00	113.56	0.00
132	15,813	15,813	45.5	No	**-6.97**	104.0	3.01	94.98	14.16	4.80	0.00	0.00	113.94	0.00
133	13,951	13,952	45.2	No	**-5.05**	104.0	3.01	93.89	13.33	4.80	0.00	0.00	112.02	0.00
134	17,898	17,898	52.7	No	**-8.89**	104.0	3.01	96.06	15.01	4.80	0.00	0.00	115.87	0.00
141	16,810	16,810	71.6	No	**-7.92**	104.0	3.01	95.51	14.58	4.80	0.00	0.00	114.89	0.00
142	14,082	14,083	77.1	No	**-5.19**	104.0	3.01	93.97	13.39	4.80	0.00	0.00	112.16	0.00
143	17,182	17,182	74.5	No	**-8.26**	104.0	3.01	95.70	14.73	4.80	0.00	0.00	115.23	0.00
144	12,985	12,985	61.8	No	**-3.96**	104.0	3.01	93.27	12.86	4.80	0.00	0.00	110.93	0.00
145	11,702	11,702	42.2	No	**-2.39**	104.0	3.01	92.37	12.20	4.80	0.00	0.00	109.37	0.00
146	11,952	11,952	42.2	No	**-2.71**	104.0	3.01	92.55	12.33	4.80	0.00	0.00	109.68	0.00

Sum 17.44

Noise sensitive area: H41 H41

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	18,299	18,299	46.3	Yes	**-9.16**	104.0	3.01	96.25	15.17	4.71	0.00	0.00	116.13	0.00
2	18,337	18,338	42.7	Yes	**-9.20**	104.0	3.01	96.27	15.18	4.72	0.00	0.00	116.17	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	17,894	17,894	46.7	Yes	**-8.80**	104.0	3.01	96.05	15.01	4.71	0.00	0.00	115.77	0.00
4	17,277	17,277	39.9	Yes	**-8.26**	104.0	3.01	95.75	14.77	4.72	0.00	0.00	115.24	0.00
5	16,879	16,879	43.3	Yes	**-7.89**	104.0	3.01	95.55	14.61	4.71	0.00	0.00	114.87	0.00
6	17,319	17,320	49.1	Yes	**-8.28**	104.0	3.01	95.77	14.78	4.70	0.00	0.00	115.26	0.00
7	15,158	15,159	62.2	Yes	**-6.18**	104.0	3.01	94.61	13.88	4.66	0.00	0.00	113.15	0.00
8	18,880	18,880	39.9	Yes	**-9.66**	104.0	3.01	96.52	15.38	4.73	0.00	0.00	116.63	0.00
9	17,768	17,768	52.1	Yes	**-8.68**	104.0	3.01	95.99	14.96	4.70	0.00	0.00	115.65	0.00
10	17,390	17,390	66.2	Yes	**-8.32**	104.0	3.01	95.81	14.81	4.67	0.00	0.00	115.29	0.00
11	18,435	18,435	71.3	Yes	**-9.23**	104.0	3.01	96.31	15.22	4.67	0.00	0.00	116.20	0.00
12	18,305	18,306	70.7	Yes	**-9.12**	104.0	3.01	96.25	15.17	4.67	0.00	0.00	116.09	0.00
13	17,839	17,840	76.4	Yes	**-8.70**	104.0	3.01	96.03	14.99	4.65	0.00	0.00	115.67	0.00
14	17,411	17,412	77.7	Yes	**-8.31**	104.0	3.01	95.82	14.82	4.65	0.00	0.00	115.28	0.00
15	16,775	16,776	73.0	Yes	**-7.74**	104.0	3.01	95.49	14.56	4.65	0.00	0.00	114.71	0.00
16	16,587	16,588	67.9	Yes	**-7.57**	104.0	3.01	95.40	14.49	4.66	0.00	0.00	114.54	0.00
17	18,623	18,623	69.8	Yes	**-9.39**	104.0	3.01	96.40	15.29	4.67	0.00	0.00	116.36	0.00
18	18,647	18,648	67.6	Yes	**-9.41**	104.0	3.01	96.41	15.30	4.68	0.00	0.00	116.39	0.00
19	17,534	17,535	72.1	Yes	**-8.43**	104.0	3.01	95.88	14.87	4.66	0.00	0.00	115.41	0.00
20	16,493	16,494	68.2	Yes	**-7.48**	104.0	3.01	95.35	14.45	4.66	0.00	0.00	114.45	0.00
21	16,519	16,519	46.7	Yes	**-7.55**	104.0	3.01	95.36	14.46	4.70	0.00	0.00	114.52	0.00
22	16,331	16,331	41.8	No	**-7.47**	104.0	3.01	95.26	14.38	4.80	0.00	0.00	114.44	0.00
23	16,029	16,029	43.7	No	**-7.18**	104.0	3.01	95.10	14.25	4.80	0.00	0.00	114.15	0.00
24	16,536	16,536	41.4	No	**-7.66**	104.0	3.01	95.37	14.47	4.80	0.00	0.00	114.63	0.00
25	13,762	13,762	39.6	No	**-4.84**	104.0	3.01	93.77	13.24	4.80	0.00	0.00	111.81	0.00
26	15,769	15,769	48.4	Yes	**-6.82**	104.0	3.01	94.96	14.14	4.70	0.00	0.00	113.79	0.00
27	13,934	13,934	42.7	Yes	**-4.92**	104.0	3.01	93.88	13.32	4.70	0.00	0.00	111.90	0.00
28	13,991	13,992	58.1	Yes	**-4.95**	104.0	3.01	93.92	13.35	4.66	0.00	0.00	111.92	0.00
29	15,529	15,529	42.5	No	**-6.69**	104.0	3.01	94.82	14.04	4.80	0.00	0.00	113.66	0.00
30	15,634	15,634	37.9	No	**-6.79**	104.0	3.01	94.88	14.08	4.80	0.00	0.00	113.77	0.00
31	16,683	16,683	44.2	No	**-7.80**	104.0	3.01	95.45	14.53	4.80	0.00	0.00	114.77	0.00
32	13,852	13,852	39.2	No	**-4.94**	104.0	3.01	93.83	13.28	4.80	0.00	0.00	111.91	0.00
33	15,120	15,121	36.9	No	**-6.28**	104.0	3.01	94.59	13.86	4.80	0.00	0.00	113.25	0.00
34	14,879	14,880	57.6	Yes	**-5.90**	104.0	3.01	94.45	13.75	4.67	0.00	0.00	112.87	0.00
35	15,427	15,428	62.6	Yes	**-6.45**	104.0	3.01	94.77	14.00	4.66	0.00	0.00	113.42	0.00
36	15,706	15,707	62.9	Yes	**-6.73**	104.0	3.01	94.92	14.12	4.66	0.00	0.00	113.70	0.00
37	14,595	14,595	56.5	Yes	**-5.61**	104.0	3.01	94.28	13.63	4.67	0.00	0.00	112.58	0.00
38	13,752	13,752	40.2	No	**-4.83**	104.0	3.01	93.77	13.23	4.80	0.00	0.00	111.80	0.00
39	13,249	13,249	54.1	Yes	**-4.12**	104.0	3.01	93.44	12.99	4.66	0.00	0.00	111.10	0.00
40	13,086	13,087	53.1	Yes	**-3.94**	104.0	3.01	93.34	12.91	4.66	0.00	0.00	110.91	0.00
41	13,059	13,060	64.7	Yes	**-3.88**	104.0	3.01	93.32	12.90	4.63	0.00	0.00	110.85	0.00
43	14,040	14,041	62.8	Yes	**-4.99**	104.0	3.01	93.95	13.37	4.65	0.00	0.00	111.97	0.00
44	12,719	12,719	75.0	Yes	**-3.45**	104.0	3.01	93.09	12.73	4.60	0.00	0.00	110.42	0.00
45	12,500	12,500	72.3	Yes	**-3.19**	104.0	3.01	92.94	12.62	4.60	0.00	0.00	110.16	0.00
46	13,311	13,311	57.3	Yes	**-4.19**	104.0	3.01	93.48	13.02	4.65	0.00	0.00	111.16	0.00
48	13,095	13,095	38.3	No	**-4.09**	104.0	3.01	93.34	12.92	4.80	0.00	0.00	111.06	0.00
49	13,820	13,820	36.5	No	**-4.90**	104.0	3.01	93.81	13.27	4.80	0.00	0.00	111.88	0.00
50	16,284	16,285	52.7	Yes	**-7.31**	104.0	3.01	95.24	14.36	4.69	0.00	0.00	114.29	0.00
51	14,156	14,156	35.4	No	**-5.27**	104.0	3.01	94.02	13.42	4.80	0.00	0.00	112.24	0.00
52	14,398	14,398	35.6	No	**-5.53**	104.0	3.01	94.17	13.54	4.80	0.00	0.00	112.50	0.00
53	13,583	13,583	40.1	No	**-4.64**	104.0	3.01	93.66	13.15	4.80	0.00	0.00	111.61	0.00
55	12,526	12,527	36.9	No	**-3.42**	104.0	3.01	92.96	12.63	4.80	0.00	0.00	110.39	0.00
56	12,334	12,334	39.9	No	**-3.18**	104.0	3.01	92.82	12.53	4.80	0.00	0.00	110.15	0.00
57	11,775	11,775	36.6	No	**-2.49**	104.0	3.01	92.42	12.24	4.80	0.00	0.00	109.46	0.00
58	14,452	14,453	36.3	No	**-5.59**	104.0	3.01	94.20	13.56	4.80	0.00	0.00	112.56	0.00
59	12,137	12,137	42.0	No	**-2.94**	104.0	3.01	92.68	12.43	4.80	0.00	0.00	109.91	0.00
60	10,972	10,973	46.8	No	**-1.43**	104.0	3.01	91.81	11.80	4.80	0.00	0.00	108.41	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:
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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	10,777	10,777	44.7	No	**-1.17**	104.0	3.01	91.65	11.69	4.80	0.00	0.00	108.14	0.00
62	9,335	9,335	43.5	No	**0.95**	104.0	3.01	90.40	10.82	4.80	0.00	0.00	106.03	0.00
63	8,285	8,285	48.9	No	**2.68**	104.0	3.01	89.37	10.13	4.80	0.00	0.00	104.30	0.00
64	6,968	6,969	47.9	No	**5.14**	104.0	3.01	87.86	9.17	4.80	0.00	0.00	101.84	0.00
65	6,680	6,680	48.0	No	**5.73**	104.0	3.01	87.50	8.95	4.80	0.00	0.00	101.24	0.00
66	13,316	13,316	49.6	Yes	**-4.21**	104.0	3.01	93.49	13.02	4.67	0.00	0.00	111.18	0.00
67	7,615	7,616	46.9	No	**3.88**	104.0	3.01	88.63	9.66	4.80	0.00	0.00	103.09	0.00
68	7,260	7,260	44.2	No	**4.56**	104.0	3.01	88.22	9.40	4.80	0.00	0.00	102.41	0.00
69	6,578	6,578	47.6	No	**5.94**	104.0	3.01	87.36	8.87	4.80	0.00	0.00	101.03	0.00
70	16,982	16,982	48.9	Yes	**-7.98**	104.0	3.01	95.60	14.65	4.70	0.00	0.00	114.95	0.00
71	17,166	17,166	62.4	Yes	**-8.12**	104.0	3.01	95.69	14.72	4.68	0.00	0.00	115.09	0.00
72	17,578	17,579	40.8	Yes	**-8.53**	104.0	3.01	95.90	14.89	4.72	0.00	0.00	115.51	0.00
73	17,036	17,036	46.5	Yes	**-8.03**	104.0	3.01	95.63	14.67	4.71	0.00	0.00	115.00	0.00
74	15,976	15,977	55.1	Yes	**-7.01**	104.0	3.01	95.07	14.23	4.68	0.00	0.00	113.98	0.00
75	15,402	15,402	40.7	Yes	**-6.47**	104.0	3.01	94.75	13.98	4.71	0.00	0.00	113.45	0.00
76	11,911	11,912	40.4	No	**-2.66**	104.0	3.01	92.52	12.31	4.80	0.00	0.00	109.63	0.00
77	12,924	12,924	36.0	No	**-3.89**	104.0	3.01	93.23	12.83	4.80	0.00	0.00	110.86	0.00
78	16,084	16,084	61.1	Yes	**-7.10**	104.0	3.01	95.13	14.28	4.67	0.00	0.00	114.08	0.00
80	11,127	11,127	47.1	No	**-1.64**	104.0	3.01	91.93	11.89	4.80	0.00	0.00	108.61	0.00
81	17,726	17,726	71.4	Yes	**-8.61**	104.0	3.01	95.97	14.94	4.66	0.00	0.00	115.58	0.00
82	14,667	14,667	37.7	No	**-5.81**	104.0	3.01	94.33	13.66	4.80	0.00	0.00	112.78	0.00
83	7,910	7,911	46.9	No	**3.34**	104.0	3.01	88.96	9.87	4.80	0.00	0.00	103.63	0.00
85	14,402	14,403	38.7	No	**-5.53**	104.0	3.01	94.17	13.54	4.80	0.00	0.00	112.51	0.00
86	11,289	11,289	45.2	No	**-1.86**	104.0	3.01	92.05	11.98	4.80	0.00	0.00	108.83	0.00
87	6,589	6,590	47.2	No	**5.92**	104.0	3.01	87.38	8.88	4.80	0.00	0.00	101.05	0.00
89	7,428	7,428	48.1	No	**4.23**	104.0	3.01	88.42	9.52	4.80	0.00	0.00	102.74	0.00
90	10,829	10,829	42.2	No	**-1.24**	104.0	3.01	91.69	11.72	4.80	0.00	0.00	108.21	0.00
91	8,900	8,901	45.1	No	**1.64**	104.0	3.01	89.99	10.54	4.80	0.00	0.00	105.33	0.00
92	6,223	6,223	46.1	No	**6.71**	104.0	3.01	86.88	8.58	4.80	0.00	0.00	100.26	0.00
94	17,369	17,369	71.7	Yes	**-8.29**	104.0	3.01	95.80	14.80	4.66	0.00	0.00	115.26	0.00
95	18,544	18,545	59.7	Yes	**-9.34**	104.0	3.01	96.36	15.26	4.69	0.00	0.00	116.31	0.00
97	15,988	15,989	76.0	Yes	**-6.98**	104.0	3.01	95.08	14.24	4.64	0.00	0.00	113.95	0.00
98	17,810	17,810	68.2	Yes	**-8.69**	104.0	3.01	96.01	14.98	4.67	0.00	0.00	115.66	0.00
99	18,287	18,287	41.9	Yes	**-9.15**	104.0	3.01	96.24	15.16	4.72	0.00	0.00	116.13	0.00
100	12,524	12,524	60.0	Yes	**-3.25**	104.0	3.01	92.95	12.63	4.64	0.00	0.00	110.22	0.00
101	18,085	18,085	68.8	Yes	**-8.93**	104.0	3.01	96.15	15.08	4.67	0.00	0.00	115.90	0.00
102	13,047	13,048	75.3	Yes	**-3.83**	104.0	3.01	93.31	12.89	4.60	0.00	0.00	110.81	0.00
103	18,904	18,904	65.6	Yes	**-9.63**	104.0	3.01	96.53	15.39	4.68	0.00	0.00	116.61	0.00
104	13,534	13,534	59.7	Yes	**-4.44**	104.0	3.01	93.63	13.13	4.65	0.00	0.00	111.41	0.00
107	16,844	16,845	71.0	Yes	**-7.81**	104.0	3.01	95.53	14.59	4.66	0.00	0.00	114.78	0.00
108	18,871	18,871	39.4	No	**-9.72**	104.0	3.01	96.52	15.38	4.80	0.00	0.00	116.70	0.00
109	11,914	11,914	44.0	No	**-2.66**	104.0	3.01	92.52	12.31	4.80	0.00	0.00	109.63	0.00
110	12,694	12,694	38.6	No	**-3.62**	104.0	3.01	93.07	12.72	4.80	0.00	0.00	110.59	0.00
111	12,215	12,215	40.3	No	**-3.04**	104.0	3.01	92.74	12.47	4.80	0.00	0.00	110.01	0.00
113	17,157	17,157	70.4	Yes	**-8.09**	104.0	3.01	95.69	14.72	4.66	0.00	0.00	115.07	0.00
114	14,191	14,191	38.3	No	**-5.31**	104.0	3.01	94.04	13.44	4.80	0.00	0.00	112.28	0.00
115	18,681	18,681	40.2	Yes	**-9.49**	104.0	3.01	96.43	15.31	4.73	0.00	0.00	116.47	0.00
116	14,092	14,093	70.7	Yes	**-5.03**	104.0	3.01	93.98	13.39	4.63	0.00	0.00	112.00	0.00
118	11,662	11,662	44.5	No	**-2.34**	104.0	3.01	92.34	12.18	4.80	0.00	0.00	109.31	0.00
119	16,553	16,553	57.9	Yes	**-7.56**	104.0	3.01	95.38	14.47	4.68	0.00	0.00	114.53	0.00
120	18,373	18,374	63.4	Yes	**-9.19**	104.0	3.01	96.28	15.19	4.68	0.00	0.00	116.16	0.00
121	15,994	15,995	62.8	Yes	**-7.01**	104.0	3.01	95.08	14.24	4.67	0.00	0.00	113.98	0.00
125	8,073	8,073	47.0	No	**3.05**	104.0	3.01	89.14	9.98	4.80	0.00	0.00	103.92	0.00
126	11,372	11,372	56.0	No	**-1.97**	104.0	3.01	92.12	12.02	4.80	0.00	0.00	108.94	0.00
127	11,248	11,249	55.8	No	**-1.80**	104.0	3.01	92.02	11.95	4.80	0.00	0.00	108.78	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	11,248	11,249	55.3	No	**-1.80**	104.0	3.01	92.02	11.95	4.80	0.00	0.00	108.78	0.00
129	14,655	14,656	52.4	Yes	**-5.68**	104.0	3.01	94.32	13.65	4.68	0.00	0.00	112.65	0.00
130	14,228	14,228	50.0	Yes	**-5.23**	104.0	3.01	94.06	13.46	4.68	0.00	0.00	112.20	0.00
131	14,528	14,529	46.3	No	**-5.67**	104.0	3.01	94.24	13.60	4.80	0.00	0.00	112.64	0.00
132	14,913	14,913	45.1	No	**-6.07**	104.0	3.01	94.47	13.77	4.80	0.00	0.00	113.04	0.00
133	13,201	13,202	45.4	Yes	**-4.09**	104.0	3.01	93.41	12.97	4.68	0.00	0.00	111.06	0.00
134	17,020	17,020	53.6	Yes	**-8.00**	104.0	3.01	95.62	14.66	4.69	0.00	0.00	114.98	0.00
141	15,972	15,973	73.6	Yes	**-6.97**	104.0	3.01	95.07	14.23	4.64	0.00	0.00	113.94	0.00
142	13,277	13,278	77.9	Yes	**-4.10**	104.0	3.01	93.46	13.01	4.60	0.00	0.00	111.07	0.00
143	16,332	16,333	75.9	Yes	**-7.31**	104.0	3.01	95.26	14.38	4.64	0.00	0.00	114.28	0.00
144	12,203	12,203	63.1	Yes	**-2.85**	104.0	3.01	92.73	12.46	4.62	0.00	0.00	109.82	0.00
145	11,062	11,062	44.6	No	**-1.55**	104.0	3.01	91.88	11.85	4.80	0.00	0.00	108.53	0.00
146	11,299	11,299	44.4	No	**-1.87**	104.0	3.01	92.06	11.98	4.80	0.00	0.00	108.84	0.00

Sum 18.41

Noise sensitive area: H42 H42

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	13,361	13,361	38.9	No	**-4.39**	104.0	3.01	93.52	13.05	4.80	0.00	0.00	111.36	0.00
2	13,487	13,487	35.0	No	**-4.53**	104.0	3.01	93.60	13.11	4.80	0.00	0.00	111.51	0.00
3	13,129	13,130	38.2	No	**-4.13**	104.0	3.01	93.37	12.93	4.80	0.00	0.00	111.10	0.00
4	12,857	12,857	27.6	No	**-3.81**	104.0	3.01	93.18	12.80	4.80	0.00	0.00	110.78	0.00
5	12,304	12,304	32.8	No	**-3.15**	104.0	3.01	92.80	12.52	4.80	0.00	0.00	110.12	0.00
6	12,585	12,585	41.0	No	**-3.49**	104.0	3.01	93.00	12.66	4.80	0.00	0.00	110.46	0.00
7	10,425	10,426	55.9	Yes	**-0.49**	104.0	3.01	91.36	11.49	4.62	0.00	0.00	107.47	0.00
8	13,882	13,882	31.6	No	**-4.97**	104.0	3.01	93.85	13.30	4.80	0.00	0.00	111.94	0.00
9	12,841	12,842	44.5	No	**-3.79**	104.0	3.01	93.17	12.79	4.80	0.00	0.00	110.76	0.00
10	12,381	12,382	57.3	Yes	**-3.08**	104.0	3.01	92.86	12.56	4.64	0.00	0.00	110.05	0.00
11	13,206	13,207	58.1	Yes	**-4.06**	104.0	3.01	93.42	12.97	4.65	0.00	0.00	111.04	0.00
12	13,105	13,106	58.3	Yes	**-3.95**	104.0	3.01	93.35	12.92	4.65	0.00	0.00	110.92	0.00
13	12,666	12,667	64.0	Yes	**-3.41**	104.0	3.01	93.05	12.70	4.63	0.00	0.00	110.38	0.00
14	12,252	12,252	66.2	Yes	**-2.90**	104.0	3.01	92.76	12.49	4.62	0.00	0.00	109.87	0.00
15	11,718	11,719	63.6	Yes	**-2.23**	104.0	3.01	92.38	12.21	4.62	0.00	0.00	109.20	0.00
16	11,604	11,605	59.8	Yes	**-2.09**	104.0	3.01	92.29	12.15	4.62	0.00	0.00	109.07	0.00
17	13,373	13,374	55.9	Yes	**-4.26**	104.0	3.01	93.52	13.05	4.66	0.00	0.00	111.23	0.00
18	13,352	13,353	53.8	Yes	**-4.24**	104.0	3.01	93.51	13.04	4.66	0.00	0.00	111.22	0.00
19	12,316	12,317	59.6	Yes	**-3.00**	104.0	3.01	92.81	12.52	4.64	0.00	0.00	109.97	0.00
20	11,361	11,362	57.4	Yes	**-1.78**	104.0	3.01	92.11	12.02	4.63	0.00	0.00	108.75	0.00
21	12,075	12,076	34.9	No	**-2.86**	104.0	3.01	92.64	12.40	4.80	0.00	0.00	109.84	0.00
22	12,103	12,103	29.9	No	**-2.90**	104.0	3.01	92.66	12.41	4.80	0.00	0.00	109.87	0.00
23	11,877	11,877	33.0	No	**-2.62**	104.0	3.01	92.49	12.29	4.80	0.00	0.00	109.59	0.00
24	12,264	12,264	29.3	No	**-3.10**	104.0	3.01	92.77	12.50	4.80	0.00	0.00	110.07	0.00
25	9,803	9,804	35.3	No	**0.23**	104.0	3.01	90.83	11.11	4.80	0.00	0.00	106.74	0.00
26	11,198	11,198	38.1	No	**-1.74**	104.0	3.01	91.98	11.93	4.80	0.00	0.00	108.71	0.00
27	9,696	9,696	34.0	No	**0.39**	104.0	3.01	90.73	11.05	4.80	0.00	0.00	106.58	0.00
28	9,450	9,451	47.8	Yes	**0.94**	104.0	3.01	90.51	10.90	4.63	0.00	0.00	106.03	0.00
29	11,294	11,294	31.6	No	**-1.86**	104.0	3.01	92.06	11.98	4.80	0.00	0.00	108.84	0.00
30	11,568	11,568	29.9	No	**-2.22**	104.0	3.01	92.27	12.13	4.80	0.00	0.00	109.19	0.00
31	12,636	12,636	35.5	No	**-3.55**	104.0	3.01	93.03	12.69	4.80	0.00	0.00	110.52	0.00
32	10,056	10,057	35.2	No	**-0.14**	104.0	3.01	91.05	11.27	4.80	0.00	0.00	107.12	0.00
33	11,183	11,183	31.8	No	**-1.72**	104.0	3.01	91.97	11.92	4.80	0.00	0.00	108.69	0.00
34	10,204	10,205	51.6	Yes	**-0.19**	104.0	3.01	91.18	11.36	4.63	0.00	0.00	107.16	0.00
35	10,653	10,654	55.5	Yes	**-0.82**	104.0	3.01	91.55	11.62	4.62	0.00	0.00	107.79	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	10,892	10,893	55.1	Yes	**-1.15**	104.0	3.01	91.74	11.75	4.63	0.00	0.00	108.12	0.00
37	9,971	9,972	48.4	Yes	**0.15**	104.0	3.01	90.98	11.22	4.63	0.00	0.00	106.83	0.00
38	9,653	9,653	33.8	No	**0.46**	104.0	3.01	90.69	11.02	4.80	0.00	0.00	106.52	0.00
39	8,932	8,932	45.7	Yes	**1.76**	104.0	3.01	90.02	10.56	4.63	0.00	0.00	105.21	0.00
40	8,160	8,160	46.5	Yes	**3.09**	104.0	3.01	89.23	10.04	4.61	0.00	0.00	103.88	0.00
41	8,657	8,658	55.0	Yes	**2.26**	104.0	3.01	89.75	10.38	4.58	0.00	0.00	104.72	0.00
43	9,427	9,428	54.2	Yes	**1.00**	104.0	3.01	90.49	10.88	4.60	0.00	0.00	105.97	0.00
44	8,227	8,228	65.0	Yes	**3.04**	104.0	3.01	89.31	10.09	4.53	0.00	0.00	103.93	0.00
45	8,094	8,095	63.3	Yes	**3.27**	104.0	3.01	89.16	10.00	4.53	0.00	0.00	103.70	0.00
46	8,525	8,526	51.2	Yes	**2.47**	104.0	3.01	89.61	10.30	4.60	0.00	0.00	104.51	0.00
48	9,428	9,429	34.0	No	**0.80**	104.0	3.01	90.49	10.88	4.80	0.00	0.00	106.17	0.00
49	10,417	10,417	33.5	No	**-0.66**	104.0	3.01	91.35	11.48	4.80	0.00	0.00	107.64	0.00
50	11,549	11,550	45.5	No	**-2.20**	104.0	3.01	92.25	12.12	4.80	0.00	0.00	109.17	0.00
51	10,606	10,606	31.6	No	**-0.93**	104.0	3.01	91.51	11.59	4.80	0.00	0.00	107.90	0.00
52	10,762	10,763	32.6	No	**-1.15**	104.0	3.01	91.64	11.68	4.80	0.00	0.00	108.12	0.00
53	10,286	10,286	35.7	No	**-0.48**	104.0	3.01	91.24	11.40	4.80	0.00	0.00	107.45	0.00
55	9,753	9,754	33.7	No	**0.31**	104.0	3.01	90.78	11.08	4.80	0.00	0.00	106.67	0.00
56	9,687	9,687	36.0	No	**0.41**	104.0	3.01	90.72	11.04	4.80	0.00	0.00	106.57	0.00
57	8,951	8,951	33.4	No	**1.56**	104.0	3.01	90.04	10.58	4.80	0.00	0.00	105.41	0.00
58	10,488	10,488	31.2	No	**-0.76**	104.0	3.01	91.41	11.52	4.80	0.00	0.00	107.74	0.00
59	9,620	9,621	37.8	No	**0.51**	104.0	3.01	90.66	11.00	4.80	0.00	0.00	106.47	0.00
60	9,061	9,061	40.0	No	**1.38**	104.0	3.01	90.14	10.65	4.80	0.00	0.00	105.59	0.00
61	9,049	9,049	36.8	No	**1.40**	104.0	3.01	90.13	10.64	4.80	0.00	0.00	105.57	0.00
62	7,037	7,037	40.2	Yes	**5.19**	104.0	3.01	87.95	9.23	4.61	0.00	0.00	101.78	0.00
63	5,952	5,953	44.8	Yes	**7.58**	104.0	3.01	86.49	8.35	4.54	0.00	0.00	99.39	0.00
64	5,435	5,436	42.8	Yes	**8.84**	104.0	3.01	85.70	7.90	4.53	0.00	0.00	98.13	0.00
65	5,715	5,716	40.9	Yes	**8.13**	104.0	3.01	86.14	8.15	4.56	0.00	0.00	98.84	0.00
66	8,325	8,325	43.3	Yes	**2.78**	104.0	3.01	89.41	10.16	4.62	0.00	0.00	104.19	0.00
67	6,336	6,336	41.3	Yes	**6.69**	104.0	3.01	87.04	8.67	4.58	0.00	0.00	100.28	0.00
68	6,400	6,401	36.9	Yes	**6.52**	104.0	3.01	87.12	8.72	4.60	0.00	0.00	100.45	0.00
69	5,477	5,478	41.3	Yes	**8.72**	104.0	3.01	85.77	7.93	4.54	0.00	0.00	98.25	0.00
70	11,678	11,679	35.5	Yes	**-2.26**	104.0	3.01	92.35	12.19	4.70	0.00	0.00	109.23	0.00
71	12,199	12,200	54.9	Yes	**-2.86**	104.0	3.01	92.73	12.46	4.65	0.00	0.00	109.84	0.00
72	13,092	13,092	29.4	No	**-4.08**	104.0	3.01	93.34	12.91	4.80	0.00	0.00	111.06	0.00
73	12,347	12,347	38.1	No	**-3.20**	104.0	3.01	92.83	12.54	4.80	0.00	0.00	110.17	0.00
74	11,273	11,273	48.2	Yes	**-1.69**	104.0	3.01	92.04	11.97	4.65	0.00	0.00	108.66	0.00
75	10,994	10,995	29.9	No	**-1.46**	104.0	3.01	91.82	11.81	4.80	0.00	0.00	108.44	0.00
76	8,696	8,697	37.0	Yes	**2.12**	104.0	3.01	89.79	10.41	4.65	0.00	0.00	104.85	0.00
77	9,640	9,640	32.1	No	**0.48**	104.0	3.01	90.68	11.01	4.80	0.00	0.00	106.50	0.00
78	10,964	10,965	50.4	Yes	**-1.27**	104.0	3.01	91.80	11.80	4.64	0.00	0.00	108.24	0.00
80	9,008	9,008	42.0	No	**1.47**	104.0	3.01	90.09	10.61	4.80	0.00	0.00	105.51	0.00
81	12,476	12,477	58.2	Yes	**-3.20**	104.0	3.01	92.92	12.61	4.64	0.00	0.00	110.17	0.00
82	10,875	10,875	33.5	No	**-1.30**	104.0	3.01	91.73	11.74	4.80	0.00	0.00	108.27	0.00
83	6,049	6,050	43.9	Yes	**7.35**	104.0	3.01	86.63	8.43	4.55	0.00	0.00	99.62	0.00
85	11,189	11,189	33.9	No	**-1.72**	104.0	3.01	91.98	11.92	4.80	0.00	0.00	108.70	0.00
86	9,027	9,027	39.5	No	**1.43**	104.0	3.01	90.11	10.63	4.80	0.00	0.00	105.54	0.00
87	5,839	5,840	39.8	Yes	**7.82**	104.0	3.01	86.33	8.25	4.57	0.00	0.00	99.15	0.00
89	5,579	5,579	45.3	Yes	**8.49**	104.0	3.01	85.93	8.03	4.52	0.00	0.00	98.48	0.00
90	8,035	8,035	39.1	Yes	**3.28**	104.0	3.01	89.10	9.96	4.63	0.00	0.00	103.69	0.00
91	6,567	6,567	41.7	Yes	**6.18**	104.0	3.01	87.35	8.86	4.58	0.00	0.00	100.79	0.00
92	4,648	4,649	40.8	Yes	**10.97**	104.0	3.01	84.35	7.16	4.50	0.00	0.00	96.00	0.00
94	12,290	12,291	61.7	Yes	**-2.96**	104.0	3.01	92.79	12.51	4.63	0.00	0.00	109.93	0.00
95	13,422	13,422	49.4	Yes	**-4.33**	104.0	3.01	93.56	13.08	4.67	0.00	0.00	111.31	0.00
97	10,988	10,989	67.8	Yes	**-1.25**	104.0	3.01	91.82	11.81	4.59	0.00	0.00	108.22	0.00
98	12,714	12,715	58.3	Yes	**-3.48**	104.0	3.01	93.09	12.73	4.64	0.00	0.00	110.46	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	13,597	13,597	32.0	No	**-4.66**	104.0	3.01	93.67	13.16	4.80	0.00	0.00	111.63	0.00
100	8,262	8,263	54.0	Yes	**2.94**	104.0	3.01	89.34	10.12	4.58	0.00	0.00	104.04	0.00
101	12,800	12,800	54.9	Yes	**-3.60**	104.0	3.01	93.14	12.77	4.65	0.00	0.00	110.57	0.00
102	8,516	8,517	65.9	Yes	**2.54**	104.0	3.01	89.61	10.29	4.54	0.00	0.00	104.43	0.00
103	13,588	13,589	51.8	Yes	**-4.52**	104.0	3.01	93.66	13.16	4.67	0.00	0.00	111.49	0.00
104	9,064	9,065	49.1	Yes	**1.56**	104.0	3.01	90.15	10.65	4.62	0.00	0.00	105.41	0.00
107	11,662	11,663	59.3	Yes	**-2.17**	104.0	3.01	92.34	12.18	4.63	0.00	0.00	109.14	0.00
108	14,292	14,292	28.6	No	**-5.42**	104.0	3.01	94.10	13.49	4.80	0.00	0.00	112.39	0.00
109	9,528	9,529	39.0	No	**0.65**	104.0	3.01	90.58	10.94	4.80	0.00	0.00	106.33	0.00
110	9,118	9,118	34.6	No	**1.29**	104.0	3.01	90.20	10.69	4.80	0.00	0.00	105.68	0.00
111	8,851	8,851	37.3	Yes	**1.86**	104.0	3.01	89.94	10.51	4.66	0.00	0.00	105.11	0.00
113	11,953	11,954	58.5	Yes	**-2.54**	104.0	3.01	92.55	12.33	4.63	0.00	0.00	109.52	0.00
114	11,071	11,071	33.9	No	**-1.57**	104.0	3.01	91.88	11.85	4.80	0.00	0.00	108.54	0.00
115	13,714	13,714	32.2	No	**-4.79**	104.0	3.01	93.74	13.22	4.80	0.00	0.00	111.76	0.00
116	9,304	9,305	64.2	Yes	**1.23**	104.0	3.01	90.37	10.80	4.57	0.00	0.00	105.74	0.00
118	9,504	9,504	39.0	No	**0.68**	104.0	3.01	90.56	10.93	4.80	0.00	0.00	106.29	0.00
119	11,720	11,721	50.0	Yes	**-2.27**	104.0	3.01	92.38	12.21	4.65	0.00	0.00	109.24	0.00
120	13,046	13,046	50.2	Yes	**-3.90**	104.0	3.01	93.31	12.89	4.67	0.00	0.00	110.87	0.00
121	11,132	11,132	55.7	Yes	**-1.48**	104.0	3.01	91.93	11.89	4.63	0.00	0.00	108.45	0.00
125	5,987	5,988	43.2	Yes	**7.49**	104.0	3.01	86.55	8.38	4.55	0.00	0.00	99.48	0.00
126	7,504	7,505	53.1	Yes	**4.33**	104.0	3.01	88.51	9.58	4.56	0.00	0.00	102.64	0.00
127	7,486	7,487	52.9	Yes	**4.36**	104.0	3.01	88.49	9.56	4.56	0.00	0.00	102.61	0.00
128	7,617	7,618	52.3	Yes	**4.11**	104.0	3.01	88.64	9.66	4.57	0.00	0.00	102.86	0.00
129	9,427	9,427	41.5	Yes	**0.95**	104.0	3.01	90.49	10.88	4.65	0.00	0.00	106.02	0.00
130	8,920	8,921	37.9	Yes	**1.75**	104.0	3.01	90.01	10.56	4.66	0.00	0.00	105.22	0.00
131	9,161	9,162	33.7	Yes	**1.35**	104.0	3.01	90.24	10.71	4.67	0.00	0.00	105.63	0.00
132	9,518	9,519	32.9	Yes	**0.78**	104.0	3.01	90.57	10.94	4.68	0.00	0.00	106.19	0.00
133	9,061	9,062	39.5	No	**1.38**	104.0	3.01	90.14	10.65	4.80	0.00	0.00	105.59	0.00
134	11,757	11,757	40.5	Yes	**-2.35**	104.0	3.01	92.41	12.23	4.68	0.00	0.00	109.32	0.00
141	11,022	11,023	66.5	Yes	**-1.30**	104.0	3.01	91.85	11.83	4.59	0.00	0.00	108.27	0.00
142	8,680	8,681	68.9	Yes	**2.27**	104.0	3.01	89.77	10.40	4.53	0.00	0.00	104.70	0.00
143	11,286	11,287	66.9	Yes	**-1.65**	104.0	3.01	92.05	11.97	4.60	0.00	0.00	108.62	0.00
144	7,868	7,869	55.8	Yes	**3.65**	104.0	3.01	88.92	9.84	4.56	0.00	0.00	103.32	0.00
145	8,031	8,031	41.0	Yes	**3.30**	104.0	3.01	89.10	9.95	4.63	0.00	0.00	103.68	0.00
146	8,132	8,133	40.7	Yes	**3.11**	104.0	3.01	89.20	10.03	4.63	0.00	0.00	103.86	0.00

Sum 22.78

Noise sensitive area: H43 H43

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	12,958	12,959	35.6	No	**-3.93**	104.0	3.01	93.25	12.85	4.80	0.00	0.00	110.90	0.00
2	13,098	13,099	32.8	No	**-4.09**	104.0	3.01	93.34	12.92	4.80	0.00	0.00	111.06	0.00
3	12,756	12,756	36.4	No	**-3.69**	104.0	3.01	93.11	12.75	4.80	0.00	0.00	110.66	0.00
4	12,538	12,538	26.3	No	**-3.43**	104.0	3.01	92.96	12.64	4.80	0.00	0.00	110.40	0.00
5	11,964	11,964	31.8	No	**-2.73**	104.0	3.01	92.56	12.34	4.80	0.00	0.00	109.70	0.00
6	12,218	12,218	38.7	No	**-3.04**	104.0	3.01	92.74	12.47	4.80	0.00	0.00	110.01	0.00
7	10,070	10,071	53.9	No	**-0.17**	104.0	3.01	91.06	11.28	4.80	0.00	0.00	107.14	0.00
8	13,468	13,468	28.5	No	**-4.51**	104.0	3.01	93.59	13.10	4.80	0.00	0.00	111.48	0.00
9	12,442	12,443	41.7	No	**-3.31**	104.0	3.01	92.90	12.59	4.80	0.00	0.00	110.29	0.00
10	11,969	11,970	54.2	No	**-2.73**	104.0	3.01	92.56	12.34	4.80	0.00	0.00	109.70	0.00
11	12,754	12,755	53.5	No	**-3.69**	104.0	3.01	93.11	12.75	4.80	0.00	0.00	110.66	0.00
12	12,659	12,660	53.2	No	**-3.57**	104.0	3.01	93.05	12.70	4.80	0.00	0.00	110.55	0.00
13	12,225	12,226	59.0	No	**-3.05**	104.0	3.01	92.75	12.48	4.80	0.00	0.00	110.02	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	11,814	11,815	61.4	No	**-2.54**	104.0	3.01	92.45	12.26	4.80	0.00	0.00	109.51	0.00
15	11,300	11,301	60.1	No	**-1.87**	104.0	3.01	92.06	11.98	4.80	0.00	0.00	108.85	0.00
16	11,200	11,201	56.6	No	**-1.74**	104.0	3.01	91.99	11.93	4.80	0.00	0.00	108.71	0.00
17	12,917	12,917	51.9	No	**-3.88**	104.0	3.01	93.22	12.83	4.80	0.00	0.00	110.85	0.00
18	12,888	12,888	50.9	No	**-3.85**	104.0	3.01	93.20	12.81	4.80	0.00	0.00	110.82	0.00
19	11,868	11,869	54.5	No	**-2.61**	104.0	3.01	92.49	12.29	4.80	0.00	0.00	109.58	0.00
20	10,931	10,932	53.6	No	**-1.38**	104.0	3.01	91.77	11.78	4.80	0.00	0.00	108.35	0.00
21	11,757	11,757	33.6	No	**-2.46**	104.0	3.01	92.41	12.23	4.80	0.00	0.00	109.44	0.00
22	11,817	11,817	27.3	No	**-2.54**	104.0	3.01	92.45	12.26	4.80	0.00	0.00	109.51	0.00
23	11,605	11,605	29.8	No	**-2.27**	104.0	3.01	92.29	12.15	4.80	0.00	0.00	109.24	0.00
24	11,970	11,971	26.7	No	**-2.73**	104.0	3.01	92.56	12.34	4.80	0.00	0.00	109.71	0.00
25	9,578	9,578	31.0	No	**0.57**	104.0	3.01	90.63	10.98	4.80	0.00	0.00	106.40	0.00
26	10,864	10,865	37.0	No	**-1.29**	104.0	3.01	91.72	11.74	4.80	0.00	0.00	108.26	0.00
27	9,427	9,428	31.1	No	**0.80**	104.0	3.01	90.49	10.88	4.80	0.00	0.00	106.17	0.00
28	9,134	9,135	46.6	No	**1.26**	104.0	3.01	90.21	10.70	4.80	0.00	0.00	105.71	0.00
29	11,013	11,013	28.5	No	**-1.49**	104.0	3.01	91.84	11.82	4.80	0.00	0.00	108.46	0.00
30	11,310	11,310	25.8	No	**-1.88**	104.0	3.01	92.07	11.99	4.80	0.00	0.00	108.86	0.00
31	12,373	12,374	31.5	No	**-3.23**	104.0	3.01	92.85	12.55	4.80	0.00	0.00	110.20	0.00
32	9,853	9,853	31.9	No	**0.16**	104.0	3.01	90.87	11.14	4.80	0.00	0.00	106.82	0.00
33	10,947	10,948	27.3	No	**-1.40**	104.0	3.01	91.79	11.79	4.80	0.00	0.00	108.37	0.00
34	9,859	9,860	50.0	No	**0.15**	104.0	3.01	90.88	11.15	4.80	0.00	0.00	106.83	0.00
35	10,289	10,290	53.3	No	**-0.48**	104.0	3.01	91.25	11.41	4.80	0.00	0.00	107.45	0.00
36	10,520	10,521	53.2	No	**-0.81**	104.0	3.01	91.44	11.54	4.80	0.00	0.00	107.78	0.00
37	9,637	9,638	47.3	No	**0.48**	104.0	3.01	90.68	11.01	4.80	0.00	0.00	106.49	0.00
38	9,407	9,408	29.5	No	**0.83**	104.0	3.01	90.47	10.87	4.80	0.00	0.00	106.14	0.00
39	8,658	8,659	43.2	No	**2.04**	104.0	3.01	89.75	10.38	4.80	0.00	0.00	104.93	0.00
40	7,786	7,786	44.8	No	**3.56**	104.0	3.01	88.83	9.78	4.80	0.00	0.00	103.41	0.00
41	8,373	8,374	52.8	No	**2.52**	104.0	3.01	89.46	10.19	4.80	0.00	0.00	104.45	0.00
43	9,099	9,100	52.9	No	**1.32**	104.0	3.01	90.18	10.67	4.80	0.00	0.00	105.65	0.00
44	7,932	7,933	63.3	No	**3.30**	104.0	3.01	88.99	9.89	4.80	0.00	0.00	103.67	0.00
45	7,816	7,817	61.1	No	**3.51**	104.0	3.01	88.86	9.80	4.80	0.00	0.00	103.46	0.00
46	8,175	8,175	49.2	No	**2.87**	104.0	3.01	89.25	10.06	4.80	0.00	0.00	104.11	0.00
48	9,251	9,251	32.0	No	**1.08**	104.0	3.01	90.32	10.77	4.80	0.00	0.00	105.89	0.00
49	10,265	10,265	30.6	No	**-0.45**	104.0	3.01	91.23	11.39	4.80	0.00	0.00	107.42	0.00
50	11,187	11,188	43.3	No	**-1.72**	104.0	3.01	91.97	11.92	4.80	0.00	0.00	108.69	0.00
51	10,432	10,432	29.7	No	**-0.69**	104.0	3.01	91.37	11.49	4.80	0.00	0.00	107.66	0.00
52	10,574	10,575	29.6	No	**-0.89**	104.0	3.01	91.49	11.57	4.80	0.00	0.00	107.86	0.00
53	10,150	10,151	32.9	No	**-0.28**	104.0	3.01	91.13	11.32	4.80	0.00	0.00	107.25	0.00
55	9,696	9,696	30.9	No	**0.39**	104.0	3.01	90.73	11.05	4.80	0.00	0.00	106.58	0.00
56	9,647	9,647	33.6	No	**0.47**	104.0	3.01	90.69	11.02	4.80	0.00	0.00	106.51	0.00
57	8,899	8,900	30.8	No	**1.64**	104.0	3.01	89.99	10.54	4.80	0.00	0.00	105.33	0.00
58	10,254	10,255	26.8	No	**-0.43**	104.0	3.01	91.22	11.39	4.80	0.00	0.00	107.40	0.00
59	9,598	9,598	35.7	No	**0.54**	104.0	3.01	90.64	10.99	4.80	0.00	0.00	106.43	0.00
60	9,122	9,122	38.3	No	**1.28**	104.0	3.01	90.20	10.69	4.80	0.00	0.00	105.69	0.00
61	9,132	9,132	34.8	No	**1.27**	104.0	3.01	90.21	10.69	4.80	0.00	0.00	105.71	0.00
62	7,098	7,099	38.1	No	**4.88**	104.0	3.01	88.02	9.27	4.80	0.00	0.00	102.10	0.00
63	6,046	6,047	42.9	No	**7.11**	104.0	3.01	86.63	8.43	4.80	0.00	0.00	99.86	0.00
64	5,653	5,653	40.8	No	**8.04**	104.0	3.01	86.05	8.09	4.80	0.00	0.00	98.94	0.00
65	5,982	5,983	39.8	No	**7.26**	104.0	3.01	86.54	8.38	4.80	0.00	0.00	99.71	0.00
66	7,937	7,937	41.0	No	**3.29**	104.0	3.01	88.99	9.89	4.80	0.00	0.00	103.68	0.00
67	6,543	6,544	39.2	No	**6.02**	104.0	3.01	87.32	8.84	4.80	0.00	0.00	100.95	0.00
68	6,650	6,650	35.8	No	**5.79**	104.0	3.01	87.46	8.92	4.80	0.00	0.00	101.18	0.00
69	5,741	5,742	40.2	Yes	**8.06**	104.0	3.01	86.18	8.17	4.56	0.00	0.00	98.91	0.00
70	11,216	11,216	32.1	No	**-1.76**	104.0	3.01	92.00	11.94	4.80	0.00	0.00	108.73	0.00
71	11,796	11,797	51.6	No	**-2.51**	104.0	3.01	92.44	12.25	4.80	0.00	0.00	109.49	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	12,762	12,762	28.2	No	**-3.70**	104.0	3.01	93.12	12.75	4.80	0.00	0.00	110.67	0.00
73	11,989	11,989	35.8	No	**-2.76**	104.0	3.01	92.58	12.35	4.80	0.00	0.00	109.73	0.00
74	10,917	10,918	46.0	No	**-1.36**	104.0	3.01	91.76	11.77	4.80	0.00	0.00	108.33	0.00
75	10,688	10,689	27.7	No	**-1.04**	104.0	3.01	91.58	11.64	4.80	0.00	0.00	108.02	0.00
76	8,595	8,596	34.5	No	**2.14**	104.0	3.01	89.69	10.34	4.80	0.00	0.00	104.83	0.00
77	9,515	9,515	29.4	No	**0.67**	104.0	3.01	90.57	10.94	4.80	0.00	0.00	106.30	0.00
78	10,538	10,539	47.0	No	**-0.84**	104.0	3.01	91.46	11.55	4.80	0.00	0.00	107.81	0.00
80	9,045	9,046	39.8	No	**1.41**	104.0	3.01	90.13	10.64	4.80	0.00	0.00	105.57	0.00
81	12,021	12,022	53.8	No	**-2.80**	104.0	3.01	92.60	12.37	4.80	0.00	0.00	109.77	0.00
82	10,663	10,663	29.8	No	**-1.01**	104.0	3.01	91.56	11.62	4.80	0.00	0.00	107.98	0.00
83	6,200	6,201	41.3	No	**6.77**	104.0	3.01	86.85	8.56	4.80	0.00	0.00	100.21	0.00
85	11,055	11,055	31.3	No	**-1.55**	104.0	3.01	91.87	11.85	4.80	0.00	0.00	108.52	0.00
86	9,046	9,047	37.9	No	**1.40**	104.0	3.01	90.13	10.64	4.80	0.00	0.00	105.57	0.00
87	6,122	6,123	37.7	No	**6.94**	104.0	3.01	86.74	8.49	4.80	0.00	0.00	100.03	0.00
89	5,752	5,752	43.1	No	**7.80**	104.0	3.01	86.20	8.18	4.80	0.00	0.00	99.17	0.00
90	8,005	8,005	36.8	No	**3.17**	104.0	3.01	89.07	9.94	4.80	0.00	0.00	103.80	0.00
91	6,638	6,639	39.4	No	**5.82**	104.0	3.01	87.44	8.91	4.80	0.00	0.00	101.16	0.00
92	4,907	4,907	39.5	Yes	**10.22**	104.0	3.01	84.82	7.41	4.53	0.00	0.00	96.75	0.00
94	11,867	11,868	58.4	No	**-2.60**	104.0	3.01	92.49	12.29	4.80	0.00	0.00	109.58	0.00
95	12,988	12,988	45.1	No	**-3.96**	104.0	3.01	93.27	12.86	4.80	0.00	0.00	110.93	0.00
97	10,583	10,585	64.7	No	**-0.90**	104.0	3.01	91.49	11.58	4.80	0.00	0.00	107.87	0.00
98	12,287	12,288	55.0	No	**-3.13**	104.0	3.01	92.79	12.51	4.80	0.00	0.00	110.10	0.00
99	13,233	13,234	29.5	No	**-4.25**	104.0	3.01	93.43	12.98	4.80	0.00	0.00	111.22	0.00
100	8,007	8,007	50.3	No	**3.16**	104.0	3.01	89.07	9.94	4.80	0.00	0.00	103.81	0.00
101	12,338	12,339	51.5	No	**-3.19**	104.0	3.01	92.83	12.53	4.80	0.00	0.00	110.16	0.00
102	8,210	8,212	64.3	No	**2.80**	104.0	3.01	89.29	10.08	4.80	0.00	0.00	104.17	0.00
103	13,120	13,121	48.8	No	**-4.12**	104.0	3.01	93.36	12.93	4.80	0.00	0.00	111.09	0.00
104	8,764	8,765	47.7	No	**1.86**	104.0	3.01	89.85	10.45	4.80	0.00	0.00	105.11	0.00
107	11,222	11,223	54.3	No	**-1.77**	104.0	3.01	92.00	11.94	4.80	0.00	0.00	108.74	0.00
108	13,943	13,943	25.7	No	**-5.04**	104.0	3.01	93.89	13.32	4.80	0.00	0.00	112.01	0.00
109	9,524	9,524	36.9	No	**0.65**	104.0	3.01	90.58	10.94	4.80	0.00	0.00	106.32	0.00
110	8,958	8,959	31.5	No	**1.55**	104.0	3.01	90.04	10.58	4.80	0.00	0.00	105.43	0.00
111	8,726	8,726	34.4	No	**1.93**	104.0	3.01	89.82	10.43	4.80	0.00	0.00	105.05	0.00
113	11,508	11,509	53.2	No	**-2.14**	104.0	3.01	92.22	12.10	4.80	0.00	0.00	109.12	0.00
114	10,951	10,951	31.3	No	**-1.40**	104.0	3.01	91.79	11.79	4.80	0.00	0.00	108.38	0.00
115	13,305	13,305	29.2	No	**-4.33**	104.0	3.01	93.48	13.02	4.80	0.00	0.00	111.30	0.00
116	8,947	8,948	62.3	No	**1.56**	104.0	3.01	90.03	10.57	4.80	0.00	0.00	105.41	0.00
118	9,528	9,528	37.4	No	**0.65**	104.0	3.01	90.58	10.94	4.80	0.00	0.00	106.33	0.00
119	11,341	11,342	47.9	No	**-1.93**	104.0	3.01	92.09	12.00	4.80	0.00	0.00	108.90	0.00
120	12,576	12,576	47.1	No	**-3.48**	104.0	3.01	92.99	12.66	4.80	0.00	0.00	110.45	0.00
121	10,750	10,751	53.5	No	**-1.13**	104.0	3.01	91.63	11.67	4.80	0.00	0.00	108.10	0.00
125	6,112	6,113	40.9	No	**6.96**	104.0	3.01	86.73	8.49	4.80	0.00	0.00	100.01	0.00
126	7,326	7,326	50.8	No	**4.43**	104.0	3.01	88.30	9.44	4.80	0.00	0.00	102.54	0.00
127	7,325	7,326	49.9	No	**4.43**	104.0	3.01	88.30	9.44	4.80	0.00	0.00	102.54	0.00
128	7,475	7,475	49.0	No	**4.14**	104.0	3.01	88.47	9.56	4.80	0.00	0.00	102.83	0.00
129	8,986	8,986	36.2	No	**1.50**	104.0	3.01	90.07	10.60	4.80	0.00	0.00	105.47	0.00
130	8,465	8,466	33.5	No	**2.36**	104.0	3.01	89.55	10.25	4.80	0.00	0.00	104.61	0.00
131	8,693	8,693	30.7	No	**1.98**	104.0	3.01	89.78	10.41	4.80	0.00	0.00	104.99	0.00
132	9,043	9,043	29.7	No	**1.41**	104.0	3.01	90.13	10.64	4.80	0.00	0.00	105.56	0.00
133	8,815	8,816	35.3	No	**1.78**	104.0	3.01	89.91	10.49	4.80	0.00	0.00	105.19	0.00
134	11,302	11,302	36.3	No	**-1.87**	104.0	3.01	92.06	11.98	4.80	0.00	0.00	108.85	0.00
141	10,626	10,627	63.6	No	**-0.96**	104.0	3.01	91.53	11.60	4.80	0.00	0.00	107.93	0.00
142	8,361	8,363	67.9	No	**2.54**	104.0	3.01	89.45	10.18	4.80	0.00	0.00	104.43	0.00
143	10,872	10,873	63.7	No	**-1.30**	104.0	3.01	91.73	11.74	4.80	0.00	0.00	108.27	0.00
144	7,606	7,607	52.7	No	**3.90**	104.0	3.01	88.62	9.65	4.80	0.00	0.00	103.07	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	7,968	7,969	38.2	No	**3.23**	104.0	3.01	89.03	9.91	4.80	0.00	0.00	103.74	0.00
146	8,049	8,049	38.3	No	**3.09**	104.0	3.01	89.11	9.97	4.80	0.00	0.00	103.88	0.00
Sum	22.67													

Noise sensitive area: H44 H44

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	11,085	11,085	30.5	Yes	**-1.49**	104.0	3.01	91.89	11.86	4.71	0.00	0.00	108.46	0.00
2	11,346	11,347	24.4	No	**-1.93**	104.0	3.01	92.10	12.01	4.80	0.00	0.00	108.90	0.00
3	11,153	11,154	27.3	No	**-1.68**	104.0	3.01	91.95	11.90	4.80	0.00	0.00	108.65	0.00
4	11,417	11,418	16.9	No	**-2.03**	104.0	3.01	92.15	12.05	4.80	0.00	0.00	109.00	0.00
5	10,696	10,697	19.6	No	**-1.06**	104.0	3.01	91.59	11.64	4.80	0.00	0.00	108.03	0.00
6	10,704	10,704	28.8	No	**-1.07**	104.0	3.01	91.59	11.65	4.80	0.00	0.00	108.04	0.00
7	8,794	8,795	44.1	Yes	**1.98**	104.0	3.01	89.88	10.47	4.63	0.00	0.00	104.99	0.00
8	11,468	11,468	25.6	No	**-2.09**	104.0	3.01	92.19	12.07	4.80	0.00	0.00	109.06	0.00
9	10,624	10,625	34.3	Yes	**-0.85**	104.0	3.01	91.53	11.60	4.69	0.00	0.00	107.82	0.00
10	10,058	10,059	49.6	Yes	**0.02**	104.0	3.01	91.05	11.27	4.63	0.00	0.00	106.95	0.00
11	10,410	10,411	57.9	Yes	**-0.47**	104.0	3.01	91.35	11.48	4.61	0.00	0.00	107.44	0.00
12	10,373	10,374	56.7	Yes	**-0.42**	104.0	3.01	91.32	11.46	4.61	0.00	0.00	107.39	0.00
13	10,014	10,016	60.9	Yes	**0.12**	104.0	3.01	91.01	11.24	4.59	0.00	0.00	106.85	0.00
14	9,657	9,658	61.7	Yes	**0.67**	104.0	3.01	90.70	11.03	4.58	0.00	0.00	106.31	0.00
15	9,365	9,366	55.8	Yes	**1.10**	104.0	3.01	90.43	10.84	4.60	0.00	0.00	105.87	0.00
16	9,399	9,400	49.1	Yes	**1.02**	104.0	3.01	90.46	10.86	4.62	0.00	0.00	105.95	0.00
17	10,524	10,525	57.5	Yes	**-0.63**	104.0	3.01	91.44	11.54	4.61	0.00	0.00	107.60	0.00
18	10,412	10,413	56.8	Yes	**-0.47**	104.0	3.01	91.35	11.48	4.61	0.00	0.00	107.44	0.00
19	9,600	9,602	57.9	Yes	**0.74**	104.0	3.01	90.65	10.99	4.59	0.00	0.00	106.23	0.00
20	8,897	8,898	51.1	Yes	**1.84**	104.0	3.01	89.99	10.54	4.60	0.00	0.00	105.13	0.00
21	10,684	10,685	25.5	No	**-1.04**	104.0	3.01	91.58	11.64	4.80	0.00	0.00	108.01	0.00
22	11,008	11,008	20.2	No	**-1.48**	104.0	3.01	91.83	11.82	4.80	0.00	0.00	108.45	0.00
23	10,910	10,911	22.6	No	**-1.35**	104.0	3.01	91.76	11.76	4.80	0.00	0.00	108.32	0.00
24	11,091	11,091	19.5	No	**-1.59**	104.0	3.01	91.90	11.87	4.80	0.00	0.00	108.57	0.00
25	9,393	9,394	20.8	No	**0.85**	104.0	3.01	90.46	10.86	4.80	0.00	0.00	106.12	0.00
26	9,721	9,722	28.4	No	**0.35**	104.0	3.01	90.75	11.06	4.80	0.00	0.00	106.62	0.00
27	8,933	8,933	25.3	No	**1.59**	104.0	3.01	90.02	10.57	4.80	0.00	0.00	105.39	0.00
28	8,282	8,283	42.7	No	**2.68**	104.0	3.01	89.36	10.13	4.80	0.00	0.00	104.29	0.00
29	10,289	10,289	22.5	No	**-0.48**	104.0	3.01	91.25	11.41	4.80	0.00	0.00	107.45	0.00
30	10,750	10,751	17.9	No	**-1.13**	104.0	3.01	91.63	11.67	4.80	0.00	0.00	108.10	0.00
31	11,716	11,717	22.6	No	**-2.41**	104.0	3.01	92.38	12.21	4.80	0.00	0.00	109.38	0.00
32	9,805	9,805	21.4	No	**0.23**	104.0	3.01	90.83	11.12	4.80	0.00	0.00	106.74	0.00
33	10,581	10,581	18.6	No	**-0.90**	104.0	3.01	91.49	11.58	4.80	0.00	0.00	107.87	0.00
34	8,698	8,699	40.6	No	**1.97**	104.0	3.01	89.79	10.41	4.80	0.00	0.00	105.00	0.00
35	8,920	8,921	42.7	Yes	**1.77**	104.0	3.01	90.01	10.56	4.64	0.00	0.00	105.20	0.00
36	9,061	9,062	42.5	Yes	**1.54**	104.0	3.01	90.14	10.65	4.64	0.00	0.00	105.43	0.00
37	8,584	8,585	39.7	No	**2.16**	104.0	3.01	89.67	10.33	4.80	0.00	0.00	104.81	0.00
38	9,088	9,088	21.5	No	**1.34**	104.0	3.01	90.17	10.67	4.80	0.00	0.00	105.64	0.00
39	8,203	8,204	37.3	No	**2.82**	104.0	3.01	89.28	10.08	4.80	0.00	0.00	104.16	0.00
40	6,579	6,580	35.4	Yes	**6.12**	104.0	3.01	87.36	8.87	4.62	0.00	0.00	100.85	0.00
41	7,861	7,863	48.1	No	**3.43**	104.0	3.01	88.91	9.84	4.80	0.00	0.00	103.55	0.00
43	8,150	8,151	47.6	No	**2.91**	104.0	3.01	89.22	10.04	4.80	0.00	0.00	104.06	0.00
44	7,392	7,393	58.9	No	**4.30**	104.0	3.01	88.38	9.49	4.80	0.00	0.00	102.67	0.00
45	7,425	7,426	55.0	No	**4.24**	104.0	3.01	88.42	9.52	4.80	0.00	0.00	102.73	0.00
46	7,130	7,131	42.1	No	**4.81**	104.0	3.01	88.06	9.30	4.80	0.00	0.00	102.16	0.00
48	9,445	9,446	23.0	No	**0.77**	104.0	3.01	90.50	10.89	4.80	0.00	0.00	106.20	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	10,554	10,554	22.5	No	**-0.86**	104.0	3.01	91.47	11.56	4.80	0.00	0.00	107.83	0.00
50	9,773	9,774	32.6	No	**0.27**	104.0	3.01	90.80	11.10	4.80	0.00	0.00	106.70	0.00
51	10,551	10,551	19.7	No	**-0.85**	104.0	3.01	91.47	11.56	4.80	0.00	0.00	107.82	0.00
52	10,584	10,584	18.8	No	**-0.90**	104.0	3.01	91.49	11.58	4.80	0.00	0.00	107.87	0.00
53	10,559	10,559	25.3	No	**-0.86**	104.0	3.01	91.47	11.56	4.80	0.00	0.00	107.84	0.00
55	10,642	10,642	24.8	No	**-0.98**	104.0	3.01	91.54	11.61	4.80	0.00	0.00	107.95	0.00
56	10,703	10,704	27.7	No	**-1.07**	104.0	3.01	91.59	11.65	4.80	0.00	0.00	108.04	0.00
57	9,947	9,947	24.9	No	**0.02**	104.0	3.01	90.95	11.20	4.80	0.00	0.00	106.96	0.00
58	9,955	9,955	17.5	No	**0.00**	104.0	3.01	90.96	11.21	4.80	0.00	0.00	106.97	0.00
59	10,766	10,766	29.3	No	**-1.15**	104.0	3.01	91.64	11.68	4.80	0.00	0.00	108.12	0.00
60	10,806	10,806	32.6	No	**-1.21**	104.0	3.01	91.67	11.71	4.80	0.00	0.00	108.18	0.00
61	10,934	10,935	30.1	No	**-1.38**	104.0	3.01	91.78	11.78	4.80	0.00	0.00	108.35	0.00
62	8,951	8,952	33.7	No	**1.56**	104.0	3.01	90.04	10.58	4.80	0.00	0.00	105.42	0.00
63	8,179	8,180	37.1	No	**2.86**	104.0	3.01	89.26	10.06	4.80	0.00	0.00	104.11	0.00
64	8,370	8,370	36.9	No	**2.53**	104.0	3.01	89.45	10.19	4.80	0.00	0.00	104.44	0.00
65	8,870	8,870	35.5	No	**1.69**	104.0	3.01	89.96	10.52	4.80	0.00	0.00	105.28	0.00
66	6,579	6,580	31.5	No	**5.94**	104.0	3.01	87.36	8.87	4.80	0.00	0.00	101.03	0.00
67	9,140	9,141	34.9	No	**1.25**	104.0	3.01	90.22	10.70	4.80	0.00	0.00	105.72	0.00
68	9,420	9,420	32.1	No	**0.81**	104.0	3.01	90.48	10.88	4.80	0.00	0.00	106.16	0.00
69	8,634	8,635	35.5	No	**2.08**	104.0	3.01	89.73	10.37	4.80	0.00	0.00	104.89	0.00
70	8,825	8,826	38.8	Yes	**1.91**	104.0	3.01	89.92	10.49	4.65	0.00	0.00	105.06	0.00
71	9,968	9,969	44.7	Yes	**0.14**	104.0	3.01	90.97	11.21	4.65	0.00	0.00	106.84	0.00
72	11,538	11,538	16.3	No	**-2.18**	104.0	3.01	92.24	12.11	4.80	0.00	0.00	109.15	0.00
73	10,562	10,562	25.8	No	**-0.87**	104.0	3.01	91.48	11.57	4.80	0.00	0.00	107.84	0.00
74	9,579	9,580	35.0	No	**0.57**	104.0	3.01	90.63	10.98	4.80	0.00	0.00	106.40	0.00
75	9,787	9,788	21.7	No	**0.25**	104.0	3.01	90.81	11.10	4.80	0.00	0.00	106.72	0.00
76	9,363	9,363	27.2	No	**0.90**	104.0	3.01	90.43	10.84	4.80	0.00	0.00	106.07	0.00
77	10,041	10,042	22.2	No	**-0.12**	104.0	3.01	91.04	11.26	4.80	0.00	0.00	107.09	0.00
78	8,564	8,565	43.0	Yes	**2.37**	104.0	3.01	89.65	10.32	4.63	0.00	0.00	104.60	0.00
80	10,602	10,602	34.1	No	**-0.92**	104.0	3.01	91.51	11.59	4.80	0.00	0.00	107.90	0.00
81	9,682	9,684	58.8	Yes	**0.62**	104.0	3.01	90.72	11.04	4.59	0.00	0.00	106.36	0.00
82	10,496	10,496	18.8	No	**-0.78**	104.0	3.01	91.42	11.53	4.80	0.00	0.00	107.75	0.00
83	8,577	8,578	35.9	No	**2.17**	104.0	3.01	89.67	10.33	4.80	0.00	0.00	104.80	0.00
85	11,410	11,410	23.9	No	**-2.02**	104.0	3.01	92.15	12.04	4.80	0.00	0.00	108.99	0.00
86	10,501	10,502	31.7	No	**-0.78**	104.0	3.01	91.43	11.53	4.80	0.00	0.00	107.76	0.00
87	9,064	9,065	33.8	No	**1.37**	104.0	3.01	90.15	10.65	4.80	0.00	0.00	105.60	0.00
89	8,272	8,272	37.6	No	**2.70**	104.0	3.01	89.35	10.12	4.80	0.00	0.00	104.27	0.00
90	9,266	9,266	31.2	No	**1.05**	104.0	3.01	90.34	10.78	4.80	0.00	0.00	105.92	0.00
91	8,593	8,593	34.9	No	**2.15**	104.0	3.01	89.68	10.34	4.80	0.00	0.00	104.82	0.00
92	7,849	7,850	34.8	No	**3.45**	104.0	3.01	88.90	9.83	4.80	0.00	0.00	103.52	0.00
94	9,848	9,849	55.9	Yes	**0.36**	104.0	3.01	90.87	11.14	4.61	0.00	0.00	106.62	0.00
95	10,816	10,817	44.9	Yes	**-1.08**	104.0	3.01	91.68	11.71	4.66	0.00	0.00	108.05	0.00
97	8,815	8,817	56.3	Yes	**1.99**	104.0	3.01	89.91	10.49	4.58	0.00	0.00	104.98	0.00
98	10,207	10,208	52.8	Yes	**-0.19**	104.0	3.01	91.18	11.36	4.62	0.00	0.00	107.16	0.00
99	11,699	11,700	19.9	No	**-2.39**	104.0	3.01	92.36	12.20	4.80	0.00	0.00	109.36	0.00
100	7,765	7,766	43.8	No	**3.60**	104.0	3.01	88.80	9.77	4.80	0.00	0.00	103.37	0.00
101	9,913	9,914	57.9	Yes	**0.26**	104.0	3.01	90.93	11.18	4.60	0.00	0.00	106.71	0.00
102	7,552	7,553	59.7	No	**4.00**	104.0	3.01	88.56	9.61	4.80	0.00	0.00	102.97	0.00
103	10,594	10,595	55.7	Yes	**-0.74**	104.0	3.01	91.50	11.58	4.62	0.00	0.00	107.71	0.00
104	8,081	8,082	43.6	No	**3.03**	104.0	3.01	89.15	9.99	4.80	0.00	0.00	103.94	0.00
107	9,070	9,071	55.3	Yes	**1.57**	104.0	3.01	90.15	10.65	4.59	0.00	0.00	105.40	0.00
108	12,506	12,506	14.3	No	**-3.39**	104.0	3.01	92.94	12.62	4.80	0.00	0.00	110.36	0.00
109	10,804	10,804	31.0	No	**-1.20**	104.0	3.01	91.67	11.70	4.80	0.00	0.00	108.18	0.00
110	9,302	9,302	23.9	No	**1.00**	104.0	3.01	90.37	10.80	4.80	0.00	0.00	105.97	0.00
111	9,326	9,327	27.8	No	**0.96**	104.0	3.01	90.39	10.82	4.80	0.00	0.00	106.01	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	9,292	9,294	55.8	Yes	**1.22**	104.0	3.01	90.36	10.80	4.60	0.00	0.00	105.76	0.00
114	11,406	11,406	23.7	No	**-2.01**	104.0	3.01	92.14	12.04	4.80	0.00	0.00	108.98	0.00
115	11,363	11,363	25.6	No	**-1.95**	104.0	3.01	92.11	12.02	4.80	0.00	0.00	108.93	0.00
116	7,753	7,754	52.7	Yes	**3.85**	104.0	3.01	88.79	9.76	4.57	0.00	0.00	103.12	0.00
118	10,974	10,974	31.7	No	**-1.44**	104.0	3.01	91.81	11.80	4.80	0.00	0.00	108.41	0.00
119	9,765	9,766	38.2	Yes	**0.42**	104.0	3.01	90.79	11.09	4.67	0.00	0.00	106.55	0.00
120	10,053	10,054	54.5	Yes	**0.04**	104.0	3.01	91.05	11.27	4.62	0.00	0.00	106.93	0.00
121	9,189	9,190	43.5	Yes	**1.34**	104.0	3.01	90.27	10.73	4.64	0.00	0.00	105.64	0.00
125	8,382	8,383	35.5	No	**2.51**	104.0	3.01	89.47	10.20	4.80	0.00	0.00	104.47	0.00
126	7,733	7,734	43.1	No	**3.66**	104.0	3.01	88.77	9.74	4.80	0.00	0.00	103.31	0.00
127	7,850	7,851	43.5	No	**3.45**	104.0	3.01	88.90	9.83	4.80	0.00	0.00	103.53	0.00
128	8,099	8,100	42.2	No	**3.00**	104.0	3.01	89.17	10.00	4.80	0.00	0.00	103.97	0.00
129	6,976	6,977	34.2	Yes	**5.29**	104.0	3.01	87.87	9.18	4.63	0.00	0.00	101.69	0.00
130	6,351	6,352	35.6	Yes	**6.62**	104.0	3.01	87.06	8.68	4.61	0.00	0.00	100.35	0.00
131	6,401	6,402	37.4	Yes	**6.52**	104.0	3.01	87.13	8.72	4.60	0.00	0.00	100.45	0.00
132	6,640	6,641	39.6	Yes	**6.01**	104.0	3.01	87.45	8.92	4.60	0.00	0.00	100.96	0.00
133	8,554	8,555	27.2	No	**2.21**	104.0	3.01	89.64	10.31	4.80	0.00	0.00	104.76	0.00
134	8,987	8,988	40.9	Yes	**1.65**	104.0	3.01	90.07	10.60	4.64	0.00	0.00	105.32	0.00
141	8,938	8,940	54.0	Yes	**1.78**	104.0	3.01	90.03	10.57	4.59	0.00	0.00	105.19	0.00
142	7,573	7,575	63.3	No	**3.96**	104.0	3.01	88.59	9.63	4.80	0.00	0.00	103.02	0.00
143	8,995	8,996	57.1	Yes	**1.70**	104.0	3.01	90.08	10.61	4.58	0.00	0.00	105.27	0.00
144	7,364	7,365	46.4	No	**4.35**	104.0	3.01	88.34	9.47	4.80	0.00	0.00	102.62	0.00
145	9,038	9,039	32.6	No	**1.42**	104.0	3.01	90.12	10.63	4.80	0.00	0.00	105.56	0.00
146	8,980	8,981	32.5	No	**1.51**	104.0	3.01	90.07	10.60	4.80	0.00	0.00	105.46	0.00

Sum 22.44

Noise sensitive area: H45 H45

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	13,826	13,827	34.6	Yes	**-4.83**	104.0	3.01	93.81	13.27	4.71	0.00	0.00	111.80	0.00
2	14,000	14,000	32.1	Yes	**-5.02**	104.0	3.01	93.92	13.35	4.72	0.00	0.00	112.00	0.00
3	13,693	13,693	37.5	Yes	**-4.67**	104.0	3.01	93.73	13.21	4.71	0.00	0.00	111.64	0.00
4	13,583	13,583	28.8	No	**-4.64**	104.0	3.01	93.66	13.15	4.80	0.00	0.00	111.61	0.00
5	12,973	12,973	32.5	No	**-3.94**	104.0	3.01	93.26	12.86	4.80	0.00	0.00	110.92	0.00
6	13,172	13,172	39.0	Yes	**-4.07**	104.0	3.01	93.39	12.95	4.70	0.00	0.00	111.05	0.00
7	11,057	11,058	54.5	Yes	**-1.38**	104.0	3.01	91.87	11.85	4.63	0.00	0.00	108.35	0.00
8	14,304	14,304	27.7	Yes	**-5.36**	104.0	3.01	94.11	13.49	4.73	0.00	0.00	112.34	0.00
9	13,321	13,321	40.6	Yes	**-4.24**	104.0	3.01	93.49	13.03	4.70	0.00	0.00	111.21	0.00
10	12,818	12,819	53.2	Yes	**-3.62**	104.0	3.01	93.16	12.78	4.66	0.00	0.00	110.60	0.00
11	13,479	13,479	55.3	Yes	**-4.38**	104.0	3.01	93.59	13.10	4.66	0.00	0.00	111.36	0.00
12	13,402	13,403	55.1	Yes	**-4.30**	104.0	3.01	93.54	13.07	4.66	0.00	0.00	111.27	0.00
13	12,989	12,989	59.7	Yes	**-3.81**	104.0	3.01	93.27	12.86	4.64	0.00	0.00	110.78	0.00
14	12,590	12,591	61.3	Yes	**-3.33**	104.0	3.01	93.00	12.66	4.63	0.00	0.00	110.30	0.00
15	12,136	12,137	58.8	Yes	**-2.78**	104.0	3.01	92.68	12.43	4.64	0.00	0.00	109.75	0.00
16	12,072	12,073	55.4	Yes	**-2.70**	104.0	3.01	92.64	12.40	4.64	0.00	0.00	109.68	0.00
17	13,627	13,627	54.2	Yes	**-4.55**	104.0	3.01	93.69	13.17	4.66	0.00	0.00	111.53	0.00
18	13,569	13,569	53.9	Yes	**-4.49**	104.0	3.01	93.65	13.15	4.66	0.00	0.00	111.46	0.00
19	12,610	12,611	56.0	Yes	**-3.37**	104.0	3.01	93.02	12.67	4.65	0.00	0.00	110.34	0.00
20	11,735	11,736	52.3	Yes	**-2.28**	104.0	3.01	92.39	12.22	4.65	0.00	0.00	109.26	0.00
21	12,806	12,806	36.7	No	**-3.75**	104.0	3.01	93.15	12.77	4.80	0.00	0.00	110.72	0.00
22	12,918	12,918	29.4	No	**-3.88**	104.0	3.01	93.22	12.83	4.80	0.00	0.00	110.85	0.00
23	12,724	12,725	31.4	No	**-3.65**	104.0	3.01	93.09	12.73	4.80	0.00	0.00	110.62	0.00
24	13,059	13,059	29.0	No	**-4.04**	104.0	3.01	93.32	12.90	4.80	0.00	0.00	111.02	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	10,762	10,762	31.9	No	**-1.15**	104.0	3.01	91.64	11.68	4.80	0.00	0.00	108.12	0.00
26	11,890	11,890	39.7	Yes	**-2.52**	104.0	3.01	92.50	12.30	4.69	0.00	0.00	109.49	0.00
27	10,561	10,561	33.4	No	**-0.87**	104.0	3.01	91.47	11.56	4.80	0.00	0.00	107.84	0.00
28	10,198	10,198	50.1	Yes	**-0.18**	104.0	3.01	91.17	11.35	4.63	0.00	0.00	107.16	0.00
29	12,122	12,122	31.0	No	**-2.92**	104.0	3.01	92.67	12.42	4.80	0.00	0.00	109.89	0.00
30	12,451	12,451	27.1	No	**-3.32**	104.0	3.01	92.90	12.59	4.80	0.00	0.00	110.30	0.00
31	13,505	13,506	32.1	No	**-4.55**	104.0	3.01	93.61	13.12	4.80	0.00	0.00	111.53	0.00
32	11,059	11,059	32.3	No	**-1.55**	104.0	3.01	91.87	11.85	4.80	0.00	0.00	108.52	0.00
33	12,116	12,117	28.0	No	**-2.92**	104.0	3.01	92.67	12.42	4.80	0.00	0.00	109.89	0.00
34	10,869	10,870	51.2	Yes	**-1.13**	104.0	3.01	91.72	11.74	4.64	0.00	0.00	108.11	0.00
35	11,257	11,258	53.6	Yes	**-1.65**	104.0	3.01	92.03	11.96	4.64	0.00	0.00	108.63	0.00
36	11,470	11,471	53.3	Yes	**-1.94**	104.0	3.01	92.19	12.08	4.64	0.00	0.00	108.91	0.00
37	10,667	10,667	50.0	Yes	**-0.86**	104.0	3.01	91.56	11.63	4.64	0.00	0.00	107.83	0.00
38	10,569	10,569	31.3	No	**-0.88**	104.0	3.01	91.48	11.57	4.80	0.00	0.00	107.85	0.00
39	9,788	9,789	45.7	Yes	**0.41**	104.0	3.01	90.81	11.11	4.64	0.00	0.00	106.56	0.00
40	8,750	8,750	43.7	Yes	**2.06**	104.0	3.01	89.84	10.45	4.63	0.00	0.00	104.92	0.00
41	9,488	9,489	55.9	Yes	**0.91**	104.0	3.01	90.54	10.92	4.60	0.00	0.00	106.06	0.00
43	10,143	10,144	56.4	Yes	**-0.08**	104.0	3.01	91.12	11.32	4.61	0.00	0.00	107.05	0.00
44	9,035	9,036	66.7	Yes	**1.67**	104.0	3.01	90.12	10.63	4.55	0.00	0.00	105.30	0.00
45	8,943	8,944	63.7	Yes	**1.81**	104.0	3.01	90.03	10.57	4.56	0.00	0.00	105.16	0.00
46	9,183	9,183	49.5	Yes	**1.37**	104.0	3.01	90.26	10.73	4.62	0.00	0.00	105.60	0.00
48	10,484	10,484	32.7	No	**-0.76**	104.0	3.01	91.41	11.52	4.80	0.00	0.00	107.73	0.00
49	11,517	11,517	31.2	No	**-2.15**	104.0	3.01	92.23	12.10	4.80	0.00	0.00	109.13	0.00
50	12,155	12,156	43.6	Yes	**-2.84**	104.0	3.01	92.70	12.44	4.68	0.00	0.00	109.81	0.00
51	11,665	11,665	30.1	No	**-2.35**	104.0	3.01	92.34	12.18	4.80	0.00	0.00	109.32	0.00
52	11,794	11,795	30.1	No	**-2.51**	104.0	3.01	92.43	12.25	4.80	0.00	0.00	109.48	0.00
53	11,414	11,414	33.6	No	**-2.02**	104.0	3.01	92.15	12.04	4.80	0.00	0.00	108.99	0.00
55	11,001	11,001	32.4	Yes	**-1.37**	104.0	3.01	91.83	11.82	4.70	0.00	0.00	108.34	0.00
56	10,958	10,958	34.7	Yes	**-1.31**	104.0	3.01	91.79	11.79	4.69	0.00	0.00	108.28	0.00
57	10,207	10,207	32.2	Yes	**-0.26**	104.0	3.01	91.18	11.36	4.69	0.00	0.00	107.23	0.00
58	11,428	11,428	27.9	No	**-2.04**	104.0	3.01	92.16	12.05	4.80	0.00	0.00	109.01	0.00
59	10,914	10,914	36.7	Yes	**-1.24**	104.0	3.01	91.76	11.77	4.69	0.00	0.00	108.21	0.00
60	10,444	10,445	39.6	Yes	**-0.57**	104.0	3.01	91.38	11.50	4.67	0.00	0.00	107.55	0.00
61	10,452	10,452	36.2	Yes	**-0.60**	104.0	3.01	91.38	11.50	4.68	0.00	0.00	107.57	0.00
62	8,420	8,420	39.9	Yes	**2.60**	104.0	3.01	89.51	10.22	4.64	0.00	0.00	104.37	0.00
63	7,363	7,363	44.9	Yes	**4.57**	104.0	3.01	88.34	9.47	4.59	0.00	0.00	102.41	0.00
64	6,913	6,913	43.2	Yes	**5.46**	104.0	3.01	87.79	9.13	4.59	0.00	0.00	101.51	0.00
65	7,203	7,203	41.1	Yes	**4.86**	104.0	3.01	88.15	9.35	4.61	0.00	0.00	102.11	0.00
66	8,870	8,870	39.8	Yes	**1.84**	104.0	3.01	89.96	10.52	4.65	0.00	0.00	105.13	0.00
67	7,811	7,811	41.6	Yes	**3.70**	104.0	3.01	88.85	9.80	4.62	0.00	0.00	103.27	0.00
68	7,886	7,886	37.0	Yes	**3.54**	104.0	3.01	88.94	9.85	4.64	0.00	0.00	103.43	0.00
69	6,964	6,964	41.5	Yes	**5.35**	104.0	3.01	87.86	9.17	4.60	0.00	0.00	101.62	0.00
70	11,912	11,912	34.7	Yes	**-2.56**	104.0	3.01	92.52	12.31	4.70	0.00	0.00	109.53	0.00
71	12,666	12,667	50.6	Yes	**-3.45**	104.0	3.01	93.05	12.70	4.66	0.00	0.00	110.42	0.00
72	13,787	13,787	29.9	No	**-4.87**	104.0	3.01	93.79	13.25	4.80	0.00	0.00	111.84	0.00
73	12,962	12,962	36.0	Yes	**-3.84**	104.0	3.01	93.25	12.85	4.71	0.00	0.00	110.81	0.00
74	11,900	11,901	46.5	Yes	**-2.51**	104.0	3.01	92.51	12.31	4.67	0.00	0.00	109.48	0.00
75	11,761	11,762	31.1	No	**-2.47**	104.0	3.01	92.41	12.23	4.80	0.00	0.00	109.44	0.00
76	9,882	9,882	35.9	Yes	**0.24**	104.0	3.01	90.90	11.16	4.68	0.00	0.00	106.74	0.00
77	10,786	10,786	30.2	No	**-1.18**	104.0	3.01	91.66	11.69	4.80	0.00	0.00	108.15	0.00
78	11,355	11,356	45.4	Yes	**-1.81**	104.0	3.01	92.10	12.01	4.66	0.00	0.00	108.78	0.00
80	10,368	10,369	41.2	Yes	**-0.46**	104.0	3.01	91.31	11.45	4.66	0.00	0.00	107.43	0.00
81	12,742	12,743	55.5	Yes	**-3.53**	104.0	3.01	93.11	12.74	4.65	0.00	0.00	110.50	0.00
82	11,860	11,860	30.0	No	**-2.59**	104.0	3.01	92.48	12.28	4.80	0.00	0.00	109.57	0.00
83	7,498	7,498	42.9	Yes	**4.30**	104.0	3.01	88.50	9.57	4.61	0.00	0.00	102.68	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	12,318	12,319	31.8	No	**-3.16**	104.0	3.01	92.81	12.52	4.80	0.00	0.00	110.14	0.00
86	10,369	10,369	39.2	Yes	**-0.47**	104.0	3.01	91.31	11.45	4.67	0.00	0.00	107.44	0.00
87	7,327	7,327	39.7	Yes	**4.61**	104.0	3.01	88.30	9.45	4.62	0.00	0.00	102.36	0.00
89	7,039	7,039	44.8	Yes	**5.21**	104.0	3.01	87.95	9.23	4.58	0.00	0.00	101.76	0.00
90	9,320	9,320	38.3	Yes	**1.11**	104.0	3.01	90.39	10.81	4.66	0.00	0.00	105.86	0.00
91	7,959	7,959	41.3	Yes	**3.43**	104.0	3.01	89.02	9.90	4.62	0.00	0.00	103.55	0.00
92	6,134	6,135	41.0	Yes	**7.14**	104.0	3.01	86.76	8.50	4.57	0.00	0.00	99.83	0.00
94	12,685	12,686	57.8	Yes	**-3.45**	104.0	3.01	93.07	12.71	4.64	0.00	0.00	110.42	0.00
95	13,769	13,770	44.9	Yes	**-4.74**	104.0	3.01	93.78	13.24	4.69	0.00	0.00	111.71	0.00
97	11,457	11,458	63.2	Yes	**-1.89**	104.0	3.01	92.18	12.07	4.61	0.00	0.00	108.86	0.00
98	13,091	13,091	54.3	Yes	**-3.94**	104.0	3.01	93.34	12.91	4.66	0.00	0.00	110.91	0.00
99	14,191	14,191	29.5	No	**-5.31**	104.0	3.01	94.04	13.44	4.80	0.00	0.00	112.28	0.00
100	9,162	9,163	52.9	Yes	**1.41**	104.0	3.01	90.24	10.71	4.60	0.00	0.00	105.56	0.00
101	13,033	13,033	54.3	Yes	**-3.87**	104.0	3.01	93.30	12.89	4.66	0.00	0.00	110.84	0.00
102	9,297	9,298	67.1	Yes	**1.25**	104.0	3.01	90.37	10.80	4.55	0.00	0.00	105.72	0.00
103	13,785	13,786	52.9	Yes	**-4.74**	104.0	3.01	93.79	13.25	4.67	0.00	0.00	111.71	0.00
104	9,854	9,855	50.8	Yes	**0.33**	104.0	3.01	90.87	11.15	4.62	0.00	0.00	106.64	0.00
107	11,994	11,995	54.4	Yes	**-2.61**	104.0	3.01	92.58	12.36	4.65	0.00	0.00	109.58	0.00
108	14,928	14,928	25.4	No	**-6.08**	104.0	3.01	94.48	13.78	4.80	0.00	0.00	113.06	0.00
109	10,843	10,843	38.1	Yes	**-1.14**	104.0	3.01	91.70	11.73	4.68	0.00	0.00	108.11	0.00
110	10,206	10,206	32.7	No	**-0.36**	104.0	3.01	91.18	11.36	4.80	0.00	0.00	107.33	0.00
111	9,999	9,999	35.3	Yes	**0.06**	104.0	3.01	91.00	11.23	4.68	0.00	0.00	106.91	0.00
113	12,263	12,264	54.1	Yes	**-2.95**	104.0	3.01	92.77	12.50	4.65	0.00	0.00	109.92	0.00
114	12,224	12,224	31.9	No	**-3.05**	104.0	3.01	92.74	12.48	4.80	0.00	0.00	110.02	0.00
115	14,156	14,157	28.5	Yes	**-5.20**	104.0	3.01	94.02	13.42	4.73	0.00	0.00	112.17	0.00
116	9,936	9,937	62.5	Yes	**0.25**	104.0	3.01	90.95	11.20	4.59	0.00	0.00	106.73	0.00
118	10,851	10,851	38.7	Yes	**-1.15**	104.0	3.01	91.71	11.73	4.68	0.00	0.00	108.12	0.00
119	12,272	12,273	49.1	Yes	**-2.97**	104.0	3.01	92.78	12.50	4.66	0.00	0.00	109.94	0.00
120	13,238	13,239	51.3	Yes	**-4.12**	104.0	3.01	93.44	12.99	4.67	0.00	0.00	111.09	0.00
121	11,679	11,679	54.4	Yes	**-2.21**	104.0	3.01	92.35	12.19	4.64	0.00	0.00	109.18	0.00
125	7,420	7,421	43.0	Yes	**4.45**	104.0	3.01	88.41	9.51	4.60	0.00	0.00	102.53	0.00
126	8,563	8,564	51.4	Yes	**2.40**	104.0	3.01	89.65	10.32	4.60	0.00	0.00	104.57	0.00
127	8,577	8,577	51.1	Yes	**2.38**	104.0	3.01	89.67	10.33	4.60	0.00	0.00	104.59	0.00
128	8,739	8,739	50.2	Yes	**2.10**	104.0	3.01	89.83	10.44	4.60	0.00	0.00	104.87	0.00
129	9,770	9,771	36.7	Yes	**0.41**	104.0	3.01	90.80	11.09	4.67	0.00	0.00	106.57	0.00
130	9,210	9,211	35.7	Yes	**1.27**	104.0	3.01	90.29	10.74	4.67	0.00	0.00	105.70	0.00
131	9,388	9,388	34.0	Yes	**0.99**	104.0	3.01	90.45	10.86	4.68	0.00	0.00	105.99	0.00
132	9,708	9,708	34.7	Yes	**0.49**	104.0	3.01	90.74	11.06	4.68	0.00	0.00	106.48	0.00
133	9,979	9,980	37.4	No	**-0.03**	104.0	3.01	90.98	11.22	4.80	0.00	0.00	107.00	0.00
134	12,024	12,024	37.9	Yes	**-2.69**	104.0	3.01	92.60	12.37	4.69	0.00	0.00	109.66	0.00
141	11,521	11,522	63.1	Yes	**-1.98**	104.0	3.01	92.23	12.10	4.61	0.00	0.00	108.95	0.00
142	9,425	9,427	70.9	Yes	**1.06**	104.0	3.01	90.49	10.88	4.54	0.00	0.00	105.91	0.00
143	11,720	11,721	61.9	Yes	**-2.24**	104.0	3.01	92.38	12.21	4.62	0.00	0.00	109.21	0.00
144	8,755	8,755	55.4	Yes	**2.09**	104.0	3.01	89.85	10.45	4.58	0.00	0.00	104.88	0.00
145	9,273	9,274	40.2	Yes	**1.19**	104.0	3.01	90.35	10.78	4.65	0.00	0.00	105.78	0.00
146	9,345	9,345	39.9	Yes	**1.08**	104.0	3.01	90.41	10.83	4.65	0.00	0.00	105.90	0.00

Sum 20.82

Noise sensitive area: H46 H46

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	19,533	19,533	49.9	No	**-10.27**	104.0	3.01	96.82	15.63	4.80	0.00	0.00	117.24	0.00
2	19,578	19,578	46.3	No	**-10.31**	104.0	3.01	96.84	15.64	4.80	0.00	0.00	117.28	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	19,140	19,140	49.9	No	**-9.95**	104.0	3.01	96.64	15.48	4.80	0.00	0.00	116.92	0.00
4	18,538	18,538	42.8	Yes	**-9.37**	104.0	3.01	96.36	15.26	4.72	0.00	0.00	116.34	0.00
5	18,134	18,134	46.2	Yes	**-9.01**	104.0	3.01	96.17	15.10	4.71	0.00	0.00	115.99	0.00
6	18,567	18,567	52.2	Yes	**-9.37**	104.0	3.01	96.37	15.27	4.70	0.00	0.00	116.35	0.00
7	16,402	16,403	65.2	Yes	**-7.40**	104.0	3.01	95.30	14.41	4.66	0.00	0.00	114.37	0.00
8	20,109	20,109	43.6	No	**-10.73**	104.0	3.01	97.07	15.83	4.80	0.00	0.00	117.70	0.00
9	19,002	19,002	55.7	Yes	**-9.73**	104.0	3.01	96.58	15.43	4.70	0.00	0.00	116.71	0.00
10	18,616	18,616	69.1	Yes	**-9.38**	104.0	3.01	96.40	15.29	4.67	0.00	0.00	116.36	0.00
11	19,635	19,636	73.3	No	**-10.35**	104.0	3.01	96.86	15.66	4.80	0.00	0.00	117.32	0.00
12	19,510	19,510	72.8	No	**-10.25**	104.0	3.01	96.81	15.62	4.80	0.00	0.00	117.22	0.00
13	19,047	19,048	78.5	Yes	**-9.73**	104.0	3.01	96.60	15.45	4.66	0.00	0.00	116.70	0.00
14	18,620	18,621	79.7	Yes	**-9.37**	104.0	3.01	96.40	15.29	4.65	0.00	0.00	116.34	0.00
15	17,995	17,996	75.7	Yes	**-8.84**	104.0	3.01	96.10	15.05	4.66	0.00	0.00	115.81	0.00
16	17,815	17,815	70.6	Yes	**-8.69**	104.0	3.01	96.02	14.98	4.67	0.00	0.00	115.66	0.00
17	19,820	19,821	71.5	No	**-10.50**	104.0	3.01	96.94	15.73	4.80	0.00	0.00	117.47	0.00
18	19,837	19,838	68.7	No	**-10.51**	104.0	3.01	96.95	15.74	4.80	0.00	0.00	117.48	0.00
19	18,735	18,735	73.8	No	**-9.61**	104.0	3.01	96.45	15.33	4.80	0.00	0.00	116.58	0.00
20	17,704	17,704	69.8	Yes	**-8.59**	104.0	3.01	95.96	14.93	4.67	0.00	0.00	115.56	0.00
21	17,778	17,779	49.7	Yes	**-8.69**	104.0	3.01	96.00	14.96	4.70	0.00	0.00	115.67	0.00
22	17,596	17,596	44.2	Yes	**-8.54**	104.0	3.01	95.91	14.89	4.71	0.00	0.00	115.52	0.00
23	17,295	17,295	46.1	Yes	**-8.27**	104.0	3.01	95.76	14.77	4.71	0.00	0.00	115.24	0.00
24	17,800	17,800	43.8	Yes	**-8.72**	104.0	3.01	96.01	14.97	4.72	0.00	0.00	115.70	0.00
25	15,028	15,029	42.1	Yes	**-6.09**	104.0	3.01	94.54	13.82	4.70	0.00	0.00	113.06	0.00
26	17,023	17,023	51.2	Yes	**-8.01**	104.0	3.01	95.62	14.66	4.70	0.00	0.00	114.98	0.00
27	15,196	15,196	45.3	Yes	**-6.26**	104.0	3.01	94.63	13.89	4.70	0.00	0.00	113.23	0.00
28	15,243	15,244	60.5	Yes	**-6.27**	104.0	3.01	94.66	13.91	4.66	0.00	0.00	113.24	0.00
29	16,793	16,793	45.0	Yes	**-7.81**	104.0	3.01	95.50	14.57	4.71	0.00	0.00	114.78	0.00
30	16,901	16,901	40.4	Yes	**-7.92**	104.0	3.01	95.56	14.61	4.72	0.00	0.00	114.89	0.00
31	17,950	17,950	46.7	Yes	**-8.85**	104.0	3.01	96.08	15.03	4.71	0.00	0.00	115.82	0.00
32	15,119	15,119	41.6	Yes	**-6.18**	104.0	3.01	94.59	13.86	4.71	0.00	0.00	113.16	0.00
33	16,388	16,388	39.3	Yes	**-7.44**	104.0	3.01	95.29	14.40	4.72	0.00	0.00	114.41	0.00
34	16,126	16,126	60.3	Yes	**-7.15**	104.0	3.01	95.15	14.29	4.67	0.00	0.00	114.12	0.00
35	16,669	16,670	65.9	Yes	**-7.65**	104.0	3.01	95.44	14.52	4.67	0.00	0.00	114.62	0.00
36	16,946	16,946	66.0	Yes	**-7.91**	104.0	3.01	95.58	14.63	4.67	0.00	0.00	114.88	0.00
37	15,844	15,845	59.2	Yes	**-6.87**	104.0	3.01	95.00	14.17	4.67	0.00	0.00	113.85	0.00
38	15,017	15,017	42.6	Yes	**-6.08**	104.0	3.01	94.53	13.81	4.70	0.00	0.00	113.05	0.00
39	14,508	14,508	56.9	Yes	**-5.51**	104.0	3.01	94.23	13.59	4.67	0.00	0.00	112.48	0.00
40	14,311	14,311	54.4	Yes	**-5.31**	104.0	3.01	94.11	13.50	4.67	0.00	0.00	112.28	0.00
41	14,315	14,316	67.6	Yes	**-5.28**	104.0	3.01	94.12	13.50	4.64	0.00	0.00	112.25	0.00
43	15,289	15,289	65.2	Yes	**-6.31**	104.0	3.01	94.69	13.93	4.65	0.00	0.00	113.28	0.00
44	13,970	13,971	77.0	Yes	**-4.88**	104.0	3.01	93.90	13.34	4.61	0.00	0.00	111.85	0.00
45	13,755	13,755	74.6	Yes	**-4.65**	104.0	3.01	93.77	13.24	4.62	0.00	0.00	111.62	0.00
46	14,547	14,547	59.2	Yes	**-5.55**	104.0	3.01	94.26	13.60	4.66	0.00	0.00	112.52	0.00
48	14,362	14,362	40.7	Yes	**-5.39**	104.0	3.01	94.14	13.52	4.70	0.00	0.00	112.37	0.00
49	15,084	15,084	39.0	No	**-6.24**	104.0	3.01	94.57	13.84	4.80	0.00	0.00	113.21	0.00
50	17,530	17,530	55.9	Yes	**-8.46**	104.0	3.01	95.88	14.87	4.69	0.00	0.00	115.43	0.00
51	15,421	15,421	37.6	No	**-6.58**	104.0	3.01	94.76	13.99	4.80	0.00	0.00	113.56	0.00
52	15,665	15,665	37.9	No	**-6.82**	104.0	3.01	94.90	14.10	4.80	0.00	0.00	113.80	0.00
53	14,845	14,845	42.6	Yes	**-5.90**	104.0	3.01	94.43	13.74	4.70	0.00	0.00	112.87	0.00
55	13,776	13,776	39.3	Yes	**-4.76**	104.0	3.01	93.78	13.25	4.70	0.00	0.00	111.73	0.00
56	13,579	13,579	42.2	Yes	**-4.53**	104.0	3.01	93.66	13.15	4.69	0.00	0.00	111.50	0.00
57	13,029	13,029	39.3	Yes	**-3.91**	104.0	3.01	93.30	12.88	4.70	0.00	0.00	110.88	0.00
58	15,719	15,719	38.8	Yes	**-6.79**	104.0	3.01	94.93	14.12	4.72	0.00	0.00	113.77	0.00
59	13,377	13,377	44.1	Yes	**-4.30**	104.0	3.01	93.53	13.05	4.69	0.00	0.00	111.27	0.00
60	12,189	12,190	48.8	Yes	**-2.87**	104.0	3.01	92.72	12.46	4.66	0.00	0.00	109.84	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	11,984	11,984	45.4	Yes	**-2.62**	104.0	3.01	92.57	12.35	4.67	0.00	0.00	109.59	0.00
62	10,584	10,585	45.8	Yes	**-0.75**	104.0	3.01	91.49	11.58	4.65	0.00	0.00	107.72	0.00
63	9,542	9,543	51.3	Yes	**0.81**	104.0	3.01	90.59	10.95	4.62	0.00	0.00	106.16	0.00
64	8,215	8,216	49.2	Yes	**3.00**	104.0	3.01	89.29	10.08	4.60	0.00	0.00	103.97	0.00
65	7,906	7,906	49.2	Yes	**3.56**	104.0	3.01	88.96	9.87	4.59	0.00	0.00	103.41	0.00
66	14,535	14,535	51.4	No	**-5.67**	104.0	3.01	94.25	13.60	4.80	0.00	0.00	112.65	0.00
67	8,839	8,840	48.1	Yes	**1.92**	104.0	3.01	89.93	10.50	4.61	0.00	0.00	105.05	0.00
68	8,466	8,466	44.2	Yes	**2.54**	104.0	3.01	89.55	10.25	4.62	0.00	0.00	104.43	0.00
69	7,813	7,814	48.8	Yes	**3.73**	104.0	3.01	88.86	9.80	4.59	0.00	0.00	103.24	0.00
70	18,168	18,169	49.5	No	**-9.13**	104.0	3.01	96.19	15.12	4.80	0.00	0.00	116.10	0.00
71	18,395	18,396	65.9	Yes	**-9.20**	104.0	3.01	96.29	15.20	4.68	0.00	0.00	116.17	0.00
72	18,838	18,838	43.8	No	**-9.70**	104.0	3.01	96.50	15.37	4.80	0.00	0.00	116.67	0.00
73	18,285	18,285	49.4	Yes	**-9.14**	104.0	3.01	96.24	15.16	4.71	0.00	0.00	116.11	0.00
74	17,223	17,224	58.1	Yes	**-8.18**	104.0	3.01	95.72	14.74	4.69	0.00	0.00	115.15	0.00
75	16,662	16,662	43.8	Yes	**-7.69**	104.0	3.01	95.43	14.52	4.71	0.00	0.00	114.66	0.00
76	13,175	13,175	42.8	Yes	**-4.07**	104.0	3.01	93.39	12.96	4.69	0.00	0.00	111.04	0.00
77	14,187	14,187	38.4	Yes	**-5.21**	104.0	3.01	94.04	13.44	4.71	0.00	0.00	112.18	0.00
78	17,296	17,296	62.7	Yes	**-8.24**	104.0	3.01	95.76	14.77	4.68	0.00	0.00	115.21	0.00
80	12,355	12,355	49.2	Yes	**-3.07**	104.0	3.01	92.84	12.54	4.66	0.00	0.00	110.04	0.00
81	18,922	18,923	72.9	No	**-9.77**	104.0	3.01	96.54	15.40	4.80	0.00	0.00	116.74	0.00
82	15,934	15,934	40.0	Yes	**-7.00**	104.0	3.01	95.05	14.21	4.71	0.00	0.00	113.97	0.00
83	9,157	9,157	48.7	Yes	**1.41**	104.0	3.01	90.24	10.71	4.62	0.00	0.00	105.56	0.00
85	15,661	15,661	41.2	Yes	**-6.73**	104.0	3.01	94.90	14.10	4.71	0.00	0.00	113.70	0.00
86	12,523	12,523	47.0	Yes	**-3.28**	104.0	3.01	92.95	12.63	4.67	0.00	0.00	110.26	0.00
87	7,805	7,806	47.5	Yes	**3.74**	104.0	3.01	88.85	9.79	4.59	0.00	0.00	103.24	0.00
89	8,679	8,680	50.4	Yes	**2.20**	104.0	3.01	89.77	10.40	4.60	0.00	0.00	104.77	0.00
90	12,085	12,085	44.7	Yes	**-2.75**	104.0	3.01	92.65	12.40	4.67	0.00	0.00	109.72	0.00
91	10,154	10,154	47.7	Yes	**-0.13**	104.0	3.01	91.13	11.33	4.64	0.00	0.00	107.10	0.00
92	7,482	7,482	48.3	Yes	**4.35**	104.0	3.01	88.48	9.56	4.58	0.00	0.00	102.62	0.00
94	18,588	18,588	74.7	Yes	**-9.35**	104.0	3.01	96.38	15.27	4.66	0.00	0.00	116.32	0.00
95	19,759	19,760	62.9	Yes	**-10.34**	104.0	3.01	96.92	15.71	4.69	0.00	0.00	117.31	0.00
97	17,213	17,213	78.4	Yes	**-8.13**	104.0	3.01	95.72	14.74	4.65	0.00	0.00	115.10	0.00
98	19,027	19,028	71.4	Yes	**-9.73**	104.0	3.01	96.59	15.44	4.67	0.00	0.00	116.70	0.00
99	19,538	19,538	44.7	No	**-10.27**	104.0	3.01	96.82	15.63	4.80	0.00	0.00	117.24	0.00
100	13,783	13,784	62.7	Yes	**-4.71**	104.0	3.01	93.79	13.25	4.65	0.00	0.00	111.68	0.00
101	19,276	19,276	69.9	No	**-10.06**	104.0	3.01	96.70	15.53	4.80	0.00	0.00	117.03	0.00
102	14,297	14,298	77.4	Yes	**-5.24**	104.0	3.01	94.11	13.49	4.62	0.00	0.00	112.21	0.00
103	20,090	20,091	66.5	No	**-10.71**	104.0	3.01	97.06	15.83	4.80	0.00	0.00	117.69	0.00
104	14,788	14,788	62.4	Yes	**-5.80**	104.0	3.01	94.40	13.71	4.66	0.00	0.00	112.77	0.00
107	18,049	18,050	72.6	Yes	**-8.89**	104.0	3.01	96.13	15.07	4.66	0.00	0.00	115.86	0.00
108	20,127	20,127	42.7	No	**-10.74**	104.0	3.01	97.08	15.84	4.80	0.00	0.00	117.71	0.00
109	13,150	13,150	45.8	Yes	**-4.03**	104.0	3.01	93.38	12.94	4.68	0.00	0.00	111.00	0.00
110	13,961	13,961	41.0	Yes	**-4.96**	104.0	3.01	93.90	13.33	4.70	0.00	0.00	111.93	0.00
111	13,480	13,480	42.7	Yes	**-4.42**	104.0	3.01	93.59	13.10	4.69	0.00	0.00	111.39	0.00
113	18,359	18,360	72.1	No	**-9.29**	104.0	3.01	96.28	15.19	4.80	0.00	0.00	116.27	0.00
114	15,447	15,447	40.8	Yes	**-6.52**	104.0	3.01	94.78	14.00	4.71	0.00	0.00	113.49	0.00
115	19,913	19,913	44.1	No	**-10.57**	104.0	3.01	96.98	15.76	4.80	0.00	0.00	117.55	0.00
116	15,330	15,331	72.9	Yes	**-6.33**	104.0	3.01	94.71	13.95	4.64	0.00	0.00	113.30	0.00
118	12,888	12,888	46.4	Yes	**-3.72**	104.0	3.01	93.20	12.81	4.68	0.00	0.00	110.69	0.00
119	17,793	17,793	61.2	Yes	**-8.69**	104.0	3.01	96.00	14.97	4.68	0.00	0.00	115.66	0.00
120	19,557	19,557	64.3	No	**-10.29**	104.0	3.01	96.83	15.63	4.80	0.00	0.00	117.26	0.00
121	17,231	17,231	65.8	Yes	**-8.17**	104.0	3.01	95.73	14.75	4.67	0.00	0.00	115.14	0.00
125	9,325	9,325	49.4	Yes	**1.14**	104.0	3.01	90.39	10.82	4.62	0.00	0.00	105.83	0.00
126	12,638	12,638	58.2	Yes	**-3.39**	104.0	3.01	93.03	12.69	4.64	0.00	0.00	110.36	0.00
127	12,515	12,515	58.2	Yes	**-3.24**	104.0	3.01	92.95	12.63	4.64	0.00	0.00	110.22	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	12,516	12,516	57.5	Yes	**-3.25**	104.0	3.01	92.95	12.63	4.64	0.00	0.00	110.22	0.00
129	15,850	15,850	53.4	No	**-7.01**	104.0	3.01	95.00	14.18	4.80	0.00	0.00	113.98	0.00
130	15,408	15,408	50.1	No	**-6.57**	104.0	3.01	94.76	13.99	4.80	0.00	0.00	113.54	0.00
131	15,698	15,698	46.6	No	**-6.86**	104.0	3.01	94.92	14.11	4.80	0.00	0.00	113.83	0.00
132	16,078	16,078	45.7	No	**-7.23**	104.0	3.01	95.12	14.27	4.80	0.00	0.00	114.20	0.00
133	14,465	14,465	47.9	Yes	**-5.49**	104.0	3.01	94.21	13.57	4.69	0.00	0.00	112.46	0.00
134	18,213	18,213	54.8	No	**-9.17**	104.0	3.01	96.21	15.13	4.80	0.00	0.00	116.14	0.00
141	17,201	17,202	76.6	Yes	**-8.12**	104.0	3.01	95.71	14.74	4.65	0.00	0.00	115.10	0.00
142	14,525	14,525	80.0	Yes	**-5.48**	104.0	3.01	94.24	13.59	4.61	0.00	0.00	112.45	0.00
143	17,553	17,553	78.5	Yes	**-8.44**	104.0	3.01	95.89	14.88	4.65	0.00	0.00	115.41	0.00
144	13,459	13,460	65.8	Yes	**-4.34**	104.0	3.01	93.58	13.09	4.63	0.00	0.00	111.31	0.00
145	12,324	12,324	47.2	Yes	**-3.04**	104.0	3.01	92.81	12.53	4.67	0.00	0.00	110.01	0.00
146	12,562	12,563	46.8	Yes	**-3.33**	104.0	3.01	92.98	12.65	4.67	0.00	0.00	110.30	0.00

Sum 16.72

Noise sensitive area: H48 H48

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	16,891	16,892	51.4	No	**-7.99**	104.0	3.01	95.55	14.61	4.80	0.00	0.00	114.96	0.00
2	17,028	17,028	48.4	No	**-8.12**	104.0	3.01	95.62	14.67	4.80	0.00	0.00	115.09	0.00
3	16,677	16,678	51.4	No	**-7.79**	104.0	3.01	95.44	14.52	4.80	0.00	0.00	114.77	0.00
4	16,402	16,402	39.4	No	**-7.54**	104.0	3.01	95.30	14.41	4.80	0.00	0.00	114.51	0.00
5	15,855	15,856	44.5	No	**-7.01**	104.0	3.01	95.00	14.18	4.80	0.00	0.00	113.98	0.00
6	16,135	16,135	53.7	No	**-7.28**	104.0	3.01	95.16	14.30	4.80	0.00	0.00	114.25	0.00
7	13,977	13,978	67.0	No	**-5.08**	104.0	3.01	93.91	13.34	4.80	0.00	0.00	112.05	0.00
8	17,401	17,401	44.2	No	**-8.45**	104.0	3.01	95.81	14.82	4.80	0.00	0.00	115.43	0.00
9	16,375	16,375	57.3	No	**-7.51**	104.0	3.01	95.28	14.40	4.80	0.00	0.00	114.48	0.00
10	15,903	15,903	69.4	No	**-7.06**	104.0	3.01	95.03	14.20	4.80	0.00	0.00	114.03	0.00
11	16,663	16,664	69.3	No	**-7.78**	104.0	3.01	95.44	14.52	4.80	0.00	0.00	114.75	0.00
12	16,574	16,575	68.9	No	**-7.70**	104.0	3.01	95.39	14.48	4.80	0.00	0.00	114.67	0.00
13	16,146	16,147	74.0	No	**-7.29**	104.0	3.01	95.16	14.30	4.80	0.00	0.00	114.26	0.00
14	15,738	15,738	75.7	No	**-6.90**	104.0	3.01	94.94	14.13	4.80	0.00	0.00	113.87	0.00
15	15,233	15,233	74.4	No	**-6.39**	104.0	3.01	94.66	13.91	4.80	0.00	0.00	113.37	0.00
16	15,133	15,134	71.1	No	**-6.29**	104.0	3.01	94.60	13.87	4.80	0.00	0.00	113.27	0.00
17	16,821	16,821	67.7	No	**-7.93**	104.0	3.01	95.52	14.58	4.80	0.00	0.00	114.90	0.00
18	16,780	16,780	66.6	No	**-7.89**	104.0	3.01	95.50	14.57	4.80	0.00	0.00	114.86	0.00
19	15,783	15,783	69.4	No	**-6.94**	104.0	3.01	94.96	14.15	4.80	0.00	0.00	113.91	0.00
20	14,860	14,860	66.5	No	**-6.01**	104.0	3.01	94.44	13.74	4.80	0.00	0.00	112.99	0.00
21	15,621	15,621	46.7	No	**-6.78**	104.0	3.01	94.87	14.08	4.80	0.00	0.00	113.75	0.00
22	15,628	15,628	42.2	No	**-6.79**	104.0	3.01	94.88	14.08	4.80	0.00	0.00	113.76	0.00
23	15,392	15,392	45.2	No	**-6.55**	104.0	3.01	94.75	13.98	4.80	0.00	0.00	113.53	0.00
24	15,795	15,795	41.0	No	**-6.95**	104.0	3.01	94.97	14.15	4.80	0.00	0.00	113.92	0.00
25	13,272	13,272	42.9	No	**-4.29**	104.0	3.01	93.46	13.00	4.80	0.00	0.00	111.26	0.00
26	14,748	14,748	49.6	No	**-5.90**	104.0	3.01	94.37	13.69	4.80	0.00	0.00	112.87	0.00
27	13,210	13,211	45.8	No	**-4.22**	104.0	3.01	93.42	12.97	4.80	0.00	0.00	111.19	0.00
28	12,996	12,996	58.7	No	**-3.97**	104.0	3.01	93.28	12.87	4.80	0.00	0.00	110.94	0.00
29	14,817	14,817	43.6	No	**-5.97**	104.0	3.01	94.42	13.73	4.80	0.00	0.00	112.94	0.00
30	15,068	15,068	40.6	No	**-6.23**	104.0	3.01	94.56	13.84	4.80	0.00	0.00	113.20	0.00
31	16,139	16,139	46.8	No	**-7.28**	104.0	3.01	95.16	14.30	4.80	0.00	0.00	114.26	0.00
32	13,494	13,494	42.2	No	**-4.54**	104.0	3.01	93.60	13.11	4.80	0.00	0.00	111.51	0.00
33	14,659	14,659	40.8	No	**-5.80**	104.0	3.01	94.32	13.65	4.80	0.00	0.00	112.78	0.00
34	13,756	13,756	62.2	No	**-4.83**	104.0	3.01	93.77	13.24	4.80	0.00	0.00	111.81	0.00
35	14,203	14,204	66.9	No	**-5.32**	104.0	3.01	94.05	13.45	4.80	0.00	0.00	112.29	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
+1 701 775 5507
Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
36	14,440	14,440	66.9	No	**-5.57**	104.0	3.01	94.19	13.55	4.80	0.00	0.00	112.55	0.00
37	13,522	13,522	59.1	No	**-4.57**	104.0	3.01	93.62	13.12	4.80	0.00	0.00	111.54	0.00
38	13,146	13,146	43.6	No	**-4.14**	104.0	3.01	93.38	12.94	4.80	0.00	0.00	111.12	0.00
39	12,452	12,453	56.9	No	**-3.33**	104.0	3.01	92.91	12.59	4.80	0.00	0.00	110.30	0.00
40	11,707	11,707	54.4	No	**-2.40**	104.0	3.01	92.37	12.20	4.80	0.00	0.00	109.37	0.00
41	12,187	12,187	65.5	No	**-3.00**	104.0	3.01	92.72	12.46	4.80	0.00	0.00	109.97	0.00
43	12,977	12,977	64.5	No	**-3.95**	104.0	3.01	93.26	12.86	4.80	0.00	0.00	110.92	0.00
44	11,764	11,764	74.5	No	**-2.47**	104.0	3.01	92.41	12.23	4.80	0.00	0.00	109.44	0.00
45	11,621	11,621	72.8	No	**-2.29**	104.0	3.01	92.30	12.16	4.80	0.00	0.00	109.26	0.00
46	12,077	12,078	59.2	No	**-2.87**	104.0	3.01	92.64	12.40	4.80	0.00	0.00	109.84	0.00
48	12,828	12,828	40.9	No	**-3.77**	104.0	3.01	93.16	12.78	4.80	0.00	0.00	110.75	0.00
49	13,763	13,763	39.2	No	**-4.84**	104.0	3.01	93.77	13.24	4.80	0.00	0.00	111.81	0.00
50	15,100	15,100	57.8	No	**-6.26**	104.0	3.01	94.58	13.85	4.80	0.00	0.00	113.23	0.00
51	13,992	13,992	38.4	No	**-5.09**	104.0	3.01	93.92	13.35	4.80	0.00	0.00	112.07	0.00
52	14,171	14,171	39.1	No	**-5.29**	104.0	3.01	94.03	13.43	4.80	0.00	0.00	112.26	0.00
53	13,600	13,600	42.0	No	**-4.66**	104.0	3.01	93.67	13.16	4.80	0.00	0.00	111.63	0.00
55	12,895	12,895	40.2	No	**-3.85**	104.0	3.01	93.21	12.82	4.80	0.00	0.00	110.83	0.00
56	12,784	12,784	42.8	No	**-3.72**	104.0	3.01	93.13	12.76	4.80	0.00	0.00	110.69	0.00
57	12,090	12,090	39.8	No	**-2.88**	104.0	3.01	92.65	12.41	4.80	0.00	0.00	109.85	0.00
58	13,963	13,964	40.0	No	**-5.06**	104.0	3.01	93.90	13.33	4.80	0.00	0.00	112.03	0.00
59	12,669	12,669	44.2	No	**-3.59**	104.0	3.01	93.06	12.70	4.80	0.00	0.00	110.56	0.00
60	11,860	11,860	47.9	No	**-2.59**	104.0	3.01	92.48	12.28	4.80	0.00	0.00	109.57	0.00
61	11,772	11,772	45.5	No	**-2.48**	104.0	3.01	92.42	12.24	4.80	0.00	0.00	109.45	0.00
62	9,906	9,906	45.6	No	**0.08**	104.0	3.01	90.92	11.18	4.80	0.00	0.00	106.89	0.00
63	8,768	8,769	49.6	No	**1.86**	104.0	3.01	89.86	10.46	4.80	0.00	0.00	105.12	0.00
64	7,833	7,833	48.4	No	**3.48**	104.0	3.01	88.88	9.81	4.80	0.00	0.00	103.49	0.00
65	7,860	7,860	46.4	No	**3.43**	104.0	3.01	88.91	9.83	4.80	0.00	0.00	103.54	0.00
66	11,865	11,865	51.2	No	**-2.60**	104.0	3.01	92.49	12.29	4.80	0.00	0.00	109.57	0.00
67	8,701	8,701	47.5	No	**1.97**	104.0	3.01	89.79	10.41	4.80	0.00	0.00	105.00	0.00
68	8,565	8,566	42.5	No	**2.20**	104.0	3.01	89.66	10.32	4.80	0.00	0.00	104.78	0.00
69	7,662	7,662	47.0	No	**3.79**	104.0	3.01	88.69	9.69	4.80	0.00	0.00	103.18	0.00
70	15,112	15,113	46.9	No	**-6.27**	104.0	3.01	94.59	13.86	4.80	0.00	0.00	113.24	0.00
71	15,729	15,729	66.8	No	**-6.89**	104.0	3.01	94.93	14.13	4.80	0.00	0.00	113.86	0.00
72	16,641	16,641	41.1	No	**-7.76**	104.0	3.01	95.42	14.51	4.80	0.00	0.00	114.73	0.00
73	15,899	15,899	50.5	No	**-7.05**	104.0	3.01	95.03	14.20	4.80	0.00	0.00	114.03	0.00
74	14,824	14,825	60.1	No	**-5.98**	104.0	3.01	94.42	13.73	4.80	0.00	0.00	112.95	0.00
75	14,534	14,535	41.4	No	**-5.67**	104.0	3.01	94.25	13.60	4.80	0.00	0.00	112.65	0.00
76	11,957	11,957	42.6	No	**-2.72**	104.0	3.01	92.55	12.34	4.80	0.00	0.00	109.69	0.00
77	12,940	12,940	38.1	No	**-3.91**	104.0	3.01	93.24	12.84	4.80	0.00	0.00	110.88	0.00
78	14,469	14,469	59.6	No	**-5.60**	104.0	3.01	94.21	13.57	4.80	0.00	0.00	112.58	0.00
80	11,889	11,889	48.1	No	**-2.63**	104.0	3.01	92.50	12.30	4.80	0.00	0.00	109.60	0.00
81	15,929	15,929	68.9	No	**-7.08**	104.0	3.01	95.04	14.21	4.80	0.00	0.00	114.05	0.00
82	14,319	14,319	40.5	No	**-5.45**	104.0	3.01	94.12	13.50	4.80	0.00	0.00	112.42	0.00
83	8,663	8,663	49.3	No	**2.03**	104.0	3.01	89.75	10.39	4.80	0.00	0.00	104.94	0.00
85	14,493	14,494	40.5	No	**-5.63**	104.0	3.01	94.22	13.58	4.80	0.00	0.00	112.60	0.00
86	11,964	11,964	45.9	No	**-2.72**	104.0	3.01	92.56	12.34	4.80	0.00	0.00	109.70	0.00
87	7,888	7,888	44.8	No	**3.38**	104.0	3.01	88.94	9.85	4.80	0.00	0.00	103.59	0.00
89	8,144	8,145	50.1	No	**2.92**	104.0	3.01	89.22	10.03	4.80	0.00	0.00	104.05	0.00
90	11,136	11,136	45.0	No	**-1.65**	104.0	3.01	91.93	11.89	4.80	0.00	0.00	108.63	0.00
91	9,424	9,424	46.9	No	**0.81**	104.0	3.01	90.48	10.88	4.80	0.00	0.00	106.16	0.00
92	6,961	6,962	46.3	No	**5.15**	104.0	3.01	87.85	9.17	4.80	0.00	0.00	101.82	0.00
94	15,798	15,799	73.1	No	**-6.96**	104.0	3.01	94.97	14.16	4.80	0.00	0.00	113.93	0.00
95	16,913	16,914	60.3	No	**-8.01**	104.0	3.01	95.56	14.62	4.80	0.00	0.00	114.98	0.00
97	14,517	14,517	78.3	No	**-5.66**	104.0	3.01	94.24	13.59	4.80	0.00	0.00	112.63	0.00
98	16,216	16,217	69.6	No	**-7.36**	104.0	3.01	95.20	14.33	4.80	0.00	0.00	114.33	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
99	17,148	17,148	44.8	No	**-8.23**	104.0	3.01	95.68	14.71	4.80	0.00	0.00	115.20	0.00
100	11,770	11,770	63.6	No	**-2.48**	104.0	3.01	92.42	12.24	4.80	0.00	0.00	109.45	0.00
101	16,236	16,236	66.8	No	**-7.38**	104.0	3.01	95.21	14.34	4.80	0.00	0.00	114.35	0.00
102	12,058	12,058	75.6	No	**-2.84**	104.0	3.01	92.63	12.39	4.80	0.00	0.00	109.81	0.00
103	17,004	17,005	65.1	No	**-8.10**	104.0	3.01	95.61	14.66	4.80	0.00	0.00	115.07	0.00
104	12,603	12,603	59.7	No	**-3.51**	104.0	3.01	93.01	12.67	4.80	0.00	0.00	110.48	0.00
107	15,145	15,145	68.1	No	**-6.30**	104.0	3.01	94.61	13.87	4.80	0.00	0.00	113.28	0.00
108	17,844	17,844	40.6	No	**-8.85**	104.0	3.01	96.03	14.99	4.80	0.00	0.00	115.82	0.00
109	12,527	12,527	45.1	No	**-3.42**	104.0	3.01	92.96	12.63	4.80	0.00	0.00	110.39	0.00
110	12,490	12,490	40.6	No	**-3.37**	104.0	3.01	92.93	12.61	4.80	0.00	0.00	110.34	0.00
111	12,159	12,159	43.1	No	**-2.97**	104.0	3.01	92.70	12.44	4.80	0.00	0.00	109.94	0.00
113	15,426	15,427	67.5	No	**-6.59**	104.0	3.01	94.77	13.99	4.80	0.00	0.00	113.56	0.00
114	14,347	14,347	40.6	No	**-5.47**	104.0	3.01	94.14	13.51	4.80	0.00	0.00	112.45	0.00
115	17,238	17,239	45.0	No	**-8.31**	104.0	3.01	95.73	14.75	4.80	0.00	0.00	115.28	0.00
116	12,856	12,856	73.5	No	**-3.81**	104.0	3.01	93.18	12.80	4.80	0.00	0.00	110.78	0.00
118	12,416	12,416	45.6	No	**-3.28**	104.0	3.01	92.88	12.57	4.80	0.00	0.00	110.25	0.00
119	15,266	15,266	62.8	No	**-6.43**	104.0	3.01	94.67	13.92	4.80	0.00	0.00	113.40	0.00
120	16,458	16,459	63.2	No	**-7.59**	104.0	3.01	95.33	14.43	4.80	0.00	0.00	114.56	0.00
121	14,676	14,677	67.8	No	**-5.82**	104.0	3.01	94.33	13.66	4.80	0.00	0.00	112.79	0.00
125	8,697	8,698	49.2	No	**1.97**	104.0	3.01	89.79	10.41	4.80	0.00	0.00	105.00	0.00
126	10,921	10,921	58.8	No	**-1.36**	104.0	3.01	91.77	11.77	4.80	0.00	0.00	108.34	0.00
127	10,876	10,877	58.3	No	**-1.30**	104.0	3.01	91.73	11.75	4.80	0.00	0.00	108.28	0.00
128	10,975	10,975	56.6	No	**-1.44**	104.0	3.01	91.81	11.80	4.80	0.00	0.00	108.41	0.00
129	12,909	12,909	49.2	No	**-3.87**	104.0	3.01	93.22	12.82	4.80	0.00	0.00	110.84	0.00
130	12,377	12,377	47.8	No	**-3.23**	104.0	3.01	92.85	12.55	4.80	0.00	0.00	110.21	0.00
131	12,585	12,585	45.7	No	**-3.49**	104.0	3.01	93.00	12.66	4.80	0.00	0.00	110.46	0.00
132	12,922	12,922	46.2	No	**-3.88**	104.0	3.01	93.23	12.83	4.80	0.00	0.00	110.86	0.00
133	12,556	12,556	49.0	No	**-3.45**	104.0	3.01	92.98	12.65	4.80	0.00	0.00	110.42	0.00
134	15,209	15,209	50.8	No	**-6.37**	104.0	3.01	94.64	13.90	4.80	0.00	0.00	113.34	0.00
141	14,558	14,558	77.4	No	**-5.70**	104.0	3.01	94.26	13.61	4.80	0.00	0.00	112.67	0.00
142	12,227	12,228	78.5	No	**-3.05**	104.0	3.01	92.75	12.48	4.80	0.00	0.00	110.02	0.00
143	14,805	14,805	77.4	No	**-5.96**	104.0	3.01	94.41	13.72	4.80	0.00	0.00	112.93	0.00
144	11,383	11,384	65.3	No	**-1.98**	104.0	3.01	92.13	12.03	4.80	0.00	0.00	108.95	0.00
145	11,215	11,215	46.7	No	**-1.76**	104.0	3.01	92.00	11.93	4.80	0.00	0.00	108.73	0.00
146	11,363	11,364	46.3	No	**-1.95**	104.0	3.01	92.11	12.02	4.80	0.00	0.00	108.93	0.00

Sum 17.94

Noise sensitive area: H49 H49

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	17,034	17,034	52.2	No	**-8.12**	104.0	3.01	95.63	14.67	4.80	0.00	0.00	115.09	0.00
2	17,169	17,169	48.9	No	**-8.25**	104.0	3.01	95.69	14.72	4.80	0.00	0.00	115.22	0.00
3	16,816	16,816	51.9	No	**-7.92**	104.0	3.01	95.51	14.58	4.80	0.00	0.00	114.89	0.00
4	16,533	16,533	39.9	No	**-7.66**	104.0	3.01	95.37	14.46	4.80	0.00	0.00	114.63	0.00
5	15,990	15,990	44.8	No	**-7.14**	104.0	3.01	95.08	14.24	4.80	0.00	0.00	114.11	0.00
6	16,273	16,273	54.2	No	**-7.41**	104.0	3.01	95.23	14.36	4.80	0.00	0.00	114.38	0.00
7	14,114	14,114	67.3	No	**-5.23**	104.0	3.01	93.99	13.40	4.80	0.00	0.00	112.20	0.00
8	17,545	17,545	44.9	No	**-8.58**	104.0	3.01	95.88	14.87	4.80	0.00	0.00	115.56	0.00
9	16,517	16,517	57.9	No	**-7.64**	104.0	3.01	95.36	14.46	4.80	0.00	0.00	114.62	0.00
10	16,046	16,047	70.0	No	**-7.20**	104.0	3.01	95.11	14.26	4.80	0.00	0.00	114.17	0.00
11	16,812	16,812	69.8	No	**-7.92**	104.0	3.01	95.51	14.58	4.80	0.00	0.00	114.89	0.00
12	16,722	16,722	69.4	No	**-7.84**	104.0	3.01	95.47	14.54	4.80	0.00	0.00	114.81	0.00
13	16,293	16,294	74.5	No	**-7.43**	104.0	3.01	95.24	14.36	4.80	0.00	0.00	114.40	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
14	15,885	15,885	76.2	No	**-7.04**	104.0	3.01	95.02	14.19	4.80	0.00	0.00	114.01	0.00
15	15,377	15,378	75.0	No	**-6.54**	104.0	3.01	94.74	13.97	4.80	0.00	0.00	113.51	0.00
16	15,276	15,277	71.9	No	**-6.44**	104.0	3.01	94.68	13.93	4.80	0.00	0.00	113.41	0.00
17	16,970	16,970	68.2	No	**-8.06**	104.0	3.01	95.59	14.64	4.80	0.00	0.00	115.04	0.00
18	16,929	16,930	67.0	No	**-8.03**	104.0	3.01	95.57	14.63	4.80	0.00	0.00	115.00	0.00
19	15,931	15,931	69.8	No	**-7.08**	104.0	3.01	95.04	14.21	4.80	0.00	0.00	114.06	0.00
20	15,006	15,006	67.0	No	**-6.16**	104.0	3.01	94.53	13.81	4.80	0.00	0.00	113.14	0.00
21	15,752	15,752	47.2	No	**-6.91**	104.0	3.01	94.95	14.14	4.80	0.00	0.00	113.88	0.00
22	15,755	15,755	42.9	No	**-6.91**	104.0	3.01	94.95	14.14	4.80	0.00	0.00	113.88	0.00
23	15,517	15,517	45.7	No	**-6.68**	104.0	3.01	94.82	14.03	4.80	0.00	0.00	113.65	0.00
24	15,922	15,922	41.6	No	**-7.08**	104.0	3.01	95.04	14.21	4.80	0.00	0.00	114.05	0.00
25	13,391	13,391	43.0	No	**-4.42**	104.0	3.01	93.54	13.06	4.80	0.00	0.00	111.40	0.00
26	14,882	14,882	49.9	No	**-6.04**	104.0	3.01	94.45	13.75	4.80	0.00	0.00	113.01	0.00
27	13,336	13,336	46.1	No	**-4.36**	104.0	3.01	93.50	13.03	4.80	0.00	0.00	111.33	0.00
28	13,127	13,127	59.1	No	**-4.12**	104.0	3.01	93.36	12.93	4.80	0.00	0.00	111.10	0.00
29	14,943	14,943	44.2	No	**-6.10**	104.0	3.01	94.49	13.78	4.80	0.00	0.00	113.07	0.00
30	15,191	15,191	41.2	No	**-6.35**	104.0	3.01	94.63	13.89	4.80	0.00	0.00	113.32	0.00
31	16,262	16,262	47.4	No	**-7.40**	104.0	3.01	95.22	14.35	4.80	0.00	0.00	114.37	0.00
32	13,609	13,609	42.6	No	**-4.67**	104.0	3.01	93.68	13.17	4.80	0.00	0.00	111.64	0.00
33	14,779	14,779	40.7	No	**-5.93**	104.0	3.01	94.39	13.71	4.80	0.00	0.00	112.90	0.00
34	13,891	13,891	62.5	No	**-4.98**	104.0	3.01	93.85	13.30	4.80	0.00	0.00	111.95	0.00
35	14,341	14,341	67.4	No	**-5.47**	104.0	3.01	94.13	13.51	4.80	0.00	0.00	112.44	0.00
36	14,579	14,579	67.4	No	**-5.72**	104.0	3.01	94.27	13.62	4.80	0.00	0.00	112.69	0.00
37	13,655	13,656	59.4	No	**-4.72**	104.0	3.01	93.71	13.19	4.80	0.00	0.00	111.69	0.00
38	13,268	13,268	44.1	No	**-4.28**	104.0	3.01	93.46	13.00	4.80	0.00	0.00	111.26	0.00
39	12,578	12,579	57.4	No	**-3.48**	104.0	3.01	92.99	12.66	4.80	0.00	0.00	110.45	0.00
40	11,846	11,846	54.8	No	**-2.58**	104.0	3.01	92.47	12.28	4.80	0.00	0.00	109.55	0.00
41	12,315	12,315	66.0	No	**-3.16**	104.0	3.01	92.81	12.52	4.80	0.00	0.00	110.13	0.00
43	13,110	13,110	64.9	No	**-4.10**	104.0	3.01	93.35	12.92	4.80	0.00	0.00	111.08	0.00
44	11,893	11,894	74.8	No	**-2.64**	104.0	3.01	92.51	12.30	4.80	0.00	0.00	109.61	0.00
45	11,748	11,748	73.2	No	**-2.45**	104.0	3.01	92.40	12.22	4.80	0.00	0.00	109.42	0.00
46	12,214	12,214	59.4	No	**-3.04**	104.0	3.01	92.74	12.47	4.80	0.00	0.00	110.01	0.00
48	12,940	12,940	41.1	No	**-3.91**	104.0	3.01	93.24	12.84	4.80	0.00	0.00	110.88	0.00
49	13,870	13,870	39.8	No	**-4.96**	104.0	3.01	93.84	13.29	4.80	0.00	0.00	111.93	0.00
50	15,237	15,238	58.2	No	**-6.40**	104.0	3.01	94.66	13.91	4.80	0.00	0.00	113.37	0.00
51	14,103	14,103	38.7	No	**-5.21**	104.0	3.01	93.99	13.40	4.80	0.00	0.00	112.19	0.00
52	14,284	14,284	39.4	No	**-5.41**	104.0	3.01	94.10	13.48	4.80	0.00	0.00	112.38	0.00
53	13,705	13,705	42.7	No	**-4.78**	104.0	3.01	93.74	13.21	4.80	0.00	0.00	111.75	0.00
55	12,988	12,988	41.1	No	**-3.96**	104.0	3.01	93.27	12.86	4.80	0.00	0.00	110.93	0.00
56	12,874	12,874	43.5	No	**-3.83**	104.0	3.01	93.19	12.81	4.80	0.00	0.00	110.80	0.00
57	12,184	12,184	40.8	No	**-3.00**	104.0	3.01	92.72	12.45	4.80	0.00	0.00	109.97	0.00
58	14,083	14,083	40.0	No	**-5.19**	104.0	3.01	93.97	13.39	4.80	0.00	0.00	112.16	0.00
59	12,757	12,757	45.0	No	**-3.69**	104.0	3.01	93.11	12.75	4.80	0.00	0.00	110.66	0.00
60	11,934	11,934	48.9	No	**-2.69**	104.0	3.01	92.54	12.32	4.80	0.00	0.00	109.66	0.00
61	11,842	11,842	46.1	No	**-2.57**	104.0	3.01	92.47	12.27	4.80	0.00	0.00	109.54	0.00
62	9,986	9,986	46.6	No	**-0.04**	104.0	3.01	90.99	11.23	4.80	0.00	0.00	107.01	0.00
63	8,848	8,849	50.6	No	**1.72**	104.0	3.01	89.94	10.51	4.80	0.00	0.00	105.25	0.00
64	7,895	7,896	49.1	Yes	**3.58**	104.0	3.01	88.95	9.86	4.59	0.00	0.00	103.39	0.00
65	7,911	7,911	46.6	No	**3.34**	104.0	3.01	88.96	9.87	4.80	0.00	0.00	103.63	0.00
66	12,006	12,006	51.7	No	**-2.78**	104.0	3.01	92.59	12.36	4.80	0.00	0.00	109.75	0.00
67	8,759	8,759	47.8	No	**1.87**	104.0	3.01	89.85	10.45	4.80	0.00	0.00	105.10	0.00
68	8,615	8,615	42.9	No	**2.11**	104.0	3.01	89.70	10.35	4.80	0.00	0.00	104.86	0.00
69	7,715	7,715	47.1	No	**3.70**	104.0	3.01	88.75	9.73	4.80	0.00	0.00	103.28	0.00
70	15,262	15,262	47.3	No	**-6.42**	104.0	3.01	94.67	13.92	4.80	0.00	0.00	113.40	0.00
71	15,871	15,872	67.6	No	**-7.03**	104.0	3.01	95.01	14.19	4.80	0.00	0.00	114.00	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
72	16,774	16,774	41.5	No	**-7.88**	104.0	3.01	95.49	14.56	4.80	0.00	0.00	114.86	0.00
73	16,035	16,036	51.0	No	**-7.19**	104.0	3.01	95.10	14.26	4.80	0.00	0.00	114.16	0.00
74	14,961	14,961	60.5	No	**-6.12**	104.0	3.01	94.50	13.79	4.80	0.00	0.00	113.09	0.00
75	14,664	14,664	41.7	No	**-5.81**	104.0	3.01	94.33	13.66	4.80	0.00	0.00	112.78	0.00
76	12,058	12,059	43.5	No	**-2.84**	104.0	3.01	92.63	12.39	4.80	0.00	0.00	109.82	0.00
77	13,044	13,044	38.8	No	**-4.03**	104.0	3.01	93.31	12.89	4.80	0.00	0.00	111.00	0.00
78	14,614	14,614	60.3	No	**-5.76**	104.0	3.01	94.30	13.63	4.80	0.00	0.00	112.73	0.00
80	11,967	11,967	49.2	No	**-2.73**	104.0	3.01	92.56	12.34	4.80	0.00	0.00	109.70	0.00
81	16,077	16,078	69.3	No	**-7.23**	104.0	3.01	95.12	14.27	4.80	0.00	0.00	114.20	0.00
82	14,436	14,436	41.0	No	**-5.57**	104.0	3.01	94.19	13.55	4.80	0.00	0.00	112.54	0.00
83	8,733	8,733	50.0	No	**1.92**	104.0	3.01	89.82	10.43	4.80	0.00	0.00	105.06	0.00
85	14,597	14,597	41.2	No	**-5.74**	104.0	3.01	94.29	13.63	4.80	0.00	0.00	112.71	0.00
86	12,045	12,045	46.7	No	**-2.83**	104.0	3.01	92.62	12.38	4.80	0.00	0.00	109.80	0.00
87	7,935	7,935	45.2	No	**3.29**	104.0	3.01	88.99	9.89	4.80	0.00	0.00	103.68	0.00
89	8,214	8,214	50.9	Yes	**3.01**	104.0	3.01	89.29	10.08	4.59	0.00	0.00	103.96	0.00
90	11,228	11,228	46.0	No	**-1.78**	104.0	3.01	92.01	11.94	4.80	0.00	0.00	108.75	0.00
91	9,505	9,505	47.9	No	**0.68**	104.0	3.01	90.56	10.93	4.80	0.00	0.00	106.29	0.00
92	7,024	7,024	47.0	Yes	**5.25**	104.0	3.01	87.93	9.22	4.57	0.00	0.00	101.72	0.00
94	15,943	15,944	73.8	No	**-7.10**	104.0	3.01	95.05	14.22	4.80	0.00	0.00	114.07	0.00
95	17,060	17,060	61.0	No	**-8.15**	104.0	3.01	95.64	14.68	4.80	0.00	0.00	115.12	0.00
97	14,659	14,660	79.0	No	**-5.80**	104.0	3.01	94.32	13.65	4.80	0.00	0.00	112.78	0.00
98	16,362	16,362	70.3	No	**-7.50**	104.0	3.01	95.28	14.39	4.80	0.00	0.00	114.47	0.00
99	17,285	17,285	45.3	No	**-8.35**	104.0	3.01	95.75	14.77	4.80	0.00	0.00	115.32	0.00
100	11,894	11,894	63.9	No	**-2.64**	104.0	3.01	92.51	12.30	4.80	0.00	0.00	109.61	0.00
101	16,385	16,385	67.2	No	**-7.52**	104.0	3.01	95.29	14.40	4.80	0.00	0.00	114.49	0.00
102	12,188	12,189	76.0	No	**-3.00**	104.0	3.01	92.72	12.46	4.80	0.00	0.00	109.98	0.00
103	17,155	17,155	65.6	No	**-8.23**	104.0	3.01	95.69	14.72	4.80	0.00	0.00	115.21	0.00
104	12,732	12,733	60.1	No	**-3.66**	104.0	3.01	93.10	12.74	4.80	0.00	0.00	110.63	0.00
107	15,292	15,292	68.6	No	**-6.45**	104.0	3.01	94.69	13.94	4.80	0.00	0.00	113.43	0.00
108	17,979	17,979	40.9	No	**-8.97**	104.0	3.01	96.10	15.04	4.80	0.00	0.00	115.94	0.00
109	12,611	12,611	46.2	No	**-3.52**	104.0	3.01	93.02	12.67	4.80	0.00	0.00	110.49	0.00
110	12,600	12,600	41.1	No	**-3.50**	104.0	3.01	93.01	12.67	4.80	0.00	0.00	110.48	0.00
111	12,264	12,264	43.9	No	**-3.10**	104.0	3.01	92.77	12.50	4.80	0.00	0.00	110.07	0.00
113	15,574	15,574	67.9	No	**-6.73**	104.0	3.01	94.85	14.06	4.80	0.00	0.00	113.71	0.00
114	14,448	14,448	41.5	No	**-5.58**	104.0	3.01	94.20	13.56	4.80	0.00	0.00	112.55	0.00
115	17,382	17,382	45.7	No	**-8.44**	104.0	3.01	95.80	14.81	4.80	0.00	0.00	115.41	0.00
116	12,992	12,993	73.8	No	**-3.97**	104.0	3.01	93.27	12.87	4.80	0.00	0.00	110.94	0.00
118	12,495	12,495	46.6	No	**-3.38**	104.0	3.01	92.93	12.62	4.80	0.00	0.00	110.35	0.00
119	15,405	15,406	63.2	No	**-6.57**	104.0	3.01	94.75	13.99	4.80	0.00	0.00	113.54	0.00
120	16,609	16,609	63.6	No	**-7.73**	104.0	3.01	95.41	14.50	4.80	0.00	0.00	114.70	0.00
121	14,816	14,816	68.3	No	**-5.97**	104.0	3.01	94.41	13.73	4.80	0.00	0.00	112.94	0.00
125	8,772	8,772	50.3	No	**1.85**	104.0	3.01	89.86	10.46	4.80	0.00	0.00	105.12	0.00
126	11,036	11,036	59.2	No	**-1.52**	104.0	3.01	91.86	11.84	4.80	0.00	0.00	108.49	0.00
127	10,989	10,989	58.5	No	**-1.46**	104.0	3.01	91.82	11.81	4.80	0.00	0.00	108.43	0.00
128	11,085	11,085	57.1	No	**-1.59**	104.0	3.01	91.89	11.86	4.80	0.00	0.00	108.56	0.00
129	13,056	13,056	49.6	No	**-4.04**	104.0	3.01	93.32	12.90	4.80	0.00	0.00	111.01	0.00
130	12,525	12,525	48.1	No	**-3.41**	104.0	3.01	92.96	12.63	4.80	0.00	0.00	110.39	0.00
131	12,735	12,735	46.1	No	**-3.66**	104.0	3.01	93.10	12.74	4.80	0.00	0.00	110.64	0.00
132	13,073	13,073	46.7	No	**-4.06**	104.0	3.01	93.33	12.90	4.80	0.00	0.00	111.03	0.00
133	12,678	12,678	49.5	No	**-3.60**	104.0	3.01	93.06	12.71	4.80	0.00	0.00	110.57	0.00
134	15,357	15,358	51.3	No	**-6.52**	104.0	3.01	94.73	13.96	4.80	0.00	0.00	113.49	0.00
141	14,699	14,700	78.1	No	**-5.85**	104.0	3.01	94.35	13.67	4.80	0.00	0.00	112.82	0.00
142	12,359	12,360	78.9	No	**-3.21**	104.0	3.01	92.84	12.55	4.80	0.00	0.00	110.19	0.00
143	14,949	14,949	78.0	No	**-6.10**	104.0	3.01	94.49	13.78	4.80	0.00	0.00	113.08	0.00
144	11,509	11,509	65.6	No	**-2.14**	104.0	3.01	92.22	12.10	4.80	0.00	0.00	109.12	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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US-GRAND FORKS, ND 58201
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
145	11,312	11,312	47.8	No	**-1.89**	104.0	3.01	92.07	11.99	4.80	0.00	0.00	108.86	0.00
146	11,464	11,464	47.2	No	**-2.09**	104.0	3.01	92.19	12.07	4.80	0.00	0.00	109.06	0.00
Sum	17.84													

Noise sensitive area: H52 H52

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	12,330	12,331	38.1	No	**-3.18**	104.0	3.01	92.82	12.53	4.80	0.00	0.00	110.15	0.00
2	12,607	12,607	31.8	No	**-3.51**	104.0	3.01	93.01	12.67	4.80	0.00	0.00	110.48	0.00
3	12,432	12,433	34.0	No	**-3.30**	104.0	3.01	92.89	12.58	4.80	0.00	0.00	110.27	0.00
4	12,732	12,733	21.2	No	**-3.66**	104.0	3.01	93.10	12.74	4.80	0.00	0.00	110.63	0.00
5	12,005	12,005	25.1	No	**-2.78**	104.0	3.01	92.59	12.36	4.80	0.00	0.00	109.75	0.00
6	11,993	11,994	35.2	No	**-2.76**	104.0	3.01	92.58	12.36	4.80	0.00	0.00	109.73	0.00
7	10,108	10,109	49.3	No	**-0.22**	104.0	3.01	91.09	11.30	4.80	0.00	0.00	107.19	0.00
8	12,691	12,691	33.5	No	**-3.61**	104.0	3.01	93.07	12.71	4.80	0.00	0.00	110.58	0.00
9	11,880	11,881	42.4	No	**-2.62**	104.0	3.01	92.50	12.30	4.80	0.00	0.00	109.59	0.00
10	11,305	11,306	57.3	No	**-1.88**	104.0	3.01	92.07	11.98	4.80	0.00	0.00	108.85	0.00
11	11,574	11,575	64.5	Yes	**-2.04**	104.0	3.01	92.27	12.13	4.61	0.00	0.00	109.01	0.00
12	11,551	11,552	62.8	No	**-2.20**	104.0	3.01	92.25	12.12	4.80	0.00	0.00	109.17	0.00
13	11,211	11,212	67.9	Yes	**-1.55**	104.0	3.01	91.99	11.93	4.59	0.00	0.00	108.52	0.00
14	10,866	10,868	68.8	Yes	**-1.08**	104.0	3.01	91.72	11.74	4.58	0.00	0.00	108.05	0.00
15	10,613	10,615	63.4	Yes	**-0.74**	104.0	3.01	91.52	11.60	4.60	0.00	0.00	107.71	0.00
16	10,665	10,666	55.6	No	**-1.01**	104.0	3.01	91.56	11.63	4.80	0.00	0.00	107.99	0.00
17	11,677	11,678	64.1	Yes	**-2.18**	104.0	3.01	92.35	12.19	4.61	0.00	0.00	109.15	0.00
18	11,545	11,546	61.9	Yes	**-2.01**	104.0	3.01	92.25	12.12	4.62	0.00	0.00	108.98	0.00
19	10,789	10,790	64.5	Yes	**-0.98**	104.0	3.01	91.66	11.70	4.60	0.00	0.00	107.95	0.00
20	10,135	10,136	58.1	No	**-0.26**	104.0	3.01	91.12	11.31	4.80	0.00	0.00	107.23	0.00
21	12,003	12,003	30.2	No	**-2.77**	104.0	3.01	92.59	12.36	4.80	0.00	0.00	109.75	0.00
22	12,333	12,333	24.4	No	**-3.18**	104.0	3.01	92.82	12.53	4.80	0.00	0.00	110.15	0.00
23	12,237	12,237	26.7	No	**-3.06**	104.0	3.01	92.75	12.48	4.80	0.00	0.00	110.04	0.00
24	12,415	12,415	23.9	No	**-3.28**	104.0	3.01	92.88	12.57	4.80	0.00	0.00	110.25	0.00
25	10,706	10,707	24.5	No	**-1.07**	104.0	3.01	91.59	11.65	4.80	0.00	0.00	108.04	0.00
26	11,039	11,040	33.5	No	**-1.52**	104.0	3.01	91.86	11.84	4.80	0.00	0.00	108.50	0.00
27	10,256	10,256	29.3	No	**-0.43**	104.0	3.01	91.22	11.39	4.80	0.00	0.00	107.41	0.00
28	9,609	9,610	47.3	Yes	**0.69**	104.0	3.01	90.65	11.00	4.63	0.00	0.00	106.28	0.00
29	11,616	11,616	26.8	No	**-2.28**	104.0	3.01	92.30	12.15	4.80	0.00	0.00	109.26	0.00
30	12,077	12,077	21.6	No	**-2.87**	104.0	3.01	92.64	12.40	4.80	0.00	0.00	109.84	0.00
31	13,043	13,043	26.5	No	**-4.03**	104.0	3.01	93.31	12.89	4.80	0.00	0.00	111.00	0.00
32	11,112	11,112	25.1	No	**-1.62**	104.0	3.01	91.92	11.88	4.80	0.00	0.00	108.59	0.00
33	11,904	11,904	22.0	No	**-2.65**	104.0	3.01	92.51	12.31	4.80	0.00	0.00	109.62	0.00
34	10,018	10,019	46.0	No	**-0.09**	104.0	3.01	91.02	11.25	4.80	0.00	0.00	107.06	0.00
35	10,229	10,230	48.4	No	**-0.40**	104.0	3.01	91.20	11.37	4.80	0.00	0.00	107.37	0.00
36	10,363	10,364	48.7	No	**-0.59**	104.0	3.01	91.31	11.45	4.80	0.00	0.00	107.56	0.00
37	9,908	9,909	45.0	No	**0.07**	104.0	3.01	90.92	11.18	4.80	0.00	0.00	106.90	0.00
38	10,406	10,406	25.3	No	**-0.65**	104.0	3.01	91.35	11.47	4.80	0.00	0.00	107.62	0.00
39	9,523	9,524	41.3	No	**0.65**	104.0	3.01	90.58	10.94	4.80	0.00	0.00	106.32	0.00
40	7,904	7,905	39.9	No	**3.35**	104.0	3.01	88.96	9.87	4.80	0.00	0.00	103.62	0.00
41	9,182	9,183	52.0	Yes	**1.38**	104.0	3.01	90.26	10.73	4.61	0.00	0.00	105.59	0.00
43	9,476	9,477	52.4	Yes	**0.91**	104.0	3.01	90.53	10.91	4.61	0.00	0.00	106.06	0.00
44	8,712	8,713	62.4	Yes	**2.19**	104.0	3.01	89.80	10.42	4.56	0.00	0.00	104.78	0.00
45	8,739	8,740	58.5	No	**1.90**	104.0	3.01	89.83	10.44	4.80	0.00	0.00	105.07	0.00
46	8,457	8,457	46.3	No	**2.38**	104.0	3.01	89.54	10.25	4.80	0.00	0.00	104.59	0.00
48	10,734	10,734	26.4	No	**-1.11**	104.0	3.01	91.62	11.66	4.80	0.00	0.00	108.08	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
49	11,841	11,842	25.4	No	**-2.57**	104.0	3.01	92.47	12.27	4.80	0.00	0.00	109.54	0.00
50	11,075	11,076	38.9	No	**-1.57**	104.0	3.01	91.89	11.86	4.80	0.00	0.00	108.54	0.00
51	11,851	11,851	23.6	No	**-2.58**	104.0	3.01	92.48	12.28	4.80	0.00	0.00	109.55	0.00
52	11,891	11,891	22.3	No	**-2.63**	104.0	3.01	92.50	12.30	4.80	0.00	0.00	109.61	0.00
53	11,836	11,836	27.7	No	**-2.56**	104.0	3.01	92.46	12.27	4.80	0.00	0.00	109.54	0.00
55	11,860	11,860	26.4	No	**-2.59**	104.0	3.01	92.48	12.28	4.80	0.00	0.00	109.57	0.00
56	11,907	11,907	29.2	No	**-2.65**	104.0	3.01	92.52	12.31	4.80	0.00	0.00	109.63	0.00
57	11,145	11,145	26.6	No	**-1.67**	104.0	3.01	91.94	11.90	4.80	0.00	0.00	108.64	0.00
58	11,275	11,275	21.0	No	**-1.84**	104.0	3.01	92.04	11.97	4.80	0.00	0.00	108.81	0.00
59	11,954	11,954	31.1	No	**-2.71**	104.0	3.01	92.55	12.33	4.80	0.00	0.00	109.68	0.00
60	11,906	11,906	34.6	No	**-2.65**	104.0	3.01	92.52	12.31	4.80	0.00	0.00	109.62	0.00
61	12,012	12,012	32.4	No	**-2.78**	104.0	3.01	92.59	12.36	4.80	0.00	0.00	109.76	0.00
62	9,995	9,996	35.7	No	**-0.05**	104.0	3.01	91.00	11.23	4.80	0.00	0.00	107.03	0.00
63	9,147	9,148	40.7	No	**1.24**	104.0	3.01	90.23	10.70	4.80	0.00	0.00	105.73	0.00
64	9,179	9,180	40.2	Yes	**1.34**	104.0	3.01	90.26	10.72	4.65	0.00	0.00	105.63	0.00
65	9,629	9,630	40.6	Yes	**0.64**	104.0	3.01	90.67	11.01	4.66	0.00	0.00	106.34	0.00
66	7,900	7,901	36.5	No	**3.36**	104.0	3.01	88.95	9.86	4.80	0.00	0.00	103.62	0.00
67	9,998	9,999	38.7	Yes	**0.07**	104.0	3.01	91.00	11.23	4.67	0.00	0.00	106.90	0.00
68	10,226	10,227	35.0	Yes	**-0.28**	104.0	3.01	91.19	11.37	4.68	0.00	0.00	107.25	0.00
69	9,388	9,389	41.1	Yes	**1.01**	104.0	3.01	90.45	10.86	4.65	0.00	0.00	105.96	0.00
70	9,996	9,997	44.2	No	**-0.06**	104.0	3.01	91.00	11.23	4.80	0.00	0.00	107.03	0.00
71	11,227	11,228	52.3	No	**-1.78**	104.0	3.01	92.01	11.94	4.80	0.00	0.00	108.75	0.00
72	12,846	12,847	21.4	No	**-3.80**	104.0	3.01	93.18	12.79	4.80	0.00	0.00	110.77	0.00
73	11,859	11,860	31.5	No	**-2.59**	104.0	3.01	92.48	12.28	4.80	0.00	0.00	109.57	0.00
74	10,887	10,888	40.9	No	**-1.32**	104.0	3.01	91.74	11.75	4.80	0.00	0.00	108.29	0.00
75	11,113	11,113	26.4	No	**-1.62**	104.0	3.01	91.92	11.88	4.80	0.00	0.00	108.59	0.00
76	10,593	10,593	29.7	No	**-0.91**	104.0	3.01	91.50	11.58	4.80	0.00	0.00	107.88	0.00
77	11,304	11,304	24.8	No	**-1.88**	104.0	3.01	92.06	11.98	4.80	0.00	0.00	108.85	0.00
78	9,814	9,815	50.1	No	**0.21**	104.0	3.01	90.84	11.12	4.80	0.00	0.00	106.76	0.00
80	11,724	11,724	35.8	No	**-2.42**	104.0	3.01	92.38	12.21	4.80	0.00	0.00	109.39	0.00
81	10,855	10,856	64.4	Yes	**-1.07**	104.0	3.01	91.71	11.73	4.60	0.00	0.00	108.05	0.00
82	11,811	11,811	21.8	No	**-2.53**	104.0	3.01	92.45	12.26	4.80	0.00	0.00	109.50	0.00
83	9,489	9,490	39.7	Yes	**0.85**	104.0	3.01	90.55	10.92	4.66	0.00	0.00	106.12	0.00
85	12,696	12,696	26.5	No	**-3.62**	104.0	3.01	93.07	12.72	4.80	0.00	0.00	110.59	0.00
86	11,640	11,641	33.1	No	**-2.31**	104.0	3.01	92.32	12.17	4.80	0.00	0.00	109.29	0.00
87	9,807	9,807	39.2	Yes	**0.36**	104.0	3.01	90.83	11.12	4.66	0.00	0.00	106.61	0.00
89	9,139	9,139	41.4	Yes	**1.41**	104.0	3.01	90.22	10.70	4.65	0.00	0.00	105.56	0.00
90	10,425	10,425	32.6	No	**-0.67**	104.0	3.01	91.36	11.49	4.80	0.00	0.00	107.65	0.00
91	9,609	9,609	37.3	No	**0.52**	104.0	3.01	90.65	10.99	4.80	0.00	0.00	106.45	0.00
92	8,573	8,574	39.8	Yes	**2.34**	104.0	3.01	89.66	10.33	4.64	0.00	0.00	104.63	0.00
94	11,080	11,081	64.1	No	**-1.58**	104.0	3.01	91.89	11.86	4.80	0.00	0.00	108.55	0.00
95	12,013	12,014	52.0	No	**-2.79**	104.0	3.01	92.59	12.37	4.80	0.00	0.00	109.76	0.00
97	10,090	10,091	62.8	Yes	**0.02**	104.0	3.01	91.08	11.29	4.59	0.00	0.00	106.96	0.00
98	11,426	11,427	60.3	No	**-2.04**	104.0	3.01	92.16	12.05	4.80	0.00	0.00	109.01	0.00
99	12,983	12,983	26.7	No	**-3.96**	104.0	3.01	93.27	12.86	4.80	0.00	0.00	110.93	0.00
100	9,073	9,074	47.9	No	**1.36**	104.0	3.01	90.16	10.66	4.80	0.00	0.00	105.61	0.00
101	11,064	11,065	64.0	Yes	**-1.36**	104.0	3.01	91.88	11.85	4.60	0.00	0.00	108.33	0.00
102	8,876	8,877	63.5	Yes	**1.92**	104.0	3.01	89.97	10.53	4.56	0.00	0.00	105.05	0.00
103	11,712	11,713	60.0	Yes	**-2.23**	104.0	3.01	92.37	12.21	4.63	0.00	0.00	109.20	0.00
104	9,406	9,407	47.6	Yes	**1.01**	104.0	3.01	90.47	10.87	4.63	0.00	0.00	105.97	0.00
107	10,286	10,287	62.4	No	**-0.48**	104.0	3.01	91.25	11.40	4.80	0.00	0.00	107.45	0.00
108	13,795	13,796	20.1	No	**-4.88**	104.0	3.01	93.79	13.25	4.80	0.00	0.00	111.85	0.00
109	11,975	11,975	32.8	No	**-2.74**	104.0	3.01	92.57	12.35	4.80	0.00	0.00	109.71	0.00
110	10,577	10,577	26.6	No	**-0.89**	104.0	3.01	91.49	11.57	4.80	0.00	0.00	107.86	0.00
111	10,576	10,576	30.4	No	**-0.89**	104.0	3.01	91.49	11.57	4.80	0.00	0.00	107.86	0.00

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Project:
20102130 - Merricourt ND Enxco

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Description:
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Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
113	10,495	10,496	62.2	No	**-0.77**	104.0	3.01	91.42	11.53	4.80	0.00	0.00	107.75	0.00
114	12,683	12,683	26.0	No	**-3.60**	104.0	3.01	93.06	12.71	4.80	0.00	0.00	110.58	0.00
115	12,596	12,596	33.7	No	**-3.50**	104.0	3.01	93.00	12.67	4.80	0.00	0.00	110.47	0.00
116	9,075	9,076	57.9	Yes	**1.57**	104.0	3.01	90.16	10.66	4.58	0.00	0.00	105.40	0.00
118	12,119	12,119	32.9	No	**-2.92**	104.0	3.01	92.67	12.42	4.80	0.00	0.00	109.89	0.00
119	11,053	11,054	44.9	No	**-1.54**	104.0	3.01	91.87	11.85	4.80	0.00	0.00	108.52	0.00
120	11,177	11,178	58.8	Yes	**-1.53**	104.0	3.01	91.97	11.91	4.62	0.00	0.00	108.50	0.00
121	10,482	10,483	49.3	No	**-0.76**	104.0	3.01	91.41	11.52	4.80	0.00	0.00	107.73	0.00
125	9,319	9,320	39.2	No	**0.97**	104.0	3.01	90.39	10.81	4.80	0.00	0.00	106.00	0.00
126	8,987	8,988	45.2	No	**1.50**	104.0	3.01	90.07	10.60	4.80	0.00	0.00	105.47	0.00
127	9,093	9,094	45.8	No	**1.33**	104.0	3.01	90.17	10.67	4.80	0.00	0.00	105.64	0.00
128	9,333	9,334	44.6	No	**0.95**	104.0	3.01	90.40	10.82	4.80	0.00	0.00	106.02	0.00
129	8,239	8,239	40.8	No	**2.75**	104.0	3.01	89.32	10.10	4.80	0.00	0.00	104.22	0.00
130	7,608	7,608	42.5	No	**3.89**	104.0	3.01	88.63	9.65	4.80	0.00	0.00	103.08	0.00
131	7,628	7,629	45.9	No	**3.86**	104.0	3.01	88.65	9.67	4.80	0.00	0.00	103.12	0.00
132	7,841	7,842	46.0	No	**3.46**	104.0	3.01	88.89	9.82	4.80	0.00	0.00	103.51	0.00
133	9,868	9,868	31.1	No	**0.13**	104.0	3.01	90.88	11.15	4.80	0.00	0.00	106.84	0.00
134	10,173	10,173	47.2	No	**-0.31**	104.0	3.01	91.15	11.34	4.80	0.00	0.00	107.29	0.00
141	10,221	10,222	61.0	No	**-0.38**	104.0	3.01	91.19	11.37	4.80	0.00	0.00	107.36	0.00
142	8,900	8,901	67.2	Yes	**1.90**	104.0	3.01	89.99	10.54	4.54	0.00	0.00	105.08	0.00
143	10,255	10,256	64.3	Yes	**-0.22**	104.0	3.01	91.22	11.39	4.59	0.00	0.00	107.19	0.00
144	8,670	8,670	50.6	No	**2.02**	104.0	3.01	89.76	10.39	4.80	0.00	0.00	104.95	0.00
145	10,224	10,225	34.5	No	**-0.39**	104.0	3.01	91.19	11.37	4.80	0.00	0.00	107.36	0.00
146	10,185	10,185	34.2	No	**-0.33**	104.0	3.01	91.16	11.34	4.80	0.00	0.00	107.30	0.00

Sum 20.51

Noise sensitive area: H53 H53

WTG — **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	3,916	3,918	60.9	Yes	**13.44**	104.0	3.01	82.86	6.40	4.27	0.00	0.00	93.53	0.00
2	3,700	3,702	58.0	Yes	**14.17**	104.0	3.01	82.37	6.17	4.26	0.00	0.00	92.80	0.00
3	4,039	4,041	60.5	Yes	**13.02**	104.0	3.01	83.13	6.53	4.29	0.00	0.00	93.95	0.00
4	4,742	4,743	44.3	Yes	**10.72**	104.0	3.01	84.52	7.25	4.48	0.00	0.00	96.25	0.00
5	5,020	5,021	48.9	Yes	**9.97**	104.0	3.01	85.02	7.51	4.47	0.00	0.00	97.00	0.00
6	4,596	4,598	59.1	Yes	**11.25**	104.0	3.01	84.25	7.11	4.36	0.00	0.00	95.72	0.00
7	6,771	6,772	54.1	Yes	**5.81**	104.0	3.01	87.61	9.02	4.53	0.00	0.00	101.16	0.00
8	3,568	3,569	56.7	Yes	**14.65**	104.0	3.01	82.05	6.02	4.26	0.00	0.00	92.33	0.00
9	4,395	4,397	61.0	Yes	**11.88**	104.0	3.01	83.86	6.90	4.33	0.00	0.00	95.09	0.00
10	4,943	4,945	67.2	Yes	**10.31**	104.0	3.01	84.88	7.44	4.34	0.00	0.00	96.66	0.00
11	4,950	4,952	63.4	Yes	**10.26**	104.0	3.01	84.90	7.45	4.36	0.00	0.00	96.71	0.00
12	4,887	4,889	63.6	Yes	**10.44**	104.0	3.01	84.79	7.39	4.36	0.00	0.00	96.53	0.00
13	5,117	5,119	68.5	Yes	**9.84**	104.0	3.01	85.18	7.61	4.34	0.00	0.00	97.13	0.00
14	5,408	5,410	67.0	Yes	**9.06**	104.0	3.01	85.66	7.87	4.38	0.00	0.00	97.92	0.00
15	5,637	5,639	62.8	Yes	**8.45**	104.0	3.01	86.02	8.08	4.42	0.00	0.00	98.52	0.00
16	5,642	5,644	59.8	Yes	**8.42**	104.0	3.01	86.03	8.08	4.44	0.00	0.00	98.55	0.00
17	4,947	4,949	62.4	Yes	**10.26**	104.0	3.01	84.89	7.45	4.37	0.00	0.00	96.71	0.00
18	5,215	5,217	58.1	Yes	**9.51**	104.0	3.01	85.35	7.70	4.42	0.00	0.00	97.47	0.00
19	5,555	5,557	56.8	Yes	**8.62**	104.0	3.01	85.90	8.01	4.45	0.00	0.00	98.35	0.00
20	6,104	6,106	50.3	Yes	**7.26**	104.0	3.01	86.71	8.48	4.52	0.00	0.00	99.71	0.00
21	5,440	5,441	49.6	Yes	**8.87**	104.0	3.01	85.71	7.90	4.49	0.00	0.00	98.10	0.00
22	5,841	5,841	44.7	Yes	**7.85**	104.0	3.01	86.33	8.25	4.54	0.00	0.00	99.12	0.00
23	6,210	6,210	46.0	Yes	**7.00**	104.0	3.01	86.86	8.57	4.55	0.00	0.00	99.98	0.00
24	5,600	5,601	44.4	Yes	**8.43**	104.0	3.01	85.96	8.04	4.53	0.00	0.00	98.54	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
25	8,424	8,424	41.0	Yes	**2.60**	104.0	3.01	89.51	10.23	4.63	0.00	0.00	104.37	0.00
26	6,123	6,124	50.2	Yes	**7.22**	104.0	3.01	86.74	8.49	4.52	0.00	0.00	99.76	0.00
27	8,047	8,048	41.8	Yes	**3.27**	104.0	3.01	89.11	9.97	4.62	0.00	0.00	103.70	0.00
28	7,900	7,900	50.3	Yes	**3.57**	104.0	3.01	88.95	9.86	4.58	0.00	0.00	103.40	0.00
29	6,557	6,558	43.2	Yes	**6.21**	104.0	3.01	87.33	8.85	4.58	0.00	0.00	100.76	0.00
30	6,668	6,668	39.9	Yes	**5.96**	104.0	3.01	87.48	8.94	4.60	0.00	0.00	101.01	0.00
31	5,839	5,840	46.2	Yes	**7.86**	104.0	3.01	86.33	8.25	4.53	0.00	0.00	99.11	0.00
32	8,521	8,521	42.5	Yes	**2.44**	104.0	3.01	89.61	10.29	4.63	0.00	0.00	104.53	0.00
33	7,282	7,283	40.0	Yes	**4.70**	104.0	3.01	88.25	9.41	4.61	0.00	0.00	102.27	0.00
34	7,028	7,029	50.3	Yes	**5.26**	104.0	3.01	87.94	9.22	4.56	0.00	0.00	101.71	0.00
35	6,525	6,526	55.0	Yes	**6.34**	104.0	3.01	87.29	8.82	4.51	0.00	0.00	100.63	0.00
36	6,276	6,277	55.7	Yes	**6.90**	104.0	3.01	86.96	8.62	4.50	0.00	0.00	100.07	0.00
37	7,301	7,302	49.8	Yes	**4.71**	104.0	3.01	88.27	9.43	4.57	0.00	0.00	102.26	0.00
38	8,312	8,312	40.9	Yes	**2.80**	104.0	3.01	89.39	10.15	4.63	0.00	0.00	104.18	0.00
39	8,672	8,673	49.7	Yes	**2.21**	104.0	3.01	89.76	10.39	4.60	0.00	0.00	104.76	0.00
40	9,006	9,007	25.0	No	**1.47**	104.0	3.01	90.09	10.61	4.80	0.00	0.00	105.50	0.00
41	8,838	8,839	55.2	Yes	**1.95**	104.0	3.01	89.93	10.50	4.59	0.00	0.00	105.02	0.00
43	7,857	7,859	52.0	Yes	**3.66**	104.0	3.01	88.91	9.83	4.57	0.00	0.00	103.31	0.00
44	9,173	9,174	55.6	Yes	**1.41**	104.0	3.01	90.25	10.72	4.59	0.00	0.00	105.57	0.00
45	9,393	9,394	54.7	Yes	**1.05**	104.0	3.01	90.46	10.86	4.60	0.00	0.00	105.92	0.00
46	8,665	8,666	30.4	Yes	**2.15**	104.0	3.01	89.76	10.39	4.68	0.00	0.00	104.83	0.00
48	9,296	9,296	41.9	Yes	**1.16**	104.0	3.01	90.37	10.80	4.65	0.00	0.00	105.81	0.00
49	9,084	9,084	41.7	Yes	**1.50**	104.0	3.01	90.17	10.66	4.64	0.00	0.00	105.47	0.00
50	5,638	5,639	54.8	Yes	**8.40**	104.0	3.01	86.02	8.08	4.47	0.00	0.00	98.57	0.00
51	8,616	8,616	39.8	Yes	**2.27**	104.0	3.01	89.71	10.36	4.64	0.00	0.00	104.70	0.00
52	8,302	8,303	39.5	Yes	**2.81**	104.0	3.01	89.38	10.14	4.64	0.00	0.00	104.17	0.00
53	9,414	9,414	44.6	Yes	**0.99**	104.0	3.01	90.48	10.87	4.64	0.00	0.00	105.99	0.00
55	10,897	10,897	42.4	Yes	**-1.20**	104.0	3.01	91.75	11.76	4.67	0.00	0.00	108.17	0.00
56	11,202	11,202	45.0	Yes	**-1.60**	104.0	3.01	91.99	11.93	4.66	0.00	0.00	108.58	0.00
57	11,293	11,294	43.8	Yes	**-1.73**	104.0	3.01	92.06	11.98	4.67	0.00	0.00	108.70	0.00
58	7,813	7,813	38.6	Yes	**3.68**	104.0	3.01	88.86	9.80	4.63	0.00	0.00	103.29	0.00
59	11,511	11,512	46.6	Yes	**-2.01**	104.0	3.01	92.22	12.10	4.66	0.00	0.00	108.98	0.00
60	12,995	12,995	49.6	Yes	**-3.84**	104.0	3.01	93.28	12.87	4.67	0.00	0.00	110.81	0.00
61	13,349	13,349	46.1	Yes	**-4.26**	104.0	3.01	93.51	13.04	4.68	0.00	0.00	111.23	0.00
62	13,459	13,460	45.6	Yes	**-4.39**	104.0	3.01	93.58	13.09	4.68	0.00	0.00	111.36	0.00
63	14,156	14,157	45.7	Yes	**-5.16**	104.0	3.01	94.02	13.42	4.69	0.00	0.00	112.13	0.00
64	15,550	15,551	42.7	Yes	**-6.62**	104.0	3.01	94.83	14.05	4.71	0.00	0.00	113.59	0.00
65	16,096	16,097	43.6	Yes	**-7.15**	104.0	3.01	95.13	14.28	4.71	0.00	0.00	114.12	0.00
66	8,850	8,850	22.7	No	**1.72**	104.0	3.01	89.94	10.51	4.80	0.00	0.00	105.25	0.00
67	15,361	15,361	45.0	Yes	**-6.42**	104.0	3.01	94.73	13.97	4.70	0.00	0.00	113.40	0.00
68	15,896	15,896	42.0	Yes	**-6.96**	104.0	3.01	95.03	14.20	4.71	0.00	0.00	113.93	0.00
69	16,058	16,058	42.5	Yes	**-7.12**	104.0	3.01	95.11	14.27	4.71	0.00	0.00	114.09	0.00
70	6,389	6,390	30.8	Yes	**6.51**	104.0	3.01	87.11	8.71	4.64	0.00	0.00	100.46	0.00
71	5,055	5,057	62.8	Yes	**9.97**	104.0	3.01	85.08	7.55	4.38	0.00	0.00	97.00	0.00
72	4,391	4,392	46.5	Yes	**11.78**	104.0	3.01	83.85	6.90	4.44	0.00	0.00	95.19	0.00
73	4,863	4,864	53.6	Yes	**10.44**	104.0	3.01	84.74	7.37	4.42	0.00	0.00	96.53	0.00
74	5,933	5,935	55.8	Yes	**7.69**	104.0	3.01	86.47	8.33	4.48	0.00	0.00	99.28	0.00
75	6,540	6,541	42.2	Yes	**6.24**	104.0	3.01	87.31	8.84	4.58	0.00	0.00	100.73	0.00
76	10,729	10,729	46.3	Yes	**-0.95**	104.0	3.01	91.61	11.66	4.65	0.00	0.00	107.93	0.00
77	9,897	9,897	41.7	Yes	**0.23**	104.0	3.01	90.91	11.17	4.66	0.00	0.00	106.74	0.00
78	6,438	6,439	39.7	Yes	**6.45**	104.0	3.01	87.18	8.75	4.59	0.00	0.00	100.52	0.00
80	12,624	12,624	51.7	Yes	**-3.39**	104.0	3.01	93.02	12.68	4.66	0.00	0.00	110.37	0.00
81	5,566	5,568	55.3	Yes	**8.58**	104.0	3.01	85.91	8.02	4.46	0.00	0.00	98.39	0.00
82	7,860	7,861	40.5	Yes	**3.60**	104.0	3.01	88.91	9.83	4.62	0.00	0.00	103.37	0.00
83	14,735	14,735	44.6	Yes	**-5.78**	104.0	3.01	94.37	13.69	4.70	0.00	0.00	112.75	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

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Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
85	9,027	9,027	42.2	Yes	**1.59**	104.0	3.01	90.11	10.63	4.64	0.00	0.00	105.38	0.00
86	12,339	12,339	49.9	Yes	**-3.05**	104.0	3.01	92.83	12.54	4.66	0.00	0.00	110.02	0.00
87	16,300	16,300	42.6	Yes	**-7.35**	104.0	3.01	95.24	14.37	4.71	0.00	0.00	114.32	0.00
89	15,057	15,058	43.9	Yes	**-6.12**	104.0	3.01	94.56	13.83	4.70	0.00	0.00	113.09	0.00
90	11,968	11,968	48.0	Yes	**-2.59**	104.0	3.01	92.56	12.34	4.66	0.00	0.00	109.57	0.00
91	13,722	13,722	45.0	Yes	**-4.68**	104.0	3.01	93.75	13.22	4.69	0.00	0.00	111.66	0.00
92	16,021	16,021	38.3	Yes	**-7.09**	104.0	3.01	95.09	14.25	4.72	0.00	0.00	114.06	0.00
94	5,160	5,162	68.5	Yes	**9.72**	104.0	3.01	85.26	7.65	4.35	0.00	0.00	97.25	0.00
95	4,339	4,341	62.5	Yes	**12.06**	104.0	3.01	83.75	6.85	4.31	0.00	0.00	94.91	0.00
97	6,251	6,253	59.8	Yes	**6.97**	104.0	3.01	86.92	8.60	4.47	0.00	0.00	100.00	0.00
98	4,832	4,834	70.0	Yes	**10.64**	104.0	3.01	84.69	7.34	4.31	0.00	0.00	96.33	0.00
99	3,606	3,608	55.9	Yes	**14.50**	104.0	3.01	82.14	6.06	4.27	0.00	0.00	92.48	0.00
100	9,397	9,397	51.3	Yes	**1.04**	104.0	3.01	90.46	10.86	4.61	0.00	0.00	105.94	0.00
101	5,505	5,507	53.8	Yes	**8.73**	104.0	3.01	85.82	7.96	4.47	0.00	0.00	98.24	0.00
102	8,846	8,847	57.5	Yes	**1.95**	104.0	3.01	89.94	10.51	4.58	0.00	0.00	105.02	0.00
103	5,208	5,210	58.7	Yes	**9.53**	104.0	3.01	85.34	7.69	4.42	0.00	0.00	97.44	0.00
104	8,359	8,360	50.9	Yes	**2.75**	104.0	3.01	89.44	10.18	4.59	0.00	0.00	104.22	0.00
107	5,969	5,970	54.5	Yes	**7.60**	104.0	3.01	86.52	8.36	4.49	0.00	0.00	99.37	0.00
108	3,067	3,068	48.5	Yes	**16.54**	104.0	3.01	80.74	5.43	4.26	0.00	0.00	90.43	0.00
109	11,829	11,830	48.0	Yes	**-2.42**	104.0	3.01	92.46	12.27	4.66	0.00	0.00	109.39	0.00
110	9,722	9,722	42.3	Yes	**0.50**	104.0	3.01	90.76	11.06	4.65	0.00	0.00	106.47	0.00
111	10,333	10,333	46.0	Yes	**-0.39**	104.0	3.01	91.28	11.43	4.65	0.00	0.00	107.36	0.00
113	5,795	5,796	53.8	Yes	**8.01**	104.0	3.01	86.26	8.22	4.48	0.00	0.00	98.96	0.00
114	9,328	9,329	42.3	Yes	**1.11**	104.0	3.01	90.40	10.82	4.65	0.00	0.00	105.86	0.00
115	3,644	3,646	58.0	Yes	**14.38**	104.0	3.01	82.24	6.10	4.26	0.00	0.00	92.60	0.00
116	7,878	7,880	48.4	Yes	**3.60**	104.0	3.01	88.93	9.85	4.59	0.00	0.00	103.37	0.00
118	12,305	12,305	48.7	Yes	**-3.01**	104.0	3.01	92.80	12.52	4.67	0.00	0.00	109.98	0.00
119	5,446	5,448	58.4	Yes	**8.91**	104.0	3.01	85.72	7.91	4.43	0.00	0.00	98.07	0.00
120	5,593	5,595	50.2	Yes	**8.48**	104.0	3.01	85.96	8.04	4.49	0.00	0.00	98.49	0.00
121	6,036	6,038	56.5	Yes	**7.45**	104.0	3.01	86.62	8.42	4.48	0.00	0.00	99.52	0.00
125	14,470	14,470	44.6	Yes	**-5.50**	104.0	3.01	94.21	13.57	4.70	0.00	0.00	112.47	0.00
126	10,654	10,654	49.2	Yes	**-0.84**	104.0	3.01	91.55	11.62	4.64	0.00	0.00	107.81	0.00
127	10,824	10,824	50.9	Yes	**-1.07**	104.0	3.01	91.69	11.72	4.64	0.00	0.00	108.04	0.00
128	10,904	10,905	53.2	Yes	**-1.18**	104.0	3.01	91.75	11.76	4.63	0.00	0.00	108.15	0.00
129	8,034	8,035	29.7	No	**3.12**	104.0	3.01	89.10	9.96	4.80	0.00	0.00	103.86	0.00
130	8,651	8,652	30.7	No	**2.05**	104.0	3.01	89.74	10.38	4.80	0.00	0.00	104.92	0.00
131	8,611	8,611	31.1	No	**2.12**	104.0	3.01	89.70	10.35	4.80	0.00	0.00	104.85	0.00
132	8,418	8,418	31.3	No	**2.45**	104.0	3.01	89.50	10.22	4.80	0.00	0.00	104.53	0.00
133	8,798	8,798	43.4	Yes	**1.98**	104.0	3.01	89.89	10.48	4.63	0.00	0.00	105.00	0.00
134	6,163	6,164	34.9	Yes	**7.04**	104.0	3.01	86.80	8.53	4.61	0.00	0.00	99.93	0.00
141	6,178	6,180	60.7	Yes	**7.15**	104.0	3.01	86.82	8.54	4.47	0.00	0.00	99.83	0.00
142	8,623	8,624	58.9	Yes	**2.33**	104.0	3.01	89.71	10.36	4.57	0.00	0.00	104.64	0.00
143	6,022	6,024	60.6	Yes	**7.51**	104.0	3.01	86.60	8.41	4.46	0.00	0.00	99.47	0.00
144	9,696	9,697	46.7	Yes	**0.55**	104.0	3.01	90.73	11.05	4.64	0.00	0.00	106.42	0.00
145	11,557	11,558	48.2	Yes	**-2.07**	104.0	3.01	92.26	12.12	4.66	0.00	0.00	109.04	0.00
146	11,245	11,246	47.8	Yes	**-1.65**	104.0	3.01	92.02	11.95	4.66	0.00	0.00	108.63	0.00
Sum	28.20													

Noise sensitive area: H54 H54

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	11,502	11,503	52.8	Yes	**-1.98**	104.0	3.01	92.22	12.09	4.64	0.00	0.00	108.95	0.00
2	11,261	11,261	52.8	Yes	**-1.66**	104.0	3.01	92.03	11.96	4.64	0.00	0.00	108.63	0.00

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
3	10,669	10,670	58.2	Yes	**-0.83**	104.0	3.01	91.56	11.63	4.61	0.00	0.00	107.80	0.00
4	9,303	9,303	46.4	Yes	**1.17**	104.0	3.01	90.37	10.80	4.63	0.00	0.00	105.81	0.00
5	9,394	9,395	52.2	Yes	**1.04**	104.0	3.01	90.46	10.86	4.61	0.00	0.00	105.93	0.00
6	10,151	10,152	60.1	Yes	**-0.08**	104.0	3.01	91.13	11.32	4.60	0.00	0.00	107.05	0.00
7	8,671	8,672	62.2	Yes	**2.26**	104.0	3.01	89.76	10.39	4.56	0.00	0.00	104.71	0.00
8	12,151	12,152	45.5	No	**-2.96**	104.0	3.01	92.69	12.44	4.80	0.00	0.00	109.93	0.00
9	11,060	11,060	56.9	Yes	**-1.38**	104.0	3.01	91.88	11.85	4.62	0.00	0.00	108.35	0.00
10	11,048	11,049	63.1	Yes	**-1.34**	104.0	3.01	91.87	11.84	4.61	0.00	0.00	108.31	0.00
11	12,654	12,655	53.1	Yes	**-3.43**	104.0	3.01	93.05	12.70	4.66	0.00	0.00	110.40	0.00
12	12,436	12,437	54.8	Yes	**-3.16**	104.0	3.01	92.89	12.59	4.65	0.00	0.00	110.13	0.00
13	11,978	11,979	59.9	Yes	**-2.57**	104.0	3.01	92.57	12.35	4.63	0.00	0.00	109.55	0.00
14	11,607	11,608	59.5	Yes	**-2.10**	104.0	3.01	92.29	12.15	4.63	0.00	0.00	109.07	0.00
15	10,771	10,773	60.4	Yes	**-0.97**	104.0	3.01	91.65	11.69	4.61	0.00	0.00	107.94	0.00
16	10,385	10,386	61.0	Yes	**-0.42**	104.0	3.01	91.33	11.46	4.60	0.00	0.00	107.39	0.00
17	12,889	12,890	50.8	Yes	**-3.71**	104.0	3.01	93.20	12.81	4.67	0.00	0.00	110.69	0.00
18	13,105	13,106	45.5	Yes	**-3.98**	104.0	3.01	93.35	12.92	4.68	0.00	0.00	110.95	0.00
19	11,928	11,929	49.6	Yes	**-2.54**	104.0	3.01	92.53	12.32	4.66	0.00	0.00	109.51	0.00
20	10,844	10,845	46.7	Yes	**-1.11**	104.0	3.01	91.70	11.73	4.65	0.00	0.00	108.09	0.00
21	8,801	8,802	54.6	Yes	**2.01**	104.0	3.01	89.89	10.48	4.59	0.00	0.00	104.96	0.00
22	8,159	8,159	46.2	Yes	**3.09**	104.0	3.01	89.23	10.04	4.61	0.00	0.00	103.88	0.00
23	7,774	7,774	47.6	Yes	**3.80**	104.0	3.01	88.81	9.77	4.59	0.00	0.00	103.18	0.00
24	8,407	8,407	46.0	Yes	**2.65**	104.0	3.01	89.49	10.21	4.61	0.00	0.00	104.32	0.00
25	5,951	5,951	45.3	Yes	**7.59**	104.0	3.01	86.49	8.35	4.54	0.00	0.00	99.38	0.00
26	8,613	8,614	56.7	Yes	**2.34**	104.0	3.01	89.70	10.35	4.58	0.00	0.00	104.63	0.00
27	6,686	6,686	47.8	Yes	**5.96**	104.0	3.01	87.50	8.95	4.56	0.00	0.00	101.01	0.00
28	7,483	7,484	57.8	Yes	**4.39**	104.0	3.01	88.48	9.56	4.54	0.00	0.00	102.58	0.00
29	7,620	7,621	48.4	Yes	**4.09**	104.0	3.01	88.64	9.66	4.58	0.00	0.00	102.89	0.00
30	7,314	7,314	41.6	Yes	**4.65**	104.0	3.01	88.28	9.44	4.61	0.00	0.00	102.33	0.00
31	8,028	8,029	46.6	Yes	**3.32**	104.0	3.01	89.09	9.95	4.60	0.00	0.00	103.65	0.00
32	5,640	5,641	43.7	Yes	**8.33**	104.0	3.01	86.03	8.08	4.54	0.00	0.00	98.64	0.00
33	6,695	6,695	40.2	Yes	**5.90**	104.0	3.01	87.51	8.96	4.60	0.00	0.00	101.07	0.00
34	8,340	8,341	58.5	Yes	**2.82**	104.0	3.01	89.42	10.17	4.56	0.00	0.00	104.16	0.00
35	8,962	8,963	62.5	Yes	**1.78**	104.0	3.01	90.05	10.58	4.56	0.00	0.00	105.20	0.00
36	9,258	9,260	62.4	Yes	**1.29**	104.0	3.01	90.33	10.78	4.57	0.00	0.00	105.68	0.00
37	8,033	8,034	57.3	Yes	**3.36**	104.0	3.01	89.10	9.96	4.56	0.00	0.00	103.61	0.00
38	6,266	6,266	45.0	Yes	**6.86**	104.0	3.01	86.94	8.61	4.55	0.00	0.00	100.11	0.00
39	6,560	6,561	55.1	Yes	**6.27**	104.0	3.01	87.34	8.85	4.51	0.00	0.00	100.70	0.00
40	8,162	8,162	35.4	Yes	**3.04**	104.0	3.01	89.24	10.05	4.65	0.00	0.00	103.93	0.00
41	6,695	6,696	61.9	Yes	**6.01**	104.0	3.01	87.52	8.96	4.48	0.00	0.00	100.96	0.00
43	7,702	7,703	61.0	Yes	**3.99**	104.0	3.01	88.73	9.72	4.53	0.00	0.00	102.98	0.00
44	6,795	6,797	63.2	Yes	**5.80**	104.0	3.01	87.65	9.04	4.48	0.00	0.00	101.17	0.00
45	6,501	6,503	61.6	Yes	**6.43**	104.0	3.01	87.26	8.81	4.48	0.00	0.00	100.55	0.00
46	7,836	7,837	39.9	Yes	**3.65**	104.0	3.01	88.88	9.82	4.63	0.00	0.00	103.33	0.00
48	5,006	5,007	42.9	Yes	**9.97**	104.0	3.01	84.99	7.50	4.51	0.00	0.00	97.00	0.00
49	4,830	4,831	37.3	Yes	**10.42**	104.0	3.01	84.68	7.33	4.54	0.00	0.00	96.55	0.00
50	9,413	9,413	60.6	Yes	**1.04**	104.0	3.01	90.47	10.87	4.58	0.00	0.00	105.93	0.00
51	5,307	5,308	36.7	Yes	**9.13**	104.0	3.01	85.50	7.78	4.56	0.00	0.00	97.84	0.00
52	5,623	5,623	37.2	Yes	**8.33**	104.0	3.01	86.00	8.06	4.57	0.00	0.00	98.64	0.00
53	4,496	4,497	39.7	Yes	**11.41**	104.0	3.01	84.06	7.01	4.50	0.00	0.00	95.56	0.00
55	3,009	3,010	35.0	Yes	**16.64**	104.0	3.01	80.57	5.36	4.40	0.00	0.00	90.33	0.00
56	2,702	2,703	36.8	Yes	**18.03**	104.0	3.01	79.64	4.97	4.33	0.00	0.00	88.94	0.00
57	2,884	2,885	36.5	Yes	**17.20**	104.0	3.01	80.20	5.20	4.37	0.00	0.00	89.77	0.00
58	6,339	6,340	41.3	Yes	**6.68**	104.0	3.01	87.04	8.67	4.58	0.00	0.00	100.29	0.00
59	2,390	2,392	38.1	Yes	**19.58**	104.0	3.01	78.57	4.56	4.25	0.00	0.00	87.39	0.00
60	1,093	1,097	41.8	Yes	**29.12**	104.0	3.01	71.80	2.56	3.48	0.00	0.00	77.85	0.00

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Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Brandon Storm, bstorm@eapc.net
Calculated:
4/23/2010 6:51 AM/2.7.453

DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

Wind speed: 9.0 m/s

WTG No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
61	809	813	40.8	Yes	**32.68**	104.0	3.01	69.20	2.03	3.06	0.00	0.00	74.29	0.00
62	2,739	2,741	45.1	Yes	**17.95**	104.0	3.01	79.76	5.02	4.24	0.00	0.00	89.02	0.00
63	3,697	3,699	47.4	Yes	**14.09**	104.0	3.01	82.36	6.16	4.36	0.00	0.00	92.89	0.00
64	4,375	4,376	49.0	Yes	**11.85**	104.0	3.01	83.82	6.88	4.42	0.00	0.00	95.12	0.00
65	4,412	4,413	49.8	Yes	**11.74**	104.0	3.01	83.89	6.92	4.41	0.00	0.00	95.23	0.00
66	8,468	8,469	32.3	Yes	**2.49**	104.0	3.01	89.56	10.26	4.67	0.00	0.00	104.48	0.00
67	3,518	3,519	49.2	Yes	**14.76**	104.0	3.01	81.93	5.96	4.32	0.00	0.00	92.21	0.00
68	3,750	3,751	46.7	Yes	**13.89**	104.0	3.01	82.48	6.22	4.37	0.00	0.00	93.08	0.00
69	4,581	4,582	48.1	Yes	**11.22**	104.0	3.01	84.22	7.09	4.44	0.00	0.00	95.75	0.00
70	11,894	11,895	30.4	Yes	**-2.55**	104.0	3.01	92.51	12.30	4.71	0.00	0.00	109.52	0.00
71	10,742	10,743	61.9	Yes	**-0.92**	104.0	3.01	91.62	11.67	4.60	0.00	0.00	107.90	0.00
72	9,691	9,692	47.9	Yes	**0.57**	104.0	3.01	90.73	11.05	4.63	0.00	0.00	106.41	0.00
73	9,813	9,814	57.1	Yes	**0.41**	104.0	3.01	90.84	11.12	4.60	0.00	0.00	106.56	0.00
74	9,113	9,114	62.4	Yes	**1.53**	104.0	3.01	90.19	10.68	4.57	0.00	0.00	105.44	0.00
75	7,953	7,954	49.3	Yes	**3.47**	104.0	3.01	89.01	9.90	4.59	0.00	0.00	103.50	0.00
76	3,694	3,695	43.6	Yes	**14.06**	104.0	3.01	82.35	6.16	4.40	0.00	0.00	92.91	0.00
77	4,149	4,150	38.5	Yes	**12.48**	104.0	3.01	83.36	6.65	4.48	0.00	0.00	94.49	0.00
78	10,518	10,519	40.2	Yes	**-0.68**	104.0	3.01	91.44	11.54	4.67	0.00	0.00	107.65	0.00
80	1,472	1,474	41.8	Yes	**25.57**	104.0	3.01	74.37	3.20	3.82	0.00	0.00	81.40	0.00
81	12,205	12,206	48.2	Yes	**-2.89**	104.0	3.01	92.73	12.47	4.67	0.00	0.00	109.86	0.00
82	6,103	6,103	39.7	Yes	**7.21**	104.0	3.01	86.71	8.48	4.58	0.00	0.00	99.77	0.00
83	3,596	3,597	48.7	Yes	**14.47**	104.0	3.01	82.12	6.05	4.34	0.00	0.00	92.51	0.00
85	4,850	4,851	37.7	Yes	**10.37**	104.0	3.01	84.72	7.35	4.53	0.00	0.00	96.60	0.00
86	1,742	1,744	38.6	Yes	**23.47**	104.0	3.01	75.83	3.63	4.04	0.00	0.00	83.50	0.00
87	4,443	4,444	48.5	Yes	**11.64**	104.0	3.01	83.96	6.95	4.43	0.00	0.00	95.34	0.00
89	4,098	4,099	48.4	Yes	**12.73**	104.0	3.01	83.25	6.60	4.40	0.00	0.00	94.25	0.00
90	2,836	2,837	44.3	Yes	**17.50**	104.0	3.01	80.06	5.14	4.27	0.00	0.00	89.47	0.00
91	3,147	3,148	46.1	Yes	**16.18**	104.0	3.01	80.96	5.53	4.30	0.00	0.00	90.79	0.00
92	5,247	5,247	44.9	Yes	**9.34**	104.0	3.01	85.40	7.73	4.51	0.00	0.00	97.63	0.00
94	11,275	11,276	61.5	Yes	**-1.65**	104.0	3.01	92.04	11.97	4.61	0.00	0.00	108.63	0.00
95	12,324	12,324	54.3	Yes	**-3.02**	104.0	3.01	92.82	12.53	4.65	0.00	0.00	109.99	0.00
97	10,034	10,035	61.7	Yes	**0.10**	104.0	3.01	91.03	11.25	4.59	0.00	0.00	106.88	0.00
98	11,664	11,665	59.8	Yes	**-2.17**	104.0	3.01	92.34	12.18	4.63	0.00	0.00	109.14	0.00
99	10,764	10,765	52.5	Yes	**-0.98**	104.0	3.01	91.64	11.68	4.63	0.00	0.00	107.96	0.00
100	6,153	6,154	57.3	Yes	**7.19**	104.0	3.01	86.78	8.52	4.48	0.00	0.00	99.79	0.00
101	12,625	12,626	44.8	Yes	**-3.41**	104.0	3.01	93.03	12.68	4.68	0.00	0.00	110.39	0.00
102	7,023	7,024	66.0	Yes	**5.34**	104.0	3.01	87.93	9.22	4.48	0.00	0.00	101.63	0.00
103	13,398	13,398	43.5	Yes	**-4.32**	104.0	3.01	93.54	13.06	4.69	0.00	0.00	111.29	0.00
104	7,072	7,073	58.1	Yes	**5.21**	104.0	3.01	87.99	9.25	4.52	0.00	0.00	101.77	0.00
107	11,284	11,285	48.6	Yes	**-1.70**	104.0	3.01	92.05	11.97	4.65	0.00	0.00	108.68	0.00
108	10,938	10,939	46.6	Yes	**-1.24**	104.0	3.01	91.78	11.78	4.65	0.00	0.00	108.21	0.00
109	2,078	2,080	39.7	Yes	**21.34**	104.0	3.01	77.36	4.13	4.15	0.00	0.00	85.64	0.00
110	4,660	4,660	41.3	Yes	**10.94**	104.0	3.01	84.37	7.17	4.50	0.00	0.00	96.03	0.00
111	4,068	4,069	43.4	Yes	**12.78**	104.0	3.01	83.19	6.56	4.44	0.00	0.00	94.19	0.00
113	11,595	11,596	47.5	Yes	**-2.12**	104.0	3.01	92.29	12.14	4.66	0.00	0.00	109.09	0.00
114	4,551	4,551	37.1	Yes	**11.23**	104.0	3.01	84.16	7.06	4.52	0.00	0.00	95.74	0.00
115	11,895	11,895	46.8	No	**-2.64**	104.0	3.01	92.51	12.30	4.80	0.00	0.00	109.61	0.00
116	8,226	8,227	57.0	Yes	**3.01**	104.0	3.01	89.30	10.09	4.56	0.00	0.00	103.96	0.00
118	1,593	1,595	41.2	Yes	**24.61**	104.0	3.01	75.06	3.40	3.91	0.00	0.00	82.37	0.00
119	9,885	9,886	61.9	Yes	**0.32**	104.0	3.01	90.90	11.16	4.59	0.00	0.00	106.65	0.00
120	13,042	13,043	39.6	Yes	**-3.92**	104.0	3.01	93.31	12.89	4.70	0.00	0.00	110.89	0.00
121	9,595	9,596	61.5	Yes	**0.76**	104.0	3.01	90.64	10.99	4.58	0.00	0.00	106.21	0.00
125	3,638	3,639	46.9	Yes	**14.30**	104.0	3.01	82.22	6.10	4.36	0.00	0.00	92.68	0.00
126	5,012	5,013	48.5	Yes	**9.99**	104.0	3.01	85.00	7.51	4.47	0.00	0.00	96.98	0.00
127	4,776	4,777	49.2	Yes	**10.66**	104.0	3.01	84.58	7.28	4.45	0.00	0.00	96.31	0.00

To be continued on next page...

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DECIBEL - Detailed results

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54) **Noise calculation model:** ISO 9613-2 General 9.0 m/s

...continued from previous page

WTG **Wind speed: 9.0 m/s**

No.	Distance [m]	Sound distance [m]	Mean height [m]	Visible	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
128	4,497	4,499	50.8	Yes	**11.49**	104.0	3.01	84.06	7.01	4.41	0.00	0.00	95.48	0.00
129	10,033	10,033	35.1	No	**-0.11**	104.0	3.01	91.03	11.25	4.80	0.00	0.00	107.08	0.00
130	10,112	10,113	36.8	Yes	**-0.10**	104.0	3.01	91.10	11.30	4.68	0.00	0.00	107.07	0.00
131	10,560	10,560	35.2	Yes	**-0.75**	104.0	3.01	91.47	11.56	4.69	0.00	0.00	107.72	0.00
132	10,929	10,930	34.8	Yes	**-1.27**	104.0	3.01	91.77	11.78	4.69	0.00	0.00	108.24	0.00
133	6,112	6,113	47.8	Yes	**7.23**	104.0	3.01	86.73	8.49	4.53	0.00	0.00	99.74	0.00
134	11,743	11,743	32.6	Yes	**-2.35**	104.0	3.01	92.40	12.22	4.71	0.00	0.00	109.32	0.00
141	9,856	9,857	64.2	Yes	**0.37**	104.0	3.01	90.88	11.15	4.58	0.00	0.00	106.60	0.00
142	7,295	7,297	67.6	Yes	**4.80**	104.0	3.01	88.26	9.42	4.48	0.00	0.00	102.17	0.00
143	10,424	10,425	60.2	Yes	**-0.48**	104.0	3.01	91.36	11.49	4.60	0.00	0.00	107.45	0.00
144	6,236	6,237	52.0	Yes	**6.97**	104.0	3.01	86.90	8.59	4.52	0.00	0.00	100.00	0.00
145	3,273	3,274	46.1	Yes	**15.67**	104.0	3.01	81.30	5.68	4.32	0.00	0.00	91.30	0.00
146	3,537	3,538	46.4	Yes	**14.66**	104.0	3.01	81.98	5.98	4.35	0.00	0.00	92.31	0.00

Sum 36.74

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DECIBEL - Assumptions for noise calculation

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

Noise calculation model:
ISO 9613-2 General
Wind speed:
9.0 m/s
Ground attenuation:
Alternative
Meteorological coefficient, C0:
0.0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Pure and Impulse tone penalty are added to WTG source noise
Height above ground level, when no value in NSA object:
1.5 m Don't allow override of model height with height from NSA object
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0.0 dB(A)
Octave data required
Air absorption

63 [db/km]	125 [db/km]	250 [db/km]	500 [db/km]	1,000 [db/km]	2,000 [db/km]	4,000 [db/km]	8,000 [db/km]
0.1	0.4	1.0	1.9	3.7	9.7	32.8	117.0

WTG: GE WIND ENERGY GE 1.5sle 60Hz 1500 77.0 !O!
Noise: Man. 8m/s 09-2002

Source	Source/Date	Creator	Edited
Manufacturer	9/17/2002	USER	3/27/2009 10:15 AM

					Octave data							
Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]
From Windcat	80.0	9.0	104.0	No	85.1	94.0	97.2	98.6	97.9	94.5	87.3	77.0

NSA: H01-H01
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H02-H02
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H03-H03
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

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DECIBEL - Assumptions for noise calculation

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

NSA: H04-H04
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H05-H05
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H06-H06
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H07-H07
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H08-H08
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H09-H09
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H10-H10
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H11-H11
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

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DECIBEL - Assumptions for noise calculation

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

NSA: H12-H12
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H13-H13
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H14-H14
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H15-H15
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H16-H16
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H17-H17
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H18-H18
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H19-H19
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

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DECIBEL - Assumptions for noise calculation

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

NSA: H20-H20
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H21-H21
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H22-H22
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H23-H23
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H24-H24
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H25-H25
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H27-H27
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H28-H28
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

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DECIBEL - Assumptions for noise calculation

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

NSA: H29-H29
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H30-H30
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H31-H31
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H32-H32
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H33-H33
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H34-H34
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H35-H35
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H36-H36
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

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DECIBEL - Assumptions for noise calculation

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s

NSA: H37-H37
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H38-H38
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H39-H39
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H40-H40
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H41-H41
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H42-H42
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H43-H43
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H44-H44
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

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NSA: H45-H45
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H46-H46
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H48-H48
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H49-H49
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H52-H52
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H53-H53
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

NSA: H54-H54
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45.0 dB(A)
Distance demand: 427.0 m

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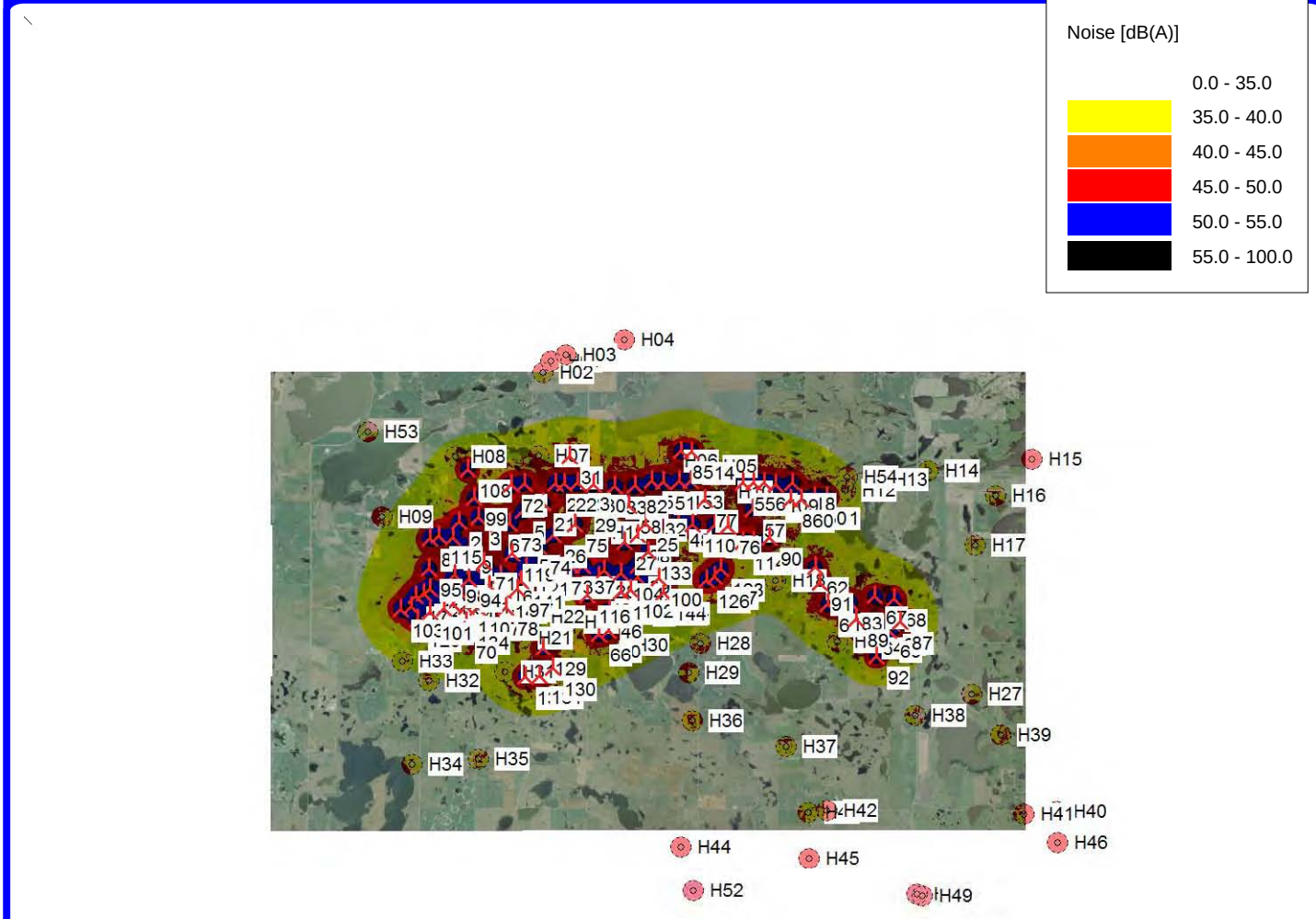
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Brandon Storm, bstorm@eapc.net

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DECIBEL - Map 9.0 m/s

Calculation: Merricourt ND Alt 125 WTGs (v15f w/out 54)**Noise calculation model:** ISO 9613-2 General 9.0 m/s



Map: , Print scale 1:200,000, Map center UTM NAD 83 Zone: 14 East: 497,074 North: 5,106,074
Noise calculation model: ISO 9613-2 General. Wind speed: 9.0 m/s

New WTG Noise sensitive area

Height above sea level from active line object

35.0 dB(A) 40.0 dB(A) 45.0 dB(A) 50.0 dB(A) 55.0 dB(A)

APPENDIX F:
PRELIMINARY SHADOW FLICKER ANALYSIS

EAPC
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Merricourt 183 MW Wind Farm
Preliminary Shadow Flicker
Merricourt, North Dakota

September 29,

2010

Submitted To:
Chris Sternhagen
Project Manager - Development
enXco - an EDF Energies Nouvelles Company
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Report Update

EAPC bears no responsibility to update this report for any changes occurring subsequent to the final issuance of this report.

Revision History

Revision No.	Revision Purpose	Date	Revised By
0	Original	09/20/2010	B. Storm
1	New Homes and Realistic results	9/29/2010	B. Storm

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APPENDIX D: REALISTIC CASE SHADOW FLICKER WINDPRO REPORT 70

EXECUTIVE SUMMARY

EAPC was hired by enXco to provide a preliminary shadow flicker analysis on residences within and surrounding the proposed wind farm of 122 G.E. 1.5sle wind turbines (183 MW) near Merricourt, ND. Coordinates of the proposed turbines as well as occupied residences were provided by enXco and Kadrmas, Lee and Jackson (KLJ) (version 15g used in this analysis). Locations denoted in a shapefile KLJ provided were analyzed in detail (version 3). A map of the turbine locations and assumed occupied residences are shown in the Appendices.

For preliminary screening purposes, an absolute worst case shadow flicker scenario was analyzed within WindPRO. The worst case scenario assumed that the wind turbines were always operating, perpendicular to the sun, no cloud cover, and that all shadows within 2 km are visible, and that the sensors were "Greenhouses". Greenhouse sensor mode indicates that a shadow casted from any direction was cumulated in the results. In reality, individual rooms and windows would need to be modeled to determine the full impact on a house (i.e., if there are no windows on the side of a house where a shadow is casted, it should not be included).

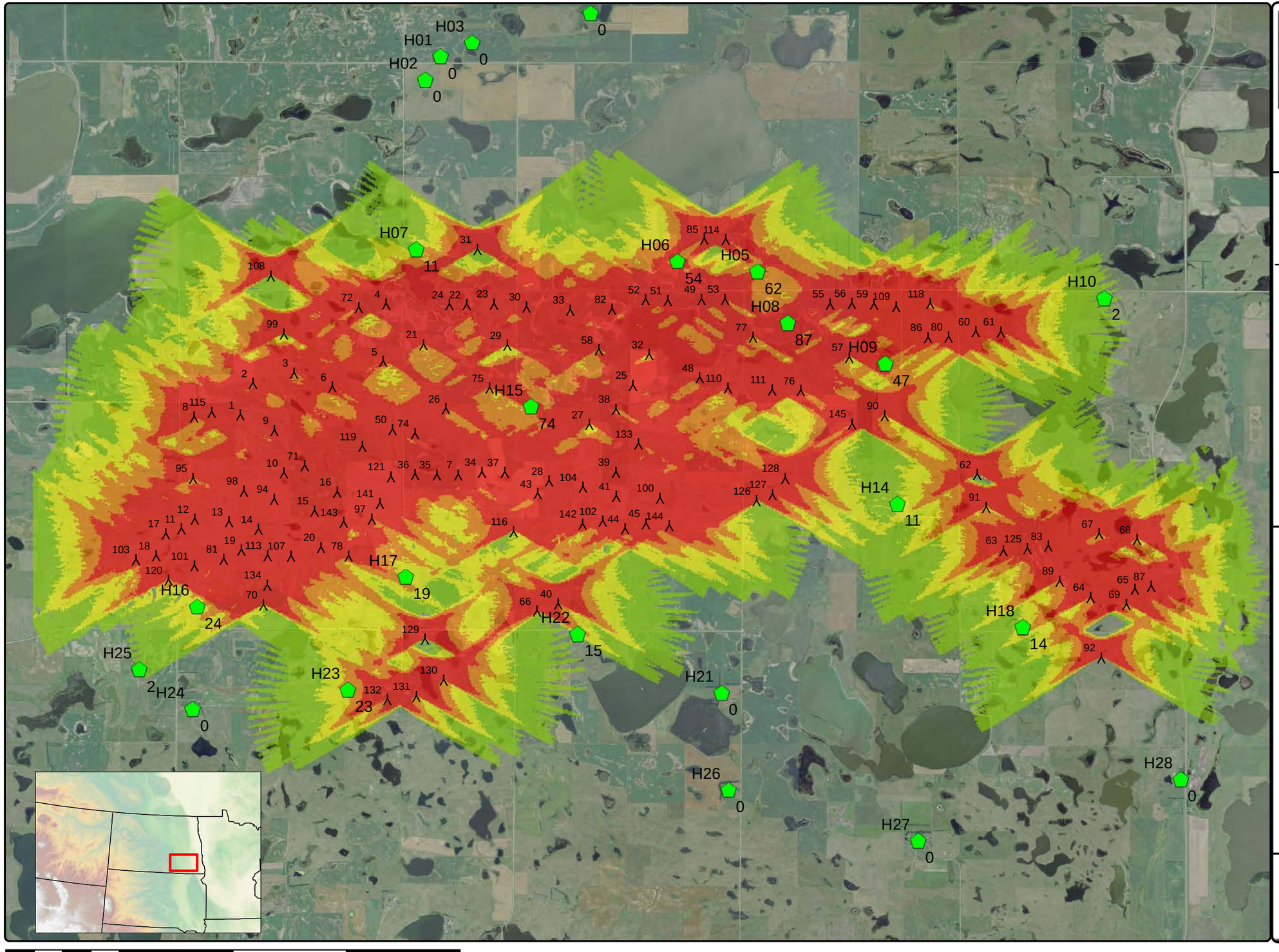
The worst case scenario resulted in five locations being above 24 hours a year (a nominal value). House locations 5, 6, 8, 9, and 15 are the locations of concern, as well as House 16, which returned and expected value very near 24 hours a year of shadow flicker. Results and maps depicting the worst case shadow flicker scenario results are shown in Appendix A and Appendix B.

A refined analysis was performed to see if any turbines are advised to be moved or other forms of mitigation are recommended. This revised analysis included sunshine probabilities and operational statistics (Appendix C and D). The refined analysis only resulted in two home locations (8, ~31.5 hrs/yr and 15, ~29.5 hrs/yr) having more than 24 hours a year of shadow flicker anticipated. The home locations in question have significant wind breaks around the property, so it is unlikely that the shadow flicker would be as high as reported in the realistic results. Further analysis taking into nearby obstacles (e.g., tree rows and out buildings) and directional sensors on the windows could be performed if there is still concern at homes 8 and 15.

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Appendix A: Worst Case Shadow Flicker Map

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H01
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47
74
24
19
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Appendix B: Worst Case Shadow Flicker WindPRO Report

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SHADOW - Main Result

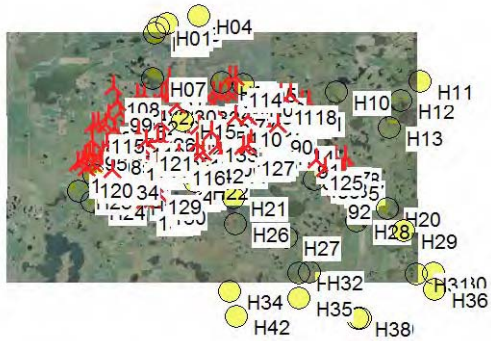
Calculation: WTGs v15g / Occupied Home v3 Worst Case

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:
- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: 100308_Merricourt_10ftHCLs_from10m
Obstacles used in calculation
Eye height: 1.5 m
Grid resolution: 10 m



Scale 1:400,000

New WTG Shadow receptor

WTGs

	UTM WGS84 Zone: 14				WTG type						
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM WGS84 Zone: 14		[m]					[kW]	[m]	[m]	[RPM]
1	490,965	5,108,120	640.1	1	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
2	491,148	5,108,571	632.3	2	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
3	491,727	5,108,716	640.1	3	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
4	493,034	5,109,690	608.5	4	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
5	492,992	5,108,880	621.8	5	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
6	492,273	5,108,516	643.1	6	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
7	494,058	5,107,274	661.7	7	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
8	490,312	5,108,098	626.5	8	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
9	491,450	5,107,902	650.3	9	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
10	491,587	5,107,303	673.6	10	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
11	490,133	5,106,507	676.7	11	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
12	490,322	5,106,643	676.7	12	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
13	490,807	5,106,607	685.8	13	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
14	491,225	5,106,500	685.8	14	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
15	492,019	5,106,760	679.7	15	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
16	492,343	5,107,028	673.0	16	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
17	489,908	5,106,439	673.6	17	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
18	489,773	5,106,126	667.0	18	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
19	490,981	5,106,204	673.2	19	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
20	492,111	5,106,244	661.4	20	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
21	493,565	5,109,117	624.8	21	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
22	494,178	5,109,682	606.6	22	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
23	494,563	5,109,697	608.7	23	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
24	493,930	5,109,687	606.6	24	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
25	496,532	5,108,542	603.5	25	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
26	493,882	5,108,206	632.9	26	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
27	495,917	5,107,986	614.9	27	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
28	495,345	5,107,187	649.1	28	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
29	494,752	5,109,105	609.6	29	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
30	495,024	5,109,653	595.8	30	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
31	494,330	5,110,469	606.6	31	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
32	496,764	5,108,977	600.5	32	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
33	495,645	5,109,612	594.4	33	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
34	494,394	5,107,309	652.7	34	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0

To be continued on next page...

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SHADOW - Main Result

Calculation: WTGs v15g / Occupied Home v3 Worst Case

...continued from previous page

	UTM WGS84 Zone: 14				WTG type						
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM WGS84 Zone: 14		[m]					[kW]	[m]	[m]	[RPM]
35	493,754	5,107,275	663.7	35	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
36	493,443	5,107,280	664.5	36	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
37	494,718	5,107,307	649.2	37	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
38	496,292	5,108,204	606.6	38	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
39	496,291	5,107,310	638.8	39	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
40	495,470	5,105,445	624.8	40	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
41	496,298	5,106,965	658.4	41	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
43	495,183	5,107,002	658.7	43	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
44	496,423	5,106,509	673.6	44	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
45	496,720	5,106,582	667.5	45	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
48	497,477	5,108,649	600.5	48	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
49	497,506	5,109,758	594.4	49	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
50	493,125	5,107,917	648.9	50	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
51	497,029	5,109,742	591.3	51	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
52	496,713	5,109,755	591.3	52	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
53	497,840	5,109,759	599.9	53	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
55	499,330	5,109,696	595.1	55	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
56	499,638	5,109,702	600.5	56	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
57	499,602	5,108,937	597.4	57	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
58	496,048	5,109,045	595.2	58	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
59	499,950	5,109,699	603.9	59	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
60	501,393	5,109,304	612.1	60	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
61	501,750	5,109,300	606.1	61	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
62	501,414	5,107,279	615.7	62	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
63	501,784	5,106,203	624.8	63	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
64	503,022	5,105,538	621.8	64	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
65	503,647	5,105,647	621.8	65	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
66	495,174	5,105,339	618.7	66	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
67	503,142	5,106,435	618.7	67	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
68	503,679	5,106,358	612.1	68	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
69	503,527	5,105,436	621.8	69	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
70	491,296	5,105,430	626.0	70	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
71	491,878	5,107,400	667.5	71	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
72	492,646	5,109,647	612.6	72	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
74	493,444	5,107,858	652.3	74	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
75	494,498	5,108,503	613.4	75	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
76	498,913	5,108,467	606.5	76	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
77	498,235	5,109,222	594.4	77	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
78	492,503	5,106,122	646.1	78	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
80	501,006	5,109,227	614.8	80	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
81	490,731	5,106,077	671.6	81	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
82	496,237	5,109,617	594.4	82	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
83	502,422	5,106,264	621.2	83	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
85	497,544	5,110,614	594.4	85	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
86	500,716	5,109,217	610.0	86	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
87	503,880	5,105,693	618.7	87	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
89	502,583	5,105,769	623.6	89	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
90	500,101	5,108,112	611.4	90	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
91	501,541	5,106,814	618.9	91	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
92	503,174	5,104,680	618.7	92	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
94	491,447	5,106,932	680.7	94	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
95	490,296	5,107,226	660.4	95	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
97	492,829	5,106,648	682.9	97	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
98	491,016	5,107,045	675.9	98	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0

To be continued on next page...

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Minneapolis, MN 55413

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9/29/2010 4:33 PM/2.7.473

SHADOW - Main Result

Calculation: WTGs v15g / Occupied Home v3 Worst Case

...continued from previous page

	UTM WGS84 Zone: 14					WTG type						
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM WGS84 Zone: 14		[m]					[kW]	[m]	[m]	[RPM]
99	491,587	5,109,269	624.8	99	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
100	496,917	5,106,943	648.0	100	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
101	490,319	5,105,984	667.5	101	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
102	496,106	5,106,616	677.3	102	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
103	489,484	5,106,071	665.0	103	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
104	495,824	5,107,098	649.7	104	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
107	491,687	5,106,123	667.5	107	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
108	491,399	5,110,092	610.8	108	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
109	500,266	5,109,661	607.2	109	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
110	497,878	5,108,500	601.9	110	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
111	498,507	5,108,481	607.1	111	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
113	491,356	5,106,130	667.5	113	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
114	497,846	5,110,606	594.4	114	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
115	490,562	5,108,163	627.9	115	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
116	494,841	5,106,468	667.5	116	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
118	500,750	5,109,701	609.6	118	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
119	492,694	5,107,675	658.4	119	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
120	489,947	5,105,780	658.4	120	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
121	493,103	5,107,245	665.3	121	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
125	502,127	5,106,227	621.8	125	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
126	498,288	5,106,902	637.0	126	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
127	498,513	5,106,995	637.0	127	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
128	498,692	5,107,222	636.3	128	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
129	493,588	5,104,945	627.9	129	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
130	493,847	5,104,363	627.9	130	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
131	493,464	5,104,131	624.8	131	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
132	493,053	5,104,089	624.8	132	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
133	496,614	5,107,707	618.7	133	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
134	491,350	5,105,709	633.4	134	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
141	492,945	5,106,864	681.9	141	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
142	495,820	5,106,577	682.8	142	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
143	492,433	5,106,601	682.7	143	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
144	497,049	5,106,551	649.3	144	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
145	499,643	5,107,997	615.7	145	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0

Shadow receptor-Input

		UTM WGS84 Zone: 14								
No.	Name	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
				[m]	[m]	[m]	[m]	[°]	[°]	
H01	H01	493,803	5,113,211	618.9	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H02	H02	493,587	5,112,886	609.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H03	H03	494,248	5,113,411	621.8	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H04	H04	495,928	5,113,827	614.9	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H05	H05	498,292	5,110,165	596.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H06	H06	497,162	5,110,309	594.4	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H07	H07	493,457	5,110,480	605.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H08	H08	498,722	5,109,435	595.5	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H09	H09	500,105	5,108,858	594.4	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H10	H10	503,211	5,109,791	600.5	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H11	H11	507,670	5,110,359	606.7	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H12	H12	506,627	5,109,318	620.5	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H13	H13	506,041	5,107,907	627.0	1.0	1.0	1.0	-180.0	90.0	"Green house mode"

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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Minneapolis, MN 55413

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SHADOW - Main Result

Calculation: WTGs v15g / Occupied Home v3 Worst Case

...continued from previous page

UTM WGS84 Zone: 14

No.	Name	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
H14	H14	500,278	5,106,873	617.0	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H15	H15	495,083	5,108,248	614.0	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H16	H16	490,353	5,105,415	626.5	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H17	H17	493,309	5,105,833	630.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H18	H18	502,051	5,105,123	615.7	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H20	H20	505,934	5,103,586	618.0	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H21	H21	497,786	5,104,193	607.1	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H22	H22	495,745	5,105,026	609.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H23	H23	492,486	5,104,236	621.1	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H24	H24	490,288	5,103,962	618.7	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H25	H25	489,534	5,104,522	603.7	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H26	H26	497,884	5,102,817	617.3	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H27	H27	500,571	5,102,094	622.1	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H28	H28	504,292	5,102,969	620.4	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H29	H29	506,783	5,102,415	609.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H30	H30	508,385	5,100,218	620.8	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H31	H31	507,435	5,100,145	622.4	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H32	H32	501,763	5,100,251	609.8	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H33	H33	501,209	5,100,184	605.5	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H34	H34	497,551	5,099,204	595.7	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H35	H35	501,233	5,098,861	606.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H36	H36	508,413	5,099,339	629.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H38	H38	504,352	5,097,819	638.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H39	H39	504,504	5,097,783	640.1	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H42	H42	497,897	5,097,923	600.5	1.0	1.0	1.0	-180.0	90.0	"Green house mode"

Calculation Results

Shadow receptor

Shadow, worst case

No.	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
H01	H01	0:00	0	0:00
H02	H02	0:00	0	0:00
H03	H03	0:00	0	0:00
H04	H04	0:00	0	0:00
H05	H05	61:47	181	0:35
H06	H06	53:42	166	0:38
H07	H07	11:15	65	0:21
H08	H08	87:23	239	0:40
H09	H09	47:25	147	0:43
H10	H10	1:49	21	0:09
H11	H11	0:00	0	0:00
H12	H12	0:00	0	0:00
H13	H13	0:00	0	0:00
H14	H14	10:46	92	0:14
H15	H15	73:35	249	0:34
H16	H16	23:39	128	0:19
H17	H17	18:56	78	0:34
H18	H18	14:26	88	0:18
H20	H20	0:00	0	0:00
H21	H21	0:00	0	0:00
H22	H22	15:08	44	0:25

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

enXco
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SHADOW - Main Result

Calculation: WTGs v15g / Occupied Home v3 Worst Case

...continued from previous page

Shadow, worst case

No.	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
H23	H23	22:55	67	0:38
H24	H24	0:00	0	0:00
H25	H25	1:36	21	0:07
H26	H26	0:00	0	0:00
H27	H27	0:00	0	0:00
H28	H28	0:00	0	0:00
H29	H29	0:00	0	0:00
H30	H30	0:00	0	0:00
H31	H31	0:00	0	0:00
H32	H32	0:00	0	0:00
H33	H33	0:00	0	0:00
H34	H34	0:00	0	0:00
H35	H35	0:00	0	0:00
H36	H36	0:00	0	0:00
H38	H38	0:00	0	0:00
H39	H39	0:00	0	0:00
H42	H42	0:00	0	0:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	1	0:00	
2	2	0:00	
3	3	0:00	
4	4	0:00	
5	5	0:00	
6	6	0:00	
7	7	4:04	
8	8	0:00	
9	9	0:00	
10	10	0:00	
11	11	0:00	
12	12	0:00	
13	13	0:00	
14	14	0:00	
15	15	0:00	
16	16	0:00	
17	17	0:00	
18	18	0:00	
19	19	0:00	
20	20	6:53	
21	21	4:20	
22	22	0:00	
23	23	4:02	
24	24	0:00	
25	25	1:01	
26	26	3:35	
27	27	7:06	
28	28	0:00	
29	29	0:00	
30	30	0:20	
31	31	6:51	
32	32	1:09	

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

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SHADOW - Main Result

Calculation: WTGs v15g / Occupied Home v3 Worst Case

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
33	33	0:44	
34	34	0:00	
35	35	4:08	
36	36	2:01	
37	37	0:00	
38	38	2:16	
39	39	6:00	
40	40	0:00	
41	41	0:00	
43	43	0:00	
44	44	0:00	
45	45	0:00	
48	48	2:18	
49	49	10:45	
50	50	0:51	
51	51	2:10	
52	52	0:34	
53	53	65:29	
55	55	37:18	
56	56	9:24	
57	57	31:10	
58	58	0:00	
59	59	4:07	
60	60	4:08	
61	61	2:28	
62	62	3:52	
63	63	1:09	
64	64	8:19	
65	65	1:06	
66	66	15:11	
67	67	0:00	
68	68	0:00	
69	69	1:37	
70	70	7:09	
71	71	0:00	
72	72	0:00	
74	74	1:45	
75	75	35:32	
76	76	3:05	
77	77	20:25	
78	78	12:09	
80	80	10:57	
81	81	0:00	
82	82	7:23	
83	83	0:00	
85	85	8:04	
86	86	2:45	
87	87	0:26	
89	89	0:00	
90	90	0:00	
91	91	2:28	
92	92	3:16	
94	94	0:00	
95	95	0:00	
97	97	0:00	
98	98	0:00	

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SHADOW - Main Result

Calculation: WTGs v15g / Occupied Home v3 Worst Case

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
99	99	0:00	
100	100	0:00	
101	101	0:00	
102	102	0:00	
103	103	0:00	
104	104	0:00	
107	107	11:48	
108	108	0:00	
109	109	1:32	
110	110	0:00	
111	111	1:08	
113	113	1:01	
114	114	25:00	
115	115	0:00	
116	116	3:01	
118	118	0:00	
119	119	0:00	
120	120	0:00	
121	121	0:00	
125	125	0:18	
126	126	0:28	
127	127	0:57	
128	128	1:31	
129	129	0:00	
130	130	2:12	
131	131	5:11	
132	132	15:30	
133	133	1:05	
134	134	6:23	
141	141	0:00	
142	142	0:00	
143	143	0:00	
144	144	0:00	
145	145	0:00	

Project:

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enXco
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SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H01 - H01

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:20	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:17	07:58
	17:01	17:41	18:21	20:03	20:43	21:19	21:32	21:09	20:19	19:20	17:24	16:53
2	08:20	07:59	07:15	07:16	06:23	05:49	05:49	06:19	06:58	07:36	07:18	07:59
	17:02	17:42	18:22	20:05	20:44	21:20	21:32	21:08	20:17	19:18	17:22	16:53
3	08:20	07:58	07:14	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:20	08:00
	17:03	17:44	18:24	20:06	20:46	21:21	21:32	21:06	20:15	19:16	17:21	16:52
4	08:20	07:57	07:12	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:21	08:02
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20	08:12	07:33	07:41	06:43	05:59	05:45	06:04	06:41	07:20	08:00	07:44	08:16
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22	08:11	07:29	07:37	06:39	05:57	05:45	06:06	06:44	07:23	08:03	07:47	08:17
	17:26	18:11	19:50	20:31	21:09	21:32	21:20	20:37	19:38	18:40	16:59	16:54
23	08:10	07:28	07:35	06:38	05:56	05:46	06:08	06:45	07:24	08:04	07:48	08:17
	17:28	18:12	19:51	20:33	21:10	21:32	21:19	20:35	19:36	18:38	16:58	16:54
24	08:09	07:26	07:34	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:49	08:18
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25	08:08	07:24	07:32	06:34	05:55	05:46	06:10	06:48	07:27	08:07	07:51	08:18
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:34	16:56	16:55
26	08:07	07:23	07:30	06:32	05:54	05:46	06:11	06:49	07:28	08:08	07:52	08:18
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27	08:06	07:21	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:10	07:53	08:19
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28	08:05	07:19	07:26	06:29	05:52	05:47	06:13	06:51	07:31	08:11	07:54	08:19
	17:35	18:19	19:58	20:39	21:16	21:32	21:14	20:26	19:26	18:30	16:55	16:58
29	08:04		07:24	06:28	05:51	05:48	06:14	06:53	07:32	08:13	07:56	08:19
	17:37		19:59	20:41	21:17	21:32	21:13	20:24	19:24	18:28	16:54	16:58
30	08:03		07:22	06:26	05:51	05:48	06:15	06:54	07:33	08:14	07:57	08:19
	17:38		20:01	20:42	21:18	21:32	21:12	20:22	19:22	18:27	16:53	16:59
31	08:02		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	477	439	378	339	284	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H02 - H02

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:20	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:17	07:58
	17:01	17:41	18:21	20:03	20:43	21:19	21:32	21:09	20:19	19:20	17:24	16:53
2	08:20	07:59	07:15	07:16	06:23	05:49	05:49	06:19	06:58	07:36	07:18	07:59
	17:02	17:42	18:22	20:05	20:44	21:20	21:32	21:08	20:17	19:18	17:22	16:53
3	08:20	07:58	07:14	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:20	08:00
	17:03	17:44	18:24	20:06	20:46	21:21	21:32	21:06	20:15	19:16	17:21	16:52
4	08:20	07:57	07:12	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:21	08:02
	17:04	17:45	18:25	20:07	20:47	21:22	21:32	21:05	20:13	19:14	17:19	16:52
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	17:06	17:48	18:28	20:10	20:50	21:24	21:31	21:02	20:09	19:10	17:16	16:51
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	17:08	17:51	18:31	20:13	20:52	21:25	21:30	20:59	20:05	19:07	17:14	16:51
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11	08:18	07:47	07:59	06:59	06:10	05:45	05:56	06:30	07:09	07:48	07:31	08:09
	17:12	17:56	19:35	20:17	20:56	21:27	21:29	20:55	19:59	19:01	17:10	16:51
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17	08:15	07:38	07:47	06:48	06:03	05:45	06:01	06:38	07:17	07:56	07:40	08:14
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19	08:13	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:15
	17:22	18:06	19:46	20:27	21:06	21:31	21:23	20:42	19:44	18:45	17:01	16:52
20	08:12	07:33	07:41	06:43	05:59	05:45	06:04	06:41	07:20	08:00	07:44	08:16
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21	08:12	07:31	07:39	06:41	05:58	05:45	06:05	06:43	07:22	08:01	07:45	08:16
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	17:32	18:17	19:55	20:37	21:13	21:32	21:16	20:30	19:30	18:33	16:56	16:56
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31	08:02		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	477	439	378	339	284	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:

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9/29/2010 4:34 PM / 10

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H03 - H03

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:20	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:17	07:58
	17:01	17:41	18:21	20:03	20:43	21:19	21:32	21:09	20:19	19:20	17:23	16:53
2	08:20	07:59	07:15	07:16	06:23	05:49	05:49	06:19	06:58	07:36	07:18	07:59
	17:02	17:42	18:22	20:05	20:44	21:20	21:32	21:08	20:17	19:18	17:22	16:53
3	08:20	07:58	07:14	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:20	08:00
	17:03	17:44	18:24	20:06	20:46	21:21	21:32	21:06	20:15	19:16	17:21	16:52
4	08:20	07:57	07:12	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:21	08:02
	17:04	17:45	18:25	20:07	20:47	21:22	21:32	21:05	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:18	05:47	05:51	06:23	07:01	07:40	07:23	08:03
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	17:06	17:48	18:28	20:10	20:50	21:24	21:31	21:02	20:09	19:10	17:16	16:51
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9	08:19	07:50	08:02	07:03	06:13	05:46	05:54	06:28	07:06	07:45	07:28	08:07
	17:09	17:53	19:32	20:14	20:53	21:26	21:30	20:58	20:03	19:05	17:12	16:51
10	08:18	07:48	08:00	07:01	06:11	05:45	05:55	06:29	07:08	07:46	07:30	08:08
	17:11	17:54	19:34	20:15	20:55	21:27	21:29	20:56	20:01	19:03	17:11	16:51
11	08:18	07:47	07:59	06:59	06:10	05:45	05:56	06:30	07:09	07:48	07:31	08:09
	17:12	17:56	19:35	20:17	20:56	21:27	21:29	20:55	19:59	19:01	17:10	16:51
12	08:17	07:46	07:57	06:57	06:09	05:45	05:57	06:31	07:10	07:49	07:33	08:10
	17:13	17:57	19:36	20:18	20:57	21:28	21:28	20:53	19:57	18:57	17:09	16:51
13	08:17	07:44	07:55	06:55	06:07	05:45	05:58	06:33	07:11	07:50	07:34	08:11
	17:14	17:59	19:38	20:19	20:58	21:28	21:28	20:52	19:55	18:55	17:08	16:51
14	08:16	07:42	07:53	06:53	06:06	05:45	05:59	06:34	07:13	07:52	07:35	08:11
	17:16	18:00	19:39	20:21	21:00	21:29	21:27	20:50	19:54	18:54	17:06	16:51
15	08:16	07:41	07:51	06:52	06:05	05:45	05:59	06:35	07:14	07:53	07:37	08:12
	17:17	18:00	19:40	20:22	21:01	21:29	21:26	20:49	19:52	18:52	17:05	16:51
16	08:15	07:39	07:49	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:38	08:13
	17:18	18:02	19:42	20:23	21:02	21:30	21:25	20:47	19:50	18:50	17:04	16:51
17	08:15	07:38	07:47	06:48	06:03	05:45	06:01	06:38	07:16	07:56	07:40	08:14
	17:19	18:03	19:43	20:25	21:03	21:30	21:25	20:45	19:48	18:48	17:03	16:52
18	08:14	07:36	07:45	06:46	06:01	05:45	06:02	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:45	20:26	21:05	21:31	21:24	20:44	19:46	18:46	17:02	16:52
19	08:13	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:15
	17:22	18:06	19:46	20:27	21:06	21:31	21:23	20:42	19:44	18:45	17:01	16:52
20	08:12	07:33	07:41	06:43	05:59	05:45	06:04	06:41	07:20	08:00	07:44	08:16
	17:24	18:08	19:47	20:29	21:07	21:31	21:22	20:40	19:42	18:43	17:00	16:53
21	08:12	07:31	07:39	06:41	05:58	05:45	06:05	06:43	07:22	08:01	07:45	08:16
	17:25	18:09	19:49	20:30	21:08	21:32	21:21	20:38	19:40	18:41	17:00	16:53
22	08:11	07:29	07:37	06:39	05:57	05:45	06:06	06:44	07:23	08:03	07:47	08:17
	17:26	18:11	19:50	20:31	21:09	21:32	21:20	20:37	19:38	18:39	16:59	16:54
23	08:10	07:28	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:04	07:48	08:17
	17:28	18:12	19:51	20:33	21:10	21:32	21:19	20:35	19:36	18:38	16:58	16:54
24	08:09	07:26	07:33	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:49	08:18
	17:29	18:14	19:53	20:34	21:11	21:32	21:18	20:33	19:34	18:36	16:57	16:55
25	08:08	07:24	07:32	06:34	05:55	05:46	06:10	06:48	07:27	08:07	07:51	08:18
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:34	16:56	16:55
26	08:07	07:22	07:30	06:32	05:54	05:46	06:11	06:49	07:28	08:08	07:52	08:18
	17:32	18:17	19:55	20:37	21:13	21:32	21:16	20:30	19:30	18:33	16:56	16:56
27	08:06	07:21	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:10	07:53	08:19
	17:34	18:18	19:57	20:38	21:14	21:32	21:15	20:28	19:28	18:31	16:55	16:57
28	08:05	07:19	07:26	06:29	05:52	05:47	06:13	06:51	07:30	08:11	07:54	08:19
	17:35	18:19	19:58	20:39	21:16	21:32	21:14	20:26	19:26	18:30	16:55	16:58
29	08:04		07:24	06:28	05:51	05:48	06:14	06:53	07:32	08:13	07:56	08:19
	17:36		19:59	20:40	21:17	21:32	21:13	20:24	19:24	18:28	16:54	16:58
30	08:03		07:22	06:26	05:51	05:48	06:15	06:54	07:33	08:14	07:57	08:19
	17:38		20:01	20:42	21:17	21:32	21:12	20:22	19:22	18:27	16:53	16:59
31	08:02		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	477	439	378	339	284	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H04 - H04

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:20	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:17	07:58
	17:01	17:41	18:21	20:03	20:43	21:19	21:32	21:09	20:18	19:20	17:23	16:53
2	08:20	07:59	07:15	07:16	06:23	05:49	05:49	06:19	06:58	07:36	07:18	07:59
	17:02	17:42	18:22	20:05	20:44	21:20	21:32	21:08	20:17	19:18	17:22	16:52
3	08:20	07:58	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:20	08:00
	17:03	17:44	18:24	20:06	20:46	21:21	21:32	21:06	20:15	19:16	17:20	16:52
4	08:19	07:57	07:12	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:21	08:02
	17:04	17:45	18:25	20:07	20:47	21:22	21:32	21:05	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:18	05:47	05:51	06:23	07:01	07:40	07:22	08:03
	17:05	17:47	18:26	20:09	20:48	21:23	21:31	21:04	20:11	19:12	17:18	16:51
6	08:19	07:54	07:08	07:08	06:17	05:47	05:52	06:24	07:03	07:41	07:24	08:04
	17:06	17:48	18:28	20:10	20:50	21:24	21:31	21:02	20:09	19:10	17:16	16:51
7	08:19	07:53	07:06	07:06	06:15	05:46	05:53	06:25	07:04	07:42	07:25	08:05
	17:07	17:50	18:29	20:11	20:51	21:24	21:31	21:01	20:07	19:08	17:15	16:51
8	08:19	07:51	08:04	07:05	06:14	05:46	05:53	06:26	07:05	07:43	07:27	08:06
	17:08	17:51	18:31	20:13	20:52	21:25	21:30	20:59	20:05	19:07	17:14	16:51
9	08:18	07:50	08:02	07:03	06:13	05:46	05:54	06:27	07:06	07:45	07:28	08:07
	17:09	17:53	19:32	20:14	20:53	21:26	21:30	20:58	20:03	19:05	17:12	16:51
10	08:18	07:48	08:00	07:01	06:11	05:45	05:55	06:29	07:08	07:46	07:30	08:08
	17:11	17:54	19:33	20:15	20:55	21:26	21:29	20:56	20:01	19:03	17:11	16:51
11	08:18	07:47	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:31	08:09
	17:12	17:56	19:35	20:17	20:56	21:27	21:29	20:55	19:59	19:01	17:10	16:51
12	08:17	07:45	07:57	06:57	06:09	05:45	05:57	06:31	07:10	07:49	07:33	08:10
	17:13	17:57	19:36	20:18	20:57	21:28	21:28	20:53	19:57	18:57	17:09	16:51
13	08:17	07:44	07:55	06:55	06:07	05:45	05:57	06:32	07:11	07:50	07:34	08:10
	17:14	17:59	19:38	20:19	20:58	21:28	21:27	20:52	19:55	18:55	17:07	16:51
14	08:16	07:42	07:53	06:53	06:06	05:45	05:58	06:34	07:13	07:52	07:35	08:11
	17:15	18:00	19:39	20:21	21:00	21:29	21:27	20:50	19:53	18:53	17:06	16:51
15	08:16	07:41	07:51	06:52	06:05	05:45	05:59	06:35	07:14	07:53	07:37	08:12
	17:17	18:00	19:40	20:22	21:01	21:29	21:26	20:48	19:51	18:52	17:05	16:51
16	08:15	07:39	07:49	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:38	08:13
	17:18	18:02	19:42	20:23	21:02	21:30	21:25	20:47	19:50	18:50	17:04	16:51
17	08:15	07:38	07:47	06:48	06:03	05:45	06:01	06:37	07:16	07:56	07:40	08:14
	17:19	18:03	19:43	20:25	21:03	21:30	21:25	20:45	19:48	18:48	17:03	16:52
18	08:14	07:36	07:45	06:46	06:01	05:45	06:02	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:44	20:26	21:04	21:31	21:24	20:43	19:46	18:46	17:02	16:52
19	08:13	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:15
	17:22	18:06	19:46	20:27	21:06	21:31	21:23	20:42	19:44	18:45	17:01	16:52
20	08:12	07:33	07:41	06:43	05:59	05:45	06:04	06:41	07:20	08:00	07:44	08:16
	17:23	18:08	19:47	20:29	21:07	21:31	21:22	20:40	19:42	18:43	17:00	16:53
21	08:12	07:31	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:01	07:45	08:16
	17:25	18:09	19:48	20:30	21:08	21:32	21:21	20:38	19:40	18:41	16:59	16:53
22	08:11	07:29	07:37	06:39	05:57	05:45	06:06	06:44	07:23	08:03	07:46	08:17
	17:26	18:11	19:50	20:31	21:09	21:32	21:20	20:37	19:38	18:39	16:59	16:54
23	08:10	07:28	07:35	06:37	05:56	05:45	06:07	06:45	07:24	08:04	07:48	08:17
	17:28	18:12	19:51	20:32	21:10	21:32	21:19	20:35	19:36	18:38	16:58	16:54
24	08:09	07:26	07:33	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:49	08:18
	17:29	18:14	19:53	20:34	21:11	21:32	21:18	20:33	19:34	18:36	16:57	16:55
25	08:08	07:24	07:31	06:34	05:54	05:46	06:10	06:47	07:27	08:07	07:50	08:18
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:34	16:56	16:55
26	08:07	07:22	07:30	06:32	05:54	05:46	06:11	06:49	07:28	08:08	07:52	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:16	20:30	19:30	18:33	16:56	16:56
27	08:06	07:21	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:10	07:53	08:19
	17:33	18:18	19:57	20:38	21:14	21:32	21:15	20:28	19:28	18:31	16:55	16:57
28	08:05	07:19	07:26	06:29	05:52	05:47	06:13	06:51	07:30	08:11	07:54	08:19
	17:35	18:19	19:58	20:39	21:15	21:32	21:14	20:26	19:26	18:30	16:54	16:57
29	08:04		07:24	06:27	05:51	05:48	06:14	06:53	07:32	08:12	07:56	08:19
	17:36		19:59	20:40	21:16	21:32	21:13	20:24	19:24	18:28	16:54	16:58
30	08:03		07:22	06:26	05:51	05:48	06:15	06:54	07:33	08:14	07:57	08:19
	17:38		20:01	20:42	21:17	21:32	21:11	20:22	19:22	18:26	16:53	16:59
31	08:02		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	477	439	378	339	284	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
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Description:

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9/29/2010 4:34 PM / 12

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H05 - H05

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January			February			March			April		May	June		
1	08:19		15:54 (53)	08:00		17:09 (49)	07:17		07:39 (59)	07:18		06:24	05:49		
	17:01	30	16:32 (32)	17:41	5	17:14 (49)	18:21	10	17:58 (52)	20:03		20:43	21:19		
2	08:19		15:54 (53)	07:59		17:08 (49)	07:15		17:54 (52)	07:16		06:23	05:49		20:51 (85)
	17:02	30	16:33 (32)	17:42	8	17:16 (49)	18:22	5	17:59 (52)	20:04		20:44	21:20	2	20:53 (85)
3	08:19		15:55 (53)	07:58		17:06 (49)	07:13		17:57 (52)	07:14		06:21	05:48		20:48 (85)
	17:03	31	16:34 (32)	17:44	11	17:17 (49)	18:23	3	18:00 (52)	20:06		20:45	21:21	5	20:53 (85)
4	08:19		15:55 (53)	07:56		17:05 (49)	07:11			07:12		06:20	05:48		20:48 (85)
	17:04	32	16:35 (32)	17:45	14	17:19 (49)	18:25			20:07		20:47	21:22	6	20:54 (85)
5	08:19		15:54 (53)	07:55		17:05 (49)	07:10			07:10		06:18	05:47		20:48 (85)
	17:05	33	16:35 (32)	17:47	16	17:21 (49)	18:26			20:08		20:48	21:23	8	20:56 (85)
6	08:19		15:55 (53)	07:54		17:04 (49)	07:08			07:08		06:17	05:47		20:46 (85)
	17:06	34	16:37 (32)	17:48	18	17:22 (49)	18:28			20:10		20:49	21:23	10	20:56 (85)
7	08:19		15:55 (53)	07:52		08:15 (55)	07:06			07:06		06:15	05:46		20:46 (85)
	17:07	34	16:38 (32)	17:50	22	17:24 (49)	18:29			20:11		20:51	21:24	11	20:57 (85)
8	08:18		15:55 (53)	07:51		08:13 (55)	08:04			07:04		06:14	05:46		20:46 (85)
	17:08	34	16:39 (32)	17:51	26	17:25 (49)	18:31			20:12		20:52	21:25	12	20:58 (85)
9	08:18		15:56 (53)	07:50		08:12 (55)	08:02			07:03		06:13	05:46		20:46 (85)
	17:09	33	16:40 (32)	17:53	28	17:25 (49)	19:32			20:14		20:53	21:26	11	20:57 (85)
10	08:18		15:56 (53)	07:48		08:10 (55)	08:00			07:01		06:11	05:45		20:46 (85)
	17:11	31	16:27 (53)	17:54	31	17:25 (49)	19:33			20:15		20:54	21:26	12	20:58 (85)
11	08:17		15:56 (53)	07:47		08:09 (55)	07:58			06:59		06:10	05:45		20:46 (85)
	17:12	31	16:27 (53)	17:56	32	17:25 (49)	19:35			20:16		20:56	21:27	13	20:59 (85)
12	08:17		15:57 (53)	07:45		08:07 (55)	07:56			06:57		06:09	05:45		20:46 (85)
	17:13	31	16:28 (53)	17:57	32	17:24 (49)	19:36			20:18		20:57	21:27	14	21:00 (85)
13	08:17		15:57 (53)	07:44		08:06 (55)	07:55			06:55		06:07	05:45		20:46 (85)
	17:14	31	16:28 (53)	17:59	31	17:23 (49)	19:37			20:19		20:58	21:28	14	21:00 (85)
14	08:16		15:57 (53)	07:42		08:05 (55)	07:53			06:53		06:06	05:45		20:46 (85)
	17:15	31	16:28 (53)	18:00	30	17:22 (49)	19:39			20:20		20:59	21:29	15	21:01 (85)
15	08:16		15:58 (53)	07:41		08:05 (55)	07:51			06:51		06:05	05:45		20:46 (85)
	17:17	31	16:29 (53)	18:00	25	17:20 (49)	19:40			20:22		21:01	21:29	15	21:01 (85)
16	08:15		15:58 (53)	07:39		08:07 (55)	07:49			06:50		06:04	05:45		20:46 (85)
	17:18	31	16:29 (53)	18:02	16	17:17 (49)	19:42			20:23		21:02	21:30	16	21:02 (85)
17	08:14		15:58 (53)	07:37		08:08 (55)	07:47			06:48		06:02	05:45		20:46 (85)
	17:19	31	16:29 (53)	18:03	8	08:16 (55)	19:43			20:24		21:03	21:30	16	21:02 (85)
18	08:14		15:59 (53)	07:36		07:58 (56)	07:45			06:46		06:01	05:45		20:46 (85)
	17:21	31	16:30 (53)	18:05	2	08:00 (56)	19:44			20:26		21:04	21:30	16	21:02 (85)
19	08:13		16:00 (53)	07:34		07:56 (56)	07:43			06:44		06:00	05:45		20:46 (85)
	17:22	30	16:30 (53)	18:06	6	17:43 (51)	19:46			20:27		21:05	21:31	17	21:03 (85)
20	08:12		16:00 (53)	07:33		07:54 (56)	07:41			06:43		05:59	05:45		20:46 (85)
	17:23	30	16:30 (53)	18:08	10	17:44 (51)	19:47			20:28		21:07	21:31	17	21:03 (85)
21	08:11		16:01 (53)	07:31		07:52 (56)	07:39			06:41		05:58	05:45		20:46 (85)
	17:25	29	16:30 (53)	18:09	15	17:46 (51)	19:48			20:30		21:08	21:31	17	21:03 (85)
22	08:11		16:02 (53)	07:29		07:51 (56)	07:37			06:39		05:57	05:45		20:47 (85)
	17:26	28	16:30 (53)	18:11	18	17:48 (51)	19:50			20:31		21:09	21:32	17	21:04 (85)
23	08:10		16:02 (53)	07:27		07:49 (56)	07:35			06:37		05:56	05:45		20:47 (85)
	17:28	27	16:29 (53)	18:12	20	17:49 (51)	19:51			20:32		21:10	21:32	17	21:04 (85)
24	08:09		16:03 (53)	07:26		07:49 (56)	07:33			06:36		05:55	05:46		20:47 (85)
	17:29	26	16:29 (53)	18:13	20	17:51 (51)	19:52			20:34		21:11	21:32	16	21:03 (85)
25	08:08		16:05 (53)	07:24		07:45 (59)	07:31			06:34		05:54	05:46		20:47 (85)
	17:31	23	16:28 (53)	18:15	16	17:50 (51)	19:54			20:35		21:12	21:32	16	21:03 (85)
26	08:07		16:06 (53)	07:22		07:44 (59)	07:29			06:32		05:54	05:46		20:48 (85)
	17:32	22	16:28 (53)	18:16	7	17:48 (51)	19:55			20:36		21:13	21:32	16	21:04 (85)
27	08:06		16:07 (53)	07:20		07:42 (59)	07:27			06:31		05:53	05:47		20:48 (85)
	17:33	20	16:27 (53)	18:18	8	17:56 (52)	19:56			20:38		21:14	21:32	16	21:04 (85)
28	08:05		16:09 (53)	07:19		07:40 (59)	07:26			06:29		05:52	05:47		20:49 (85)
	17:35	17	16:26 (53)	18:19	10	17:57 (52)	19:58			20:39		21:15	21:32	15	21:04 (85)
29	08:04		16:12 (53)				07:24			06:27		05:51	05:48		20:49 (85)
	17:36	12	16:24 (53)				19:59			20:40		21:16	21:32	15	21:04 (85)
30	08:03		16:16 (53)				07:22			06:26		05:51	05:48		20:50 (85)
	17:38	3	16:19 (53)				20:00			20:42		21:17	21:32	14	21:04 (85)
31	08:01						07:20					05:50			
	17:39						20:02					21:18			
Potential sun hours	282			289			368			406		463	471		
Total, worst case		837			485			18						389	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H05 - H05

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July			August			September			October			November			December		
1	05:49		20:50 (85)	06:18			06:56			07:34			07:17		07:40 (55)	07:58		15:38 (53)
	21:32	13	21:03 (85)	21:09			20:18			19:20			17:23	29	16:54 (49)	16:53	31	16:09 (53)
2	05:49		20:51 (85)	06:19			06:57			07:35			07:18		07:42 (55)	07:59		15:38 (53)
	21:32	13	21:04 (85)	21:07			20:16			19:18			17:22	28	16:55 (49)	16:52	31	16:09 (53)
3	05:50		20:51 (85)	06:20			06:59			07:37			07:19		07:43 (55)	08:00		15:40 (53)
	21:32	12	21:03 (85)	21:06			20:15			19:16			17:20	24	16:54 (49)	16:52	32	16:23 (32)
4	05:51		20:51 (85)	06:21			07:00			07:38			07:21		07:45 (55)	08:01		15:40 (53)
	21:31	12	21:03 (85)	21:05			20:13			19:14			17:19	22	16:54 (49)	16:52	34	16:24 (32)
5	05:51		20:52 (85)	06:23			07:01			07:39			07:22		16:34 (49)	08:02		15:40 (53)
	21:31	11	21:03 (85)	21:03			20:11			19:12			17:18	18	16:52 (49)	16:51	35	16:23 (32)
6	05:52		20:52 (85)	06:24			07:02			07:41			07:24		16:35 (49)	08:03		15:41 (53)
	21:31	10	21:02 (85)	21:02			20:09			19:10			17:16	16	16:51 (49)	16:51	34	16:23 (32)
7	05:53		20:54 (85)	06:25			07:04			07:42			07:25		16:35 (49)	08:05		15:41 (53)
	21:30	8	21:02 (85)	21:01			20:07			19:08			17:15	14	16:49 (49)	16:51	33	16:22 (32)
8	05:53		20:55 (85)	06:26			07:05			07:43			07:27		16:37 (49)	08:06		15:42 (53)
	21:30	7	21:02 (85)	20:59			20:05			19:06			17:14	11	16:48 (49)	16:51	32	16:22 (32)
9	05:54		20:55 (85)	06:27			07:06			07:45			07:28		16:38 (49)	08:07		15:43 (53)
	21:29	6	21:01 (85)	20:58			20:03			19:05			17:12	8	16:46 (49)	16:51	31	16:22 (32)
10	05:55		20:57 (85)	06:29			07:08			07:46			07:29		16:40 (49)	08:08		15:43 (53)
	21:29	3	21:00 (85)	20:56			20:01			19:03			17:11	5	16:45 (49)	16:51	30	16:22 (32)
11	05:56			06:30			07:09			07:47		18:29 (52)	07:31			08:08		15:44 (53)
	21:28			20:55			19:59			19:01	5	18:34 (52)	17:10			16:51	30	16:22 (32)
12	05:57			06:31			07:10			07:49		18:28 (52)	07:32		15:47 (53)	08:09		15:45 (53)
	21:28			20:53			19:57			18:57	5	18:33 (52)	17:09	5	15:52 (53)	16:51	29	16:22 (32)
13	05:57			06:32			07:11			07:50		08:12 (59)	07:34		15:44 (53)	08:10		15:45 (53)
	21:27			20:51			19:55			18:55	11	18:31 (52)	17:07	12	15:56 (53)	16:51	29	16:22 (32)
14	05:58			06:34			07:13			07:51		08:13 (59)	07:35		15:41 (53)	08:11		15:46 (53)
	21:27			20:50			19:53			18:53	8	18:28 (52)	17:06	17	15:58 (53)	16:51	27	16:13 (53)
15	05:59			06:35			07:14			07:53		08:15 (59)	07:37		15:40 (53)	08:12		15:46 (53)
	21:26			20:48			19:51			18:52	7	18:27 (52)	17:05	20	16:00 (53)	16:51	28	16:22 (32)
16	06:00			06:36			07:15			07:54		08:16 (59)	07:38		15:39 (53)	08:13		15:47 (53)
	21:25			20:47			19:49			18:50	10	18:21 (51)	17:04	22	16:01 (53)	16:51	26	16:13 (53)
17	06:01			06:37			07:16			07:55		08:18 (59)	07:39		15:38 (53)	08:13		15:48 (53)
	21:24			20:45			19:47			18:48	19	18:23 (51)	17:03	24	16:02 (53)	16:52	26	16:14 (53)
18	06:02			06:39			07:18			07:57		08:20 (56)	07:41		15:37 (53)	08:14		15:49 (53)
	21:24			20:43			19:45			18:46	20	18:21 (51)	17:02	26	16:03 (53)	16:52	25	16:14 (53)
19	06:03			06:40			07:19			07:58		08:21 (56)	07:42		15:37 (53)	08:15		15:49 (53)
	21:23			20:42			19:43			18:44	19	18:20 (51)	17:01	27	16:04 (53)	16:52	25	16:14 (53)
20	06:04			06:41			07:20			08:00		08:22 (56)	07:44		15:37 (53)	08:15		15:49 (53)
	21:22			20:40			19:41			18:43	17	18:18 (51)	17:00	28	16:05 (53)	16:53	26	16:15 (53)
21	06:05			06:42			07:21			08:01		08:24 (56)	07:45		15:37 (53)	08:16		15:49 (53)
	21:21			20:38			19:40			18:41	14	18:17 (51)	16:59	29	16:06 (53)	16:53	26	16:15 (53)
22	06:06			06:44			07:23			08:02		08:25 (56)	07:46		15:36 (53)	08:16		15:50 (53)
	21:20			20:36			19:38			18:39	9	18:14 (51)	16:59	30	16:06 (53)	16:54	26	16:16 (53)
23	06:07			06:45			07:24			08:04		08:26 (56)	07:48		15:36 (53)	08:17		15:50 (53)
	21:19			20:35			19:36			18:38	6	18:12 (51)	16:58	30	16:06 (53)	16:54	26	16:16 (53)
24	06:09			06:46			07:25			08:05		08:28 (56)	07:49		15:37 (53)	08:17		15:51 (53)
	21:18			20:33			19:34			18:36	6	08:44 (55)	16:57	30	16:07 (53)	16:55	26	16:17 (53)
25	06:10			06:47			07:26			08:07		08:37 (55)	07:50		15:36 (53)	08:18		15:52 (53)
	21:17			20:31			19:32			18:34	10	08:47 (55)	16:56	31	16:07 (53)	16:55	25	16:17 (53)
26	06:11			06:49			07:28			08:08		08:36 (55)	07:52		15:37 (53)	08:18		15:52 (53)
	21:16			20:29			19:30			18:33	19	17:48 (49)	16:56	31	16:08 (53)	16:56	25	16:17 (53)
27	06:12			06:50			07:29			08:09		08:34 (55)	07:53		15:37 (53)	08:18		15:52 (53)
	21:15			20:28			19:28			18:31	27	17:50 (49)	16:55	31	16:08 (53)	16:57	26	16:18 (53)
28	06:13			06:51			07:30			08:11		08:34 (55)	07:54		15:37 (53)	08:19		15:53 (53)
	21:14			20:26			19:26			18:29	31	17:52 (49)	16:54	31	16:08 (53)	16:57	26	16:19 (53)
29	06:14			06:52			07:32			08:12		08:35 (55)	07:55		15:38 (53)	08:19		15:53 (53)
	21:12			20:24			19:24			18:28	31	17:52 (49)	16:54	31	16:09 (53)	16:58	27	16:20 (53)
30	06:15			06:54			07:33			08:14		08:37 (55)	07:57		15:38 (53)	08:19		15:53 (53)
	21:11			20:22			19:22			18:26	32	17:54 (49)	16:53	31	16:09 (53)	16:59	29	16:30 (32)
31	06:17			06:55						08:15		08:39 (55)				08:19		15:54 (53)
	21:10			20:20						18:25	31	17:55 (49)				17:00	29	16:31 (32)
Potential sun hours	477			439			378			339			284			270		
Total, worst case		95									337			661			885	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H06 - H06

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January			February			March		April		May			June		
1	08:19		08:45 (53)	08:00			07:17		07:18		06:24			05:49		06:30 (114)
	17:01	20	16:32 (82)	17:41			18:21		20:03		20:43			21:19	22	06:52 (114)
2	08:19		08:46 (53)	07:59			07:15		07:16		06:23			05:49		06:30 (114)
	17:02	20	16:33 (82)	17:42			18:22		20:04		20:44			21:20	21	06:51 (114)
3	08:19		08:46 (53)	07:58			07:13		07:14		06:21			05:48		06:31 (114)
	17:03	22	16:34 (82)	17:44			18:24		20:06		20:45			21:21	20	06:51 (114)
4	08:19		08:46 (53)	07:57			07:11		07:12		06:20			05:48		06:31 (114)
	17:04	24	16:35 (82)	17:45			18:25		20:07		20:47			21:22	19	06:50 (114)
5	08:19		08:46 (53)	07:55			07:10		07:10		06:18			05:47		06:32 (114)
	17:05	24	16:35 (82)	17:47			18:26		20:08		20:48			21:23	18	06:50 (114)
6	08:19		08:46 (53)	07:54			07:08		07:08		06:17			05:47		06:32 (114)
	17:06	27	16:37 (82)	17:48			18:28		20:10		20:49			21:23	18	06:50 (114)
7	08:19		08:46 (53)	07:53			07:06		07:06		06:15			05:46		06:33 (114)
	17:07	29	16:38 (82)	17:50			18:29		20:11		20:51			21:24	17	06:50 (114)
8	08:19		08:47 (53)	07:51		17:23 (33)	08:04		07:04		06:14			05:46		06:34 (114)
	17:08	30	16:40 (82)	17:51	2	17:25 (33)	18:31		20:12		20:52			21:25	16	06:50 (114)
9	08:18		08:47 (53)	07:50		17:24 (33)	08:02		07:03		06:13			05:46		06:34 (114)
	17:09	31	16:40 (82)	17:53	3	17:27 (33)	19:32		20:14		20:53			21:26	15	06:49 (114)
10	08:18		08:47 (53)	07:48		17:23 (33)	08:00		07:01		06:11		06:36 (114)	05:45		06:35 (114)
	17:11	33	16:42 (82)	17:54	5	17:28 (33)	19:33		20:15		20:54	7	06:43 (114)	21:26	13	06:48 (114)
11	08:18		08:47 (53)	07:47		17:25 (33)	07:58		06:59		06:10		06:33 (114)	05:45		06:36 (114)
	17:12	34	16:43 (82)	17:56	5	17:30 (33)	19:35		20:16		20:56	12	06:45 (114)	21:27	12	06:48 (114)
12	08:17		08:48 (53)	07:45		17:26 (33)	07:57		06:57		06:09		06:31 (114)	05:45		06:36 (114)
	17:13	34	16:44 (82)	17:57	6	17:32 (33)	19:36		20:18		20:57	16	06:47 (114)	21:28	12	06:48 (114)
13	08:17		08:48 (53)	07:44			07:55		06:55		06:07		06:30 (114)	05:45		06:37 (114)
	17:14	36	16:45 (82)	17:59			19:38		20:19		20:58	18	06:48 (114)	21:28	11	06:48 (114)
14	08:16		08:49 (53)	07:42			07:53		06:53		06:06		06:29 (114)	05:45		06:38 (114)
	17:16	37	16:47 (82)	18:00			19:39		20:20		20:59	20	06:49 (114)	21:29	10	06:48 (114)
15	08:16		08:49 (53)	07:41			07:51		06:52		06:05		06:29 (114)	05:45		06:39 (114)
	17:17	37	16:48 (82)	18:00			19:40		20:22		21:01	21	06:50 (114)	21:29	8	06:47 (114)
16	08:15		08:49 (53)	07:39			07:49		06:50		06:04		06:28 (114)	05:45		06:40 (114)
	17:18	38	16:49 (82)	18:02			19:42		20:23		21:02	23	06:51 (114)	21:30	7	06:47 (114)
17	08:14		08:49 (53)	07:38			07:47		06:48		06:03		06:28 (114)	05:45		06:40 (114)
	17:19	37	16:49 (82)	18:03			19:43		20:24		21:03	23	06:51 (114)	21:30	7	06:47 (114)
18	08:14		08:51 (53)	07:36			07:45		06:46		06:01		06:27 (114)	05:45		06:41 (114)
	17:21	34	16:49 (82)	18:05			19:44		20:26		21:04	24	06:51 (114)	21:30	5	06:46 (114)
19	08:13		08:51 (53)	07:34			07:43		06:44		06:00		06:26 (114)	05:45		06:41 (114)
	17:22	34	16:49 (82)	18:06			19:46		20:27		21:05	25	06:51 (114)	21:31	5	06:46 (114)
20	08:12		08:52 (53)	07:33			07:41		06:43		05:59		06:27 (114)	05:45		06:42 (114)
	17:24	31	16:48 (82)	18:08			19:47		20:28		21:07	25	06:52 (114)	21:31	4	06:46 (114)
21	08:11		08:53 (53)	07:31			07:39		06:41		05:58		06:27 (114)	05:45		06:42 (114)
	17:25	27	16:48 (82)	18:09			19:48		20:30		21:08	25	06:52 (114)	21:31	4	06:46 (114)
22	08:11		08:54 (53)	07:29			07:37		06:39		05:57		06:27 (114)	05:45		06:43 (114)
	17:26	23	16:46 (82)	18:11			19:50		20:31		21:09	25	06:52 (114)	21:32	4	06:47 (114)
23	08:10		08:55 (53)	07:28			07:35		06:37		05:56		06:27 (114)	05:45		06:42 (114)
	17:28	14	09:09 (53)	18:12			19:51		20:32		21:10	25	06:52 (114)	21:32	5	06:47 (114)
24	08:09		08:57 (53)	07:26			07:33		06:36		05:55		06:27 (114)	05:46		06:42 (114)
	17:29	11	09:08 (53)	18:13			19:52		20:34		21:11	25	06:52 (114)	21:32	5	06:47 (114)
25	08:08		08:59 (53)	07:24			07:31		06:34		05:54		06:27 (114)	05:46		06:41 (114)
	17:31	6	09:05 (53)	18:15			19:54		20:35		21:12	25	06:52 (114)	21:32	7	06:48 (114)
26	08:07			07:22			07:29		06:32		05:54		06:27 (114)	05:46		06:42 (114)
	17:32			18:16			19:55		20:36		21:13	25	06:52 (114)	21:32	7	06:49 (114)
27	08:06			07:21			07:28		06:31		05:53		06:28 (114)	05:47		06:41 (114)
	17:33			18:18			19:56		20:38		21:14	24	06:52 (114)	21:32	8	06:49 (114)
28	08:05			07:19			07:26		06:29		05:52		06:28 (114)	05:47		06:41 (114)
	17:35			18:19			19:58		20:39		21:15	24	06:52 (114)	21:32	10	06:51 (114)
29	08:04						07:24		06:27		05:51		06:28 (114)	05:48		06:41 (114)
	17:36						19:59		20:40		21:16	23	06:51 (114)	21:32	10	06:51 (114)
30	08:03						07:22		06:26		05:51		06:29 (114)	05:48		06:41 (114)
	17:38						20:00		20:42		21:17	23	06:52 (114)	21:32	11	06:52 (114)
31	08:01						07:20				05:50		06:29 (114)			
	17:39						20:02				21:18	22	06:51 (114)			
Potential sun hours	282			289			368		406		463			471		
Total, worst case		693			21							480			331	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H06 - H06

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July			August			September	October			November			December		
1	05:49		06:40 (114)	06:18		06:42 (114)	06:56	07:34			07:17		16:53 (33)	07:58		08:29 (53)
	21:32	12	06:52 (114)	21:09	15	06:57 (114)	20:18	19:20			17:23	5	16:58 (33)	16:53	34	16:25 (82)
2	05:49		06:40 (114)	06:19		06:44 (114)	06:58	07:36			07:18		16:53 (33)	07:59		08:29 (53)
	21:32	13	06:53 (114)	21:07	10	06:54 (114)	20:16	19:18			17:22	4	16:57 (33)	16:53	33	16:24 (82)
3	05:50		06:39 (114)	06:20		06:48 (114)	06:59	07:37			07:19		16:53 (33)	08:00		08:31 (53)
	21:32	14	06:53 (114)	21:06	2	06:50 (114)	20:15	19:16			17:20	2	16:55 (33)	16:52	31	16:24 (82)
4	05:51		06:39 (114)	06:21			07:00	07:38			07:21			08:01		08:31 (53)
	21:31	16	06:55 (114)	21:05			20:13	19:14			17:19			16:52	30	16:24 (82)
5	05:51		06:39 (114)	06:23			07:01	07:39			07:22			08:02		08:31 (53)
	21:31	17	06:56 (114)	21:03			20:11	19:12			17:18			16:52	29	16:23 (82)
6	05:52		06:38 (114)	06:24			07:03	07:41			07:24			08:04		08:32 (53)
	21:31	18	06:56 (114)	21:02			20:09	19:10			17:16			16:51	27	16:23 (82)
7	05:53		06:38 (114)	06:25			07:04	07:42			07:25			08:05		08:33 (53)
	21:30	19	06:57 (114)	21:01			20:07	19:08			17:15			16:51	24	16:22 (82)
8	05:53		06:38 (114)	06:26			07:05	07:43			07:27			08:06		08:33 (53)
	21:30	19	06:57 (114)	20:59			20:05	19:06			17:14			16:51	24	16:22 (82)
9	05:54		06:37 (114)	06:27			07:06	07:45			07:28			08:07		08:34 (53)
	21:29	20	06:57 (114)	20:58			20:03	19:05			17:12			16:51	22	16:22 (82)
10	05:55		06:37 (114)	06:29			07:08	07:46			07:30			08:08		08:35 (53)
	21:29	21	06:58 (114)	20:56			20:01	19:03			17:11			16:51	20	16:22 (82)
11	05:56		06:37 (114)	06:30			07:09	07:47			07:31			08:09		08:35 (53)
	21:28	22	06:59 (114)	20:55			19:59	19:01			17:10			16:51	20	16:22 (82)
12	05:57		06:37 (114)	06:31			07:10	07:49			07:32			08:09		08:36 (53)
	21:28	22	06:59 (114)	20:53			19:57	18:57			17:09			16:51	19	16:22 (82)
13	05:58		06:37 (114)	06:32			07:11	07:50			07:34			08:10		08:37 (53)
	21:27	23	07:00 (114)	20:52			19:55	18:55			17:07			16:51	16	08:53 (53)
14	05:58		06:37 (114)	06:34			07:13	07:51			07:35			08:11		08:38 (53)
	21:27	24	07:01 (114)	20:50			19:53	18:53			17:06			16:51	16	08:54 (53)
15	05:59		06:36 (114)	06:35			07:14	07:53			07:37			08:12		08:39 (53)
	21:26	24	07:00 (114)	20:48			19:51	18:52			17:05			16:51	15	08:54 (53)
16	06:00		06:36 (114)	06:36			07:15	07:54			07:38			08:13		08:39 (53)
	21:25	25	07:01 (114)	20:47			19:49	18:50			17:04			16:51	14	08:53 (53)
17	06:01		06:36 (114)	06:37			07:16	07:56			07:39		08:33 (53)	08:13		08:40 (53)
	21:24	25	07:01 (114)	20:45			19:47	18:48			17:03	6	08:39 (53)	16:52	14	08:54 (53)
18	06:02		06:36 (114)	06:39			07:18	07:57			07:41		08:31 (53)	08:14		08:41 (53)
	21:24	25	07:01 (114)	20:43			19:45	18:46			17:02	11	08:42 (53)	16:52	14	08:55 (53)
19	06:03		06:36 (114)	06:40			07:19	07:58			07:42		08:30 (53)	08:15		08:41 (53)
	21:23	26	07:02 (114)	20:42			19:44	18:45			17:01	14	08:44 (53)	16:52	13	08:54 (53)
20	06:04		06:36 (114)	06:41			07:20	08:00			07:44		08:29 (53)	08:15		08:42 (53)
	21:22	26	07:02 (114)	20:40			19:42	18:43			17:00	23	16:21 (82)	16:53	13	08:55 (53)
21	06:05		06:36 (114)	06:42			07:21	08:01			07:45		08:29 (53)	08:16		08:42 (53)
	21:21	26	07:02 (114)	20:38			19:40	18:41			16:59	27	16:24 (82)	16:53	13	08:55 (53)
22	06:06		06:36 (114)	06:44			07:23	08:02			07:46		08:28 (53)	08:16		08:43 (53)
	21:20	26	07:02 (114)	20:37			19:38	18:39			16:59	31	16:24 (82)	16:54	13	08:56 (53)
23	06:07		06:37 (114)	06:45			07:24	08:04			07:48		08:27 (53)	08:17		08:43 (53)
	21:19	25	07:02 (114)	20:35			19:36	18:38			16:58	34	16:25 (82)	16:54	13	08:56 (53)
24	06:09		06:37 (114)	06:46			07:25	08:05			07:49		08:28 (53)	08:17		08:44 (53)
	21:18	25	07:02 (114)	20:33			19:34	18:36			16:57	34	16:26 (82)	16:55	13	08:57 (53)
25	06:10		06:37 (114)	06:47			07:26	08:07			07:50		08:27 (53)	08:18		08:44 (53)
	21:17	24	07:01 (114)	20:31			19:32	18:34			16:56	37	16:27 (82)	16:55	14	08:58 (53)
26	06:11		06:37 (114)	06:49			07:28	08:08			07:52		08:28 (53)	08:18		08:44 (53)
	21:16	24	07:01 (114)	20:29			19:30	18:33			16:56	38	16:28 (82)	16:56	14	08:58 (53)
27	06:12		06:38 (114)	06:50			07:29	08:09			07:53		08:28 (53)	08:18		08:44 (53)
	21:15	23	07:01 (114)	20:28			19:28	18:31			16:55	37	16:27 (82)	16:57	14	08:58 (53)
28	06:13		06:39 (114)	06:51			07:30	08:11			07:54		08:28 (53)	08:19		08:45 (53)
	21:14	22	07:01 (114)	20:26			19:26	18:30			16:54	36	16:26 (82)	16:57	15	09:00 (53)
29	06:14		06:40 (114)	06:52			07:32	08:12			07:55		08:29 (53)	08:19		08:45 (53)
	21:12	20	07:00 (114)	20:24			19:24	18:28			16:54	35	16:26 (82)	16:58	15	09:00 (53)
30	06:15		06:40 (114)	06:54			07:33	08:14		17:55 (33)	07:57		08:29 (53)	08:19		08:45 (53)
	21:11	19	06:59 (114)	20:22			19:22	18:26	6	18:01 (33)	16:53	35	16:26 (82)	16:59	16	09:01 (53)
31	06:17		06:41 (114)	06:55				08:15		17:54 (33)				08:19		08:45 (53)
	21:10	17	06:58 (114)	20:20				18:25	6	18:00 (33)				17:00	19	16:31 (82)
Potential sun hours	477			439			378	339			284			270		
Total, worst case		662			27				12			409			587	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H07 - H07

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January		February		March		April		May	June
1	08:20		08:00		07:17		07:18	07:48 (31)	06:25	05:49
	17:01		17:41		18:21		20:03	18 08:06 (31)	20:43	21:19
2	08:20		07:59	08:22 (30)	07:15		07:16	07:49 (31)	06:23	05:49
	17:02		17:43	2 08:24 (30)	18:22		20:05	15 08:04 (31)	20:44	21:20
3	08:20		07:58	08:21 (30)	07:14		07:14	07:50 (31)	06:21	05:48
	17:03		17:44	3 08:24 (30)	18:24		20:06	12 08:02 (31)	20:46	21:21
4	08:19		07:57	08:19 (30)	07:12		07:12	07:52 (31)	06:20	05:48
	17:04		17:46	3 08:22 (30)	18:25		20:07	7 07:59 (31)	20:47	21:22
5	08:19		07:55	08:18 (30)	07:10		07:10		06:18	05:47
	17:05		17:47	3 08:21 (30)	18:27		20:09		20:48	21:23
6	08:19		07:54		07:08		07:08		06:17	05:47
	17:06		17:49		18:28		20:10		20:50	21:24
7	08:19		07:53		07:06		07:07		06:16	05:46
	17:07		17:50		18:29		20:11		20:51	21:24
8	08:19		07:51		08:04		07:05		06:14	05:46
	17:08		17:52		18:31		20:13		20:52	21:25
9	08:18		07:50		08:02		07:03		06:13	05:46
	17:10		17:53		19:32		20:14		20:53	21:26
10	08:18	08:43 (23)	07:48		08:01		07:01		06:11	05:46
	17:11	2 08:45 (23)	17:54		19:34		20:15		20:55	21:26
11	08:18	08:42 (23)	07:47		07:59		06:59		06:10	05:45
	17:12	3 08:45 (23)	17:56		19:35		20:17		20:56	21:27
12	08:17	08:42 (23)	07:46		07:57		06:57		06:09	05:45
	17:13	5 08:47 (23)	17:57		19:36		20:18		20:57	21:28
13	08:17	08:41 (23)	07:44		07:55		06:55		06:08	05:45
	17:14	6 08:47 (23)	17:59		19:38		20:19		20:58	21:28
14	08:16	08:41 (23)	07:42		07:53		06:54		06:06	05:45
	17:16	7 08:48 (23)	18:00		19:39		20:21		21:00	21:29
15	08:16	08:40 (23)	07:41		07:51		06:52		06:05	05:45
	17:17	8 08:48 (23)	18:00		19:40		20:22		21:01	21:29
16	08:15	08:39 (23)	07:39		07:49		06:50		06:04	05:45
	17:18	10 08:49 (23)	18:02		19:42		20:23		21:02	21:30
17	08:15	08:39 (23)	07:38		07:47		06:48		06:03	05:45
	17:20	11 08:50 (23)	18:03		19:43		20:25		21:03	21:30
18	08:14	08:38 (23)	07:36		07:45		06:46		06:02	05:45
	17:21	12 08:50 (23)	18:05		19:45		20:26		21:04	21:31
19	08:13	08:37 (23)	07:34		07:43		06:45		06:01	05:45
	17:22	13 08:50 (23)	18:06		19:46		20:27		21:06	21:31
20	08:12	08:37 (23)	07:33		07:41		06:43		05:59	05:45
	17:24	12 08:49 (23)	18:08		19:47		20:29		21:07	21:31
21	08:12	08:37 (23)	07:31		07:39		06:41		05:58	05:45
	17:25	12 08:49 (23)	18:09		19:49		20:30		21:08	21:32
22	08:11	08:38 (23)	07:29		07:37		06:39		05:57	05:45
	17:26	10 08:48 (23)	18:11		19:50		20:31		21:09	21:32
23	08:10	08:40 (23)	07:28		07:35	07:56 (31)	06:38		05:56	05:46
	17:28	7 08:47 (23)	18:12		19:51	8 08:04 (31)	20:33		21:10	21:32
24	08:09	08:43 (23)	07:26		07:34	07:54 (31)	06:36		05:56	05:46
	17:29	2 08:45 (23)	18:14		19:53	12 08:06 (31)	20:34		21:11	21:32
25	08:08		07:24		07:32	07:52 (31)	06:34		05:55	05:46
	17:31		18:15		19:54	15 08:07 (31)	20:35		21:12	21:32
26	08:07		07:23		07:30	07:50 (31)	06:33		05:54	05:47
	17:32		18:17		19:55	17 08:07 (31)	20:37		21:13	21:32
27	08:06		07:21		07:28	07:48 (31)	06:31		05:53	05:47
	17:34		18:18		19:57	20 08:08 (31)	20:38		21:14	21:32
28	08:05		07:19		07:26	07:47 (31)	06:29		05:52	05:47
	17:35		18:19		19:58	21 08:08 (31)	20:39		21:15	21:32
29	08:04				07:24	07:48 (31)	06:28		05:51	05:48
	17:37				19:59	20 08:08 (31)	20:40		21:16	21:32
30	08:03				07:22	07:48 (31)	06:26		05:51	05:48
	17:38				20:01	20 08:08 (31)	20:42		21:17	21:32
31	08:02				07:20	07:48 (31)			05:50	
	17:40				20:02	19 08:07 (31)			21:18	
Potential sun hours	282		289		368		406		463	471
Total, worst case		120		11		152		52		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

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enXco
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H07 - H07

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July		August		September		October		November		December	
1	05:49		06:18		06:56		07:34		07:17		07:58	08:24 (23)
	21:32		21:09		20:19		19:20		17:24		16:53	3 08:27 (23)
2	05:50		06:19		06:58		07:36		07:18		07:59	08:26 (23)
	21:32		21:08		20:17		19:18		17:22		16:53	2 08:28 (23)
3	05:50		06:20		06:59		07:37		07:20		08:00	08:27 (23)
	21:32		21:06		20:15		19:16		17:21		16:52	2 08:28 (23)
4	05:51		06:22		07:00		07:38		07:21		08:02	
	21:32		21:05		20:13		19:14		17:19		16:52	
5	05:51		06:23		07:01		07:40		07:23		08:03	
	21:31		21:04		20:11		19:12		17:18		16:52	
6	05:52		06:24		07:03		07:41		07:24		07:48 (30)	08:04
	21:31		21:02		20:09		19:10		17:16	3	07:51 (30)	16:51
7	05:53		06:25		07:04		07:42		07:25		07:50 (30)	08:05
	21:31		21:01		20:07		19:09		17:15	3	07:53 (30)	16:51
8	05:54		06:26		07:05		07:44		07:27		07:51 (30)	08:06
	21:30		20:59		20:05	7	07:53 (31)		19:07		17:14	2 07:53 (30)	16:51
9	05:54		06:28		07:07		07:44 (31)		07:45		07:28	07:53 (30)	08:07
	21:30		20:58		20:03	12	07:56 (31)		19:05		17:13	2 07:54 (30)	16:51
10	05:55		06:29		07:08		07:42 (31)		07:46		07:30		08:08
	21:29		20:56		20:01	15	07:57 (31)		19:03		17:11		16:51
11	05:56		06:30		07:09		07:40 (31)		07:48		07:31		08:09
	21:29		20:55		19:59	18	07:58 (31)		19:01		17:10		16:51
12	05:57		06:31		07:10		07:39 (31)		07:49		07:33		08:10
	21:28		20:53		19:57	19	07:58 (31)		18:57		17:09		16:51
13	05:58		06:33		07:12		07:38 (31)		07:50		07:34		08:10
	21:27		20:52		19:56	20	07:58 (31)		18:55		17:08		16:51
14	05:59		06:34		07:13		07:38 (31)		07:52		07:35		08:11
	21:27		20:50		19:54	20	07:58 (31)		18:54		17:07		16:51
15	06:00		06:35		07:14		07:37 (31)		07:53		07:37		08:12
	21:26		20:49		19:52	21	07:58 (31)		18:52		17:05		16:51
16	06:01		06:36		07:15		07:37 (31)		07:54		07:38		08:13
	21:25		20:47		19:50	20	07:57 (31)		18:50		17:04		16:52
17	06:01		06:38		07:17		07:38 (31)		07:56		07:40		08:14
	21:25		20:45		19:48	18	07:56 (31)		18:48		17:03		16:52
18	06:02		06:39		07:18		07:40 (31)		07:57		07:41	08:17 (23)	08:14
	21:24		20:44		19:46	15	07:55 (31)		18:46		17:02	2 08:19 (23)	16:52
19	06:03		06:40		07:19		07:41 (31)		07:58		07:42	08:15 (23)	08:15
	21:23		20:42		19:44	13	07:54 (31)		18:45		17:01	7 08:22 (23)	16:53
20	06:05		06:41		07:20		07:42 (31)		08:00		07:44	08:13 (23)	08:16
	21:22		20:40		19:42	9	07:51 (31)		18:43		17:01	10 08:23 (23)	16:53
21	06:06		06:43		07:22				08:01		07:45	08:13 (23)	08:16
	21:21		20:38		19:40				18:41		17:00	12 08:25 (23)	16:53
22	06:07		06:44		07:23				08:03		07:47	08:13 (23)	08:17
	21:20		20:37		19:38				18:40		16:59	12 08:25 (23)	16:54
23	06:08		06:45		07:24				08:04		07:48	08:14 (23)	08:17
	21:19		20:35		19:36				18:38		16:58	13 08:27 (23)	16:54
24	06:09		06:46		07:25				08:05		07:49	08:15 (23)	08:18
	21:18		20:33		19:34				18:36		16:57	12 08:27 (23)	16:55
25	06:10		06:48		07:27				08:07		07:51	08:16 (23)	08:18
	21:17		20:31		19:32				18:35		16:57	11 08:27 (23)	16:56
26	06:11		06:49		07:28				08:08		07:52	08:18 (23)	08:18
	21:16		20:30		19:30				18:33		16:56	10 08:28 (23)	16:56
27	06:12		06:50		07:29				08:10		07:53	08:19 (23)	08:19
	21:15		20:28		19:28				18:31		16:55	9 08:28 (23)	16:57
28	06:13		06:51		07:31				08:11		07:54	08:21 (23)	08:19
	21:14		20:26		19:26				18:30		16:55	7 08:28 (23)	16:58
29	06:14		06:53		07:32				08:12		07:56	08:22 (23)	08:19
	21:13		20:24		19:24				18:28		16:54	6 08:28 (23)	16:58
30	06:16		06:54		07:33				08:14		07:57	08:23 (23)	08:19
	21:11		20:22		19:22				18:27		16:54	5 08:28 (23)	16:59
31	06:17		06:55						08:15				08:19
	21:10		20:20						18:25				17:00
Potential sun hours	477		439		378				339		284		270
Total, worst case						207				126			7

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H08 - H08

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January			February			March			April			May			June		
1	08:19			08:00		08:23 (57)	07:17		17:02 (77)	07:18			06:24		06:49 (56)	05:49		06:29 (55)
	17:01			17:41	16	08:39 (57)	18:21	28	17:30 (77)	20:03			20:43	20	07:09 (56)	21:19	27	06:56 (55)
2	08:19			07:59		08:22 (57)	07:15		17:03 (77)	07:16			06:23		06:49 (56)	05:49		06:30 (55)
	17:02			17:42	17	08:39 (57)	18:22	26	17:29 (77)	20:04			20:44	25	20:19 (53)	21:20	27	06:57 (55)
3	08:19			07:58		08:20 (57)	07:13		17:04 (77)	07:14			06:21		06:50 (56)	05:48		06:30 (55)
	17:03			17:44	19	08:39 (57)	18:23	23	17:27 (77)	20:06			20:45	28	20:21 (53)	21:21	26	06:56 (55)
4	08:19			07:56		08:21 (57)	07:11		17:07 (77)	07:12			06:20		06:51 (56)	05:48		06:31 (55)
	17:04			17:45	18	08:39 (57)	18:25	19	17:26 (77)	20:07			20:47	30	20:23 (53)	21:22	25	06:56 (55)
5	08:19			07:55		08:22 (57)	07:10		17:10 (77)	07:10			06:18		06:51 (56)	05:47		06:32 (55)
	17:05			17:47	18	08:40 (57)	18:26	13	17:23 (77)	20:08			20:48	29	20:23 (53)	21:22	25	06:57 (55)
6	08:19			07:54		08:22 (57)	07:08			07:08			06:17		06:52 (56)	05:47		06:31 (55)
	17:06			17:48	17	08:39 (57)	18:28			20:10			20:49	30	20:25 (53)	21:23	25	06:56 (55)
7	08:19			07:52		08:23 (57)	07:06			07:06			06:15		06:53 (56)	05:46		06:32 (55)
	17:07			17:50	16	08:39 (57)	18:29			20:11			20:51	28	20:25 (53)	21:24	24	06:56 (55)
8	08:18			07:51		08:23 (57)	08:04			07:04		07:25 (109)	06:14		06:55 (56)	05:46		06:33 (55)
	17:08			17:51	14	08:37 (57)	18:31			20:12	2	07:27 (109)	20:52	26	20:27 (53)	21:25	23	06:56 (55)
9	08:18			07:50		08:25 (57)	08:02			07:03		07:23 (109)	06:13		20:07 (53)	05:46		06:33 (55)
	17:09			17:53	11	08:36 (57)	19:32			20:14	5	07:28 (109)	20:53	20	20:27 (53)	21:25	22	06:55 (55)
10	08:18			07:48		08:27 (57)	08:00			07:01		07:21 (109)	06:11		06:39 (55)	05:45		06:33 (55)
	17:11			17:54	6	08:33 (57)	19:33			20:15	7	07:28 (109)	20:54	27	20:27 (53)	21:26	22	06:55 (55)
11	08:17			07:47			07:58			06:59		07:20 (109)	06:10		06:35 (55)	05:45		06:34 (55)
	17:12			17:56			19:35			20:16	8	07:28 (109)	20:56	32	20:26 (53)	21:27	22	06:56 (55)
12	08:17			07:45		17:11 (77)	07:56			06:57		07:18 (109)	06:09		06:34 (55)	05:45		06:35 (55)
	17:13			17:57	13	17:24 (77)	19:36			20:18	9	07:27 (109)	20:57	35	20:26 (53)	21:27	21	06:56 (55)
13	08:17			07:44		17:09 (77)	07:55			06:55		07:17 (109)	06:07		06:32 (55)	05:45		06:35 (55)
	17:14			17:59	18	17:27 (77)	19:37			20:19	11	19:56 (51)	20:58	38	20:26 (53)	21:28	21	06:56 (55)
14	08:16			07:42		17:07 (77)	07:53			06:53		07:18 (109)	06:06		06:31 (55)	05:45		06:36 (55)
	17:15			18:00	21	17:28 (77)	19:39			20:20	9	19:57 (51)	20:59	40	20:26 (53)	21:29	20	06:56 (55)
15	08:15			07:41		17:05 (77)	07:51			06:51		07:12 (59)	06:05		06:31 (55)	05:45		06:36 (55)
	17:17			18:00	25	17:30 (77)	19:40			20:22	7	19:58 (51)	21:01	39	20:25 (53)	21:29	20	06:56 (55)
16	08:15			07:39		17:04 (77)	07:49			06:50		07:11 (59)	06:04		06:30 (55)	05:45		06:37 (55)
	17:18			18:02	27	17:31 (77)	19:42			20:23	9	20:00 (51)	21:02	39	20:25 (53)	21:29	19	06:56 (55)
17	08:14			07:37		17:03 (77)	07:47			06:48		07:09 (59)	06:02		06:29 (55)	05:45		06:37 (55)
	17:19			18:03	29	17:32 (77)	19:43			20:24	9	07:18 (59)	21:03	38	20:23 (53)	21:30	19	06:56 (55)
18	08:14			07:36		17:03 (77)	07:45			06:46		07:07 (59)	06:01		06:28 (55)	05:45		06:37 (55)
	17:21			18:05	30	17:33 (77)	19:44			20:26	11	07:18 (59)	21:04	38	20:22 (53)	21:30	19	06:56 (55)
19	08:13			07:34		17:02 (77)	07:43			06:44		07:05 (59)	06:00		06:28 (55)	05:45		06:37 (55)
	17:22			18:06	32	17:34 (77)	19:46			20:27	13	07:18 (59)	21:05	34	20:20 (53)	21:31	19	06:56 (55)
20	08:12		16:54 (48)	07:33		17:01 (77)	07:41			06:43		07:04 (59)	05:59		06:28 (55)	05:45		06:37 (55)
	17:23	2	16:55 (48)	18:08	33	17:34 (77)	19:47			20:28	16	20:05 (49)	21:06	27	06:55 (55)	21:31	19	06:56 (55)
21	08:11		16:54 (48)	07:31		17:00 (77)	07:39			06:41		07:03 (59)	05:58		06:28 (55)	05:45		06:38 (55)
	17:25	3	16:57 (48)	18:09	34	17:34 (77)	19:48			20:30	18	20:06 (49)	21:08	29	06:57 (55)	21:31	18	06:56 (55)
22	08:10		16:54 (48)	07:29		17:01 (77)	07:37			06:39		07:03 (59)	05:57		06:28 (55)	05:45		06:38 (55)
	17:26	4	16:58 (48)	18:11	33	17:34 (77)	19:50			20:31	19	20:07 (49)	21:09	29	06:57 (55)	21:31	19	06:57 (55)
23	08:10		16:54 (48)	07:27		17:00 (77)	07:35			06:37		07:00 (56)	05:56		06:28 (55)	05:45		06:38 (55)
	17:28	6	17:00 (48)	18:12	34	17:34 (77)	19:51			20:32	20	20:09 (49)	21:10	29	06:57 (55)	21:32	19	06:57 (55)
24	08:09		16:54 (48)	07:26		17:00 (77)	07:33			06:36		06:57 (56)	05:55		06:28 (55)	05:46		06:38 (55)
	17:29	7	17:01 (48)	18:13	34	17:34 (77)	19:52			20:34	25	20:10 (49)	21:11	29	06:57 (55)	21:32	19	06:57 (55)
25	08:08		16:54 (48)	07:24		17:00 (77)	07:31			06:34		06:55 (56)	05:54		06:28 (55)	05:46		06:38 (55)
	17:31	9	17:03 (48)	18:15	33	17:33 (77)	19:54			20:35	23	20:11 (49)	21:12	29	06:57 (55)	21:32	19	06:57 (55)
26	08:07		16:55 (48)	07:22		17:01 (77)	07:29			06:32		06:54 (56)	05:54		06:28 (55)	05:46		06:39 (55)
	17:32	10	17:05 (48)	18:16	32	17:33 (77)	19:55			20:36	27	20:13 (49)	21:13	28	06:56 (55)	21:32	19	06:58 (55)
27	08:06		08:29 (57)	07:20		17:01 (77)	07:27			06:31		06:52 (56)	05:53		06:29 (55)	05:47		06:38 (55)
	17:33	13	17:06 (48)	18:18	32	17:33 (77)	19:56			20:38	28	20:13 (49)	21:14	28	06:57 (55)	21:32	20	06:58 (55)
28	08:05		08:28 (57)	07:19		17:02 (77)	07:25			06:29		06:51 (56)	05:52		06:29 (55)	05:47		06:39 (55)
	17:35	17	17:07 (48)	18:19	30	17:32 (77)	19:58			20:39	28	20:12 (49)	21:15	28	06:57 (55)	21:32	20	06:59 (55)
29	08:04		08:27 (57)				07:24			06:27		06:50 (56)	05:51		06:28 (55)	05:48		06:38 (55)
	17:36	17	17:06 (48)				19:59			20:40	24	20:09 (49)	21:16	29	06:57 (55)	21:32	21	06:59 (55)
30	08:02		08:25 (57)				07:22			06:26		06:49 (56)	05:51		06:29 (55)	05:48		06:39 (55)
	17:38	14	17:02 (48)				20:00			20:41	19	07:08 (56)	21:17	28	06:57 (55)	21:32	21	07:00 (55)
31	08:01		08:24 (57)				07:20						05:50		06:29 (55)			
	17:39	14	08:38 (57)				20:02						21:18	28	06:57 (55)			
Potential sun hours	282			289			368			406			463			471		
Total, worst case		116			642			109			347			937			640	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
20102130 - Merricourt ND Enxco

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Description:
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9/29/2010 4:34 PM / 19
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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H08 - H08

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	July			August			September			October			November			December		
1	05:49		06:38 (55)	06:18		06:45 (55)	06:56		07:19 (109)	07:34			07:16		07:56 (57)	07:58		
	21:32	22	07:00 (55)	21:09	34	20:37 (53)	20:18	8	07:27 (109)	19:20			17:23	8	08:04 (57)	16:53		
2	05:49		06:39 (55)	06:19		06:46 (55)	06:57		07:20 (109)	07:35			07:18		07:55 (57)	07:59		
	21:32	21	07:00 (55)	21:07	32	20:37 (53)	20:16	7	07:27 (109)	19:18			17:22	11	08:06 (57)	16:52		
3	05:50		06:38 (55)	06:20		06:50 (55)	06:59		07:21 (109)	07:37			07:19		07:53 (57)	08:00		
	21:31	22	07:00 (55)	21:06	24	20:37 (53)	20:15	5	07:26 (109)	19:16			17:20	14	08:07 (57)	16:52		
4	05:51		06:38 (55)	06:21		20:17 (53)	07:00		07:22 (109)	07:38			07:21		07:52 (57)	08:01		
	21:31	23	07:01 (55)	21:05	20	20:37 (53)	20:13	2	07:24 (109)	19:14			17:19	16	08:08 (57)	16:52		
5	05:51		06:39 (55)	06:23		07:05 (56)	07:01			07:39			07:22		07:51 (57)	08:02		
	21:31	23	07:02 (55)	21:03	27	20:37 (53)	20:11			19:12			17:18	18	08:09 (57)	16:51		
6	05:52		06:38 (55)	06:24		07:03 (56)	07:02			07:41			07:24		07:51 (57)	08:03		
	21:31	24	07:02 (55)	21:02	29	20:36 (53)	20:09			19:10			17:16	18	08:09 (57)	16:51		
7	05:53		06:38 (55)	06:25		07:01 (56)	07:04			07:42			07:25		07:51 (57)	08:04		
	21:30	25	07:03 (55)	21:00	30	20:34 (53)	20:07			19:08			17:15	18	08:09 (57)	16:51		
8	05:53		06:38 (55)	06:26		07:00 (56)	07:05			07:43		17:47 (77)	07:27		07:51 (57)	08:06		
	21:30	25	07:03 (55)	20:59	29	20:32 (53)	20:05			19:06	9	17:56 (77)	17:14	19	08:10 (57)	16:51		
9	05:54		06:37 (55)	06:27		06:59 (56)	07:06			07:45		17:42 (77)	07:28		07:52 (57)	08:07		
	21:29	26	07:03 (55)	20:58	29	20:31 (53)	20:03			19:05	16	17:58 (77)	17:12	17	08:09 (57)	16:51		
10	05:55		06:37 (55)	06:29		06:58 (56)	07:07			07:46		17:40 (77)	07:29		07:54 (57)	08:07		
	21:29	27	07:04 (55)	20:56	28	20:29 (53)	20:01			19:03	21	18:01 (77)	17:11	15	08:09 (57)	16:51		
11	05:56		06:38 (55)	06:30		06:59 (56)	07:09			07:47		17:38 (77)	07:31		07:55 (57)	08:08		
	21:28	26	07:04 (55)	20:55	25	20:29 (53)	19:59			19:01	24	18:02 (77)	17:10	14	08:09 (57)	16:51		
12	05:57		06:38 (55)	06:31		06:58 (56)	07:10			07:49		17:37 (77)	07:32		07:57 (57)	08:09		
	21:28	27	07:05 (55)	20:53	19	07:17 (56)	19:57			18:57	27	18:04 (77)	17:09	13	16:34 (48)	16:51		
13	05:58		06:38 (55)	06:32		06:58 (56)	07:11			07:50		17:35 (77)	07:34		07:59 (57)	08:10		
	21:27	27	07:05 (55)	20:51	19	07:17 (56)	19:55			18:55	29	18:04 (77)	17:07	17	16:38 (48)	16:51		
14	05:58		06:38 (55)	06:34		06:58 (56)	07:13			07:51		17:34 (77)	07:35		08:00 (57)	08:11		
	21:27	28	07:06 (55)	20:50	25	20:17 (49)	19:53			18:53	30	18:04 (77)	17:06	16	16:38 (48)	16:51		
15	05:59		06:37 (55)	06:35		06:58 (56)	07:14			07:53		17:33 (77)	07:37		08:02 (57)	08:12		
	21:26	28	07:05 (55)	20:48	28	20:19 (49)	19:51			18:52	32	18:05 (77)	17:05	13	16:39 (48)	16:51		
16	06:00		06:37 (55)	06:36		07:00 (56)	07:15			07:54		17:32 (77)	07:38		16:28 (48)	08:13		
	21:25	29	07:06 (55)	20:47	28	20:20 (49)	19:49			18:50	33	18:05 (77)	17:04	9	16:37 (48)	16:51		
17	06:01		06:37 (55)	06:37		07:01 (56)	07:16			07:55		17:32 (77)	07:39		16:28 (48)	08:13		
	21:24	29	07:06 (55)	20:45	26	20:19 (49)	19:47			18:48	34	18:06 (77)	17:03	9	16:37 (48)	16:52		
18	06:02		06:37 (55)	06:39		07:02 (56)	07:18			07:57		17:31 (77)	07:41		16:28 (48)	08:14		
	21:24	29	07:06 (55)	20:43	22	20:17 (49)	19:45			18:46	34	18:05 (77)	17:02	7	16:35 (48)	16:52		
19	06:03		06:37 (55)	06:40		07:03 (56)	07:19			07:58		17:32 (77)	07:42		16:29 (48)	08:15		
	21:23	29	07:06 (55)	20:42	25	20:16 (49)	19:43			18:44	34	18:06 (77)	17:01	6	16:35 (48)	16:52		
20	06:04		06:38 (55)	06:41		07:10 (59)	07:20			08:00		17:31 (77)	07:43		16:29 (48)	08:15		
	21:22	28	07:06 (55)	20:40	19	20:14 (49)	19:41			18:43	34	18:05 (77)	17:00	4	16:33 (48)	16:53		
21	06:05		06:38 (55)	06:42		07:09 (59)	07:21			08:01		17:31 (77)	07:45		16:29 (48)	08:16		
	21:21	28	07:06 (55)	20:38	20	20:13 (49)	19:39			18:41	33	18:04 (77)	16:59	3	16:32 (48)	16:53		
22	06:06		06:38 (55)	06:44		07:08 (59)	07:23			08:02		17:32 (77)	07:46		16:30 (48)	08:16		
	21:20	28	07:06 (55)	20:36	18	20:11 (49)	19:38			18:39	32	18:04 (77)	16:59	2	16:32 (48)	16:54		
23	06:07		06:38 (55)	06:45		07:08 (59)	07:24			08:04		17:31 (77)	07:48			08:17		
	21:19	28	07:06 (55)	20:35	16	20:09 (49)	19:36			18:38	32	18:03 (77)	16:58			16:54		
24	06:09		06:38 (55)	06:46		07:09 (59)	07:25			08:05		17:32 (77)	07:49			08:17		
	21:18	31	20:29 (53)	20:33	12	07:21 (59)	19:34			18:36	31	18:03 (77)	16:57			16:55		
25	06:10		06:39 (55)	06:47		07:10 (59)	07:26			08:07		17:33 (77)	07:50			08:18		
	21:17	34	20:31 (53)	20:31	11	07:21 (59)	19:32			18:34	28	18:01 (77)	16:56			16:55		
26	06:11		06:39 (55)	06:49		07:11 (59)	07:28			08:08		17:34 (77)	07:52			08:18		
	21:16	38	20:33 (53)	20:29	9	07:20 (59)	19:30			18:33	27	18:01 (77)	16:56			16:56		
27	06:12		06:39 (55)	06:50		07:13 (59)	07:29			08:09		17:35 (77)	07:53			08:18		
	21:15	39	20:34 (53)	20:28	9	20:02 (51)	19:28			18:31	24	17:59 (77)	16:55			16:57		
28	06:13		06:41 (55)	06:51		07:14 (59)	07:30			08:11		17:37 (77)	07:54			08:19		
	21:14	40	20:36 (53)	20:26	7	20:00 (51)	19:26			18:29	21	17:58 (77)	16:54			16:57		
29	06:14		06:42 (55)	06:52		07:19 (109)	07:32			08:12		17:38 (77)	07:55			08:19		
	21:12	39	20:36 (53)	20:24	9	19:58 (51)	19:24			18:28	17	17:55 (77)	16:54			16:58		
30	06:15		06:42 (55)	06:54		07:17 (109)	07:33			08:14		17:41 (77)	07:57			08:19		
	21:11	39	20:37 (53)	20:22	11	19:56 (51)	19:22			18:26	12	17:53 (77)	16:53			16:59		
31	06:17		06:43 (55)	06:55		07:18 (109)				08:15						08:19		
	21:10	38	20:37 (53)	20:20	9	07:27 (109)				18:25						17:00		
Potential sun hours	477			439			378			339			284			270		
Total, worst case		900			649			22			614			267				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 4:34 PM / 20

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wind@eapc.net

Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H09 - H09

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June
1	08:19	08:00	07:17	17:56 (111)	07:18	06:24	06:46 (60)	05:49
	17:01	17:41	18:21	2	17:58 (111)	20:03	20:43	37	19:48 (57)	21:19
2	08:19	07:59	07:15	17:55 (111)	07:16	06:23	06:44 (60)	05:49
	17:02	17:42	18:22	5	18:00 (111)	20:04	20:44	36	19:46 (57)	21:20
3	08:19	07:58	07:13	17:55 (111)	07:14	06:21	06:43 (60)	05:48
	17:03	17:44	18:23	6	18:01 (111)	20:06	20:45	37	19:46 (57)	21:21
4	08:19	07:56	07:11	17:56 (111)	07:12	06:20	06:42 (60)	05:48
	17:04	17:45	18:25	7	18:03 (111)	20:07	20:47	36	19:45 (57)	21:22
5	08:19	07:55	07:09	17:56 (111)	07:10	06:18	06:40 (60)	05:47
	17:05	17:47	18:26	9	18:05 (111)	20:08	20:48	35	19:43 (57)	21:22
6	08:19	07:54	07:08	17:57 (111)	07:08	06:17	06:41 (60)	05:47
	17:06	17:48	18:28	6	18:03 (111)	20:10	20:49	29	19:41 (57)	21:23
7	08:19	07:52	07:06		07:06	06:15	06:41 (60)	05:46
	17:07	17:50	18:29		20:11	20:50	23	19:38 (57)	21:24
8	08:18	07:51	08:04		07:04	06:14	06:42 (60)	05:46
	17:08	17:51	18:30		20:12	20:52	10	06:52 (60)	21:25
9	08:18	07:50	08:02		07:02	06:12	06:39 (80)	05:46
	17:09	17:53	19:32		20:14	20:53	12	06:51 (60)	21:25
10	08:18	07:48	08:00		07:01	06:11	06:37 (80)	05:45
	17:10	17:54	19:33		20:15	20:54	13	06:50 (60)	21:26
11	08:17	07:47	07:58		06:59	06:10	06:35 (80)	05:45
	17:12	17:56	19:35		20:16	20:56	14	06:49 (80)	21:27
12	08:17	07:45	07:56		06:57	19:31 (57)	06:09	06:34 (80)	05:45
	17:13	17:57	19:36		20:18	13	19:44 (57)	20:57	16	06:50 (80)	21:27
13	08:16	07:44	07:54		06:55	19:27 (57)	06:07	06:34 (80)	05:45	06:22 (86)
	17:14	17:59	19:37		20:19	19	19:46 (57)	20:58	17	06:51 (80)	21:28	6	06:28 (86)
14	08:16	07:42	07:53		06:53	19:25 (57)	06:06	06:33 (80)	05:45	06:22 (86)
	17:15	18:00	19:39		20:20	22	19:47 (57)	20:59	18	06:51 (80)	21:28	7	06:29 (86)
15	08:15	07:41	07:51		06:51	19:23 (57)	06:05	06:33 (80)	05:45	06:21 (86)
	17:17	18:00	19:40		20:22	28	19:58 (77)	21:00	19	06:52 (80)	21:29	9	06:30 (86)
16	08:15	07:39	07:49		06:50	19:22 (57)	06:04	06:32 (80)	05:44	06:21 (86)
	17:18	18:02	19:41		20:23	30	20:00 (77)	21:02	19	06:51 (80)	21:29	10	06:31 (86)
17	08:14	07:37	07:47		06:48	19:21 (57)	06:02	06:32 (80)	05:44	06:21 (86)
	17:19	18:03	19:43		20:24	32	20:01 (77)	21:03	19	06:51 (80)	21:30	10	06:31 (86)
18	08:14	07:36	07:45		06:46	19:19 (57)	06:01	06:32 (80)	05:45	06:21 (86)
	17:21	18:05	19:44		20:26	32	19:51 (57)	21:04	19	06:51 (80)	21:30	11	06:32 (86)
19	08:13	07:34	07:43		06:44	19:18 (57)	06:00	06:32 (80)	05:45	06:21 (86)
	17:22	18:06	19:46		20:27	33	19:51 (57)	21:05	19	06:51 (80)	21:31	11	06:32 (86)
20	08:12	07:32	17:41 (76)	07:41		06:42	19:18 (57)	05:59	06:32 (80)	05:45	06:21 (86)
	17:23	18:08	3	17:44 (76)	19:47		20:28	34	19:52 (57)	21:06	19	06:51 (80)	21:31	11	06:32 (86)
21	08:11	07:31		17:39 (76)	07:39		06:41	07:02 (61)	05:58	06:32 (80)	05:45	06:21 (86)
	17:25	18:09	7	17:46 (76)	19:48		20:30	37	19:52 (57)	21:08	19	06:51 (80)	21:31	11	06:32 (86)
22	08:10	07:29		17:39 (76)	07:37		06:39	07:00 (61)	05:57	06:34 (80)	05:45	06:21 (86)
	17:26	18:10	9	17:48 (76)	19:50		20:31	39	19:52 (57)	21:09	18	06:52 (80)	21:31	11	06:32 (86)
23	08:10	07:27		17:38 (76)	07:35		06:37	06:59 (61)	05:56	06:34 (80)	05:45	06:22 (86)
	17:28	18:12	11	17:49 (76)	19:51		20:32	40	19:52 (57)	21:10	17	06:51 (80)	21:32	11	06:33 (86)
24	08:09	07:26		17:37 (76)	07:33		06:36	06:57 (61)	05:55	06:34 (80)	05:46	06:22 (86)
	17:29	18:13	14	17:51 (76)	19:52		20:34	43	19:52 (57)	21:11	17	06:51 (80)	21:32	11	06:33 (86)
25	08:08	07:24		17:37 (76)	07:31		06:34	06:55 (61)	05:54	06:35 (80)	05:46	06:22 (86)
	17:30	18:15	14	17:51 (76)	19:54		20:35	43	19:51 (57)	21:12	15	06:50 (80)	21:32	10	06:32 (86)
26	08:07	07:22		17:38 (76)	07:29		06:32	06:54 (61)	05:54	06:35 (80)	05:46	06:23 (86)
	17:32	18:16	14	17:52 (76)	19:55		20:36	42	19:51 (57)	21:13	14	06:49 (80)	21:32	10	06:33 (86)
27	08:06	07:20		17:39 (76)	07:27		06:31	06:56 (61)	05:53	06:37 (80)	05:47	06:23 (86)
	17:33	18:18	11	17:50 (76)	19:56		20:37	38	19:51 (57)	21:14	12	06:49 (80)	21:32	9	06:32 (86)
28	08:05	07:19		17:40 (76)	07:25		06:29	19:16 (57)	05:52	06:38 (80)	05:47	06:25 (86)
	17:35	18:19	8	17:48 (76)	19:58		20:39	34	19:50 (57)	21:15	10	06:48 (80)	21:32	7	06:32 (86)
29	08:04				07:23		06:27	19:17 (57)	05:51	06:39 (80)	05:48	06:25 (86)
	17:36				19:59		20:40	32	19:49 (57)	21:16	8	06:47 (80)	21:32	6	06:31 (86)
30	08:02				07:22		06:26	06:47 (60)	05:50	06:42 (80)	05:48	06:27 (86)
	17:38				20:00		20:41	36	19:48 (57)	21:17	3	06:45 (80)	21:32	4	06:31 (86)
31	08:01				07:20					05:50			
	17:39				20:02					21:18			
Potential sun hours	282	289		368		406			463			471		
Total, worst case			91		35		627			580			165	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H09 - H09

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July		August		September	October		November	December
1	05:49		06:18	06:45 (80)	06:56	07:34		07:16	07:58
	21:32		21:09	15 07:00 (80)	20:18	19:20		17:23	16:53
2	05:49		06:19	06:46 (80)	06:57	07:35		07:18	07:59
	21:32		21:07	13 06:59 (80)	20:16	19:18		17:22	16:52
3	05:50		06:20	06:48 (80)	06:59	07:37		07:19	08:00
	21:31		21:06	12 07:00 (60)	20:14	19:16		17:20	16:52
4	05:50		06:21	06:51 (80)	07:00	07:38		07:21	08:01
	21:31		21:05	10 07:01 (60)	20:13	19:14		17:19	16:52
5	05:51		06:22	06:52 (60)	07:01	07:39		07:22	08:02
	21:31		21:03	15 19:45 (57)	20:11	19:12		17:18	16:51
6	05:52		06:24	06:51 (60)	07:02	07:41		07:24	08:03
	21:31		21:02	26 19:49 (57)	20:09	19:10		17:16	16:51
7	05:53		06:25	06:50 (60)	07:04	07:42	18:35 (111)	07:25	08:04
	21:30		21:00	31 19:51 (57)	20:07	19:08	2 18:37 (111)	17:15	16:51
8	05:53		06:26	06:50 (60)	07:05	07:43	18:32 (111)	07:26	08:05
	21:30		20:59	35 19:53 (57)	20:05	19:06	7 18:39 (111)	17:13	16:51
9	05:54		06:27	06:51 (60)	07:06	07:45	18:30 (111)	07:28	08:06
	21:29		20:57	36 19:54 (57)	20:03	19:04	8 18:38 (111)	17:12	16:51
10	05:55		06:29	06:52 (60)	07:07	07:46	18:30 (111)	07:29	08:07
	21:29		20:56	38 19:55 (57)	20:01	19:03	7 18:37 (111)	17:11	16:51
11	05:56		06:30	06:54 (60)	07:09	07:47	18:29 (111)	07:31	08:08
	21:28		20:54	37 19:56 (57)	19:59	19:01	5 18:34 (111)	17:10	16:51
12	05:57		06:31	06:55 (60)	07:10	07:49	18:30 (111)	07:32	08:09
	21:28		20:53	36 19:57 (57)	19:57	18:57	3 18:33 (111)	17:09	16:51
13	05:57		06:32	06:56 (60)	07:11	07:50	18:15 (76)	07:34	08:10
	21:27		20:51	35 19:57 (57)	19:55	18:55	7 18:31 (111)	17:07	16:51
14	05:58	06:48 (80)	06:34	19:25 (57)	07:12	07:51	18:12 (76)	07:35	08:11
	21:26	6 06:54 (80)	20:50	32 19:57 (57)	19:53	18:53	10 18:22 (76)	17:06	16:51
15	05:59	06:47 (80)	06:35	19:24 (57)	07:14	07:53	18:11 (76)	07:36	08:12
	21:26	9 06:56 (80)	20:48	33 19:57 (57)	19:51	18:52	12 18:23 (76)	17:05	16:51
16	06:00	06:46 (80)	06:36	07:02 (61)	07:15	07:54	18:09 (76)	07:38	08:12
	21:25	11 06:57 (80)	20:46	39 19:57 (57)	19:49	18:50	14 18:23 (76)	17:04	16:51
17	06:01	06:45 (80)	06:37	07:01 (61)	07:16	07:55	18:09 (76)	07:39	08:13
	21:24	13 06:58 (80)	20:45	43 19:58 (57)	19:47	18:48	15 18:24 (76)	17:03	16:52
18	06:02	06:45 (80)	06:39	07:02 (61)	07:17	07:57	18:09 (76)	07:41	08:14
	21:23	14 06:59 (80)	20:43	42 19:58 (57)	19:45	18:46	12 18:21 (76)	17:02	16:52
19	06:03	06:44 (80)	06:40	07:03 (61)	07:19	07:58	18:08 (76)	07:42	08:15
	21:23	16 07:00 (80)	20:41	42 19:58 (57)	19:43	18:44	11 18:19 (76)	17:01	16:52
20	06:04	06:44 (80)	06:41	07:04 (61)	07:20	07:59	18:10 (76)	07:43	08:15
	21:22	17 07:01 (80)	20:40	40 19:57 (57)	19:41	18:43	8 18:18 (76)	17:00	16:53
21	06:05	06:43 (80)	06:42	07:05 (61)	07:21	08:01	18:10 (76)	07:45	08:16
	21:21	18 07:01 (80)	20:38	39 19:57 (57)	19:39	18:41	6 18:16 (76)	16:59	16:53
22	06:06	06:43 (80)	06:44	07:07 (61)	07:23	08:02	18:13 (76)	07:46	08:16
	21:20	18 07:01 (80)	20:36	37 19:57 (57)	19:37	18:39	2 18:14 (76)	16:59	16:54
23	06:07	06:43 (80)	06:45	19:22 (57)	07:24	08:04		07:47	08:17
	21:19	19 07:02 (80)	20:35	34 19:56 (57)	19:35	18:38		16:58	16:54
24	06:08	06:43 (80)	06:46	19:22 (57)	07:25	08:05		07:49	08:17
	21:18	19 07:02 (80)	20:33	33 19:55 (57)	19:34	18:36		16:57	16:55
25	06:10	06:43 (80)	06:47	19:22 (57)	07:26	08:06		07:50	08:18
	21:17	19 07:02 (80)	20:31	32 19:54 (57)	19:32	18:34		16:56	16:55
26	06:11	06:43 (80)	06:49	19:22 (57)	07:28	08:08		07:51	08:18
	21:16	19 07:02 (80)	20:29	33 20:03 (77)	19:30	18:33		16:56	16:56
27	06:12	06:43 (80)	06:50	19:24 (57)	07:29	08:09		07:53	08:18
	21:15	19 07:02 (80)	20:27	30 20:02 (77)	19:28	18:31		16:55	16:57
28	06:13	06:43 (80)	06:51	19:25 (57)	07:30	08:11		07:54	08:18
	21:13	19 07:02 (80)	20:26	27 20:00 (77)	19:26	18:29		16:54	16:57
29	06:14	06:44 (80)	06:52	19:26 (57)	07:31	08:12		07:55	08:19
	21:12	18 07:02 (80)	20:24	24 19:58 (77)	19:24	18:28		16:54	16:58
30	06:15	06:44 (80)	06:54	19:27 (57)	07:33	08:14		07:56	08:19
	21:11	18 07:02 (80)	20:22	19 19:46 (57)	19:22	18:26		16:53	16:59
31	06:16	06:45 (80)	06:55	19:30 (57)		08:15			08:19
	21:10	16 07:01 (80)	20:20	12 19:42 (57)		18:25			17:00
Potential sun hours	477		439		378	339		285	270
Total, worst case		288		930			129		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H10 - H10

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February		March		April	May	June	July	August	September	October		November	December
1	08:19	08:00		07:17	17:53 (60)	07:18	06:24	05:49	05:48	06:17	06:56	07:34		07:16	07:58
	17:01	17:41		18:20	5 17:58 (60)	20:03	20:43	21:19	21:32	21:08	20:18	19:20		17:23	16:53
2	08:19	07:59		07:15	17:55 (60)	07:16	06:22	05:48	05:49	06:19	06:57	07:35		07:18	07:59
	17:02	17:42		18:22	4 17:59 (60)	20:04	20:44	21:20	21:31	21:07	20:16	19:18		17:22	16:52
3	08:19	07:57		07:13		07:14	06:21	05:48	05:50	06:20	06:58	07:36		07:19	08:00
	17:03	17:44		18:23		20:06	20:45	21:21	21:31	21:06	20:14	19:16		17:20	16:52
4	08:19	07:56		07:11		07:12	06:19	05:47	05:50	06:21	07:00	07:38		07:21	08:01
	17:04	17:45		18:25		20:07	20:46	21:21	21:31	21:04	20:12	19:14		17:19	16:52
5	08:19	07:55		07:09		07:10	06:18	05:47	05:51	06:22	07:01	07:39		07:22	08:02
	17:05	17:47		18:26		20:08	20:48	21:22	21:31	21:03	20:10	19:12		17:17	16:51
6	08:19	07:54		07:07		07:08	06:17	05:46	05:52	06:23	07:02	07:40		07:23	08:03
	17:06	17:48		18:27		20:09	20:49	21:23	21:30	21:02	20:09	19:10		17:16	16:51
7	08:18	07:52		07:06		07:06	06:15	05:46	05:52	06:25	07:03	07:42		07:25	08:04
	17:07	17:50		18:29		20:11	20:50	21:24	21:30	21:00	20:07	19:08		17:15	16:51
8	08:18	07:51		08:04		07:04	06:14	05:46	05:53	06:26	07:05	07:43		07:26	08:05
	17:08	17:51		18:30		20:12	20:52	21:25	21:30	20:59	20:05	19:06		17:13	16:51
9	08:18	07:49		08:02		07:02	06:12	05:45	05:54	06:27	07:06	07:44		07:28	08:06
	17:09	17:53		19:32		20:13	20:53	21:25	21:29	20:57	20:03	19:04		17:12	16:51
10	08:18	07:48		08:00		07:00	06:11	05:45	05:55	06:28	07:07	07:46		07:29	08:07
	17:10	17:54		19:33		20:15	20:54	21:26	21:29	20:56	20:01	19:02		17:11	16:50
11	08:17	07:46		07:58		06:59	06:10	05:45	05:56	06:30	07:09	07:47		07:31	08:08
	17:11	17:55		19:34		20:16	20:55	21:27	21:28	20:54	19:59	19:01		17:10	16:50
12	08:17	07:45		07:56		06:57	06:08	05:45	05:56	06:31	07:10	07:48	18:27 (60)	07:32	08:09
	17:13	17:57		19:36		20:17	20:57	21:27	21:28	20:53	19:57	18:57	5 18:32 (60)	17:08	16:50
13	08:16	07:43		07:54		06:55	06:07	05:44	05:57	06:32	07:11	07:50	18:26 (60)	07:33	08:10
	17:14	17:58		19:37		20:19	20:58	21:28	21:27	20:51	19:55	18:55	5 18:31 (60)	17:07	16:51
14	08:16	07:42		07:52		06:53	06:06	05:44	05:58	06:33	07:12	07:51	18:25 (60)	07:35	08:11
	17:15	18:00		19:39		20:20	20:59	21:28	21:26	20:50	19:53	18:53	4 18:29 (60)	17:06	16:51
15	08:15	07:40		07:50		06:51	06:05	05:44	05:59	06:35	07:14	07:52	18:25 (60)	07:36	08:12
	17:17	18:00		19:40		20:21	21:00	21:29	21:26	20:48	19:51	18:51	2 18:27 (60)	17:05	16:51
16	08:15	07:39		07:49		06:49	06:03	05:44	06:00	06:36	07:15	07:54		07:38	08:12
	17:18	18:01		19:41		20:23	21:02	21:29	21:25	20:46	19:49	18:50		17:04	16:51
17	08:14	07:37		07:47		06:48	06:02	05:44	06:01	06:37	07:16	07:55	18:14 (61)	07:39	08:13
	17:19	18:03		19:43		20:24	21:03	21:30	21:24	20:45	19:47	18:48	7 18:21 (61)	17:03	16:51
18	08:13	07:36		07:45		06:46	06:01	05:44	06:02	06:38	07:17	07:57	18:13 (61)	07:41	08:14
	17:20	18:04		19:44		20:25	21:04	21:30	21:23	20:43	19:45	18:46	8 18:21 (61)	17:02	16:52
19	08:13	07:34	17:42 (61)	07:43		06:44	06:00	05:44	06:03	06:40	07:19	07:58	18:11 (61)	07:42	08:14
	17:22	18:06	2 17:43 (61)	19:45		20:27	21:05	21:30	21:22	20:41	19:43	18:44	8 18:19 (61)	17:01	16:52
20	08:12	07:32	17:41 (61)	07:41		06:42	05:59	05:45	06:04	06:41	07:20	07:59	18:11 (61)	07:43	08:15
	17:23	18:07	3 17:44 (61)	19:47		20:28	21:06	21:31	21:22	20:40	19:41	18:42	7 18:18 (61)	17:00	16:52
21	08:11	07:31	17:40 (61)	07:39		06:41	05:58	05:45	06:05	06:42	07:21	08:01	18:11 (61)	07:45	08:16
	17:25	18:09	6 17:46 (61)	19:48		20:29	21:07	21:31	21:21	20:38	19:39	18:41	5 18:16 (61)	16:59	16:53
22	08:10	07:29	17:40 (61)	07:37		06:39	05:57	05:45	06:06	06:43	07:22	08:02	18:12 (61)	07:46	08:16
	17:26	18:10	7 17:47 (61)	19:49		20:31	21:09	21:31	21:20	20:36	19:37	18:39	2 18:14 (61)	16:58	16:53
23	08:09	07:27	17:41 (61)	07:35		06:37	05:56	05:45	06:07	06:45	07:24	08:03		07:47	08:17
	17:27	18:12	8 17:49 (61)	19:51		20:32	21:10	21:31	21:19	20:34	19:35	18:37		16:58	16:54
24	08:08	07:25	17:42 (61)	07:33		06:35	05:55	05:45	06:08	06:46	07:25	08:05		07:49	08:17
	17:29	18:13	9 17:51 (61)	19:52		20:33	21:11	21:32	21:18	20:33	19:33	18:36		16:57	16:54
25	08:08	07:24	17:43 (61)	07:31		06:34	05:54	05:46	06:09	06:47	07:26	08:06		07:50	08:17
	17:30	18:15	5 17:48 (61)	19:53		20:35	21:12	21:32	21:17	20:31	19:31	18:34		16:56	16:55
26	08:07	07:22		07:29		06:32	05:53	05:46	06:11	06:48	07:27	08:08		07:51	08:18
	17:32	18:16		19:55		20:36	21:13	21:32	21:16	20:29	19:29	18:32		16:55	16:56
27	08:06	07:20	17:53 (60)	07:27		06:30	05:52	05:47	06:12	06:50	07:29	08:09		07:53	08:18
	17:33	18:18	3 17:56 (60)	19:56		20:37	21:14	21:32	21:14	20:27	19:27	18:31		16:55	16:56
28	08:04	07:18	17:53 (60)	07:25		06:29	05:52	05:47	06:13	06:51	07:30	08:11		07:54	08:18
	17:35	18:19	4 17:57 (60)	19:58		20:39	21:15	21:32	21:13	20:25	19:25	18:29		16:54	16:57
29	08:03			07:23		06:27	05:51	05:47	06:14	06:52	07:31	08:12		07:55	08:19
	17:36			19:59		20:40	21:16	21:32	21:12	20:24	19:24	18:28		16:54	16:58
30	08:02			07:21		06:26	05:50	05:48	06:15	06:53	07:33	08:13		07:56	08:19
	17:38			20:00		20:41	21:17	21:32	21:11	20:22	19:22	18:26		16:53	16:59
31	08:01			07:19			05:50		06:16	06:55		08:15			08:19
	17:39			20:02			21:18		21:10	20:20		18:25			17:00
Potential sun hours	282	289		368		406	463	471	477	439	378	339		284	270
Total, worst case			47		9								53		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H11 - H11

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:16	07:17	06:24	05:49	05:48	06:17	06:56	07:34	07:16	07:57
	17:01	17:40	18:20	20:03	20:42	21:19	21:31	21:08	20:18	19:19	17:23	16:52
2	08:19	07:58	07:15	07:15	06:22	05:48	05:49	06:18	06:57	07:35	07:17	07:58
	17:01	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:17	17:21	16:52
3	08:19	07:57	07:13	07:13	06:21	05:48	05:49	06:20	06:58	07:36	07:19	08:00
	17:02	17:43	18:23	20:05	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:19	05:47	05:50	06:21	06:59	07:38	07:20	08:01
	17:03	17:45	18:24	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:51
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:04	17:46	18:26	20:08	20:48	21:22	21:31	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:16	05:46	05:51	06:23	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:23	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:52	06:24	07:03	07:42	07:25	08:04
	17:07	17:49	18:29	20:11	20:50	21:24	21:30	21:00	20:06	19:08	17:14	16:51
8	08:18	07:51	08:04	07:04	06:13	05:45	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:04	19:06	17:13	16:50
9	08:18	07:49	08:02	07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:28	08:06
	17:09	17:52	19:31	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:50
10	08:17	07:48	08:00	07:00	06:11	05:45	05:54	06:28	07:07	07:45	07:29	08:07
	17:10	17:54	19:33	20:15	20:54	21:26	21:28	20:56	20:01	19:02	17:11	16:50
11	08:17	07:46	07:58	06:58	06:09	05:45	05:55	06:29	07:08	07:47	07:30	08:08
	17:11	17:55	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:00	17:09	16:50
12	08:17	07:45	07:56	06:56	06:08	05:44	05:56	06:31	07:10	07:48	07:32	08:09
	17:12	17:57	19:36	20:17	20:56	21:27	21:27	20:53	19:57	18:57	17:08	16:50
13	08:16	07:43	07:54	06:55	06:07	05:44	05:57	06:32	07:11	07:50	07:33	08:10
	17:14	17:58	19:37	20:19	20:58	21:28	21:27	20:51	19:55	18:55	17:07	16:50
14	08:16	07:42	07:52	06:53	06:06	05:44	05:58	06:33	07:12	07:51	07:35	08:11
	17:15	18:00	19:38	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:50
15	08:15	07:40	07:50	06:51	06:04	05:44	05:59	06:34	07:13	07:52	07:36	08:11
	17:16	18:00	19:40	20:21	21:00	21:29	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:39	07:48	06:49	06:03	05:44	06:00	06:36	07:15	07:54	07:38	08:12
	17:18	18:01	19:41	20:23	21:01	21:29	21:25	20:46	19:49	18:49	17:04	16:51
17	08:14	07:37	07:46	06:47	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:42	20:24	21:03	21:29	21:24	20:44	19:47	18:48	17:03	16:51
18	08:13	07:35	07:44	06:46	06:01	05:44	06:02	06:38	07:17	07:56	07:40	08:14
	17:20	18:04	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:51
19	08:12	07:34	07:43	06:44	06:00	05:44	06:03	06:39	07:18	07:58	07:42	08:14
	17:22	18:06	19:45	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:12	07:32	07:41	06:42	05:59	05:44	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:31	21:21	20:39	19:41	18:42	17:00	16:52
21	08:11	07:30	07:39	06:40	05:58	05:44	06:05	06:42	07:21	08:00	07:44	08:15
	17:24	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:46	08:16
	17:26	18:10	19:49	20:30	21:08	21:31	21:20	20:36	19:37	18:39	16:58	16:53
23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:44	07:23	08:03	07:47	08:16
	17:27	18:11	19:51	20:32	21:09	21:31	21:19	20:34	19:35	18:37	16:57	16:54
24	08:08	07:25	07:33	06:35	05:55	05:45	06:08	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:11	21:31	21:18	20:32	19:33	18:35	16:57	16:54
25	08:07	07:24	07:31	06:33	05:54	05:46	06:09	06:47	07:26	08:06	07:50	08:17
	17:30	18:14	19:53	20:34	21:12	21:32	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:10	06:48	07:27	08:07	07:51	08:18
	17:31	18:16	19:55	20:36	21:13	21:32	21:15	20:29	19:29	18:32	16:55	16:55
27	08:05	07:20	07:27	06:30	05:52	05:46	06:11	06:49	07:28	08:09	07:52	08:18
	17:33	18:17	19:56	20:37	21:14	21:32	21:14	20:27	19:27	18:31	16:54	16:56
28	08:04	07:18	07:25	06:29	05:51	05:47	06:13	06:51	07:30	08:10	07:54	08:18
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29	08:03		07:23	06:27	05:51	05:47	06:14	06:52	07:31	08:12	07:55	08:18
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30	08:02		07:21	06:25	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:19
	17:37		20:00	20:41	21:17	21:32	21:11	20:22	19:21	18:26	16:53	16:59
31	08:01		07:19		05:49		06:16	06:54		08:15		08:19
	17:39		20:01		21:18		21:10	20:20		18:24		16:59
Potential sun hours	282	289	368	406	463	471	477	439	378	339	284	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 4:34 PM / 24

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H12 - H12

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:16	07:17	06:24	05:49	05:48	06:17	06:56	07:34	07:16	07:57
	17:01	17:40	18:20	20:03	20:42	21:19	21:31	21:08	20:18	19:19	17:23	16:52
2	08:19	07:59	07:15	07:15	06:22	05:48	05:49	06:18	06:57	07:35	07:18	07:59
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:21	16:52
3	08:19	07:57	07:13	07:14	06:21	05:48	05:49	06:20	06:58	07:36	07:19	08:00
	17:03	17:43	18:23	20:05	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:19	05:47	05:50	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:24	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:51
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:46	18:26	20:08	20:48	21:22	21:31	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:16	05:46	05:51	06:23	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:23	21:30	21:02	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:52	06:25	07:03	07:42	07:25	08:04
	17:07	17:49	18:29	20:11	20:50	21:24	21:30	21:00	20:06	19:08	17:14	16:51
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	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:05	19:06	17:13	16:50
9	08:18	07:49	08:02	07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:28	08:06
	17:09	17:52	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:50
10	08:17	07:48	08:00	07:00	06:11	05:45	05:55	06:28	07:07	07:46	07:29	08:07
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11	08:17	07:46	07:58	06:58	06:09	05:45	05:55	06:29	07:08	07:47	07:30	08:08
	17:11	17:55	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:00	17:09	16:50
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19	08:12	07:34	07:43	06:44	06:00	05:44	06:03	06:39	07:18	07:58	07:42	08:14
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20	08:12	07:32	07:41	06:42	05:59	05:44	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:31	21:21	20:39	19:41	18:42	17:00	16:52
21	08:11	07:30	07:39	06:40	05:58	05:45	06:05	06:42	07:21	08:01	07:44	08:15
	17:24	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:46	08:16
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23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:44	07:23	08:03	07:47	08:16
	17:27	18:12	19:51	20:32	21:09	21:31	21:19	20:34	19:35	18:37	16:57	16:54
24	08:08	07:25	07:33	06:35	05:55	05:45	06:08	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:11	21:31	21:18	20:32	19:33	18:36	16:57	16:54
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	17:30	18:14	19:53	20:34	21:12	21:32	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:10	06:48	07:27	08:08	07:51	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:15	20:29	19:29	18:32	16:55	16:56
27	08:05	07:20	07:27	06:30	05:52	05:46	06:11	06:50	07:29	08:09	07:52	08:18
	17:33	18:17	19:56	20:37	21:14	21:32	21:14	20:27	19:27	18:31	16:55	16:56
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:54	08:18
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29	08:03		07:23	06:27	05:51	05:47	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:32	21:12	20:23	19:23	18:27	16:53	16:58
30	08:02		07:21	06:25	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:19
	17:37		20:00	20:41	21:17	21:32	21:11	20:22	19:21	18:26	16:53	16:59
31	08:01		07:19		05:49		06:16	06:55		08:15		08:19
	17:39		20:01		21:18		21:10	20:20		18:24		16:59
Potential sun hours	282	289	368	406	463	471	477	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H13 - H13

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:16	07:17	06:24	05:49	05:48	06:17	06:56	07:34	07:16	07:57
	17:01	17:40	18:20	20:03	20:42	21:19	21:31	21:08	20:18	19:19	17:23	16:53
2	08:19	07:59	07:15	07:15	06:22	05:48	05:49	06:19	06:57	07:35	07:18	07:59
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:52
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:58	07:36	07:19	08:00
	17:03	17:43	18:23	20:05	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:19	05:47	05:50	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:51
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:46	18:26	20:08	20:48	21:22	21:31	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:16	05:46	05:52	06:23	07:02	07:40	07:23	08:03
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	17:07	17:49	18:29	20:11	20:50	21:24	21:30	21:00	20:06	19:08	17:15	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:05	19:06	17:13	16:51
9	08:18	07:49	08:02	07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:28	08:06
	17:09	17:52	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:50
10	08:17	07:48	08:00	07:00	06:11	05:45	05:55	06:28	07:07	07:46	07:29	08:07
	17:10	17:54	19:33	20:15	20:54	21:26	21:28	20:56	20:01	19:02	17:11	16:50
11	08:17	07:46	07:58	06:58	06:10	05:45	05:55	06:30	07:08	07:47	07:30	08:08
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12	08:17	07:45	07:56	06:57	06:08	05:45	05:56	06:31	07:10	07:48	07:32	08:09
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	17:16	18:00	19:40	20:21	21:00	21:29	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:39	07:48	06:49	06:03	05:44	06:00	06:36	07:15	07:54	07:38	08:12
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26	08:06	07:22	07:29	06:32	05:53	05:46	06:10	06:48	07:27	08:08	07:51	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:15	20:29	19:29	18:32	16:55	16:56
27	08:05	07:20	07:27	06:30	05:52	05:46	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:17	19:56	20:37	21:14	21:32	21:14	20:27	19:27	18:31	16:55	16:56
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:54	08:18
	17:35	18:19	19:57	20:38	21:15	21:32	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:47	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:32	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:25	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:19
	17:37		20:00	20:41	21:17	21:32	21:11	20:22	19:21	18:26	16:53	16:59
31	08:01		07:19		05:50		06:16	06:55		08:15		08:19
	17:39		20:01		21:18		21:10	20:20		18:24		17:00
Potential sun hours	282	289	368	406	463	471	477	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H14 - H14

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June
1	08:19	08:00	07:17	07:18	19:37 (127) 06:24	06:46 (62) 05:49
	17:01	17:41	18:21	20:03	4 19:41 (127) 20:43	5 06:51 (62) 21:19
2	08:19	07:59	07:15	07:16	19:37 (127) 06:23	06:44 (62) 05:49
	17:02	17:42	18:22	20:04	5 19:42 (127) 20:44	7 06:51 (62) 21:20
3	08:19	07:58	07:13	07:14	19:37 (127) 06:21	06:43 (62) 05:48
	17:03	17:44	18:23	20:06	7 19:44 (127) 20:45	9 06:52 (62) 21:21
4	08:19	07:56	07:11	07:12	19:38 (127) 06:20	06:42 (62) 05:48
	17:04	17:45	18:25	20:07	7 19:45 (127) 20:47	11 06:53 (62) 21:21
5	08:19	07:55	07:09	07:10	19:38 (127) 06:18	06:40 (62) 05:47
	17:05	17:47	18:26	20:08	6 19:44 (127) 20:48	12 06:52 (62) 21:22
6	08:19	07:54	07:08	07:08	06:17	06:39 (62) 05:47
	17:06	17:48	18:28	20:10	20:49	13 06:52 (62) 21:23
7	08:19	07:52	07:06	07:06	06:15	06:37 (62) 05:46
	17:07	17:50	18:29	20:11	20:50	14 06:51 (62) 21:24
8	08:18	07:51	08:04	07:04	06:14	06:37 (62) 05:46
	17:08	17:51	18:30	20:12	20:52	14 06:51 (62) 21:25
9	08:18	07:49 08:12 (63)	08:02	07:02	06:13	06:38 (62) 05:46
	17:09	17:53 2 08:14 (63)	19:32	20:14	20:53	12 06:50 (62) 21:25
10	08:18	07:48 08:10 (63)	08:00	07:01	06:11	06:40 (62) 05:45
	17:11	17:54 4 08:14 (63)	19:33	20:15	20:54	9 06:49 (62) 21:26
11	08:17	07:47 08:09 (63)	07:58	06:59	06:10	06:41 (62) 05:45
	17:12	17:56 6 08:15 (63)	19:35	20:16	20:55	6 06:47 (62) 21:27
12	08:17	07:45 08:07 (63)	07:56	06:57	06:09	05:45
	17:13	17:57 7 08:14 (63)	19:36	20:18	20:57	21:27
13	08:16	07:44 08:06 (63)	07:54	06:55	06:07	05:45
	17:14	17:59 8 08:14 (63)	19:37	20:19	20:58	21:28
14	08:16	07:42 08:06 (63)	07:53	06:53	06:06	05:45
	17:15	18:00 6 08:12 (63)	19:39	20:20	20:59	21:28
15	08:15	07:40	07:51	06:51	06:05	05:45
	17:17	18:00	19:40	20:22	21:00	21:29
16	08:15	07:39	07:49	06:50	19:58 (128) 06:04	05:45
	17:18	18:02	19:41	20:23	2 20:00 (128) 21:02	21:29
17	08:14	07:37	07:47	06:48	19:57 (128) 06:02	05:45
	17:19	18:03	19:43	20:24	4 20:01 (128) 21:03	21:30
18	08:13	07:36	07:45	06:46	19:56 (128) 06:01	05:45
	17:21	18:05	19:44	20:26	6 20:02 (128) 21:04	21:30
19	08:13	07:34 07:56 (125)	07:43 08:04 (91)	06:44	19:55 (128) 06:00	05:45
	17:22	18:06 2 07:58 (125)	19:46 3 08:07 (91)	20:27	8 20:03 (128) 21:05	21:30
20	08:12	07:32 07:54 (125)	07:41 08:02 (91)	06:42	19:56 (128) 05:59	05:45
	17:23	18:08 3 07:57 (125)	19:47 6 08:08 (91)	20:28	9 20:05 (128) 21:06	21:31
21	08:11	07:31 07:52 (125)	07:39 08:00 (91)	06:41	19:56 (128) 05:58	05:45
	17:25	18:09 3 07:55 (125)	19:48 8 08:08 (91)	20:29	10 20:06 (128) 21:07	21:31
22	08:10	07:29	07:37 07:58 (91)	06:39	19:57 (128) 05:57	05:45
	17:26	18:10	19:50 10 08:08 (91)	20:31	7 20:04 (128) 21:09	21:31
23	08:09	07:27	07:35 07:56 (91)	06:37	05:56	05:45
	17:28	18:12	19:51 12 08:08 (91)	20:32	21:10	21:32
24	08:09	07:26	07:33 07:54 (91)	06:36	05:55	05:46
	17:29	18:13	19:52 13 08:07 (91)	20:33	21:11	21:32
25	08:08	07:24	07:31 07:54 (91)	06:34	05:54	05:46
	17:31	18:15	19:54 12 08:06 (91)	20:35	21:12	21:32
26	08:07	07:22	07:29 07:55 (91)	06:32	05:54	05:46
	17:32	18:16	19:55 11 19:33 (126)	20:36	21:13	21:32
27	08:06	07:20	07:27 19:31 (126)	06:31	05:53	05:47
	17:33	18:18	19:56 3 19:34 (126)	20:37	21:14	21:32
28	08:05	07:19	07:25 19:31 (126)	06:29	05:52	05:47
	17:35	18:19	19:58 5 19:36 (126)	20:39	21:15	21:32
29	08:03		07:23 19:32 (126)	06:27	05:51	05:48
	17:36		19:59 5 19:37 (126)	20:40	21:16	21:32
30	08:02		07:22	06:26	06:47 (62) 05:51	05:48
	17:38		20:00	20:41	3 06:50 (62) 21:17	21:32
31	08:01		07:20		05:50	
	17:39		20:02		21:18	
Potential sun hours	282	289	368	406	463	471
Total, worst case		41	88	78	112	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H14 - H14

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July		August			September			October			November			December
1	05:49		06:18		06:53 (62)	06:56			07:34			07:16		07:40 (63)	07:58
	21:32		21:09	2	06:55 (62)	20:18			19:20			17:23	4	07:44 (63)	16:53
2	05:49		06:19		06:50 (62)	06:57			07:35			07:18		07:41 (63)	07:59
	21:32		21:07	8	06:58 (62)	20:16			19:18			17:22	2	07:43 (63)	16:52
3	05:50		06:20		06:49 (62)	06:59			07:37			07:19			08:00
	21:31		21:06	10	06:59 (62)	20:14			19:16			17:20			16:52
4	05:51		06:21		06:48 (62)	07:00			07:38			07:21			08:01
	21:31		21:05	12	07:00 (62)	20:13			19:14			17:19			16:52
5	05:51		06:22		06:48 (62)	07:01			07:39			07:22			08:02
	21:31		21:03	14	07:02 (62)	20:11			19:12			17:18			16:51
6	05:52		06:24		06:48 (62)	07:02			07:41			07:24			08:03
	21:30		21:02	14	07:02 (62)	20:09			19:10			17:16			16:51
7	05:53		06:25		06:49 (62)	07:04		19:34 (127)	07:42			07:25			08:04
	21:30		21:00	13	07:02 (62)	20:07	5	19:39 (127)	19:08			17:15			16:51
8	05:53		06:26		06:50 (62)	07:05		19:32 (127)	07:43			07:26			08:05
	21:30		20:59	12	07:02 (62)	20:05	7	19:39 (127)	19:06			17:14			16:51
9	05:54		06:27		06:51 (62)	07:06		19:30 (127)	07:45			07:28			08:06
	21:29		20:57	10	07:01 (62)	20:03	7	19:37 (127)	19:04			17:12			16:51
10	05:55		06:29		06:52 (62)	07:07		19:30 (127)	07:46			07:29			08:07
	21:29		20:56	9	07:01 (62)	20:01	5	19:35 (127)	19:03			17:11			16:51
11	05:56		06:30		06:54 (62)	07:09		19:31 (127)	07:47			07:31			08:08
	21:28		20:54	7	07:01 (62)	19:59	3	19:34 (127)	19:01			17:10			16:51
12	05:57		06:31		06:55 (62)	07:10		19:31 (127)	07:49			07:32			08:09
	21:28		20:53	4	06:59 (62)	19:57	2	19:32 (127)	18:57			17:09			16:51
13	05:58		06:32		06:56 (62)	07:11			07:50			07:34			08:10
	21:27		20:51	2	06:58 (62)	19:55			18:55			17:07			16:51
14	05:58		06:34			07:12		19:22 (126)	07:51			07:35			08:11
	21:26		20:50			19:53	5	19:27 (126)	18:53			17:06			16:51
15	05:59		06:35			07:14		19:22 (126)	07:53			07:36			08:12
	21:26		20:48			19:51	4	19:26 (126)	18:52			17:05			16:51
16	06:00		06:36			07:15		19:21 (126)	07:54			07:38			08:12
	21:25		20:46			19:49	3	19:24 (126)	18:50			17:04			16:51
17	06:01		06:37			07:16		07:44 (91)	07:55			07:39			08:13
	21:24		20:45			19:47	10	19:22 (126)	18:48			17:03			16:52
18	06:02		06:39			07:17		07:42 (91)	07:57			07:41			08:14
	21:23		20:43			19:45	11	07:53 (91)	18:46			17:02			16:52
19	06:03		06:40			07:19		07:40 (91)	07:58			07:42			08:14
	21:23		20:41			19:43	13	07:53 (91)	18:44			17:01			16:52
20	06:04		06:41			07:20		07:42 (91)	07:59		08:22 (125)	07:43			08:15
	21:22		20:40			19:41	12	07:54 (91)	18:43	3	08:25 (125)	17:00			16:53
21	06:05		06:42		20:02 (128)	07:21		07:43 (91)	08:01		08:23 (125)	07:45			08:16
	21:21		20:38	7	20:09 (128)	19:39	11	07:54 (91)	18:41	3	08:26 (125)	16:59			16:53
22	06:06		06:44		20:01 (128)	07:23		07:44 (91)	08:02		08:25 (125)	07:46			08:16
	21:20		20:36	9	20:10 (128)	19:37	9	07:53 (91)	18:39	3	08:28 (125)	16:59			16:54
23	06:07		06:45		20:00 (128)	07:24		07:45 (91)	08:04		08:26 (125)	07:47			08:17
	21:19		20:35	9	20:09 (128)	19:35	7	07:52 (91)	18:38	2	08:27 (125)	16:58			16:54
24	06:09		06:46		19:59 (128)	07:25		07:47 (91)	08:05			07:49			08:17
	21:18		20:33	8	20:07 (128)	19:33	4	07:51 (91)	18:36			16:57			16:55
25	06:10		06:47		19:59 (128)	07:26			08:06			07:50			08:17
	21:17		20:31	6	20:05 (128)	19:32			18:34			16:56			16:55
26	06:11		06:49		19:59 (128)	07:28			08:08			07:51			08:18
	21:16		20:29	4	20:03 (128)	19:30			18:33			16:56			16:56
27	06:12		06:50		20:00 (128)	07:29			08:09		08:37 (63)	07:53			08:18
	21:15		20:27	2	20:02 (128)	19:28			18:31	2	08:39 (63)	16:55			16:57
28	06:13		06:51			07:30			08:11		08:35 (63)	07:54			08:18
	21:13		20:26			19:26			18:29	7	08:42 (63)	16:54			16:57
29	06:14		06:52			07:31			08:12		08:35 (63)	07:55			08:19
	21:12		20:24			19:24			18:28	8	08:43 (63)	16:54			16:58
30	06:15		06:54			07:33			08:14		08:37 (63)	07:56			08:19
	21:11		20:22			19:22			18:26	7	08:44 (63)	16:53			16:59
31	06:17		06:55						08:15		08:38 (63)				08:19
	21:10		20:20						18:25	6	08:44 (63)				17:00
Potential sun hours	477		439			378			339			285			270
Total, worst case				162			118			41			6		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

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Chris Sternhagen
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H15 - H15

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January			February			March			April			May			June		
1	08:19		08:45 (39)	08:00		17:02 (36)	07:17		07:43 (27)	07:18			06:24			05:49		20:09 (75)
	17:01	13	16:12 (7)	17:41	9	17:11 (36)	18:21	22	17:58 (74)	20:03			20:43			21:19	31	20:52 (21)
2	08:19		08:45 (39)	07:59		17:03 (36)	07:15		07:43 (27)	07:16			06:23			05:49		20:09 (75)
	17:02	12	16:12 (7)	17:42	7	17:10 (36)	18:22	26	18:00 (74)	20:05			20:44			21:20	32	20:53 (21)
3	08:19		08:45 (39)	07:58		17:05 (36)	07:13		07:45 (27)	07:14			06:21			05:48		20:10 (75)
	17:03	11	16:11 (7)	17:44	3	17:08 (36)	18:24	26	18:02 (74)	20:06			20:46			21:21	32	20:54 (21)
4	08:19		08:45 (39)	07:57			07:12		07:46 (27)	07:12			06:20			05:48		20:09 (75)
	17:04	8	08:53 (39)	17:45			18:25	25	18:03 (74)	20:07			20:47			21:22	33	20:54 (21)
5	08:19		08:44 (39)	07:55			07:10		07:47 (27)	07:10			06:18			05:47		20:10 (75)
	17:05	9	08:53 (39)	17:47			18:27	22	18:03 (74)	20:09			20:48			21:23	33	20:55 (21)
6	08:19		08:44 (39)	07:54			07:08		07:50 (27)	07:08			06:17			05:47		20:10 (75)
	17:06	10	08:54 (39)	17:48			18:28	15	18:02 (74)	20:10			20:49			21:23	32	20:55 (21)
7	08:19		08:44 (39)	07:53			07:06		17:54 (74)	07:07			06:16			05:46		20:11 (75)
	17:07	10	08:54 (39)	17:50			18:29	7	18:01 (74)	20:11			20:51			21:24	33	20:57 (21)
8	08:19		08:44 (39)	07:51			08:04		19:06 (50)	07:05			06:14			05:46		20:11 (75)
	17:08	11	08:55 (39)	17:51			18:31	3	19:09 (50)	20:13			20:52			21:25	33	20:57 (21)
9	08:18		08:43 (39)	07:50			08:02		19:05 (50)	07:03			06:13			05:46		20:12 (75)
	17:10	12	08:55 (39)	17:53			19:32	5	19:10 (50)	20:14			20:53			21:26	33	20:58 (21)
10	08:18		08:43 (39)	07:48			08:00		19:05 (50)	07:01			06:11			05:46		20:12 (75)
	17:11	16	16:41 (35)	17:54			19:34	6	19:11 (50)	20:15			20:55			21:26	32	20:58 (21)
11	08:18		08:43 (39)	07:47			07:59		19:05 (50)	06:59			06:10		20:18 (75)	05:45		20:12 (75)
	17:12	19	16:43 (35)	17:56			19:35	8	19:13 (50)	20:17			20:56	8	20:26 (75)	21:27	32	20:59 (21)
12	08:17		08:44 (39)	07:45			07:57		19:07 (50)	06:57			06:09		06:31 (32)	05:45		20:13 (75)
	17:13	20	16:44 (35)	17:57			19:36	5	19:12 (50)	20:18			20:57	15	20:28 (75)	21:28	32	21:00 (21)
13	08:17		08:45 (39)	07:44			07:55			06:55			06:08		06:30 (32)	05:45		20:13 (75)
	17:14	20	16:45 (35)	17:59			19:38			20:19			20:58	19	20:30 (75)	21:28	32	21:00 (21)
14	08:16		08:46 (39)	07:42			07:53			06:53		07:14 (25)	06:06		06:29 (32)	05:45		20:14 (75)
	17:16	21	16:46 (35)	18:00			19:39			20:21	2	07:16 (25)	21:00	22	20:32 (75)	21:29	32	21:01 (21)
15	08:16		08:46 (39)	07:41			07:51			06:52		07:13 (25)	06:05		20:11 (75)	05:45		20:14 (75)
	17:17	21	16:47 (35)	18:00			19:40			20:22	4	07:17 (25)	21:01	22	20:33 (75)	21:29	31	21:01 (21)
16	08:15		08:47 (39)	07:39			07:49			06:50		07:11 (25)	06:04		20:10 (75)	05:45		20:14 (75)
	17:18	20	16:47 (35)	18:02			19:42			20:23	5	07:16 (25)	21:02	24	20:34 (75)	21:30	31	21:01 (21)
17	08:14		08:48 (39)	07:38			07:47			06:48		07:09 (25)	06:03		20:10 (75)	05:45		20:15 (75)
	17:20	17	16:47 (35)	18:03			19:43			20:24	6	07:15 (25)	21:03	25	20:35 (75)	21:30	30	21:01 (21)
18	08:14		16:37 (35)	07:36		07:58 (133)	07:45			06:46		07:07 (25)	06:02		20:09 (75)	05:45		20:15 (75)
	17:21	11	16:48 (35)	18:05	3	08:01 (133)	19:44			20:26	7	07:14 (25)	21:04	26	20:35 (75)	21:30	29	21:01 (21)
19	08:13		16:37 (35)	07:34		07:56 (133)	07:43			06:44		07:06 (25)	06:00		20:09 (75)	05:45		20:15 (75)
	17:22	11	16:48 (35)	18:06	5	08:01 (133)	19:46			20:27	7	07:13 (25)	21:05	27	20:36 (75)	21:31	29	21:01 (21)
20	08:12		16:38 (35)	07:33		07:54 (133)	07:41		08:02 (38)	06:43			05:59		20:08 (75)	05:45		20:15 (75)
	17:24	10	16:48 (35)	18:08	6	08:00 (133)	19:47	3	08:05 (38)	20:28			21:07	28	20:36 (75)	21:31	29	21:01 (21)
21	08:11		16:38 (35)	07:31		07:53 (27)	07:39		08:00 (38)	06:41			05:58		20:08 (75)	05:45		20:16 (75)
	17:25	10	16:48 (35)	18:09	7	08:00 (133)	19:49	10	19:27 (26)	20:30			21:08	28	20:36 (75)	21:31	29	21:02 (21)
22	08:11		16:39 (35)	07:29		07:51 (27)	07:37		07:58 (38)	06:39			05:57		20:08 (75)	05:45		20:16 (75)
	17:26	8	16:47 (35)	18:11	10	08:01 (27)	19:50	17	19:28 (26)	20:31			21:09	29	20:37 (75)	21:32	29	21:02 (21)
23	08:10		16:41 (35)	07:28		07:49 (27)	07:35		07:56 (38)	06:38			05:56		20:07 (75)	05:46		20:16 (75)
	17:28	5	16:46 (35)	18:12	13	08:02 (27)	19:51	20	19:29 (26)	20:32			21:10	30	20:37 (75)	21:32	29	21:02 (21)
24	08:09			07:26		07:47 (27)	07:33		07:54 (38)	06:36			05:56		20:07 (75)	05:46		20:16 (75)
	17:29			18:14	16	08:03 (27)	19:53	25	19:31 (26)	20:34			21:11	30	20:37 (75)	21:32	29	21:02 (21)
25	08:08			07:24		07:46 (27)	07:32		07:52 (38)	06:34			05:55		20:07 (75)	05:46		20:17 (75)
	17:31			18:15	18	08:04 (27)	19:54	27	19:31 (26)	20:35			21:12	30	20:37 (75)	21:32	29	21:03 (21)
26	08:07		17:03 (36)	07:22		07:44 (27)	07:30		07:51 (38)	06:33			05:54		20:08 (75)	05:47		20:16 (75)
	17:32	2	17:05 (36)	18:17	20	08:04 (27)	19:55	26	19:30 (26)	20:36			21:13	30	20:38 (75)	21:32	31	21:03 (21)
27	08:06		17:02 (36)	07:21		07:44 (27)	07:28		07:53 (38)	06:31			05:53		20:08 (75)	05:47		20:16 (75)
	17:34	4	17:06 (36)	18:18	20	08:04 (27)	19:57	21	19:30 (26)	20:38			21:14	30	20:38 (75)	21:32	31	21:03 (21)
28	08:05		17:01 (36)	07:19		07:43 (27)	07:26		19:16 (26)	06:29			05:52		20:08 (75)	05:47		20:17 (75)
	17:35	7	17:08 (36)	18:19	21	08:04 (27)	19:58	12	19:28 (26)	20:39			21:15	29	20:37 (75)	21:32	32	21:04 (21)
29	08:04		17:01 (36)				07:24		19:17 (26)	06:28			05:51		20:07 (75)	05:48		20:16 (75)
	17:37	9	17:10 (36)				19:59	10	19:27 (26)	20:40			21:16	30	20:37 (75)	21:32	32	21:03 (21)
30	08:03		17:01 (36)				07:22		19:20 (26)	06:26			05:51		20:08 (75)	05:48		20:17 (75)
	17:38	10	17:11 (36)				20:01	3	19:23 (26)	20:42			21:17	32	20:51 (21)	21:32	33	21:04 (21)
31	08:01		17:01 (36)				07:20						05:50		20:08 (75)			
	17:40	10	17:11 (36)				20:02						21:18	31	20:51 (21)			
Potential sun hours	282			289			368			406			463			471		
Total, worst case		347			158			344			31			545			935	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 4:34 PM / 29

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H15 - H15

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July			August			September			October			November			December		
1	05:49		20:16 (75)	06:18		06:42 (32)	06:56			07:34		18:48 (50)	07:17			07:58		08:25 (39)
	21:32	32	21:03 (21)	21:09	14	20:38 (75)	20:18			19:20	2	18:49 (50)	17:24			16:53	20	16:25 (35)
2	05:50		20:17 (75)	06:19		20:29 (75)	06:58			07:36		18:44 (50)	07:18			07:59		08:25 (39)
	21:32	32	21:03 (21)	21:08	5	20:34 (75)	20:17			19:18	7	18:51 (50)	17:22			16:53	16	16:23 (35)
3	05:50		20:16 (75)	06:20			06:59			07:37		18:44 (50)	07:20			08:00		08:27 (39)
	21:32	33	21:03 (21)	21:06			20:15			19:16	7	18:51 (50)	17:21			16:52	12	08:39 (39)
4	05:51		20:17 (75)	06:22			07:00			07:38		18:43 (50)	07:21			08:01		08:28 (39)
	21:31	33	21:03 (21)	21:05			20:13			19:14	5	18:48 (50)	17:19			16:52	11	08:39 (39)
5	05:51		20:17 (75)	06:23			07:01			07:40		18:43 (50)	07:22			08:02		08:29 (39)
	21:31	34	21:03 (21)	21:03			20:11			19:12	3	18:46 (50)	17:18			16:52	10	08:39 (39)
6	05:52		20:16 (75)	06:24			07:03			07:41		18:33 (74)	07:24			08:04		08:30 (39)
	21:31	33	21:02 (21)	21:02			20:09			19:10	5	18:45 (50)	17:16			16:51	10	08:40 (39)
7	05:53		20:16 (75)	06:25			07:04			07:42		18:30 (74)	07:25			08:05		08:31 (39)
	21:30	34	21:02 (21)	21:01			20:07			19:09	8	18:38 (74)	17:15			16:51	9	08:40 (39)
8	05:54		20:17 (75)	06:26			07:05			07:43		08:23 (27)	07:27		16:35 (36)	08:06		08:32 (39)
	21:30	33	21:02 (21)	20:59			20:05			19:07	20	18:38 (74)	17:14	4	16:39 (36)	16:51	8	08:40 (39)
9	05:54		20:17 (75)	06:28			07:06			07:45		08:21 (27)	07:28		16:34 (36)	08:07		08:33 (39)
	21:30	33	21:02 (21)	20:58			20:03			19:05	25	18:39 (74)	17:12	7	16:41 (36)	16:51	11	15:59 (7)
10	05:55		20:16 (75)	06:29			07:08			07:46		08:19 (27)	07:30		16:33 (36)	08:08		08:34 (39)
	21:29	33	21:00 (21)	20:56			20:01			19:03	27	18:37 (74)	17:11	8	16:41 (36)	16:51	12	16:01 (7)
11	05:56		20:16 (75)	06:30			07:09			07:47		08:18 (27)	07:31		16:33 (36)	08:09		08:35 (39)
	21:29	32	21:00 (21)	20:55			19:59			19:01	25	18:34 (74)	17:10	9	16:42 (36)	16:51	12	16:02 (7)
12	05:57		20:16 (75)	06:31			07:10			07:49		08:17 (27)	07:32		16:32 (36)	08:09		08:36 (39)
	21:28	33	21:00 (21)	20:53			19:57			18:57	24	18:33 (74)	17:09	10	16:42 (36)	16:51	13	16:03 (7)
13	05:58		20:17 (75)	06:33			07:11			07:50		08:17 (27)	07:34		16:33 (36)	08:10		08:37 (39)
	21:27	31	20:59 (21)	20:52			19:55			18:55	20	08:37 (27)	17:08	9	16:42 (36)	16:51	13	16:04 (7)
14	05:59		20:17 (75)	06:34			07:13		19:09 (26)	07:52		08:17 (27)	07:35		16:33 (36)	08:11		08:38 (39)
	21:27	31	20:59 (21)	20:50			19:53	9	19:18 (26)	18:54	20	08:37 (27)	17:07	7	16:40 (36)	16:51	13	16:05 (7)
15	06:00		20:17 (75)	06:35			07:14		19:07 (26)	07:53		08:16 (27)	07:37		16:35 (36)	08:12		08:39 (39)
	21:26	30	20:47 (75)	20:48			19:51	12	19:19 (26)	18:52	21	08:37 (27)	17:05	4	16:39 (36)	16:51	13	16:06 (7)
16	06:01		20:17 (75)	06:36			07:15		07:43 (38)	07:54		08:16 (27)	07:38		16:36 (36)	08:13		08:39 (39)
	21:25	30	20:47 (75)	20:47			19:50	20	19:19 (26)	18:50	20	08:36 (27)	17:04	2	16:38 (36)	16:52	13	16:06 (7)
17	06:01		20:16 (75)	06:38			07:16		07:40 (38)	07:56		08:18 (27)	07:40			08:13		08:40 (39)
	21:24	30	20:46 (75)	20:45			19:48	26	19:19 (26)	18:48	17	08:35 (27)	17:03			16:52	12	16:06 (7)
18	06:02		20:16 (75)	06:39			07:18		07:40 (38)	07:57		08:19 (27)	07:41			08:14		08:41 (39)
	21:24	30	20:46 (75)	20:43			19:46	27	19:19 (26)	18:46	15	08:34 (27)	17:02			16:52	13	16:07 (7)
19	06:03		20:17 (75)	06:40			07:19		07:41 (38)	07:58		08:21 (27)	07:42		16:16 (35)	08:15		15:56 (7)
	21:23	29	20:46 (75)	20:42			19:44	25	19:18 (26)	18:45	12	08:33 (27)	17:01	5	16:21 (35)	16:52	11	16:07 (7)
20	06:04		20:17 (75)	06:41			07:20		07:42 (38)	08:00		08:22 (27)	07:44		16:14 (35)	08:15		15:57 (7)
	21:22	29	20:46 (75)	20:40			19:42	22	19:16 (26)	18:43	8	08:30 (27)	17:01	8	16:22 (35)	16:53	11	16:08 (7)
21	06:06		20:17 (75)	06:43			07:22		07:43 (38)	08:01		08:24 (133)	07:45		16:14 (35)	08:16		15:57 (7)
	21:21	29	20:46 (75)	20:38			19:40	18	19:14 (26)	18:41	7	08:31 (133)	17:00	10	16:24 (35)	16:53	11	16:08 (7)
22	06:07		20:17 (75)	06:44			07:23		07:44 (38)	08:02		08:25 (133)	07:46		16:14 (35)	08:16		15:58 (7)
	21:20	29	20:46 (75)	20:37			19:38	13	19:12 (26)	18:40	6	08:31 (133)	16:59	10	16:24 (35)	16:54	11	16:09 (7)
23	06:08		20:18 (75)	06:45			07:24		07:46 (38)	08:04		08:27 (133)	07:48		16:13 (35)	08:17		15:58 (7)
	21:19	28	20:46 (75)	20:35			19:36	4	07:50 (38)	18:38	4	08:31 (133)	16:58	11	16:24 (35)	16:54	11	16:09 (7)
24	06:09		20:18 (75)	06:46		07:09 (25)	07:25		07:47 (38)	08:05		08:28 (133)	07:49		16:14 (35)	08:17		15:59 (7)
	21:18	27	20:45 (75)	20:33	7	07:16 (25)	19:34	2	07:48 (38)	18:36	2	08:30 (133)	16:57	11	16:25 (35)	16:55	11	16:10 (7)
25	06:10		20:19 (75)	06:48		07:11 (25)	07:27			08:07			07:50		08:27 (39)	08:18		15:59 (7)
	21:17	27	20:46 (75)	20:31	7	07:18 (25)	19:32			18:35			16:57	16	16:25 (35)	16:56	11	16:10 (7)
26	06:11		20:20 (75)	06:49		07:12 (25)	07:28			08:08			07:52		08:26 (39)	08:18		08:44 (39)
	21:16	25	20:45 (75)	20:29	6	07:18 (25)	19:30			18:33			16:56	20	16:26 (35)	16:56	13	16:10 (7)
27	06:12		20:20 (75)	06:50		07:13 (25)	07:29			08:10			07:53		08:26 (39)	08:18		08:45 (39)
	21:15	25	20:45 (75)	20:28	5	07:18 (25)	19:28			18:31			16:55	20	16:26 (35)	16:57	13	16:12 (7)
28	06:13		20:21 (75)	06:51		07:14 (25)	07:30			08:11			07:54		08:25 (39)	08:19		08:45 (39)
	21:14	23	20:44 (75)	20:26	3	07:17 (25)	19:26			18:30			16:55	22	16:26 (35)	16:58	13	16:12 (7)
29	06:14		20:22 (75)	06:53		07:15 (25)	07:32			08:12			07:55		08:26 (39)	08:19		08:45 (39)
	21:13	21	20:43 (75)	20:24	2	07:17 (25)	19:24			18:28			16:54	20	16:26 (35)	16:58	13	16:12 (7)
30	06:16		06:40 (32)	06:54			07:33			08:14			07:57		08:25 (39)	08:19		08:45 (39)
	21:11	21	20:42 (75)	20:22			19:22			18:27			16:54	20	16:25 (35)	16:59	14	16:12 (7)
31	06:17		06:41 (32)	06:55						08:15						08:19		08:45 (39)
	21:10	18	20:40 (75)	20:20						18:25						17:00	13	16:12 (7)
Potential sun hours	477			439			378			339			285			270		
Total, worst case		908			49			178			310			233			377	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H16 - H16

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March		April			May			June		
1	08:20	08:00	07:17		07:18		07:41 (70)	06:25		06:49 (134)	05:50		06:16 (107)
	17:02	17:41	18:21		20:03	19	08:00 (70)	20:43	17	07:06 (134)	21:19	12	06:28 (107)
2	08:20	07:59	07:15		07:16		07:41 (70)	06:23		06:49 (134)	05:49		06:16 (107)
	17:03	17:43	18:23		20:05	18	07:59 (70)	20:44	17	07:06 (134)	21:20	13	06:29 (107)
3	08:20	07:58	07:14		07:14		07:42 (70)	06:22		06:50 (134)	05:49		06:16 (107)
	17:03	17:44	18:24		20:06	16	07:58 (70)	20:46	16	07:06 (134)	21:21	13	06:29 (107)
4	08:19	07:57	07:12		07:12		07:43 (70)	06:20		06:50 (134)	05:48		06:17 (107)
	17:04	17:46	18:25		20:07	14	07:57 (70)	20:47	15	07:05 (134)	21:22	12	06:29 (107)
5	08:19	07:55	07:10		07:11		07:44 (70)	06:19		06:51 (134)	05:48		06:16 (107)
	17:06	17:47	18:27		20:09	10	07:54 (70)	20:48	13	07:04 (134)	21:23	13	06:29 (107)
6	08:19	07:54	07:08		07:09		07:47 (70)	06:17		06:52 (134)	05:47		06:17 (107)
	17:07	17:49	18:28		20:10	3	07:50 (70)	20:50	10	07:02 (134)	21:24	12	06:29 (107)
7	08:19	07:53	07:06		07:07			06:16		06:54 (134)	05:47		06:16 (107)
	17:08	17:50	18:30		20:11			20:51	6	07:00 (134)	21:24	13	06:29 (107)
8	08:19	07:51	08:04		07:05			06:14			05:46		06:17 (107)
	17:09	17:52	18:31		20:13			20:52			21:25	12	06:29 (107)
9	08:18	07:50	08:03		07:03			06:13			05:46		06:17 (107)
	17:10	17:53	19:32		20:14			20:53			21:26	13	06:30 (107)
10	08:18	07:49	08:01		07:01			06:12			05:46		06:18 (107)
	17:11	17:55	19:34		20:15			20:55			21:26	12	06:30 (107)
11	08:18	07:47	07:59		06:59			06:10			05:46		06:18 (107)
	17:12	17:56	19:35		20:17			20:56			21:27	12	06:30 (107)
12	08:17	07:46	07:57		06:57			06:09			05:45		06:18 (107)
	17:14	17:58	19:37		20:18			20:57			21:28	11	06:29 (107)
13	08:17	07:44	07:55		06:56			06:08			05:45		06:18 (107)
	17:15	17:59	19:38		20:19			20:58			21:28	11	06:29 (107)
14	08:16	07:43	07:53		06:54			06:07			05:45		06:19 (107)
	17:16	18:01	19:39		20:21			21:00			21:29	11	06:30 (107)
15	08:16	07:41	07:51		06:52			06:05		06:28 (20)	05:45		06:19 (107)
	17:17	18:01	19:41		20:22			21:01	2	06:29 (20)	21:29	11	06:30 (107)
16	08:15	07:39	07:49		06:50			06:04		06:27 (20)	05:45		06:20 (107)
	17:19	18:02	19:42		20:23			21:02	3	06:30 (20)	21:30	10	06:30 (107)
17	08:15	07:38	07:47		06:48			06:03		06:26 (20)	05:45		06:20 (107)
	17:20	18:04	19:43		20:25			21:03	5	06:31 (20)	21:30	10	06:30 (107)
18	08:14	07:36	07:45		06:47			06:02		06:25 (20)	05:45		06:20 (107)
	17:21	18:05	19:45		20:26			21:04	6	06:31 (20)	21:31	10	06:30 (107)
19	08:13	07:35	07:43		06:45			06:01		06:24 (20)	05:45		06:20 (107)
	17:23	18:07	19:46		20:27			21:06	7	06:31 (20)	21:31	10	06:30 (107)
20	08:12	07:33	07:41		06:43			06:00		06:23 (20)	05:45		06:21 (107)
	17:24	18:08	19:47		20:29			21:07	8	06:31 (20)	21:31	10	06:31 (107)
21	08:12	07:31	07:40		06:41			05:59		06:22 (20)	05:46		06:21 (107)
	17:25	18:10	19:49		20:30			21:08	9	06:31 (20)	21:32	10	06:31 (107)
22	08:11	07:30	07:38		06:40			05:58		06:22 (20)	05:46		06:21 (107)
	17:27	18:11	19:50		20:31			21:09	8	06:30 (20)	21:32	10	06:31 (107)
23	08:10	07:28	07:36		06:38			05:57		06:23 (20)	05:46		06:21 (107)
	17:28	18:12	19:51		20:33			21:10	7	06:30 (20)	21:32	10	06:31 (107)
24	08:09	07:26	07:34		06:36		06:57 (134)	05:56		06:24 (20)	05:46		06:22 (107)
	17:30	18:14	19:53		20:34	5	07:02 (134)	21:11	4	06:28 (20)	21:32	10	06:32 (107)
25	08:08	07:24	07:32		07:52 (70)		06:56 (134)	05:55			05:47		06:22 (107)
	17:31	18:15	19:54	3	07:55 (70)		20:35 9	07:05 (134)		21:12	21:32	10	06:32 (107)
26	08:07	07:23	07:30		07:51 (70)		06:33	06:54 (134)		05:54	06:19 (107)		05:47 06:22 (107)
	17:32	18:17	19:55	8	07:59 (70)		20:37 12	07:06 (134)		21:13 5	06:24 (107)		21:32 10 06:32 (107)
27	08:06	07:21	07:28		07:49 (70)		06:31	06:53 (134)		05:53	06:17 (107)		05:47 06:22 (107)
	17:34	18:18	19:57	11	08:00 (70)		20:38 14	07:07 (134)		21:14 8	06:25 (107)		21:32 11 06:33 (107)
28	08:05	07:19	07:26		07:47 (70)		06:30	06:51 (134)		05:53	06:16 (107)		05:48 06:22 (107)
	17:35	18:20	19:58	14	08:01 (70)		20:39 16	07:07 (134)		21:15 10	06:26 (107)		21:32 11 06:33 (107)
29	08:04		07:24		07:45 (70)		06:28	06:49 (134)		05:52	06:17 (107)		05:48 06:23 (107)
	17:37		19:59	16	08:01 (70)		20:41 17	07:06 (134)		21:16 10	06:27 (107)		21:32 10 06:33 (107)
30	08:03		07:22		07:43 (70)		06:26	06:49 (134)		05:51	06:16 (107)		05:49 06:22 (107)
	17:38		20:01	18	08:01 (70)		20:42 18	07:07 (134)		21:17 11	06:27 (107)		21:32 11 06:33 (107)
31	08:02		07:20		07:42 (70)					05:50	06:16 (107)		
	17:40		20:02	19	08:01 (70)					21:18 12	06:28 (107)		
Potential sun hours	282	289	368		406			463			471		
Total, worst case				89		171			209			334	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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wind@eapc.net
Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H16 - H16

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	July			August			September			October	November	December
1	05:49		06:23 (107)	06:18			06:57			07:35	07:17	07:58
	21:32	11	06:34 (107)	21:09			20:19			19:20	17:24	16:53
2	05:50		06:22 (107)	06:19			06:58			07:36	07:18	07:59
	21:32	12	06:34 (107)	21:08			20:17			19:18	17:22	16:53
3	05:50		06:23 (107)	06:21			06:59			07:37	07:20	08:00
	21:32	12	06:35 (107)	21:06			20:15			19:16	17:21	16:53
4	05:51		06:22 (107)	06:22			07:00			07:38	07:21	08:02
	21:32	12	06:34 (107)	21:05			20:13			19:15	17:19	16:52
5	05:52		06:23 (107)	06:23			07:02			07:40	07:23	08:03
	21:31	12	06:35 (107)	21:04			20:11			19:13	17:18	16:52
6	05:52		06:23 (107)	06:24		07:03 (134)	07:03		07:44 (70)	07:41	07:24	08:04
	21:31	13	06:36 (107)	21:02	8	07:11 (134)	20:09	2	07:45 (70)	19:11	17:17	16:52
7	05:53		06:22 (107)	06:25		07:01 (134)	07:04		07:39 (70)	07:42	07:25	08:05
	21:31	13	06:35 (107)	21:01	11	07:12 (134)	20:07	10	07:49 (70)	19:09	17:15	16:52
8	05:54		06:23 (107)	06:27		07:00 (134)	07:05		07:38 (70)	07:44	07:27	08:06
	21:30	13	06:36 (107)	20:59	14	07:14 (134)	20:05	14	07:52 (70)	19:07	17:14	16:51
9	05:55		06:23 (107)	06:28		06:59 (134)	07:07		07:36 (70)	07:45	07:28	08:07
	21:30	13	06:36 (107)	20:58	16	07:15 (134)	20:03	16	07:52 (70)	19:05	17:13	16:51
10	05:56		06:24 (107)	06:29		06:58 (134)	07:08		07:35 (70)	07:46	07:30	08:08
	21:29	12	06:36 (107)	20:56	17	07:15 (134)	20:01	17	07:52 (70)	19:03	17:12	16:51
11	05:56		06:24 (107)	06:30		06:58 (134)	07:09		07:34 (70)	07:48	07:31	08:09
	21:29	13	06:37 (107)	20:55	17	07:15 (134)	20:00	18	07:52 (70)	19:01	17:10	16:51
12	05:57		06:24 (107)	06:32		06:57 (134)	07:10		07:33 (70)	07:49	07:33	08:10
	21:28	12	06:36 (107)	20:53	18	07:15 (134)	19:58	19	07:52 (70)	18:58	17:09	16:51
13	05:58		06:24 (107)	06:33		06:57 (134)	07:12		07:34 (70)	07:50	07:34	08:10
	21:27	12	06:36 (107)	20:52	18	07:15 (134)	19:56	18	07:52 (70)	18:56	17:08	16:51
14	05:59		06:25 (107)	06:34		06:58 (134)	07:13		07:35 (70)	07:52	07:35	08:11
	21:27	11	06:36 (107)	20:50	17	07:15 (134)	19:54	16	07:51 (70)	18:54	17:07	16:52
15	06:00		06:25 (107)	06:35		06:59 (134)	07:14		07:36 (70)	07:53	07:37	08:12
	21:26	10	06:35 (107)	20:49	15	07:14 (134)	19:52	14	07:50 (70)	18:52	17:06	16:52
16	06:01		06:26 (107)	06:37		07:00 (134)	07:15		07:37 (70)	07:54	07:38	08:13
	21:25	9	06:35 (107)	20:47	13	07:13 (134)	19:50	12	07:49 (70)	18:50	17:05	16:52
17	06:02		06:27 (107)	06:38		07:01 (134)	07:17		07:39 (70)	07:56	07:40	08:14
	21:25	7	06:34 (107)	20:45	11	07:12 (134)	19:48	8	07:47 (70)	18:48	17:04	16:52
18	06:03		06:29 (107)	06:39		07:02 (134)	07:18		07:40 (70)	07:57	07:41	08:14
	21:24	4	06:33 (107)	20:44	8	07:10 (134)	19:46	4	07:44 (70)	18:47	17:03	16:52
19	06:04		06:35 (20)	06:40		07:04 (134)	07:19			07:59	07:42	08:15
	21:23	3	06:38 (20)	20:42	5	07:09 (134)	19:44			18:45	17:02	16:53
20	06:05		06:34 (20)	06:42			07:20			08:00	07:44	08:16
	21:22	6	06:40 (20)	20:40			19:42			18:43	17:01	16:53
21	06:06		06:33 (20)	06:43			07:22			08:01	07:45	08:16
	21:21	7	06:40 (20)	20:39			19:40			18:41	17:00	16:54
22	06:07		06:32 (20)	06:44			07:23			08:03	07:47	08:17
	21:20	9	06:41 (20)	20:37			19:38			18:40	16:59	16:54
23	06:08		06:33 (20)	06:45			07:24			08:04	07:48	08:17
	21:19	8	06:41 (20)	20:35			19:36			18:38	16:58	16:55
24	06:09		06:34 (20)	06:47			07:26			08:05	07:49	08:18
	21:18	8	06:42 (20)	20:33			19:34			18:36	16:58	16:55
25	06:10		06:35 (20)	06:48			07:27			08:07	07:51	08:18
	21:17	7	06:42 (20)	20:31			19:32			18:35	16:57	16:56
26	06:11		06:36 (20)	06:49			07:28			08:08	07:52	08:18
	21:16	5	06:41 (20)	20:30			19:30			18:33	16:56	16:57
27	06:12		06:37 (20)	06:50			07:29			08:10	07:53	08:19
	21:15	4	06:41 (20)	20:28			19:28			18:32	16:56	16:57
28	06:14		06:38 (20)	06:52			07:31			08:11	07:54	08:19
	21:14	2	06:40 (20)	20:26			19:26			18:30	16:55	16:58
29	06:15			06:53			07:32			08:13	07:56	08:19
	21:13			20:24			19:24			18:28	16:54	16:59
30	06:16			06:54			07:33			08:14	07:57	08:19
	21:11			20:22			19:22			18:27	16:54	17:00
31	06:17			06:55						08:15		08:19
	21:10			20:21						18:25		17:00
Potential sun hours	476			439			378			339	285	270
Total, worst case		260			188			168				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
20102130 - Merricourt ND Enxco

enXco
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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H17 - H17

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:
- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February		March		April		May		June
1	08:19	08:00		07:17		07:18		06:25	20:10 (20)	05:50
	17:01	17:41		18:21		20:03		20:43	8 20:18 (20)	21:19
2	08:19	07:59		07:15		07:16		06:23	20:09 (20)	05:49
	17:02	17:43		18:22		20:05		20:44	11 20:20 (20)	21:20
3	08:19	07:58		07:13		07:14		06:22	20:07 (20)	05:48
	17:03	17:44		18:24		20:06		20:46	13 20:20 (20)	21:21
4	08:19	07:57		07:12		07:12		06:20	20:06 (78)	05:48
	17:04	17:46		18:25		20:07		20:47	15 20:21 (20)	21:22
5	08:19	07:55		07:10		07:10		06:19	20:05 (78)	05:47
	17:05	17:47		18:27		20:09		20:48	17 20:22 (20)	21:23
6	08:19	07:54		07:08		07:09		06:17	20:04 (78)	05:47
	17:06	17:49		18:28		20:10		20:49	17 20:21 (20)	21:23
7	08:19	07:53		07:06		07:07		06:16	20:03 (78)	05:47
	17:07	17:50		18:29		20:11		20:51	19 20:22 (78)	21:24
8	08:19	07:51		08:04		07:05		06:14	06:36 (116)	05:46
	17:09	17:52		18:31		20:13		20:52	22 20:22 (78)	21:25
9	08:18	07:50		08:02		07:03	19:50 (113)	06:13	06:35 (116)	05:46
	17:10	17:53		19:32		20:14	2 19:52 (113)	20:53	26 20:22 (78)	21:26
10	08:18	07:48		08:00		07:01	19:49 (113)	06:12	06:34 (116)	05:46
	17:11	17:55		19:34		20:15	4 19:53 (113)	20:55	29 20:23 (78)	21:26
11	08:18	07:47		07:59		06:59	19:48 (113)	06:10	06:33 (116)	05:46
	17:12	17:56		19:35		20:17	6 19:54 (113)	20:56	31 20:23 (78)	21:27
12	08:17	07:45		07:57		06:57	19:48 (113)	06:09	06:31 (116)	05:45
	17:13	17:58		19:36		20:18	7 19:55 (107)	20:57	32 20:23 (78)	21:28
13	08:17	07:44		07:55		06:55	19:48 (113)	06:08	06:30 (116)	05:45
	17:15	17:59		19:38		20:19	8 19:56 (107)	20:58	34 20:23 (78)	21:28
14	08:16	07:42		07:53		06:54	19:49 (107)	06:06	06:31 (116)	05:45
	17:16	18:01		19:39		20:21	8 19:57 (107)	21:00	33 20:23 (78)	21:29
15	08:16	07:41		07:51		06:52	19:49 (107)	06:05	06:31 (116)	05:45
	17:17	18:01		19:40		20:22	10 19:59 (107)	21:01	31 20:22 (78)	21:29
16	08:15	07:39		07:49		06:50	19:49 (107)	06:04	06:32 (116)	05:45
	17:18	18:02		19:42		20:23	10 19:59 (107)	21:02	29 20:22 (78)	21:30
17	08:14	07:38		07:47		06:48	19:49 (107)	06:03	06:32 (116)	05:45
	17:20	18:04		19:43		20:25	9 19:58 (107)	21:03	28 20:22 (78)	21:30
18	08:14	07:36		07:45		06:46	19:49 (107)	06:02	06:34 (116)	05:45
	17:21	18:05		19:45		20:26	8 19:57 (107)	21:04	24 20:21 (78)	21:30
19	08:13	07:34		07:43	19:23 (134)	06:45	19:52 (107)	06:01	20:04 (78)	05:45
	17:22	18:06		19:46	2 19:24 (134)	20:27	3 19:55 (107)	21:06	17 20:21 (78)	21:31
20	08:12	07:33		07:41	19:23 (134)	06:43		06:00	20:05 (78)	05:45
	17:24	18:08		19:47	2 19:25 (134)	20:29		21:07	15 20:20 (78)	21:31
21	08:11	07:31		07:39	19:25 (134)	06:41		05:59	20:06 (78)	05:45
	17:25	18:09		19:49	2 19:27 (134)	20:30		21:08	13 20:19 (78)	21:31
22	08:11	07:29		07:37		06:39		05:58	20:07 (78)	05:46
	17:27	18:11		19:50		20:31		21:09	11 20:18 (78)	21:32
23	08:10	07:28		07:35		06:38		05:57	20:09 (78)	05:46
	17:28	18:12		19:51		20:32		21:10	7 20:16 (78)	21:32
24	08:09	07:26		07:34		06:36		05:56		05:46
	17:29	18:14		19:53		20:34		21:11		21:32
25	08:08	07:24		07:32		06:34		05:55		05:46
	17:31	18:15		19:54		20:35		21:12		21:32
26	08:07	07:22		07:30		06:33		05:54		05:47
	17:32	18:17		19:55		20:36		21:13		21:32
27	08:06	07:21		07:28		06:31		05:53		05:47
	17:34	18:18		19:57		20:38		21:14		21:32
28	08:05	07:19	07:40 (66)	07:26		06:29		05:52		05:48
	17:35	18:20	2 07:41 (66)	19:58		20:39		21:15		21:32
29	08:04			07:24		06:28		05:52		05:48
	17:37			19:59		20:40		21:16		21:32
30	08:03			07:22		06:26		05:51		05:49
	17:38			20:01		20:42		21:17		21:32
31	08:02			07:20				05:50		
	17:40			20:02				21:18		
Potential sun hours	282	289		368		406		463		471
Total, worst case			2		6		75		482	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
20102130 - Merricourt ND Enxco

enXco
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Calculated:
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SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H17 - H17

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:
- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	July		August		September		October		November	December
1	05:49		06:18	06:42 (116)	06:57	19:47 (113)	07:34		07:17	07:58
	21:32		21:09 32	20:33 (78)	20:19 6	19:53 (113)	19:20		17:24	16:53
2	05:50		06:19	06:43 (116)	06:58	19:47 (113)	07:36		07:18	07:59
	21:32		21:08 30	20:33 (78)	20:17 4	19:51 (113)	19:18		17:22	16:53
3	05:50		06:20	06:45 (116)	06:59	19:47 (113)	07:37		07:20	08:00
	21:32		21:06 27	20:33 (78)	20:15 2	19:49 (113)	19:16		17:21	16:52
4	05:51		06:22	06:46 (116)	07:00		07:38		07:21	08:01
	21:31		21:05 25	20:33 (78)	20:13		19:14		17:19	16:52
5	05:52		06:23	20:12 (78)	07:02		07:40		07:22	08:03
	21:31		21:04 20	20:32 (78)	20:11		19:12		17:18	16:52
6	05:52		06:24	20:13 (78)	07:03		07:41		07:24	08:04
	21:31		21:02 18	20:31 (20)	20:09		19:11		17:17	16:52
7	05:53		06:25	20:13 (78)	07:04		07:42		07:25	08:05
	21:30		21:01 18	20:31 (20)	20:07		19:09		17:15	16:51
8	05:54		06:27	20:14 (78)	07:05		07:44		07:27	08:06
	21:30		20:59 16	20:30 (20)	20:05		19:07		17:14	16:51
9	05:55		06:28	20:17 (20)	07:07		07:45		07:28	08:07
	21:30		20:58 13	20:30 (20)	20:03		19:05		17:13	16:51
10	05:55		06:29	20:17 (20)	07:08		07:46		07:30	08:08
	21:29		20:56 12	20:29 (20)	20:01		19:03		17:11	16:51
11	05:56		06:30	20:18 (20)	07:09		07:48		07:31	08:09
	21:29		20:55 10	20:28 (20)	19:59		19:01		17:10	16:51
12	05:57		06:31	20:20 (20)	07:10		07:49		07:32	08:09
	21:28		20:53 6	20:26 (20)	19:57		18:57		17:09	16:51
13	05:58		06:33		07:12		07:50	08:12 (66)	07:34	08:10
	21:27		20:52		19:55		18:56 2	08:13 (66)	17:08	16:51
14	05:59		06:34		07:13		07:52	08:14 (66)	07:35	08:11
	21:27		20:50		19:54		18:54 2	08:15 (66)	17:07	16:51
15	06:00		06:35		07:14		07:53		07:37	08:12
	21:26		20:48		19:52		18:52		17:06	16:52
16	06:01		06:36		07:15		07:54		07:38	08:13
	21:25		20:47		19:50		18:50		17:05	16:52
17	06:02		06:38		07:17		07:56		07:40	08:13
	21:24		20:45		19:48		18:48		17:04	16:52
18	06:03		06:39		07:18		07:57		07:41	08:14
	21:24		20:43		19:46		18:47		17:03	16:52
19	06:04		06:40		07:19		07:58		07:42	08:15
	21:23		20:42		19:44		18:45		17:02	16:53
20	06:05	20:22 (78)	06:41		07:20		08:00		07:44	08:15
	21:22 2	20:24 (78)	20:40		19:42		18:43		17:01	16:53
21	06:06	20:19 (78)	06:43		07:22		08:01		07:45	08:16
	21:21 8	20:27 (78)	20:38		19:40		18:41		17:00	16:54
22	06:07	20:17 (78)	06:44		07:23		08:03		07:46	08:16
	21:20 12	20:29 (78)	20:37		19:38		18:40		16:59	16:54
23	06:08	20:16 (78)	06:45		07:24	19:08 (134)	08:04		07:48	08:17
	21:19 14	20:30 (78)	20:35		19:36 2	19:10 (134)	18:38		16:58	16:55
24	06:09	20:15 (78)	06:46	19:54 (107)	07:25	19:06 (134)	08:05		07:49	08:17
	21:18 16	20:31 (78)	20:33 4	19:58 (107)	19:34 2	19:08 (134)	18:36		16:57	16:55
25	06:10	06:45 (116)	06:48	19:53 (107)	07:27	19:05 (134)	08:07		07:50	08:18
	21:17 22	20:32 (78)	20:31 8	20:01 (107)	19:32 2	19:06 (134)	18:35		16:57	16:56
26	06:11	06:44 (116)	06:49	19:51 (107)	07:28		08:08		07:52	08:18
	21:16 25	20:32 (78)	20:30 10	20:01 (107)	19:30		18:33		16:56	16:56
27	06:12	06:43 (116)	06:50	19:50 (107)	07:29		08:10		07:53	08:18
	21:15 29	20:33 (78)	20:28 11	20:01 (107)	19:28		18:31		16:55	16:57
28	06:13	06:42 (116)	06:52	19:50 (107)	07:31		08:11		07:54	08:19
	21:14 31	20:33 (78)	20:26 10	20:00 (107)	19:26		18:30		16:55	16:58
29	06:15	06:41 (116)	06:53	19:50 (107)	07:32		08:12		07:55	08:19
	21:13 32	20:33 (78)	20:24 8	19:58 (107)	19:24		18:28		16:54	16:59
30	06:16	06:41 (116)	06:54	19:49 (113)	07:33		08:14		07:57	08:19
	21:11 32	20:33 (78)	20:22 8	19:57 (107)	19:22		18:27		16:54	16:59
31	06:17	06:41 (116)	06:55	19:48 (113)			08:15			08:19
	21:10 33	20:33 (78)	20:20 7	19:55 (107)			18:25			17:00
Potential sun hours	476		439		378		339		285	270
Total, worst case	256		293		18		4			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
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SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H18 - H18

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:
- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

	January	February		March	April		May		June
1	08:19	08:00		07:17	07:18		06:24	06:46 (65)	05:49
	17:01	17:41		18:20	20:03		20:43	7 06:53 (65)	21:19
2	08:19	07:59		07:15	07:16		06:23	06:44 (65)	05:49
	17:02	17:42		18:22	20:04		20:44	7 06:51 (65)	21:20
3	08:19	07:57		07:13	07:14		06:21	06:44 (65)	05:48
	17:03	17:44		18:23	20:06		20:45	6 06:50 (65)	21:20
4	08:19	07:56		07:11	07:12		06:20		05:48
	17:04	17:45		18:25	20:07		20:46		21:21
5	08:19	07:55		07:09	07:10		06:18		05:47
	17:05	17:47		18:26	20:08		20:48		21:22
6	08:19	07:54		07:08	07:08		06:17		05:47
	17:06	17:48		18:28	20:10		20:49		21:23
7	08:18	07:52		07:06	07:06		06:15		05:46
	17:07	17:50		18:29	20:11		20:50		21:24
8	08:18	07:51		08:04	07:04		06:14		05:46
	17:08	17:51		18:30	20:12		20:52		21:24
9	08:18	07:49		08:02	07:02		06:12	06:35 (64)	05:46
	17:09	17:53		19:32	20:13		20:53	6 06:41 (64)	21:25
10	08:18	07:48		08:00	07:01		06:11	06:33 (64)	05:45
	17:11	17:54		19:33	20:15		20:54	8 06:41 (64)	21:26
11	08:17	07:46		07:58	06:59		06:10	06:32 (64)	05:45
	17:12	17:56		19:35	20:16		20:55	11 06:43 (64)	21:26
12	08:17	07:45		07:56	06:57		06:09	06:31 (64)	05:45
	17:13	17:57		19:36	20:17		20:57	13 06:44 (64)	21:27
13	08:16	07:43	08:05 (92)	07:54	06:55		06:07	06:30 (64)	05:45
	17:14	17:59	3 08:08 (92)	19:37	20:19		20:58	14 06:44 (64)	21:28
14	08:16	07:42	08:04 (92)	07:52	06:53		06:06	06:29 (64)	05:45
	17:15	18:00	6 08:10 (92)	19:39	20:20		20:59	16 06:45 (64)	21:28
15	08:15	07:40	08:02 (92)	07:51	06:51	07:12 (69)	06:05	06:28 (64)	05:45
	17:17	18:00	8 08:10 (92)	19:40	20:21	3 07:15 (69)	21:00	17 06:45 (64)	21:29
16	08:15	07:39	08:01 (92)	07:49	06:50	07:10 (69)	06:04	06:26 (64)	05:45
	17:18	18:02	10 08:11 (92)	19:41	20:23	5 07:15 (69)	21:01	18 06:44 (64)	21:29
17	08:14	07:37	07:59 (92)	07:47	06:48	07:09 (69)	06:02	06:27 (64)	05:45
	17:19	18:03	12 08:11 (92)	19:43	20:24	7 07:16 (69)	21:03	17 06:44 (64)	21:30
18	08:13	07:36	07:57 (92)	07:45	06:46	07:07 (69)	06:01	06:27 (64)	05:45
	17:21	18:05	14 08:11 (92)	19:44	20:25	8 07:15 (69)	21:04	17 06:44 (64)	21:30
19	08:13	07:34	07:57 (92)	07:43	06:44	07:05 (69)	06:00	06:27 (64)	05:45
	17:22	18:06	14 08:11 (92)	19:45	20:27	9 07:14 (69)	21:05	17 06:44 (64)	21:30
20	08:12	07:32	07:57 (92)	07:41	06:42	07:03 (69)	05:59	06:27 (64)	05:45
	17:23	18:07	13 08:10 (92)	19:47	20:28	10 07:13 (69)	21:06	17 06:44 (64)	21:31
21	08:11	07:31	07:58 (92)	07:39	06:41	07:05 (69)	05:58	06:28 (64)	05:45
	17:25	18:09	11 08:09 (92)	19:48	20:29	7 07:12 (69)	21:07	16 06:44 (64)	21:31
22	08:10	07:29	07:59 (92)	07:37	06:39		05:57	06:29 (64)	05:45
	17:26	18:10	7 08:06 (92)	19:50	20:31		21:08	15 06:44 (64)	21:31
23	08:09	07:27		07:35	06:37		05:56	06:30 (64)	05:45
	17:28	18:12		19:51	20:32		21:10	13 06:43 (64)	21:31
24	08:08	07:25		07:33	06:36		05:55	06:30 (64)	05:46
	17:29	18:13		19:52	20:33		21:11	12 06:42 (64)	21:32
25	08:07	07:24		07:31	06:34		05:54	06:31 (64)	05:46
	17:30	18:15		19:54	20:35		21:12	10 06:41 (64)	21:32
26	08:06	07:22		07:29	06:32	06:54 (87)	05:54	06:32 (64)	05:46
	17:32	18:16		19:55	20:36	2 06:55 (87)	21:13	8 06:40 (64)	21:32
27	08:05	07:20		07:27	06:31	06:52 (87)	05:53	06:35 (64)	05:47
	17:33	18:18		19:56	20:37	2 06:54 (87)	21:14	3 06:38 (64)	21:32
28	08:04	07:18		07:25	06:29	06:50 (65)	05:52		05:47
	17:35	18:19		19:58	20:39	3 06:53 (87)	21:15		21:32
29	08:03			07:23	06:27	06:49 (65)	05:51		05:48
	17:36			19:59	20:40	4 06:53 (65)	21:16		21:32
30	08:02			07:21	06:26	06:47 (65)	05:50		05:48
	17:38			20:00	20:41	5 06:52 (65)	21:17		21:32
31	08:01			07:20			05:50		
	17:39			20:02			21:18		
Potential sun hours	282	289		368	406		463		471
Total, worst case			98			65		268	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
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SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H18 - H18

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	July			August			September	October			November	December
1	05:49			06:18		06:42 (64)	06:56	07:34			07:16	07:57
	21:32			21:08	12	06:54 (64)	20:18	19:20			17:23	16:53
2	05:49			06:19		06:43 (64)	06:57	07:35			07:18	07:59
	21:31			21:07	10	06:53 (64)	20:16	19:18			17:22	16:52
3	05:50			06:20		06:44 (64)	06:59	07:37			07:19	08:00
	21:31			21:06	7	06:51 (64)	20:14	19:16			17:20	16:52
4	05:51			06:21		06:45 (64)	07:00	07:38			07:21	08:01
	21:31			21:04	4	06:49 (64)	20:12	19:14			17:19	16:52
5	05:51			06:22			07:01	07:39			07:22	08:02
	21:31			21:03			20:10	19:12			17:18	16:51
6	05:52			06:24			07:02	07:40			07:23	08:03
	21:30			21:02			20:09	19:10			17:16	16:51
7	05:53			06:25			07:04	07:42			07:25	08:04
	21:30			21:00			20:07	19:08			17:15	16:51
8	05:53			06:26			07:05	07:43			07:26	08:05
	21:30			20:59			20:05	19:06			17:13	16:51
9	05:54			06:27		06:54 (65)	07:06	07:44			07:28	08:06
	21:29			20:57	4	06:58 (65)	20:03	19:04			17:12	16:51
10	05:55			06:29		06:52 (65)	07:07	07:46			07:29	08:07
	21:29			20:56	7	06:59 (65)	20:01	19:03			17:11	16:51
11	05:56			06:30		06:53 (65)	07:09	07:47			07:31	08:08
	21:28			20:54	7	07:00 (65)	19:59	19:01			17:10	16:51
12	05:57			06:31		06:55 (65)	07:10	07:48			07:32	08:09
	21:27			20:53	6	07:01 (65)	19:57	18:57			17:09	16:51
13	05:57			06:32		06:56 (65)	07:11	07:50			07:33	08:10
	21:27			20:51	5	07:01 (65)	19:55	18:55			17:07	16:51
14	05:58			06:34		06:57 (65)	07:12	07:51			07:35	08:11
	21:26			20:50	4	07:01 (65)	19:53	18:53			17:06	16:51
15	05:59			06:35		06:58 (65)	07:14	07:52			07:36	08:11
	21:26			20:48	3	07:01 (87)	19:51	18:51			17:05	16:51
16	06:00			06:36		06:59 (87)	07:15	07:54			07:38	08:12
	21:25			20:46	2	07:01 (87)	19:49	18:50			17:04	16:51
17	06:01		06:43 (64)	06:37			07:16	07:55			07:39	08:13
	21:24	5	06:48 (64)	20:45			19:47	18:48			17:03	16:52
18	06:02		06:41 (64)	06:39			07:17	07:57			07:40	08:14
	21:23	9	06:50 (64)	20:43			19:45	18:46			17:02	16:52
19	06:03		06:40 (64)	06:40			07:19	07:58			07:42	08:14
	21:22	11	06:51 (64)	20:41			19:43	18:44			17:01	16:52
20	06:04		06:40 (64)	06:41			07:20	07:59		08:30 (92)	07:43	08:15
	21:21	12	06:52 (64)	20:40			19:41	18:43	8	08:38 (92)	17:00	16:53
21	06:05		06:39 (64)	06:42			07:21	08:01		08:28 (92)	07:45	08:15
	21:21	14	06:53 (64)	20:38			19:39	18:41	11	08:39 (92)	16:59	16:53
22	06:06		06:38 (64)	06:44		07:10 (69)	07:22	08:02		08:27 (92)	07:46	08:16
	21:20	16	06:54 (64)	20:36	7	07:17 (69)	19:37	18:39	14	08:41 (92)	16:59	16:54
23	06:07		06:38 (64)	06:45		07:08 (69)	07:24	08:03		08:26 (92)	07:47	08:16
	21:19	16	06:54 (64)	20:34	10	07:18 (69)	19:35	18:38	15	08:41 (92)	16:58	16:54
24	06:08		06:38 (64)	06:46		07:09 (69)	07:25	08:05		08:28 (92)	07:49	08:17
	21:18	17	06:55 (64)	20:33	9	07:18 (69)	19:33	18:36	13	08:41 (92)	16:57	16:55
25	06:10		06:37 (64)	06:47		07:10 (69)	07:26	08:06		08:29 (92)	07:50	08:17
	21:17	18	06:55 (64)	20:31	8	07:18 (69)	19:31	18:34	12	08:41 (92)	16:56	16:55
26	06:11		06:37 (64)	06:49		07:11 (69)	07:28	08:08		08:31 (92)	07:51	08:18
	21:16	18	06:55 (64)	20:29	7	07:18 (69)	19:29	18:33	10	08:41 (92)	16:56	16:56
27	06:12		06:37 (64)	06:50		07:13 (69)	07:29	08:09		08:32 (92)	07:52	08:18
	21:14	18	06:55 (64)	20:27	5	07:18 (69)	19:28	18:31	8	08:40 (92)	16:55	16:57
28	06:13		06:37 (64)	06:51		07:14 (69)	07:30	08:11		08:34 (92)	07:54	08:18
	21:13	18	06:55 (64)	20:25	2	07:16 (69)	19:26	18:29	5	08:39 (92)	16:54	16:57
29	06:14		06:39 (64)	06:52			07:31	08:12		08:35 (92)	07:55	08:18
	21:12	17	06:56 (64)	20:24			19:24	18:28	2	08:37 (92)	16:54	16:58
30	06:15		06:40 (64)	06:54			07:33	08:13			07:56	08:19
	21:11	15	06:55 (64)	20:22			19:22	18:26			16:53	16:59
31	06:16		06:41 (64)	06:55				08:15				08:19
	21:10	14	06:55 (64)	20:20				18:25				17:00
Potential sun hours	476			439			378	339			285	270
Total, worst case		218			119				98			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H20 - H20

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:16	07:17	06:24	05:49	05:49	06:17	06:56	07:34	07:16	07:57
	17:01	17:41	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:58	07:15	07:16	06:22	05:48	05:49	06:19	06:57	07:35	07:17	07:58
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:52
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:58	07:36	07:19	08:00
	17:03	17:44	18:23	20:05	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:19	05:47	05:50	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:18	07:55	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:47	21:22	21:30	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:17	05:46	05:52	06:23	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:23	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:52	06:25	07:03	07:42	07:25	08:04
	17:07	17:49	18:29	20:11	20:50	21:23	21:30	21:00	20:06	19:08	17:15	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:05	19:06	17:13	16:51
9	08:18	07:49	08:02	07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:27	08:06
	17:09	17:52	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:00	06:11	05:45	05:55	06:28	07:07	07:46	07:29	08:07
	17:10	17:54	19:33	20:15	20:54	21:26	21:28	20:56	20:01	19:02	17:11	16:51
11	08:17	07:46	07:58	06:59	06:10	05:45	05:56	06:30	07:08	07:47	07:30	08:08
	17:12	17:55	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:00	17:10	16:51
12	08:16	07:45	07:56	06:57	06:08	05:45	05:56	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:52	19:57	18:57	17:08	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:57	06:32	07:11	07:50	07:33	08:10
	17:14	17:58	19:37	20:19	20:58	21:27	21:27	20:51	19:55	18:55	17:07	16:51
14	08:15	07:42	07:52	06:53	06:06	05:44	05:58	06:33	07:12	07:51	07:35	08:10
	17:15	18:00	19:38	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:05	05:44	05:59	06:35	07:13	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:39	07:48	06:49	06:03	05:44	06:00	06:36	07:15	07:54	07:37	08:12
	17:18	18:01	19:41	20:23	21:01	21:29	21:25	20:46	19:49	18:49	17:04	16:51
17	08:14	07:37	07:46	06:48	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:43	20:24	21:02	21:29	21:24	20:44	19:47	18:48	17:03	16:51
18	08:13	07:35	07:45	06:46	06:01	05:44	06:02	06:38	07:17	07:56	07:40	08:13
	17:21	18:04	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:18	07:58	07:42	08:14
	17:22	18:06	19:45	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:12	07:32	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:30	21:21	20:39	19:41	18:42	17:00	16:52
21	08:11	07:30	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:00	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:46	08:16
	17:26	18:10	19:49	20:30	21:08	21:31	21:19	20:36	19:37	18:39	16:58	16:53
23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:45	07:23	08:03	07:47	08:16
	17:27	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:35	05:55	05:46	06:08	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:54	05:46	06:09	06:47	07:26	08:06	07:50	08:17
	17:30	18:15	19:53	20:34	21:11	21:31	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:11	06:48	07:27	08:07	07:51	08:17
	17:32	18:16	19:55	20:36	21:13	21:31	21:15	20:29	19:29	18:32	16:55	16:56
27	08:05	07:20	07:27	06:30	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:17	19:56	20:37	21:14	21:31	21:14	20:27	19:27	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:54	08:18
	17:35	18:19	19:57	20:38	21:15	21:31	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:31	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:26	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:18
	17:38		20:00	20:41	21:17	21:31	21:11	20:22	19:21	18:26	16:53	16:59
31	08:01		07:19		05:50		06:16	06:55		08:15		08:18
	17:39		20:01		21:17		21:09	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
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Description:

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9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H21 - H21

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:58
	17:01	17:41	18:21	20:03	20:43	21:19	21:32	21:09	20:18	19:20	17:23	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:50	06:19	06:58	07:35	07:18	07:59
	17:02	17:42	18:22	20:04	20:44	21:20	21:32	21:07	20:16	19:18	17:22	16:53
3	08:19	07:58	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:24	20:06	20:45	21:21	21:31	21:06	20:15	19:16	17:21	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:21	08:01
	17:04	17:45	18:25	20:07	20:47	21:22	21:31	21:05	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:31	21:03	20:11	19:12	17:18	16:52
6	08:19	07:54	07:08	07:08	06:17	05:47	05:52	06:24	07:03	07:41	07:24	08:03
	17:06	17:48	18:28	20:10	20:49	21:23	21:30	21:02	20:09	19:10	17:16	16:51
7	08:19	07:52	07:06	07:06	06:16	05:46	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:05	06:14	05:46	05:54	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:31	20:12	20:52	21:25	21:30	20:59	20:05	19:07	17:14	16:51
9	08:18	07:50	08:02	07:03	06:13	05:46	05:54	06:28	07:06	07:45	07:28	08:06
	17:10	17:53	19:32	20:14	20:53	21:25	21:29	20:57	20:03	19:05	17:12	16:51
10	08:18	07:48	08:00	07:01	06:11	05:46	05:55	06:29	07:08	07:46	07:29	08:07
	17:11	17:54	19:33	20:15	20:54	21:26	21:29	20:56	20:01	19:03	17:11	16:51
11	08:17	07:47	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:31	08:08
	17:12	17:56	19:35	20:16	20:56	21:27	21:28	20:54	19:59	19:01	17:10	16:51
12	08:17	07:45	07:56	06:57	06:09	05:45	05:57	06:31	07:10	07:49	07:32	08:09
	17:13	17:57	19:36	20:18	20:57	21:27	21:28	20:53	19:57	18:57	17:09	16:51
13	08:16	07:44	07:55	06:55	06:07	05:45	05:58	06:33	07:11	07:50	07:34	08:10
	17:14	17:59	19:38	20:19	20:58	21:28	21:27	20:51	19:55	18:55	17:08	16:51
14	08:16	07:42	07:53	06:53	06:06	05:45	05:59	06:34	07:13	07:51	07:35	08:11
	17:16	18:00	19:39	20:20	20:59	21:28	21:26	20:50	19:53	18:53	17:06	16:51
15	08:15	07:41	07:51	06:52	06:05	05:45	06:00	06:35	07:14	07:53	07:36	08:12
	17:17	18:00	19:40	20:22	21:00	21:29	21:26	20:48	19:51	18:52	17:05	16:51
16	08:15	07:39	07:49	06:50	06:04	05:45	06:01	06:36	07:15	07:54	07:38	08:12
	17:18	18:02	19:42	20:23	21:02	21:29	21:25	20:47	19:49	18:50	17:04	16:52
17	08:14	07:37	07:47	06:48	06:03	05:45	06:01	06:38	07:16	07:55	07:39	08:13
	17:20	18:03	19:43	20:24	21:03	21:30	21:24	20:45	19:47	18:48	17:03	16:52
18	08:13	07:36	07:45	06:46	06:02	05:45	06:02	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:44	20:26	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:13	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:46	20:27	21:05	21:31	21:23	20:42	19:43	18:45	17:01	16:52
20	08:12	07:32	07:41	06:43	05:59	05:45	06:04	06:41	07:20	08:00	07:43	08:15
	17:24	18:08	19:47	20:28	21:06	21:31	21:22	20:40	19:41	18:43	17:00	16:53
21	08:11	07:31	07:39	06:41	05:58	05:45	06:06	06:43	07:21	08:01	07:45	08:16
	17:25	18:09	19:48	20:30	21:08	21:31	21:21	20:38	19:40	18:41	17:00	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:07	06:44	07:23	08:02	07:46	08:16
	17:26	18:11	19:50	20:31	21:09	21:31	21:20	20:36	19:38	18:39	16:59	16:54
23	08:10	07:27	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:04	07:47	08:17
	17:28	18:12	19:51	20:32	21:10	21:32	21:19	20:35	19:36	18:38	16:58	16:54
24	08:09	07:26	07:33	06:36	05:56	05:46	06:09	06:46	07:25	08:05	07:49	08:17
	17:29	18:14	19:52	20:34	21:11	21:32	21:18	20:33	19:34	18:36	16:57	16:55
25	08:08	07:24	07:31	06:34	05:55	05:46	06:10	06:48	07:26	08:06	07:50	08:17
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:34	16:57	16:56
26	08:07	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:16	20:29	19:30	18:33	16:56	16:56
27	08:06	07:20	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:53	08:18
	17:34	18:18	19:56	20:37	21:14	21:32	21:15	20:27	19:28	18:31	16:55	16:57
28	08:05	07:19	07:26	06:29	05:52	05:47	06:13	06:51	07:30	08:11	07:54	08:18
	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:26	19:26	18:30	16:55	16:58
29	08:04		07:24	06:28	05:51	05:48	06:14	06:53	07:32	08:12	07:55	08:19
	17:37		19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28	16:54	16:58
30	08:02		07:22	06:26	05:51	05:48	06:16	06:54	07:33	08:14	07:56	08:19
	17:38		20:00	20:41	21:17	21:32	21:11	20:22	19:22	18:26	16:54	16:59
31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H22 - H22

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:25	05:50	05:49	06:18	06:56	07:34	07:17	07:58
	17:01	17:41	18:21	20:03	20:43	21:19 11 20:43 (66)	21:32 24 20:55 (66)	21:09	20:18	19:20	17:24	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:50	06:19	06:58	07:36	07:18	07:59
	17:02	17:43	18:22	20:05	20:44	21:20 14 20:44 (66)	21:32 23 20:55 (66)	21:07	20:17	19:18	17:22	16:53
3	08:19	07:58	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:24	20:06	20:45	21:21 16 20:46 (66)	21:31 22 20:55 (66)	21:06	20:15	19:16	17:21	16:52
4	08:19	07:56	07:12	07:12	06:20	05:48	05:51	06:22	07:00	07:38	07:21	08:01
	17:04	17:46	18:25	20:07	20:47	21:22 17 20:46 (66)	21:31 22 20:55 (66)	21:05	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:09	20:48	21:22 18 20:47 (66)	21:31 21 20:55 (66)	21:03	20:11	19:12	17:18	16:52
6	08:19	07:54	07:08	07:08	06:17	05:47	05:52	06:24	07:03	07:41	07:24	08:03
	17:06	17:48	18:28	20:10	20:49	21:23 19 20:48 (66)	21:31 20 20:54 (66)	21:02	20:09	19:10	17:16	16:52
7	08:19	07:52	07:06	07:07	06:16	05:47	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:51	21:24 20 20:48 (66)	21:30 19 20:54 (66)	21:01	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:05	06:14	05:46	05:54	06:26	07:05	07:43	07:27	08:06
	17:09	17:51	18:31	20:12	20:52	21:25 21 20:49 (66)	21:30 18 20:54 (66)	20:59	20:05	19:07	17:14	16:51
9	08:18	07:50	08:02	07:03	06:13	05:46	05:54	06:28	07:06	07:45	07:28	08:07
	17:10	17:53	19:32	20:14	20:53	21:25 22 20:50 (66)	21:29 16 20:53 (66)	20:58	20:03	19:05	17:13	16:51
10	08:18	07:48	08:00	07:01	06:11	05:46	05:55	06:29	07:08	07:46	07:29	08:07
	17:11	17:54	19:33	20:15	20:54	21:26 23 20:50 (66)	21:29 15 20:52 (66)	20:56	20:01	19:03	17:11	16:51
11	08:17	07:47	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:31	08:08
	17:12	17:56	19:35	20:16	20:56	21:27 23 20:50 (66)	21:28 12 20:51 (66)	20:55	19:59	19:01	17:10	16:51
12	08:17	07:45	07:57	06:57	06:09	05:45	05:57	06:31	07:10	07:49	07:32	08:09
	17:13	17:57	19:36	20:18	20:57	21:27 24 20:51 (66)	21:28 9 20:50 (66)	20:53	19:57	18:57	17:09	16:51
13	08:17	07:44	07:55	06:55	06:08	05:45	05:58	06:33	07:11	07:50	07:34	08:10
	17:14	17:59	19:38	20:19	20:58	21:28 25 20:52 (66)	21:27 5 20:48 (66)	20:51	19:55	18:55	17:08	16:51
14	08:16	07:42	07:53	06:53	06:06	05:45	05:59	06:34	07:13	07:51	07:35	08:11
	17:16	18:00	19:39	20:20	20:59	21:28 24 20:52 (66)	21:27	20:50	19:53	18:54	17:07	16:51
15	08:16	07:41	07:51	06:52	06:05	05:45	06:00	06:35	07:14	07:53	07:37	08:12
	17:17	18:00	19:40	20:22	21:01	21:29 24 20:52 (66)	21:26	20:48	19:51	18:52	17:05	16:51
16	08:15	07:39	07:49	06:50	06:04	05:45	06:01	06:36	07:15	07:54	07:38	08:13
	17:18	18:02	19:42	20:23	21:02	21:29 25 20:53 (66)	21:25	20:47	19:49	18:50	17:04	16:52
17	08:14	07:38	07:47	06:48	06:03	05:45	06:02	06:38	07:16	07:56	07:39	08:13
	17:20	18:03	19:43	20:24	21:03	21:30 25 20:53 (66)	21:24	20:45	19:48	18:48	17:03	16:52
18	08:14	07:36	07:45	06:46	06:02	05:45	06:03	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:44	20:26	21:04	21:30 25 20:53 (66)	21:24	20:43	19:46	18:46	17:02	16:52
19	08:13	07:34	07:43	06:45	06:01	05:45	06:04	06:40	07:19	07:58	07:42	08:15
	17:22	18:06	19:46	20:27	21:05	21:31 25 20:53 (66)	21:23	20:42	19:44	18:45	17:01	16:53
20	08:12	07:33	07:41	06:43	05:59	05:45	06:05	06:41	07:20	08:00	07:44	08:15
	17:24	18:08	19:47	20:28	21:07	21:31 25 20:53 (66)	21:22	20:40	19:42	18:43	17:01	16:53
21	08:11	07:31	07:39	06:41	05:58	05:45	06:06	06:43	07:21	08:01	07:45	08:16
	17:25	18:09	19:48	20:30	21:08	21:31 25 20:54 (66)	21:21	20:38	19:40	18:41	17:00	16:53
22	08:11	07:29	07:37	06:39	05:57	05:45	06:07	06:44	07:23	08:02	07:46	08:16
	17:27	18:11	19:50	20:31	21:09	21:31 25 20:54 (66)	21:20	20:36	19:38	18:40	16:59	16:54
23	08:10	07:28	07:35	06:38	05:57	05:46	06:08	06:45	07:24	08:04	07:48	08:17
	17:28	18:12	19:51	20:32	21:10	21:32 25 20:54 (66)	21:19	20:35	19:36	18:38	16:58	16:54
24	08:09	07:26	07:33	06:36	05:56	05:46	06:09	06:46	07:25	08:05	07:49	08:17
	17:29	18:14	19:53	20:34	21:11	21:32 25 20:54 (66)	21:18	20:33	19:34	18:36	16:57	16:55
25	08:08	07:24	07:31	06:34	05:55	05:46	06:10	06:48	07:27	08:07	07:50	08:18
	17:31	18:15	19:54	20:35	21:12	21:32 25 20:55 (66)	21:17	20:31	19:32	18:35	16:57	16:56
26	08:07	07:22	07:30	06:33	05:54	05:47	06:11	06:49	07:28	08:08	07:52	08:18
	17:32	18:17	19:55	20:36	21:13	21:32 25 20:55 (66)	21:16	20:29	19:30	18:33	16:56	16:56
27	08:06	07:21	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:53	08:18
	17:34	18:18	19:57	20:38	21:14	21:32 25 20:55 (66)	21:15	20:28	19:28	18:31	16:55	16:57
28	08:05	07:19	07:26	06:29	05:52	05:48	06:13	06:51	07:30	08:11	07:54	08:19
	17:35	18:19	19:58	20:39	21:15	21:32 24 20:55 (66)	21:14	20:26	19:26	18:30	16:55	16:58
29	08:04		07:24	06:28	05:52	05:48	06:14	06:53	07:32	08:12	07:55	08:19
	17:37		19:59	20:40	21:16	21:32 25 20:55 (66)	21:12	20:24	19:24	18:28	16:54	16:58
30	08:03		07:22	06:26	05:51	05:48	06:16	06:54	07:33	08:14	07:57	08:19
	17:38		20:01	20:42	21:17	21:32 24 20:55 (66)	21:11	20:22	19:22	18:27	16:54	16:59
31	08:01		07:20		05:50 20:33 (66)		06:17	06:55		08:15		08:19
	17:40		20:02		21:18 8 20:41 (66)		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case					8	674	226					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H23 - H23

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March			April			May	June	July	August	September			October			November	December
1	08:19	08:00	07:17		07:47 (132)	07:18			06:25	05:50	05:49	06:18	06:57			07:34		08:15 (132)	07:17	07:58
	17:02	17:41	18:21	11	07:58 (132)	20:03			20:43	21:19	21:32	21:09	20:19			19:20	29	08:44 (132)	17:24	16:53
2	08:19	07:59	07:15		07:44 (132)	07:16		07:37 (130)	06:23	05:49	05:50	06:19	06:58		07:29 (130)	07:36		08:14 (132)	07:18	07:59
	17:02	17:43	18:22	18	08:02 (132)	20:05	2	07:38 (130)	20:44	21:20	21:32	21:08	20:17	2	07:31 (130)	19:18	30	08:44 (132)	17:22	16:53
3	08:19	07:58	07:14		07:42 (132)	07:14		07:35 (130)	06:22	05:49	05:50	06:21	06:59		07:25 (130)	07:37		08:14 (132)	07:20	08:00
	17:03	17:44	18:24	21	08:03 (132)	20:06	4	07:39 (130)	20:46	21:21	21:32	21:06	20:15	9	07:34 (130)	19:16	30	08:44 (132)	17:21	16:53
4	08:19	07:57	07:12		07:40 (132)	07:12		07:33 (130)	06:20	05:48	05:51	06:22	07:00		07:24 (130)	07:38		08:13 (132)	07:21	08:01
	17:04	17:46	18:25	24	08:04 (132)	20:07	7	07:40 (130)	20:47	21:22	21:31	21:05	20:13	12	07:36 (130)	19:14	31	08:44 (132)	17:19	16:52
5	08:19	07:55	07:10		07:39 (132)	07:10		07:31 (130)	06:19	05:48	05:52	06:23	07:02		07:24 (130)	07:40		08:13 (132)	07:22	08:02
	17:05	17:47	18:27	26	08:05 (132)	20:09	9	07:40 (130)	20:48	21:23	21:31	21:04	20:11	12	07:36 (130)	19:12	30	08:43 (132)	17:18	16:52
6	08:19	07:54	07:08		07:38 (132)	07:09		07:29 (130)	06:17	05:47	05:52	06:24	07:03		07:25 (130)	07:41		08:13 (132)	07:24	08:04
	17:06	17:49	18:28	27	08:05 (132)	20:10	10	07:39 (130)	20:49	21:23	21:31	21:02	20:09	10	07:35 (130)	19:11	30	08:43 (132)	17:17	16:52
7	08:19	07:53	07:06		07:37 (132)	07:07		07:27 (130)	06:16	05:47	05:53	06:25	07:04		07:26 (130)	07:42		08:13 (132)	07:25	08:05
	17:08	17:50	18:29	29	08:06 (132)	20:11	12	07:39 (130)	20:51	21:24	21:30	21:01	20:07	9	07:35 (130)	19:09	29	08:42 (132)	17:15	16:52
8	08:19	07:51	08:04		08:36 (132)	07:05		07:27 (130)	06:14	05:46	05:54	06:27	07:05		07:27 (130)	07:44		08:13 (132)	07:27	08:06
	17:09	17:52	18:31	30	09:06 (132)	20:13	12	07:39 (130)	20:52	21:25	21:30	20:59	20:05	7	07:34 (130)	19:07	27	08:40 (132)	17:14	16:51
9	08:18	07:50	08:02		08:36 (132)	07:03		07:28 (130)	06:13	05:46	05:55	06:28	07:07		07:29 (130)	07:45		08:15 (132)	07:28	08:07
	17:10	17:53	19:32	30	09:06 (132)	20:14	9	07:37 (130)	20:53	21:26	21:30	20:58	20:03	4	07:33 (130)	19:05	25	08:40 (132)	17:13	16:51
10	08:18	07:48	08:01		08:35 (132)	07:01		07:31 (130)	06:12	05:46	05:55	06:29	07:08		07:30 (130)	07:46		08:15 (132)	07:30	08:08
	17:11	17:55	19:34	30	09:05 (132)	20:15	2	07:33 (130)	20:55	21:26	21:29	20:56	20:01	2	07:31 (130)	19:03	23	08:38 (132)	17:11	16:51
11	08:18	07:47	07:59		08:36 (132)	06:59			06:10	05:46	05:56	06:30	07:09			07:48		08:16 (132)	07:31	08:09
	17:12	17:56	19:35	30	09:06 (132)	20:17			20:56	21:27	21:28	20:55	19:59			19:01	20	08:36 (132)	17:10	16:51
12	08:17	07:45	07:57		08:36 (132)	06:57			06:09	05:45	05:57	06:32	07:10			07:49		08:19 (132)	07:32	08:09
	17:13	17:58	19:36	29	09:05 (132)	20:18			20:57	21:28	21:28	20:53	19:57			18:57	15	08:34 (132)	17:09	16:51
13	08:17	07:44	07:55		08:16 (131)	06:56			06:08	05:45	05:58	06:33	07:12			07:50		08:22 (132)	07:34	08:10
	17:15	17:59	19:38	32	09:05 (132)	20:19			20:58	21:28	21:27	20:52	19:56			18:56	8	08:30 (132)	17:08	16:51
14	08:16	07:42	07:53		08:14 (131)	06:54			06:07	05:45	05:59	06:34	07:13			07:52			07:35	08:11
	17:16	18:01	19:39	36	09:04 (132)	20:21			21:00	21:29	21:27	20:50	19:54			18:54			17:07	16:51
15	08:16	07:41	07:51		08:12 (131)	06:52			06:05	05:45	06:00	06:35	07:14			07:53			07:37	08:12
	17:17	18:01	19:41	37	09:02 (132)	20:22			21:01	21:29	21:26	20:48	19:52			18:52			17:06	16:52
16	08:15	07:39	07:49		08:10 (131)	06:50			06:04	05:45	06:01	06:37	07:15			07:54			07:38	08:13
	17:19	18:02	19:42	38	09:01 (132)	20:23			21:02	21:30	21:25	20:47	19:50			18:50			17:05	16:52
17	08:14	07:38	07:47		08:08 (131)	06:48			06:03	05:45	06:02	06:38	07:17			07:56			07:40	08:13
	17:20	18:04	19:43	37	08:59 (132)	20:25			21:03	21:30	21:24	20:45	19:48			18:48			17:04	16:52
18	08:14	07:36	07:45		08:06 (131)	06:46			06:02	05:45	06:03	06:39	07:18			07:57			07:41	08:14
	17:21	18:05	19:45	35	08:57 (132)	20:26			21:04	21:30	21:24	20:43	19:46			18:47			17:03	16:52
19	08:13	07:34	07:43		08:06 (131)	06:45			06:01	05:45	06:04	06:40	07:19		07:59 (131)	07:58			07:42	08:15
	17:23	18:07	19:46	28	08:53 (132)	20:27			21:05	21:31	21:23	20:42	19:44	3	08:02 (131)	18:45			17:02	16:53
20	08:12	07:33	07:41		08:06 (131)	06:43			06:00	05:45	06:05	06:42	07:20		07:55 (131)	08:00			07:44	08:15
	17:24	18:08	19:47	17	08:23 (131)	20:29			21:07	21:31	21:22	20:40	19:42	10	08:05 (131)	18:43			17:01	16:53
21	08:11	07:31	07:39		08:06 (131)	06:41			05:59	05:45	06:06	06:43	07:22		07:52 (131)	08:01			07:45	08:16
	17:25	18:09	19:49	16	08:22 (131)	20:30			21:08	21:31	21:21	20:38	19:40	14	08:06 (131)	18:41			17:00	16:54
22	08:11	07:29	07:37		08:07 (131)	06:39			05:58	05:46	06:07	06:44	07:23		07:52 (131)	08:03			07:46	08:16
	17:27	18:11	19:50	14	08:21 (131)	20:31			21:09	21:32	21:20	20:37	19:38	16	08:08 (131)	18:40			16:59	16:54
23	08:10	07:28	07:36		08:08 (131)	06:38			05:57	05:46	06:08	06:45	07:24		07:50 (131)	08:04			07:48	08:17
	17:28	18:12	19:51	11	08:19 (131)	20:32			21:10	21:32	21:19	20:35	19:36	18	08:08 (131)	18:38			16:58	16:55
24	08:09	07:26	07:34		08:10 (131)	06:36			05:56	05:46	06:09	06:47	07:25		07:50 (131)	08:05			07:49	08:17
	17:30	18:14	19:53	6	08:16 (131)	20:34			21:11	21:32	21:18	20:33	19:34	25	08:35 (132)	18:36			16:57	16:55
25	08:08	07:24	07:32			06:34			05:55	05:47	06:10	06:48	07:27		07:49 (131)	08:07			07:50	08:18
	17:31	18:15	19:54			20:35			21:12	21:32	21:17	20:31	19:32	33	08:38 (132)	18:35			16:57	16:56
26	08:07	07:22	07:30			06:33			05:54	05:47	06:11	06:49	07:28		07:50 (131)	08:08			07:52	08:18
	17:32	18:17	19:55			20:36			21:13	21:32	21:16	20:30	19:30	36	08:41 (132)	18:33			16:56	16:56
27	08:06	07:21	07:28			06:31			05:53	05:47	06:12	06:50	07:29		07:51 (131)	08:10			07:53	08:18
	17:34	18:18	19:57			20:38			21:14	21:32	21:15	20:28	19:28	38	08:42 (132)	18:31			16:55	16:57
28	08:05	07:19	07:26			06:29			05:52	05:48	06:13	06:52	07:31		07:52 (131)	08:11			07:54	08:19
	17:35	18:20	19:58			20:39			21:15	21:32	21:14	20:26	19:26	38	08:43 (132)	18:30			16:55	16:58
29	08:04		07:24			06:28			05:52	05:48	06:15	06:53	07:32		07:53 (131)	08:12			07:55	08:19
	17:37		19:59			20:40			21:16	21:32	21:13	20:24	19:24	37	08:43 (132)	18:28			16:54	16:59
30	08:03		07:22			06:26			05:51	05:49	06:16	06:54	07:33		07:55 (131)	08:14			07:57	08:19
	17:38		20:01			20:42			21:17	21:32	21:11	20:22	19:22	34	08:44 (132)	18:27			16:54	17:00
31	08:02		07:20						05:50		06:17	06:55				08:15				08:19
	17:40		20:02						21:18		21:10	20:20				18:25				17:00
Potential sun hours	282	289	368			406			463	471	476	439	378			339			285	270
Total, worst case				612			67							369			327			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H24 - H24

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:25	05:50	05:49	06:18	06:57	07:35	07:17	07:58
	17:02	17:41	18:21	20:03	20:43	21:19	21:32	21:09	20:19	19:20	17:24	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:50	06:19	06:58	07:36	07:18	07:59
	17:03	17:43	18:23	20:05	20:44	21:20	21:32	21:08	20:17	19:18	17:22	16:53
3	08:19	07:58	07:14	07:14	06:22	05:49	05:51	06:21	06:59	07:37	07:20	08:00
	17:04	17:44	18:24	20:06	20:46	21:21	21:32	21:06	20:15	19:16	17:21	16:53
4	08:19	07:57	07:12	07:12	06:20	05:48	05:51	06:22	07:00	07:38	07:21	08:01
	17:05	17:46	18:25	20:07	20:47	21:22	21:31	21:05	20:13	19:15	17:20	16:52
5	08:19	07:55	07:10	07:11	06:19	05:48	05:52	06:23	07:02	07:40	07:23	08:03
	17:06	17:47	18:27	20:09	20:48	21:23	21:31	21:04	20:11	19:13	17:18	16:52
6	08:19	07:54	07:08	07:09	06:17	05:47	05:53	06:24	07:03	07:41	07:24	08:04
	17:07	17:49	18:28	20:10	20:50	21:24	21:31	21:02	20:09	19:11	17:17	16:52
7	08:19	07:53	07:06	07:07	06:16	05:47	05:53	06:26	07:04	07:42	07:25	08:05
	17:08	17:50	18:30	20:11	20:51	21:24	21:30	21:01	20:07	19:09	17:15	16:52
8	08:19	07:51	08:04	07:05	06:14	05:47	05:54	06:27	07:05	07:44	07:27	08:06
	17:09	17:52	18:31	20:13	20:52	21:25	21:30	20:59	20:05	19:07	17:14	16:51
9	08:18	07:50	08:03	07:03	06:13	05:46	05:55	06:28	07:07	07:45	07:28	08:07
	17:10	17:53	19:32	20:14	20:53	21:26	21:30	20:58	20:03	19:05	17:13	16:51
10	08:18	07:49	08:01	07:01	06:12	05:46	05:56	06:29	07:08	07:46	07:30	08:08
	17:11	17:55	19:34	20:15	20:55	21:26	21:29	20:56	20:01	19:03	17:12	16:51
11	08:18	07:47	07:59	06:59	06:10	05:46	05:56	06:30	07:09	07:48	07:31	08:09
	17:12	17:56	19:35	20:17	20:56	21:27	21:29	20:55	20:00	19:01	17:10	16:51
12	08:17	07:46	07:57	06:57	06:09	05:46	05:57	06:32	07:10	07:49	07:33	08:10
	17:14	17:58	19:37	20:18	20:57	21:28	21:28	20:53	19:58	18:58	17:09	16:51
13	08:17	07:44	07:55	06:56	06:08	05:45	05:58	06:33	07:12	07:50	07:34	08:10
	17:15	17:59	19:38	20:19	20:58	21:28	21:27	20:52	19:56	18:56	17:08	16:51
14	08:16	07:43	07:53	06:54	06:07	05:45	05:59	06:34	07:13	07:52	07:35	08:11
	17:16	18:01	19:39	20:21	21:00	21:29	21:27	20:50	19:54	18:54	17:07	16:52
15	08:16	07:41	07:51	06:52	06:05	05:45	06:00	06:35	07:14	07:53	07:37	08:12
	17:17	18:01	19:41	20:22	21:01	21:29	21:26	20:49	19:52	18:52	17:06	16:52
16	08:15	07:39	07:49	06:50	06:04	05:45	06:01	06:37	07:15	07:54	07:38	08:13
	17:19	18:02	19:42	20:23	21:02	21:30	21:25	20:47	19:50	18:50	17:05	16:52
17	08:15	07:38	07:47	06:48	06:03	05:45	06:02	06:38	07:17	07:56	07:40	08:14
	17:20	18:04	19:43	20:25	21:03	21:30	21:25	20:45	19:48	18:48	17:04	16:52
18	08:14	07:36	07:45	06:47	06:02	05:45	06:03	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:45	20:26	21:04	21:31	21:24	20:44	19:46	18:47	17:03	16:53
19	08:13	07:35	07:43	06:45	06:01	05:45	06:04	06:40	07:19	07:59	07:42	08:15
	17:23	18:07	19:46	20:27	21:06	21:31	21:23	20:42	19:44	18:45	17:02	16:53
20	08:12	07:33	07:41	06:43	06:00	05:45	06:05	06:42	07:21	08:00	07:44	08:15
	17:24	18:08	19:47	20:29	21:07	21:31	21:22	20:40	19:42	18:43	17:01	16:53
21	08:12	07:31	07:40	06:41	05:59	05:46	06:06	06:43	07:22	08:01	07:45	08:16
	17:25	18:10	19:49	20:30	21:08	21:31	21:21	20:38	19:40	18:42	17:00	16:54
22	08:11	07:30	07:38	06:40	05:58	05:46	06:07	06:44	07:23	08:03	07:47	08:17
	17:27	18:11	19:50	20:31	21:09	21:32	21:20	20:37	19:38	18:40	16:59	16:54
23	08:10	07:28	07:36	06:38	05:57	05:46	06:08	06:45	07:24	08:04	07:48	08:17
	17:28	18:12	19:51	20:33	21:10	21:32	21:19	20:35	19:36	18:38	16:58	16:55
24	08:09	07:26	07:34	06:36	05:56	05:46	06:09	06:47	07:26	08:05	07:49	08:17
	17:30	18:14	19:53	20:34	21:11	21:32	21:18	20:33	19:34	18:36	16:58	16:55
25	08:08	07:24	07:32	06:34	05:55	05:47	06:10	06:48	07:27	08:07	07:50	08:18
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:35	16:57	16:56
26	08:07	07:23	07:30	06:33	05:54	05:47	06:11	06:49	07:28	08:08	07:52	08:18
	17:33	18:17	19:55	20:37	21:13	21:32	21:16	20:30	19:30	18:33	16:56	16:57
27	08:06	07:21	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:10	07:53	08:19
	17:34	18:18	19:57	20:38	21:14	21:32	21:15	20:28	19:28	18:32	16:56	16:57
28	08:05	07:19	07:26	06:30	05:53	05:48	06:14	06:52	07:31	08:11	07:54	08:19
	17:35	18:20	19:58	20:39	21:15	21:32	21:14	20:26	19:26	18:30	16:55	16:58
29	08:04		07:24	06:28	05:52	05:48	06:15	06:53	07:32	08:13	07:56	08:19
	17:37		19:59	20:40	21:16	21:32	21:13	20:24	19:24	18:28	16:54	16:59
30	08:03		07:22	06:26	05:51	05:49	06:16	06:54	07:33	08:14	07:57	08:19
	17:38		20:01	20:42	21:17	21:32	21:11	20:22	19:22	18:27	16:54	17:00
31	08:02		07:20		05:50		06:17	06:55		08:15		08:19
	17:40		20:02		21:18		21:10	20:21		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H25 - H25

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May		June	July		August	September	October	November	December
1	08:20	08:01	07:17	07:18	06:25		05:50	05:49		06:18	06:57	07:35	07:17	07:58
	17:02	17:41	18:21	20:04	20:43		21:19	21:32		21:09	20:19	19:20	17:24	16:54
2	08:20	07:59	07:15	07:16	06:23		05:49	05:50		06:19	06:58	07:36	07:18	07:59
	17:03	17:43	18:23	20:05	20:44		21:20	21:32		21:08	20:17	19:18	17:22	16:53
3	08:20	07:58	07:14	07:14	06:22		05:49	05:51		06:21	06:59	07:37	07:20	08:00
	17:04	17:44	18:24	20:06	20:46		21:21	21:32		21:06	20:15	19:16	17:21	16:53
4	08:19	07:57	07:12	07:13	06:20		05:48	05:51		06:22	07:00	07:38	07:21	08:02
	17:05	17:46	18:25	20:08	20:47		21:22	21:32		21:05	20:13	19:15	17:20	16:52
5	08:19	07:55	07:10	07:11	06:19		05:48	05:52		06:23	07:02	07:40	07:23	08:03
	17:06	17:47	18:27	20:09	20:48		21:23	21:31		21:04	20:11	19:13	17:18	16:52
6	08:19	07:54	07:08	07:09	06:17		05:47	05:53		06:24	07:03	07:41	07:24	08:04
	17:07	17:49	18:28	20:10	20:50		21:24	21:31		21:02	20:09	19:11	17:17	16:52
7	08:19	07:53	07:06	07:07	06:16		05:47	05:53		06:26	07:04	07:42	07:25	08:05
	17:08	17:50	18:30	20:11	20:51		21:24	21:31		21:01	20:07	19:09	17:15	16:52
8	08:19	07:51	08:04	07:05	06:15		05:47	05:54		06:27	07:06	07:44	07:27	08:06
	17:09	17:52	18:31	20:13	20:52		21:25	21:30		20:59	20:05	19:07	17:14	16:52
9	08:18	07:50	08:03	07:03	06:13		05:46	05:55		06:28	07:07	07:45	07:28	08:07
	17:10	17:53	19:32	20:14	20:53		21:26	21:30		20:58	20:03	19:05	17:13	16:51
10	08:18	07:49	08:01	07:01	06:12		05:46	05:56		06:29	07:08	07:46	07:30	08:08
	17:11	17:55	19:34	20:15	20:55		21:26	21:29		20:56	20:02	19:03	17:12	16:51
11	08:18	07:47	07:59	06:59	06:10		05:46	05:56		06:30	07:09	07:48	07:31	08:09
	17:12	17:56	19:35	20:17	20:56		21:27	21:29		20:55	20:00	19:01	17:10	16:51
12	08:17	07:46	07:57	06:57	06:09		05:46	05:57		06:32	07:11	07:49	07:33	08:10
	17:14	17:58	19:37	20:18	20:57		21:28	21:28		20:53	19:58	18:58	17:09	16:51
13	08:17	07:44	07:55	06:56	06:08		05:45	05:58	06:26 (70)	06:33	07:12	07:50	07:34	08:10
	17:15	17:59	19:38	20:19	20:58		21:28	21:27	3 06:29 (70)	20:52	19:56	18:56	17:08	16:51
14	08:16	07:43	07:53	06:54	06:07		05:45	05:59	06:25 (70)	06:34	07:13	07:52	07:35	08:11
	17:16	18:01	19:39	20:21	21:00		21:29	21:27	6 06:31 (70)	20:50	19:54	18:54	17:07	16:52
15	08:16	07:41	07:51	06:52	06:05		05:45	06:00	06:25 (70)	06:35	07:14	07:53	07:37	08:12
	17:17	18:01	19:41	20:22	21:01		21:29	21:26	7 06:32 (70)	20:49	19:52	18:52	17:06	16:52
16	08:15	07:39	07:49	06:50	06:04		05:45	06:01	06:26 (70)	06:37	07:16	07:54	07:38	08:13
	17:19	18:02	19:42	20:23	21:02		21:30	21:25	6 06:32 (70)	20:47	19:50	18:50	17:05	16:52
17	08:15	07:38	07:47	06:48	06:03		05:45	06:02	06:27 (70)	06:38	07:17	07:56	07:40	08:14
	17:20	18:04	19:43	20:25	21:03		21:30	21:25	6 06:33 (70)	20:45	19:48	18:49	17:04	16:52
18	08:14	07:36	07:45	06:47	06:02		05:45	06:03	06:28 (70)	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:45	20:26	21:04		21:31	21:24	5 06:33 (70)	20:44	19:46	18:47	17:03	16:53
19	08:13	07:35	07:43	06:45	06:01		05:45	06:04	06:29 (70)	06:40	07:19	07:59	07:42	08:15
	17:23	18:07	19:46	20:27	21:06		21:31	21:23	5 06:34 (70)	20:42	19:44	18:45	17:02	16:53
20	08:12	07:33	07:42	06:43	06:00		05:45	06:05	06:30 (70)	06:42	07:21	08:00	07:44	08:16
	17:24	18:08	19:47	20:29	21:07		21:31	21:22	4 06:34 (70)	20:40	19:42	18:43	17:01	16:53
21	08:12	07:31	07:40	06:41	05:59	06:22 (70)	05:46	06:06	06:31 (70)	06:43	07:22	08:01	07:45	08:16
	17:25	18:10	19:49	20:30	21:08	2 06:23 (70)	21:32	21:21	3 06:34 (70)	20:39	19:40	18:42	17:00	16:54
22	08:11	07:30	07:38	06:40	05:58	06:21 (70)	05:46	06:07	06:32 (70)	06:44	07:23	08:03	07:47	08:17
	17:27	18:11	19:50	20:31	21:09	2 06:23 (70)	21:32	21:20	2 06:33 (70)	20:37	19:38	18:40	16:59	16:54
23	08:10	07:28	07:36	06:38	05:57	06:20 (70)	05:46	06:08		06:45	07:24	08:04	07:48	08:17
	17:28	18:13	19:52	20:33	21:10	3 06:23 (70)	21:32	21:19		20:35	19:36	18:38	16:58	16:55
24	08:09	07:26	07:34	06:36	05:56	06:20 (70)	05:46	06:09		06:47	07:26	08:06	07:49	08:18
	17:30	18:14	19:53	20:34	21:11	4 06:24 (70)	21:32	21:18		20:33	19:34	18:36	16:58	16:55
25	08:08	07:24	07:32	06:35	05:55	06:19 (70)	05:47	06:10		06:48	07:27	08:07	07:51	08:18
	17:31	18:15	19:54	20:35	21:12	5 06:24 (70)	21:32	21:17		20:32	19:32	18:35	16:57	16:56
26	08:07	07:23	07:30	06:33	05:54	06:18 (70)	05:47	06:11		06:49	07:28	08:08	07:52	08:18
	17:33	18:17	19:56	20:37	21:13	6 06:24 (70)	21:32	21:16		20:30	19:30	18:33	16:56	16:57
27	08:06	07:21	07:28	06:31	05:53	06:17 (70)	05:47	06:13		06:50	07:29	08:10	07:53	08:19
	17:34	18:18	19:57	20:38	21:14	6 06:23 (70)	21:32	21:15		20:28	19:28	18:32	16:56	16:57
28	08:05	07:19	07:26	06:30	05:53	06:17 (70)	05:48	06:14		06:52	07:31	08:11	07:54	08:19
	17:35	18:20	19:58	20:39	21:15	7 06:24 (70)	21:32	21:14		20:26	19:26	18:30	16:55	16:58
29	08:04		07:24	06:28	05:52	06:16 (70)	05:48	06:15		06:53	07:32	08:13	07:56	08:19
	17:37		20:00	20:41	21:16	7 06:23 (70)	21:32	21:13		20:24	19:24	18:28	16:54	16:59
30	08:03		07:22	06:26	05:51	06:17 (70)	05:49	06:16		06:54	07:33	08:14	07:57	08:19
	17:38		20:01	20:42	21:17	5 06:22 (70)	21:32	21:12		20:22	19:22	18:27	16:54	17:00
31	08:02		07:20		05:50	06:19 (70)		06:17		06:55		08:15		08:19
	17:40		20:02		21:18	2 06:20 (70)		21:10		20:21		18:25		17:00
Potential sun hours	282	289	368	406	463		471	476		439	378	339	285	270
Total, worst case						49			47					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H26 - H26

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:58
	17:01	17:41	18:21	20:03	20:43	21:19	21:32	21:09	20:18	19:20	17:23	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:50	06:19	06:58	07:35	07:18	07:59
	17:02	17:42	18:22	20:04	20:44	21:20	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:58	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:24	20:06	20:45	21:21	21:31	21:06	20:14	19:16	17:21	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:22	07:00	07:38	07:21	08:01
	17:04	17:45	18:25	20:07	20:47	21:21	21:31	21:05	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:31	21:03	20:11	19:12	17:18	16:52
6	08:19	07:54	07:08	07:08	06:17	05:47	05:52	06:24	07:03	07:41	07:24	08:03
	17:06	17:48	18:28	20:10	20:49	21:23	21:30	21:02	20:09	19:10	17:16	16:51
7	08:19	07:52	07:06	07:06	06:16	05:47	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:05	06:14	05:46	05:54	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:31	20:12	20:52	21:25	21:30	20:59	20:05	19:07	17:14	16:51
9	08:18	07:50	08:02	07:03	06:13	05:46	05:54	06:28	07:06	07:45	07:28	08:06
	17:10	17:53	19:32	20:14	20:53	21:25	21:29	20:57	20:03	19:05	17:12	16:51
10	08:18	07:48	08:00	07:01	06:11	05:46	05:55	06:29	07:08	07:46	07:29	08:07
	17:11	17:54	19:33	20:15	20:54	21:26	21:29	20:56	20:01	19:03	17:11	16:51
11	08:17	07:47	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:31	08:08
	17:12	17:56	19:35	20:16	20:56	21:27	21:28	20:54	19:59	19:01	17:10	16:51
12	08:17	07:45	07:56	06:57	06:09	05:45	05:57	06:31	07:10	07:49	07:32	08:09
	17:13	17:57	19:36	20:18	20:57	21:27	21:28	20:53	19:57	18:57	17:09	16:51
13	08:16	07:44	07:55	06:55	06:08	05:45	05:58	06:33	07:11	07:50	07:34	08:10
	17:14	17:59	19:38	20:19	20:58	21:28	21:27	20:51	19:55	18:55	17:08	16:51
14	08:16	07:42	07:53	06:53	06:06	05:45	05:59	06:34	07:13	07:51	07:35	08:11
	17:16	18:00	19:39	20:20	20:59	21:28	21:26	20:50	19:53	18:54	17:07	16:51
15	08:15	07:41	07:51	06:52	06:05	05:45	06:00	06:35	07:14	07:53	07:36	08:12
	17:17	18:00	19:40	20:22	21:00	21:29	21:26	20:48	19:51	18:52	17:05	16:51
16	08:15	07:39	07:49	06:50	06:04	05:45	06:01	06:36	07:15	07:54	07:38	08:12
	17:18	18:02	19:42	20:23	21:02	21:29	21:25	20:46	19:49	18:50	17:04	16:52
17	08:14	07:37	07:47	06:48	06:03	05:45	06:02	06:38	07:16	07:55	07:39	08:13
	17:20	18:03	19:43	20:24	21:03	21:30	21:24	20:45	19:47	18:48	17:03	16:52
18	08:13	07:36	07:45	06:46	06:02	05:45	06:02	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:44	20:26	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:13	07:34	07:43	06:44	06:01	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:46	20:27	21:05	21:30	21:23	20:41	19:43	18:45	17:01	16:53
20	08:12	07:32	07:41	06:43	05:59	05:45	06:05	06:41	07:20	07:59	07:43	08:15
	17:24	18:08	19:47	20:28	21:06	21:31	21:22	20:40	19:41	18:43	17:01	16:53
21	08:11	07:31	07:39	06:41	05:58	05:45	06:06	06:43	07:21	08:01	07:45	08:16
	17:25	18:09	19:48	20:30	21:07	21:31	21:21	20:38	19:40	18:41	17:00	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:07	06:44	07:23	08:02	07:46	08:16
	17:26	18:11	19:50	20:31	21:09	21:31	21:20	20:36	19:38	18:39	16:59	16:54
23	08:09	07:27	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:04	07:47	08:17
	17:28	18:12	19:51	20:32	21:10	21:31	21:19	20:35	19:36	18:38	16:58	16:54
24	08:09	07:26	07:33	06:36	05:56	05:46	06:09	06:46	07:25	08:05	07:49	08:17
	17:29	18:14	19:52	20:34	21:11	21:32	21:18	20:33	19:34	18:36	16:57	16:55
25	08:08	07:24	07:31	06:34	05:55	05:46	06:10	06:48	07:26	08:06	07:50	08:17
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:34	16:57	16:56
26	08:07	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:16	20:29	19:30	18:33	16:56	16:56
27	08:06	07:20	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:53	08:18
	17:34	18:18	19:56	20:37	21:14	21:32	21:15	20:27	19:28	18:31	16:55	16:57
28	08:05	07:19	07:26	06:29	05:52	05:48	06:13	06:51	07:30	08:11	07:54	08:18
	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:26	19:26	18:30	16:55	16:58
29	08:03		07:24	06:28	05:51	05:48	06:14	06:53	07:32	08:12	07:55	08:19
	17:37		19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28	16:54	16:58
30	08:02		07:22	06:26	05:51	05:48	06:16	06:54	07:33	08:14	07:56	08:19
	17:38		20:00	20:41	21:17	21:32	21:11	20:22	19:22	18:27	16:54	16:59
31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H27 - H27

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:21	20:03	20:43	21:19	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:49	06:19	06:57	07:35	07:18	07:59
	17:02	17:42	18:22	20:04	20:44	21:20	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:23	20:06	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:21	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:31	21:03	20:11	19:12	17:18	16:52
6	08:19	07:54	07:08	07:08	06:17	05:47	05:52	06:24	07:02	07:41	07:23	08:03
	17:06	17:48	18:28	20:10	20:49	21:23	21:30	21:02	20:09	19:10	17:16	16:51
7	08:18	07:52	07:06	07:06	06:15	05:46	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:54	06:26	07:05	07:43	07:26	08:05
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9	08:18	07:49	08:02	07:03	06:13	05:46	05:54	06:27	07:06	07:44	07:28	08:06
	17:10	17:53	19:32	20:14	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:01	06:11	05:45	05:55	06:29	07:07	07:46	07:29	08:07
	17:11	17:54	19:33	20:15	20:54	21:26	21:29	20:56	20:01	19:03	17:11	16:51
11	08:17	07:46	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:31	08:08
	17:12	17:56	19:35	20:16	20:55	21:26	21:28	20:54	19:59	19:01	17:10	16:51
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	17:13	17:57	19:36	20:18	20:57	21:27	21:27	20:53	19:57	18:57	17:09	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:58	06:32	07:11	07:50	07:33	08:10
	17:14	17:59	19:37	20:19	20:58	21:28	21:27	20:51	19:55	18:55	17:08	16:51
14	08:16	07:42	07:52	06:53	06:06	05:45	05:59	06:34	07:12	07:51	07:35	08:11
	17:16	18:00	19:39	20:20	20:59	21:28	21:26	20:50	19:53	18:53	17:06	16:51
15	08:15	07:40	07:51	06:51	06:05	05:45	05:59	06:35	07:14	07:53	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:29	21:25	20:48	19:51	18:52	17:05	16:51
16	08:15	07:39	07:49	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:38	08:12
	17:18	18:02	19:41	20:23	21:01	21:29	21:25	20:46	19:49	18:50	17:04	16:51
17	08:14	07:37	07:47	06:48	06:03	05:45	06:01	06:37	07:16	07:55	07:39	08:13
	17:20	18:03	19:43	20:24	21:03	21:30	21:24	20:45	19:47	18:48	17:03	16:52
18	08:13	07:36	07:45	06:46	06:01	05:45	06:02	06:39	07:17	07:57	07:40	08:14
	17:21	18:05	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:13	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:46	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:12	07:32	07:41	06:43	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:24	18:08	19:47	20:28	21:06	21:31	21:21	20:40	19:41	18:43	17:00	16:53
21	08:11	07:31	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:01	07:45	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:21	20:38	19:39	18:41	17:00	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:44	07:22	08:02	07:46	08:16
	17:26	18:11	19:50	20:31	21:08	21:31	21:20	20:36	19:37	18:39	16:59	16:54
23	08:09	07:27	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:04	07:47	08:16
	17:28	18:12	19:51	20:32	21:10	21:31	21:19	20:34	19:35	18:38	16:58	16:54
24	08:08	07:26	07:33	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:49	08:17
	17:29	18:13	19:52	20:33	21:11	21:31	21:18	20:33	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:55	05:46	06:10	06:47	07:26	08:06	07:50	08:17
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:16	20:29	19:30	18:33	16:56	16:56
27	08:05	07:20	07:27	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:34	18:18	19:56	20:37	21:14	21:32	21:14	20:27	19:28	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:11	07:54	08:18
	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:25	19:26	18:29	16:55	16:58
29	08:03		07:24	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28	16:54	16:58
30	08:02		07:22	06:26	05:51	05:48	06:15	06:54	07:33	08:13	07:56	08:19
	17:38		20:00	20:41	21:17	21:32	21:11	20:22	19:22	18:26	16:53	16:59
31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H28 - H28

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:58	07:15	07:16	06:23	05:49	05:49	06:19	06:57	07:35	07:18	07:58
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:52
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:58	07:36	07:19	08:00
	17:03	17:44	18:23	20:05	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:50	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:30	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:17	05:47	05:52	06:24	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:23	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:06	07:06	06:15	05:46	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:05	19:06	17:13	16:51
9	08:18	07:49	08:02	07:02	06:12	05:46	05:54	06:27	07:06	07:44	07:28	08:06
	17:09	17:53	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:00	06:11	05:45	05:55	06:29	07:07	07:46	07:29	08:07
	17:10	17:54	19:33	20:15	20:54	21:26	21:28	20:56	20:01	19:02	17:11	16:51
11	08:17	07:46	07:58	06:59	06:10	05:45	05:56	06:30	07:08	07:47	07:30	08:08
	17:12	17:56	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:01	17:10	16:51
12	08:17	07:45	07:56	06:57	06:08	05:45	05:57	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:53	19:57	18:57	17:08	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:57	06:32	07:11	07:50	07:33	08:10
	17:14	17:59	19:37	20:19	20:58	21:27	21:27	20:51	19:55	18:55	17:07	16:51
14	08:16	07:42	07:52	06:53	06:06	05:45	05:58	06:33	07:12	07:51	07:35	08:10
	17:15	18:00	19:39	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:05	05:45	05:59	06:35	07:14	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:39	07:48	06:49	06:04	05:44	06:00	06:36	07:15	07:54	07:37	08:12
	17:18	18:02	19:41	20:23	21:01	21:29	21:25	20:46	19:49	18:50	17:04	16:51
17	08:14	07:37	07:47	06:48	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:43	20:24	21:02	21:29	21:24	20:45	19:47	18:48	17:03	16:52
18	08:13	07:35	07:45	06:46	06:01	05:45	06:02	06:38	07:17	07:56	07:40	08:13
	17:21	18:04	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:45	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:12	07:32	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:30	21:21	20:39	19:41	18:43	17:00	16:53
21	08:11	07:30	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:01	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:46	08:16
	17:26	18:10	19:49	20:31	21:08	21:31	21:19	20:36	19:37	18:39	16:58	16:54
23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:45	07:24	08:03	07:47	08:16
	17:28	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:35	05:55	05:46	06:08	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:54	05:46	06:10	06:47	07:26	08:06	07:50	08:17
	17:30	18:15	19:53	20:34	21:12	21:31	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:11	06:48	07:27	08:08	07:51	08:17
	17:32	18:16	19:55	20:36	21:13	21:32	21:15	20:29	19:29	18:32	16:56	16:56
27	08:05	07:20	07:27	06:30	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:18	19:56	20:37	21:14	21:32	21:14	20:27	19:27	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:54	08:18
	17:35	18:19	19:57	20:38	21:15	21:32	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:32	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:26	05:50	05:48	06:15	06:53	07:33	08:13	07:56	08:18
	17:38		20:00	20:41	21:17	21:31	21:11	20:22	19:22	18:26	16:53	16:59
31	08:01		07:19		05:50		06:16	06:55		08:15		08:19
	17:39		20:01		21:18		21:09	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H29 - H29

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:16	07:17	06:24	05:49	05:49	06:17	06:56	07:34	07:16	07:57
	17:01	17:41	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:19	17:23	16:53
2	08:19	07:58	07:15	07:15	06:22	05:48	05:49	06:19	06:57	07:35	07:17	07:58
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:52
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:58	07:36	07:19	07:59
	17:03	17:44	18:23	20:05	20:45	21:20	21:31	21:05	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:19	05:47	05:50	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:18	07:55	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:46	18:26	20:08	20:47	21:22	21:30	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:17	05:46	05:52	06:23	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:23	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:52	06:25	07:03	07:42	07:25	08:04
	17:07	17:49	18:29	20:11	20:50	21:23	21:30	21:00	20:06	19:08	17:15	16:51
8	08:18	07:50	08:04	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:58	20:04	19:06	17:13	16:51
9	08:18	07:49	08:02	07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:27	08:06
	17:09	17:52	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:00	06:11	05:45	05:55	06:28	07:07	07:45	07:29	08:07
	17:10	17:54	19:33	20:15	20:54	21:25	21:28	20:55	20:01	19:02	17:11	16:51
11	08:17	07:46	07:58	06:58	06:10	05:45	05:56	06:30	07:08	07:47	07:30	08:08
	17:12	17:55	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:00	17:10	16:51
12	08:16	07:45	07:56	06:57	06:08	05:45	05:56	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:52	19:57	18:57	17:08	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:57	06:32	07:11	07:49	07:33	08:10
	17:14	17:58	19:37	20:19	20:58	21:27	21:27	20:51	19:55	18:55	17:07	16:51
14	08:15	07:42	07:52	06:53	06:06	05:44	05:58	06:33	07:12	07:51	07:35	08:10
	17:15	18:00	19:38	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:05	05:44	05:59	06:35	07:13	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:39	07:48	06:49	06:03	05:44	06:00	06:36	07:15	07:54	07:37	08:12
	17:18	18:01	19:41	20:22	21:01	21:29	21:24	20:46	19:49	18:49	17:04	16:51
17	08:14	07:37	07:46	06:48	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:43	20:24	21:02	21:29	21:24	20:44	19:47	18:48	17:03	16:51
18	08:13	07:35	07:44	06:46	06:01	05:44	06:02	06:38	07:17	07:56	07:40	08:13
	17:21	18:04	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:18	07:58	07:42	08:14
	17:22	18:06	19:45	20:26	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:11	07:32	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:30	21:21	20:39	19:41	18:42	17:00	16:52
21	08:11	07:30	07:39	06:40	05:58	05:45	06:05	06:42	07:21	08:00	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:46	08:16
	17:26	18:10	19:49	20:30	21:08	21:31	21:19	20:36	19:37	18:39	16:58	16:53
23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:45	07:23	08:03	07:47	08:16
	17:27	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:35	05:55	05:46	06:08	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:23	07:31	06:34	05:54	05:46	06:09	06:47	07:26	08:06	07:50	08:17
	17:30	18:15	19:53	20:34	21:11	21:31	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:11	06:48	07:27	08:07	07:51	08:17
	17:32	18:16	19:55	20:36	21:12	21:31	21:15	20:29	19:29	18:32	16:55	16:56
27	08:05	07:20	07:27	06:30	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:17	19:56	20:37	21:13	21:31	21:14	20:27	19:27	18:31	16:55	16:56
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:53	08:18
	17:35	18:19	19:57	20:38	21:14	21:31	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:15	21:31	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:26	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:18
	17:38		20:00	20:41	21:16	21:31	21:11	20:21	19:21	18:26	16:53	16:59
31	08:01		07:19		05:50		06:16	06:55		08:15		08:18
	17:39		20:01		21:17		21:09	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

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Chris Sternhagen
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H30 - H30

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:18	07:59	07:16	07:17	06:24	05:49	05:49	06:17	06:56	07:34	07:16	07:57
	17:01	17:40	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:19	17:23	16:53
2	08:18	07:58	07:14	07:15	06:22	05:48	05:49	06:19	06:57	07:35	07:17	07:58
	17:02	17:42	18:22	20:04	20:43	21:19	21:31	21:07	20:16	19:17	17:22	16:52
3	08:18	07:57	07:13	07:13	06:21	05:48	05:50	06:20	06:58	07:36	07:19	07:59
	17:03	17:43	18:23	20:05	20:45	21:20	21:31	21:05	20:14	19:16	17:20	16:52
4	08:18	07:56	07:11	07:12	06:19	05:47	05:50	06:21	07:00	07:37	07:20	08:00
	17:04	17:45	18:24	20:06	20:46	21:21	21:30	21:04	20:12	19:14	17:19	16:52
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	17:05	17:46	18:26	20:08	20:47	21:22	21:30	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:16	05:46	05:52	06:23	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:22	21:30	21:01	20:08	19:10	17:16	16:51
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	17:09	17:52	19:31	20:13	20:52	21:25	21:29	20:57	20:02	19:04	17:12	16:51
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	17:10	17:54	19:33	20:14	20:54	21:25	21:28	20:55	20:01	19:02	17:11	16:51
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	17:12	17:55	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:00	17:10	16:51
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	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:52	19:57	18:57	17:08	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:57	06:32	07:11	07:49	07:33	08:09
	17:14	17:58	19:37	20:18	20:57	21:27	21:26	20:51	19:55	18:55	17:07	16:51
14	08:15	07:42	07:52	06:53	06:06	05:44	05:58	06:33	07:12	07:51	07:34	08:10
	17:15	18:00	19:38	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:05	05:44	05:59	06:35	07:13	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:38	07:48	06:49	06:03	05:44	06:00	06:36	07:15	07:53	07:37	08:12
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17	08:13	07:37	07:46	06:47	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:12
	17:19	18:03	19:42	20:24	21:02	21:29	21:24	20:44	19:47	18:48	17:03	16:51
18	08:13	07:35	07:44	06:46	06:01	05:44	06:02	06:38	07:17	07:56	07:40	08:13
	17:20	18:04	19:44	20:25	21:03	21:29	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:42	06:44	06:00	05:45	06:03	06:40	07:18	07:58	07:41	08:14
	17:22	18:06	19:45	20:26	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:11	07:32	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:14
	17:23	18:07	19:46	20:28	21:06	21:30	21:21	20:39	19:41	18:42	17:00	16:52
21	08:11	07:30	07:39	06:40	05:58	05:45	06:05	06:42	07:21	08:00	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:30	21:20	20:37	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:45	08:15
	17:26	18:10	19:49	20:30	21:08	21:31	21:19	20:36	19:37	18:39	16:58	16:53
23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:45	07:23	08:03	07:47	08:16
	17:27	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:35	05:55	05:46	06:08	06:46	07:25	08:04	07:48	08:16
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:23	07:31	06:34	05:54	05:46	06:09	06:47	07:26	08:06	07:49	08:17
	17:30	18:14	19:53	20:34	21:11	21:31	21:16	20:30	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:11	06:48	07:27	08:07	07:51	08:17
	17:32	18:16	19:55	20:36	21:12	21:31	21:15	20:29	19:29	18:32	16:55	16:56
27	08:05	07:20	07:27	06:30	05:53	05:47	06:12	06:50	07:28	08:09	07:52	08:17
	17:33	18:17	19:56	20:37	21:13	21:31	21:14	20:27	19:27	18:31	16:55	16:56
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:53	08:18
	17:35	18:19	19:57	20:38	21:14	21:31	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:39	21:15	21:31	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:26	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:18
	17:38		20:00	20:41	21:16	21:31	21:10	20:21	19:21	18:26	16:53	16:59
31	08:01		07:19		05:50		06:16	06:55		08:14		08:18
	17:39		20:01		21:17		21:09	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H31 - H31

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:18	07:59	07:16	07:17	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:19	17:23	16:53
2	08:18	07:58	07:15	07:15	06:22	05:48	05:49	06:19	06:57	07:35	07:17	07:58
	17:02	17:42	18:22	20:04	20:43	21:19	21:31	21:07	20:16	19:18	17:22	16:52
3	08:18	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:58	07:36	07:19	07:59
	17:03	17:44	18:23	20:05	20:45	21:20	21:31	21:05	20:14	19:16	17:20	16:52
4	08:18	07:56	07:11	07:12	06:19	05:47	05:50	06:21	07:00	07:38	07:20	08:00
	17:04	17:45	18:25	20:07	20:46	21:21	21:30	21:04	20:12	19:14	17:19	16:52
5	08:18	07:54	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:47	21:22	21:30	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:17	05:47	05:52	06:24	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:22	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:52	06:25	07:03	07:41	07:24	08:04
	17:07	17:49	18:29	20:11	20:50	21:23	21:29	21:00	20:06	19:08	17:15	16:51
8	08:18	07:50	08:03	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:58	20:04	19:06	17:13	16:51
9	08:17	07:49	08:02	07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:27	08:06
	17:09	17:52	19:32	20:13	20:52	21:25	21:29	20:57	20:02	19:04	17:12	16:51
10	08:17	07:48	08:00	07:00	06:11	05:45	05:55	06:28	07:07	07:45	07:29	08:07
	17:10	17:54	19:33	20:14	20:54	21:25	21:28	20:55	20:01	19:02	17:11	16:51
11	08:17	07:46	07:58	06:58	06:10	05:45	05:56	06:30	07:08	07:47	07:30	08:08
	17:12	17:55	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:00	17:10	16:51
12	08:16	07:45	07:56	06:57	06:08	05:45	05:56	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:52	19:57	18:57	17:08	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:57	06:32	07:11	07:49	07:33	08:09
	17:14	17:58	19:37	20:18	20:57	21:27	21:26	20:51	19:55	18:55	17:07	16:51
14	08:15	07:42	07:52	06:53	06:06	05:45	05:58	06:33	07:12	07:51	07:34	08:10
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15	08:15	07:40	07:50	06:51	06:05	05:44	05:59	06:35	07:13	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:38	07:48	06:49	06:03	05:44	06:00	06:36	07:15	07:53	07:37	08:12
	17:18	18:01	19:41	20:22	21:01	21:29	21:24	20:46	19:49	18:49	17:04	16:51
17	08:14	07:37	07:46	06:48	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:42	20:24	21:02	21:29	21:24	20:44	19:47	18:48	17:03	16:51
18	08:13	07:35	07:44	06:46	06:01	05:44	06:02	06:38	07:17	07:56	07:40	08:13
	17:21	18:04	19:44	20:25	21:03	21:29	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:18	07:58	07:41	08:14
	17:22	18:06	19:45	20:26	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:11	07:32	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:14
	17:23	18:07	19:47	20:28	21:06	21:30	21:21	20:39	19:41	18:42	17:00	16:53
21	08:11	07:30	07:39	06:40	05:58	05:45	06:05	06:42	07:21	08:00	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:30	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:46	08:16
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	17:27	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:35	05:55	05:46	06:08	06:46	07:25	08:05	07:48	08:16
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:23	07:31	06:34	05:54	05:46	06:09	06:47	07:26	08:06	07:49	08:17
	17:30	18:15	19:53	20:34	21:11	21:31	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:11	06:48	07:27	08:07	07:51	08:17
	17:32	18:16	19:55	20:36	21:12	21:31	21:15	20:29	19:29	18:32	16:55	16:56
27	08:05	07:20	07:27	06:30	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:17	19:56	20:37	21:13	21:31	21:14	20:27	19:27	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:53	08:18
	17:35	18:19	19:57	20:38	21:14	21:31	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:15	21:31	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:26	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:18
	17:38		20:00	20:41	21:16	21:31	21:10	20:21	19:21	18:26	16:53	16:59
31	08:01		07:19		05:50		06:16	06:55		08:14		08:18
	17:39		20:01		21:17		21:09	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
20102130 - Merricourt ND Enxco

enXco
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Description:
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+1 701 775 3000
wind@eapc.net
Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H32 - H32

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:21	20:03	20:42	21:19	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:49	06:19	06:57	07:35	07:18	07:58
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:23	20:06	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:30	21:03	20:10	19:12	17:18	16:52
6	08:18	07:53	07:07	07:08	06:17	05:47	05:52	06:24	07:02	07:40	07:23	08:03
	17:06	17:48	18:28	20:09	20:49	21:23	21:30	21:02	20:09	19:10	17:16	16:51
7	08:18	07:52	07:06	07:06	06:15	05:46	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:54	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:05	19:06	17:14	16:51
9	08:18	07:49	08:02	07:02	06:13	05:46	05:54	06:27	07:06	07:44	07:28	08:06
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14	08:16	07:42	07:52	06:53	06:06	05:45	05:59	06:34	07:12	07:51	07:35	08:11
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16	08:14	07:39	07:49	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:38	08:12
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17	08:14	07:37	07:47	06:48	06:03	05:45	06:01	06:37	07:16	07:55	07:39	08:13
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	17:21	18:05	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
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	17:24	18:08	19:47	20:28	21:06	21:30	21:21	20:40	19:41	18:43	17:00	16:53
21	08:11	07:31	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:01	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	17:00	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:44	07:22	08:02	07:46	08:16
	17:26	18:10	19:50	20:31	21:08	21:31	21:20	20:36	19:37	18:39	16:59	16:54
23	08:09	07:27	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:03	07:47	08:16
	17:28	18:12	19:51	20:32	21:09	21:31	21:19	20:34	19:35	18:38	16:58	16:54
24	08:08	07:25	07:33	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:11	21:31	21:18	20:33	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:55	05:46	06:10	06:47	07:26	08:06	07:50	08:17
	17:31	18:15	19:54	20:35	21:12	21:31	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:17
	17:32	18:16	19:55	20:36	21:13	21:32	21:15	20:29	19:29	18:33	16:56	16:56
27	08:05	07:20	07:27	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:18	19:56	20:37	21:14	21:32	21:14	20:27	19:28	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:54	08:18
	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:25	19:26	18:29	16:55	16:58
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
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30	08:02		07:22	06:26	05:51	05:48	06:15	06:54	07:33	08:13	07:56	08:18
	17:38		20:00	20:41	21:17	21:31	21:11	20:22	19:22	18:26	16:53	16:59
31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H33 - H33

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:21	20:03	20:42	21:19	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:49	06:19	06:57	07:35	07:18	07:59
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:23	20:06	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:30	21:03	20:10	19:12	17:18	16:52
6	08:18	07:53	07:08	07:08	06:17	05:47	05:52	06:24	07:02	07:40	07:23	08:03
	17:06	17:48	18:28	20:10	20:49	21:23	21:30	21:02	20:09	19:10	17:16	16:51
7	08:18	07:52	07:06	07:06	06:15	05:46	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:54	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:05	19:06	17:14	16:51
9	08:18	07:49	08:02	07:03	06:13	05:46	05:54	06:27	07:06	07:44	07:28	08:06
	17:10	17:53	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:01	06:11	05:46	05:55	06:29	07:07	07:46	07:29	08:07
	17:11	17:54	19:33	20:15	20:54	21:26	21:28	20:56	20:01	19:03	17:11	16:51
11	08:17	07:46	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:31	08:08
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	17:13	17:57	19:36	20:17	20:57	21:27	21:27	20:53	19:57	18:57	17:09	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:58	06:32	07:11	07:50	07:33	08:10
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15	08:15	07:40	07:51	06:51	06:05	05:45	06:00	06:35	07:14	07:52	07:36	08:11
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16	08:14	07:39	07:49	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:38	08:12
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17	08:14	07:37	07:47	06:48	06:03	05:45	06:01	06:37	07:16	07:55	07:39	08:13
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19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:46	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:12	07:32	07:41	06:43	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:24	18:08	19:47	20:28	21:06	21:30	21:21	20:40	19:41	18:43	17:00	16:53
21	08:11	07:31	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:01	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	17:00	16:53
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23	08:09	07:27	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:03	07:47	08:16
	17:28	18:12	19:51	20:32	21:09	21:31	21:19	20:34	19:35	18:38	16:58	16:54
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25	08:07	07:24	07:31	06:34	05:55	05:46	06:10	06:47	07:26	08:06	07:50	08:17
	17:31	18:15	19:54	20:35	21:12	21:31	21:16	20:31	19:31	18:34	16:56	16:56
26	08:06	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:15	20:29	19:30	18:33	16:56	16:56
27	08:05	07:20	07:27	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:34	18:18	19:56	20:37	21:14	21:32	21:14	20:27	19:28	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:54	08:18
	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:25	19:26	18:29	16:55	16:58
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28	16:54	16:58
30	08:02		07:22	06:26	05:51	05:48	06:15	06:54	07:33	08:13	07:56	08:18
	17:38		20:00	20:41	21:17	21:31	21:11	20:22	19:22	18:26	16:54	16:59
31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H34 - H34

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:25	05:50	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:21	20:03	20:43	21:19	21:32	21:08	20:18	19:20	17:24	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:50	06:19	06:58	07:35	07:18	07:59
	17:02	17:43	18:22	20:04	20:44	21:20	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:58	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:24	20:06	20:45	21:20	21:31	21:06	20:14	19:16	17:21	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:22	07:00	07:38	07:21	08:01
	17:04	17:46	18:25	20:07	20:47	21:21	21:31	21:05	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:19	05:48	05:52	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:31	21:03	20:11	19:12	17:18	16:52
6	08:19	07:54	07:08	07:08	06:17	05:47	05:52	06:24	07:03	07:41	07:24	08:03
	17:06	17:49	18:28	20:10	20:49	21:23	21:30	21:02	20:09	19:10	17:16	16:52
7	08:18	07:52	07:06	07:06	06:16	05:47	05:53	06:25	07:04	07:42	07:25	08:04
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8	08:18	07:51	08:04	07:05	06:14	05:46	05:54	06:26	07:05	07:43	07:26	08:05
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	17:10	17:53	19:32	20:14	20:53	21:25	21:29	20:57	20:03	19:05	17:13	16:51
10	08:18	07:48	08:00	07:01	06:12	05:46	05:55	06:29	07:08	07:46	07:29	08:07
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13	08:16	07:44	07:55	06:55	06:08	05:45	05:58	06:33	07:11	07:50	07:34	08:10
	17:15	17:59	19:38	20:19	20:58	21:28	21:27	20:51	19:55	18:55	17:08	16:51
14	08:16	07:42	07:53	06:53	06:06	05:45	05:59	06:34	07:13	07:51	07:35	08:11
	17:16	18:00	19:39	20:20	20:59	21:28	21:26	20:50	19:53	18:54	17:07	16:51
15	08:15	07:41	07:51	06:52	06:05	05:45	06:00	06:35	07:14	07:53	07:36	08:12
	17:17	18:00	19:40	20:22	21:00	21:29	21:26	20:48	19:51	18:52	17:06	16:52
16	08:15	07:39	07:49	06:50	06:04	05:45	06:01	06:36	07:15	07:54	07:38	08:12
	17:18	18:02	19:42	20:23	21:02	21:29	21:25	20:46	19:49	18:50	17:04	16:52
17	08:14	07:37	07:47	06:48	06:03	05:45	06:02	06:38	07:16	07:55	07:39	08:13
	17:20	18:03	19:43	20:24	21:03	21:30	21:24	20:45	19:47	18:48	17:03	16:52
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	17:21	18:05	19:44	20:26	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:13	07:34	07:43	06:45	06:01	05:45	06:04	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:46	20:27	21:05	21:30	21:22	20:41	19:43	18:45	17:02	16:53
20	08:12	07:32	07:41	06:43	06:00	05:45	06:05	06:41	07:20	07:59	07:43	08:15
	17:24	18:08	19:47	20:28	21:06	21:31	21:22	20:40	19:41	18:43	17:01	16:53
21	08:11	07:31	07:39	06:41	05:59	05:45	06:06	06:43	07:21	08:01	07:45	08:15
	17:25	18:09	19:48	20:30	21:07	21:31	21:21	20:38	19:40	18:41	17:00	16:54
22	08:10	07:29	07:37	06:39	05:58	05:46	06:07	06:44	07:23	08:02	07:46	08:16
	17:27	18:11	19:50	20:31	21:08	21:31	21:20	20:36	19:38	18:40	16:59	16:54
23	08:09	07:27	07:35	06:38	05:57	05:46	06:08	06:45	07:24	08:04	07:47	08:16
	17:28	18:12	19:51	20:32	21:10	21:31	21:19	20:35	19:36	18:38	16:58	16:55
24	08:08	07:26	07:33	06:36	05:56	05:46	06:09	06:46	07:25	08:05	07:49	08:17
	17:29	18:14	19:52	20:33	21:11	21:32	21:18	20:33	19:34	18:36	16:57	16:55
25	08:08	07:24	07:31	06:34	05:55	05:46	06:10	06:48	07:26	08:06	07:50	08:17
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:35	16:57	16:56
26	08:07	07:22	07:29	06:33	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:16	20:29	19:30	18:33	16:56	16:56
27	08:06	07:20	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:53	08:18
	17:34	18:18	19:56	20:37	21:14	21:32	21:14	20:27	19:28	18:31	16:55	16:57
28	08:04	07:19	07:26	06:29	05:52	05:48	06:13	06:51	07:30	08:11	07:54	08:18
	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:26	19:26	18:30	16:55	16:58
29	08:03		07:24	06:28	05:52	05:48	06:15	06:53	07:32	08:12	07:55	08:18
	17:37		19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28	16:54	16:59
30	08:02		07:22	06:26	05:51	05:49	06:16	06:54	07:33	08:14	07:56	08:19
	17:38		20:00	20:41	21:17	21:32	21:11	20:22	19:22	18:27	16:54	16:59
31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:40		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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9/29/2010 4:34 PM / 51
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wind@eapc.net
Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H35 - H35

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:21	20:03	20:42	21:19	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:50	06:19	06:57	07:35	07:18	07:58
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:23	20:06	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:30	21:03	20:10	19:12	17:18	16:52
6	08:18	07:53	07:08	07:08	06:17	05:47	05:52	06:24	07:02	07:40	07:23	08:03
	17:06	17:48	18:28	20:10	20:49	21:23	21:30	21:02	20:09	19:10	17:16	16:51
7	08:18	07:52	07:06	07:06	06:15	05:47	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:54	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:05	19:06	17:14	16:51
9	08:18	07:49	08:02	07:03	06:13	05:46	05:54	06:28	07:06	07:44	07:28	08:06
	17:10	17:53	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:01	06:11	05:46	05:55	06:29	07:07	07:46	07:29	08:07
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11	08:17	07:46	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:30	08:08
	17:12	17:56	19:35	20:16	20:55	21:26	21:28	20:54	19:59	19:01	17:10	16:51
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	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:53	19:57	18:57	17:09	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:58	06:32	07:11	07:50	07:33	08:10
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14	08:16	07:42	07:52	06:53	06:06	05:45	05:59	06:34	07:12	07:51	07:35	08:11
	17:16	18:00	19:39	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:51	06:51	06:05	05:45	06:00	06:35	07:14	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:52	17:05	16:51
16	08:14	07:39	07:49	06:50	06:04	05:45	06:01	06:36	07:15	07:54	07:38	08:12
	17:18	18:02	19:41	20:23	21:01	21:29	21:25	20:46	19:49	18:50	17:04	16:52
17	08:14	07:37	07:47	06:48	06:03	05:45	06:01	06:37	07:16	07:55	07:39	08:13
	17:20	18:03	19:43	20:24	21:03	21:29	21:24	20:45	19:47	18:48	17:03	16:52
18	08:13	07:36	07:45	06:46	06:02	05:45	06:02	06:39	07:17	07:57	07:40	08:13
	17:21	18:05	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:46	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:53
20	08:12	07:32	07:41	06:43	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:24	18:08	19:47	20:28	21:06	21:30	21:21	20:40	19:41	18:43	17:00	16:53
21	08:11	07:31	07:39	06:41	05:58	05:45	06:06	06:42	07:21	08:01	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	17:00	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:07	06:44	07:22	08:02	07:46	08:16
	17:26	18:11	19:50	20:31	21:08	21:31	21:19	20:36	19:37	18:39	16:59	16:54
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	17:28	18:12	19:51	20:32	21:09	21:31	21:19	20:34	19:35	18:38	16:58	16:54
24	08:08	07:25	07:33	06:36	05:56	05:46	06:09	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:33	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:55	05:46	06:10	06:47	07:26	08:06	07:50	08:17
	17:31	18:15	19:54	20:35	21:12	21:31	21:16	20:31	19:31	18:34	16:56	16:56
26	08:06	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:17
	17:32	18:16	19:55	20:36	21:13	21:32	21:15	20:29	19:30	18:33	16:56	16:56
27	08:05	07:20	07:27	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:34	18:18	19:56	20:37	21:14	21:32	21:14	20:27	19:28	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:54	08:18
	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:25	19:26	18:30	16:55	16:58
29	08:03		07:23	06:28	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28	16:54	16:58
30	08:02		07:22	06:26	05:51	05:48	06:16	06:54	07:33	08:13	07:56	08:18
	17:38		20:00	20:41	21:17	21:31	21:11	20:22	19:22	18:26	16:54	16:59
31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
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Description:

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9/29/2010 4:34 PM / 52

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H36 - H36

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:18	07:59	07:16	07:17	06:24	05:49	05:49	06:17	06:56	07:34	07:16	07:57
	17:01	17:41	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:19	17:23	16:53
2	08:18	07:58	07:14	07:15	06:22	05:48	05:49	06:19	06:57	07:35	07:17	07:58
	17:02	17:42	18:22	20:04	20:43	21:19	21:31	21:07	20:16	19:17	17:22	16:52
3	08:18	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:58	07:36	07:19	07:59
	17:03	17:43	18:23	20:05	20:45	21:20	21:31	21:05	20:14	19:16	17:20	16:52
4	08:18	07:56	07:11	07:12	06:19	05:47	05:50	06:21	07:00	07:37	07:20	08:00
	17:04	17:45	18:24	20:06	20:46	21:21	21:30	21:04	20:12	19:14	17:19	16:52
5	08:18	07:54	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:46	18:26	20:08	20:47	21:22	21:30	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:17	05:47	05:52	06:23	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:22	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:52	06:25	07:03	07:41	07:24	08:04
	17:07	17:49	18:29	20:10	20:50	21:23	21:29	21:00	20:06	19:08	17:15	16:51
8	08:18	07:50	08:03	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:58	20:04	19:06	17:13	16:51
9	08:17	07:49	08:02	07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:27	08:06
	17:09	17:52	19:31	20:13	20:52	21:25	21:29	20:57	20:02	19:04	17:12	16:51
10	08:17	07:47	08:00	07:00	06:11	05:45	05:55	06:28	07:07	07:45	07:29	08:07
	17:10	17:54	19:33	20:14	20:54	21:25	21:28	20:55	20:01	19:02	17:11	16:51
11	08:17	07:46	07:58	06:58	06:10	05:45	05:56	06:30	07:08	07:47	07:30	08:08
	17:12	17:55	19:34	20:16	20:55	21:26	21:27	20:54	19:59	19:00	17:10	16:51
12	08:16	07:45	07:56	06:57	06:08	05:45	05:56	06:31	07:10	07:48	07:32	08:08
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:52	19:57	18:57	17:08	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:57	06:32	07:11	07:49	07:33	08:09
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14	08:15	07:41	07:52	06:53	06:06	05:45	05:58	06:33	07:12	07:51	07:34	08:10
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15	08:15	07:40	07:50	06:51	06:05	05:44	05:59	06:35	07:13	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:38	07:48	06:49	06:03	05:44	06:00	06:36	07:15	07:53	07:37	08:12
	17:18	18:01	19:41	20:22	21:01	21:29	21:24	20:46	19:49	18:49	17:04	16:51
17	08:13	07:37	07:46	06:47	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:12
	17:19	18:03	19:42	20:24	21:02	21:29	21:23	20:44	19:47	18:48	17:03	16:51
18	08:13	07:35	07:44	06:46	06:01	05:44	06:02	06:38	07:17	07:56	07:40	08:13
	17:21	18:04	19:44	20:25	21:03	21:29	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:42	06:44	06:00	05:45	06:03	06:40	07:18	07:58	07:41	08:14
	17:22	18:06	19:45	20:26	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:11	07:32	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:14
	17:23	18:07	19:46	20:28	21:06	21:30	21:21	20:39	19:41	18:42	17:00	16:53
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	17:25	18:09	19:48	20:29	21:07	21:30	21:20	20:37	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:45	08:15
	17:26	18:10	19:49	20:30	21:08	21:31	21:19	20:36	19:37	18:39	16:58	16:53
23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:45	07:23	08:03	07:47	08:16
	17:27	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:35	05:55	05:46	06:08	06:46	07:25	08:04	07:48	08:16
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:23	07:31	06:34	05:54	05:46	06:09	06:47	07:26	08:06	07:49	08:17
	17:30	18:14	19:53	20:34	21:11	21:31	21:16	20:30	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:11	06:48	07:27	08:07	07:51	08:17
	17:32	18:16	19:55	20:36	21:12	21:31	21:15	20:29	19:29	18:32	16:55	16:56
27	08:05	07:20	07:27	06:30	05:53	05:47	06:12	06:50	07:28	08:09	07:52	08:17
	17:33	18:17	19:56	20:37	21:13	21:31	21:14	20:27	19:27	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:53	08:18
	17:35	18:19	19:57	20:38	21:14	21:31	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:54	08:18
	17:36		19:59	20:39	21:15	21:31	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:26	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:18
	17:38		20:00	20:41	21:16	21:31	21:10	20:21	19:21	18:26	16:53	16:59
31	08:01		07:19		05:50		06:16	06:55		08:14		08:18
	17:39		20:01		21:17		21:09	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H38 - H38

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:16	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:58	07:15	07:16	06:23	05:49	05:49	06:19	06:57	07:35	07:17	07:58
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:36	07:19	07:59
	17:03	17:44	18:23	20:05	20:45	21:20	21:31	21:05	20:14	19:16	17:20	16:52
4	08:18	07:56	07:11	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:18	07:55	07:09	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:47	21:22	21:30	21:03	20:10	19:12	17:18	16:52
6	08:18	07:53	07:07	07:08	06:17	05:47	05:52	06:24	07:02	07:40	07:23	08:03
	17:06	17:48	18:28	20:09	20:49	21:23	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:23	21:30	21:00	20:06	19:08	17:15	16:51
8	08:18	07:50	08:04	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:58	20:05	19:06	17:14	16:51
9	08:17	07:49	08:02	07:02	06:13	05:46	05:54	06:27	07:06	07:44	07:27	08:06
	17:09	17:53	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:01	06:11	05:45	05:55	06:29	07:07	07:46	07:29	08:07
	17:11	17:54	19:33	20:15	20:54	21:25	21:28	20:56	20:01	19:02	17:11	16:51
11	08:17	07:46	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:30	08:08
	17:12	17:56	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:01	17:10	16:51
12	08:16	07:45	07:56	06:57	06:09	05:45	05:57	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:52	19:57	18:57	17:09	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:58	06:32	07:11	07:50	07:33	08:09
	17:14	17:59	19:37	20:19	20:58	21:27	21:26	20:51	19:55	18:55	17:07	16:51
14	08:15	07:42	07:52	06:53	06:06	05:45	05:59	06:34	07:12	07:51	07:35	08:10
	17:16	18:00	19:39	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:05	05:45	05:59	06:35	07:14	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:39	07:48	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:37	08:12
	17:18	18:02	19:41	20:23	21:01	21:29	21:24	20:46	19:49	18:50	17:04	16:51
17	08:14	07:37	07:47	06:48	06:03	05:45	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:43	20:24	21:02	21:29	21:24	20:44	19:47	18:48	17:03	16:52
18	08:13	07:35	07:45	06:46	06:01	05:45	06:02	06:39	07:17	07:56	07:40	08:13
	17:21	18:05	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:45	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:11	07:32	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:30	21:21	20:39	19:41	18:43	17:00	16:53
21	08:11	07:30	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:00	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:44	07:22	08:02	07:46	08:16
	17:26	18:10	19:49	20:30	21:08	21:31	21:19	20:36	19:37	18:39	16:59	16:54
23	08:09	07:27	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:03	07:47	08:16
	17:28	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:54	05:46	06:10	06:47	07:26	08:06	07:50	08:17
	17:31	18:15	19:53	20:34	21:11	21:31	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:27	08:07	07:51	08:17
	17:32	18:16	19:55	20:36	21:12	21:31	21:15	20:29	19:29	18:33	16:56	16:56
27	08:05	07:20	07:27	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:18	19:56	20:37	21:13	21:31	21:14	20:27	19:27	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:53	08:18
	17:35	18:19	19:57	20:38	21:14	21:31	21:13	20:25	19:25	18:29	16:54	16:58
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:15	21:31	21:12	20:23	19:24	18:28	16:54	16:58
30	08:02		07:21	06:26	05:51	05:48	06:15	06:54	07:33	08:13	07:56	08:18
	17:38		20:00	20:41	21:16	21:31	21:11	20:22	19:22	18:26	16:53	16:59
31	08:01		07:19		05:50		06:17	06:55		08:15		08:18
	17:39		20:01		21:17		21:09	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
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Description:

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Calculated:
9/29/2010 4:33 PM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H39 - H39

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:16	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:58	07:15	07:16	06:23	05:49	05:49	06:19	06:57	07:35	07:17	07:58
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:36	07:19	07:59
	17:03	17:44	18:23	20:05	20:45	21:20	21:31	21:05	20:14	19:16	17:20	16:52
4	08:18	07:56	07:11	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:18	07:55	07:09	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:47	21:22	21:30	21:03	20:10	19:12	17:18	16:52
6	08:18	07:53	07:07	07:08	06:17	05:47	05:52	06:24	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:23	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:23	21:30	21:00	20:06	19:08	17:15	16:51
8	08:18	07:50	08:04	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:58	20:05	19:06	17:14	16:51
9	08:17	07:49	08:02	07:02	06:13	05:46	05:54	06:27	07:06	07:44	07:27	08:06
	17:09	17:53	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:01	06:11	05:45	05:55	06:29	07:07	07:46	07:29	08:07
	17:11	17:54	19:33	20:15	20:54	21:25	21:28	20:55	20:01	19:02	17:11	16:51
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13	08:16	07:43	07:54	06:55	06:07	05:45	05:58	06:32	07:11	07:50	07:33	08:09
	17:14	17:59	19:37	20:19	20:58	21:27	21:26	20:51	19:55	18:55	17:07	16:51
14	08:15	07:42	07:52	06:53	06:06	05:45	05:59	06:34	07:12	07:51	07:35	08:10
	17:16	18:00	19:39	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:05	05:45	05:59	06:35	07:14	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:39	07:48	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:37	08:12
	17:18	18:02	19:41	20:23	21:01	21:29	21:24	20:46	19:49	18:50	17:04	16:51
17	08:14	07:37	07:47	06:48	06:03	05:45	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:43	20:24	21:02	21:29	21:24	20:44	19:47	18:48	17:03	16:52
18	08:13	07:35	07:45	06:46	06:01	05:45	06:02	06:39	07:17	07:56	07:40	08:13
	17:21	18:05	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:45	20:26	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:11	07:32	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:30	21:21	20:39	19:41	18:43	17:00	16:53
21	08:11	07:30	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:00	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:44	07:22	08:02	07:46	08:16
	17:26	18:10	19:49	20:30	21:08	21:31	21:19	20:36	19:37	18:39	16:59	16:54
23	08:09	07:27	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:03	07:47	08:16
	17:28	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:54	05:46	06:10	06:47	07:26	08:06	07:50	08:17
	17:31	18:15	19:53	20:34	21:11	21:31	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:27	08:07	07:51	08:17
	17:32	18:16	19:55	20:36	21:12	21:31	21:15	20:29	19:29	18:33	16:56	16:56
27	08:05	07:20	07:27	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:18	19:56	20:37	21:13	21:31	21:14	20:27	19:27	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:53	08:18
	17:35	18:19	19:57	20:38	21:14	21:31	21:13	20:25	19:25	18:29	16:54	16:58
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:15	21:31	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:26	05:51	05:48	06:15	06:54	07:32	08:13	07:56	08:18
	17:38		20:00	20:41	21:16	21:31	21:11	20:22	19:22	18:26	16:53	16:59
31	08:01		07:19		05:50		06:17	06:55		08:15		08:18
	17:39		20:01		21:17		21:09	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

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Minneapolis, MN 55413

Description:

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SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Worst Case **Shadow receptor:** H42 - H42

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:25	05:50	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:21	20:03	20:43	21:19	21:31	21:08	20:18	19:20	17:24	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:50	06:19	06:58	07:35	07:18	07:59
	17:02	17:43	18:22	20:04	20:44	21:20	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:57	07:13	07:14	06:21	05:49	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:24	20:06	20:45	21:20	21:31	21:06	20:14	19:16	17:21	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:22	07:00	07:38	07:21	08:01
	17:04	17:46	18:25	20:07	20:46	21:21	21:31	21:04	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:19	05:48	05:52	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:31	21:03	20:11	19:12	17:18	16:52
6	08:19	07:54	07:08	07:08	06:17	05:47	05:52	06:24	07:03	07:41	07:23	08:03
	17:06	17:49	18:28	20:10	20:49	21:23	21:30	21:02	20:09	19:10	17:17	16:52
7	08:18	07:52	07:06	07:06	06:16	05:47	05:53	06:25	07:04	07:42	07:25	08:04
	17:08	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
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	17:09	17:52	18:31	20:12	20:52	21:24	21:29	20:59	20:05	19:07	17:14	16:51
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	17:10	17:53	19:32	20:14	20:53	21:25	21:29	20:57	20:03	19:05	17:13	16:51
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	17:11	17:55	19:33	20:15	20:54	21:26	21:29	20:56	20:01	19:03	17:11	16:51
11	08:17	07:47	07:58	06:59	06:10	05:46	05:56	06:30	07:09	07:47	07:31	08:08
	17:12	17:56	19:35	20:16	20:55	21:26	21:28	20:54	19:59	19:01	17:10	16:51
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31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:40		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

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enXco
Chris Sternhagen
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Minneapolis, MN 55413

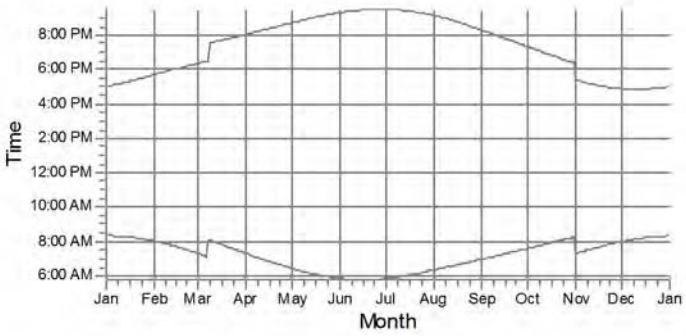
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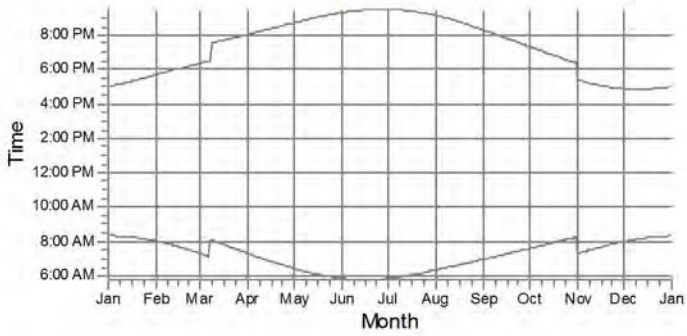
SHADOW - Calendar, graphical

Calculation: WTGs v15g / Occupied Home v3 Worst Case

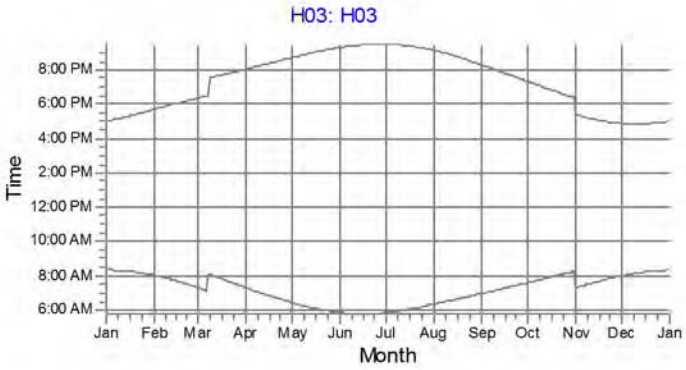
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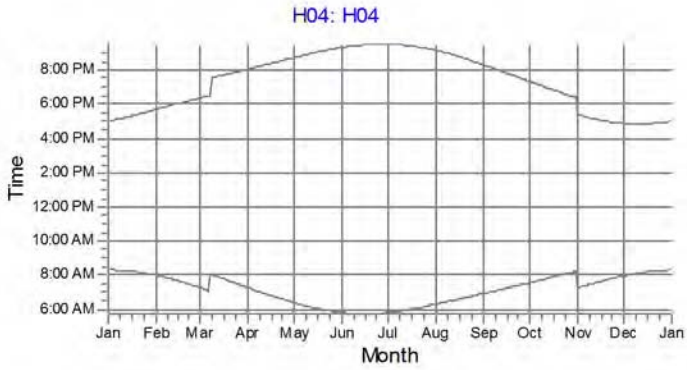
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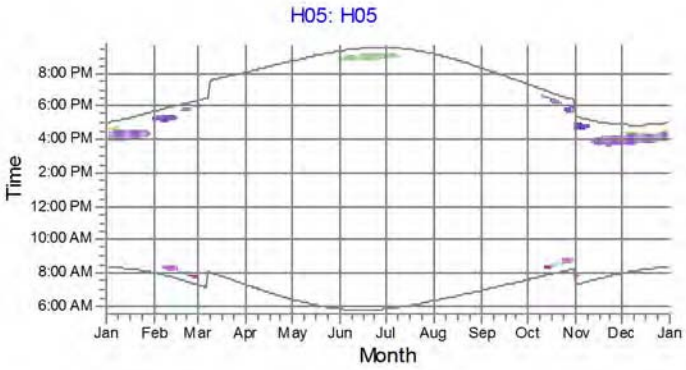
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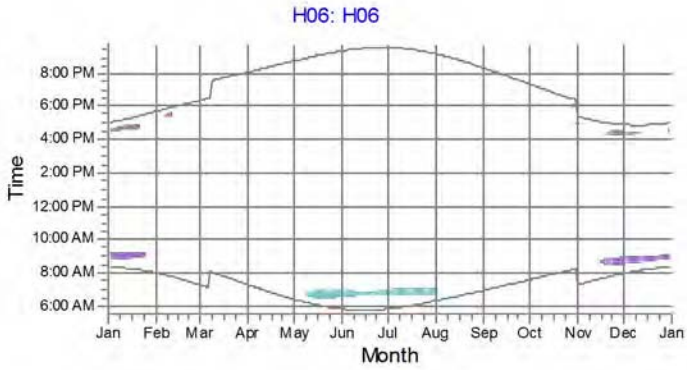
H04: H04



H05: H05



H06: H06



WTGs



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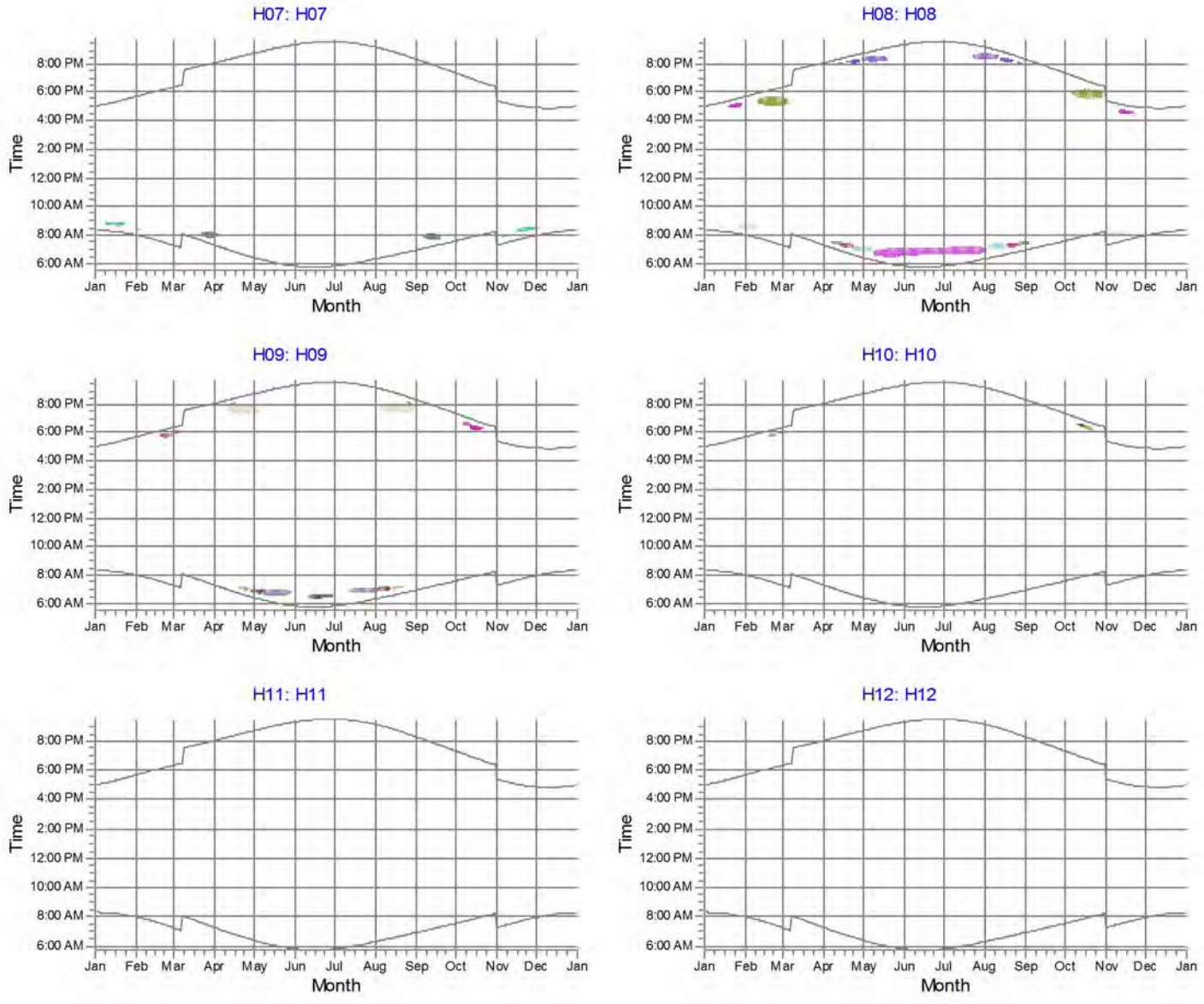
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SHADOW - Calendar, graphical

Calculation: WTGs v15g / Occupied Home v3 Worst Case



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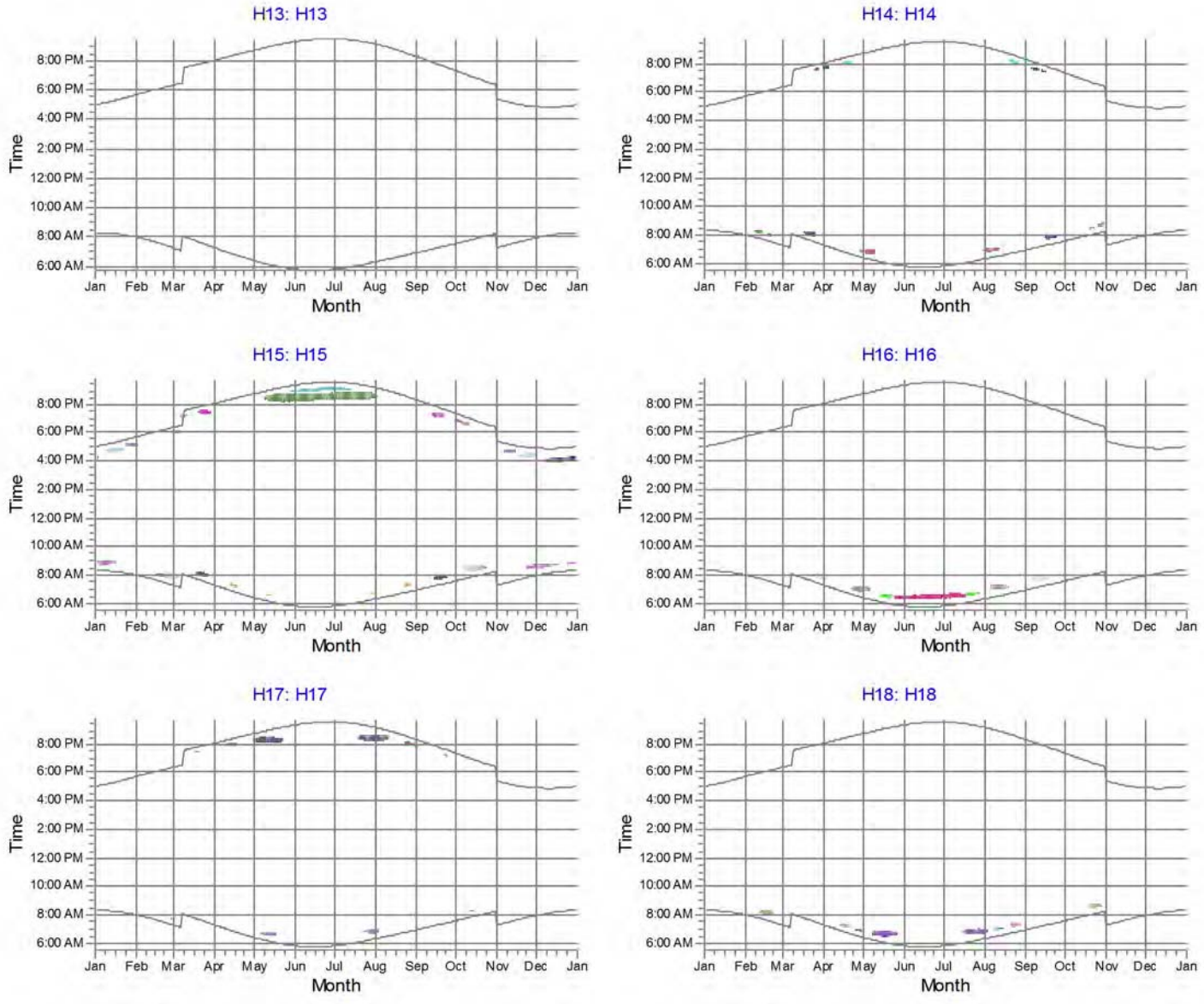
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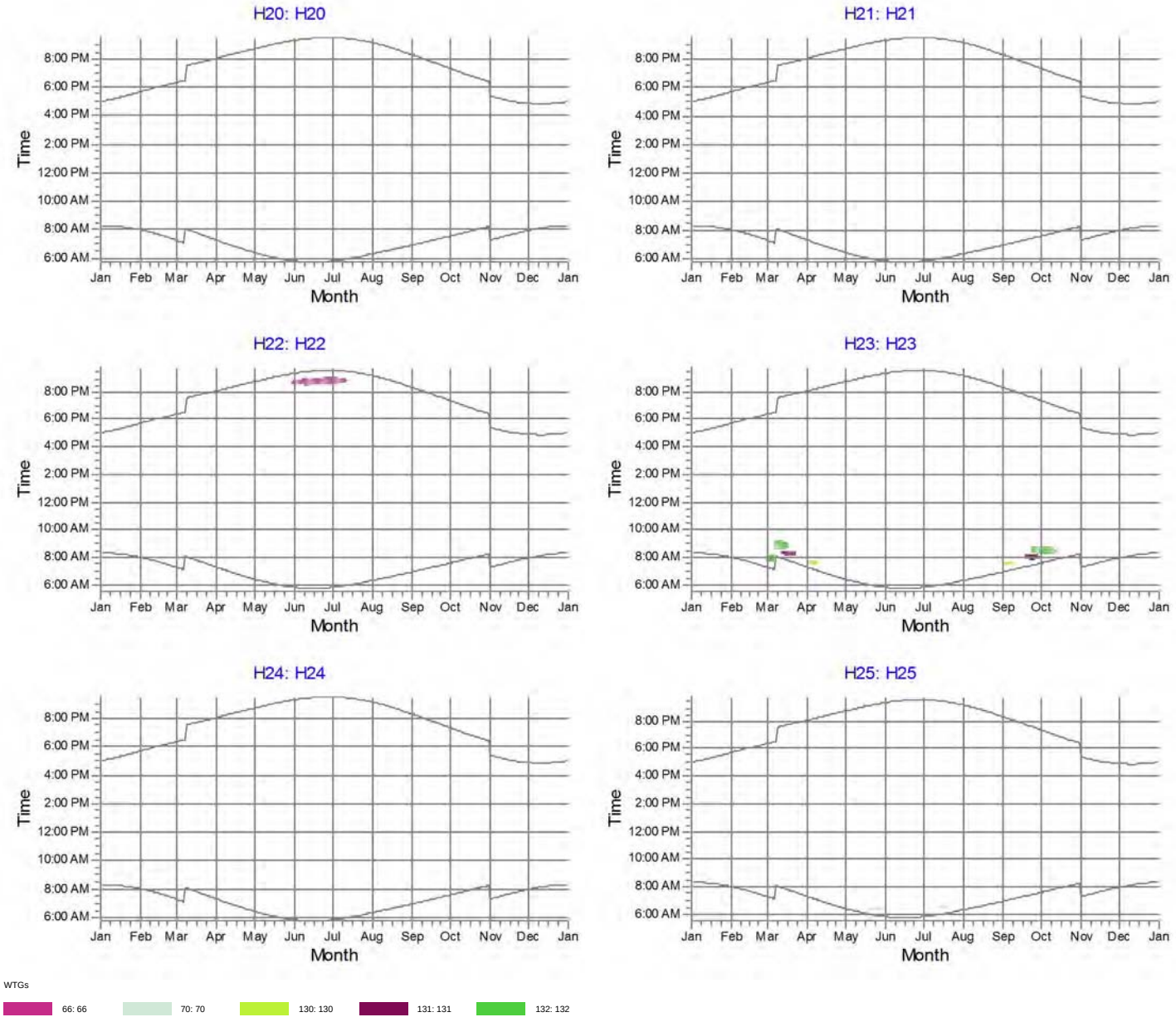
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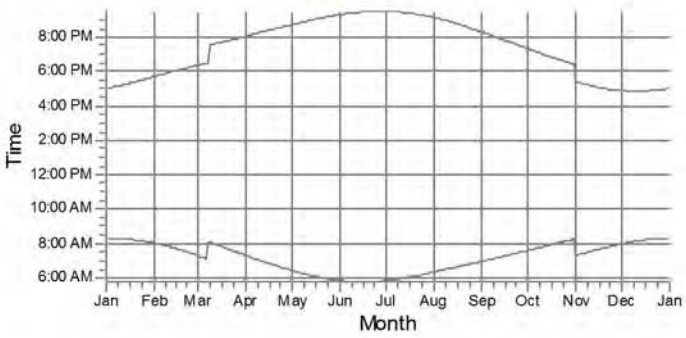
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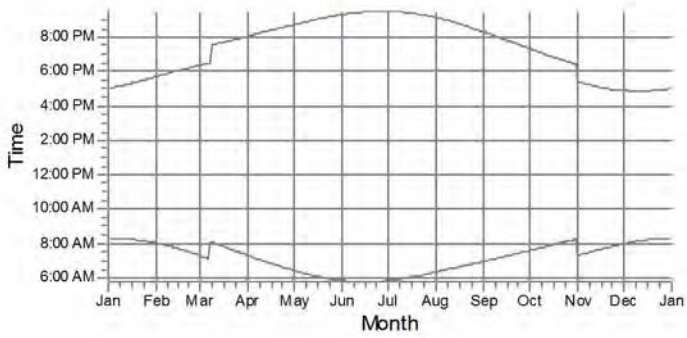
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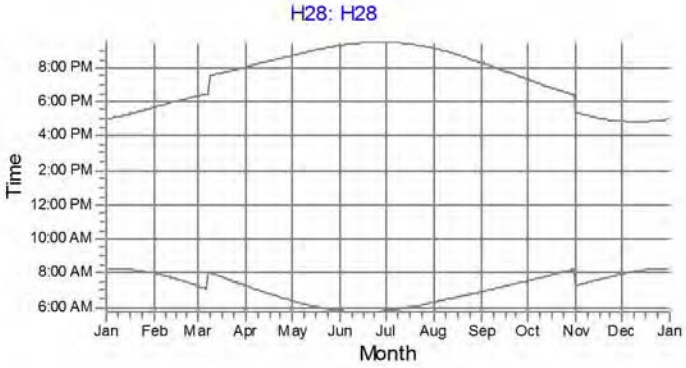
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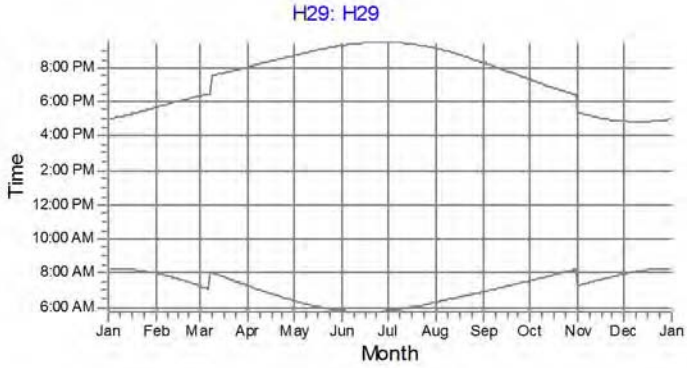
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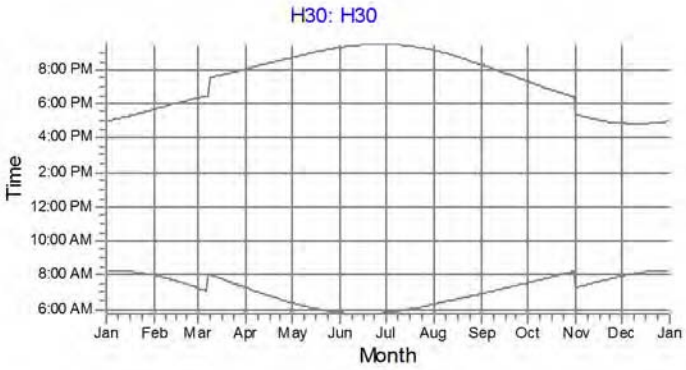
H28: H28



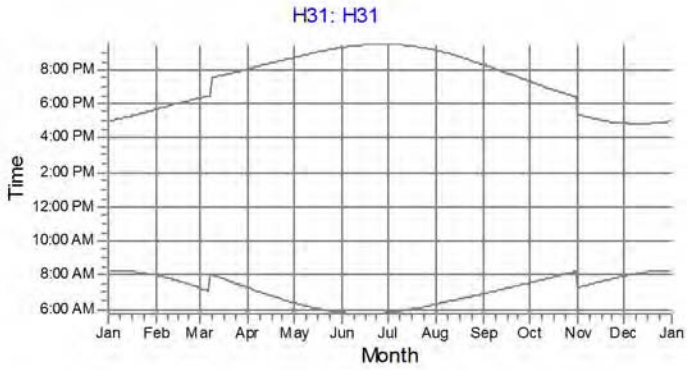
H29: H29



H30: H30



H31: H31



WTGs

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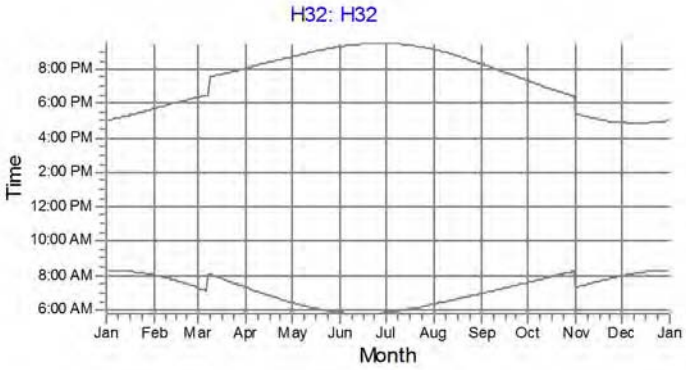
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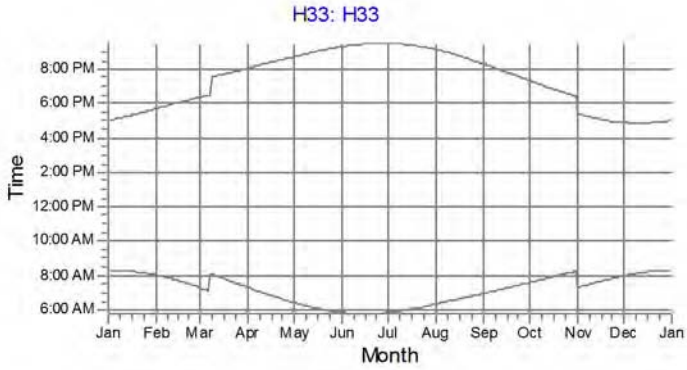
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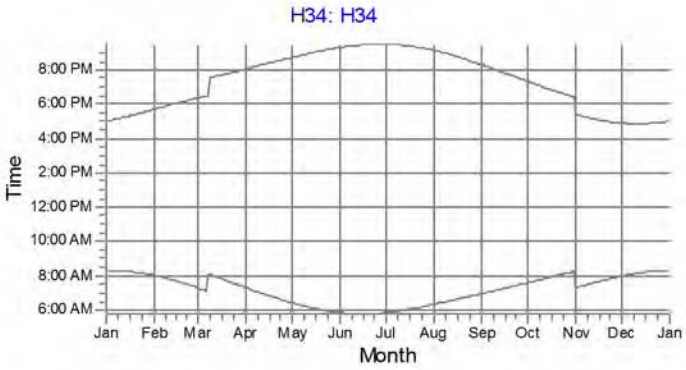
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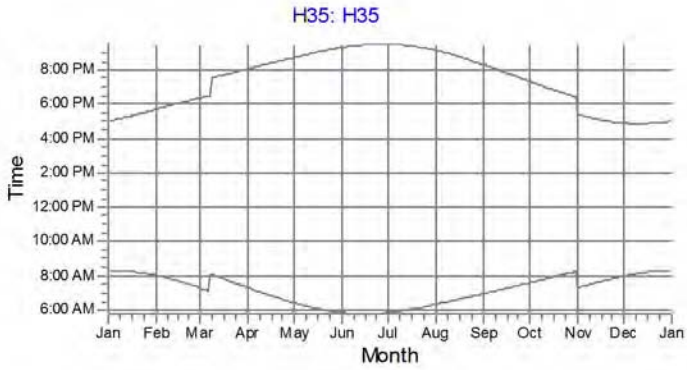
SHADOW - Calendar, graphical

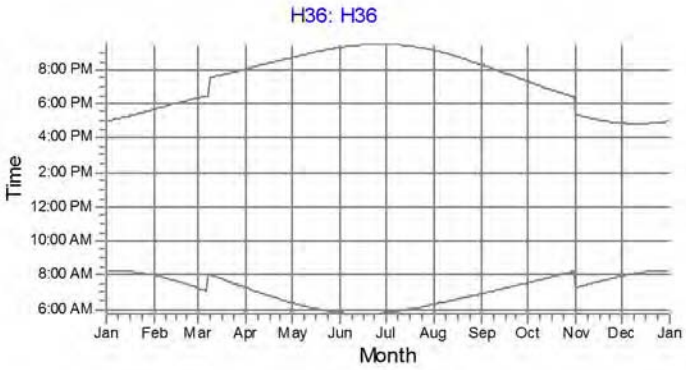
Calculation: WTGs v15g / Occupied Home v3 Worst Case

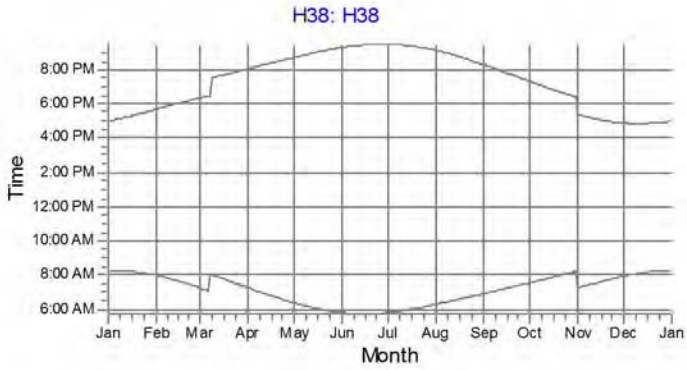












WTGs

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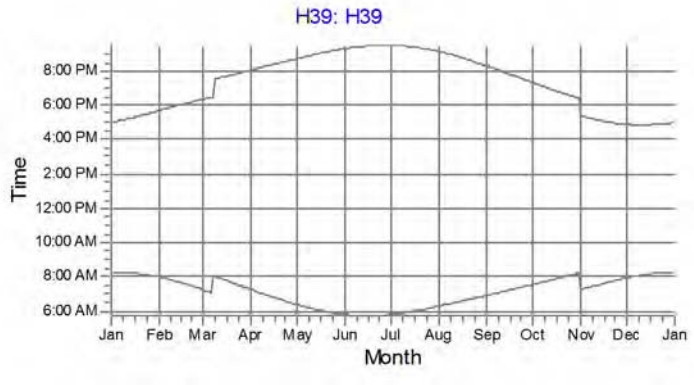
enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

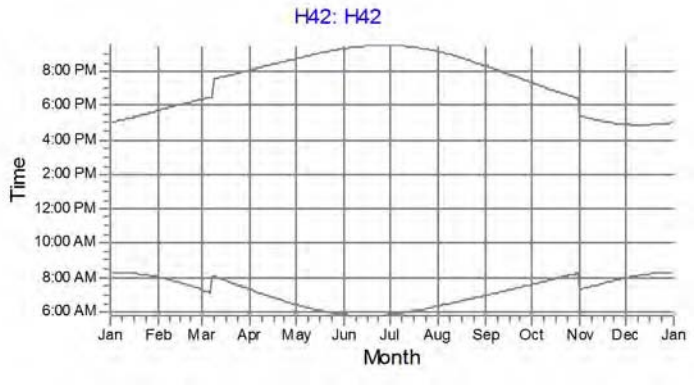
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SHADOW - Calendar, graphical

Calculation: WTGs v15g / Occupied Home v3 Worst Case





WTGs

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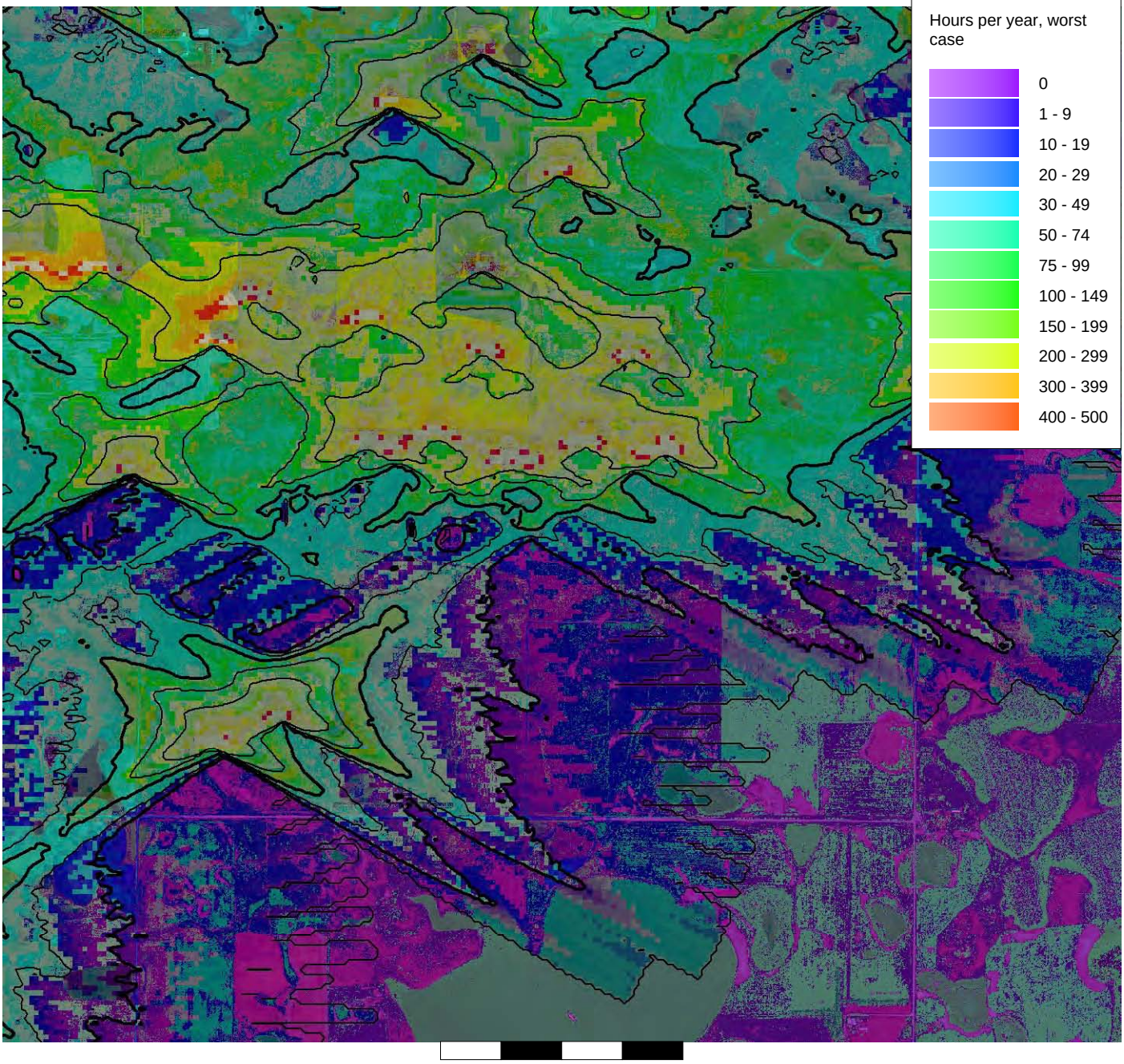
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SHADOW - Map

Calculation: WTGs v15g / Occupied Home v3 Worst Case



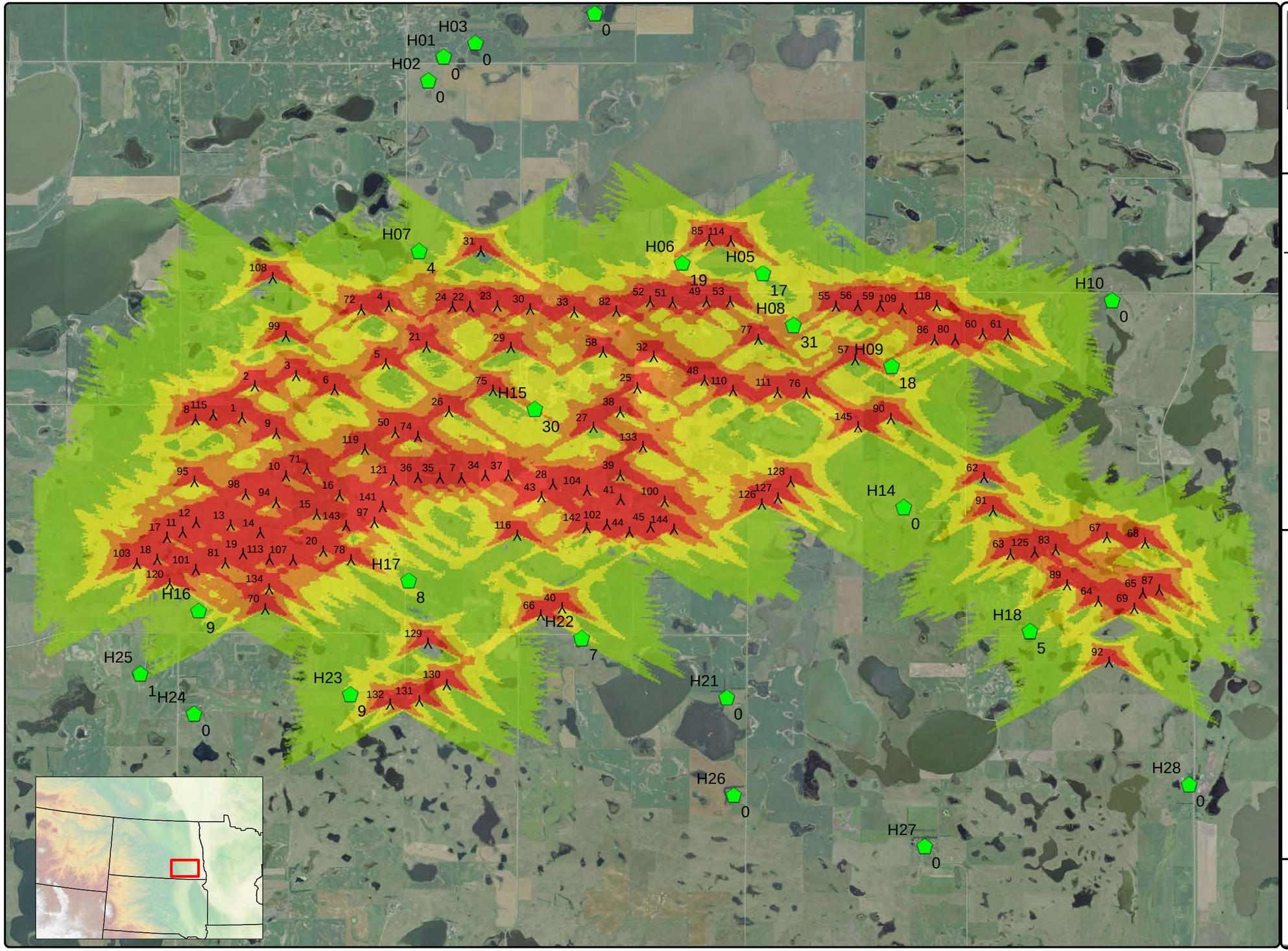
Map: , Print scale 1:25,000, Map center UTM WGS 84 Zone: 14 East: 496,615 North: 5,106,292

Isolines showing shadow in Hours per year, worst case

0 10 25 50 100 200

Appendix C: Realistic Case Shadow Flicker Map

The information presented in this report is subject to the Legal Notice and Disclaimer included at the beginning of the report


H01
H02
H03
H04
H05
H06
H07
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H09
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H26
H27
H28
0
4
19
17
31
18
30
9
8
5
7
1
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0

Appendix D: Realistic Case Shadow Flicker WindPRO Report

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SHADOW - Main Result

Calculation: WTGs v15g / Occupied Home v3 Realistic

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

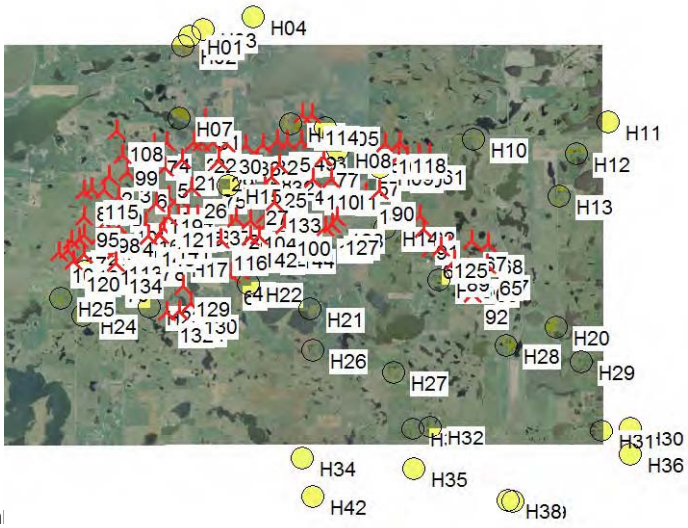
Operational hours are calculated from WTGs in calculation and wind distribution:
0324

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: 100308_Merricourt_10ftHCLs_from10m
Obstacles used in calculation
Eye height: 1.5 m
Grid resolution: 10 m



Scale 1:250,000

New WTG Shadow receptor

WTGs

	UTM WGS84 Zone: 14 East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM WGS84 Zone: 14		[m]					[kW]	[m]	[m]	[RPM]
1	490,965	5,108,120	640.1	1	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
2	491,148	5,108,571	632.3	2	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
3	491,727	5,108,716	640.1	3	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
4	493,034	5,109,690	608.5	4	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
5	492,992	5,108,880	621.8	5	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
6	492,273	5,108,516	643.1	6	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
7	494,058	5,107,274	661.7	7	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
8	490,312	5,108,098	626.5	8	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
9	491,450	5,107,902	650.3	9	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
10	491,587	5,107,303	673.6	10	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
11	490,133	5,106,507	676.7	11	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
12	490,322	5,106,643	676.7	12	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
13	490,807	5,106,607	685.8	13	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
14	491,225	5,106,500	685.8	14	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
15	492,019	5,106,760	679.7	15	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
16	492,343	5,107,028	673.0	16	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
17	489,908	5,106,439	673.6	17	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
18	489,773	5,106,126	667.0	18	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
19	490,981	5,106,204	673.2	19	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
20	492,111	5,106,244	661.4	20	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
21	493,565	5,109,117	624.8	21	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
22	494,178	5,109,682	606.6	22	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
23	494,563	5,109,697	608.7	23	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
24	493,930	5,109,687	606.6	24	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
25	496,532	5,108,542	603.5	25	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
26	493,882	5,108,206	632.9	26	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
27	495,917	5,107,986	614.9	27	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0

To be continued on next page...

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enXco
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SHADOW - Main Result

Calculation: WTGs v15g / Occupied Home v3 Realistic

...continued from previous page

	UTM WGS84 Zone: 14				WTG type						
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM WGS84 Zone: 14		[m]					[kW]	[m]	[m]	[RPM]
28	495,345	5,107,187	649.1	28	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
29	494,752	5,109,105	609.6	29	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
30	495,024	5,109,653	595.8	30	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
31	494,330	5,110,469	606.6	31	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
32	496,764	5,108,977	600.5	32	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
33	495,645	5,109,612	594.4	33	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
34	494,394	5,107,309	652.7	34	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
35	493,754	5,107,275	663.7	35	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
36	493,443	5,107,280	664.5	36	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
37	494,718	5,107,307	649.2	37	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
38	496,292	5,108,204	606.6	38	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
39	496,291	5,107,310	638.8	39	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
40	495,470	5,105,445	624.8	40	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
41	496,298	5,106,965	658.4	41	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
43	495,183	5,107,002	658.7	43	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
44	496,423	5,106,509	673.6	44	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
45	496,720	5,106,582	667.5	45	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
48	497,477	5,108,649	600.5	48	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
49	497,506	5,109,758	594.4	49	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
50	493,125	5,107,917	648.9	50	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
51	497,029	5,109,742	591.3	51	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
52	496,713	5,109,755	591.3	52	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
53	497,840	5,109,759	599.9	53	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
55	499,330	5,109,696	595.1	55	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
56	499,638	5,109,702	600.5	56	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
57	499,602	5,108,937	597.4	57	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
58	496,048	5,109,045	595.2	58	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
59	499,950	5,109,699	603.9	59	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
60	501,393	5,109,304	612.1	60	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
61	501,750	5,109,300	606.1	61	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
62	501,414	5,107,279	615.7	62	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
63	501,784	5,106,203	624.8	63	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
64	503,022	5,105,538	621.8	64	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
65	503,647	5,105,647	621.8	65	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
66	495,174	5,105,339	618.7	66	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
67	503,142	5,106,435	618.7	67	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
68	503,679	5,106,358	612.1	68	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
69	503,527	5,105,436	621.8	69	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
70	491,296	5,105,430	626.0	70	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
71	491,878	5,107,400	667.5	71	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
72	492,646	5,109,647	612.6	72	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
74	493,444	5,107,858	652.3	74	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
75	494,498	5,108,503	613.4	75	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
76	498,913	5,108,467	606.5	76	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
77	498,235	5,109,222	594.4	77	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
78	492,503	5,106,122	646.1	78	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
80	501,006	5,109,227	614.8	80	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
81	490,731	5,106,077	671.6	81	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
82	496,237	5,109,617	594.4	82	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
83	502,422	5,106,264	621.2	83	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
85	497,544	5,110,614	594.4	85	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
86	500,716	5,109,217	610.0	86	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
87	503,880	5,105,693	618.7	87	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
89	502,583	5,105,769	623.6	89	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0

To be continued on next page...

Project:
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wind@eapc.net
Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Main Result

Calculation: WTGs v15g / Occupied Home v3 Realistic

...continued from previous page

	UTM WGS84 Zone: 14											
	East	North	Z	Row data/Description	Valid	WTG type Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM WGS84 Zone: 14		[m]					[kW]	[m]	[m]	[RPM]
90	500,101	5,108,112	611.4	90	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
91	501,541	5,106,814	618.9	91	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
92	503,174	5,104,680	618.7	92	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
94	491,447	5,106,932	680.7	94	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
95	490,296	5,107,226	660.4	95	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
97	492,829	5,106,648	682.9	97	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
98	491,016	5,107,045	675.9	98	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
99	491,587	5,109,269	624.8	99	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
100	496,917	5,106,943	648.0	100	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
101	490,319	5,105,984	667.5	101	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
102	496,106	5,106,616	677.3	102	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
103	489,484	5,106,071	665.0	103	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
104	495,824	5,107,098	649.7	104	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
107	491,687	5,106,123	667.5	107	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
108	491,399	5,110,092	610.8	108	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
109	500,266	5,109,661	607.2	109	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
110	497,878	5,108,500	601.9	110	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
111	498,507	5,108,481	607.1	111	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
113	491,356	5,106,130	667.5	113	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
114	497,846	5,110,606	594.4	114	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
115	490,562	5,108,163	627.9	115	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
116	494,841	5,106,468	667.5	116	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
118	500,750	5,109,701	609.6	118	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
119	492,694	5,107,675	658.4	119	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
120	489,947	5,105,780	658.4	120	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
121	493,103	5,107,245	665.3	121	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
125	502,127	5,106,227	621.8	125	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
126	498,288	5,106,902	637.0	126	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
127	498,513	5,106,995	637.0	127	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
128	498,692	5,107,222	636.3	128	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
129	493,588	5,104,945	627.9	129	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
130	493,847	5,104,363	627.9	130	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
131	493,464	5,104,131	624.8	131	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
132	493,053	5,104,089	624.8	132	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
133	496,614	5,107,707	618.7	133	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
134	491,350	5,105,709	633.4	134	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
141	492,945	5,106,864	681.9	141	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
142	495,820	5,106,577	682.8	142	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
143	492,433	5,106,601	682.7	143	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
144	497,049	5,106,551	649.3	144	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0
145	499,643	5,107,997	615.7	145	Yes	GE WIND ENERGY	GE 1.5sle-1,500	1,500	77.0	80.0	18.0

Shadow receptor-Input

		UTM WGS84 Zone: 14								
No.	Name	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
				[m]	[m]	[m]	[m]	[°]	[°]	
H01	H01	493,803	5,113,211	618.9	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H02	H02	493,587	5,112,886	609.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H03	H03	494,248	5,113,411	621.8	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H04	H04	495,928	5,113,827	614.9	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H05	H05	498,292	5,110,165	596.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H06	H06	497,162	5,110,309	594.4	1.0	1.0	1.0	-180.0	90.0	"Green house mode"

To be continued on next page...

Project:
20102130 - Merricourt ND Enxco

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SHADOW - Main Result

Calculation: WTGs v15g / Occupied Home v3 Realistic

...continued from previous page

No.	Name	UTM WGS84 Zone: 14 East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
H07	H07	493,457	5,110,480	605.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H08	H08	498,722	5,109,435	595.5	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H09	H09	500,105	5,108,858	594.4	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H10	H10	503,211	5,109,791	600.5	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H11	H11	507,670	5,110,359	606.7	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H12	H12	506,627	5,109,318	620.5	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H13	H13	506,041	5,107,907	627.0	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H14	H14	500,278	5,106,873	617.0	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H15	H15	495,083	5,108,248	614.0	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H16	H16	490,353	5,105,415	626.5	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H17	H17	493,309	5,105,833	630.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H18	H18	502,051	5,105,123	615.7	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H20	H20	505,934	5,103,586	618.0	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H21	H21	497,786	5,104,193	607.1	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H22	H22	495,745	5,105,026	609.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H23	H23	492,486	5,104,236	621.1	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H24	H24	490,288	5,103,962	618.7	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H25	H25	489,534	5,104,522	603.7	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H26	H26	497,884	5,102,817	617.3	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H27	H27	500,571	5,102,094	622.1	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H28	H28	504,292	5,102,969	620.4	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H29	H29	506,783	5,102,415	609.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H30	H30	508,385	5,100,218	620.8	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H31	H31	507,435	5,100,145	622.4	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H32	H32	501,763	5,100,251	609.8	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H33	H33	501,209	5,100,184	605.5	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H34	H34	497,551	5,099,204	595.7	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H35	H35	501,233	5,098,861	606.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H36	H36	508,413	5,099,339	629.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H38	H38	504,352	5,097,819	638.6	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H39	H39	504,504	5,097,783	640.1	1.0	1.0	1.0	-180.0	90.0	"Green house mode"
H42	H42	497,897	5,097,923	600.5	1.0	1.0	1.0	-180.0	90.0	"Green house mode"

Calculation Results

Shadow receptor

No.	Name	Shadow, worst case Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow, expected values Shadow hours per year [h/year]
H01	H01	0:00	0	0:00	0:00
H02	H02	0:00	0	0:00	0:00
H03	H03	0:00	0	0:00	0:00
H04	H04	0:00	0	0:00	0:00
H05	H05	61:47	181	0:35	17:22
H06	H06	53:42	166	0:38	18:45
H07	H07	11:15	65	0:21	4:09
H08	H08	87:23	239	0:40	31:27
H09	H09	47:25	147	0:43	18:28
H10	H10	1:49	21	0:09	0:30
H11	H11	0:00	0	0:00	0:00
H12	H12	0:00	0	0:00	0:00
H13	H13	0:00	0	0:00	0:00
H14	H14	10:46	92	0:14	4:08

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Project:
20102130 - Merricourt ND Enxco

enXco
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SHADOW - Main Result

Calculation: WTGs v15g / Occupied Home v3 Realistic

...continued from previous page

		Shadow, worst case			Shadow, expected values
No.	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
H15	H15	73:35	249	0:34	29:24
H16	H16	23:39	128	0:19	9:03
H17	H17	18:56	78	0:34	8:18
H18	H18	14:26	88	0:18	5:23
H20	H20	0:00	0	0:00	0:00
H21	H21	0:00	0	0:00	0:00
H22	H22	15:08	44	0:25	7:22
H23	H23	22:55	67	0:38	8:40
H24	H24	0:00	0	0:00	0:00
H25	H25	1:36	21	0:07	0:37
H26	H26	0:00	0	0:00	0:00
H27	H27	0:00	0	0:00	0:00
H28	H28	0:00	0	0:00	0:00
H29	H29	0:00	0	0:00	0:00
H30	H30	0:00	0	0:00	0:00
H31	H31	0:00	0	0:00	0:00
H32	H32	0:00	0	0:00	0:00
H33	H33	0:00	0	0:00	0:00
H34	H34	0:00	0	0:00	0:00
H35	H35	0:00	0	0:00	0:00
H36	H36	0:00	0	0:00	0:00
H38	H38	0:00	0	0:00	0:00
H39	H39	0:00	0	0:00	0:00
H42	H42	0:00	0	0:00	0:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	1	0:00	0:00
2	2	0:00	0:00
3	3	0:00	0:00
4	4	0:00	0:00
5	5	0:00	0:00
6	6	0:00	0:00
7	7	4:04	0:57
8	8	0:00	0:00
9	9	0:00	0:00
10	10	0:00	0:00
11	11	0:00	0:00
12	12	0:00	0:00
13	13	0:00	0:00
14	14	0:00	0:00
15	15	0:00	0:00
16	16	0:00	0:00
17	17	0:00	0:00
18	18	0:00	0:00
19	19	0:00	0:00
20	20	6:53	2:58
21	21	4:20	2:04
22	22	0:00	0:00
23	23	4:02	1:19
24	24	0:00	0:00
25	25	1:01	0:22

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SHADOW - Main Result

Calculation: WTGs v15g / Occupied Home v3 Realistic

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
26	26	3:35	1:23
27	27	7:06	2:21
28	28	0:00	0:00
29	29	0:00	0:00
30	30	0:20	0:06
31	31	6:51	2:40
32	32	1:09	0:18
33	33	0:44	0:11
34	34	0:00	0:00
35	35	4:08	1:08
36	36	2:01	0:30
37	37	0:00	0:00
38	38	2:16	0:53
39	39	6:00	1:48
40	40	0:00	0:00
41	41	0:00	0:00
43	43	0:00	0:00
44	44	0:00	0:00
45	45	0:00	0:00
48	48	2:18	0:37
49	49	10:45	3:12
50	50	0:51	0:16
51	51	2:10	0:40
52	52	0:34	0:10
53	53	65:29	18:42
55	55	37:18	14:22
56	56	9:24	3:29
57	57	31:10	12:02
58	58	0:00	0:00
59	59	4:07	1:28
60	60	4:08	1:37
61	61	2:28	0:49
62	62	3:52	1:27
63	63	1:09	0:22
64	64	8:19	3:13
65	65	1:06	0:24
66	66	15:11	7:23
67	67	0:00	0:00
68	68	0:00	0:00
69	69	1:37	0:35
70	70	7:09	2:45
71	71	0:00	0:00
72	72	0:00	0:00
74	74	1:45	0:35
75	75	35:32	16:56
76	76	3:05	0:50
77	77	20:25	5:44
78	78	12:09	5:25
80	80	10:57	4:13
81	81	0:00	0:00
82	82	7:23	2:14
83	83	0:00	0:00
85	85	8:04	3:56
86	86	2:45	1:02
87	87	0:26	0:09
89	89	0:00	0:00

To be continued on next page...

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SHADOW - Main Result

Calculation: WTGs v15g / Occupied Home v3 Realistic

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
90	90	0:00	0:00
91	91	2:28	0:58
92	92	3:16	1:04
94	94	0:00	0:00
95	95	0:00	0:00
97	97	0:00	0:00
98	98	0:00	0:00
99	99	0:00	0:00
100	100	0:00	0:00
101	101	0:00	0:00
102	102	0:00	0:00
103	103	0:00	0:00
104	104	0:00	0:00
107	107	11:48	4:38
108	108	0:00	0:00
109	109	1:32	0:34
110	110	0:00	0:00
111	111	1:08	0:21
113	113	1:01	0:24
114	114	25:00	9:44
115	115	0:00	0:00
116	116	3:01	1:19
118	118	0:00	0:00
119	119	0:00	0:00
120	120	0:00	0:00
121	121	0:00	0:00
125	125	0:18	0:05
126	126	0:28	0:11
127	127	0:57	0:22
128	128	1:31	0:37
129	129	0:00	0:00
130	130	2:12	0:48
131	131	5:11	2:05
132	132	15:30	5:45
133	133	1:05	0:21
134	134	6:23	2:19
141	141	0:00	0:00
142	142	0:00	0:00
143	143	0:00	0:00
144	144	0:00	0:00
145	145	0:00	0:00

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SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H01 - H01

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:20	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:17	07:58
	17:01	17:41	18:21	20:03	20:43	21:19	21:32	21:09	20:19	19:20	17:24	16:53
2	08:20	07:59	07:15	07:16	06:23	05:49	05:49	06:19	06:58	07:36	07:18	07:59
	17:02	17:42	18:22	20:05	20:44	21:20	21:32	21:08	20:17	19:18	17:22	16:53
3	08:20	07:58	07:14	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:20	08:00
	17:03	17:44	18:24	20:06	20:46	21:21	21:32	21:06	20:15	19:16	17:21	16:52
4	08:20	07:57	07:12	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:21	08:02
	17:04	17:45	18:25	20:07	20:47	21:22	21:32	21:05	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:18	05:47	05:51	06:23	07:01	07:40	07:23	08:03
	17:05	17:47	18:27	20:09	20:48	21:23	21:31	21:04	20:11	19:12	17:18	16:52
6	08:19	07:54	07:08	07:08	06:17	05:47	05:52	06:24	07:03	07:41	07:24	08:04
	17:06	17:48	18:28	20:10	20:50	21:24	21:31	21:02	20:09	19:10	17:16	16:51
7	08:19	07:53	07:06	07:07	06:15	05:46	05:53	06:25	07:04	07:42	07:25	08:05
	17:07	17:50	18:29	20:11	20:51	21:24	21:31	21:01	20:07	19:09	17:15	16:51
8	08:19	07:51	08:04	07:05	06:14	05:46	05:53	06:26	07:05	07:44	07:27	08:06
	17:08	17:51	18:31	20:13	20:52	21:25	21:30	20:59	20:05	19:07	17:14	16:51
9	08:19	07:50	08:02	07:03	06:13	05:46	05:54	06:28	07:06	07:45	07:28	08:07
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10	08:18	07:48	08:00	07:01	06:11	05:45	05:55	06:29	07:08	07:46	07:30	08:08
	17:11	17:54	19:34	20:15	20:55	21:27	21:29	20:56	20:01	19:03	17:11	16:51
11	08:18	07:47	07:59	06:59	06:10	05:45	05:56	06:30	07:09	07:48	07:31	08:09
	17:12	17:56	19:35	20:17	20:56	21:27	21:29	20:55	19:59	19:01	17:10	16:51
12	08:17	07:46	07:57	06:57	06:09	05:45	05:57	06:31	07:10	07:49	07:33	08:10
	17:13	17:57	19:36	20:18	20:57	21:28	21:28	20:53	19:57	18:57	17:09	16:51
13	08:17	07:44	07:55	06:55	06:07	05:45	05:58	06:33	07:11	07:50	07:34	08:11
	17:14	17:59	19:38	20:19	20:58	21:28	21:28	20:52	19:56	18:55	17:08	16:51
14	08:16	07:42	07:53	06:53	06:06	05:45	05:59	06:34	07:13	07:52	07:35	08:11
	17:16	18:00	19:39	20:21	21:00	21:29	21:27	20:50	19:54	18:54	17:06	16:51
15	08:16	07:41	07:51	06:52	06:05	05:45	05:59	06:35	07:14	07:53	07:37	08:12
	17:17	18:00	19:40	20:22	21:01	21:29	21:26	20:49	19:52	18:52	17:05	16:51
16	08:15	07:39	07:49	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:38	08:13
	17:18	18:02	19:42	20:23	21:02	21:30	21:25	20:47	19:50	18:50	17:04	16:51
17	08:15	07:38	07:47	06:48	06:03	05:45	06:01	06:38	07:17	07:56	07:40	08:14
	17:20	18:03	19:43	20:25	21:03	21:30	21:25	20:45	19:48	18:48	17:03	16:52
18	08:14	07:36	07:45	06:46	06:02	05:45	06:02	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:45	20:26	21:05	21:31	21:24	20:44	19:46	18:46	17:02	16:52
19	08:13	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:15
	17:22	18:06	19:46	20:27	21:06	21:31	21:23	20:42	19:44	18:45	17:01	16:52
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	17:24	18:08	19:47	20:29	21:07	21:31	21:22	20:40	19:42	18:43	17:00	16:53
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	17:25	18:09	19:49	20:30	21:08	21:32	21:21	20:38	19:40	18:41	17:00	16:53
22	08:11	07:29	07:37	06:39	05:57	05:45	06:06	06:44	07:23	08:03	07:47	08:17
	17:26	18:11	19:50	20:31	21:09	21:32	21:20	20:37	19:38	18:40	16:59	16:54
23	08:10	07:28	07:35	06:38	05:56	05:46	06:08	06:45	07:24	08:04	07:48	08:17
	17:28	18:12	19:51	20:33	21:10	21:32	21:19	20:35	19:36	18:38	16:58	16:54
24	08:09	07:26	07:34	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:49	08:18
	17:29	18:14	19:53	20:34	21:11	21:32	21:18	20:33	19:34	18:36	16:57	16:55
25	08:08	07:24	07:32	06:34	05:55	05:46	06:10	06:48	07:27	08:07	07:51	08:18
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:34	16:56	16:55
26	08:07	07:23	07:30	06:32	05:54	05:46	06:11	06:49	07:28	08:08	07:52	08:18
	17:32	18:17	19:55	20:37	21:13	21:32	21:16	20:30	19:30	18:33	16:56	16:56
27	08:06	07:21	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:10	07:53	08:19
	17:34	18:18	19:57	20:38	21:15	21:32	21:15	20:28	19:28	18:31	16:55	16:57
28	08:05	07:19	07:26	06:29	05:52	05:47	06:13	06:51	07:31	08:11	07:54	08:19
	17:35	18:19	19:58	20:39	21:16	21:32	21:14	20:26	19:26	18:30	16:55	16:58
29	08:04		07:24	06:28	05:51	05:48	06:14	06:53	07:32	08:13	07:56	08:19
	17:37		19:59	20:41	21:17	21:32	21:13	20:24	19:24	18:28	16:54	16:58
30	08:03		07:22	06:26	05:51	05:48	06:15	06:54	07:33	08:14	07:57	08:19
	17:38		20:01	20:42	21:18	21:32	21:12	20:22	19:22	18:27	16:53	16:59
31	08:02		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	477	439	378	339	284	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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US-GRAND FORKS, ND 58201
+1 701 775 3000
wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H02 - H02

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
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Idle start wind speed: Cut in wind speed from power curve

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	17:01	17:41	18:21	20:03	20:43	21:19	21:32	21:09	20:19	19:20	17:24	16:53
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	17:02	17:42	18:22	20:05	20:44	21:20	21:32	21:08	20:17	19:18	17:22	16:53
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13	08:17	07:44	07:55	06:55	06:07	05:45	05:58	06:33	07:11	07:50	07:34	08:11
	17:14	17:59	19:38	20:19	20:58	21:28	21:28	20:52	19:56	18:55	17:08	16:51
14	08:16	07:42	07:53	06:53	06:06	05:45	05:59	06:34	07:13	07:52	07:35	08:11
	17:16	18:00	19:39	20:21	21:00	21:29	21:27	20:50	19:54	18:54	17:06	16:51
15	08:16	07:41	07:51	06:52	06:05	05:45	05:59	06:35	07:14	07:53	07:37	08:12
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19	08:13	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:15
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Potential sun hours	282	289	368	406	463	471	477	439	378	339	284	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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US-GRAND FORKS, ND 58201
+1 701 775 3000
wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H03 - H03

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
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	17:03	17:44	18:24	20:06	20:46	21:21	21:32	21:06	20:15	19:16	17:21	16:52
4	08:20	07:57	07:12	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:21	08:02
	17:04	17:45	18:25	20:07	20:47	21:22	21:32	21:05	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:18	05:47	05:51	06:23	07:01	07:40	07:23	08:03
	17:05	17:47	18:27	20:09	20:48	21:23	21:31	21:04	20:11	19:12	17:18	16:52
6	08:19	07:54	07:08	07:08	06:17	05:47	05:52	06:24	07:03	07:41	07:24	08:04
	17:06	17:48	18:28	20:10	20:50	21:24	21:31	21:02	20:09	19:10	17:16	16:51
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	17:07	17:50	18:29	20:11	20:51	21:24	21:31	21:01	20:07	19:09	17:15	16:51
8	08:19	07:51	08:04	07:05	06:14	05:46	05:53	06:26	07:05	07:44	07:27	08:06
	17:08	17:51	18:31	20:13	20:52	21:25	21:30	20:59	20:05	19:07	17:14	16:51
9	08:19	07:50	08:02	07:03	06:13	05:46	05:54	06:28	07:06	07:45	07:28	08:07
	17:09	17:53	19:32	20:14	20:53	21:26	21:30	20:58	20:03	19:05	17:12	16:51
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	17:11	17:54	19:34	20:15	20:55	21:27	21:29	20:56	20:01	19:03	17:11	16:51
11	08:18	07:47	07:59	06:59	06:10	05:45	05:56	06:30	07:09	07:48	07:31	08:09
	17:12	17:56	19:35	20:17	20:56	21:27	21:29	20:55	19:59	19:01	17:10	16:51
12	08:17	07:46	07:57	06:57	06:09	05:45	05:57	06:31	07:10	07:49	07:33	08:10
	17:13	17:57	19:36	20:18	20:57	21:28	21:28	20:53	19:57	18:57	17:09	16:51
13	08:17	07:44	07:55	06:55	06:07	05:45	05:58	06:33	07:11	07:50	07:34	08:11
	17:14	17:59	19:38	20:19	20:58	21:28	21:28	20:52	19:55	18:55	17:08	16:51
14	08:16	07:42	07:53	06:53	06:06	05:45	05:59	06:34	07:13	07:52	07:35	08:11
	17:16	18:00	19:39	20:21	21:00	21:29	21:27	20:50	19:54	18:54	17:06	16:51
15	08:16	07:41	07:51	06:52	06:05	05:45	05:59	06:35	07:14	07:53	07:37	08:12
	17:17	18:00	19:40	20:22	21:01	21:29	21:26	20:49	19:52	18:52	17:05	16:51
16	08:15	07:39	07:49	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:38	08:13
	17:18	18:02	19:42	20:23	21:02	21:30	21:25	20:47	19:50	18:50	17:04	16:51
17	08:15	07:38	07:47	06:48	06:03	05:45	06:01	06:38	07:16	07:56	07:40	08:14
	17:19	18:03	19:43	20:25	21:03	21:30	21:25	20:45	19:48	18:48	17:03	16:52
18	08:14	07:36	07:45	06:46	06:01	05:45	06:02	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:45	20:26	21:05	21:31	21:24	20:44	19:46	18:46	17:02	16:52
19	08:13	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:15
	17:22	18:06	19:46	20:27	21:06	21:31	21:23	20:42	19:44	18:45	17:01	16:52
20	08:12	07:33	07:41	06:43	05:59	05:45	06:04	06:41	07:20	08:00	07:44	08:16
	17:24	18:08	19:47	20:29	21:07	21:31	21:22	20:40	19:42	18:43	17:00	16:53
21	08:12	07:31	07:39	06:41	05:58	05:45	06:05	06:43	07:22	08:01	07:45	08:16
	17:25	18:09	19:49	20:30	21:08	21:32	21:21	20:38	19:40	18:41	17:00	16:53
22	08:11	07:29	07:37	06:39	05:57	05:45	06:06	06:44	07:23	08:03	07:47	08:17
	17:26	18:11	19:50	20:31	21:09	21:32	21:20	20:37	19:38	18:39	16:59	16:54
23	08:10	07:28	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:04	07:48	08:17
	17:28	18:12	19:51	20:33	21:10	21:32	21:19	20:35	19:36	18:38	16:58	16:54
24	08:09	07:26	07:33	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:49	08:18
	17:29	18:14	19:53	20:34	21:11	21:32	21:18	20:33	19:34	18:36	16:57	16:55
25	08:08	07:24	07:32	06:34	05:55	05:46	06:10	06:48	07:27	08:07	07:51	08:18
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:34	16:56	16:55
26	08:07	07:22	07:30	06:32	05:54	05:46	06:11	06:49	07:28	08:08	07:52	08:18
	17:32	18:17	19:55	20:37	21:13	21:32	21:16	20:30	19:30	18:33	16:56	16:56
27	08:06	07:21	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:10	07:53	08:19
	17:34	18:18	19:57	20:38	21:14	21:32	21:15	20:28	19:28	18:31	16:55	16:57
28	08:05	07:19	07:26	06:29	05:52	05:47	06:13	06:51	07:30	08:11	07:54	08:19
	17:35	18:19	19:58	20:39	21:16	21:32	21:14	20:26	19:26	18:30	16:55	16:58
29	08:04		07:24	06:28	05:51	05:48	06:14	06:53	07:32	08:13	07:56	08:19
	17:36		19:59	20:40	21:17	21:32	21:13	20:24	19:24	18:28	16:54	16:58
30	08:03		07:22	06:26	05:51	05:48	06:15	06:54	07:33	08:14	07:57	08:19
	17:38		20:01	20:42	21:17	21:32	21:12	20:22	19:22	18:27	16:53	16:59
31	08:02		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	477	439	378	339	284	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 8:45 AM / 11

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H04 - H04

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:20	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:17	07:58
	17:01	17:41	18:21	20:03	20:43	21:19	21:32	21:09	20:18	19:20	17:23	16:53
2	08:20	07:59	07:15	07:16	06:23	05:49	05:49	06:19	06:58	07:36	07:18	07:59
	17:02	17:42	18:22	20:05	20:44	21:20	21:32	21:08	20:17	19:18	17:22	16:52
3	08:20	07:58	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:20	08:00
	17:03	17:44	18:24	20:06	20:46	21:21	21:32	21:06	20:15	19:16	17:20	16:52
4	08:19	07:57	07:12	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:21	08:02
	17:04	17:45	18:25	20:07	20:47	21:22	21:32	21:05	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:18	05:47	05:51	06:23	07:01	07:40	07:22	08:03
	17:05	17:47	18:26	20:09	20:48	21:23	21:31	21:04	20:11	19:12	17:18	16:51
6	08:19	07:54	07:08	07:08	06:17	05:47	05:52	06:24	07:03	07:41	07:24	08:04
	17:06	17:48	18:28	20:10	20:50	21:24	21:31	21:02	20:09	19:10	17:16	16:51
7	08:19	07:53	07:06	07:06	06:15	05:46	05:53	06:25	07:04	07:42	07:25	08:05
	17:07	17:50	18:29	20:11	20:51	21:24	21:31	21:01	20:07	19:08	17:15	16:51
8	08:19	07:51	08:04	07:05	06:14	05:46	05:53	06:26	07:05	07:43	07:27	08:06
	17:08	17:51	18:31	20:13	20:52	21:25	21:30	20:59	20:05	19:07	17:14	16:51
9	08:18	07:50	08:02	07:03	06:13	05:46	05:54	06:27	07:06	07:45	07:28	08:07
	17:09	17:53	19:32	20:14	20:53	21:26	21:30	20:58	20:03	19:05	17:12	16:51
10	08:18	07:48	08:00	07:01	06:11	05:45	05:55	06:29	07:08	07:46	07:30	08:08
	17:11	17:54	19:33	20:15	20:55	21:26	21:29	20:56	20:01	19:03	17:11	16:51
11	08:18	07:47	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:31	08:09
	17:12	17:56	19:35	20:17	20:56	21:27	21:29	20:55	19:59	19:01	17:10	16:51
12	08:17	07:45	07:57	06:57	06:09	05:45	05:57	06:31	07:10	07:49	07:33	08:10
	17:13	17:57	19:36	20:18	20:57	21:28	21:28	20:53	19:57	18:57	17:09	16:51
13	08:17	07:44	07:55	06:55	06:07	05:45	05:57	06:32	07:11	07:50	07:34	08:10
	17:14	17:59	19:38	20:19	20:58	21:28	21:27	20:52	19:55	18:55	17:07	16:51
14	08:16	07:42	07:53	06:53	06:06	05:45	05:58	06:34	07:13	07:52	07:35	08:11
	17:15	18:00	19:39	20:21	21:00	21:29	21:27	20:50	19:53	18:53	17:06	16:51
15	08:16	07:41	07:51	06:52	06:05	05:45	05:59	06:35	07:14	07:53	07:37	08:12
	17:17	18:00	19:40	20:22	21:01	21:29	21:26	20:48	19:51	18:52	17:05	16:51
16	08:15	07:39	07:49	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:38	08:13
	17:18	18:02	19:42	20:23	21:02	21:30	21:25	20:47	19:50	18:50	17:04	16:51
17	08:15	07:38	07:47	06:48	06:03	05:45	06:01	06:37	07:16	07:56	07:40	08:14
	17:19	18:03	19:43	20:25	21:03	21:30	21:25	20:45	19:48	18:48	17:03	16:52
18	08:14	07:36	07:45	06:46	06:01	05:45	06:02	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:44	20:26	21:04	21:31	21:24	20:43	19:46	18:46	17:02	16:52
19	08:13	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:15
	17:22	18:06	19:46	20:27	21:06	21:31	21:23	20:42	19:44	18:45	17:01	16:52
20	08:12	07:33	07:41	06:43	05:59	05:45	06:04	06:41	07:20	08:00	07:44	08:16
	17:23	18:08	19:47	20:29	21:07	21:31	21:22	20:40	19:42	18:43	17:00	16:53
21	08:12	07:31	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:01	07:45	08:16
	17:25	18:09	19:48	20:30	21:08	21:32	21:21	20:38	19:40	18:41	16:59	16:53
22	08:11	07:29	07:37	06:39	05:57	05:45	06:06	06:44	07:23	08:03	07:46	08:17
	17:26	18:11	19:50	20:31	21:09	21:32	21:20	20:37	19:38	18:39	16:59	16:54
23	08:10	07:28	07:35	06:37	05:56	05:45	06:07	06:45	07:24	08:04	07:48	08:17
	17:28	18:12	19:51	20:32	21:10	21:32	21:19	20:35	19:36	18:38	16:58	16:54
24	08:09	07:26	07:33	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:49	08:18
	17:29	18:14	19:53	20:34	21:11	21:32	21:18	20:33	19:34	18:36	16:57	16:55
25	08:08	07:24	07:31	06:34	05:54	05:46	06:10	06:47	07:27	08:07	07:50	08:18
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:34	16:56	16:55
26	08:07	07:22	07:30	06:32	05:54	05:46	06:11	06:49	07:28	08:08	07:52	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:16	20:30	19:30	18:33	16:56	16:56
27	08:06	07:21	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:10	07:53	08:19
	17:33	18:18	19:57	20:38	21:14	21:32	21:15	20:28	19:28	18:31	16:55	16:57
28	08:05	07:19	07:26	06:29	05:52	05:47	06:13	06:51	07:30	08:11	07:54	08:19
	17:35	18:19	19:58	20:39	21:15	21:32	21:14	20:26	19:26	18:30	16:54	16:57
29	08:04		07:24	06:27	05:51	05:48	06:14	06:53	07:32	08:12	07:56	08:19
	17:36		19:59	20:40	21:16	21:32	21:13	20:24	19:24	18:28	16:54	16:58
30	08:03		07:22	06:26	05:51	05:48	06:15	06:54	07:33	08:14	07:57	08:19
	17:38		20:01	20:42	21:17	21:32	21:11	20:22	19:22	18:26	16:53	16:59
31	08:02		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	477	439	378	339	284	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H05 - H05

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April		May	June		
1	08:19		15:54 (53)	08:00		17:09 (49)	07:17		07:39 (59)	07:18		06:24	05:49		
	17:01	30	16:32 (32)	17:41	5	17:14 (49)	18:21	10	17:58 (52)	20:03		20:43	21:19		
2	08:19		15:54 (53)	07:59		17:08 (49)	07:15		17:54 (52)	07:16		06:23	05:49		20:51 (85)
	17:02	30	16:33 (32)	17:42	8	17:16 (49)	18:22	5	17:59 (52)	20:04		20:44	21:20	2	20:53 (85)
3	08:19		15:55 (53)	07:58		17:06 (49)	07:13		17:57 (52)	07:14		06:21	05:48		20:48 (85)
	17:03	31	16:34 (32)	17:44	11	17:17 (49)	18:23	3	18:00 (52)	20:06		20:45	21:21	5	20:53 (85)
4	08:19		15:55 (53)	07:56		17:05 (49)	07:11			07:12		06:20	05:48		20:48 (85)
	17:04	32	16:35 (32)	17:45	14	17:19 (49)	18:25			20:07		20:47	21:22	6	20:54 (85)
5	08:19		15:54 (53)	07:55		17:05 (49)	07:10			07:10		06:18	05:47		20:48 (85)
	17:05	33	16:35 (32)	17:47	16	17:21 (49)	18:26			20:08		20:48	21:23	8	20:56 (85)
6	08:19		15:55 (53)	07:54		17:04 (49)	07:08			07:08		06:17	05:47		20:46 (85)
	17:06	34	16:37 (32)	17:48	18	17:22 (49)	18:28			20:10		20:49	21:23	10	20:56 (85)
7	08:19		15:55 (53)	07:52		08:15 (55)	07:06			07:06		06:15	05:46		20:46 (85)
	17:07	34	16:38 (32)	17:50	22	17:24 (49)	18:29			20:11		20:51	21:24	11	20:57 (85)
8	08:18		15:55 (53)	07:51		08:13 (55)	08:04			07:04		06:14	05:46		20:46 (85)
	17:08	34	16:39 (32)	17:51	26	17:25 (49)	18:31			20:12		20:52	21:25	12	20:58 (85)
9	08:18		15:56 (53)	07:50		08:12 (55)	08:02			07:03		06:13	05:46		20:46 (85)
	17:09	33	16:40 (32)	17:53	28	17:25 (49)	19:32			20:14		20:53	21:26	11	20:57 (85)
10	08:18		15:56 (53)	07:48		08:10 (55)	08:00			07:01		06:11	05:45		20:46 (85)
	17:11	31	16:27 (53)	17:54	31	17:25 (49)	19:33			20:15		20:54	21:26	12	20:58 (85)
11	08:17		15:56 (53)	07:47		08:09 (55)	07:58			06:59		06:10	05:45		20:46 (85)
	17:12	31	16:27 (53)	17:56	32	17:25 (49)	19:35			20:16		20:56	21:27	13	20:59 (85)
12	08:17		15:57 (53)	07:45		08:07 (55)	07:56			06:57		06:09	05:45		20:46 (85)
	17:13	31	16:28 (53)	17:57	32	17:24 (49)	19:36			20:18		20:57	21:27	14	21:00 (85)
13	08:17		15:57 (53)	07:44		08:06 (55)	07:55			06:55		06:07	05:45		20:46 (85)
	17:14	31	16:28 (53)	17:59	31	17:23 (49)	19:37			20:19		20:58	21:28	14	21:00 (85)
14	08:16		15:57 (53)	07:42		08:05 (55)	07:53			06:53		06:06	05:45		20:46 (85)
	17:15	31	16:28 (53)	18:00	30	17:22 (49)	19:39			20:20		20:59	21:29	15	21:01 (85)
15	08:16		15:58 (53)	07:41		08:05 (55)	07:51			06:51		06:05	05:45		20:46 (85)
	17:17	31	16:29 (53)	18:00	25	17:20 (49)	19:40			20:22		21:01	21:29	15	21:01 (85)
16	08:15		15:58 (53)	07:39		08:07 (55)	07:49			06:50		06:04	05:45		20:46 (85)
	17:18	31	16:29 (53)	18:02	16	17:17 (49)	19:42			20:23		21:02	21:30	16	21:02 (85)
17	08:14		15:58 (53)	07:37		08:08 (55)	07:47			06:48		06:02	05:45		20:46 (85)
	17:19	31	16:29 (53)	18:03	8	08:16 (55)	19:43			20:24		21:03	21:30	16	21:02 (85)
18	08:14		15:59 (53)	07:36		07:58 (56)	07:45			06:46		06:01	05:45		20:46 (85)
	17:21	31	16:30 (53)	18:05	2	08:00 (56)	19:44			20:26		21:04	21:30	16	21:02 (85)
19	08:13		16:00 (53)	07:34		07:56 (56)	07:43			06:44		06:00	05:45		20:46 (85)
	17:22	30	16:30 (53)	18:06	6	17:43 (51)	19:46			20:27		21:05	21:31	17	21:03 (85)
20	08:12		16:00 (53)	07:33		07:54 (56)	07:41			06:43		05:59	05:45		20:46 (85)
	17:23	30	16:30 (53)	18:08	10	17:44 (51)	19:47			20:28		21:07	21:31	17	21:03 (85)
21	08:11		16:01 (53)	07:31		07:52 (56)	07:39			06:41		05:58	05:45		20:46 (85)
	17:25	29	16:30 (53)	18:09	15	17:46 (51)	19:48			20:30		21:08	21:31	17	21:03 (85)
22	08:11		16:02 (53)	07:29		07:51 (56)	07:37			06:39		05:57	05:45		20:47 (85)
	17:26	28	16:30 (53)	18:11	18	17:48 (51)	19:50			20:31		21:09	21:32	17	21:04 (85)
23	08:10		16:02 (53)	07:27		07:49 (56)	07:35			06:37		05:56	05:45		20:47 (85)
	17:28	27	16:29 (53)	18:12	20	17:49 (51)	19:51			20:32		21:10	21:32	17	21:04 (85)
24	08:09		16:03 (53)	07:26		07:49 (56)	07:33			06:36		05:55	05:46		20:47 (85)
	17:29	26	16:29 (53)	18:13	20	17:51 (51)	19:52			20:34		21:11	21:32	16	21:03 (85)
25	08:08		16:05 (53)	07:24		07:45 (59)	07:31			06:34		05:54	05:46		20:47 (85)
	17:31	23	16:28 (53)	18:15	16	17:50 (51)	19:54			20:35		21:12	21:32	16	21:03 (85)
26	08:07		16:06 (53)	07:22		07:44 (59)	07:29			06:32		05:54	05:46		20:48 (85)
	17:32	22	16:28 (53)	18:16	7	17:48 (51)	19:55			20:36		21:13	21:32	16	21:04 (85)
27	08:06		16:07 (53)	07:20		07:42 (59)	07:27			06:31		05:53	05:47		20:48 (85)
	17:33	20	16:27 (53)	18:18	8	17:56 (52)	19:56			20:38		21:14	21:32	16	21:04 (85)
28	08:05		16:09 (53)	07:19		07:40 (59)	07:26			06:29		05:52	05:47		20:49 (85)
	17:35	17	16:26 (53)	18:19	10	17:57 (52)	19:58			20:39		21:15	21:32	15	21:04 (85)
29	08:04		16:12 (53)				07:24			06:27		05:51	05:48		20:49 (85)
	17:36	12	16:24 (53)				19:59			20:40		21:16	21:32	15	21:04 (85)
30	08:03		16:16 (53)				07:22			06:26		05:51	05:48		20:50 (85)
	17:38	3	16:19 (53)				20:00			20:42		21:17	21:32	14	21:04 (85)
31	08:01						07:20					05:50			
	17:39						20:02					21:18			
Potential sun hours	282			289			368			406		463	471		
Total, worst case		837			485			18						389	
Sun reduction		0.54			0.50			0.63						0.71	
Oper. time red.		0.96			0.96			0.96						0.96	
Wind dir. red.		0.53			0.60			0.59						0.70	
Total reduction		0.27			0.28			0.35						0.48	
Total, real		229			138			6						185	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H05 - H05

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	05:49		20:50 (85)	06:18			06:56			07:34			07:17		07:40 (55)	07:58		15:38 (53)
	21:32	13	21:03 (85)	21:09			20:18			19:20			17:23	29	16:54 (49)	16:53	31	16:09 (53)
2	05:49		20:51 (85)	06:19			06:57			07:35			07:18		07:42 (55)	07:59		15:38 (53)
	21:32	13	21:04 (85)	21:07			20:16			19:18			17:22	28	16:55 (49)	16:52	31	16:09 (53)
3	05:50		20:51 (85)	06:20			06:59			07:37			07:19		07:43 (55)	08:00		15:40 (53)
	21:32	12	21:03 (85)	21:06			20:15			19:16			17:20	24	16:54 (49)	16:52	32	16:23 (32)
4	05:51		20:51 (85)	06:21			07:00			07:38			07:21		07:45 (55)	08:01		15:40 (53)
	21:31	12	21:03 (85)	21:05			20:13			19:14			17:19	22	16:54 (49)	16:52	34	16:24 (32)
5	05:51		20:52 (85)	06:23			07:01			07:39			07:22		16:34 (49)	08:02		15:40 (53)
	21:31	11	21:03 (85)	21:03			20:11			19:12			17:18	18	16:52 (49)	16:51	35	16:23 (32)
6	05:52		20:52 (85)	06:24			07:02			07:41			07:24		16:35 (49)	08:03		15:41 (53)
	21:31	10	21:02 (85)	21:02			20:09			19:10			17:16	16	16:51 (49)	16:51	34	16:23 (32)
7	05:53		20:54 (85)	06:25			07:04			07:42			07:25		16:35 (49)	08:05		15:41 (53)
	21:30	8	21:02 (85)	21:01			20:07			19:08			17:15	14	16:49 (49)	16:51	33	16:22 (32)
8	05:53		20:55 (85)	06:26			07:05			07:43			07:27		16:37 (49)	08:06		15:42 (53)
	21:30	7	21:02 (85)	20:59			20:05			19:06			17:14	11	16:48 (49)	16:51	32	16:22 (32)
9	05:54		20:55 (85)	06:27			07:06			07:45			07:28		16:38 (49)	08:07		15:43 (53)
	21:29	6	21:01 (85)	20:58			20:03			19:05			17:12	8	16:46 (49)	16:51	31	16:22 (32)
10	05:55		20:57 (85)	06:29			07:08			07:46			07:29		16:40 (49)	08:08		15:43 (53)
	21:29	3	21:00 (85)	20:56			20:01			19:03			17:11	5	16:45 (49)	16:51	30	16:22 (32)
11	05:56			06:30			07:09			07:47		18:29 (52)	07:31			08:08		15:44 (53)
	21:28			20:55			19:59			19:01	5	18:34 (52)	17:10			16:51	30	16:22 (32)
12	05:57			06:31			07:10			07:49		18:28 (52)	07:32		15:47 (53)	08:09		15:45 (53)
	21:28			20:53			19:57			18:57	5	18:33 (52)	17:09	5	15:52 (53)	16:51	29	16:22 (32)
13	05:57			06:32			07:11			07:50		08:12 (59)	07:34		15:44 (53)	08:10		15:45 (53)
	21:27			20:51			19:55			18:55	11	18:31 (52)	17:07	12	15:56 (53)	16:51	29	16:22 (32)
14	05:58			06:34			07:13			07:51		08:13 (59)	07:35		15:41 (53)	08:11		15:46 (53)
	21:27			20:50			19:53			18:53	8	18:28 (52)	17:06	17	15:58 (53)	16:51	27	16:13 (53)
15	05:59			06:35			07:14			07:53		08:15 (59)	07:37		15:40 (53)	08:12		15:46 (53)
	21:26			20:48			19:51			18:52	7	18:27 (52)	17:05	20	16:00 (53)	16:51	28	16:22 (32)
16	06:00			06:36			07:15			07:54		08:16 (59)	07:38		15:39 (53)	08:13		15:47 (53)
	21:25			20:47			19:49			18:50	10	18:21 (51)	17:04	22	16:01 (53)	16:51	26	16:13 (53)
17	06:01			06:37			07:16			07:55		08:18 (59)	07:39		15:38 (53)	08:13		15:48 (53)
	21:24			20:45			19:47			18:48	19	18:23 (51)	17:03	24	16:02 (53)	16:52	26	16:14 (53)
18	06:02			06:39			07:18			07:57		08:20 (56)	07:41		15:37 (53)	08:14		15:49 (53)
	21:24			20:43			19:45			18:46	20	18:21 (51)	17:02	26	16:03 (53)	16:52	25	16:14 (53)
19	06:03			06:40			07:19			07:58		08:21 (56)	07:42		15:37 (53)	08:15		15:49 (53)
	21:23			20:42			19:43			18:44	19	18:20 (51)	17:01	27	16:04 (53)	16:52	25	16:14 (53)
20	06:04			06:41			07:20			08:00		08:22 (56)	07:44		15:37 (53)	08:15		15:49 (53)
	21:22			20:40			19:41			18:43	17	18:18 (51)	17:00	28	16:05 (53)	16:53	26	16:15 (53)
21	06:05			06:42			07:21			08:01		08:24 (56)	07:45		15:37 (53)	08:16		15:49 (53)
	21:21			20:38			19:40			18:41	14	18:17 (51)	16:59	29	16:06 (53)	16:53	26	16:15 (53)
22	06:06			06:44			07:23			08:02		08:25 (56)	07:46		15:36 (53)	08:16		15:50 (53)
	21:20			20:36			19:38			18:39	9	18:14 (51)	16:59	30	16:06 (53)	16:54	26	16:16 (53)
23	06:07			06:45			07:24			08:04		08:26 (56)	07:48		15:36 (53)	08:17		15:50 (53)
	21:19			20:35			19:36			18:38	6	18:12 (51)	16:58	30	16:06 (53)	16:54	26	16:16 (53)
24	06:09			06:46			07:25			08:05		08:28 (56)	07:49		15:37 (53)	08:17		15:51 (53)
	21:18			20:33			19:34			18:36	6	08:44 (55)	16:57	30	16:07 (53)	16:55	26	16:17 (53)
25	06:10			06:47			07:26			08:07		08:37 (55)	07:50		15:36 (53)	08:18		15:52 (53)
	21:17			20:31			19:32			18:34	10	08:47 (55)	16:56	31	16:07 (53)	16:55	25	16:17 (53)
26	06:11			06:49			07:28			08:08		08:36 (55)	07:52		15:37 (53)	08:18		15:52 (53)
	21:16			20:29			19:30			18:33	19	17:48 (49)	16:56	31	16:08 (53)	16:56	25	16:17 (53)
27	06:12			06:50			07:29			08:09		08:34 (55)	07:53		15:37 (53)	08:18		15:52 (53)
	21:15			20:28			19:28			18:31	27	17:50 (49)	16:55	31	16:08 (53)	16:57	26	16:18 (53)
28	06:13			06:51			07:30			08:11		08:34 (55)	07:54		15:37 (53)	08:19		15:53 (53)
	21:14			20:26			19:26			18:29	31	17:52 (49)	16:54	31	16:08 (53)	16:57	26	16:19 (53)
29	06:14			06:52			07:32			08:12		08:35 (55)	07:55		15:38 (53)	08:19		15:53 (53)
	21:12			20:24			19:24			18:28	31	17:52 (49)	16:54	31	16:09 (53)	16:58	27	16:20 (53)
30	06:15			06:54			07:33			08:14		08:37 (55)	07:57		15:38 (53)	08:19		15:53 (53)
	21:11			20:22			19:22			18:26	32	17:54 (49)	16:53	31	16:09 (53)	16:59	29	16:30 (32)
31	06:17			06:55						08:15		08:39 (55)				08:19		15:54 (53)
	21:10			20:20						18:25	31	17:55 (49)				17:00	29	16:31 (32)
Potential sun hours	477			439			378			339			284			270		
Total, worst case		95									337			661			885	
Sun reduction		0.76									0.52			0.42			0.42	
Oper. time red.		0.96									0.96			0.96			0.96	
Wind dir. red.		0.70									0.62			0.54			0.53	
Total reduction		0.51									0.30			0.22			0.21	
Total, real		48									102			144			190	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H06 - H06

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May			June		
1	08:19		08:45 (53)	08:00			07:17	07:18	06:24			05:49		06:30 (114)
	17:01	20	16:32 (82)	17:41			18:21	20:03	20:43			21:19	22	06:52 (114)
2	08:19		08:46 (53)	07:59			07:15	07:16	06:23			05:49		06:30 (114)
	17:02	20	16:33 (82)	17:42			18:22	20:04	20:44			21:20	21	06:51 (114)
3	08:19		08:46 (53)	07:58			07:13	07:14	06:21			05:48		06:31 (114)
	17:03	22	16:34 (82)	17:44			18:24	20:06	20:45			21:21	20	06:51 (114)
4	08:19		08:46 (53)	07:57			07:11	07:12	06:20			05:48		06:31 (114)
	17:04	24	16:35 (82)	17:45			18:25	20:07	20:47			21:22	19	06:50 (114)
5	08:19		08:46 (53)	07:55			07:10	07:10	06:18			05:47		06:32 (114)
	17:05	24	16:35 (82)	17:47			18:26	20:08	20:48			21:23	18	06:50 (114)
6	08:19		08:46 (53)	07:54			07:08	07:08	06:17			05:47		06:32 (114)
	17:06	27	16:37 (82)	17:48			18:28	20:10	20:49			21:23	18	06:50 (114)
7	08:19		08:46 (53)	07:53			07:06	07:06	06:15			05:46		06:33 (114)
	17:07	29	16:38 (82)	17:50			18:29	20:11	20:51			21:24	17	06:50 (114)
8	08:19		08:47 (53)	07:51		17:23 (33)	08:04	07:04	06:14			05:46		06:34 (114)
	17:08	30	16:40 (82)	17:51	2	17:25 (33)	18:31	20:12	20:52			21:25	16	06:50 (114)
9	08:18		08:47 (53)	07:50		17:24 (33)	08:02	07:03	06:13			05:46		06:34 (114)
	17:09	31	16:40 (82)	17:53	3	17:27 (33)	19:32	20:14	20:53			21:26	15	06:49 (114)
10	08:18		08:47 (53)	07:48		17:23 (33)	08:00	07:01	06:11		06:36 (114)	05:45		06:35 (114)
	17:11	33	16:42 (82)	17:54	5	17:28 (33)	19:33	20:15	20:54	7	06:43 (114)	21:26	13	06:48 (114)
11	08:18		08:47 (53)	07:47		17:25 (33)	07:58	06:59	06:10		06:33 (114)	05:45		06:36 (114)
	17:12	34	16:43 (82)	17:56	5	17:30 (33)	19:35	20:16	20:56	12	06:45 (114)	21:27	12	06:48 (114)
12	08:17		08:48 (53)	07:45		17:26 (33)	07:57	06:57	06:09		06:31 (114)	05:45		06:36 (114)
	17:13	34	16:44 (82)	17:57	6	17:32 (33)	19:36	20:18	20:57	16	06:47 (114)	21:28	12	06:48 (114)
13	08:17		08:48 (53)	07:44			07:55	06:55	06:07		06:30 (114)	05:45		06:37 (114)
	17:14	36	16:45 (82)	17:59			19:38	20:19	20:58	18	06:48 (114)	21:28	11	06:48 (114)
14	08:16		08:49 (53)	07:42			07:53	06:53	06:06		06:29 (114)	05:45		06:38 (114)
	17:16	37	16:47 (82)	18:00			19:39	20:20	20:59	20	06:49 (114)	21:29	10	06:48 (114)
15	08:16		08:49 (53)	07:41			07:51	06:52	06:05		06:29 (114)	05:45		06:39 (114)
	17:17	37	16:48 (82)	18:00			19:40	20:22	21:01	21	06:50 (114)	21:29	8	06:47 (114)
16	08:15		08:49 (53)	07:39			07:49	06:50	06:04		06:28 (114)	05:45		06:40 (114)
	17:18	38	16:49 (82)	18:02			19:42	20:23	21:02	23	06:51 (114)	21:30	7	06:47 (114)
17	08:14		08:49 (53)	07:38			07:47	06:48	06:03		06:28 (114)	05:45		06:40 (114)
	17:19	37	16:49 (82)	18:03			19:43	20:24	21:03	23	06:51 (114)	21:30	7	06:47 (114)
18	08:14		08:51 (53)	07:36			07:45	06:46	06:01		06:27 (114)	05:45		06:41 (114)
	17:21	34	16:49 (82)	18:05			19:44	20:26	21:04	24	06:51 (114)	21:30	5	06:46 (114)
19	08:13		08:51 (53)	07:34			07:43	06:44	06:00		06:26 (114)	05:45		06:41 (114)
	17:22	34	16:49 (82)	18:06			19:46	20:27	21:05	25	06:51 (114)	21:31	5	06:46 (114)
20	08:12		08:52 (53)	07:33			07:41	06:43	05:59		06:27 (114)	05:45		06:42 (114)
	17:24	31	16:48 (82)	18:08			19:47	20:28	21:07	25	06:52 (114)	21:31	4	06:46 (114)
21	08:11		08:53 (53)	07:31			07:39	06:41	05:58		06:27 (114)	05:45		06:42 (114)
	17:25	27	16:48 (82)	18:09			19:48	20:30	21:08	25	06:52 (114)	21:31	4	06:46 (114)
22	08:11		08:54 (53)	07:29			07:37	06:39	05:57		06:27 (114)	05:45		06:43 (114)
	17:26	23	16:46 (82)	18:11			19:50	20:31	21:09	25	06:52 (114)	21:32	4	06:47 (114)
23	08:10		08:55 (53)	07:28			07:35	06:37	05:56		06:27 (114)	05:45		06:42 (114)
	17:28	14	09:09 (53)	18:12			19:51	20:32	21:10	25	06:52 (114)	21:32	5	06:47 (114)
24	08:09		08:57 (53)	07:26			07:33	06:36	05:55		06:27 (114)	05:46		06:42 (114)
	17:29	11	09:08 (53)	18:13			19:52	20:34	21:11	25	06:52 (114)	21:32	5	06:47 (114)
25	08:08		08:59 (53)	07:24			07:31	06:34	05:54		06:27 (114)	05:46		06:41 (114)
	17:31	6	09:05 (53)	18:15			19:54	20:35	21:12	25	06:52 (114)	21:32	7	06:48 (114)
26	08:07			07:22			07:29	06:32	05:54		06:27 (114)	05:46		06:42 (114)
	17:32			18:16			19:55	20:36	21:13	25	06:52 (114)	21:32	7	06:49 (114)
27	08:06			07:21			07:28	06:31	05:53		06:28 (114)	05:47		06:41 (114)
	17:33			18:18			19:56	20:38	21:14	24	06:52 (114)	21:32	8	06:49 (114)
28	08:05			07:19			07:26	06:29	05:52		06:28 (114)	05:47		06:41 (114)
	17:35			18:19			19:58	20:39	21:15	24	06:52 (114)	21:32	10	06:51 (114)
29	08:04						07:24	06:27	05:51		06:28 (114)	05:48		06:41 (114)
	17:36						19:59	20:40	21:16	23	06:51 (114)	21:32	10	06:51 (114)
30	08:03						07:22	06:26	05:51		06:29 (114)	05:48		06:41 (114)
	17:38						20:00	20:42	21:17	23	06:52 (114)	21:32	11	06:52 (114)
31	08:01						07:20		05:50		06:29 (114)			
	17:39						20:02		21:18	22	06:51 (114)			
Potential sun hours	282			289			368	406	463			471		
Total, worst case		693			21					480			331	
Sun reduction		0.54			0.50					0.68			0.71	
Oper. time red.		0.96			0.96					0.96			0.96	
Wind dir. red.		0.66			0.56					0.56			0.56	
Total reduction		0.35			0.27					0.37			0.39	
Total, real		242			6					179			129	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H06 - H06

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October		November			December		
1	05:49		06:40 (114)	06:18		06:42 (114)	06:56	07:34		07:17		16:53 (33)	07:58		08:29 (53)
	21:32	12	06:52 (114)	21:09	15	06:57 (114)	20:18	19:20		17:23	5	16:58 (33)	16:53	34	16:25 (82)
2	05:49		06:40 (114)	06:19		06:44 (114)	06:58	07:36		07:18		16:53 (33)	07:59		08:29 (53)
	21:32	13	06:53 (114)	21:07	10	06:54 (114)	20:16	19:18		17:22	4	16:57 (33)	16:53	33	16:24 (82)
3	05:50		06:39 (114)	06:20		06:48 (114)	06:59	07:37		07:19		16:53 (33)	08:00		08:31 (53)
	21:32	14	06:53 (114)	21:06	2	06:50 (114)	20:15	19:16		17:20	2	16:55 (33)	16:52	31	16:24 (82)
4	05:51		06:39 (114)	06:21			07:00	07:38		07:21			08:01		08:31 (53)
	21:31	16	06:55 (114)	21:05			20:13	19:14		17:19			16:52	30	16:24 (82)
5	05:51		06:39 (114)	06:23			07:01	07:39		07:22			08:02		08:31 (53)
	21:31	17	06:56 (114)	21:03			20:11	19:12		17:18			16:52	29	16:23 (82)
6	05:52		06:38 (114)	06:24			07:03	07:41		07:24			08:04		08:32 (53)
	21:31	18	06:56 (114)	21:02			20:09	19:10		17:16			16:51	27	16:23 (82)
7	05:53		06:38 (114)	06:25			07:04	07:42		07:25			08:05		08:33 (53)
	21:30	19	06:57 (114)	21:01			20:07	19:08		17:15			16:51	24	16:22 (82)
8	05:53		06:38 (114)	06:26			07:05	07:43		07:27			08:06		08:33 (53)
	21:30	19	06:57 (114)	20:59			20:05	19:06		17:14			16:51	24	16:22 (82)
9	05:54		06:37 (114)	06:27			07:06	07:45		07:28			08:07		08:34 (53)
	21:29	20	06:57 (114)	20:58			20:03	19:05		17:12			16:51	22	16:22 (82)
10	05:55		06:37 (114)	06:29			07:08	07:46		07:30			08:08		08:35 (53)
	21:29	21	06:58 (114)	20:56			20:01	19:03		17:11			16:51	20	16:22 (82)
11	05:56		06:37 (114)	06:30			07:09	07:47		07:31			08:09		08:35 (53)
	21:28	22	06:59 (114)	20:55			19:59	19:01		17:10			16:51	20	16:22 (82)
12	05:57		06:37 (114)	06:31			07:10	07:49		07:32			08:09		08:36 (53)
	21:28	22	06:59 (114)	20:53			19:57	18:57		17:09			16:51	19	16:22 (82)
13	05:58		06:37 (114)	06:32			07:11	07:50		07:34			08:10		08:37 (53)
	21:27	23	07:00 (114)	20:52			19:55	18:55		17:07			16:51	16	08:53 (53)
14	05:58		06:37 (114)	06:34			07:13	07:51		07:35			08:11		08:38 (53)
	21:27	24	07:01 (114)	20:50			19:53	18:53		17:06			16:51	16	08:54 (53)
15	05:59		06:36 (114)	06:35			07:14	07:53		07:37			08:12		08:39 (53)
	21:26	24	07:00 (114)	20:48			19:51	18:52		17:05			16:51	15	08:54 (53)
16	06:00		06:36 (114)	06:36			07:15	07:54		07:38			08:13		08:39 (53)
	21:25	25	07:01 (114)	20:47			19:49	18:50		17:04			16:51	14	08:53 (53)
17	06:01		06:36 (114)	06:37			07:16	07:56		07:39		08:33 (53)	08:13		08:40 (53)
	21:24	25	07:01 (114)	20:45			19:47	18:48		17:03	6	08:39 (53)	16:52	14	08:54 (53)
18	06:02		06:36 (114)	06:39			07:18	07:57		07:41		08:31 (53)	08:14		08:41 (53)
	21:24	25	07:01 (114)	20:43			19:45	18:46		17:02	11	08:42 (53)	16:52	14	08:55 (53)
19	06:03		06:36 (114)	06:40			07:19	07:58		07:42		08:30 (53)	08:15		08:41 (53)
	21:23	26	07:02 (114)	20:42			19:44	18:45		17:01	14	08:44 (53)	16:52	13	08:54 (53)
20	06:04		06:36 (114)	06:41			07:20	08:00		07:44		08:29 (53)	08:15		08:42 (53)
	21:22	26	07:02 (114)	20:40			19:42	18:43		17:00	23	16:21 (82)	16:53	13	08:55 (53)
21	06:05		06:36 (114)	06:42			07:21	08:01		07:45		08:29 (53)	08:16		08:42 (53)
	21:21	26	07:02 (114)	20:38			19:40	18:41		16:59	27	16:24 (82)	16:53	13	08:55 (53)
22	06:06		06:36 (114)	06:44			07:23	08:02		07:46		08:28 (53)	08:16		08:43 (53)
	21:20	26	07:02 (114)	20:37			19:38	18:39		16:59	31	16:24 (82)	16:54	13	08:56 (53)
23	06:07		06:37 (114)	06:45			07:24	08:04		07:48		08:27 (53)	08:17		08:43 (53)
	21:19	25	07:02 (114)	20:35			19:36	18:38		16:58	34	16:25 (82)	16:54	13	08:56 (53)
24	06:09		06:37 (114)	06:46			07:25	08:05		07:49		08:28 (53)	08:17		08:44 (53)
	21:18	25	07:02 (114)	20:33			19:34	18:36		16:57	34	16:26 (82)	16:55	13	08:57 (53)
25	06:10		06:37 (114)	06:47			07:26	08:07		07:50		08:27 (53)	08:18		08:44 (53)
	21:17	24	07:01 (114)	20:31			19:32	18:34		16:56	37	16:27 (82)	16:55	14	08:58 (53)
26	06:11		06:37 (114)	06:49			07:28	08:08		07:52		08:28 (53)	08:18		08:44 (53)
	21:16	24	07:01 (114)	20:29			19:30	18:33		16:56	38	16:28 (82)	16:56	14	08:58 (53)
27	06:12		06:38 (114)	06:50			07:29	08:09		07:53		08:28 (53)	08:18		08:44 (53)
	21:15	23	07:01 (114)	20:28			19:28	18:31		16:55	37	16:27 (82)	16:57	14	08:58 (53)
28	06:13		06:39 (114)	06:51			07:30	08:11		07:54		08:28 (53)	08:19		08:45 (53)
	21:14	22	07:01 (114)	20:26			19:26	18:30		16:54	36	16:26 (82)	16:57	15	09:00 (53)
29	06:14		06:40 (114)	06:52			07:32	08:12		07:55		08:29 (53)	08:19		08:45 (53)
	21:12	20	07:00 (114)	20:24			19:24	18:28		16:54	35	16:26 (82)	16:58	15	09:00 (53)
30	06:15		06:40 (114)	06:54			07:33	08:14		07:57		08:29 (53)	08:19		08:45 (53)
	21:11	19	06:59 (114)	20:22			19:22	18:26	6	18:01 (33)	16:53	35	16:26 (82)	16:59	16	09:01 (53)
31	06:17		06:41 (114)	06:55				08:15		17:54 (33)				08:19		08:45 (53)
	21:10	17	06:58 (114)	20:20				18:25	6	18:00 (33)				17:00	19	16:31 (82)
Potential sun hours	477			439			378	339			284			270		
Total, worst case		662			27				12			409			587	
Sun reduction		0.76			0.73				0.52			0.42			0.42	
Oper. time red.		0.96			0.96				0.96			0.96			0.96	
Wind dir. red.		0.56			0.56				0.56			0.65			0.69	
Total reduction		0.42			0.40				0.28			0.27			0.29	
Total, real		276			11				3			110			168	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H07 - H07

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January		February		March		April		May	June
1	08:20		08:00		07:17		07:18	07:48 (31)	06:25	05:49
	17:01		17:41		18:21		20:03	18 08:06 (31)	20:43	21:19
2	08:20		07:59	08:22 (30)	07:15		07:16	07:49 (31)	06:23	05:49
	17:02		17:43	2 08:24 (30)	18:22		20:05	15 08:04 (31)	20:44	21:20
3	08:20		07:58	08:21 (30)	07:14		07:14	07:50 (31)	06:21	05:48
	17:03		17:44	3 08:24 (30)	18:24		20:06	12 08:02 (31)	20:46	21:21
4	08:19		07:57	08:19 (30)	07:12		07:12	07:52 (31)	06:20	05:48
	17:04		17:46	3 08:22 (30)	18:25		20:07	7 07:59 (31)	20:47	21:22
5	08:19		07:55	08:18 (30)	07:10		07:10		06:18	05:47
	17:05		17:47	3 08:21 (30)	18:27		20:09		20:48	21:23
6	08:19		07:54		07:08		07:08		06:17	05:47
	17:06		17:49		18:28		20:10		20:50	21:24
7	08:19		07:53		07:06		07:07		06:16	05:46
	17:07		17:50		18:29		20:11		20:51	21:24
8	08:19		07:51		08:04		07:05		06:14	05:46
	17:08		17:52		18:31		20:13		20:52	21:25
9	08:18		07:50		08:02		07:03		06:13	05:46
	17:10		17:53		19:32		20:14		20:53	21:26
10	08:18	08:43 (23)	07:48		08:01		07:01		06:11	05:46
	17:11	2 08:45 (23)	17:54		19:34		20:15		20:55	21:26
11	08:18	08:42 (23)	07:47		07:59		06:59		06:10	05:45
	17:12	3 08:45 (23)	17:56		19:35		20:17		20:56	21:27
12	08:17	08:42 (23)	07:46		07:57		06:57		06:09	05:45
	17:13	5 08:47 (23)	17:57		19:36		20:18		20:57	21:28
13	08:17	08:41 (23)	07:44		07:55		06:55		06:08	05:45
	17:14	6 08:47 (23)	17:59		19:38		20:19		20:58	21:28
14	08:16	08:41 (23)	07:42		07:53		06:54		06:06	05:45
	17:16	7 08:48 (23)	18:00		19:39		20:21		21:00	21:29
15	08:16	08:40 (23)	07:41		07:51		06:52		06:05	05:45
	17:17	8 08:48 (23)	18:00		19:40		20:22		21:01	21:29
16	08:15	08:39 (23)	07:39		07:49		06:50		06:04	05:45
	17:18	10 08:49 (23)	18:02		19:42		20:23		21:02	21:30
17	08:15	08:39 (23)	07:38		07:47		06:48		06:03	05:45
	17:20	11 08:50 (23)	18:03		19:43		20:25		21:03	21:30
18	08:14	08:38 (23)	07:36		07:45		06:46		06:02	05:45
	17:21	12 08:50 (23)	18:05		19:45		20:26		21:04	21:31
19	08:13	08:37 (23)	07:34		07:43		06:45		06:01	05:45
	17:22	13 08:50 (23)	18:06		19:46		20:27		21:06	21:31
20	08:12	08:37 (23)	07:33		07:41		06:43		05:59	05:45
	17:24	12 08:49 (23)	18:08		19:47		20:29		21:07	21:31
21	08:12	08:37 (23)	07:31		07:39		06:41		05:58	05:45
	17:25	12 08:49 (23)	18:09		19:49		20:30		21:08	21:32
22	08:11	08:38 (23)	07:29		07:37		06:39		05:57	05:45
	17:26	10 08:48 (23)	18:11		19:50		20:31		21:09	21:32
23	08:10	08:40 (23)	07:28		07:35	07:56 (31)	06:38		05:56	05:46
	17:28	7 08:47 (23)	18:12		19:51	8 08:04 (31)	20:33		21:10	21:32
24	08:09	08:43 (23)	07:26		07:34	07:54 (31)	06:36		05:56	05:46
	17:29	2 08:45 (23)	18:14		19:53	12 08:06 (31)	20:34		21:11	21:32
25	08:08		07:24		07:32	07:52 (31)	06:34		05:55	05:46
	17:31		18:15		19:54	15 08:07 (31)	20:35		21:12	21:32
26	08:07		07:23		07:30	07:50 (31)	06:33		05:54	05:47
	17:32		18:17		19:55	17 08:07 (31)	20:37		21:13	21:32
27	08:06		07:21		07:28	07:48 (31)	06:31		05:53	05:47
	17:34		18:18		19:57	20 08:08 (31)	20:38		21:14	21:32
28	08:05		07:19		07:26	07:47 (31)	06:29		05:52	05:47
	17:35		18:19		19:58	21 08:08 (31)	20:39		21:15	21:32
29	08:04				07:24	07:48 (31)	06:28		05:51	05:48
	17:37				19:59	20 08:08 (31)	20:40		21:16	21:32
30	08:03				07:22	07:48 (31)	06:26		05:51	05:48
	17:38				20:01	20 08:08 (31)	20:42		21:17	21:32
31	08:02				07:20	07:48 (31)			05:50	
	17:40				20:02	19 08:07 (31)			21:18	
Potential sun hours	282		289		368		406		463	471
Total, worst case		120		11		152		52		
Sun reduction		0.54		0.50		0.63		0.59		
Oper. time red.		0.96		0.96		0.96		0.96		
Wind dir. red.		0.71		0.70		0.62		0.62		
Total reduction		0.37		0.34		0.38		0.36		
Total, real		45		4		58		19		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H07 - H07

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October		November		December	
1	05:49		06:18		06:56		07:34		07:17		07:58	08:24 (23)
	21:32		21:09		20:19		19:20		17:24		16:53	3 08:27 (23)
2	05:50		06:19		06:58		07:36		07:18		07:59	08:26 (23)
	21:32		21:08		20:17		19:18		17:22		16:53	2 08:28 (23)
3	05:50		06:20		06:59		07:37		07:20		08:00	08:27 (23)
	21:32		21:06		20:15		19:16		17:21		16:52	2 08:28 (23)
4	05:51		06:22		07:00		07:38		07:21		08:02	
	21:32		21:05		20:13		19:14		17:19		16:52	
5	05:51		06:23		07:01		07:40		07:23		08:03	
	21:31		21:04		20:11		19:12		17:18		16:52	
6	05:52		06:24		07:03		07:41		07:24	07:48 (30)	08:04	
	21:31		21:02		20:09		19:10		17:16	3 07:51 (30)	16:51	
7	05:53		06:25		07:04		07:42		07:25	07:50 (30)	08:05	
	21:31		21:01		20:07		19:09		17:15	3 07:53 (30)	16:51	
8	05:54		06:26		07:05	07:46 (31)	07:44		07:27	07:51 (30)	08:06	
	21:30		20:59		20:05	7 07:53 (31)	19:07		17:14	2 07:53 (30)	16:51	
9	05:54		06:28		07:07	07:44 (31)	07:45		07:28	07:53 (30)	08:07	
	21:30		20:58		20:03	12 07:56 (31)	19:05		17:13	2 07:54 (30)	16:51	
10	05:55		06:29		07:08	07:42 (31)	07:46		07:30		08:08	
	21:29		20:56		20:01	15 07:57 (31)	19:03		17:11		16:51	
11	05:56		06:30		07:09	07:40 (31)	07:48		07:31		08:09	
	21:29		20:55		19:59	18 07:58 (31)	19:01		17:10		16:51	
12	05:57		06:31		07:10	07:39 (31)	07:49		07:33		08:10	
	21:28		20:53		19:57	19 07:58 (31)	18:57		17:09		16:51	
13	05:58		06:33		07:12	07:38 (31)	07:50		07:34		08:10	
	21:27		20:52		19:56	20 07:58 (31)	18:55		17:08		16:51	
14	05:59		06:34		07:13	07:38 (31)	07:52		07:35		08:11	
	21:27		20:50		19:54	20 07:58 (31)	18:54		17:07		16:51	
15	06:00		06:35		07:14	07:37 (31)	07:53		07:37		08:12	
	21:26		20:49		19:52	21 07:58 (31)	18:52		17:05		16:51	
16	06:01		06:36		07:15	07:37 (31)	07:54		07:38		08:13	
	21:25		20:47		19:50	20 07:57 (31)	18:50		17:04		16:52	
17	06:01		06:38		07:17	07:38 (31)	07:56		07:40		08:14	
	21:25		20:45		19:48	18 07:56 (31)	18:48		17:03		16:52	
18	06:02		06:39		07:18	07:40 (31)	07:57		07:41	08:17 (23)	08:14	
	21:24		20:44		19:46	15 07:55 (31)	18:46		17:02	2 08:19 (23)	16:52	
19	06:03		06:40		07:19	07:41 (31)	07:58		07:42	08:15 (23)	08:15	
	21:23		20:42		19:44	13 07:54 (31)	18:45		17:01	7 08:22 (23)	16:53	
20	06:05		06:41		07:20	07:42 (31)	08:00		07:44	08:13 (23)	08:16	
	21:22		20:40		19:42	9 07:51 (31)	18:43		17:01	10 08:23 (23)	16:53	
21	06:06		06:43		07:22		08:01		07:45	08:13 (23)	08:16	
	21:21		20:38		19:40		18:41		17:00	12 08:25 (23)	16:53	
22	06:07		06:44		07:23		08:03		07:47	08:13 (23)	08:17	
	21:20		20:37		19:38		18:40		16:59	12 08:25 (23)	16:54	
23	06:08		06:45		07:24		08:04		07:48	08:14 (23)	08:17	
	21:19		20:35		19:36		18:38		16:58	13 08:27 (23)	16:54	
24	06:09		06:46		07:25		08:05		07:49	08:15 (23)	08:18	
	21:18		20:33		19:34		18:36		16:57	12 08:27 (23)	16:55	
25	06:10		06:48		07:27		08:07		07:51	08:16 (23)	08:18	
	21:17		20:31		19:32		18:35		16:57	11 08:27 (23)	16:56	
26	06:11		06:49		07:28		08:08		07:52	08:18 (23)	08:18	
	21:16		20:30		19:30		18:33		16:56	10 08:28 (23)	16:56	
27	06:12		06:50		07:29		08:10		07:53	08:19 (23)	08:19	
	21:15		20:28		19:28		18:31		16:55	9 08:28 (23)	16:57	
28	06:13		06:51		07:31		08:11		07:54	08:21 (23)	08:19	
	21:14		20:26		19:26		18:30		16:55	7 08:28 (23)	16:58	
29	06:14		06:53		07:32		08:12		07:56	08:22 (23)	08:19	
	21:13		20:24		19:24		18:28		16:54	6 08:28 (23)	16:58	
30	06:16		06:54		07:33		08:14		07:57	08:23 (23)	08:19	
	21:11		20:22		19:22		18:27		16:54	5 08:28 (23)	16:59	
31	06:17		06:55				08:15				08:19	
	21:10		20:20				18:25				17:00	
Potential sun hours	477		439		378		339		284		270	
Total, worst case						207				126		7
Sun reduction						0.69				0.42		0.42
Oper. time red.						0.96				0.96		0.96
Wind dir. red.						0.62				0.71		0.71
Total reduction						0.42				0.29		0.29
Total, real						86				37		2

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H08 - H08

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	08:19			08:00		08:23 (57)	07:17		17:02 (77)	07:18			06:24		06:49 (56)	05:49		06:29 (55)
	17:01			17:41	16	08:39 (57)	18:21	28	17:30 (77)	20:03			20:43	20	07:09 (56)	21:19	27	06:56 (55)
2	08:19			07:59		08:22 (57)	07:15		17:03 (77)	07:16			06:23		06:49 (56)	05:49		06:30 (55)
	17:02			17:42	17	08:39 (57)	18:22	26	17:29 (77)	20:04			20:44	25	20:19 (53)	21:20	27	06:57 (55)
3	08:19			07:58		08:20 (57)	07:13		17:04 (77)	07:14			06:21		06:50 (56)	05:48		06:30 (55)
	17:03			17:44	19	08:39 (57)	18:23	23	17:27 (77)	20:06			20:45	28	20:21 (53)	21:21	26	06:56 (55)
4	08:19			07:56		08:21 (57)	07:11		17:07 (77)	07:12			06:20		06:51 (56)	05:48		06:31 (55)
	17:04			17:45	18	08:39 (57)	18:25	19	17:26 (77)	20:07			20:47	30	20:23 (53)	21:22	25	06:56 (55)
5	08:19			07:55		08:22 (57)	07:10		17:10 (77)	07:10			06:18		06:51 (56)	05:47		06:32 (55)
	17:05			17:47	18	08:40 (57)	18:26	13	17:23 (77)	20:08			20:48	29	20:23 (53)	21:22	25	06:57 (55)
6	08:19			07:54		08:22 (57)	07:08			07:08			06:17		06:52 (56)	05:47		06:31 (55)
	17:06			17:48	17	08:39 (57)	18:28			20:10			20:49	30	20:25 (53)	21:23	25	06:56 (55)
7	08:19			07:52		08:23 (57)	07:06			07:06			06:15		06:53 (56)	05:46		06:32 (55)
	17:07			17:50	16	08:39 (57)	18:29			20:11			20:51	28	20:25 (53)	21:24	24	06:56 (55)
8	08:18			07:51		08:23 (57)	08:04			07:04		07:25 (109)	06:14		06:55 (56)	05:46		06:33 (55)
	17:08			17:51	14	08:37 (57)	18:31			20:12	2	07:27 (109)	20:52	26	20:27 (53)	21:25	23	06:56 (55)
9	08:18			07:50		08:25 (57)	08:02			07:03		07:23 (109)	06:13		20:07 (53)	05:46		06:33 (55)
	17:09			17:53	11	08:36 (57)	19:32			20:14	5	07:28 (109)	20:53	20	20:27 (53)	21:25	22	06:55 (55)
10	08:18			07:48		08:27 (57)	08:00			07:01		07:21 (109)	06:11		06:39 (55)	05:45		06:33 (55)
	17:11			17:54	6	08:33 (57)	19:33			20:15	7	07:28 (109)	20:54	27	20:27 (53)	21:26	22	06:55 (55)
11	08:17			07:47			07:58			06:59		07:20 (109)	06:10		06:35 (55)	05:45		06:34 (55)
	17:12			17:56			19:35			20:16	8	07:28 (109)	20:56	32	20:26 (53)	21:27	22	06:56 (55)
12	08:17			07:45		17:11 (77)	07:56			06:57		07:18 (109)	06:09		06:34 (55)	05:45		06:35 (55)
	17:13			17:57	13	17:24 (77)	19:36			20:18	9	07:27 (109)	20:57	35	20:26 (53)	21:27	21	06:56 (55)
13	08:17			07:44		17:09 (77)	07:55			06:55		07:17 (109)	06:07		06:32 (55)	05:45		06:35 (55)
	17:14			17:59	18	17:27 (77)	19:37			20:19	11	19:56 (51)	20:58	38	20:26 (53)	21:28	21	06:56 (55)
14	08:16			07:42		17:07 (77)	07:53			06:53		07:18 (109)	06:06		06:31 (55)	05:45		06:36 (55)
	17:15			18:00	21	17:28 (77)	19:39			20:20	9	19:57 (51)	20:59	40	20:26 (53)	21:29	20	06:56 (55)
15	08:15			07:41		17:05 (77)	07:51			06:51		07:12 (59)	06:05		06:31 (55)	05:45		06:36 (55)
	17:17			18:00	25	17:30 (77)	19:40			20:22	7	19:58 (51)	21:01	39	20:25 (53)	21:29	20	06:56 (55)
16	08:15			07:39		17:04 (77)	07:49			06:50		07:11 (59)	06:04		06:30 (55)	05:45		06:37 (55)
	17:18			18:02	27	17:31 (77)	19:42			20:23	9	20:00 (51)	21:02	39	20:25 (53)	21:29	19	06:56 (55)
17	08:14			07:37		17:03 (77)	07:47			06:48		07:09 (59)	06:02		06:29 (55)	05:45		06:37 (55)
	17:19			18:03	29	17:32 (77)	19:43			20:24	9	07:18 (59)	21:03	38	20:23 (53)	21:30	19	06:56 (55)
18	08:14			07:36		17:03 (77)	07:45			06:46		07:07 (59)	06:01		06:28 (55)	05:45		06:37 (55)
	17:21			18:05	30	17:33 (77)	19:44			20:26	11	07:18 (59)	21:04	38	20:22 (53)	21:30	19	06:56 (55)
19	08:13			07:34		17:02 (77)	07:43			06:44		07:05 (59)	06:00		06:28 (55)	05:45		06:37 (55)
	17:22			18:06	32	17:34 (77)	19:46			20:27	13	07:18 (59)	21:05	34	20:20 (53)	21:31	19	06:56 (55)
20	08:12		16:54 (48)	07:33		17:01 (77)	07:41			06:43		07:04 (59)	05:59		06:28 (55)	05:45		06:37 (55)
	17:23	2	16:55 (48)	18:08	33	17:34 (77)	19:47			20:28	16	20:05 (49)	21:06	27	06:55 (55)	21:31	19	06:56 (55)
21	08:11		16:54 (48)	07:31		17:00 (77)	07:39			06:41		07:03 (59)	05:58		06:28 (55)	05:45		06:38 (55)
	17:25	3	16:57 (48)	18:09	34	17:34 (77)	19:48			20:30	18	20:06 (49)	21:08	29	06:57 (55)	21:31	18	06:56 (55)
22	08:10		16:54 (48)	07:29		17:01 (77)	07:37			06:39		07:03 (59)	05:57		06:28 (55)	05:45		06:38 (55)
	17:26	4	16:58 (48)	18:11	33	17:34 (77)	19:50			20:31	19	20:07 (49)	21:09	29	06:57 (55)	21:31	19	06:57 (55)
23	08:10		16:54 (48)	07:27		17:00 (77)	07:35			06:37		07:00 (56)	05:56		06:28 (55)	05:45		06:38 (55)
	17:28	6	17:00 (48)	18:12	34	17:34 (77)	19:51			20:32	20	20:09 (49)	21:10	29	06:57 (55)	21:32	19	06:57 (55)
24	08:09		16:54 (48)	07:26		17:00 (77)	07:33			06:36		06:57 (56)	05:55		06:28 (55)	05:46		06:38 (55)
	17:29	7	17:01 (48)	18:13	34	17:34 (77)	19:52			20:34	25	20:10 (49)	21:11	29	06:57 (55)	21:32	19	06:57 (55)
25	08:08		16:54 (48)	07:24		17:00 (77)	07:31			06:34		06:55 (56)	05:54		06:28 (55)	05:46		06:38 (55)
	17:31	9	17:03 (48)	18:15	33	17:33 (77)	19:54			20:35	23	20:11 (49)	21:12	29	06:57 (55)	21:32	19	06:57 (55)
26	08:07		16:55 (48)	07:22		17:01 (77)	07:29			06:32		06:54 (56)	05:54		06:28 (55)	05:46		06:39 (55)
	17:32	10	17:05 (48)	18:16	32	17:33 (77)	19:55			20:36	27	20:13 (49)	21:13	28	06:56 (55)	21:32	19	06:58 (55)
27	08:06		08:29 (57)	07:20		17:01 (77)	07:27			06:31		06:52 (56)	05:53		06:29 (55)	05:47		06:38 (55)
	17:33	13	17:06 (48)	18:18	32	17:33 (77)	19:56			20:38	28	20:13 (49)	21:14	28	06:57 (55)	21:32	20	06:58 (55)
28	08:05		08:28 (57)	07:19		17:02 (77)	07:25			06:29		06:51 (56)	05:52		06:29 (55)	05:47		06:39 (55)
	17:35	17	17:07 (48)	18:19	30	17:32 (77)	19:58			20:39	28	20:12 (49)	21:15	28	06:57 (55)	21:32	20	06:59 (55)
29	08:04		08:27 (57)				07:24			06:27		06:50 (56)	05:51		06:28 (55)	05:48		06:38 (55)
	17:36	17	17:06 (48)				19:59			20:40	24	20:09 (49)	21:16	29	06:57 (55)	21:32	21	06:59 (55)
30	08:02		08:25 (57)				07:22			06:26		06:49 (56)	05:51		06:29 (55)	05:48		06:39 (55)
	17:38	14	17:02 (48)				20:00			20:41	19	07:08 (56)	21:17	28	06:57 (55)	21:32	21	07:00 (55)
31	08:01		08:24 (57)				07:20						05:50		06:29 (55)			
	17:39	14	08:38 (57)				20:02						21:18	28	06:57 (55)			
Potential sun hours	282			289			368			406			463			471		
Total, worst case	116			642			109			347			937			640		
Sun reduction	0.54			0.50			0.63			0.59			0.68			0.71		
Oper. time red.	0.96			0.96			0.96			0.96			0.96			0.96		
Wind dir. red.	0.61			0.59			0.56			0.59			0.59			0.56		
Total reduction	0.32			0.28			0.34			0.34			0.39			0.38		
Total, real	37			182			37			116			364			246		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H08 - H08

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October		November		December
1	05:49 - 21:32	22	06:38 (55) - 07:00 (55)	34	06:18 - 20:37 (53)	8	06:45 (55) - 07:27 (109)		06:56 - 19:20		07:19 (109) - 07:34 - 07:16 - 07:56 (57) - 07:58
2	05:49 - 21:32	21	06:39 (55) - 07:00 (55)	32	06:19 - 20:37 (53)	7	06:46 (55) - 07:27 (109)		06:57 - 19:18		07:20 (109) - 07:35 - 07:18 - 07:55 (57) - 07:59
3	05:50 - 21:31	22	06:38 (55) - 07:00 (55)	32	06:20 - 20:37 (53)	7	06:50 (55) - 07:27 (109)		06:59 - 19:16		07:21 (109) - 07:37 - 07:19 - 07:53 (57) - 08:00
4	05:51 - 21:31	23	06:38 (55) - 07:01 (55)	24	06:21 - 20:37 (53)	5	07:00 - 07:26 (109)		07:00 - 19:14		07:22 (109) - 07:38 - 07:20 - 07:52 (57) - 08:01
5	05:51 - 21:31	23	06:39 (55) - 07:02 (55)	20	06:23 - 20:37 (53)	2	07:01 - 07:24 (109)		07:01 - 19:12		07:39 - 07:22 - 07:18 - 07:51 (57) - 08:02
6	05:52 - 21:31	24	06:38 (55) - 07:02 (55)	29	06:24 - 20:36 (53)		07:03 (56) - 07:05 - 19:10		07:02 - 19:08		07:41 - 07:24 - 07:16 - 07:51 (57) - 08:03
7	05:53 - 21:30	25	06:38 (55) - 07:03 (55)	30	06:25 - 20:34 (53)		07:01 (56) - 07:04 - 19:08		07:04 - 19:06		07:42 - 07:25 - 07:15 - 07:51 (57) - 08:04
8	05:53 - 21:30	25	06:38 (55) - 07:03 (55)	29	06:26 - 20:32 (53)		07:00 (56) - 07:05 - 19:06		07:05 - 19:04		07:43 - 07:27 - 07:14 - 07:51 (57) - 08:04
9	05:54 - 21:29	26	06:37 (55) - 07:03 (55)	29	06:27 - 20:31 (53)		06:59 (56) - 07:06 - 19:05		07:06 - 19:03		07:45 - 07:28 - 07:13 - 07:52 (57) - 08:05
10	05:55 - 21:29	27	06:37 (55) - 07:04 (55)	28	06:29 - 20:29 (53)		06:58 (56) - 07:07 - 19:03		07:07 - 19:01		07:46 - 07:29 - 07:11 - 07:52 (57) - 08:06
11	05:56 - 21:28	26	06:38 (55) - 07:04 (55)	25	06:30 - 20:29 (53)		06:59 (56) - 07:09 - 19:01		07:08 - 18:59		07:47 - 07:31 - 07:09 - 07:51 (57) - 08:06
12	05:57 - 21:28	27	06:38 (55) - 07:05 (55)	19	06:31 - 20:53		06:58 (56) - 07:10 - 18:57		07:09 - 18:57		07:49 - 07:32 - 07:08 - 07:51 (57) - 08:07
13	05:58 - 21:27	27	06:38 (55) - 07:05 (55)	19	06:32 - 20:51		06:58 (56) - 07:11 - 18:55		07:10 - 18:55		07:50 - 07:34 - 07:06 - 07:51 (57) - 08:08
14	05:58 - 21:27	28	06:38 (55) - 07:06 (55)	25	06:34 - 20:50		06:58 (56) - 07:13 - 18:53		07:11 - 18:53		07:51 - 07:35 - 07:05 - 08:00 (57) - 08:11
15	05:59 - 21:26	28	06:37 (55) - 07:05 (55)	28	06:35 - 20:48		06:58 (56) - 07:14 - 18:52		07:12 - 18:52		07:53 - 07:37 - 07:04 - 08:02 (57) - 08:12
16	06:00 - 21:25	29	06:37 (55) - 07:06 (55)	28	06:36 - 20:47		07:00 (56) - 07:15 - 18:50		07:13 - 18:50		07:54 - 07:38 - 07:03 - 08:13
17	06:01 - 21:24	29	06:37 (55) - 07:06 (55)	26	06:37 - 20:45		07:01 (56) - 07:16 - 18:48		07:14 - 18:48		07:55 - 07:39 - 07:02 - 08:13
18	06:02 - 21:24	29	06:37 (55) - 07:06 (55)	22	06:39 - 20:43		07:02 (56) - 07:18 - 18:46		07:15 - 18:46		07:57 - 07:41 - 07:01 - 08:14
19	06:03 - 21:23	29	06:37 (55) - 07:06 (55)	25	06:40 - 20:42		07:03 (56) - 07:19 - 18:44		07:16 - 18:44		07:58 - 07:42 - 07:00 - 08:15
20	06:04 - 21:22	28	06:38 (55) - 07:06 (55)	19	06:41 - 20:40		07:10 (59) - 07:20 - 18:43		07:17 - 18:43		08:00 - 07:43 - 06:59 - 08:16
21	06:05 - 21:21	28	06:38 (55) - 07:06 (55)	20	06:42 - 20:38		07:09 (59) - 07:21 - 18:41		07:18 - 18:41		08:01 - 07:45 - 06:58 - 08:17
22	06:06 - 21:20	28	06:38 (55) - 07:06 (55)	18	06:44 - 20:36		07:08 (59) - 07:23 - 18:39		07:19 - 18:39		08:02 - 07:46 - 06:57 - 08:17
23	06:07 - 21:19	28	06:38 (55) - 07:06 (55)	16	06:45 - 20:35		07:08 (59) - 07:24 - 18:38		07:20 - 18:38		08:04 - 07:48 - 06:56 - 08:17
24	06:09 - 21:18	31	06:38 (55) - 07:06 (55)	12	06:46 - 20:33		07:09 (59) - 07:25 - 18:36		07:21 - 18:36		08:05 - 07:49 - 06:55 - 08:17
25	06:10 - 21:17	34	06:39 (55) - 07:06 (55)	11	06:47 - 20:31		07:10 (59) - 07:26 - 18:34		07:21 (59) - 19:32		08:07 - 07:50 - 06:54 - 08:18
26	06:11 - 21:16	38	06:39 (55) - 07:06 (55)	9	06:49 - 20:29		07:11 (59) - 07:28 - 18:33		07:28 - 18:33		08:08 - 07:52 - 06:53 - 08:18
27	06:12 - 21:15	39	06:39 (55) - 07:06 (55)	9	06:50 - 20:28		07:13 (59) - 07:29 - 18:31		07:30 - 18:31		08:09 - 07:53 - 06:52 - 08:18
28	06:13 - 21:14	40	06:41 (55) - 07:06 (55)	7	06:51 - 20:26		07:14 (59) - 07:30 - 18:29		07:31 - 18:29		08:11 - 07:54 - 06:51 - 08:19
29	06:14 - 21:12	39	06:42 (55) - 07:06 (55)	9	06:52 - 20:24		07:19 (109) - 07:32 - 18:28		07:33 - 18:28		08:12 - 07:55 - 06:50 - 08:19
30	06:15 - 21:11	39	06:42 (55) - 07:06 (55)	11	06:54 - 20:22		07:17 (109) - 07:33 - 18:26		07:34 - 18:26		08:14 - 07:57 - 06:49 - 08:19
31	06:17 - 21:10	38	06:43 (55) - 07:06 (55)	9	06:55 - 20:20		07:18 (109) - 07:27 (109)		07:35 - 18:25		08:15 - 07:59 - 06:48 - 08:19
Potential sun hours	477		439		378		339		284		270
Total, worst case	900		649		22		614		267		
Sun reduction	0.76		0.73		0.69		0.52		0.42		
Oper. time red.	0.96		0.96		0.96		0.96		0.96		
Wind dir. red.	0.57		0.60		0.59		0.56		0.66		
Total reduction	0.42		0.42		0.39		0.28		0.27		
Total, real	377		275		9		172		72		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H09 - H09

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	08:19			08:00			07:17			17:56 (111)	07:18			06:24			06:46 (60)	05:49	
	17:01			17:41			18:21	2		17:58 (111)	20:03			20:43	37		19:48 (57)	21:19	
2	08:19			07:59			07:15			17:55 (111)	07:16			06:23			06:44 (60)	05:49	
	17:02			17:42			18:22	5		18:00 (111)	20:04			20:44	36		19:46 (57)	21:20	
3	08:19			07:58			07:13			17:55 (111)	07:14			06:21			06:43 (60)	05:48	
	17:03			17:44			18:23	6		18:01 (111)	20:06			20:45	37		19:46 (57)	21:21	
4	08:19			07:56			07:11			17:56 (111)	07:12			06:20			06:42 (60)	05:48	
	17:04			17:45			18:25	7		18:03 (111)	20:07			20:47	36		19:45 (57)	21:22	
5	08:19			07:55			07:09			17:56 (111)	07:10			06:18			06:40 (60)	05:47	
	17:05			17:47			18:26	9		18:05 (111)	20:08			20:48	35		19:43 (57)	21:22	
6	08:19			07:54			07:08			17:57 (111)	07:08			06:17			06:41 (60)	05:47	
	17:06			17:48			18:28	6		18:03 (111)	20:10			20:49	29		19:41 (57)	21:23	
7	08:19			07:52			07:06				07:06			06:15			06:41 (60)	05:46	
	17:07			17:50			18:29				20:11			20:50	23		19:38 (57)	21:24	
8	08:18			07:51			08:04				07:04			06:14			06:42 (60)	05:46	
	17:08			17:51			18:30				20:12			20:52	10		06:52 (60)	21:25	
9	08:18			07:50			08:02				07:02			06:12			06:39 (80)	05:46	
	17:09			17:53			19:32				20:14			20:53	12		06:51 (60)	21:25	
10	08:18			07:48			08:00				07:01			06:11			06:37 (80)	05:45	
	17:10			17:54			19:33				20:15			20:54	13		06:50 (60)	21:26	
11	08:17			07:47			07:58				06:59			06:10			06:35 (80)	05:45	
	17:12			17:56			19:35				20:16			20:56	14		06:49 (80)	21:27	
12	08:17			07:45			07:56				06:57		19:31 (57)	06:09			06:34 (80)	05:45	
	17:13			17:57			19:36				20:18	13	19:44 (57)	20:57	16		06:50 (80)	21:27	
13	08:16			07:44			07:54				06:55		19:27 (57)	06:07			06:34 (80)	05:45	06:22 (86)
	17:14			17:59			19:37				20:19	19	19:46 (57)	20:58	17		06:51 (80)	21:28	6 06:28 (86)
14	08:16			07:42			07:53				06:53		19:25 (57)	06:06			06:33 (80)	05:45	06:22 (86)
	17:15			18:00			19:39				20:20	22	19:47 (57)	20:59	18		06:51 (80)	21:28	7 06:29 (86)
15	08:15			07:41			07:51				06:51		19:23 (57)	06:05			06:33 (80)	05:45	06:21 (86)
	17:17			18:00			19:40				20:22	28	19:58 (77)	21:00	19		06:52 (80)	21:29	9 06:30 (86)
16	08:15			07:39			07:49				06:50		19:22 (57)	06:04			06:32 (80)	05:44	06:21 (86)
	17:18			18:02			19:41				20:23	30	20:00 (77)	21:02	19		06:51 (80)	21:29	10 06:31 (86)
17	08:14			07:37			07:47				06:48		19:21 (57)	06:02			06:32 (80)	05:44	06:21 (86)
	17:19			18:03			19:43				20:24	32	20:01 (77)	21:03	19		06:51 (80)	21:30	10 06:31 (86)
18	08:14			07:36			07:45				06:46		19:19 (57)	06:01			06:32 (80)	05:45	06:21 (86)
	17:21			18:05			19:44				20:26	32	19:51 (57)	21:04	19		06:51 (80)	21:30	11 06:32 (86)
19	08:13			07:34			07:43				06:44		19:18 (57)	06:00			06:32 (80)	05:45	06:21 (86)
	17:22			18:06			19:46				20:27	33	19:51 (57)	21:05	19		06:51 (80)	21:31	11 06:32 (86)
20	08:12			07:32		17:41 (76)	07:41				06:42		19:18 (57)	05:59			06:32 (80)	05:45	06:21 (86)
	17:23			18:08	3	17:44 (76)	19:47				20:28	34	19:52 (57)	21:06	19		06:51 (80)	21:31	11 06:32 (86)
21	08:11			07:31		17:39 (76)	07:39				06:41		07:02 (61)	05:58			06:32 (80)	05:45	06:21 (86)
	17:25			18:09	7	17:46 (76)	19:48				20:30	37	19:52 (57)	21:08	19		06:51 (80)	21:31	11 06:32 (86)
22	08:10			07:29		17:39 (76)	07:37				06:39		07:00 (61)	05:57			06:34 (80)	05:45	06:21 (86)
	17:26			18:10	9	17:48 (76)	19:50				20:31	39	19:52 (57)	21:09	18		06:52 (80)	21:31	11 06:32 (86)
23	08:10			07:27		17:38 (76)	07:35				06:37		06:59 (61)	05:56			06:34 (80)	05:45	06:22 (86)
	17:28			18:12	11	17:49 (76)	19:51				20:32	40	19:52 (57)	21:10	17		06:51 (80)	21:32	11 06:33 (86)
24	08:09			07:26		17:37 (76)	07:33				06:36		06:57 (61)	05:55			06:34 (80)	05:46	06:22 (86)
	17:29			18:13	14	17:51 (76)	19:52				20:34	43	19:52 (57)	21:11	17		06:51 (80)	21:32	11 06:33 (86)
25	08:08			07:24		17:37 (76)	07:31				06:34		06:55 (61)	05:54			06:35 (80)	05:46	06:22 (86)
	17:30			18:15	14	17:51 (76)	19:54				20:35	43	19:51 (57)	21:12	15		06:50 (80)	21:32	10 06:32 (86)
26	08:07			07:22		17:38 (76)	07:29				06:32		06:54 (61)	05:54			06:35 (80)	05:46	06:23 (86)
	17:32			18:16	14	17:52 (76)	19:55				20:36	42	19:51 (57)	21:13	14		06:49 (80)	21:32	10 06:33 (86)
27	08:06			07:20		17:39 (76)	07:27				06:31		06:56 (61)	05:53			06:37 (80)	05:47	06:23 (86)
	17:33			18:18	11	17:50 (76)	19:56				20:37	38	19:51 (57)	21:14	12		06:49 (80)	21:32	9 06:32 (86)
28	08:05			07:19		17:40 (76)	07:25				06:29		19:16 (57)	05:52			06:38 (80)	05:47	06:25 (86)
	17:35			18:19	8	17:48 (76)	19:58				20:39	34	19:50 (57)	21:15	10		06:48 (80)	21:32	7 06:32 (86)
29	08:04						07:23				06:27		19:17 (57)	05:51			06:39 (80)	05:48	06:25 (86)
	17:36						19:59				20:40	32	19:49 (57)	21:16	8		06:47 (80)	21:32	6 06:31 (86)
30	08:02						07:22				06:26		06:47 (60)	05:50			06:42 (80)	05:48	06:27 (86)
	17:38						20:00				20:41	36	19:48 (57)	21:17	3		06:45 (80)	21:32	4 06:31 (86)
31	08:01						07:20							05:50					
	17:39						20:02							21:18					
Potential sun hours	282			289			368				406			463				471	
Total, worst case					91				35			627			580				165
Sun reduction					0.50				0.63			0.59			0.68				0.71
Oper. time red.					0.96				0.96			0.96			0.96				0.96
Wind dir. red.					0.56				0.56			0.63			0.58				0.56
Total reduction					0.27				0.34			0.36			0.38				0.38
Total, real					24				12			227			221				63

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H09 - H09

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	July		August		September	October		November	December
1	05:49		06:18		06:45 (80)	06:56	07:34	07:16	07:58
	21:32		21:09	15	07:00 (80)	20:18	19:20	17:23	16:53
2	05:49		06:19		06:46 (80)	06:57	07:35	07:18	07:59
	21:32		21:07	13	06:59 (80)	20:16	19:18	17:22	16:52
3	05:50		06:20		06:48 (80)	06:59	07:37	07:19	08:00
	21:31		21:06	12	07:00 (60)	20:14	19:16	17:20	16:52
4	05:50		06:21		06:51 (80)	07:00	07:38	07:21	08:01
	21:31		21:05	10	07:01 (60)	20:13	19:14	17:19	16:52
5	05:51		06:22		06:52 (60)	07:01	07:39	07:22	08:02
	21:31		21:03	15	19:45 (57)	20:11	19:12	17:18	16:51
6	05:52		06:24		06:51 (60)	07:02	07:41	07:24	08:03
	21:31		21:02	26	19:49 (57)	20:09	19:10	17:16	16:51
7	05:53		06:25		06:50 (60)	07:04	07:42	18:35 (111)	07:25	08:04
	21:30		21:00	31	19:51 (57)	20:07	19:08	2	18:37 (111)	17:15	16:51
8	05:53		06:26		06:50 (60)	07:05	07:43	18:32 (111)	07:26	08:05
	21:30		20:59	35	19:53 (57)	20:05	19:06	7	18:39 (111)	17:13	16:51
9	05:54		06:27		06:51 (60)	07:06	07:45	18:30 (111)	07:28	08:06
	21:29		20:57	36	19:54 (57)	20:03	19:04	8	18:38 (111)	17:12	16:51
10	05:55		06:29		06:52 (60)	07:07	07:46	18:30 (111)	07:29	08:07
	21:29		20:56	38	19:55 (57)	20:01	19:03	7	18:37 (111)	17:11	16:51
11	05:56		06:30		06:54 (60)	07:09	07:47	18:29 (111)	07:31	08:08
	21:28		20:54	37	19:56 (57)	19:59	19:01	5	18:34 (111)	17:10	16:51
12	05:57		06:31		06:55 (60)	07:10	07:49	18:30 (111)	07:32	08:09
	21:28		20:53	36	19:57 (57)	19:57	18:57	3	18:33 (111)	17:09	16:51
13	05:57		06:32		06:56 (60)	07:11	07:50	18:15 (76)	07:34	08:10
	21:27		20:51	35	19:57 (57)	19:55	18:55	7	18:31 (111)	17:07	16:51
14	05:58		06:48 (80)	06:34		19:25 (57)	07:12	07:51	18:12 (76)	07:35	08:11
	21:26	6	06:54 (80)	20:50	32	19:57 (57)	19:53	18:53	10	18:22 (76)	17:06	16:51
15	05:59		06:47 (80)	06:35		19:24 (57)	07:14	07:53	18:11 (76)	07:36	08:12
	21:26	9	06:56 (80)	20:48	33	19:57 (57)	19:51	18:52	12	18:23 (76)	17:05	16:51
16	06:00		06:46 (80)	06:36		07:02 (61)	07:15	07:54	18:09 (76)	07:38	08:12
	21:25	11	06:57 (80)	20:46	39	19:57 (57)	19:49	18:50	14	18:23 (76)	17:04	16:51
17	06:01		06:45 (80)	06:37		07:01 (61)	07:16	07:55	18:09 (76)	07:39	08:13
	21:24	13	06:58 (80)	20:45	43	19:58 (57)	19:47	18:48	15	18:24 (76)	17:03	16:52
18	06:02		06:45 (80)	06:39		07:02 (61)	07:17	07:57	18:09 (76)	07:41	08:14
	21:23	14	06:59 (80)	20:43	42	19:58 (57)	19:45	18:46	12	18:21 (76)	17:02	16:52
19	06:03		06:44 (80)	06:40		07:03 (61)	07:19	07:58	18:08 (76)	07:42	08:15
	21:23	16	07:00 (80)	20:41	42	19:58 (57)	19:43	18:44	11	18:19 (76)	17:01	16:52
20	06:04		06:44 (80)	06:41		07:04 (61)	07:20	07:59	18:10 (76)	07:43	08:15
	21:22	17	07:01 (80)	20:40	40	19:57 (57)	19:41	18:43	8	18:18 (76)	17:00	16:53
21	06:05		06:43 (80)	06:42		07:05 (61)	07:21	08:01	18:10 (76)	07:45	08:16
	21:21	18	07:01 (80)	20:38	39	19:57 (57)	19:39	18:41	6	18:16 (76)	16:59	16:53
22	06:06		06:43 (80)	06:44		07:07 (61)	07:23	08:02	18:13 (76)	07:46	08:16
	21:20	18	07:01 (80)	20:36	37	19:57 (57)	19:37	18:39	2	18:14 (76)	16:59	16:54
23	06:07		06:43 (80)	06:45		19:22 (57)	07:24	08:04			07:47	08:17
	21:19	19	07:02 (80)	20:35	34	19:56 (57)	19:35	18:38			16:58	16:54
24	06:08		06:43 (80)	06:46		19:22 (57)	07:25	08:05			07:49	08:17
	21:18	19	07:02 (80)	20:33	33	19:55 (57)	19:34	18:36			16:57	16:55
25	06:10		06:43 (80)	06:47		19:22 (57)	07:26	08:06			07:50	08:18
	21:17	19	07:02 (80)	20:31	32	19:54 (57)	19:32	18:34			16:56	16:55
26	06:11		06:43 (80)	06:49		19:22 (57)	07:28	08:08			07:51	08:18
	21:16	19	07:02 (80)	20:29	33	20:03 (77)	19:30	18:33			16:56	16:56
27	06:12		06:43 (80)	06:50		19:24 (57)	07:29	08:09			07:53	08:18
	21:15	19	07:02 (80)	20:27	30	20:02 (77)	19:28	18:31			16:55	16:57
28	06:13		06:43 (80)	06:51		19:25 (57)	07:30	08:11			07:54	08:18
	21:13	19	07:02 (80)	20:26	27	20:00 (77)	19:26	18:29			16:54	16:57
29	06:14		06:44 (80)	06:52		19:26 (57)	07:31	08:12			07:55	08:19
	21:12	18	07:02 (80)	20:24	24	19:58 (77)	19:24	18:28			16:54	16:58
30	06:15		06:44 (80)	06:54		19:27 (57)	07:33	08:14			07:56	08:19
	21:11	18	07:02 (80)	20:22	19	19:46 (57)	19:22	18:26			16:53	16:59
31	06:16		06:45 (80)	06:55		19:30 (57)		08:15				08:19
	21:10	16	07:01 (80)	20:20	12	19:42 (57)		18:25				17:00
Potential sun hours	477			439		378	339		285	270
Total, worst case		288			930			129		
Sun reduction		0.76			0.73			0.52		
Oper. time red.		0.96			0.96			0.96		
Wind dir. red.		0.56			0.62			0.56		
Total reduction		0.41			0.44			0.28		
Total, real		118			408			36		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H10 - H10

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	17:53 (60)	07:18	06:24	05:49	05:48	06:17	06:56	07:34	07:16	07:58
	17:01	17:41	18:20	5 17:58 (60)	20:03	20:43	21:19	21:32	21:08	20:18	19:20	17:23	16:53
2	08:19	07:59	07:15	17:55 (60)	07:16	06:22	05:48	05:49	06:19	06:57	07:35	07:18	07:59
	17:02	17:42	18:22	4 17:59 (60)	20:04	20:44	21:20	21:31	21:07	20:16	19:18	17:22	16:52
3	08:19	07:57	07:13		07:14	06:21	05:48	05:50	06:20	06:58	07:36	07:19	08:00
	17:03	17:44	18:23		20:06	20:45	21:21	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11		07:12	06:19	05:47	05:50	06:21	07:00	07:38	07:21	08:01
	17:04	17:45	18:25		20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:19	07:55	07:09		07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:47	18:26		20:08	20:48	21:22	21:31	21:03	20:10	19:12	17:17	16:51
6	08:19	07:54	07:07		07:08	06:17	05:46	05:52	06:23	07:02	07:40	07:23	08:03
	17:06	17:48	18:27		20:09	20:49	21:23	21:30	21:02	20:09	19:10	17:16	16:51
7	08:18	07:52	07:06		07:06	06:15	05:46	05:52	06:25	07:03	07:42	07:25	08:04
	17:07	17:50	18:29		20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04		07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30		20:12	20:52	21:25	21:30	20:59	20:05	19:06	17:13	16:51
9	08:18	07:49	08:02		07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:28	08:06
	17:09	17:53	19:32		20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:18	07:48	08:00		07:00	06:11	05:45	05:55	06:28	07:07	07:46	07:29	08:07
	17:10	17:54	19:33		20:15	20:54	21:26	21:29	20:56	20:01	19:02	17:11	16:50
11	08:17	07:46	07:58		06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:31	08:08
	17:11	17:55	19:34		20:16	20:55	21:27	21:28	20:54	19:59	19:01	17:10	16:50
12	08:17	07:45	07:56		06:57	06:08	05:45	05:56	06:31	07:10	07:48	18:27 (60)	07:32	08:09
	17:13	17:57	19:36		20:17	20:57	21:27	21:28	20:53	19:57	18:57	5 18:32 (60)	17:08	16:50
13	08:16	07:43	07:54		06:55	06:07	05:44	05:57	06:32	07:11	07:50	18:26 (60)	07:33	08:10
	17:14	17:58	19:37		20:19	20:58	21:28	21:27	20:51	19:55	18:55	5 18:31 (60)	17:07	16:51
14	08:16	07:42	07:52		06:53	06:06	05:44	05:58	06:33	07:12	07:51	18:25 (60)	07:35	08:11
	17:15	18:00	19:39		20:20	20:59	21:28	21:26	20:50	19:53	18:53	4 18:29 (60)	17:06	16:51
15	08:15	07:40	07:50		06:51	06:05	05:44	05:59	06:35	07:14	07:52	18:25 (60)	07:36	08:12
	17:17	18:00	19:40		20:21	21:00	21:29	21:26	20:48	19:51	18:51	2 18:27 (60)	17:05	16:51
16	08:15	07:39	07:49		06:49	06:03	05:44	06:00	06:36	07:15	07:54		07:38	08:12
	17:18	18:01	19:41		20:23	21:02	21:29	21:25	20:46	19:49	18:50		17:04	16:51
17	08:14	07:37	07:47		06:48	06:02	05:44	06:01	06:37	07:16	07:55	18:14 (61)	07:39	08:13
	17:19	18:03	19:43		20:24	21:03	21:30	21:24	20:45	19:47	18:48	7 18:21 (61)	17:03	16:51
18	08:13	07:36	07:45		06:46	06:01	05:44	06:02	06:38	07:17	07:57	18:13 (61)	07:41	08:14
	17:20	18:04	19:44		20:25	21:04	21:30	21:23	20:43	19:45	18:46	8 18:21 (61)	17:02	16:52
19	08:13	07:34	17:42 (61)	07:43	06:44	06:00	05:44	06:03	06:40	07:19	07:58	18:11 (61)	07:42	08:14
	17:22	18:06	2 17:43 (61)	19:45	20:27	21:05	21:30	21:22	20:41	19:43	18:44	8 18:19 (61)	17:01	16:52
20	08:12	07:32	17:41 (61)	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	18:11 (61)	07:43	08:15
	17:23	18:07	3 17:44 (61)	19:47	20:28	21:06	21:31	21:22	20:40	19:41	18:42	7 18:18 (61)	17:00	16:52
21	08:11	07:31	17:40 (61)	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:01	18:11 (61)	07:45	08:16
	17:25	18:09	6 17:46 (61)	19:48	20:29	21:07	21:31	21:21	20:38	19:39	18:41	5 18:16 (61)	16:59	16:53
22	08:10	07:29	17:40 (61)	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	18:12 (61)	07:46	08:16
	17:26	18:10	7 17:47 (61)	19:49	20:31	21:09	21:31	21:20	20:36	19:37	18:39	2 18:14 (61)	16:58	16:53
23	08:09	07:27	17:41 (61)	07:35	06:37	05:56	05:45	06:07	06:45	07:24	08:03		07:47	08:17
	17:27	18:12	8 17:49 (61)	19:51	20:32	21:10	21:31	21:19	20:34	19:35	18:37		16:58	16:54
24	08:08	07:25	17:42 (61)	07:33	06:35	05:55	05:45	06:08	06:46	07:25	08:05		07:49	08:17
	17:29	18:13	9 17:51 (61)	19:52	20:33	21:11	21:32	21:18	20:33	19:33	18:36		16:57	16:54
25	08:08	07:24	17:43 (61)	07:31	06:34	05:54	05:46	06:09	06:47	07:26	08:06		07:50	08:17
	17:30	18:15	5 17:48 (61)	19:53	20:35	21:12	21:32	21:17	20:31	19:31	18:34		16:56	16:55
26	08:07	07:22		07:29	06:32	05:53	05:46	06:11	06:48	07:27	08:08		07:51	08:18
	17:32	18:16		19:55	20:36	21:13	21:32	21:16	20:29	19:29	18:32		16:55	16:56
27	08:06	07:20	17:53 (60)	07:27	06:30	05:52	05:47	06:12	06:50	07:29	08:09		07:53	08:18
	17:33	18:18	3 17:56 (60)	19:56	20:37	21:14	21:32	21:14	20:27	19:27	18:31		16:55	16:56
28	08:04	07:18	17:53 (60)	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:11		07:54	08:18
	17:35	18:19	4 17:57 (60)	19:58	20:39	21:15	21:32	21:13	20:25	19:25	18:29		16:54	16:57
29	08:03			07:23	06:27	05:51	05:47	06:14	06:52	07:31	08:12		07:55	08:19
	17:36			19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28		16:54	16:58
30	08:02			07:21	06:26	05:50	05:48	06:15	06:53	07:33	08:13		07:56	08:19
	17:38			20:00	20:41	21:17	21:32	21:11	20:22	19:22	18:26		16:53	16:59
31	08:01			07:19		05:50		06:16	06:55		08:15			08:19
	17:39			20:02		21:18		21:10	20:20		18:25			17:00
Potential sun hours	282	289		368	406	463	471	477	439	378	339		284	270
Total, worst case			47	9								53		
Sun reduction			0.50	0.63								0.52		
Oper. time red.			0.96	0.96								0.96		
Wind dir. red.			0.56	0.55								0.55		
Total reduction			0.27	0.33								0.28		
Total, real			12	3								15		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H11 - H11

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:16	07:17	06:24	05:49	05:48	06:17	06:56	07:34	07:16	07:57
	17:01	17:40	18:20	20:03	20:42	21:19	21:31	21:08	20:18	19:19	17:23	16:52
2	08:19	07:58	07:15	07:15	06:22	05:48	05:49	06:18	06:57	07:35	07:17	07:58
	17:01	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:17	17:21	16:52
3	08:19	07:57	07:13	07:13	06:21	05:48	05:49	06:20	06:58	07:36	07:19	08:00
	17:02	17:43	18:23	20:05	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:19	05:47	05:50	06:21	06:59	07:38	07:20	08:01
	17:03	17:45	18:24	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:51
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:04	17:46	18:26	20:08	20:48	21:22	21:31	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:16	05:46	05:51	06:23	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:23	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:52	06:24	07:03	07:42	07:25	08:04
	17:07	17:49	18:29	20:11	20:50	21:24	21:30	21:00	20:06	19:08	17:14	16:51
8	08:18	07:51	08:04	07:04	06:13	05:45	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:04	19:06	17:13	16:50
9	08:18	07:49	08:02	07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:28	08:06
	17:09	17:52	19:31	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:50
10	08:17	07:48	08:00	07:00	06:11	05:45	05:54	06:28	07:07	07:45	07:29	08:07
	17:10	17:54	19:33	20:15	20:54	21:26	21:28	20:56	20:01	19:02	17:11	16:50
11	08:17	07:46	07:58	06:58	06:09	05:45	05:55	06:29	07:08	07:47	07:30	08:08
	17:11	17:55	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:00	17:09	16:50
12	08:17	07:45	07:56	06:56	06:08	05:44	05:56	06:31	07:10	07:48	07:32	08:09
	17:12	17:57	19:36	20:17	20:56	21:27	21:27	20:53	19:57	18:57	17:08	16:50
13	08:16	07:43	07:54	06:55	06:07	05:44	05:57	06:32	07:11	07:50	07:33	08:10
	17:14	17:58	19:37	20:19	20:58	21:28	21:27	20:51	19:55	18:55	17:07	16:50
14	08:16	07:42	07:52	06:53	06:06	05:44	05:58	06:33	07:12	07:51	07:35	08:11
	17:15	18:00	19:38	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:50
15	08:15	07:40	07:50	06:51	06:04	05:44	05:59	06:34	07:13	07:52	07:36	08:11
	17:16	18:00	19:40	20:21	21:00	21:29	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:39	07:48	06:49	06:03	05:44	06:00	06:36	07:15	07:54	07:38	08:12
	17:18	18:01	19:41	20:23	21:01	21:29	21:25	20:46	19:49	18:49	17:04	16:51
17	08:14	07:37	07:46	06:47	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:42	20:24	21:03	21:29	21:24	20:44	19:47	18:48	17:03	16:51
18	08:13	07:35	07:44	06:46	06:01	05:44	06:02	06:38	07:17	07:56	07:40	08:14
	17:20	18:04	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:51
19	08:12	07:34	07:43	06:44	06:00	05:44	06:03	06:39	07:18	07:58	07:42	08:14
	17:22	18:06	19:45	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:12	07:32	07:41	06:42	05:59	05:44	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:31	21:21	20:39	19:41	18:42	17:00	16:52
21	08:11	07:30	07:39	06:40	05:58	05:44	06:05	06:42	07:21	08:00	07:44	08:15
	17:24	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:46	08:16
	17:26	18:10	19:49	20:30	21:08	21:31	21:20	20:36	19:37	18:39	16:58	16:53
23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:44	07:23	08:03	07:47	08:16
	17:27	18:11	19:51	20:32	21:09	21:31	21:19	20:34	19:35	18:37	16:57	16:54
24	08:08	07:25	07:33	06:35	05:55	05:45	06:08	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:11	21:31	21:18	20:32	19:33	18:35	16:57	16:54
25	08:07	07:24	07:31	06:33	05:54	05:46	06:09	06:47	07:26	08:06	07:50	08:17
	17:30	18:14	19:53	20:34	21:12	21:32	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:10	06:48	07:27	08:07	07:51	08:18
	17:31	18:16	19:55	20:36	21:13	21:32	21:15	20:29	19:29	18:32	16:55	16:55
27	08:05	07:20	07:27	06:30	05:52	05:46	06:11	06:49	07:28	08:09	07:52	08:18
	17:33	18:17	19:56	20:37	21:14	21:32	21:14	20:27	19:27	18:31	16:54	16:56
28	08:04	07:18	07:25	06:29	05:51	05:47	06:13	06:51	07:30	08:10	07:54	08:18
	17:34	18:19	19:57	20:38	21:15	21:32	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:47	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:32	21:12	20:23	19:23	18:27	16:53	16:58
30	08:02		07:21	06:25	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:19
	17:37		20:00	20:41	21:17	21:32	21:11	20:22	19:21	18:26	16:53	16:59
31	08:01		07:19		05:49		06:16	06:54		08:15		08:19
	17:39		20:01		21:18		21:10	20:20		18:24		16:59
Potential sun hours	282	289	368	406	463	471	477	439	378	339	284	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H12 - H12

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:16	07:17	06:24	05:49	05:48	06:17	06:56	07:34	07:16	07:57
	17:01	17:40	18:20	20:03	20:42	21:19	21:31	21:08	20:18	19:19	17:23	16:52
2	08:19	07:59	07:15	07:15	06:22	05:48	05:49	06:18	06:57	07:35	07:18	07:59
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:21	16:52
3	08:19	07:57	07:13	07:14	06:21	05:48	05:49	06:20	06:58	07:36	07:19	08:00
	17:03	17:43	18:23	20:05	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:19	05:47	05:50	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:24	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:51
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:46	18:26	20:08	20:48	21:22	21:31	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:16	05:46	05:51	06:23	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:23	21:30	21:02	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:52	06:25	07:03	07:42	07:25	08:04
	17:07	17:49	18:29	20:11	20:50	21:24	21:30	21:00	20:06	19:08	17:14	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:05	19:06	17:13	16:50
9	08:18	07:49	08:02	07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:28	08:06
	17:09	17:52	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:50
10	08:17	07:48	08:00	07:00	06:11	05:45	05:55	06:28	07:07	07:46	07:29	08:07
	17:10	17:54	19:33	20:15	20:54	21:26	21:28	20:56	20:01	19:02	17:11	16:50
11	08:17	07:46	07:58	06:58	06:09	05:45	05:55	06:29	07:08	07:47	07:30	08:08
	17:11	17:55	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:00	17:09	16:50
12	08:17	07:45	07:56	06:57	06:08	05:44	05:56	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:53	19:57	18:57	17:08	16:50
13	08:16	07:43	07:54	06:55	06:07	05:44	05:57	06:32	07:11	07:50	07:33	08:10
	17:14	17:58	19:37	20:19	20:58	21:28	21:27	20:51	19:55	18:55	17:07	16:50
14	08:16	07:42	07:52	06:53	06:06	05:44	05:58	06:33	07:12	07:51	07:35	08:11
	17:15	18:00	19:38	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:04	05:44	05:59	06:34	07:13	07:52	07:36	08:11
	17:16	18:00	19:40	20:21	21:00	21:29	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:39	07:48	06:49	06:03	05:44	06:00	06:36	07:15	07:54	07:38	08:12
	17:18	18:01	19:41	20:23	21:01	21:29	21:25	20:46	19:49	18:49	17:04	16:51
17	08:14	07:37	07:46	06:47	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:43	20:24	21:03	21:29	21:24	20:45	19:47	18:48	17:03	16:51
18	08:13	07:35	07:44	06:46	06:01	05:44	06:02	06:38	07:17	07:56	07:40	08:14
	17:20	18:04	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:44	06:03	06:39	07:18	07:58	07:42	08:14
	17:22	18:06	19:45	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:12	07:32	07:41	06:42	05:59	05:44	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:31	21:21	20:39	19:41	18:42	17:00	16:52
21	08:11	07:30	07:39	06:40	05:58	05:45	06:05	06:42	07:21	08:01	07:44	08:15
	17:24	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:46	08:16
	17:26	18:10	19:49	20:31	21:08	21:31	21:20	20:36	19:37	18:39	16:58	16:53
23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:44	07:23	08:03	07:47	08:16
	17:27	18:12	19:51	20:32	21:09	21:31	21:19	20:34	19:35	18:37	16:57	16:54
24	08:08	07:25	07:33	06:35	05:55	05:45	06:08	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:11	21:31	21:18	20:32	19:33	18:36	16:57	16:54
25	08:07	07:24	07:31	06:34	05:54	05:46	06:09	06:47	07:26	08:06	07:50	08:17
	17:30	18:14	19:53	20:34	21:12	21:32	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:10	06:48	07:27	08:08	07:51	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:15	20:29	19:29	18:32	16:55	16:56
27	08:05	07:20	07:27	06:30	05:52	05:46	06:11	06:50	07:29	08:09	07:52	08:18
	17:33	18:17	19:56	20:37	21:14	21:32	21:14	20:27	19:27	18:31	16:55	16:56
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:54	08:18
	17:34	18:19	19:57	20:38	21:15	21:32	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:47	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:32	21:12	20:23	19:23	18:27	16:53	16:58
30	08:02		07:21	06:25	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:19
	17:37		20:00	20:41	21:17	21:32	21:11	20:22	19:21	18:26	16:53	16:59
31	08:01		07:19		05:49		06:16	06:55		08:15		08:19
	17:39		20:01		21:18		21:10	20:20		18:24		16:59
Potential sun hours	282	289	368	406	463	471	477	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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US-GRAND FORKS, ND 58201
+1 701 775 3000
wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H13 - H13

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:16	07:17	06:24	05:49	05:48	06:17	06:56	07:34	07:16	07:57
	17:01	17:40	18:20	20:03	20:42	21:19	21:31	21:08	20:18	19:19	17:23	16:53
2	08:19	07:59	07:15	07:15	06:22	05:48	05:49	06:19	06:57	07:35	07:18	07:59
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:52
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:58	07:36	07:19	08:00
	17:03	17:43	18:23	20:05	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:19	05:47	05:50	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:51
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:46	18:26	20:08	20:48	21:22	21:31	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:16	05:46	05:52	06:23	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:23	21:30	21:02	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:52	06:25	07:03	07:42	07:25	08:04
	17:07	17:49	18:29	20:11	20:50	21:24	21:30	21:00	20:06	19:08	17:15	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:05	19:06	17:13	16:51
9	08:18	07:49	08:02	07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:28	08:06
	17:09	17:52	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:50
10	08:17	07:48	08:00	07:00	06:11	05:45	05:55	06:28	07:07	07:46	07:29	08:07
	17:10	17:54	19:33	20:15	20:54	21:26	21:28	20:56	20:01	19:02	17:11	16:50
11	08:17	07:46	07:58	06:58	06:10	05:45	05:55	06:30	07:08	07:47	07:30	08:08
	17:11	17:55	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:00	17:09	16:50
12	08:17	07:45	07:56	06:57	06:08	05:45	05:56	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:53	19:57	18:57	17:08	16:50
13	08:16	07:43	07:54	06:55	06:07	05:44	05:57	06:32	07:11	07:50	07:33	08:10
	17:14	17:58	19:37	20:19	20:58	21:28	21:27	20:51	19:55	18:55	17:07	16:50
14	08:16	07:42	07:52	06:53	06:06	05:44	05:58	06:33	07:12	07:51	07:35	08:11
	17:15	18:00	19:38	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:04	05:44	05:59	06:35	07:13	07:52	07:36	08:11
	17:16	18:00	19:40	20:21	21:00	21:29	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:39	07:48	06:49	06:03	05:44	06:00	06:36	07:15	07:54	07:38	08:12
	17:18	18:01	19:41	20:23	21:01	21:29	21:25	20:46	19:49	18:49	17:04	16:51
17	08:14	07:37	07:46	06:47	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:43	20:24	21:03	21:29	21:24	20:45	19:47	18:48	17:03	16:51
18	08:13	07:35	07:45	06:46	06:01	05:44	06:02	06:38	07:17	07:56	07:40	08:14
	17:20	18:04	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:44	06:03	06:40	07:18	07:58	07:42	08:14
	17:22	18:06	19:45	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:12	07:32	07:41	06:42	05:59	05:44	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:31	21:21	20:39	19:41	18:42	17:00	16:52
21	08:11	07:30	07:39	06:40	05:58	05:45	06:05	06:42	07:21	08:01	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:46	08:16
	17:26	18:10	19:49	20:31	21:08	21:31	21:20	20:36	19:37	18:39	16:58	16:53
23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:45	07:23	08:03	07:47	08:16
	17:27	18:12	19:51	20:32	21:09	21:31	21:19	20:34	19:35	18:37	16:57	16:54
24	08:08	07:25	07:33	06:35	05:55	05:45	06:08	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:11	21:31	21:18	20:32	19:33	18:36	16:57	16:54
25	08:07	07:24	07:31	06:34	05:54	05:46	06:09	06:47	07:26	08:06	07:50	08:17
	17:30	18:15	19:53	20:34	21:12	21:32	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:10	06:48	07:27	08:08	07:51	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:15	20:29	19:29	18:32	16:55	16:56
27	08:05	07:20	07:27	06:30	05:52	05:46	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:17	19:56	20:37	21:14	21:32	21:14	20:27	19:27	18:31	16:55	16:56
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:54	08:18
	17:35	18:19	19:57	20:38	21:15	21:32	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:47	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:32	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:25	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:19
	17:37		20:00	20:41	21:17	21:32	21:11	20:22	19:21	18:26	16:53	16:59
31	08:01		07:19		05:50		06:16	06:55		08:15		08:19
	17:39		20:01		21:18		21:10	20:20		18:24		17:00
Potential sun hours	282	289	368	406	463	471	477	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
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Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H14 - H14

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April		May		June
1	08:19	08:00		07:17		07:18		19:37 (127)	06:24	06:46 (62) 05:49
	17:01	17:41		18:21		20:03	4	19:41 (127)	20:43	5 06:51 (62) 21:19
2	08:19	07:59		07:15		07:16		19:37 (127)	06:23	06:44 (62) 05:49
	17:02	17:42		18:22		20:04	5	19:42 (127)	20:44	7 06:51 (62) 21:20
3	08:19	07:58		07:13		07:14		19:37 (127)	06:21	06:43 (62) 05:48
	17:03	17:44		18:23		20:06	7	19:44 (127)	20:45	9 06:52 (62) 21:21
4	08:19	07:56		07:11		07:12		19:38 (127)	06:20	06:42 (62) 05:48
	17:04	17:45		18:25		20:07	7	19:45 (127)	20:47	11 06:53 (62) 21:21
5	08:19	07:55		07:09		07:10		19:38 (127)	06:18	06:40 (62) 05:47
	17:05	17:47		18:26		20:08	6	19:44 (127)	20:48	12 06:52 (62) 21:22
6	08:19	07:54		07:08		07:08			06:17	06:39 (62) 05:47
	17:06	17:48		18:28		20:10			20:49	13 06:52 (62) 21:23
7	08:19	07:52		07:06		07:06			06:15	06:37 (62) 05:46
	17:07	17:50		18:29		20:11			20:50	14 06:51 (62) 21:24
8	08:18	07:51		08:04		07:04			06:14	06:37 (62) 05:46
	17:08	17:51		18:30		20:12			20:52	14 06:51 (62) 21:25
9	08:18	07:49	08:12 (63)	08:02		07:02			06:13	06:38 (62) 05:46
	17:09	17:53	2 08:14 (63)	19:32		20:14			20:53	12 06:50 (62) 21:25
10	08:18	07:48	08:10 (63)	08:00		07:01			06:11	06:40 (62) 05:45
	17:11	17:54	4 08:14 (63)	19:33		20:15			20:54	9 06:49 (62) 21:26
11	08:17	07:47	08:09 (63)	07:58		06:59			06:10	06:41 (62) 05:45
	17:12	17:56	6 08:15 (63)	19:35		20:16			20:55	6 06:47 (62) 21:27
12	08:17	07:45	08:07 (63)	07:56		06:57			06:09	05:45
	17:13	17:57	7 08:14 (63)	19:36		20:18			20:57	21:27
13	08:16	07:44	08:06 (63)	07:54		06:55			06:07	05:45
	17:14	17:59	8 08:14 (63)	19:37		20:19			20:58	21:28
14	08:16	07:42	08:06 (63)	07:53		06:53			06:06	05:45
	17:15	18:00	6 08:12 (63)	19:39		20:20			20:59	21:28
15	08:15	07:40		07:51		06:51			06:05	05:45
	17:17	18:00		19:40		20:22			21:00	21:29
16	08:15	07:39		07:49		06:50		19:58 (128)	06:04	05:45
	17:18	18:02		19:41		20:23	2	20:00 (128)	21:02	21:29
17	08:14	07:37		07:47		06:48		19:57 (128)	06:02	05:45
	17:19	18:03		19:43		20:24	4	20:01 (128)	21:03	21:30
18	08:13	07:36		07:45		06:46		19:56 (128)	06:01	05:45
	17:21	18:05		19:44		20:26	6	20:02 (128)	21:04	21:30
19	08:13	07:34	07:56 (125)	07:43		08:04 (91)	06:44	19:55 (128)	06:00	05:45
	17:22	18:06	2 07:58 (125)	19:46	3	08:07 (91)	20:27	8 20:03 (128)	21:05	21:30
20	08:12	07:32	07:54 (125)	07:41		08:02 (91)	06:42	19:56 (128)	05:59	05:45
	17:23	18:08	3 07:57 (125)	19:47	6	08:08 (91)	20:28	9 20:05 (128)	21:06	21:31
21	08:11	07:31	07:52 (125)	07:39		08:00 (91)	06:41	19:56 (128)	05:58	05:45
	17:25	18:09	3 07:55 (125)	19:48	8	08:08 (91)	20:29	10 20:06 (128)	21:07	21:31
22	08:10	07:29		07:37		07:58 (91)	06:39	19:57 (128)	05:57	05:45
	17:26	18:10		19:50	10	08:08 (91)	20:31	7 20:04 (128)	21:09	21:31
23	08:09	07:27		07:35		07:56 (91)	06:37		05:56	05:45
	17:28	18:12		19:51	12	08:08 (91)	20:32		21:10	21:32
24	08:09	07:26		07:33		07:54 (91)	06:36		05:55	05:46
	17:29	18:13		19:52	13	08:07 (91)	20:33		21:11	21:32
25	08:08	07:24		07:31		07:54 (91)	06:34		05:54	05:46
	17:31	18:15		19:54	12	08:06 (91)	20:35		21:12	21:32
26	08:07	07:22		07:29		07:55 (91)	06:32		05:54	05:46
	17:32	18:16		19:55	11	19:33 (126)	20:36		21:13	21:32
27	08:06	07:20		07:27		19:31 (126)	06:31		05:53	05:47
	17:33	18:18		19:56	3	19:34 (126)	20:37		21:14	21:32
28	08:05	07:19		07:25		19:31 (126)	06:29		05:52	05:47
	17:35	18:19		19:58	5	19:36 (126)	20:39		21:15	21:32
29	08:03			07:23		19:32 (126)	06:27		05:51	05:48
	17:36			19:59	5	19:37 (126)	20:40		21:16	21:32
30	08:02			07:22			06:26	06:47 (62)	05:51	05:48
	17:38			20:00			20:41	3 06:50 (62)	21:17	21:32
31	08:01			07:20					05:50	
	17:39			20:02					21:18	
Potential sun hours	282	289		368			406		463	471
Total, worst case			41		88			78	112	
Sun reduction			0.50		0.63			0.59	0.68	
Oper. time red.			0.96		0.96			0.96	0.96	
Wind dir. red.			0.68		0.63			0.64	0.56	
Total reduction			0.33		0.38			0.37	0.37	
Total, real			13		33			29	41	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H14 - H14

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October		November		December
1	05:49		06:18		06:53 (62)	06:56		07:34		07:16	07:40 (63)	07:58
	21:32		21:09	2	06:55 (62)	20:18		19:20		17:23	4 07:44 (63)	16:53
2	05:49		06:19		06:50 (62)	06:57		07:35		07:18	07:41 (63)	07:59
	21:32		21:07	8	06:58 (62)	20:16		19:18		17:22	2 07:43 (63)	16:52
3	05:50		06:20		06:49 (62)	06:59		07:37		07:19		08:00
	21:31		21:06	10	06:59 (62)	20:14		19:16		17:20		16:52
4	05:51		06:21		06:48 (62)	07:00		07:38		07:21		08:01
	21:31		21:05	12	07:00 (62)	20:13		19:14		17:19		16:52
5	05:51		06:22		06:48 (62)	07:01		07:39		07:22		08:02
	21:31		21:03	14	07:02 (62)	20:11		19:12		17:18		16:51
6	05:52		06:24		06:48 (62)	07:02		07:41		07:24		08:03
	21:30		21:02	14	07:02 (62)	20:09		19:10		17:16		16:51
7	05:53		06:25		06:49 (62)	07:04	19:34 (127)	07:42		07:25		08:04
	21:30		21:00	13	07:02 (62)	20:07	5 19:39 (127)	19:08		17:15		16:51
8	05:53		06:26		06:50 (62)	07:05	19:32 (127)	07:43		07:26		08:05
	21:30		20:59	12	07:02 (62)	20:05	7 19:39 (127)	19:06		17:14		16:51
9	05:54		06:27		06:51 (62)	07:06	19:30 (127)	07:45		07:28		08:06
	21:29		20:57	10	07:01 (62)	20:03	7 19:37 (127)	19:04		17:12		16:51
10	05:55		06:29		06:52 (62)	07:07	19:30 (127)	07:46		07:29		08:07
	21:29		20:56	9	07:01 (62)	20:01	5 19:35 (127)	19:03		17:11		16:51
11	05:56		06:30		06:54 (62)	07:09	19:31 (127)	07:47		07:31		08:08
	21:28		20:54	7	07:01 (62)	19:59	3 19:34 (127)	19:01		17:10		16:51
12	05:57		06:31		06:55 (62)	07:10	19:31 (127)	07:49		07:32		08:09
	21:28		20:53	4	06:59 (62)	19:57	2 19:32 (127)	18:57		17:09		16:51
13	05:58		06:32		06:56 (62)	07:11		07:50		07:34		08:10
	21:27		20:51	2	06:58 (62)	19:55		18:55		17:07		16:51
14	05:58		06:34			07:12	19:22 (126)	07:51		07:35		08:11
	21:26		20:50			19:53	5 19:27 (126)	18:53		17:06		16:51
15	05:59		06:35			07:14	19:22 (126)	07:53		07:36		08:12
	21:26		20:48			19:51	4 19:26 (126)	18:52		17:05		16:51
16	06:00		06:36			07:15	19:21 (126)	07:54		07:38		08:12
	21:25		20:46			19:49	3 19:24 (126)	18:50		17:04		16:51
17	06:01		06:37			07:16	07:44 (91)	07:55		07:39		08:13
	21:24		20:45			19:47	10 19:22 (126)	18:48		17:03		16:52
18	06:02		06:39			07:17	07:42 (91)	07:57		07:41		08:14
	21:23		20:43			19:45	11 07:53 (91)	18:46		17:02		16:52
19	06:03		06:40			07:19	07:40 (91)	07:58		07:42		08:14
	21:23		20:41			19:43	13 07:53 (91)	18:44		17:01		16:52
20	06:04		06:41			07:20	07:42 (91)	07:59	08:22 (125)	07:43		08:15
	21:22		20:40			19:41	12 07:54 (91)	18:43	3 08:25 (125)	17:00		16:53
21	06:05		06:42		20:02 (128)	07:21	07:43 (91)	08:01	08:23 (125)	07:45		08:16
	21:21		20:38	7	20:09 (128)	19:39	11 07:54 (91)	18:41	3 08:26 (125)	16:59		16:53
22	06:06		06:44		20:01 (128)	07:23	07:44 (91)	08:02	08:25 (125)	07:46		08:16
	21:20		20:36	9	20:10 (128)	19:37	9 07:53 (91)	18:39	3 08:28 (125)	16:59		16:54
23	06:07		06:45		20:00 (128)	07:24	07:45 (91)	08:04	08:26 (125)	07:47		08:17
	21:19		20:35	9	20:09 (128)	19:35	7 07:52 (91)	18:38	2 08:27 (125)	16:58		16:54
24	06:09		06:46		19:59 (128)	07:25	07:47 (91)	08:05		07:49		08:17
	21:18		20:33	8	20:07 (128)	19:33	4 07:51 (91)	18:36		16:57		16:55
25	06:10		06:47		19:59 (128)	07:26		08:06		07:50		08:17
	21:17		20:31	6	20:05 (128)	19:32		18:34		16:56		16:55
26	06:11		06:49		19:59 (128)	07:28		08:08		07:51		08:18
	21:16		20:29	4	20:03 (128)	19:30		18:33		16:56		16:56
27	06:12		06:50		20:00 (128)	07:29		08:09	08:37 (63)	07:53		08:18
	21:15		20:27	2	20:02 (128)	19:28		18:31	2 08:39 (63)	16:55		16:57
28	06:13		06:51			07:30		08:11	08:35 (63)	07:54		08:18
	21:13		20:26			19:26		18:29	7 08:42 (63)	16:54		16:57
29	06:14		06:52			07:31		08:12	08:35 (63)	07:55		08:19
	21:12		20:24			19:24		18:28	8 08:43 (63)	16:54		16:58
30	06:15		06:54			07:33		08:14	08:37 (63)	07:56		08:19
	21:11		20:22			19:22		18:26	7 08:44 (63)	16:53		16:59
31	06:17		06:55					08:15	08:38 (63)			08:19
	21:10		20:20					18:25	6 08:44 (63)			17:00
Potential sun hours	477		439			378		339		285		270
Total, worst case				162			118		41		6	
Sun reduction				0.73			0.69		0.52		0.42	
Oper. time red.				0.96			0.96		0.96		0.96	
Wind dir. red.				0.58			0.63		0.68		0.69	
Total reduction				0.41			0.42		0.34		0.28	
Total, real				67			49		14		2	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 8:45 AM / 28
Licensed user:
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+1 701 775 3000
wind@eapc.net
Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H15 - H15

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	08:19		08:45 (39)	08:00		17:02 (36)	07:17		07:43 (27)	07:18			06:24			05:49		20:09 (75)
	17:01	13	16:12 (7)	17:41	9	17:11 (36)	18:21	22	17:58 (74)	20:03			20:43			21:19	31	20:52 (21)
2	08:19		08:45 (39)	07:59		17:03 (36)	07:15		07:43 (27)	07:16			06:23			05:49		20:09 (75)
	17:02	12	16:12 (7)	17:42	7	17:10 (36)	18:22	26	18:00 (74)	20:05			20:44			21:20	32	20:53 (21)
3	08:19		08:45 (39)	07:58		17:05 (36)	07:13		07:45 (27)	07:14			06:21			05:48		20:10 (75)
	17:03	11	16:11 (7)	17:44	3	17:08 (36)	18:24	26	18:02 (74)	20:06			20:46			21:21	32	20:54 (21)
4	08:19		08:45 (39)	07:57			07:12		07:46 (27)	07:12			06:20			05:48		20:09 (75)
	17:04	8	08:53 (39)	17:45			18:25	25	18:03 (74)	20:07			20:47			21:22	33	20:54 (21)
5	08:19		08:44 (39)	07:55			07:10		07:47 (27)	07:10			06:18			05:47		20:10 (75)
	17:05	9	08:53 (39)	17:47			18:27	22	18:03 (74)	20:09			20:48			21:23	33	20:55 (21)
6	08:19		08:44 (39)	07:54			07:08		07:50 (27)	07:08			06:17			05:47		20:10 (75)
	17:06	10	08:54 (39)	17:48			18:28	15	18:02 (74)	20:10			20:49			21:23	32	20:55 (21)
7	08:19		08:44 (39)	07:53			07:06		17:54 (74)	07:07			06:16			05:46		20:11 (75)
	17:07	10	08:54 (39)	17:50			18:29	7	18:01 (74)	20:11			20:51			21:24	33	20:57 (21)
8	08:19		08:44 (39)	07:51			08:04		19:06 (50)	07:05			06:14			05:46		20:11 (75)
	17:08	11	08:55 (39)	17:51			18:31	3	19:09 (50)	20:13			20:52			21:25	33	20:57 (21)
9	08:18		08:43 (39)	07:50			08:02		19:05 (50)	07:03			06:13			05:46		20:12 (75)
	17:10	12	08:55 (39)	17:53			19:32	5	19:10 (50)	20:14			20:53			21:26	33	20:58 (21)
10	08:18		08:43 (39)	07:48			08:00		19:05 (50)	07:01			06:11			05:46		20:12 (75)
	17:11	16	16:41 (35)	17:54			19:34	6	19:11 (50)	20:15			20:55			21:26	32	20:58 (21)
11	08:18		08:43 (39)	07:47			07:59		19:05 (50)	06:59			06:10		20:18 (75)	05:45		20:12 (75)
	17:12	19	16:43 (35)	17:56			19:35	8	19:13 (50)	20:17			20:56	8	20:26 (75)	21:27	32	20:59 (21)
12	08:17		08:44 (39)	07:45			07:57		19:07 (50)	06:57			06:09		06:31 (32)	05:45		20:13 (75)
	17:13	20	16:44 (35)	17:57			19:36	5	19:12 (50)	20:18			20:57	15	20:28 (75)	21:28	32	21:00 (21)
13	08:17		08:45 (39)	07:44			07:55			06:55			06:08		06:30 (32)	05:45		20:13 (75)
	17:14	20	16:45 (35)	17:59			19:38			20:19			20:58	19	20:30 (75)	21:28	32	21:00 (21)
14	08:16		08:46 (39)	07:42			07:53			06:53	07:14 (25)		06:06		06:29 (32)	05:45		20:14 (75)
	17:16	21	16:46 (35)	18:00			19:39			20:21	2 07:16 (25)		21:00	22	20:32 (75)	21:29	32	21:01 (21)
15	08:16		08:46 (39)	07:41			07:51			06:52	07:13 (25)		06:05		20:11 (75)	05:45		20:14 (75)
	17:17	21	16:47 (35)	18:00			19:40			20:22	4 07:17 (25)		21:01	22	20:33 (75)	21:29	31	21:01 (21)
16	08:15		08:47 (39)	07:39			07:49			06:50	07:11 (25)		06:04		20:10 (75)	05:45		20:14 (75)
	17:18	20	16:47 (35)	18:02			19:42			20:23	5 07:16 (25)		21:02	24	20:34 (75)	21:30	31	21:01 (21)
17	08:14		08:48 (39)	07:38			07:47			06:48	07:09 (25)		06:03		20:10 (75)	05:45		20:15 (75)
	17:20	17	16:47 (35)	18:03			19:43			20:24	6 07:15 (25)		21:03	25	20:35 (75)	21:30	30	21:01 (21)
18	08:14		16:37 (35)	07:36		07:58 (133)	07:45			06:46	07:07 (25)		06:02		20:09 (75)	05:45		20:15 (75)
	17:21	11	16:48 (35)	18:05	3	08:01 (133)	19:44			20:26	7 07:14 (25)		21:04	26	20:35 (75)	21:30	29	21:01 (21)
19	08:13		16:37 (35)	07:34		07:56 (133)	07:43			06:44	07:06 (25)		06:00		20:09 (75)	05:45		20:15 (75)
	17:22	11	16:48 (35)	18:06	5	08:01 (133)	19:46			20:27	7 07:13 (25)		21:05	27	20:36 (75)	21:31	29	21:01 (21)
20	08:12		16:38 (35)	07:33		07:54 (133)	07:41		08:02 (38)	06:43			05:59		20:08 (75)	05:45		20:15 (75)
	17:24	10	16:48 (35)	18:08	6	08:00 (133)	19:47	3	08:05 (38)	20:28			21:07	28	20:36 (75)	21:31	29	21:01 (21)
21	08:11		16:38 (35)	07:31		07:53 (27)	07:39		08:00 (38)	06:41			05:58		20:08 (75)	05:45		20:16 (75)
	17:25	10	16:48 (35)	18:09	7	08:00 (133)	19:49	10	19:27 (26)	20:30			21:08	28	20:36 (75)	21:31	29	21:02 (21)
22	08:11		16:39 (35)	07:29		07:51 (27)	07:37		07:58 (38)	06:39			05:57		20:08 (75)	05:45		20:16 (75)
	17:26	8	16:47 (35)	18:11	10	08:01 (27)	19:50	17	19:28 (26)	20:31			21:09	29	20:37 (75)	21:32	29	21:02 (21)
23	08:10		16:41 (35)	07:28		07:49 (27)	07:35		07:56 (38)	06:38			05:56		20:07 (75)	05:46		20:16 (75)
	17:28	5	16:46 (35)	18:12	13	08:02 (27)	19:51	20	19:29 (26)	20:32			21:10	30	20:37 (75)	21:32	29	21:02 (21)
24	08:09			07:26		07:47 (27)	07:33		07:54 (38)	06:36			05:56		20:07 (75)	05:46		20:16 (75)
	17:29			18:14	16	08:03 (27)	19:53	25	19:31 (26)	20:34			21:11	30	20:37 (75)	21:32	29	21:02 (21)
25	08:08			07:24		07:46 (27)	07:32		07:52 (38)	06:34			05:55		20:07 (75)	05:46		20:17 (75)
	17:31			18:15	18	08:04 (27)	19:54	27	19:31 (26)	20:35			21:12	30	20:37 (75)	21:32	29	21:03 (21)
26	08:07		17:03 (36)	07:22		07:44 (27)	07:30		07:51 (38)	06:33			05:54		20:08 (75)	05:47		20:16 (75)
	17:32	2	17:05 (36)	18:17	20	08:04 (27)	19:55	26	19:30 (26)	20:36			21:13	30	20:38 (75)	21:32	31	21:03 (21)
27	08:06		17:02 (36)	07:21		07:44 (27)	07:28		07:53 (38)	06:31			05:53		20:08 (75)	05:47		20:16 (75)
	17:34	4	17:06 (36)	18:18	20	08:04 (27)	19:57	21	19:30 (26)	20:38			21:14	30	20:38 (75)	21:32	31	21:03 (21)
28	08:05		17:01 (36)	07:19		07:43 (27)	07:26		19:16 (26)	06:29			05:52		20:08 (75)	05:47		20:17 (75)
	17:35	7	17:08 (36)	18:19	21	08:04 (27)	19:58	12	19:28 (26)	20:39			21:15	29	20:37 (75)	21:32	32	21:04 (21)
29	08:04		17:01 (36)				07:24		19:17 (26)	06:28			05:51		20:07 (75)	05:48		20:16 (75)
	17:37	9	17:10 (36)				19:59	10	19:27 (26)	20:40			21:16	30	20:37 (75)	21:32	32	21:03 (21)
30	08:03		17:01 (36)				07:22		19:20 (26)	06:26			05:51		20:08 (75)	05:48		20:17 (75)
	17:38	10	17:11 (36)				20:01	3	19:23 (26)	20:42			21:17	32	20:51 (21)	21:32	33	21:04 (21)
31	08:01		17:01 (36)				07:20						05:50		20:08 (75)			
	17:40	10	17:11 (36)				20:02						21:18	31	20:51 (21)			
Potential sun hours	282			289			368			406			463			471		
Total, worst case	347			158			344			31			545			935		
Sun reduction	0.54			0.50			0.63			0.59			0.68			0.71		
Oper. time red.	0.96			0.96			0.96			0.96			0.96			0.96		
Wind dir. red.	0.63			0.65			0.62			0.57			0.68			0.69		
Total reduction	0.32			0.31			0.37			0.32			0.44			0.47		
Total, real	112			48			127			10			242			437		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 8:45 AM / 29

Licensed user:

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+1 701 775 3000
wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H15 - H15

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	05:49		20:16 (75)	06:18		06:42 (32)	06:56			07:34		18:48 (50)	07:17			07:58		08:25 (39)
	21:32	32	21:03 (21)	21:09	14	20:38 (75)	20:18			19:20	2	18:49 (50)	17:24			16:53	20	16:25 (35)
2	05:50		20:17 (75)	06:19		20:29 (75)	06:58			07:36		18:44 (50)	07:18			07:59		08:25 (39)
	21:32	32	21:03 (21)	21:08	5	20:34 (75)	20:17			19:18	7	18:51 (50)	17:22			16:53	16	16:23 (35)
3	05:50		20:16 (75)	06:20			06:59			07:37		18:44 (50)	07:20			08:00		08:27 (39)
	21:32	33	21:03 (21)	21:06			20:15			19:16	7	18:51 (50)	17:21			16:52	12	08:39 (39)
4	05:51		20:17 (75)	06:22			07:00			07:38		18:43 (50)	07:21			08:01		08:28 (39)
	21:31	33	21:03 (21)	21:05			20:13			19:14	5	18:48 (50)	17:19			16:52	11	08:39 (39)
5	05:51		20:17 (75)	06:23			07:01			07:40		18:43 (50)	07:22			08:02		08:29 (39)
	21:31	34	21:03 (21)	21:03			20:11			19:12	3	18:46 (50)	17:18			16:52	10	08:39 (39)
6	05:52		20:16 (75)	06:24			07:03			07:41		18:33 (74)	07:24			08:04		08:30 (39)
	21:31	33	21:02 (21)	21:02			20:09			19:10	5	18:45 (50)	17:16			16:51	10	08:40 (39)
7	05:53		20:16 (75)	06:25			07:04			07:42		18:30 (74)	07:25			08:05		08:31 (39)
	21:30	34	21:02 (21)	21:01			20:07			19:09	8	18:38 (74)	17:15			16:51	9	08:40 (39)
8	05:54		20:17 (75)	06:26			07:05			07:43		08:23 (27)	07:27		16:35 (36)	08:06		08:32 (39)
	21:30	33	21:02 (21)	20:59			20:05			19:07	20	18:38 (74)	17:14	4	16:39 (36)	16:51	8	08:40 (39)
9	05:54		20:17 (75)	06:28			07:06			07:45		08:21 (27)	07:28		16:34 (36)	08:07		08:33 (39)
	21:30	33	21:02 (21)	20:58			20:03			19:05	25	18:39 (74)	17:12	7	16:41 (36)	16:51	11	15:59 (7)
10	05:55		20:16 (75)	06:29			07:08			07:46		08:19 (27)	07:30		16:33 (36)	08:08		08:34 (39)
	21:29	33	21:00 (21)	20:56			20:01			19:03	27	18:37 (74)	17:11	8	16:41 (36)	16:51	12	16:01 (7)
11	05:56		20:16 (75)	06:30			07:09			07:47		08:18 (27)	07:31		16:33 (36)	08:09		08:35 (39)
	21:29	32	21:00 (21)	20:55			19:59			19:01	25	18:34 (74)	17:10	9	16:42 (36)	16:51	12	16:02 (7)
12	05:57		20:16 (75)	06:31			07:10			07:49		08:17 (27)	07:32		16:32 (36)	08:09		08:36 (39)
	21:28	33	21:00 (21)	20:53			19:57			18:57	24	18:33 (74)	17:09	10	16:42 (36)	16:51	13	16:03 (7)
13	05:58		20:17 (75)	06:33			07:11			07:50		08:17 (27)	07:34		16:33 (36)	08:10		08:37 (39)
	21:27	31	20:59 (21)	20:52			19:55			18:55	20	08:37 (27)	17:08	9	16:42 (36)	16:51	13	16:04 (7)
14	05:59		20:17 (75)	06:34			07:13		19:09 (26)	07:52		08:17 (27)	07:35		16:33 (36)	08:11		08:38 (39)
	21:27	31	20:59 (21)	20:50			19:53	9	19:18 (26)	18:54	20	08:37 (27)	17:07	7	16:40 (36)	16:51	13	16:05 (7)
15	06:00		20:17 (75)	06:35			07:14		19:07 (26)	07:53		08:16 (27)	07:37		16:35 (36)	08:12		08:39 (39)
	21:26	30	20:47 (75)	20:48			19:51	12	19:19 (26)	18:52	21	08:37 (27)	17:05	4	16:39 (36)	16:51	13	16:06 (7)
16	06:01		20:17 (75)	06:36			07:15		07:43 (38)	07:54		08:16 (27)	07:38		16:36 (36)	08:13		08:39 (39)
	21:25	30	20:47 (75)	20:47			19:50	20	19:19 (26)	18:50	20	08:36 (27)	17:04	2	16:38 (36)	16:52	13	16:06 (7)
17	06:01		20:16 (75)	06:38			07:16		07:40 (38)	07:56		08:18 (27)	07:40			08:13		08:40 (39)
	21:24	30	20:46 (75)	20:45			19:48	26	19:19 (26)	18:48	17	08:35 (27)	17:03			16:52	12	16:06 (7)
18	06:02		20:16 (75)	06:39			07:18		07:40 (38)	07:57		08:19 (27)	07:41			08:14		08:41 (39)
	21:24	30	20:46 (75)	20:43			19:46	27	19:19 (26)	18:46	15	08:34 (27)	17:02			16:52	13	16:07 (7)
19	06:03		20:17 (75)	06:40			07:19		07:41 (38)	07:58		08:21 (27)	07:42		16:16 (35)	08:15		15:56 (7)
	21:23	29	20:46 (75)	20:42			19:44	25	19:18 (26)	18:45	12	08:33 (27)	17:01	5	16:21 (35)	16:52	11	16:07 (7)
20	06:04		20:17 (75)	06:41			07:20		07:42 (38)	08:00		08:22 (27)	07:44		16:14 (35)	08:15		15:57 (7)
	21:22	29	20:46 (75)	20:40			19:42	22	19:16 (26)	18:43	8	08:30 (27)	17:01	8	16:22 (35)	16:53	11	16:08 (7)
21	06:06		20:17 (75)	06:43			07:22		07:43 (38)	08:01		08:24 (133)	07:45		16:14 (35)	08:16		15:57 (7)
	21:21	29	20:46 (75)	20:38			19:40	18	19:14 (26)	18:41	7	08:31 (133)	17:00	10	16:24 (35)	16:53	11	16:08 (7)
22	06:07		20:17 (75)	06:44			07:23		07:44 (38)	08:02		08:25 (133)	07:46		16:14 (35)	08:16		15:58 (7)
	21:20	29	20:46 (75)	20:37			19:38	13	19:12 (26)	18:40	6	08:31 (133)	16:59	10	16:24 (35)	16:54	11	16:09 (7)
23	06:08		20:18 (75)	06:45			07:24		07:46 (38)	08:04		08:27 (133)	07:48		16:13 (35)	08:17		15:58 (7)
	21:19	28	20:46 (75)	20:35			19:36	4	07:50 (38)	18:38	4	08:31 (133)	16:58	11	16:24 (35)	16:54	11	16:09 (7)
24	06:09		20:18 (75)	06:46		07:09 (25)	07:25		07:47 (38)	08:05		08:28 (133)	07:49		16:14 (35)	08:17		15:59 (7)
	21:18	27	20:45 (75)	20:33	7	07:16 (25)	19:34	2	07:48 (38)	18:36	2	08:30 (133)	16:57	11	16:25 (35)	16:55	11	16:10 (7)
25	06:10		20:19 (75)	06:48		07:11 (25)	07:27			08:07			07:50		08:27 (39)	08:18		15:59 (7)
	21:17	27	20:46 (75)	20:31	7	07:18 (25)	19:32			18:35			16:57	16	16:25 (35)	16:56	11	16:10 (7)
26	06:11		20:20 (75)	06:49		07:12 (25)	07:28			08:08			07:52		08:26 (39)	08:18		08:44 (39)
	21:16	25	20:45 (75)	20:29	6	07:18 (25)	19:30			18:33			16:56	20	16:26 (35)	16:56	13	16:10 (7)
27	06:12		20:20 (75)	06:50		07:13 (25)	07:29			08:10			07:53		08:26 (39)	08:18		08:45 (39)
	21:15	25	20:45 (75)	20:28	5	07:18 (25)	19:28			18:31			16:55	20	16:26 (35)	16:57	13	16:12 (7)
28	06:13		20:21 (75)	06:51		07:14 (25)	07:30			08:11			07:54		08:25 (39)	08:19		08:45 (39)
	21:14	23	20:44 (75)	20:26	3	07:17 (25)	19:26			18:30			16:55	22	16:26 (35)	16:58	13	16:12 (7)
29	06:14		20:22 (75)	06:53		07:15 (25)	07:32			08:12			07:55		08:26 (39)	08:19		08:45 (39)
	21:13	21	20:43 (75)	20:24	2	07:17 (25)	19:24			18:28			16:54	20	16:26 (35)	16:58	13	16:12 (7)
30	06:16		06:40 (32)	06:54			07:33			08:14			07:57		08:25 (39)	08:19		08:45 (39)
	21:11	21	20:42 (75)	20:22			19:22			18:27			16:54	20	16:25 (35)	16:59	14	16:12 (7)
31	06:17		06:41 (32)	06:55						08:15						08:19		08:45 (39)
	21:10	18	20:40 (75)	20:20						18:25						17:00	13	16:12 (7)
Potential sun hours	477			439			378			339			285			270		
Total, worst case		908			49			178			310			233			377	
Sun reduction		0.76			0.73			0.69			0.52			0.42			0.42	
Oper. time red.		0.96			0.96			0.96			0.96			0.96			0.96	
Wind dir. red.		0.68			0.61			0.62			0.64			0.59			0.60	
Total reduction		0.50			0.42			0.41			0.32			0.24			0.24	
Total, real		450			21			72			98			56			91	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 8:45 AM / 30

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H16 - H16

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January		February		March		April		May		June	
1	08:20		08:00		07:17		07:18		06:25		05:50	
	17:02		17:41		18:21		20:03	19	07:41 (70)		06:49 (134)	
2	08:20		07:59		07:15		07:16		20:03	17	05:49	12
	17:03		17:43		18:23		20:05	18	07:41 (70)		06:49 (134)	
3	08:20		07:58		07:14		07:14		06:23		05:49	
	17:03		17:44		18:24		20:06	16	07:42 (70)		06:50 (134)	
4	08:19		07:57		07:12		07:12		06:22		05:49	
	17:04		17:46		18:25		20:07	14	07:43 (70)		06:50 (134)	
5	08:19		07:55		07:10		07:11		06:20		05:48	
	17:06		17:47		18:27		20:09	10	07:44 (70)		06:51 (134)	
6	08:19		07:54		07:08		07:09		06:19		05:48	
	17:07		17:49		18:28		20:10	3	07:47 (70)		06:52 (134)	
7	08:19		07:53		07:06		07:07		06:17		05:47	
	17:08		17:50		18:30		20:11		07:50 (70)		06:54 (134)	
8	08:19		07:51		08:04		07:05		06:16		05:47	
	17:09		17:52		18:31		20:13		20:51	6	07:00 (134)	
9	08:18		07:50		08:03		07:03		06:14		05:46	
	17:10		17:53		19:32		20:14		20:52		21:24	13
10	08:18		07:49		08:01		07:01		06:13		05:46	
	17:11		17:55		19:34		20:15		20:53		21:25	12
11	08:18		07:47		07:59		06:59		06:12		05:46	
	17:12		17:56		19:35		20:17		20:55		21:26	12
12	08:17		07:46		07:57		06:57		06:10		05:46	
	17:14		17:58		19:37		20:18		20:56		21:27	12
13	08:17		07:44		07:55		06:56		06:09		05:45	
	17:15		17:59		19:38		20:19		20:57		21:28	11
14	08:16		07:43		07:53		06:54		06:08		05:45	
	17:16		18:01		19:39		20:21		20:58		21:28	11
15	08:16		07:41		07:51		06:52		06:07		05:45	
	17:17		18:01		19:41		20:22		21:00		21:29	11
16	08:15		07:39		07:49		06:50		06:05		05:45	
	17:19		18:02		19:42		20:23		21:01	2	06:28 (20)	
17	08:15		07:38		07:47		06:48		06:04		05:45	
	17:20		18:04		19:43		20:25		21:02	3	06:29 (20)	
18	08:14		07:36		07:45		06:47		06:03		05:45	
	17:21		18:05		19:45		20:26		21:03	5	06:30 (20)	
19	08:13		07:35		07:43		06:45		06:02		05:45	
	17:23		18:07		19:46		20:27		21:04	6	06:31 (20)	
20	08:12		07:33		07:41		06:43		06:01		05:45	
	17:24		18:08		19:47		20:29		21:06	7	06:31 (20)	
21	08:12		07:31		07:40		06:41		06:00		05:45	
	17:25		18:10		19:49		20:30		21:07	8	06:31 (20)	
22	08:11		07:30		07:38		06:40		05:59		05:46	
	17:27		18:11		19:50		20:31		21:08	9	06:31 (20)	
23	08:10		07:28		07:36		06:38		06:22 (20)		05:46	
	17:28		18:12		19:51		20:33		21:09	8	06:30 (20)	
24	08:09		07:26		07:34		06:36		05:57		05:46	
	17:30		18:14		19:53		20:34	5	06:57 (134)		06:24 (20)	
25	08:08		07:24		07:32		06:34		05:56		05:46	
	17:31		18:15		19:54	3	07:52 (70)		07:02 (134)		06:28 (20)	
26	08:07		07:23		07:30		06:33		05:55		05:47	
	17:32		18:17		19:55	8	07:55 (70)		06:54 (134)		06:19 (107)	
27	08:06		07:21		07:28		06:31		05:54		05:47	
	17:34		18:18		19:57	11	07:59 (70)		07:06 (134)		06:24 (107)	
28	08:05		07:19		07:26		06:30		05:53		05:47	
	17:35		18:20		19:58	14	08:00 (70)		06:53 (134)		06:17 (107)	
29	08:04				07:24		06:28		05:53		05:48	
	17:37				19:59	16	08:01 (70)		07:07 (134)		06:16 (107)	
30	08:03				07:22		06:26		05:52		05:48	
	17:38				20:01	18	08:01 (70)		07:07 (134)		06:26 (107)	
31	08:02				07:20		06:26		05:51		05:49	
	17:40				20:02	19	08:01 (70)		07:07 (134)		06:27 (107)	
									05:50		05:49	
									07:17

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H16 - H16

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October	November	December
1	05:49		06:23 (107)	06:18			06:57			07:35	07:17	07:58
	21:32	11	06:34 (107)	21:09			20:19			19:20	17:24	16:53
2	05:50		06:22 (107)	06:19			06:58			07:36	07:18	07:59
	21:32	12	06:34 (107)	21:08			20:17			19:18	17:22	16:53
3	05:50		06:23 (107)	06:21			06:59			07:37	07:20	08:00
	21:32	12	06:35 (107)	21:06			20:15			19:16	17:21	16:53
4	05:51		06:22 (107)	06:22			07:00			07:38	07:21	08:02
	21:32	12	06:34 (107)	21:05			20:13			19:15	17:19	16:52
5	05:52		06:23 (107)	06:23			07:02			07:40	07:23	08:03
	21:31	12	06:35 (107)	21:04			20:11			19:13	17:18	16:52
6	05:52		06:23 (107)	06:24		07:03 (134)	07:03		07:44 (70)	07:41	07:24	08:04
	21:31	13	06:36 (107)	21:02	8	07:11 (134)	20:09	2	07:45 (70)	19:11	17:17	16:52
7	05:53		06:22 (107)	06:25		07:01 (134)	07:04		07:39 (70)	07:42	07:25	08:05
	21:31	13	06:35 (107)	21:01	11	07:12 (134)	20:07	10	07:49 (70)	19:09	17:15	16:52
8	05:54		06:23 (107)	06:27		07:00 (134)	07:05		07:38 (70)	07:44	07:27	08:06
	21:30	13	06:36 (107)	20:59	14	07:14 (134)	20:05	14	07:52 (70)	19:07	17:14	16:51
9	05:55		06:23 (107)	06:28		06:59 (134)	07:07		07:36 (70)	07:45	07:28	08:07
	21:30	13	06:36 (107)	20:58	16	07:15 (134)	20:03	16	07:52 (70)	19:05	17:13	16:51
10	05:56		06:24 (107)	06:29		06:58 (134)	07:08		07:35 (70)	07:46	07:30	08:08
	21:29	12	06:36 (107)	20:56	17	07:15 (134)	20:01	17	07:52 (70)	19:03	17:12	16:51
11	05:56		06:24 (107)	06:30		06:58 (134)	07:09		07:34 (70)	07:48	07:31	08:09
	21:29	13	06:37 (107)	20:55	17	07:15 (134)	20:00	18	07:52 (70)	19:01	17:10	16:51
12	05:57		06:24 (107)	06:32		06:57 (134)	07:10		07:33 (70)	07:49	07:33	08:10
	21:28	12	06:36 (107)	20:53	18	07:15 (134)	19:58	19	07:52 (70)	18:58	17:09	16:51
13	05:58		06:24 (107)	06:33		06:57 (134)	07:12		07:34 (70)	07:50	07:34	08:10
	21:27	12	06:36 (107)	20:52	18	07:15 (134)	19:56	18	07:52 (70)	18:56	17:08	16:51
14	05:59		06:25 (107)	06:34		06:58 (134)	07:13		07:35 (70)	07:52	07:35	08:11
	21:27	11	06:36 (107)	20:50	17	07:15 (134)	19:54	16	07:51 (70)	18:54	17:07	16:52
15	06:00		06:25 (107)	06:35		06:59 (134)	07:14		07:36 (70)	07:53	07:37	08:12
	21:26	10	06:35 (107)	20:49	15	07:14 (134)	19:52	14	07:50 (70)	18:52	17:06	16:52
16	06:01		06:26 (107)	06:37		07:00 (134)	07:15		07:37 (70)	07:54	07:38	08:13
	21:25	9	06:35 (107)	20:47	13	07:13 (134)	19:50	12	07:49 (70)	18:50	17:05	16:52
17	06:02		06:27 (107)	06:38		07:01 (134)	07:17		07:39 (70)	07:56	07:40	08:14
	21:25	7	06:34 (107)	20:45	11	07:12 (134)	19:48	8	07:47 (70)	18:48	17:04	16:52
18	06:03		06:29 (107)	06:39		07:02 (134)	07:18		07:40 (70)	07:57	07:41	08:14
	21:24	4	06:33 (107)	20:44	8	07:10 (134)	19:46	4	07:44 (70)	18:47	17:03	16:52
19	06:04		06:35 (20)	06:40		07:04 (134)	07:19			07:59	07:42	08:15
	21:23	3	06:38 (20)	20:42	5	07:09 (134)	19:44			18:45	17:02	16:53
20	06:05		06:34 (20)	06:42			07:20			08:00	07:44	08:16
	21:22	6	06:40 (20)	20:40			19:42			18:43	17:01	16:53
21	06:06		06:33 (20)	06:43			07:22			08:01	07:45	08:16
	21:21	7	06:40 (20)	20:39			19:40			18:41	17:00	16:54
22	06:07		06:32 (20)	06:44			07:23			08:03	07:47	08:17
	21:20	9	06:41 (20)	20:37			19:38			18:40	16:59	16:54
23	06:08		06:33 (20)	06:45			07:24			08:04	07:48	08:17
	21:19	8	06:41 (20)	20:35			19:36			18:38	16:58	16:55
24	06:09		06:34 (20)	06:47			07:26			08:05	07:49	08:18
	21:18	8	06:42 (20)	20:33			19:34			18:36	16:58	16:55
25	06:10		06:35 (20)	06:48			07:27			08:07	07:51	08:18
	21:17	7	06:42 (20)	20:31			19:32			18:35	16:57	16:56
26	06:11		06:36 (20)	06:49			07:28			08:08	07:52	08:18
	21:16	5	06:41 (20)	20:30			19:30			18:33	16:56	16:57
27	06:12		06:37 (20)	06:50			07:29			08:10	07:53	08:19
	21:15	4	06:41 (20)	20:28			19:28			18:32	16:56	16:57
28	06:14		06:38 (20)	06:52			07:31			08:11	07:54	08:19
	21:14	2	06:40 (20)	20:26			19:26			18:30	16:55	16:58
29	06:15			06:53			07:32			08:13	07:56	08:19
	21:13			20:24			19:24			18:28	16:54	16:59
30	06:16			06:54			07:33			08:14	07:57	08:19
	21:11			20:22			19:22			18:27	16:54	17:00
31	06:17			06:55						08:15		08:19
	21:10			20:21						18:25		17:00
Potential sun hours	476			439			378			339	285	270
Total, worst case		260			188			168				
Sun reduction		0.76			0.73			0.69				
Oper. time red.		0.96			0.96			0.96				
Wind dir. red.		0.56			0.55			0.62				
Total reduction		0.41			0.39			0.41				
Total, real		106			73			69				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H17 - H17

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:19	08:00	07:17	07:18	06:25	20:10 (20) 05:50
	17:01	17:41	18:21	20:03	20:43 8	20:18 (20) 21:19
2	08:19	07:59	07:15	07:16	06:23	20:09 (20) 05:49
	17:02	17:43	18:22	20:05	20:44 11	20:20 (20) 21:20
3	08:19	07:58	07:13	07:14	06:22	20:07 (20) 05:48
	17:03	17:44	18:24	20:06	20:46 13	20:20 (20) 21:21
4	08:19	07:57	07:12	07:12	06:20	20:06 (78) 05:48
	17:04	17:46	18:25	20:07	20:47 15	20:21 (20) 21:22
5	08:19	07:55	07:10	07:10	06:19	20:05 (78) 05:47
	17:05	17:47	18:27	20:09	20:48 17	20:22 (20) 21:23
6	08:19	07:54	07:08	07:09	06:17	20:04 (78) 05:47
	17:06	17:49	18:28	20:10	20:49 17	20:21 (20) 21:23
7	08:19	07:53	07:06	07:07	06:16	20:03 (78) 05:47
	17:07	17:50	18:29	20:11	20:51 19	20:22 (78) 21:24
8	08:19	07:51	08:04	07:05	06:14	06:36 (116) 05:46
	17:09	17:52	18:31	20:13	20:52 22	20:22 (78) 21:25
9	08:18	07:50	08:02	07:03	19:50 (113) 06:13	06:35 (116) 05:46
	17:10	17:53	19:32	20:14 2	19:52 (113) 20:53 26	20:22 (78) 21:26
10	08:18	07:48	08:00	07:01	19:49 (113) 06:12	06:34 (116) 05:46
	17:11	17:55	19:34	20:15 4	19:53 (113) 20:55 29	20:23 (78) 21:26
11	08:18	07:47	07:59	06:59	19:48 (113) 06:10	06:33 (116) 05:46
	17:12	17:56	19:35	20:17 6	19:54 (113) 20:56 31	20:23 (78) 21:27
12	08:17	07:45	07:57	06:57	19:48 (113) 06:09	06:31 (116) 05:45
	17:13	17:58	19:36	20:18 7	19:55 (107) 20:57 32	20:23 (78) 21:28
13	08:17	07:44	07:55	06:55	19:48 (113) 06:08	06:30 (116) 05:45
	17:15	17:59	19:38	20:19 8	19:56 (107) 20:58 34	20:23 (78) 21:28
14	08:16	07:42	07:53	06:54	19:49 (107) 06:06	06:31 (116) 05:45
	17:16	18:01	19:39	20:21 8	19:57 (107) 21:00 33	20:23 (78) 21:29
15	08:16	07:41	07:51	06:52	19:49 (107) 06:05	06:31 (116) 05:45
	17:17	18:01	19:40	20:22 10	19:59 (107) 21:01 31	20:22 (78) 21:29
16	08:15	07:39	07:49	06:50	19:49 (107) 06:04	06:32 (116) 05:45
	17:18	18:02	19:42	20:23 10	19:59 (107) 21:02 29	20:22 (78) 21:30
17	08:14	07:38	07:47	06:48	19:49 (107) 06:03	06:32 (116) 05:45
	17:20	18:04	19:43	20:25 9	19:58 (107) 21:03 28	20:22 (78) 21:30
18	08:14	07:36	07:45	06:46	19:49 (107) 06:02	06:34 (116) 05:45
	17:21	18:05	19:45	20:26 8	19:57 (107) 21:04 24	20:21 (78) 21:30
19	08:13	07:34	07:43 19:23 (134)	06:45	19:52 (107) 06:01	20:04 (78) 05:45
	17:22	18:06	19:46 2 19:24 (134)	20:27 3	19:55 (107) 21:06 17	20:21 (78) 21:31
20	08:12	07:33	07:41 19:23 (134)	06:43	06:00	20:05 (78) 05:45
	17:24	18:08	19:47 2 19:25 (134)	20:29	21:07 15	20:20 (78) 21:31
21	08:11	07:31	07:39 19:25 (134)	06:41	05:59	20:06 (78) 05:45
	17:25	18:09	19:49 2 19:27 (134)	20:30	21:08 13	20:19 (78) 21:31
22	08:11	07:29	07:37	06:39	05:58	20:07 (78) 05:46
	17:27	18:11	19:50	20:31	21:09 11	20:18 (78) 21:32
23	08:10	07:28	07:35	06:38	05:57	20:09 (78) 05:46
	17:28	18:12	19:51	20:32	21:10 7	20:16 (78) 21:32
24	08:09	07:26	07:34	06:36	05:56	05:46
	17:29	18:14	19:53	20:34	21:11	21:32
25	08:08	07:24	07:32	06:34	05:55	05:46
	17:31	18:15	19:54	20:35	21:12	21:32
26	08:07	07:22	07:30	06:33	05:54	05:47
	17:32	18:17	19:55	20:36	21:13	21:32
27	08:06	07:21	07:28	06:31	05:53	05:47
	17:34	18:18	19:57	20:38	21:14	21:32
28	08:05	07:19 07:40 (66)	07:26	06:29	05:52	05:48
	17:35	18:20 2 07:41 (66)	19:58	20:39	21:15	21:32
29	08:04		07:24	06:28	05:52	05:48
	17:37		19:59	20:40	21:16	21:32
30	08:03		07:22	06:26	05:51	05:49
	17:38		20:01	20:42	21:17	21:32
31	08:02		07:20		05:50	
	17:40		20:02		21:18	
Potential sun hours	282	289	368	406	463	471
Total, worst case		2	6	75	482	
Sun reduction		0.50	0.63	0.59	0.68	
Oper. time red.		0.96	0.96	0.96	0.96	
Wind dir. red.		0.65	0.61	0.64	0.65	
Total reduction		0.31	0.37	0.37	0.43	
Total, real		1	2	27	205	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H17 - H17

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October		November	December
1	05:49		06:18	06:42 (116)	06:57	19:47 (113)	07:34		07:17	07:58
	21:32		21:09 32	20:33 (78)	20:19 6	19:53 (113)	19:20		17:24	16:53
2	05:50		06:19	06:43 (116)	06:58	19:47 (113)	07:36		07:18	07:59
	21:32		21:08 30	20:33 (78)	20:17 4	19:51 (113)	19:18		17:22	16:53
3	05:50		06:20	06:45 (116)	06:59	19:47 (113)	07:37		07:20	08:00
	21:32		21:06 27	20:33 (78)	20:15 2	19:49 (113)	19:16		17:21	16:52
4	05:51		06:22	06:46 (116)	07:00		07:38		07:21	08:01
	21:31		21:05 25	20:33 (78)	20:13		19:14		17:19	16:52
5	05:52		06:23	20:12 (78)	07:02		07:40		07:22	08:03
	21:31		21:04 20	20:32 (78)	20:11		19:12		17:18	16:52
6	05:52		06:24	20:13 (78)	07:03		07:41		07:24	08:04
	21:31		21:02 18	20:31 (20)	20:09		19:11		17:17	16:52
7	05:53		06:25	20:13 (78)	07:04		07:42		07:25	08:05
	21:30		21:01 18	20:31 (20)	20:07		19:09		17:15	16:51
8	05:54		06:27	20:14 (78)	07:05		07:44		07:27	08:06
	21:30		20:59 16	20:30 (20)	20:05		19:07		17:14	16:51
9	05:55		06:28	20:17 (20)	07:07		07:45		07:28	08:07
	21:30		20:58 13	20:30 (20)	20:03		19:05		17:13	16:51
10	05:55		06:29	20:17 (20)	07:08		07:46		07:30	08:08
	21:29		20:56 12	20:29 (20)	20:01		19:03		17:11	16:51
11	05:56		06:30	20:18 (20)	07:09		07:48		07:31	08:09
	21:29		20:55 10	20:28 (20)	19:59		19:01		17:10	16:51
12	05:57		06:31	20:20 (20)	07:10		07:49		07:32	08:09
	21:28		20:53 6	20:26 (20)	19:57		18:57		17:09	16:51
13	05:58		06:33		07:12		07:50	08:12 (66)	07:34	08:10
	21:27		20:52		19:55		18:56 2	08:13 (66)	17:08	16:51
14	05:59		06:34		07:13		07:52	08:14 (66)	07:35	08:11
	21:27		20:50		19:54		18:54 2	08:15 (66)	17:07	16:51
15	06:00		06:35		07:14		07:53		07:37	08:12
	21:26		20:48		19:52		18:52		17:06	16:52
16	06:01		06:36		07:15		07:54		07:38	08:13
	21:25		20:47		19:50		18:50		17:05	16:52
17	06:02		06:38		07:17		07:56		07:40	08:13
	21:24		20:45		19:48		18:48		17:04	16:52
18	06:03		06:39		07:18		07:57		07:41	08:14
	21:24		20:43		19:46		18:47		17:03	16:52
19	06:04		06:40		07:19		07:58		07:42	08:15
	21:23		20:42		19:44		18:45		17:02	16:53
20	06:05	20:22 (78)	06:41		07:20		08:00		07:44	08:15
	21:22 2	20:24 (78)	20:40		19:42		18:43		17:01	16:53
21	06:06	20:19 (78)	06:43		07:22		08:01		07:45	08:16
	21:21 8	20:27 (78)	20:38		19:40		18:41		17:00	16:54
22	06:07	20:17 (78)	06:44		07:23		08:03		07:46	08:16
	21:20 12	20:29 (78)	20:37		19:38		18:40		16:59	16:54
23	06:08	20:16 (78)	06:45		07:24	19:08 (134)	08:04		07:48	08:17
	21:19 14	20:30 (78)	20:35		19:36 2	19:10 (134)	18:38		16:58	16:55
24	06:09	20:15 (78)	06:46	19:54 (107)	07:25	19:06 (134)	08:05		07:49	08:17
	21:18 16	20:31 (78)	20:33 4	19:58 (107)	19:34 2	19:08 (134)	18:36		16:57	16:55
25	06:10	06:45 (116)	06:48	19:53 (107)	07:27	19:05 (134)	08:07		07:50	08:18
	21:17 22	20:32 (78)	20:31 8	20:01 (107)	19:32 2	19:06 (134)	18:35		16:57	16:56
26	06:11	06:44 (116)	06:49	19:51 (107)	07:28		08:08		07:52	08:18
	21:16 25	20:32 (78)	20:30 10	20:01 (107)	19:30		18:33		16:56	16:56
27	06:12	06:43 (116)	06:50	19:50 (107)	07:29		08:10		07:53	08:18
	21:15 29	20:33 (78)	20:28 11	20:01 (107)	19:28		18:31		16:55	16:57
28	06:13	06:42 (116)	06:52	19:50 (107)	07:31		08:11		07:54	08:19
	21:14 31	20:33 (78)	20:26 10	20:00 (107)	19:26		18:30		16:55	16:58
29	06:15	06:41 (116)	06:53	19:50 (107)	07:32		08:12		07:55	08:19
	21:13 32	20:33 (78)	20:24 8	19:58 (107)	19:24		18:28		16:54	16:59
30	06:16	06:41 (116)	06:54	19:49 (113)	07:33		08:14		07:57	08:19
	21:11 32	20:33 (78)	20:22 8	19:57 (107)	19:22		18:27		16:54	16:59
31	06:17	06:41 (116)	06:55	19:48 (113)			08:15			08:19
	21:10 33	20:33 (78)	20:20 7	19:55 (107)			18:25			17:00
Potential sun hours	476		439		378		339		285	270
Total, worst case	256		293		18		4			
Sun reduction	0.76		0.73		0.69		0.52			
Oper. time red.	0.96		0.96		0.96		0.96			
Wind dir. red.	0.64		0.65		0.63		0.65			
Total reduction	0.47		0.46		0.42		0.32			
Total, real	120		134		8		1			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
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Minneapolis, MN 55413

Description:

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Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H18 - H18

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January		February		March		April		May		June	
1	08:19		08:00		07:17		07:18		06:24		06:46 (65)	05:49
	17:01		17:41		18:20		20:03		20:43	7	06:53 (65)	21:19
2	08:19		07:59		07:15		07:16		06:23		06:44 (65)	05:49
	17:02		17:42		18:22		20:04		20:44	7	06:51 (65)	21:20
3	08:19		07:57		07:13		07:14		06:21		06:44 (65)	05:48
	17:03		17:44		18:23		20:06		20:45	6	06:50 (65)	21:20
4	08:19		07:56		07:11		07:12		06:20			05:48
	17:04		17:45		18:25		20:07		20:46			21:21
5	08:19		07:55		07:09		07:10		06:18			05:47
	17:05		17:47		18:26		20:08		20:48			21:22
6	08:19		07:54		07:08		07:08		06:17			05:47
	17:06		17:48		18:28		20:10		20:49			21:23
7	08:18		07:52		07:06		07:06		06:15			05:46
	17:07		17:50		18:29		20:11		20:50			21:24
8	08:18		07:51		08:04		07:04		06:14			05:46
	17:08		17:51		18:30		20:12		20:52			21:24
9	08:18		07:49		08:02		07:02		06:12		06:35 (64)	05:46
	17:09		17:53		19:32		20:13		20:53	6	06:41 (64)	21:25
10	08:18		07:48		08:00		07:01		06:11		06:33 (64)	05:45
	17:11		17:54		19:33		20:15		20:54	8	06:41 (64)	21:26
11	08:17		07:46		07:58		06:59		06:10		06:32 (64)	05:45
	17:12		17:56		19:35		20:16		20:55	11	06:43 (64)	21:26
12	08:17		07:45		07:56		06:57		06:09		06:31 (64)	05:45
	17:13		17:57		19:36		20:17		20:57	13	06:44 (64)	21:27
13	08:16		07:43		08:05 (92)		07:54		06:55		06:07	06:30 (64)	05:45
	17:14		17:59	3	08:08 (92)		19:37		20:19		20:58	14	06:44 (64)	21:28
14	08:16		07:42		08:04 (92)		07:52		06:53		06:06	06:29 (64)	05:45
	17:15		18:00	6	08:10 (92)		19:39		20:20		20:59	16	06:45 (64)	21:28
15	08:15		07:40		08:02 (92)		07:51		06:51		07:12 (69)	06:05	06:28 (64)	05:45
	17:17		18:00	8	08:10 (92)		19:40		20:21	3	07:15 (69)	21:00	17	06:45 (64)	21:29
16	08:15		07:39		08:01 (92)		07:49		06:50		07:10 (69)	06:04		06:26 (64)	05:45
	17:18		18:02	10	08:11 (92)		19:41		20:23	5	07:15 (69)	21:01	18	06:44 (64)	21:29
17	08:14		07:37		07:59 (92)		07:47		06:48		07:09 (69)	06:02		06:27 (64)	05:45
	17:19		18:03	12	08:11 (92)		19:43		20:24	7	07:16 (69)	21:03	17	06:44 (64)	21:30
18	08:13		07:36		07:57 (92)		07:45		06:46		07:07 (69)	06:01		06:27 (64)	05:45
	17:21		18:05	14	08:11 (92)		19:44		20:25	8	07:15 (69)	21:04	17	06:44 (64)	21:30
19	08:13		07:34		07:57 (92)		07:43		06:44		07:05 (69)	06:00		06:27 (64)	05:45
	17:22		18:06	14	08:11 (92)		19:45		20:27	9	07:14 (69)	21:05	17	06:44 (64)	21:30
20	08:12		07:32		07:57 (92)		07:41		06:42		07:03 (69)	05:59		06:27 (64)	05:45
	17:23		18:07	13	08:10 (92)		19:47		20:28	10	07:13 (69)	21:06	17	06:44 (64)	21:31
21	08:11		07:31		07:58 (92)		07:39		06:41		07:05 (69)	05:58		06:28 (64)	05:45
	17:25		18:09	11	08:09 (92)		19:48		20:29	7	07:12 (69)	21:07	16	06:44 (64)	21:31
22	08:10		07:29		07:59 (92)		07:37		06:39			05:57		06:29 (64)	05:45
	17:26		18:10	7	08:06 (92)		19:50		20:31			21:08	15	06:44 (64)	21:31
23	08:09		07:27				07:35		06:37			05:56		06:30 (64)	05:45
	17:28		18:12				19:51		20:32			21:10	13	06:43 (64)	21:31
24	08:08		07:25				07:33		06:36			05:55		06:30 (64)	05:46
	17:29		18:13				19:52		20:33			21:11	12	06:42 (64)	21:32
25	08:07		07:24				07:31		06:34			05:54		06:31 (64)	05:46
	17:30		18:15				19:54		20:35			21:12	10	06:41 (64)	21:32
26	08:06		07:22				07:29		06:32		06:54 (87)	05:54		06:32 (64)	05:46
	17:32		18:16				19:55		20:36	2	06:55 (87)	21:13	8	06:40 (64)	21:32
27	08:05		07:20				07:27		06:31		06:52 (87)	05:53		06:35 (64)	05:47
	17:33		18:18				19:56		20:37	2	06:54 (87)	21:14	3	06:38 (64)	21:32
28	08:04		07:18				07:25		06:29		06:50 (65)	05:52			05:47
	17:35		18:19				19:58		20:39	3	06:53 (87)	21:15			21:32
29	08:03						07:23		06:27		06:49 (65)	05:51			05:48
	17:36						19:59		20:40	4	06:53 (65)	21:16			21:32
30	08:02						07:21		06:26		06:47 (65)	05:50			05:48
	17:38						20:00		20:41	5	06:52 (65)	21:17			21:32
31	08:01						07:20					05:50			
	17:39						20:02					21:18			
Potential sun hours	282		289			368		406			463			471
Total, worst case				98				65			268			
Sun reduction				0.50				0.59			0.68			
Oper. time red.				0.96				0.96			0.96			
Wind dir. red.				0.68				0.57			0.56			
Total reduction				0.33				0.33			0.37			
Total, real				32				21			99			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 8:45 AM / 35

Licensed user:
EAPC Wind Energy
3100 DeMers Avenue
US-GRAND FORKS, ND 58201
+1 701 775 3000
wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H18 - H18

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	July		August		September	October		November	December
1	05:49		06:18		06:42 (64)	06:56	07:34	07:16	07:57
	21:32		21:08	12	06:54 (64)	20:18	19:20	17:23	16:53
2	05:49		06:19		06:43 (64)	06:57	07:35	07:18	07:59
	21:31		21:07	10	06:53 (64)	20:16	19:18	17:22	16:52
3	05:50		06:20		06:44 (64)	06:59	07:37	07:19	08:00
	21:31		21:06	7	06:51 (64)	20:14	19:16	17:20	16:52
4	05:51		06:21		06:45 (64)	07:00	07:38	07:21	08:01
	21:31		21:04	4	06:49 (64)	20:12	19:14	17:19	16:52
5	05:51		06:22			07:01	07:39	07:22	08:02
	21:31		21:03			20:10	19:12	17:18	16:51
6	05:52		06:24			07:02	07:40	07:23	08:03
	21:30		21:02			20:09	19:10	17:16	16:51
7	05:53		06:25			07:04	07:42	07:25	08:04
	21:30		21:00			20:07	19:08	17:15	16:51
8	05:53		06:26			07:05	07:43	07:26	08:05
	21:30		20:59			20:05	19:06	17:13	16:51
9	05:54		06:27		06:54 (65)	07:06	07:44	07:28	08:06
	21:29		20:57	4	06:58 (65)	20:03	19:04	17:12	16:51
10	05:55		06:29		06:52 (65)	07:07	07:46	07:29	08:07
	21:29		20:56	7	06:59 (65)	20:01	19:03	17:11	16:51
11	05:56		06:30		06:53 (65)	07:09	07:47	07:31	08:08
	21:28		20:54	7	07:00 (65)	19:59	19:01	17:10	16:51
12	05:57		06:31		06:55 (65)	07:10	07:48	07:32	08:09
	21:27		20:53	6	07:01 (65)	19:57	18:57	17:09	16:51
13	05:57		06:32		06:56 (65)	07:11	07:50	07:33	08:10
	21:27		20:51	5	07:01 (65)	19:55	18:55	17:07	16:51
14	05:58		06:34		06:57 (65)	07:12	07:51	07:35	08:11
	21:26		20:50	4	07:01 (65)	19:53	18:53	17:06	16:51
15	05:59		06:35		06:58 (65)	07:14	07:52	07:36	08:11
	21:26		20:48	3	07:01 (87)	19:51	18:51	17:05	16:51
16	06:00		06:36		06:59 (87)	07:15	07:54	07:38	08:12
	21:25		20:46	2	07:01 (87)	19:49	18:50	17:04	16:51
17	06:01	06:43 (64)	06:37			07:16	07:55	07:39	08:13
	21:24	5 06:48 (64)	20:45			19:47	18:48	17:03	16:52
18	06:02	06:41 (64)	06:39			07:17	07:57	07:40	08:14
	21:23	9 06:50 (64)	20:43			19:45	18:46	17:02	16:52
19	06:03	06:40 (64)	06:40			07:19	07:58	07:42	08:14
	21:22	11 06:51 (64)	20:41			19:43	18:44	17:01	16:52
20	06:04	06:40 (64)	06:41			07:20	07:59	08:30 (92)	07:43	08:15
	21:21	12 06:52 (64)	20:40			19:41	18:43	8 08:38 (92)	17:00	16:53
21	06:05	06:39 (64)	06:42			07:21	08:01	08:28 (92)	07:45	08:15
	21:21	14 06:53 (64)	20:38			19:39	18:41	11 08:39 (92)	16:59	16:53
22	06:06	06:38 (64)	06:44		07:10 (69)	07:22	08:02	08:27 (92)	07:46	08:16
	21:20	16 06:54 (64)	20:36	7	07:17 (69)	19:37	18:39	14 08:41 (92)	16:59	16:54
23	06:07	06:38 (64)	06:45		07:08 (69)	07:24	08:03	08:26 (92)	07:47	08:16
	21:19	16 06:54 (64)	20:34	10	07:18 (69)	19:35	18:38	15 08:41 (92)	16:58	16:54
24	06:08	06:38 (64)	06:46		07:09 (69)	07:25	08:05	08:28 (92)	07:49	08:17
	21:18	17 06:55 (64)	20:33	9	07:18 (69)	19:33	18:36	13 08:41 (92)	16:57	16:55
25	06:10	06:37 (64)	06:47		07:10 (69)	07:26	08:06	08:29 (92)	07:50	08:17
	21:17	18 06:55 (64)	20:31	8	07:18 (69)	19:31	18:34	12 08:41 (92)	16:56	16:55
26	06:11	06:37 (64)	06:49		07:11 (69)	07:28	08:08	08:31 (92)	07:51	08:18
	21:16	18 06:55 (64)	20:29	7	07:18 (69)	19:29	18:33	10 08:41 (92)	16:56	16:56
27	06:12	06:37 (64)	06:50		07:13 (69)	07:29	08:09	08:32 (92)	07:52	08:18
	21:14	18 06:55 (64)	20:27	5	07:18 (69)	19:28	18:31	8 08:40 (92)	16:55	16:57
28	06:13	06:37 (64)	06:51		07:14 (69)	07:30	08:11	08:34 (92)	07:54	08:18
	21:13	18 06:55 (64)	20:25	2	07:16 (69)	19:26	18:29	5 08:39 (92)	16:54	16:57
29	06:14	06:39 (64)	06:52			07:31	08:12	08:35 (92)	07:55	08:18
	21:12	17 06:56 (64)	20:24			19:24	18:28	2 08:37 (92)	16:54	16:58
30	06:15	06:40 (64)	06:54			07:33	08:13		07:56	08:19
	21:11	15 06:55 (64)	20:22			19:22	18:26		16:53	16:59
31	06:16	06:41 (64)	06:55				08:15			08:19
	21:10	14 06:55 (64)	20:20				18:25			17:00
Potential sun hours	476		439			378	339		285	270
Total, worst case		218		119				98		
Sun reduction		0.76		0.73				0.52		
Oper. time red.		0.96		0.96				0.96		
Wind dir. red.		0.56		0.56				0.68		
Total reduction		0.41		0.40				0.34		
Total, real		90		47				33		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 8:45 AM / 36
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+1 701 775 3000
wind@eapc.net
Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H20 - H20

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:16	07:17	06:24	05:49	05:49	06:17	06:56	07:34	07:16	07:57
	17:01	17:41	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:58	07:15	07:16	06:22	05:48	05:49	06:19	06:57	07:35	07:17	07:58
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:52
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:58	07:36	07:19	08:00
	17:03	17:44	18:23	20:05	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:19	05:47	05:50	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:18	07:55	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:47	21:22	21:30	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:17	05:46	05:52	06:23	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:23	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:52	06:25	07:03	07:42	07:25	08:04
	17:07	17:49	18:29	20:11	20:50	21:23	21:30	21:00	20:06	19:08	17:15	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:05	19:06	17:13	16:51
9	08:18	07:49	08:02	07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:27	08:06
	17:09	17:52	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:00	06:11	05:45	05:55	06:28	07:07	07:46	07:29	08:07
	17:10	17:54	19:33	20:15	20:54	21:26	21:28	20:56	20:01	19:02	17:11	16:51
11	08:17	07:46	07:58	06:59	06:10	05:45	05:56	06:30	07:08	07:47	07:30	08:08
	17:12	17:55	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:00	17:10	16:51
12	08:16	07:45	07:56	06:57	06:08	05:45	05:56	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:52	19:57	18:57	17:08	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:57	06:32	07:11	07:50	07:33	08:10
	17:14	17:58	19:37	20:19	20:58	21:27	21:27	20:51	19:55	18:55	17:07	16:51
14	08:15	07:42	07:52	06:53	06:06	05:44	05:58	06:33	07:12	07:51	07:35	08:10
	17:15	18:00	19:38	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:05	05:44	05:59	06:35	07:13	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:39	07:48	06:49	06:03	05:44	06:00	06:36	07:15	07:54	07:37	08:12
	17:18	18:01	19:41	20:23	21:01	21:29	21:25	20:46	19:49	18:49	17:04	16:51
17	08:14	07:37	07:46	06:48	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:43	20:24	21:02	21:29	21:24	20:44	19:47	18:48	17:03	16:51
18	08:13	07:35	07:45	06:46	06:01	05:44	06:02	06:38	07:17	07:56	07:40	08:13
	17:21	18:04	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:18	07:58	07:42	08:14
	17:22	18:06	19:45	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:12	07:32	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:30	21:21	20:39	19:41	18:42	17:00	16:52
21	08:11	07:30	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:00	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:46	08:16
	17:26	18:10	19:49	20:30	21:08	21:31	21:19	20:36	19:37	18:39	16:58	16:53
23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:45	07:23	08:03	07:47	08:16
	17:27	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:35	05:55	05:46	06:08	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:54	05:46	06:09	06:47	07:26	08:06	07:50	08:17
	17:30	18:15	19:53	20:34	21:11	21:31	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:11	06:48	07:27	08:07	07:51	08:17
	17:32	18:16	19:55	20:36	21:13	21:31	21:15	20:29	19:29	18:32	16:55	16:56
27	08:05	07:20	07:27	06:30	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:17	19:56	20:37	21:14	21:31	21:14	20:27	19:27	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:54	08:18
	17:35	18:19	19:57	20:38	21:15	21:31	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:31	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:26	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:18
	17:38		20:00	20:41	21:17	21:31	21:11	20:22	19:21	18:26	16:53	16:59
31	08:01		07:19		05:50		06:16	06:55		08:15		08:18
	17:39		20:01		21:17		21:09	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 8:45 AM / 37

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H21 - H21

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:58
	17:01	17:41	18:21	20:03	20:43	21:19	21:32	21:09	20:18	19:20	17:23	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:50	06:19	06:58	07:35	07:18	07:59
	17:02	17:42	18:22	20:04	20:44	21:20	21:32	21:07	20:16	19:18	17:22	16:53
3	08:19	07:58	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:24	20:06	20:45	21:21	21:31	21:06	20:15	19:16	17:21	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:21	08:01
	17:04	17:45	18:25	20:07	20:47	21:22	21:31	21:05	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:31	21:03	20:11	19:12	17:18	16:52
6	08:19	07:54	07:08	07:08	06:17	05:47	05:52	06:24	07:03	07:41	07:24	08:03
	17:06	17:48	18:28	20:10	20:49	21:23	21:30	21:02	20:09	19:10	17:16	16:51
7	08:19	07:52	07:06	07:06	06:16	05:46	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:05	06:14	05:46	05:54	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:31	20:12	20:52	21:25	21:30	20:59	20:05	19:07	17:14	16:51
9	08:18	07:50	08:02	07:03	06:13	05:46	05:54	06:28	07:06	07:45	07:28	08:06
	17:10	17:53	19:32	20:14	20:53	21:25	21:29	20:57	20:03	19:05	17:12	16:51
10	08:18	07:48	08:00	07:01	06:11	05:46	05:55	06:29	07:08	07:46	07:29	08:07
	17:11	17:54	19:33	20:15	20:54	21:26	21:29	20:56	20:01	19:03	17:11	16:51
11	08:17	07:47	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:31	08:08
	17:12	17:56	19:35	20:16	20:56	21:27	21:28	20:54	19:59	19:01	17:10	16:51
12	08:17	07:45	07:56	06:57	06:09	05:45	05:57	06:31	07:10	07:49	07:32	08:09
	17:13	17:57	19:36	20:18	20:57	21:27	21:28	20:53	19:57	18:57	17:09	16:51
13	08:16	07:44	07:55	06:55	06:07	05:45	05:58	06:33	07:11	07:50	07:34	08:10
	17:14	17:59	19:38	20:19	20:58	21:28	21:27	20:51	19:55	18:55	17:08	16:51
14	08:16	07:42	07:53	06:53	06:06	05:45	05:59	06:34	07:13	07:51	07:35	08:11
	17:16	18:00	19:39	20:20	20:59	21:28	21:26	20:50	19:53	18:53	17:06	16:51
15	08:15	07:41	07:51	06:52	06:05	05:45	06:00	06:35	07:14	07:53	07:36	08:12
	17:17	18:00	19:40	20:22	21:00	21:29	21:26	20:48	19:51	18:52	17:05	16:51
16	08:15	07:39	07:49	06:50	06:04	05:45	06:01	06:36	07:15	07:54	07:38	08:12
	17:18	18:02	19:42	20:23	21:02	21:29	21:25	20:47	19:49	18:50	17:04	16:52
17	08:14	07:37	07:47	06:48	06:03	05:45	06:01	06:38	07:16	07:55	07:39	08:13
	17:20	18:03	19:43	20:24	21:03	21:30	21:24	20:45	19:47	18:48	17:03	16:52
18	08:13	07:36	07:45	06:46	06:02	05:45	06:02	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:44	20:26	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:13	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:46	20:27	21:05	21:31	21:23	20:42	19:43	18:45	17:01	16:52
20	08:12	07:32	07:41	06:43	05:59	05:45	06:04	06:41	07:20	08:00	07:43	08:15
	17:24	18:08	19:47	20:28	21:06	21:31	21:22	20:40	19:41	18:43	17:00	16:53
21	08:11	07:31	07:39	06:41	05:58	05:45	06:06	06:43	07:21	08:01	07:45	08:16
	17:25	18:09	19:48	20:30	21:08	21:31	21:21	20:38	19:40	18:41	17:00	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:07	06:44	07:23	08:02	07:46	08:16
	17:26	18:11	19:50	20:31	21:09	21:31	21:20	20:36	19:38	18:39	16:59	16:54
23	08:10	07:27	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:04	07:47	08:17
	17:28	18:12	19:51	20:32	21:10	21:32	21:19	20:35	19:36	18:38	16:58	16:54
24	08:09	07:26	07:33	06:36	05:56	05:46	06:09	06:46	07:25	08:05	07:49	08:17
	17:29	18:14	19:52	20:34	21:11	21:32	21:18	20:33	19:34	18:36	16:57	16:55
25	08:08	07:24	07:31	06:34	05:55	05:46	06:10	06:48	07:26	08:06	07:50	08:17
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:34	16:57	16:56
26	08:07	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:16	20:29	19:30	18:33	16:56	16:56
27	08:06	07:20	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:53	08:18
	17:34	18:18	19:56	20:37	21:14	21:32	21:15	20:27	19:28	18:31	16:55	16:57
28	08:05	07:19	07:26	06:29	05:52	05:47	06:13	06:51	07:30	08:11	07:54	08:18
	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:26	19:26	18:30	16:55	16:58
29	08:04		07:24	06:28	05:51	05:48	06:14	06:53	07:32	08:12	07:55	08:19
	17:37		19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28	16:54	16:58
30	08:02		07:22	06:26	05:51	05:48	06:16	06:54	07:33	08:14	07:56	08:19
	17:38		20:00	20:41	21:17	21:32	21:11	20:22	19:22	18:26	16:54	16:59
31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H22 - H22

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:25	05:50	05:49	06:18	06:56	07:34	07:17	07:58
	17:01	17:41	18:21	20:03	20:43	21:19 11	20:43 (66) 21:32 24	20:55 (66) 21:09	20:18	19:20	17:24	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	20:30 (66) 05:50	20:32 (66) 06:19	06:58	07:36	07:18	07:59
	17:02	17:43	18:22	20:05	20:44	21:20 14	20:44 (66) 21:32 23	20:55 (66) 21:07	20:17	19:18	17:22	16:53
3	08:19	07:58	07:13	07:14	06:21	05:48	20:30 (66) 05:50	20:33 (66) 06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:24	20:06	20:45	21:21 16	20:46 (66) 21:31 22	20:55 (66) 21:06	20:15	19:16	17:21	16:52
4	08:19	07:56	07:12	07:12	06:20	05:48	20:29 (66) 05:51	20:33 (66) 06:22	07:00	07:38	07:21	08:01
	17:04	17:46	18:25	20:07	20:47	21:22 17	20:46 (66) 21:31 22	20:55 (66) 21:05	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:18	05:47	20:29 (66) 05:51	20:34 (66) 06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:09	20:48	21:22 18	20:47 (66) 21:31 21	20:55 (66) 21:03	20:11	19:12	17:18	16:52
6	08:19	07:54	07:08	07:08	06:17	05:47	20:29 (66) 05:52	20:34 (66) 06:24	07:03	07:41	07:24	08:03
	17:06	17:48	18:28	20:10	20:49	21:23 19	20:48 (66) 21:31 20	20:54 (66) 21:02	20:09	19:10	17:16	16:52
7	08:19	07:52	07:06	07:07	06:16	05:47	20:28 (66) 05:53	20:35 (66) 06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:51	21:24 20	20:48 (66) 21:30 19	20:54 (66) 21:01	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:05	06:14	05:46	20:28 (66) 05:54	20:36 (66) 06:26	07:05	07:43	07:27	08:06
	17:09	17:51	18:31	20:12	20:52	21:25 21	20:49 (66) 21:30 18	20:54 (66) 20:59	20:05	19:07	17:14	16:51
9	08:18	07:50	08:02	07:03	06:13	05:46	20:28 (66) 05:54	20:37 (66) 06:28	07:06	07:45	07:28	08:07
	17:10	17:53	19:32	20:14	20:53	21:25 22	20:50 (66) 21:29 16	20:53 (66) 20:58	20:03	19:05	17:13	16:51
10	08:18	07:48	08:00	07:01	06:11	05:46	20:27 (66) 05:55	20:37 (66) 06:29	07:08	07:46	07:29	08:07
	17:11	17:54	19:33	20:15	20:54	21:26 23	20:50 (66) 21:29 15	20:52 (66) 20:56	20:01	19:03	17:11	16:51
11	08:17	07:47	07:58	06:59	06:10	05:45	20:27 (66) 05:56	20:39 (66) 06:30	07:09	07:47	07:31	08:08
	17:12	17:56	19:35	20:16	20:56	21:27 23	20:50 (66) 21:28 12	20:51 (66) 20:55	19:59	19:01	17:10	16:51
12	08:17	07:45	07:57	06:57	06:09	05:45	20:27 (66) 05:57	20:41 (66) 06:31	07:10	07:49	07:32	08:09
	17:13	17:57	19:36	20:18	20:57	21:27 24	20:51 (66) 21:28 9	20:50 (66) 20:53	19:57	18:57	17:09	16:51
13	08:17	07:44	07:55	06:55	06:08	05:45	20:27 (66) 05:58	20:43 (66) 06:33	07:11	07:50	07:34	08:10
	17:14	17:59	19:38	20:19	20:58	21:28 25	20:52 (66) 21:27 5	20:48 (66) 20:51	19:55	18:55	17:08	16:51
14	08:16	07:42	07:53	06:53	06:06	05:45	20:28 (66) 05:59	06:34	07:13	07:51	07:35	08:11
	17:16	18:00	19:39	20:20	20:59	21:28 24	20:52 (66) 21:27	20:50	19:53	18:54	17:07	16:51
15	08:16	07:41	07:51	06:52	06:05	05:45	20:28 (66) 06:00	06:35	07:14	07:53	07:37	08:12
	17:17	18:00	19:40	20:22	21:01	21:29 24	20:52 (66) 21:26	20:48	19:51	18:52	17:05	16:51
16	08:15	07:39	07:49	06:50	06:04	05:45	20:28 (66) 06:01	06:36	07:15	07:54	07:38	08:13
	17:18	18:02	19:42	20:23	21:02	21:29 25	20:53 (66) 21:25	20:47	19:49	18:50	17:04	16:52
17	08:14	07:38	07:47	06:48	06:03	05:45	20:28 (66) 06:02	06:38	07:16	07:56	07:39	08:13
	17:20	18:03	19:43	20:24	21:03	21:30 25	20:53 (66) 21:24	20:45	19:48	18:48	17:03	16:52
18	08:14	07:36	07:45	06:46	06:02	05:45	20:28 (66) 06:03	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:44	20:26	21:04	21:30 25	20:53 (66) 21:24	20:43	19:46	18:46	17:02	16:52
19	08:13	07:34	07:43	06:45	06:01	05:45	20:28 (66) 06:04	06:40	07:19	07:58	07:42	08:15
	17:22	18:06	19:46	20:27	21:05	21:31 25	20:53 (66) 21:23	20:42	19:44	18:45	17:01	16:53
20	08:12	07:33	07:41	06:43	05:59	05:45	20:28 (66) 06:05	06:41	07:20	08:00	07:44	08:15
	17:24	18:08	19:47	20:28	21:07	21:31 25	20:53 (66) 21:22	20:40	19:42	18:43	17:01	16:53
21	08:11	07:31	07:39	06:41	05:58	05:45	20:29 (66) 06:06	06:43	07:21	08:01	07:45	08:16
	17:25	18:09	19:48	20:30	21:08	21:31 25	20:54 (66) 21:21	20:38	19:40	18:41	17:00	16:53
22	08:11	07:29	07:37	06:39	05:57	05:45	20:29 (66) 06:07	06:44	07:23	08:02	07:46	08:16
	17:27	18:11	19:50	20:31	21:09	21:31 25	20:54 (66) 21:20	20:36	19:38	18:40	16:59	16:54
23	08:10	07:28	07:35	06:38	05:57	05:46	20:29 (66) 06:08	06:45	07:24	08:04	07:48	08:17
	17:28	18:12	19:51	20:32	21:10	21:32 25	20:54 (66) 21:19	20:35	19:36	18:38	16:58	16:54
24	08:09	07:26	07:33	06:36	05:56	05:46	20:29 (66) 06:09	06:46	07:25	08:05	07:49	08:17
	17:29	18:14	19:53	20:34	21:11	21:32 25	20:54 (66) 21:18	20:33	19:34	18:36	16:57	16:55
25	08:08	07:24	07:31	06:34	05:55	05:46	20:30 (66) 06:10	06:48	07:27	08:07	07:50	08:18
	17:31	18:15	19:54	20:35	21:12	21:32 25	20:55 (66) 21:17	20:31	19:32	18:35	16:57	16:56
26	08:07	07:22	07:30	06:33	05:54	05:47	20:30 (66) 06:11	06:49	07:28	08:08	07:52	08:18
	17:32	18:17	19:55	20:36	21:13	21:32 25	20:55 (66) 21:16	20:29	19:30	18:33	16:56	16:56
27	08:06	07:21	07:28	06:31	05:53	05:47	20:30 (66) 06:12	06:50	07:29	08:09	07:53	08:18
	17:34	18:18	19:57	20:38	21:14	21:32 25	20:55 (66) 21:15	20:28	19:28	18:31	16:55	16:57
28	08:05	07:19	07:26	06:29	05:52	05:48	20:31 (66) 06:13	06:51	07:30	08:11	07:54	08:19
	17:35	18:19	19:58	20:39	21:15	21:32 24	20:55 (66) 21:14	20:26	19:26	18:30	16:55	16:58
29	08:04		07:24	06:28	05:52	05:48	20:30 (66) 06:14	06:53	07:32	08:12	07:55	08:19
	17:37		19:59	20:40	21:16	21:32 25	20:55 (66) 21:12	20:24	19:24	18:28	16:54	16:58
30	08:03		07:22	06:26	05:51	05:48	20:31 (66) 06:16	06:54	07:33	08:14	07:57	08:19
	17:38		20:01	20:42	21:17	21:32 24	20:55 (66) 21:11	20:22	19:22	18:27	16:54	16:59
31	08:01		07:20		05:50 20:33 (66)		06:17	06:55		08:15		08:19
	17:40		20:02		21:18 8 20:41 (66)		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case					8	674	226					
Sun reduction					0.68	0.71	0.76					
Oper. time red.					0.96	0.96	0.96					
Wind dir. red.					0.70	0.70	0.70					
Total reduction					0.46	0.48	0.51					
Total, real					4	324	116					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 8:45 AM / 39

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Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H23 - H23

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April		May	June	July	August	September		October		November	December
1	08:19	08:00	07:17		07:47 (132)	07:18		06:25	05:50	05:49	06:18	06:57		07:34	08:15 (132)	07:17	07:58
	17:02	17:41	18:21	11	07:58 (132)	20:03		20:43	21:19	21:32	21:09	20:19		19:20	29 08:44 (132)	17:24	16:53
2	08:19	07:59	07:15		07:44 (132)	07:16	07:37 (130)	06:23	05:49	05:50	06:19	06:58	07:29 (130)	07:36	08:14 (132)	07:18	07:59
	17:02	17:43	18:22	18	08:02 (132)	20:05	2 07:38 (130)	20:44	21:20	21:32	21:08	20:17	2 07:31 (130)	19:18	30 08:44 (132)	17:22	16:53
3	08:19	07:58	07:14		07:42 (132)	07:14	07:35 (130)	06:22	05:49	05:50	06:21	06:59	07:25 (130)	07:37	08:14 (132)	07:20	08:00
	17:03	17:44	18:24	21	08:03 (132)	20:06	4 07:39 (130)	20:46	21:21	21:32	21:06	20:15	9 07:34 (130)	19:16	30 08:44 (132)	17:21	16:53
4	08:19	07:57	07:12		07:40 (132)	07:12	07:33 (130)	06:20	05:48	05:51	06:22	07:00	07:24 (130)	07:38	08:13 (132)	07:21	08:01
	17:04	17:46	18:25	24	08:04 (132)	20:07	7 07:40 (130)	20:47	21:22	21:31	21:05	20:13	12 07:36 (130)	19:14	31 08:44 (132)	17:19	16:52
5	08:19	07:55	07:10		07:39 (132)	07:10	07:31 (130)	06:19	05:48	05:52	06:23	07:02	07:24 (130)	07:40	08:13 (132)	07:22	08:02
	17:05	17:47	18:27	26	08:05 (132)	20:09	9 07:40 (130)	20:48	21:23	21:31	21:04	20:11	12 07:36 (130)	19:12	30 08:43 (132)	17:18	16:52
6	08:19	07:54	07:08		07:38 (132)	07:09	07:29 (130)	06:17	05:47	05:52	06:24	07:03	07:25 (130)	07:41	08:13 (132)	07:24	08:04
	17:06	17:49	18:28	27	08:05 (132)	20:10	10 07:39 (130)	20:49	21:23	21:31	21:02	20:09	10 07:35 (130)	19:11	30 08:43 (132)	17:17	16:52
7	08:19	07:53	07:06		07:37 (132)	07:07	07:27 (130)	06:16	05:47	05:53	06:25	07:04	07:26 (130)	07:42	08:13 (132)	07:25	08:05
	17:08	17:50	18:29	29	08:06 (132)	20:11	12 07:39 (130)	20:51	21:24	21:30	21:01	20:07	9 07:35 (130)	19:09	29 08:42 (132)	17:15	16:52
8	08:19	07:51	08:04		08:36 (132)	07:05	07:27 (130)	06:14	05:46	05:54	06:27	07:05	07:27 (130)	07:44	08:13 (132)	07:27	08:06
	17:09	17:52	18:31	30	09:06 (132)	20:13	12 07:39 (130)	20:52	21:25	21:30	20:59	20:05	7 07:34 (130)	19:07	27 08:40 (132)	17:14	16:51
9	08:18	07:50	08:02		08:36 (132)	07:03	07:28 (130)	06:13	05:46	05:55	06:28	07:07	07:29 (130)	07:45	08:15 (132)	07:28	08:07
	17:10	17:53	19:32	30	09:06 (132)	20:14	9 07:37 (130)	20:53	21:26	21:30	20:58	20:03	4 07:33 (130)	19:05	25 08:40 (132)	17:13	16:51
10	08:18	07:48	08:01		08:35 (132)	07:01	07:31 (130)	06:12	05:46	05:55	06:29	07:08	07:30 (130)	07:46	08:15 (132)	07:30	08:08
	17:11	17:55	19:34	30	09:05 (132)	20:15	2 07:33 (130)	20:55	21:26	21:29	20:56	20:01	2 07:31 (130)	19:03	23 08:38 (132)	17:11	16:51
11	08:18	07:47	07:59		08:36 (132)	06:59		06:10	05:46	05:56	06:30	07:09		07:48	08:16 (132)	07:31	08:09
	17:12	17:56	19:35	30	09:06 (132)	20:17		20:56	21:27	21:28	20:55	19:59		19:01	20 08:36 (132)	17:10	16:51
12	08:17	07:45	07:57		08:36 (132)	06:57		06:09	05:45	05:57	06:32	07:10		07:49	08:19 (132)	07:32	08:09
	17:13	17:58	19:36	29	09:05 (132)	20:18		20:57	21:28	21:28	20:53	19:57		18:57	15 08:34 (132)	17:09	16:51
13	08:17	07:44	07:55		08:16 (131)	06:56		06:08	05:45	05:58	06:33	07:12		07:50	08:22 (132)	07:34	08:10
	17:15	17:59	19:38	32	09:05 (132)	20:19		20:58	21:28	21:27	20:52	19:56		18:56	8 08:30 (132)	17:08	16:51
14	08:16	07:42	07:53		08:14 (131)	06:54		06:07	05:45	05:59	06:34	07:13		07:52		07:35	08:11
	17:16	18:01	19:39	36	09:04 (132)	20:21		21:00	21:29	21:27	20:50	19:54		18:54		17:07	16:51
15	08:16	07:41	07:51		08:12 (131)	06:52		06:05	05:45	06:00	06:35	07:14		07:53		07:37	08:12
	17:17	18:01	19:41	37	09:02 (132)	20:22		21:01	21:29	21:26	20:48	19:52		18:52		17:06	16:52
16	08:15	07:39	07:49		08:10 (131)	06:50		06:04	05:45	06:01	06:37	07:15		07:54		07:38	08:13
	17:19	18:02	19:42	38	09:01 (132)	20:23		21:02	21:30	21:25	20:47	19:50		18:50		17:05	16:52
17	08:14	07:38	07:47		08:08 (131)	06:48		06:03	05:45	06:02	06:38	07:17		07:56		07:40	08:13
	17:20	18:04	19:43	37	08:59 (132)	20:25		21:03	21:30	21:24	20:45	19:48		18:48		17:04	16:52
18	08:14	07:36	07:45		08:06 (131)	06:46		06:02	05:45	06:03	06:39	07:18		07:57		07:41	08:14
	17:21	18:05	19:45	35	08:57 (132)	20:26		21:04	21:30	21:24	20:43	19:46		18:47		17:03	16:52
19	08:13	07:34	07:43		08:06 (131)	06:45		06:01	05:45	06:04	06:40	07:19	07:59 (131)	07:58		07:42	08:15
	17:23	18:07	19:46	28	08:53 (132)	20:27		21:05	21:31	21:23	20:42	19:44	3 08:02 (131)	18:45		17:02	16:53
20	08:12	07:33	07:41		08:06 (131)	06:43		06:00	05:45	06:05	06:42	07:20	07:55 (131)	08:00		07:44	08:15
	17:24	18:08	19:47	17	08:23 (131)	20:29		21:07	21:31	21:22	20:40	19:42	10 08:05 (131)	18:43		17:01	16:53
21	08:11	07:31	07:39		08:06 (131)	06:41		05:59	05:45	06:06	06:43	07:22	07:52 (131)	08:01		07:45	08:16
	17:25	18:09	19:49	16	08:22 (131)	20:30		21:08	21:31	21:21	20:38	19:40	14 08:06 (131)	18:41		17:00	16:54
22	08:11	07:29	07:37		08:07 (131)	06:39		05:58	05:46	06:07	06:44	07:23	07:52 (131)	08:03		07:46	08:16
	17:27	18:11	19:50	14	08:21 (131)	20:31		21:09	21:32	21:20	20:37	19:38	16 08:08 (131)	18:40		16:59	16:54
23	08:10	07:28	07:36		08:08 (131)	06:38		05:57	05:46	06:08	06:45	07:24	07:50 (131)	08:04		07:48	08:17
	17:28	18:12	19:51	11	08:19 (131)	20:32		21:10	21:32	21:19	20:35	19:36	18 08:08 (131)	18:38		16:58	16:55
24	08:09	07:26	07:34		08:10 (131)	06:36		05:56	05:46	06:09	06:47	07:25	07:50 (131)	08:05		07:49	08:17
	17:30	18:14	19:53	6	08:16 (131)	20:34		21:11	21:32	21:18	20:33	19:34	25 08:35 (132)	18:36		16:57	16:55
25	08:08	07:24	07:32			06:34		05:55	05:47	06:10	06:48	07:27	07:49 (131)	08:07		07:50	08:18
	17:31	18:15	19:54			20:35		21:12	21:32	21:17	20:31	19:32	33 08:38 (132)	18:35		16:57	16:56
26	08:07	07:22	07:30			06:33		05:54	05:47	06:11	06:49	07:28	07:50 (131)	08:08		07:52	08:18
	17:32	18:17	19:55			20:36		21:13	21:32	21:16	20:30	19:30	36 08:41 (132)	18:33		16:56	16:56
27	08:06	07:21	07:28			06:31		05:53	05:47	06:12	06:50	07:29	07:51 (131)	08:10		07:53	08:18
	17:34	18:18	19:57			20:38		21:14	21:32	21:15	20:28	19:28	38 08:42 (132)	18:31		16:55	16:57
28	08:05	07:19	07:26			06:29		05:52	05:48	06:13	06:52	07:31	07:52 (131)	08:11		07:54	08:19
	17:35	18:20	19:58			20:39		21:15	21:32	21:14	20:26	19:26	38 08:43 (132)	18:30		16:55	16:58
29	08:04		07:24			06:28		05:52	05:48	06:15	06:53	07:32	07:53 (131)	08:12		07:55	08:19
	17:37		19:59			20:40		21:16	21:32	21:13	20:24	19:24	37 08:43 (132)	18:28		16:54	16:59
30	08:03		07:22			06:26		05:51	05:49	06:16	06:54	07:33	07:55 (131)	08:14		07:57	08:19
	17:38		20:01			20:42		21:17	21:32	21:11	20:22	19:22	34 08:44 (132)	18:27		16:54	17:00
31	08:02		07:20					05:50		06:17	06:55			08:15			08:19
	17:40		20:02					21:18		21:10	20:20			18:25			17:00
Potential sun hours	282	289	368			406		463	471	476	439	378		339		285	270
Total, worst case				612		67							369		327		
Sun reduction				0.63		0.59							0.69		0.52		
Oper. time red.				0.96		0.96							0.96		0.96		
Wind dir. red.				0.64		0.60							0.63		0.65		
Total reduction				0.39		0.34							0.42		0.32		
Total, real				237		23							155		106		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 8:45 AM / 40

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H24 - H24

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:25	05:50	05:49	06:18	06:57	07:35	07:17	07:58
	17:02	17:41	18:21	20:03	20:43	21:19	21:32	21:09	20:19	19:20	17:24	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:50	06:19	06:58	07:36	07:18	07:59
	17:03	17:43	18:23	20:05	20:44	21:20	21:32	21:08	20:17	19:18	17:22	16:53
3	08:19	07:58	07:14	07:14	06:22	05:49	05:51	06:21	06:59	07:37	07:20	08:00
	17:04	17:44	18:24	20:06	20:46	21:21	21:32	21:06	20:15	19:16	17:21	16:53
4	08:19	07:57	07:12	07:12	06:20	05:48	05:51	06:22	07:00	07:38	07:21	08:01
	17:05	17:46	18:25	20:07	20:47	21:22	21:31	21:05	20:13	19:15	17:20	16:52
5	08:19	07:55	07:10	07:11	06:19	05:48	05:52	06:23	07:02	07:40	07:23	08:03
	17:06	17:47	18:27	20:09	20:48	21:23	21:31	21:04	20:11	19:13	17:18	16:52
6	08:19	07:54	07:08	07:09	06:17	05:47	05:53	06:24	07:03	07:41	07:24	08:04
	17:07	17:49	18:28	20:10	20:50	21:24	21:31	21:02	20:09	19:11	17:17	16:52
7	08:19	07:53	07:06	07:07	06:16	05:47	05:53	06:26	07:04	07:42	07:25	08:05
	17:08	17:50	18:30	20:11	20:51	21:24	21:30	21:01	20:07	19:09	17:15	16:52
8	08:19	07:51	08:04	07:05	06:14	05:47	05:54	06:27	07:05	07:44	07:27	08:06
	17:09	17:52	18:31	20:13	20:52	21:25	21:30	20:59	20:05	19:07	17:14	16:51
9	08:18	07:50	08:03	07:03	06:13	05:46	05:55	06:28	07:07	07:45	07:28	08:07
	17:10	17:53	19:32	20:14	20:53	21:26	21:30	20:58	20:03	19:05	17:13	16:51
10	08:18	07:49	08:01	07:01	06:12	05:46	05:56	06:29	07:08	07:46	07:30	08:08
	17:11	17:55	19:34	20:15	20:55	21:26	21:29	20:56	20:01	19:03	17:12	16:51
11	08:18	07:47	07:59	06:59	06:10	05:46	05:56	06:30	07:09	07:48	07:31	08:09
	17:12	17:56	19:35	20:17	20:56	21:27	21:29	20:55	20:00	19:01	17:10	16:51
12	08:17	07:46	07:57	06:57	06:09	05:46	05:57	06:32	07:10	07:49	07:33	08:10
	17:14	17:58	19:37	20:18	20:57	21:28	21:28	20:53	19:58	18:58	17:09	16:51
13	08:17	07:44	07:55	06:56	06:08	05:45	05:58	06:33	07:12	07:50	07:34	08:10
	17:15	17:59	19:38	20:19	20:58	21:28	21:27	20:52	19:56	18:56	17:08	16:51
14	08:16	07:43	07:53	06:54	06:07	05:45	05:59	06:34	07:13	07:52	07:35	08:11
	17:16	18:01	19:39	20:21	21:00	21:29	21:27	20:50	19:54	18:54	17:07	16:52
15	08:16	07:41	07:51	06:52	06:05	05:45	06:00	06:35	07:14	07:53	07:37	08:12
	17:17	18:01	19:41	20:22	21:01	21:29	21:26	20:49	19:52	18:52	17:06	16:52
16	08:15	07:39	07:49	06:50	06:04	05:45	06:01	06:37	07:15	07:54	07:38	08:13
	17:19	18:02	19:42	20:23	21:02	21:30	21:25	20:47	19:50	18:50	17:05	16:52
17	08:15	07:38	07:47	06:48	06:03	05:45	06:02	06:38	07:17	07:56	07:40	08:14
	17:20	18:04	19:43	20:25	21:03	21:30	21:25	20:45	19:48	18:48	17:04	16:52
18	08:14	07:36	07:45	06:47	06:02	05:45	06:03	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:45	20:26	21:04	21:31	21:24	20:44	19:46	18:47	17:03	16:53
19	08:13	07:35	07:43	06:45	06:01	05:45	06:04	06:40	07:19	07:59	07:42	08:15
	17:23	18:07	19:46	20:27	21:06	21:31	21:23	20:42	19:44	18:45	17:02	16:53
20	08:12	07:33	07:41	06:43	06:00	05:45	06:05	06:42	07:21	08:00	07:44	08:15
	17:24	18:08	19:47	20:29	21:07	21:31	21:22	20:40	19:42	18:43	17:01	16:53
21	08:12	07:31	07:40	06:41	05:59	05:46	06:06	06:43	07:22	08:01	07:45	08:16
	17:25	18:10	19:49	20:30	21:08	21:31	21:21	20:38	19:40	18:42	17:00	16:54
22	08:11	07:30	07:38	06:40	05:58	05:46	06:07	06:44	07:23	08:03	07:47	08:17
	17:27	18:11	19:50	20:31	21:09	21:32	21:20	20:37	19:38	18:40	16:59	16:54
23	08:10	07:28	07:36	06:38	05:57	05:46	06:08	06:45	07:24	08:04	07:48	08:17
	17:28	18:12	19:51	20:33	21:10	21:32	21:19	20:35	19:36	18:38	16:58	16:55
24	08:09	07:26	07:34	06:36	05:56	05:46	06:09	06:47	07:26	08:05	07:49	08:17
	17:30	18:14	19:53	20:34	21:11	21:32	21:18	20:33	19:34	18:36	16:58	16:55
25	08:08	07:24	07:32	06:34	05:55	05:47	06:10	06:48	07:27	08:07	07:50	08:18
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:35	16:57	16:56
26	08:07	07:23	07:30	06:33	05:54	05:47	06:11	06:49	07:28	08:08	07:52	08:18
	17:33	18:17	19:55	20:37	21:13	21:32	21:16	20:30	19:30	18:33	16:56	16:57
27	08:06	07:21	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:10	07:53	08:19
	17:34	18:18	19:57	20:38	21:14	21:32	21:15	20:28	19:28	18:32	16:56	16:57
28	08:05	07:19	07:26	06:30	05:53	05:48	06:14	06:52	07:31	08:11	07:54	08:19
	17:35	18:20	19:58	20:39	21:15	21:32	21:14	20:26	19:26	18:30	16:55	16:58
29	08:04		07:24	06:28	05:52	05:48	06:15	06:53	07:32	08:13	07:56	08:19
	17:37		19:59	20:40	21:16	21:32	21:13	20:24	19:24	18:28	16:54	16:59
30	08:03		07:22	06:26	05:51	05:49	06:16	06:54	07:33	08:14	07:57	08:19
	17:38		20:01	20:42	21:17	21:32	21:11	20:22	19:22	18:27	16:54	17:00
31	08:02		07:20		05:50		06:17	06:55		08:15		08:19
	17:40		20:02		21:18		21:10	20:21		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H25 - H25

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June	July		August	September	October	November	December
1	08:20	08:01	07:17	07:18	06:25		05:50	05:49		06:18	06:57	07:35	07:17	07:58
	17:02	17:41	18:21	20:04	20:43		21:19	21:32		21:09	20:19	19:20	17:24	16:54
2	08:20	07:59	07:15	07:16	06:23		05:49	05:50		06:19	06:58	07:36	07:18	07:59
	17:03	17:43	18:23	20:05	20:44		21:20	21:32		21:08	20:17	19:18	17:22	16:53
3	08:20	07:58	07:14	07:14	06:22		05:49	05:51		06:21	06:59	07:37	07:20	08:00
	17:04	17:44	18:24	20:06	20:46		21:21	21:32		21:06	20:15	19:16	17:21	16:53
4	08:19	07:57	07:12	07:13	06:20		05:48	05:51		06:22	07:00	07:38	07:21	08:02
	17:05	17:46	18:25	20:08	20:47		21:22	21:32		21:05	20:13	19:15	17:20	16:52
5	08:19	07:55	07:10	07:11	06:19		05:48	05:52		06:23	07:02	07:40	07:23	08:03
	17:06	17:47	18:27	20:09	20:48		21:23	21:31		21:04	20:11	19:13	17:18	16:52
6	08:19	07:54	07:08	07:09	06:17		05:47	05:53		06:24	07:03	07:41	07:24	08:04
	17:07	17:49	18:28	20:10	20:50		21:24	21:31		21:02	20:09	19:11	17:17	16:52
7	08:19	07:53	07:06	07:07	06:16		05:47	05:53		06:26	07:04	07:42	07:25	08:05
	17:08	17:50	18:30	20:11	20:51		21:24	21:31		21:01	20:07	19:09	17:15	16:52
8	08:19	07:51	08:04	07:05	06:15		05:47	05:54		06:27	07:06	07:44	07:27	08:06
	17:09	17:52	18:31	20:13	20:52		21:25	21:30		20:59	20:05	19:07	17:14	16:52
9	08:18	07:50	08:03	07:03	06:13		05:46	05:55		06:28	07:07	07:45	07:28	08:07
	17:10	17:53	19:32	20:14	20:53		21:26	21:30		20:58	20:03	19:05	17:13	16:51
10	08:18	07:49	08:01	07:01	06:12		05:46	05:56		06:29	07:08	07:46	07:30	08:08
	17:11	17:55	19:34	20:15	20:55		21:26	21:29		20:56	20:02	19:03	17:12	16:51
11	08:18	07:47	07:59	06:59	06:10		05:46	05:56		06:30	07:09	07:48	07:31	08:09
	17:12	17:56	19:35	20:17	20:56		21:27	21:29		20:55	20:00	19:01	17:10	16:51
12	08:17	07:46	07:57	06:57	06:09		05:46	05:57		06:32	07:11	07:49	07:33	08:10
	17:14	17:58	19:37	20:18	20:57		21:28	21:28		20:53	19:58	18:58	17:09	16:51
13	08:17	07:44	07:55	06:56	06:08		05:45	05:58		06:26 (70)	06:33	07:12	07:50	07:34	08:10
	17:15	17:59	19:38	20:19	20:58		21:28	21:27	3	06:29 (70)	20:52	19:56	18:56	17:08	16:51
14	08:16	07:43	07:53	06:54	06:07		05:45	05:59		06:25 (70)	06:34	07:13	07:52	07:35	08:11
	17:16	18:01	19:39	20:21	21:00		21:29	21:27	6	06:31 (70)	20:50	19:54	18:54	17:07	16:52
15	08:16	07:41	07:51	06:52	06:05		05:45	06:00		06:25 (70)	06:35	07:14	07:53	07:37	08:12
	17:17	18:01	19:41	20:22	21:01		21:29	21:26	7	06:32 (70)	20:49	19:52	18:52	17:06	16:52
16	08:15	07:39	07:49	06:50	06:04		05:45	06:01		06:26 (70)	06:37	07:16	07:54	07:38	08:13
	17:19	18:02	19:42	20:23	21:02		21:30	21:25	6	06:32 (70)	20:47	19:50	18:50	17:05	16:52
17	08:15	07:38	07:47	06:48	06:03		05:45	06:02		06:27 (70)	06:38	07:17	07:56	07:40	08:14
	17:20	18:04	19:43	20:25	21:03		21:30	21:25	6	06:33 (70)	20:45	19:48	18:49	17:04	16:52
18	08:14	07:36	07:45	06:47	06:02		05:45	06:03		06:28 (70)	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:45	20:26	21:04		21:31	21:24	5	06:33 (70)	20:44	19:46	18:47	17:03	16:53
19	08:13	07:35	07:43	06:45	06:01		05:45	06:04		06:29 (70)	06:40	07:19	07:59	07:42	08:15
	17:23	18:07	19:46	20:27	21:06		21:31	21:23	5	06:34 (70)	20:42	19:44	18:45	17:02	16:53
20	08:12	07:33	07:42	06:43	06:00		05:45	06:05		06:30 (70)	06:42	07:21	08:00	07:44	08:16
	17:24	18:08	19:47	20:29	21:07		21:31	21:22	4	06:34 (70)	20:40	19:42	18:43	17:01	16:53
21	08:12	07:31	07:40	06:41	05:59	06:22 (70)	05:46	06:06		06:31 (70)	06:43	07:22	08:01	07:45	08:16
	17:25	18:10	19:49	20:30	21:08	2 06:23 (70)	21:32	21:21	3	06:34 (70)	20:39	19:40	18:42	17:00	16:54
22	08:11	07:30	07:38	06:40	05:58	06:21 (70)	05:46	06:07		06:32 (70)	06:44	07:23	08:03	07:47	08:17
	17:27	18:11	19:50	20:31	21:09	2 06:23 (70)	21:32	21:20	2	06:33 (70)	20:37	19:38	18:40	16:59	16:54
23	08:10	07:28	07:36	06:38	05:57	06:20 (70)	05:46	06:08			06:45	07:24	08:04	07:48	08:17
	17:28	18:13	19:52	20:33	21:10	3 06:23 (70)	21:32	21:19			20:35	19:36	18:38	16:58	16:55
24	08:09	07:26	07:34	06:36	05:56	06:20 (70)	05:46	06:09			06:47	07:26	08:06	07:49	08:18
	17:30	18:14	19:53	20:34	21:11	4 06:24 (70)	21:32	21:18			20:33	19:34	18:36	16:58	16:55
25	08:08	07:24	07:32	06:35	05:55	06:19 (70)	05:47	06:10			06:48	07:27	08:07	07:51	08:18
	17:31	18:15	19:54	20:35	21:12	5 06:24 (70)	21:32	21:17			20:32	19:32	18:35	16:57	16:56
26	08:07	07:23	07:30	06:33	05:54	06:18 (70)	05:47	06:11			06:49	07:28	08:08	07:52	08:18
	17:33	18:17	19:56	20:37	21:13	6 06:24 (70)	21:32	21:16			20:30	19:30	18:33	16:56	16:57
27	08:06	07:21	07:28	06:31	05:53	06:17 (70)	05:47	06:13			06:50	07:29	08:10	07:53	08:19
	17:34	18:18	19:57	20:38	21:14	6 06:23 (70)	21:32	21:15			20:28	19:28	18:32	16:56	16:57
28	08:05	07:19	07:26	06:30	05:53	06:17 (70)	05:48	06:14			06:52	07:31	08:11	07:54	08:19
	17:35	18:20	19:58	20:39	21:15	7 06:24 (70)	21:32	21:14			20:26	19:26	18:30	16:55	16:58
29	08:04		07:24	06:28	05:52	06:16 (70)	05:48	06:15			06:53	07:32	08:13	07:56	08:19
	17:37		20:00	20:41	21:16	7 06:23 (70)	21:32	21:13			20:24	19:24	18:28	16:54	16:59
30	08:03		07:22	06:26	05:51	06:17 (70)	05:49	06:16			06:54	07:33	08:14	07:57	08:19
	17:38		20:01	20:42	21:17	5 06:22 (70)	21:32	21:12			20:22	19:22	18:27	16:54	17:00
31	08:02		07:20		05:50	06:19 (70)		06:17			06:55		08:15		08:19
	17:40		20:02		21:18	2 06:20 (70)		21:10			20:21		18:25		17:00
Potential sun hours	282	289	368	406	463		471	476		439	378	339	285	270
Total, worst case					49			47						
Sun reduction					0.68			0.76						
Oper. time red.					0.96			0.96						
Wind dir. red.					0.56			0.56						
Total reduction					0.37			0.41						
Total, real					18			19						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H26 - H26

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:58
	17:01	17:41	18:21	20:03	20:43	21:19	21:32	21:09	20:18	19:20	17:23	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:50	06:19	06:58	07:35	07:18	07:59
	17:02	17:42	18:22	20:04	20:44	21:20	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:58	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:24	20:06	20:45	21:21	21:31	21:06	20:14	19:16	17:21	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:22	07:00	07:38	07:21	08:01
	17:04	17:45	18:25	20:07	20:47	21:21	21:31	21:05	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:31	21:03	20:11	19:12	17:18	16:52
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	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
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	17:12	17:56	19:35	20:16	20:56	21:27	21:28	20:54	19:59	19:01	17:10	16:51
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	17:13	17:57	19:36	20:18	20:57	21:27	21:28	20:53	19:57	18:57	17:09	16:51
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	17:14	17:59	19:38	20:19	20:58	21:28	21:27	20:51	19:55	18:55	17:08	16:51
14	08:16	07:42	07:53	06:53	06:06	05:45	05:59	06:34	07:13	07:51	07:35	08:11
	17:16	18:00	19:39	20:20	20:59	21:28	21:26	20:50	19:53	18:54	17:07	16:51
15	08:15	07:41	07:51	06:52	06:05	05:45	06:00	06:35	07:14	07:53	07:36	08:12
	17:17	18:00	19:40	20:22	21:00	21:29	21:26	20:48	19:51	18:52	17:05	16:51
16	08:15	07:39	07:49	06:50	06:04	05:45	06:01	06:36	07:15	07:54	07:38	08:12
	17:18	18:02	19:42	20:23	21:02	21:29	21:25	20:46	19:49	18:50	17:04	16:52
17	08:14	07:37	07:47	06:48	06:03	05:45	06:02	06:38	07:16	07:55	07:39	08:13
	17:20	18:03	19:43	20:24	21:03	21:30	21:24	20:45	19:47	18:48	17:03	16:52
18	08:13	07:36	07:45	06:46	06:02	05:45	06:02	06:39	07:18	07:57	07:41	08:14
	17:21	18:05	19:44	20:26	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:13	07:34	07:43	06:44	06:01	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:46	20:27	21:05	21:30	21:23	20:41	19:43	18:45	17:01	16:53
20	08:12	07:32	07:41	06:43	05:59	05:45	06:05	06:41	07:20	07:59	07:43	08:15
	17:24	18:08	19:47	20:28	21:06	21:31	21:22	20:40	19:41	18:43	17:01	16:53
21	08:11	07:31	07:39	06:41	05:58	05:45	06:06	06:43	07:21	08:01	07:45	08:16
	17:25	18:09	19:48	20:30	21:07	21:31	21:21	20:38	19:40	18:41	17:00	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:07	06:44	07:23	08:02	07:46	08:16
	17:26	18:11	19:50	20:31	21:09	21:31	21:20	20:36	19:38	18:39	16:59	16:54
23	08:09	07:27	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:04	07:47	08:17
	17:28	18:12	19:51	20:32	21:10	21:31	21:19	20:35	19:36	18:38	16:58	16:54
24	08:09	07:26	07:33	06:36	05:56	05:46	06:09	06:46	07:25	08:05	07:49	08:17
	17:29	18:14	19:52	20:34	21:11	21:32	21:18	20:33	19:34	18:36	16:57	16:55
25	08:08	07:24	07:31	06:34	05:55	05:46	06:10	06:48	07:26	08:06	07:50	08:17
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:34	16:57	16:56
26	08:07	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:16	20:29	19:30	18:33	16:56	16:56
27	08:06	07:20	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:53	08:18
	17:34	18:18	19:56	20:37	21:14	21:32	21:15	20:27	19:28	18:31	16:55	16:57
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	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:26	19:26	18:30	16:55	16:58
29	08:03		07:24	06:28	05:51	05:48	06:14	06:53	07:32	08:12	07:55	08:19
	17:37		19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28	16:54	16:58
30	08:02		07:22	06:26	05:51	05:48	06:16	06:54	07:33	08:14	07:56	08:19
	17:38		20:00	20:41	21:17	21:32	21:11	20:22	19:22	18:27	16:54	16:59
31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H27 - H27

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:21	20:03	20:43	21:19	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:49	06:19	06:57	07:35	07:18	07:59
	17:02	17:42	18:22	20:04	20:44	21:20	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:23	20:06	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:21	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:31	21:03	20:11	19:12	17:18	16:52
6	08:19	07:54	07:08	07:08	06:17	05:47	05:52	06:24	07:02	07:41	07:23	08:03
	17:06	17:48	18:28	20:10	20:49	21:23	21:30	21:02	20:09	19:10	17:16	16:51
7	08:18	07:52	07:06	07:06	06:15	05:46	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:54	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:52	21:24	21:29	20:59	20:05	19:06	17:14	16:51
9	08:18	07:49	08:02	07:03	06:13	05:46	05:54	06:27	07:06	07:44	07:28	08:06
	17:10	17:53	19:32	20:14	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:01	06:11	05:45	05:55	06:29	07:07	07:46	07:29	08:07
	17:11	17:54	19:33	20:15	20:54	21:26	21:29	20:56	20:01	19:03	17:11	16:51
11	08:17	07:46	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:31	08:08
	17:12	17:56	19:35	20:16	20:55	21:26	21:28	20:54	19:59	19:01	17:10	16:51
12	08:17	07:45	07:56	06:57	06:09	05:45	05:57	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:18	20:57	21:27	21:27	20:53	19:57	18:57	17:09	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:58	06:32	07:11	07:50	07:33	08:10
	17:14	17:59	19:37	20:19	20:58	21:28	21:27	20:51	19:55	18:55	17:08	16:51
14	08:16	07:42	07:52	06:53	06:06	05:45	05:59	06:34	07:12	07:51	07:35	08:11
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15	08:15	07:40	07:51	06:51	06:05	05:45	05:59	06:35	07:14	07:53	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:29	21:25	20:48	19:51	18:52	17:05	16:51
16	08:15	07:39	07:49	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:38	08:12
	17:18	18:02	19:41	20:23	21:01	21:29	21:25	20:46	19:49	18:50	17:04	16:51
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	17:20	18:03	19:43	20:24	21:03	21:30	21:24	20:45	19:47	18:48	17:03	16:52
18	08:13	07:36	07:45	06:46	06:01	05:45	06:02	06:39	07:17	07:57	07:40	08:14
	17:21	18:05	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:13	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:46	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:12	07:32	07:41	06:43	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:24	18:08	19:47	20:28	21:06	21:31	21:21	20:40	19:41	18:43	17:00	16:53
21	08:11	07:31	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:01	07:45	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:21	20:38	19:39	18:41	17:00	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:44	07:22	08:02	07:46	08:16
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23	08:09	07:27	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:04	07:47	08:16
	17:28	18:12	19:51	20:32	21:10	21:31	21:19	20:34	19:35	18:38	16:58	16:54
24	08:08	07:26	07:33	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:49	08:17
	17:29	18:13	19:52	20:33	21:11	21:31	21:18	20:33	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:55	05:46	06:10	06:47	07:26	08:06	07:50	08:17
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:16	20:29	19:30	18:33	16:56	16:56
27	08:05	07:20	07:27	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:34	18:18	19:56	20:37	21:14	21:32	21:14	20:27	19:28	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:11	07:54	08:18
	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:25	19:26	18:29	16:55	16:58
29	08:03		07:24	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28	16:54	16:58
30	08:02		07:22	06:26	05:51	05:48	06:15	06:54	07:33	08:13	07:56	08:19
	17:38		20:00	20:41	21:17	21:32	21:11	20:22	19:22	18:26	16:53	16:59
31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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+1 701 775 3000
wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H28 - H28

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:58	07:15	07:16	06:23	05:49	05:49	06:19	06:57	07:35	07:18	07:58
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:52
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:58	07:36	07:19	08:00
	17:03	17:44	18:23	20:05	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:50	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:30	21:03	20:10	19:12	17:17	16:51
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	17:06	17:48	18:27	20:09	20:49	21:23	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:06	07:06	06:15	05:46	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:05	19:06	17:13	16:51
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	17:09	17:53	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:00	06:11	05:45	05:55	06:29	07:07	07:46	07:29	08:07
	17:10	17:54	19:33	20:15	20:54	21:26	21:28	20:56	20:01	19:02	17:11	16:51
11	08:17	07:46	07:58	06:59	06:10	05:45	05:56	06:30	07:08	07:47	07:30	08:08
	17:12	17:56	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:01	17:10	16:51
12	08:17	07:45	07:56	06:57	06:08	05:45	05:57	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:53	19:57	18:57	17:08	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:57	06:32	07:11	07:50	07:33	08:10
	17:14	17:59	19:37	20:19	20:58	21:27	21:27	20:51	19:55	18:55	17:07	16:51
14	08:16	07:42	07:52	06:53	06:06	05:45	05:58	06:33	07:12	07:51	07:35	08:10
	17:15	18:00	19:39	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:05	05:45	05:59	06:35	07:14	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:39	07:48	06:49	06:04	05:44	06:00	06:36	07:15	07:54	07:37	08:12
	17:18	18:02	19:41	20:23	21:01	21:29	21:25	20:46	19:49	18:50	17:04	16:51
17	08:14	07:37	07:47	06:48	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:43	20:24	21:02	21:29	21:24	20:45	19:47	18:48	17:03	16:52
18	08:13	07:35	07:45	06:46	06:01	05:45	06:02	06:38	07:17	07:56	07:40	08:13
	17:21	18:04	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:45	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:12	07:32	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:30	21:21	20:39	19:41	18:43	17:00	16:53
21	08:11	07:30	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:01	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:46	08:16
	17:26	18:10	19:49	20:31	21:08	21:31	21:19	20:36	19:37	18:39	16:58	16:54
23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:45	07:24	08:03	07:47	08:16
	17:28	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:35	05:55	05:46	06:08	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:54	05:46	06:10	06:47	07:26	08:06	07:50	08:17
	17:30	18:15	19:53	20:34	21:12	21:31	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:11	06:48	07:27	08:08	07:51	08:17
	17:32	18:16	19:55	20:36	21:13	21:32	21:15	20:29	19:29	18:32	16:56	16:56
27	08:05	07:20	07:27	06:30	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:18	19:56	20:37	21:14	21:32	21:14	20:27	19:27	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:54	08:18
	17:35	18:19	19:57	20:38	21:15	21:32	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:32	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:26	05:50	05:48	06:15	06:53	07:33	08:13	07:56	08:18
	17:38		20:00	20:41	21:17	21:31	21:11	20:22	19:22	18:26	16:53	16:59
31	08:01		07:19		05:50		06:16	06:55		08:15		08:19
	17:39		20:01		21:18		21:09	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 8:45 AM / 45

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H29 - H29

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:16	07:17	06:24	05:49	05:49	06:17	06:56	07:34	07:16	07:57
	17:01	17:41	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:19	17:23	16:53
2	08:19	07:58	07:15	07:15	06:22	05:48	05:49	06:19	06:57	07:35	07:17	07:58
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:52
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:58	07:36	07:19	07:59
	17:03	17:44	18:23	20:05	20:45	21:20	21:31	21:05	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:19	05:47	05:50	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:18	07:55	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:46	18:26	20:08	20:47	21:22	21:30	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:17	05:46	05:52	06:23	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:23	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:52	06:25	07:03	07:42	07:25	08:04
	17:07	17:49	18:29	20:11	20:50	21:23	21:30	21:00	20:06	19:08	17:15	16:51
8	08:18	07:50	08:04	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:58	20:04	19:06	17:13	16:51
9	08:18	07:49	08:02	07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:27	08:06
	17:09	17:52	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:00	06:11	05:45	05:55	06:28	07:07	07:45	07:29	08:07
	17:10	17:54	19:33	20:15	20:54	21:25	21:28	20:55	20:01	19:02	17:11	16:51
11	08:17	07:46	07:58	06:58	06:10	05:45	05:56	06:30	07:08	07:47	07:30	08:08
	17:12	17:55	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:00	17:10	16:51
12	08:16	07:45	07:56	06:57	06:08	05:45	05:56	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:52	19:57	18:57	17:08	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:57	06:32	07:11	07:49	07:33	08:10
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	17:15	18:00	19:38	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:05	05:44	05:59	06:35	07:13	07:52	07:36	08:11
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16	08:14	07:39	07:48	06:49	06:03	05:44	06:00	06:36	07:15	07:54	07:37	08:12
	17:18	18:01	19:41	20:22	21:01	21:29	21:24	20:46	19:49	18:49	17:04	16:51
17	08:14	07:37	07:46	06:48	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:43	20:24	21:02	21:29	21:24	20:44	19:47	18:48	17:03	16:51
18	08:13	07:35	07:44	06:46	06:01	05:44	06:02	06:38	07:17	07:56	07:40	08:13
	17:21	18:04	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:18	07:58	07:42	08:14
	17:22	18:06	19:45	20:26	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:11	07:32	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:30	21:21	20:39	19:41	18:42	17:00	16:52
21	08:11	07:30	07:39	06:40	05:58	05:45	06:05	06:42	07:21	08:00	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:46	08:16
	17:26	18:10	19:49	20:30	21:08	21:31	21:19	20:36	19:37	18:39	16:58	16:53
23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:45	07:23	08:03	07:47	08:16
	17:27	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:35	05:55	05:46	06:08	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:23	07:31	06:34	05:54	05:46	06:09	06:47	07:26	08:06	07:50	08:17
	17:30	18:15	19:53	20:34	21:11	21:31	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:11	06:48	07:27	08:07	07:51	08:17
	17:32	18:16	19:55	20:36	21:12	21:31	21:15	20:29	19:29	18:32	16:55	16:56
27	08:05	07:20	07:27	06:30	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:17	19:56	20:37	21:13	21:31	21:14	20:27	19:27	18:31	16:55	16:56
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:53	08:18
	17:35	18:19	19:57	20:38	21:14	21:31	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:15	21:31	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:26	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:18
	17:38		20:00	20:41	21:16	21:31	21:11	20:21	19:21	18:26	16:53	16:59
31	08:01		07:19		05:50		06:16	06:55		08:15		08:18
	17:39		20:01		21:17		21:09	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H30 - H30

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:18	07:59	07:16	07:17	06:24	05:49	05:49	06:17	06:56	07:34	07:16	07:57
	17:01	17:40	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:19	17:23	16:53
2	08:18	07:58	07:14	07:15	06:22	05:48	05:49	06:19	06:57	07:35	07:17	07:58
	17:02	17:42	18:22	20:04	20:43	21:19	21:31	21:07	20:16	19:17	17:22	16:52
3	08:18	07:57	07:13	07:13	06:21	05:48	05:50	06:20	06:58	07:36	07:19	07:59
	17:03	17:43	18:23	20:05	20:45	21:20	21:31	21:05	20:14	19:16	17:20	16:52
4	08:18	07:56	07:11	07:12	06:19	05:47	05:50	06:21	07:00	07:37	07:20	08:00
	17:04	17:45	18:24	20:06	20:46	21:21	21:30	21:04	20:12	19:14	17:19	16:52
5	08:18	07:54	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:46	18:26	20:08	20:47	21:22	21:30	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:16	05:46	05:52	06:23	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:22	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:52	06:25	07:03	07:41	07:24	08:04
	17:07	17:49	18:29	20:10	20:50	21:23	21:29	21:00	20:06	19:08	17:15	16:51
8	08:18	07:50	08:03	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:58	20:04	19:06	17:13	16:51
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	17:09	17:52	19:31	20:13	20:52	21:25	21:29	20:57	20:02	19:04	17:12	16:51
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11	08:17	07:46	07:58	06:58	06:10	05:45	05:56	06:30	07:08	07:47	07:30	08:08
	17:12	17:55	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:00	17:10	16:51
12	08:16	07:45	07:56	06:57	06:08	05:45	05:56	06:31	07:10	07:48	07:32	08:08
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:52	19:57	18:57	17:08	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:57	06:32	07:11	07:49	07:33	08:09
	17:14	17:58	19:37	20:18	20:57	21:27	21:26	20:51	19:55	18:55	17:07	16:51
14	08:15	07:42	07:52	06:53	06:06	05:44	05:58	06:33	07:12	07:51	07:34	08:10
	17:15	18:00	19:38	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:05	05:44	05:59	06:35	07:13	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:38	07:48	06:49	06:03	05:44	06:00	06:36	07:15	07:53	07:37	08:12
	17:18	18:01	19:41	20:22	21:01	21:29	21:24	20:46	19:49	18:49	17:04	16:51
17	08:13	07:37	07:46	06:47	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:12
	17:19	18:03	19:42	20:24	21:02	21:29	21:24	20:44	19:47	18:48	17:03	16:51
18	08:13	07:35	07:44	06:46	06:01	05:44	06:02	06:38	07:17	07:56	07:40	08:13
	17:20	18:04	19:44	20:25	21:03	21:29	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:42	06:44	06:00	05:45	06:03	06:40	07:18	07:58	07:41	08:14
	17:22	18:06	19:45	20:26	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:11	07:32	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:14
	17:23	18:07	19:46	20:28	21:06	21:30	21:21	20:39	19:41	18:42	17:00	16:52
21	08:11	07:30	07:39	06:40	05:58	05:45	06:05	06:42	07:21	08:00	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:30	21:20	20:37	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:45	08:15
	17:26	18:10	19:49	20:30	21:08	21:31	21:19	20:36	19:37	18:39	16:58	16:53
23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:45	07:23	08:03	07:47	08:16
	17:27	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:35	05:55	05:46	06:08	06:46	07:25	08:04	07:48	08:16
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:23	07:31	06:34	05:54	05:46	06:09	06:47	07:26	08:06	07:49	08:17
	17:30	18:14	19:53	20:34	21:11	21:31	21:16	20:30	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:11	06:48	07:27	08:07	07:51	08:17
	17:32	18:16	19:55	20:36	21:12	21:31	21:15	20:29	19:29	18:32	16:55	16:56
27	08:05	07:20	07:27	06:30	05:53	05:47	06:12	06:50	07:28	08:09	07:52	08:17
	17:33	18:17	19:56	20:37	21:13	21:31	21:14	20:27	19:27	18:31	16:55	16:56
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:53	08:18
	17:35	18:19	19:57	20:38	21:14	21:31	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:39	21:15	21:31	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:26	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:18
	17:38		20:00	20:41	21:16	21:31	21:10	20:21	19:21	18:26	16:53	16:59
31	08:01		07:19		05:50		06:16	06:55		08:14		08:18
	17:39		20:01		21:17		21:09	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 8:45 AM / 47

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H31 - H31

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:18	07:59	07:16	07:17	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:19	17:23	16:53
2	08:18	07:58	07:15	07:15	06:22	05:48	05:49	06:19	06:57	07:35	07:17	07:58
	17:02	17:42	18:22	20:04	20:43	21:19	21:31	21:07	20:16	19:18	17:22	16:52
3	08:18	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:58	07:36	07:19	07:59
	17:03	17:44	18:23	20:05	20:45	21:20	21:31	21:05	20:14	19:16	17:20	16:52
4	08:18	07:56	07:11	07:12	06:19	05:47	05:50	06:21	07:00	07:38	07:20	08:00
	17:04	17:45	18:25	20:07	20:46	21:21	21:30	21:04	20:12	19:14	17:19	16:52
5	08:18	07:54	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:47	21:22	21:30	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:17	05:47	05:52	06:24	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:22	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:52	06:25	07:03	07:41	07:24	08:04
	17:07	17:49	18:29	20:11	20:50	21:23	21:29	21:00	20:06	19:08	17:15	16:51
8	08:18	07:50	08:03	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:58	20:04	19:06	17:13	16:51
9	08:17	07:49	08:02	07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:27	08:06
	17:09	17:52	19:32	20:13	20:52	21:25	21:29	20:57	20:02	19:04	17:12	16:51
10	08:17	07:48	08:00	07:00	06:11	05:45	05:55	06:28	07:07	07:45	07:29	08:07
	17:10	17:54	19:33	20:14	20:54	21:25	21:28	20:55	20:01	19:02	17:11	16:51
11	08:17	07:46	07:58	06:58	06:10	05:45	05:56	06:30	07:08	07:47	07:30	08:08
	17:12	17:55	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:00	17:10	16:51
12	08:16	07:45	07:56	06:57	06:08	05:45	05:56	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:52	19:57	18:57	17:08	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:57	06:32	07:11	07:49	07:33	08:09
	17:14	17:58	19:37	20:18	20:57	21:27	21:26	20:51	19:55	18:55	17:07	16:51
14	08:15	07:42	07:52	06:53	06:06	05:45	05:58	06:33	07:12	07:51	07:34	08:10
	17:15	18:00	19:38	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:05	05:44	05:59	06:35	07:13	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:38	07:48	06:49	06:03	05:44	06:00	06:36	07:15	07:53	07:37	08:12
	17:18	18:01	19:41	20:22	21:01	21:29	21:24	20:46	19:49	18:49	17:04	16:51
17	08:14	07:37	07:46	06:48	06:02	05:44	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:42	20:24	21:02	21:29	21:24	20:44	19:47	18:48	17:03	16:51
18	08:13	07:35	07:44	06:46	06:01	05:44	06:02	06:38	07:17	07:56	07:40	08:13
	17:21	18:04	19:44	20:25	21:03	21:29	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:18	07:58	07:41	08:14
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	17:23	18:07	19:47	20:28	21:06	21:30	21:21	20:39	19:41	18:42	17:00	16:53
21	08:11	07:30	07:39	06:40	05:58	05:45	06:05	06:42	07:21	08:00	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:30	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:46	08:16
	17:26	18:10	19:49	20:30	21:08	21:31	21:19	20:36	19:37	18:39	16:58	16:53
23	08:09	07:27	07:35	06:37	05:56	05:45	06:07	06:45	07:23	08:03	07:47	08:16
	17:27	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:35	05:55	05:46	06:08	06:46	07:25	08:05	07:48	08:16
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:23	07:31	06:34	05:54	05:46	06:09	06:47	07:26	08:06	07:49	08:17
	17:30	18:15	19:53	20:34	21:11	21:31	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:53	05:46	06:11	06:48	07:27	08:07	07:51	08:17
	17:32	18:16	19:55	20:36	21:12	21:31	21:15	20:29	19:29	18:32	16:55	16:56
27	08:05	07:20	07:27	06:30	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:17	19:56	20:37	21:13	21:31	21:14	20:27	19:27	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:53	08:18
	17:35	18:19	19:57	20:38	21:14	21:31	21:13	20:25	19:25	18:29	16:54	16:57
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:15	21:31	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:26	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:18
	17:38		20:00	20:41	21:16	21:31	21:10	20:21	19:21	18:26	16:53	16:59
31	08:01		07:19		05:50		06:16	06:55		08:14		08:18
	17:39		20:01		21:17		21:09	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H32 - H32

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:21	20:03	20:42	21:19	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:49	06:19	06:57	07:35	07:18	07:58
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:23	20:06	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:30	21:03	20:10	19:12	17:18	16:52
6	08:18	07:53	07:07	07:08	06:17	05:47	05:52	06:24	07:02	07:40	07:23	08:03
	17:06	17:48	18:28	20:09	20:49	21:23	21:30	21:02	20:09	19:10	17:16	16:51
7	08:18	07:52	07:06	07:06	06:15	05:46	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:54	06:26	07:05	07:43	07:26	08:05
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9	08:18	07:49	08:02	07:02	06:13	05:46	05:54	06:27	07:06	07:44	07:28	08:06
	17:10	17:53	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:01	06:11	05:46	05:55	06:29	07:07	07:46	07:29	08:07
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11	08:17	07:46	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:30	08:08
	17:12	17:56	19:35	20:16	20:55	21:26	21:28	20:54	19:59	19:01	17:10	16:51
12	08:17	07:45	07:56	06:57	06:09	05:45	05:57	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:53	19:57	18:57	17:09	16:51
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	17:14	17:59	19:37	20:19	20:58	21:27	21:27	20:51	19:55	18:55	17:08	16:51
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	17:16	18:00	19:39	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:51	06:51	06:05	05:45	05:59	06:35	07:14	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:29	21:25	20:48	19:51	18:52	17:05	16:51
16	08:14	07:39	07:49	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:38	08:12
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18	08:13	07:36	07:45	06:46	06:01	05:45	06:02	06:39	07:17	07:57	07:40	08:13
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20	08:12	07:32	07:41	06:43	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:24	18:08	19:47	20:28	21:06	21:30	21:21	20:40	19:41	18:43	17:00	16:53
21	08:11	07:31	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:01	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	17:00	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:44	07:22	08:02	07:46	08:16
	17:26	18:10	19:50	20:31	21:08	21:31	21:20	20:36	19:37	18:39	16:59	16:54
23	08:09	07:27	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:03	07:47	08:16
	17:28	18:12	19:51	20:32	21:09	21:31	21:19	20:34	19:35	18:38	16:58	16:54
24	08:08	07:25	07:33	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:11	21:31	21:18	20:33	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:55	05:46	06:10	06:47	07:26	08:06	07:50	08:17
	17:31	18:15	19:54	20:35	21:12	21:31	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:17
	17:32	18:16	19:55	20:36	21:13	21:32	21:15	20:29	19:29	18:33	16:56	16:56
27	08:05	07:20	07:27	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:18	19:56	20:37	21:14	21:32	21:14	20:27	19:28	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:54	08:18
	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:25	19:26	18:29	16:55	16:58
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28	16:54	16:58
30	08:02		07:22	06:26	05:51	05:48	06:15	06:54	07:33	08:13	07:56	08:18
	17:38		20:00	20:41	21:17	21:31	21:11	20:22	19:22	18:26	16:53	16:59
31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H33 - H33

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:21	20:03	20:42	21:19	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:49	06:19	06:57	07:35	07:18	07:59
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:23	20:06	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:30	21:03	20:10	19:12	17:18	16:52
6	08:18	07:53	07:08	07:08	06:17	05:47	05:52	06:24	07:02	07:40	07:23	08:03
	17:06	17:48	18:28	20:10	20:49	21:23	21:30	21:02	20:09	19:10	17:16	16:51
7	08:18	07:52	07:06	07:06	06:15	05:46	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:54	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:05	19:06	17:14	16:51
9	08:18	07:49	08:02	07:03	06:13	05:46	05:54	06:27	07:06	07:44	07:28	08:06
	17:10	17:53	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:01	06:11	05:46	05:55	06:29	07:07	07:46	07:29	08:07
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11	08:17	07:46	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:31	08:08
	17:12	17:56	19:35	20:16	20:55	21:26	21:28	20:54	19:59	19:01	17:10	16:51
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	17:13	17:57	19:36	20:17	20:57	21:27	21:27	20:53	19:57	18:57	17:09	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:58	06:32	07:11	07:50	07:33	08:10
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15	08:15	07:40	07:51	06:51	06:05	05:45	06:00	06:35	07:14	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:29	21:25	20:48	19:51	18:52	17:05	16:51
16	08:14	07:39	07:49	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:38	08:12
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17	08:14	07:37	07:47	06:48	06:03	05:45	06:01	06:37	07:16	07:55	07:39	08:13
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18	08:13	07:36	07:45	06:46	06:02	05:45	06:02	06:39	07:17	07:57	07:40	08:14
	17:21	18:05	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
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20	08:12	07:32	07:41	06:43	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:24	18:08	19:47	20:28	21:06	21:30	21:21	20:40	19:41	18:43	17:00	16:53
21	08:11	07:31	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:01	07:44	08:15
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22	08:10	07:29	07:37	06:39	05:57	05:45	06:07	06:44	07:22	08:02	07:46	08:16
	17:26	18:11	19:50	20:31	21:08	21:31	21:20	20:36	19:37	18:39	16:59	16:54
23	08:09	07:27	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:03	07:47	08:16
	17:28	18:12	19:51	20:32	21:09	21:31	21:19	20:34	19:35	18:38	16:58	16:54
24	08:08	07:25	07:33	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:11	21:31	21:18	20:33	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:55	05:46	06:10	06:47	07:26	08:06	07:50	08:17
	17:31	18:15	19:54	20:35	21:12	21:31	21:16	20:31	19:31	18:34	16:56	16:56
26	08:06	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:15	20:29	19:30	18:33	16:56	16:56
27	08:05	07:20	07:27	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:34	18:18	19:56	20:37	21:14	21:32	21:14	20:27	19:28	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:54	08:18
	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:25	19:26	18:29	16:55	16:58
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28	16:54	16:58
30	08:02		07:22	06:26	05:51	05:48	06:15	06:54	07:33	08:13	07:56	08:18
	17:38		20:00	20:41	21:17	21:31	21:11	20:22	19:22	18:26	16:54	16:59
31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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+1 701 775 3000
wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H34 - H34

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:25	05:50	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:21	20:03	20:43	21:19	21:32	21:08	20:18	19:20	17:24	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:50	06:19	06:58	07:35	07:18	07:59
	17:02	17:43	18:22	20:04	20:44	21:20	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:58	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:24	20:06	20:45	21:20	21:31	21:06	20:14	19:16	17:21	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:22	07:00	07:38	07:21	08:01
	17:04	17:46	18:25	20:07	20:47	21:21	21:31	21:05	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:19	05:48	05:52	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:31	21:03	20:11	19:12	17:18	16:52
6	08:19	07:54	07:08	07:08	06:17	05:47	05:52	06:24	07:03	07:41	07:24	08:03
	17:06	17:49	18:28	20:10	20:49	21:23	21:30	21:02	20:09	19:10	17:16	16:52
7	08:18	07:52	07:06	07:06	06:16	05:47	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:05	06:14	05:46	05:54	06:26	07:05	07:43	07:26	08:05
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10	08:18	07:48	08:00	07:01	06:12	05:46	05:55	06:29	07:08	07:46	07:29	08:07
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13	08:16	07:44	07:55	06:55	06:08	05:45	05:58	06:33	07:11	07:50	07:34	08:10
	17:15	17:59	19:38	20:19	20:58	21:28	21:27	20:51	19:55	18:55	17:08	16:51
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	17:16	18:00	19:39	20:20	20:59	21:28	21:26	20:50	19:53	18:54	17:07	16:51
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	17:17	18:00	19:40	20:22	21:00	21:29	21:26	20:48	19:51	18:52	17:06	16:52
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	17:29	18:14	19:52	20:33	21:11	21:32	21:18	20:33	19:34	18:36	16:57	16:55
25	08:08	07:24	07:31	06:34	05:55	05:46	06:10	06:48	07:26	08:06	07:50	08:17
	17:31	18:15	19:54	20:35	21:12	21:32	21:17	20:31	19:32	18:35	16:57	16:56
26	08:07	07:22	07:29	06:33	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:18
	17:32	18:16	19:55	20:36	21:13	21:32	21:16	20:29	19:30	18:33	16:56	16:56
27	08:06	07:20	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:53	08:18
	17:34	18:18	19:56	20:37	21:14	21:32	21:14	20:27	19:28	18:31	16:55	16:57
28	08:04	07:19	07:26	06:29	05:52	05:48	06:13	06:51	07:30	08:11	07:54	08:18
	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:26	19:26	18:30	16:55	16:58
29	08:03		07:24	06:28	05:52	05:48	06:15	06:53	07:32	08:12	07:55	08:18
	17:37		19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28	16:54	16:59
30	08:02		07:22	06:26	05:51	05:49	06:16	06:54	07:33	08:14	07:56	08:19
	17:38		20:00	20:41	21:17	21:32	21:11	20:22	19:22	18:27	16:54	16:59
31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:40		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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9/29/2010 8:45 AM / 51

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H35 - H35

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:21	20:03	20:42	21:19	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:50	06:19	06:57	07:35	07:18	07:58
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:23	20:06	20:45	21:20	21:31	21:06	20:14	19:16	17:20	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:19	07:55	07:09	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:30	21:03	20:10	19:12	17:18	16:52
6	08:18	07:53	07:08	07:08	06:17	05:47	05:52	06:24	07:02	07:40	07:23	08:03
	17:06	17:48	18:28	20:10	20:49	21:23	21:30	21:02	20:09	19:10	17:16	16:51
7	08:18	07:52	07:06	07:06	06:15	05:47	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:04	06:14	05:46	05:54	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:59	20:05	19:06	17:14	16:51
9	08:18	07:49	08:02	07:03	06:13	05:46	05:54	06:28	07:06	07:44	07:28	08:06
	17:10	17:53	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:01	06:11	05:46	05:55	06:29	07:07	07:46	07:29	08:07
	17:11	17:54	19:33	20:15	20:54	21:26	21:28	20:56	20:01	19:03	17:11	16:51
11	08:17	07:46	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:30	08:08
	17:12	17:56	19:35	20:16	20:55	21:26	21:28	20:54	19:59	19:01	17:10	16:51
12	08:17	07:45	07:56	06:57	06:09	05:45	05:57	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:53	19:57	18:57	17:09	16:51
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	17:16	18:00	19:39	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:51	06:51	06:05	05:45	06:00	06:35	07:14	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:52	17:05	16:51
16	08:14	07:39	07:49	06:50	06:04	05:45	06:01	06:36	07:15	07:54	07:38	08:12
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17	08:14	07:37	07:47	06:48	06:03	05:45	06:01	06:37	07:16	07:55	07:39	08:13
	17:20	18:03	19:43	20:24	21:03	21:29	21:24	20:45	19:47	18:48	17:03	16:52
18	08:13	07:36	07:45	06:46	06:02	05:45	06:02	06:39	07:17	07:57	07:40	08:13
	17:21	18:05	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:46	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:53
20	08:12	07:32	07:41	06:43	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:24	18:08	19:47	20:28	21:06	21:30	21:21	20:40	19:41	18:43	17:00	16:53
21	08:11	07:31	07:39	06:41	05:58	05:45	06:06	06:42	07:21	08:01	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	17:00	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:07	06:44	07:22	08:02	07:46	08:16
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	17:28	18:12	19:51	20:32	21:09	21:31	21:19	20:34	19:35	18:38	16:58	16:54
24	08:08	07:25	07:33	06:36	05:56	05:46	06:09	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:33	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:55	05:46	06:10	06:47	07:26	08:06	07:50	08:17
	17:31	18:15	19:54	20:35	21:12	21:31	21:16	20:31	19:31	18:34	16:56	16:56
26	08:06	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:17
	17:32	18:16	19:55	20:36	21:13	21:32	21:15	20:29	19:30	18:33	16:56	16:56
27	08:05	07:20	07:27	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:34	18:18	19:56	20:37	21:14	21:32	21:14	20:27	19:28	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:54	08:18
	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:25	19:26	18:30	16:55	16:58
29	08:03		07:23	06:28	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
	17:36		19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28	16:54	16:58
30	08:02		07:22	06:26	05:51	05:48	06:16	06:54	07:33	08:13	07:56	08:18
	17:38		20:00	20:41	21:17	21:31	21:11	20:22	19:22	18:26	16:54	16:59
31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:39		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H36 - H36

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:18	07:59	07:16	07:17	06:24	05:49	05:49	06:17	06:56	07:34	07:16	07:57
	17:01	17:41	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:19	17:23	16:53
2	08:18	07:58	07:14	07:15	06:22	05:48	05:49	06:19	06:57	07:35	07:17	07:58
	17:02	17:42	18:22	20:04	20:43	21:19	21:31	21:07	20:16	19:17	17:22	16:52
3	08:18	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:58	07:36	07:19	07:59
	17:03	17:43	18:23	20:05	20:45	21:20	21:31	21:05	20:14	19:16	17:20	16:52
4	08:18	07:56	07:11	07:12	06:19	05:47	05:50	06:21	07:00	07:37	07:20	08:00
	17:04	17:45	18:24	20:06	20:46	21:21	21:30	21:04	20:12	19:14	17:19	16:52
5	08:18	07:54	07:09	07:10	06:18	05:47	05:51	06:22	07:01	07:39	07:22	08:02
	17:05	17:46	18:26	20:08	20:47	21:22	21:30	21:03	20:10	19:12	17:17	16:51
6	08:18	07:53	07:07	07:08	06:17	05:47	05:52	06:23	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:22	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:52	06:25	07:03	07:41	07:24	08:04
	17:07	17:49	18:29	20:10	20:50	21:23	21:29	21:00	20:06	19:08	17:15	16:51
8	08:18	07:50	08:03	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:58	20:04	19:06	17:13	16:51
9	08:17	07:49	08:02	07:02	06:12	05:45	05:54	06:27	07:06	07:44	07:27	08:06
	17:09	17:52	19:31	20:13	20:52	21:25	21:29	20:57	20:02	19:04	17:12	16:51
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11	08:17	07:46	07:58	06:58	06:10	05:45	05:56	06:30	07:08	07:47	07:30	08:08
	17:12	17:55	19:34	20:16	20:55	21:26	21:27	20:54	19:59	19:00	17:10	16:51
12	08:16	07:45	07:56	06:57	06:08	05:45	05:56	06:31	07:10	07:48	07:32	08:08
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	17:14	17:58	19:37	20:18	20:57	21:27	21:26	20:51	19:55	18:55	17:07	16:51
14	08:15	07:41	07:52	06:53	06:06	05:45	05:58	06:33	07:12	07:51	07:34	08:10
	17:15	18:00	19:38	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:05	05:44	05:59	06:35	07:13	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
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18	08:13	07:35	07:44	06:46	06:01	05:44	06:02	06:38	07:17	07:56	07:40	08:13
	17:21	18:04	19:44	20:25	21:03	21:29	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:42	06:44	06:00	05:45	06:03	06:40	07:18	07:58	07:41	08:14
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22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:43	07:22	08:02	07:45	08:15
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	17:27	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:35	05:55	05:46	06:08	06:46	07:25	08:04	07:48	08:16
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	17:30	18:14	19:53	20:34	21:11	21:31	21:16	20:30	19:31	18:34	16:56	16:55
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	17:36		19:59	20:39	21:15	21:31	21:12	20:23	19:23	18:28	16:54	16:58
30	08:02		07:21	06:26	05:50	05:48	06:15	06:53	07:32	08:13	07:56	08:18
	17:38		20:00	20:41	21:16	21:31	21:10	20:21	19:21	18:26	16:53	16:59
31	08:01		07:19		05:50		06:16	06:55		08:14		08:18
	17:39		20:01		21:17		21:09	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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US-GRAND FORKS, ND 58201
+1 701 775 3000
wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H38 - H38

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:16	07:18	06:24	05:49	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:58	07:15	07:16	06:23	05:49	05:49	06:19	06:57	07:35	07:17	07:58
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:36	07:19	07:59
	17:03	17:44	18:23	20:05	20:45	21:20	21:31	21:05	20:14	19:16	17:20	16:52
4	08:18	07:56	07:11	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
5	08:18	07:55	07:09	07:10	06:18	05:47	05:51	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:47	21:22	21:30	21:03	20:10	19:12	17:18	16:52
6	08:18	07:53	07:07	07:08	06:17	05:47	05:52	06:24	07:02	07:40	07:23	08:03
	17:06	17:48	18:28	20:09	20:49	21:23	21:30	21:01	20:08	19:10	17:16	16:51
7	08:18	07:52	07:05	07:06	06:15	05:46	05:53	06:25	07:04	07:42	07:25	08:04
	17:07	17:50	18:29	20:11	20:50	21:23	21:30	21:00	20:06	19:08	17:15	16:51
8	08:18	07:50	08:04	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:58	20:05	19:06	17:14	16:51
9	08:17	07:49	08:02	07:02	06:13	05:46	05:54	06:27	07:06	07:44	07:27	08:06
	17:09	17:53	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
10	08:17	07:48	08:00	07:01	06:11	05:45	05:55	06:29	07:07	07:46	07:29	08:07
	17:11	17:54	19:33	20:15	20:54	21:25	21:28	20:56	20:01	19:02	17:11	16:51
11	08:17	07:46	07:58	06:59	06:10	05:45	05:56	06:30	07:09	07:47	07:30	08:08
	17:12	17:56	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:01	17:10	16:51
12	08:16	07:45	07:56	06:57	06:09	05:45	05:57	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:52	19:57	18:57	17:09	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:58	06:32	07:11	07:50	07:33	08:09
	17:14	17:59	19:37	20:19	20:58	21:27	21:26	20:51	19:55	18:55	17:07	16:51
14	08:15	07:42	07:52	06:53	06:06	05:45	05:59	06:34	07:12	07:51	07:35	08:10
	17:16	18:00	19:39	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:05	05:45	05:59	06:35	07:14	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:39	07:48	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:37	08:12
	17:18	18:02	19:41	20:23	21:01	21:29	21:24	20:46	19:49	18:50	17:04	16:51
17	08:14	07:37	07:47	06:48	06:03	05:45	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:43	20:24	21:02	21:29	21:24	20:44	19:47	18:48	17:03	16:52
18	08:13	07:35	07:45	06:46	06:01	05:45	06:02	06:39	07:17	07:56	07:40	08:13
	17:21	18:05	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:45	20:27	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:11	07:32	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:30	21:21	20:39	19:41	18:43	17:00	16:53
21	08:11	07:30	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:00	07:44	08:15
	17:25	18:09	19:48	20:29	21:07	21:31	21:20	20:38	19:39	18:41	16:59	16:53
22	08:10	07:29	07:37	06:39	05:57	05:45	06:06	06:44	07:22	08:02	07:46	08:16
	17:26	18:10	19:49	20:30	21:08	21:31	21:19	20:36	19:37	18:39	16:59	16:54
23	08:09	07:27	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:03	07:47	08:16
	17:28	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:54	05:46	06:10	06:47	07:26	08:06	07:50	08:17
	17:31	18:15	19:53	20:34	21:11	21:31	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:27	08:07	07:51	08:17
	17:32	18:16	19:55	20:36	21:12	21:31	21:15	20:29	19:29	18:33	16:56	16:56
27	08:05	07:20	07:27	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:18	19:56	20:37	21:13	21:31	21:14	20:27	19:27	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:53	08:18
	17:35	18:19	19:57	20:38	21:14	21:31	21:13	20:25	19:25	18:29	16:54	16:58
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
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Total, worst case												
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Table layout: For each day in each month the following matrix apply

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Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H39 - H39

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

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	17:01	17:41	18:20	20:03	20:42	21:18	21:31	21:08	20:18	19:20	17:23	16:53
2	08:19	07:58	07:15	07:16	06:23	05:49	05:49	06:19	06:57	07:35	07:17	07:58
	17:02	17:42	18:22	20:04	20:44	21:19	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:57	07:13	07:14	06:21	05:48	05:50	06:20	06:59	07:36	07:19	07:59
	17:03	17:44	18:23	20:05	20:45	21:20	21:31	21:05	20:14	19:16	17:20	16:52
4	08:18	07:56	07:11	07:12	06:20	05:48	05:51	06:21	07:00	07:38	07:20	08:01
	17:04	17:45	18:25	20:07	20:46	21:21	21:31	21:04	20:12	19:14	17:19	16:52
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	17:05	17:47	18:26	20:08	20:47	21:22	21:30	21:03	20:10	19:12	17:18	16:52
6	08:18	07:53	07:07	07:08	06:17	05:47	05:52	06:24	07:02	07:40	07:23	08:03
	17:06	17:48	18:27	20:09	20:49	21:23	21:30	21:01	20:08	19:10	17:16	16:51
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	17:07	17:50	18:29	20:11	20:50	21:23	21:30	21:00	20:06	19:08	17:15	16:51
8	08:18	07:50	08:04	07:04	06:14	05:46	05:53	06:26	07:05	07:43	07:26	08:05
	17:08	17:51	18:30	20:12	20:51	21:24	21:29	20:58	20:05	19:06	17:14	16:51
9	08:17	07:49	08:02	07:02	06:13	05:46	05:54	06:27	07:06	07:44	07:27	08:06
	17:09	17:53	19:32	20:13	20:53	21:25	21:29	20:57	20:03	19:04	17:12	16:51
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	17:12	17:56	19:34	20:16	20:55	21:26	21:28	20:54	19:59	19:01	17:10	16:51
12	08:16	07:45	07:56	06:57	06:09	05:45	05:57	06:31	07:10	07:48	07:32	08:09
	17:13	17:57	19:36	20:17	20:56	21:27	21:27	20:52	19:57	18:57	17:09	16:51
13	08:16	07:43	07:54	06:55	06:07	05:45	05:58	06:32	07:11	07:50	07:33	08:09
	17:14	17:59	19:37	20:19	20:58	21:27	21:26	20:51	19:55	18:55	17:07	16:51
14	08:15	07:42	07:52	06:53	06:06	05:45	05:59	06:34	07:12	07:51	07:35	08:10
	17:16	18:00	19:39	20:20	20:59	21:28	21:26	20:49	19:53	18:53	17:06	16:51
15	08:15	07:40	07:50	06:51	06:05	05:45	05:59	06:35	07:14	07:52	07:36	08:11
	17:17	18:00	19:40	20:21	21:00	21:28	21:25	20:48	19:51	18:51	17:05	16:51
16	08:14	07:39	07:48	06:50	06:04	05:45	06:00	06:36	07:15	07:54	07:37	08:12
	17:18	18:02	19:41	20:23	21:01	21:29	21:24	20:46	19:49	18:50	17:04	16:51
17	08:14	07:37	07:47	06:48	06:03	05:45	06:01	06:37	07:16	07:55	07:39	08:13
	17:19	18:03	19:43	20:24	21:02	21:29	21:24	20:44	19:47	18:48	17:03	16:52
18	08:13	07:35	07:45	06:46	06:01	05:45	06:02	06:39	07:17	07:56	07:40	08:13
	17:21	18:05	19:44	20:25	21:04	21:30	21:23	20:43	19:45	18:46	17:02	16:52
19	08:12	07:34	07:43	06:44	06:00	05:45	06:03	06:40	07:19	07:58	07:42	08:14
	17:22	18:06	19:45	20:26	21:05	21:30	21:22	20:41	19:43	18:44	17:01	16:52
20	08:11	07:32	07:41	06:42	05:59	05:45	06:04	06:41	07:20	07:59	07:43	08:15
	17:23	18:07	19:47	20:28	21:06	21:30	21:21	20:39	19:41	18:43	17:00	16:53
21	08:11	07:30	07:39	06:41	05:58	05:45	06:05	06:42	07:21	08:00	07:44	08:15
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	17:26	18:10	19:49	20:30	21:08	21:31	21:19	20:36	19:37	18:39	16:59	16:54
23	08:09	07:27	07:35	06:37	05:56	05:46	06:08	06:45	07:24	08:03	07:47	08:16
	17:28	18:12	19:51	20:32	21:09	21:31	21:18	20:34	19:35	18:37	16:58	16:54
24	08:08	07:25	07:33	06:36	05:55	05:46	06:09	06:46	07:25	08:05	07:48	08:17
	17:29	18:13	19:52	20:33	21:10	21:31	21:17	20:32	19:33	18:36	16:57	16:55
25	08:07	07:24	07:31	06:34	05:54	05:46	06:10	06:47	07:26	08:06	07:50	08:17
	17:31	18:15	19:53	20:34	21:11	21:31	21:16	20:31	19:31	18:34	16:56	16:55
26	08:06	07:22	07:29	06:32	05:54	05:47	06:11	06:49	07:27	08:07	07:51	08:17
	17:32	18:16	19:55	20:36	21:12	21:31	21:15	20:29	19:29	18:33	16:56	16:56
27	08:05	07:20	07:27	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
	17:33	18:18	19:56	20:37	21:13	21:31	21:14	20:27	19:27	18:31	16:55	16:57
28	08:04	07:18	07:25	06:29	05:52	05:47	06:13	06:51	07:30	08:10	07:53	08:18
	17:35	18:19	19:57	20:38	21:14	21:31	21:13	20:25	19:25	18:29	16:54	16:58
29	08:03		07:23	06:27	05:51	05:48	06:14	06:52	07:31	08:12	07:55	08:18
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30	08:02		07:21	06:26	05:51	05:48	06:15	06:54	07:32	08:13	07:56	08:18
	17:38		20:00	20:41	21:16	21:31	21:11	20:22	19:22	18:26	16:53	16:59
31	08:01		07:19		05:50		06:17	06:55		08:15		08:18
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Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
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Oper. time red.												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:

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+1 701 775 3000
wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar

Calculation: WTGs v15g / Occupied Home v3 Realistic **Shadow receptor:** H42 - H42

Assumptions for shadow calculations

Maximum distance for influence	2,000 m
Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [BISMARCK]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.92	5.13	7.45	8.03	10.20	11.21	11.69	10.35	8.68	5.69	4.02	3.69

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
750	544	492	383	561	813	1,056	657	466	490	942	1,263	8,418

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:19	08:00	07:17	07:18	06:25	05:50	05:49	06:18	06:56	07:34	07:16	07:57
	17:01	17:41	18:21	20:03	20:43	21:19	21:31	21:08	20:18	19:20	17:24	16:53
2	08:19	07:59	07:15	07:16	06:23	05:49	05:50	06:19	06:58	07:35	07:18	07:59
	17:02	17:43	18:22	20:04	20:44	21:20	21:31	21:07	20:16	19:18	17:22	16:53
3	08:19	07:57	07:13	07:14	06:21	05:49	05:50	06:20	06:59	07:37	07:19	08:00
	17:03	17:44	18:24	20:06	20:45	21:20	21:31	21:06	20:14	19:16	17:21	16:52
4	08:19	07:56	07:11	07:12	06:20	05:48	05:51	06:22	07:00	07:38	07:21	08:01
	17:04	17:46	18:25	20:07	20:46	21:21	21:31	21:04	20:13	19:14	17:19	16:52
5	08:19	07:55	07:10	07:10	06:19	05:48	05:52	06:23	07:01	07:39	07:22	08:02
	17:05	17:47	18:26	20:08	20:48	21:22	21:31	21:03	20:11	19:12	17:18	16:52
6	08:19	07:54	07:08	07:08	06:17	05:47	05:52	06:24	07:03	07:41	07:23	08:03
	17:06	17:49	18:28	20:10	20:49	21:23	21:30	21:02	20:09	19:10	17:17	16:52
7	08:18	07:52	07:06	07:06	06:16	05:47	05:53	06:25	07:04	07:42	07:25	08:04
	17:08	17:50	18:29	20:11	20:50	21:24	21:30	21:00	20:07	19:08	17:15	16:51
8	08:18	07:51	08:04	07:05	06:14	05:46	05:54	06:26	07:05	07:43	07:26	08:05
	17:09	17:52	18:31	20:12	20:52	21:24	21:29	20:59	20:05	19:07	17:14	16:51
9	08:18	07:49	08:02	07:03	06:13	05:46	05:55	06:28	07:06	07:45	07:28	08:06
	17:10	17:53	19:32	20:14	20:53	21:25	21:29	20:57	20:03	19:05	17:13	16:51
10	08:18	07:48	08:00	07:01	06:12	05:46	05:55	06:29	07:08	07:46	07:29	08:07
	17:11	17:55	19:33	20:15	20:54	21:26	21:29	20:56	20:01	19:03	17:11	16:51
11	08:17	07:47	07:58	06:59	06:10	05:46	05:56	06:30	07:09	07:47	07:31	08:08
	17:12	17:56	19:35	20:16	20:55	21:26	21:28	20:54	19:59	19:01	17:10	16:51
12	08:17	07:45	07:56	06:57	06:09	05:45	05:57	06:31	07:10	07:49	07:32	08:09
	17:13	17:57	19:36	20:18	20:57	21:27	21:27	20:53	19:57	18:57	17:09	16:51
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19	08:13	07:34	07:43	06:45	06:01	05:45	06:04	06:40	07:19	07:58	07:42	08:14
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22	08:10	07:29	07:37	06:39	05:58	05:46	06:07	06:44	07:23	08:02	07:46	08:16
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	17:28	18:12	19:51	20:32	21:10	21:31	21:19	20:35	19:36	18:38	16:58	16:55
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26	08:07	07:22	07:29	06:33	05:54	05:47	06:11	06:49	07:28	08:08	07:51	08:18
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27	08:05	07:20	07:28	06:31	05:53	05:47	06:12	06:50	07:29	08:09	07:52	08:18
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	17:35	18:19	19:58	20:39	21:15	21:32	21:13	20:26	19:26	18:30	16:55	16:58
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	17:37		19:59	20:40	21:16	21:32	21:12	20:24	19:24	18:28	16:54	16:59
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31	08:01		07:20		05:50		06:17	06:55		08:15		08:19
	17:40		20:02		21:18		21:10	20:20		18:25		17:00
Potential sun hours	282	289	368	406	463	471	476	439	378	339	285	270
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

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enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

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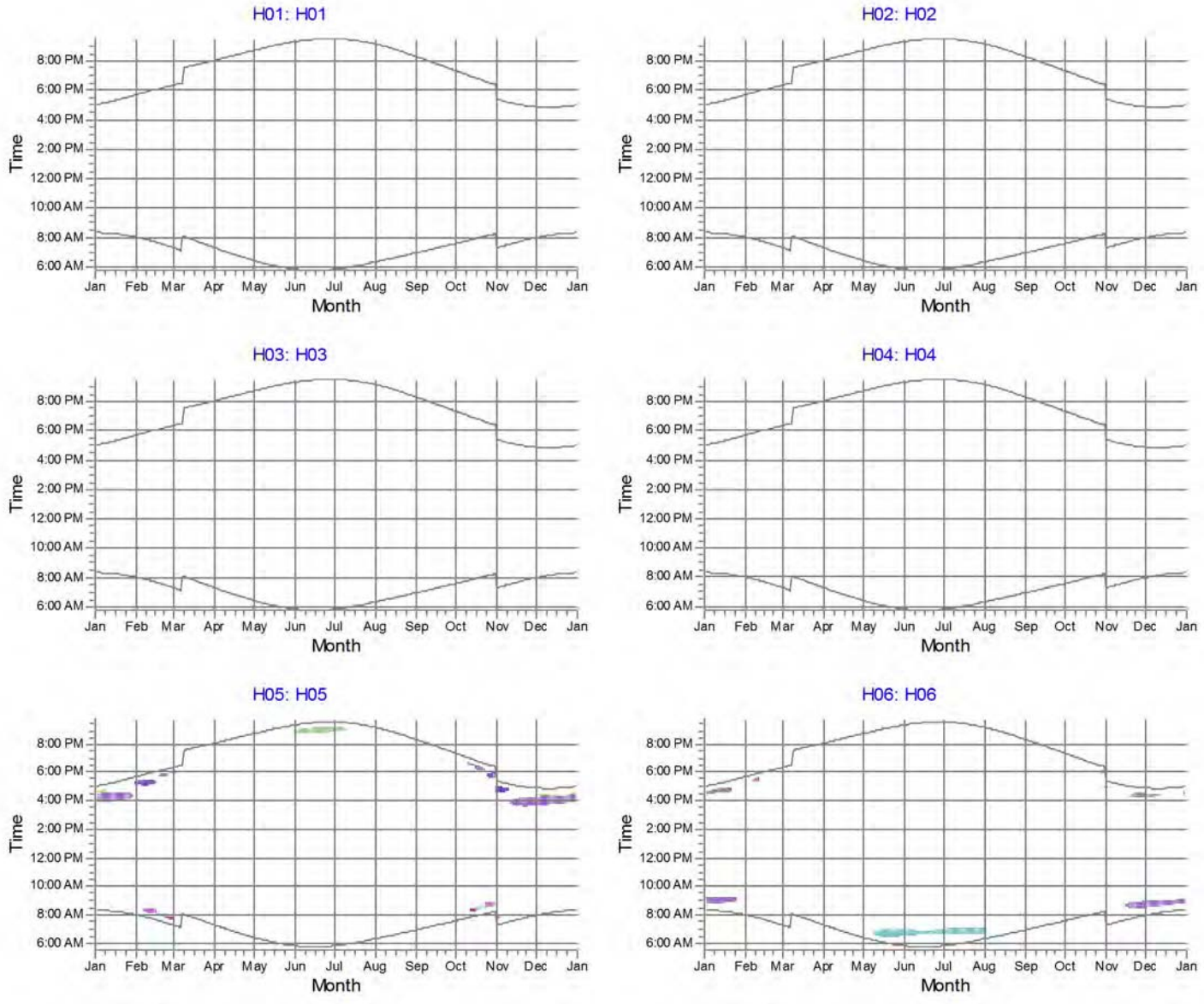
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SHADOW - Calendar, graphical

Calculation: WTGs v15g / Occupied Home v3 Realistic



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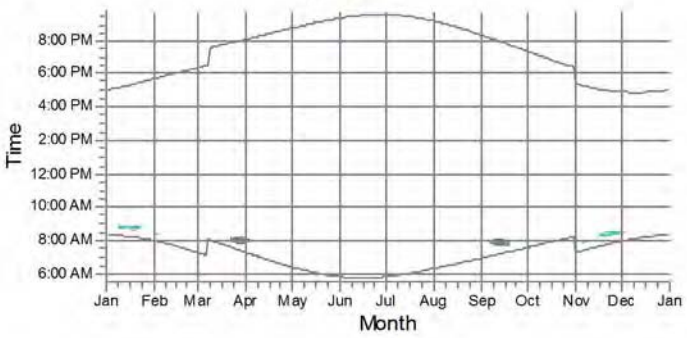
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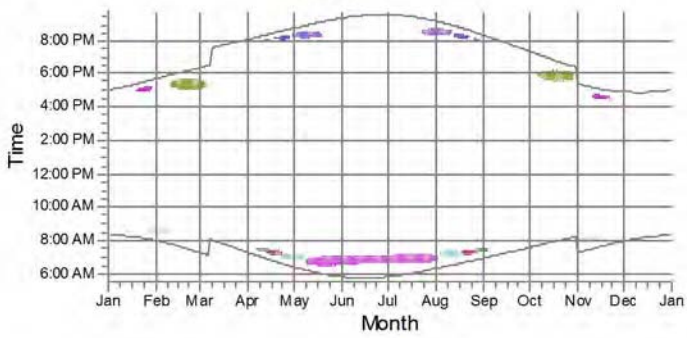
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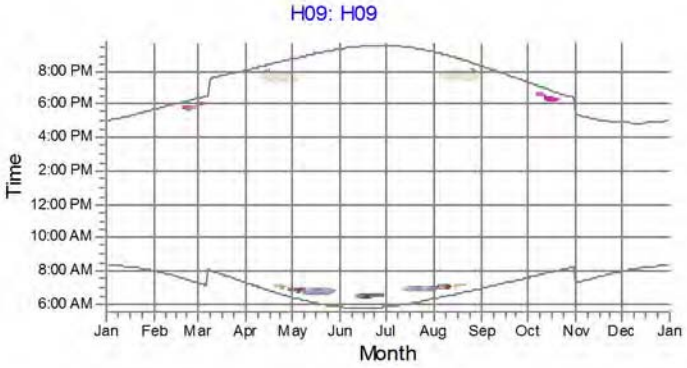
H07: H07



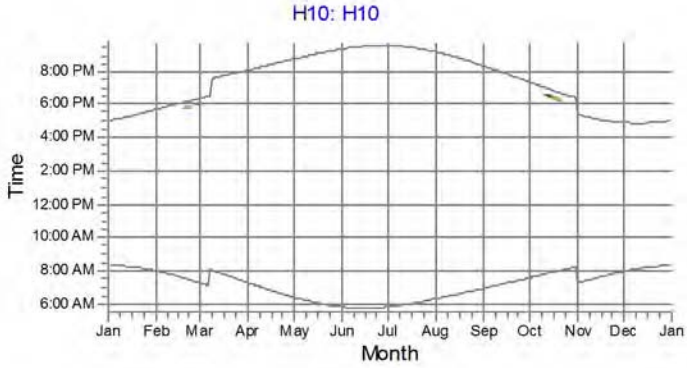
H08: H08



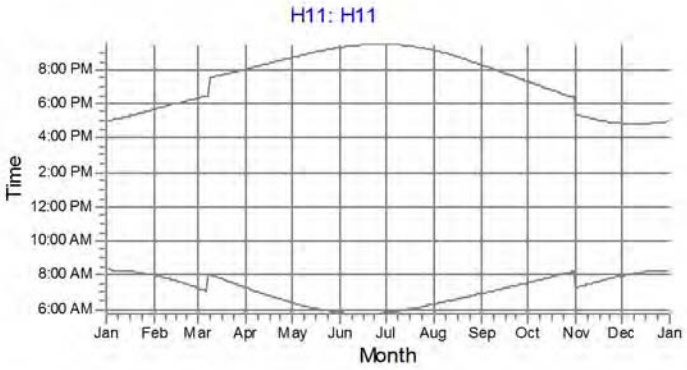
H09: H09



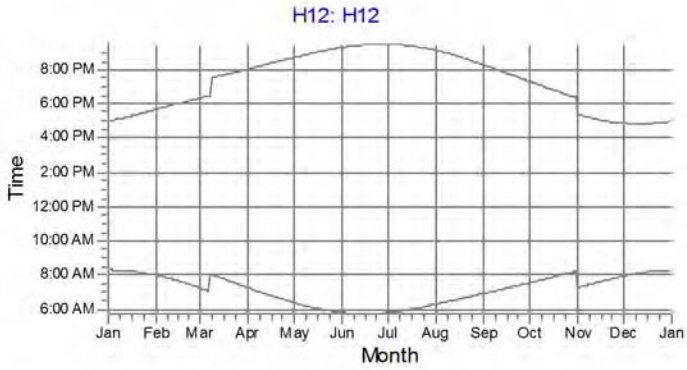
H10: H10



H11: H11



H12: H12



WTGs



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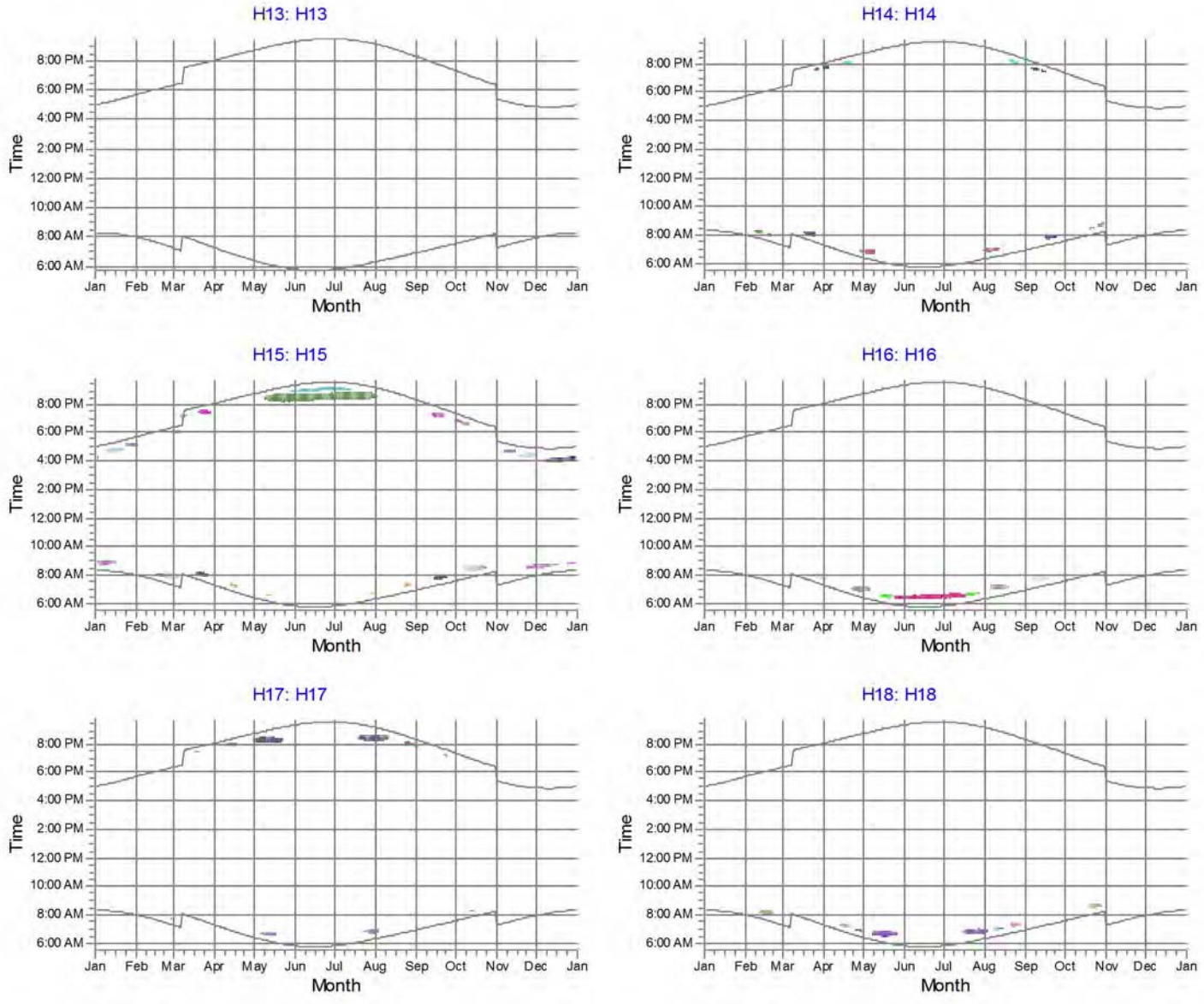
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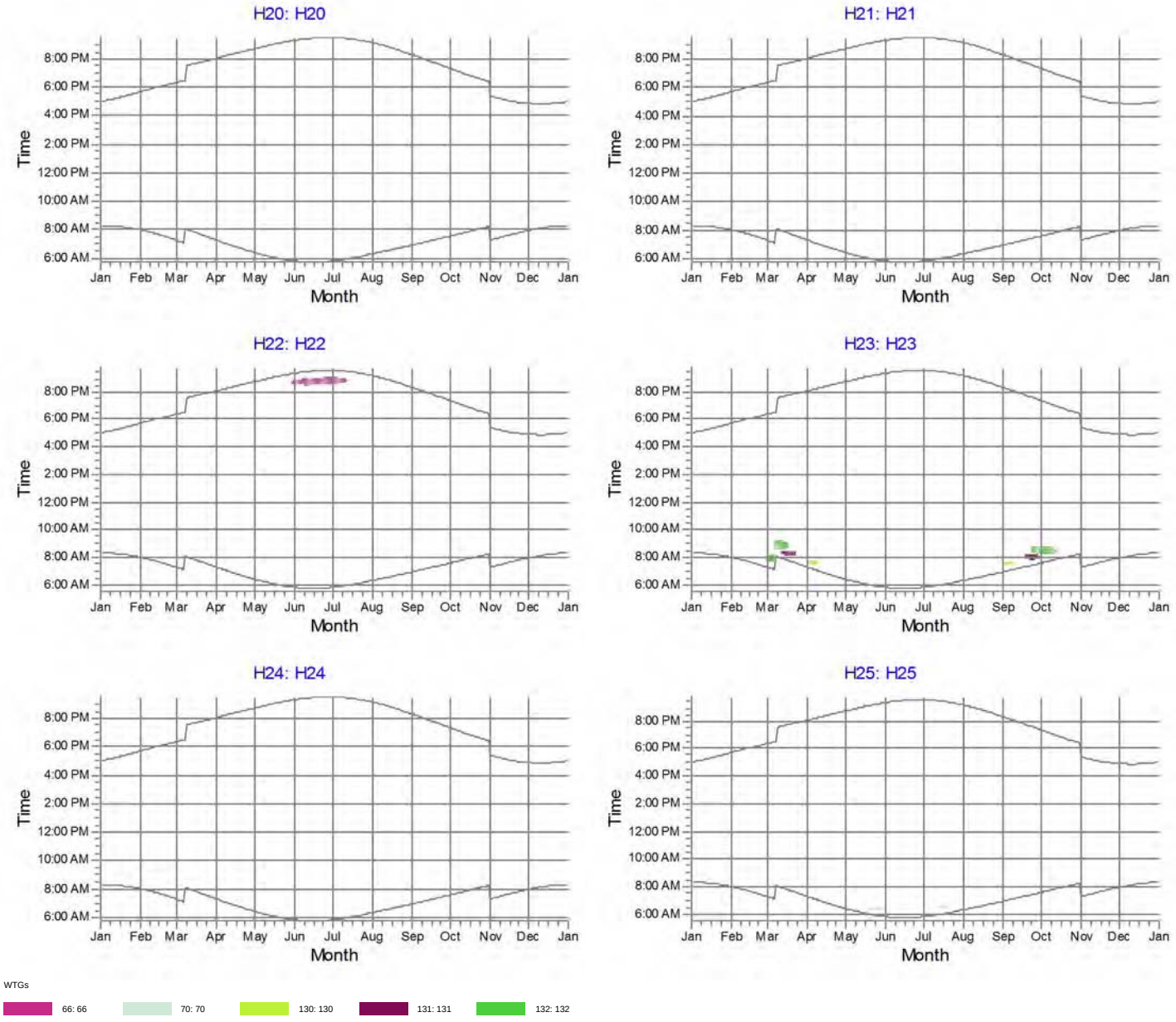
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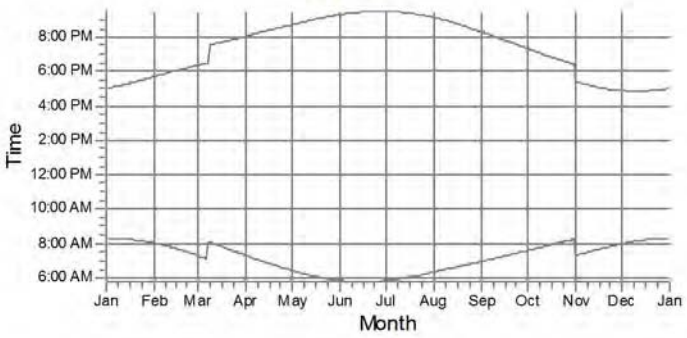
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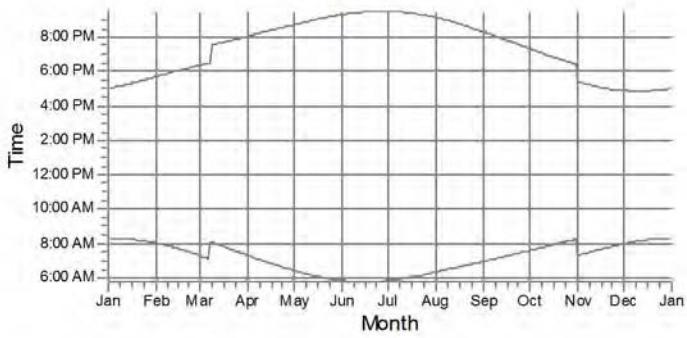
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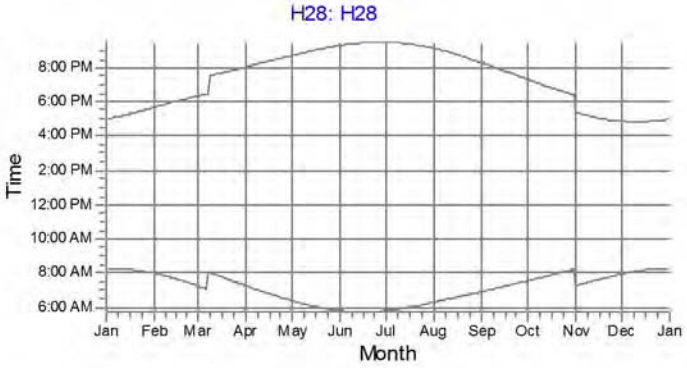
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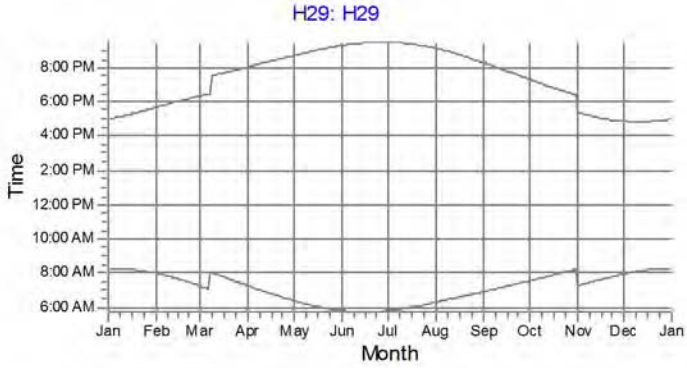
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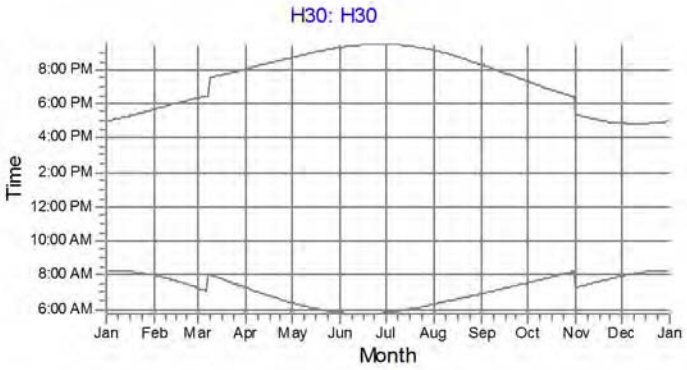
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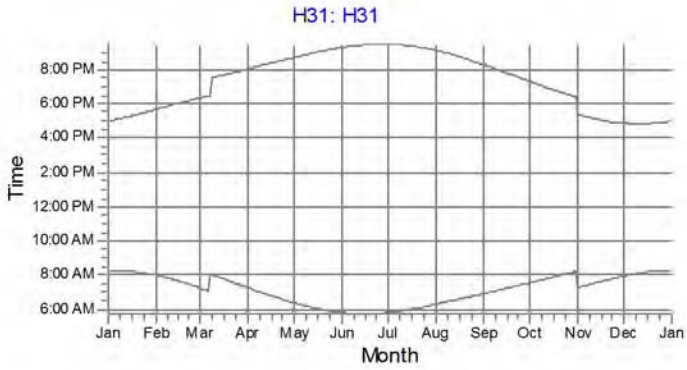
H29: H29



H30: H30



H31: H31



WTGs

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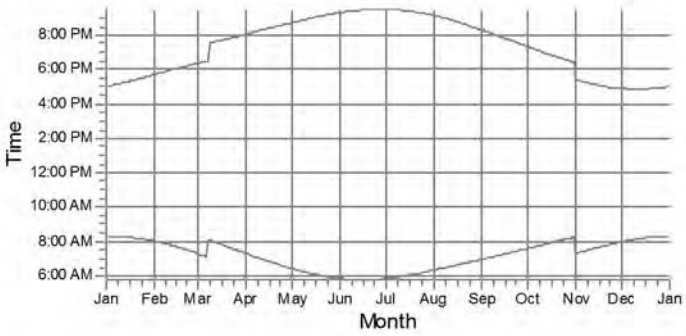
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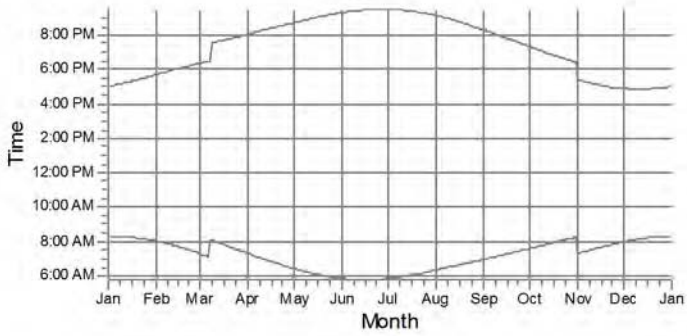
SHADOW - Calendar, graphical

Calculation: WTGs v15g / Occupied Home v3 Realistic

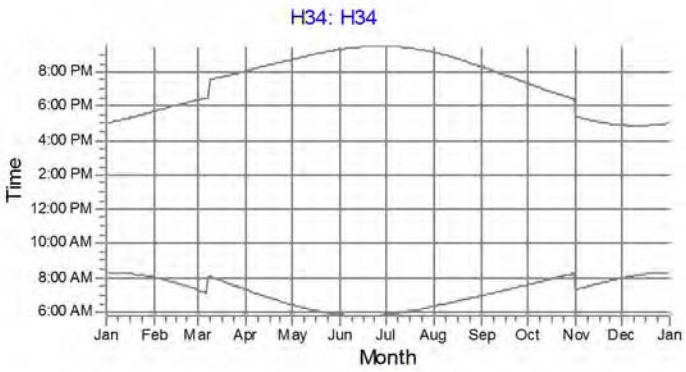
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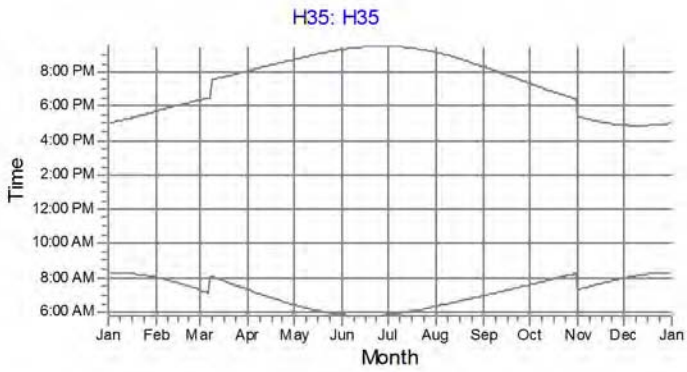
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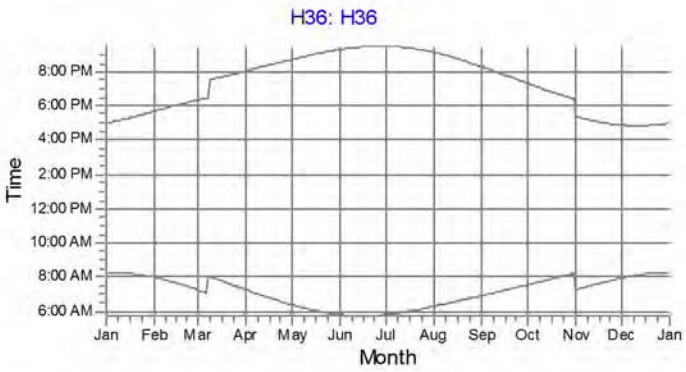
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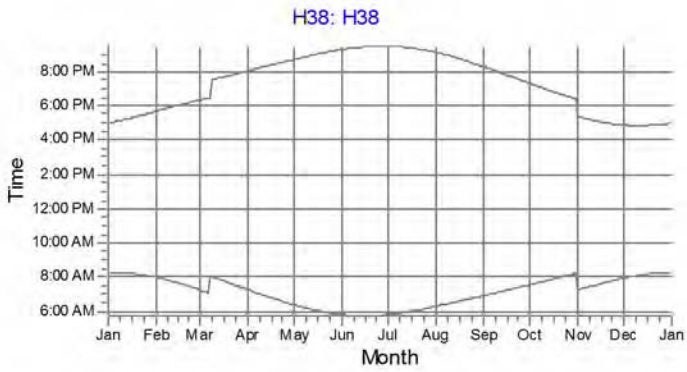
H35: H35



H36: H36



H38: H38



WTGs

Project:
20102130 - Merricourt ND Enxco

enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

Description:
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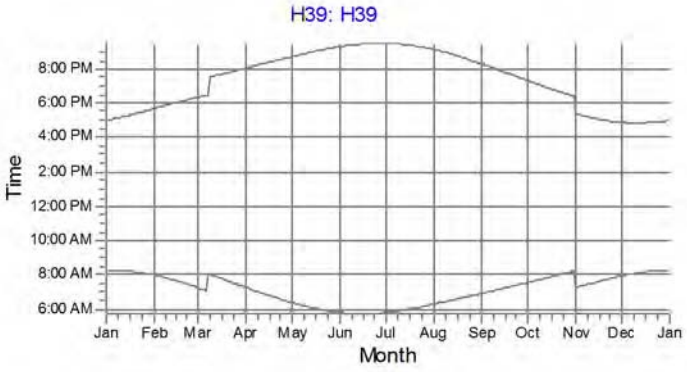
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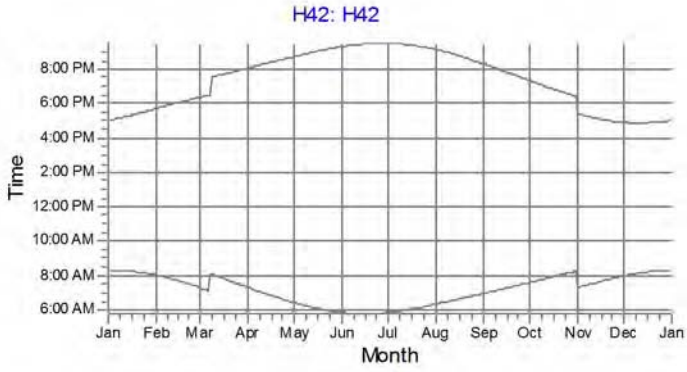
Licensed user:
EAPC Wind Energy
3100 DeMers Avenue
US-GRAND FORKS, ND 58201
+1 701 775 3000
wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Calendar, graphical

Calculation: WTGs v15g / Occupied Home v3 Realistic





WTGs

Project:
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enXco
Chris Sternhagen
10 Second Street NE, Ste 107
Minneapolis, MN 55413

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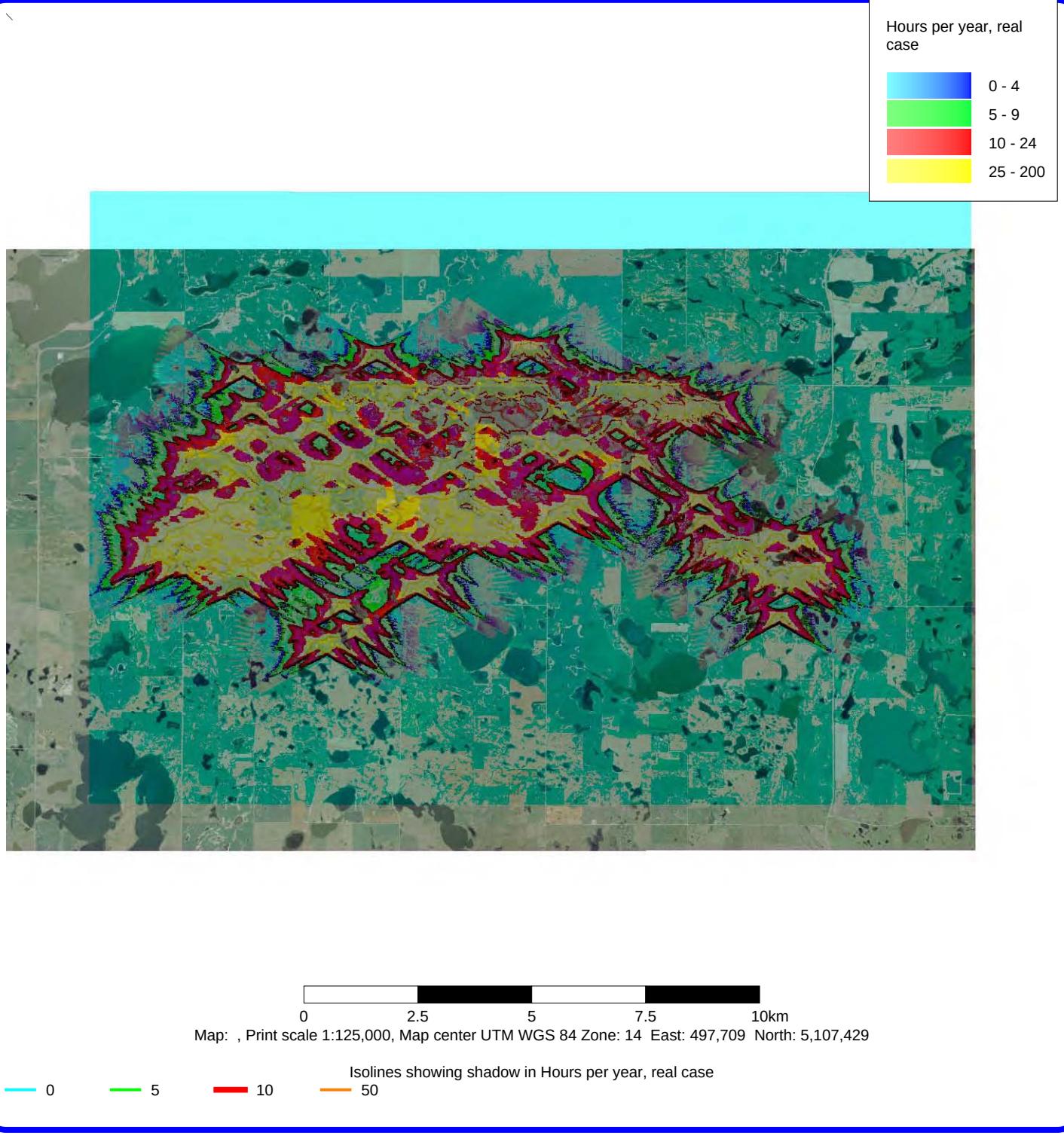
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US-GRAND FORKS, ND 58201
+1 701 775 3000
wind@eapc.net

Calculated:
9/29/2010 2:32 AM/2.7.473

SHADOW - Map

Calculation: WTGs v15g / Occupied Home v3 Realistic



Map: , Print scale 1:125,000, Map center UTM WGS 84 Zone: 14 East: 497,709 North: 5,107,429

Isolines showing shadow in Hours per year, real case

0 5 10 50

APPENDIX G:
SHPO CORRESPONDENCE

STATE HISTORICAL SOCIETY OF NORTH DAKOTA

John Hoeven
Governor of North Dakota

North Dakota State Historical Board

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Director Department of Transportation

Merlan E. Paaverud, Jr.
Director

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September 24, 2010

Jennifer L. Harty
Senior Staff Archaeologist
Kadrmas, Lee & Jackson
128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502-1157

RECEIVED
SEP 27 2010

NDSHPO REF.: 09-1186 PSC enXco Merricourt Wind Power Project
Class III Cultural Resource Inventory Report

Dear Jennifer:

We have received and reviewed correspondence and project document for **09-1186:** "Merricourt Wind Power Project, Volume 1: A Class III Cultural Resource Inventory in McIntosh and Dickey Counties, North Dakota," by Jennifer L. Harty, Angie Rabe, Amy Luechtmann, Michael Shropshire, Mitch Steckler, and Stacie Taylor (Kadrmas, Lee , and Jackson, ROI 1162, 1175, September 2010), and find it acceptable.

We concur with "***No Significant Sites Affected***" and ***"No Historic Properties Affected"*** determinations provided the project area is as mapped and described in the report, and that recommendations regarding avoidance outlined are followed as stipulated. We look forward to reviewing forthcoming documents regarding this project if there are changes to avoidance strategies and/or project designs as reported herein.

If you have questions please contact either Paul Picha at ppicha@nd.gov or (701) 328-3574 or Susan Quinnell at squinnell@nd.gov or (701) 328-3576.

Sincerely,

Merlan E. Paaverud, Jr.
State Historic Preservation Officer (North Dakota)
and
Director, State Historical Society of North Dakota
c: Patrick Fahn, NDPSC

APPENDIX H:
BAT ASSESSMENT

Bat Assessment for the Merricourt Wind Power Project, Dickey and McIntosh Counties, North Dakota

October 2009

Prepared for:

enXco Development Corporation
10 Second Street NE, Ste. 107
Minneapolis, MN 55413

Prepared by:

Erin Gillam
Department of Biological Sciences
North Dakota State University
Fargo, ND 58108

Bat Assessment for the Merricourt Wind Power Project

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EXECUTIVE SUMMARY

EnXco Development Corporation (EDC) is planning the development of the Merricourt Wind Power Project (WPP) in South Central North Dakota, which includes land in parts of Dickey and McIntosh counties. The entire project area covers approximately 30 square miles, and the final facility will include 100 wind turbines. EDC contracted Kadrmas Lee and Jackson, who subcontracted with Erin Gillam and her students to conduct a baseline survey of bat activity in the project area, and determine if any bat populations or types of habitat require special consideration during the development of the Merricourt WPP. This report summarizes the results of the survey, which was conducted from July 27 to September 15, 2009. This sampling period includes the fall migration of bats when turbine-related kills are highest.

Passive acoustic monitoring was conducted at seven sites within the area of the Merricourt WPP. Monitoring systems captured the calls of echolocating bats in the area, which were later analyzed and identified to the species level. Efforts were also put forth to directly capture bats with mistnets, yet this proved to be unsuccessful in the relatively open landscape of the drift prairie.

At total of 6,779 files were recorded from passive monitoring systems over a total of 621 sampling hours. After filtering out files with noise, 547 files remained that contained a total of 5,911 high quality echolocation calls. Bat activity was highest in late July and early August, with a maximum of 987 calls recorded in one night. Within a night, bat activity followed a unimodal distribution with the peak near 1:00. Activity was unrelated to local climatic conditions, but appeared to be linked to habitat type, with higher activity and species diversity near hardwood shelterbelts compared to wetlands or drift prairie.

A total of five species were identified from recordings: 1) big brown bats, *Eptesicus* fuscus, 2) little brown bats, *Myotis lucifugus*, 3) red bats, *Lasiurus* borealis, 4) hoary bats, *Lasiurus* cinereus, and 5) silver-haired bats, *Lasionycteris* noctivigans. Red bats comprised 86% of the dataset, indicating that this is the primary species found in South Central North Dakota during the fall migratory season. Red bats are one of the few species that are highly susceptible to the presence of wind turbines, hence it is possible that construction of the Merricourt WPP will negatively impact this species. Post-construction monitoring is recommended to determine if such negative impacts are occurring. If high red bat mortality is detected, mitigative measures may be necessary; these may include curtailing wind turbines during the migratory season by setting a cut-in speed of 5 m/s.

INTRODUCTION

EnXco Development Corporation (EDC) is planning the development of the Merricourt Wind Power Project (WPP) in South Central North Dakota, which includes land in parts of Dickey and McIntosh counties. The entire project area covers approximately 30 square miles, and the final facility will include 100 wind turbines. Most of the study area consists of private land used for either crop production or grazing of livestock, interspersed with shallow wetlands.

This work was completed under a subcontract with Kadrmas Lee & Jackson, who signed a contract with EDC to conduct the permitting and environmental services for the Merricourt WPP. The primary goal of the study was to determine the potential impacts of wind power development on bat communities in South Central North Dakota. Data was collected from July 27 to September 15, 2009. All study methods were approved by the North Dakota Game and Fish Department (License # GNF02612681) and met with the standards of the US Fish and Wildlife Service and the Endangered Species Act.

An assessment of bat activity is important for determining if bat populations will be significantly impacted by the presence of a wind energy facility. Turbine-related bat kills have been reported at wind energy facilities across the United States and Canada (Kunz et. al. 2007). While scientists originally believed these deaths were primarily due to direct strikes with moving blades, new research shows that the vast majority of bats are killed by a condition known as barotrauma (Baerwald et. al. 2008). Barotrauma occurs when there is a rapid change in external pressure and can lead to either expansion or compression of body tissues, depending upon the direction of pressure change. For bats flying near turbines, the very high wind speeds at the tips of turbine blades (55-80 m/s) lead to danger zones where the air pressure is substantially lower than in the surrounding air. When bats fly into these low-pressure zones, their lungs rapidly expand, leading to rupturing of blood vessels and extensive internal hemorrhaging (Baerwald et. al. 2008).

Another important issue is that bat kills are not randomly distributed across time and do not equally affect all species. Most bat fatalities occur in the fall migratory period (Johnson et al. 2003), which spans from late July to mid September in the Great Plains region. Further, amongst the 45 species of bats found in the United States, three species make up more than 75% of turbine-related bat deaths (Kunz e.t al. 2007). These species - hoary bats, red bats, and silver-haired bats - are all solitary bats that roost in trees and undergo a long distance migration in the spring and the fall every year (Cryan. 2003)

Overall, an understanding of the baseline migratory activity of bats at the Merricourt WPP is necessary to determine the potential impacts of project development on bat populations. This data will also be valuable for determining if mitigative measures during or after development would be valuable for minimizing effects of the wind energy facility on bats.

Objectives

The general objectives of this assessment were to 1) determine if there are any bat populations or types of habitat that require special consideration during the development of the Merricourt WPP, and 2) if so, determine if mitigative measures are necessary to minimize impacts on bats.

Specific objectives were to:

1) Conduct a thorough literature review to determine the bat species that are known to occur in South Central North Dakota, and the roosting and foraging habitats primarily used by each species.
2) Carry out a six-week acoustic survey of the area in which passive monitoring systems are deployed in the field and used to record the calls of nearby bats.
3) Directly capture bats with mistnets for six nights during the study period at a variety of locations within the project area.
4) Conduct an analysis of acoustic data to determine species identification and levels of bat activity at each study site within the Merricourt WPP.

STUDY AREA AND KNOWN BAT SPECIES

The 30-square-mile area slotted for the Merricourt WPP (Figure 1) is located in the Drift Prairie region of North Dakota, which is characterized by gently rolling hills and an abundance of shallow wetlands. The study area is fragmented into sections of land used for crop production, livestock grazing, and private homes. While intensive use of the land for agriculture has modified the landscape such that little natural prairie remains, many wetlands are undisturbed, providing bats with a large number of water sources. The area contains very little tree cover, most of which is in the form of hardwood shelterbelts separating plots of land. Unfortunately, some plots in the northwestern part of the study area (parts of sections 29-32, ~1,200 acres) were not accessible due to residual flooding of roads from the spring season.

Five bat species are known to occur in Dickey and McIntosh counties: 1) big brown bats, *Eptesicus* fuscus, 2) little brown bats, *Myotis lucifugus*, 3) red bats, *Lasiurus* borealis, 4) hoary bats, *Lasiurus* cinereus, and 5) silver-haired bats, *Lasionycteris* noctivigans. Big brown and little brown bats are summer residents that leave South Central North Dakota in late summer. These

bats are believed to migrate short distances east to winter hibernacula in caves and mines of southern Minnesota (Gunderson and Beer 1953). Alternatively, red, hoary and silver-haired bats undergo a long distance fall migration from Canada and the northern United State to the southern United States (Findley and Jones 1964, LaVal and LaVal 1979, Izor 1979, Koehler and Barclay 2000, Cryan 2003). These three species also comprise the majority of bats killed by wind turbines, hence they are of special concern when assessing potential impacts of facility development on bat populations.

METHODS

Acoustic Monitoring

Data Collection

We selected seven locations within the study area at which to conduct passive acoustic monitoring (Figure 2). Sampling occurred from July 27 to September 15, 2009. Acoustic data was collected using two frequency-division Anabat SD-1 ultrasonic detection systems (Titley Electronics, Ballina, NSW, Australia). These systems automatically detect sounds in the environment and store information about acoustic signals on removable compact flash cards. Each Anabat SD-1 unit was powered by a 12 V, 630 Ah car battery and housed in an 14 gallon plastic tub. A circular section was removed from one side of the tub to facilitate placement of an 11" diameter, 90° PVC joint connector with a small hole drilled in the bottom. The connector was oriented so that one side entered the plastic tub, while the other side pointed upward. Each Anabat unit was placed at the edge of the PVC connector with the microphone pointing out of the tub. This arrangement protected the microphone and recording system from precipitation, while also permitting the detection and recording of bat calls. Anabats were programmed to monitor ultrasonic signals from 19:30 each evening to 7:00 the following morning. Approximately once a week data was downloaded from flash cards and units were moved to a new location. We selected locations to ensure we sampled the three major habitat types found in the area of the Merricourt WPP: hardwood shelterbelts, wetlands, and drift prairie. Given the ubiquitous nature of cropland throughout the site, we did not designate this as a separate artificial habitat type, as all study sites were in close proximity to an agricultural field.

Data Assumptions

Interpretation of acoustic monitoring data involved a series of assumptions:

1) Bat activity recorded at the seven study sites (Figure 2) accurately represents bat activity across the area of the Merricourt WPP
2) Ultrasonic detection systems functioned properly and documented the majority of bat activity within the recording area.

3) Bat activity is minimal outside of the sampling period of 19:30 – 7:00
4) The study period (July 27 – Sept 15) accurately represented the timing of the fall migration at the Merricourt WPP for the bat species most strongly affected by the presence of turbines.
5) Different files represent separate bat passes through the recording area and can be used as a measure of abundance
6) Echolocation calls within the same file were emitted by a single individual.

Assumption 1 is based on our observation that patterns of land use and available habitat for bats and other wildlife is similar across the sampling area, and that detection systems were placed so that each of the natural habitat types (ie. drift prairie, wetlands, shelterbelts) were acoustically sampled at least once during the study period. Further, detection systems were primarily placed at or near proposed turbine sites, thus the data should provide an accurate view of expected bat activity where some construction will occur.

Assumption 2 recognizes the technical limitations of the recording system and that improper placement of equipment can lead to inaccurate estimates of bat activity (ie. incorrect microphone orientation). We minimized such effects by using methods of placement that are recommended by the producer of the system, as well as by previous studies that have used Anabat systems (Hayes 1997, Britzke and Murray 2000, Fiedler 2004).

Assumption 3 has been documented in an extensive number of locations with many different species (Griffin 1958), and hence is strongly supported by the available data.

Assumption 4 is based on previous studies of migratory behavior of red, hoary, and silver-haired bats, the three species most strongly affected by the presence of wind turbines (Findley and Jones 1964, LaVal and LaVal 1979, Izor 1979, Koehler and Barclay 2000, Cryan 2003). Unfortunately, no data is available about the movement patterns of these species throughout North Dakota, so the assumption has not been validated. Future studies sampling the study area from spring to fall would help to determine if this assumption is valid in South Central North Dakota.

Assumptions 5 and 6 are directly related to how echolocation calls are interpreted during data analysis. Before explaining these assumptions, two definitions are needed: a call is an individual, discrete vocal pulse, while a call sequence is a series of consecutive calls produced by a single bat during a single pass through the recording area (O'Farrell et al. 1999). The Anabat SD-1 system records each call sequence to a separate file. It is well accepted that the number of recorded calls should not be used as a measure of bat abundance (ie. number of

bats), as calls emitted by the same bat are not independent of each other (Gannon et al. 2003). Number of calls is instead viewed as an index of relative bat activity between sampling sites and nights, and bat abundance is assessed by the number of recorded call sequences (Thomas and West 1989). Yet, it is important to note that even the number of sequences does not provide a completely accurate reflection of abundance, as it is possible that multiple sequences were produced by the same bat as it repeatedly flew through the sampling area.

Data Analysis

Collected files were viewed and analyzed using ANALOOK 4.9g (Titley Electronics). Filters developed by E. Britzke were used for selecting and cleaning files. First, a screening filter was used to scan all recordings and mark files that did not contain echolocation calls. After deletion of these noise files, an additional filter was used to remove extraneous noise from files with bat calls. All files with fewer than three calls were removed from the analysis. Overall, filtering is a necessary step for ensuring that the measured call parameters are accurate and can be used for species identification. The final dataset included files that each contained a sequence of calls presumably emitted by the same bat. Values of ten parameters were measured for each call within a sequence (Table 1).

General level of bat activity was defined as the number of bat calls recorded each night. We looked at trends in bat activity across the night, as well as throughout the study period. We also examined how local weather conditions and habitat type related to observed bat activity. Information about minimum temperature, maximum temperature, precipitation and wind speed were obtained from the archives at Weather Underground (http://www.wunderground.com). A linear regression was conducted to examine the relationship between each climatic variable and nightly call count.

Species Identification

All identification was performed with a custom source code and call library developed by E. Britzke (Britzke 2003, Britzke and Murray 2000, Britzke et. al. 2002, in press., Murray et al. 2001) that was based in program R (v. 2.7.2., packages class and mda; http:/www.r-project.org). The program used a library of 6,263 known calls from the five species found in South Central North Dakota. Known sequences were obtained from bats at other locations in the United States that had been captured, identified, and recorded after release. A discriminant function analysis was used to assign the unknown calls recorded in the area of the Merricourt WPP to the species level. Each call within a sequence was individually identified to species and then pooled across the sequence. Sequence identification was defined based on which species was assigned to the majority of calls within a sequence. If the majority of call identifications resulted in a tie among species, the sequence was considered unidentifiable.

Mistnetting

In addition to acoustic monitoring, we attempted to directly capture bats using mistnets (Kunz 1988). We limited mistnetting to key "hotspots" within the study area where we believed bats would most likely be found, which primarily included hardwood shelterbelts and areas close to shallow bodies of water (Figure 2). At a given site, three to four mistnets were set within a relatively small area (0.1 – 0.25 square miles) so that we could walk between nets and check for bats every 10-15 min. Nets were primarily placed across openings and along the edges of shelterbelts, and at the edge of water bodies. Mistnets were opened at sunset, which varied throughout the study period from 19:46 to 21:10, and were closed at 02:00 if no bats had been captured. Additional methods for processing bats and recording the calls of hand-released individuals are not described as we did not capture any bats during the study period (see Results).

RESULTS

Acoustic Monitoring

Sampling Effort

During the 51 day sampling period, we recorded a total of 6,779 files from the two Anabat SD-1 detection systems. Unfortunately, one of the units was damaged in the first week of the study and was not operable for the remainder of the sampling period. Despite this setback, we still obtained 621 sampling hours between the two systems. After removal of files containing extraneous noise, a total of 547 data files remained. Hence, only 8% of the dataset included files with echolocation calls. This is not surprising given the high wind speeds in the area, which often trigger the detection system to record.

Bat Activity

Echolocation calls were recorded from July 27 to August 25, 2009 (Figure 3). All recordings obtained after August 25 did not contain bat calls, indicating that the majority of bats had already migrated through the area by this time. Bat activity was highest in late July and early August, with a maximum of 987 calls recorded in one night. A total of five species were identified from recordings: red bats, hoary bats, silver-haired bats, big brown bats, and little brown bats. When activity was partitioned by species (Figure 4), it was clear that diversity changed throughout the sampling period. Diversity started off high, with all five species being identified in the beginning of the study, but dropped off over time, with all calls after August 8 attributed to only two species (red bats and little brown bats). Bat activity also varied substantially across the night. Activity steadily rose from the beginning of the night, peaking near 1:00 and then dropping off throughout the early morning (Figure 5). Regression analyses revealed no significant relationship between any of the climatic variables and nightly call count

(Figure 6). In reference to habitat type, bat activity was highest when detectors were located in hardwood shelterbelts, and substantially lower at wetland edge and drift prairie sites.

Bat Abundance

A total of 547 call sequences were identified to the species level (Table 2). The vast majority of calls (86%) were identified as red bats. The remaining calls were attributed to little brown bats (10%), hoary bats (2%), silver-haired bats (1%) and big brown bats (< 1%). Cross-classification analysis resulted in the model assigning calls to the correct species > 90% of the time (Table 3). Classification rates for the two most common species were especially high: red bat = 99.9%, little brown bat = 100%. Overall, these high cross-classification rates indicate that misclassification of species is rare, and high confidence can be attributed to the assigned species identifications.

Mistnetting

We mistnetted on six nights throughout the study period, although rain caused us to close our nets very early on one night, so only five sites were adequately sampled (Figure 2). We captured no bats on any of the mistnet sampling nights. This is most likely due to the difficulty of capturing bats in an open landscape, such as the drift prairie of South Central North Dakota. When mistnetting, it is ideal to choose locations in which bats funnel through a small area, such as a narrow trail in a forest; in the study area, no such funneling points existed, hence the chance of capturing bats was severely reduced.

DISCUSSION

We detected all five species known to occur in South Central North Dakota at the site of the Merricourt WPP (Table 2). Red bats dominated the dataset, with 86% of files assigned to this species. While a high abundance of bats known to migrate in late summer and early fall was not a surprise, the skew towards red bats was unexpected. Even though hoary bats and silver-haired bats are also known to migrate from north to south in August and September (Cryan 2003), these species made up a small percentage of the dataset (3%). The reason for the abundance of red bats and the scarcity of hoary and silver-haired bats is not clear. One plausible possibility is that these species use different fall migratory pathways, and that red bats are the only species that have a major migratory corridor passing through South Central North Dakota.

Our observations of overall and species-specific patterns of bat activity (Figures 3, 4) indicate that the sampling period included the fall migration of species moving long distances from northern to southern locations. We found that activity of red bats and hoary bats was low in late July, rose throughout the first week of August, and then decreased in the second week of August, signifying that minimal migratory activity was occurring at the beginning and end of the study. Further, big brown bats, which are summer residents of North Dakota that migrate east in August, were detected only in the first few days of the study. This indicates that our sampling period captured the tail end of the summer season, before the fall migratory period began and the composition of the bat community changed substantially. It was surprising to only detect silver-haired bats in late July, as we expected this species to be migrating through the area at the same time as red bats and hoary bats. Similar to our explanation of bat abundance patterns, it is possible that silver-haired bats do not maintain a migratory corridor in South Central North Dakota, but instead move east or west to established pathways that lead south. The continued presence of little brown bats into late August was also surprising; this species exhibits an eastward migratory pattern similar to big brown bats, hence we would have expected their presence to drop off near the beginning of the sampling period. Unfortunately, our minimal knowledge of the migratory ecology of little brown bats in North Dakota prevents us from further explaining this observation. It is possible that little brown bats, which eat substantially smaller prey than big brown bats, remain in South Central North Dakota due to the continued availability of food resources into the early fall.

Patterns of bat activity changed throughout the night, peaking in the early morning hours. During the summer, most bat species exhibit a peak in activity from 9-11pm and 3-5am, with a

lull in the intermediate hours (Hayes 1997). This bimodal peak is associated with bats foraging early and late in the night, and resting at the roost in between. Alternatively, a different activity pattern would be expected for migrating species. While individuals will vary in the time they start migrating each evening and stop migrating each morning, the majority of bats should be moving in the middle of the night. Hence, the unimodal distribution of activity we have observed further suggests that the majority of detected bats were migrating through the area.

Temperature, precipitation, and wind speed were not related to patterns of bat activity. While climatic conditions have previously been shown to affect levels of bat activity, several reasons could explain the lack of effect observed here. First, temperatures ranged from 43 – 83 °F; while this is a large amount of variation, it is feasible that bats do not begin curtailing migratory activity until lower temperatures are reached. It should be adaptive for migratory bats to minimize the length of migration by avoiding long stopovers, since temperatures will become lower and energetic costs will become higher as the fall season proceeds. Second, daily precipitation and average wind speeds do not provide information about how these variables change within a night; it is highly probable that most nights included periods of time when it was not raining and wind speeds were relatively low. During such times, bats would be expected to emerge from their roosts and proceed with foraging/migrating.

The habitat types in which recording systems were placed may have affected bat activity, although it is difficult to tease this effect apart from temporal changes. Both activity and species diversity were highest From July 27 to August 12, during which detectors were placed near hardwood shelterbelts. Alternatively, activity and abundance decreased from August 13 – 25, when recordings came from the edge of a wetland and from a drift prairie field. While it is possible that part of this trend is due to the changing number of bats migrating through South Central North Dakota, the steep drop-off near the time when recording habitat changed indicates that bat activity is inherently higher near shelterbelts. This is not a surprising finding; insects are highly abundant in edge habitat, and as a result bats often concentrate in these areas (Mager and Thomas 2001). Further, migratory tree-roosting species would be expected to concentrate near shelterbelts, as these as these are the primary areas in which bats can find temporary habitat for roosting during the day.

RECOMMENDATIONS FOR MINIMIZING IMPACTS ON BAT POPULATIONS

Given the high abundance of red bats in the study area, it is possible that construction of the Merricourt WPP may negatively impact this species. The other two species that are subject to high turbine-related mortality rates (hoary and silver-haired bats) could potentially be impacted, although the low numbers detected in this study suggest that concern for these

species should be minimal. The remaining two detected species, big brown bats and little brown bats, are abundant in the study area, but are rarely killed at turbines and should not be affected by the placement of a wind energy facility.

To minimize impacts on populations of red bats, it is recommended that monitoring for bats be continued after the Merricourt WPP is functional. Such post-construction monitoring should involve acoustic surveys and regular searches near the base of turbines for bat carcasses. If substantial bat kills are documented, mitigative measures may be necessary to reduce mortality rates. Currently, the most efficient method known for reducing bat deaths while minimizing economic losses to energy companies is to curtail turbines during the fall migratory period by setting cut-in speeds. Arnett et al. (2009) conducted a 12-turbine experiment at the Casselman Wind Project in Somerset County, PA during the 76-day fall migratory period. Researchers found that bats kills were more than 5 times higher at fully operational turbines compared to those running at a cut-in speed of 5 m/s. Further, it was estimated that if the 5 m/s curtailment was applied during the fall migratory season, this would only represent a 0.3 % loss of total annual output.

It is also recommended that the removal of hardwood shelterbelts during construction be kept to a minimum. Our data suggest that bats concentrate in these areas and that removal may limit the foraging and roosting habitat available to bats. Shelterbelts are already relatively rare on the landscape, and can be viewed as patches of high quality bat habitat in an environment dominated by low-quality prairie.

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Figure 1. Proposed area of Merricourt Wind Power Project (in green), Dickey and McIntosh counties, North Dakota. Landowner names denoted for each plot. Yellow circles indicate proposed location of wind turbines.



Figure 2. Sampling sites within the Merricourt Wind Power Project (in green), Dickey and McIntosh counties, North Dakota. Orange dots denote the location of acoustic sampling sites. Black dots denote the location of mistnet sites.

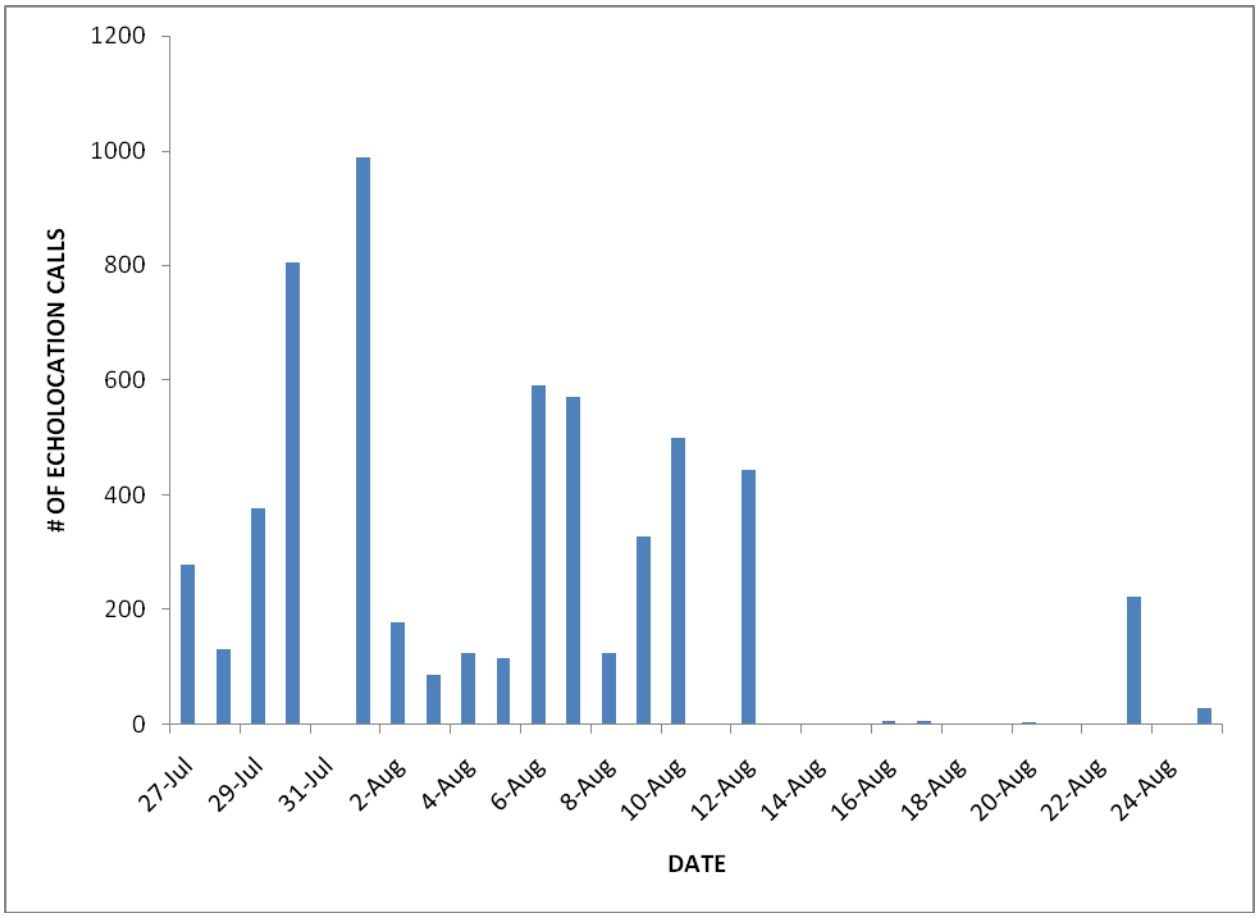


Figure 3. Bat activity per night. Bat activity is defined as the number of recorded echolocation calls.

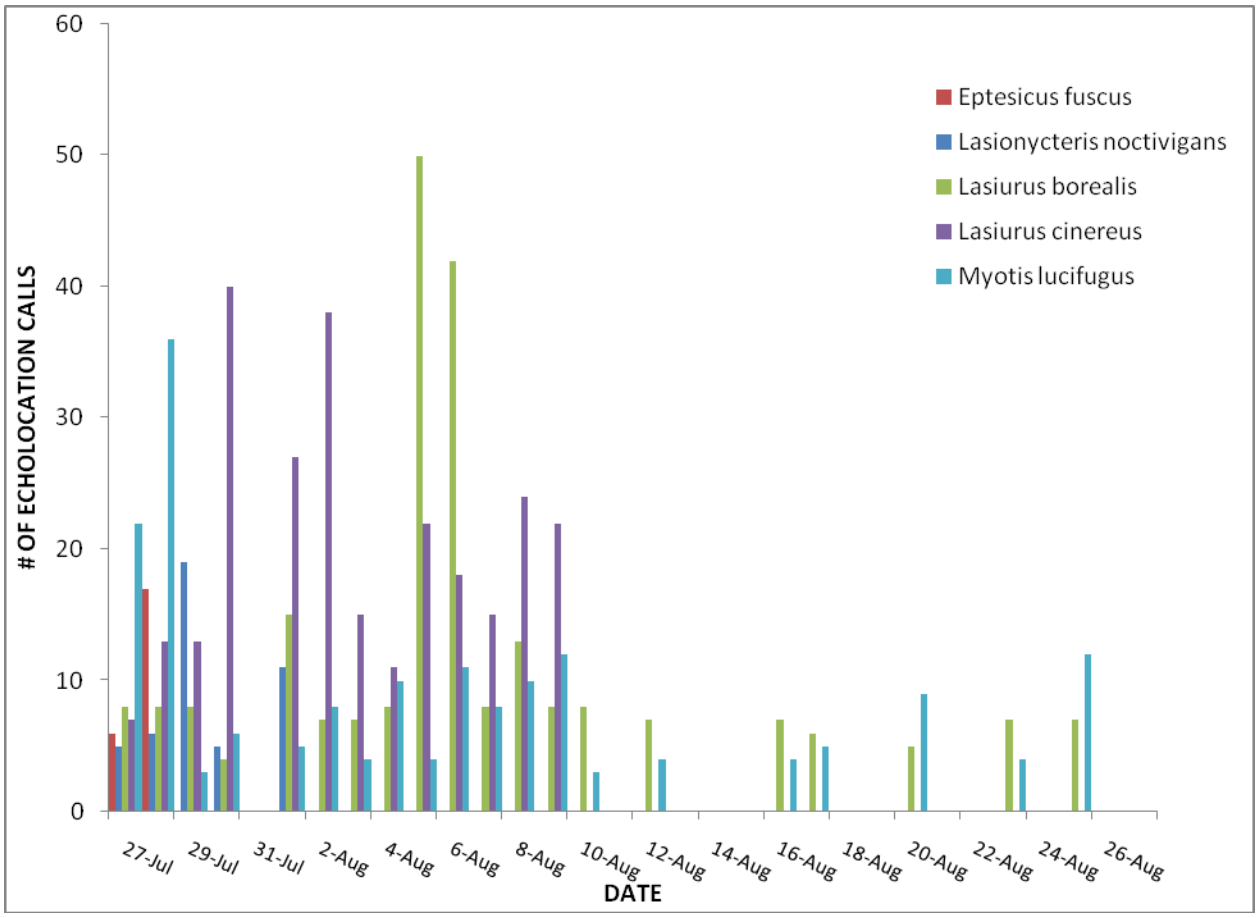


Figure 4. Bat activity per night. Each of the five identified species is shown in a separate color.

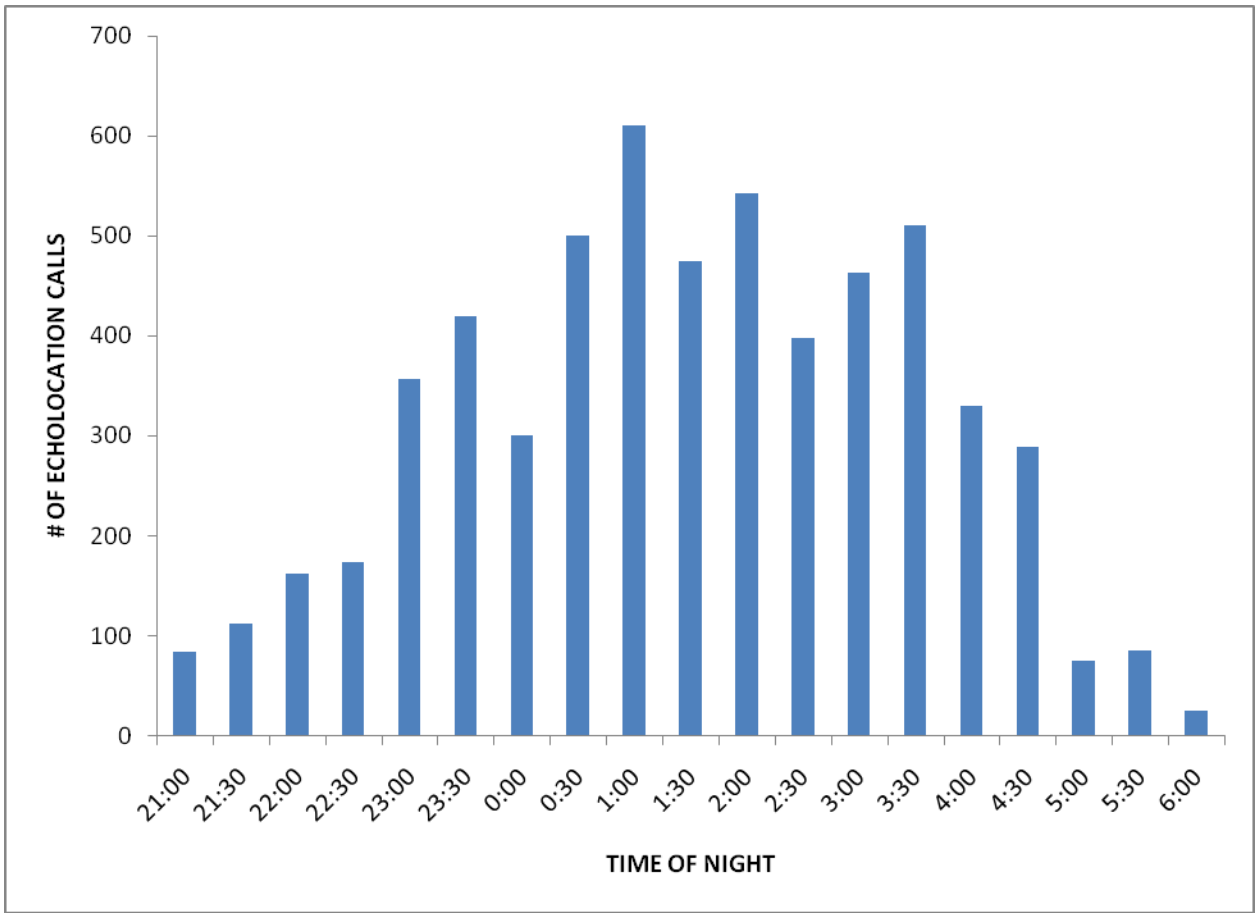


Figure 5. Bat activity throughout the night. Bat activity is defined as the number of recorded echolocation calls. All dates are pooled together and values reflect number of sequences recorded in a 30 min period (ex. bar at 21:00 represents number of sequences from 21:00 to 21:29)

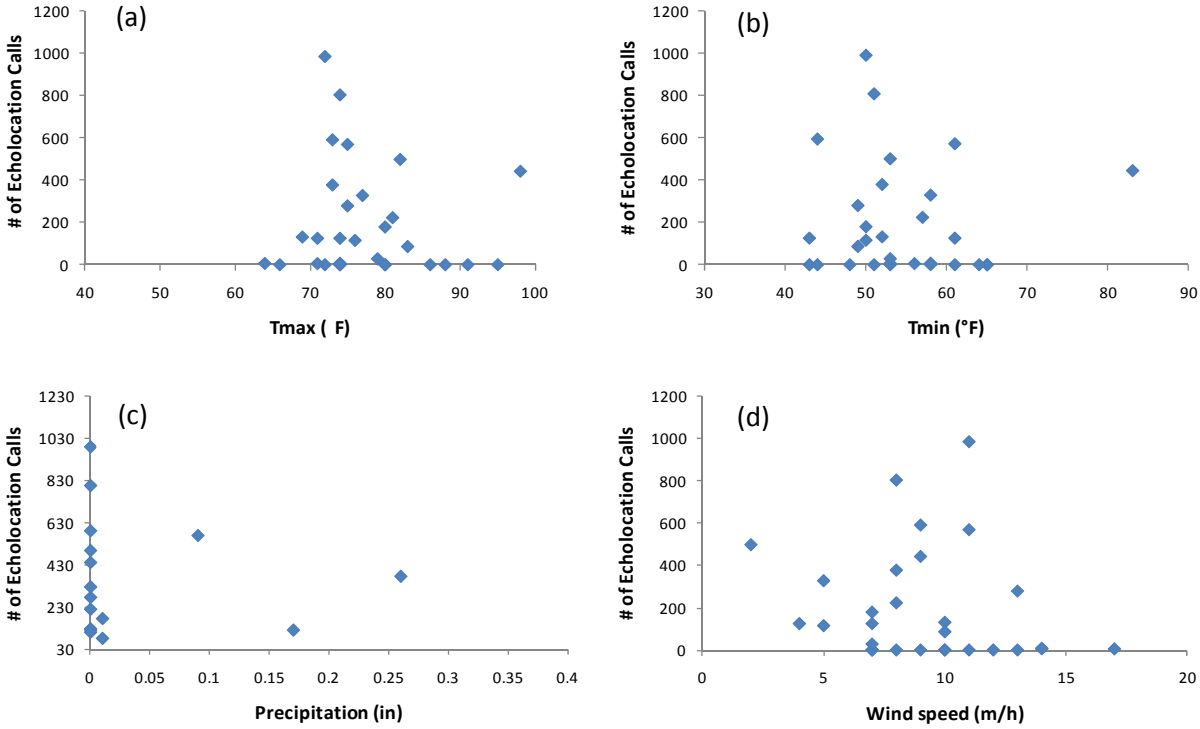


Figure 6. Graphs depicting how the number of recorded calls on a given night was related to (a) maximum temperature, (b) minimum temperature, (c) precipitation, and (d) average wind speed. No significant linear or polynomial fits were observed.

Table 1. Description of the 10 call parameters measured by program ANALOOK and used in this analysis. Measurements followed by the same superscript indicate highly correlated variables.

Call Parameter	Description
Dur	Duration of the call
S1	Initial slope of the call
Sc	Slope of the call body (flattest section of the call)
Fmax	Maximum frequency
Fmin	Minimum frequency
Fmean	Weighted mean frequency
Tk	Time from initiation to call knee (point where S1 changes to Sc)
Fk	Frequency of the call knee
	Time from initiation to Fc is reached
Fc	Characteristic frequency of the call body

Table 2. Number of call sequences attributed to each of the five species known to occur in South Central North Dakota.

Bat Species	Call Sequences
Big brown bat, *Eptesicus fuscus*	2
Silver-haired bat, *Lasionycteris noctivigans*	5
Red bat, *Lasiurus borealis*	471
Hoary bat, *Lasiurus cinereus*	12
Little brown bat, *Myotis lucifugus*	57
TOTAL	**547**

Table 3. Cross-classification rates for species identification analysis. One-third of known calls were assigned to an unknown group, while the remaining two-thirds comprised the known call library. Calls from the unknown group were processed and identified to species. "Actual" column refers to the correct species identity, and "Predicted" refers to the species assigned to a call in the discriminant function analysis. "Count of Actual" refers to the number of calls classified into each of these categories. From these values, the accuracy rate of the call library can be calculated ("% of Total"), which is important for validating the model.

Actual	Predicted	Count Of Actual	% of Total
Big brown	Big brown	2684	94.64
Big brown	Silver-haired	147	5.18
Big brown	Hoary	5	0.18
Silver-haired	Silver-haired	461	96.24
Silver-haired	Big brown	18	3.76
Red	Red	1340	99.33
Red	Little brown	9	0.67
Hoary	Hoary	115	88.46
Hoary	Big brown	15	11.54
Little brown	Little brown	1451	100.00

APPENDIX I:
AVIAN ASSESSMENT

AVIAN ASSESSMENT AND SURVEYS FOR THE PROPOSED MERRICOURT WIND POWER PROJECT, DICKEY AND MCINTOSH COUNTIES, NORTH DAKOTA

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INTRODUCTION

enXco Development Company is planning to develop a wind energy conversion facility in Dickey and McIntosh Counties in North Dakota. The proposed Merricourt Wind Resource Area (WRA) will encompass approximately 103 sections (Figure 1). The facility is planned to consist of approximately 100 wind turbines.

enXco Development Company contracted with Kadrmas Lee & Jackson who subcontracted with Bob Anderson of North Dakota Birding to conduct an avian assessment of Merricourt WRA. Of particular interest, were potential impacts to the federally endangered whooping crane (*Grus americana*) and the threatened piping plover (*Charadrius melodus*) due to construction and operation of the WRA. Raptor nest surveys were conducted since a number of potential raptor species within the WRA are considered state species of conservation priority (defined on page 2). In addition raptors are provided regulatory authority under the Migratory Bird Treaty Act (MBTA). The bald eagle (*Haliaeetus leucocephelus)* and golden eagle (*Aquila chrysaetos)* are also protected by the provisions of the Eagle Protection Act. Sharp-tailed grouse (*Tympanuchus phasianellus*) lek surveys were conducted to identify leks to diminish impacts to this state species of conservation priority which breeds within the WRA. Although rather common in North Dakota, this species is showing a slight decrease in population rangewide, and it is estimated as much as 1/3 of the entire population resides in the state, making North Dakota part of its core range (Hagen et al. 2005). In addition, a literature review and direct contact with agency representatives was conducted to determine if there were any avian populations or habitats present in the WRA that would prevent the installation of the project or that would necessitate special measures.

The study protocol was developed with input from the U.S. Fish and Wildlife Service (USFWS) and the North Dakota Game and Fish Department (NDGFD). This final report summarizes the results of the avian assessment and raptor nest and lek surveys conducted from May 1, 2009 through June 15, 2009. Information from this survey should provide information that can be used to help with decisions about turbine final siting and wind plant design to reduce the risk to avian species.

The principle goals of this study were to:

- Locate raptor nests within the WRA;
- Locate sharp-tailed grouse leks within the WRA;
- Assess potential habitats and impacts to whooping cranes and piping plovers;
- Recommend conservation measures.

Endangered, Threatened, and State Species of Conservation Priority

The avian species protected by the Endangered Species Act (ESA) within the WRA are piping plovers and potentially whooping cranes. The Merricourt WRA is within the migration corridor for the Aransas-Wood Buffalo Population (AWBP) of whooping cranes. The whooping crane was listed as endangered in 1970 under the ESA. There also is critical habitat for the threatened piping plover within the WRA. The piping plover was listed in 1985 under the ESA. Potential impacts of wind development on these 2 species and compliance with the ESA are discussed on pages 8 - 11 of this report.

The USFWS publishes a Birds of Conservation Concern report in order to "accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent our highest conservation priorities" (USFWS 2008a). The Merricourt WRA is located within Bird Conservation Region 11, and includes the following stick-nesting raptor species that are considered Birds of Conservation Concern (USFWS 2008a). Peregrine falcon (*Falco peregrines*) nests usually are a well-rounded scrape in accumulated debris on a ledge, but they rarely can use old tree nests or cavities.

Bald Eagle

Ferruginous Hawk – *Buteo regalis*

Swainson's Hawk - *Buteo swainsoni*

Peregrine Falcon

North Dakota also has identified species of conservation concern that occur within the state. The NDGFD (Dyke et al. 2004) determined and ranked the state's top 100 species of conservation priority into 3 levels. The species considered included birds, mammals, fish, reptiles, amphibians, and freshwater mussels. The NDGFD (Hagen et al. 2005) detailed the methods used to rank and identify avian species of conservation priority. These methods included using Partners in Flight Species Assessment and Prioritization Scores; the U.S.

Shorebird Conservation Plan; the North American Waterbird Conservation Plan; current federal endangered, threatened, or candidate species or recent delisting from the ESA; and considered species with local management interest (Hagen et al. 2005).

The three levels for the Species of Conservation Priority are defined as: "Level 1: Species having a high level of conservation priority because of declining status either in North Dakota or across their range; or a high rate of occurrence in North Dakota constituting the core of the species' breeding range, but are at-risk range wide, and non-State Wildlife Grant funding is not readily available to them. Level 2: Species having a moderate level of conservation priority; or a high level of conservation priority, but a substantial amount of non-State Wildlife Grant funding is available to them. Level 3: North Dakota's species having a moderate level of conservation priority, but are believed to be peripheral or do not breed in North Dakota." Stick-nesting raptor species on the ND list included ferruginous hawks and Swainson's hawks, both state Level 1 - Species of Conservation Priority (Dyke et al. 2004). Golden eagles, bald eagles, and prairie falcons are listed as state Level 2 – Species of Conservation Priority (Dyke et al. 2004). Sharp-tailed grouse are listed as state Level 2 – Species of Conservation Priority (Dyke et al. 2004). Although most species on the list are declining, a number of the 100 species on the list are considered common in North Dakota, or at least, not declining. These species were included because of North Dakota's importance as a last stronghold for that population, and these are "responsibility" species for which the state has a long-term stewardship role (Hagen et al. 2005). For example, the American white pelican (Level 1) is common in North Dakota, but is designated as vulnerable, imperiled, or critically imperiled in 27 states and provinces (Hagen et al. 2005).

METHODS

Raptor Nest Survey

The search area for raptor stick-nests included the entire Merricourt WRA (Figure 1). Two qualified biologists experienced with raptor nest surveys actively searched suitable nesting habitat from established roadways, section lines, and trails for raptor stick nests and structures suitable for peregrine falcon nests within the WRA. A spotting scope and/or binoculars were used to view all visible trees and other structures, such as power poles with platforms and old windmills for stick-nests. Areas that could not be viewed from roadways were checked with all terrain vehicles (ATVs). Landowners were contacted when permission to access ground was required.

All above-ground nests of raptors were recorded. Data recorded for each nest included the species occupying the nest (including owls), nest status (e.g., inactive, active) nest substrate

(e.g., tree species, rocky outcrop, power line), time and date of observation, and the nests coordinates. Nests were approached to verify the status of the nest, and to record the GPS coordinates. Nest locations were plotted on a map and recorded in Geographic coordinate system using North American Datum (NAD) 83.

Old stick nests are much more visible prior to the trees regaining leaves, and most trees had not foliated yet. Nests with an inactive status were revisited during the last week of May, and again on June 15 if necessary to determine if late nesting species, such as Swainson's hawks, were using the nest.

ArcGIS 9.3 software was used to create figures of raptor nesting locations by township. Nesting density was calculated as nests/km^2 within the WRA. The results should be used to make final siting recommendations for turbines, and construction timelines within the WRA.

Sharp-tailed Grouse Lek Survey

A lek is a traditional area of ground where male grouse gather in tiny territories to display to visiting females, who then select males for copulation. Grouse arrive on their lek daily starting in early March and extend through May, with the peak activity in mid-April. The lek may be a knoll, ridge, or other flat area with sparse vegetation, which enables females to better view the males and for all birds to better detect predators.

Two qualified biologists conducted a lek survey to identify sharp-tailed grouse leks within the WRA. Lek surveys were conducted from the ground by driving along roads within the WRA and stopping every 800 m to listen for sounds of dancing grouse where there was suitable breeding habitat (e.g., pasture, alfalfa, hayland, CRP). On a calm morning sharp-tailed grouse can be heard on their leks up to 1.6 km. Surveys were conducted from an hour before to 1.5 hours after sunrise. Suspected leks were visited later to record the coordinates of the lek with a GPS unit. Leks were verified by discovering concentrated tracks, droppings, and feathers on the lek site itself. Lek searches were conducted 2 times from May 1, 2009 through May 15, 2009, with subsequent surveys 7-10 days apart. This survey method is consistent with the NDGFD lek survey. Lek locations were plotted on a map and recorded in Geographic coordinate system using North American Datum (NAD) 83. ArcGIS 9.3 software was used to produce a map of the lek locations within the WRA.

Data Quality Assurance/Quality Control

QA/QC measures were implemented during all stages of the study. Survey forms were inspected at the end of each survey for completeness, accuracy, and legibility. Data was entered into a spreadsheet by a qualified person for subsequent data analysis. All field notebooks, data forms, and electronic data files were retained for future reference.

RESULTS

Raptor Nest Survey

Raptor surveys began May 1st after the go-ahead had been given by enXco and KL&J. Most trees did not have their leaves on yet, and a May 1st start date was early enough to adequately survey for raptor nests. The raptor surveys were completed on June 15, 2009. Spring 2009 was a very wet spring with many roads being blocked by overland flooding into May. Consequently, ATVs were used to access many roads that would otherwise have been impassible. ATVs were also used to survey areas that could not be seen from roadways. The entire WRA was surveyed, with the exception of land owned or rented by a single landowner that denied permission for any surveying to be done on his property; therefore, all surveying was done from roadways only around his property. The description of the land that was not able to be completely surveyed included the following in Spring Valley Township: SW ¼ of Sec. 14, W ½ of Sec. 22, Sec. 23, NE ¼ of Sec. 27, and N ½ of Sec. 26.

A total of 39 raptor nests were documented within the WRA, including 28 active raptor nests and 11 inactive raptor nests (Table 1). Raptor nests were mapped by township and County (Figures 2-6). Details about each raptor nest, including exact coordinates, are in Appendix A. Four raptor species, including Ferruginous hawk, red-tailed hawk, Swainson's hawk, and great-horned owls, were documented nesting within the WRA, but no peregrine falcon or bald eagle nests were documented (Table 1).

Nest density for all raptor nests located was 0.15 nests/km^2 (0.38 nests/mi^2), and nest density for only active nests was 0.10 nests/km^2 (0.27 nests/mi^2). Nesting densities for the Swainson's, ferruginous, and red-tailed hawks were 33.4 km^2 per pair (12.9 mi^2 per pair), 133.4 km^2 per pair (51.5 mi^2 per pair), and 17.8 km^2 per pair (6.9 mi^2 per pair), respectively. These nesting densities were in line with other regional studies (Table 2).

Sharp-tailed Grouse Lek Survey

The first lek survey began on May 1, 2009 and the second lek survey was finished on May 15, 2009. Nine active leks were documented within the WRA during the 2 different surveys (Table 3, Figure 7). Surveys were made from all passable roads and section lines within the WRA as stated in the scope of work; however, there were some areas where a drivable road was not within 800 meters. Therefore, there may be more active leks than documented during this survey. Areas of land that may not of been adequately surveyed and were 800 m or farther from a road in McIntosh County include: Antelope Township, S ½ of Sec. 14, SE ¼ Sec. 15, SW ¼ Sec. 26, SE ¼ Sec. 27, SE ¼ Sec. 33, S ½ and NE ¼ Sec. 34, and E ½ Sec. 35; Beresina Township, E ½ of Sec. 1, SE ¼ Sec. 7, SE ¼ Sec. 10, SW ¼ Sec. 11, E ½ Sec. 12, E ½ Sec. 13, E ½ Sec. 14, W ½

Sec. 15, W ½ Sec. 16, E ½ Sec. 17, W ½ Sec. 23, W ½ Sec. 26, and NW Sec. 35; Iowa Township, SW ¼ Sec. 13; Rosenthal Township, SW ¼ of Sec. 36. Areas in Dickey County include: German Township, SW ¼ Sec. 28, SE ¼ Sec. 29, SW ¼ Sec. 30, NW ¼ Sec. 31, E ½ Sec. 32, E ¼ Sec. 33; Spring Valley Township, SW ¼ Sec. 7, W ½ Sec. 14, SE ¼ Sec. 15, SW ¼ Sec. 16, SE ¼ Sec. 17, N ½ Sec. 18, NW ¼ Sec. 20, NW ¼ Sec. 21, S ½ Sec. 26, SE ¼ Sec. 27, SW ¼ Sec. 30, NW ¼ Sec. 31, NE ¼ Sec. 34, N ½ Sec. 35, and NW ¼ Sec. 36. As previously mentioned, under ideal conditions sharp-tailed grouse on their lek can be heard up to 1.6 km away, which would cover all the land described above.

DISCUSSION AND CONSERVATION MEASURES

Conservation Measures for Active Raptor Nests

The intent of the raptor nest surveys was to identify as many raptor nests as possible within the WRA. In accordance with the MBTA and the Bald and Golden Eagle Protection Act, active raptor nests that could be affected by the proposed Merricourt Wind Farm Project should be monitored immediately prior to construction for raptor activity. In the event the nest is active, appropriate site-specific protections would need to be followed for the active nest. These protections would be based on the following:

- Species of raptor using the nest
- Location of nest in relation to construction activities, and
- Nesting period of raptor in relation to construction activity

Recommended Conservation Measures by Species

Bald and Golden Eagle Nests

There were no eagle nests observed within the WRA; however, if one were encountered certain protections would need to be followed under the Bald and Golden Eagle Protection Act. Since golden eagles are found primarily west of the Missouri River and particularly in the Badlands of ND, it would be unlikely that a nest would be encountered. In the unlikely event that an eagle nest is found, the nest structure may not be removed, regardless of the time of year or the status of the nest. A tree that would otherwise have been removed for construction activities must be marked for preservation and appropriate avoidance measures following the National Bald Eagle Management Guidelines would need to be followed.

Other Raptor Nests

The raptor nests indentified in this report need to be monitored prior to construction beginning to determine their status if construction is to be done during the raptor nesting period (April 15

– August 15). Great-horned owls may start nesting as early as February, so it is recommended that all nests in trees subject to being cleared be checked to verify their nest status. If a nest of any raptor species is determined to be active (adults on nest, eggs in nest, or young in nest), the tree containing the nest must be protected to maintain compliance with the MBTA. In this case, construction would either need to be delayed until after the young have fledged before the tree was removed, or a no-work buffer would be put up around the nest until the young have fledged. Recommended work buffers for red-tailed hawks and Swainson's hawks are 0.25 miles. Clearing of trees with raptor nests can be done outside the raptor nesting period if the nest is inactive in accordance with the MBTA. Nests should still be inspected to make sure there are not any young or eggs in the nest prior to cutting the tree down.

The ferruginous hawk is a grassland specialist that prefers predominantly native grasslands and shrubland habitat. Their population in ND has been declining due to destruction and alteration to their breeding habitat (Dyke et al. 2004). This species is extremely sensitive to human disturbance, and (Hagen et al. 2005) reported that this species avoids nesting within 0.7 km of occupied buildings. White and Thurow (1985) reported that about a third of ferruginous hawk's nests exposed to human disturbance were abandoned and those nests not abandoned fledged fewer young than undisturbed nests. There are multiple recommendations in the literature of suggested buffer sizes around ferruginous hawk nests, including delaying energy development until 45 days after fledging (Konrad and Gilmer 1986). White and Thurow (1985) recommended creating a buffer zone of 0.25 km around nest sites, while Atkinson (1992) suggested 0.45 km buffer. Olendorff (1993) suggested buffer zones from 0.25 km to > 1.0 km depending on the activity. Romin and Muck (1999) suggested a seasonal buffer of 0.5 miles. North Dakota Birding recommends that a construction buffer of 0.5 miles be voluntarily put up around all active ferruginous nests on the Merricourt WRA until after the young have fledged. The timeline for this seasonal buffer would be appoximately 15 March to 15 July (Howard and Wolfe 1976, Bechard and Schmutz 1995).

It is likely that nests that were inactive during the spring of 2009, may be active in the future, so all nests should be checked before the nesting tree is cleared during the raptor nesting period. It also is likely that new nests will be built and all trees should be inspected to verify that they do not have an active raptor nest in them prior to clearing.

This data should aid in project planning in 3 ways: 1) provide information to avoid the disturbance of nest sites located within the WRA during the breeding season; 2) or if necessary, identify nests that may need to be taken down for construction purposes outside the nesting season; and 3) to provide exact nest site locations for follow up surveys that may need to be completed to determine nest status immediately prior to construction.

Recommended Conservation Measures for Sharp-tailed Grouse

Sharp-tailed grouse are a ND state Level 2 – Species of Conservation Priority (Dyke et al. 2004). It is recommended that wind turbines or roads leading to turbines be placed as far from active grouse leks as possible. The U.S. Fish and Wildlife Service's voluntary guidelines recommend that wind farms be located 5 miles from active leks to avoid disturbance of prairie grouse (Manville 2004). Again there are many buffer recommendations in the literature. A minimum of a 0.25 mile work buffer during March through May 15th when the grouse are active on their leks would minimize disruption to the grouse. Additional grouse leks that may be located during the construction process should also be voluntarily avoided.

COMPLIANCE WITH THE ENDANGERED SPECIES ACT

Pursuant to Section 9 of the ESA, it is unlawful for any entity to take any federally listed threatened or endangered fish or wildlife species. The ESA defines take as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct. Harm is further defined by the USFWS to include significant habitat modifications or degradation that results in death or injury to the listed species. There were no whooping cranes or piping plovers seen on the WRA while conducting raptor nest surveys or lek surveys during the spring of 2009.

Whooping Cranes

There are only 247 whooping cranes within the AWBP, which is far below management goals (USFWS 2009a). The AWBP whooping cranes migrate more than 2,400 miles twice annually over the same general path each year (Kuyt 1992). The Merricourt WRA is within the whooping crane's 180 mile migration corridor which includes 95% of all whooping crane sightings up through spring 2007 (USFWS 2008b). The WRA is not within the 120 mile corridor, which contains 85% of all whooping crane sightings. The primary migration corridor can be over 200 miles wide when cranes are pushed east or west by winds (USFWS 2009a).

There have not been any documented collisions of either whooping cranes or sandhill cranes (*Grus canadensis*) with wind turbines to date (USFWS 2009a). However, wind energy development poses potential threats to migrating cranes on the WRA (USFWS 2009a), such as possible mortality of whooping cranes as they encounter turbines in bad weather or low light conditions at the beginning and end of migration flights or when they are flying between roosts and foraging areas at stopover sites. The greatest known source of mortality for fledged whooping cranes is collisions with power lines, which have killed or caused serious injury to 46 whooping cranes since 1956 (Stehn and Wassenich 2008). Indirect impacts of wind

developments to whooping cranes include the possible avoidance of stopover habitat by cranes, as well as the loss of habitat (USFWS 2009a). This avoidance may deny cranes the use of important habitat, resulting in a form of harm by habitat modification.

Whooping cranes migrate primarily during daylight hours between about 0930 and 1700 hours, and take advantage of thermals and favorable tailwinds (USFWS 2009a). If thermals quit or cranes encounter an unfavorable wind shift, they may start flap-flying for a short period before they tire and look for suitable wetland habitat nearby (USFWS 2009a). Whooping cranes stop nightly to roost in shallow wetlands and may fly out from wetlands to feed during the day in local agricultural fields and pastures. Cranes may stay at the same stopover wetland for days in unfavorable weather, and occasionally will fly during periods of darkness (USFWS 2009a). Whooping cranes would be most vulnerable to collisions with turbines or power lines when they are flying at low altitudes when starting or ending a migration flight or when flying to feed in an agricultural field.

Whooping cranes use a wide variety of wetland and upland habitats during migration (USFWS 2009a). Seventy-five percent of roost wetlands used by whooping cranes in the U. S. were less than 10 acres in size, with 40% less than 1.24 acres (USFWS 2009a). Whooping cranes use migration habitat opportunistically and often stop wherever they happen to be late in the day and look for the nearest suitable habitat. The stopover use of individual wetlands or habitats is very unpredictable, and cranes may only use a particular wetland once in their lives (USFWS 2009a). Some areas during migration are used by at least some whooping cranes on a regular basis and are termed traditional stopover sites. There are no “traditional” stopover sites within the WRA. However, because of the number of wetlands and associated pasture and croplands within the WRA, the majority of the WRA could possibly be used by whooping cranes on any given year. There has been one confirmed whooping crane sighting in Dickey County and 1 in McIntosh County between 1943 and 1999 (Austin and Richert 2001). Additional sightings have been reported in the Counties directly north and south of Dickey and McIntosh Counties, which provides a strong indication that the site is within the whooping crane migration corridor (Austin and Richert 2001) (see Figures 8 and 9). It is important to point out that a low number or even lack of verified sightings at a particular location should not be interpreted as a lack of use of that location by whooping cranes (USFWS 2009a). The presence of sandhill cranes using both Dickey and McIntosh Counties is also a good indication that the area has suitable habitat and may potentially be used by whooping cranes (USFWS 2009a).

The Merricourt WRA is within the whooping crane migration corridor, so there is potential to either directly take whooping cranes or indirectly take stopover habitat. The Merricourt Project has no Federal nexus to trigger a section 7 consultation under the ESA. In 1982, Congress amended the ESA and established a provision in section 10 that allows for “incidental take”.

Incidental take is defined by the ESA as take that is "incidental to, and not the purpose of, the carrying out of otherwise lawful activity.'' A habitat conservation plan (HCP) must accompany an application for an incidental take permit. The purpose of the HCP is to ensure that the effects of the permitted action on whooping cranes are adequately minimized and mitigated. A HCP and permit would ensure that if "unforeseen circumstances" arise, the USFWS would not require the commitment of additional land, water, or financial compensation beyond the level otherwise agreed to in the HCP without the consent of the permittee.

During 2009, 11 of the largest wind development companies, including enXco, joined together to work on endangered species issues on a range-wide basis. With the support of the State of Oklahoma, the industry group applied for and received a total of $1,080,990 to develop a landscape level, multi-species HCP. This HCP will encompass the whooping crane migration route in the U. S. and is designed to avoid and minimize impacts to whooping cranes associated with wind energy development (Stehn 2009). It is recommended that enXco follow the recommendations as much as possible to avoid and minimize "take" of whooping cranes and mitigate unavoidable impacts outlined on pages 21-23 of the paper entitled "Whooping Cranes and Wind Development – An Issue Paper" (USFWS 2009a).

Piping Plovers

The piping plover is a small shorebird listed as a federally threatened species in North Dakota. Habitat loss, predation, and poor breeding success were major reasons for the population decline. North Dakota is the most important State in the Great Plains for nesting piping plovers (USFWS 2009b). More than three-fourths of piping plovers in North Dakota nest on prairie alkali lakes, while the remainder use the Missouri River (USFWS 2009b). Piping plovers inhabit barren sand and gravel shores of rivers and lakes, avoiding shorelines with dense vegetation. The prairie alkali lakes used in North Dakota by piping plovers are alkaline in nature and have salt-encrusted, white beaches which sparse vegetation.

There is piping plover critical habitat within the Merricourt WRA (Figure 10). Critical habitat is a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. The site description that follows includes the site common name, Township, Range, and Section(s): and the UTM coordinates of the center point: McIntosh 02, T. 130 N., R. 68 W., Sec. 13, 14, 23, 24; 488392.570, 5101297.805 (USFWS 2002). Only section 13 within Iowa Township is within the Merricourt WRA. This alkaline wetland is the only critical habitat for the piping plover in the WRA. The critical habitat in section 13 is still several miles from a proposed turbine site (C. Sternhagen, enXco, personal communication). The USFWS recommends that companies "Avoid placing turbines in documented locations of any species of wildlife, fish, or plant protected

under the Federal Endangered Species Act". Piping plover breeding habitat is very specific and hard to mitigate, which makes critical habitat that much more important to the survival of this species (C. Aron, U.S. Fish and Wildlife Service, personal communication).

There is not good guidance on suggested buffer distances from turbines to plover nests; however, Martin et al. (2009) used a 1-mile buffer around each piping plover breeding location in Montana. Since the critical habitat only includes Section 13 in Iowa Township, a solution may be to avoid placing any turbines in section 13 or possibly avoid placing turbine within a certain buffer by consultation with the USFWS from the alkaline wetland shoreline in section 13.

Although highly unlikely, it is possible that the wind farm might incidentally harm or "take" the piping plover on or near the designated critical habitat. In order to provide protection from violating the ESA, it is recommended that enXco consider obtaining an incidental take permit from the USFWS. To obtain a permit, enXco would need to work with the USFWS to develop a HCP designed to offset any harmful effects the proposed wind farm might have on the piping plover.

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Table 1. Raptor nests observed by county within the Merricourt Wind Resource Area, 2009.

Species	Dickey	McIntosh	Total	Status[a] BBC or State
Ferruginous Hawk	1	1	2	Both Lists
Red-tailed hawk	8	7	15	Neither
Swainson's Hawk	6	2	8	Both
Great-horned Owl	2	1	3	Neither
Inactive Nests	6	5	11	
Bald Eagle	0	0	0	Both Lists
Peregrine Falcon	0	0	0	Both
Totals	**23**	**16**	**39**	
				Total Nests = 39

[a] - BBC stands for a species on the USFWS Birds of Conservation Concern, Region 11 (USFWS 2008).
[a] - State stands for a species listed as a ND State Species of Conservation Priority (NDGFD 2004).

Table 2. Comparison of Merricourt WRA nesting densities for ferruginous, Swainson's, and red-tailed hawks with other regional studies.

Area	Density Sq. miles per pair	Source
Ferruginous Hawk		
MT	40	Knowles 1997
SD	111-159	Blair and Schitoskey 1982
SD	6.7	Lokemoen and Duebbert 1976
SD	56	Knowles 2001
ND	14	Gilmer and Stewart 1983
ND	51	Anderson 2009
ND	51.5	This Study
Swainson's Hawk		
SD	11	Knowles 2001
WY	4	Dunkle 1977
ND	5-10	Gilmer and Stewart 1984
ND	39	Anderson 2009
ND	12.9	This Study
Red-tailed Hawk		
WI	3.7	Gates 1972
WI	3.2	Orians and Kuhlman 1956
AB	2.7	Luttich et al. 1971
ND	5	Anderson 2009
ND	6.9	This Study

Table 3. Sharp-tailed grouse leks within the Merricourt Wind Resource Area, 2009.

Township	Section	Latitude	Longitude	Habitat
German	35	46.11964	-98.9146	Pasture
Spring Valley	3	46.11292	-98.9258	CRP
Spring Valley	28	46.04969	-98.9507	Pasture
Antelope	29	46.12656	-99.0965	Pasture
Iowa	13	46.08243	-99.1321	Pasture
Iowa	1	46.10578	-99.1456	Pasture
Beresina	36	46.02785	-99.0051	Cemetery
Beresina	35	46.03623	-99.0416	Pasture
Beresina	23	46.05655	-99.0319	Pasture
				Total Leks = 9

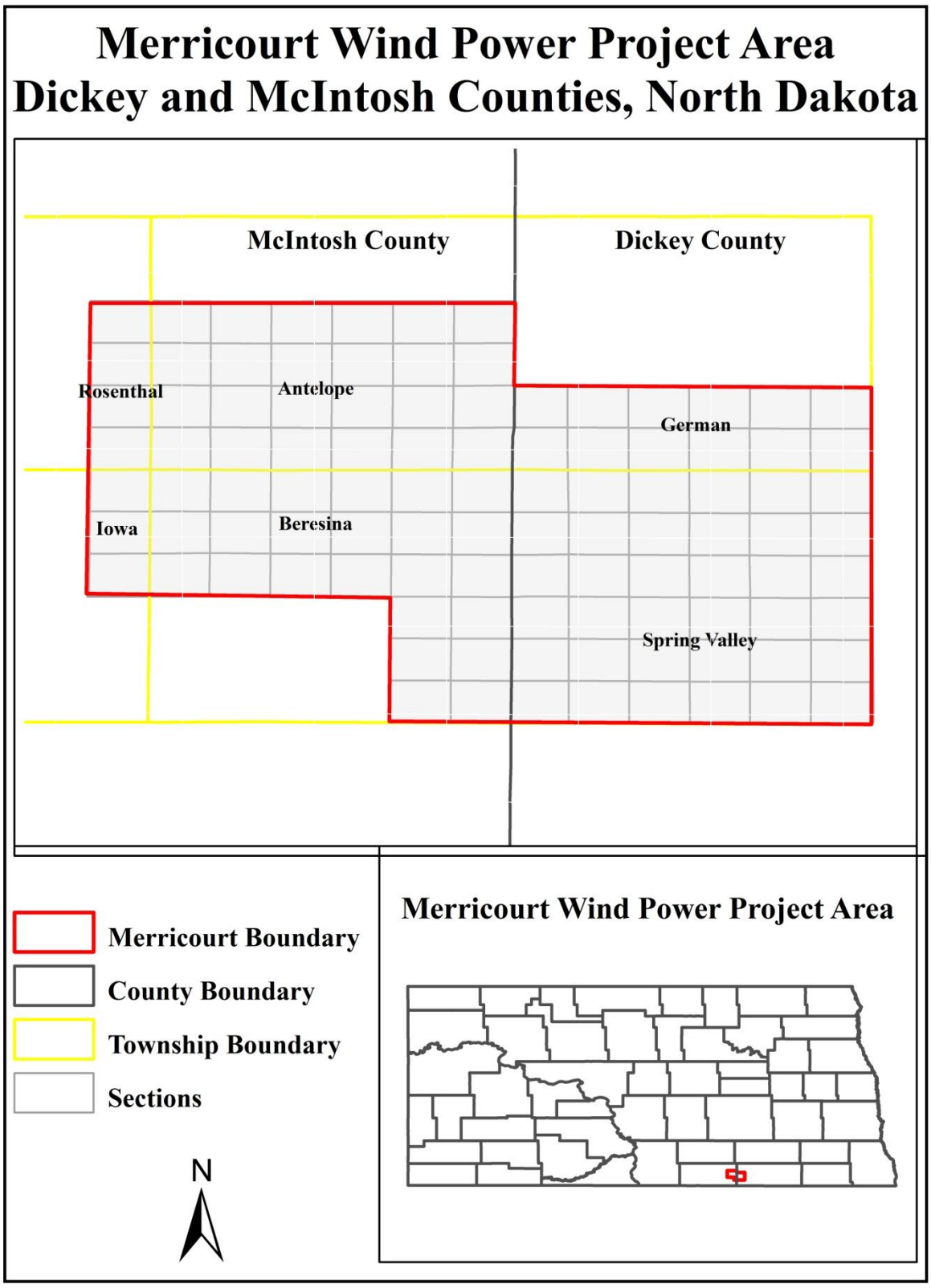


Figure 1. Map of proposed Merricourt Wind Power Project area within Dickey and McIntosh Counties.

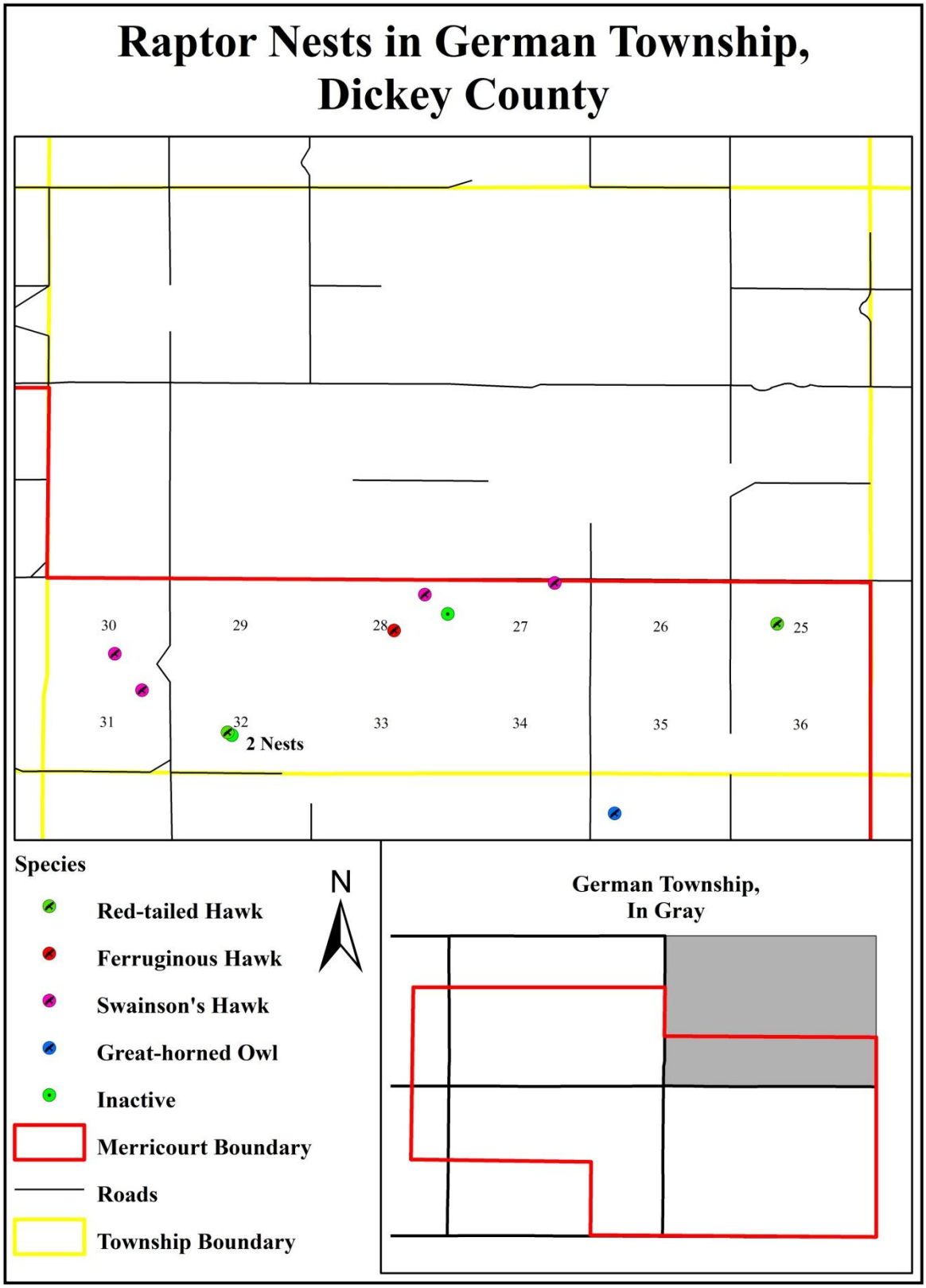


Figure 2. Raptor nests located in German Township of Dickey County during spring 2009.

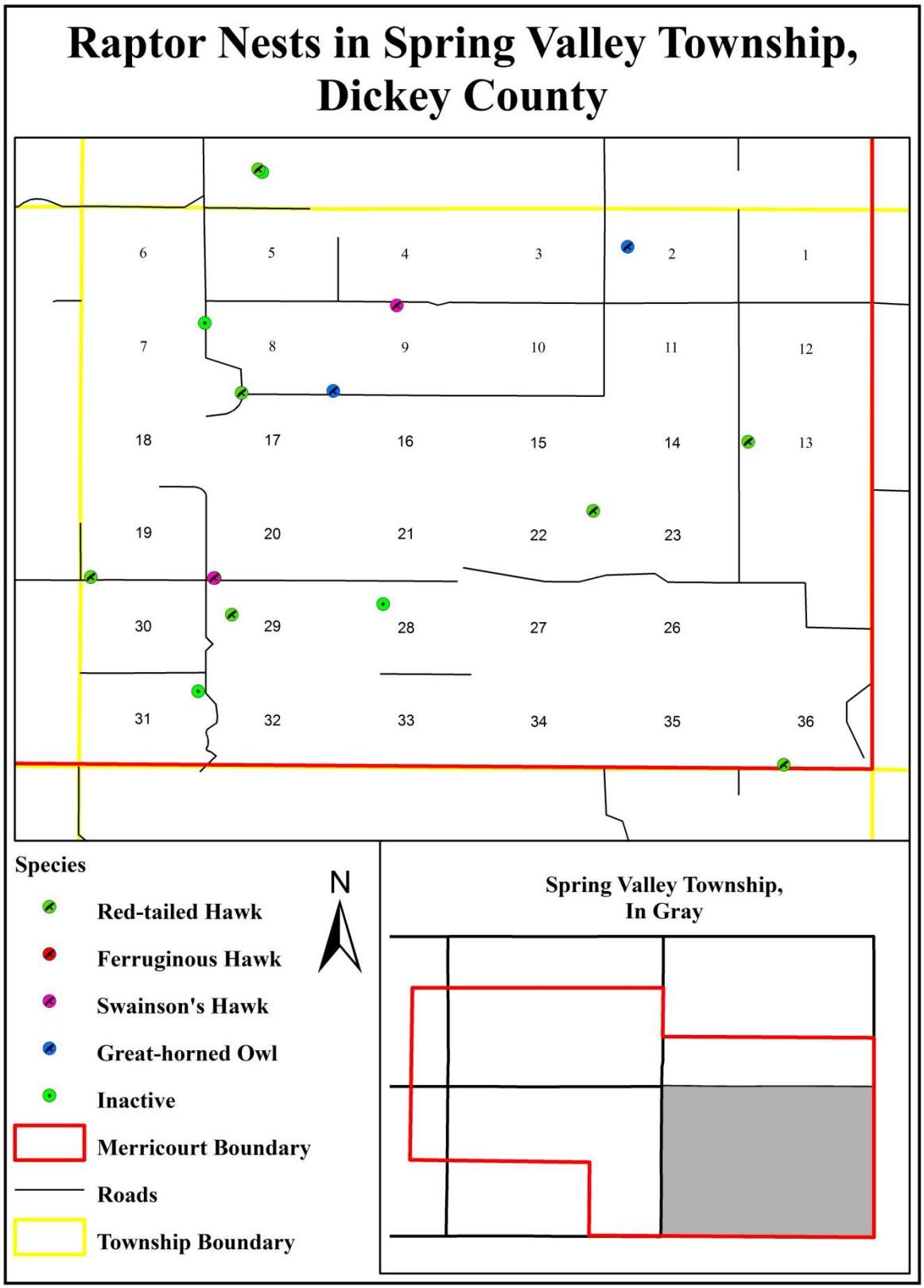


Figure 3. Raptor nests located in Spring Valley Township of Dickey County during spring 2009.

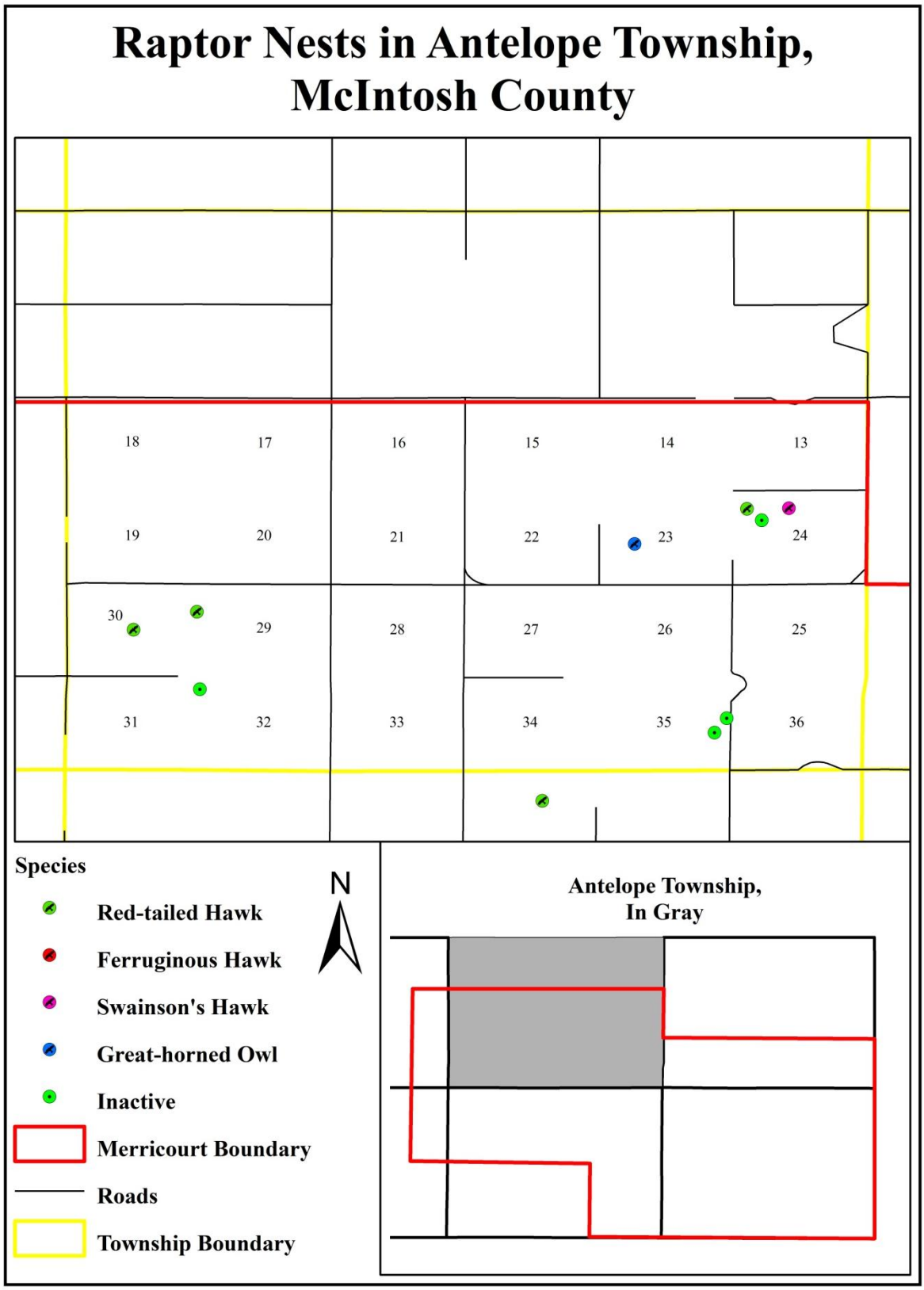


Figure 4. Raptor nests located in Antelope Township of McIntosh County during spring 2009.

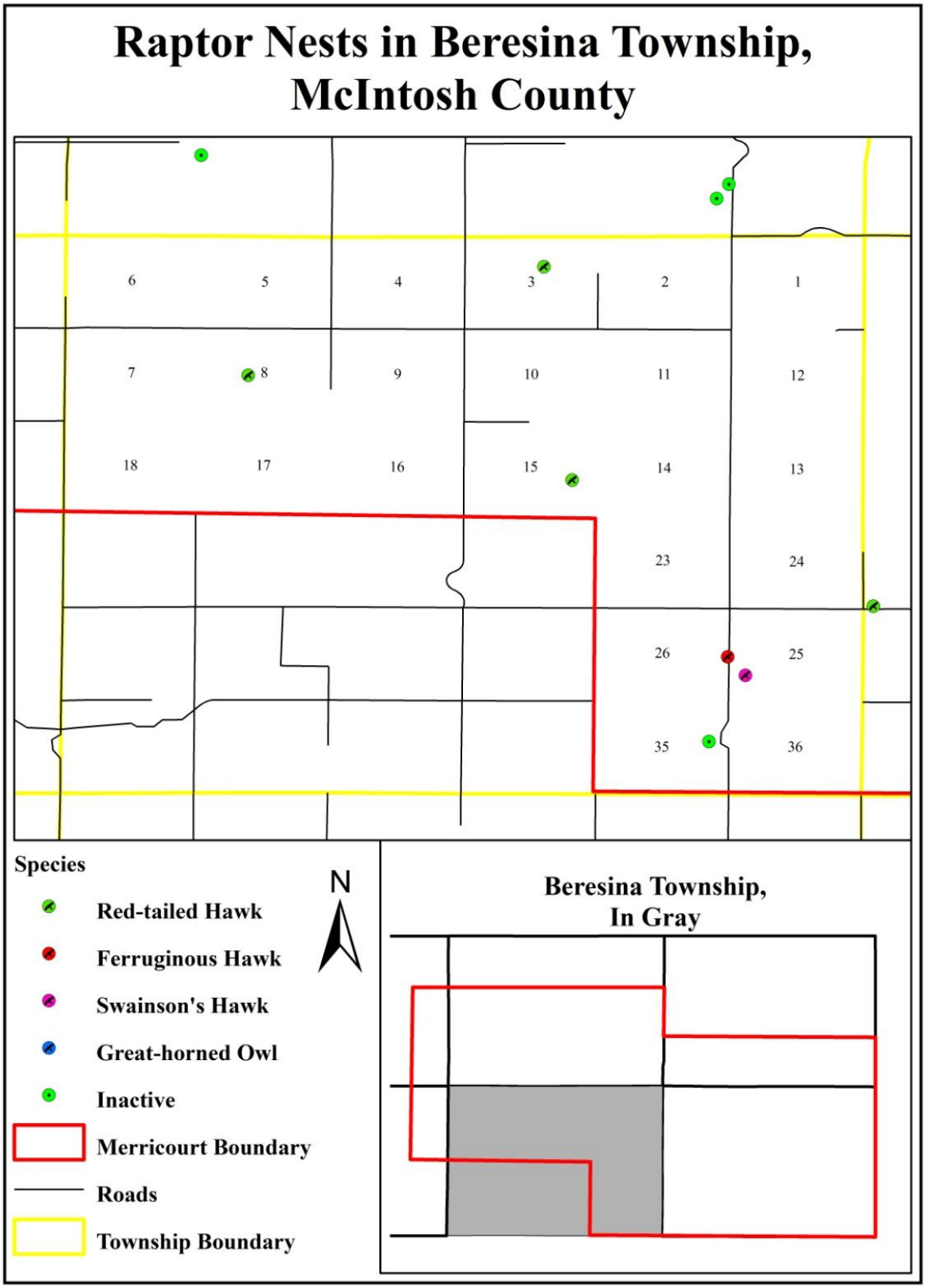


Figure 5. Raptor nests located in Beresina Township of McIntosh County during spring 2009.

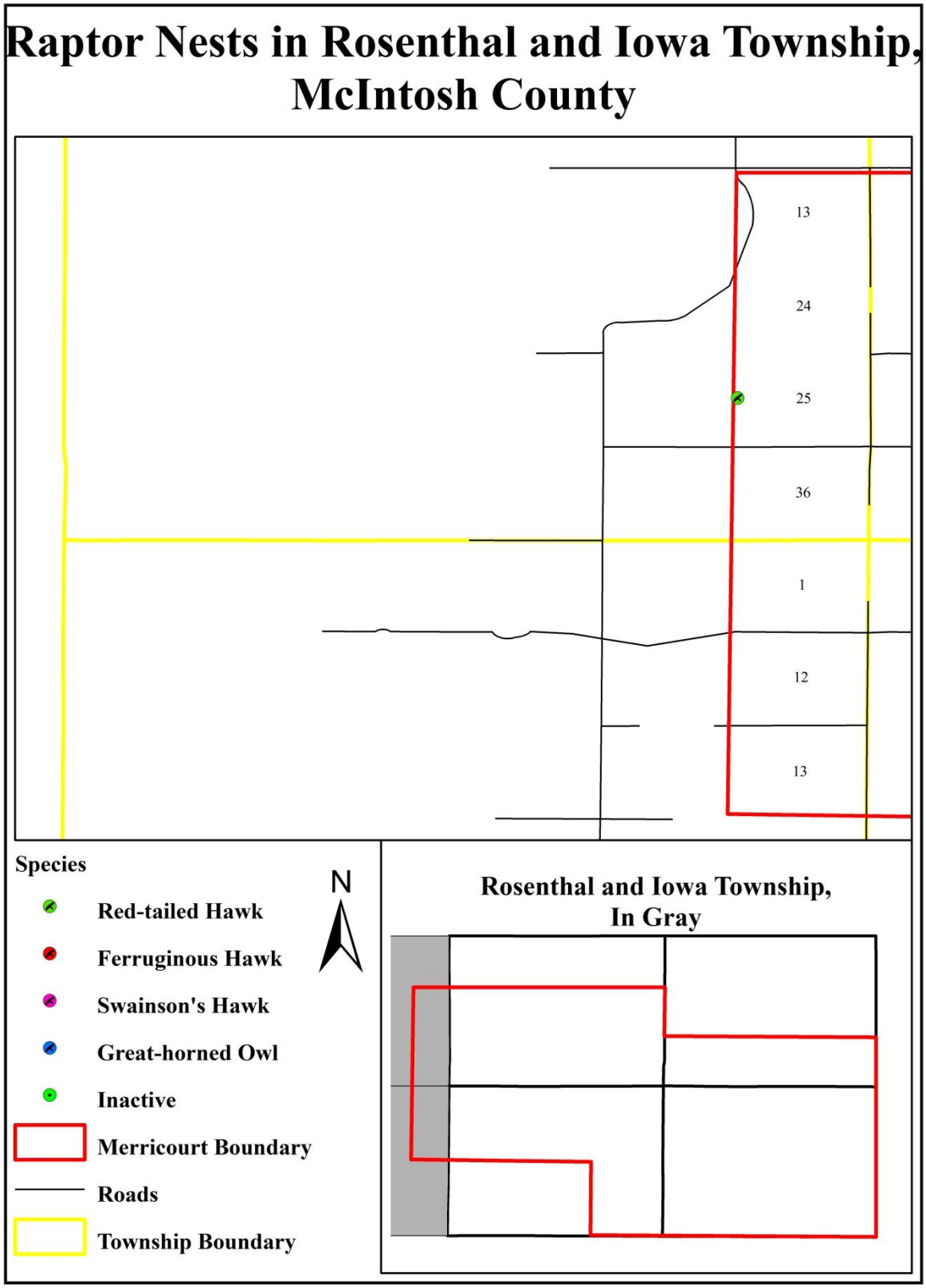


Figure 6. Raptor nests located in Iowa and Rosenthal Townships of McIntosh County, 2009.

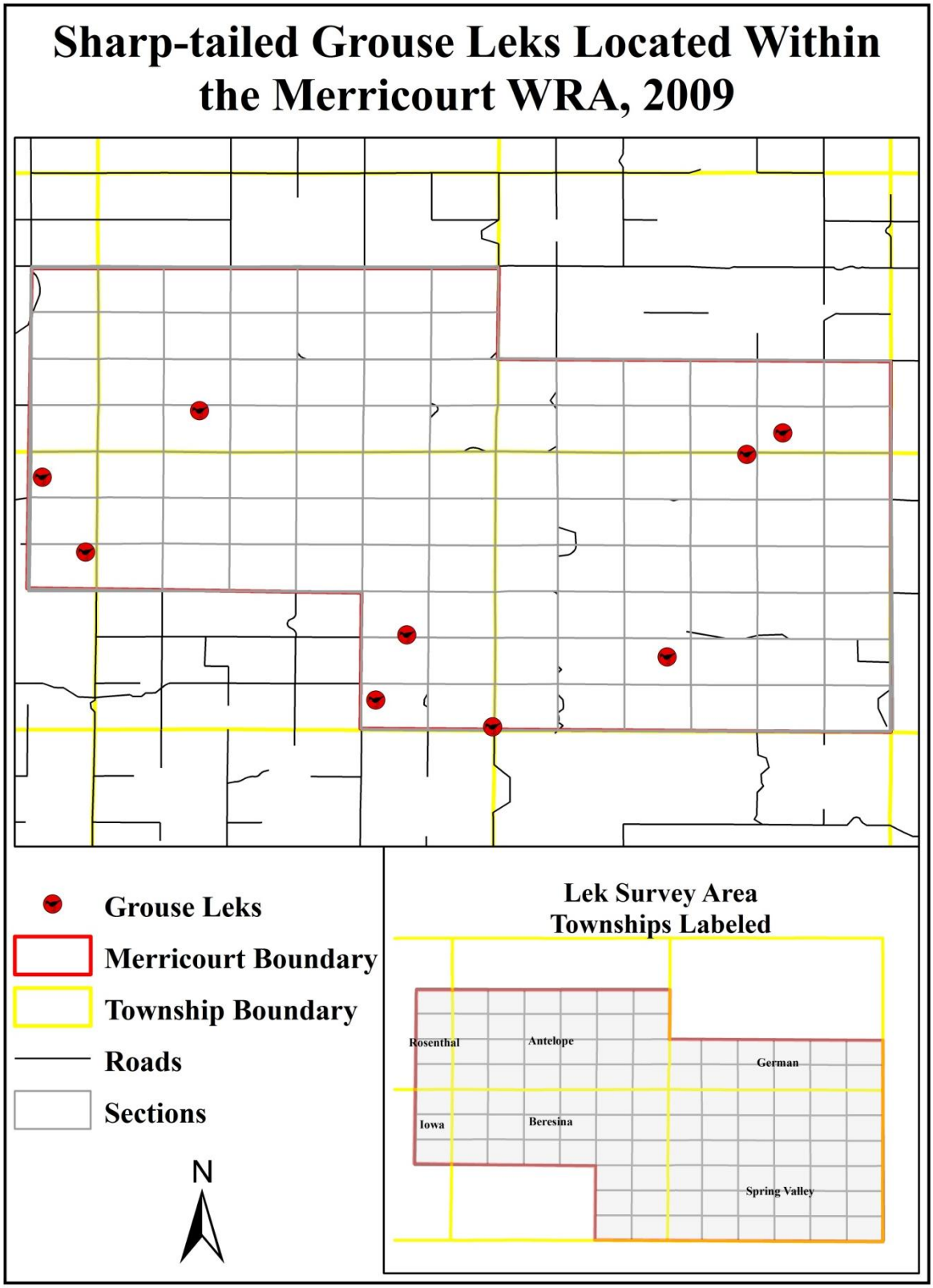


Figure 7. Sharp-tailed grouse leks located in the Merricourt WRA during spring 2009.

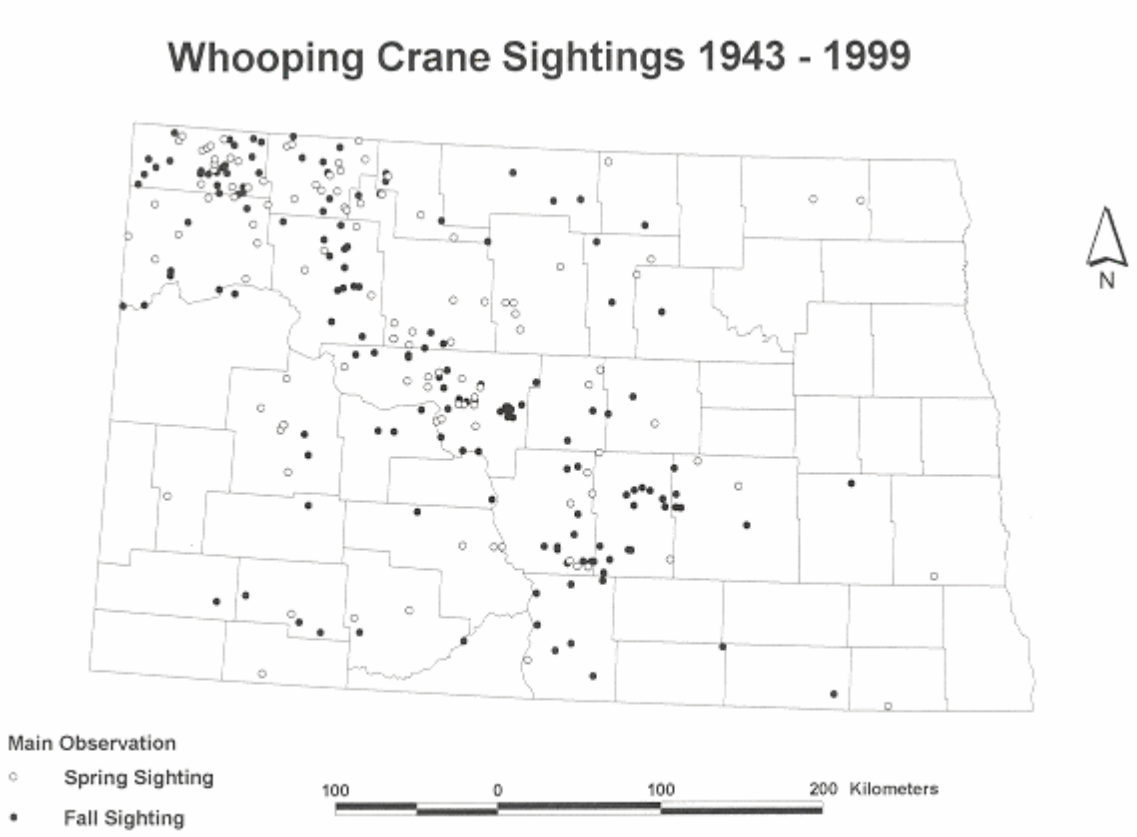


Figure 8. Distribution of confirmed whooping crane observations in spring and fall in North Dakota with County boundaries, 1943 – 1999. Map from (Austin and Richert 2001).

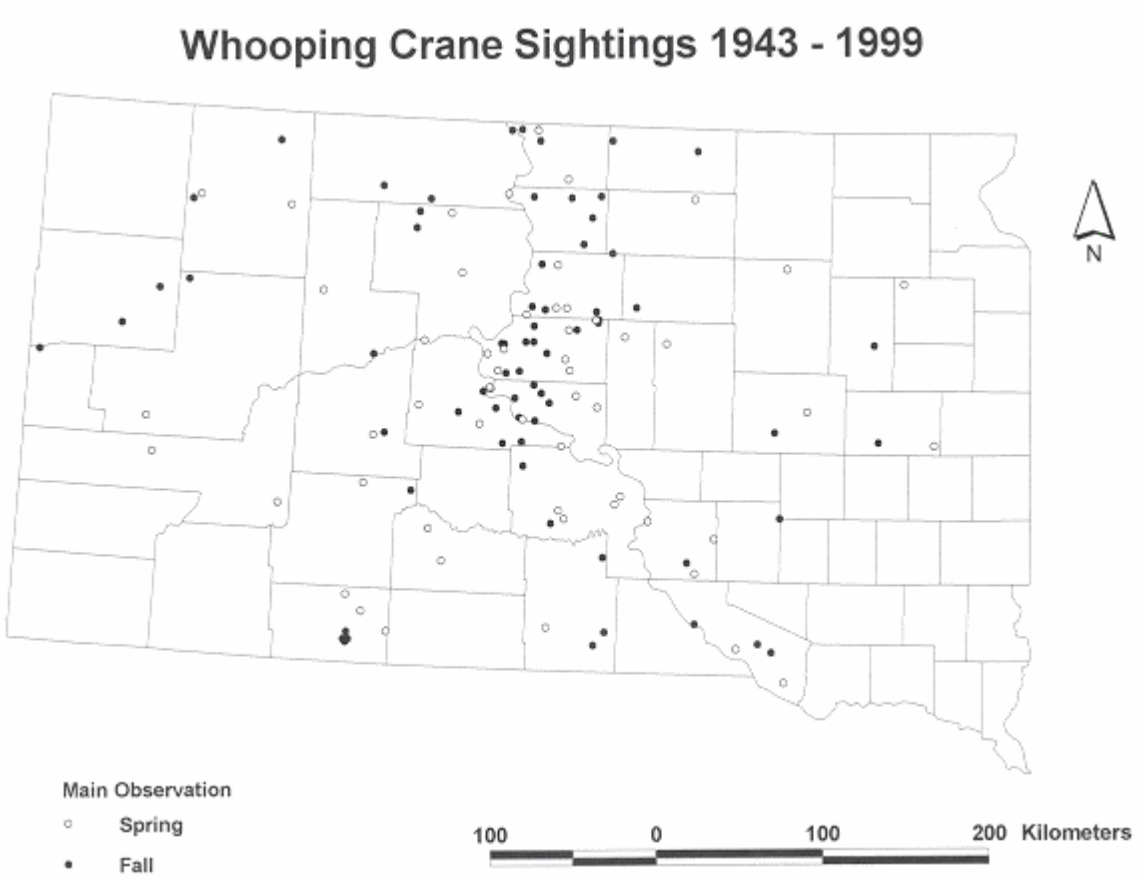


Figure 9. Distribution of confirmed whooping crane observations in spring and fall in South Dakota with County boundaries, 1943 – 1999. Map from (Austin and Richert 2001).

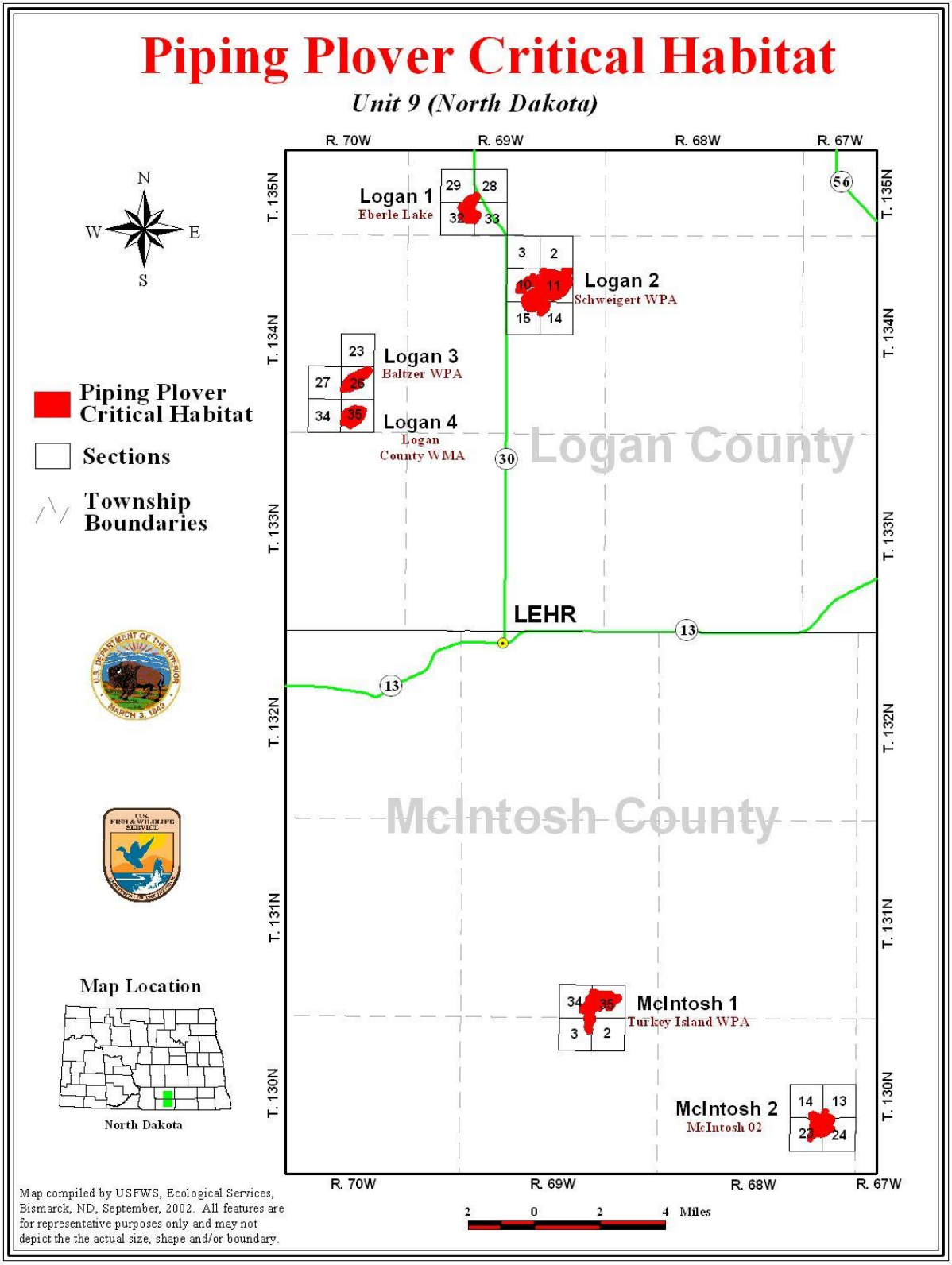


Figure 10. Piping plover critical habitat within the Merricourt WRA (Section 13 in McIntosh 2). Map from (USFWS 2002).

Appendix A. Raptor nests observed within the Merricourt Wind Resource Area, 2009.

County	Township	Section	Species	Nest Substrate	Height (m)	Latitude	Longitude
Dickey	German	25	Red-tailed Hawk	Tree	10	46.13579	-98.89478
Dickey	German	27	Swainson's Hawk	Cottonwood	20	46.14187	-98.92792
Dickey	German	28	Inactive	Tree	3	46.05192	-98.95712
Dickey	German	28	Ferruginous Hawk	Cottonwood	5	46.1348	-98.95181
Dickey	German	28	Swainson's Hawk	Cottonwood	3	46.14013	-98.94723
Dickey	German	28	Inactive	Willow	3	46.13728	-98.94382
Dickey	German	30	Swainson's Hawk	Siberian Elm	6	46.13132	-98.99339
Dickey	German	31	Swainson's Hawk	Willow	8	46.12589	-98.98934
Dickey	German	32	Inactive	Willow	10	46.11919	-98.97598
Dickey	German	32	Red-tailed Hawk	Willow	8	46.11961	-98.9766
Dickey	Spring Valley	2	Great-horned Owl	Tree	8	46.10754	-98.91899
Dickey	Spring Valley	7	Inactive	Cottonwood	12	46.09568	-98.98495
Dickey	Spring Valley	8	Red-tailed Hawk	Cottonwood	13	46.08478	-98.97922
Dickey	Spring Valley	8	Great-horned Owl	Cottonwood	10	46.08509	-98.96493
Dickey	Spring Valley	9	Swainson's Hawk	Cottonwood	8	46.09842	-98.95501
Dickey	Spring Valley	13	Red-tailed Hawk	Cottonwood	13	46.07719	-98.9002
Dickey	Spring Valley	19	Red-tailed Hawk	Cottonwood	13	46.0561	-99.00275
Dickey	Spring Valley	20	Inactive	Siberian Elm	3	46.05595	-98.98343
Dickey	Spring Valley	20	Swainson's Hawk	Siberian Elm	4	46.05595	-98.98353
Dickey	Spring Valley	22	Red-tailed Hawk	Cottonwood	10	46.06643	-98.92438

Appendix A (Continued). Raptor nests observed within the Merricourt Wind Resource Area, 2009.

County	Township	Section	Species	Nest Substrate	Height (m)	Latitude	Longitude
Dickey	Spring Valley	29	Red-tailed Hawk	Tree	8	46.05024	-98.98074
Dickey	Spring Valley	31	Inactive	Siberian Elm	6	46.03833	-98.986
Dickey	Spring Valley	36	Red-tailed Hawk	Tree	8	46.02687	-98.89464
McIntosh	Antelope	23	Great-horned Owl	Siberian Elm	7	46.14892	-99.03958
McIntosh	Antelope	24	Inactive	Siberian Elm	10	46.15261	-99.01977
McIntosh	Antelope	24	Swainson's Hawk	Siberian Elm	5	46.15448	-99.01555
McIntosh	Antelope	24	Red-tailed Hawk	Siberian Elm	4	46.15437	-99.02209
McIntosh	Antelope	30	Red-tailed Hawk	Cottonwood	30	46.13558	-99.11768
McIntosh	Antelope	30	Red-tailed Hawk	Cottonwood	13	46.13837	-99.10782
McIntosh	Antelope	32	Inactive	Green Ash	5	46.12632	-99.10735
McIntosh	Antelope	35	Inactive	Green Ash	7	46.12181	-99.02524
McIntosh	Antelope	35	Inactive	Siberian Elm	2	46.11956	-99.02713
McIntosh	Beresina	3	Red-tailed Hawk	Siberian Elm	7	46.10895	-99.05399
McIntosh	Beresina	8	Red-tailed Hawk	Siberian Elm	10	46.09207	-99.1
McIntosh	Beresina	15	Red-tailed Hawk	Cottonwood	15	46.07573	-99.0496
McIntosh	Beresina	25	Swainson's Hawk	Siberian Elm	5	46.04534	-99.02265
McIntosh	Beresina	26	Ferruginous Hawk	Willow	3	46.04823	-99.02542
McIntosh	Beresina	35	Inactive	Siberian Elm	7	46.03502	-99.02831
McIntosh	Rosenthal	25	Red-tailed Hawk	American Elm	10	46.13591	-99.14879

APPENDIX J:
SHARP-TAILED GROUSE LEK SURVEY

SHARP-TAILED GROUSE LEK SURVEYS FOR THE MERRICOURT WIND POWER PROJECT, DICKEY AND MCINTOSH COUNTIES, NORTH DAKOTA

May 2010

Prepared for:
Merricourt Wind Power Project
enXco Development Company
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INTRODUCTION

enXco Development Company is planning to develop a wind energy conversion facility in Dickey and McIntosh Counties in North Dakota. The proposed Merricourt Wind Resource Area (WRA) will encompass approximately 103 sections (Figure 1). The facility is planned to consist of approximately 100 wind turbines.

enXco Development Company contracted with Kadrmas Lee & Jackson who subcontracted with Bob Anderson of North Dakota Birding to conduct a sharp-tailed grouse (*Tympanuchus phasianellus*) lek survey of the Merricourt WRA. A lek is a traditional area of ground where male grouse gather in tiny territories to display to visiting females, who then select males for copulation. Female grouse are the primary dispersers, whereas males "imprint" on a particular lek and remain in the vicinity until their death (Manville 2004). Sharp-tailed grouse lek surveys were conducted to diminish potential impacts to this state species of conservation priority which breeds within the WRA.

A lek survey was conducted during spring 2009 to identify sharp-tailed grouse leks within the WRA (Figure 2) (Anderson 2009). During spring 2009, lek surveys were conducted by driving along roads within the WRA and stopping every 800 m to listen for sounds of dancing grouse. Areas within the WRA that did not have roads or navigable roads within 800 m probably were not adequately surveyed. Therefore, the areas that may not have been adequately surveyed with the 2009 lek survey methods were resurveyed using different methods during spring 2010 (see Methods).

The study protocol was developed with input from the U.S. Fish and Wildlife Service (USFWS) and the North Dakota Game and Fish Department (NDGFD). This final report summarizes the results of the sharp-tailed grouse lek surveys conducted during the springs of 2009 and 2010. The principle goals of these surveys were to locate grouse leks within the WRA and then make recommendations regarding turbine placement in relation to leks. Information from this survey should provide information that can be used to help with decisions about turbine final siting and wind plant design to reduce the potential impacts to sharp-tailed grouse.

State Species of Conservation Priority

The sharp-tailed grouse is on the North Dakota State Species of Conservation Priority list, and is ranked as a Level II species (Dyke et al. 2004). North Dakota has identified species of conservation concern that occur within the state. The NDGFD (Dyke et al. 2004) determined and ranked the state's top 100 species of conservation priority into 3 levels. The species considered included birds, mammals, fish, reptiles, amphibians, and freshwater mussels. The

NDGFD (Hagen et al. 2005) described the methods used to rank and identify avian species of conservation priority. These methods included using Partners in Flight Species Assessment and Prioritization Scores; the U.S. Shorebird Conservation Plan; the North American Waterbird Conservation Plan; current federal endangered, threatened, or candidate species or recent delisting from the ESA; and considered species with local management interest (Hagen et al. 2005).

The three levels for the Species of Conservation Priority are defined as: "Level 1: Species having a high level of conservation priority because of declining status either in North Dakota or across their range; or a high rate of occurrence in North Dakota constituting the core of the species' breeding range, but are at-risk range wide, and non-State Wildlife Grant funding is not readily available to them. Level 2: Species having a moderate level of conservation priority; or a high level of conservation priority, but a substantial amount of non-State Wildlife Grant funding is available to them. Level 3: North Dakota's species having a moderate level of conservation priority, but are believed to be peripheral or do not breed in North Dakota."

Sharp-tailed grouse are listed as state Level 2 – Species of Conservation Priority (Dyke et al. 2004). Although most species on the list are declining, a number of the 100 species on the list are considered common in North Dakota, or at least, not declining. These species were included because of North Dakota's importance as a last stronghold for that population, and these are "responsibility" species for which the state has a long-term stewardship role (Hagen et al. 2005). For example, the American white pelican (*Pelecanus erythrorhynchos*) (Level 1) is common in North Dakota, but is designated as vulnerable, imperiled, or critically imperiled in 27 states and provinces (Hagen et al. 2005). Although rather common in North Dakota, sharp-tailed grouse are experiencing a population decrease range-wide, and it is estimated as much as 1/3 of the entire population resides in the state, making North Dakota part of its core range (Hagen et al. 2005).

METHODS

2009 Methods

Grouse arrive on their lek daily starting in early March and extend through May, with the peak activity in mid-April. The lek may be a knoll, ridge, or other flat area with sparse vegetation, which enables females to better view the males and for all birds to better detect predators.

Two qualified biologists conducted a lek survey during spring 2009 to identify sharp-tailed grouse leks within the WRA. Lek surveys were conducted from the ground by driving along roads within the WRA and stopping every 800 m for 5 minutes to listen for sounds of dancing grouse. On a calm morning sharp-tailed grouse can be heard on their leks up to 1.6 km, but this

distance can be greatly affected by wind speed and direction. Surveys were conducted from an hour before to 1.5 hours after sunrise. Suspected leks were visited later to record the coordinates of the lek with a GPS unit. Leks were verified by discovering concentrated tracks, droppings, and feathers on the lek site itself. Lek searches were conducted 2 times from May 1, 2009 through May 15, 2009, with subsequent surveys 7-10 days apart. This survey method was consistent with the NDGFD lek survey methods. Lek locations were plotted on a map and recorded in Geographic coordinate system using North American Datum (NAD) 83. ArcGIS 9.3 software was used to produce a map of the lek locations within the WRA.

2010 Methods

A qualified biologist (Bob Anderson) conducted a lek survey to identify sharp-tailed grouse leks within the Merricourt Wind Resource Area (WRA) that may not have been adequately surveyed during the spring 2009 survey. This included 64 quarter sections, which are described below. The land surveyed included areas within the WRA that were 800 m or farther from an established roadway during the spring 2009 survey, which possibly did not allow for adequately hearing active leks from a vehicle. Lek surveys on these areas were conducted by slowly walking along section lines and quarter lines, if necessary, to survey all the land area missed during the spring 2009 lek survey. A pair of Swarovski 8X50 binoculars was used to scan the landscape as the biologist walked the section lines, and when needed a Nikon spotting scope was also used.

The biologist stopped approximately every 0.2 km (1/8 mi) to listen for sounds of breeding grouse and to scan with optics for dancing grouse. No surveys were conducted when precipitation was falling or winds exceeded 25 mph. Surveys were conducted from 1 hour before to 2 hours after sunrise. Suspected leks were visited to record lek coordinates in Geographic coordinate system using North American Datum (NAD) 83. Leks were verified by discovering concentrated droppings, tracks, and feathers on the lek site itself.

The NDGFD recommends 2 or 3 surveys be completed over a landscape to make sure leks are not missed. This is due to the fact that grouse can temporarily leave their leks due to a number of disturbances such as raptors flying over their lek or a mammalian predator such as a coyote (*Canis latrans*) disturbing them. However, completing the survey on 2 different dates greatly diminishes the odds that grouse would be disturbed and not dancing on their leks on both survey dates. A total of 2 lek surveys were conducted starting April 3, 2010, with the subsequent survey at least 7 days apart from the first. The 2010 lek surveys were completed on May 14, 2010. Lek locations were plotted on a map using ArcGIS 9.3 software. Leks that were located during the spring 2009 survey were also revisited to determine if they were still active.

Land descriptions for the areas that were surveyed during spring 2010 included the following:

McIntosh County

Antelope Township

S ½ of Sec. 14, SE ¼ Sec. 15, SW ¼ Sec. 26, SE ¼ Sec. 27, SE ¼ Sec. 33, S ½ and NE ¼ Sec. 34, and E ½ Sec. 35;

Beresina Township

E ½ of Sec. 1, SE ¼ Sec. 7, SE ¼ Sec. 10, SW ¼ Sec. 11, E ½ Sec. 12, E ½ Sec. 13, W ½ Sec. 14, E ½ Sec. 15, W ½ Sec. 16, E ½ Sec. 17, W ½ Sec. 23, W ½ Sec. 26, and NW ¼ Sec. 35;

Iowa Township

SW ¼ Sec. 13;

Rosenthal Township

SW ¼ of Sec. 36;

Dickey County

German Township

SW ¼ Sec. 28, SE ¼ Sec. 29, SW ¼ Sec. 30, NW ¼ Sec. 31, E ½ Sec. 32, W ½ Sec. 33;

Spring Valley Township

SW ¼ Sec. 7, W ½ Sec. 14, SE ¼ Sec. 15, SW ¼ Sec. 16, SE ¼ Sec. 17, N ½ Sec. 18, NE ¼ Sec. 20, NW ¼ Sec. 21, NE ¼ Sec 22, NW ¼ Sec. 23, S ½ Sec. 26, SE ¼ Sec. 27, SW ¼ Sec. 30, NW ¼ Sec. 31, NE ¼ Sec. 34, N ½ Sec. 35, and NW ¼ Sec. 36.

Data Quality Assurance/Quality Control

QA/QC measures were implemented during all stages of the study. Survey forms were inspected at the end of each survey for completeness, accuracy, and legibility. Data was entered into a spreadsheet by a qualified person for subsequent data analysis. All field notebooks, data forms, and electronic data files were retained for future reference.

RESULTS

2009 Lek Survey

The 2009 lek survey began on May 1, 2009 and the second lek survey was finished on May 15, 2009. Nine active leks were documented within the WRA (Table 1, Figure 2).

2010 Lek Survey

The 2010 lek survey began on April 3, 2010 and concluded on May 14, 2010. A total of 9 new leks were located (Table 1, Figure 3). All land descriptions described above were thoroughly surveyed twice. In addition, leks located in spring 2009 were revisited to determine if they were still active. The only lek that was not active in 2010 was a lek located in Section 36 of Bersinia Township, which is colored yellow in Figure 3. This lek only had 2 dancing males on it during the spring 2009 survey, and there were no grouse present during 5 site observations during spring 2010. The exact coordinates for all leks are located in Table 1.

Whooping Cranes

While conducting the lek survey from April 3 – May 14, 2010, North Dakota Birding also monitored the WRA for any cranes. Wetlands and fields were scanned while driving and while walking to conduct lek surveys. No whooping cranes were saw or heard while conducting the lek surveys. However, 15 sandhill cranes (*Grus canadensis*) were observed feeding in a pasture within Section 16 in Beresina Township on April 11, 2010.

DISCUSSION

Recommended Conservation Measures for Sharp-tailed Grouse

Sharp-tailed grouse did not evolve with tall vertical structures present near their leks, so the addition of wind turbines and their supporting infrastructure represents a significant change in the species' environment (Manville 2004), and those impacts to sharp-tailed grouse have not been well documented. Therefore, it is not known to what extent the development of wind energy resources will affect sharp-tailed grouse populations.

The U.S. Fish and Wildlife Service's voluntary guidelines recommend that wind turbines avoid being placed within 8 km (5 mi) of known leks to avoid disturbance to prairie grouse (Manville 2004). Giesen and Connelly (1993) reported that all mechanical, physical and audible disturbances should be avoided during the breeding season within 2 km (1.2 mi) of active sharp-tailed grouse lek sites in Colorado. Suggested buffer distances from turbines to active

leks vary widely in the literature, extending out to 18 km (11.2 mi) for sage grouse (*Centrocercus urophasianus*) (Connelly et al. 2000).

North Dakota Birding recommends that turbines, or access roads leading to turbines, be voluntarily sited as far from active grouse leks as possible, with at least a 0.4 km (0.25 mi) buffer from any turbine to an active lek. A minimum of a 0.25 mile work buffer during March through May when the grouse are active on their leks should minimize disruption to the grouse. These recommendations would not apply to the inactive lek in Section 36 of Bersinia Township. If any additional grouse leks are located during the construction process, they should also be voluntarily avoided following the above recommendations.

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Table 1. Sharp-tailed grouse leks within the Merricourt Wind Resource Area during 2009 and 2010. Leks labeled with year 2009 were located during both 2009 and 2010, while those labeled year 2010 were not located until spring 2010.

Township	Section	Latitude	Longitude	Habitat	Year
German	35	46.11964	-98.91455	Pasture	2009
Spring Valley	3	46.11292	-98.92577	CRP	2009
Spring Valley	28	46.04969	-98.95067	Pasture	2009
Antelope	32	46.12656	-99.09652	Pasture	2009
Bersinia	23	46.05655	-99.03185	Pasture	2009
Bersinia	35	46.03623	-99.04158	Pasture	2009
Bersinia [a]	36	46.02785	-99.00510	Cemetery	2009[a]
Iowa	1	46.10578	-99.14562	Pasture	2009
Iowa	13	46.08243	-99.13209	Pasture	2009
Spring Valley	9	46.09129	-98.96097	Pasture	2010
Spring Valley	19	46.06508	-98.99422	Pasture	2010
Spring Valley	26	46.04290	-98.91222	Pasture	2010
Spring Valley	34	46.03056	-98.92422	Pasture	2010
Spring Valley	36	46.03710	-98.89329	Pasture	2010
Antelope	34	46.12179	-99.06490	Pasture	2010
Bersinia	16	46.07787	-99.07619	Pasture	2010
Bersinia	23	46.06902	-99.04116	Pasture	2010
Iowa	1	46.11270	-99.13800	Pasture	2010
					Total Leks = 18

[a] - This lek only had 2 dancing males during 2009, and there were no grouse present during spring 2010.

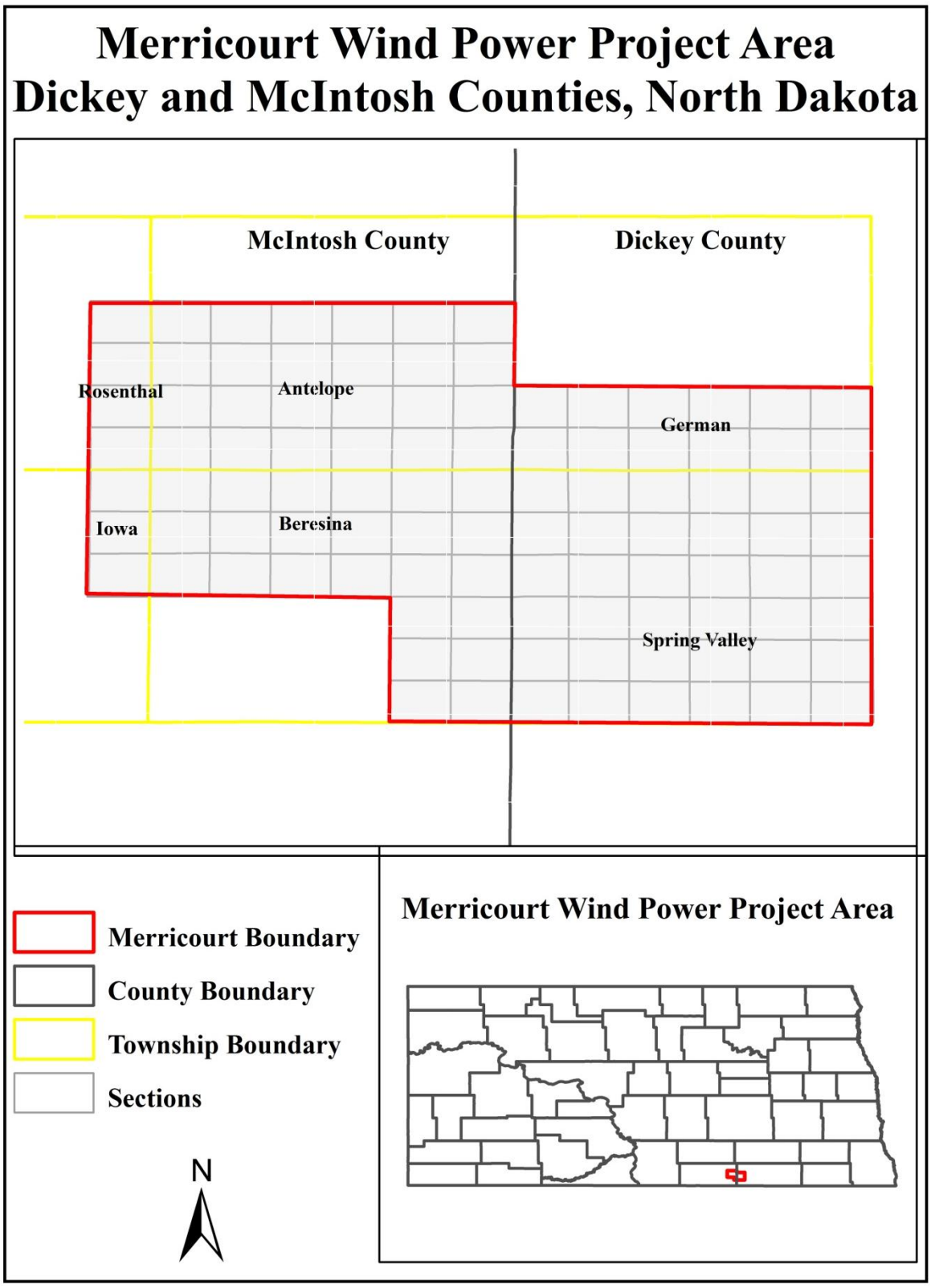


Figure 1. Map of proposed Merricourt Wind Power Project area within Dickey and McIntosh Counties.

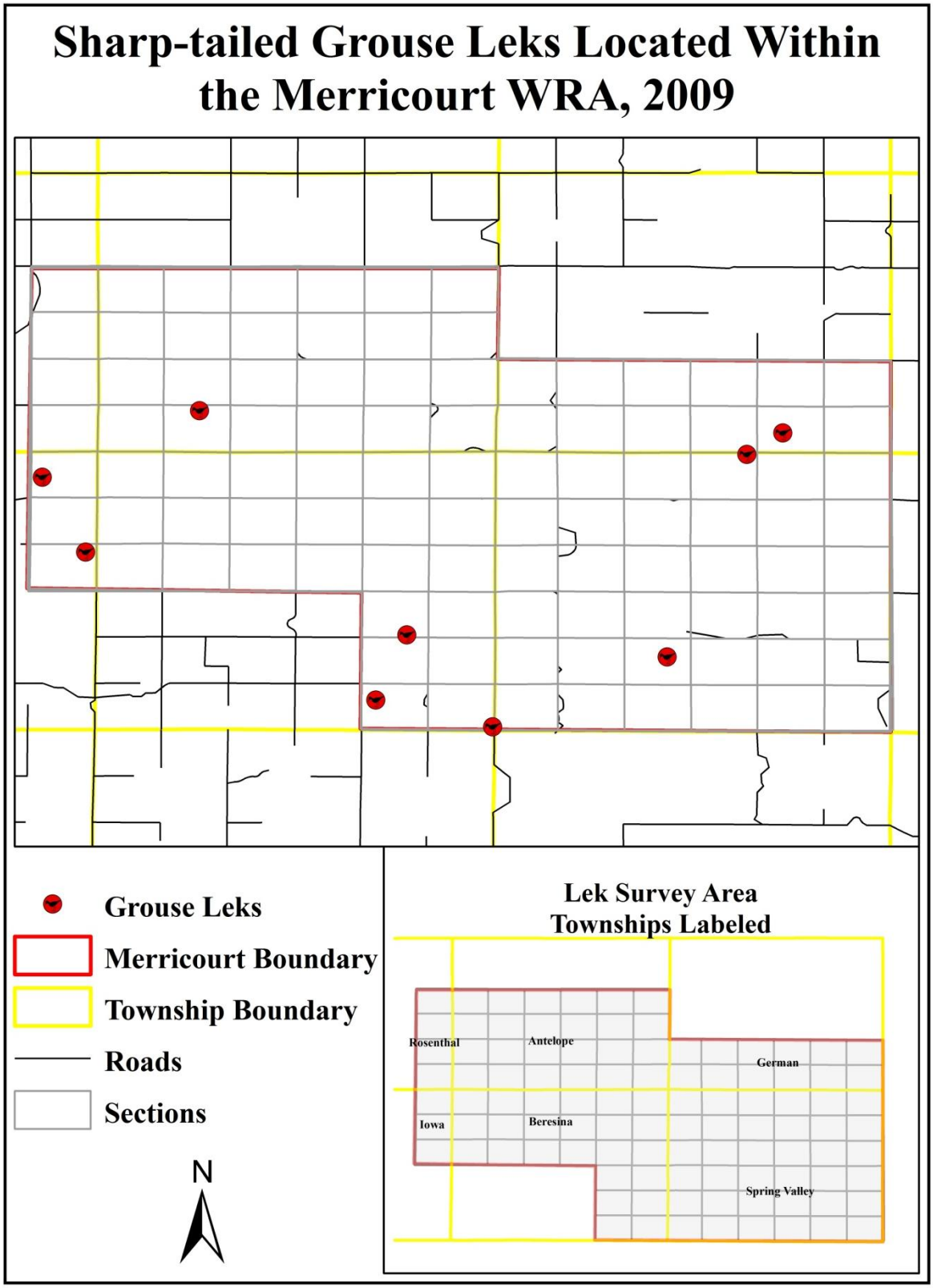


Figure 2. Sharp-tailed grouse leks located in the Merricourt WRA during spring 2009 (Anderson 2009).

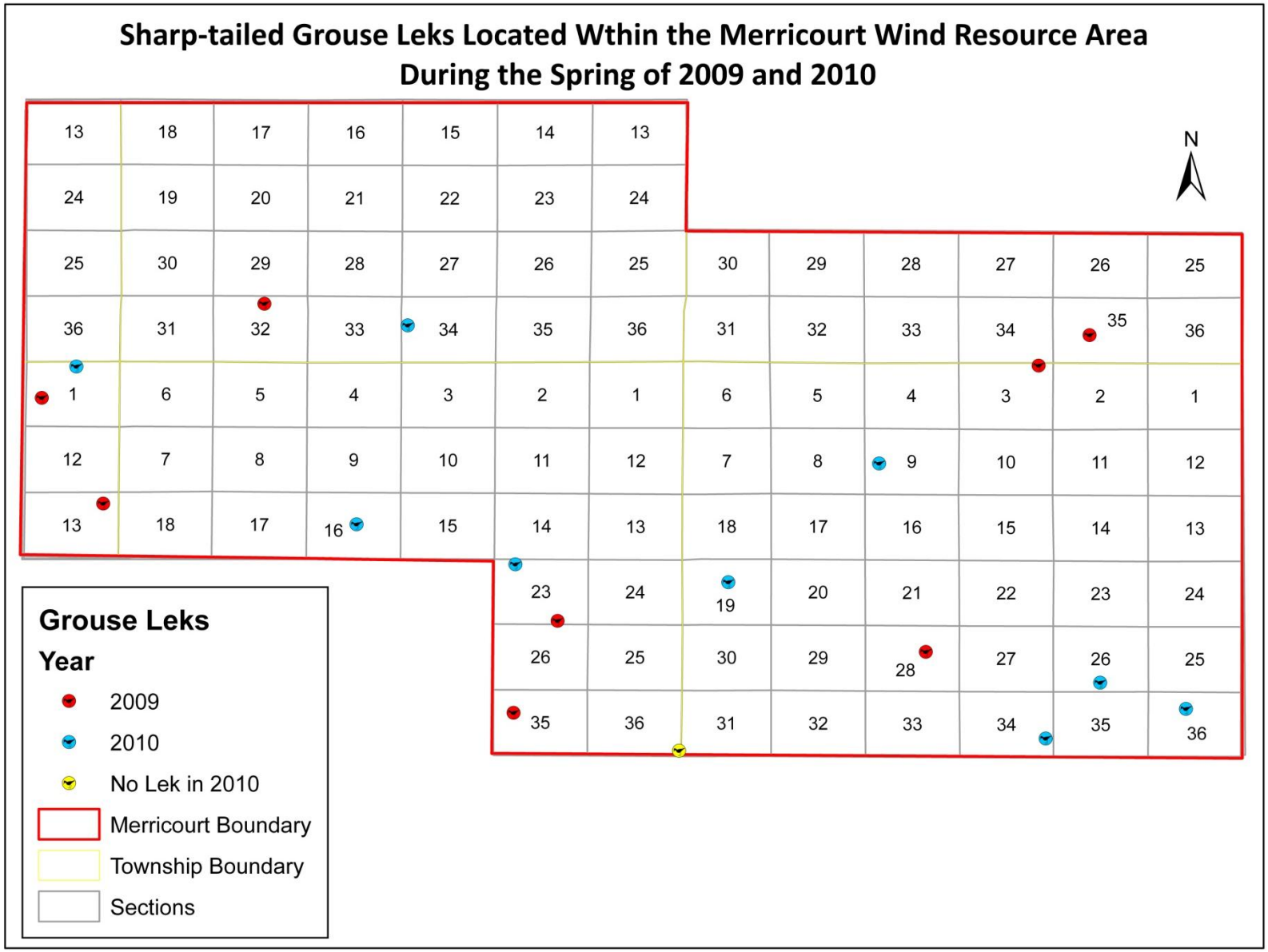


Figure 3. Sharp-tailed grouse leks located within the Merricourt WRA during spring 2009 (red) and spring 2010 (blue).

APPENDIX K:
WHOOPING CRANE HABITAT ASSESSMENT

Whooping Crane Habitat Review
Merricourt Wind Resource Area

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March 25, 2010



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INTRODUCTION

The Merricourt Wind Energy Project (Project) is proposed for development by enXco, an EDF EN Company (enXco) in Dickey and McIntosh Counties, North Dakota. Kadrmas, Lee & Jackson, Inc. (KLJ) is assisting enXco with permitting this Project and requested Western EcoSystems Technology, Inc. (WEST) to develop and implement a desktop review and analysis of potential whooping crane habitat resources in the project area and to compare these resources to areas outside of the project boundary to the north, south, east, and west. The habitat review and analysis evaluates whether or not the proposed Project area represents high, average, or low potential whooping crane habitat as compared to alternate locations. From this analysis all parties can then discuss what impacts there may be to whooping cranes from development of the proposed Project.

PROJECT AREA

The Project, currently about 62,500 acres (25,300 hectares), is located in southern North Dakota along the Dickey and McIntosh County line (Figure 1). The Project lies approximately 11-20 miles south of Kulm, North Dakota.

The majority of the Project's landscape is composed of grassland, cropland, wetland, and shrubland habitats. Wetlands vary in size and are scattered throughout the Project's area (Figure 2). The Project is located approximately one to two miles from the eastern edge of the Missouri Coteau ecoregion (Bryce et al. 1996).

METHODS

A desktop review was completing using ArcGIS 9.3.1, land cover information from North Dakota and South Dakota GAP Analysis, and the current project boundary as provided by KLJ. A site visit was not completed by WEST for this exercise.

The potential whooping crane habitat analysis included a comparison of land cover types within the proposed Project boundary as compared to alternate areas of the same dimensions located immediately adjacent to the Project boundary to the north, south, east, and west (see Figures 1 and 2).

RESULTS

There are approximately 11,037 acres of wetlands, based on the land cover data used, within the proposed project area, or 17.66% (Table 1). These wetlands are spread amongst 3,022 basins, ranging in size from 0.1 to 945.5 acres. These totals include all wetland types. Croplands make up slightly more than 25% of the project area and all grassland types combined are approximately 49% of the Project area (Table 1). Shrubland (7.26%) was the next most common land type (Table 1) and all other habitats comprised less than 1% of the area. Similar land cover types are found in the areas to the north, south, east, and west of the Project (Table 2). The area to the south of the Project falls partially into South Dakota where available land use data are not described the same as the land use data in North Dakota. An attempt was made to show them in

a compatible fashion, but the South Dakota data do not include any shrublands or developed areas, which there would be in small numbers in this area.

Table 1. Land cover types present within the Project.

Land Use	Acres	Hectares	Percent
Cropland	15,855.1	6,416.3	25.36
Deciduous Woodland	283.6	114.8	0.45
Developed	123.6	50.0	0.20
Native Grassland	17,066.7	6,906.6	27.30
Planted Grassland	13,604.2	5,505.4	21.76
Shrubland	4,537.3	1,836.2	7.26
Wetland	11,037.4	4,466.7	17.66
Total	**62,507.82**	**25,296.02**	**100.00**

Table 2. Land cover within the Project and areas adjacent to the Project.

	Project		North		East		South		West	
Habitat Type	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**	**Acre**	**%**
Cropland	15,855.1	25.4	30,428.9	48.7	28,081.1	44.9	9,936.3	15.9	15,661.4	25.0
D. Woodland	283.6	0.5	246.7	0.4	339.1	0.5	705.9	1.1	88.4	0.1
Developed	123.6	0.2	90.9	0.1	15.7	0.0	37.3	0.1	6.7	0.0
Native Grassland	17,066.7	27.3	8,548.6	13.7	13,430.9	21.5	24,864.8	39.8	21,021.1	33.6
Planted Grassland	13,604.2	21.8	6,670.3	10.7	13,334.3	21.3	14,655.0	23.5	11,602.1	18.6
Shrubland	4,537.3	7.3	3,332.9	5.3	3,065.5	4.9	4,424.4	7.1	3,215.1	5.1
Wetland	11,037.4	17.7	13,218.3	21.1	4,241.8	6.8	7,812.3	12.5	10,949.2	17.5

For this analysis it is assumed that all wetlands are potential whooping crane roosting areas under one water regime or another (e.g., drought, normal, or flood). The Project had the second highest percentage of wetland coverage, but only 0.2% higher than the area with the third highest coverage. There were fewer wetland basins to the north and west of the Project but on average they were bigger (Table 3). All areas have cultivated agriculture for feeding, with the Project area having nearly the same as the area to the west but less than areas to the north and east. Grasslands are also found in all areas, with more to the south and west compared to the Project area. Small amounts of developed areas are found in all locations, with the Project area having slightly more developed acreage than the other locations.

Table 3. Comparison of the number of wetland basins and mean size in the Project and four adjacent locations.

Area	Basins	Mean Size - acres	Range - acres
Project	3,022	3.6	0.1 – 945.5
North	2,689	4.9	0.1 – 527.1
South	4,248	1.8	0.1 – 433.8
East	3,964	1.1	0.1 – 79.8
West	2,160	5.1	0.1 – 896.1

The Project is located just inside of the defined 200-mile wide whooping crane migration corridor (CWCTP 2007) by approximately 8 miles (Figure 1). The eastern alternate area is actually located partially outside the corridor. No whooping cranes have been documented within the project area (Figure 1), but one was observed historically in the northern alternate area. Scattered whooping crane observations have been made around the project area, with more to the west, nearer the migration corridor centerline (Figure 1).

DISCUSSION

Whooping cranes are currently listed as endangered (32 FR 4001, 1967 March 11) except where nonessential experimental populations exist (66 FR 33903-33917, 2001 June 26; 62 FR 38932-38939, 1997 July 21; and 58 FR 5647-5658, 1993 January 22). In the US, the whooping crane was listed as threatened with extinction in 1967 and endangered in 1970 – both listings were "grandfathered" into the Endangered Species Act of 1973 (ESA 1973). The peak 2009-2010 winter population was 263 birds (T. Stehn, pers. comm.). This is 16 more individuals compared to the 2008-2009 winter counts. Whooping cranes typically migrate from their breeding grounds in Wood Buffalo National Park, Canada to their wintering areas in Aransas National Wildlife Refuge, Texas. During the migration, most birds pass through central North Dakota, west of the proposed Merricourt Project area; however, some birds have been documented in the general vicinity of the Project.

The US Fish and Wildlife Service (USFWS; [CWCTP 2007]) documented a 200-mile wide migration corridor for whooping cranes based on the historical sightings of whooping cranes from the early 1960's through 2007. This 200-mile wide corridor (100 miles either side of the centerline) encompasses approximately 94% of the observations and a 100-mile wide corridor subset of this encompasses approximately 82% of the observations. The Project area is on the eastern edge of the migration area (Figure 1). The USFWS has expressed concern with wind and other above ground developments (e.g., transmission lines) that are built anywhere within the 200-mile wide corridor, but with more emphasis placed on those projects within the region that encompasses 75% of the observations. The closest whooping crane observation to the Project is approximately 6 miles north (Figure 1).

The potential exists for whooping cranes to fly over the area during migration. Whooping cranes generally migrate at 1,000-6,200 ft altitudes, well above turbine height (USFWS 2009), and thus for the most part are unlikely to collide with turbines. However, as whooping cranes ascend and descend during takeoff and landing, or migrate during inclement weather, they may fly at lower altitudes and may fly at altitudes corresponding to the rotor-swept areas. No whooping cranes have been reported as being killed or injured by wind turbines (NWCC 2004), but one sandhill crane was reported at the Altamont wind farm in California (Smallwood and Karas 2009).

Besides direct mortality, concern has also been raised regarding potential displacement impacts that wind facilities may have on whooping cranes. For example, if whooping cranes avoid wind facilities, the likelihood of impacts with turbines is further decreased but the availability of habitat in the project area may be been diminished, causing cranes to have to fly further to find suitable habitat to roost and forage. To date, no or very little quantitative data is available to help

address displacement impacts on whooping cranes or sandhill cranes. A before-after control-impact (BACI) study looking at crane use (would be mostly sandhill crane use) of a wind resource area before and after construction would help identify if and to what degree wind facilities displace cranes from the area. However, since this project is located on the eastern edge of the whooping crane migration corridor and to a lesser extent on the eastern edge of the sandhill crane migration pathway, not enough useful information could probably be collected for a meaningful study.

In Stehn (2008), the point was made that suitable wetlands for overnight roost sites are available throughout the migration corridor in the Dakotas and Nebraska (Stahlecker 1997a, 1997b in Stehn 2008) and there are abundant croplands for foraging. However, in analyzing the potential for significant impacts from wind development on whooping crane stopover habitat, the USFWS (2009) also suggests assessing whether there is "will there be sufficient habitat remaining in the surrounding area for the whooping cranes to find stopover habitat or does the only stopover habitat occur on the wind farm?". This issue was investigated by comparing the potential whooping crane stopover habitat (using wetlands as this indicator) in the project area compared to surrounding areas. To complete this analysis, the exact project boundary was moved in each of the four cardinal directions so that the "new" project areas were adjacent to but did not overlap the original project boundary. GIS was used to calculate the amount of various habitats and in the case of wetlands, number of individual basins in each of the areas compared to the proposed Project (Tables 2 and 3). This analysis shows that habitat for migrating whooping cranes exist in and around the Project. Both roosting (i.e. wetlands) and foraging (i.e. croplands) habitats are plentiful in the Project and alternate areas. Whether whooping cranes would prefer one are over another could not be answered with this analysis but to answer the question posed by the USFWS (2009), the Project does not contain "the only suitable whooping crane stopover habitat." Additional considerations for avoidance, minimization, and mitigation for wind projects related to whooping cranes is found in the USFWS document "WHOOPING CRANES AND WIND DEVELOPMENT - AN ISSUE PAPER" (USFWS 2009).

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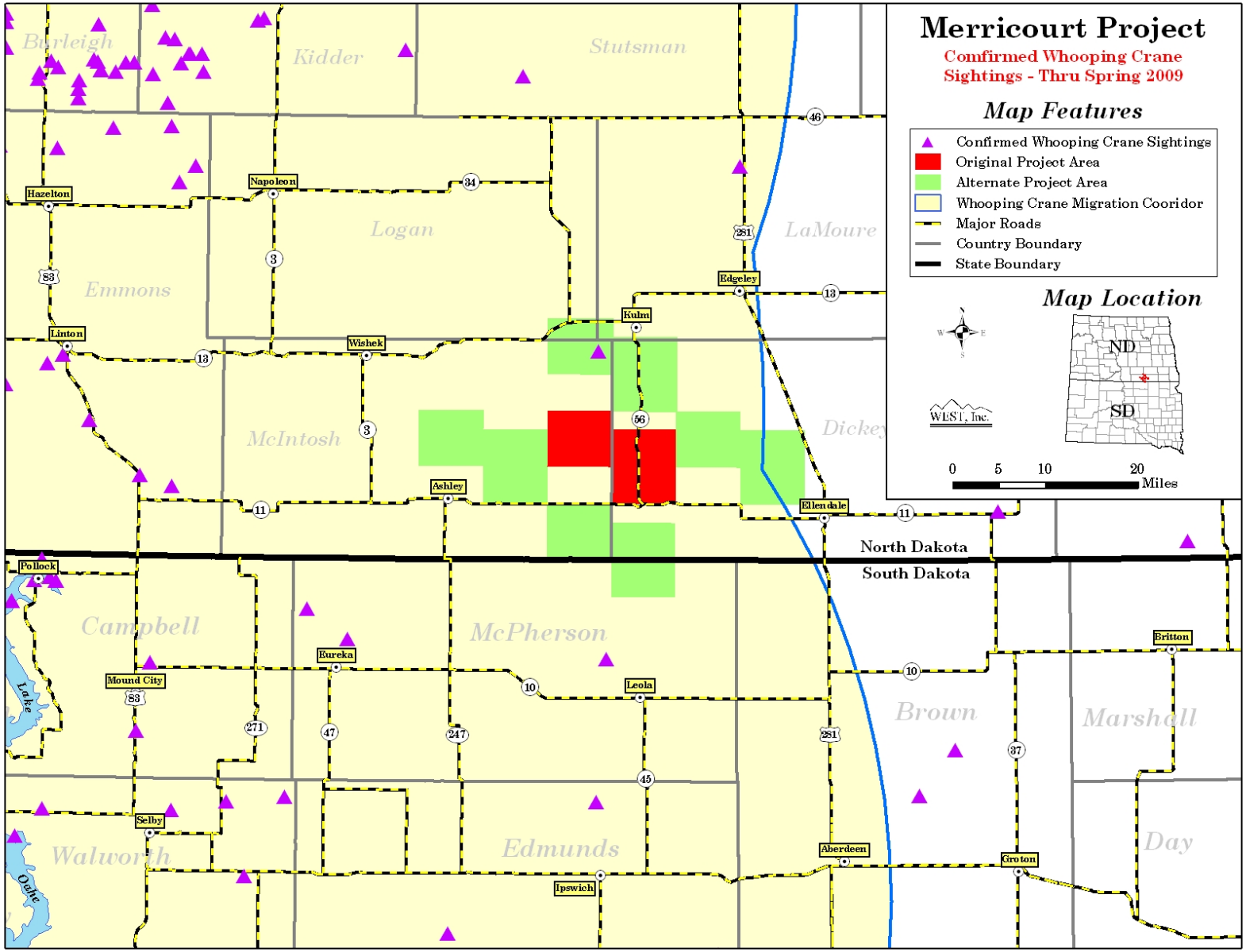


Figure 1. Location of the Merricourt Project area, alternate areas, and whooping crane observations.

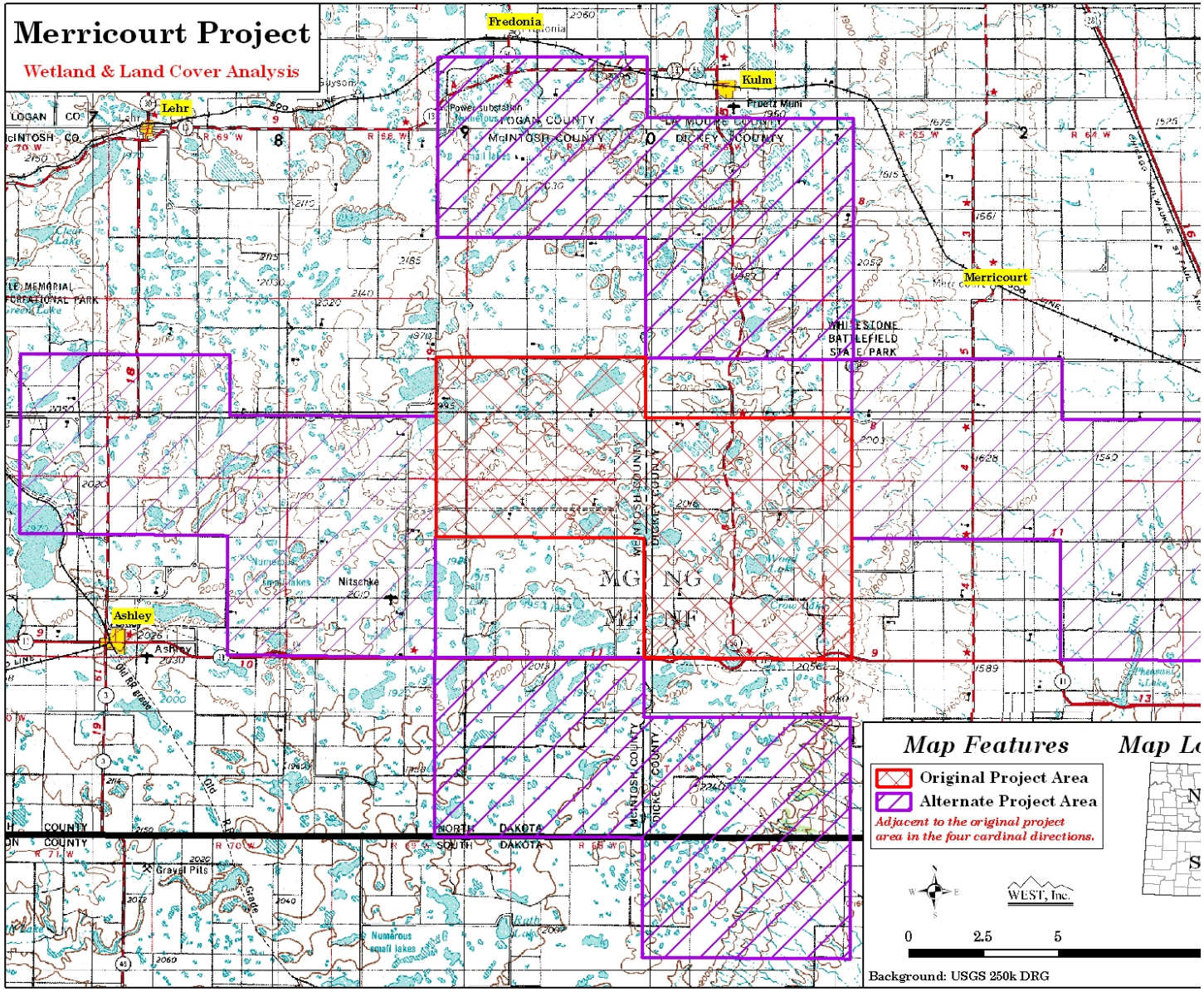


Table 2. Location of the Merricourt Project area, alternate areas.

APPENDIX L:
PIPING PLOVER SURVEY

PIPING PLOVER SURVEY FOR THE MERRICOURT WIND POWER PROJECT, DICKEY AND MCINTOSH COUNTIES, NORTH DAKOTA

June 2010

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enXco Development Company

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Prepared by:

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INTRODUCTION

enXco Development Company is planning to develop a wind energy conversion facility in Dickey and McIntosh Counties in North Dakota. enXco Development Company contracted with Kadrmas Lee & Jackson who subcontracted with Bob Anderson of North Dakota Birding to conduct a piping plover (*Charadrius melodus*) survey of the Merricourt Wind Resource Area (WRA), which encompasses approximately 103 sections (Figure 1).

The piping plover has been listed since 1985 as a threatened species protected under the Endangered Species Act (ESA). There is critical habitat (defined and described below) for the threatened piping plover on one section of land within the WRA. enXco Development Company felt in necessary to make sure that there were no other wetlands within the WRA that had piping plovers using them in order to minimize any potential risks wind farms could have on piping plovers. Therefore, a piping plover survey was conducted during June 2010 on selected wetlands within the WRA. The survey protocol was developed with input from the U.S. Fish and Wildlife Service (USFWS).

This final report summarizes the results of the piping plover survey and provides background information on the status and ecology of the piping plover in the northern Great Plains. Information from this survey should provide information that can be used to help with decisions about turbine final siting and wind plant design to reduce any potential risks to piping plovers.

The principle goals of this study were to:

- Determine the presence/absence of piping plovers on selected wetlands within the WRA;
- Recommend conservation measures if piping plovers were located within the WRA.

Status

The piping plover (*Charadrius melodus*) is a migratory member of the shorebird family Charadriidae. They are approximately 6.7 to 7.1 inches (17 to 18 centimeters) long and weigh from 1.5 to 2.2 ounces (43 to 63 grams) (Haig 1992). Three breeding populations of piping plovers have been described, including the northern Great Plains, Great Lakes, and Atlantic Coast populations. Piping plovers found in ND are part of the northern Great Plains population. The northern Great Plains population is listed as threatened in the U.S. (USFWS 1985) and endangered in Canada (Haig and Oring 1985). North Dakota is the most important State in the Great Plains for nesting piping plovers (USFWS 2009a). Historically, breeding piping plovers occurred in at least 28 ND counties, but were observed in only 20 counties during the 1990s (USFWS 2009a), but historical data on the distribution of piping plovers is scarce prior to 1980.

The continent-wide piping plover population has undergone a substantial decline, presumably because of human disturbance and habitat destruction (Haig 1985). One of the ESA Recovery Criteria goals for the northern Great Plains is for the population to increase to 1,300 pairs (USFWS 2009b). The North Dakota alkali lakes population estimates have been well below the goal of 550 pairs (USFWS 2009b).

The International Piping Plover Census (IPPC), conducted every five years, estimates the number of piping plover pairs in the northern Great Plains. The estimated breeding pairs reported in the northern Great Plains by the IPPC efforts for 1991 was 891, for 1996 was 586, for 2001 was 899, and for 2006 was 1,212 (Plissner and Haig 1996, Ferland and Haig 2002, Elliot-Smith et al. 2009).

Past population projections have indicated there will be a continued population decline, with extirpation predicted within the next century (Ryan et al. 1993, Plissner and Haig 2000). However, Larson et al. (2000) reported that the potential for recovery for the northern Great Plains population might be greater than previously thought. The northern Great Plains may be the best opportunity to preserve this species because of the relatively small human population and its large, locally concentrated piping plover population (Prindiville Gaines and Ryan 1998).

Habitat

More than three-fourths of piping plovers in North Dakota nest on prairie alkali lakes, while the remainder use sandbars and shorelines along the Missouri River (USFWS 2009a). Piping plovers prefer alkali lakes and wetlands that consist of open, sparsely vegetated, alkali beach areas that may have abundant, evenly distributed gravel (Prindiville Gaines and Ryan 1988, USFWS 2002). Plovers avoid shorelines with dense vegetation. Prindiville Gaines and Ryan (1988) considered available habitat to be exposed beach ≥ 3 m wide from the water's edge to a line of solid vegetation, and having less than 75% vegetative cover. These essential breeding habitats in North Dakota can support more than 50% of the northern Great Plain's piping plover population (USFWS 2002).

Critical habitat is defined within the ESA as a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat areas for piping plovers in the Great Plains include prairie alkali wetlands and surrounding shoreline, including 200 ft (61 m) of uplands above the high water mark (USFWS 2002). Critical habitat was determined from data obtained from surveys from 1987 to 2001 in ND, where breeding piping plovers were observed in more than 1 year for the survey period (USFWS 2002). The survey period encompassed both wet and dry cycles; therefore, the dynamic nature of prairie alkali lakes and wetlands was reflected.

There is piping plover critical habitat within the Merricourt WRA (Figure 2). The site description that follows includes the site common name, Township, Range, and Section(s): and the UTM coordinates of the center point: McIntosh 02, T. 130 N., R. 68 W., Sec. 13, 14, 23, 24; 488392.570, 5101297.805 (USFWS 2002). Only section 13 within Iowa Township is within the Merricourt WRA. This alkaline wetland is the only designated critical habitat for the piping plover in the WRA.

Nesting Chronology

Murphy et al. (1999) reported on the nesting chronology of piping plovers on alkali lakes/wetlands of the Great Plains. Arrival of plovers occurred from 20 April – 5 May (Murphy et al. 1999) in North Dakota. Plovers have a 7 day laying period and a 28 day incubation period (Prindiville Gaines and Ryan 1988). On Great Plains alkali lakes young plovers fledge at 21-28 days (Prindiville Gaines and Ryan 1988). Murphy

et al. (1999) reported that successful adult and young plovers begin leaving their alkali lakes in late July and that all plovers are gone by the third week of August. Therefore, piping plovers would potentially be present on the WRA from early April until the third week in August. Murphy et al. (1999) suggested that piping plover surveys are best conducted in June, with the best time period being June 1-10.

METHODS

The piping plover survey was conducted in June by Bob Anderson of North Dakota Birding on selected wetlands within the WRA (Figure 3). These wetlands were selected based on satellite imagery, National Wetland Inventory data, and the potential to have piping plovers present. All wetlands currently are much larger than they appear in Figure 3, due to the WRA being very wet during spring 2010. Each wetland in Figure 3 was systematically searched for potential piping plover habitat (Prindiville Gaines and Ryan (1988). A combination of a high quality Nikon spotting scope on a tripod or window mount and Swarovski 8X50 binoculars will be used to scan the shoreline edges for available plover habitat. Plover habitat was considered to be exposed beach ≥ 3 m wide (from water's edge to a line of solid vegetation) (Prindville Gaines and Ryan 1988). Wetlands that were determined in the field not to have any suitable piping plover habitat did not have their shorelines walked.

Wetlands that were determined to have potential suitable plover habitat had their shorelines walked in search of piping plovers. The biologist was familiar with piping plover behavioral cues, displays, and calls which help in locating potential piping plovers. Aerial courtship flights by males over territories and threat displays and "parallel runs" at territorial boundaries (Cairns 1982) were also watched for while conducting surveys. Piping plovers were not approached (if found) and their nests were not searched for. The sole purpose of this survey was to determine the presence/absence of piping plovers on these selected wetlands which had a potential to have breeding piping plovers using them.

RESULTS AND DISCUSSION

The piping plover survey started on June 3, 2010 and was completed on June 21, 2010. There were no piping plovers located within the WRA, including the wetland that is listed as critical habitat (Figure 2). There also was very little, if any, potential habitat for plovers found within the WRA due to the high water levels during 2010. The water levels were already high during 2009, but continued to rise into June 2010. The WRA had heavy rain in late May and early June, and the water levels had even came up significantly since the spring 2010 sharp-tailed grouse lek survey had been completed on May 15. Every road within the WRA, except maybe one, had water over at some point during May and June. Local landowners said it was the highest water they could remember.

The vast majority of wetlands had water that extended well into or past the emergent, aquatic vegetation and often water extended well into the upland vegetation, making the shorelines of these wetlands unsuitable for piping plovers. The only shoreline habitat that really remained was the shorelines of flooded agricultural fields, which are not usually suitable for nesting plovers since annual

weeds start to vegetate these areas in May. Any remotely potential shoreline habitat was walked, but there was no sign of plovers. North Dakota Birding is confident that there was no piping plover breeding habitat within the WRA during June 2010.

Wetlands are dynamic and often have greatly fluctuating water levels in this region. Thus, it is possible and likely (critical habitat wetland) that in the future piping plovers may use some of the wetlands within the WRA once suitable shoreline habitat returns. Since no piping plovers were located, North Dakota Birding recommends that the same conservation measures be followed as recommended in the previous report entitled, "Avian assessment and surveys for the proposed Merricourt Wind Power Project, Dickey and McIntosh Counties, North Dakota" (Anderson 2009).

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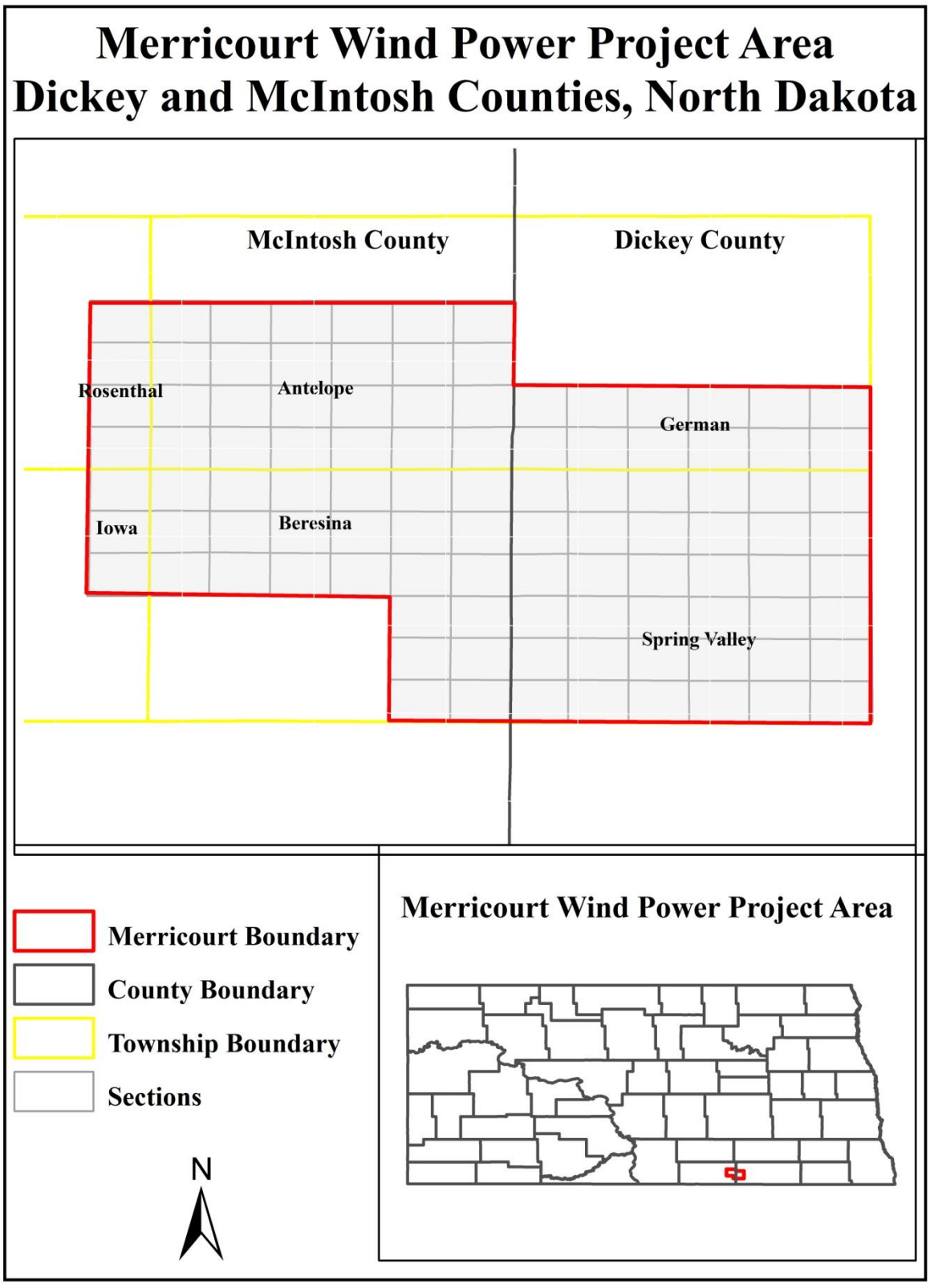


Figure 1. Map of proposed Merricourt Wind Power Project area within Dickey and McIntosh Counties.

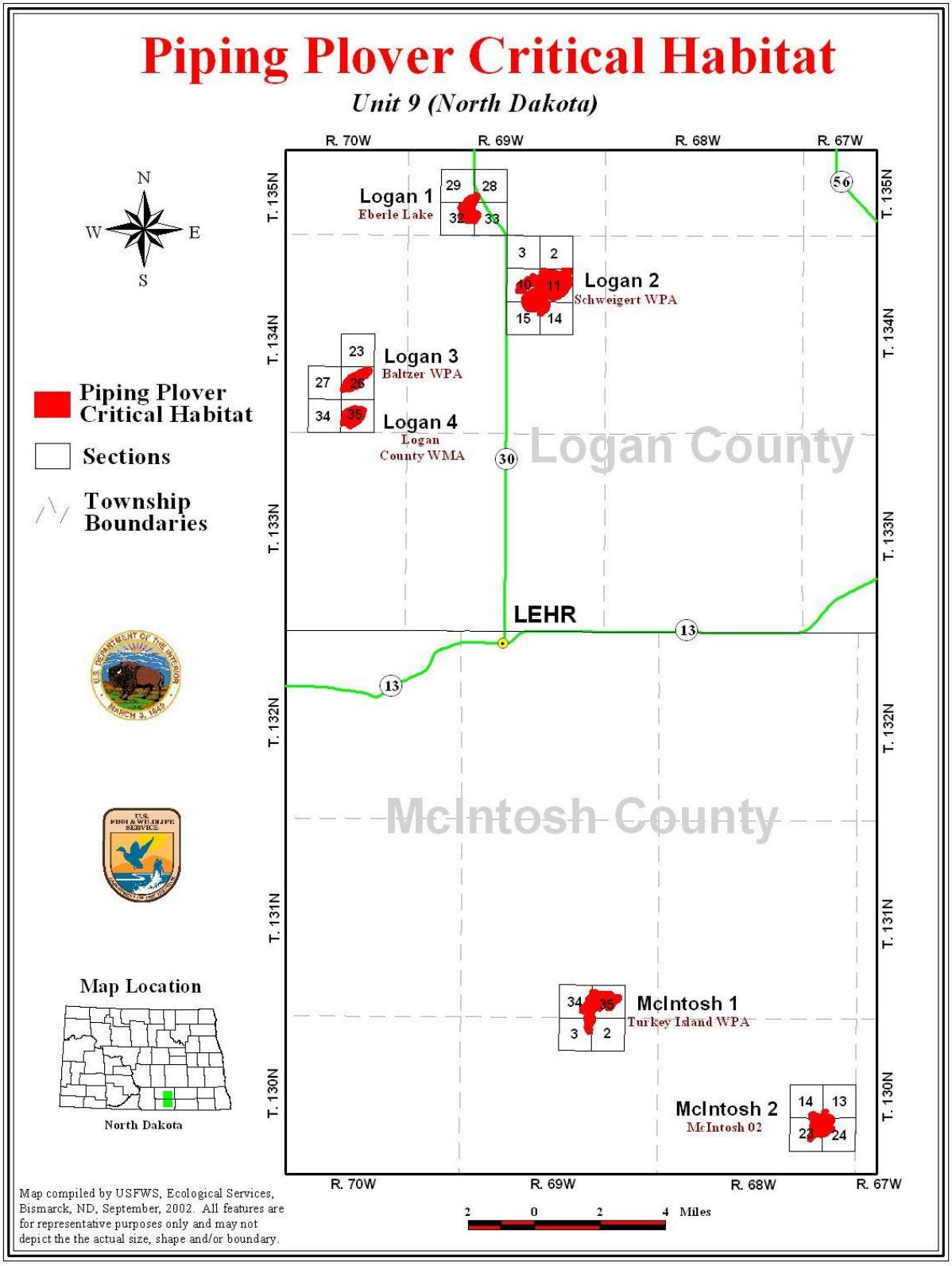


Figure 2. Piping plover critical habitat within the Merricourt WRA (Section 13 in McIntosh 2). Map from (USFWS 2002).

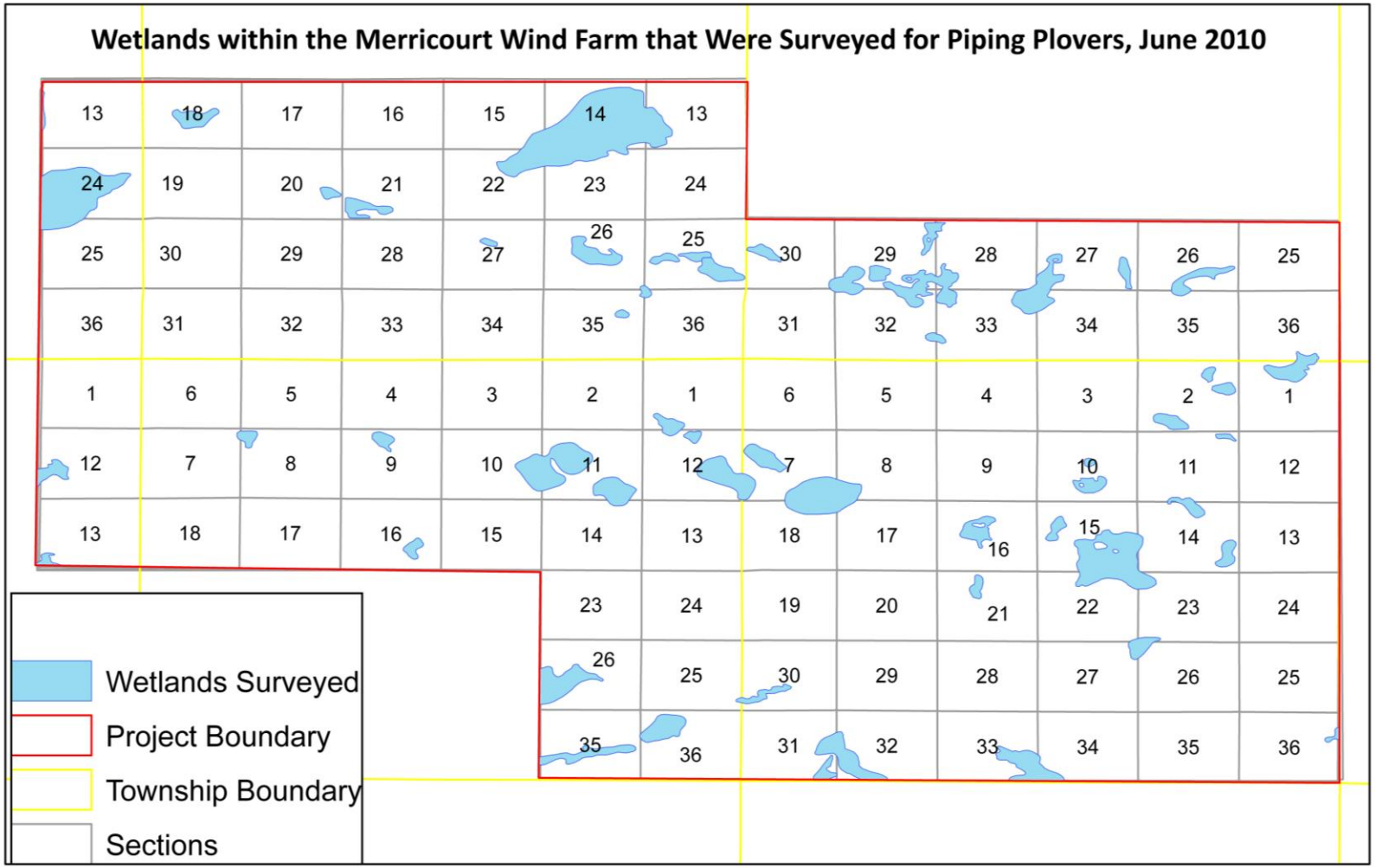


Figure 3. Wetlands within the Merricourt WRA that were surveyed for piping plovers in Dickey and McIntosh Counties during June 2010.

This is an addendum to Appendix A (page 28) in the report entitled, "Avian assessment and surveys for the proposed Merricourt Wind Power Project, Dickey and McIntosh Counties, North Dakota" (Anderson 2009).

North Dakota Birding located one additional raptor nest within the WRA while conducting sharp-tailed grouse lek surveys during spring 2010. The details of this raptor nest are located in the table below.

Appendix A: Details of the additional raptor nest that was located during spring 2010 on the Merricourt WRA.

County	Township	Section	Species	Nest Substrate	Height (m)	Latitude	Longitude
Dickey	Spring Valley	36	Red-tailed Hawk	Green Ash	5	46.03741	-98.90858

APPENDIX M:
SCOPING PACKAGE AND RESPONSES

June 17, 2009

«CTitle» «First» «Last»
«Title»
«Department»
«Agency»
«Address»
«City», «State» «Zip»

Re: Merricourt Wind Power Project
enXco Development Corporation
Dickey and McIntosh Counties, North Dakota

Dear «CTitle» «Last»:

On behalf of enXco Development Corporation (eDC), Kadrmas, Lee & Jackson is preparing an application for requirements of the North Dakota Energy Conversion and Transmission Facility Siting Act for the North Dakota Public Service Commission. The application will include the development of a 150 megawatt wind farm in Dickey and McIntosh Counties. ***Please refer to the enclosed project location map.***

The proposed wind farm would consist of 100 General Electric 1.5 sle wind turbines on 80 meter towers (262 feet) to convert wind energy into approximately 150 megawatts of electric power. The electric power will be interconnected to an existing 230kV MDU Transmission line at a yet to be determined location. eDC is currently studying various points of interconnect along the MDU Transmission line and does not anticipate the need to install additional overhead transmission line(s) for the proposed project at this time.

Construction is anticipated to begin in 2011 with a commercial operation date of December 31, 2011 (subject to change). No federal funding is anticipated.

To ensure that social, economic, and environmental effects are considered in the development of this project, we are soliciting your views and comments on the proposed development of this project. We are particularly interested in any property within the project area that your department may own, or have an interest in. We would also appreciate being made aware of any proposed development(s)your department may be contemplating in the area of the proposed project. Any information that might help us in our study would be appreciated.

If you have any questions or need further information, please call me at (701) 355-8468. Thank you for your time and cooperation.

Sincerely,
Kadrmas, Lee & Jackson, Inc.



Jennifer Turnbow
Project Manager

Enclosure (Map)

February 12, 2010

Tribe

Address

City, State Zip

Re: Merricourt Wind Power Project

Dickey & McIntosh Counties, North Dakota

Dear

On behalf of the enXco Development Corporation (eDC), Kadrmas, Lee & Jackson is completing the environmental permitting and field studies for the Merricourt Wind Power project. eDC is developing a 150 Megawatt wind farm in Dickey and McIntosh Counties that will consist of 100 General Electric 1.5sle wind turbines on 80 meter towers (262 feet) to convert wind energy into approximately 150 megawatts of electric power (Project). The electric power will be interconnected to an existing 230kV MDU Transmission line at a yet to be determined location. eDC is currently studying various points of interconnect along the MDU Transmission line and does not anticipate the need to install additional overhead transmission line(s) to interconnect the Project at this time. Construction is anticipated to begin in 2011 with a commercial operation date of December 31, 2011 (subject to change). The proposed project will not use any federal funding or include a federal action; therefore, this project is outside of the regulations set forth under Section 106 of the National Historic Preservation Act.

At the onset of the proposed project, scoping letters were sent out to seven Native American Tribes. The only response received was from the Sisseton-Wahpeton Oyate (SWO) Tribe. The SWO Tribe cited the proximity of the proposed project to the historic White Stone Site Battle Field. Additionally, the SWO were aware, through traditional teachings and knowledge, of the potential for a large number of cultural and spiritual locations within the proposed project area. Because of these issues, the SWO requested that a tribal monitor be present during the cultural resource inventory to assist in the identification of any Traditional Cultural Properties, spiritual locations, and sites of significance. eDC agreed to include tribal monitors in these efforts and to fund their participation. Additional field monitoring was provided during the initial cultural resource inventory by a monitor from the Standing Rock Sioux Tribe.

To date, a cultural resource inventory and traditional cultural property survey has been completed for the project. eDC has designed the project to avoid impacts to any of the known cultural resources, including those of a spiritual nature identified with the aid of the tribal monitors.

The SWO Tribe has recommended that eDC consult with other Tribal entities that have an interest in the area, discuss the findings of the surveys, and to discuss the future plans for the project. If you are interested in additional consultation, please contact us by **Friday, March 12, 2010**.

Our contact information is listed below; please feel free to respond via phone, email, or letter. If you have any additional questions, please feel free to contact us.

Thank you for your time and for your continued cooperation.

Sincerely,

Kadrmas, Lee & Jackson, Inc.

Jennifer Turnbow
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1	Mr.	Merl	Paaverud	State Historic Perservation Officer		State Historical Society of North Dakota	612 E. Boulevard Ave.	Bismarck	ND	58505-0830
2	Mr.	Francis	Ziegler	Director		North Dakota Department of Transportation	608 E. Boulevard Ave.	Bismarck	ND	58505-0700
3	*Sir or Madam*			Chief Missile Engineer	91st Missile Maintenance Squadron	Cable Affairs Office	417 Bomber Blvd.	Minot AFB	ND	58705
4	Ms.	Alice	Harwood	Acting Regional Director		Bureau of Indian Affairs	115 4th Ave. SE	Aberdeen	SD	57401
5	Mr.	Richard	Nelson	Chief, Resource Management	Dakotas Area Office	Bureau of Reclamation	PO Box 1017	Bismarck	ND	58502-1017
6	Mr.	Steve	Obenauer	Manager	Bismarck Airports District Office	Federal Aviation Administration	2301 University Drive, Bldg 23B	Bismarck	ND	58504
7	Ms.	Mary	Giltner	Deputy Base Civil Engineer	319 CES/CEVA	Grand Forks Air Force Base	525 Tuskagee Airmen Rd.	Grand Forks AFB	ND	58205-6434
8	Mr.	Dan	Cimarosti	Manager	ND Regulatory Office	US Army Corps of Engineers	1513 S. 12th St.	Bismarck	ND	58504
9	Ms.	Candace	Gorton	Chief, Env., Economics, & Cultural Resource Section	Omaha District	US Army Corps of Engineers	106 S. 15th St.	Omaha	NE	68102-1618
10	Mr.	J.R.	Flores	State Conservationist		US Department of Agriculture	PO Box 1458	Bismarck	ND	58502-1458
11	Mr.	Gerald	Paulson	Director, Transmission Linest Substations	Western Area Power Admin.	US Department of Energy	PO Box 1173	Bismarck	ND	58502-1173
12	Mr.	John	Hoeven	Governor		State of North Dakota	600 E. Boulevard Ave.	Bismarck	ND	58505-0001
13	Mr.	Wayne	Stenehjem	Attorney General		State of North Dakota	600 E. Boulevard Ave. Dept. 125	Bismarck	ND	58505
14	Senator	Kent	Conrad			US Federal Building, Room 228	220 E. Rosser Avenue	Bismarck	ND	58501
15	Senator	Byron L.	Dorgan			US Federal Building, Room 312	220 E. Rosser Avenue	Bismarck	ND	58501
16	Congressman	Earl	Pomeroy			US Federal Building, Room 312	220 E. Rosser Avenue	Bismarck	ND	58501
17	Mr.	Jeffrey	Towner	Field Supervisor	ND Field Office	US Fish & Wildlife Service	3425 Miriam Ave.	Bismarck	ND	58501
18	Mr.	Greg	Wiche	Director	Water Resources Division	US Geological Survey	821 E. Interstate Avenue	Bismarck	ND	58501
19	Ms.	Cheryl	Kulas	Executive Director		Indian Affairs Commission	600 E. Blvd. Ave. 1st Floor, Judicial Wing, Rm 117	Bismarck	ND	58505-0300
20	*Sir or Madam*			Director		Job Service North Dakota	PO Box 5507	Bismarck	ND	58506-5507
21	Mr.	Mike	Brand	Director	Surface Management	ND State Land Department	PO Box 5523	Bismarck	ND	58506-5523
22	Mr.	Mark	Holzer	Aviation Planner		ND Aeronautics Commission	PO Box 5020	Bismarck	ND	58502-5020
23	Mr.	Mark	Johnson	Executive Director		ND Association of Counties	1661 Capitol Way, PO Box 877	Bismarck	ND	58502-0877
24	*Sir or Madam*			Director		ND Department of Human Services	600 E. Boulevard Ave. Dept. 325	Bismarck	ND	58505-0250
25	Ms.	Lisa	Fair McEvers	Commissioner of Labor		ND Department of Labor	600 E. Boulevard Ave. Dept. 306	Bismarck	ND	58505-0340
26	Mr.	Wayne	Kutzer	Director		ND Department of Career and Technical Education	600 E. Boulevard Ave. Dept. 270	Bismarck	ND	58505-0610
27	Ms.	Pam	Sharp	Director		ND Office of Management and Budget	600 E. Boulevard Ave. Dept. 110	Bismarck	ND	58505-0400
28	Mr.	Shane	Goettle	Commissioner		Department of Commerce	600 E. Century Avenue, Suite 2	Bismarck	ND	58503
29		Lynn	Helms	Director		NDIC Oil & Gas Division	600 E. Boulevard Ave. Dept. 405	Bismarck	ND	58505-0840
30	Mr.	L. David	Glatt	Chief	Environmental Health Section Gold Seal Center	ND Department of Health	918 E. Divide Ave., 4th floor	Bismarck	ND	58501-1947
31	Mr.	Larry	Kotchmann			ND Forest Service	307 1st St. E.	Bottineau	ND	58318-1100
32	Mr.	Mike	McKenna	Chief	Conservation & Communication Division	ND Game & Fish Department	100 Bismarck Expressway	Bismarck	ND	58501-5095
33	Mr.	Ed	Murphy	State Geologist		ND Geological Survey	600 E. Blvd. Ave.	Bismarck	ND	58501-5095
34	Mr.	Doug	Prchal	Director		ND Parks & Recreation Dept.	1600 E. Century Ave., Suite 3	Bismarck	ND	58503-0649
35	Mr.	Dale	Frink	State Engineer		ND State Water Commission	900 E. Blvd. Ave.	Bismarck	ND	58505-0850
36	Mr.	Scott	Hochhalter	Soil Conservation Specialist	NDSU Extension Service	Soil Conservation Committee	2718 Gateway Ave., #104	Bismarck	ND	58503
37	*Sir or Madam*					Bek Communications	PO Box 230	Steele	ND	58482
38	*Sir or Madam*					Dickey Rural Network	103 6th St S	Oakes	ND	58474
39	Mr.	Barry	Gage	Operatons Manager	Dakota Heartland Region	Montana Dakota Utilities	PO Box 777	Devils Lake	ND	58301-0777
40	Mr.	Garry	Speidel	District Manager	Dakota Heartland Region	Montana Dakota Utilities	PO Box 2216	Jamestown	ND	58401-6054
41	Mr.	George	Berg	Manager		NoDak Electric Coop., Inc.	Box 13000	Grand Forks	ND	58208-3000
42	Mr.	Sandy	Roth		Right of Way Department	Northern Border Pipeline Company	PO Box 542500	Omaha	NE	68154-8500
43	Mr.	Bob	Krava	Right of Way Supervisor		Otter Tail Power Company	215 S. Cascade Street	Fergus Falls	MN	56537
44	*Sir or Madam*			Engineer	Engineering Department	Qwest Communications	220 N. 5th St.	Bismarck	ND	58506-5508
45	*Sir or Madam*			Engineer	Engineering Department	Qwest Communications	409 1st Avenue N	Fargo	ND	58102

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46	*Sir or Madam*			Engineer	Engineering Department	Qwest Communications	103 N. 5th Street	Grand Forks	ND	58203
47	Mr.	Dan	Hillaird			Sprint	849 Earl St.	St. Paul	MN	55106
48	Mr.	Dave	Pieper	Supervisor	Dakota Prairie Grasslands	US Forest Service	240 W. Century Ave.	Bismarck	ND	58503
49	Mr.	Bryan	Scotts	District Ranger	Sheyenne Ranger District	US Forest Service	PO Box 946	Lisbon	ND	58054
50	Mr.	John	Thompson	District Engineer	Valley City District	ND Department of Transportation	1524 8th Avenue SW	Valley City	ND	58072-4200
51	Mr.	Lonny	Bagley	Field Office Manager	North Dakota Field Office	Bureau of Land Management	29 23rd Ave W Suite A	Dickinson	ND	58601
52	Mr.	Michael	Seivage	Tribal Chairman		Sisseton-Wahpeton Sioux Tribe	PO Box 509	Sisseton	SD	57262-0267
53	Mr.	Myra	Pearson	Tribal Chairman	Ft. Totten Tribal Business Office	Spirit Lake Dacotah Nation	PO Box 359	Ft. Totten	ND	58335
54	Mr.	Ron	His Horse Is Thunder	Tribal Chairman		Standing Rock Sioux Tribe	PO Box D	Fort Yates	ND	58538
55	Mr.	Marcus	Wells	Tribal Chairman		Three Affiliated Tribes	HC3 Box 2	New Town	ND	58763
56	Mr.	David	Brien	Tribal Chairman		Turtle Mountain Chippewa	PO Box 900	Belcourt	ND	58316-0900
57	Ms.	Adrienne	Swallow	Environmental Protection Specialist		Standing Rock Sioux Tribe	PO Box D	Fort Yates	ND	58538
58	Mr.	Elton	Spotted Horse	Environmental Division Director	Natural Resources Department	Three Affiliated Tribes	404 Frontage Road	New Town	ND	58763
59	Mr.	Silas	Ironheart, Jr.	SLT-EPA Director		Spirit Lake Dacotah Nation	PO Box 99	Fort Totten	ND	58335
60	Ms.	Renee	Schlosser	District Manager	Soil Conservation District	Dickey County	PO Box 190	Ellendale	ND	58436
61	Mr.	Don	Zimbleman	Chairman	Water Resource Board	Dickey County	8538 97th Avenue SE	Fullerton	ND	58441
62	Ms.	Beverly	Kuska	Auditor		Dickey County	PO Box 215	Ellendale	ND	58436-0215
63	Mr.	Joel	Durheim	Commissioner	County Commission	Dickey County	508 N 3rd St	Ellendale	ND	58346-7239
64	Mr.	Jerome	Kelsh	Commissioner	County Commission	Dickey County	PO Box 27	Fullerton	ND	58441-0027
65	Mr.	Joel	Hamar	Commissioner	County Commission	Dickey County	9913 85th Ave SE	Ellendale	ND	58436-9636
66	Mr.	John	Hokana	Commissioner	County Commission	Dickey County	8813 111th Ave SE	Oakes	ND	58474-9102
67	Mr.	Gary	White	Commissioner	County Commission	Dickey County	PO Box 215	Ellendale	ND	58436-0215
68	Mr.	Charles	Russell	Emergency Manager		Dickey County	PO Box 215	Ellendale	ND	58436-0215
69	Mr.	Charles	Glynn	Highway Superintendent		Dickey County	213 15th St N	Ellendale	ND	58436-7600
70	Mr.	Jim	Bohannon	Sheriff		Dickey County	PO Box 297	Ellendale	ND	58436-0297

BYRON L. DORGAN
NORTH DAKOTA
322 HART SENATE OFFICE BUILDING
WASHINGTON, DC 20510-3405
202-224-2551

COMMITTEES:
APPROPRIATIONS
COMMERCE, SCIENCE & TRANSPORTATION
ENERGY & NATURAL RESOURCES
CHAIRMAN, INDIAN AFFAIRS

CHAIRMAN, DEMOCRATIC POLICY COMMITTEE

United States Senate

WASHINGTON, DC 20510-3405

STATE OFFICES:

312 FEDERAL BUILDING
THIRD AND ROSSER AVENUE
P.O. BOX 2579
BISMARCK, ND 58502
701-250-4618
1-800-666-4482 TOLL-FREE

1802 32ND AVENUE S., SUITE B
P.O. BOX 9060
FARGO, ND 58106
701-239-5389

102 NORTH 4TH STREET, ROOM 108
GRAND FORKS, ND 58201
701-746-8972

100 1ST STREET, S.W., ROOM 105
MINOT, ND 58701
701-852-0703

July 29, 2009

Jennifer Turnbow
128 Soo Line Drive
Bismarck, ND 58501

Dear Jennifer:

Thank you for updating me on your application for the development of a wind farm in Dickey and McIntosh Counties.

As you may know, experts have called North Dakota the "Saudi Arabia" of wind energy. Together North and South Dakota could supply two-thirds of the nation's current electricity supply with their capacity, according to the Department of Energy. In states like North Dakota, wind energy can create important economic opportunities and jobs, and I will continue to work to support keeping these jobs in our state.

That is why I have introduced the National Energy Security Act, to help transform our energy industry and promote energy independence. Among other things, this legislation would create a national superhighway of transmission. This will allow us to move renewable energy from areas with high renewable potential to regions where more energy is needed. By doing this, we will be able to maximize the potential of renewable energy sources such as wind and solar. The Senate energy bill also contains a transmission title, which I helped draft.

In addition, I believe that we need to use tax and other financial incentives to encourage the development and use of renewable energy sources. I am a strong supporter of extending and enhancing the production tax credit for facilities that generate electricity from wind and other renewable resources. I have previously authored legislation to extend the renewable energy production tax credit for ten years and worked to include a provision in the economic recovery package that the President recently signed into law to extend the production tax credit for another three years.

RECEIVED
AUG 04 2009

PRINTED ON RECYCLED PAPER

Thanks again for contacting me on this issue. Please continue to update me on the progress of this project.

Sincerely,



Byron L. Dorgan
U.S. Senator

BLD:jlt

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
3425 Miriam Avenue
Bismarck, North Dakota 58501

FEB 5 2010

RECEIVED
FEB 8 2010
By

Ms. Jennifer Turnbow
Kadrmas, Lee and Jackson, Inc.
P.O. Box 1157
128 Soo Line Drive
Bismarck, North Dakota 58502-1157

Dear Ms. Turnbow:

This is in response to your December 4, 2009, memo and attached November 20, 2009, letter regarding the proposed enXco Development Corporation (eDC), Merricourt Wind Power Project in Dickey and McIntosh Counties, North Dakota. We have reviewed the Project Siting Avoidance and Minimization Measures document, and we offer the following comments under the authority of and in accordance with the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 et seq.), the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d, 54 Stat. 250), the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). (In a June 17, 2009, letter, Kadrmas, Lee and Jackson, Inc. (KLJ) requested the U.S. Fish and Wildlife Service's (Service) views and comments on the proposed Merricourt Wind Power Project. The Service responded to KLJ's request with a letter dated July 8, 2009, that contained the Service's comments and recommendations on the subject project. Those previous comments are incorporated by reference.)

The November 20, 2009, letter states that the study area initially identified for the Merricourt Project was chosen based on its wind regime, the community interest in the area, and proximity to existing electrical transmission. The Service, in our July 8, 2009, letter, encouraged the project proponents to conduct a Potential Impact Index (PII) analysis on several possible development sites to assist in the selection of a wind power site that minimizes the potential impacts to wildlife resources. From the information provided, it appears that no alternative sites were considered for development, nor were potential impacts to wildlife and their habitats taken into account in the selection of the proposed wind power development site.

The November 20, 2009, letter states that eDC identified numerous Service easements administered by the Kulm Wetland Management District (WMD), and initiated discussions on those findings and potential conflicts of interest between eDC and the WMD. The Kulm WMD is part of the Service's Refuge Division and has responsibilities for the protection of Service fee title and easement property interests in their district. In this capacity, they provide information to project developers to avoid and minimize impacts to Service property interests. The Bismarck Ecological Services Office has the responsibility to ensure projects are developed in compliance with all of the environmental laws outlined above, and we serve as the coordinating body and

principal point of contact for proposals that may impact fish and wildlife trust resources, regardless of the project proponent.

Your letter states that the exclusion and avoidance criteria outlined in the North Dakota Conversion Facility Siting Act were used as a basis for the Critical Issues Analysis study. Our office was not part of the initial discussions that were held prior to initiating the Critical Issues Analysis. According to Section 69-06-08-01 Energy Conversion Facility Siting Criteria, exclusion areas include, among other things, "areas critical to the life stages of threatened or endangered animal or plant species". The identification of these critical areas is a function of this office and, therefore, we should have been contacted prior to initiating the analysis. In fact, we consider the wetland stopover habitat in the project area as critical to the survival and recovery of the endangered whooping crane.

At the Interagency Coordination Meeting (ICM) held in Bismarck on June 11, 2009, the Service informed eDC of the potential for use of habitats found on the proposed project site by federally listed threatened and endangered species, and encouraged eDC to participate in the ongoing development of a wind energy industry Habitat Conservation Plan (HCP) for the whooping crane throughout its U.S. migration corridor. The risk of lethal take to whooping cranes from wind turbines is not known at this time, but the highest source of known mortality to fledged cranes is from striking power lines. If power lines will be constructed in association with this project, the Service recommends they be placed underground to avoid collision mortality. If underground construction is not feasible, install and maintain visual marking devices on all new power lines within one mile of potentially suitable whooping crane stopover habitat and an equal length of existing power line in the migration corridor within one mile of potentially suitable whooping crane habitat.

The best available information also indicates that whooping cranes avoid stopover habitat that is developed with wind energy appurtenances, particularly wind turbines. This avoidance may deny them the use of important habitat, and thus may result in an adverse effect in the form of harm by significant habitat modification. Your November 20, 2009, letter states that the studies conducted to date have not recorded the presence of any actual threatened or endangered species. The fact that a threatened or endangered species was not seen on the site during the survey period, particularly for a rare and migratory species, is not sufficient evidence to suggest that the species will not utilize the available habitat. Whooping cranes use migration stopover habitat opportunistically and may not use the same stopovers annually. Whooping cranes often stop wherever they happen to be late in the day when they find conditions no longer suitable for migration. This tendency can make for a very unpredictable pattern of stopover use, depending on daily weather conditions. The Service recommends that eDC identify and map all wetlands at the project site within ½ mile of all turbines for potentially suitable whooping crane stopover habitat, and analyze the potential effects to migrating whooping cranes from loss of use of this habitat for migration stopovers. With the available information, the Service believes that an adverse effect to whooping cranes is likely. Therefore, the Service recommends that eDC not commence project construction until they have applied for and receive an Incidental Take Permit (ITP), if needed, from the Service in accordance with Section 10(a)(1)(B) of the ESA, pursuant to a regional or project-specific HCP. Take of federally listed species without an ITP is a violation

of Section 9 of the ESA. Violations of the ESA can result in criminal penalties of up to one year in prison and fines of up to $100,000 for individuals and $200,000 for corporations. Your letter states that eDC has joined the AWEA Programmatic Habitat Conservation Plan as suggested by the Service; however, you also indicate that construction for this project is anticipated to begin in 2011 with a commercial operation date of December 31, 2011. With a projected 2013 completion date for the AWEA HCP, compliance with the ESA in the interim appears problematic. We recommend further discussions on this issue before proceeding with project plans.

In our July 8, 2009, letter, we recommended that eDC, in concert with the Service, help to ensure that the proposed project proceed with as little impact to migratory birds as possible by, among other steps, developing an Avian and Bat Protection Plan (ABPP). That letter also outlined the Service policy related to compliance with the MBTA. According to the MBTA, a person, association, partnership, or corporation which violates the Act or its regulations is guilty of a misdemeanor and subject to a fine of up to $15,000 and/or six months in prison

Your November 20, 2009, letter states that eDC is committed to coordinating efforts to minimize impacts to wildlife and sensitive habitat(s) with the Service, but your letter does not indicate which, if any, of the recommendations provided by the Service will be implemented prior to the commercial operation date of the project. Our recommendations, if followed, provide to the extent possible, assurances that the company is in compliance with the relevant federal wildlife laws during project construction and operation. We suggest eDC inform the intended owner/operator (Northern States Power) of their potential liability should the facility be built and operated without acknowledgement from the Service that the project is in compliance with the wildlife laws cited above.

The November 20, 2009, letter states that eDC commissioned several environmental studies including a bat and avian assessment, threatened and endangered species assessment, sensitive habitat assessment, and wetland delineations. The Service has not seen the results of these studies and, therefore, we can make no judgments as to their validity or offer any further recommendations based on the studies' conclusions.

Thank you for the opportunity to comment. If you require further information as project planning proceeds, please contact Terry Ellsworth of my staff, or contact me directly, at (701) 250-4481, or at the letterhead address.

Sincerely,

Jeffrey K. Towner

Jeffrey K. Towner
Field Supervisor
North Dakota Field Office

cc: Special Agent, LE, Bismarck
Project Leader, Kulm WMD
ND Public Service Commission, Bismarck
Director, ND Game & Fish Department, Bismarck
(Attn: M. McKenna)
Minnesota Public Utilities Commission, St. Paul
Xcel Energy (Northern States Power), Minneapolis

North Dakota Geological Survey

Edward C. Murphy - State Geologist

Department of Mineral Resources

Lynn D. Helms - Director

North Dakota Industrial Commission

https://www.dmr.nd.gov/ndgs/

Jennifer Turnbow
Kadrmas Lee & Jackson, Inc.
P.O. Box 1157
Bismarck, ND 58502-1157

August 4, 2009

Dear Ms. Turnbow,

Re: Merricourt Wind Farm Project, Dickey and McIntosh Counties

I have reviewed the information in your letter of June 17, 2009 concerning the proposed location of the Merricourt Wind Farm in Dickey and McIntosh Counties, North Dakota and would like to draw your attention to a particular aspect of the local geology that you may not be aware of.

Within the till and other glaciogenic sediments that cover the project area are numerous large masses of shale that were displaced by glaciers from the underlying Pierre Formation. These ice-thrust blocks may extend across several sections and are recognizable on aerial photographs as areas of rugged topography that display an intense internal linearity. Although essentially intact, the blocks are usually tilted (up to 60°) and sheared up into thrusts or folds that are commonly overturned.

The geologic maps for Dickey (Bluemle, 1979) and McIntosh (Clayton, 1962) Counties show an area of thrusting at the junction of State Highways 11 and 56 and another that straddles the border between Townships 130 and 131, Range 67. A third, much smaller ice-thrust occurs in the east-central part of Township 130, Range 67.

I cannot comment on the integrity of these ice-thrusts from an engineering standpoint or be sure that they are even a cause for concern. However if you would like more information, I will be happy to assist you.

Sincerely,

Lorraine A. Manz, Ph.D.
Geologist

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AUG 05 2009

STATE HISTORICAL SOCIETY OF NORTH DAKOTA

John Hoeven
Governor of North Dakota

North Dakota State Historical Board

Albert I. Berger
Grand Forks - President

Chester E. Nelson, Jr.
Bismarck - Vice President

Gereld Gerntholz
Valley City - Secretary

A. Ruric Todd III
Jamestown

Diane K. Larson
Bismarck

Marvin L. Kaiser
Williston

Richard Kloubec
Fargo

Sara Otte Coleman
Director
Tourism Division

Kelly Schmidt
State Treasurer

Alvin A. Jaeger
Secretary of State

Douglass Prchal
Director
Parks and Recreation Department

Francis Ziegler
Director
Department of Transportation

Merlan E. Paaverud, Jr.
Director

Accredited by the American Association of Museums

June 23, 2009

Ms Jennifer Turnbow
Project Manager
KLJ
128 Soo Line Drive
PO Box 1157
Bismarck ND 58502-1157

ND SHPO REF: 09-1186 PSC Merricourt Wind Power Project enXco Development Corporation, Dickey and McIntosh Counties, North Dakota

Dear Ms. Turnbow,

We received ND SHPO REF: 09-1186 PSC Merricourt Wind Power Project enXco Development Corporation, Dickey and McIntosh Counties, North Dakota.
There is potential for recorded and unrecorded properties in a variety of physiographic settings in this Oliver County study area. We recommend that a Class I CRI (file and records search) be prepared covering the project area and that it be submitted for review.
Further, we encourage and recommend a Class III CRI (pedestrian survey of the Area of Potential Effect (APE), including proposed turbine locations, transmission line corridor(s), access roads, and other ancillary facilities, as part of the Environmental Assessment. Further, if the projects requires permits issued by a federal and/or state agency (e.g. PSC), then the respective agency(ies) are to be consulted regarding their recommendations on the project.
Thank you for the opportunity to review the preliminary data provided on this project, and we look forward to reviewing documents prepared for the project and to further consultation on it.

If you have any questions please contact Susan Quinnell, Review and Compliance Coordinator at (701)328-3576, squinnell@nd.gov or Paul Picha at (701) 328-3574.

Sincerely,

Merlan E. Paaverud, Jr.
State Historic Preservation Officer (North Dakota)
and
Director
State Historical Society of North Dakota

C: Patrick Fahn, PSC

RECEIVED
JUN 25 2009

NORTH DAKOTA
DEPARTMENT *of* HEALTH

ENVIRONMENTAL HEALTH SECTION
Gold Seal Center, 918 E. Divide Ave.
Bismarck, ND 58501-1947
701.328.5200 (fax)
www.ndhealth.gov

June 24, 2009

Ms. Jennifer Turnbow
Project Manager
Kadrmas, Lee & Jackson, Inc.
P.O. Box 1157
Bismarck, ND 58502-1157

Re: Merricourt Wind Power Project
enXco Development Corporation
Dickey and McIntosh Counties

Dear Ms. Turnbow:

This department has reviewed the information concerning the above-referenced project submitted under date of June 17, 2009, with respect to possible environmental impacts.

This department believes that environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. With respect to construction, we have the following comments:

1. All necessary measures must be taken to minimize fugitive dust emissions created during construction activities. Any complaints that may arise are to be dealt with in an efficient and effective manner.

2. Care is to be taken during construction activity near any water of the state to minimize adverse effects on a water body. This includes minimal disturbance of stream beds and banks to prevent excess siltation, and the replacement and revegetation of any disturbed area as soon as possible after work has been completed. Caution must also be taken to prevent spills of oil and grease that may reach the receiving water from equipment maintenance, and/or the handling of fuels on the site. Guidelines for minimizing degradation to waterways during construction are attached.

3. Projects disturbing one or more acres are required to have a permit to discharge storm water runoff until the site is stabilized by the reestablishment of vegetation or other permanent cover. Further information on the storm water permit may be obtained from the Department's website or by calling the Division of Water Quality (701-328-5210). Also, cities may impose additional requirements and/or specific best management practices for construction affecting their storm drainage system. Check with the local officials to be sure any local storm water management considerations are addressed.

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JUN 25 2009

4. Noise from construction activities may have adverse effects on persons who live near the construction area. Noise levels can be minimized by ensuring that construction equipment is equipped with a recommended muffler in good working order. Noise effects can also be minimized by ensuring that construction activities are not conducted during early morning or late evening hours.

The department owns no land in or adjacent to the proposed improvements, nor does it have any projects scheduled in the area. In addition, we believe the proposed activities are consistent with the State Implementation Plan for the Control of Air Pollution for the State of North Dakota.

These comments are based on the information provided about the project in the above-referenced submittal. The U.S. Army Corps of Engineers may require a water quality certification from this department for the project if the project is subject to their Section 404 permitting process. Any additional information which may be required by the U.S. Army Corps of Engineers under the process will be considered by this department in our determination regarding the issuance of such a certification.

If you have any questions regarding our comments, please feel free to contact this office.

Sincerely,

L. David Glatt, P.E., Chief
Environmental Health Section

LDG:cc
Attach.

NORTH DAKOTA
DEPARTMENT *of* HEALTH

ENVIRONMENTAL HEALTH SECTION
Gold Seal Center, 918 E. Divide Ave.
Bismarck, ND 58501-1947
701.328.5200 (fax)
www.ndhealth.gov

Construction and Environmental Disturbance Requirements

These represent the minimum requirements of the North Dakota Department of Health. They ensure that minimal environmental degradation occurs as a result of construction or related work which has the potential to affect the waters of the State of North Dakota. All projects will be designed and implemented to restrict the losses or disturbances of soil, vegetative cover, and pollutants (chemical or biological) from a site.

Soils

Prevent the erosion of exposed soil surfaces and trapping sediments being transported. Examples include, but are not restricted to, sediment dams or berms, diversion dikes, hay bales as erosion checks, riprap, mesh or burlap blankets to hold soil during construction, and immediately establishing vegetative cover on disturbed areas after construction is completed. Fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land resources will be protected against compaction, vegetation loss, and unnecessary damage.

Surface Waters

All construction which directly or indirectly impacts aquatic systems will be managed to minimize impacts. All attempts will be made to prevent the contamination of water at construction sites from fuel spillage, lubricants, and chemicals, by following safe storage and handling procedures. Stream bank and stream bed disturbances will be controlled to minimize and/or prevent silt movement, nutrient upsurges, plant dislocation, and any physical, chemical, or biological disruption. The use of pesticides or herbicides in or near these systems is forbidden without approval from this Department.

Fill Material

Any fill material placed below the high water mark must be free of top soils, decomposable materials, and persistent synthetic organic compounds (in toxic concentrations). This includes, but is not limited to, asphalt, tires, treated lumber, and construction debris. The Department may require testing of fill materials. All temporary fills must be removed. Debris and solid wastes will be removed from the site and the impacted areas restored as nearly as possible to the original condition.

2

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NORTH DAKOTA REGULATORY OFFICE
1513 SOUTH 12TH STREET
BISMARCK ND 58504-6640

June 19, 2009

North Dakota Regulatory Office NWO-2009-1514-BIS

Ms. Jennifer Turnbow
Kadrmas Lee & Jackson, Inc.
128 Soo Line Drive
PO Box 1157
Bismarck, North Dakota 58502-1157

Dear Ms. Turnbow:

This is in response to your June 17, 2009 request for comments concerning the proposed wind power project by the enXco Development Corporation. The proposed project involves the development of a 150 megawatt wind farm in Dickey and McIntosh Counties, North Dakota. We have assigned Project Number (NWO-2009-1514-BIS) to your request. Please reference this number when you write or call us regarding your proposal. Please be aware that Section 10 of the Rivers and Harbors Act (33 USC 403) regulates all work or structures in or affecting navigable waterways. In addition, Section 404 of the Clean Water Act (33 USC §1344) prohibits the discharge of fill material into waters of the United States without a Department of the Army permit. Fill material includes, but is not limited to, earth, clay, rock, etc. Waters of the United States could include, but are not limited to, streams, ditches, coulees, ponds, lakes, and their adjacent wetlands. The Corps of Engineers is responsible for administering both Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

If this project would result in the discharge of fill into waters of the United States, you should complete the enclosed application and submit it to the letterhead address. If you have CWA questions, permitting questions, are unsure as to what constitutes a discharge of fill, and/or are unsure of what constitutes waters of the United States, do not hesitate contact any of the staff at the NDRO at the letterhead address or by telephone (701-255-0015).

Sincerely,

Patsy Crooke

Patsy Crooke
Project Manager
North Dakota

Enclosure

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JUN 22 2009

Instructions for Preparing a
Department of the Army Permit Application

Blocks 1 through 4. To be completed by Corps of Engineers.

Block 5. Applicant's Name. Enter the name of the responsible party or parties. If the responsible party is an agency, company, corporation or other organization, indicate the responsible officer and title. If more than one party is associated with the application, please attach a sheet with the necessary information marked **Block 5.**

Block 6. Address of Applicant. Please provide the full address of the party or parties responsible for the application. If more space is needed, attach an extra sheet of paper marked Block 6.

Block 7. Applicant Telephone Number(s). Please provide the number where you can usually be reached during normal business hours.

Blocks 8 through 11. To be completed if you choose to have an agent.

Block 8. Authorized Agent's Name and Title. Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer or any other person or organization. Note: An agent is not required.

Blocks 9 and 10. Agent's Address and Telephone Number. Please provide the complete mailing address of the agent, along with the telephone number where he/she can be reached during normal business hours.

Block 11. Statement of Authorization. To be completed by applicant if an agent is to be employed.

Block 12. Proposed Project Name or Title. Please provide name identifying the proposed project (i.e., Landmark Plaza, Burned Hills Subdivision or Edsall Commercial Center).

Block 13. Name of Waterbody. Please provide the name of any stream, lake, marsh or other waterway to be directly impacted by the activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

Block 14. Proposed Project Street Address. If the proposed project is located at a site having a street address (not a box number), please enter here.

Block 15. Location of Proposed Project. Enter the county and state where the proposed project is located. If more space is required, please attach a sheet with the necessary information marked Block 15.

Block 16. Other Location Descriptions. If available, provide the Section, Township and Range of the site and/or the latitude and longitude. You may also provide description of the proposed project location, such as lot numbers, tract numbers or you may choose to locate the proposed project site from a known point (such as the right descending bank of Smith Creek, one mile down from the Highway 14 bridge). If a large river or stream, include the river mile of the proposed project site if known.

Block 17. Directions to the Site. Provide directions to the site from a known location or landmark. Include highway and street numbers as well as names. Also provide distances from known locations and any other information that would assist in locating the site.

Block 18. Nature of Activity. Describe the overall activity or project. Give appropriate dimensions of structures such as wingwalls, dikes (identify the materials to be used in construction, as well as the methods by which the work is to be done), or excavations (length, width, and height). Indicate whether discharge of dredged or fill material is involved. Also, identify any structure to be constructed on a fill, piles or float supported platforms.

The written descriptions and illustrations are an important part of the application. Please describe, in detail, what you wish to do. If more space is needed, attach an extra sheet of paper marked Block 18.

Block 19. Proposed Project Purpose. Describe the purpose and need for the proposed project. What will it be used for and why? Also include a brief description of any related activities to be developed as the result of the proposed project. Give the approximate dates you plan to both begin and complete all work.

Block 20. Reason(s) for Discharge. If the activity involves the discharge of dredged and/or fill material into a wetland or other waterbody, including the temporary placement of material, explain the specific purpose of the placement of the material (such as erosion control).

Block 21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards. Describe the material to be discharged and amount of each material to be discharged within Corps jurisdiction. Please be sure this description will agree with your illustrations. Discharge material includes: rock, sand, clay, concrete, etc.

Block 22. Surface Areas of Wetlands or Other Waters Filled. Describe the area to be filled at each location. Specifically identify the surface areas, or part thereof, to be filled. Also include the means by which the discharge is to be done (backhoe, dragline, etc.). If dredged material is to be discharged on an upland site, identify the site and the steps to be taken (if necessary) to prevent runoff from the dredged material back into a waterbody. If more space is needed, attach an extra sheet of paper marked **Block 22.**

Block 23. Is Any Portion of the Work Already Complete? Provide any background on any part of the proposed project already completed. Describe the area already developed, structures completed, any dredged or fill material already discharged, the type of material, volume in cubic yards, acres filled, if a wetland or other waterbody (in acres or square wet). if tile work was done under an existing Corps permit, identify the authorization if possible.

Block 24. Names and Addresses of Adjoining Property Owners, Lessees, etc., Whose Property Adjoins the Project Site. List complete names and full mailing addresses of the adjacent property owners (public and private) lessees, etc., whose property adjoins the waterbody or aquatic site where the work is being proposed so that they may be notified of the proposed activity (usually by public notice). If more space is needed, attach an extra sheet of paper marked Block 24.

Information regarding adjacent landowners is usually available through the office of the tax assessor in the county of counties where the project is to be developed.

Block 25. Information about Approvals or Denials by Other Agencies. You may need the approval of other Federal, state or local agencies for your project. identify any applications you have submitted and the status, if any (approved or denied) of each application. You need not have obtained all other permits before applying for a Corps permit.

Block 26. Signature of Applicant or Agent. The application must be signed by the owner or other authorized party (agent) . This signature shall be an affirmation that the party applying for the permit possesses the requisite property rights to undertake the activity applied for (including compliance with special conditions, mitigation, etc.).

DRAWINGS AND ILLUSTRATIONS

General Information.

Three types of illustrations are needed to properly depict the work to be undertaken. These illustrations or drawings are identified as a **Vicinity Map, a Plan View or a Typical Cross-Section Map.** Identify each illustration with a figure or attachment number.

Please submit one original, or good quality copy, of all drawings on 8 I/2x1 1 inch plain white paper (tracing paper or film may be substituted). Use the fewest number of sheets necessary for your drawings or illustrations.

Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view or cross-section). **While illustrations need not be professional (many small, private project illustrations are prepared by hand), they should be clear, accurate and contain all necessary information.**

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)	OMB APPROVAL NO. 0710-0003 Expires December 31, 2004

The Public burden for this collection of information is estimated to average 10 hours per response, although the majority of applications should require 5 hours or less. This includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research and Sanctuaries Act, 33 USC 1413, Section 103. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE *(an agent is not required)*
6. APPLICANT'S ADDRESS	7. AGENT'S ADDRESS
7. APPLICANT'S PHONE NOS. W/AREA CODE	10. AGENT'S PHONE NOS. W/AREA CODE
a. Residence b. Business	a. Residence b. Business

11. STATEMENT OF AUTHORIZATION

I hereby authorize _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

_____

APPLICANT'S SIGNATURE DATE

NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE *(see instructions)*

13. NAME OF WATERBODY, IF KNOWN *(if applicable)*	14. PROJECT STREET ADDRESS *(if applicable)*
15. LOCATION OF PROJECT _____ _____ COUNTY STATE	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

17. DIRECTIONS TO THE SITE

18. Nature of Activity *(Description of project, include all features)*

19. Project Purpose *(Describe the reason or purpose of the project, see instructions)*

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards

22. Surface Area in Acres of Wetlands or Other Waters Filled *(see instructions)*

23. Is Any Portion of the Work Already Complete? Yes _____ No _____ IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

25. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

*Would include but is not restricted to zoning, building and flood plain permits

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

RECEIVED
JUL 2 2009
BY:

3

June 30, 2009

Jennifer Turnbow
Kadrmas Lee & Jackson
PO Box 1157
Bismarck, ND 585021157

Dear Ms. Turnbow:

The following comments concern our review of the draft environmental assessment for the Merricourt Wind Power Project, enXco Development Corporation:

The North Dakota Department of Commerce does not own or have any interest in any property in the project area.

While wind energy projects result in gradual long term economic benefits to the local area such as wind lease income, employment of maintenance personnel, and other maintenance expenditures, they accrue gradually and do not result in major disruptions to the local economy. The socioeconomic consequences of construction, both direct and indirect, are short term in nature and should not result in significant disruptions to the area's economy and infrastructure.

Given the proximity of the project to the cities of Ashley, Edgeley, Ellendale, and Wishek, it can be expected that much of the temporary work force will look to these communities for their accommodations and living arrangements. These communities should benefit greatly from the additional work force on this project and the subsequent demand for goods and services.

In general the addition business resulting from this project should be viewed as having a positive impact to the economy as a whole.

Sincerely,

Paul T. Govig, Deputy Commissioner
ND Department of Commerce

sk

United States Department of Agriculture



NRCS

Natural Resources Conservation Service
P.O. Box 1458
Bismarck, ND 58502-1458

June 25, 2009

Jennifer Turnbow
Kadrmas, Lee & Jackson, Inc.
128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502-1157

RE: Merricourt Wind Power Project – enXco Development Corporation – Dickey and McIntosh Counties, ND

Dear Ms. Turnbow:

The Natural Resources Conservation Service (NRCS) has reviewed your letter regarding the referenced activity and acknowledges your request to determine whether your project affects farmland as defined in Sec. 658.2(a) of the Code of Federal Regulations (CFR) dealing with the Farmland Protection Policy Act (FPPA).

Important Farmlands - NRCS has a major responsibility with FPPA in documenting conversion of farmland (i.e., prime, statewide, and local importance) to non-agricultural use. It is not clear from your letter whether Federal funding will be used for this project. If the project is supported by Federal funding or actions, FPPA will apply to each wind turbine site and the Farmland Conversion Impact Rating Form AD-1006 must be completed. A negative response is not required.

Wetlands – The Wetland Conservation Provisions of the 1985 Food Security Act, as amended, provide that if a USDA participant converts a wetland for the purpose of, or to have the effect of, making agricultural production possible, loss of USDA benefits could occur. NRCS has developed the following guidelines for the installation of buried utilities. If these guidelines are followed, the impacts to the wetland(s) will be considered minimal allowing USDA participants to continue to receive USDA benefits. Following are the requirements: 1) Disturbance to the wetland(s) must be temporary, 2) no drainage of the wetland(s) is allowed (temporary or permanent), 3) mechanized landscaping necessary for installation is kept to a minimum and preconstruction contours are maintained, 4) temporary side cast material must be placed in such a manner not to be dispersed in the wetland, and 5) all trenches must be backfilled to the original wetland bottom elevation.

NRCS would recommend that impacts to wetlands be avoided. If the project requires passage through or disturbance of a wetland, NRCS can complete a certified wetland determination, if requested by the landowner/operator.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
1616 CAPITOL AVENUE
OMAHA NE 68102-4901

JULY 1, 2009

Planning, Programs, and Project Management Branch

Ms. Jennifer Turnbow
Kadrmas, Lee & Jackson
128 Soo Line Drive
P.O. Box 1157
Bismarck, North Dakota
58502-1157

Dear Ms. Turnbow:

The U.S. Army Corps of Engineers, Omaha District (Corps) has reviewed your letter dated June 17, 2009 regarding the proposed Merrick Wind Power Project, enXco Development Corporation, in Dickey and McIntosh Counties, North Dakota. The Corps offers the following comments:

If the proposed power line construction crosses the flood plains of small drainage ways and streams, flood-related problems should not occur if the supporting structures for overhead power lines are located as far from the banks of the drainage ways and streams as possible. This will minimize the potential for erosion hazards and flood flow obstruction. Similarly, flood-related problems should not occur with underground power lines, if the lines are buried far enough below the beds of drainage ways and streams to prevent exposure due to streambed erosion during periods of high floodflows. If any aboveground construction is subject to flood damage, such as electrical boxes, they should either be placed above, or flood proofed to, a level above the 100-year flood elevation.

Your plans should be coordinated with the U.S. Environmental Protection Agency, which is currently involved in a program to protect groundwater resources. If you have not already done so, it is recommended you consult with the U.S. Fish and Wildlife Service concerning wind turbine impacts on the migratory flying routes of listed species, especially whooping cranes. It is also recommended that you contact the North Dakota Department of Game and Parks, regarding other fish and wildlife resources. In addition, the North Dakota State Historic Preservation Office should be contacted for information and recommendations on potential cultural resources in the project area.

If construction activities involve any work in waters of the United States, a Section 404 permit may be required. For a detailed review of permit requirements, preliminary and final project plans should be sent to:

U.S. Army Corps of Engineers
Bismarck Regulatory Office
Attention: CENWO-OD-R-ND/Cimarosti
1513 South 12th Street
Bismarck, North Dakota 58504

In addition, please update your records with our current mailing address:

U.S. Army Corps of Engineers, Omaha District
Planning Branch
Attention: CENWO-PM-AE
1616 Capitol Ave.
Omaha, Nebraska 68102-4901

If you have any questions, please contact Ms. Theresa Martin of my staff at (402) 995-2704.

Sincerely,

Brad Thompson, Chief
Environmental, Economics, and
Cultural Resources Section
Planning Branch

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JUL 06 2009

JOB SERVICE North Dakota
www.jobsnd.com

John Hoeven, Governor • Maren L. Daley, Executive Director

PO Box 5507 • Bismarck, ND 58506-5507

June 18, 2009

Ms. Jennifer Turnbow
Project Manager
Kadrmas, Lee & Jackson, Inc.
128 Soo Line Drive
P.O. Box 1157
Bismarck, North Dakota 58502-1157

RE: Merricourt Wind Power Project
enXco Development Corporation
Dickey and McIntosh Counties, North Dakota

Dear Ms. Turnbow:

Job Service North Dakota administers the employment service and unemployment insurance programs.

We have no comments regarding the proposed project and have no applicable permits that are required from Job Service North Dakota.

Sincerely,

Maren Daley
Executive Director

Job Service North Dakota is an equal opportunity employer/program provider.
Auxiliary aids and services are available upon request to individuals with disabilities.

STATE HISTORICAL SOCIETY OF NORTH DAKOTA

John Hoeven
Governor of North Dakota

North Dakota State Historical Board

Albert I. Berger
Grand Forks - President

Chester E. Nelson, Jr.
Bismarck - Vice President

Gereld Gerntholz
Valley City - Secretary

A. Ruric Todd III
Jamestown

Diane K. Larson
Bismarck

Marvin L. Kaiser
Williston

Richard Kloubec
Fargo

Sara Otte Coleman
Director
Tourism Division

Kelly Schmidt
State Treasurer

Alvin A. Jaeger
Secretary of State

Douglass Prchal
Director
Parks and Recreation Department

Francis Ziegler
Director
Department of Transportation

Merlan E. Paaverud, Jr.
Director

July 14, 2009

Ms. Jennifer Turnbow
Project Manager
KLJ
128 Soo Line Drive
PO Box 1157
Bismarck ND 58502-1157

ND SHPO REF: 09-1186 PSC Merricourt Wind Power Project EnXco Development Corporation, Dickey and McIntosh Counties, North Dakota

Dear Ms. Turnbow,

We received your preliminary letter regarding ND SHPO REF: 09-1186 PSC Merricourt Wind Power Project EnXco Development Corporation, Dickey and McIntosh Counties, North Dakota.
There is potential for recorded and unrecorded properties in a variety of physiographic settings in this study area. We recommend that a Class I CRI (file and records search) be prepared covering the project area and that it be submitted for review.
Further, we encourage and recommend a Class III CRI (pedestrian survey_ of the Area of Potential Effect (APE), including proposed turbine locations, transmission line corridor(s), access roads, and other ancillary facilities, as part of the Environmental Assessment. Further, if the projects requires permits issued by a federal and/or state agency (e.g. PSC), then the respective agency(ies) are to be consulted regarding their recommendations on the project.
Thank you for the opportunity to review the preliminary data provided on this project, and we look forward to reviewing documents prepared for the project and to further consultation on it.

If you have any questions please contact Susan Quinnell, Review and Compliance Coordinator at (701)328-3576, squinnell@nd.gov or Paul Picha at (701) 328-3574.

Sincerely,

Merlan E. Paaverud, Jr.
State Historic Preservation Officer (North Dakota)
and
Director
State Historical Society of North Dakota

C: Patrick Fahn, PSC

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JUL 16 2009

Accredited by the American Association of Museums

John Hoeven, Governor
Douglass A. Prchal, Director

1600 East Century Avenue, Suite 3
Bismarck, ND 58503-0649
Phone 701-328-5357
Fax 701-328-5363
E-mail parkrec@nd.gov
www.parkrec.nd.gov

July 6, 2009

Jennifer Turnbow
Kadrmas, Lee & Jackson
PO Box 1157
Bismarck, ND 58502-1157

Re: Merricourt Wind Power Project

Dear Ms. Turnbow:

The North Dakota Parks and Recreation Department (the Department) has reviewed the above referenced project proposal to construct a wind farm located in Dickey and McIntosh Counties.

Our agency scope of authority and expertise covers recreation and biological resources (in particular rare plants and ecological communities). The project as defined does not affect state park lands that we manage or Land and Water Conservation Fund recreation projects that we coordinate.

The North Dakota Natural Heritage biological conservation database has been reviewed to determine if any plant or animal species of concern or other significant ecological communities are known to occur within an approximate one-mile radius of the project area. Based on this review, several occurrences have been identified within or adjacent to the project area including: *Melospiza georgiana* (swamp sparrow), *Charadrius melodus* (piping plover), and Permanent open water. Please see attached spreadsheet and map for more specific information on these species. We defer further comments regarding animal species to the North Dakota Game and Fish Department and the United States Fish and Wildlife Service.

Because this information is not based on a comprehensive inventory, there may be species of concern or otherwise significant ecological communities in the area that are not represented in the database. The lack of data for any project area cannot be construed to mean that no significant features are present. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

The Department recommends that the project be accomplished with minimal impacts and that all efforts be made to ensure that critical habitats not be disturbed in the project area to help secure rare species conservation in North Dakota. Regarding any reclamation efforts, we recommend that any impacted areas be revegetated with species native to the project area.

Given the potential for not only habitat disturbance and disruption but the threat to nesting, feeding and migratory bird and bats in the area we suggest that all efforts be made to avoid impacts to wildlife species and their habitats. In an effort to avoid or minimize impacts to wildlife and their habitats we encourage proper evaluation of all potential wind energy sites. To identify and assess adverse impacts to wildlife we suggest pre and post construction avian and bat monitoring studies be conducted.

Thank you for the opportunity to comment on this project. Please contact Kathy Duttenhefner (701-328-5370 or kgduttenhefner@nd.gov) of our staff if additional information is needed.

Sincerely,

Jesse Hanson

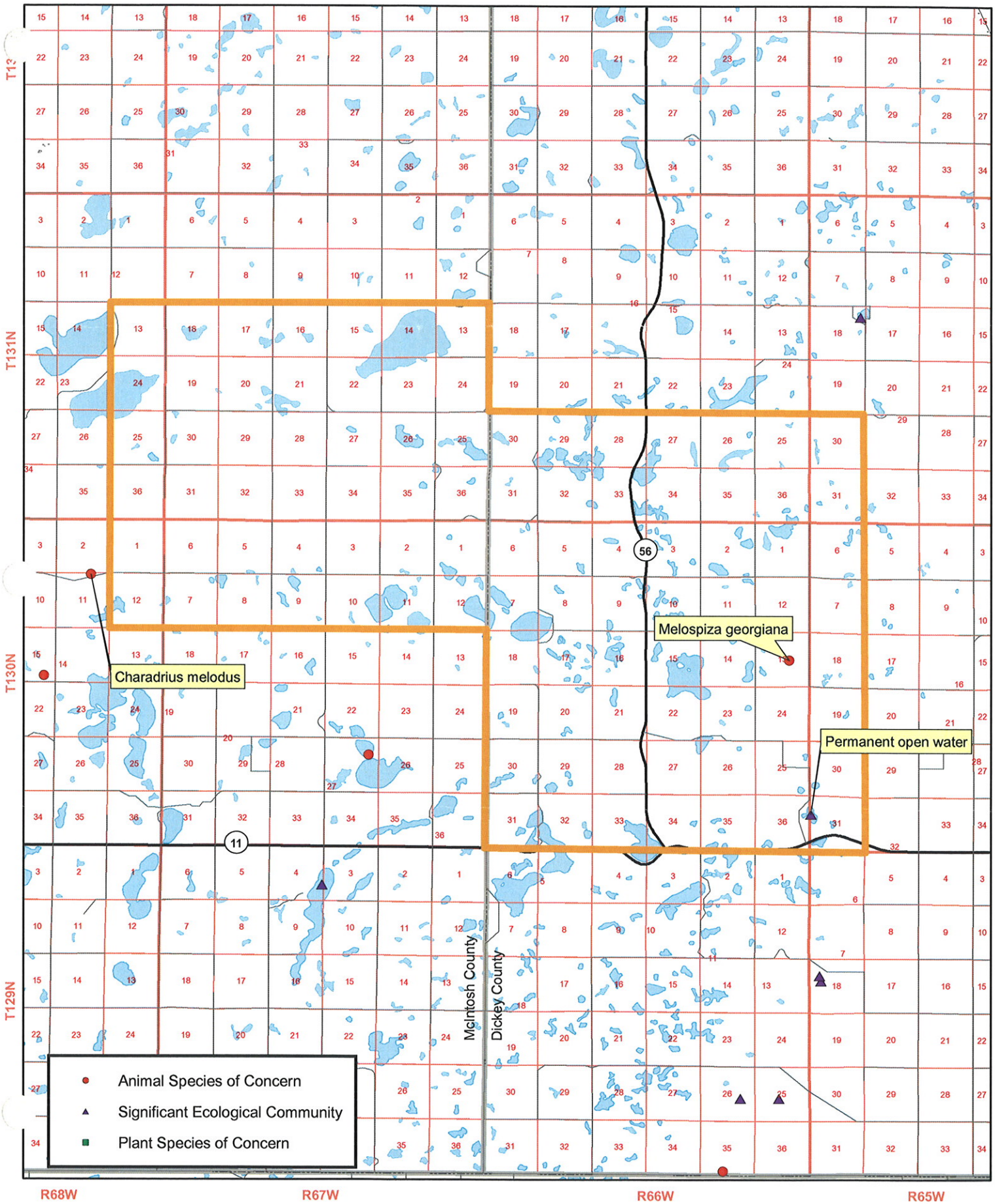
Jesse Hanson, Coordinator
Planning and Natural Resources Division

R.USNDNHI*2009-153

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JUL 15 2009

Play in our backyard!

North Dakota Natural Heritage Inventory
Species of Concern and Significant Ecological Communities



North Dakota Parks & Recreation Department
North Dakota Natural Heritage Inventory
July 2009

North Dakota Natural H[illegible]tage Inventory

Rare Animal and Plant Species and S[illegible]icant Ecological Communities

State Scientific Name	State Common Name	Township Range Section	State Rank	Global Rank	Federal Status	Last Observation	Estimated Representation Accuracy	Precision	County
Permanent open water		130N065W - 31; 130N066W - 36	S2	GNR		1977		S	Dickey
Melospiza georgiana	Swamp Sparrow	130N066W - 13; 131N065W - 29; 130N065W - 06; 130N066W - 22; 131N066W - 35; 129N065W - 04; 130N066W - 34; 130N066W - 12; 130N065W - 07; 130N065W - 20; 129N066W - 10; 129N065W - 05; 130N065W - 32; 131N065W - 27; 130N065W - 10; 131N066W - 22; 130N066W - 20;	S3	G5				G	Dickey
Charadrius melodus	Piping Plover	130N068W - 02; 130N068W - 11	S1S2	G3	LE, LT	1993-06-14		S	McIntosh

North Dakota Natural Heritage Inventory Biological and Conservation Data Disclaimer

The quantity and quality of data collected by the North Dakota Natural Heritage Inventory are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in North Dakota have never been thoroughly surveyed, and new species are still being discovered. For these reasons, the Natural Heritage Inventory cannot provide a definite statement on the presence, absence, or condition of biological elements in any part of North Dakota. Natural Heritage data summarize the existing information known at the time of the request. Our data are continually upgraded and information is continually being added to the database. This data should never be regarded as final statements on the elements or areas that are being considered, nor should they be substituted for on-site surveys.

Estimated Representation Accuracy

Value that indicates the approximate percentage of the Element Occurrence Representation (EO Rep) that was observed to be occupied by the species or community (versus buffer area added for locational uncertainty). Use of estimated representation accuracy provides a common index for the consistent comparison of EO reps, thus helping to ensure that aggregated data are correctly analyzed and interpreted.

Very high (>95%)
High (>80%, <= 95%)
Medium (>20%, <= 80%)
Low (>0%, <= 20%)
Unknown
(null) - Not assessed

Precision

A single-letter code for the precision used to map the Element Occurrence (EO) on a U.S. Geological Survey (USGS) 7.5' (or 15') topographic quadrangle map, based on the previous Heritage methodology in which EOs were located on paper maps using dots.

S - Seconds: accuracy of locality mappable within a three-second radius; 100 meters from the centerpoint
M - Minute: accuracy of locality mappable within a one-minute radius; 2 km from the centerpoint
G - General: accuracy of locality mappalbe to map or place name precision only; 8 km from centerpoint
U - Unmappable

United States Department of the Interior

FISH AND WILDLIFE SERVICE

7

IN REPLY REFER TO:

MAILING ADDRESS:
Post Office Box E
Kulm, North Dakota 58456

STREET LOCATION:
1 First Street, SW
Kulm, North Dakota 58456

June 22, 2009

Ms. Jennifer Turnbow
Project Manager
Kadrmas, Lee & Jackson
128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502-1157

Dear Ms. Turnbow:

This letter is in response to your June 17, 2009 letter notifying us of the proposed Merricourt Wind Power Project and your request for comments and information we may have concerning this project. I have attached a map showing the various U.S. Fish and Wildlife Service land and conservation easement interests we have in the proposed project area.

The Service administers Waterfowl Production Area fee title as well as wetland and grassland easements throughout North Dakota. Review of the County plat books indicate Service property interests (Waterfowl Production Areas highlighted in green; wetland easements highlighted in yellow; grassland easements highlighted in purple; and FmHA easements highlighted in red) are located in the planning area. The following suggestions and explanations of the various land interests the Service is responsible for in the proposed project area:

Waterfowl Production Areas (green) are lands purchased and owned by the Service.

Wetland easements (yellow) are legal agreements with private landowners that permanently protect wetland basins from being drained, burned, leveled or filled.

Grassland easements (purple) are legal agreements with landowners that permanently protect grassland vegetation, primarily native prairie, from being destroyed or developed. These easements prevent these grasslands from being converted to cropland. Mowing, haying and grass seed harvesting must be delayed until after July 15 each year.

FmHa conservation easements (red) are legal agreements with landowners that protect natural resources (grasslands, wetlands, shelterbelts) from being converted to cropland or developed.

The primary responsibility in protecting these easements is to review all proposed uses to ensure that the requests are compatible with Service easement regulations and various laws and policies. Therefore, these comments and suggestions are made in an attempt to accomplish three goals: 1) Avoid impacts to FWS grassland and wetland easements in the project area as much as possible; 2) If unavoidable, ensure that any proposed turbine and associated infrastructure (roads, buried collection lines, transmission lines, sub-stations, etc.) impacts on any FWS easement areas are kept to an absolute minimum; and 3) investigate all potential alternatives to eliminate or reduce impacts to easement areas to protect the integrity of the easement.

With these goals in mind we offer the following comments:

1. USFWS Waterfowl Production Areas: There are 16 WPA's located in the proposed project area. Wind turbines and other infrastructure (roads, pads, collection cables, transmission lines, etc) will not be allowed to be constructed on these lands.

2. Grassland Easements: There are three grassland easements in the proposed project area. They are located in T. 131 N., R. 67 W., Section 19; T.131N., R 66 W., Section 28; and T. 130 N., R. 66 W., Section 28. By building turbines on grassland easements, a federal nexus will be created with this proposed project. As a result, we will need to discuss with you about a variety of environmental and administrative procedures we will need to complete to comply with various laws, policies and regulations (NEPA, compatibility determinations, restoration plans, decommissioning plans, replacement of impacted areas, possible re-imburseable agreements, etc.). As you can see, there are many subjects we need to discuss so I would suggest we meet in person to cover all these items more completely once a more complete draft of the project is completed.

3. Wetland Easements: The Service manages numerous wetland easements in the proposed project area. Without a map showing the proposed turbine and road locations, it is difficult to identify specific concerns with turbines and roads. The National Wetlands Inventory identifies many of the area's wetlands, however, many of the small, shallow temporary wetland basins may not be recognized on NWI photography. The Service will review aerial photography along with field inspections to review construction stakes to make sure all wetland basins are avoided. In addition, we need to make sure that access roads do not alter individual wetland basins and their individual watersheds.

4. FmHA Easements: The Service manages one easement in the project area. Depending on the proposed turbine and road layout, a review of this easement contract will show what natural resources are protected via this easement. Some of these easements may only protect individual wetland basins while others may protect existing grasslands. Again, more detailed explanations of what may be allowed on this easement will be available once a more defined proposal is reviewed.

In summary, I encourage you to keep us informed of your proposed project as much as possible. Once road and turbine locations are proposed, I strongly suggest meeting in person to discuss specifics about each of these land interests the Service has in the project area. Perhaps a meeting with our USFWS Ecological Services in Bismarck, ND would be an efficient use of our time. At that time, we would be happy to review your draft plans and make suggestions to minimize and/or avoid impacts to wildlife populations and their habitats.

Sincerely,

Mick Erickson
Refuge Manager
Kulm WMD

DEPARTMENT OF THE AIR FORCE
319TH CIVIL ENGINEER SQUADRON
GRAND FORKS AIR FORCE BASE, NORTH DAKOTA

Wayne A. Koop
319 CES/CEV
525 Tuskegee Airmen Blvd
Grand Forks AFB ND 58205-6434

JUL 1 2009

Kadrmas, Lee & Jackson
Attn: Jennifer Turnbow
128 Soo Line Drive
PO Box 1157
Bismarck ND 58502-1157

Dear Ms. Turnbow:

Your 17 June 2009 letter concerning the proposed development of a 150 megawatt wind farm in Dickey and McIntosh counties has been reviewed by our Environmental Management and Real Estate Offices. We have found that Grand Forks AFB owns no property in or adjacent to the proposed project area and have no pertinent information or comments to contribute to your environmental assessment. Thank you for bringing this matter to our attention.

Sincerely,

WAYNE A. KOOP, R.E.M.
Environmental Management Flight Chief

North Dakota Department of Transportation

Francis G. Ziegler, P.E.
Director

John Hoeven
Governor

July 7, 2009

Jennifer Turnbow
Kadramas Lee & Jackson, Inc.
P.O. Box 1157
Bismarck, ND 58502-1157

MERRICOURT WIND POWER PROJECT, DICKEY AND MCINTOSH COUNTIES, NORTH DAKOTA

We have reviewed your June 17, 2009, letter.

Your proposed project will generate truck volumes in excess of that anticipated for this roadway. It would be helpful if the NDDOT could be provided information relative to where the traffic will be most concentrated. We are primarily interested in the aggregate and concrete haul routes, as these materials represent the bulk of the truck trips generated. Also, we are aware that specific materials sources may not have been identified at this time; however, can you identify the highways most likely to be impacted? This information would be used in the development of future surfacing projects on ND-56 in the vicinity of the wind power plant.

Additionally, if any work needs to be done on highway right-of-way, appropriate permits and risk management documents will need to be obtained from the Department of Transportation District Engineer, John Thompson at 701-845-8800.

RONALD J. HENKE, P.E, DIRECTOR – OFFICE OF PROJECT DEVELOPMENT

57: rjh:js

c: John Thompson, Valley City District Engineer

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
3425 Miriam Avenue
Bismarck, North Dakota 58501

JUL - 8 2009

Ms. Jennifer Turnbow
Kadrmas, Lee and Jackson, Inc.
P.O. Box 1157
128 Soo Line Drive
Bismarck, North Dakota 58502-1157

Dear Ms. Turnbow:

This is in response to your June 17, 2009, request for environmental information in relation to a proposed enXco Development Corporation (enXco) wind energy development project in McIntosh and Dickey Counties, North Dakota. The location for the proposed Merricourt Wind Power Project is approximately 12 miles southwest of Merricourt, North Dakota. The proposed project includes 100, 1.5 Megawatt wind turbines. The electric power will interconnect to an existing 230 kilovolt MDU transmission line. EnXco does not anticipate installing additional overhead transmission line(s) for the proposed project at this time. Construction is anticipated to begin in 2011 with a commercial operation date of December 31, 2011 (subject to change). No Federal funding is anticipated. We offer the following comments under the authority of and in accordance with the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.), Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d, 54 Stat. 250), Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds", the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), and the National Environmental Policy Act (NEPA) (Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended).

The U.S. Fish and Wildlife Service (Service) holds certain resources in trust and manages them for the benefit of the American people. These resources include migratory birds, inter-jurisdictional fish, federally-listed threatened and endangered species of plants and animals and their habitats, and units of the National Wildlife Refuge system. One goal of Service policy is that conservation of fish and wildlife resources receive equal consideration with other features of resource development, and that conservation actions are coordinated with those other forms of development. Another goal is to conserve, protect, and enhance fish and wildlife and their habitats, and to facilitate the balanced development of the Nation's natural resources. When planning an activity, project proponents should give careful consideration to potential impacts to these trust resources and compliance with the laws mentioned above. Additional information is provided below.

Migratory Birds

Adequate consideration for avian and other wildlife resources early in the site evaluation process can help to minimize impacts and facilitate project review. Although current wind turbine technology and proper siting can help to minimize the incidence of avian and bat deaths due to blade, aerial line, and turbine strikes, the potential for direct mortality of some migratory birds will remain. Wind power developers, in concert with the Service, can help to ensure that projects proceed with as little impact to migratory birds as possible. This can be accomplished by gathering information on avian resources as they relate to project siting and by implementing measures to minimize impacts to migratory birds from the construction and operation of the wind facility. The Service's Interim Wind Turbine Siting Guidelines are enclosed to assist in project planning (enclosure 1). We encourage the project proponents to conduct a Potential Impact Index (PII) analysis on several potential sites within wind resource areas to assist in the selection of a wind power site that minimizes the potential to impact migratory birds. Please inform this office whether or not you plan to use the Service's interim guidelines in selecting your site and if not, whether you intend to use a different method to assess potential impacts to avian and other wildlife resources.

The Service has coordinated with the Avian Power Line Interaction Committee (APLIC) to develop guidelines to assist companies in formulating Avian Protection Plans (APP). These plans are utility-specific and designed to provide a structured way for a company to reduce avian mortality resulting from interactions with electric utility facilities (e.g. collisions and electrocutions), but we suggest they may be adapted to wind energy facilities as well. The APP can be tailored to each utility's industry-specific and site specific wildlife needs, while in the process furthering avian conservation and improved reliability and customer service. A utility that implements the principles contained in these APP guidelines will greatly reduce avian risk as well its own risk of enforcement under the Migratory Bird Treaty Act (MBTA). The guidelines can be accessed from the Service's website at http://www.fws.gov/migratorybirds/. We strongly encourage the project developer of the proposed wind energy facility to investigate the formulation of an APP or if bats may also be affected by the project, an Avian and Bat Protection Plan (ABPP). An example of a completed ABPP can be found at Iberdrola Renewables' website at http://www.iberdrolarenewables.us/pdf/Signed_ABPP_10-28-08.pdf.

To minimize the electrocution hazard to birds, the Service, with support from the Rural Utilities Service, recommends that new or updated overhead power lines be constructed in accordance with the current guidelines for preventing raptor electrocutions. The recommended guidelines can be found in "2006 Suggested Practices for Avian Protection on Power Lines". To increase power line visibility and reduce bird fatalities resulting from collisions with power lines, the Service recommends all new power lines that cross or run adjacent to rivers or large wetlands be modified according to "Mitigating Bird Collisions with Power Lines: The State of the Art in 1994". Both publications can be obtained by writing or calling the Edison Electric Institute, P.O. Box 266, Waldorf, Maryland 20604-0266, (1-800-334-5453) or visiting their website at www.eei.org. Marking of overhead lines can also reduce the hazard of line strikes to whooping cranes and piping plovers (see below).

The Migratory Bird Treaty Act prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the Act has no provision for allowing unintentional take, the Service realizes that some birds may be killed by wind power towers or power lines even if all reasonable measures to protect them are used. The Service's Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to minimize their impacts on migratory birds, and by encouraging others to enact such programs. It is not possible to absolve individuals, companies, or agencies from liability even if they implement avian mortality avoidance or similar conservation measures. However, the Office of Law Enforcement focuses its resources on investigating and recommending prosecution of persons that take migratory birds without regard for their actions or without following recommendations such as this to avoid take. The Service cooperates with developers to minimize impacts to migratory birds and to bald and golden eagles. Parties who wish to demonstrate they have taken all reasonable steps to protect migratory birds and bald and golden eagles are advised to incorporate the Services' recommendations into their project plans, sharing those plans with this office, and making any necessary modifications.

To avoid impacts to migratory birds or other wildlife during the breeding season (February 1 to July 15), schedule construction for late summer or fall/early winter. If work is proposed to take place during the breeding season or at any other time which may result in the take of migratory birds or active nests, the Service recommends that the project proponent arrange to have a qualified biologist conduct a field survey of the affected habitats to determine the absence or presence of nesting migratory birds. If nesting migratory birds are found, we request you contact this office, suspend construction, or take other measures, such as maintaining adequate buffers, to protect the birds until the young have fledged. The Service further recommends that field surveys for nesting birds, along with information regarding the qualification of the biologist(s) performing the surveys, and any avoidance measures implemented at the project site be thoroughly documented, and that such documentation be shared with the Service and maintained on file by the project proponent at least until such time as construction on the proposed project has been completed.

Threatened and Endangered Species

A list of federally threatened and endangered species that may occur within the proposed project's area of influence is enclosed (enclosure 2). This list fulfills requirements of the Fish and Wildlife Service under the Endangered Species Act.

If a Federal agency authorizes, funds, or carries out a proposed action, the responsible Federal agency, or its designated agent, is required to evaluate whether the action "may affect" any listed species or modify critical habitat. If the Federal agency or its designated agent determines the

action "is likely to adversely affect" listed species or destroy or adversely modify critical habitat, the responsible Federal agency shall request formal section 7 consultation with this office or work with this office to remove the likely adverse effects before proceeding.. If the evaluation shows a "no effect" determination on listed species or no modification of critical habitat, further consultation is not necessary. If a private entity receives Federal funding for a construction project, or if any Federal license or permit is required, the Federal agency may designate the fund recipient or permit applicant as its agent for purposes of informal section 7 consultation.

Section 10(a)(1)(B) of the ESA allows non-Federal parties planning activities that have no Federal nexus, but which are likely to result in the incidental taking of listed animals, to apply for an incidental take permit. The application must include a habitat conservation plan (HCP) laying out the proposed actions, determining the effects of those actions on affected federally-listed fish and wildlife species and their habitats (often including proposed or candidate species), and defining measures to minimize and mitigate adverse effects.

The Aransas Wood Buffalo Population (AWBP) of whooping cranes is the only self-sustaining migratory population of whooping cranes remaining in the wild. These birds breed in the wetlands of Wood Buffalo National Park in Alberta and the Northwest Territories of northern Canada, and overwinter on the Texas coast. Whooping cranes in the AWBP annually migrate through North Dakota during their spring and fall migrations.

Endangered whooping cranes have been documented using stopover habitat in the vicinity of this proposed wind energy development project. The proposed project area is located within that portion of the whooping crane migration corridor that includes 20% (75 - 95 % band) of all confirmed whooping crane sightings in North Dakota (enclosure 3). The presence of suitable roosting and feeding habitat for whooping cranes, and location within the whooping crane migration corridor, document the potential for whooping crane presence in the proposed project area. A wind energy project in this wind resource area has the potential to affect whooping cranes during their annual spring and fall migration through North Dakota. Potential effects may be direct (e.g. collision mortality) or indirect (e.g. avoidance of the site resulting in cranes seeking alternate habitat). The interactions of whooping cranes with wind turbines and wind farms are currently not fully known, although it is expected that these large birds with relatively low maneuverability are susceptible to mortality via collisions with turbines. Currently, collisions with power lines are the greatest known source of mortality for fledged whooping cranes, and have accounted for the death or serious injury of at least 46 whooping cranes since 1956.

Piping plovers, a federally threatened species, are known to use beaches of alkali lakes adjacent to the proposed project area during the breeding season. Additionally, the Service has designated these lakes as critical habitat for piping plovers (enclosure 4). Critical habitat on alkali lakes and wetlands includes: 1) sandy to gravelly, sparsely vegetated beaches, salt-encrusted mud flats and/or gravelly salt flats; springs and fens along edges of alkali lakes and wetlands; and adjacent

uplands 200 feet (61 meters) above the high water mark of the alkali lake or wetland. The Service recommends that no construction activities take place within ½ mile of these critical habitats.

Fish and Wildlife Service Property Interests

The Service administers Waterfowl Production Areas owned in fee title as well as wetland and grassland easements throughout North Dakota. A review of Service realty records indicates Service property interests are located in the planning area (enclosure 5). The Service has an ongoing easement acquisition program and we recommend that you contact Mr. Mick Erickson, Project Leader, Kulm Wetland Management District, 1 First Street SW, P.O. Box E, Kulm, North Dakota 58456, (701-647-2866), for more specific information relative to Service easements and up to date realty records.

The primary responsibility in protecting these easements is to review all proposed uses to ensure that the requests are compatible with Service easement regulations and various laws and policies. Therefore, these comments and suggestions are made in an attempt to accomplish three goals: 1) avoid impacts to Service grassland and wetland easements in the project area as much as possible; 2) if unavoidable, ensure that any proposed turbine and associated infrastructure impacts (roads, buried collection lines, transmission lines, sub-stations, etc.) on any Service easement areas are kept to an absolute minimum; and 3) investigate all potential alternatives to eliminate or reduce impacts to easement areas to protect the integrity of the easement. With these goals in mind, the Service offers the following comments:

- Grassland Easements: The Service manages a number of grassland easements in the proposed project area. Without a map showing the proposed turbine and road locations, it is not possible at this time to identify specific concerns with turbines and roads. Building turbines on grassland easements will require a discussion about a variety of administrative procedures that will need to be completed to comply with various laws, policies, and regulations (NEPA documentation, compatibility determinations, restoration plans, decommissioning plans, replacement of impacted areas, a possible reimbursable agreement in support of Service expenditures for review, etc.). Refuge personnel will be available to meet in person to cover all these easement considerations in more detail once a more complete draft plan of the project layout is available. However, as with all other resource considerations, we urge you to discuss your plans with us prior to final site selection.

- Wetland Easements: The Service manages a number of wetland easements in the proposed project area. Without a map showing the proposed turbine and road locations, it is not possible at this time to identify specific concerns with turbines and roads. The National Wetlands Inventory (NWI) identifies many of the area's wetlands; however, many of the small, shallow temporary wetland basins may not be recognized on NWI photography. You should make all reasonable efforts to avoid facility placement and disturbance to wetland

easements. If your plans indicate a proposal to locate project facilities on Service wetland easements, the Service will review aerial photography along with field inspections to review construction stakes to make sure all wetland basins are avoided. In addition, it is important to make sure that access roads do not alter individual wetland basins and their individual watersheds.

- NEPA Review: As mentioned, if Service lands are proposed to be impacted, the Service will be required to conduct an analysis of impacts and examine alternatives, pursuant to NEPA.

High Value Habitat Avoidance

The proposed project area is located in the Missouri Coteau region of North Dakota and includes areas of native mixed-grass prairie. Since the 1800s, North Dakota has lost approximately 75 percent of its native grasslands, primarily due to crop production.

Native prairie has significant natural resource values including:

- Provides habitat for a number of migratory and resident grassland birds whose populations are declining.
- Provides nesting habitat for millions of waterfowl.
- Contains 200-300 plant species, which provide genetic diversity important to agriculture and medicine.
- Provides habitat for thousands of insects including the Dakota skipper, a candidate species for listing under the ESA, and other butterflies (Ex: Regal fritillary, Tawny crescent).
- Crucial for soil and water conservation.
- Provides recreational opportunities (hunting, bird watching/wildlife observation, hiking).
- Living laboratories for scientific research.

Our review of NWI maps indicate that wetland areas are located within the project area. NWI data can be accessed directly by visiting their website at (wetlands.fws.gov). The Service recommends that impacts to wetlands in the project area be avoided to the extent practicable and that all unavoidable loss of wetland habitat be replaced through restoration or creation of functionally equivalent wetland habitat. Section 404 of the Clean Water Act regulates placement of fill materials in certain wetlands. A Corps of Engineers' (Corps) 404 permit may be required if fill material will be placed in aquatic sites, including wetlands. Contact Mr. Dan Cimarosti, Regulatory Office, Corps of Engineers, 1513 South 12th Street, Bismarck, North Dakota 58504 (701-255-0015), to determine their permit requirements. If a 404 permit is required, the Service will provide recommendations on this project to the Corps.

Other high value wildlife habitat types in North Dakota include wooded draws and riparian forests. We recommend that you avoid construction of wind towers and appurtenant facilities in the above habitat types whenever possible.

Construction activities should be conducted in a manner that will minimize impacts to the wildlife and the existing habitat in the project area. To help avoid impacts, we recommend that you:

- Avoid construction in native prairie, if possible, and reseed disturbed native prairie with a comparable native grass/forb seed mixture. Obtain seed stock from nurseries within 250 miles of the project area to insure the particular cultivars are well adapted to the local climate.
- Minimize grassland disturbance by using fewer, larger turbines and limiting new road construction.
- Use underground transmission lines between turbines, as well as to the primary substation. If construction of overhead transmission lines is unavoidable, install and maintain appropriate visual line marking devices to reduce the potential for avian collision mortality.
- Design meteorological towers to be self standing (no guywires). If towers must be guyed, install and maintain appropriate visual line marking devices to reduce the potential for avian collision mortality
- Locate appurtenant facilities to avoid placement of fill in wetlands along the route.
- Install and maintain appropriate erosion control measures to reduce sedimentation and water quality degradation of wetlands and streams near the project area.

Avoidance of impacts can be most effectively achieved by taking a landscape-scale view, beginning with the process of prospecting for suitable sites for wind power development. Companies should assess not only those factors that indicate favorable conditions for development, such as a consistent wind resource, access to transmission, willing landowners, available financing, etc., but also anticipated impacts to wildlife and their habitats. Equal consideration should be accorded to wildlife resource conservation as to other features of development. When considering a project in a particular wind resource area, companies should use all available tools to ensure they have taken all practicable steps to avoid impacts to native habitats. This can be accomplished by utilizing GIS products depicting significant areas of contiguous prairie to site development in areas that are already impacted or fragmented. This analysis and potential site comparison should be accomplished prior to making any significant financial commitments, including entering into lease agreements with landowners.

Research, Monitoring, and Assessment

We encourage project proponents to conduct collision monitoring studies, for a minimum of three years, designed to determine the effect of several factors, such as site selection, turbine designs, the layout of wind plants, wind plant operations, habitat alteration, and changes in available perching and nesting sites, on bird deaths. Annual reports outlining the results of these monitoring studies should be submitted to this office. The Avian Subcommittee of the National Wind Coordinating Committee (NWCC) has developed a guidance document to assist wind energy developers in designing studies that will produce credible and comparable results of avian

interaction with wind power plants. The NWCC document, "Studying Wind Energy/Bird Interactions: A Guidance Document. Metrics and methods for determining or monitoring potential impacts on birds at existing and proposed wind energy sites," can be obtained by contacting the National Wind Coordination Committee, c/o RESOLVE, 1255 23rd Street, Suite 275, Washington, D.C. 20037, or by visiting their website at (www.nationalwind.org). The Service recommends a minimum of three years post construction avian and bat mortality monitoring, as appropriate.

Given the Service requirements and recommendations above, as well as possible unforeseen issues that may arise, we encourage you to build sufficient planning time for coordination with the Service into your project timeline. Thank you for the opportunity to comment. If you require further information as project planning proceeds, please contact Terry Ellsworth of my staff, or contact me directly, at (701) 250-4481, or at the letterhead address.

Sincerely,

Jeffrey K. Towner

Jeffrey K. Towner
Field Supervisor
North Dakota Field Office

Enclosures (5)

cc: Project Leader, Kulm WMD
(Attn: M. Erickson)
Regulatory Office, Army Corps of Engineers, Bismarck
(Attn: D. Cimarosti)
ND Public Service Commission, Bismarck
Director, ND Game & Fish Department, Bismarck
(Attn: M. McKenna)

Enclosure 1

INTERIM GUIDELINES TO AVOID AND MINIMIZE WILDLIFE IMPACTS FROM WIND TURBINES

Introduction

Wind-generated electrical energy is renewable, produces no emissions, and is generally considered to be an environmentally friendly technology. Development of wind energy is strongly endorsed by the Secretary of the Interior, as expressed in the Secretary's Renewable Energy on Public Lands Initiative (May 2002). However, wind energy facilities can adversely impact wildlife, especially birds (e.g., Orloff and Flannery 1992, Leddy et al. 1999, Woodward et al. 2001, Braun et al. 2002, Hunt 2002) and bats (Keeley et al. 2001, Johnson et al. 2002, Johnson et al. 2003). As more facilities with larger turbines are built, the cumulative effects of this rapidly growing industry may initiate or contribute to the decline of some wildlife populations (Manes et al. 2002, Johnson et al. 2002, Manville 2003). The potential harm to these populations from an additional source of mortality or adverse habitat impacts makes careful evaluation of proposed facilities essential. Due to local differences in wildlife concentration and movement patterns, habitats, area topography, facility design, and weather, each proposed development site is unique and requires detailed, individual evaluation.

The following guidance was prepared by the U.S. Fish and Wildlife Service (Service). Like the Service's voluntary guidance addressing the siting, construction, operation, and decommissioning of communication towers (http://migratorybirds.fws.gov/issues/towers/comtow.html) and the voluntary guidance developed in cooperation with the electric utility industry to minimize bird strikes and electrocutions (APLIC 1994, APLIC 1996), this guidance is intended to assist the wind energy industry in avoiding or minimizing impacts to wildlife and their habitats. This is accomplished through: (1) proper evaluation of potential Wind Resource Areas (WRAs), (2) proper location and design of turbines and associated structures within WRAs selected for development, and (3) pre- and post-construction research and monitoring to identify and/or assess impacts to wildlife. These guidelines are based on current science and will be updated as new information becomes available. They are voluntary, and interim in nature. They will be evaluated over a two-year period, and then modified as necessary based on their performance in the field, on comments from the public, and on the latest scientific and technical discoveries developed in coordination with industry, states, academic researchers, and other Federal agencies. After this period, the Service plans to develop a complete operations manual for evaluation, site selection, design, construction, operation, and monitoring of wind energy facilities in both terrestrial and aquatic environments.

Data on wildlife use and mortality collected at one wind energy facility are not necessarily applicable to others; each site poses its own set of possibilities for negative effects on wildlife. In addition, the wind industry is rapidly expanding into habitats and regions that have not been well studied. The Service therefore suggests a precautionary approach to site selection and development, and will employ this approach in making recommendations and assessing impacts of wind energy developments. We encourage the wind energy industry to follow these guidelines and, in cooperation with the Service, to conduct scientific research to provide additional information on the impacts of wind energy development on wildlife. We further encourage the industry to look for opportunities to promote bird and other wildlife conservation when planning wind energy facilities (e.g., voluntary habitat acquisition or conservation easements).

The Service is guided by the Fish and Wildlife Service Mitigation Policy (Federal Register 46 (15), January 1981) in evaluating modifications to or loss of habitat caused by development. This policy follows the sequence of steps recommended in the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA) in seeking to avoid, minimize, or compensate for negative impacts. Mitigation can involve (1) avoiding the impact of an activity by taking no action; (2) minimizing impacts by limiting the degree of activity; (3) rectifying an impact by repairing, rehabilitating, or restoring an affected environment; (4) reducing or eliminating an impact by conducting activities that preserve and maintain the resources; or (5) compensating for an impact by replacing or providing substitute resources or environments. Any mitigation recommended by the Service

for wind energy development would be voluntary on the part of the developer unless made a condition of a Federal license or permit. Mitigation does not apply to "take" of species under the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, or Endangered Species Act. The goal of the Service under these laws is the elimination of loss of migratory birds and endangered and threatened species due to wind energy development. The Service will actively expand partnerships with regional, national, and international organizations, States, tribes, industry, and environmental groups to meet this goal.

Projects with Federal involvement may require additional analysis under the National Environmental Policy Act (http://www.fws.gov/r9esnepa), Endangered Species Act (http://endangered.fws.gov), or National Wildlife Refuge System Administration Act (http://www.fws.gov/policyMakers/mandates/index.html#adminact). This includes projects on federally-owned lands (e.g., National Wildlife Refuges, National Forests), lands where a Federal permit is required for development (e.g., BLM-administered lands), or lands where Federal funds were used for purchase or improvement (some State Wildlife Management Areas).

These guidelines are not intended nor shall they be construed to limit or preclude the Service from exercising its authority under any law, statute, or regulation, and to take enforcement action against any individual, company, or agency, or to relieve any individual, company, or agency of its obligations to comply with any applicable Federal, State, or local laws, statutes, or regulations.

The guidelines contain a site evaluation process with checklists for pre-development evaluations of potential terrestrial wind energy development sites (Appendix 1). Use of this process allows comparison of one site with another with respect to the impacts that would occur to wildlife if the area were developed. The evaluation area for a potential development site should include the "footprint" encompassing all of the turbines and associated structures planned for that proposed facility, and the adjacent wildlife habitats which may be affected by the proximity of the structures, but excluding transmission lines extending outside the footprint. All potential development sites within a geographic area should be evaluated before a site is selected for development.

Pre-development evaluations should be conducted by a team that includes Federal and/or State agency wildlife professionals with no vested interest (e.g., monetary or personal business gain) in the sites selected. Teams may also include academic and industry wildlife professionals as available. Any site evaluations conducted by teams that do not include Federal and/or State agency wildlife professionals will not be considered valid evaluations by the Service.

The pre-development evaluation may also identify additional studies needed prior to and after development. Post-construction monitoring to identify any wildlife impacts is recommended at all developed sites. Pre- and post-development studies and monitoring may be conducted by any qualified wildlife biologist without regard to his/her affiliation or interest in the site.

Additional information relevant to these guidelines is appended as follows:

Appendix 2 – Definitions Related to Wind Energy Development and Evaluation
Appendix 3 – Wildlife Laws Relevant to Wind Power Development Projects
Appendix 4 - Research Needs on the Impacts of Wind Power Development on Wildlife
Appendix 5 – Procedures for Endangered Species Evaluations and Consultations
Appendix 6 – Guidelines for Considering Wind Turbine Siting on Easement Lands Administered as Part of the National Wildlife Refuge System in Region 6 (CO, KS, MT, NE, ND, SD, UT, WY)
Appendix 7 – Known and Suspected Impacts of Wind Turbines on Wildlife
Appendix 8 – Literature Cited

Site Evaluation

The site evaluation protocol presented in Appendix 1 was developed by a team of Federal, State, university, and wind energy industry biologists to rank potential terrestrial wind energy development sites by their potential impacts on wildlife. There are two steps to follow:

1. Identify and evaluate reference sites, preferably within the general geographic area of the proposed facility. Reference sites are high-quality wildlife areas where wind development would result in the maximum negative impact on wildlife (i.e., sites selected to have the highest possible rank using the protocol). Reference sites are used to determine the comparative risks of developing other potential sites.

2. Evaluate potential development sites to determine risk to wildlife and rank sites against each other using the highest-ranking reference site as a standard. Although high-ranking sites are generally less desirable for wind energy development, a high rank does not necessarily preclude development of a site, nor does a low rank automatically eliminate the need to conduct pre-development assessments of wildlife resources or post-development assessments of impacts.

Studies to Assess and Monitor Wildlife Impacts

While ranking potential development sites, the site evaluation team referenced above may identify pre-development studies that are needed to better assess potential negative impacts to wildlife. Ranking may also suggest the extent and duration of study required. Developers are encouraged to conduct any studies suggested by the team in coordination with Service and other agency wildlife biologists.

Post-development mortality studies should be a part of any site development plan in order to determine if or to what extent mortality occurs. As with pre-development studies, ranking may suggest the extent and duration of study needed. Studies should be designed in coordination with Federal and other agency biologists.

Site Development Recommendations

The following recommendations apply to locating turbines and associated structures within WRAs selected for development of wind energy facilities:

1. Avoid placing turbines in documented locations of any species of wildlife, fish, or plant protected under the Federal Endangered Species Act.

2. Avoid locating turbines in known local bird migration pathways or in areas where birds are highly concentrated, unless mortality risk is low (e.g., birds present rarely enter the rotor-swept area). Examples of high concentration areas for birds are wetlands, State or Federal refuges, private duck clubs, staging areas, rookeries, leks, roosts, riparian areas along streams, and landfills. Avoid known daily movement flyways (e.g., between roosting and feeding areas) and areas with a high incidence of fog, mist, low cloud ceilings, and low visibility.

3. Avoid placing turbines near known bat hibernation, breeding, and maternity/nursery colonies, in migration corridors, or in flight paths between colonies and feeding areas.

4. Configure turbine locations to avoid areas or features of the landscape known to attract raptors (hawks, falcons, eagles, owls). For example, Golden Eagles, hawks, and falcons use cliff/rim edges extensively; setbacks from these edges may reduce mortality. Other examples include not locating turbines in a dip or pass in a ridge, or in or near prairie dog colonies.

5. Configure turbine arrays to avoid potential avian mortality where feasible. For example, group turbines rather than spreading them widely, and orient rows of turbines parallel to known bird movements, thereby decreasing the potential for bird strikes. Implement appropriate storm water management practices that do not create attractions for birds, and maintain contiguous habitat for area-sensitive species (e.g., Sage Grouse).

6. Avoid fragmenting large, contiguous tracts of wildlife habitat. Where practical, place turbines on lands already altered or cultivated, and away from areas of intact and healthy native habitats. If not practical, select fragmented or degraded habitats over relatively intact areas.

7. Avoid placing turbines in habitat known to be occupied by prairie grouse or other species that exhibit extreme avoidance of vertical features and/or structural habitat fragmentation. In known prairie grouse habitat, avoid placing turbines within 5 miles of known leks (communal pair formation grounds).

8. Minimize roads, fences, and other infrastructure. All infrastructure should be capable of withstanding periodic burning of vegetation, as natural fires or controlled burns are necessary for maintaining most prairie habitats.

9. Develop a habitat restoration plan for the proposed site that avoids or minimizes negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. For example, avoid attracting high densities of prey animals (rodents, rabbits, etc.) used by raptors.

10. Reduce availability of carrion by practicing responsible animal husbandry (removing carcasses, fencing out cattle, etc.) to avoid attracting Golden Eagles and other raptors.

Turbine Design and Operation Recommendations

1. Use tubular supports with pointed tops rather than lattice supports to minimize bird perching and nesting opportunities. Avoid placing external ladders and platforms on tubular towers to minimize perching and nesting. Avoid use of guy wires for turbine or meteorological tower supports. All existing guy wires should be marked with recommended bird deterrent devices (Avian Power Line Interaction Committee 1994).

2. If taller turbines (top of the rotor-swept area is >199 feet above ground level) require lights for aviation safety, the minimum amount of pilot warning and obstruction avoidance lighting specified by the Federal Aviation Administration (FAA) should be used (FAA 2000). Unless otherwise requested by the FAA, only white strobe lights should be used at night, and these should be the minimum number, minimum intensity, and minimum number of flashes per minute (longest duration between flashes) allowable by the FAA. Solid red or pulsating red incandescent lights should not be used, as they appear to attract night-migrating birds at a much higher rate than white strobe lights.

3. Where the height of the rotor-swept area produces a high risk for wildlife, adjust tower height where feasible to reduce the risk of strikes.

4. Where feasible, place electric power lines underground or on the surface as insulated, shielded wire to avoid electrocution of birds. Use recommendations of the Avian Power Line Interaction Committee (1994, 1996) for any required above-ground lines, transformers, or conductors.

5. High seasonal concentrations of birds may cause problems in some areas. If, however, power generation is critical in these areas, an average of three years monitoring data (e.g., acoustic, radar, infrared, or observational) should be collected and used to determine peak use dates for specific sites. Where feasible, turbines should be shut down during periods when birds are highly concentrated at those sites.

6. When upgrading or retrofitting turbines, follow the above guidelines as closely as possible. If studies indicate high mortality at specific older turbines, retrofitting or relocating is highly recommended.

1. Identify and evaluate reference sites, preferably within the general geographic area of the proposed facility. Reference sites are high-quality wildlife areas where wind development would result in the maximum negative impact on wildlife (i.e., sites selected to have the highest possible rank using the protocol). Reference sites are used to determine the comparative risks of developing other potential sites.

2. Evaluate potential development sites to determine risk to wildlife and rank sites against each other using the highest-ranking reference site as a standard. Although high-ranking sites are generally less desirable for wind energy development, a high rank does not necessarily preclude development of a site, nor does a low rank automatically eliminate the need to conduct pre-development assessments of wildlife resources or post-development assessments of impacts.

Studies to Assess and Monitor Wildlife Impacts

While ranking potential development sites, the site evaluation team referenced above may identify pre-development studies that are needed to better assess potential negative impacts to wildlife. Ranking may also suggest the extent and duration of study required. Developers are encouraged to conduct any studies suggested by the team in coordination with Service and other agency wildlife biologists.

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2. Avoid locating turbines in known local bird migration pathways or in areas where birds are highly concentrated, unless mortality risk is low (e.g., birds present rarely enter the rotor-swept area). Examples of high concentration areas for birds are wetlands, State or Federal refuges, private duck clubs, staging areas, rookeries, leks, roosts, riparian areas along streams, and landfills. Avoid known daily movement flyways (e.g., between roosting and feeding areas) and areas with a high incidence of fog, mist, low cloud ceilings, and low visibility.

3. Avoid placing turbines near known bat hibernation, breeding, and maternity/nursery colonies, in migration corridors, or in flight paths between colonies and feeding areas.

4. Configure turbine locations to avoid areas or features of the landscape known to attract raptors (hawks, falcons, eagles, owls). For example, Golden Eagles, hawks, and falcons use cliff/rim edges extensively; setbacks from these edges may reduce mortality. Other examples include not locating turbines in a dip or pass in a ridge, or in or near prairie dog colonies.

5. Configure turbine arrays to avoid potential avian mortality where feasible. For example, group turbines rather than spreading them widely, and orient rows of turbines parallel to known bird movements, thereby decreasing the potential for bird strikes. Implement appropriate storm water management practices that do not create attractions for birds, and maintain contiguous habitat for area-sensitive species (e.g., Sage Grouse).

6. Avoid fragmenting large, contiguous tracts of wildlife habitat. Where practical, place turbines on lands already altered or cultivated, and away from areas of intact and healthy native habitats. If not practical, select fragmented or degraded habitats over relatively intact areas.

7. Avoid placing turbines in habitat known to be occupied by prairie grouse or other species that exhibit extreme avoidance of vertical features and/or structural habitat fragmentation. In known prairie grouse habitat, avoid placing turbines within 5 miles of known leks (communal pair formation grounds).

8. Minimize roads, fences, and other infrastructure. All infrastructure should be capable of withstanding periodic burning of vegetation, as natural fires or controlled burns are necessary for maintaining most prairie habitats.

9. Develop a habitat restoration plan for the proposed site that avoids or minimizes negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. For example, avoid attracting high densities of prey animals (rodents, rabbits, etc.) used by raptors.

10. Reduce availability of carrion by practicing responsible animal husbandry (removing carcasses, fencing out cattle, etc.) to avoid attracting Golden Eagles and other raptors.

Turbine Design and Operation Recommendations

1. Use tubular supports with pointed tops rather than lattice supports to minimize bird perching and nesting opportunities. Avoid placing external ladders and platforms on tubular towers to minimize perching and nesting. Avoid use of guy wires for turbine or meteorological tower supports. All existing guy wires should be marked with recommended bird deterrent devices (Avian Power Line Interaction Committee 1994).

2. If taller turbines (top of the rotor-swept area is >199 feet above ground level) require lights for aviation safety, the minimum amount of pilot warning and obstruction avoidance lighting specified by the Federal Aviation Administration (FAA) should be used (FAA 2000). Unless otherwise requested by the FAA, only white strobe lights should be used at night, and these should be the minimum number, minimum intensity, and minimum number of flashes per minute (longest duration between flashes) allowable by the FAA. Solid red or pulsating red incandescent lights should not be used, as they appear to attract night-migrating birds at a much higher rate than white strobe lights.

3. Where the height of the rotor-swept area produces a high risk for wildlife, adjust tower height where feasible to reduce the risk of strikes.

4. Where feasible, place electric power lines underground or on the surface as insulated, shielded wire to avoid electrocution of birds. Use recommendations of the Avian Power Line Interaction Committee (1994, 1996) for any required above-ground lines, transformers, or conductors.

5. High seasonal concentrations of birds may cause problems in some areas. If, however, power generation is critical in these areas, an average of three years monitoring data (e.g., acoustic, radar, infrared, or observational) should be collected and used to determine peak use dates for specific sites. Where feasible, turbines should be shut down during periods when birds are highly concentrated at those sites.

6. When upgrading or retrofitting turbines, follow the above guidelines as closely as possible. If studies indicate high mortality at specific older turbines, retrofitting or relocating is highly recommended.

Appendix 1

PROTOCOL TO RANK POTENTIAL TERRESTRIAL WIND ENERGY DEVELOPMENT SITES BY IMPACTS ON WILDLIFE

This protocol was developed by a team of Federal, State, university, and industry biologists to rank potential wind development sites in Montana by their potential for impacts on wildlife (USFWS 2002). It has been modified to apply nationwide. The protocol allows the user to evaluate potential development sites and rank them against a reference site. Objectives are to: (1) assist developers in deciding whether to proceed with development; (2) provide a procedure to determine pre-construction study needs to verify use of potential sites by wildlife; and (3) provide recommendations for monitoring potential sites post-construction to identify, quantify, or verify actual impacts (or lack thereof).

Although this protocol focuses on impacts to wildlife, potential impacts to fish, other aquatic life, and plants should be considered as well. Surveys for rare, threatened, or endangered plants known or suspected to occur in the geographic area should be conducted at all proposed terrestrial development sites having suitable habitat.

This protocol is intended to provide a conceptual framework for initial steps in investigating a site. It is not intended to be all-inclusive relative to objectives, methods, and analysis nor to serve as the definitive reference or directive for any step in wind power related investigations. The Physical Attributes, Species Occurrence and Status, and Ecological Attractiveness groupings in this protocol should serve as a model framework; the terrain features, species, and conditions used in these groupings will be dictated by local conditions and should be developed by wildlife biologists familiar with the region in which this protocol is being used.

Potential Impact Index (PII)

The Potential Impact Index represents a "first cut" analysis of the suitability of a site proposed for development. It does so by estimating use of the site by selected wildlife species as an indicator of potential impact. Emphasis of the PII is on initial site evaluation and is intended to provide more objectivity than simple reconnaissance surveys.

There are two steps to follow in ranking sites by their potential impact on wildlife:

1. Identify and evaluate reference sites within the general geographic area of Wind Resource Areas (WRA's) being considered for development of a facility. Reference sites are areas where wind development would result in the maximum negative impact on wildlife, resulting in a high PII score. Reference sites are used to determine the comparative risks of developing other potential sites.

2. Evaluate potential development sites to determine risk to wildlife, and rank sites against each other using the highest-ranking reference site as a standard. While high-ranking sites are generally less desirable for wind development, a high rank does not necessarily preclude development of a site, not does a low rank automatically eliminate the need to conduct pre-development assessments of wildlife use and impact potential.

The following assumptions are implicit in the PII process:

1. All WRA sites, regardless of turbine design, configuration, placement, or operation present some hazard and risk to wildlife from both an individual and population perspective.

2. Certain sites present less hazard and risk to wildlife than others.

3. No adequate and defensible information exists regarding the appropriateness of the proposed WRA site being evaluated relative to impacts to wildlife.

4. Evaluations will be conducted by qualified biologists without competitive interest in site selection, including those from State and Federal agencies who are familiar with local and regional wildlife.

The PII is designed primarily to evaluate potential impacts on aerial wildlife from collision with turbines and infrastructure. The PII is derived from the results of three checklists (forms are attached). These checklists should be developed and applied as follows:

A. The PHYSICAL ATTRIBUTE checklist considers topographic, meteorological, and site characteristics that may influence bird and bat occurrence and movements.

B. The SPECIES OCCURRENCE AND STATUS checklist includes: Birds of Conservation Concern at the Bird Conservation Region level (http://migratorybirds.fws.gov/reports/reports.html); all federally-listed Endangered, Threatened, and Candidate Species (http://endangered.fws.gov); bird species of high recreational or other value (e.g., waterfowl, prairie grouse); State Endangered, Threatened, and Species of Management Concern; and any additional species of concern listed by State Natural Heritage Programs.

C. The ECOLOGICAL ATTRACTIVENESS checklist evaluates the presence and influence of ecological magnets and other conditions that would draw birds or bats to the site or vicinity.

Each checklist has boxes to be checked for a particular attribute or species found at an evaluation site. The number of boxes in each checklist will vary from region to region due to variations in the number of physical attributes and species of concern in that region. Keep in mind that all boxes in a checklist are very unlikely to be checked at a single evaluation site, because all species and ecological physical conditions potentially occurring in the region would not exist at one site.

Each checklist should be assigned a divisor, which is developed by dividing the number of boxes in a checklist by the total number of boxes in all three checklists. This expands the spread of index values and more dramatically displays the magnitude of differences among sites. For example, if the PHYSICAL ATTRIBUTE checklist has 36 boxes and the total number of boxes in all three checklists is 144, divide 36 by 144 = 0.25, the divisor.

You can change the number of boxes in any of the checklists to fit your geographic area, habitat type, or other selected region (e.g., a state or portion of a state). Remember to recalculate the divisor if you change the number of boxes.

Boxes in a checklist are checked if the condition or species is known or strongly suspected to occur. Criteria for checklist conditions marked with an asterisk (*) are explained on the following page. Conditions that are self-explanatory are not included. Conditions are not weighted. Boxes are checked in the SPECIES OCCURRENCE AND STATUS checklist if presence of the species is unconfirmed but strongly suspected (i.e., WRA is within the range and habitat of the species). This permits more liberal assignment of potential impact, reduces the probability of missing impacts on specific species due to lack of empirical data, and focuses future study and monitoring effort. Totals for each checklist are simple column sums. The PII is calculated from the checklist totals. A completed example from Montana is provided at the end of this Appendix.

Determining Checklist Scores

Checklist scores are determined as follows:

1. Place a check in each box for which an attribute, species, or condition is present or strongly suspected.

2. After completing the three checklists for each site, add the total number of checks in a checklist for an ending sum (each box checked equals one).

Determining PII Score

The Potential Impact Index score is determined as follows:

1. Place the sums from each of the three checklists in the POTENTIAL IMPACT INDEX table sum boxes (Σ column) in the appropriate category.

2. Divide each checklist sum by the previously calculated divisor to adjust the sum for disproportionate numbers of conditions in each checklist, and place this adjusted sum in the Σ/p boxes for each checklist.

3. Add the adjusted checklist sums (Σ/p column) to produce the PII score.

Include any questions, statements, comments, or concerns regarding any checklist cell or category on the SITE SPECIFIC COMMENTS sheet. These comments are critical to determining pre-construction study needs. They will also help identify and refine questions and objectives to be addressed by follow-up study and monitoring. The nature of suspected Significant Ecological Events should be noted on the SITE SPECIFIC COMMENTS sheet.

Ranking PII Scores

PII of each site evaluated is assigned a ranking based on its proportional relationship to the reference site that has the maximum PII score, as shown in Figure 2 in the Montana example. Ranking categories (High, Low, etc.) in the example are arbitrarily set at intervals of 20 percent of maximum.

Rankings are intended as a guide to developers. They are designed to serve as indicators of relative risk to wildlife and thus provide an estimator of the level of impact that may be expected should a site be developed. A high rank does not preclude development, nor does a low rank automatically eliminate the need to conduct pre-development assessments of impacts on wildlife. More intensive pre-construction studies may be needed for both scenarios if development of the site is pursued. Rankings may also suggest the extent of additional study needed.

In the case of federally listed threatened, endangered, or candidate species of wildlife, fish, or plants, consultation with the Fish and Wildlife Service under the Endangered Species Act is required, and may preclude development of a site regardless of its PII score. See Appendix 5 for procedures for obtaining lists of these species that may be present, and for consulting with the Fish and Wildlife Service if species or their habitats are found.

Determining Pre-construction Study Needs

The goals of pre-construction studies are to estimate impacts of proposed wind power development on wildlife by addressing areas of concern identified during the PII process. Objectives, intensity, duration, and methods of pre-construction studies are likely to be site specific, but may be independent of ranking. Regardless of ranking, studies should be designed to address (1) verification of use of WRAs by all species recorded in the "SPECIES OCCURRENCE AND STATUS" checklist, (2) verification of natural conditions (e.g., under "Significant Ecological Events", the magnitude, timing, and location of suspected bird/bat migration), or (3) questions noted in the SITE SPECIFIC COMMENTS sheet for that site. The SITE SPECIFIC COMMENTS sheet may also indicate conditions that need not be investigated. As a result, a site with a low rank may require radar surveillance (e.g., important songbird migration site) while a site with a high rank may require only a single season visual survey (e.g., site potentially contains autumn Whooping Crane habitat). The process should involve a feedback mechanism within an adaptive management strategy (Figure 1). Timely review of study results will determine if data are

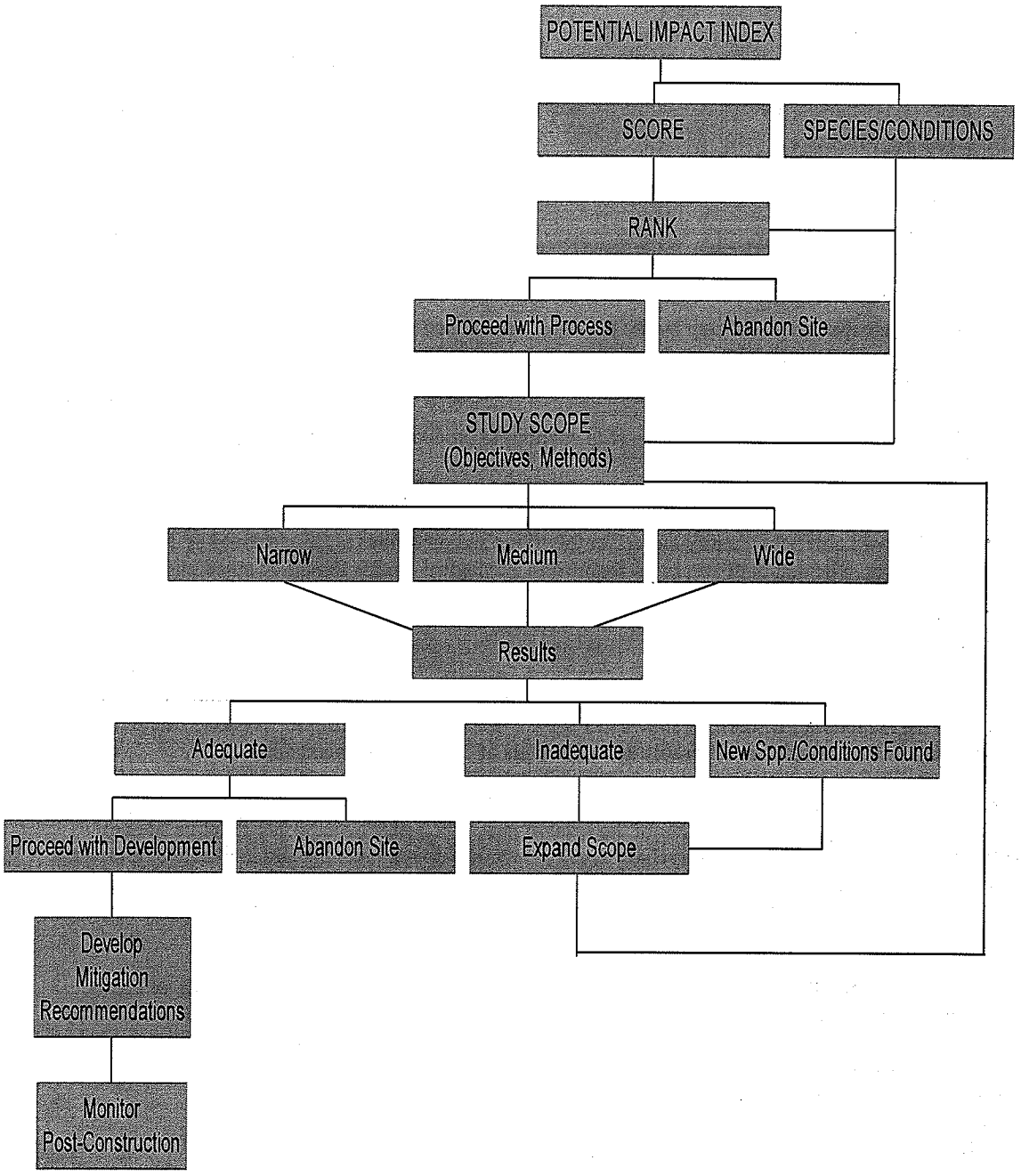


Figure 1. A suggested decision tree for assessing potential development sites. Begin by developing a PII score.

adequate, if conclusions are defensible (Anderson et al. 1999), and if additional investigational effort is required (e.g., if Black-footed Ferrets are found on Mountain Plover searches). Projects with Federal involvement may require additional analysis under the National Environmental Policy Act (http://www.fws.gov/r9esnepa), Endangered Species Act (http://endangered.fws.gov), or National Wildlife Refuge System Administration Act (http://www.fws.gov/policyMakers/mandates/index.html#adminact). Also, the mere existence of a pre-construction study, whether in progress or completed, does not imply Federal sanction for development of a site.

Post-construction Studies

The Service recommends that all sites be monitored for impacts on wildlife after construction is completed. Some sites may be so obviously benign that little more than simple reconnaissance study may be needed and any impact will be revealed during post-construction monitoring. Otherwise, pre-construction studies should be designed to explicitly consider post-construction monitoring that permits statistically valid evaluation of actual impacts. Accordingly, studies should be conducted as much as possible within a Before-After-Control-Impact (BACI) study design (Green 1979). Such design requires investigation of at least two sites (Impact [proposed site] and Control) simultaneously, both pre-construction (Before) and post-construction (After). Because true "Control" sites are seldom available, other sites may be substituted, including reference sites used in developing the PII ranking. In the case of radar surveillance studies, sites within the proposed WRA boundaries may be acceptable (e.g., Harmata et al. 1998). Structuring pre-construction studies within a hypotheses-testing framework will help identify appropriate metrics, focus effort, and permit comparisons with post-construction conditions or other WRAs.

Where feasible, post-construction studies should also be utilized to test measures that may eliminate or reduce impacts on wildlife. See Appendix 4, Research Needs on the Impacts of Wind Power Development on Wildlife.

Metrics and Methods

Metrics and methods are specific tools used to assess wildlife populations and their status (e.g., point counts, line transects, nest success studies, radar surveys, mortality rates, and risk). They can provide important information about birds, bats, and other wildlife at proposed development sites. Metrics and methods may be selected to collect seasonal, group, guild, or habitat specific information, based on data and comments in the SPECIES OCCURRENCE AND STATUS checklist and SITE SPECIFIC COMMENTS sheet. For example, a proposed WRA may be in a narrow north-south oriented valley of relatively monotypic habitat. These conditions suggest a heavy seasonal avian migration corridor but little avian breeding habitat. Accordingly, study emphasis should be on defining use and mortality of migratory birds during autumn or spring or both, with little effort directed at defining use and mortality of breeding birds. Conversely, a potential WRA on a flat plain in diverse habitat would indicate the exact opposite in study emphasis.

While metrics represent specific measurements, concepts, and relationships, methods refer to observational or manipulative study techniques that may be used to verify the location of birds and other wildlife, estimate their numbers, and document their use and behavior (Anderson et al. 1999). Table 1 depicts some commonly used metrics and methods for wildlife studies.

Table 1. Examples of metrics and methods associated with evaluating use and mortality of wildlife at proposed Wind Resource Areas in Montana.

Data Need	Metric	Methods
Use Profile	Individuals/Count	Point Counts (birds) Winter Raptor Surveys Lek Counts (grouse) Migration Counts Ungulate Surveys Spotlight Surveys

	Species/Count	Species/guild/group List Point Counts (birds) Raptor Nesting Surveys Raptor Migration Counts Winter Raptor Surveys Acoustic Surveillance (bats) Pellet Counts Bait Stations Track Boards
	Use per unit of time (e.g., hour, season)	Radar Migration Counts Raptors/watch Area Searches
	Individuals/capture effort	Various techniques for capture
	Productivity	Nests/area Raptor Nesting Surveys Nest Success Ungulate Surveys
	Events/height category (Altitude Profile)	Radar
	Events/distance category (Spatial Profile)	Radar
Mortality	Dead/injured individuals/unit	Transects Spot Searches Carcass Removal Study Observer Detection Efficiency Study

Studies should also strive to generate information to mitigate impacts by properly locating, configuring, or operating turbines (Johnson et al. 2000). Every effort should be made to choose metrics and methods that allow comparisons of pre-construction studies with post-construction studies, other WRAs, and other regions.

Interpreting Metrics

It may be difficult to establish empirically exactly what constitutes high use (i.e., potentially high impact). When looking at the distribution and movements, and local, regional, or range-wide population estimates for particular species, the relative proportions of species, groups, or guilds of wildlife using proposed WRAs may indicate degrees of risk. If baseline population data are unknown, consult with a qualified biologist who can recommend a specific metric.

It is likely that little or no evidence of mortality will be found during pre-construction study. If, however, post-construction mortality is found, and statistical evaluation is not possible, that mortality should be assessed in regard to the species status (e.g., ESA-listed species or Birds of Conservation Concern) or the effect of the loss of individuals of that species on a local, regional, or continental population.

Determining Post-construction Monitoring Needs

Post-construction monitoring is important to the Service, industry, and public because of the limited information available on impacts of wind turbines and WRAs on wildlife. Therefore, post-construction monitoring should be designed to detect major impacts. The intended time frame for post-construction monitoring is not expected to exceed three years, however. Major impacts may be considered as statistically significant decreases in use by species of concern, or limited to statistically significant increases in mortality rates of any wildlife. Monitoring effort may be intensive or cursory, depending on results of pre-construction use and mortality studies. Simple, infrequent mortality surveys on impact and

control plots may be all that is needed at WRAs where recorded pre-construction use by wildlife is low. Documented high use of a proposed WRA may require monitoring methods identical to those employed in pre-construction studies. Anderson et al. (1999) provide specific, detailed direction in post-construction study design and monitoring. Manville (2002) developed a monitoring protocol for use by the U.S. Forest Service at three National Forests in Arizona to monitor the impact of cellular telecommunications towers on migratory birds that could be modified for use at land-based wind turbines.

POTENTIAL IMPACT INDEX CHECKLIST FORMS AND INSTRUCTIONS

PHYSICAL ATTRIBUTE CHECKLIST

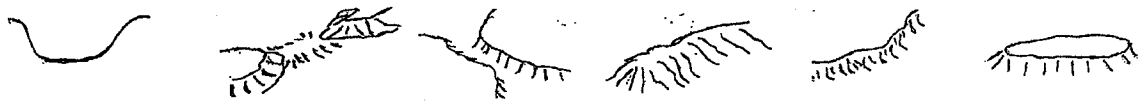
Physical Attribute				Site			
Topography	Mountain Aspect, if mountainous*	Side	W				
			E				
			N				
			S				
		Top					
		Foothill	W				
			E				
			N				
			S				
Wind* Direction	S						
	N						
	E						
	W						
	Updrafts*						
Migratory* Corridor Potential	Latitudinal (N ↔ S)						
	Longitudinal (E ↔ W)						
	Wide Approaches (>30 km)*						
	Funnel Effect	Horizontal					
		Vertical					
Site Size (acres) & Configuration*	<640						
	>640 <1000						
	>1000 <1500						
	Turbine Rows not Parallel to						
Infrastructure To Build	Transmission						
	Roads						
	Buildings*						
	Maintenance						
	Daily Activity						
	Substation						
Increased Activity*							
Totals							

* Criteria on following page

PHYSICAL ATTRIBUTE CRITERIA - categories, max Σ = , (p =).

Topography - Terrain characteristic within the ecological influence of the proposed wind development site, generally, but not restricted to ± 5 mi. Some examples are:

Valley Pass Gap Ridgetop Bluff Butte



Mountain Aspect - Aspect of topography for site of proposed development. Multiple categories may be checked.

Wind Direction - Compass direction *from* which prevailing winds approach. Multiple categories may be checked.

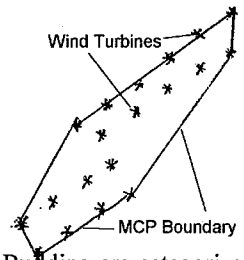
Updrafts - Do updrafts/upslope winds prevail?

Migratory Corridor Potential - Subjective estimate of area to be a potential avian/bat migratory corridor based strictly on topographical characteristics. Multiple categories may be checked.

Wide (>20 mi) - Terrain characteristics of approaches to site from each migratory direction, i.e., a large plain, river corridor, long valley. The larger the area that migrant birds/bats are drawn from, the more may be at risk

Funnel Effect - Is the site in or near an area where migrant birds/bats may be funneled (concentrated) into a smaller area, either altitudinally, laterally, or both?

Site Size & Configuration – Size is estimated as if a minimum convex polygon (MCP) were drawn around peripheral turbines.



Successive boxes are checked to convey relationship of larger size = increased impact to birds/bats, *e.g.*, a 700 acre site will have 2 categories checked while a 1,200 acre site will have all 3 categories checked.

Configuration of turbine rows is usually perpendicular to prevailing wind direction. Rows aligned perpendicular or oblique to route of migration intuitively presents more risk to birds than rows aligned parallel to movement.

Buildings – Building are categorized by relative size and visitation frequency, *i.e.,* structures that are visited daily are usually larger and present more impact than those that are not. If a "Daily Activity" building is required, all Building categories are checked. If a maintenance structure is required, Substation is also checked.

Increased Activity - Will any type of human activity increase? Sites in urban-suburban or otherwise developed areas (oil, gas, mines) will have less impact on wildlife than those in remote or undeveloped areas.

Avian Species of Concern Checklist
(Complete prior to SPECIES OCCURRENCE & STATUS Checklist)

	Site											
Birds (n =)												
Occurrence	B	M/W	Σ	B	M/W	Σ	B	M/W	Σ	B	M/W	Σ
Subtotals												
Total												

Avian Species of Concern Checklist (species, max Σ =)

Column totals of this list are added to appropriate cells in the SPECIES OCCURRENCE & STATUS checklist. Consult Birds of Conservation Concern (http://migratorybirds.fws.gov/reports/reports.html) and Threatened/Endangered Species list (http://endangered.fws.gov), and list other species of high value or management concern such as migratory waterfowl and prairie grouse. Appropriate avian field guides and species accounts should be consulted for confirmation of species distribution and habitat associations. State Natural Heritage Programs may also provide species accounts that include additional information useful in completing checklists.

In addition to species lists (rows), season of occurrence is also indicated (columns). "B" indicates breeding or summer occurrence and "M/W" indicates presence during migration or as wintering species. If occurrence within or in the vicinity of a proposed site is confirmed or suspected, an "X" is entered.

Bat Species Of Concern Checklist
(Complete prior to SPECIES OCCURRENCE & STATUS Checklist)

	Site											
Bats (n =)												
Occurrence	B	M/W	Σ	B	M/W	Σ	B	M/W	Σ	B	M/W	Σ
Subtotals												
Total												

Bat Species Of Concern Checklist (species, max Σ =).

Column totals of this list are added to appropriate cells in the SPECIES OCCURRENCE & STATUS checklist. Appropriate bat field guides and references (Barbour and Davis 1969) should be consulted for confirmation of species distribution and habitat associations. State Natural Heritage Programs may also provide species accounts that include additional information useful in completing checklists.

In addition to species lists (rows), season of occurrence is also indicated (columns). "B" indicates breeding or summer occurrence and "M/W" indicates presence during migration or as wintering species. If occurrence within or in the vicinity of a proposed site is confirmed or suspected, an "X" is entered.

SPECIES OCCURRENCE & STATUS CHECKLIST

Species		Site											
	Occurrence	B	M/W	Σ	B	M/W	Σ	B	M/W	Σ	B	M/W	Σ
Threatened & Endangered (includes wildlife, fish, and plants)													
Candidate*													
Special Concern*	Birds (max Σ=)												
	Bats (max Σ=)												
	Subtotals												
	Total												

* Criteria on following page

SPECIES OCCURRENCE & STATUS Checklist (categories, max Σ = , (p =).

Checklist totals for each column in "Avian Species of Concern List" and "Bat Species of Concern List" are inserted in this checklist.

Threatened & Endangered Species - Species on the Federal List of Endangered and Threatened Species (http://endangered.fws.gov).

Candidate Species - Species being investigated for inclusion in the Federal List of Endangered and Threatened Species (http://endangered.fws.gov).

Species of Special Concern - Species listed in Birds of Conservation Concern; by Natural Heritage Programs that are known or suspected to be rare, endemic, disjunct, threatened or endangered; and species of high value such as migratory or other game birds.

Golden Eagles may be included in this checklist because of special protective status afforded under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d). Other species (e.g., Sage Grouse) may be included because of recent concern over population declines range wide. Bats (other than bat Species of Special Concern) should be included due to generally unknown impacts of wind farms on individuals and populations.

ECOLOGICAL ATTRACTIVENESS CHECKLIST

Ecological Attractor			Site			
Migration Route*		Local				
	Continental*	N				
		S				
		E				
		W				
Ecological Magnets*		Lotic System				
		Lentic System				
		Wetlands				
		Native Grassland				
		Forest				
		Food Concentrated				
		Energetic Foraging				
	Vegetation/ Habitat	Unique				
		Diverse				
Significant Ecological Event*						
Site of Special Conservation Status*						
		Total				

* Criteria on following page

ECOLOGICAL ATTRACTIVENESS CRITERIA - categories, max Σ = , (p =).

Migration Route - Indicates predominate direction of movement of seasonal migrations. Multiple categories may be checked.

Local - Some avian populations move only altitudinally & direction may be East-West (Sage Grouse, owls, Bald Eagles).

Continental - Some migratory corridors experience mass movements in only one season/direction annually (e.g., Bridger Mountains autumn eagle migration).

Ecological Magnets - Special, unique, unusual, or super ordinary habitats or conditions within the vicinity of the site that may attract wildlife. Lotic systems include small perennial or seasonal creeks to major rivers. Lentic systems include stock ponds to lakes to marine environments. Multiple categories may be checked.

Vegetation/Habitat - Unique or exceptionally diverse vegetation or habitat in the vicinity may indicate exceptional diversity and abundance of avian species or bats.

Significant Ecological Event - Special, unique, unusual, or super ordinary events that occur or are suspected to occur in the vicinity of the site, e.g., up to one third of the Continental population of Trumpeter Swans visit Ennis Lake, < 2.5 miles from a proposed Wind Resource Area; the Continental migration of shorebirds passes over (many stop) at Benton Lake National Wildlife Refuge) and up to 2,000 Golden Eagles pass over the Bridger Mountains in autumn. If unknown but suspected a "?" is entered. Specifics regarding the cell are then addressed in the appropriate box of the SITE SPECIFIC COMMENTS sheet to focus follow-up investigation and assist in definition of study objectives.

Site of Special Conservation Status - Any existing or proposed covenants, conservation easements, or other land development limitations intended to conserve, protect, or enhance wildlife or habitat. This criterion is weighted (2 entered if true) because of previous financial or other investment in ecological values. Specifics regarding the easement are then addressed in the appropriate box of the SITE SPECIFIC COMMENTS sheet to focus follow-up attention.

POTENTIAL IMPACT INDEX

	Site							
Checklist (p)[1]	Σ	Σ/p	Σ	Σ/p	Σ	Σ/p	Σ	Σ/p
Physical ( )								
Species Occurrence & Status ( )								
Ecological ( )								
Totals								

[1]Proportion of total checklist categories.

Determining PII Score

A. Place the sums from each of the three checklists in the POTENTIAL IMPACT INDEX table sum boxes (Σ column) in the appropriate category.

B. Divide each checklist sum by the previously calculated divisor to adjust the sum for disproportionate numbers of conditions in each checklist, and place this adjusted sum in the Σ/p boxes for each checklist.

C. Add the Σ/p boxes for the three checklists to obtain a total score.

SITE SPECIFIC COMMENTS

Checklist	Site			
Physical				
Species Occurrence				
Ecological				

EXAMPLE SITE ASSESSMENT AND CALCULATION OF POTENTIAL IMPACT INDEX (PII) FROM MONTANA

POTENTIAL IMPACT INDEX CHECKLISTS

Calculating Divisors

A. Each checklist should be assigned a divisor, which is developed by dividing the number of boxes in a checklist by the total number of boxes in all three checklists. In this example, the total number of boxes in all three checklists is 143.

B. Physical Attribute checklist: 36 boxes ÷ 143 = 0.25; Species Occurrence and Status checklist: 91 boxes ÷ 143 = 0.63; Ecological Attractiveness checklist: 16 boxes ÷ 143 = 0.11.

Determining Checklist Scores

A. Place a check in each box for which an attribute, species, or condition is present or strongly suspected.

B. After completing the three checklists for each site, add the total number of checks in a checklist for an ending sum (each box checked equals 1).

PHYSICAL ATTRIBUTE CHECKLIST

Physical Attribute				Site: Snowy Mtn.Range			
Topography	Mountain Aspect	Side	W	X			
			E				
			N				
			S				
		Top					
		Foothill	W	X			
			E				
			N				
			S				
	Valley			X			
	Pass						
	Gap						
	Ridge			X			
	Bluff						
	Butte						
Wind Direction	S						
	N			X			
	E						
	W						
	Updrafts			X			
Migratory Corridor Potential	Latitudinal (N ↔ S)						
	Longitudinal (E ↔ W)			X			
	Wide Approaches (>30 km)						
	Funnel Effect	Horizontal		X			
		Vertical					
Site Size (acres) & Configuration	<640			X			
	>640 <1000			X			
	>1000 <1500			X			
	Turbine Rows not Parallel to						
Infrastructure To Build	Transmission			X			
	Roads			X			
	Buildings			X			
	Maintenance			X			
	Daily Activity			X			
	Substation			X			
Increased Activity				X			
Totals				18			

Avian Species of Concern Checklist
(Complete prior to SPECIES OCCURRENCE & STATUS Checklist)

Birds (n = 12)	Site: Snowy Mtn. R.											
Occurrence	B	M/W	Σ	B	M/W	Σ	B	M/W	Σ	B	M/W	Σ
Nelson's Sharptailed Sparrow	X	X	2									
LeConte's Sparrow	X	X	2									
Baird's Sparrow	X	X	2									
Dickcissel	X		1									
Cassion's Kingbird	X		1									
Blackbacked Woodpecker	X		1									
Yellow-billed Cuckoo	X		1									
Peregrine Falcon	X		1									
Northern Goshawk		X	1									
Ferruginous Hawk		X	1									
Clark's Grebe	X		1									
Common Loon	X		1									
Subtotals	10	5	15									
Total			15									

Bat Species Of Concern Checklist
(Complete prior to SPECIES OCCURRENCE & STATUS Checklist)

Bats (n = 2)	Site: Snowy Mtn. Range											
Occurrence	B	M/W	Σ	B	M/W	Σ	B	M/W	Σ	B	M/W	Σ
Fringed Myotis	X		1									
Spotted Bat	X		1									
Subtotals	2		2									
Total			2									

SPECIES OCCURRENCE & STATUS CHECKLIST

		Site											
Species		Snow Mtn. R.											
	Occurrence	B	M/W	Σ	B	M/W	Σ	B	M/W	Σ	B	M/W	Σ
Threatened & Endangered	Bald Eagle		X	1									
Candidate	Columbian Sharp-tailed Grouse	X	X	2									
Special Concern	Birds (max Σ=)			15									
	Bats (max Σ=)			2									
	Subtotals			20									
	Total			20									

ECOLOGICAL ATTRACTIVENESS CHECKLIST

Site

Ecological Attractor			Snowy Mtn. Range			
Migration Route	Local					
	Continental	N	X			
		S	X			
		E				
		W				
Ecological Magnets	Lotic System					
	Lentic System					
	Wetlands		X			
	Native Grassland		X			
	Forest		X			
	Food Concentrated					
	Energetic Foraging		X			
	Vegetation/ Habitat	Unique				
		Diverse	X			
Significant Ecological Event						
Site of Special Conservation Status						
Total			7			

POTENTIAL IMPACT INDEX

Checklist (p)[1]	Site							
	Σ	Σ/p	Σ	Σ/p	Σ	Σ/p	Σ	Σ/p
Physical (0.25) 15÷.25=60	15	60						
Species Occurrence & Status (0.63) 20÷.63=32	20	32						
Ecological (0.11) 7÷.11=64	7	64						
Totals	42	**156**						

[1]Proportion of total checklist categories.

Score is 156, compared to the highest reference site score of 244 (Figure 2).

Determining PII Score

A. Place the sums from each of the three checklists in the POTENTIAL IMPACT INDEX table sum boxes (Σ column) in the appropriate category.

B. Divide each checklist sum by the previously calculated divisor to adjust the sum for disproportionate numbers of conditions in each checklist, and place this adjusted sum in the Σ/p boxes for each checklist.

C. Add the Σ/p boxes for the three checklists to obtain a total score.

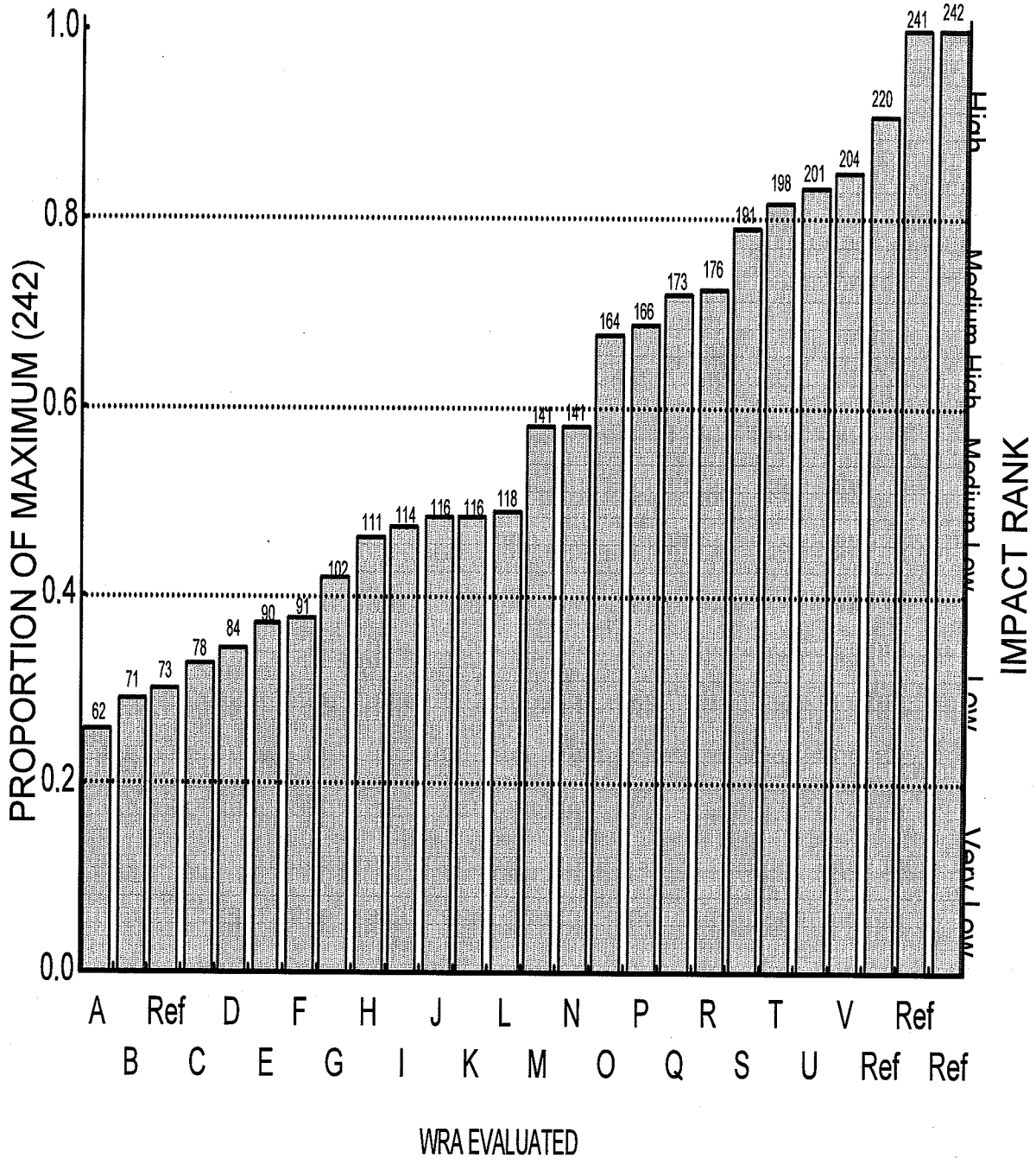


Figure 2. Impact ranks of proposed Wind Resource Areas in Montana. The number above each bar is the PII score. Rank is a function of the proportional relationship of proposed development sites to the maximum score of 4 Reference Sites evaluated.

Appendix 2

DEFINITIONS RELATED TO WIND ENERGY DEVELOPMENT AND EVALUATION

AGL: height above ground level in feet.

Breco Bird Scaring Buoy: a device developed to disperse seabirds at oil spills, which emits some 30 different sounds (including alert calls) up to 130 dB, generally effective in scaring birds at distances up to 200 yards, but may deter birds to 0.5 mile radius. The floating device can be used daytime or night, in fog, wind or storms.

Deterrent Devices: specific equipment, devices, or techniques which are intended to be seen or heard to alert and deter birds from contacting turbine towers, rotors, guy wires, or related equipment. These include diverters installed on turbine or meteorological tower guy wires, dark (e.g., black) paint on single turbine blades or portions of a blade, or noise-making devices that alert (e.g., infrasound) or frighten (e.g., Breco Buoys) birds.

Fish and Wildlife: any member of the animal kingdom, including any bird (including any migratory, non-migratory, or endangered bird for which protection is afforded), mammal, fish, amphibian, reptile, mollusk, crustacean, arthropod, or other invertebrate. Unless otherwise indicated, the Fish and Wildlife Service is particularly concerned about the impacts of wind turbines on birds and bats.

Flyway: a concentrated, predictable flight path of migratory bird species (e.g., particularly water birds such as ducks, geese, large waders, and shorebirds, but also raptors, and sometimes songbirds) from their breeding ground to wintering area. Except along coast lines, the flyway concept may not generally apply to songbirds because they tend to migrate in broad fronts rather than down specific flyways. The term "corridors" has sometimes been used. These frontal movements of songbirds can change within and between seasons and years – as can, for example, movements of waterfowl – making specific designations more difficult. The concept applies both biologically and administratively. For administrative purposes, for example, there are four waterfowl flyways (Atlantic, Pacific, Central, and Pacific and three shorebird flyways (East, Central, and Pacific). "Daily flyways" may also exist between roosting, breeding, and feeding areas.

Lek: A traditional site used year after year by males of certain species of birds (in North America, Greater and Lesser Prairie-chickens, Sage and Sharp-tailed grouse, and Buff-breasted Sandpiper), within which the males display communally to compete for female mates. Dominant males secure the majority of all the matings. Pair bonds are not formed; females leave to nest and raise the young, and males do not take part in parental care.

Passerines: a scientific term for the order of songbirds, many of which winter in tropical areas.

Precautionary Approach: a conservative, scientific approach to conserving and managing habitats and species. Absent definitive data, the approach suggests taking the best steps available to initiate appropriate conservation actions. Those actions should then be refined through the use of principles of adaptive management and sound science. The absence of complete or definitive scientific information should not be used as a reason for postponing or failing to take measures to conserve target species, associated or dependent species, or non-target species and their environments. Specifically, developers should apply a precautionary approach widely to conservation and management of birds, bats, other fauna, flora, and affected habitats. This will protect the resources and preserve Wind Resource Areas by taking account of the best scientific evidence available.

Reference Site: an area of high wildlife value which is used to evaluate the suitability of other areas for wind energy development. Reference sites are selected by biologists familiar with the wildlife in the geographic area and habitat types where wind energy development is contemplated, and evaluated using the Ranking Protocol in Appendix 1. The reference site having the highest score, i.e., the area where wind energy development would have the greatest negative impact on wildlife, is used as the standard against which potential wind energy development sites are ranked.

Riparian Area: The vegetation, habitats, or ecosystems that are associated with streams, rivers, or lakes, or are dependent upon the existence of perennial, intermittent, or ephemeral surface or subsurface water drainage. Relative to other habitats, riparian habitats have a disproportionately high wildlife value in the drier western states due to the

presence of surface water and/or lush vegetation that is typically surrounded by harsher, arid or semi-arid environments.

Rookery: the breeding place of a colony of gregarious birds (e.g., herons) or mammals (e.g., bats).

Rotor-swept Area: generally the vertical airspace within which the turbine blades (usually 3) rotate on a pivot point or drive train rotor. The Area will vary in location depending on the direction of the prevailing wind. While "slower" turbines may operate at speeds less than 30 revolutions per minute (RPMs), turbine speeds at the blade tips can still exceed 220 miles per hour in stiff winds. Recent studies indicate that birds appear unable to recognize blade presence at rotor tips during high blade speed, referred to as the "smear effect."

Staging Area: a traditional site where migratory birds of one or more species congregate in spring and fall for varying periods of time to forage and build up fat reserves prior to launching migratory flights. The term may be used on both the breeding and wintering grounds, as well as at intermediate stopover sites used at any point along the migration route.

Turbine Position within a Row/String: the specific position of a turbine within a string or row of turbines. It may be designated as an end-row, mid-row, or lone row turbine (one not located within a row).

Wind Resource Area: the geographic area or footprint within which wind turbines are located and operated, such as the Altamont Pass, California, WRA, or where location and operation of turbines are anticipated. The term may be used to describe an existing facility, or a general area in which development of a facility is proposed. Existing facilities are known variously as "wind farms," "wind parks," or "energy parks." WRAs are selected based primarily on the reliability and availability of sufficient wind. These areas are designated by the *United States Wind Resource Map*, published by the National Renewable Energy Laboratory, Department of Energy (http://rredc.nrel.gov). The *Map* delineates wind power classifications from "marginal" to "superb" based on a Weibull wind speed index.

Appendix 3

WILDLIFE LAWS RELEVANT TO WIND POWER DEVELOPMENT PROJECTS

The Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA), which is administered by the Fish and Wildlife Service (FWS), is the cornerstone of migratory bird conservation and protection in the United States. The MBTA implements four treaties that provide for international protection of migratory birds. It is a strict liability statute wherein proof of intent is not an element of a taking violation. Wording is clear in that most actions that result in a "taking" or possession (permanent or temporary) of a protected species can be a violation. Specifically, the MBTA states:

"Unless and except as permitted by regulations ... it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, kill ... possess, offer for sale, sell ... purchase ... ship, export, import ... transport or cause to be transported ... any migratory bird, any part, nest, or eggs of any such bird ... (The Act) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior." The word "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect."

A 1972 amendment to the MBTA resulted in inclusion of Bald Eagles and other birds of prey in the definition of a migratory bird. The MBTA provides criminal penalties for persons who, by any means or in any manner, pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird (including Bald Eagles) as well as possessing Bald Eagles, their parts, nests, or eggs without a permit. A violation of the MBTA by an individual can result in a fine of up to $15,000, and/or imprisonment for up to 6 months, for a misdemeanor, and up to $250,000 and/or imprisonment for up to 2 years for a felony. Fines are doubled for organizations. Penalties increase greatly for offenses involving commercialization and/or the sale of migratory birds and/or their parts. Under authority of the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; BGEPA), Bald and Golden Eagles are afforded additional legal protection. Penalties for violations of the BGEPA are up to $250,000 and/or 2 years imprisonment for a felony, with fines doubled for an organization.

While these Acts have no provision for allowing unauthorized take, the FWS realizes that some birds may be killed even if all reasonable measures to avoid the take are implemented. The FWS Office of Law Enforcement carries out its mission to protect migratory birds not only through investigations and enforcement, but also through fostering relationships with individuals, companies, and industries who seek to eliminate their impacts on migratory birds. Unless the activity is authorized, it is not possible to absolve individuals, companies, or agencies from liability even if they implement avian mortality avoidance or similar conservation measures. However, the Office of Law Enforcement focuses on those individuals, companies, or agencies that take migratory birds with disregard for their actions and the law, especially when conservation measures have been developed but are not properly implemented.

The Endangered Species Act (16 U.S.C. 1531-1544; ESA) was passed by Congress in 1973 in recognition that many of our Nation's native plants and animals were in danger of becoming extinct. The purposes of the Act are to protect these endangered and threatened species and to provide a means to conserve their ecosystems. To this end, Federal agencies are directed to utilize their authorities to conserve listed species, as well as "Candidate" species which may be listed in the near future, and make sure that their actions do not jeopardize the continued existence of these species. The law is administered by the Interior Department's FWS and the Commerce Department's National Marine Fisheries Service (NMFS). The FWS has primary responsibility for terrestrial and freshwater organisms, while the NMFS has responsibility for marine species such as whales and salmon. These two agencies work with other agencies to plan or modify Federal projects so that they will have minimal impact on listed species and their habitats. Protection of species is also achieved through partnerships with the States, with Federal financial assistance and a system of incentives available to encourage State participation. The FWS also works with private landowners, providing financial and technical assistance for management actions on their lands to benefit both listed and non-listed species.

Section 9 of the ESA makes it unlawful for a person to "take" a listed species. Take means ". . . to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." The Secretary

of the Interior, through regulations, defined the term "harm" as "an act which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering." However, permits for "incidental take" can be obtained from the FWS for take which would occur as a result of an otherwise legal activity, such as construction of wind turbines, and which would not jeopardize the species.

Section 10 of the ESA allows for the development of "Habitat Conservation Plans" for endangered species on private lands. This provision is designed to assist private landowners in incorporating conservation measures for listed species with their land and/or water development plans. Private landowners who develop and implement an approved habitat conservation plan can receive an incidental take permit that allows their development to go forward.

The National Environmental Policy Act of 1969 (42 U.S.C. 4371 et seq.; NEPA) requires that Federal agencies prepare an environmental impact statement (EIS) for Federal actions significantly affecting the quality of the human environment. "Federal Actions" are those actions in which a Federal agency is conducting the activity, providing funding for the activity, or licensing or permitting the activity. An EIS must describe the proposed action, present detailed analyses of the impacts of the proposed action and alternatives to that action, and include public involvement in the decision making process on how to proceed to accomplish the purpose of the action. The purpose of NEPA is to allow better environmental decisions to be made. The Council on Environmental Quality, established by NEPA, has promulgated regulations in 40 CFR 1500-1508 that include provisions for 1) preparing EISs and Environmental Assessments, 2) considering categorical exclusions from NEPA documentation requirements for certain agency actions, and 3) developing cooperating agency agreements between Federal agencies.

Other Federal agencies may be required by NEPA to review and comment on proposed activities as a cooperating agency with the action agency under Section 1501.6, or because of a duty to comment on federally-licensed activities for which the agency has jurisdiction by law (Section 1503.4). For the FWS, this would be the MBTA and BGEPA. Other agencies may also be called on for review and comment because of special expertise.

The National Wildlife Refuge System Administration Act (16 U.S.C. 668dd), as amended, serves as the "organic act" for the National Wildlife Refuge System. It consolidates the various categories of lands administered by the Secretary of the Interior (Secretary) through the FWS into a single National Wildlife Refuge System. The Act establishes a unifying mission for the Refuge System, a process for determining compatible uses of refuges, and a requirement for preparing comprehensive conservation plans. The Act states first and foremost that the mission of the National Wildlife Refuge System will be focused singularly on wildlife conservation.

The Act identifies six priority wildlife-dependent recreation uses; clarifies the Secretary's authority to accept donations of money for land acquisition; and places restrictions on the transfer, exchange, or other disposal of lands within the Refuge System. Most importantly, the Act reinforces and expands the "compatibility standard" of the Refuge Recreation Act, authorizing the Secretary, under such regulations as he may prescribe, to "permit the use of any area within the System for any purpose, including but not limited to hunting, fishing, public recreation and accommodations, and access whenever he determines that such uses are compatible with the major purposes for which such areas were established." This section applies to any proposed development of wind energy on Refuge System lands; such development must be compatible with the major purpose for which that Refuge was established.

The National Historic Preservation Act of 1966 (16 U.S.C. 470-470b, 470c-470n) approved October 15, 1966 and repeatedly amended, provides for preservation of significant historical features (buildings, objects, and sites) through a grant-in-aid program to the States. It established a National Register of Historic Places and a program of matching grants under the existing National Trust for Historic Preservation (16 U.S.C. 468-468d). The Act also requires Federal agencies to take into account the effects of their actions on items or sites listed or eligible for listing in the National Register. Thus, the Act functions similarly to NEPA, requiring a determination of the presence of any such items or sites, and an evaluation of the effects of proposed developments (such as wind energy facilities) on them, if the facility would be built, funded, licensed or permitted by a Federal agency. This includes State lands purchased or improved with Federal Aid in Wildlife Restoration funds.

Appendix 4

RESEARCH NEEDS ON THE IMPACTS OF WIND POWER DEVELOPMENT ON WILDLIFE

Representatives of the Fish and Wildlife Service's Wind Turbine Siting Working Group have suggested the following research needs:

- Effects of inclement weather in attracting birds and bats to lighted turbines, e.g., drawing birds and bats to within rotor-swept area of turbines, particularly for passerines during spring and fall migrations.

- Localized effects of turbines on wildlife: habitat fragmentation and loss; effects of noise on both aquatic and terrestrial wildlife; habituation.

- Effects of wind turbine string configuration on mortality, e.g., end of row turbine effect, turbines in dips or passes or draws, setbacks from rim/cliff edges.

- Effectiveness of deterrents: alternating colors on blades (particularly, effect of black/white and UV gel coats on the smear effect); lights (e.g., color, duration, and intensity of pilot warning lights; lasers); infrasound (Breco Buoys, other noisemakers such as predator and distress calls if not irritating to humans, other wildlife, or domestic animals); visual markers on guy wires.

- Utility of acoustic, infrared, and radar technologies to detect bird species presence, abundance, location height, and movement.

- Accuracy of mortality counts: estimate of the number of carcasses (especially of passerines) lost because they have been fragmented and lost to collision momentum and the wind; size and shape of dead bird search areas; possibility of recording collisions acoustically or with radar or infrared monitoring.

- Annual variability (temporal and spatial) in migratory pathways; what is the utility of Geographic Information System to assess migratory pathways and stopovers, particularly for passerines and bats.

- Effectiveness of seasonal wind turbine shutdowns at preventing mortalities, including the feasibility of using "self-erecting" turbines that are easily erected and dismantled without cranes, and taking them down during critical periods such as migrations.

- Impacts of larger turbines versus smaller models.

- Changes in predator-prey relationships due to placing potential perching sites in prairie habitats.

Appendix 5

PROCEDURES FOR ENDANGERED SPECIES EVALUATIONS AND CONSULTATIONS

The Endangered Species Act (ESA) directs all Federal agencies to participate in endangered species conservation. Specifically, section 7(a)(1) of the ESA charges Federal agencies to aid in the conservation of listed species. Section 7 (a)(2) requires Federal agencies to consult with the Fish and Wildlife Service (FWS) to ensure that actions that they fund, authorize, permit, or otherwise carry out will not jeopardize the continued existence of any listed species or adversely modify designated critical habitats. The FWS has developed a handbook describing the consultation process in detail. It is available on the FWS web site at http://endangered.fws.gov/consultations. Consultation may be informal or formal, depending upon the presence of listed species and the potential for the proposed project to affect them.

Before initiating an action, the Federal action agency (the agency authorizing a specific action) or its non-Federal permit applicant, must ask the FWS to provide a list of threatened, endangered, proposed, and candidate species and designated critical habitats that may be present in the project area. This initiates the informal consultation process. If the FWS answers that no species or critical habitats are present, then the Federal action agency or permit applicant has no further ESA obligation under section 7(a)(2), and consultation is concluded. If listed species or critical habitats are present, then the action agency or applicant must determine whether the project may affect those species (known as a *may affect* determination), and informal consultation continues. If the action agency or applicant determines, and the FWS agrees, that the project does not adversely affect any listed species, then the consultation is concluded and the decision is put in writing.

If the action agency or applicant determines that a project *may adversely affect* a listed species or designated critical habitat, the action agency/applicant prepares a *Biological Assessment* and requests formal consultation. There is a designated period of time in which to consult (90 days), and beyond that, another set period of time for the FWS to prepare a *biological opinion* (45 days). An analysis of whether or not the proposed action would be likely to jeopardize the species or adversely modify its critical habitat is determined in the biological opinion. If a *jeopardy* or *adverse modification* determination is made, the biological opinion must identify any reasonable and prudent alternatives that could allow the project to move forward.

The biological opinion will contain an "incidental take statement." "Take" is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting or attempting to engage in any such conduct. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to a listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, an otherwise lawful activity. If the FWS issues a *jeopardy* opinion, the incidental take statement will simply state that no take is authorized. If the FWS issues a nonjeopardy opinion, the FWS will anticipate the take that may result from the proposed project and describe that take in the incidental take statement. The statement will contain clear terms and conditions designed to reduce the impact of the anticipated take to the species; these terms are non-discretionary on the action agency or applicant.

When non-Federal activities will result in take of threatened or endangered species, an *incidental take permit* is required under section 10 of the ESA. A habitat conservation plan or "HCP" must accompany an application for an incidental take permit. The habitat conservation plan associated with the permit is to ensure that there are adequate conservation measures to avoid jeopardy to the species.

Examples:

1. **No Effect** – The appropriate conclusion when the action agency or applicant determines that its proposed action will not affect a listed species or designated critical habitat.

   Example: A permit applicant contacts the FWS to request information on listed species. The FWS provides a species list containing 3 plants, 1 fish, and 1 butterfly. The proposed project would be constructed at an upland site on clay soils. The 3 plants are found only on sandy soils. The butterfly's habitat is one of the plants on sandy soil. The nearest sandy soils are 10 miles from the proposed project. The fish is in a stream 5 miles from the proposed project. Conclusion: No effects from the project, either

direct or indirect. Justification: No construction is proposed in listed species habitat or in an area that may affect listed species. In addition, the project proponent has charted a route for heavy equipment moving onto the construction site that avoids listed species habitat.

2. **May Affect, but Not Likely to Adversely Affect** – The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not (a) be able to meaningfully measure, detect, or evaluate insignificant effects, or (b) expect discountable effects to occur.

   Example: The applicant contacts the FWS to request information on listed species. The FWS provides a species list containing 2 birds and 1 fish. The proposed project would be constructed at an upland site, 200 yards from the stream (fish habitat) and adjoining riparian vegetation (bird habitat). The migratory birds use the riparian vegetation to nest between April 15 and August 15. The uplands are highly erodible soils. The project proponent agrees not to construct during the nesting season. He flags the riparian vegetation to indicate an avoidance zone and installs silt fencing between the riparian vegetation and the construction site. He states that he will plant the disturbed soils surrounding the project with native vegetation after construction. He also agrees to monitor the vegetation planted for 3 years to assure that it establishes sufficiently to prevent any additional erosion in the project area caused by construction. Conclusion: Although the project proponent is working in very close proximity to listed species habitat, the action is not likely to adversely affect listed species. Justification: The proponent has incorporated sufficient avoidance and other mitigation measures into the project that any effects to listed species would be discountable. The project proponent prepares a Biological Assessment that includes a complete description of the project, all proposed avoidance and other mitigation measures, and the resulting effects of the project on the listed species. The Biological Assessment is sent to the FWS to request concurrence that the project is not likely to adversely affect listed species.

3. **May Affect, and Likely to Adversely Affect** – The appropriate finding in a Biological Assessment (or conclusion during informal consultation) if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. In the event the overall effect of the proposed action is beneficial to the listed species, but is also likely to cause some adverse effects, then the proposed action "is likely to adversely affect" the listed species. If incidental take is anticipated to occur as a result of the proposed action, an "is likely to adversely affect" determination should be made. This determination requires the initiation of formal section 7 consultation.

   Example: The applicant contacts the FWS to request information on listed species. The FWS provides a species list containing 10 birds. The proposed project would be constructed at an upland site within a significant migratory bird corridor that is utilized by the 10 listed birds. Construction will permanently alter the character of the corridor and will likely cause take of listed birds every year during the migration periods. Conclusion: Formal consultation will be required. The project proponent prepares a Biological Assessment to submit to the action agency to accompany their request to initiate formal consultation. Justification: The project is likely to cause take of listed birds every year during their migration periods.

Appendix 6

GUIDELINES FOR CONSIDERING WIND TURBINE SITING ON EASEMENT LANDS ADMINISTERED AS PART OF THE NATIONAL WILDLIFE REFUGE SYSTEM IN REGION 6

Grassland easements are acquired to protect native and planted grasslands essential for grassland dependent migratory birds and other wildlife. Healthy grasslands provide both nesting and migration habitat necessary to maintain these important populations. Wind energy could severely impact this important program if not developed carefully with as little impact to migratory birds and their habitat as possible.

The following guidelines are to be used when making compatibility determinations for the siting of wind turbines and associated facilities on lands encumbered by U.S. Fish and Wildlife Service (Service) grassland easements and USDA conservation easements administered by the Service in Region 6, particularly in North Dakota, South Dakota, and Montana. These guidelines are intended to provide guidance for considering compatibility determinations during the period while the Service and the wind power industry monitor potential impacts to migratory birds as a result of turbine construction, maintenance, and operation. The following guidelines will be incorporated into rights-of-way permits issued for the construction of turbines, access roads, and other associated activities necessary to make the turbines operational. The intention of these guidelines is to minimize impacts to migratory birds and protect the habitat covered by the easement. The guidelines pertain only to permits issued for the alteration or destruction of grassland habitat as a result of turbine and other associated construction on lands encumbered by Service easements.

Refuge Managers and Wetland District Managers shall use these guidelines for site-by-site consideration of compatibility determinations for individual right-of-way requests for wind turbines on easement lands. These guidelines may be incorporated as needed as right-of-way or permit stipulations.

These guidelines may be revised and modified as a result of the findings of research and monitoring conducted in the future. Wind turbine rights-of-way applications will be reviewed according to these guidelines in conjunction with the Service's compatibility policy and in accordance with 50 CFR 29.21 and the Service Realty Manual. Future right-of-way applications will be reviewed using the guidelines in effect at the time of application. The Service will not make changes to previously issued rights-of-way or easement permits issued under these guidelines.

1) The Service may permit up to one turbine per 160 acres on an individual easement tract. No more than one turbine may be allowed on an individual easement tract of less than 160 acres. Current biological information (Attachment 2) indicates that this density of turbines would not have any significant impact to grassland habitat and its value to migratory birds or other wildlife. This is the upper limit for the density of turbines on easements. However, consideration may be given to clump or consolidate towers within an easement tract(s) to minimize the disturbance to the remaining habitat, i.e., two turbines may be clumped on a tract of 320 acres. Information available at this time indicates that turbine densities at this level will not materially interfere with or detract from the purposes of the easement (Attachment 2). Wind power industry turbine spacing recommendations are 2,000 feet between wind turbines and 2,000 feet from an occupied building. This constraint may limit the ability to clump turbines.

2) Turbines shall not be constructed in wetlands, including lakes, ponds, marshes, sloughs, swales, swamps, or potholes. Similarly, turbine locations should avoid obvious "duck passes" between large (20 acres or greater), semi-permanent (type 4, or cattail/bulrush) wetlands or sloughs. In addition, known migratory bird corridors or flight paths and environmentally sensitive areas such as colonial bird nesting areas or upland game bird leks, should be avoided.

3) Siting recommendations made by the Service for turbines and access roads and turbine lighting recommendations shall be consistent with all general siting and mitigating measures for tower and transmission line construction (Director's September 14, 2000 memorandum, attachment 3, APLIC 1996, and APLIC 1994).

4) Priority should be given to siting turbines on tame, planted, or seeded grasslands in preference to unbroken native prairie when such options are available on a given easement tract.

5) Spoil material from the excavated turbine pad shall not be deposited in wetlands and must be stored or deposited off easement lands using established roads to transport the material off site.

6) Turbines shall be sited as close to existing roads or the edge of the grassland tract as practical. Disturbance of grassland to construct and maintain a wind turbine shall be done in such a manner as to minimize the destruction or alteration of the habitat. Use of existing roads as a means of accessing a turbine within protected habitats is strongly encouraged. Conservation measures shall be used to avoid the impacts of erosion and sedimentation in order to protect grasslands and wetlands during the construction of the access road. Buried transmission lines, electric lines, and other cables shall be co-located on the access road when practical. Turbine construction should be encouraged to occur outside the breeding season for migratory birds when practical.

7) Regardless of a Service permit the developer is responsible for adhering to all local, state, and federal regulations in siting turbine location and construction. In the event that location and construction criteria conflict between the various levels of government, the criteria providing the maximum protection to the habitat shall be the criteria used during turbine location and construction.

8) In the event that a turbine is no longer utilized for power generation and has been abandoned for that purpose, the turbine owner shall remove the turbine at his/her own expense from the easement tract. The turbine site and associated facilities shall be reclaimed by the turbine owner by planting these areas to a grass mixture consistent with the surrounding grassland or such mixture as is mutually agreed upon by the Service and the turbine owner.

9) The turbine owner must update bird strike avoidance equipment on turbines and implement techniques that reduce the disturbance to nesting birds at turbine sites as future research and evaluation by the Service and the industry indicate.

These guidelines provide flexibility for the Service Refuge Manager in evaluating compatibility determinations and to negotiate with the energy company and the easement landowner to allow wind turbine development consistent with the purposes of the conservation easements. Where development is found to be compatible with easement purposes the guidelines will be used to negotiate siting, lighting, and other restrictions to grant rights-of-way and easement permits for wind turbines.

References:

Avian Power Line Interaction Committee (APLIC). 1994. Mitigating bird collisions with power lines: The state of the art in 1994.

Avian Power Line Interaction Committee (APLIC). 1996. Suggested practices for raptor protection on power lines: the state of the art in 1996.

Attachment 2

Potential Effect of Wind Turbine Presence on Numbers of Breeding Grassland Birds and Nesting Ducks on Grassland Easement Properties in North and South Dakota.

Ron Reynolds, Project Leader, Habitat And Population Evaluation Team, Bismarck, North Dakota.
Neal Niemuth, Biologist, Habitat And Population Evaluation Team, Bismarck, North Dakota

Recently, companies that develop wind-powered electricity generation have begun operations in areas of South Dakota and North Dakota where the U.S. Fish and Wildlife Service has purchased or intends to purchase conservation easements on grasslands. Questions have been raised within the FWS as to whether the placement of wind towers on easement tracts would violate terms of the easement contract, and whether the Service would consider purchasing easements on lands after towers are in place. Before allowing turbines on easement lands, the Service must address the issue of whether placement of wind turbines on grassland easements is compatible with the

goals and purpose of refuge lands as defined by the Refuge Improvement Act, which states that, "A Compatible use means . . . any other use of a National Wildlife Refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes(s) of the National Wildlife Refuge." If birds avoid the area surrounding wind turbines because of noise, disruption of habitat, or disturbance, the biological value of an easement may be compromised. At this time, we do not know if wind turbines are compatible with the purpose of grassland easements, because we do not know if turbines reduce the attractiveness of a site to birds or if turbines affect avian reproductive success. The issue is complicated partly because, if, the FWS restricts certain alternative uses on easements, this may reduce the willingness of landowners to offer to sell easements to the FWS in the future. For example, some landowners believe the potential income derived from wind generators will exceed the income from selling grass easements to the FWS or other conservation organizations. In this respect, the future success of the easement program could be compromised if these restrictions are unnecessary.

Little is known about bird avoidance of grasslands near wind turbines, as previous avian research at wind towers has focused primarily on bird strikes. In one study that did consider avoidance, density of grassland birds was reduced in the immediate vicinity of wind turbines at Buffalo Ridge, Minnesota, (Leddy et al. 1999), although at larger scales no differences were detected (Johnson et al. 2000). However, in the Buffalo Ridge study, wind turbines were placed primarily in Conservation Reserve Program fields with few wetlands and much higher densities of breeding birds than are typically found in native prairie where grassland easements are targeted in the Dakotas, and therefore results from Leddy et al. (1999) may not be applicable here. In the absence of specific data on the effect of wind turbines on birds in North and South Dakota, we used two approaches to assess the potential impact; 1) existing data (Igl and Johnson 1997, D. H. Johnson, unpublished data) was used to estimate the potential impact of wind turbine placement on grassland bird use in quarter-section (160 acre) parcels, and 2) a Mallard productivity model (Cowardin et al. 1988) was used to predict changes in nesting and recruitment rate of ducks on grassland areas with wind turbines in place.

Grassland birds. For the first assessment, abundance of grassland birds, standardized to 160 acres of grassland habitat, was estimated from data gathered on 128 quarter sections in North Dakota during summers of 1992 and 1993 (Igl and Johnson 1997, D. H. Johnson, unpublished data). We estimated the potential impact of wind turbines at two scales representing a five-acre and two-acre loss of habitat for each wind tower, with one wind tower per quarter section. We estimated the two-acre potential area of impact as approximately 4 times the area of road and tower pad (Appendix 1); the five-acre area of impact was estimated using the 80-m reported zone of reduced bird density surrounding towers at Buffalo Ridge (Leddy et al. 1999, Appendix 1). For purposes of our analysis, we assumed that no grassland birds would be present in the area immediately surrounding the tower, which is a worst-case scenario, because (Leddy et al. 1999) showed that birds are present immediately adjacent to turbines, but at reduced densities. Thus, our methods guaranteed we would predict a reduction in birds using easements, however, our intent was to put this change into perspective relative to bird use on the entire easement. Given the high variance associated with the grassland bird data we used, it would be impossible to detect a statistically significant decrease in grassland bird numbers, because the lower 95% confidence limit for population estimates was less than zero for each species (D. H. Johnson, unpublished data). Therefore, we estimated the impact of tower presence by calculating the density of each grassland bird species per 160-acre tract, and then calculating the mean reduction in the number of pairs if 2 acre and 5 acre areas of habitat were considered as unused (Table 1).

Expected reductions were estimated at approximately 1% and 3% of the number of individuals present for each species. As expected, greatest reductions in number of pairs occurred with common species such as the chestnut-collared longspur and horned lark; where, at the 5 acres level, a reduction of less than 1 pair per 160-acre tract would be expected. For all species combined, we estimated the expected maximum reduction would be about 2 pairs per 160 acre area, or about 3 percent of the total population. As mentioned previously, based on variation observed in the existing data set, these levels of change would not be statistically significant. Additionally, because we would expect some bird use of the area near the tower, the actual change would likely be less than the numbers presented in table 1.

Table 1. Mean number of breeding pairs of grassland birds found per 160 acres of grassland and expected reduction in pairs with loss of 5 acres and 2 acres of habitat. Data based on surveys of 128 160-acre parcels in North Dakota during summers of 1992 and 1993 (Igl and Johnson 1997, D. H. Johnson, unpublished data).

	Mean Number (pairs)		Mean Reduction (pairs)	
Species	1992	1993	5 acre	2 acre
Baird's Sparrow	1.424	2.464	0.06075	0.0243
Bobolink	0.336	0.784	0.0175	0.007

Brewer's Sparrow	0	0	0	0
Brown-headed Cowbird	2.88	3.632	0.10175	0.0407
Chestnut-collared Longspur	15.584	19.696	0.55125	0.2205
Clay-colored Sparrow	2.08	1.92	0.0625	0.025
Common Yellowthroat	0.144	0.112	0.004	0.0016
Dickcissel	0.304	0.32	0.00975	0.0039
Ferruginous Hawk	0.032	0.24	0.00425	0.0017
Field Sparrow	0.24	0	0.00375	0.0015
Grasshopper Sparrow	6.368	8.928	0.239	0.0956
Gray Catbird	0	0	0	0
Gray Partridge	0.16	0.128	0.0045	0.0018
Horned Lark	6.88	12.544	0.3035	0.1214
Killdeer	0.544	0.848	0.02175	0.0087
Lark Bunting	8.416	4.16	0.1965	0.0786
Lark Sparrow	0.448	0.128	0.009	0.0036
Le Conte's Sparrow	0	0.192	0.003	0.0012
Northern Harrier	0.304	0.512	0.01275	0.0051
Red-winged Blackbird	1.616	1.248	0.04475	0.0179
Ring-necked Pheasant	0.16	0.368	0.00825	0.0033
Savannah Sparrow	1.184	2.144	0.052	0.0208
Sedge Wren	0.16	0	0.0025	0.001
Sharp-tailed Grouse	0.432	0.464	0.014	0.0056
Sharp-tailed Sparrow	0.032	0	0.0005	0.0002
Short-eared Owl	0.032	0.032	0.001	0.0004
Sprague's Pipit	0.256	0.576	0.013	0.0052
Swainson's Hawk	0.032	0.16	0.003	0.0012
Upland Sandpiper	1.52	1.552	0.048	0.0192
Vesper Sparrow	1.312	0.976	0.03575	0.0143
Western Meadowlark	7.088	11.184	0.2855	0.1142
SUM	**59.97**	**75.31**	**2.11**	**0.85**

Ducks. To assess the impact of wind turbines on ducks, we used the Mallard Productivity Model (Cowardin et al. 1988). The Mallard Model is particularly useful for this exercise because it allowed us to predict any "net" change in nest site selection and recruitment that might occur as a result of simulating the reduction of grasslands available to nesting hens due to the placement of wind turbines. For example, if grassland availability is reduced as a result of disturbance, displaced hens may select other habitat types (e.g., cropland, hayland etc.) in the area for nesting, or they may elect to nest elsewhere in the grasslands protected by easement. If other habitats are selected, this could result in reduced recruitment because, most other habitats are characterized by lower nest success compared to grass habitats. However, if these hens select nest sites in the remaining grasslands outside the influence of the wind turbines, nest success will not change materially and recruitment rate will be the same with-or-without turbines. For this exercise, we selected six study areas from Four Square Mile plots used for breeding population and production surveys (Cowardin et al. 1995) in the Kulm Wetland Management District in North Dakota. Plots were selected that had ≥160 acres of grassland in one unit, and were accessible to ≥60 breeding duck pairs (≥12 mallard pairs) based on the "thunderstorm map" (HAPET 2000) for North Dakota. These criteria are consistent with those used by FWS Realty Office, Bismarck, ND for focusing grassland easements, and the Kulm WMD is representative of areas where the grassland easement program is being targeted. For the purpose of our assessment, all grasslands on study plots selected were treated as protected by easement. This was done to obtain sample acreage similar to easement acreage being purchased. We ran the model on plots with-and-without wind turbines in place and compared the response by mallard hens. The area of influence for turbines was set at 5 acres and was converted to barren habitat which simulated eliminating all nesting activity in that area. To reduce variability, and thus increase the precision of our estimates we conducted eight model runs (1000 hens each) and then scaled the average results to the estimated mallard population on each study plot.

Neither nests initiated or recruitment rates differed significantly between treatment and control model runs (Table 2). The variation shown in nests initiated and recruitment rate between treatment and control runs is due to variation inherent in the biological system being examined. The model predicts that hens displaced by the presence of wind turbines will select nesting sites in the remaining available grass habitat and that recruitment rates will not be influenced.

Summary. Using data collected in North Dakota and South Dakota for grassland birds and ducks, we were able to estimate the magnitude of change that would likely be observed if similar data were collected on grassland easement properties. For some species of grassland birds that have restricted distributions the changes predicted could be underestimated on some sites, but it is unlikely these would be of a different order of magnitude. For ducks, the changes predicted account for differences in geographic distribution. Based on our assessment, the expected impact of wind turbines on grassland nesting species would be negligible with the density of one turbine per 160 acre area.

Table 2. Mallard nests initiated and recruitment rate estimates on six study plots with-and-without wind turbines, based on Mallard Model predictions. ( ) standard errors.

	Without Wind Turbines					With Wind Turbines			
Study plot	Pop. Estimate	Grass Acres	Init. Nests	Recr. Rate	SE	No. Turbines	Init.Nests	Recr. Rate	SE
153	55	761	21	0.67	(.0115)	2	21	0.64	(.0090)
178	60	205	14	0.53	(.0094)	1	13	0.52	(.0064)
329	45	1496	59	0.57	(.0055)	3	59	0.59	(.0124)
330	35	1810	51	0.55	(.0163)	8	52	0.55	(.0118)
331	26	1310	18	0.62	(.0104)	2	18	0.59	(.0120)
332	70	1312	58	0.58	(.0166	2	60	0.58	(.0072)

LITERATURE CITED

Cowardin, L. M., D. H. Johnson, T. L. Shaffer, and D. L. Sparling. 1988. Applications of a simulation model to decisions in mallard management. U. S. Fish and Wildlife Service Technical Report 17.

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Igl, L. D., and D. H. Johnson. 1997. Changes in breeding bird populations in North Dakota: 1967 to 1992-1993. Auk 114:74-92.

Johnson, G. D., W. P. Erickson, M. D. Strickland, M. F. Shepherd, and D. A. Shepherd. 2000. Avian monitoring studies at the Buffalo Ridge, Minnesota Wind Resource Area: results of a 4-year study. Western Ecosystems Technology, Inc. Cheyenne, Wyoming. 262pp.

Leddy, K. L., K. F. Higgins, and D. E. Naugle. 1999. Effects of wind turbines on upland nesting birds in Conservation Reserve Program grasslands. Wilson Bulletin 111:100-104.

APPENDIX 1. Calculations of potential area of impact for wind towers on grassland easements in North Dakota and South Dakota.

Two-acre impact:

40 foot by 40 foot pad for tower		1,600 ft^2
16.5 foot by 1320 foot access road		21,780 ft^2
	total	23,380

Physical disruption of site is approximately 0.54 acre; we multiplied this by four to estimate a zone of potential impact.

Five-acre impact:
80-m zone of reduced density surrounding tower
80 m * 80 m * 3.14 — 2.0 ha
~ 2.5 acres per ha — 5.0 acres

Attachment 3

Memorandum

To: Regional Directors, Regions 1-7

From: Director

Subject: Service Guidance on the Siting, Construction, Operation and Decommissioning of Communications Towers

Construction of communications towers (including radio, television, cellular, and microwave) in the United States has been growing at an exponential rate, increasing at an estimated 6 percent to 8 percent annually. According to the Federal Communication Commission=s *2000 Antenna Structure Registry*, the number of lighted towers greater than 199 feet above ground level currently number over 45,000 and the total number of towers over 74,000. By 2003, all television stations must be digital, adding potentially 1,000 new towers exceeding 1,000 feet AGL.

The construction of new towers creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. Communications towers are estimated to kill 4-5 million birds per year, which violates the spirit and the intent of the Migratory Bird Treaty Act and the Code of Federal Regulations at Part 50 designed to implement the MBTA. Some of the species affected are also protected under the Endangered Species Act and Bald and Golden Eagle Act.

Service personnel may become involved in the review of proposed tower sitings and/or in the evaluation of tower impacts on migratory birds through National Environmental Policy Act review; specifically, sections 1501.6, opportunity to be a cooperating agency, and 1503.4, duty to comment on federally-licensed activities for agencies with jurisdiction by law, in this case the MBTA, or because of special expertise. Also, the National Wildlife Refuge System Improvement Act requires that any activity on Refuge lands be determined as compatible with the Refuge system mission and the Refuge purpose(s). In addition, the Service is required by the ESA to assist other Federal agencies in ensuring that any action they authorize, implement, or fund will not jeopardize the continued existence of any federally endangered or threatened species.

A Communication Tower Working Group composed of government agencies, industry, academic researchers and NGO=s has been formed to develop and implement a research protocol to determine the best ways to construct and operate towers to prevent bird strikes. Until the research study is completed, or until research efforts uncover significant new mitigation measures, all Service personnel involved in the review of proposed tower sitings and/or the evaluation of the impacts of towers on migratory birds should use the attached interim guidelines when making recommendations to all companies, license applicants, or licensees proposing new tower sitings. These guidelines were developed by Service personnel from research conducted in several eastern, midwestern, and southern States, and have been refined through Regional review. They are based on the best information available at this time, and are the most prudent and effective measures for avoiding bird strikes at towers. We believe that they will provide significant protection for migratory birds pending completion of the Working Group=s recommendations. As new information becomes available, the guidelines will be updated accordingly.

Implementation of these guidelines by the communications industry is voluntary, and our recommendations must be balanced with Federal Aviation Administration requirements and local community concerns where necessary. Field

offices have discretion in the use of these guidelines on a case by case basis, and may also have additional recommendations to add which are specific to their geographic area.

Also attached is a Tower Site Evaluation Form which may prove useful in evaluating proposed towers and in streamlining the evaluation process. Copies may be provided to consultants or tower companies who regularly submit requests for consultation, as well as to those who submit individual requests that do not contain sufficient information to allow adequate evaluation. This form is for discretionary use, and may be modified as necessary.

The Migratory Bird Treaty Act (16 U.S.C. 703-712) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the Act has no provision for allowing an unauthorized take, it must be recognized that some birds may be killed at structures such as communications towers even if all reasonable measures to avoid it are implemented. The Service=s Division of Law Enforcement carries out its mission to protect migratory birds not only through investigations and enforcement, but also through fostering relationships with individuals and industries that proactively seek to eliminate their impacts on migratory birds. While it is not possible under the Act to absolve individuals or companies from liability if they follow these recommended guidelines, the Division of Law Enforcement and Department of Justice have used enforcement and prosecutorial discretion in the past regarding individuals or companies who have made good faith efforts to avoid the take of migratory birds.

Please ensure that all field personnel involved in review of FCC licensed communications tower proposals receive copies of this memorandum. Questions regarding this issue should be directed to Dr. Benjamin N. Tuggle, Chief, Division of Habitat Conservation, at (703)358-2161, or

Jon Andrew, Chief, Division of Migratory Bird Management, at (703)358-1714. These guidelines will be incorporated in a Director=s Order and placed in the Fish and Wildlife Service Manual at a future date.

Attachment

cc: 3012-MIB-FWS/Directorate Reading File
3012-MIB-FWS/CCU Files
3245-MIB-FWS/AFHC Reading Files
840-ARLSQ-FWS/AF Files
400-ARLSQ-FWS/DHC Files
400-ARLSQ-FWS/DHC/BFA Files
400-ARLSQ-FWS/DHC/BFA Staff
520-ARLSQ-FWS/LE Files
634-ARLSQ-FWS/MBMO Files (Jon Andrew)

FWS/DHC/BFA/RWillis:bg:08/09/00:(703)358-2183
S:\DHC\BFA\WILLIS\COMTOW-2.POL

Service Interim Guidelines For Recommendations On Communications Tower Siting, Construction, Operation, and Decommissioning

1. Any company/applicant/licensee proposing to construct a new communications tower should be strongly encouraged to collocate the communications equipment on an existing communication tower or other structure (e.g., billboard, water tower, or building mount). Depending on tower load factors, from 6 to 10 providers may collocate on an existing tower.

2. If collocation is not feasible and a new tower or towers are to be constructed, communications service providers should be strongly encouraged to construct towers no more than 199 feet above ground level, using construction techniques which do not require guy wires (e.g., use a lattice structure, monopole, etc.). Such towers should be unlighted if Federal Aviation Administration regulations permit.

3. If constructing multiple towers, providers should consider the cumulative impacts of all of those towers to migratory birds and threatened and endangered species as well as the impacts of each individual tower.

4. If at all possible, new towers should be sited within existing "antenna farms" (clusters of towers). Towers should not be sited in or near wetlands, other known bird concentration areas (e.g., State or Federal refuges, staging areas, rookeries), in known migratory or daily movement flyways, or in habitat of threatened or endangered species. Towers should not be sited in areas with a high incidence of fog, mist, and low ceilings.

5. If taller (>199 feet AGL) towers requiring lights for aviation safety must be constructed, the minimum amount of pilot warning and obstruction avoidance lighting required by the FAA should be used. Unless otherwise required by the FAA, only white (preferable) or red strobe lights should be used at night, and these should be the minimum number, minimum intensity, and minimum number of flashes per minute (longest duration between flashes) allowable by the FAA. The use of solid red or pulsating red warning lights at night should be avoided. Current research indicates that solid or pulsating (beacon) red lights attract night-migrating birds at a much higher rate than white strobe lights. Red strobe lights have not yet been studied.

6. Tower designs using guy wires for support which are proposed to be located in known raptor or waterbird concentration areas or daily movement routes, or in major diurnal migratory bird movement routes or stopover sites, should have daytime visual markers on the wires to prevent collisions by these diurnally moving species. (For guidance on markers, see *Avian Power Line Interaction Committee (APLIC). 1994. Mitigating Bird Collisions with Power Lines: The State of the Art in 1994. Edison Electric Institute, Washington, D.C., 78 pp*, and *Avian Power Line Interaction Committee (APLIC). 1996. Suggested Practices for Raptor Protection on Power Lines. Edison Electric Institute/Raptor Research Foundation, Washington, D.C., 128 pp.* Copies can be obtained via the Internet at http://www.eei.org/resources/pubcat/enviro/, or by calling 1-800/334-5453).

7. Towers and appendant facilities should be sited, designed and constructed so as to avoid or minimize habitat loss within and adjacent to the tower "footprint"@ However, a larger tower footprint is preferable to the use of guy wires in construction. Road access and fencing should be minimized to reduce or prevent habitat fragmentation and disturbance, and to reduce above ground obstacles to birds in flight.

8. If significant numbers of breeding, feeding, or roosting birds are known to habitually use the proposed tower construction area, relocation to an alternate site should be recommended. If this is not an option, seasonal restrictions on construction may be advisable in order to avoid disturbance during periods of high bird activity.

9. In order to reduce the number of towers needed in the future, providers should be encouraged to design new towers structurally and electrically to accommodate the applicant/licensee's antennas and comparable antennas for at least two additional users (minimum of three users for each tower structure), unless this design would require the addition of lights or guy wires to an otherwise unlighted and/or unguyed tower.

10. Security lighting for on-ground facilities and equipment should be down-shielded to keep light within the boundaries of the site.

11. If a tower is constructed or proposed for construction, Service personnel or researchers from the Communication Tower Working Group should be allowed access to the site to evaluate bird use, conduct dead-bird searches, to place net catchments below the towers but above the ground, and to place radar, Global Positioning

System, infrared, thermal imagery, and acoustical monitoring equipment as necessary to assess and verify bird movements and to gain information on the impacts of various tower sizes, configurations, and lighting systems.

12. Towers no longer in use or determined to be obsolete should be removed within 12 months of cessation of use.

In order to obtain information on the extent to which these guidelines are being implemented, and to identify any recurring problems with their implementation which may necessitate modifications, letters provided in response to requests for evaluation of proposed towers should contain the following request:

> "In order to obtain information on the usefulness of these guidelines in preventing bird strikes, and to identify any recurring problems with their implementation which may necessitate modifications, please advise us of the final location and specifications of the proposed tower, and which of the measures recommended for the protection of migratory birds were implemented. If any of the recommended measures can not be implemented, please explain why they were not feasible."

Appendix 7

KNOWN AND SUSPECTED IMPACTS OF WIND TURBINES ON WILDLIFE

While wind-generated electrical energy is renewable, emission-free, and generally environmentally clean (American Wind Energy Association [AWEA] unpubl. data, <http://www.awea.org>), it does have one significant downside -- rotor blades kill birds, especially raptors (Hunt 2002) and bats. Birds can strike the towers; electrocutions can occur if designs are poor; and wind farms may impact bird movements, breeding, and habitat use.

Wind turbine technology is not new to the United States. In the 1800s, Cape Cod supported over 1,000 working wind turbines (Ferdinand 2002). In the late 1930s, Vermont boasted the world's then-largest turbine, which was likely disabled by high winds due to design flaws. But wind turbine 'farms' and their impacts to birds are a recent phenomenon compared to power lines and communication towers, where mortality has been documented for decades or longer (Boeker and Nickerson 1975, Olendorff et al. 1981, APLIC 1994, APLIC 1996, Harness 1997, Ainley et al. 2001, Manville 2001). The problem in the U.S. surfaced in the late 1980s and early 1990s at the Altamont Pass Wind Resource Area, a facility then containing some 6,500 turbines on 73 mi^2 of gently rolling hills just east of San Francisco Bay, California (Davis 1995). Orloff and Flannery (1992) estimated that several hundred raptors were killed each year due to turbine collisions, guy wire strikes, and electrocutions. The most common fatalities were those of Red-tailed Hawks (*Buteo jamaicensis*), American Kestrels (*Falco sparvarius*) and Golden Eagles (*Aquila chrysaetos*), with fewer mortalities of Turkey Vultures (*Cathartes aura*), Common Ravens (*Corvus corax*), and Barn Owls (*Tyto alba*). The impacts of this wind farm were of most concern to the population of Golden Eagles, which was showing a "disturbing source of mortality" to a disproportionately large segment of the population (Southern Niagara Escarpment [WI] Wind Resource Area unpubl. report). More recent studies indicate that a model previously used to assess Golden Eagle mortality was defective, and that nonbreeding Golden Eagles representing a "floater" population were likely suffering less mortality based on a new model (Hunt 2002). Research continues at this time to further assess the impacts of Altamont turbines on raptors. The Altamont turbines are still estimated to kill 40-60 subadult and adult Golden Eagles each year, as well as several hundred Red-tailed Hawks and American Kestrels – a continuing concern for the FWS. Of the variety of wind turbines at the site, the smaller, faster moving, Kenetech-built, lattice-supported turbines caused most of the mortality. As part of a re-powering effort, these turbines are now being replaced with slower moving, tubular-supported turbines. While Europeans have used tubular towers almost exclusively, the U.S. has almost solely used lattice support, at least until recently (Berg 1996).

Colson (1995) indicated that some 16,000 wind turbines operated in California, making the State the largest concentration of wind energy development in the world. Since 1995, that statistic has changed. While California still boasts the greatest number of turbines in the U.S., many smaller turbines are being replaced by fewer but larger models. Worldwide, an estimated 50,000 turbines are generating power (AWEA unpubl. data; Ferdinand 2002), of which over 15,000 are currently in 29 states in the U.S. Turbine numbers are often difficult to track since statistics are generally presented in megawatts (MW) of electricity produced rather than number of turbines present. The latter statistic is of greater concern to ornithologists. In 1998, for example, Germany was the greatest producer with 2,874 MW of electricity produced by turbines, followed by the U.S. (1,884), and Denmark (1,450); (AWEA unpubl. data). While some project that the number of wind turbines in the U.S. may increase by another 16,000 in the next 10 years, current trends indicate an even greater potential growth. Although the U.S. presently produces less than 1% of its electrical energy from turbines – compared, for example, to Norway's 15% – 2001 was a banner year for U.S. turbine technology, doubling the previous record for installed wind production. Companies installed 1,898 turbines in 26 states, which will produce nearly 1,700 MW, at a cost of $1.7 billion for the new equipment (J. Cadogan, U.S. Department of Energy, 2002, pers. comm.). Over the past decade, wind power has been the fastest growing energy industry in the world. By 2020, the AWEA (unpubl. data) predicts that wind will provide 6% of this nation's electricity, serving as many as 25 million households. Enron Wind Corporation constructed some 1,500 of the 1,898 turbines installed in the U.S. in 2001. Although Enron is now bankrupt, General Electric purchased the company and is now producing wind turbines.

In March 2002, President Bush signed the Job Creation and Worker Assistance Act, extending the production tax credit to the wind industry for another two years. There are presently attempts in Congress to amend the reauthorization of this legislation for five or more years. However, even with a bright future for growth, and with low speed tubular-constructed wind turbine technology now being stressed, larger and slower moving turbines still kill raptors, passerines, waterbirds, other avian species, and bats. Low wind speed turbine technology requires much larger rotors, blade tips often extending more than 420 ft. above ground, and blade tips can reach speeds in excess of 200 mph under windy conditions (J. Cadogan, U.S. Department of Energy, 2002, pers. comm.). When birds

approach spinning turbine blades, "motion smear" – the inability of the bird's retina to process high speed motion stimulation – occurs primarily at the tips of the blades, making the blades deceptively transparent at high velocities. This increases the likelihood that a bird will fly through this arc, be struck by a blade, and be killed (Hodos et al. 2001).

What cumulative impact these larger turbines will have on birds and bats has yet to be determined. Johnson et al. 2002b raised some concerns about the impacts of newer, larger turbines on birds. Their data indicated that higher levels of mortality might be associated with the newer and larger turbines, and they indicated that wind power-related avian mortality would likely contribute to the cumulative impacts on birds. Since little research has been conducted on the impacts of large land-sited and offshore turbines on birds and bats, this newer technology is ripe for research.

Howell and Noone (1992) estimated U.S. avian mortality at 0.0 to 0.117 birds/turbine/yr., while in Europe, Winkelman (1992) estimated mortality at 0.1 to 37 birds/turbine/yr. Erickson et al. (2001) reassessed U.S. turbine impact, based on more than 15,000 turbines (some 11,500 in California), and estimated mortality in the range of 10,000 to 40,000 (mean = 33,000), with an average of 2.19 avian fatalities/turbine/yr. and 0.033 raptor fatalities/turbine/yr. This may be a considerable underestimate. As with other structural impacts, only a systematic turbine review will provide a more reliable estimate of mortality. While some have argued that turbine impacts are small (Berg 1996), especially when compared to those from communication towers and power lines, turbines can pose some unique problems, especially for birds of prey. Mortalities must be reduced, especially as turbine numbers increase. In addition to protections under the MBTA, Bald and Golden Eagles are afforded protections under the ESA for the former and the BGEPA for both raptors. As strict liability statutes, MBTA and BGEPA also provide no provisions for unauthorized "take." Wind farms can affect local populations of Golden Eagles and other raptors whose breeding and recruitment rates are naturally slow and whose populations tend to have smaller numbers of breeding adults (Davis 1995). Large raptors are also revered by Native Americans as well as by many others within the public. They are symbolic megafauna, and provide greater emotional appeal to many than do smaller avian species. Raptors also have a lower tolerance for additive mortality (Anderson et al. 1997). As with all other human-caused mortality, we have a responsibility to reverse mortality trends.

Until very recently, U.S. wind turbines have mostly been land-based. Perhaps following the European lead of siting wind turbines in estuarine and marine wetlands (van der Winden et al. 1999, van der Winden et al. 2000), and perhaps due to an assessment of a large number of potential offshore turbine locations in the U.S. (based on Weibull analyses of "good, excellent, outstanding, and superb" wind speed potentials [National Renewable Energy Laboratory 1987]), a new trend is evolving in North America. Several proposals for huge offshore sites are being submitted for locations on both Atlantic and Pacific coasts. These, at the very least, should require considerable research and monitoring to assess possible impacts to resident and migrating passerines, waterfowl, shorebirds, and seabirds. One site at Nantucket Shoals, offshore of Nantucket Island near Cape Cod, Massachusetts, is proposed by the Cape Wind Association to contain 170 turbines, many over 420 feet high, within a 25 mi^2 area (AWEA unpubl. data, Ferdinand 2002). What impacts this wind farm would have on wintering sea ducks and migrating terns, especially the Federally endangered Roseate Tern (*Sterna dougallii dougallii*), and on Northern Gannets (*Morus bassanus*), is unknown. The Long Island Power Authority is proposing a site offshore of Long Island, New York's south shore, covering as much as 314 mi^2. Other sites are being proposed for Portland, Maine, and Lake Erie. The largest proposed wind farm in North America is being planned for a 50 mi^2 area between Queen Charlotte Island, BC, and Alaska. It is being designed to contain 350 turbines, many exceeding 400 feet in height. The potential for significant offshore turbine impacts on waterbirds is great, virtually no research has been conducted in the United States to quell these concerns, and finding carcasses at sea is very challenging.

Europe presently has 10 offshore wind projects in operation, producing over 250 MW of electricity (British Wind Energy unpub. data, www.offshorewindfarms.co.uk). Many other projects are currently under review. To avoid citizen concerns regarding the "not in my backyard" complex, most European turbines are sited offshore or in estuaries, away from immediate human development (Larsen and Madsen 2000). While Europe is well ahead of the United States regarding turbine research, their study results are still generally inconclusive (T. Bowan, FWS, 2003 pers. comm.). Collision mortality, while generally unknown, is believed to be small because birds appear to avoid offshore wind farms. There are exceptions, including for Whooper Swans (*Cygnus Cygnus*; Larsen and Clausen 2002) that are susceptible to turbine strikes in the early mornings and evenings, especially in inclement weather. The collection of carcasses at offshore sites is more challenging than for land-based turbines since nets generally must be used to collect carcasses, tides and weather affect collection, and fog is a frequent problem. While habitat loss is not believed to be a serious concern, its impacts continue to be assessed. Disturbance may be problematic since some species such as Common Eiders avoid wind farms and may not return to a coastal area for several years (Guillemette and Larsen 2002). Disturbance may lead to displacement, and turbines may serve as barriers to

seaduck movements. Only a few studies have been conducted in Denmark, the Netherlands, and Sweden, so further research is needed. Studies deal mostly with wintering species (Noer et al. 2000, Percival 2001, Langstron and Pullan 2002, Christensen et al. 2002, and Bruns et al. 2002).

In an attempt to begin addressing the bird mortality issue – and ancillary to this, the issue of ESA-listed bat strikes – the National Wind Coordinating Committee was created in 1994 as part of President Clinton's Global Climate Change Action Plan (Colson 1995). Shortly following the creation of the Committee, the Avian Subcommittee (now called the Wildlife Work Group) was formed, co-founded by the Service. In 1999, the Avian Subcommittee published a *Metrics and Methods* document to study turbine impacts on birds (Anderson et al. 1999). The document provides an excellent resource for conducting research on proposed and existing turbines and wind farms.

Appendix 8

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Appendix 2

DEFINITIONS RELATED TO WIND ENERGY DEVELOPMENT AND EVALUATION

AGL: height above ground level in feet.

Breco Bird Scaring Buoy: a device developed to disperse seabirds at oil spills, which emits some 30 different sounds (including alert calls) up to 130 dB, generally effective in scaring birds at distances up to 200 yards, but may deter birds to 0.5 mile radius. The floating device can be used daytime or night, in fog, wind or storms.

Deterrent Devices: specific equipment, devices, or techniques which are intended to be seen or heard to alert and deter birds from contacting turbine towers, rotors, guy wires, or related equipment. These include diverters installed on turbine or meteorological tower guy wires, dark (e.g., black) paint on single turbine blades or portions of a blade, or noise-making devices that alert (e.g., infrasound) or frighten (e.g., Breco Buoys) birds.

Fish and Wildlife: any member of the animal kingdom, including any bird (including any migratory, non-migratory, or endangered bird for which protection is afforded), mammal, fish, amphibian, reptile, mollusk, crustacean, arthropod, or other invertebrate. Unless otherwise indicated, the Fish and Wildlife Service is particularly concerned about the impacts of wind turbines on birds and bats.

Flyway: a concentrated, predictable flight path of migratory bird species (e.g., particularly water birds such as ducks, geese, large waders, and shorebirds, but also raptors, and sometimes songbirds) from their breeding ground to wintering area. Except along coast lines, the flyway concept may not generally apply to songbirds because they tend to migrate in broad fronts rather than down specific flyways. The term "corridors" has sometimes been used. These frontal movements of songbirds can change within and between seasons and years – as can, for example, movements of waterfowl – making specific designations more difficult. The concept applies both biologically and administratively. For administrative purposes, for example, there are four waterfowl flyways (Atlantic, Pacific, Central, and Pacific and three shorebird flyways (East, Central, and Pacific). "Daily flyways" may also exist between roosting, breeding, and feeding areas.

Lek: A traditional site used year after year by males of certain species of birds (in North America, Greater and Lesser Prairie-chickens, Sage and Sharp-tailed grouse, and Buff-breasted Sandpiper), within which the males display communally to compete for female mates. Dominant males secure the majority of all the matings. Pair bonds are not formed; females leave to nest and raise the young, and males do not take part in parental care.

Passerines: a scientific term for the order of songbirds, many of which winter in tropical areas.

Precautionary Approach: a conservative, scientific approach to conserving and managing habitats and species. Absent definitive data, the approach suggests taking the best steps available to initiate appropriate conservation actions. Those actions should then be refined through the use of principles of adaptive management and sound science. The absence of complete or definitive scientific information should not be used as a reason for postponing or failing to take measures to conserve target species, associated or dependent species, or non-target species and their environments. Specifically, developers should apply a precautionary approach widely to conservation and management of birds, bats, other fauna, flora, and affected habitats. This will protect the resources and preserve Wind Resource Areas by taking account of the best scientific evidence available.

Reference Site: an area of high wildlife value which is used to evaluate the suitability of other areas for wind energy development. Reference sites are selected by biologists familiar with the wildlife in the geographic area and habitat types where wind energy development is contemplated, and evaluated using the Ranking Protocol in Appendix 1. The reference site having the highest score, i.e., the area where wind energy development would have the greatest negative impact on wildlife, is used as the standard against which potential wind energy development sites are ranked.

Riparian Area: The vegetation, habitats, or ecosystems that are associated with streams, rivers, or lakes, or are dependent upon the existence of perennial, intermittent, or ephemeral surface or subsurface water drainage. Relative to other habitats, riparian habitats have a disproportionately high wildlife value in the drier western states due to the

Appendix 3

WILDLIFE LAWS RELEVANT TO WIND POWER DEVELOPMENT PROJECTS

The Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA), which is administered by the Fish and Wildlife Service (FWS), is the cornerstone of migratory bird conservation and protection in the United States. The MBTA implements four treaties that provide for international protection of migratory birds. It is a strict liability statute wherein proof of intent is not an element of a taking violation. Wording is clear in that most actions that result in a "taking" or possession (permanent or temporary) of a protected species can be a violation. Specifically, the MBTA states:

"Unless and except as permitted by regulations ... it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, kill ... possess, offer for sale, sell ... purchase ... ship, export, import ... transport or cause to be transported ... any migratory bird, any part, nest, or eggs of any such bird ... (The Act) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior." The word "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect."

A 1972 amendment to the MBTA resulted in inclusion of Bald Eagles and other birds of prey in the definition of a migratory bird. The MBTA provides criminal penalties for persons who, by any means or in any manner, pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird (including Bald Eagles) as well as possessing Bald Eagles, their parts, nests, or eggs without a permit. A violation of the MBTA by an individual can result in a fine of up to $15,000, and/or imprisonment for up to 6 months, for a misdemeanor, and up to $250,000 and/or imprisonment for up to 2 years for a felony. Fines are doubled for organizations. Penalties increase greatly for offenses involving commercialization and/or the sale of migratory birds and/or their parts. Under authority of the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; BGEPA), Bald and Golden Eagles are afforded additional legal protection. Penalties for violations of the BGEPA are up to $250,000 and/or 2 years imprisonment for a felony, with fines doubled for an organization.

While these Acts have no provision for allowing unauthorized take, the FWS realizes that some birds may be killed even if all reasonable measures to avoid the take are implemented. The FWS Office of Law Enforcement carries out its mission to protect migratory birds not only through investigations and enforcement, but also through fostering relationships with individuals, companies, and industries who seek to eliminate their impacts on migratory birds. Unless the activity is authorized, it is not possible to absolve individuals, companies, or agencies from liability even if they implement avian mortality avoidance or similar conservation measures. However, the Office of Law Enforcement focuses on those individuals, companies, or agencies that take migratory birds with disregard for their actions and the law, especially when conservation measures have been developed but are not properly implemented.

The Endangered Species Act (16 U.S.C. 1531-1544; ESA) was passed by Congress in 1973 in recognition that many of our Nation's native plants and animals were in danger of becoming extinct. The purposes of the Act are to protect these endangered and threatened species and to provide a means to conserve their ecosystems. To this end, Federal agencies are directed to utilize their authorities to conserve listed species, as well as "Candidate" species which may be listed in the near future, and make sure that their actions do not jeopardize the continued existence of these species. The law is administered by the Interior Department's FWS and the Commerce Department's National Marine Fisheries Service (NMFS). The FWS has primary responsibility for terrestrial and freshwater organisms, while the NMFS has responsibility for marine species such as whales and salmon. These two agencies work with other agencies to plan or modify Federal projects so that they will have minimal impact on listed species and their habitats. Protection of species is also achieved through partnerships with the States, with Federal financial assistance and a system of incentives available to encourage State participation. The FWS also works with private landowners, providing financial and technical assistance for management actions on their lands to benefit both listed and non-listed species.

Section 9 of the ESA makes it unlawful for a person to "take" a listed species. Take means ". . . to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." The Secretary

Appendix 4

RESEARCH NEEDS ON THE IMPACTS OF WIND POWER DEVELOPMENT ON WILDLIFE

Representatives of the Fish and Wildlife Service's Wind Turbine Siting Working Group have suggested the following research needs:

- Effects of inclement weather in attracting birds and bats to lighted turbines, e.g., drawing birds and bats to within rotor-swept area of turbines, particularly for passerines during spring and fall migrations.

- Localized effects of turbines on wildlife: habitat fragmentation and loss; effects of noise on both aquatic and terrestrial wildlife; habituation.

- Effects of wind turbine string configuration on mortality, e.g., end of row turbine effect, turbines in dips or passes or draws, setbacks from rim/cliff edges.

- Effectiveness of deterrents: alternating colors on blades (particularly, effect of black/white and UV gel coats on the smear effect); lights (e.g., color, duration, and intensity of pilot warning lights; lasers); infrasound (Breco Buoys, other noisemakers such as predator and distress calls if not irritating to humans, other wildlife, or domestic animals); visual markers on guy wires.

- Utility of acoustic, infrared, and radar technologies to detect bird species presence, abundance, location height, and movement.

- Accuracy of mortality counts: estimate of the number of carcasses (especially of passerines) lost because they have been fragmented and lost to collision momentum and the wind; size and shape of dead bird search areas; possibility of recording collisions acoustically or with radar or infrared monitoring.

- Annual variability (temporal and spatial) in migratory pathways; what is the utility of Geographic Information System to assess migratory pathways and stopovers, particularly for passerines and bats.

- Effectiveness of seasonal wind turbine shutdowns at preventing mortalities, including the feasibility of using "self-erecting" turbines that are easily erected and dismantled without cranes, and taking them down during critical periods such as migrations.

- Impacts of larger turbines versus smaller models.

- Changes in predator-prey relationships due to placing potential perching sites in prairie habitats.

direct or indirect. Justification: No construction is proposed in listed species habitat or in an area that may affect listed species. In addition, the project proponent has charted a route for heavy equipment moving onto the construction site that avoids listed species habitat.

2. **May Affect, but Not Likely to Adversely Affect** – The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not (a) be able to meaningfully measure, detect, or evaluate insignificant effects, or (b) expect discountable effects to occur.

   Example: The applicant contacts the FWS to request information on listed species. The FWS provides a species list containing 2 birds and 1 fish. The proposed project would be constructed at an upland site, 200 yards from the stream (fish habitat) and adjoining riparian vegetation (bird habitat). The migratory birds use the riparian vegetation to nest between April 15 and August 15. The uplands are highly erodible soils. The project proponent agrees not to construct during the nesting season. He flags the riparian vegetation to indicate an avoidance zone and installs silt fencing between the riparian vegetation and the construction site. He states that he will plant the disturbed soils surrounding the project with native vegetation after construction. He also agrees to monitor the vegetation planted for 3 years to assure that it establishes sufficiently to prevent any additional erosion in the project area caused by construction. Conclusion: Although the project proponent is working in very close proximity to listed species habitat, the action is not likely to adversely affect listed species. Justification: The proponent has incorporated sufficient avoidance and other mitigation measures into the project that any effects to listed species would be discountable. The project proponent prepares a Biological Assessment that includes a complete description of the project, all proposed avoidance and other mitigation measures, and the resulting effects of the project on the listed species. The Biological Assessment is sent to the FWS to request concurrence that the project is not likely to adversely affect listed species.

3. **May Affect, and Likely to Adversely Affect** – The appropriate finding in a Biological Assessment (or conclusion during informal consultation) if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. In the event the overall effect of the proposed action is beneficial to the listed species, but is also likely to cause some adverse effects, then the proposed action "is likely to adversely affect" the listed species. If incidental take is anticipated to occur as a result of the proposed action, an "is likely to adversely affect" determination should be made. This determination requires the initiation of formal section 7 consultation.

   Example: The applicant contacts the FWS to request information on listed species. The FWS provides a species list containing 10 birds. The proposed project would be constructed at an upland site within a significant migratory bird corridor that is utilized by the 10 listed birds. Construction will permanently alter the character of the corridor and will likely cause take of listed birds every year during the migration periods. Conclusion: Formal consultation will be required. The project proponent prepares a Biological Assessment to submit to the action agency to accompany their request to initiate formal consultation. Justification: The project is likely to cause take of listed birds every year during their migration periods.

5) Spoil material from the excavated turbine pad shall not be deposited in wetlands and must be stored or deposited off easement lands using established roads to transport the material off site.

6) Turbines shall be sited as close to existing roads or the edge of the grassland tract as practical. Disturbance of grassland to construct and maintain a wind turbine shall be done in such a manner as to minimize the destruction or alteration of the habitat. Use of existing roads as a means of accessing a turbine within protected habitats is strongly encouraged. Conservation measures shall be used to avoid the impacts of erosion and sedimentation in order to protect grasslands and wetlands during the construction of the access road. Buried transmission lines, electric lines, and other cables shall be co-located on the access road when practical. Turbine construction should be encouraged to occur outside the breeding season for migratory birds when practical.

7) Regardless of a Service permit the developer is responsible for adhering to all local, state, and federal regulations in siting turbine location and construction. In the event that location and construction criteria conflict between the various levels of government, the criteria providing the maximum protection to the habitat shall be the criteria used during turbine location and construction.

8) In the event that a turbine is no longer utilized for power generation and has been abandoned for that purpose, the turbine owner shall remove the turbine at his/her own expense from the easement tract. The turbine site and associated facilities shall be reclaimed by the turbine owner by planting these areas to a grass mixture consistent with the surrounding grassland or such mixture as is mutually agreed upon by the Service and the turbine owner.

9) The turbine owner must update bird strike avoidance equipment on turbines and implement techniques that reduce the disturbance to nesting birds at turbine sites as future research and evaluation by the Service and the industry indicate.

These guidelines provide flexibility for the Service Refuge Manager in evaluating compatibility determinations and to negotiate with the energy company and the easement landowner to allow wind turbine development consistent with the purposes of the conservation easements. Where development is found to be compatible with easement purposes the guidelines will be used to negotiate siting, lighting, and other restrictions to grant rights-of-way and easement permits for wind turbines.

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Attachment 2

Potential Effect of Wind Turbine Presence on Numbers of Breeding Grassland Birds and Nesting Ducks on Grassland Easement Properties in North and South Dakota.

Ron Reynolds, Project Leader, Habitat And Population Evaluation Team, Bismarck, North Dakota.
Neal Niemuth, Biologist, Habitat And Population Evaluation Team, Bismarck, North Dakota

Recently, companies that develop wind-powered electricity generation have begun operations in areas of South Dakota and North Dakota where the U.S. Fish and Wildlife Service has purchased or intends to purchase conservation easements on grasslands. Questions have been raised within the FWS as to whether the placement of wind towers on easement tracts would violate terms of the easement contract, and whether the Service would consider purchasing easements on lands after towers are in place. Before allowing turbines on easement lands, the Service must address the issue of whether placement of wind turbines on grassland easements is compatible with the

Brewer's Sparrow	0	0	0	0
Brown-headed Cowbird	2.88	3.632	0.10175	0.0407
Chestnut-collared Longspur	15.584	19.696	0.55125	0.2205
Clay-colored Sparrow	2.08	1.92	0.0625	0.025
Common Yellowthroat	0.144	0.112	0.004	0.0016
Dickcissel	0.304	0.32	0.00975	0.0039
Ferruginous Hawk	0.032	0.24	0.00425	0.0017
Field Sparrow	0.24	0	0.00375	0.0015
Grasshopper Sparrow	6.368	8.928	0.239	0.0956
Gray Catbird	0	0	0	0
Gray Partridge	0.16	0.128	0.0045	0.0018
Horned Lark	6.88	12.544	0.3035	0.1214
Killdeer	0.544	0.848	0.02175	0.0087
Lark Bunting	8.416	4.16	0.1965	0.0786
Lark Sparrow	0.448	0.128	0.009	0.0036
Le Conte's Sparrow	0	0.192	0.003	0.0012
Northern Harrier	0.304	0.512	0.01275	0.0051
Red-winged Blackbird	1.616	1.248	0.04475	0.0179
Ring-necked Pheasant	0.16	0.368	0.00825	0.0033
Savannah Sparrow	1.184	2.144	0.052	0.0208
Sedge Wren	0.16	0	0.0025	0.001
Sharp-tailed Grouse	0.432	0.464	0.014	0.0056
Sharp-tailed Sparrow	0.032	0	0.0005	0.0002
Short-eared Owl	0.032	0.032	0.001	0.0004
Sprague's Pipit	0.256	0.576	0.013	0.0052
Swainson's Hawk	0.032	0.16	0.003	0.0012
Upland Sandpiper	1.52	1.552	0.048	0.0192
Vesper Sparrow	1.312	0.976	0.03575	0.0143
Western Meadowlark	7.088	11.184	0.2855	0.1142
SUM	**59.97**	**75.31**	**2.11**	**0.85**

Ducks. To assess the impact of wind turbines on ducks, we used the Mallard Productivity Model (Cowardin et al. 1988). The Mallard Model is particularly useful for this exercise because it allowed us to predict any "net" change in nest site selection and recruitment that might occur as a result of simulating the reduction of grasslands available to nesting hens due to the placement of wind turbines. For example, if grassland availability is reduced as a result of disturbance, displaced hens may select other habitat types (e.g., cropland, hayland etc.) in the area for nesting, or they may elect to nest elsewhere in the grasslands protected by easement. If other habitats are selected, this could result in reduced recruitment because, most other habitats are characterized by lower nest success compared to grass habitats. However, if these hens select nest sites in the remaining grasslands outside the influence of the wind turbines, nest success will not change materially and recruitment rate will be the same with-or-without turbines. For this exercise, we selected six study areas from Four Square Mile plots used for breeding population and production surveys (Cowardin et al. 1995) in the Kulm Wetland Management District in North Dakota. Plots were selected that had ≥160 acres of grassland in one unit, and were accessible to ≥60 breeding duck pairs (≥12 mallard pairs) based on the "thunderstorm map" (HAPET 2000) for North Dakota. These criteria are consistent with those used by FWS Realty Office, Bismarck, ND for focusing grassland easements, and the Kulm WMD is representative of areas where the grassland easement program is being targeted. For the purpose of our assessment, all grasslands on study plots selected were treated as protected by easement. This was done to obtain sample acreage similar to easement acreage being purchased. We ran the model on plots with-and-without wind turbines in place and compared the response by mallard hens. The area of influence for turbines was set at 5 acres and was converted to barren habitat which simulated eliminating all nesting activity in that area. To reduce variability, and thus increase the precision of our estimates we conducted eight model runs (1000 hens each) and then scaled the average results to the estimated mallard population on each study plot.

Five-acre impact:
80-m zone of reduced density surrounding tower
80 m * 80 m * 3.14 — 2.0 ha
~ 2.5 acres per ha — 5.0 acres

Attachment 3

Memorandum

To: Regional Directors, Regions 1-7

From: Director

Subject: Service Guidance on the Siting, Construction, Operation and Decommissioning of Communications Towers

Construction of communications towers (including radio, television, cellular, and microwave) in the United States has been growing at an exponential rate, increasing at an estimated 6 percent to 8 percent annually. According to the Federal Communication Commission=s *2000 Antenna Structure Registry*, the number of lighted towers greater than 199 feet above ground level currently number over 45,000 and the total number of towers over 74,000. By 2003, all television stations must be digital, adding potentially 1,000 new towers exceeding 1,000 feet AGL.

The construction of new towers creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. Communications towers are estimated to kill 4-5 million birds per year, which violates the spirit and the intent of the Migratory Bird Treaty Act and the Code of Federal Regulations at Part 50 designed to implement the MBTA. Some of the species affected are also protected under the Endangered Species Act and Bald and Golden Eagle Act.

Service personnel may become involved in the review of proposed tower sitings and/or in the evaluation of tower impacts on migratory birds through National Environmental Policy Act review; specifically, sections 1501.6, opportunity to be a cooperating agency, and 1503.4, duty to comment on federally-licensed activities for agencies with jurisdiction by law, in this case the MBTA, or because of special expertise. Also, the National Wildlife Refuge System Improvement Act requires that any activity on Refuge lands be determined as compatible with the Refuge system mission and the Refuge purpose(s). In addition, the Service is required by the ESA to assist other Federal agencies in ensuring that any action they authorize, implement, or fund will not jeopardize the continued existence of any federally endangered or threatened species.

A Communication Tower Working Group composed of government agencies, industry, academic researchers and NGO=s has been formed to develop and implement a research protocol to determine the best ways to construct and operate towers to prevent bird strikes. Until the research study is completed, or until research efforts uncover significant new mitigation measures, all Service personnel involved in the review of proposed tower sitings and/or the evaluation of the impacts of towers on migratory birds should use the attached interim guidelines when making recommendations to all companies, license applicants, or licensees proposing new tower sitings. These guidelines were developed by Service personnel from research conducted in several eastern, midwestern, and southern States, and have been refined through Regional review. They are based on the best information available at this time, and are the most prudent and effective measures for avoiding bird strikes at towers. We believe that they will provide significant protection for migratory birds pending completion of the Working Group=s recommendations. As new information becomes available, the guidelines will be updated accordingly.

Implementation of these guidelines by the communications industry is voluntary, and our recommendations must be balanced with Federal Aviation Administration requirements and local community concerns where necessary. Field

Service Interim Guidelines For Recommendations On Communications Tower Siting, Construction, Operation, and Decommissioning

1. Any company/applicant/licensee proposing to construct a new communications tower should be strongly encouraged to collocate the communications equipment on an existing communication tower or other structure (e.g., billboard, water tower, or building mount). Depending on tower load factors, from 6 to 10 providers may collocate on an existing tower.

2. If collocation is not feasible and a new tower or towers are to be constructed, communications service providers should be strongly encouraged to construct towers no more than 199 feet above ground level, using construction techniques which do not require guy wires (e.g., use a lattice structure, monopole, etc.). Such towers should be unlighted if Federal Aviation Administration regulations permit.

3. If constructing multiple towers, providers should consider the cumulative impacts of all of those towers to migratory birds and threatened and endangered species as well as the impacts of each individual tower.

4. If at all possible, new towers should be sited within existing "antenna farms" (clusters of towers). Towers should not be sited in or near wetlands, other known bird concentration areas (e.g., State or Federal refuges, staging areas, rookeries), in known migratory or daily movement flyways, or in habitat of threatened or endangered species. Towers should not be sited in areas with a high incidence of fog, mist, and low ceilings.

5. If taller (>199 feet AGL) towers requiring lights for aviation safety must be constructed, the minimum amount of pilot warning and obstruction avoidance lighting required by the FAA should be used. Unless otherwise required by the FAA, only white (preferable) or red strobe lights should be used at night, and these should be the minimum number, minimum intensity, and minimum number of flashes per minute (longest duration between flashes) allowable by the FAA. The use of solid red or pulsating red warning lights at night should be avoided. Current research indicates that solid or pulsating (beacon) red lights attract night-migrating birds at a much higher rate than white strobe lights. Red strobe lights have not yet been studied.

6. Tower designs using guy wires for support which are proposed to be located in known raptor or waterbird concentration areas or daily movement routes, or in major diurnal migratory bird movement routes or stopover sites, should have daytime visual markers on the wires to prevent collisions by these diurnally moving species. (For guidance on markers, see *Avian Power Line Interaction Committee (APLIC). 1994. Mitigating Bird Collisions with Power Lines: The State of the Art in 1994. Edison Electric Institute, Washington, D.C., 78 pp*, and *Avian Power Line Interaction Committee (APLIC). 1996. Suggested Practices for Raptor Protection on Power Lines. Edison Electric Institute/Raptor Research Foundation, Washington, D.C., 128 pp.* Copies can be obtained via the Internet at http://www.eei.org/resources/pubcat/enviro/, or by calling 1-800/334-5453).

7. Towers and appendant facilities should be sited, designed and constructed so as to avoid or minimize habitat loss within and adjacent to the tower "footprint"@ However, a larger tower footprint is preferable to the use of guy wires in construction. Road access and fencing should be minimized to reduce or prevent habitat fragmentation and disturbance, and to reduce above ground obstacles to birds in flight.

8. If significant numbers of breeding, feeding, or roosting birds are known to habitually use the proposed tower construction area, relocation to an alternate site should be recommended. If this is not an option, seasonal restrictions on construction may be advisable in order to avoid disturbance during periods of high bird activity.

9. In order to reduce the number of towers needed in the future, providers should be encouraged to design new towers structurally and electrically to accommodate the applicant/licensee's antennas and comparable antennas for at least two additional users (minimum of three users for each tower structure), unless this design would require the addition of lights or guy wires to an otherwise unlighted and/or unguyed tower.

10. Security lighting for on-ground facilities and equipment should be down-shielded to keep light within the boundaries of the site.

11. If a tower is constructed or proposed for construction, Service personnel or researchers from the Communication Tower Working Group should be allowed access to the site to evaluate bird use, conduct dead-bird searches, to place net catchments below the towers but above the ground, and to place radar, Global Positioning

Appendix 7

KNOWN AND SUSPECTED IMPACTS OF WIND TURBINES ON WILDLIFE

While wind-generated electrical energy is renewable, emission-free, and generally environmentally clean (American Wind Energy Association [AWEA] unpubl. data, <http://www.awea.org>), it does have one significant downside -- rotor blades kill birds, especially raptors (Hunt 2002) and bats. Birds can strike the towers; electrocutions can occur if designs are poor; and wind farms may impact bird movements, breeding, and habitat use.

Wind turbine technology is not new to the United States. In the 1800s, Cape Cod supported over 1,000 working wind turbines (Ferdinand 2002). In the late 1930s, Vermont boasted the world's then-largest turbine, which was likely disabled by high winds due to design flaws. But wind turbine 'farms' and their impacts to birds are a recent phenomenon compared to power lines and communication towers, where mortality has been documented for decades or longer (Boeker and Nickerson 1975, Olendorff et al. 1981, APLIC 1994, APLIC 1996, Harness 1997, Ainley et al. 2001, Manville 2001). The problem in the U.S. surfaced in the late 1980s and early 1990s at the Altamont Pass Wind Resource Area, a facility then containing some 6,500 turbines on 73 mi^2 of gently rolling hills just east of San Francisco Bay, California (Davis 1995). Orloff and Flannery (1992) estimated that several hundred raptors were killed each year due to turbine collisions, guy wire strikes, and electrocutions. The most common fatalities were those of Red-tailed Hawks (*Buteo jamaicensis*), American Kestrels (*Falco sparvarius*) and Golden Eagles (*Aquila chrysaetos*), with fewer mortalities of Turkey Vultures (*Cathartes aura*), Common Ravens (*Corvus corax*), and Barn Owls (*Tyto alba*). The impacts of this wind farm were of most concern to the population of Golden Eagles, which was showing a "disturbing source of mortality" to a disproportionately large segment of the population (Southern Niagara Escarpment [WI] Wind Resource Area unpubl. report). More recent studies indicate that a model previously used to assess Golden Eagle mortality was defective, and that nonbreeding Golden Eagles representing a "floater" population were likely suffering less mortality based on a new model (Hunt 2002). Research continues at this time to further assess the impacts of Altamont turbines on raptors. The Altamont turbines are still estimated to kill 40-60 subadult and adult Golden Eagles each year, as well as several hundred Red-tailed Hawks and American Kestrels – a continuing concern for the FWS. Of the variety of wind turbines at the site, the smaller, faster moving, Kenetech-built, lattice-supported turbines caused most of the mortality. As part of a re-powering effort, these turbines are now being replaced with slower moving, tubular-supported turbines. While Europeans have used tubular towers almost exclusively, the U.S. has almost solely used lattice support, at least until recently (Berg 1996).

Colson (1995) indicated that some 16,000 wind turbines operated in California, making the State the largest concentration of wind energy development in the world. Since 1995, that statistic has changed. While California still boasts the greatest number of turbines in the U.S., many smaller turbines are being replaced by fewer but larger models. Worldwide, an estimated 50,000 turbines are generating power (AWEA unpubl. data; Ferdinand 2002), of which over 15,000 are currently in 29 states in the U.S. Turbine numbers are often difficult to track since statistics are generally presented in megawatts (MW) of electricity produced rather than number of turbines present. The latter statistic is of greater concern to ornithologists. In 1998, for example, Germany was the greatest producer with 2,874 MW of electricity produced by turbines, followed by the U.S. (1,884), and Denmark (1,450); (AWEA unpubl. data). While some project that the number of wind turbines in the U.S. may increase by another 16,000 in the next 10 years, current trends indicate an even greater potential growth. Although the U.S. presently produces less than 1% of its electrical energy from turbines – compared, for example, to Norway's 15% – 2001 was a banner year for U.S. turbine technology, doubling the previous record for installed wind production. Companies installed 1,898 turbines in 26 states, which will produce nearly 1,700 MW, at a cost of $1.7 billion for the new equipment (J. Cadogan, U.S. Department of Energy, 2002, pers. comm.). Over the past decade, wind power has been the fastest growing energy industry in the world. By 2020, the AWEA (unpubl. data) predicts that wind will provide 6% of this nation's electricity, serving as many as 25 million households. Enron Wind Corporation constructed some 1,500 of the 1,898 turbines installed in the U.S. in 2001. Although Enron is now bankrupt, General Electric purchased the company and is now producing wind turbines.

In March 2002, President Bush signed the Job Creation and Worker Assistance Act, extending the production tax credit to the wind industry for another two years. There are presently attempts in Congress to amend the reauthorization of this legislation for five or more years. However, even with a bright future for growth, and with low speed tubular-constructed wind turbine technology now being stressed, larger and slower moving turbines still kill raptors, passerines, waterbirds, other avian species, and bats. Low wind speed turbine technology requires much larger rotors, blade tips often extending more than 420 ft. above ground, and blade tips can reach speeds in excess of 200 mph under windy conditions (J. Cadogan, U.S. Department of Energy, 2002, pers. comm.). When birds

seaduck movements. Only a few studies have been conducted in Denmark, the Netherlands, and Sweden, so further research is needed. Studies deal mostly with wintering species (Noer et al. 2000, Percival 2001, Langstron and Pullan 2002, Christensen et al. 2002, and Bruns et al. 2002).

In an attempt to begin addressing the bird mortality issue – and ancillary to this, the issue of ESA-listed bat strikes – the National Wind Coordinating Committee was created in 1994 as part of President Clinton's Global Climate Change Action Plan (Colson 1995). Shortly following the creation of the Committee, the Avian Subcommittee (now called the Wildlife Work Group) was formed, co-founded by the Service. In 1999, the Avian Subcommittee published a *Metrics and Methods* document to study turbine impacts on birds (Anderson et al. 1999). The document provides an excellent resource for conducting research on proposed and existing turbines and wind farms.

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Enclosure 2

FEDERAL ENDANGERED SPECIES
FOUND IN DICKEY COUNTY
NORTH DAKOTA
July 2009

ENDANGERED SPECIES

Birds

Whooping crane (Grus Americana): Migrates through North Dakota counties during spring and fall. Prefers to roost on wetlands and stockdams with good visibility. Current flock size of the Aransas - Wood Buffalo migratory population is estimated to be 266 birds.

FEDERAL THREATENED AND ENDANGERED SPECIES
AND DESIGNATED CRITICAL HABITAT FOUND IN
MCINTOSH COUNTY, NORTH DAKOTA
July 2009

ENDANGERED SPECIES

Birds

Whooping crane (Grus Americana): Migrates through North Dakota counties during spring and fall. Prefers to roost on wetlands and stockdams with good visibility. Current flock size of the Aransas - Wood Buffalo migratory population is estimated to be 266 birds.

THREATENED SPECIES

Birds

Piping plover (Charadrius melodus): Nests on midstream sandbars of the Missouri and Yellowstone Rivers and along shorelines of saline wetlands. More nest in North Dakota than any other state.

DESIGNATED CRITICAL HABITAT

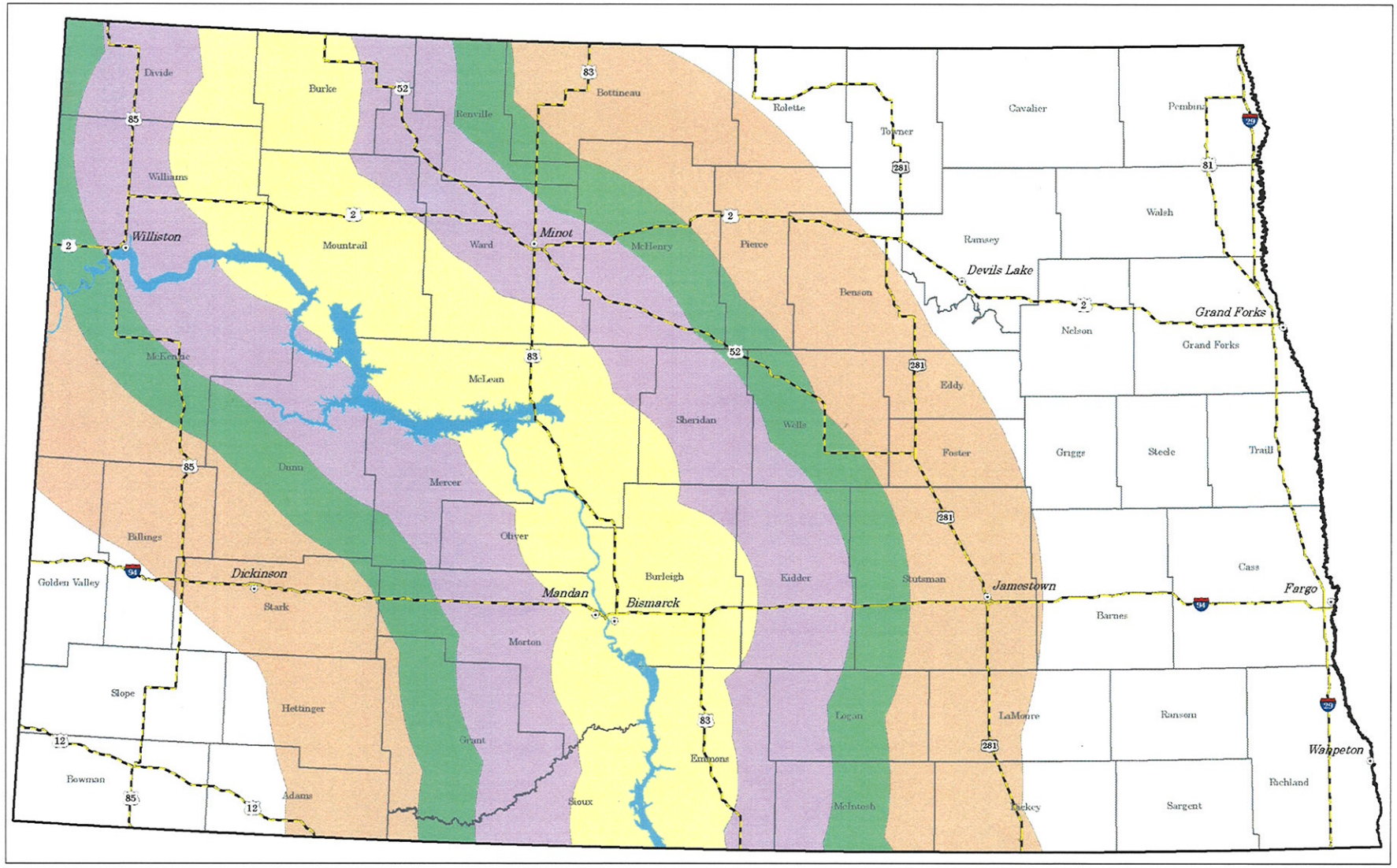
Birds

Piping Plover - Alkali Lakes and Wetlands - Critical habitat includes: (1) shallow, seasonally to permanently flooded, mixosaline to hypersaline wetlands with sandy to gravelly, sparsely vegetated beaches, salt-encrusted mud flats, and/or gravelly salt flats; (2) springs and fens along edges of alkali lakes and wetlands; and (3) adjacent uplands 200 feet (61 meters) above the high water mark of the alkali lake or wetland.

U.S. Fish & Wildlife Service

Selected Percentages Of Whooping Crane Sightings

North Dakota



PRODUCED BY ECOLOGICAL SERVICES
BISMARCK, NORTH DAKOTA
MAP DATE: 03/18/08
SIGHTINGS THROUGH SPRING 2007
FILE: TOWERS_NOLOCATIONS.MXD

0 12.5 25 50 Miles

0 12.5 25 50 Kilometers

Map Features

- Major Roads
- County Boundaries
- Missouri/Yellowstone River System

Percent Whooping Crane Sightings

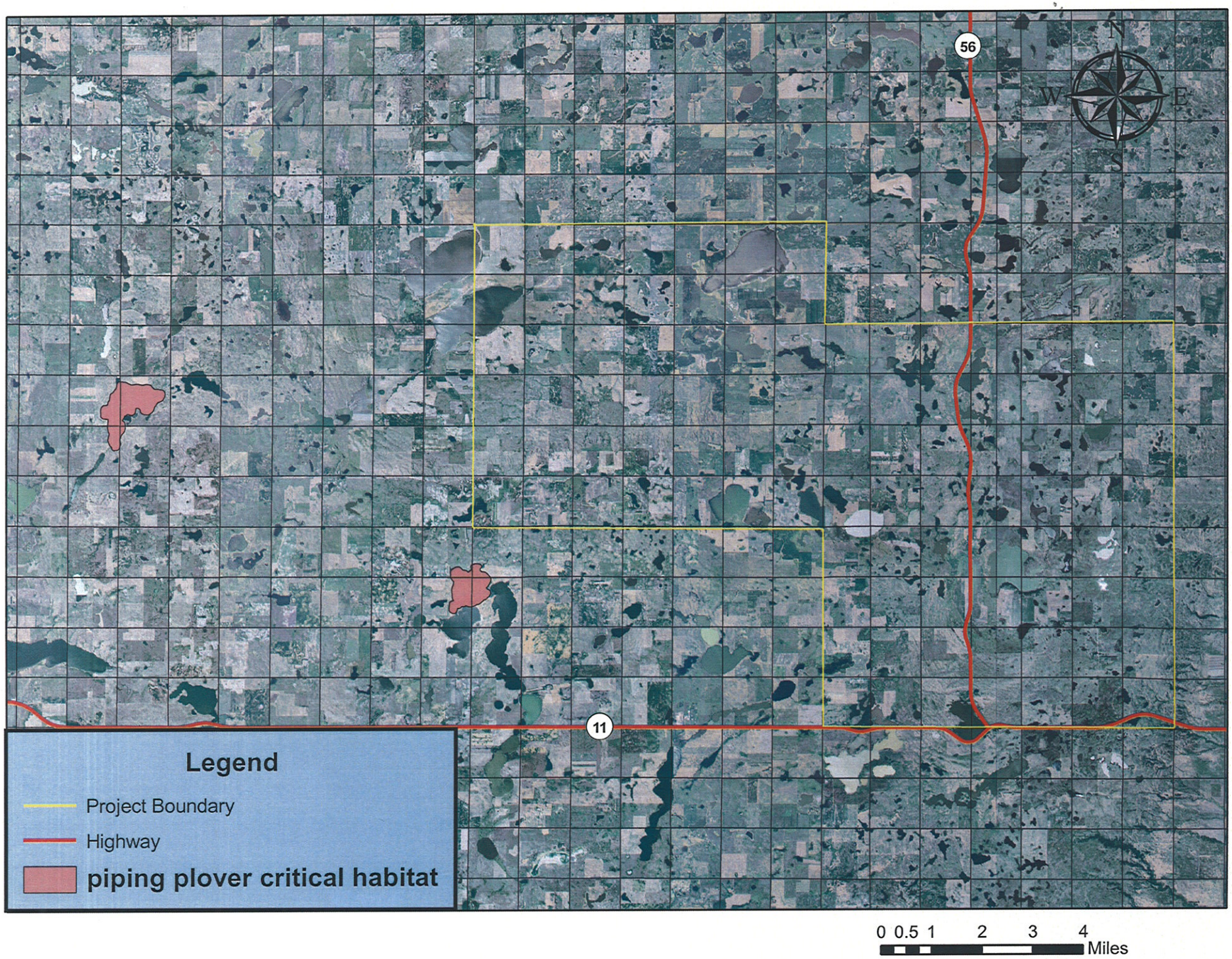
- Approx. 50% (40 mile corridor)
- Approx. 75% (90 mile corridor)
- Approx. 85% (120 mile corridor)
- Approx. 95% (180 mile corridor)

N

NAD 83
UTM ZONE 14

Enclosure 3

enXco Merricourt Wind Farm

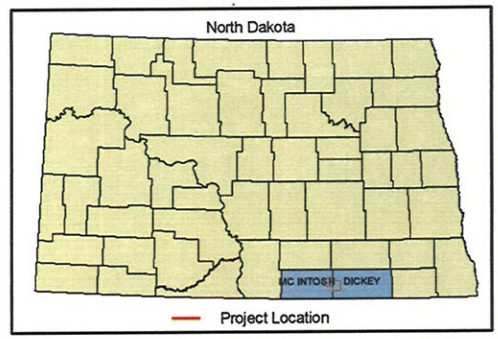


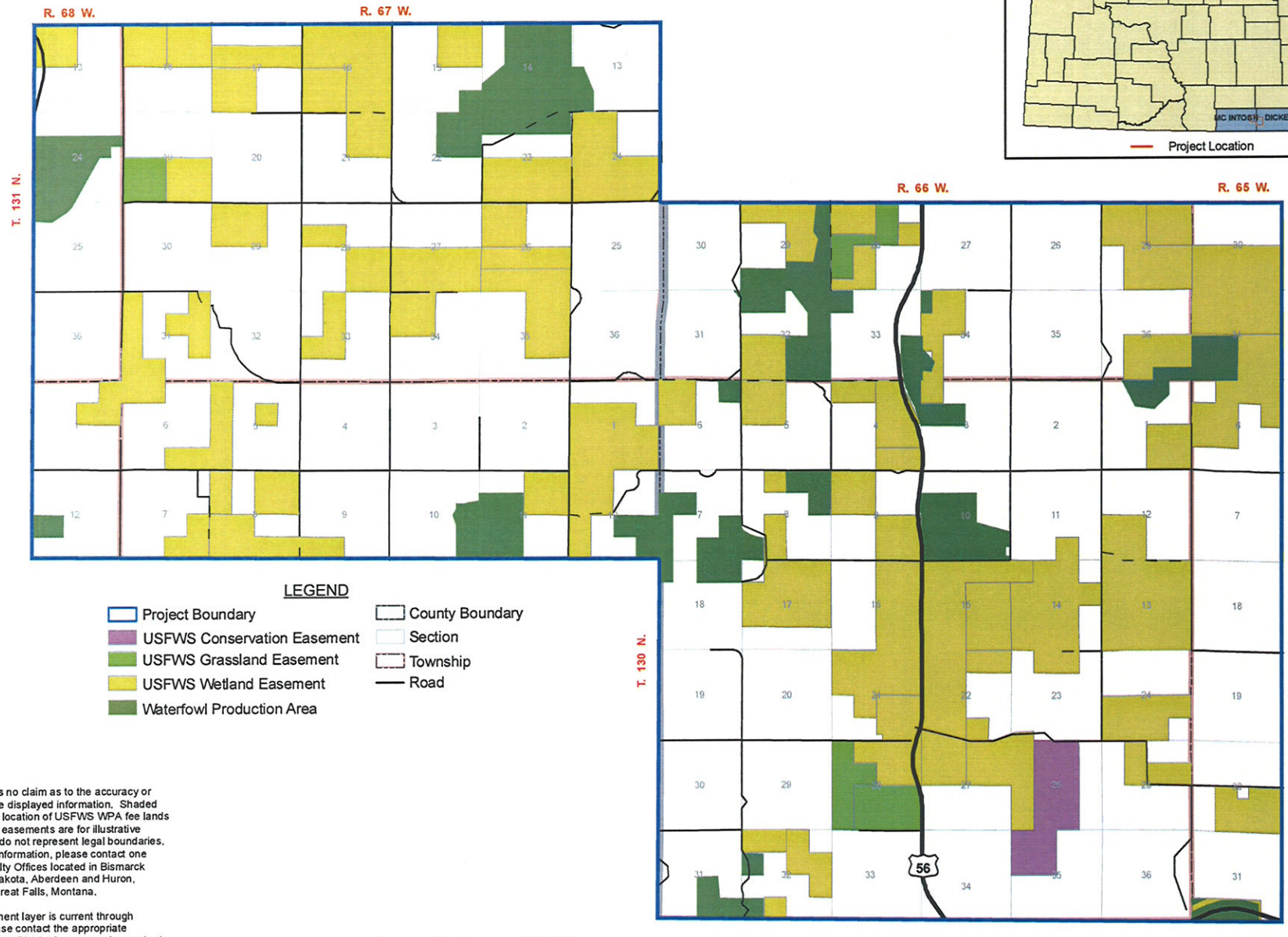
Enclosure 4

U.S. Fish & Wildlife Service

Merricourt Wind Farm - Kadrmas Lee & Jackson (KLJ)

Dickey and McIntosh Counties, North Dakota





LEGEND

- Project Boundary
- USFWS Conservation Easement
- USFWS Grassland Easement
- USFWS Wetland Easement
- Waterfowl Production Area
- County Boundary
- Section
- Township
- Road

DISCLAIMER:

The USFWS makes no claim as to the accuracy or completeness of the displayed information. Shaded areas depicting the location of USFWS WPA fee lands and limited interest easements are for illustrative purposes only and do not represent legal boundaries. For more detailed information, please contact one of the USFWS Realty Offices located in Bismarck and Minot, North Dakota, Aberdeen and Huron, South Dakota, or Great Falls, Montana.

The USFWS easement layer is current through October 2008. Please contact the appropriate Wetland Management District for any newly acquired easements.

Map was produced by the HAPET Office, Bismarck, ND
June, 2009

N

0 0.5 1 2 Kilometers

0 0.5 1 2 Miles

Projection Information:
Universal Transverse Mercator
Datum NAD1983
Zone 14

Enclosure 5

TOWNSHIP OF SPRING VALLEY

DICKEY COUNTY, NORTH DAKOTA

Mark Flaten, Chairman
Ryan Brokaw, Supervisor
eLane Henke, Supervisor

6755 91st St SE
Ashley ND 58413

Matt Herman, Clerk/Treasurer
Jim Herman, Assessor

July 22, 2009

Jennifer Turnbow
Kadrmas, Lee, & Jackson, Inc.
PO Box 1157
Bismarck ND 58502-1157

RE: Merricourt Wind Tower Project

Dear Ms. Turnbow:

This is in response to your 17 June 2009 letter requesting information that would assist your study in preparation of an application for the ND Public Service Commission.

Because our entire township lies within the boundaries of the project map you enclosed, we have a substantial interest in the Merricourt project. Our township does have a zoning ordinance in effect that does address the permitting of a wind farm. Email correspondence with Chris Sternhagen of enXco has verified that enXco is aware of our zoning requirements and does have a copy of our zoning regulations. The permitting process will need to be followed and a permit granted to construct in Spring Valley Township.

One of the primary concerns of our township will be the maintenance of our township roads throughout the construction phase of the project and the restoration of the same upon completion. Our roads were not engineered with the anticipation of use by the heavy equipment that the construction of a wind farm will bring. With an annual township budget of approximately $7500, our resources our ability to generate revenue to maintain our roadways are limited.

To the best of our knowledge, at this time there are no developments being proposed or contemplated in the area of the proposed project.

Please feel free to contact us should we be of additional help in your study. We are hopeful that your study will be thorough and accurate. You might note that Ms. Darlene Schnabel has never been the chair of Spring Valley Township. In fact, she has not been an officer of the township since March of 2007.

Sincerely,

Mark Flaten, Chair
Board of Supervisors

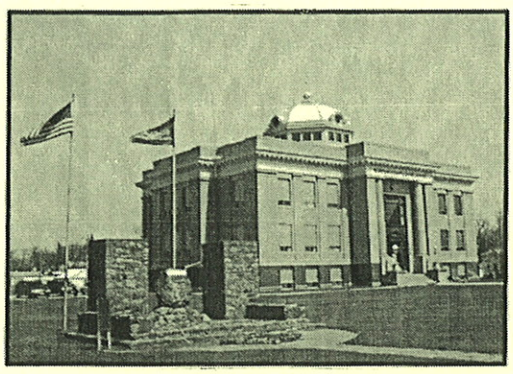
Brad Crabtree, Chair
Zoning Committee

Matt Herman
Clerk/Treasurer
Zoning Code Administrator

RECEIVED
AUG 0 3 2009

BOARD OF COUNTY COMMISSIONERS:
Neil Meidinger
Ronald J. Meidinger
James Raile

AUDITOR: Gina Ketterling
TREASURER: Donna Heupel
STATE'S ATTORNEY: Terry Elhard
SHERIFF: Laurie Spitzer
CLERK OF COURT/COUNTY RECORDER: Carol Fey
TAX DIRECTOR: Delbert Heil
SUPT. OF SCHOOLS: Coreen Schumacher
VETERANS SERVICE OFFICER: Leo P. Keaveny
DISASTER EMERGENCY MANAGER: DeLoris Rudolph



McINTOSH COUNTY
112 1ST St. NE
PO Box 39
Ashley, ND 58413

July 7, 2009

Kadrmas, Lee & Jackson, Inc.
PO Box 1157
Bismarck ND 58502-1157

RE: Merricourt Wind Power Project
EnXco Development Corporation

ATTN: JENNIFER TURNBOW

Dear Ms. Turnbow:

The McIntosh County Board of Commissioners reviewed your letter and they are making the following requests:

a) The Board wants to know the main road that will be used during construction.
b) They want the McIntosh County Road Supervisor to do a pre-inspection and a post-inspection.

The county's main concern, in the proposed development site, is the roads.

McIntosh County is also in the process of adopting a Zoning Ordinance. I am enclosing a copy of it for your information.

If you have any questions, please call me at 701-288-3347.

Sincerely,

Gina Ketterling
McIntosh County Auditor



MCINTOSH COUNTY
NORTH DAKOTA

ZONING
REGULATIONS

May, 2009

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1) ARTICLE 1: INTRODUCTION

1.1 TITLE

This ordinance, its regulations, and the County Zoning Map shall be known and cited as the McIntosh County Zoning Ordinance.

1.2 PURPOSE AND INTENT

To protect public health, safety, morals, comfort, convenience, prosperity and general welfare of McIntosh County, North Dakota.

To secure safety from fire, panic, noxious fumes, and other dangers.

The purpose of this ordinance is to promote the health, safety and welfare of the people of McIntosh County. It is intended that the establishment of this ordinance will promote orderly and non-conflicting uses of land and property, protect property rights, ensure the provisions of adequate public services and promote conservation of land, water and other natural resources to assist in the realization of goals and objectives of the McIntosh County Comprehensive Policy Plan and subsequent amendments thereto.

To promote orderly development of the county's resources including, but not limited to, land, wind, and water resources, and to prevent conflict among land uses and structures.

1.3 AUTHORITY

This zoning ordinance is developed and enacted under authority granted to MCINTOSH COUNTY in Chapter 11-33 of the North Dakota Century Code (NDCC).

1.4 JURISDICTION

General

This ordinance shall affect all unincorporated territory over which the Board of County Commissioners have jurisdiction in MCINTOSH COUNTY, North Dakota except as indicated below.

Extraterritorial Areas

This ordinance shall not affect any property, real or personal, which is located within the zoning or subdivision authority of any township having lawfully

enacted regulations as provided in Sections 58-03-11 through 58-03-15 of the NDCC, except where such township supervisors relinquish to the County their powers or any portion thereof, to enact zoning regulations. This ordinance shall not affect any property, real or personal, located within the zoning or subdivision authority of any city of this state, except that any such city may by resolution of its governing body relinquish to the county its authority, or any portion thereof, to enact zoning or subdivision regulations under Chapter 40-47 or 40-48 of the NDCC, in which case such property shall be subject to the provisions of this ordinance.

1.5. INTERPRETATION

These regulations shall be held to be minimum requirements adopted for promotion of purposes cited in Section 1.2. Whenever the requirements of these regulations are at variance with the requirements of other lawfully adopted rules, regulations, ordinances, deed restrictions or covenants, the most restrictive shall govern unless otherwise specifically stated.

1.6 SEVERABILITY

If any part, provision, or portion of these regulations is adjudged invalid by a court of competent jurisdiction, the remainder of this ordinance shall not be affected thereby.

1.7 EFFECTIVE DATE

These regulations shall be effective upon adoption by the Board of County Commissioners as provided by the NDCC.

1.8 NON-RESTRICTION OF FARMING

No regulation or restriction contained in this ordinance shall be construed to prohibit or prevent the use of land or buildings for farming or any of the normal incidents of farming.

1.9 DISCLAIMER

This ordinance shall not create liability on the part of *MCINTOSH COUNTY*, any officer or employee thereof, or the Federal Insurance Administration for any damage that results from reliance on this ordinance or any administrative decision lawfully made there under.

2) ARTICLE 2: RULES AND DEFINITIONS

2.1 RULES

In construction of these regulations, the rules and definitions contained in this section shall be observed and applied except when the context clearly indicates otherwise.

1) Words used in present tense shall include the future.

2) Words used in singular number shall include the plural number, and the plural the singular.

3) Shall is a mandatory word and not discretionary.

4) May is a permissive word.

2.2 DEFINITIONS

The definitions of specific terms used in this ordinance are:

1) **"Accessory Building and Uses"** means a subordinate building or portion of the main building the use of which is clearly incidental to and serves exclusively the principal building or principal use. The accessory building or use shall be located on the same zoning lot and it is established to contribute to the comfort, convenience or necessity of occupants of the principal building or principal use.

2) **"Adjoining Properties"** means properties contiguous with the Wind Energy Facility Perimeter and external to such Perimeter.

3) **"Agriculture"** means the process of producing food and fiber including, but not limited to the land, facilities, structures, and buildings for operation and maintenance thereof. It includes all types of general farming, crop and vegetable farming, dairying, livestock and poultry raising, apiaries, fur farming, horticulture, pasturing, tree farming and related land based food and fiber producing facilities.

4) **"Agriculture (Farming, Ranching)"** means the art or science of cultivating the soil and activities incidental thereto; cultivating land for production of agricultural crops or livestock; raising, feeding, or producing livestock, poultry, milk, or fruit. The term shall include incidental retail selling by the producer of products raised on the premises, provided that space necessary for parking of vehicles of customers shall be furnished off the public right-of-way. The term does not include producing timber or forest products, nor does the term include a contract whereby a processor or distributor of farm products or supplies, provides grain, harvesting grain, or other farm services. See also Section 11-33-2 of the NDCC.

5) **"Airport"** means any area designated for the landing and take off of aircraft and any appurtenant areas which are used or intended for use for airport buildings and structures including runways, taxi-ways, aircraft storage and tie down areas, hangars and other related facilities and open spaces other than landing strips used for family purposes.

6) **"Animal feeding operation"** means a place where: livestock have been, are or will be confined, concentrated and fed for 45 or more days in any 12 month period; pasture, crops or other vegetation are not normally managed or sustained for grazing during the normal growing season; and animal waste or manure accumulates. This term does not include an animal wintering operation. Two or more feeding operations under common ownership shall be considered a single animal operation, if they use a common system for manure handling.

7) **"Animal Feeding Operation Structure"** means lagoon, formed manure storage, wash water storage structure, earthen manure storage basin, or any animal confinement building.

8) **"Animal Hospital or Kennel"** means a building or premises set up for treatment and boarding of domestic animals including veterinary facilities.

9) **"Animal Wintering Operation"** means the confinement of cattle or sheep used or kept for breeding purposes in a feedlot or sheltered area at any time between October 15 and May 15 of each production cycle under circumstances in which these animals do not obtain a majority of their feed and nutrients from grazing. The term includes the weaned offspring of cattle and sheep, but it does not include (1) breeding operations of more than 1,000 animal units or (2) weaned offspring which are kept longer than 150 days and that are not retained for breeding purposes.

10) **"Applicant"** means an individual, corporation, and group of individuals, partnership, joint venture, owners, or any other business entity having charge or control of one or more animal feeding operations.

11) **"Aquifer"** means a geologic formation, group of formations, or part of a formation capable of storing and yielding ground water to wells and springs.

12) **"Building"** means any structure designed or intended for shelter, housing, business, office, and accommodation of persons, animals, chattels or property.

13) **"Building Area"** means that portion of the zoning lot that can be occupied by the principal use, excluding the front, rear and side yards.

14) **"Building Height"** means vertical distance from the grade to the highest point of the roof.

15) **"Building Line"** means a line establishing the minimum distance that structures may be placed from the lot lines or highway right-of-way. For the purposes of these regulations the building line is the same as setback line.

16) **"Building Principal"** means a building, the principal use of which is single family and multi-family dwellings, and offices, shops, stores, and other uses.

17) **"Certificate of Site Compatibility"** means a certificate of site compatibility within the meaning of NDCC Chapter 49.22 or successor statute.

18) **"Channel"** means a natural or man-made water course for conducting the flowing water.

19) **"Closure"** means taking of those actions to close and reclaim a feedlot. Closure actions may include, but are not limited to, cleaning of buildings, disposal of manure and demolition and/or removal of all manure storage structures.

20) **"Club or Lodge"** means a private club or lodge which is a nonprofit association of persons for the purpose of gatherings and entertaining members including consumption of food and beverages.

21) **"Commission"** means the County Zoning Commission.

22) **"Comprehensive Plan"** means a guide for management of the physical resources and development of the County as adopted by the County Commission.

23) **"Conditional Use"** means use of a special nature not automatically permitted in a zoning district and which requires review and approval of the Zoning Commission after public hearing.

24) **"Conforming Building or Structure"** means a building or structure which complies with all requirements of these regulations and other regulations adopted by the County.

25) **"County"** means MCINTOSH COUNTY.

26) **"Development"** means any man-made change to improved or unimproved real estate, including but not limited to the construction of buildings, structures or accessory structures, the construction of additions or alternations to buildings or structures, ditching, lagooning, dredging, filling, grading, paving, excavation and drilling operations.

27) **"Development Plan"** means a document including maps and data for physical development of an area as provided by these regulations.

28) **"District"** means a section or sections of the county for which regulations governing the use of building and premises, the building heights, size of yards, lot area, lot width and the use are uniform.

29) **"Due process"** involves two essential elements; (1) notice and (2) an opportunity for a hearing. The notice must adequately describe the potential action that might affect the person(s) being notified and it must provide the person(s) a reasonable time to respond. If the person(s) request(s) a hearing, the hearing must be fair and allow the person(s) to present relevant evidence and arguments.

30) **"Dwelling"** means any building or portion thereof, used exclusively for human habitation including single family and multiple family units but not including hotels or motels.

31) **"Dwelling, Multiple Family"** means a single building or portion thereof, containing two (2) or more dwelling units.

32) **"Dwelling, single family"** means a building containing one dwelling unit only.

33) **"Earthen Manure Storage Basin"** means an earthen cavity, either covered or uncovered, which, on a regular basis, receives waste discharges from an animal feeding operation and from which accumulated wastes from the basin are removed at least once a year.

34) **"Encroachment"** means any fill, building, structure or use including accessory used projecting into the required yard areas or public and private property.

35) **"Established Residence"** means any residence established by a personal presence, in a fixed and permanent dwelling with intent to remain there.

36) **"Establishment"** means a place of business for processing, production, assembly, sales, service of goods and materials.

37) **"Existing"** means an animal unit handling facility in place on the date this ordinance is effective.

38) **"FAA"** means the Federal Aviation Administration.

39) **"Farm"** means a tract of land of not less than five acres which is devoted to agricultural activities.

40) **"Farming"** - see Agriculture (Farming, Ranching).

41) **"Feedlot"** means a parcel of land which contains a commercial operation for feeding or raising of 200 (two hundred) or more animals which is operated as a separate activity and not incidental to farming.

42) **"Flood Plain"** means lowland and relatively flat areas adjoining inland and coastal waters that are inundated by a one-hundred (100) year flood.

43) **"Frontage"** means the front part of a lot abutting a public right-of-way, or road or highway.

44) **"Grade"** means the land elevation at the horizontal intersection of the ground and the building.

45) **"Ground Water"** means water below the surface in a geological unit in which soil pores are filled with water and the pressure of that water is equal to or greater than atmospheric pressure.

46) **"Home Occupation"** means any occupation carried on in a dwelling unit by a member or members of the family and which meets these requirements:
   a) That the occupation is conducted within the principal building and not in an accessory building.
   b) That no stock-in-trade is kept or commodities sold other than those produced on the premises.
   c) That no more than twenty five percent (25%) of the floor area of the dwelling is devoted to such home occupation.

47) **"Hotel or Motel"** means a building in which lodging accommodations with or without meals is provided for compensation.

48) **"Hub Height"** means, when referring to a Wind Turbine, the distance measured from the ground level to the center of the turbine hub.

49) **"Junk or Salvage Yard"** means an open area where waste or scrap material, including parts of used motor vehicles, appliances and farm implements are bought, sold, exchanged, stored, baled, parked, disassembled or handled.

50) **"Kennel, Animal"** means any premises where dogs, cats and other household pets are boarded, bred and maintained for compensation.

51) **"Lagoon"** means an impoundment made by excavation or earth fill for biological treatment of animal or other agricultural wastes, lagoons can be aerobic, anaerobic or facultative, depending on their loading and design.

52) **"Livestock"** means any animal raised for food, raw materials, or pleasure, including but not limited to, beef and dairy cattle, bison, sheep, swine,

poultry and horses. Livestock also includes fur animals raised for pelts.

53) **"Lot"** means a piece, parcel, lot or area of land of continuous assemblage established by survey, plat or deed.

54) **"Lot Lines"** means the property lines bounding the lot.

55) **"Lot Width"** means the horizontal distance between the side lot lines of a lot measured at the front building setback line.

56) **"Lot, Zoning"** means a single lot, parcel, tract of land within a zoning district developed or to be developed.

57) **"Manure"** means fecal material and urine from livestock, as well as animal-housing wash water, bedding material, rainwater or snow melt that comes in contact with fecal material or urine.

58) **"MET Tower"** means temporary and permanent meteorological towers used for measurement of wind speed, direction and other meteorological conditions.

59) **"Mobile Home"** means a manufactured trailer intended for family residential occupancy.

60) **"Mobile Home Park"** means a parcel of land for which a detailed plan indicating the location of lots, blocks, streets, facilities and utilities exists.

61) **"Nonconforming Building"** means any building which does not comply with any or all of these regulations.

62) **"Nonconforming Use"** means any principal use of land or building which does not comply with any or all of these regulations.

63) **"Nursing Home or convalescent Home"** means a home for the aged or infirm which unrelated persons are accommodated for compensation.

64) **"Occupied Structures and Facilities"** means any occupied dwelling, commercial building or publicly-used structure or facility.

65) **"Operator"** means an individual or group of individuals, a partnership, a corporation, a joint venture, or any other entity owning or controlling one or more animal feeding operations or animal wintering operations.

66) **"Permitee"** means an individual, group of individuals, corporation, partnership, joint venture, owners, or any other business entity, or combination thereof, that leases or owns the wind rights, Wind Turbines

and associated improvements, and all subsequent assignees and/or transferees of these rights, and that submits a Wind Energy Facility Siting Permit application, develops the Wind Energy Facility, and subsequently operates such facility.

67) **"Permitted Uses"** means those uses, buildings or structures which comply with the provisions of specific zoning districts because of the similarities in nature and relationship to each other. Permitted uses are distinct from conditional uses that are authorized only if certain requirements of these provisions are met after a public hearing and approval by the Zoning commission.

68) **"Person"** means any individual, firm, corporation, partnership or legal entity.

69) **"Planned Development"** means a grouping of buildings and structures on a site of five (5) or more acres in single ownership which is not limited by the yard or building height limitations but is based on a detailed development plan and recorded in the office of the County Code Administrator upon approval by the Zoning Commission.

70) **"Pollution, Air"** means the presence in the outdoor atmosphere of one or more air contaminants in such quantities and duration as is or may injurious to human health, welfare, or property, animal, or plant life or which unreasonable interferes with the enjoyment of life or property.

71) **"Pollution, Water"** means manmade or man-induced alteration of the physical, chemical, biological integrity of any Water of the State.

72) **"Public Roadway or Public Way"** means any dedicated and recorded right-of-way including alleys, sidewalks, streets, roads or highways.

73) **"Regional Flood"** means a flood determined by the State and Federal Emergency Management Agency which is representative of large floods known to have occurred in the County.

74) **"Rotor Diameter"** means the diameter of the circle formed by the swept area of the Wind Turbine's blades.

75) **"Service Station"** means any building or premises where automotive fuels, automotive related services, lubricants, parts and supplies are made available to the motorist.

76) **"Shall"** means that the requirement is mandatory, rather than optional.

77) **"Sign"** means any emblem, name, identification, description or illustration

which is used for outdoor advertising having permanent location on the ground or attached to or painted on a building including bulletin boards, billboards and poster boards, but excluding real estate for sale signs, political campaign signs, public information and traffic signs.

78) **"Site Plan"** means a detailed plan for making improvements to parcel(s) of land for the purpose of building and development as provided in these regulations.

79) **"Source-Water Protection Area"** means a boundary which defines the surface and subsurface area surrounding a water well or a well field, which supplies a public water system and through which contaminants are likely to move toward and reach such water well or field.

80) **"Stream"** means any running body of surface water that ordinarily flows within a channel. This includes both perennial and intermittent stream.

81) **"Structural Alterations"** means any change in the supporting elements of a building or structure including bearing elements, partitions, columns, beams, girders, roofs, exterior walls and embankment.

82) **"Structure"** means anything constructed or erected, the use of which requires permanent location on the ground including advertising signs and billboards.

83) **"Substantial Improvement"** means any repair, reconstruction or improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure either:
   a) Before the improvement or repair is started, or
   b) If the structure has been damaged and is being restored, before the damages occurred. For the purposes of this definition "substantial improvement" is considered to occur when the first alteration of any wall, ceiling or floor or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure.

84) **"Surface Water"** means water of the state located on the ground surface such as lakes, reservoirs, rivers and creeks.

85) **"Total Height"** means, when referring to a Wind Turbine, the distance measured from the ground level to the blade extended at its highest point.

86) **"Utilities"** means installations for conducting water, sewage, gas, electricity, television, storm water and similar facilities providing service to and used by the public.

87) **"Variance"** means the relaxation of the terms of the zoning regulations in

relationship to building height, size of the front, rear and side yards, where the literal enforcement of these regulations could create unreasonable hardship, but it is not contrary to the purposes of the County Comprehensive Plan and these regulations.

88) **"Waters of the state"** means all waters within the jurisdiction of this state, including all streams, lakes, ponds, impounding reservoirs, marshes, watercourses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, situated wholly or partly within or bordering upon the state, except those private waters that do not combine or effect a junction with natural surface or underground waters just defined.

89) **"Wind Energy facility"** means a facility directly generating electricity or indirectly generating electricity or energy through production of hydrogen, compressed air or other energy carrier from conversion of wind to energy and consisting of one or more Wind Turbines under common ownership or operating control, and includes substations, temporary and permanent MET towers, cables/wires and other building accessories to such facility, whose main purpose is to supply electricity directly, or through wind energy conversion to another form of energy, to off-site customer(s).

90) **"Wind Energy Facility Perimeter"** means the boundary of the Wind Energy Facility as defined by the external property lines of landowners who have a contractual relationship with the Permitee and who will receive Wind Turbine compensation type payments or other forms of revenue derived from Wind Turbines sited within such Wind Energy Facility.

91) **"Wind Energy Facility Siting Permit"** means a construction and operating Permit granted in accordance with the provision of this Ordinance.

92) **"Wind Turbine"** means a wind energy conversion system which converts Wind energy into electricity, hydrogen, compressed air, or some other Energy carrier and includes the turbine, blade, tower, base and pad Transformer, if any; provided that such a system shall only be a Wind Turbine for the purposes of 6.11, if it has a name plate capacity of 100 Kilowatts or greater. Wind Turbines of less than 100 kilowatts name plate Capacity will be regulated pursuant to 6.11.

93) **"Yard"** means an open space on the zoning lot which is unoccupied or unobstructed by any portion of a structure from the ground upward.

94) **"Zoning Commission"** shall mean a body consisting of no more than seven

(7) members. Terms of office shall be established as set forth in NDCC 11-33-04.

3) ARTICLE 3: GENERAL PROVISIONS

3.1 COMPLIANCE

No building or land shall hereafter be used or occupied and no building shall be erected, moved, or altered unless in conformity with these regulations.

No person, firm or corporation shall erect, construct, make structural changes or move any structure without first obtaining a Building Permit. Application for a building permit shall be made to the County Code Administrator, who may issue said "permitted use" permit. Permits other than "permitted use" shall be brought to the Zoning Commission for action. No building permit shall be issued if the actions described in the application would constitute a violation of this ordinance.

If, for any reason, a "permitted use" building permit is initially denied by the County Code Administrator, the applicant shall be informed within seven days of the date of the application. The applicant may than request a hearing before the Zoning Commission to appeal for a reversal of such denial or may reapply after making whatever changes in the application deemed necessary by the County Code Administrator. If, for any reason, a building permit is initially denied by the Zoning Commission, the applicant shall be informed within seven days of the date of application. The applicant may then reapply after making whatever changes in the application deemed necessary by the Zoning Commission or appeal to a court of law.

The fee for a Building Permit is listed within this document.

A) Building Height, Lot Area and Yards

B) No Building shall exceed the height, occupy larger part of lot area, and no lot shall be created smaller than the requirements of these regulations.

C) Substandard Lots

D) All existing lots at the date of adoption of these regulations shall be deemed buildable unless for the reasons of land suitability, flooding and other physical limitations contrary to the purpose of these regulations.

3.2 AMENDMENTS

The County Zoning Commission may, from time to time, amend, supplement or repeal any part of these regulations after a public notice and hearing.

3.3 COMPREHENSIVE PLAN

These regulations are administered and enforced to implement the Comprehensive Plan of the County, a document adopted by the County Commission as a policy guide for protection of the county' natural resources and accommodating the type of development deemed appropriate including but not limited to the following objectives.

A) To conserve and enhance the taxable value of land and buildings in the county.

B) To encourage the most appropriate use of land in the county.

C) To protect the character and maintain the stability of farming activities and production.

D) To regulate and restrict the location and intensity of use of buildings and land not related to farming.

E) To separate and control unavoidable nuisance producing uses to minimize the adverse impacts on the surrounding areas or uses.

F) To facilitate traffic movement and promote development of compatible uses.

3.4 NON-CONFORMING USES

The lawful use of a building or premises existing at the date of adoption of these regulations may be continued. Where a non-conforming use is discontinued for a period of more than twelve consecutive calendar months any subsequent use or occupancy of such premises shall conform to these regulations. Whenever a building is destroyed or damaged by fire or other casualty to the extent of more than sixty percent (60%) of its market value it shall not be restored unless said building shall conform to the provisions of the district in which it is located. Non-conforming uses shall not be expanded to occupy a larger area of land than existed at the date of adoption of these regulations unless approved by the Zoning Commission after a public hearing.

3.5 LAND SUITABILITY

No land shall be used for a purpose which is held unsuitable for the reason of flooding, soil limitations, inadequate drainage, incompatibility with adjoining uses or any condition likely to be harmful to the health, safety or the welfare of the people in the area. The County Zoning Commission may require information and data to determine the land suitability. The County may consult with County and state agencies to assist in its determination.

3.6 CONDITIONALLY PERMITTED USES

Where a use is classified as a conditional use under these regulations and exists at the date of adoption of these regulations, it shall be considered a permitted use. Where a use is not allowed as a conditional use or permitted use, under these regulations, and exists at the date of adoption of these regulations, it shall be considered non-conforming and shall be subject to the non-conforming buildings and use provisions.

3.7 ROAD AND HIGHWAY ACCESS

A permit for access to the county roads is required by the County Commission. In granting the access permit to the county roads, the County Commission may adopt rules and regulations as to the number of access points per mile, the width, construction and other features of the access to the adjoining properties. The County Commission may place conditions when granting a road access permit. Farm driveways and field access points are exempt from these provisions.

3.8 ROAD AND HIGHWAY SETBACKS

All buildings and structures shall be placed at least 100 (one hundred) feet from county and state rights-of-way, and at least 100 (one hundred) feet from the county road rights-of-way for the purpose of preventing hazardous accumulations of snow and to allow for future widening of public right-of-ways. Tree plantings and shelterbelts shall be planted at least 200 (two hundred) feet from the center of all roads (North, South, West and East).

4) ARTICLE 4: ZONING DISTRICT BOUNDARIES AND MAP

4.1 ZONING DISTRICT

In order to carry out the purposes and provisions of these regulations, the following zoning districts are hereby established:

4.1.1 A-Agricultural Zone
4.1.2 RR-Rural Residential Zone
4.1.3 RC-Residential Community Zone
4.1.4 C-Commercial Zone
4.1.5 I-Industrial Zone
4.1.6 R/O-Recreation/Open Space Zone

4.2 ZONING DISTRICT MAP

1) Zoning Districts

The location and boundaries of the zoning districts are hereby established as shown on the "Zoning District Map" on file in the Office of the County Code

Administrator. The zoning district maps, together with all information shown thereon and all amendments thereto, shall be an integral part of these regulations.

2) Public Roads and Highways as Boundary

Where zoning district boundary lines are indicated as following roads and highways or extensions thereof, such boundary lines shall be construed to be the center line of said roads and highways or extension thereof unless clearly shown to the contrary.

3) Property Line as Boundary

Where a zoning district boundary line coincides approximately but not exactly with the property line, the zoning boundary shall be construed to be the lot line at that location. All section lines, quarter section lines and quarter/quarter section lines may be construed as the property lines.

4) District Description for Unsubdivided Lands

For un-subdivided property, zoning district boundaries are determined by a metes and bounds description or by a legal description as deemed necessary.

5) Vacated Areas

Where a public road or highway is vacated by the official action of the County Commission, the zoning district boundaries shall be extended to the center of the vacated public road or highway.

6) Zoning District Boundary Interpretation

Where any uncertainty exists as to the exact location of the zoning district boundary lines, the County Commission shall determine the location of such boundary lines.

7) Certification

The official zoning map shall bear a certificate with the signature of the County Commission and certification of the County Auditor and date of adoption of the zoning map as an integral part of these regulations.

5) ARTICLE 5: ZONING DISTRICT REGULATIONS

5.1 A-1 AGRICULTURAL DISTRICT

1) Purpose

The purpose of this district is to provide for preservation and protection of agricultural lands and to discourage uses incompatible with agricultural operations or detrimental to agricultural lands utilization.

2) Permitted Uses

A) All types of farming and ranching operations including dairy, livestock and poultry raising, apiaries, fur farming, and harvesting and selling crops and forest products.

B) Accessory Buildings and Structures.

C) Cemeteries.

D) Churches.

E) Grain Elevators and Accessory Structures.

F) Home Occupations.

G) Parks, Playgrounds, and Conservation/Recreation Areas.

H) Public and Private Schools.

I) Public Buildings and Facilities Including County Garages.

J) Single Family Non-farm Residential Units subject to the details in these regulations.

K) Stock Piling of Sand and Gravel for Road Construction and maintenance.

L) Utility Lines and Pipe Lines including Substations for Transformers, Pumping Stations and Lift Stations.

M) Wind Energy Facility with one (1) or more Wind Turbines of 100 Kilowatts Nameplate Capacity or greater subject to the provisions of Section 6.11.

N) Veterinary Clinics, Animal Hospitals and Domestic Animal Kennels not nearer than 500 (five hundred) feet from any residence except the residence of the owner or operator.

3) Conditionally Permitted Uses

A) Livestock sales arenas, livestock feedlots and slaughterhouses as previously defined, provided that: no livestock sales arenas, feedlot or slaughterhouse shall be located within 1320 feet of any natural surface water body that contains water on an average of more than two months of any given year.

B) Commercially operated air landing strip and accessory buildings.

C) Feedlots, subject to these regulations.

D) Voltage transmission lines and accessory structures.

E) Manufacturing and processing of agricultural products produced in the area.

F) Radio, TV stations and towers.

G) Sale and Services of Agricultural Equipment and Machinery.

H) Salvage and Junk Yards subject to provisions of Section 6.6.

I) Sanitary Landfills subject to provisions of Section 6.5.

J) Sewage Lagoons and Wastewater treatment facilities.

K) Golf Courses

L) Storage of Farm Related Chemicals.

M) Mining of Sand and Gravel subject to provisions of Section 6.4.

N) Mobile Homes.

O) Public and Non-profit Wildlife Management Areas.

P) Skeet, trap and Rifle Ranges if not nearer than 1,000 (one thousand) Feet from any residence.

4) Lot Area and Lot Width

A) For non-farm residential uses the lot area shall not be less than 5(five) acres.

B) For non-residential uses the lot area shall not be less than 5(five) acres.

C) The lot width for any use in agricultural district shall not be less than 250 (two hundred fifty) feet.

5) Yard Requirements

A) Minimum setback of non-farm structure shall be 200 feet from any public road right-of-way and 50 feet from any lot line of any lot of record.

5.2 RURAL RESIDENTIAL (RR) ZONE

The intent and purpose of the RR zone is to allow the development of moderate-density residential areas in a manner that does not interfere with normal farming and business activities and is not unduly destructive to the infrastructure or environment of McIntosh County.

1) Permitted Uses

A) Agriculture

B) One and two family residences

C) Schools, churches, and cemeteries

D) Public parks, playgrounds, and open spaces.

E) Community meeting halls.

2. Conditional Uses

A) Medical care facilities and nursing homes.

B) Mobile home courts, provided that the provisions of Section 3 below are met.

C) Animal hospitals or clinics.

D) Commercial dog kennels.

E) Government administrative, maintenance or research facilities.

F) Campgrounds.

G) Water treatment facilities, sewage lagoons and sediment ponds provided that: written proof that all water treatment facilities, sewage lagoons and sediment ponds meet or exceed the approval criteria set forth by any and

all North Dakota State agencies or officials shall be required prior to approval of a Conditional Use Permit for such use. Said written proof shall be signed by the acting agency director or official or his/her authorized representative.

3. RR Zone District Regulations

A) The minimum size of a RR district shall be 10 acres.

B) Minimum lot size shall be 20,000 square feet for lots served by public water or sewer and 1 acre for lots not served by public water or sewer.

C) Minimum setback of any structure shall be 100 feet from any right-of-way and 50 feet from any lot line.

D) Any structure exceeding 35 feet in height shall require a Conditional Use Permit, with the exception of metal towers such as windmills and antennas.

E) The maximum intensity of buildings or other structures on any lot shall be 30% of the lot area.

F) Any two family residential structures shall include off-street parking space for at least two full size automobiles.

G) Points of ingress and egress from any public road shall be limited to one per 1/4 mile in or from any RR Zone properties. A frontage road shall be constructed as necessary to allow access to public roads via the allowable points of ingress and egress.

H) Minimum setback of any non-farm vegetation exceeding 48 inches in height which is left standing after November 1st of any year shall be 100 feet from any public right-of-way.

5.3 RESIDENTIAL COMMUNITY ZONE (R-C)

The intent and purpose of the R-C Zone is to preserve the integrity and character of rural residential areas and incorporated or unincorporated cities and small towns in MCINTOSH COUNTY.

1) Permitted Uses

A) Agriculture

B) Single-family residences

C) Multi-family residences containing four units or less
D) Public parks, playgrounds and open spaces

2) Conditional Uses

A) Campgrounds.

B) Keeping of livestock on lots of 30,000 square feet or more.

C) Water treatment facilities, sewage lagoons and sediment ponds provided that: written proof that all proposed water treatment facilities, sewage lagoons and sediment ponds meet or exceed the approval criteria set forth by any or all North Dakota State agencies or officials shall be required prior to approval of a Conditional Use Permit for such use. Said written proof shall be signed by the acting agency director or official or his/her authorized representative.

3) R/C Zone District Regulations

A) The minimum size of an R/C District shall be over 40 acres.

B) Minimum lot size shall be 5,000 square feet for lots served by public water or sewer and 20,000 square feet for lots not served by public water or sewer.

C) Minimum setback of any structure shall by 25 feet from any public right-of-way, 10 feet from any lot line.

D) Any structure exceeding 35 feet in height shall require a Conditional Use Permit with the exception of metal towers such as windmills and antennas.

E) The maximum intensity of buildings or other structures on any lot shall be 40% of the lot area.

F) Any two or more family residential structures shall include off-street parking space for at least one full-size automobile per housing unit.

5.4 COMMERCIAL (C) ZONE

The intent and purpose of the C Zone is to provide areas in the county in which commercial sales and service establishments may be situated such that they compliment the surrounding land uses, economy and social structure.

1) Permitted Uses

A) Agriculture, including any permitted use in an A Zone, as listed in Section 5.1.

B) Retail Businesses.

C) Auction houses or stores, excluding livestock sales.

D) Automobile, motorized vehicle, boat, motor home and implement sales, including repair and storage facilities.

E) Business, professional and government offices.

F) Repair shops, upholstery shops, auto body shops and equipment retail shops.

G) Hotels, motels and seasonal campgrounds less than one acre in size.

H) Lodges, clubs, fraternal and community meeting halls.

I) Warehousing, not to include any outside storage.

J) Fabrication and manufacturing enterprises occupying not more that 100,000 square feet of floor space.

K) Commercial eating and drinking establishments.

L) Race tracks, drive-in theaters, movie houses, gun clubs, carnivals, circuses and other similar entertainment enterprises.

M) Animal hospitals or clinics.

N) Government research or maintenance facilities.

O) Communication towers, lines, equipment, maintenance facilities and offices.

2. Conditional Uses

A) Residential dwellings of not more than four housing units.

B) Commercial dog kennels.

C) Medical care facilities and nursing homes.

D) Water treatment facilities, sewage lagoons and sediment ponds provided that: written proof that all water treatment facilities, sewage lagoons and

sediment ponds meet or exceed the approval criteria set forth by any and all North Dakota State agencies or officials shall be required prior to approval of a Conditional Use Permit for such use. Said written proof shall be signed by the acting agency director or official or his/her authorized representative.

3. C Zone District Regulations

A) Minimum lot size shall by 20,000 square feet for lots served by public water and sewer and 1 acre for lots not served by public water and sewer.

B) Minimum setback of any structure shall be 100 feet from any public road right-of-way and 10 feet from any lot line.

C) Any structure exceeding 35 feet in height shall require a Conditional Use Permit, with the exception of metal towers such as windmills and antennas.

D) Off-street parking shall be provided at the minimum rate of 2 spaces per management employee on the premises.

E) All loading docks, truck bays, etc., shall be located in such a manner that no public right-of-way is wholly or partially blocked during normal cargo loading or unloading procedures.

F) Minimum setback of any non-farm vegetation exceeding 48 inches in height which is left standing after November 1st of any year shall be 100 feet from any public road right-of-way.

5.5 INDUSTRIAL (I) ZONE

The intent and purpose of the I Zone is to allocate specific locations for large-scale manufacturing, processing and /or related enterprises where such enterprises may utilize natural and manmade resources to their benefit while imposing minimal adverse effects on surrounding uses.

1. **Permitted Uses**

A) Agriculture.

B) Processing of food, fiber, agricultural products, petroleum and mineral resources.

C) Manufacturing and fabrication enterprises.

D) Railroad yards, including maintenance, storage, repair facilities, and offices.

E) Communication towers, lines, equipment, maintenance facilities, and offices.

F) Water treatment facilities, sewage lagoons and sediment ponds, provided that written proof that all water treatment facilities, sewage lagoons and sediment ponds meet or exceed that approval criteria set forth by any and all North Dakota state agencies or officials shall be required prior to approval of a Conditional Use Permit for such use. Said written proof shall be signed by the acting agency director or official or his/her authorized representative.

G) Rock, sand or gravel excavation, crushing and handling.

H) Truck and freight terminals, warehousing, bulk terminals involving dry, liquid and gaseous substances.

I) Concrete and concrete product plants.

2. **Conditional Uses**

A) Single-family residential dwellings.

B) Temporary work camps, provided that such camps shall provide occupancy only for those persons directly involved in the construction of industrial facilities during such construction. No such camp shall be in existence for more than 18 months. All such camps must be approved prior to occupancy by the State Regulatory Agency.

C) Electrical generation facilities with greater than five megawatts (5 MW) rate output.

D) Livestock slaughter and meat processing operations, provided that written proof shall be provided to the MCINTOSH COUNTY Planning and Zoning Commission that any livestock slaughter and/or meat processing operations meet or exceed State Health Department standards and are approved by the State Regulatory Agency shall be furnished prior to commencement of any such operations.

E) Wrecking, junk and salvage yards.

3. **I Zone District Regulations**

A) All enterprises in the I Zone shall comply with all regulatory and legislative requirements set forth by any and all federal, state and local government agencies and offices. Written verification of such compliance shall be submitted to the MCINTOSH COUNTY Planning and Zoning Commission prior to commencement of operations in an I Zone.

B) Minimum lot size in I Zone shall be 25,000 square feet.

C) Minimum setback shall be 50 feet from any lot line and 100 feet from any public road right of way.

D) Minimum setback of any non-farm vegetation exceeding 48 inches in height which is left standing after November 1st of any year shall be 100 feet from any public road right of way.

5.6 RECREATION/OPEN SPACE (R/O) ZONE

The intent and purpose of the R/O Zone is to encourage the conservation of public and private lands to be used for outdoor recreation and to preserve natural features and wildlife habitat.

1. Permitted Uses

A) Agriculture

B) Harvesting of natural crops.

C) Raising of game animals, fowl and fish.

D) Public parks, recreation areas, playgrounds, picnic areas and natural preserves.

E) Flood water management structures.

F) Historical structures and monuments.

G) Structures and facilities used directly for the administration and/or management of lands in the R/O district.

2. Conditional Uses

A) Residential dwellings, either seasonal or permanent.

B) Commercial retail businesses related to recreation, such as marinas, bait shops and souvenir shops.

C) Private docks, ramps and boat houses.

D) Campgrounds.

3. Building Height

A) The building height for residential buildings shall not exceed two and one half stories or 35 (thirty five) feet except for farm buildings and structures.

B) The building heights manufacturing of agricultural products and for construction and maintenance of livestock/ag waste systems shall be determined by the County Commission.

C) The building height, excepting radio and TV towers, MET Towers, Wind Turbines, and church steeples, for all other uses shall not exceed 35 (thirty five) feet.

4. For non farm uses the parking requirements shall be subject to the provisions of Section 6.2 of these regulations.

5. Sign requirements shall be subject to the provisions of Section 6.3 of these regulations.

6) ARTICLE 6: SPECIAL PROVISIONS

6.1 ADDITIONAL USE PROVISION, RESTRICTIONS, AND REQUIREMENTS

No use, whether permitted or conditional, shall be permitted if the use is deemed, by the County Zoning Commission, to be dangerous, obnoxious or offensive to persons residing in the vicinity thereof, or impair the use, enjoyment or value of any property.

6.2 OFF-STREET PARKING

1. Purpose

The purpose of this section is to provide for the off-street parking regulations to:

A) Increase the safety and capacity of public roads by requiring off-street parking or loading facilities.

B) Minimize adverse effects of off-street parking and off-street loading facilities on the adjacent properties.

C) Lessen congestion and preventing the overtaxing of public roads by regulating the location and capacity of off-street parking or off-street loading facilities.

2. General Requirements

A) An off-street automobile parking space shall be at least 9 feet wide and 20 feet long, exclusive of access drives or ramps.

B) All open off-street parking areas with 4 or more spaces and all loading berths shall be graded to dispose of all surface water run-offs but not be diverted to adjoining properties.

3. Special Requirements

A) No building shall be erected or enlarged without meeting the following parking requirements.

1) Business, professional, or public office building, studio, bank, medical or dental clinics, three parking spaces plus one additional space for each 400 square feet of floor area over 1,000 square feet.

2) Hotels and motels: one parking space for each room plus one space for each 200 square feet of eating and drinking establishments or restaurants.

3) Private club or lodge: one parking space for each 200 square feet of service area.

4) Restaurant, eating and drinking establishment; one parking space for each 100 square feet of floor area.

6.3 SIGNS

1. Purpose

The purposes of regulating signs in the County is to provide for a visually pleasant environment and minimize potentially unsafe conditions for all age groups, but yet offer opportunities for public and private information and advertising.

2. General Requirements

A) No sign shall be located, erected, moved, reconstructed, extended, enlarged or structurally altered without obtaining a permit from the County Code Administrator.

B) Signs shall not be permitted within 300 feet of any road crossing which is measured from the point of intersection of the road center lines. For state and federal highways the state and federal sign requirements shall apply.

C) Directory signs shall be no larger than 20 square feet in area for permitted uses.

D) Directory signs for conditional uses shall not be larger than 40 square feet.

E) Advertising signs shall not be larger than 96 square feet.

6.4 MINING OF SAND, GRAVEL AND EXCAVATION

1. Purpose

The purpose of these provisions is to provide for mining and extraction of sand and gravel for commercial uses, and to protect and preserve agricultural land by guiding such operations, and to minimize the traffic, noise, dust, fume and vibration impact on the adjoining uses and the road network.

2. Site Approval Requirements

All sand and gravel mining, excavation site require approval by the county Zoning Board excepting those related to farming and county road maintenance.

3. Data Submission Requirements

A) A site plan for operation and reclamation of the mined land including maps showing location of the land to be mined, location of roads and points of access to the site, maps showing the existing and proposed contours after the land is mined and a time table for operation of the site.

B) A guarantee that the reclamation of the site be completed within one year of the closure of the operation of the site.

C) Proof of compatibility with the existing land form including the vegetation, surface and ground water resources.

4. Proximity to Existing Uses

The operation of sand and gravel sites shall not be nearer than 500 feet from any residential uses or 300 feet from non-residential uses.

5. Permit Requirements

Any person who operates a sand and gravel operation shall obtain a permit from the County Zoning Commission before resuming any mining or excavation of the sand and gravel sites.

6.5 SANITARY LANDFILLS AND SOLID WASTE SITES

1. Compliance with North Dakota State Laws and Rules.

Any person who operates sanitary landfills or solid waste sites shall comply with all North Dakota state laws and administrative rules set forth by the state agencies.

2. Compliance with County Ordinances and Procedures.

Where a county solid waste ordinance exists, any person who operates a sanitary landfill or solid waste site shall comply with the county ordinance, rules and procedures.

3. County Ordinance and Procedures

The county hereby adopts solid waste provisions, subject to the provisions of NDCC 11-33-20, to assure meeting the purposes of these regulations and the county comprehensive plan.

4. Purpose

The purpose of these provisions is to protect public health, ground and surface water, conflict with present land uses and preservation and protection of natural resources in the county.

5. Site Approval Requirements

All solid waste sites require approval by County Zoning Commission and North Dakota State Health Department.

6. Locational Standards

A) No landfill incinerator shall be located within 1,000 feet of residential uses, 500 feet of commercial buildings and structures.

B) No landfill shall be located in areas which due to high water table, flooding, or soil conditions may affect the quality of surface and ground water.

C) No landfill operation shall be located nearer than 200 feet of all road and highway rights-of-way.

7. Data Submission Requirements

A) Maps of the area showing existing features such as roads, highways, vegetation cover, water courses, drainage way, soils, topography, depth of water table, wet lands, sloughs, existing uses, buildings and structures including the existing utility lines.

B) A plan for operation of the site including a descriptive text explaining consistency or inconsistency with the natural or man made environment.

C) Records of data and information submitted to the state of North Dakota appropriate agencies and the County as a part of application for state and county permits.

D) The Zoning Commission may require additional information if it deems it necessary.

8. Statement of Findings

Upon the public notification and a public hearing the Zoning Commission shall determine whether the proposed site meets the requirements of these regulations. The Zoning Commission may place conditions for approval of the site.

6.6 JUNK OR SALVAGE YARDS

1. Purpose

The purpose of these requirements is to preserve and protect the visual and other environmental amenities of the rural areas while allowing the salvage or junk yards as business places.

2. Site Approval Requirements

All sites for salvage and junk yards require approval by the County Zoning Commission.

3. Locational Standards

A) No salvage or junk yard shall be located within 500 feet of a residential district and 200 feet of commercial buildings and structures.

B) No salvage or junk yard shall be located in areas which due to high water table, flooding and soil conditions may affect the quality of surface and ground water.

C) No salvage or junk yard shall be located nearer than 200 feet of all road and highway rights-of-way.

D) All salvage yards and operations shall be screened from the public view unless the salvage material is placed 500 feet away from any highway right-of-way and screened by natural vegetation, building and land form.

6.7 UTILITIES

1. Purpose

The purpose of these provisions is to encourage orderly development of utilities in relationship to the agricultural and nonagricultural uses and to provide for the safety of the County residents.

2. General Requirements

A) The Utilities include but not limited to electric power, electrical transmission lines, electrical towers and substations, natural gas pipelines, the petroleum product pipelines, water and sewer lines, telephone lines and other above ground or underground communication and energy transfer lines and pipelines.

B) All new utility lines and pipelines require a permit from the Zoning Commission.

C) All new utility lines and pipelines are considered conditional uses and shall conform to the provisions of Section 8.2, Conditional Use Permits, of these regulations.

D) All pipelines, natural gas, petroleum pipelines and other energy transfer lines shall be placed deep enough in the ground so as to not interfere with or become hazardous to normal farming operations.

E) Excavation for tunneling of any pipelines under roads, farm drains, group drains and local drains shall be done by the company owning or leasing said pipelines and the cost of said excavation and damages to be born by the said company.

6.8 PUBLIC AND NON-PROFIT WILDLIFE MANAGEMENT AREAS

1. Purpose

These provisions are designed to address the need for Public Wildlife Management Areas and at the same time preserve and protect the interest of the county for its tax lease and investment in construction and maintenance of public roads.

2. General Requirements

A) All publicly owned and non-profit agency wildlife management areas established after adoption of these regulations require a conditional use permit subject to the provisions of Section 8.2.

B) If the area is leased for this purpose, the public agency is required to provide the following as a part of the petition for a conditional use permit:

1) A road maintenance agreement specifying duties and responsibilities of the owner/lessee for access and through roads.

2) Duties and responsibilities of the owner/lessee for the control of noxious weeds in the wildlife management area.

C) If the land is purchased by a public agency for such a purpose, the public agency shall arrange for compensating the county for the loss of the property tax.

D) When a county road provides access to the wildlife management area, a road maintenance agreement specifying the duties and responsibilities of the public agency shall be a part of the conditional use permit.

6.9 ANIMAL FEEDING OPERATIONS

1. Purpose

These regulations are designed to allow commercial feedlots for feeding of livestock, fur bearers, and poultry at the same time protect the adjoining uses against odor, run off and other incompatible characteristics associated with feedlots.

2. General Provisions

All livestock operations shall follow the rules and regulations as set forth in the "North Dakota Model Zoning Ordinance for Animal Feeding Operations."

A) Equivalent Animal Numbers

An "animal unit equivalent" is a unit-less number developed from the nutrient and volume characteristics of *manure* for a specific *livestock type*. The term "animal units" is used to normalize the number of animals (e.g., head) for each specific *livestock type* which produce comparable bulk quantities of *manure*. The animal unit equivalents for types of *livestock* and the numbers of *livestock* for facility size thresholds of 300 animal units (a.u.), and so forth, are listed in the following table

		Equivalent Numbers of the Livestock (hd) for four sizes (a.u.) of Animal Feeding Operations			
Livestock Type	Animal Unit Equivalent	300a.u.	1,000a.u.	2,000a.u.	5,000a.u.
1 duck	0.033	9,091	30,303	60,606	151,515
1 mature dairy cow whether milking or dry	1.33	225	750	1,500	3,750
1 mature cow, heifer or bull, other than above	1.0	300	1,000	2,000	5,000
1 weaned beef animal, Whether a calf, heifer, steer or bull	.75	400	1,333	2,667	6,667
1 cow-calf pair	1.0	300	1,000	2,000	5,000
1 swine weighing 55 pounds or more	0.4	750	2,500	5,000	12,500
1 swine weighing less Than 55 pounds	0.1	3,000	10,000	20,000	50,000
1 horse	2.0	150	500	1,000	2,500
1 sheep or lamb	0.1	3,000	10,000	20,000	50,000
1 turkey	0.0182	16,500	55,000	110,000	275,000
1 chicken, other than a laying hen	0.008	37,500	125,000	250,000	625,000
1 laying hen	0.012	25,000	83,333	166,667	416,667

For any livestock not listed above, 1.0 animal unit equals one thousand pounds [453.59 kilograms] whether single or combined animal weight.

3. Environmental Protection

The *operator* of a new facility for animal feeding is expected to locate, construct, operate and maintain the facility so as to minimize, reduce or abate effects of pollution on environmental resources and on public safety and health. The *operator* of an existing facility is expected to operate and maintain the facility so as to minimize, reduce or abate effects of pollution on environmental resources and on public safety and health. Each *operator* shall comply with the rules and regulations as set forth in the Model Zoning Ordinance for Animal Feeding Operations as developed by the North Dakota Health Department.

4. Enforcement

In the event of a violation of this ordinance or a judgment on a civil action by the North Dakota Department of Health, the local unit of government, after due process, can order cessation of a facility for animal feeding within a reasonable period of time and until such time as the *operator* corrects or abates the cause(s) of the violation. If the cause(s) of the violation are not remedied within a reasonable period of time as set by the local unit of government, the permit may be revoked.

5. Severability

If any paragraph, sentence, clause or phrase of this ordinance is for any reason held to be invalid or unconstitutional by a court of competent jurisdiction, such decision shall not affect the validity of the remaining portion of this ordinance.

6. Setback Requirements

Shall follow the rules and regulations of the North Dakota Department of Health.

A) Water Resource Setbacks

The *operator* of a new animal feeding operation that has more than 1,000 animal units shall not locate or establish that operation:

1. Within a delineated source water protection area for a public water system. The source water protection areas for water supply wells include the entire wellhead protection area. For the *surface-water* intakes of public water systems, source water protection areas include all or portions of the surface water that supplies the water for the

public water system, including all or portions of the surface-water's shoreline.

2. Within 1,200 feet (365.6 meters) of a private ground water well which is not owned by the *operator* or within 1,500 feet (457.1 meters) of a public ground water well which does not have a delineated source water protection area.

3. Within 1,000 feet (304.7 meters) of surface water which is not included in a source water protection area.

B) Odor Setbacks

The *operator* of a new facility for an *animal feeding* operation shall not locate that operation within the extra territorial-zoning jurisdiction of an incorporated city.

An *owner* of property shall locate and establish a residence, business, church, school, public park or zone for residential use so as to provide a separation distance from any *existing animal feeding operation.* The separation distances, or setbacks, are listed in the following table. An *owner* who is an *operator* may locate the owner(s) residence or business within the setbacks.

Setback Distances for Animal Feeding Operations

Number of Animal Units	**Hog Operations**	**Other Animal Operations**
Fewer than 300	none	none
300-1000	0.50mi(0.805km)	0.50mi(0.805km)
1001 - 2000	0.75 mi(1.207km)	0.50mi(0.805km)
2001 - 5000	1.00mi(1.609km)	0.75mi(1,207km)
5001 or more	1.50mi(2,414km)	1.00mi(1.609km)

The *operator* of a new *animal feeding operation* shall locate the site of that operation from existing residences, businesses, churches, schools, public parks and areas of property that are zoned residential so as to exceed the corresponding listed setback from these places.

If notified in writing by an *operator* of a planned future expansion of an *animal feeding operation,* the local unit of government may implement the corresponding odor setback for a temporary time period not to exceed two years, after which time the setback will remain in effect only if the expansion was completed.

A local unit of government may, upon recommendation of the zoning commission or land use administrator, increase or decrease a setback distance for a new *animal feeding operation* after consideration of the proposed operation's plans, if it determines that a greater or lesser setback distance is necessary or acceptable, respectively, based upon site conditions or demonstrable safety, health, environmental or public welfare concerns.

Setback distances for Animal Feeding Operations shall follow the guidelines as set forth by the North Dakota Department of Health.

7. Conditional Uses

A) Permit Procedures

1) Applicability

The *operator* of a new *livestock* facility or an *existing livestock* facility which meets the definition of an *animal feeding operation* and which is a conditional (or special) use of land as listed below, shall apply for and obtain a conditional (or special) use permit.

a. A new *animal feeding operation* that would be capable of handling, or that expands to handle, more than 1,000 animal units is a conditional (or special) use of land.

b. An *existing animal feeding* operation that expands to handle more than 1,000 animal units is a conditional (or special) use of land.

Whenever the capacity of an *animal feeding operation* is expanded to handle more than 2,000 to 5,000 animal units, the *operator* shall apply for a new conditional (or special) use permit.

B) Procedure

The local unit of government may practice any or all of the provisions in the following subparagraphs in harmony with the permitting process of its general zoning regulations.

1. Application of a conditional use (or special use) permit shall be submitted to the local unit of government for tentative approval. The local unit of government shall notify the Department of Health that it has received such application.

2. The local unit of government shall notify by certified mail all property owners having property within the corresponding odor setback

distance of a proposed new *animal feeding operation.* This notification must occur within 21 days of receiving the application. The approval process utilized by the local unit of government may include one advertised public hearing.

3. Following tentative approval or denial of the application by the local unit of government, the applicant shall be notified by letter of the decision, including conditions imposed, if any.

4. The applicant shall then forward its application for a conditional (or special) use permit, together with the tentative approval by the local government, to the North Dakota Department of Health.

5. Following a review by the Department of Health of the operator(s) application for a state permit, the Department of Health will notify the local unit of government of its decision.

6. The conditional (or special) use permit will become final following the granting of a permit by the Department of Health.

7. A conditional (or special) use permit granted to the operator of a new animal feeding operation shall be put into use within twenty-four (24) months, or the permit shall lapse and the operator may re-apply.

C. Application Requirements

The application for a conditional use (or special use) permit to operate a facility for an *animal feeding operation* shall include a scaled site plan. If the facility will handle more than 1,000 animal units, the scaled site plan shall be prepared by a registered land surveyor, a civil engineer or other person having comparable experience or qualifications. The local unit of government may require any or all of the following elements, or require additional elements, in its site plan review process when needed to determine the nature and scope of the *animal feeding operation.*

1. Proposed number of animal units.

2. Total acreage of the site of the facility.

3. Existing and proposed roads and access ways within and adjacent to the site of the facility.

4. Surrounding land uses and ownership, if the operation will have the capacity to handle more than 1,000 animal units.

5. A copy of the permit application submitted by the applicant to the Dept. of Health.

D. Ownership Change

An *operator* of a facility that includes an *animal feeding operation* having a permit granted by this ordinance shall notify the local unit of government of the sale, or the transfer of the ownership of that operation.

E. Operating Change

An *operator* of a facility that includes an *animal feeding operation* having a permit granted by this ordinance shall notify the local unit of government of intent to include an alternate *livestock* type. The notice shall be given at least 120 days prior to the anticipated date of the change.

6.10 GEOPHYSICAL EXPLORATION REQUIREMENTS

Any persons intending to carry out geophysical(including seismic) exploration activities in MCINTOSH COUNTY shall obtain a Geophysical Exploration permit at least two weeks prior to the commencement of such activities. In addition, a copy of the surety bond filed with the ND Industrial Commission shall be affixed to the permit. Only the County Zoning Commission may issue a Geophysical Exploration permit, it may also at its discretion suspend or revoke said permit, with or without prior notice to the permit holder or other parties. The fee for geophysical exploration shall be as follows:

GEOPHYSICAL EXPLORATION PERMIT..... $50.00
DRILLING FEES; FIRST 10HOLES.....$25.00 PER HOLE
AFTER FIRST 10 HOLES.....$10.00 PER HOLE

Suspension or revocation of a Geophysical Exploration Permit shall be accompanied by cessation of all activities at all sites covered by said permit, excepting those activities specifically allowed to continue, which shall be specified in written form. Notice of suspension or revocation of any Geophysical Exploration Permit shall be delivered to the permit holder or any of his agents at any site covered by the permit or at any office of the permit holder. Any damages, special meeting costs, or other costs associated with any Geophysical Exploration Permit or exploration activities which are incurred after issuance of said permit may be assessed against the permit holder.

Geophysical exploration activities are further required to be conducted in compliance with all State and Federal laws and regulations relating thereto, including but not limited to those summarized in APPENDIX I

6.11 WIND ENERGY FACILITY

1. Purpose

The purpose of the Ordinance is to provide a regulatory framework for the siting, construction and operation of Wind Energy Facilities in the County, subject to reasonable restrictions, which will preserve the safety and well-being of the residents, while allowing equitable and orderly development of Wind Energy Facilities.

2. Regulatory Framework

A) Zoning

Wind Energy Facilities may be constructed within the County, subject to the restrictions and conditions of this ordinance.

B) Principal or Accessory Use

A different existing use or an existing structure on the same parcel shall not preclude the installation of a Wind Energy Facility or a part of such facility on such parcel. Wind Energy Facilities that are constructed and installed in accordance with the provisions of this Ordinance shall not be deemed to constitute expansion of a nonconforming use or structure.

C) Applicability

The requirements of this Ordinance shall apply to all Wind Energy Facilities with one or more Turbines rated at 100 kilowatts nameplate capacity or larger constructed after the effective date of this Ordinance. No operation of an existing Wind Energy Facility shall be allowed without full compliance with this Ordinance and its Wind Energy Facility Siting Permit.

3. Wind Energy Facility Siting Permit

A) Application for Permit

All wind energy projects shall follow siting and location regulations as determined by the North Dakota Public Service Commission, the North Dakota Century Code, or this ordinance, which ever is more stringent.

No work, except for wind monitoring, soil testing and other survey work, may commence to construct a Wind Energy Facility until a county Wind Energy Facility Siting Permit has been issued by the County Zoning Commission. The prospective Permittee shall submit an application for said

permitee to the County Zoning Commission. The application shall be signed by an authorized representative of the prospective permit, including a fee of $2,000 plus $500 for each proposed wind turbine up to a total amount of no more than $50,000, and the following information:

1. The complete name, legal address and phone number of the prospective permitee and responsible contact person.

2. A USGS topographical map of the facility and 500 feet of all adjoining properties along the facility perimeter. Which map shall show all existing features, including property boundaries, structures, improvements, roads, utility lines, public facilities and natural features. The map shall also show location of all proposed improvements for the wind energy facility, including wind turbines, met towers, electrical lines and roads. Each proposed wind turbine shall be numbered and fully described in technical details, including rotor diameter, model, and manufacturer, and distances, measured in feet, from property lines and from existing improvements for each proposed wind turbine.

3. Details as to how the prospective permitee will comply with each item in 6.11(4).

4. A schedule for the proposed start and completion of construction of the facility.

B) Public Hearings

Upon receipt of the application, the Zoning Commission, and any experts it may retain, shall review the application and, in its discretion, may hold a public hearing on the application within no more than 45 days from receipt of the application, providing at least 15 days notice prior to the hearing in the official newspaper of MCINTOSH COUNTY and mailing written notice to property owners within 1,320 (1/4 mile) feet of the proposed wind energy facility.

C) Deliberation and Decision

If the Zoning Commission finds that the prospective permitee will comply with all requirements, it may, within no more than 30 days after the hearing, issue a permit.

D) Demonstration of Compliance

~~The permit issued pursuant to 6.11(3)(A) shall be contingent upon~~ the permitee's final demonstration of compliance with the requirements of the

permit following completion of construction of the wind energy facility. Within 90 days of construction, the permitee shall submit to the Zoning Commission an updated and final USGS topographical map, or survey if available, providing all information pursuant to 6.11(3)(A)(2) and demonstrating actual compliance with the requirements and conditions of the permit.

4. General Requirements for Wind Energy Facilities

A) Appearance, lighting, facility footprint, agricultural operations, roads and power lines.

1. Wind turbines shall be painted in an FAA approved color.

2. Wind turbines shall not be used for displaying any advertising except for reasonable identification of the manufacturer or operator of the wind energy facility.

3. Each wind turbine shall be marked with a visible identification number to assist with provision of emergency services, and the permitee shall file with local fire departments, law enforcement and the county emergency management coordinator a wind energy facility map identifying wind turbine locations and numbers.

4. Wind turbines shall not be artificially lighted, except to the extent required by the FAA or other applicable authority.

5. At wind energy facility sites, the design of the buildings and related structures shall, to the extent reasonably possible, use materials, colors, textures, and location that will blend the facility into the natural setting and existing environment.

6. At wind energy facility sites, the location and construction of access roads and other infrastructure shall, to the extent reasonably possible, minimize disruption to farmland, the landscape and agricultural operations within the county.

7. The permitee shall ensure that, following completion of construction, County roads will be repaired or restored to a condition at least equal to the condition prior to construction of such facility.

8. The permitee shall place electrical lines, known as collectors, and communication cables underground when located on private property. Collectors and cables shall also be placed within or adjacent to the land necessary for wind turbine access roads, unless

otherwise negotiated with the affected landowner. This paragraph does not apply to feeder lines.

9. The permitee shall place overhead feeder lines on public rights-of-way, if a public right-of-way exists, or the permitee may place feeder lines on private property. A change of routes may be made as long as the feeders remain on public rights of way and approval has been obtained from the governmental unit responsible for the affected right-of-way. When placing feeders on private property, the permitee shall place the feeder in accordance with the easement negotiated with the affected landowner.

B) Setbacks

The following setbacks and separation requirements shall apply to all wind energy turbines in a wind energy facility.

1. Occupied Structures and Facilities: Each turbine shall be set back from the nearest dwelling, commercial building or publicly used structure or facility at a distance not less than 1,320 feet (1/4 mile) or a variance, as agreed upon by the landowner and the power company, may be allowed.

2. Public Roads and Above Ground Communication and Electrical Lines: Each wind turbine shall be set back from the nearest public road or above ground communication and electrical lines at a distance not less than 200 feet, determined at the center of the existing right-of-way.

3. Wind Energy Facility Perimeter: Each wind turbine shall be set back from the facility perimeter at a distance not less than 2.5 times the rotor diameter of the wind turbine. A variance may be granted if an authorized representative or agent of the permitee and those affected parties on adjoining properties with associated wind rights sign a formal and legally-binding agreement expressing all parties support for a variance that waives or reduces the setback requirements.

C) Restoration of Property

Within 180 days of termination or abandonment of leases or easements for a wind energy facility in the county, the permitee shall cause, at its expense, removal of all structures to a depth of 4 feet below preconstruction grade.

D) Transfer of Wind Energy Facility Siting Permit

In the event of a change in controlling interest in a wind energy facility and the transfer of the permit, any successors and assigns of the original permitee shall comply with the requirements and conditions of such permit for the duration of operation of a wind energy facility permitted in the county. Within 30 days of such change in controlling interest of any entity owning a wind energy facility, the parties to the transaction shall notify the commission by letter and provide information pursuant to 6.11(3)(A). The letter shall be signed by the authorized representatives or agents of both original permitee and the entity to which the permit is being transferred.

6.12 PRIVATE SEPTIC AND SEWAGE SYSTEMS

Any outside sewer work has to conform to State Administrative Code 63-03.1-03 (Private Sewage Disposal Systems).

7) ARTICLE 7: ADMINISTRATION AND ENFORCEMENT

7.1 ORGANIZATION

Administration of this ordinance is hereby vested in 2 offices of MCINTOSH COUNTY:

1. The County Code Administrator
2. The Zoning Commission

7.2 THE CODE ADMINISTRATOR

The Code Administrator is a duly elected county official authorized by the County Commission and is responsible to assist and make recommendations to the Zoning Commission on any matter related to planning for and development of the county.

1. Duties and Responsibilities

The code administrator shall be specifically responsible for the administrative responsibilities of the Zoning Commission.

A) Issue "Permitted Uses" permits and maintain records thereof.

B) Issue, upon approval by the Zoning Commission, all zoning certificates and maintain records thereof.

C) Issue, upon approval by the Zoning Commission, all building and repair permits.

D) Issue, upon approval by the Zoning Commission, all certificates of occupancy for all buildings including mobile homes and manufactured homes.

E) Maintain zoning related records and zoning district map including records of all amendments, conditional uses and variances.

F) Receive, file and forward to the Zoning Commission all applications for zoning amendments and conditional uses.

G) Serve as secretary for the Zoning Commission.

7.3 THE ZONING COMMISSION

The zoning commission is hereby vested with authority and jurisdiction to administer the County Zoning Ordinance, Subdivision Regulations, Building Code and Housing Code.

1. Membership

The Zoning Commission shall consist of seven members, of whom at least one must be appointed from the governing body of the city that is the county seat and of whom at most one may be appointed from the board of county commissioners. Terms of the members of the commission shall be established as set forth in NDCC 11-33-04.

2. Duties and Responsibilities

A) The Zoning Commission shall be specifically responsible for interpretation and enforcement of this ordinance including the issuance of building permits.

B) Approve all zoning certificates and maintain records thereof.

C) Approve all building and repair permits.

D) Approve all certificates of occupancy for all buildings including mobile homes and manufactured homes.

E) Inspect all buildings, structures and use of land to determine compliance with these and other applicable regulations of the county.

F) Notify, in writing, the property owner or user upon finding violation of this ordinance and cite the nature of violation clearly and require compliance within

a reasonable time. If the notification is not replied to or steps are not taken to correct the violations within 30 days, the Zoning Commission shall make a report of the findings to the County Attorney.

G) Maintain zoning related records and zoning district map including records of all amendments, conditional uses and variances.

H) To hear and act on all applications for amendments to zoning districts.

I) To hear and act on all applications for conditional uses in the manner prescribed in this ordinance.

J) To study, examine and make changes to the comprehensive plan for the future development of MCINTOSH COUNTY.

3. Officers

The Zoning Commission shall elect its own officers and may establish rules and procedures for all cases before it.

A) Notice of Hearings

The Zoning Commissions shall fix a reasonable date for hearing of applications for zoning district amendments, conditional use permits and other matters before it; give public notice thereof in the official newspaper of the county at least 1 week prior to the hearing. The notices shall state the purpose of the hearing and that the applications and supporting documents for zoning district amendments and conditional use permits are available for public inspection in the office of and/or designated place of businesses of the Code Administrator during the normal working hours.

B) Meetings

Meetings of the Zoning Commission shall be held at the call of its Chairperson and at such other times as the Zoning commission may determine. All meetings shall be open to the public and any person may testify for or against a petition.

C) Interpretation of Regulations

All questions of interpretation of this ordinance shall be first presented to the Code Administrator, who shall forward the question to the Zoning Commission.

D) Building Permit Application

Any person or persons intending to construct or reconstruct or relocate a building or structure or make alteration shall, before proceeding with the work, obtain a permit from the Zoning Commission. All mobile homes and manufactured homes are required to comply with the Manufactured Housing and Building Code and are required to obtain a permit from the Zoning Commission for placement and relocation thereof.

E) Each application for a building permit shall be accompanied by a legal description and a map showing the actual dimension of the lot to be built upon, the size, shape and location of the building for observing the yard requirements of this ordinance.

F) The application shall specify the type of the building, structure, material of which it is composed, the part or portion of the lot to be occupied by the principal building and accessory buildings and the probable building cost, together with such additional plans and specifications as may be required by the Code Administrator.

G) The edition of the Uniform Building code as published by the International Conference or Building Officials and adopted by the County Commission, together with any amendments made hereafter are incorporated and made a part of this ordinance.

4. Building Permit

The Zoning Commission shall issue a building permit if the proposed building or structure conforms to zoning and building provision of this ordinance.

A) Building Permit Fees

The Code Administrator shall charge and collect a fee according to the Resolution of Fees and Schedules established by the MCINTOSH COUNTY Commissioners.

B) Certificate of Occupancy

The Zoning Commission shall issue a certificate of occupancy upon inspection of the completed building, including placement of mobile homes and manufactured homes and assurance that all provisions and conditions set forth by the authority of this ordinance are met. In the event the Zoning Commission finds violations and deviations from the terms and condition of this ordinance, they shall make a report and describe the action to be taken.

C) Conditional Use Permit

The Code Administrator shall issue a conditional use permit upon approval by the Zoning Commission. The terms of the variance shall be stipulated subject to the provisions of Section 8.3 of this ordinance.

7.4 VIOLATIONS AND PENALTIES

Violations of this ordinance may be reported to the Zoning Administrator. Complaints referring to such violations shall be filed in written form and shall state fully the causes and basis thereof. The Zoning Administrator shall record properly said complaint, notify the Zoning Commission, and make an inspection of the affected site.

1. **Remedies for violations shall be in accordance with Chapters 11-33-17 and 11-33-21, NDCC, as follows:**

   11-33-17: Violation of zoning regulations and restrictions-remedies. If any building or structure is erected, constructed, reconstructed, altered, repaired, converted or maintained, or if any building, structure or land is used in violation of this chapter, the proper county authorities or any affected citizen or property owner, in addition to other remedies may institute any appropriate action or proceedings.

   a. To prevent such unlawful erection, construction, reconstruction, alteration, repair, conversion, maintenance or use.

   b. To restrain, correct or abate such violations.

   c. To prevent the occupancy of the building, structure or land.

   d. To prevent any illegal act, conduct, business or use in or about such premises.

   11-33-21: General penalties for violation of zoning regulations and restriction. A violation of any provision of this chapter or the regulations and restrictions made there under shall constitute the maintenance of a public nuisance and shall be a Class B misdemeanor.

7.5 CERTIFICATE OF COMPLIANCE

Every application for a building permit shall be deemed to also be an application for certificate of compliance. No structure or addition thereto which is subject to the need for a building permit shall be occupied or used for any purpose until a Certificate of Compliance has been issued by the Zoning Administrator and the Tax Assessor shall be notified of the issuance of said Certificate.

8) ARTICLE 8: PROCEDURE FOR AMENDMENTS, CONDITIONAL USES AND VARIANCES

8.1 ZONING DISTRICT AMENDMENTS

1. Public Hearing Notice

The Zoning Commission shall hold a public hearing, a notice of which shall be published at least one week prior to the hearing in the official newspaper of the county. The notice of hearing shall include:

a. The time and place of hearing.

b. Description of the property by street address for platted lands and clearly identifiable location for the unplatted lands.

c. The proposed use and requested zoning district change.

d. Time and place for public inspection of the document in the county offices before the hearing.

2. Public Hearing

The Zoning Commission, at the hearing, shall listen to all persons who may speak in support of or in opposition to the proposal. Upon the completion of its review, the Zoning Commission shall make approval, deny or modify the petition. The Zoning Commission may require additional information before it completes its findings and recommendations.

3. Data Submission Requirements

Petitions for zoning district change and conditional uses shall be submitted with the following information:

A) Legal description of the area proposed to be rezoned, the name and addresses of all owners of property lying within such area.

B) A map showing the existing land uses and zoning district classification of the area.

C) A site plan showing buildings and uses and in the zoning district proposed to be changed and the requested zoning district classification.

D) A fee shall be paid in accordance with the schedule established by the County Commission.

4. Deliberation and Decision

Following the hearing, the Zoning Commission, upon due deliberation, shall make a decision on the proposed amendment within 30 days after the hearing. In making its finding, the Zoning Commission shall ascertain that the proposal for zoning district amendment is consistent with the County Land Use Plan and meets all requirements of this ordinance and other regulations of the County.

8.2 CONDITIONAL USE PERMITS

1. Purpose

The development of this ordinance is based upon division of the county into districts, within which district the use of land and the building bulk and locations of building and structures are mutually compatible and substantially harmonious. However, there are certain uses which, because of their unique characteristics, cannot be properly classified as permitted uses in any particular district without consideration, in each case, of impact of those uses upon neighboring premises. Such uses, nevertheless, may be necessary or desirable to be allowed in a particular district provided that due consideration is given to location, development and operation of such uses.

2. Public Hearing Notice

Shall be the same as the provisions set forth for public hearing for zoning district amendment in Section 8.1(1).

3. Public Hearing

Shall be the same as the provisions set forth for public hearing for zoning district amendments in Section 8.1(2).

4. Data Submission Requirements

Shall be the same as the provisions set forth for data submission requirements for zoning district amendment in Section 8.1(3).

5. Deliberation and Decision

Shall be the same as the provisions set forth for deliberation and decisions for zoning district amendment in Section 8.1(4).

6. Standards

No application for conditional use shall be recommended for approval unless the Zoning Commission finds that all of the following conditions are present:

A) That the establishment, maintenance or operation of the conditional use will not be detrimental or to endanger the public health, safety, morals, comfort or general welfare.

B) That the uses, values and enjoyment of other property in the neighborhood for purposes already permitted shall be in no foreseeable manner substantially impaired or diminished by the establishment, maintenance or operation of the conditional use.

C) That the establishment of the conditional use will not impede the normal and orderly development and improvement of the surrounding property for uses permitted in the district.

D) That adequate utilities, access roads, drainage and other necessary site improvements have been or are being provided.

E) That adequate measures have been or will be taken to provide ingress and egress so designed as to minimize traffic congestion in the public streets.

F) That the conditional use shall substantially conform to all applicable regulations of the district in which it is located.

7. Conditions and Guarantees

A) Prior to the decision on any conditional use, the Zoning Commission may stipulate such conditions and restrictions upon the establishment, location, construction, maintenance and operation of the conditional use as deemed necessary to promote the public health, safety and general welfare of the community, and to secure compliance with the standards and requirements specified in Section 8.2.5. In all cases in which conditional uses are granted, the Zoning commission shall require such evidence and guarantees as it may deem necessary as proof that the conditions stipulated in connection therewith are being and will be complied with.

B) No alteration of a conditional use shall be permitted unless approved by the Zoning Commission. Where the Zoning Commission has approved or conditionally approved an application for a conditional use, such approval shall become null and void within 12 months of the date of the Zoning Commission action unless the use is commenced, construction is underway or the current owner possesses a valid building permit.

8.3 VARIANCES

Variance from the terms of this ordinance shall be granted provided that the applicant establishes proof of practical difficulty or undue hardship.

1. Public Hearing Notice

The Zoning Commission shall hold a public hearing, a notice of which shall be published at least one week prior to the hearing in the official newspaper of the county. The notice of hearing shall include:

a. The time and place of hearing.

b. Description of the property by street address for platted lands and clearly identifiable location for the unplatted lands.

c. The proposed use and requested zoning district change.

d. Time and place for public inspection of the documents in the County Offices before the hearing.

2. Public Hearing

The Zoning Commission at the hearing shall listen to all persons who may speak in support of or in opposition to the proposal. Upon the completion of its review, the Zoning Commission will approve, deny or modify the proposal. The Zoning Commission may require additional information before it completes its findings and decision.

3. Data Submission Requirements

Petitions for variances or special use permits shall be submitted with the following information:

A) Legal description of the area proposed to be rezoned, the name and addresses of all owners of property lying within such area.
B) A map showing the existing land uses and zoning district classification of the area.

C) A site plan showing the existing buildings and uses and the requested changes.

D) A fee shall be paid in accordance with the schedule established by the County Commission.

4. Deliberation and Decision

In making it's finding, the Zoning Commission shall ascertain that the request for variance is consistent with the County Land Use Plan and meets all requirements of this ordinance and other regulations of the County.

5. Standards

No application for variance or special use permit shall be approved unless the Zoning Commission finds that all of the following are present.

A) That special conditions and circumstances exist which are peculiar to the premises and which are not applicable to other premises in the same zoning district.

B) That literal interpretation of this ordinance would deprive the applicant of rights commonly enjoyed by other properties in the same zoning district.

C) That the special conditions and circumstances have not resulted from actions of the applicant.

D) That granting the variance requested will not confer upon the applicant any special privileges that are denied by this ordinance to other premises.

6. Justification

A) That the reasons set forth in the application justify the granting of the variance.

B) The variance is the minimum, which would make possible a reasonable use of the premises.

C) That the granting of variance will be in harmony with the general purpose of this ordinance and will not be injurious to the surrounding premises, neighborhood or the county and will not be contrary to the land use plan and the purposes of this ordinance.

D) That there is practical difficulty or unnecessary hardship in use of the premises if the strict application of the regulations were to be carried out.

7. Authorized Variances

A variance shall not be granted for any yard or setback less than the yard or setback as required by this ordinance.

A) To reduce not by more than 20% the applicable requirements for lot area and lot width.

B) To reduce the applicable off-street parking or loading facilities by

no more than 50% of the requirements.

C) To permit the use of lot of record if it is smaller than the minimum size required by this ordinance.

D) To permit roof alterations to provide additional windows, headroom or area for occupancy of third level.

E) To permit conversion of an existing building to a permitted residential use provided that it shall not conflict with the above standards cited in Section 8.3.5 and 8.3.6.

8.4 ACTION OF THE ZONING COMMISSION

1. Initiation of Amendment

Amendments may be proposed by the Zoning Commission or any person, firm, corporation or organization which has a freehold interest or contractual interest in a building, structure, lot, or parcel of land.

2. Application for Amendment

Application for an amendment shall be filed with the Code Administrator who shall forward all such applications to the Zoning Commission.

3. Notice of Public Hearing

Notice of hearing shall include time, place and purpose of such hearing and shall be published at least one week before the hearing in the official newspaper of the county.

4. Public Hearing

At the public hearing before the Zoning Commission, the proposed amendment is discussed. Any person may express opposition to or support for the amendment at such hearing.

5. Effect of Denial of Application

An application for an amendment to the zoning district map or conditional use permit which has been denied by the Zoning Commission shall not be made for a period of one year from the date of such denials, unless the new application is substantially different from the denied application.

RESOLUTION

Whereas, the County Zoning Commission has approved this amended County Zoning Ordinance, and recommends it adopted by the County Commission.

Now and therefore, be it resolved that the County Commission hereby adopts the MCINTOSH COUNTY Zoning Ordinance.

County Auditor	Date	Chairman	Date

PERMIT FEE SCHEDULE

Application for Building Permit:

Value of work to be done:	**Fee**
Over $20,000	$25
Agricultural Use	Exempt

Application for Wind Energy Facility Siting Permit	$2,000 plus $500 per wind turbine up to a maximum of $50,000
Application for Conditional Use Permit	$50
Application for Road and Highway Access Permit	No Fee
Application for Zoning Amendment	$50
Application for Variance	$50

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Great Plains Regional Office
115 Fourth Avenue S.E.
Aberdeen, South Dakota 57401

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
DESCRM
MC-208

JUL 0 9 2009

Jennifer Turnbow, Project Manager
Kadrmas Lee & Jackson
128 Soo Line Drive
Bismarck, North Dakota 58502-1157

Dear Ms. Turnbow:

We received your letter regarding the proposed Merricourt Wind Power project in Dickey and McIntosh Counties, in North Dakota. We have considered the potential for both environmental damage and impacts to archeological and Native American religious sites on lands held in trust by the Bureau of Indian Affairs, Great Plains Region. You should be aware, however, that tribes or tribal members may have lands in fee status near the site of interest. These lands would not necessarily be in our databases, and the tribes should be contacted directly to ensure all concerns are recognized. The action considered has the following notification date and project location:

- June 17, 2009 Merricourt Wind Power Project enXco Development Corporation Dickey and McIntosh Counties, North Dakota

We have no environmental objections to this action, as long as the project complies with all pertinent laws and regulations. Questions regarding environmental opinions and conditions can be addressed to Jeffrey Davis, Environmental Protection Specialist, at (605) 226-7656.

We also find that the listed action will not affect cultural resources on tribal or individual landholdings for which we are responsible. Methodologies for the treatment of cultural resources now known or yet to be discovered – particularly human remains – must nevertheless utilize the best available science in accordance with provisions of the Native American Graves Protection and Repatriation Act, the Archaeological Resources Protection Act of 1979 (as amended), and all other pertinent legislation and implementing regulations. Archeological concerns can be addressed to Dr. Carson N. Murdy, Regional Archaeologist, at (605) 226-7656.

Sincerely,

Deputy Regional Director – Indian Services

North Dakota State Water Commission

900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850
701-328-2750 • TDD 701-328-2750 • FAX 701-328-3696 • INTERNET: http://swc.nd.gov

July 22, 2009

Jennifer Turnbow
Kadrmas, Lee & Jackson
PO Box 1157
Bismarck, ND 58502-1157

Dear Ms. Turnbow:

This is in response to your request for review of environmental impacts associated with the Merricourt Wind Power Project, enXco Development Corporation, Dickey and McIntosh Counties, ND.

The proposed projects have been reviewed by State Water Commission staff and the following comments are provided:

- The property is not located in an identified floodplain and it is believed the project will not affect an identified floodplain.

- Modification of water control structure may need a construction permit.

- All waste material associated with the project must be disposed of properly and not placed in identified floodway areas.

- No sole-source aquifers have been designated in ND.

- It is the responsibility of the project sponsor to ensure that local, state and federal agencies are contacted for any required approvals or permits.

There are no other concerns associated with this project that affect State Water Commission or State Engineer regulatory responsibilities.

Thank you for the opportunity to provide review comments. If you have any questions, please call me at 328-4969.

Sincerely,

Larry Knudtson
Research Analyst

RECEIVED
JUL 24 2009

JOHN HOEVEN, GOVERNOR
CHAIRMAN

DALE L. FRINK
SECRETARY AND STATE ENGINEER

"VARIETY IN HUNTING AND FISHING"

NORTH DAKOTA GAME AND FISH DEPARTMENT

100 NORTH BISMARCK EXPRESSWAY BISMARCK, NORTH DAKOTA 58501-5095 PHONE 701-328-6300 FAX 701-328-6352

July 15, 2009

Jennifer Turnbow
Kadrmas, Lee & Jackson, Inc.
P.O. Box 1157
Bismarck, ND 58502-1157

Dear Ms. Turnbow:

RE: Merricourt Wind Power Project – Dickey & McIntosh Counties, North Dakota
enXco Development Corporation

The North Dakota Game and Fish Department has reviewed this project for wildlife concerns.

Our primary concern with wind power development is the disturbance of native prairie associated with construction of turbines, access roads, and other associated facilities. We ask that work within native prairie be avoided to the extent possible. This could include micro-siting turbines onto adjacent previously disturbed land, locating access roads on existing section line trails rather than across undisturbed native prairie, etc.

This department manages the McIntosh County Wildlife Management Area in Section 14 E½, T131N/R68W. If it is intended to place wind turbines near the project boundary, we ask that they be set-back from the WMA a sufficient distance to minimize disturbance to wildlife.

National Wetland Inventory maps indicate numerous wetlands within the proposed project area. We recommend that any unavoidable wetland impacts be replaced in kind, above-ground appurtenances not be placed in wetland areas, and no alterations be made to existing drainage patterns.

We also recommend that routine monitoring for avian and bat mortality be included as part of the facility maintenance plan for the life of the project.

We would appreciate being kept informed as this project progresses, and as other wind power projects are developed in North Dakota. If possible, we would also like the GPS coordinates for each turbine after the site has been established.

RECEIVED
JUL 17 2009

Sincerely,



Michael G. McKenna
Chief
Conservation & Communication Division

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