Monday, October 11, 2011

Dr. Burl A. Haar
Executive Secretary
Minnesota Public Utilities Commission
Suite 350, 121 7th Place East
Saint Paul, MN 55101-2198

Re: Getty Wind Company, LLC
Application for a State Site Permit for a Large Wind Energy Conversion System
MPUC Docket No.: IP6866/WS-11-831

Dear Dr. Burl A. Haar,

Getty Wind Company, LLC (Getty) is pleased to transmit this Large Wind Energy Conversion System (LWECS) Site Permit Application for the Getty Wind (Project) in accordance with Minnesota Rules 7854.

Please do not hesitate to call me with any questions regarding this application.

Sincerely,

Keith L Thorstad, Vice President
Getty Wind Company, LLC
P.O. Box 321
Chokio, MN 56221
(320) 324-7122

Getty Wind Project

Large Wind Energy Conversion System

Site Permit Application

Docket No. IP6866/WS-11-831

October 11, 2011

Prepared for:

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Prepared by:

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Applicant:

Getty Wind Company, LLC
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Project Name:	**Getty Wind (Project)**
Project Location:	Stearns County, Sauk Centre Township T 126 N, R 34 W, Sections 29 - 33 Getty Township T 125 N, R 34 W, Sections 1 - 11, 16 - 21

Applicant:	**Getty Wind Company, LLC (Getty)**
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Signature:	
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Section 1 - Applicant Information

Getty Wind Company, LLC (Applicant or Getty), a Minnesota limited liability company, is pleased to submit this Large Wind Energy Conversation System Site Permit Application (Application) to the Minnesota Public Utilities Commission (MPUC) for a site permit to construct and operate the Getty Wind Project (Project). The Project as proposed is a 40 megawatt (MW) Community-Based Energy Development (C-BED) wind energy project, located in Stearns County, Minnesota.

Getty is a wholly owned subsidiary of Getty Wind, LLC. Getty Wind, LLC is wholly owned by ten Minnesota limited liability companies **(see Table 1.1)** formed by 18 Minnesota residences for the specific purpose of owning Getty collectively and developing the Project as a C-BED wind energy project. Getty began development activities in early 2007. To assist with the development of the Project, Mnioka Construction, LLC (Mnioka), a North Dakota limited liability company with offices in Chokio, Minnesota, was retained by Getty as the Project developer. Getty sought a financial partner to facilitate the financing of Midwest ISO transmission system upgrades and Project construction and has entered into an agreement with Geronimo Wind Energy, LLC to facilitate that financing.

Table 1.1 – Project Owners

Owner	Street Address	City	State	Zip
Kemar Wind, LLC.	42136 County RD 188	Sauk Centre	MN	56378
West Wind 1, LLC.	36879 County RD 190	Sauk Centre	MN	56378
JD Retirement, LLC.	40154 Highway 71	Sauk Centre	MN	56378
LLB Energy, LLC.	41777 385th Street	Sauk Centre	MN	56378
ALJ Wind, LLC.	38354 US Highway 71	Sauk Centre	MN	56378
Endeavor Enterprises, LLC.	37402 County Road 187	Sauk Centre	MN	56378
Max Wind, LLC.	37402 County Road 187	Sauk Centre	MN	56378
Windy Day Acres, LLC.	37089 395th Avenue	Sauk Centre	MN	56378
Beste Wind, LLC.	40985 425th Avenue	Sauk Centre	MN	56378
GWF1 Wind, LLC.	PO Box 321	Chokio	MN	56221

Getty's authorized representative is Keith L. Thorstad, Vice President of Getty and President of Mnioka. Mr. Thorstad may be contacted by U.S. mail at P.O. Box 321, Chokio, Minnesota 56221, by e-mail at mnioka@fedtel.net, or by telephone at (320) 324-7122. Getty's application was prepared by Roland Jurgens III of Mnioka. Getty will be the Permittee if a site permit is issued. Permittee's mailing address is:

Getty Wind Company, LLC
P.O. Box 321
Chokio, Minnesota 56221

Section 2 - Certificate of Need

A Certificate of Need ("CN") is required for a large energy facility greater than 50 megawatts (MW) (Minnesota Statutes §§ 216B.2421 and 216B.243, subd. 2, and Minnesota Rules Chapter 7849). Alone, the Getty project does not require a CN because it is less than 50 MWs. However, Getty has executed an agreement with Geronimo Wind Energy, LLC, the developer of the adjacent 42 MW Black Oak Wind project. Because Black Oak and Getty may come under common ownership, the two entities have filed concurrent to this application, a joint CN application. Filings in Docket No. IP6853 and IP6866/CN-11-471 describes the unique circumstances prompting the joint filing. Black Oak and Getty expect that the joint CN application and this Site Permit application will proceed concurrently.

Getty has not yet determined who will ultimately purchase the Project's output. Getty may choose to negotiate a power purchase agreement (PPA) with a purchasing utility, or alternatively, Getty may find it commercially advantageous to sell the energy in the wholesale market. Getty may choose to offer the Project's output for sale directly to wholesale customers, including Minnesota utilities and cooperatives.

Section 3 - State Policy

The contents and treatment of applications for LWECS site permits are governed by Minn. R. Ch. 7854 under the Wind Siting Act. In this application, Getty presents information required by Minn. R. Ch. 7854. Additionally, sufficient Project design, wind resource, and technical information are provided for a thorough evaluation of the reasonableness of the Project area as a location for the Project.

The Wind Siting Act requires an application for a site permit for an LWECS to meet the substantive criteria set forth in Minn. Stat. § 216E.03, subd. 7. This application provides information necessary to demonstrate compliance with these criteria and Minn. R. Ch. 7854. The siting of an LWECS is to be made in an orderly manner compatible with environmental preservation, sustainable development, and the efficient use of resources (Minn. Stat. § 216F.03). Getty is designing the Project to comply with the Minnesota Public Utilities Commission's wind turbine setback and siting guidelines. In addition, this application has been organized to meet the guidelines set forth in the Minnesota Department of Commerce - Energy Facilities Permitting Application Guidelines for Site Permitting of LWECS in Minnesota.

Because the Project is a Large Wind Energy Conversion System (LWECS), as defined in the Wind Siting Act, Minnesota Statutes § 216F.01, the Minnesota Public Utilities Commission has permitting authority for the Project. Getty has contacted Stearns County and provided notice that the Project is to be permitted by the MPUC. Getty will continue to work with Stearns County to ensure that the Project meets County setbacks and standards as set forth in Stearns County Ordinance Number 439. Stearns County will issue conditional use permits for the Project's substation and transmission line, and may issue individual building permits for each turbine site.

The Project has been designed to qualify as a C-BED project, pursuant to Minn. Stat. § 216.1612. As a matter of State policy, the Legislature has identified C-BED projects as a priority for utilities that need to construct or purchase additional renewable energy generation capacity. C-BED projects such as this Project will help Minnesota-based utilities meet renewable energy objectives which have been established by the Legislature and the Governor (Minn. Stat. § 216B.1691). Getty received a Resolution of support for the Project from Stearns County Board of Commissioners on June 8, 2010, Stearns County Resolution Number 10-45. A copy of this resolution is provided in **Appendix A**. As a community-based project, there is strong local support for the Project. Getty is owned by 10 local Minnesota limited liability companies, identified previously in **Table 1.1**.

The Project's 40 megawatts will help to satisfy the State of Minnesota's renewable energy objectives, as defined by the State's Renewable Energy Standard (RES) which requires that 25% of the State's energy be supplied from renewable sources by the year 2025.

Section 4 - Project Description and Overview

Project Location and Description of Facilities

The Project is located in central Minnesota approximately 6 miles south and southwest of the City of Sauk Centre, Minnesota **(see Figure 1)**. The Project will be located within sections 29 - 33 of Sauk Centre and sections 4-9, 16-21 of Getty Townships in Stearns County. The Project boundary contains approximately 7,630 acres, of which 4,632 acres of land is currently under agreement (61% of the area within the Project boundary). Getty currently has enough land area under agreement to construct the Project facilities, including the turbines, collection system, substation, transmission lines, permanent meteorological tower, operations and maintenance facility, and associated roads. Getty is continuing to seek additional site control to improve the Project's layout and energy production to further reduce impacts to environmentally sensitive areas within the Project.

Getty is proposing a 40 MW LWECS, consisting of up to 26 turbines, collection system, substation, transmission lines, one permanent meteorological tower, operations and maintenance facility, and associated roads. Getty has not chosen a turbine model because we are in period of time where wind turbine manufactures are continuously introducing new turbine models and aggressively changing existing turbine technology for class IIb/IIIb wind sites. Also, with new turbine manufactures entering the US market and with increased competition, turbine pricing has been and continues to decline. Due to these market conditions, Getty requests that the Commission permit the Project for a range of turbine sizes, ranging from 1.5 to 3.0 megawatts and up to 26 turbines.

Getty has performed an analysis of turbine models that are currently available. Based on technology, performance, and price, Getty is currently considering 21 REpower MM100 turbines at 1.8 megawatts, with a total output of 37.8 megawatts. Two alternative designs are also under consideration which would consist of up to (i) 26 Goldwind 87/1500 turbines at 1.5 megawatts with a total output of 39 megawatts or (ii) 13 Vestas V112 turbines at 3.0 megawatts with the total output of 39 megawatts. Tentative layouts for each turbine type currently under consideration are shown in **Figures 2.1 – 2.3.** Getty requests the right to choose turbines from a different vendor but in a similar class to the Repower, Goldwind, or Vestas, depending on turbine technology, performance, and price. Having the flexibility in the future to select the best turbine available based on technology, performance, and price will give Getty the potential to improve energy generation of the project, while minimizing impacts to the land and surrounding community. Getty understands that a change of turbine model will require prior Commission approval and is prepared to put forth the additional effort to improve the project.

Ownership

Getty is a wholly owned subsidiary of Getty Wind, LLC. As shown in **Table 1.1**, Getty Wind, LLC is owned by the 10 Minnesota limited liability companies. Keith Thorstad, a member of GWF1 Wind, LLC has an ownership interest in West Stevens Wind, LLC in Stevens County, Minnesota. No other Getty members have an ownership or financial interests in any another LWECS.

Getty also has an agreement with Geronimo Wind Energy, LLC ("Geronimo"). Under the terms of that agreement, Geronimo may acquire an ownership interest in Getty at a future date. Geronimo has an ownership in several Midwest wind farms, including the Odin and Marshall Projects currently operating in Southwest Minnesota and the Prairie Rose, Paynesville, and Black Oak projects currently being permitted or recently permitted.

Section 5 - Project Design

5.1 Project Layout

The wind turbines and associated facilities will be sited primarily on agricultural land. The topography and environmental characteristics of the site, the selected turbine model, impacts to area residents, and the General Permit Standards for LWECS developed by the MPUC and found in Docket No. E999/M07-1102 **(Table 5.1)**, as well as Stearns County setback requirements **(Table 5.2)** will dictate turbine locations. Getty will create a site layout that maximizes the energy generation of the project while minimizing impacts to the land and surrounding community.

Table 5.1 – MPUC Setback Requirements

Resource Category	General Permit Setback	Minimum Setback
Wind Access Buffer (setback from lands and/or wind rights not under permittee's control)	Wind turbine towers shall not be placed less than 5 rotor diameters (RD) from all boundaries of developer's site control area (wind and land rights) on the predominant wind axis (typically north-south axis) and 3 rotor diameters (RD) on the secondary wind axis (typically east-west axis), without the approval of the permitting authority. This setback applies to all parcels for which the permittee does not control land and wind rights, including all public lands	3 RD (760-985 ft) on east-west axis and 5RD (1280-1640 ft) on north-south using turbines with 78-100 meter rotor diameters.
Internal Turbine Spacing	The turbine towers shall be spaced no closer than 3 rotor diameters (RD) for crosswind spacing (distance between towers) and 5 RD downwind spacing (distance between strings of towers). If required during final micro siting of the turbine towers to account for topographic conditions, up to 20 percent of the towers may be sited closer than the above spacing but the permittee shall minimize the need to site the turbine towers closer.	5 rotor diameters downwind spacing 3 rotor diameters apart for crosswind spacing
Noise Standard	Project must meet Minnesota Noise Standards, Minnesota Rules Chapter 7030, at all residential receivers (homes). Residential noise standard NAC 1, L50 50 dBA during overnight hours. Setback distance calculated based on site layout and turbine for each residential receiver.	Typically750-1500ft is required to meet noise standards depending on turbine model, layout, site specific conditions.

Resource Category	General Permit Setback	Minimum Setback
Homes	At least 500 ft and sufficient distance to meet state noise standard	500 ft +distance required to meet state noise standard.
Public Roads and Recreational Trails	The turbine towers shall be placed no closer than 250 feet from the edge of public road rights-of-way. Setbacks from state trails and other recreational trails shall be considered on a case-by-case basis.	Minimum 250 ft
Meteorological Towers	Meteorological towers shall be placed no closer than 250 foot from the edge of road rights-of-way and from the boundaries of developer's site control (wind and land rights). Setbacks from state trails and other recreational trails shall be considered on a case-by-case basis.	Minimum 250 ft
Wetlands	No turbines, towers or associated facilities shall be located in public waters wetlands. However, electric collector and feeder lines may cross or be placed in public waters or public water wetlands subject to MDNR, USFWS and/or USACOE permits.	No setback required pending further PUC action.
Native Prairie	Turbines and associated facilities shall not be placed in native prairie unless approved in native prairie protection plan. Native prairie protection plan shall be submitted if native prairie is present.	No setback required
Sand and Gravel Operations	No turbines, towers or associated facilities in active sand and gravel operations, unless negotiated with the landowner.	
Aviation (public and private airports)	No turbines, towers or associated facilities shall be located so as to create an obstruction to navigable airspace of public and private airports in Minnesota or adjacent states and/or providences.	Setbacks or other limitations determined in accordance with MNDOT Department of Aviation and FAA requirements.

Table 5.2 – Stearns County Setback Requirements

	5 MW and Larger	Meteorological Towers[5]
Property Lines[1]	1.1 times the total height	1.1 times the total height
Right of Way	250 feet	1.1 times the total height
Occupied Structure participating property owner[2]	500 feet and sufficient distance to meet the state noise standard	The fall zone, as certified by a professional engineer +10 feet or 1.1 times the total height.

	5 MW and Larger	Meteorological Towers[5]
Occupied Structure nonparticipating property owner[2]	1000 feet and sufficient distance to meet the state noise standard	The fall zone, as certified by a professional engineer +10 feet or 1.1 times the total height
Project Boundary[3]	5 times the rotor diameter[4]	
Internal Turbine Spacing[6]	5 rotor diameters downwind spacing, 3 rotor diameters apart for crosswind spacing	
Setbacks for Wind Energy Conversion Systems 40.01kw and larger are measured from the tip of the blade when the blade is extended perpendicular to the tower.		

1. A recorded fall zone easement acceptable to the Department (Stearns County Environmental Services Department) may be allowed in lieu of the required setback, provided all other setbacks are met.
2. For the purposes of this Section, an occupied structure shall include, but is not limited to, structures such as residential dwelling units, schools, churches and places of business. In instances where a fall zone easement has been recorded, the occupied structure setback is not required. For WECS 40kw or less, the setback for an occupied structure does not apply to structures on the same parcel as the WECS.
3. Project boundary shall include all parcels of land which have a wind easement for one wind project.
4. It has been documented that the most important directions to access wind for energy production is north, northwest, southwest, and south therefore the Board may authorize a setback of less than 5 times the rotor diameter if the applicant demonstrates that due to the wind direction, the wake interference is less than 5 rotor diameters.
5. Meteorological towers in conjunction with a wind energy project between 5mw and 25mw shall be placed no closer than 250 feet from the edge of the road right-of-way and from the boundaries of the developer's site control.
6. If required during final micro siting of the turbine towers to account for topographic conditions, up to 20 percent of the towers may be sited closer than the above spacing but the permittee shall minimize the need to site the turbine towers closer.

Substations and accessory facilities: Minimum setback standards for substations and feeder lines shall be consistent with the standards for essential services established in *Section 7.11 of Stearns County Land Use and Zoning Ordinance #439.* For purposes of this Section, substations are defined as any electrical facility designed to convert electricity produced by wind turbines to a voltage greater than 35,000 volts (35KV) for interconnection with high voltage transmission lines shall be located outside of the road right-of-way.

Figures 2.1, 2.2, 2.3 depict proposed preliminary site layouts for the three turbine types identified in Section 4. These figures also identify the local roads within the Project boundary. Turbines may be placed at a minimum internal spacing of five rotor diameters (RD) in the prevailing wind direction and three RDs in the non-prevailing wind direction, with no more than 20 percent of the turbines spaced closer than the prescribed setback. Getty has established that the prevailing wind directions are azimuths of 325 & 145, based on analysis of the on-site data which was correlated to long term meteorological data. Turbines have been placed to meet all MPUC setbacks.

Figures 4.1, 4.2, 4.3 depict current Project constraints within Project boundary for the three turbines types identified in Section 4. These figures also identify locations where Project site control will extend outside of the Project boundary so that the Project will meet the MPUC Wind Access Buffer setback and Stearns County Project Boundary setback of five RD in the prevailing wind direction and three RD in the non-prevailing wind direction.

The differences in turbine models will influence the final location of each turbine, and the identified turbine locations are subject to change during final design.

5.2 Major Wind Turbine Components

Modern wind turbines including the Repower and Vestas proposed by Getty, generally consist of a nacelle, hub, blades, tower, and foundation. The nacelle may house the generator, gear box, controls, braking systems, cooling systems, hoist, cabling, transformer, lightning protection system, and other miscellaneous equipment. The hub consists of the blades, spinner, blade pitch motors, blade angle detection systems, and lightning protection system. The Goldwind turbines are unique from the other turbines proposed, in that they are a direct drive, permanent magnet generator turbine. The hub and blades of the Goldwind turbine are directly coupled to the generator, so the turbine has no gearbox. All turbine models proposed have three blades composed of carbon fibers, fiberglass, and internal supports to provide a lightweight but strong component. The tip of each blade is equipped with a lightning receptor. The tower supports the nacelle, hub, and blades. The tower houses the nacelle access systems, power rail, controls, communication cables, and control systems are located at the base of the tower. 100 meter towers often include a lift or lift assist systems for Project personnel accessing the nacelle. All towers are tubular steel (not latticed) and are painted a non-glare white. Specialized electrical equipment may also be located at the base of each tower to conditions the generated electricity to match electric grid requirements. The Goldwind turbines will also contain a full power converter in the base of the tower. The expected turbine foundation will be a spread foundation design. Foundations for the towers will be approximately 2500 square feet with a depth of up to 10 feet. Except for approximately 18 inches that will remain above-ground to allow the tower to be appropriately bolted to the foundation, the tower foundation will be below ground. A specific foundation design will be chosen based on soil borings conducted at each turbine location.

All turbine models also contain emergency power supplies to allow operation of the control systems, braking systems, yaw systems, and blade pitch systems, to shut the turbine down safely if grid power is lost.

Wind turbine blades convert linear energy from wind into rotational energy, which the hub transfers to the gear box or directly to the generator located within the nacelle. The transferred mechanical force is converted into electrical energy by the generator. Heated mechanical and/or ultrasonic anemometers and weather vanes, located on the turbine nacelle, continuously collect real-time wind speed and direction data. Based on the data collected the turbine yaw system constantly rotates the hub, blades, and nacelle into the wind, while the blade pitch system continuously adjusts the pitch of the blades to optimize the output of the generator. The pitch system also protects the turbine from over-speed events in high winds by pitching to blades perpendicular to the wind. The mechanical braking system, located within the nacelle, is used to stop the turbines rotation in the event of high winds, a storm, or other turbine fault. The mechanical brake and lock

out system is used to lock the blade rotor to prevent the blades from spinning during maintenance periods or other times when the turbine is out of service. The gear box adjusts shaft speeds to maintain generator speed in low and high wind speeds. Electrical energy produced by the generator is transmitted through insulated cables in the power rail to a safety switch then to either a pad-mount transformer or for Goldwind turbines a full power converter and then to a pad-mount transformer, located at the base of the tower.

The turbines proposed to be used on the Project, the REpower MM100, Goldwind 87/1500, and Vestas V112, are all representative of the turbine types described above. Getty is currently planning to use these types of turbines; **Table 5.3** contains specific turbine characteristics for each turbine model under consideration.

Table 5.3 - Turbine Model Characteristics

Characteristics	REpower MM100	Goldwind 87/1500	Vestas V112
Name capacity	1,800 kW	1,500 kW	3,075 kW
Hub Height	100 meters (328.1 feet) or 80 meters (262.5 feet)	100 meters (328.1 feet) or 85 meters (278.9 feet)	94 meters (308.4 feet) or 84 meters (275.6 feet)
Rotor Diameter	100 meters (328.1 feet)	87 meters (285.4 feet)	112 meters (367.5 feet)
Total Height	150 meters (492.1 feet) or 130 meters (426.5 feet)	144 meters (472.4 feet) or 129 meters (423.2 feet)	150 meters (492.1 feet) or 140 meters (459.3 feet)
Cut-in Speed	3.0 m/s (6.7 mph)	3.0 m/s (6.7 mph)	3.0 m/s (6.7 mph)
Rated Speed	10.5 m/s (23.5 mph)	9 m/s (20.1 mph)	13 m/s (29.1 mph)
Cut-out Speed	22 m/s (49.2 mph)	22 m/s (49.2 mph)	25 m/s (55.9 mph)
Rotor Area	7,854 m^2 (84,539 ft^2)	5,944 m^2 (63,987 ft^2)	9,852 m^2 (106,046 ft^2)
Rotor Speed	7.8 to 13.9 rpm	9.0 to 16.6 rpm	6.2 to 17.7 rpm

5.3 Project Electrical System

Construction of the Project could include up to 26 wind turbines, each will have the transformer either mounted in the nacelle, within the tower, or pad-mounted outside at the base of the turbine. The proposed turbines will be connected to the Project substation by an underground electrical 34.5 kilovolts (kV) collection system, including an occasional aboveground junction box. At the Project substation the power will be converted from 34.5 kV to 69 kV and then transmitted via a Project-owned above ground 69 kV transmission line to Xcel's existing Black Oak switching station, as shown in **Figure 2**. The Project will interconnect to the existing grid at 69 kV, via an existing station bay at the Black Oak switching station. The proposed electrical collector system and transmission system will be located on properties leased by Getty or in public road rights-of-way. Getty will seek approval of the 69 kV transmission line through Stearns County. See Section 6.1 of this document for more detailed discussion of the electrical interconnection.

Section 6 - Description and Location of Associated Facilities

Getty is seeking permitting approval from the MPUC for the following associated facilities: access roads, electrical collection system, up to 2 permanent meteorological towers, Project substation, and the option to connect the Black Oak LWECS project collection system to the Project substation. Getty will also seek appropriate permits and approvals from Stearns County for the following associated facilities: permanent meteorological tower(s), transmission line to Xcel's Black Oak switching station, and the Project O&M building.

6.1 Transmission and Project Substation

The Project's interconnection with the Midwest Independent Transmission System Operator (MISO) system is located at Xcel's Black Oak switching station. The Black Oak switching station is located approximately 3 1/2 miles east of the Project's boundary **(see Figure 2)**. The Project will build a 69kV transmission line from the Project substation to an existing bay in Black Oak switching station (**see Appendix B**). The transmission line will be located on private land, and the Project has voluntarily acquired all easements required to construct and operate the Project's transmission line. The neighboring Black Oak LWECS project's interconnection is also located at the Black Oak switching station. Getty intends to connect the neighboring Black Oak LWECS project's collection system to Getty's Project substation and plans to lease excess capacity on its 69kV transmission line to the Black Oak Wind project. Getty requests this arrangement be part of the site permit. This will reduce costs for each project and reduce the impact on area landowners by eliminating a second redundant 69kV line to the Black Oak switching station from the Black Oak Wind project. This scenario will also likely eliminate the need to expand the Black Oak switching station by allowing both projects to use the same existing station bay.

The Project substation will require approximately 1 acre of land within the project boundary and be located on land leased by Getty. The Project substation will contain low-side metering equipment and switches to protect Getty's collection system, it will also contain a shared 34.5 kV to 69 kV main step-up transformer and high-side switches for Getty and the neighboring Black Oak Wind project. If Getty and the Black Oak Wind Project share the capacity of one main transformer and switch, it will eliminate redundant equipment and land used for that equipment in Black Oak's project substation. The exact location of the Getty substation has not yet been determined; it will be sited so that the Black Oak Wind project can connect to it. The overhead 69 kV transmission line from the Project's substation to Xcel's Black Oak switching station will be permitted through Stearns County.

Getty's interconnection request with MISO has completed the facility studies related to Getty's interconnection request, and Getty is ready to negotiate the Generator Interconnection Agreement (GIA) upon MISO's completion of the Group 5 and Definitive Planning Phase Cycle 1 restudies. The final electrical system design and interconnection details will be determined through GIA negotiations with MISO and Xcel Energy. The Project will meet electrical design requirements, including power factor, voltage control, and grid system protection set forth by MISO. All electrical system components will be designed and installed in accordance with the standards of high-voltage engineering practice to be compatible with the specified requirements of the interconnecting area transmission system as set forth by the local transmission owners and the reliability and operating organizations.

6.2 Collector Lines and Feeder Lines

The electrical collection system proposed for the Project and the Black Oak Wind project is designed to be "a separately derived system" as defined in the National Electric Code. The system will have no direct electrical connection (including grounded circuit conductors) to conductors originating in another system. The Project's collection system and Black Oak Wind project collection system will have their own substation and transformer.

Each proposed turbine will have a step-up transformer, either inside the turbine or outside at the base of the turbine, to raise the voltage from 575 to 690 volts to the power collection line voltage of 34.5 kV. If external transformers are used, then small, concrete foundation will be constructed to support the transformer within the gravel area adjacent to the turbine base. The electrical collection system will consist of a network of underground electrical cabling operating at 34.5 kV. Power will run through an underground collection system from each turbine to the Project's metering station within the Project substation and then to the Project's main transformer within the substation, which will raise the voltage to 69 kV. Getty also requests that the Commission permit the Project to connect the Black Oak Wind project collection system to the Project's main transformer. This connection would originate at the Black Oak Wind project metering station and would run on either underground cables or an overhead line operating at 34.5 kV to the Project's main transformer, which would raise the voltage to 69 kV for delivery to the Black Oak switching station. Approximately 9.4 miles to 11.8 miles of underground lines will be installed by trenching, plowing, or where needed, directionally boring the cables underground. The collection lines will occasionally require an aboveground junction box when the lines from separate spools need to be spliced together. Conceptual electrical layouts based on the preliminary turbine layouts are shown in **Figures 2.1 through 2.3**.

6.3 Associated Facilities

A 60-meter guyed meteorological tower installed in April of 2009 and an 80-meter guyed meteorological tower installed in December of 2009 will be removed during construction of the Project. At least 1, and up to 2, self-supporting permanent 80 or 100 meter meteorological tower(s) will be constructed as part of the Project. The location and number of the permanent meteorological tower(s) is usually determined by the manufacturer of the Project's turbines.

The individual wind turbines will each have a gravel access road that allows access to the wind turbines year-round. These roads are expected to be approximately 16 feet wide with a class-five gravel surface and geotextile fabric underlay. Getty will continue to work with the landowners during micro-siting to reach agreements on the locations of the turbines, access roads, and collector system to minimize land use disruptions.

An Operations & Maintenance (O&M) Facility may be constructed on or near the site. The location of the O&M facility has yet to be determined. It will most likely be in an established industrial park with adequate transportation access, communications facilities, and easy access to the Project. If the facility is located outside the project boundary fiber optic lines may connect from it and the turbines to ensure that the SCADA system's communications are readily available. An existing facility, meeting the turbine manufacturer's criteria, could be utilized. The building typically used for this purpose is 3,000 to 5,000 sq ft with a parking lot adjacent to the building. The building will house the equipment, offices, and control systems used to operate

and maintain the wind farm. O&M facilities typically include an outdoor secured storage area for large components. As each turbine manufacturer has different requirements for O&M facilities, the location and design of the facility will be completed after a turbine model is chosen. It is also possible that Getty and the Black Oak Wind Project could share one O&M facility to reduce costs for each project and reduce the impact on area residences.

6.4 Permitting Associated Facilities

Getty will be responsible for all required environmental reviews and will obtain all additional local permits and licenses that are required following issuance of the LWECS Site Permit. The Project will apply to Stearns County for a conditional use permit to construct the 69 kV overhead transmission line, permanent meteorological tower(s), utility road crossings, and O&M facility. Getty will also obtain building permits, as required, from Stearns County and/or Getty and Sauk Centre Townships for each turbine, Project substation, permanent meteorological tower(s), and O&M facility.

Section 7 - Wind Rights

All wind energy agreements with Landowners have been in the form of a wind energy lease and wind energy easement agreements that contain up to a seven-year development period, which upon construction is automatically converted to a thirty-year extended term with two optional five-year extensions, to ensure access to the site for construction and operation of the Project for up to forty years. All agreements have been recorded with a memorandum of wind energy lease and wind energy easement agreement at the Office of the Stearns County Recorder. All transmission agreements with landowners have been in the form of a transmission easement agreement that contains a development period, which upon construction, is automatically converted to permanent transmission easement, until such time that the transmission line is removed, to ensure access to the site for construction and operation of the line. All agreements have been recorded with a memorandum of transmission easement agreement at the Office of the Stearns County Recorder.

The Project boundary contains approximately 7,600 acres, of which 4,632 acres of land is currently under agreement (61% of the area within the Project boundary). See Section 4 for additional information on the acres secured for construction and operation of the Project.

Section 8 - Environmental Impacts

Consistent with MPUC objectives, Getty has designed the Project to make efficient use of land and wind resources to create a sustainable, environmentally-beneficial energy supply, while minimizing the potential for environmental impacts. Project design decisions are based on environmental features, topographical features, current turbine technology, and the prevailing wind resource at the site.

8.1 Demographics

The Project is located in portions of Getty and Sauk Centre Townships, in northwestern Stearns County. The Population densities near the Project vary greatly and decline rapidly as distance from I-94 increases. Densities within 5 miles of the Project boundary range from 6.2 people per square mile in Ashley Township to 1,057 people per square mile within the City of Sauk Centre. Densities of surrounding political subdivisions are listed in **Table 8.1**. Getty Township has a density of 10.4 people per square mile and Sauk Centre Township has a density of 25.9 people per square mile. There are 33 homes within the project boundary (**see Figure 4**).

Table 8.1 – Project Demographics

County 2010 Census Data				
Political Subdivision	Population	Households	Household Size	Population Density
Stearns County	150,642	56,323	2.53	112.0/ sq. mile
Township 2010 Census Data				
Political Subdivision	Population	Households	Household Size	Population Density
Ashley Twp	262	94	2.79	6.2/ sq. mile
Getty Twp	376	118	3.19	10.4/ sq. mile
Grove Twp	493	169	2.92	13.7/ sq. mile
Lake George Twp	335	111	3.02	9.3/ sq. mile
North Fork Twp	247	93	2.66	6.8/ sq. mile
Melrose Twp	759	273	2.78	18.1/ sq. mile
Raymond Twp	259	82	3.53	7.2/ sq. mile
Sauk Centre Twp	1088	404	2.69	25.9/ sq. mile
Spring Hill Twp	368	120	3.07	10.2/ sq. mile
City 2010 Census Data				
Political Subdivision	Population	Households	Household Size	Population Density
Elrosa	211	85	2.42	2.11/ acre
Greenwald	222	98	2.27	2.05/ acre
Meire Grove	179	70	2.56	1.37/ acre
Sauk Centre	4317	1851	2.28	1.69/ acre

The Project is located within a moderately-populated rural portion of Stearns County. According to the 2030 Stearns County Comprehensive Plan, townships in the Cluster 1 - Northwest (which includes Getty and Sauk Centre townships) are experiencing slightly declining populations. The Comprehensive Plan reads, “Most housing and population growth is occurring within and around the larger cities along the I-94 corridor, particularly Sauk Centre and Melrose. The smaller cities and most townships show slightly declining

populations but relatively stable numbers of households. The agricultural economy remains strong in this area."

Impacts and Mitigation

Construction jobs will bring approximately 50 to 80 temporary workers to the area for approximately 4 to 6 months. These workers usually utilize existing lodging, camping facilities, and rental properties during construction which will not permanent impact demographics within the Project boundary.

Operations and Maintenance positions may create 2 to 4 positions for the life of the Project. Workers in these positions may live within the Project boundary, but more often live in neighboring communities due to the greater availability of housing options. These positions are not expected to permanently impact demographics within the Project boundary.

The area within the Project boundary has been identified for continued agricultural use in the most recent Future Land Use Plan in Stearns County 2030 Comprehensive Plan. The Project is not anticipated to prohibit future development or significantly displace current uses because wind energy projects are very compatible with current and future agriculture uses.

Getty anticipates that the Project will not have a significant impact on the demographics within the Project boundary and as such, no mitigation is proposed.

8.2 Land Use

The predominant use of the land within the Project boundary is agricultural, including agricultural-related businesses and dispersed rural residences. The landscape within the boundary is rural with gentle rolling terrain. The Project's boundary adjoins two Waterfowl Production Areas (WPA) and one Wildlife Management Area (WMA); however the Project will be located only on agricultural lands.

Local Zoning

Land within the Project Boundary is current zoned as an Agricultural District A-160 **(Figure 7)**. Which is defined in Section 9.1 of Stearns County Land Use and Zoning Ordinance #439 as:

9.*1 Agricultural District A-160 (A-160 District)*

9.1.1 Purpose: The purpose of this district is to maintain and conserve agricultural lands which are historically valuable for crop and animal production, pastureland and natural habitat for wildlife within the Comprehensive Plan Agricultural/Limited Development land use area. The A-160 district highly restricts residential encroachment by restricting the location and density of residential dwellings to one per one hundred sixty (160) acres. The A-160 district meets the following Stearns County Comprehensive Plan goals:

A. Preserve highly valued farmland for agricultural pursuits (Land Use Plan Goal 1, Objective 2).

B. Protect agricultural soils and other agricultural resources by regulating nonagricultural land uses in areas with agricultural soils (Natural Resources Plan, Goal 3, Objective 1).

C. Maintain suitable boundaries for urban, rural residential and agricultural areas (Land Use Plan Goal 2, Objective 1).

D. Create land use regulation that protects and encourages the expansion of the County's economic diversity (by) . . . reaffirming the A-80 and A-160 zoning districts in those townships committed to agricultural protection (Economic Development Policy 1).

Section 9.1.5 identifies Wind Energy Conversion Systems (greater than 40KW) as a Conditional Use, subject to certain defined performance and general development standards, in Agricultural District A-160.

Section 6.60 Wind Energy Conversion Systems (WECS) of the Stearns County Land Use and Zoning Ordinance #439 governs WECS in Stearns County. This Section states its purpose is, "to set forth a process for permitting wind energy conversion systems (WECS) and meteorological towers (MT) not otherwise subject to siting and oversight by the State of Minnesota under the *Minnesota Power Plant Siting Act, Minnesota Statutes, section 216F.01-216F.081; or successor statutes*." Section 6.60.5 of the Stearns County Land Use and Zoning Ordinance #439 defines the setbacks that all WECS and MT shall adhere to; these setbacks are included in **Table 5.2**.

Getty and Sauk Centre Townships have entered into memorandums of understanding making Stearns County the permitting authority for WECS within the Townships. It is the Applicants understanding that both townships have adopted Stearns County Land Use and Zoning Ordinance #439 as township zoning code for WECS and do not have more restrictive WECS zoning ordinances.

According to the 2030 Stearns County Comprehensive, Plan no change in land use is slated for any of the parcels located in the proposed Project Area. The existing land use within the Project Boundary is designated as Agricultural/Woodlands. All parcels located in the Project Boundary are zoned A-160, meaning it is zoned for agriculture uses which include WECS, with a density of one residential unit per 160 acres. The A-160 zoning designation coincides with Getty and Sauk Centre Townships' visions to limit residential growth, as stated in the Stearns County Comprehensive Plan. This zoning designation is the most restrictive in terms of agricultural preservation and preventing the defragmentation of prime farmland within Stearns County. The Project is consistent with the intent to preserve farmland; a wind farm requires large amounts of open space, and farming operations are able to continue among the turbines.

As part of a Stearns County Board of Commissioners resolution on a moratorium request in 2010, the Board reinstated the Stearns County LWECS committee to review the Counties WECS ordinance and make recommendations on WECS setbacks and project density. Between July and November 2010 the 10-member LWECS committee met eight times. Kevin Lahr, President of Getty Wind, LLC participated as a member of the LWECS committee and Roland Jurgens, Getty project manager participated as a non-voting industry expert. The LWECS committee's recommendations and wind turbine standards that the Stearns County Board adopted can be found in the November 16, 2010 letter from the Stearns County Board of Commissioners to the Minnesota Public Utilities Commission.

Conservation Easements

The U.S. Fish and Wildlife Service (USFWS) administers programs by which it holds easements on private lands that have wetlands and/or grassland habitat. Development may be restricted on lands held in a USFWS easement. The USFWS was contacted to verity the presence or lack of easements; no easements are known to

exist within the Project boundary. Getty is conducting a title search to identify conservation easements on any properties within the Project boundary. To date, none have been found. The Project's boundary does adjoin the Trisko WPA and Kenda WPA which are part of the USFWS Litchfield Wetland Management District. Waterfowl Production Areas (WPAs) are public lands purchased by the Federal government for the purpose of increasing the production of migratory birds, especially waterfowl. Both the Trisko WPA and Kenda WPA are open to such public uses as hiking, bird watching, hunting, and recreational trapping of fur-bearers.

The Minnesota Department of Natural Resources (MDNR) and Minnesota Board of Water and Soil Resources (BWSR) also administer conservation programs such as Reinvest in Minnesota (RIM), in which the MDNR and/or BWSR holds easements on private lands for conservation purposes. No RIM lands have been found within the Project boundary. RIM lands in vicinity of the Project are shown on **Figures 3**. The Project's boundary does adjoin a strip of land that is an access point to the Padua WMA, which is managed by the MDNR. Wildlife management areas (WMAs) are part of Minnesota's outdoor recreation system and are established to protect those lands and waters that have a high potential for wildlife production, public hunting, trapping, fishing, and other compatible recreational uses.

The Nature Conservancy (TNC) is a non-profit, private organization that acquires lands for conservation purposes. There are no known TNC lands within or adjacent to the Project boundary.

Impacts and Mitigation

The proposed Project will not alter the land use or zoning classification of any parcel within or adjacent to the Project boundary. The Project is consistent with the intent to preserve farmland; a wind farm requires large amounts of open space, and farming operations are able to continue among the turbines. The Project will provide farmers and landowners with another source of income and may prevent the need to subdivide and sell land.

Getty intends to meet the more stringent setback requirements of the Stearns County Land Use and Zoning Ordinance #439 where it is feasible and reasonable. The information provided in the section 9 demonstrates the total energy loss resulting from wake interference in the non-prevailing wind direction will be significantly less than the energy loss in the prevailing wind direction. This reduced interference warrants the commission implementing the 3 rotor diameter setback in the non-prevailing direction and will be consistent with the Stearns County Ordinance's setbacks as discussed in section 5.1 of this document.

No Project activities will occur within conservation easements held by public agencies or private organizations.

8.3 Noise

Noise is measured in units of decibels (dB) on a logarithmic scale. Human hearing is not equally sensitive to all frequencies of sound, so to level the frequencies, certain frequencies are given more "weight". An A-weighted scale dB(A) is used to reflect human hearing; it puts more weight on the range of frequencies that the human ear perceives and less weight on those that human ear does not hear well. Very low frequencies and very high frequencies are the type of frequencies that humans cannot hear well.

The MPUC general wind turbine permit setbacks and standards requires that the Project meet Minnesota residential noise standard Noise Area Classification (NAC) 1, L50 of 50 dBA during nighttime hours and L50 at all residential receivers (homes) as defined in Minnesota Rules Chapter 7030. Noise pollution control is regulated by the Minnesota Pollution Control Agency (MPCA).

Minnesota Rules, part 7030.0030, **Noise Control Requirement**. States that; "No person may violate the standards established in part 7030.0040, unless exempted by Minnesota Statutes, section 116.07, subdivision 2a. Any municipality having authority to regulate land use shall take all reasonable measures within its jurisdiction to prevent the establishment of land use activities listed in noise area classification (NAC) 1, 2, or 3 in any location where the standards established in part 7030.0040 will be violated immediately upon establishment of the land use."

Minnesota Rules, part 7030.0040, subpart 1. **Scope**. States that; "These standards describe the limiting levels of sound established on the basis of present knowledge for the preservation of public health and welfare. These standards are consistent with speech, sleep, annoyance, and hearing conservation requirements for receivers within areas grouped according to land activities by the noise area classification (NAC) system established in part 7030.0050. However, these standards do not, by themselves, identify the limiting levels of impulsive noise needed for the preservation of public health and welfare. Noise standards in subpart 2 apply to all sources."

Minnesota Rules, part 7030.0040, subpart 2. **Noise Standards.** Identifies limiting levels of sound;

Table 8.2 – MPCA Noise Standards

NAC	DAYTIME		NIGHTTIME	
	L50	L10	L50	L10
1	60 db(A)	65 db(A)	50 db(A)	55 db(A)
2	65 db(A)	70 db(A)	65 db(A)	70 db(A)
3	75 db(A)	80 db(A)	75 db(A)	80 db(A)

Minnesota Rules, part 7030.0050, subpart 1. **Applicability.** States that; "The noise area classification is based on the land use activity at the location of the receiver and determines the noise standards applicable to that land use activity unless an exception is applied under subpart 3." Subpart 2. **Noise area classifications.** Lists NAC and the activities included in Classification 1 as:

- 1 Household Units (includes farm houses)
- Group quarters
- Residential hotels
- Mobile home parks or courts
- Transient lodging
- Other residential
- Motion picture production
- Medical and other health services
- Correctional institutions
- Educational services
- Religious activities

- Cultural activities and nature exhibitions
- Entertainment assembly
- Camping and picnicking areas (designated)
- Resorts and group camps

"L50" is defined in part 7030.0020, subpart 8 as the sound level, expressed in dB(A), which is exceeded 50 percent of the time for a one hour survey, as measured by test procedures approved by the commissioner.

"dB(A)" is defined in part 7030.0020, subpart 4 as a unit of sound level expressed in decibels (dB) and A-weighted.

"A-weighted" is defined in part 7030.0020, subpart 2 as specific weighting of the sound pressure level for the purpose of determining the human response to sound. The specific weighting characteristics and tolerances are those given in American National Standards Institute S1.4-1983, section 5.1.

Impacts and Mitigation

Wind turbines emit a perceptible sound when in motion. The level of this noise varies with the speed of the turbine and the distance of the noise receptor from the turbine. On relatively windy days, the turbines create more noise; however, the noise of wind tends to override the turbine noise, especially as distance from the turbines increases. The turbines will comply with noise standards administered by the MPCA (Minn. R. Chapter 7030). The impact to all nearby residents will be taken into consideration as part of the final siting of the turbines to establish appropriate turbine locations.

Background noise levels in the Project area are expected to be typical of those in rural agricultural areas and are commonly in the low to mid-30 A-weighted decibel (dBA) range (equivalent to household level noise). These are relatively low background levels and are generally representative of the proposed site location. Higher levels exist near roads (I-94, US Hwy 71, & State Hwy 28) and other areas of regular human activity such as noise associated with agricultural practices, and nearer to or within the City of Sauk Centre.

Preliminary noise impacts for the Project were calculated for the three proposed turbine layouts by using openWind® software. openWind® is a software program developed by AWS Truepower, LLC, as an aid for the design, optimization, and assessment of wind power projects. openWind® noise model is based on ISO 9613-2, which is the international standard for the propagation and attenuation of industrial noise. The results of those calculations are shown graphically in **Figures 15.1** through **15.3** and **Appendix C** contains the expected dB(A) noise calculation for each residence (receptor) within the project area. In summary, expected maximum noise at any adjacent residence is less than 45 dB(A). These calculations are based on turbine noise emissions provided by the manufacturer with 2dB of uncertainty added, the proposed locations for turbines, and actual residence's locations. The three layouts are 21 REpower MM100 turbines (**Figure 15.1**), 26 Goldwind 87/1500 turbines (**Figure 15.2**), 13 Vestas V112 turbines (**Figure 15.3**). The maximum predicted noise impact that occurred at a residence for each turbine layout is shown in **Table 8.3.** As depicted in **Table 8.3**, all proposed turbine layouts comply with MPCA noise guidelines. Maximum cumulative impacts from all wind turbine models as currently planned are at least 5dB below the nighttime L50 noise limit of 50 dB(A), which the Minnesota Department of Health (MDH) suggests as a surrogate for low-frequency noise mitigation.

Table 8.3 – Maximum predicted cumulative noise impacts

Turbine Layout	Max dB(A)	Average dB(A)
REpower MM100	44.66	29.08
Goldwind 87/1500	44.50	32.60
Vestas V112	42.80	26.97

When a final turbine model is selected for the project and siting is complete, Getty will again model its turbines and the adjacent Black Oak turbines to determine the cumulative noise impacts of the projects. Getty will provide an updated study to the Energy Facilities Permitting Staff as part of its pre-construction studies.

Getty used the openWind software to analysis multiple iterations of turbine layouts to develop turbine layout for each proposed turbine class that meets State and County setbacks, avoided environmental sensitive areas, maintained less than 45 db(A) noise impacts at all residences, maintained less than 1% of annual daylight shadow flicker impact at all residences, while maintaining a commercially viable annual capacity factor.

8.4 Visual Impacts

The landscape in the Project site is rural open cropland with a gentle rolling terrain. The area is characterized by agricultural fields and farmsteads. The most widely grown crops in the area are corn and soybeans. Farmsteads are often surrounded by trees planted as windbreaks.

All potential turbine models will be relatively similar in appearance, with a monopole tower, a single hub, and three blades. The proposed Wind turbines will have a visual effect on the area and while wind turbines will impact the visual surroundings of the Project area, the degree of visual impact will vary based upon personal preferences.

Visual Impacts and Mitigation

Some of the Project's turbines will be located within the view-shed of private lands and homes, Minnesota Department of Natural Resources (MDNR)-managed Wildlife Management Areas (WMAs), U.S. Fish and Wildlife Service (USFWS) Waterfowl Production Areas (WPAs) or other natural areas. **Figure 3** identifies the recreation and wildlife areas near the Project. Some wind turbines will be visible to residents and may be visible to people using nearby public lands by introducing structures contrasting in form and color from the existing landscape, a wind farm could be perceived as an intrusion to the landscape. While the proposed wind turbines will have a visual impact on these areas, this impact is based on a personal subjective response, and perceived visual impacts would likely lessen over time as people using those areas adapt to the change in the visual setting. Operation of the wind farm will generate minimal vehicle traffic and will not significantly increase day-to-day human activity in the area. Therefore, the Project area will retain a rural sense and remote character.

Shadow Flicker Impacts and Mitigation

Shadow flicker caused by wind turbines is defined as alternating changes in light intensity at a given stationary location, or receptor, such as the window of a home. In order for shadow flicker to occur, three conditions must be met: first, the sun must be shining with no clouds to obscure it; second, the rotor blades must be

spinning and must be located between the receptor and the sun; and third, the receptor must be sufficiently close to the turbine to be able to distinguish a shadow created by it. Shadow flicker intensity and frequency at a given receptor are determined by a number of interacting factors:

- Sun angle and sun path – As the sun moves across the sky on a given day, shadows are longest during periods nearest sunrise and sunset, and shortest nearest midday. They are longer in winter than in summer. On the longest day of the year (the summer solstice), the sun's path tracks much farther to the north and much higher in the sky than on the shortest day of the year (the winter solstice). As a result, the duration of shadow flicker at a given receptor will change significantly from one season to the next.
- Turbine and receptor locations – The frequency of shadow flicker at a given receptor tends to decrease with greater distance between turbine and receptor. The frequency of occurrence is also affected by the sightline direction between turbine and receptor. A turbine placed due east of a given receptor will cause shadow flicker at the receptor at some point during the year while a turbine placed due north of the same receptor at the same distance will not, due to the path of the sun.
- Cloud cover and degree of visibility – As noted above, shadow flicker will not occur when the sun is obscured by clouds. A clear day has more opportunity for shadow flicker than a cloudy day. Likewise, smoke, fog, haze, or other phenomena limiting visibility would reduce the intensity of the shadow flicker.
- Wind Direction – The size of the area affected by shadow flicker caused by a single wind turbine is based on the direction that the turbine is facing in relation to the sun and location of the receptor. The turbine is designed to rotate to face into the wind, and as a result, turbine direction is determined by wind direction. Shadow flicker will affect a larger area if the wind is blowing from a direction such that the turbine rotor is near perpendicular to the sun-receptor view line. Similarly, shadow flicker will affect a smaller area if the wind is blowing from a direction such that the turbine rotor is near parallel to the sun-receptor view line.
- Wind Speed – Shadow flicker can only occur if the turbine is in operation. Turbines are designed to operate within a specific range of wind speeds. If the wind speed is too low (cut-in speed) or too high (cut-out speed), the turbine will not operate, eliminating shadow flicker.
- Obstacles – Obstacles, such as trees or buildings, which lie between the wind turbine and the receptor have a screening effect and can reduce or eliminate the occurrence of shadow flicker.
- Contrast – Because shadow flicker is defined as a change in light intensity, the effects of shadow flicker can be reduced by increasing the amount of light within a home or room experiencing shadow flicker.
- Local topography – Changes in elevation between the turbine location and the receptor can either reduce or increase frequency of occurrence of shadow flicker, compared to flat terrain.

Shadow flicker frequency calculations for the Project were modeled for 162 residences (receptors) with WindPRO's Shadow Module. Both the expected case and the worst case scenarios were modeled. The results by residence for the expected case scenario can be found in **Appendix D**. The results by residence for the worst case scenario can be found in **Appendix D**. In summary, the maximum expected shadow flicker at any residence is less than 1% of annual daylight. The maximum predicted shadow flicker impacts that occurred at a residence for each turbine layout is shown in **Table 8.4.** The stratification of residences with expected shadow flicker impacts grouped by percentage of annual daylight for each turbine layout is shown in **Table 8.5.**

Table 8.4 – Maximum predicted shadow flicker impacts

Statistic	Hours / Year V112	Hours / Year MM100	Hours / Year GW 87/1500
Max - Expected Case	20.1	28.9	22.1
Avg - Expected Case	1.0	1.6	1.9
Max - Worst Case	70.3	88.2	79.0
Avg - Worst Case	3.1	5.2	6.9

Table 8.5 – Residences with expected shadow flicker impacts grouped by percentage

Percentage of Total Annual Daylight	Hours / Year V112	Hours / Year MM100	Hours / Year GW 87/1500
≥0.75% (>33.5h/y)	0%	0%	0%
0.75% to 0.50% (<33.5h/y)	0%	0.6%	0%
0.50% to 0.25% (<22.3h/y)	3.7%	4.9%	6.2%
>0% to 0.25% (<11.2h/y)	9.3%	18.5%	29.6%
0% (0h/y)	87.0%	76.0%	64.2%

The annual daylight in 2011 which is the number of hours the sun is above the horizon at Latitude of 45.65° and Longitude of 94.98° is 4466 hours. By simulating the sun path throughout a whole year, WindPRO calculates the number of hours per year as well as maximum minutes per day during which a given receptor could realistically expect to be exposed to shadow flicker from nearby wind turbines. Simulated conditions for the worst case scenario where:

- There is always sunshine,
- The turbines are always in operation,
- The wind direction always orients the rotors perpendicular to the sun-receptor sightline,
- There are no local obstacles blocking potential shadows such as buildings or vegetation,
- Specific window configurations on houses are not considered,
- Receptors are assumed to be exposed to the sky in all directions, and the shielding influence of terrain is not considered ("greenhouse receptors").

The worst case scenario model was refined to represent a less conservative expected scenario by incorporating the following more realistic features in the expected case scenario model:

- Wind Direction – Turbine rotors do not orient themselves to the sun all day, every day, as modeled in the worst case scenario. To adjust for actual rotor direction, wind data is entered into the model. For the analysis included in this application, wind data was taken from the temporary meteorological tower located in the Project Boundary.

- Turbine Operating Hours – The turbine will not be operational all of the time due to local winds being outside of turbine operation specifications, or due to maintenance. Project specific wind rose data again was incorporated to reflect the frequency of sufficient wind speed to activate the turbine. The expected percentage of time the turbine is activated is multiplied by the number of minutes of shadow flicker.
- Actual Sunshine Hours – Sunshine hours are affected by cloud cover, fog or haze, time of day, and time of year. This data is provided by the WindPro software which selects the nearest weather station from its database.

Combining these three mitigating factors creates a less conservative scenario which aims to produce a scenario closet to the actual expected results. These "expected" results represent a significant reduction in shadow flicker hours per day or per year in contrast to a worst case scenario. However, by including the above factors into the model, it is possible – though not likely- to have lower modeled results compared to actual results in the field. This is due to the fact that true meteorological factors like wind direction or sunshine hours could be different from the averages used in a way that is worse for shadow flicker.

Getty will minimize the potential for shadow flicker for all residences, participating and non-participating, when siting wind turbines. Getty will provide a shadow flicker analysis prior to the preconstruction meeting, and an opportunity to review the shadow flicker investigation will be provided to any residences anticipated to experience more than 0.5% of annual daylight flicker. Beyond these conservative measures of siting to prevent shadow flicker, other mitigation measures will be considered and implemented on a case-by-case basis. Shadow flicker will be addressed as situations arise wherein a residence is experiencing significantly more shadow flicker than is anticipated in the modeling, although it is highly unlikely more flicker than modeled will occur. Shadow flicker occurrences shall be documented by the residence daily for several consecutive months including time of day and duration. Documentation must include the location of where the shadow flicker is occurring at and thus disturbing the residence (such as a window or front porch), as well as the location of the turbine causing the flicker. Upon verification of the shadow flicker occurrences, Getty will take mitigation measures. Mitigation measures will be determined by the individual circumstances of residences experiencing shadow flicker, and as a reasonable function of the amount of flicker experienced. Such mitigation measures may include:

- Providing education about how to minimize the effect of shadow flicker.
- Providing indoor screening, such as curtains or blinds in windows, where appropriate and reasonable.
- Providing exterior screening such as a vegetation buffer or awnings over windows where appropriate and reasonable.
- Turbine Control Software programmed to temporarily shut down a specific turbine for a few minutes if conditions are present to create flicker.

8.5 Public Services and Infrastructure

There is an established transportation and utility network that provides access and necessary services to the homesteads, and farms within the Project boundary. The Project will not adversely impact the established transportation and utility network.

Roads

In general, the existing roadway infrastructure in the Project area is characterized by county and township roads that generally follow section lines. Various county and township roads provide access to the proposed site. Access to the Project area also includes two-lane paved and gravel roads. Road miles within the Project boundary are summarized in **Table 8.6**.

Table 8.6 - Summary of Roadways Miles

Road Type	Miles
US Highway 71	2.3
State Highway 28	0
County Highway 28	3.7
County Highway 187	1.7
County Highway 18	0.9
County Road 188	4.8
Township Roads	12.2

The Annual Average Daily Traffic (AADT) volumes on the area's Roadways are documented in **Table 8.7**.
Source: Minnesota Department of Transportation, 2009 Traffic Volumes General Highway Map.

Table 8.7 - Daily Traffic Levels

Roadway	2009 AADT
US Highway 71	2350
State Highway 28	2400
County Highway 28	125 to 160
County Highway 187	105
County Highway 18	225
County Road 188	75
Township Roads	N/A

Telecommunications, Television, and Communications Systems

The Minnesota Department of Commerce lists the following companies as local telephone service providers in Getty and Sauk Centre Townships.

- BullsEye Telecom, Inc.
- Citizens Telecommunications Company of MN,LLC
- Integra Telecom of Minnesota, Inc.
- Ionex Communications North, Inc.
- Mainstreet Communications, LLC

- Melrose Telephone Company
- Qwest Corporation
- Sprint Communications Company L. P.
- USLink, Inc. dba TDS METROCOM

Television service in the area is provided by off-air digital TV signal, satellite TV providers, and possibly by local telephone companies. The Project retained Evans Engineering Solutions to perform an assessment of microwave beam paths and land mobile communications to ensure that the Project does not interfere with microwave beam paths, Stearns County ARMER system, or other established for communications systems in the vicinity of the Project. The study identified two unique microwave beam paths near the Project boundary, but neither microwave path passes through the Project boundary. The study also identified two licensed land mobile sites near the Project boundary, but both are outside of the Project boundary. The location of the microwave beam paths and land mobile sites are shown in **Figure 14**.

Other Infrastructure

No railroads or underground pipelines are located within the Project boundary. There is currently one major utility corridor in the Project area; the Great River Energy (GRE) 400kV HVDC power line from Coal Creek Station in North Dakota to the Dickinson Converter Station in Minnesota runs through the Project boundary. Xcel Energy owns 69 kV transmission lines approximately 4 miles east of the Project area and GRE owns a 69 kV transmission line approximately 5 miles southwest of the Project area. Distribution lines are present, but infrequent in the Project area.

Homes and farms in the Project area use private wells and septic systems for their household needs. According to the MN Department of Health's County Well Index online database, there are 11 registered wells within the Project boundary, but there also appears from personal observation to be several unregistered wells serving rural residential and agricultural sites within the boundary.

Impacts and Mitigation

Other than short-term impacts, no significant permanent changes in road traffic patterns or volume are expected. State, Township, and County officials will receive advance notice of the construction schedule, including the timing of the delivery of towers and turbines and arrival of the crane to erect Project equipment. Traffic control will comply with AASHTO standards and the requirements of local authorities. Limited wear and tear on roads is anticipated to occur as a result of the transport of heavy equipment and other materials. The Applicant will repair any road damage as required.

Construction and operation of the proposed wind farm will not impact telephone service to the Project area. Gopher One Call will be contacted prior to surveying and construction to locate and enable avoidance of all underground facilities. To the extent Project facilities cross or otherwise affect existing telephone lines or equipment, the Applicant will by using proper construction techniques, shielded cables, and by maintaining appropriate distances from existing facilities, mitigate and avoid interference with existing facilities.

The Applicant will conduct an off-air television reception analysis of the Project when a final turbine model is selected for the project and siting is complete. The Applicant will not operate the wind farm such that it causes television interference contrary to FCC regulations or other law. In the event of a problem after

construction, the Applicant will work with affected residents to determine the cause of interference and, where necessary, reestablish acceptable reception in a timely fashion. Evans Engineering's study of communications signals indicated no interference is anticipated.

There is no established setback from GRE 400kV HVDC power line. Getty voluntarily used a setback of 1.1 times the total height of the turbine to site all turbines adjacent to the GRE 400kV HVDC power line. Getty will maintain a minimum setback of 1.1 times the total height of the turbine from GRE 400kV HVDC power line during micro-siting. No further mitigation is anticipated.

All turbines and associated facilities are appropriately setback from homes and farms in the Project area. Getty also does not anticipate the need for deep foundations, piling, or piers in turbine foundations. No mitigation for private wells and septic systems is anticipated.

8.6 Archaeological, Cultural, and Historic Resources

Getty has contacted the Minnesota State Historic Preservation Office (SHPO) for comment on the proposed project and potential impacts on cultural resources. Getty received a response from SHPO on April 7, 2010 (**Appendix E**). SHPO recommended that an archaeological resources survey be completed prior to project construction. Getty also notified various Native American Tribes about the proposed development in conjunction with the Federal Grant Application process through the U.S. Department of Agriculture. A copy of the letters and a list of the tribes to whom it was sent are also included in **Appendix F**. No concerns were raised in Native American Tribe response letters.

Impacts and Mitigation

Archaeological resources could be impacted directly during the construction of a wind energy facility. Construction within the turbine footprint, cable trenching, access roads, and borrow areas could impact archaeological resources. In addition, construction of turbines or other protruding structures may impact viewshed integrity from existing historic facilities. If any archaeological or historic sites are discovered in the proposed boundary, Getty and the assigned construction contractor will minimize impacts to archaeological and historic sites. An Unanticipated Discovery Plan will be prepared for use during the construction effort in order to provide direction to the construction workforce in the event resources are identified.

Getty retained Stemper and Associates Consulting Archaeologist to conduct an archaeological assessment of the Project. The consultant has completed a Phase 1 Archaeological Field Investigation for 27 potential turbine locations sited within the 4,632 acres of land currently under agreement. The literature and field search portion of the investigation did not identify important historical resources within this area. The consultant's report is included as an **Appendix K**. Stemper and Associates report was completed by the applicant as part of the Applicants preliminary site due diligences and is not intended as the final Archaeological Field Investigation report. The Stemper report only represents a portion of the turbine positions and facility locations under consideration, Getty will clear all turbine sites and all associated facilities after final turbine micro siting is complete. The final Archaeological Field Investigation report will be sent to SHPO for review after final turbine micro siting and associated facilities layout is complete. Getty will provide the MPUC with an updated Archaeological Field Investigation report and comments letters prior to construction.

8.7 Recreational Resources

Recreational activities in Stearns County include hiking, biking, boating, fishing, camping, swimming, horseback riding, cross country skiing, snowmobiling, hunting, and nature viewing. Recreational activities will not be significantly impacted by the Project, as the turbines are located on agricultural lands not used for recreation.

There are no state parks near the Project site. The nearest state park recreational area is Sibley Park, which is approximately 23 miles south of the site. There are no County parks near the Project boundary. The nearest county park is Oak Township County Park, which is approximately 11 miles east of the site. There are no recreational trails within the Project boundary; the nearest recreational trail is the Lake Wobegon Trail, which is approximately 4 miles northeast of the site. There are no National Wildlife Refuges identified within 10 miles of the Project boundary. There are no WMAs within the Project boundary, although the Padua WMA is located immediately west of the Project. WMAs located within ten miles of the Project boundary are listed in **Table 8.8.** There are no WPAs within the Project boundary, although the Trisko WPA and Kenna WPA are adjacent to the Project. WPAs located within ten miles of the Project boundary are included in **Table 8.9**. One SNA is located 6.6 miles southwest of the Project boundary. The Sedan Brook Prairie SNA is Prairie Grasslands SNA located within Sections 16 & 17 of North Fork Township. The locations of WMAs, SNAs and WPAs within 5 miles of the Project boundary are depicted in **Figure 3.**

Table 8.8 - Wildlife Management Areas less than ten miles from the Project boundary

WMA Name	General Direction	Distance from Boundary (miles)	Area (acres)
Padua WMA	South	Adjacent	324
Sauk River WMA	East	1.9	900
Spirit Marsh WMA	East	3.4	39
Victor Winter WMA	North	4.5	160
Miller WMA	North	4.9	39
Tower WMA	West	5.4	81
Vision WMA	Southeast	5.5	234
Oxcart Crossing WMA	South	6.6	212
Milton Kjeldahl WMA	South	7	194
Westport WMA	West	8.1	242
Kuhtz Lake WMA	Northwest	8.5	25
Elgin Woods WMA	Northeast	8.8	240
West Union WMA	North	9.3	244
Christopher Kurilla WMA	East	9.3	239
Herberger Lake WMA	Northwest	9.4	156
Grey Eagle WMA	Northeast	9.4	1400
Aurzada Prairie WMA	North	9.5	105
Ritter WMA	Northeast	9.5	100
Quistorff WMA	North	9.7	361
Gravel Pit 1676 WMA	Southeast	9.8	16
Spohn WMA	North	9.9	162

Table 8.9 - Waterfowl Production Areas Less than Ten Miles from the Project Boundary

WPA Name	General Direction	Distance from Boundary (miles)	Area (acres)
Trisko	West	Adjacent	397
Kenna	East	Adjacent	251
Whitney	Northwest	2.2	346
Behnen	West	2.5	371
Stoney Creek	Southeast	2.6	48
McCormick Lake	Northeast	2.9	245
Zehrer	North	3.0	145
Schurman	East	3.0	18
Wiener	Northwest	3.0	100
Gettel	North	3.2	116
Costello	Northeast	3.3	106
Claude	West	3.6	62
Padua	West	3.8	720
Crosier	East	3.9	99
Ashley	West	4.5	876
Dickhaus	Southwest	4.8	319
Pope	West	5.5	155
Twin Lakes	Northeast	5.7	162
Krantz Lake	West	6.3	1111
Greenwald	East	6.3	252
Lake George	Southeast	6.8	76
Westport	West	7.1	140
Stearns	Southwest	7.9	27
Spring Hill	Southeast	7.9	36
West Union	Northwest	8.6	307
Bailey	Northwest	9.1	45
Bredberg	Northwest	9.1	160
Terfher	Northwest	9.1	71
Cedar Lake	East	9.3	151
Schultz Lake	Northwest	9.4	321
Holder	Northwest	9.5	46
Grove Lake	West	9.8	352
Sogge	Northwest	9.9	132

The Project is located within the Sauk River Watershed District. According to the Stearns County Comprehensive Plan, there are no planned or proposed trails or parks within the Project area. One

snowmobile trail, which passes through the Padua WPA, the Claude WPA, and the Ashley WPA, is located several miles west the Project area.

Impacts and Mitigation

The Project will avoid all WMAs, WPAs, SNAs, USFWS lands, and public parks. In general, recreational impacts will be visual in nature affecting individuals using public land near the Project area for recreation. See Section 8.4 for additional discussion of visual impacts and proposed mitigative measures. Visual impacts will be most evident to visitors using the WPAs adjacent to the site. The impact to wild game hunting should also not be significantly impacted because of the lack of cover for wildlife where the turbines will located.

8.8 Public Health and Safety

8.8.1 EMF

The term electromagnetic field (EMF) refers to electric and magnetic fields that are present around any electrical device. Electric fields arise from the voltage or electrical charges and magnetic fields arise from the flow of electricity or current that travels along transmission lines, power collection (feeder) lines, substation transformers, house wiring, and electrical appliances. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors (wire). EMF can occur indoors and outdoors. However, there are no discernible health impacts from power lines (NIEH 1999). Wind turbine generators and power lines will be setback from residences according to state and county standards, where EMF will be at background levels.

Impacts and Mitigation

While the general consensus is that electric fields pose no risk to humans, the question of whether or not exposure to magnetic fields potentially causes biological responses or even health effects continues to be the subject of research and debate. EMF from underground electrical collection lines dissipates very close to the lines because they are installed below ground within insulated shielding. The electrical fields are negligible, and there is a small magnetic field directly above the lines that, based on engineering analysis, dissipates within 20 feet on either side of the installed cable. EMF associated with the transformers at the base of each turbine completely dissipates within 500 ft, so the 1,000 ft turbine setback from residences will be adequate to avoid any EMF exposure to homes. No impacts due to electromagnetic fields are anticipated and no mitigation is proposed.

8.8.2 Aviation

No public-use or private-use airports are located within the proposed Project area. The nearest public airports are the Sauk Centre Municipal Airport, located approximately 2 miles to the east-northeast, and the Brooten Municipal Airport, located approximately 10 miles to the southwest.

The closest airport to the Project is the Sauk Centre Municipal airport, located approximately 2 miles from the Project area. Getty will coordinate with the Sauk Centre airport, the FAA, and MNDOT prior to construction. Notices of Proposed Construction (Form 7460-1) will be filed with the Federal Aviation Administration (FAA) and updated as needed during micro-siting. Getty will contact MNDOT for a determination if an airspace obstruction permit is required for any or all of the proposed wind turbines and permanent MET tower(s), if required Getty will submit permit applications to MNDOT when final wind turbine locations are determined.

Air traffic may be present near the Project Area for crop dusting of agricultural fields. Crop dusting is typically carried out during the day by highly maneuverable airplanes or helicopters. The installation of wind turbine towers in active croplands, installation of aboveground collection lines (if needed), and the installation of the transmission line will create a potential for collisions with crop-dusting aircraft. However, aboveground collection and transmission lines are expected to be similar to existing distribution lines (located along the edges of fields and roadways) and the turbines themselves would be visible from a distance and lighted according to FAA guidelines.

Impacts and Mitigation

Getty has retained the services of Aviation Systems, Inc. to perform an initial evaluation to determine the feasibility of erecting wind turbines with a height of 495 feet above ground level (AGL) within the Project boundary. Aviation Systems, Inc. reviewed the Project against aviation and airspace criteria set forth in Federal Aviation Regulation (FAR) Part 77 (14 CFR 77) Objects Affecting Navigable Airspace; FAA Order 8260.3B, the United States Standard for Terminal Instrument Procedures (TERPs) and; FAA Order JO 7400.2G, Procedures for Handling Airspace Matters. Aviation System, Inc. determined:

- The Project would have no impact on Minimum Vectoring Altitudes (MVA), or Enroute Low Altitude Airways.
- The Project would not affect Military Special Use Airspace.
- The Project is unlikely to impact Air Defense and Homeland Security radars. Further radar impact study is not necessary.
- The Project would have minimal to no impact to Weather Surveillance Radar-1988 Doppler (WSR-880) weather radar operations. Further radar impact study is not necessary.
- A list of geographic limitations based on Sauk Centre airport operations.

To ensure that the Project will not impact operations at the Sauk Center airport, Getty has used the geographic limitation information provided by Aviation System, Inc to establish the Project boundary and develop the proposed wind turbine layouts found in this application. The applicant has prescreened the project area using the tools available on the FAA's Obstacle Evaluation website and found the area to have no identified impacts to aviation radar or military flight activities. Because there is agricultural land use within the Project site, aerial chemical application may occur periodically. Aerial application is typically done during the day by small aircraft.

The Project will be illuminated in accordance with FAA Advisory Circular (AC) 70/7460-1 K, Change 2. After final turbine locations are selected, Getty will employ Aviation Systems, Inc. to handle the FAA filing process pursuant to the notice requirements of FAR Part 77 and follow-up until the No Hazard Determinations are issued by the FAA.

8.8.3 Project Safety and Security

The proposed wind farm is located within a moderately-populated rural portion of Stearns County. Construction and operation of the Project will have minimal impacts on the security and safety of the local population.

Impacts and Mitigation

During the Project construction period and during subsequent operation, it is expected that the Project will have no significant impact on the security and safety of the local communities and the surrounding area. Some additional risk for worker or public injury may exist during the construction phase, as it would for any large construction project. However, work plans and specifications would be prepared to address worker and community safety during Project construction. During Project construction the Project's general contractor will identify and secure all active construction areas to prevent public access to potentially hazardous areas.

Getty will coordinate with local and County emergency management for the purpose of protecting the public and the property related to the Project during natural, manmade or other incidents. Getty will provide required information and work with the local and County emergency management to develop procedures for response to emergencies, natural hazards, hazardous materials incidents, manmade problems, and potential incidents concerning the Project. Getty will register each turbine location and the O&M building with the rural identification/addressing (fire number) system and 911 systems.

The Project Area is within a region considered to have low seismic activity. Minnesota has one of the lowest occurrence levels of earthquakes in the United States, but small to moderate earthquakes have been documented since 1860. Current knowledge indicates that, although weak to moderate earthquakes do occur occasionally in Minnesota, a severe earthquake is very unlikely (V.W. Chandler, 1994). Furthermore, modern turbine technology, along with preventative maintenance and inspections, has reduced these risks to insignificant rates. Therefore, a safety issue from seismicity activities is not anticipated for the Project.

Under certain weather conditions wind turbines can build up ice on the exposed parts of the turbine and ice may fall or be cast from the turbine components. After an icing event most if not all ice is dropped before the turbine is started as temperatures rise and ice thaws from the turbine. While cases of ice throw have occurred, these incidents are not frequent and improved wind turbine design, engineering, and operational controls make the likelihood of such an occurrence remote. Therefore, a safety issue from ice fall or throw is not anticipated for the Project.

8.9 Hazardous Materials

The land within the Project boundary is primarily rural and used for agriculture. Potential hazardous materials within the Project area would be associated with agricultural activities, and include petroleum products (fuel and lubricants), pesticides, and herbicides. Older farm sites may also have lead-based paint, asbestos, and polychlorinated biphenyls in transformers. Trash and farm equipment dumps can be also be found on farm sites.

Impacts and Mitigation

Prior to construction as part of the Project financing, Getty will complete an ASTM E 1527-05 conforming environmental site assessment (ESA) for the Project boundary. Any Environmental Concerns identified with the Project boundary will be avoided and not impacted by project construction or operations.

During normal operations of the Project, all fluids will be contained within the wind turbine structure or the pad-mounted transformers. Three types of petroleum product fluids are necessary for the operation of each

wind turbine and may include: gear box oil (synthetic or mineral depending on application), hydraulic fluid, and gear lube grease. Modern transformer oil is standard mineral oil (ASTM D3487). These wastes will be managed and, if disposal is necessary, disposed of in compliance with the requirements of applicable laws and regulations. Proper maintenance procedures and fluid-handling practices will be followed and a Spill Prevention and Countermeasure Control (SPCC) Plan will be prepared as necessary.

Because potential hazardous waste sites identified in the ESA will be avoided, no mitigative measures are proposed. If any wastes, fluids, or pollutants are generated during any phase of the operation of the Project, they will be handled, processed, treated, stored, and disposed of in accordance with Minn. R. Ch. 7045.

8.10 Land-Based Economics

The area in which the wind farm will be located consists of rural agricultural-based farming operations, mostly row crop. There are no known mineral or gravel deposits within the Project boundary and economically important forestry resources are not found in this region of Minnesota. Forested areas are primarily associated with minor hedgerows at farm sites.

Impacts and Mitigation

The proposed land loss due to roads and turbine sites during the time the wind farm is in operation will be approximately 18 to 32 acres. Final acreage will be dependent on final site layout. It is anticipated that the Project's contribution to the local economy by way of lease payments, production tax payments, and the acquisition of local goods and services in support of the Project, as well as additional jobs, will more than offset the loss of 18 to 32 acres of farmland. Less than one half of one percent of land within the Project boundary will be converted to non-agricultural land use. This will not significantly alter crop production in the Project boundary or Stearns County. The loss of 18 to 32 acres of farmland will not result in the loss of any agriculture-related jobs and no net loss of income. Revenue lost from the removal of farmland from agricultural production will be offset by lease payments to landowners hosting the Project facilities.

The construction of the proposed Project will likely have positive impacts on area residents. Local service-related businesses will likely realize short-term benefits resulting from patronage by workers during the construction phases of the Project. The County and local government will benefit from the tax revenue generated by the Project. Additional direct local benefit will be derived from the lease monies paid to local farmers for the use of their properties and/or for wind rights. Since the Project plans to proceed as a C-BED project, it will also provide strong direct economic benefit to the ten Minnesota limited liability companies that own Getty. Economic benefit to the State of Minnesota is anticipated through helping to satisfy the Minnesota RES goals with a cost effective PPA.

8.11 Tourism and Community Benefits

Tourism in Stearns County focuses on promoting the area's game and wildlife, lakes, farms, and villages. Also publicized are culture (museums, art, and antiques) and recreation activities (parks, hiking trails, camping, canoeing, horseback riding, fishing, wildlife refuges, snowmobiling, golf courses, swimming pools, tennis courts, and skiing).

Impacts and Mitigation

Because all Project facilities will be located on private lands, there will be no direct impacts to recreational facilities, public lands, or other tourism-related activities. Proposed setbacks from recreational trails, public roads, and non-leased properties (including public lands) will minimize any indirect impacts. The Project is not anticipated to have a significant effect on area tourism. Because no significant impacts are anticipated, no mitigation beyond the proposed setbacks is proposed.

8.12 Local Economies

According to the 2007 U.S. Economic Census, the largest industries employing residents of Stearns County are manufacturing, health care/social services, and retail. 2009 per capita incomes in Getty and Sauk Centre Townships ($19,948 and $23,873) is lower as compared to Stearns County ($24,521). Getty Township 2009 percentage of poverty (17.7%) is higher as compared to Stearns County (12.3%) and Sauk Centre Township 2009 percentage of poverty (4.7%) is lower as compared to Stearns County (12.3%).

The Project will neither overburden infrastructure nor natural resources, and it will balance well with the county's agricultural base. Community benefits associated with the Project closely correspond with Goal 3 within the Economic Development element of the Stearns County 2030 Comprehensive Plan. This goal seeks to "strengthen and diversify the agricultural economy" through a variety of objectives, including:

- Objective 1: Strive for and support higher farm profitability and family farm stability, including encouraging creative agricultural diversification of crops and products.
- Objective 3: Create opportunities for new investment in agricultural operations and support industries.

The Project provides landowners and/or farmers with opportunities for higher farm profitability by farming the wind resource to produce energy, thus encouraging creative agricultural diversification of crops and products. Hence, wind energy harvesting is a new investment opportunity in agricultural operations.

Goal 4 of the Economic Development element of the Stearns County Comprehensive Plan seeks to "promote sustainable development initiatives." Objective 5 within Goal 4 states that Stearns County will "Encourage the appropriate development and use of electricity from wind energy as a means of substituting underutilized local renewable resources for non-renewable, non-local, energy sources." Further, the County's Policies and Action Items within the Economic Development element include the creation of "land use regulation that protects and encourages the expansion of the County's economic diversity." Stearns County has followed this policy by instituting a WECS Ordinance in anticipation of wind development opportunities within the county.

Impacts and Mitigation

Socioeconomic impacts associated with the Project will be primarily positive at all stages of the Project's life cycle. Wind projects start with an influx of jobs, wages, and expenditures made at local businesses during project construction. Wind project also directly or indirectly create long term jobs and wages through O&M personnel and landowner payments during the life of a project. Wind project in Minnesota create new source of tax revenue for host Counties and Townships from project construction and energy production taxes.

Employment Impacts

Construction jobs will bring approximately 50 to 80 temporary workers to the area for approximately 4 to 6 months. These workers are temporary but they utilize local lodging, purchase fuel and food, and make other

expenditures during construction which contribute to local economies. Project workers also typically purchase incidental Project supplies and construction materials from local businesses during construction. Operations and Maintenance positions may create 2 to 4 positions for the life of the Project. Workers in these positions will likely live and raise families in neighboring communities contributing to those local economies. Indirect jobs are typically a result of increased personal incomes from wind easement lease payments and local CBED ownership. Additional spending is likely at local and regional businesses, as the money is circulated through the economy businesses have reasons and means to increase employment. Supply creates its own demand.

Local contractors and suppliers will be used for portions of Project construction. Total wages and salaries paid to contractors and workers in Stearns County will contribute to the total personal income of the region. Additional personal income will be generated for residents in the County and State by circulation and recirculation of dollars paid out by the Applicant for business expenditures and for state and local taxes. Expenditures made for equipment, fuel, operating supplies, and other products and services benefit businesses in the county and the state. Landowners having turbine or other Project facilities on their land will receive a lease payment annually for the life of the Project. This payment diversifies and strengthens the local economy as discussed previously.

Tax Payments

Long-term beneficial impacts to the County's tax base as a result of the construction and operation of the wind farm will contribute to improving the local economy in this area of Minnesota. In addition to the creation of jobs and personal income, the Project will pay a wind energy production tax to the local units of government of $0.0012 per kWh of electricity produced, resulting in an annual wind energy production tax ranging from approximately $164,000 to $185,000.

Because the expected impacts are anticipated to be positive, no mitigation is proposed.

8.13 Topography

The Project is located the eastern edge of the Minnesota River Prairie Subsection Profile of the Minnesota DNR's Ecological Classification System. The Minnesota River Prairie is a large subsection that includes part of northwestern Iowa and spreads across southwestern Minnesota into eastern South Dakota. The Minnesota River forms a broad valley, dividing the area in half. This valley once had a continuous band of floodplain forest that extended upstream as far as Lac Qui Parle, with highly unique bedrock exposures. There are 150 lakes larger than 160 acres in the subsection, most of which are shallow. Before settlement by people of European descent, the predominant vegetation was tallgrass prairie and wetlands. Fire was once a common natural disturbance and critical to maintaining native prairie communities. Today, row-crop agriculture is the predominant land use, and prairie remnants and floodplain forests are rare. A major concern is impacts on water quality from intensive agricultural activities, including use of fertilizers and pesticides, expanding use of pattern tiling, and ditching and draining of small wetlands. Continued loss of the small amount of native upland habitat and over-intensive grazing remain a concern. (Minnesota DNR 2009a)

The majority of northwestern Stearns County is low rolling hills and agricultural land, with remnants of woodlands and wetlands in areas not suited for farming. The proposed Project has been sited in this area for its openness and ease of site access, as well as the presence of good wind resource. In addition to topography,

land-use patterns were also considered in order to minimize or avoid any negative impacts. No significant impacts on topography are anticipated.

Impacts and Mitigation

Access roads, wind turbine locations, and the proposed underground collector system will not require significant cut or fill. The collector system is proposed to be buried to minimize impact to existing farm operations and any drainage tile disruption will be corrected during construction. Topsoil will be segregated and replaced. In the Project area, elevations range from 1255 ft to 1370 ft above sea level. Elevation maps of the Project area are shown in **Figure 8, and Figures 8.1 through 8.3**.

8.14 Soils

Boroll and Aquoll suborder soil types are dominant in this area. The diverse underlying bedrock is covered by 100 to 400 feet of glacial till. The glacial till is calcareous loamy sediment. Soils tend to range from loamy sands to clay loams. Two soils associations are found within the Project boundary; the Normania-Flom-Roliss and Ves-Normania-Flom. The main soil association is the Normania-Flom-Roliss at approximately 7564 acres and minor soil association is the Ves-Normania-Flom at approximately 36 acres. Soil associations found within Project area are shown in **Figure 12**.

The Normania-Flom-Roliss Association is a complex of three soil types. Normania soils are loams in slightly concave foot slopes on glacial till plains in cultivated fields. They are somewhat poorly drained with low surface runoff and moderate permeability. Flom soils are silty clay loams with 1 percent plane on nearly level slopes on a glacial till plain in cultivated fields. Flom soils are poorly to very poorly drained with moderately slow permeability and slow surface runoff. Roliss soils are loams with a plane north facing slope of less than 1 percent on a lake plane in a cultivated field. Roliss ranges from poorly to very poorly drained soil with negligible to low surface runoff and moderate to moderately slow permeability (U.S. Department of Agriculture 2009c).

The Ves-Normania-Flom Association is a complex of three soil types. Ves soils are loamy and found on convex slopes of nine percent and in tilled/cultivated fields, and are very deep and well drained. Normania soils are loams in slightly concave foot slopes on glacial till plains in cultivated fields. They are somewhat poorly drained with low surface runoff and moderate permeability. Flom soils are silty clay loams with 1 percent plane on nearly level slopes on a glacial till plain in cultivated fields. Flom soils are poorly to very poorly drained with moderately slow permeability and slow surface runoff (U.S. Department of Agriculture 2009c).

Impacts and Mitigation

Construction of the wind turbines and access roads will increase the potential for soil erosion during construction and convert prime farmland from agricultural uses to industrial uses. A National Pollutant Discharge Elimination System (NPDES) permit application to discharge stormwater from construction facilities will be acquired by Getty from the MPCA. Best Management Practices (BMP) will be used during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion. Practices may include containment of excavated material, protection of exposed soil, and stabilization of restored material. A Stormwater Pollution Prevention Plan (SWPPP) will be developed prior to construction that will include BMPs such as silt fencing, revegetation plans, management of exposed soils to prevent erosion.

8.15 Geologic and Groundwater Resources

Surficial geology of the Project area consists of glacial deposits associated with the Des Moines Lobe. The Project area is covered by till deposits described chiefly as loam-textured, unsorted sediment with scattered pebbles, cobbles, and boulders. Thin beds of silty clay to gravelly sand are common in places. The west side of the Project area is considered pitted supraglacial till where the land surface is characterized by close depressions. It is commonly overlain by three feet or more of loamy to clayey, organic-bearing colluviums in low lying areas. The northeast area of the Project area contains till that has been modified by water action, and, in places, is mantled by silt, sand, or gravel. Thickness of the surficial deposits range from 150 to 250 feet across the Project area **(Figure 13)** (Minnesota Geological Survey 1995).

The bedrock underlying the glacial material consists of a granitoid gneiss from the Archean Eon. This unit is described as a predominantly pink to pinkish-gray quartz_of_elspathic gneiss from granite to granodioritic origins. Outcropping of this unit can be found approximately 6 mile to the northwest in Section 17 and 18 of Ashley Township (Minnesota Geological Survey 1995).

Groundwater in the region is supplied by unconfined and confined (buried) glacial aquifers. The glacial aquifers in the Project area are generally unconfined and are considered low yield with less than 100 gallons per minute. The water table is shallow with an elevation of approximately 1,340 feet above mean sea level (AMSL) (0 to 20 ft below ground surface across the site) and groundwater flow directed easterly. Portions of the Project area are underlain by sand and gravel aquifer, identified as Aquifer 1. The thickness of this aquifer ranges from 20 to 30 feet and is used for domestic, industrial, and municipal uses (MDNR 1998).

No active gravel pits or mines are present within the Project boundary. The nearest gravel pit site is located approximately 1 mile to the northeast in the northeast quarter of Section 28 of Getty Township.

Impacts and Mitigation

Impacts to geologic and groundwater resources are not anticipated. Water supply needs will be quite limited. O&M water requirements will be satisfied with either a well or municipal water service. Wind turbine locations will not impact the use of existing water wells because the turbines will be set back from occupied structures according to state and county standards. Getty also does not anticipate the need for deep foundations, piling, or piers in turbine foundations. No mitigation for geologic and groundwater resources is proposed.

8.16 Surface Water and Floodplain Resources

Surface water and floodplain resources for the Project boundary were identified by reviewing U.S. Geological Survey (USGS) topographic maps, Minnesota Public Waters Inventory (PWI) maps, and Stearns County Geographic Information System (GIS) maps. Major surface waters located within the Project boundary are part of the Sauk River Watershed. Within the Project boundary there are two sub-watersheds, Moliter Lake/Getty Creek, and Hoboken Creek, which are tributaries to the Sauk River. The main channel of both creeks has been identified by Stearns County GIS as public waters. Within the Project boundary there are also two surface waters identified by Stearns County GIS as public waters. The two surface waters are Moliter Lake in the northwest quarter of section 17, township 125, range 34 and unnamed surface water in the southeast quarter

of section 4, township 125, range 34. Adjacent to the Project boundary there are also three surface waters identified by Stearns County GIS as public waters. The three surface waters are Unger-Schlogel Slough within the Trisko WPA in section 6, township 125, range 34, unnamed surface water within the Kenna WPA in section 9, township 125, range 34, and unnamed surface water in the southwest quarter of section 18, township 125, range 34. There are also a number of unnamed intermittent and perennial streams that are not designated publics waters. Setbacks and restriction from the public waters identified by Stearns County are regulated by Section 10.2 Shoreland Overlay District of Stearns County Land Use and Zoning Ordinance #439. **Figure 10** shows the locations of public waters.

There are no MDNR designated "Wildlife Lakes" in or adjacent to the Project boundary.

Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps are available for the Project boundary. No 100-year floodplains are located within the Project boundary, the closest floodplain is associated with the Sauk River. No wind turbines are located in a designated flood plain.

Impacts and Mitigation

Construction of the wind turbines and access roads will increase the potential for soil erosion during construction and sediment moving into surface waters of the Sauk River Watershed. A National Pollutant Discharge Elimination System (NPDES) permit application to discharge storm water from construction facilities will be acquired by Getty from the MPCA. Best Management Practices (BMP) will be used during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion. Practices may include containment of excavated material, protection of exposed soil, and stabilization of restored material. A Stormwater Pollution Prevention Plan (SWPPP) will be developed prior to construction that will include BMPs such as silt fencing, re-vegetation plans, management of exposed soils to prevent erosion.

8.17 Wetlands

Preliminary identifications of wetlands near the Project boundary was made by reviewing National Wetland Inventory (NWI) maps and Minnesota PWI maps. Some of the wetlands are associated with creeks and unnamed intermittent streams within the site and some of the wetlands are isolated basins. Formal wetland delineations within the Project boundary will be completed prior to design and construction, after a turbine model is selected for the Project. See **Figure 9 and Figures 9.1 through 9.3** for locations of NWI wetlands within the boundary.

The Wetland Conservation Act (WCA) of 1991, states that wetlands must not be drained or filled unless (1) the drain or fill activity is exempt or (2) wetlands are replaced by restoring or creating wetland areas of at least equal public value. The goal of the Wetland Conservation Act is no net loss of wetlands. NRCS/NWI mapping of wetlands has no connection to what WCA considers wetland. It is not unusual for WCA to identify jurisdictional wetlands in areas not considered wetland by NRCS/NWI.

Impacts and Mitigation

The Project layout will be designed to avoid and minimize wetland impacts. No permanent impacts to state public waters or jurisdictional wetlands are anticipated. No permanent impacts to federal jurisdictional wetlands or Water of the U.S. are anticipated. Should final site layout require either temporary or permanent impacts to jurisdictional wetlands or waters, exceeding any allowable threshold and requiring either pre-

construction notification or permit authority, such notification or permit authority will be obtained, the Applicant will submit Section 404 and Minnesota Wetland Conservation Act permit applications to the U.S. Army Corps of Engineers and the State prior to construction.

Getty will make every effort to avoid locating any wind turbines in biologically sensitive areas such as wetlands. Permanent infrastructure such as wind turbines, step-up substation, and the O&M facility will be built on high elevations, avoiding wetlands in the lower portions of the landscape. Access roads and the electrical collection system will be designed to minimize impacts to wetlands. Construction of collector lines that cross defined waterways will be conducted by boring beneath the waterway. As part of the Project design process Getty will complete preconstruction inventories of existing biological resources, native prairie, and wetlands in areas where turbine and associated facilities are proposed.

8.18 Vegetation

The Native Plant Communities and Rare Species of Stearns County Map (MDNR 2005) identifies the areas of Stearns County where the Project is located as historically dry or mesic prairie and wet prairie (includes marshes, swamps, wet meadows, and fens). Currently, the land within Project boundary is predominantly disturbed agricultural lands **(Figure 6)**. No areas of native prairie, mesic prairie, or wet meadow are mapped near the Project area. Based on review of aerial photographs, land use database information, and a visit to the Project Area, Getty determined that the majority of the land area at the site is cultivated. The grassland and wetland areas at the site may contain potential remnant native prairie areas. Native prairie is identified as lands that have never been plowed, with less than 10 percent tree cover, and presence of native prairie vegetation. Unplowed fields of native grassland or pasture, with 10 or more prairie plant indicator species, are considered to be prairie for the purposes of this application. A list of prairie indicator species can be found in the Field Guide to the Native Plant Communities of Minnesota: The Prairie Parkland and Tallgrass Aspen Parklands Provinces, Minnesota Department of Natural Resources, 2005. Tree coverage is minimal, primarily planted hedgerows. The areas of land cover types within the Project boundary and the anticipated number of acres to be impacted by the project are listed in **Table 8.10** (GAP Data, USGS 2004)

Table 8.10 - Land Cover Types within the Project boundary (acres)

Land Cover Type	Land Cover Area	Annual Impacts	Construction Impacts
Aquatic	20	0	0
Aspen/White Birch	1	0	0
Cropland	6214	17 to 31	38 to 70
Grassland	1325	1	2
Lowland Shrub	30	0	0
Marsh	43	0	0
Oak	3	0	0

Reinvest in Minnesota (RIM) land involves the acquisition and enhancement of critical habitat. No RIM easements are located within or adjacent to the Project area (BWSR 2011). Conservation Reserve Program (CRP) lands may be located within or in the vicinity of the Project area. CRP is a voluntary program for agricultural landowners. The program encourages them to convert marginal highly erodible cropland or other

environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filterstrips, or riparian buffers. Farmers receive an annual payment for the term of the multi-year contract and upon the expiration of the contract the land maybe turned to production.

Central Region Regionally Ecological Significant Areas (CRRESA) are areas of natural land cover (less than 4 percent impervious surface and no maintained vegetation such as agriculture or short grass) identified by the MDNR based on the shape and size of the area, and their adjacent land use and connectivity to other natural areas. The stated purpose of the CRRESA data is to help make regional scale land use decisions, especially as it relates to balancing development and natural resource protection (MDNR Data Deli, full Data Abstract for Data Set Identifier "ear_rseapy3", MDNR Central Region, 2/12/2004). The MDNR has identified one Central Region Regionally Ecological Significant Area (CRRESA) near the Project. It is located 1/2 mile southwest of the Project boundary in Section 13 of Raymond Township. The CRRESA extends north and west from the Padua WMA onto privately held lands (**Figure 3**). The Applicant has identified three other areas identified as CRRESA within the Project boundary and four other areas identified as CRRESA within one mile of the Project boundary (MDNR Data Deli, ear_rseapy3 Data Set), the location, ranking, association, and land cover of the CRRESAs are listed in **Table 8.11**. It is not clear to the Applicant why the areas being actively farmed have been identified as CRRESA. CRRESAs near the Project area are shown in **Figure 3.**

Table 8.11 - Central Region Regionally Ecological Significant Areas within One Mile of Project

Location	Distance from Project Boundary	Ranking	Association	Land Cover
Section 17, Getty Township	Within Boundary	Moderate	None	Cropland
Section 21, Getty Township	Within Boundary	High	None	Cropland
Sections 24, 25, Ashley Township and Section 30, Sauk Centre Township	Within Boundary (section 30 area)	High	None	Cropland
Sections 13, 24, Raymond Township and Sections 18, 19, Getty Township	0.5 mile Southwest	Outstanding	Padua WPA	Natural land cover
Section 31, Sauk Centre Township and Section 6, Getty Township	Adjacent	Moderate	Trisko WPA	Natural land cover
Sections 9 and 16, Getty Township	Adjacent	Moderate	Kenna WPA	Natural land cover
Section 28, Sauk Centre Township	0.75 mile East	Moderate	None	Cropland
Section 19, Sauk Centre Township	0.1 mile North	Moderate	None	Cropland

Impacts and Mitigation

The proposed wind farm will be located entirely on land which has been used as agricultural lands, mainly for row crop production of corn, soybeans, and alfalfa. Getty will perform a preconstruction inventory of existing biological resources, native prairie, and wetlands. Currently there are no known native prairie lands located in the Project boundary. Getty anticipated that the Project will displace approximately 40 to 72 acres of crop lands for one growing season during project construction and displace approximately 18 to 32 acres of crop lands annually for the time the wind farm is in operation. Final acreages will be dependent on final turbine layout.

Getty does not foresee the removal of any trees, groves of trees or shelter belts. Any disturbed grasses in the right-of-ways will be re-seeded. Getty will have a re-vegetation agreement with the County and Townships for road rights-of-ways, and with individual landowners.

8.19 Wildlife

Information on the existing wildlife in the proposed wind farm area was obtained from a variety of sources including the MDNR, the USFWS, Minnesota Ornithologist's Union County Checklists, avian and bat preconstruction surveys conducted at the nearby Paynesville Wind Farm, and the recently completed combined avian study for Getty and Black Oak Wind Farms. The following sections include a discussion of general wildlife that occurs in the Getty Wind Farm Project area. Section 8.20 includes a discussion of wildlife considered by the state to be threatened, endangered, or of special concern.

8.19.1 Description of Resources

Wildlife in the Project area consists of birds, mammals, fish, reptiles, amphibians, and insects, both resident and migratory, which use the Project area habitat for forage, breeding, and/or shelter. The resident species are representative of Minnesota game and non-game fauna that are associated with upland grass, farmlands, and wetland and forested areas. The majority of the migratory wildlife species are birds, including waterfowl, raptors, and songbirds.

Twenty-one WMAs and one SNA are located within 10 miles of the Project boundary. Together these WMAs comprise 5,473 acres. WMAs are part of Minnesota's outdoor recreation system and are established to protect those lands and waters that have a high potential for wildlife production, public hunting, trapping, fishing, and other compatible recreational uses. WMAs provide habitat, breeding area, and food supply for many types of wildlife. Animal populations are expected to be denser near WMAs, including bird and bat populations. SNAs are areas designated to protect rare and endangered species habitat, unique plant communities, and significant geologic features that possess exceptional scientific or educational values. SNAs are open to the public for nature observation and education, but are not meant for intensive recreational activities. See Section 8.7 for further discussion on WMAs and SNAs near the Project.

Thirty-three WPAs are located within 10 miles of the Project boundary. Together these WPAs comprise 7,763 acres. Two of the thirty-two, the Kenna and Trisko WPA are adjacent to, but outside of the Project boundary. WPAs are public lands purchased by the Federal government for the purpose of increasing the production of migratory birds, especially waterfowl. Both the Trisko WPA and Kenna WPA are open to such public uses as hiking, bird watching, hunting, and recreational trapping of fur-bearers. WPAs are managed by the USFWS to protect breeding, forage, shelter, and migratory habitat for waterfowl or wading birds, such as ducks, geese, herons, and egrets. WMAs, SNAs and WPAs within 5 miles of the Project boundary are depicted in **Figure 3.**

Migratory Waterfowl Feeding and Resting Areas protect waterfowl from disturbance on selected waters of the state. Motors are prohibited on Migratory Waterfowl Feeding and Resting Areas during the waterfowl season. There are no MDNR-designated waterfowl feeding or resting areas in Stearns County or near the Project area. The nearest Migratory Waterfowl Feeding and Resting Area is Lake Johanna in Pope County, 16 miles southwest of the Project boundary.

Important Bird Areas are voluntary and non-regulatory, and part of an international conservation effort. The program relies on participation of private landowners, public land managers, and community member to identify, monitor, and conserve sites, which are chosen for their biological value. There are no Important Bird Areas identified within or adjacent to the Project boundary. The nearest Important Bird Area is Avon Hills in Collegeville Township in eastern Stearns County, 22 miles east of the Project boundary.

8.19.2 Regulatory Environment

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712) regulates the taking, selling, transporting, and importing of migratory birds, their nests, eggs, parts, or products. The MBTA protects more than 800 species of birds that occur within the U.S. A list of federally protected migratory birds may be found in 50 CFR Part 10.13. Most birds within the Project area would be afforded protection under this act.

USFWS Wind Turbine Advisory Committee Recommendations

The Wind Turbine Guidelines Advisory Committee (WTGAC) was established in 2007 under the Federal Advisory Committee Act to provide advice and recommendations to the secretary of the interior on developing effective measures to avoid or minimize impacts to wildlife and their habitats related to land-based wind energy projects. On March 4, 2010, the WTGAC submitted to the secretary of the interior its policy recommendations and recommended guidelines. The recommendations were developed over a 2-year period by a consortium of agency and wind industry experts, and provide the most current and comprehensive guidance for evaluating potential wildlife impacts from a proposed wind energy facility.

The WTGAC's guidelines are founded on a tiered approach for assessing potential impacts to wildlife and their habitats. The tiered approach is an iterative decision-making process for collecting information in increasing detail, quantifying the possible risks of proposed wind energy projects to wildlife and habitats, and evaluating those risks to make siting, construction, and operations decisions. Subsequent tiers refine and build upon issues raised and efforts undertaken in previous tiers. At each tier, a set of questions is provided to help the developer identify potential problems associated with each phase of a project, and to guide the decision process. The tiered approach is designed to assess the risks of project development by formulating questions that relate to site-specific conditions regarding potential species and habitat impacts. The tiers are outlined briefly as:

- Tier I: Preliminary evaluation or screening of sites (landscape-level screening of possible project sites; generally based on readily available public information)
- Tier II: Site characterization (comprehensive characterization of one or more potential project sites; generally based on consulting with the appropriate agencies/authorities and one or more reconnaissance level site visits by a wildlife biologist)
- Tier III: Field studies to document site wildlife conditions and predict project impacts (site-specific assessments at the proposed project site; quantitative and scientifically rigorous studies; e.g., acoustical monitoring, point-count avian surveys, raptor nest surveys, lek surveys, etc.)
- Tier IV: Postconstruction mortality studies (to evaluate direct fatality impacts)
- Tier V: Other postconstruction studies (to evaluate direct and indirect effects of adverse habitat impacts, and assess how they may be addressed; not done for most projects; e.g., post-construction displacement and/or use studies, curtailment effectiveness studies, etc.)

This tiered approach allows developers to determine whether they have sufficient information, whether and/or how to proceed with development of a project, or whether additional information gathered at a subsequent tier is necessary to make those decisions. The WTGAC indicated that wind energy developers who voluntarily adhere to these guidelines will be undertaking a robust level of wildlife impact analysis, and have a shared responsibility with the USFWS to ensure that the scientific standards of the guidelines are upheld and used to make wise development decisions.

It is important to note that not all of the five tiers are recommended or necessary for all projects.

At each tier, potential issues associated with developing or operating a project is identified and questions are formulated to guide the decision process. The guidelines outline the questions to be posed at each tier, and recommend methods and metrics for gathering the data needed to answer those questions. If sufficient data is available at a particular tier, the following outcomes are possible based on analysis of the information gathered:

- The project is abandoned because the risk is considered unacceptable, or
- The project proceeds in the development process without additional data collection, or
- An action, or combination of actions, such as project modification, mitigation, or specific post-construction monitoring, is indicated.

If data is deemed insufficient at a tier, more intensive study is conducted in the subsequent tier until sufficient data are available to make a decision to abandon the project, modify the project, or proceed with and expand the project (USFWS 2010).

Results of Tier I and II Review Process

A review of sensitive natural resources (Tiers I and II analysis) was completed for the proposed Project by reviewing readily available off-site information and by soliciting comments from the MDNR and USFWS on March 16, 2010, and March 18, 2010, respectively. Information obtained from these agencies is summarized in Sections 8.20.1. Based on the results of the MDNR and USFWS comments, Tier III studies were conducted for all avian flights, avian wetland use, marbled godwits, and bald eagle nest monitoring within the Project boundary. No additional Tier III studies are being proposed. This decision was reached by answering the following questions from the WTGAC guidelines:

Are there known species of concern present on the proposed site, or is habitat (including designated critical habitat) present for these species?

After examining the available public records, Getty found no known records of native plant communities (in MDNR Natural Heritage records), federal species, or designated critical habitat within the Project area boundary. One record of a state-listed species of special concern and one record of a state-listed species of greatest conservation need is located within the project boundary or within 1 mile of the project **(Figure 11)**. The majority of the Project area (more than 81 percent) is used for crop production. Intact natural habitat consists of scattered wetlands, roadside wet and mesic prairie in Trisko WPA, and small remnants of woodland areas that are primarily located adjacent to farmsteads. The Kenna and Trisko WPAs occur adjacent to the Project boundary.

Preconstruction avian surveys discovered the presence of five (5) species listed by the State of Minnesota as endangered, threatened or special concern during spring 2011 surveys. Observations of State listed sensitive species include; marbled godwit (*Limosa fedoa*, SPC), horned grebe (*Podiceps auritus*, T), Forster's Tern (*Sterna forsteri*, SPC), American white pelican (*Pelecanus erythrorhynchos,* SPC), and bald eagle (*Haliaeetus leucocephalus*, SPC) during the spring of 2011.

One observation of a horned grebe was recorded during the migratory period for this species. No additional observations were documented in subsequent surveys of any kind. Although suitable habitat does occur within the Padua WMA and other WPA's near the Project, an isolated observation of this species during the migratory period indicates that this species is a migrant and not a breeding species at this location.

Marbled godwits and suitable breeding habitat occur within the project boundary. Areas that exhibit suitable habitat characteristics are located in Sections 23, 24, 25 of Raymond Township at the southern end of the Getty Wind Farm. One marbled godwits was documented adjacent to the Trisko WPA in late May. Marbled godwits were observed engaged in two distinct flight types during the spring 2011 surveys. The display/courtship flights consisted of birds observed circling suitable nesting habitat while calling or chasing other godwits. The second flight type was a directional flights, which were noted on two occasions. The presence of territorial godwits of both sexes in suitable habitat throughout the spring indicate that this species likely breeds on or near the Getty Wind Farm. No godwits were observed during any of the Marbled Godwit surveys conducted at the Behnen, Trisko, or Kenna WPA's. These WPA's contain abundant grassland/wetland complexes of suitable size, but during the 2011 surveys were characterized by monotypic late season grass species and forbs that did not provide the short stature grassland/wetland interface preferred by this species. The observations of godwits at other locations throughout the project area may indicate that, in addition to using the site for foraging, this species utilizes grasslands throughout the Project area when they provide habitat with the proper structure and vegetative composition in any given year.

Forster's Terns were observed twice during migration on May 10 and 19, 2011 at the wetland located adjacent to U.S. Highway 71 on the northeast boundary of the Project area. However, no active breeding colonies were present on wetlands within or adjacent to the Getty Wind Farm. The absence of breeding colonies on or near the project indicate a lack of use during 2011 but do not preclude use by this species in subsequent years. Suitable breeding habitat does exist at several wetland complexes on and near the Project and these areas could be used by this species in future years.

American white pelicans were observed frequently during the spring 2011 surveys. They were observed feeding at waterbodies associated with the Kenna and Trisko WPA's and at the Padua WMA adjacent to Raymond Lake. Observations were also documented while this species was flying to other lakes and rivers near the Project. Most of the flight observations were of birds travelling between wetlands, rivers, and the larger lakes and waterbodies to the west and northeast of the Getty Wind Farm. Although frequent use was observed by this species breeding colonies were not present and suitable breeding substrate was absent during 2011.

One nesting pair of eagles occurs in the NW ¼ of Section 18 of Getty Township. Nest observations of this pair throughout the breeding season indicated the pair successfully raised at least one young from this site. A total of 18 bald eagles observations and flights were documented throughout the spring of 2011. These observations were primarily of the resident adults tending to their nest, young, or engaged in foraging forays. However, migratory eagles were present when migratory waterfowl provided a prey base. When migratory waterfowl left the area the migratory eagles followed and were no longer observed using the Project area.

Does the landscape contain areas where development is precluded by law or designated as sensitive according to scientifically credible information? Examples of designated areas include, but are not limited to: areas of scientific importance; areas of significant value; federally-designated critical habitat; high-priority conservation areas for NGOs; or other local, state, regional, federal, tribal, or international organizations.

Only the Trisko WPA is an ecologically significant habitat adjacent to the Getty Wind Farm boundaries. This WPA is also considered a MCBS site of Moderate importance. Other areas near the Project boundary include the Kenna WPA, which is adjacent to the Projects' eastern boundary, and the Padua WMA located southwest of the Project boundary. Portions of the Padua WMA is considered a CRRESA. This CRRESA which is outside of and to the southwest of the Project boundary is ranked as a "3" in the MDNR database, which is the highest rank given to a CRRESA; it is listed as "below ranking" on the Minnesota County Biological Survey (MCBS), indicating the lowest quality habitat recognized as an MCBS community. While this tract represents an ecologically intact area, in the context of the Project area it is relatively isolated from other intact communities by surrounding crop land. The CRRESA extending into the northwest corner of the Project boundary is ranked as a "2" in the MDNR database, which is the middle ranking given to CRRESAs and is based on land cover characteristics. This area is currently in crop production. The two other CRRESAs located completely within the Project boundary are ranked as a "1" (the lowest ranking given to CRESAs) and a "2". Both of these areas are in a combination of row crop and hay production. CRRESAs ranked "1" are also located within the Kenna and Trisko WPAs.

As described in the response to the previous question, Getty will avoid impacts to ecologically significant areas. There will be no direct impacts to the WPAs or WMAs within 1 mile of the Project boundary, and 1800 foot setback from the Project perimeter will result in a minimum buffer between these resources and any turbines.

Are there plant communities of concern present or likely to be present at the site(s)?

Getty found areas of native prairie within the adjacent Trisko WPA during 2011 preconstruction avian studies. While small remnants of wooded areas were identified during the site visit, they are generally located adjacent to farmsteads and will not be affected by Project activities. The Trisko WPA (Section 6, Getty Township) will be avoided.

Are there known critical areas of congregation of species of concern, including, but not limited to: maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks, or other areas of seasonal importance?

Getty found that there are no Natural Heritage Information System (NHIS) records of maternity roosts, hibernacula, or colonial waterbird nesting sites on the Project site or within 5 miles of the Project boundary. However, the 2011 preconstruction avian studies found an active bald eagle nest site within ½ mile of the Project boundary, a black tern nesting colony within the Project boundary, and nesting red-necked grebes in Sections 18, 7, and 24 of Getty Township, respectively. Additionally, in their April 12, 2010, response letter, MDNR staff indicated that visiting and migrating waterbirds such as tundra swans, ring-necked ducks, mallards, and Canada geese were observed in March 2010 during a Project site visit. The MDNR and USFWS have indicated that the wetlands and adjacent habitat within the WPAs and WMAs that are located within 1 mile of the Project boundary attract birds on a seasonal basis. Additionally, MDNR staff noted that observations of tundra swans in a seasonally flooded, cropped wetland in Sections 5 and 6 of Getty Township indicate the possibility of similar seasonal use of wetlands within the Project boundary. Preconstruction avian surveys corroborated observations recorded by the MDNR and documented waterfowl use of seasonal wetlands within the project boundary.

Using best available scientific information has the relevant federal, state, tribal, and/or local agency independently demonstrated the potential presence of a population of a species of habitat fragmentation concern? If not, the developer need not assess impacts of the proposed project on habitat fragmentation.

Through the consultation process, no specific habitat fragmentation has been identified by the USFWS or MDNR. Because the area is already highly fragmented by agricultural uses and few intact natural communities exist within the Project boundary, the risk of additional habitat fragmentation is minimal. Getty continues to consult with the USFWS and MDNR on habitat fragmentation.

Which species of birds and bats, especially those known to be at risk from wind energy facilities, are likely to use the proposed site based on an assessment of site attributes?

The complete list of birds from the closest BBS route to the Project area (New London Route) and a summary of avian species observed during 2011 preconstruction avian surveys is included in **Appendix I**. In addition, the species list of birds from the Minnesota Breeding Bird Atlas (MBBA) blocks that partially occur within the Project boundary is included in **Appendix I**. A list of bat species from preconstruction surveys conducted for the nearby Paynesville WRA is also included in **Appendix I**. Avian surveys conducted for the site indicated that species composition is similar to the BBS summaries, which supports the use of BBS data for predicting avian composition in the Project area.

Species at risk include species that are at risk of collision with turbines and those that are at risk of being displaced through habitat alteration. Those species with the highest relative abundance occurring within the RSZ theoretically have a higher chance of experiencing mortality as a result of collisions with turbine blades. While the turbine models have not yet been selected, they are expected to fall in the range of 1.5 to 3.0 Megawatts (MW), with tower heights of 80-100 m and rotor diameters between 82.5 and 112 meters. Given these general specifications, the upper and lower limits of the rotor sweep zone (RSZ) would be between 28 and 150 meters AGL. Species that have been found to be at risk of collision include members of group passerines. Some (Kerlinger) studies have found that up to 80 percent of the mortality due to collisions with turbines are members of this group. Preconstruction avian studies at the Getty Wind Farm found that 82 percent of all observations were

passerines. Despite the large numbers of passerine species observed, only 3.3 percent of all flights for this group occurred within the RSZ. Passerine observations from the spring 2011 provide an index of daytime flights at select locations within the Getty Wind Farm. The relative abundance of passerines and mean flight height assessed for this group during daytime flights, indicate that passerines have a relatively low risk for collision during daytime flights at the Getty Wind Farm. However, most migratory flights from this group occur at night (Richardson 1990) and these flights are not represented in this analysis.

Species at risk of habitat displacement at the Getty Wind Farm which are considered sensitive to habitat displacement include marbled godwit, upland sandpiper, bobolink, and sedge wren. During the breeding season bobolinks were found at every Survey point and were associated with grasslands of various sizes, hay fields, or were observed flying over cropland with little to no vegetation. Grasshopper sparrows, bobolinks, and sedge wrens are all examples of species noted as declining in the BBS region and are also considered species sensitive to habitat displacement. Habitat displacement is most likely to occur for grasslands breeders occurring ≤100 m from turbine sites (Johnson et al. 2002) due to the response of grassland birds to tall structures, noise, or human disturbance. The proposed setbacks from grassland habitats at the Padua WMA and Trisko and Kenna WPA's will be more than adequate to avoid habitat displacement for the majority of grassland habitats on the Getty Wind Farm. The level of displacement to species using the remaining grassland habitats are thought to be low risk mainly because turbine placement is expected to be associated with cropland areas and not grassland habitat.

Summary of Tier I, Tier II, and Tier III Process

Based on the preliminary site screening process and agency consultation with the MDNR and USFWS, a Tier III study of marbled godwits and bald eagle use at the Getty Wind Farm was conducted during the spring of 2011 to gather more information on these species' use of the site. The results of these studies indicate that an active bald eagle nest is present at the north end of the Padua WMA and some use of small wetlands and grasslands by marbled godwits occurred adjacent to the Trisko WPA. Although no observations of courtship displays or regular use of lands within the Project boundary occurred for bald eagles or marbled godwits, three flights by the eagles were noted between the active nest site and the City of Sauk Center to the north. These flights took the adult eagles across the series of wetlands north of the Padua WMA, over the Trisko WPA, then northeasterly to Sauk Center. In addition, a single observation of a marbled godwit adjacent to the Trisko WPA indicates there is likely some use of the site by this species for foraging or for breeding when appropriate habitat parameters are present in grasslands within the Project boundary.

Analysis of flight path data identified significant movement and concentration areas within the Getty Wind Farm. These areas lie in a broad corridor stretching from the Padua WMA south of the project boundaries northward through Trisko WPA then northeast or northwest to the Sauk River. Waterbodies associated with the Raymond Lake/Padua WMA are the source or destination of many of the flights that were observed during the spring of 2011 study. This area also harbors a perennial nest location for bald eagles, nesting red-necked grebes, a black tern colony, occasional use by sandhill cranes, and frequent common loon use. Since collision risk is related to local abundance at some level, flight physiology (i.e. wing loading characteristics), with behavior an important additional factor, ETSC, SGCN, waterfowl and other sensitive species that utilize flight

paths between wetland and lake areas will be considered when designing turbine arrays and associated infrastructure. Additionally, direct impact to the eagle nest site and two waterbird congregation areas identified during spring avian surveys will be avoided. Prairie areas identified during the spring avian surveys within the Trisko WPA will be avoided. Although wetlands, including cropped wetlands, within the Project boundary are used as stopover sites during spring migration, as the MDNR noted, the wetlands within the Project boundary are similar in size, quality, and density to those in the adjacent landscape. Because the Project area has landscape features and cover types similar to both the Buffalo Ridge and Paynesville WRAs, there is substantial existing data available to predict avian and bat impacts from comparable sites. Therefore, no additional studies are proposed for the Project. Getty will continue to coordinate with the USFWS and MDNR on issues addressed by the agencies as the Project layout is developed.

8.19.3 Birds and Bats

Various migratory and resident bird species use the Project area as a part of their life cycle. Migratory bird species are known to use the Project area for resting, foraging, or breeding activities for only a portion of the year. Resident bird species occupy the proposed wind farm site throughout the year. A list of migratory and resident bird species documented by the U.S. Geological Survey (USGS) Breeding Bird Survey (BBS) in the vicinity of the Project area is presented in **Appendix I.** The results of the preconstruction avian survey that HDR conducted for the Getty Wind Farm (see **Appendix I**) found 116 different species and indicate that the site-specific avian point-count data are consistent with the species composition listed in the nearest BBS route (New London route). Therefore, it is anticipated that the species listed in the New London BBS route, are representative of bird populations over the long term.

Upland game birds observed on or near the project area include ring-necked pheasant (Phasianus colchicus), gray partridge (Perdix perdix), and mourning dove (Zenaida macroura). Raptors observed on or near the project area include bald eagle (*Haliaeetus leucocephalus*), red-tailed hawk (Buteo jamaicensis), American kestrel (Falco sparverius), Cooper's hawk (*Accipiter cooperii*), and northern harrier (*Circus cyaneus*).

Bat species present in Minnesota include the hoary bat (*Lasiurus cinereus*), eastern red bat (*Lasiurus borealis*), big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), northern myotis (*Myotis septentrionalis*), eastern pipistrelle (*Pipistrellus subflavus*), and little brown bat (*Myotis lucifiugus*). The results from preconstruction bat acoustical surveys for the nearby Paynesville Wind Farm recorded calls from the silver-haired/big brown bat species group (which make up the majority of the calls), hoary bats, eastern red bats, and little brown bats (Stumpf and Hamer, 2010). Land uses, wetland frequency, wooded area, and grassland frequency at the Paynesville and Getty sites are very similar and bat use is expected to indistinguishable between the two sites

Birds and Bats Impacts

Development of the Project, including construction and operation, is expected to produce minimal impacts on birds, bats, and other wildlife. The final report for the Project (Avian Use Assessment Report on the Black Oak/Getty Wind Development Sites-HDR 2011) which also includes avian use within project area of the adjacent Black Oak wind farm, concluded that, similar to other wind developments, there is a high likelihood that individual bird fatalities will occur, but that it is unlikely to affect populations of most species, especially at a regional scale. The report concluded that the setbacks from public lands (WMAs and WPAs) of three–to-five-

times rotor diameter, which is based on EFP siting guidelines, should be adequate to reduce risk to waterfowl/waterbirds and grassland-associated birds when siting turbines within the Project area. These recommendations were based on a review of relevant studies of existing wind energy facilities. Similar to the Paynesville Wind Resource area, grassland (including potential native prairie) and wetlands with semi-permanent and permanent open water within the Project area are limited to the WMAs and WPAs. These areas will be avoided.

There are few studies of pre- and post-construction bat use and fatality studies available to draw correlations from. However, those that are available show a general correlation between pre construction activity and post-construction fatalities. In Iowa, Jain (2005) found pre-construction activity of 34.9 bat calls/detector/night corresponded to approximately 10 bats killed/MW/year after the site was developed. Similarly, studies in West Virginia, Minnesota (Buffalo Ridge), and Wyoming found the number of bat calls recorded/detector/night roughly corresponded to the annual number of bats killed/MW/year. The Paynesville pre-construction bat monitoring recorded a mean 6.6 calls/detector/night which should result in roughly 5-7 bats killed/MW/year. Based on the results of previous studies, the land cover types within the Project area, and the similarity of species composition between Paynesville WRA and the Project area, the impact of the proposed Project on all wildlife is expected to be at the lower end of bat mortality for wind development sites. There is potential for avian and bat collisions with facility turbines or meteorological towers and an additional impact may include a small reduction in the available habitat that some birds and bats uses for forage.

Avian Impacts

Few recent studies are available in comparable landscapes that provide both pre and post-construction data from which to draw correlative inferences about potential impacts. The final report on avian monitoring studies at the Buffalo Ridge Wind Resource area (WRA), Minnesota, from 1996 to 1999(WEST 2000), provides the most recent and relevant data available for potential impacts at the Getty Wind Farm. The purpose of these studies was to evaluate the risk to birds from each phase of development and the cumulative risk to birds from all wind power development in the Buffalo Ridge WRA. Although the Buffalo Ridge WRA is located approximately 120 miles from the Project area, the general species composition and land cover is similar. Both areas are generally a mixture of crop fields growing corn, soybeans, small grains, and hay; pasture; and CRP lands. As a comparison, **Table 8.12** lists the 10 most commonly observed species along the Tyler BBS route, located within the Buffalo Ridge WRA, along with data from the closest BBS route to the Project area (New London). Based on the comparison of the BBS routes, the Project area has a similar species composition to the Buffalo Ridge WRA.

Table 8.12 - Top 10 Most Frequently Recorded Species in BBS Routes

New London Route (Stearns County)			Tyler Route (Buffalo Ridge)		
Bird Est.*	**Common Name**	**Scientific Name**	**Bird Est.***	**Common Name**	**Scientific Name**
169	Red-winged blackbird	*Agelaius phoeniceus*	171	Red-winged blackbird	*Agelaius phoeniceus*
122	Common grackle	*Quiscalus quiscula*	67	Common grackle	*Quiscalus quiscula*

New London Route (Stearns County)			Tyler Route (Buffalo Ridge)		
Bird Est.*	**Common Name**	**Scientific Name**	**Bird Est.***	**Common Name**	**Scientific Name**
67	Common yellowthroat	*Geothlypis trichas*	48	Western meadowlark	*Sturnella neglecta*
66	Mourning dove	*Zenaida macroura*	32	Mourning dove	*Zenaida macroura*
60	European starling	*Sturnus vulgaris*	29	Ring-necked pheasant	*Phasianus colchicus*
46	Horned lark	*Eremophila alpestris*	20	American robin	*Turdus migratorius*
42	American robin	*Turdus migratorius*	20	American crow	*Corvus brachyrhynchos*
42	Cliff swallow	*Petrochelidon pyrrhonota*	18	Cliff swallow	*Petrochelidon pyrrhonota*
36	Grasshopper sparrow	*Ammodramus savannarum*	14	Barn swallow	*Hirundo rustica*
33	Ring-necked pheasant	*Phasianus colchicus*	14	Mallard	*Anas platyrhynchos*

Source: New London: http://www.mbr-pwrc.usgs.gov/cgi-bin/rtena23.pl?50064; Tyler: http://www.mbr-pwrc.usgs.gov/cgi-bin/rtena226.pl?50062
**Estimated number of birds a very good birder would encounter in about 2.5 hours of birding along the BBS "New London" or "Tyler" routes.*

The Buffalo Ridge Study identified the following avian impacts:

- Following construction of the wind turbines there is a reduction in use of the area within 100 meters of the turbines by about 32 percent of species of grassland breeding birds. It was hypothesized that lower avian use may be associated with avoidance of turbine noise, maintenance activities, and less available habitat. The researchers stated that "on a large scale basis, reduced use by birds associated with wind power development appears to be relatively minor and would not likely have any population consequences on a regional level."
- Avian mortality appears to be low in the vicinity of the nearby Buffalo Ridge WRA, compared to other wind facilities in the United States (WEST 2001 and 2002). These recent studies found an overall avian mortality of 0.98 birds per turbine per year. Avian mortality is primarily related to nocturnal migrants. Resident bird mortality is very low and involves common species. The researchers stated that "based on the estimated number of birds that migrate through Buffalo Ridge each year, the number of wind plant related avian fatalities at Buffalo Ridge is likely inconsequential from a population standpoint."

Both the Top of Iowa (Koford et al. 2004, Jain 2005) and Buffalo ridge pre-construction studies recorded red-winged blackbird and common grackles as the two most abundant species recorded during these studies. This aligns well with the Getty results where these two species were also the most abundant species recorded and comprised 70 percent of all observations. Results of post-construction mortality monitoring at the more recent Top of Iowa WRA study indicated low impacts to waterfowl species. Similar to the Project area, the Top of Iowa wind project is located in an agricultural area with several WMAs within and adjacent to the Wind Resource Area (WRA), providing wetland, grassland, and woodland habitat. During preconstruction surveys, the area had high shorebird, passerine, and migrant and resident waterfowl utilization. No waterfowl fatalities were found on extensive post-construction searches at Top of Iowa wind project. Ranges of estimated avian mortality (resident and migratory) observed for a sample of wind-energy projects in the U.S. (National Research Council 2007) are from 1 to 12 birds per megawatt per year, which is higher than that found at the Buffalo Ridge WRA. However, many of these estimates are based on older generation wind energy facilities which typically have higher megawatt/year fatality rates compared to newer-generation turbines, which, while taller and having more wind-swept area, also have rotor-blades that move more slowly, are easier to see, and have other features that apparently reduce avian mortality (Erickson et al. 2002, Smallwood and Karas 2009). Postconstruction mortality studies at other sites, including the Buffalo Ridge WRA, indicate that collision events will likely be much lower than national averages.

Bat Impacts

Results of the preconstruction survey for the nearby Paynesville Wind Farm show that the mean number of bat calls per detector per night is lower than many of those observed at other wind resource areas for which preconstruction and postconstruction surveys have been completed (Hamer 2010). The Paynesville Wind Farm study recorded 6.6 bat calls/detector/night. The Buffalo Ridge WRA study recorded 48 bat calls/detector/night. Though geographically disparate, studies in West Virginia, Wyoming, Minnesota, and Iowa seem to indicate a rough correlation between pre-construction detection and post-construction mortality of bats. Given the similar habitat types, and proximity of the Project area to the Paynesville project, it is anticipated that the general bat use at the Project is similar to that recorded at Paynesville.

The Buffalo Ridge Study identified the following bat impacts. Bat mortality was studied at the Buffalo Ridge WRA in 2001 and 2002 by WEST. They found an overall mortality average of 2.16 bats/turbine/year. Approximately 82 percent of the bat mortality occurred from mid-July to the end of August. WEST found that "both the bat detector and mist net data indicate there are relatively large breeding populations of bats in close proximity to the wind plant that experienced little to no wind plant related collision fatality." It appears that most bat mortality at Buffalo Ridge involves migrating bats. Researchers highlighted that bat mortality increased with reduced distance between turbines and wetlands or woodlands. Turbines in this study were 750 kW turbines with a 50 meter tower and rotor diameters of 46 or 48 meters, depending on blade length. (Turbines would be larger at the Getty Wind Farm.)Areas within the Getty site that provide known bat use habitat such as wetlands, trees, woodlots, lie in areas identified as high avian use areas and are being avoided when placing turbines. Bat use at the Getty site is expected to be very close to the site-wide mean of 6.6 calls/detector/night due to the similarity of available habitat, proximity to known use corridors (Sauk River), species range, and geographic proximity.

Mitigation Measures

Combining guidance provided by the DNR in their January 13, 2011 draft survey methodology and information provided in direct consultations with the DNR, USFWS and EFP, HDR developed survey protocol for the combined Black Oak/Getty spring 2011 avian surveys. Survey methodologies for avian use implemented on the Project included the following analyses: (1) Pre-construction Avian Use/Flight Paths, (2) Bald Eagle Nesting Activity, (3) Wetland Utilization and, (4) Marbled Godwit Surveys. The objectives of these surveys was to sample avian use of the site during the spring migratory period, to identify breeding species within the site, develop data on habitat use patterns, and to document flight paths used by birds at the Project site. USFWS, EFP, and DNR staff reviewed and approved of survey methods prior to implementation. The Applicant conducted avian use/flight path surveys, wetland utilization surveys, marbled godwit surveys, raptor nest searches, and eagle nest monitoring studies during the spring of 2011. Bat use information gathered at the Paynesville Wind Resource Area and a general knowledge of the species documented during the 2010 study is informing turbine placement and other avoidance and minimization measures at the Getty site. Based on the results of the studies sited previously, the Applicant voluntarily implemented to the extent practicable the following turbine siting standards to avoid potential avian and bat impacts:

- 1800 foot setback from the Trisko WPA, Kenna WPA, and the Padua WMA.
- Remove turbines from waterbird congregation areas identified during spring avian surveys.
- Maintain the corridor stretching from the Padua WMA south of the project boundaries northward through Trisko WPA then northeast or northwest to the Sauk River.
- Maintain the “duck passes” between large, semi-permanent wetlands or sloughs and known migratory bird corridors or flight paths especially in areas such as colonial bird nesting areas.
- Avoid native prairie areas identified during the spring avian surveys within the WPAs.
- Evaluate all turbine sites based on potential avian and bat impacts and choose sites based on least impact.
- Work with the MDNR and USFWS to develop turbine placements that will minimize impacts on birds and bats.

In addition, the Applicant will implement the following measures to help avoid potential impacts to birds and bats in the Project area during selection of the turbine locations, subsequent Project development, construction, and operations:

- Prepare and implement an avian and bat protection plan during construction and operation of the Project. This plan will consist of Getty’s corporate standards for minimizing impacts to avian and bat species during construction and operation of wind energy projects, which will be developed in a manner that is consistent with the guidelines and recommendations of the Wind Turbine Guidelines Advisory Committee’s Recommended Guidelines to the USFWS (March 4, 2010). It will include Getty’s commitments to wind farm siting and transmission route suitability assessments, construction practices and design standards, operational practices, permit compliance, and construction and operation worker training.
- Conduct a preconstruction inventory of existing biological resources, native prairie, and wetlands.
- Avoid or minimize disturbance of individual wetlands or drainage systems during Project construction. Wetland delineations will be conducted prior to design and construction to identify the limits of wetland boundaries in the vicinity of Project activities.

- Not place turbines in native prairie tracts. Based on preliminary site observations conducted by HDR, these tracts are limited to public lands (WPAs, WMAs, and SNAs) that are outside the Project boundary. Additionally, areas that will be temporarily or permanently disturbed for Project activities will be evaluated prior to construction by field surveys to identify any high quality native prairie remnants.
- Maintain, at a minimum, a five and one half times rotor diameter setback from WMAs and WPAs to reduce risk to waterfowl/waterbirds and grassland-associated birds when siting turbines.
- Protect existing trees and shrubs by avoiding tree removal for turbines, access roads, and underground collector lines. These will be identified using aerial photos and field surveys.
- Maintain sound water and soil conservation practices during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion. To minimize erosion during and after construction, BMPs for erosion and sediment control will be used. These practices include silt fencing, temporary seeding, permanent seeding, mulching, filter strips, erosion blankets, grassed waterways, and sod stabilization.
- Light turbines according to FAA requirements.
- Re-vegetate non-cropland and pasture areas disturbed during construction or operation with an appropriate native seed mix.
- Inspect and control noxious weeds in areas disturbed by construction and operations.

The Applicant is committed to minimizing bird and bat impacts within the Project area. Getty will design their facility to minimize avian impacts by avoiding high use habitat (woodlands, wetlands, and WMAs/WPAs), and consult with the MPUC, USFWS, and MDNR regarding appropriate mitigation measures for bird and bat impacts.

8.19.4 Non Bird and Bat Wildlife

Various resident species of mammal, reptiles, amphibians, and insects use the Project area as a part of their life cycle. A list of these species that have a potential to occur in the Project area is presented in **Appendix I**. Several migratory insect species use the Project area for resting, feeding, or breeding activities for only a portion of the year.

General Non Bird and Bat Wildlife Impacts

Development of the Project, including construction and operation, is expected to produce minimal impacts on both resident and migratory species. Based on studies of existing wind power projects in the United States and Europe, the impacts on wildlife would primarily occur within avian and bat populations. Based on the results of previous studies, the land cover types within the Project area, and the similarity of species composition between the Buffalo Ridge WRA and the Project area, the impact of the proposed Project on resident and migratory species is expected to be minimal.

The project will convert 16 to 31 acres of farmland to non-agricultural land use, this small reduction in the available habitat that some species use for forage or cover is not expected to impact resident and migratory species populations in the Project area or outside the Project area. Less than one half of one percent of the Project boundary will be converted to non-agricultural land use. Many species life cycles rely on wetlands, streams, ponds, lakes, and grasslands. Construction of the wind turbines and access roads will increase the

potential for soil erosion during construction, which if not properly controlled could impact the habitat that some species use for forage, reproduction, and cover.

General Non Bird and Bat Wildlife Mitigation Measures

Applicant will implement the following measures to help avoid potential impacts to resident and migratory species in the Project area during selection of the turbine locations, subsequent Project development, construction, and operations:

- Conduct a preconstruction inventory of existing biological resources, native prairie, and wetlands.
- Maintain an 1800 foot turbine setback from the Trisko WPA, Kenna WPA, and the Pauda WMA.
- To the extent possible protect existing trees and shrubs by avoiding tree removal for turbines, access roads, and underground collector lines. These will be identified using aerial photos and field surveys.
- Avoid or minimize disturbance of individual wetlands or drainage systems during Project construction. Wetland delineations will be conducted prior to design and construction to identify the limits of wetland boundaries in the vicinity of Project activities.
- Avoid disruption of native prairie tracts. Based on preliminary site observations conducted by HDR, these tracts are limited to public lands (WPAs, WMAs, and SNAs) that are outside the Project boundary. Additionally, areas that will be temporarily or permanently disturbed for Project activities will be evaluated prior to construction by field surveys to identify any high quality native prairie remnants.
- Maintain sound water and soil conservation practices during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion. To minimize erosion during and after construction, BMPs for erosion and sediment control will be used. These practices include silt fencing, temporary seeding, permanent seeding, mulching, filter strips, erosion blankets, grassed waterways, and sod stabilization. The project will observe the Stearns County BMPs
- Re-vegetate non-cropland and pasture areas disturbed during construction or operation with an appropriate native seed mix.
- Inspect and control noxious weeds in areas disturbed by construction and operations.

The Applicant is committed to minimizing all wildlife impacts within the Project area. Getty will design its facilities to minimize mammal impacts by avoiding high use habitat (woodlands, wetlands, and WMAs/WPAs), and consult with the MPUC, USFWS, and MDNR regarding appropriate mitigation measures for wildlife impacts.

8.19.5 Specific Mammal Impacts

Construction and operation of the Project is expected to produce minimal impacts on habitat used by mammals. Grassland areas and woody vegetation are habitat for a variety of small mammals. White-tailed deer (Odocoileus virginianus), an economically important species, have a strong affinity to feed in agricultural crops and use farm woodlots and intermittent stream bottoms for shelter.

Specific Mammal Mitigation Measures

Applicant will implement the following measures to help avoid potential impacts to mammals in the Project area during selection of the turbine locations, subsequent Project development, construction, and operations:

- Avoid placing turbines and associated facilities in grassland and wooded tracts wherever practical.

- Avoid unnecessary crop removal during construction activities.
- Avoid construction activities within deer-wintering yards during winter.

8.19.6 Specific Reptile and Amphibian Impacts

Construction and operation of the Project is expected to produce minimal impacts on habitat used by Reptiles and Amphibians. Grassland areas, woody vegetation, and wetlands are habitat for a variety of Reptiles and Amphibians.

Specific Reptile and Amphibian Mitigation Measures

Applicant will implement the following measures to help avoid potential impacts to Reptiles and Amphibians in the Project area during selection of the turbine locations, subsequent Project development, construction, and operations:

- Avoid placement of turbines and associated facilities in pasture/grassland tracts wherever practical.
- Avoid placement of associated facilities in high quality wetlands.
- Avoid unnecessary vegetation disturbance during construction activities.
- Maintain sound water and soil conservation practices during construction and operation of the Project to avoid impacts to habitat that reptiles and amphibians use for forage, reproduction, and cover.

8.19.7 Specific Insect Impacts

Various migratory and resident insect species use the Project area as a part of their life cycle. While many insect species are important to the cultivated vegetation and wildlife, honeybees are the only species in the Project area that are economically important. Honeybees are considered a small but important part of central Minnesota's economy. Statewide, production from 130,000 colonies was valued at around $9 million in 2007 (U.S. Department of Agriculture 2009a). The Applicant has not found evidence of any perennial honeybee colonies in the project area and is not aware of any hobby honey colonies in the project area.

Butterfly species are associated with native prairie plants. One historic record of the Powesheik skipper (Oarisma powesheik) a species of state special concern occurred at the Trisko WPA which is adjacent to, but outside of the Project boundary. This species is a prairie obligate butterfly that is currently being considered for listing as a federally protected species under the Endangered Species Act and is also undergoing an increase in state protected status from *special concern* to *endangered*.

Specific Insect Mitigation Measures

Applicant will implement the following measures to help avoid potential impacts insects in the Project area during selection of the turbine locations, subsequent Project development, construction, and operations:

- The project will not impact native prairie and will maintain 1800 foot setback from the Trisko WPA, Kenna WPA, and the Pauda WMA, to reduce or eliminate impacts to prairie obligates butterfly species and other insect species.
- Re-vegetate non-cropland and pasture areas disturbed during construction or operation with an appropriate native seed mix to maintain plant species diversity.
- Notify apiaries of spraying for noxious weeds in advance of spraying operations.

8.20 Rare and Unique Natural Features

There are no records of federally listed or candidate species in Stearns County. One historic record of the Powesheik skipper, a state species of special concern, occurs on the Trisko WPA adjacent to the Project boundary. The Tier I and II analyses did not identify any designated critical habitat within the Project boundary. The results of the Tier I and II studies are included in Section 8.19.4. The Tier III avian surveys discovered the presence of five (5) species listed by the State of Minnesota as endangered, threatened or special concern during spring 2011 surveys. Observations of State listed sensitive species include; marbled godwit (*Limosa fedoa*, SPC), horned grebe (*Podiceps auritus*, T), Forster's Tern (*Sterna forsteri*, SPC), American white pelican (*Pelecanus erythrorhynchos,* SPC), and bald eagle (*Haliaeetus leucocephalus*, SPC) during the spring of 2011. The results of the avian survey are included in **Appendix I**.

The USFWS, the MDNR Natural Heritage Program, and the MDNR Division of Ecological Resources were contacted to review the Project for threatened and endangered species and unique habitats. Response letters from the MDNR and the USFWS are included in **Appendices G and H**. In August 24, 2010 and August 29, 2011 response letters, the MDNR Natural Heritage Program indicated that one rare feature was documented within a 1-mile radius of the Project boundary. The MDNR maintains an NHIS database through their Natural Heritage Program and Nongame Game Wildlife Program, which is the most complete source of data on Minnesota's rare, endangered, or otherwise significant plant and animal species, plant communities, and other rare natural features (Minnesota DNR 2009c). NHIS data show that there are no state-listed species within the Project area. One state-listed species of special concern (Powesheik Skipper) and one state-listed species of greatest conservation need (Upland Sandpiper) was documented within 1 mile of the Project area.

8.21 Project Correspondence

The Applicant has prepared and transmitted letters to the State Historic Preservation Office, Tribal Councils, the Minnesota Department of Natural Resources, and the U.S. Fish and Wildlife Service to request agency review of the Project site. Correspondence and agency responses are presented in **Appendices E, F, G, and H** to this application.

Correspondence include:

- Letter to State Historic Preservation Office 03/16/10 Response Received: 04/07/10
  Stemper & Assoc. Archaeological Field Investigation Report Received: 04/01/11
  All State Historic Preservation Correspondence are located in Appendix E
- Notice Letter to Tribal Councils 03/16/10 Response Received: 03/23/10
  Follow-up Letter to Tribal Councils 07/29/11 Response Received: N/A
  All Tribal Council Correspondence are located in Appendix F
- Letter to MDNR 03/16/10 Response Received: 04/12/10
- MNDNR Draft Avian Report Initial Review 08/30/11 Response Received: 09/02/11
- MDNR NHIS Data Request 07/25/10 Response Received: 8/24/10
- MDNR NHIS Data Request 07/05/11 Response Received: 8/29/11
  All Minnesota DNR Correspondence are located in Appendix G
- Letter to U.S. Fish and Wildlife Service 03/16/10 Response Received: 05/11/10
  USFWS Draft Avian Report Initial Review 08/30/11 Response Received: N/A
  All U.S. Fish and Wildlife Service Correspondence are located in Appendix H

Section 9 - Site Characterization

Getty has retained the services of V-Bar, LLC to perform Wind Resource Analysis for the Project. To obtain an accurate representation of the wind resource within the Project area, V-Bar preformed a comprehensive analysis of the site using the following data:

- On-site data collected at the Project's 60 meter MET tower;
- On-site data collected at the Project's 80 meter MET tower;
- Long term correlation data from three sites: Alexandria, Saint Cloud, and Chokio; and
- Topographic and land cover data.

V-Bar used this data to develop a Wind Resource Analysis Report dated October 11, 2010, and updated that report on June 23, 2011. The REpower MM100 turbine power curve was used together with the Project's correlated on-site data to determine the Project's Annual Gross Energy Production and Capacity Factor. It is expected that the Goldwind 87/1500 would produce slightly less annual output, due to a decrease in accumulative rotor surface area, and it is expected that the Vestas V112 would produce less annual output, due to a decrease in accumulative rotor surface area. **Table 9.1** presents the capacity factor and energy production for the Project, for 21 REpower, 1.8 MW turbines at a 100 meter hub height. **Table 9.2** depicts the estimated mean annual wind speed for the Project in meters per second at 80 and 100 meters (262 and 328 feet). As shown in the table, the Project area has an average wind speed of 7.44 meters per second at a turbine hub height of 80 meters (262 feet), and an average wind speed of 7.83 meters per second at a turbine hub height of 100 meters (328 feet), which classifies the Project as a class IIb/IIIb wind site.

Table 9.1 – Gross Energy Production Analysis

Normalized Monthly and Annual Gross Energy Production and Capacity Factor – REpower MM100-100		
Month	**Energy Production, MWh/mo**	**Capacity Factor**
January	14879	52.5
February	13117	51.2
March	17017	60.0
April	16814	61.3
May	18243	64.4
June	13288	48.4
July	13505	47.6
August	14956	52.8
September	13764	50.2
October	14128	49.8
November	14379	52.4
December	15715	55.4
Annual	179805	53.83

Table 9.2 – Wind Resource Analysis

Normalized Monthly and Annual Wind Speed Averages (m/s)		
Month	**80m wind speed, m/s**	**100m wind speed, m/s**
January	7.5	8.1
February	6.8	7.1
March	7.9	8.2
April	8.2	8.6
May	8.7	9.0
June	7.0	7.3
July	7.0	7.3
August	7.3	7.8
September	7.1	7.6
October	7.0	7.4
November	7.3	7.7
December	7.4	7.7
Annual Average	7.44	7.83

9.1 Interannual Variation

The expected annual average wind speed at the site as determined by V-Bar is 7.44 m/s at an 80 meter hub height, and 7.83 m/s at a 100 meter hub height. V-Bar compared the on-site data to long term wind data near the project site. The analysis showed high correlations (average r=0.91) between the site-specific data and long term reference stations near the Project. The high correlation lends confidence to the assessment in that the site-specific data can accurately be placed in a long-term climatological context.

9.2 Seasonal Variation

The V-Bar report shows the anticipated monthly average wind speeds for the Project at a hub height of 80 meters and 100 meters. Wind speeds at 80 meters are highest in May at 8.7 m/s and lowest in June/July at 7.0 m/s. Wind speeds at 100 meters are highest in May at 9.0 m/s and lowest in June/July at 7.3 m/s. Wind speeds are generally the highest in spring, lowest in the summer.

9.3 Diurnal Conditions

At the Project the winds at turbine hub height (80 meters and 100 meters above ground) generally fall off in the morning as solar warming causes increased mixing of the winds at different levels above ground. After sunset, less mixing occurs and the winds at the hub height will again tend to increase. This pattern changes through the year, as there is a higher diurnal variation in the summer months. **Table 9.3** shows the monthly diurnal mean 100-m wind speeds.

Table 9.3 – Monthly Diurnal Mean 100-m Wind Speeds

Hour (CST)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	8.5	7.9	9.2	9.3	9.3	7.4	7.4	8.4	8.5	7.8	8.0	7.6
1	8.6	7.8	9.0	8.9	9.0	7.1	7.8	8.0	8.3	7.7	8.1	7.6
2	8.3	7.5	8.7	8.8	9.3	7.1	8.1	8.1	8.1	7.8	8.0	7.8
3	8.5	7.4	8.5	8.7	9.2	7.3	7.7	8.0	8.2	7.5	8.4	7.8
4	8.6	7.6	8.4	8.8	8.7	7.2	7.9	7.9	8.2	7.6	8.5	8.0
5	8.6	7.6	8.5	8.5	8.5	7.1	7.9	7.7	8.0	7.4	8.3	8.2
6	8.3	7.6	8.2	8.3	8.2	6.7	7.0	7.3	7.6	7.1	8.3	8.0
7	8.4	7.5	7.9	7.9	7.8	6.5	6.2	6.7	6.8	7.0	8.0	8.1
8	8.2	7.4	7.5	7.6	7.9	6.7	6.2	6.5	6.3	7.0	7.9	7.9
9	8.0	7.3	7.4	8.0	8.6	6.9	6.3	7.0	6.4	6.7	7.7	7.1
10	7.5	6.3	7.3	8.2	9.2	7.0	6.8	7.6	6.8	7.1	7.2	6.7
11	6.7	6.1	7.2	8.3	9.5	7.1	7.2	7.9	7.5	7.2	7.3	6.7
12	6.5	5.9	7.3	8.4	9.7	7.3	7.8	7.9	7.6	7.6	7.4	6.8
13	6.7	6.0	7.4	8.7	9.8	7.5	7.8	8.0	7.5	7.7	7.5	6.9
14	7.2	6.1	7.7	8.7	10.0	7.6	7.8	8.0	7.4	7.4	7.2	7.2
15	7.3	6.2	7.7	8.7	9.8	7.9	7.9	8.0	7.4	7.3	7.0	7.7
16	8.0	6.5	7.7	8.5	9.5	7.9	8.0	7.7	7.2	7.0	6.9	7.9
17	8.5	6.9	7.9	8.4	9.4	7.7	7.6	7.5	6.8	6.9	7.2	8.2
18	8.5	7.2	8.4	8.0	9.2	7.7	7.0	7.4	7.0	7.1	7.5	8.2
19	8.6	7.1	9.0	8.3	8.6	7.4	7.0	7.7	7.6	7.7	7.7	8.3
20	8.8	7.5	9.4	8.9	8.8	7.6	6.9	8.3	7.9	7.8	8.0	8.2
21	8.8	7.5	9.6	9.3	9.0	7.8	7.2	8.5	8.0	7.9	7.9	8.3
22	8.7	7.7	9.4	9.3	9.3	7.7	7.2	8.2	8.1	7.8	7.9	8.3
23	8.9	7.9	9.0	9.5	9.2	7.6	7.3	8.2	8.4	7.6	7.8	8.1
Month	8.1	7.1	8.2	8.6	9.0	7.3	7.3	7.8	7.6	7.4	7.7	7.7

9.4 Atmospheric Stability

As is typical of rural Projects, atmospheric stability data has not been compiled for this Project as the inputs are normally not collected with onsite equipment. However, it is expected to be "moderately stable" in the general area, since stability conditions for the open and gently rolling flat terrain in the Central Minnesota region do not vary significantly. Storm events can occur in the area, although their intensity, frequency, and duration are not unusual in comparison with typical Minnesota locations. Other wind farms have been placed in similar environments.

9.5 Turbulence

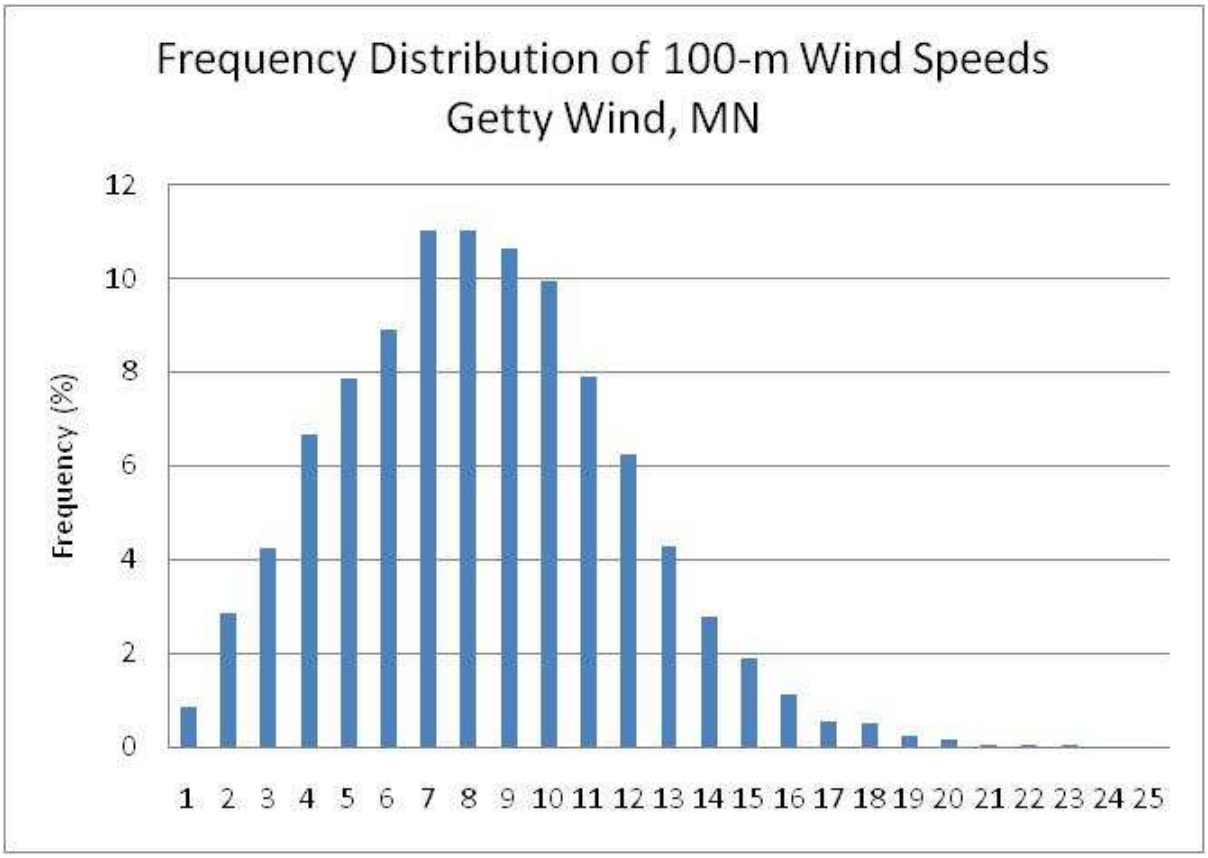
In general, the turbulence intensity for this part of Central Minnesota is anticipated to be low. The mean turbulence intensities (standard deviation of wind speed divided by average wind speed) at both met towers range from 0.07 to 0.12 in the power producing range of speeds.

9.6 Extreme Wind Conditions

Extreme wind speeds may occur with winds from any of the prevailing directions and may happen during any season. The possibility of a tornado exists in the Project area, with the potential for winds of 200 miles per hour (89 m/s).

9.7 Speed Frequency Distribution

Table 9.4 - Normalized Average Wind Speed Frequency Histogram



9.8 Variation with Height

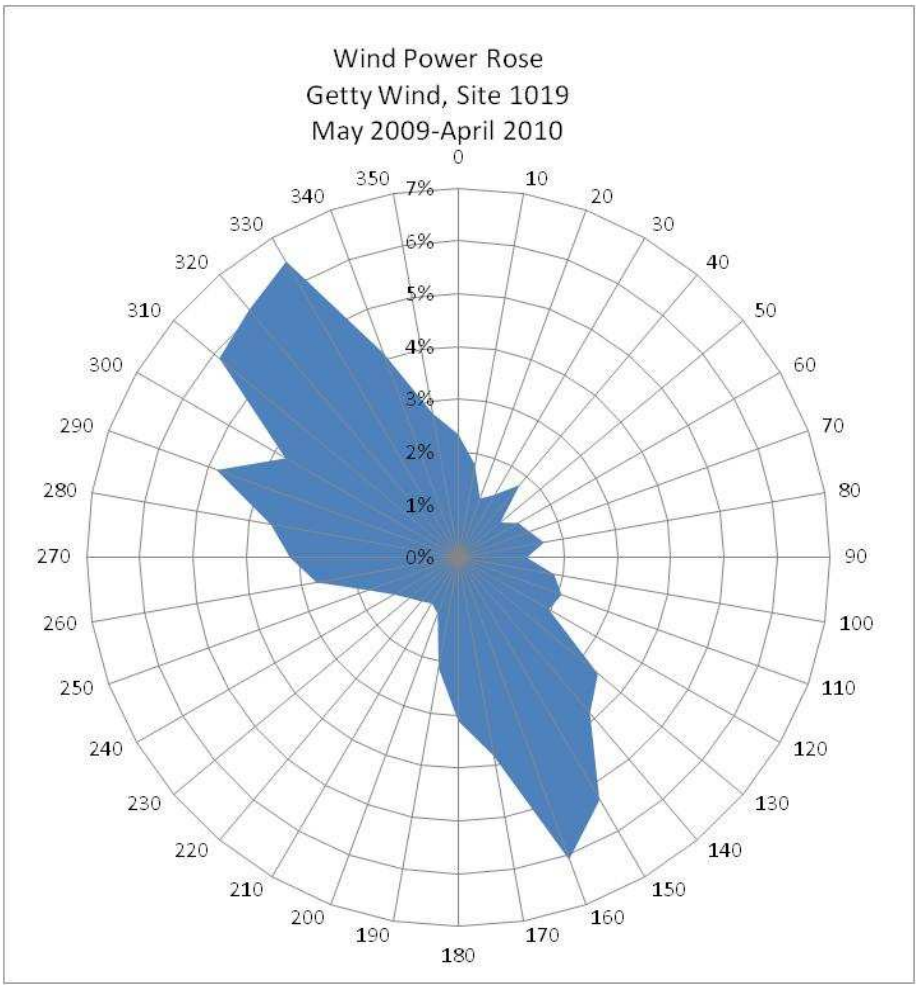
The V-Bar analysis indicates an annual mean wind shear exponent of 0.223 at the 10 to 60 meter interval, and 0.238 between the 20 and 80 m levels.

9.9 Spatial Wind Variation

Little wind variation exists in the Project area due to the land cover of the area which is mostly farmland and void of significant tree cover.

9.10 Wind Rose

Table 9.5 - Wind Power Rose



9.11 Other Meteorological Conditions at Proposed Site

Extreme weather conditions in this area are occasional and include hail, ice storms, lightening, tornados and severe thunderstorms. Due to the low frequency and short duration of these conditions, minimal effects are expected on turbine performance.

9.12 Location of Other Wind Turbines in General Area

There are no operating LWECS wind turbines near the Project. Geronimo Wind Energy, LLC has applied for a LWECS Permit for the 42 MW Black Oak Wind project directly west of the Project (Docket No. IP6853/WS-10-1240). Black Oak and Getty projects are located on adjacent sites in Stearns County, **(Figure 5)** the two projects share an approximately 4 mile north/south border along County Road 188 and County Highway 18. The projects have also filed a joint Certificate of Need application (Docket No. IP6853 and IP6866/CN-11-471); see Section 2 for additional information on the joint CN application.

The nearest operating wind turbines are the turbines owned by the City of Willmar, Minnesota. These turbines are 33 miles south of the Project.

Section 10 - Project Construction

Completion of the Project will require various types of civil work and physical improvements to the land. This civil work may include improvement of existing roads, construction of access roads adjacent to the wind turbines; clearing and grading of land, trenching for, and installation of underground electric cables and communication wires, and foundation work.

A schedule of preconstruction, construction, and post-construction activities involved in the development of the Project would list hundreds of individual tasks. In order to efficiently work through all of these tasks, Getty will work with a qualified general contractor to procure, design, and construct the Project. Getty, in cooperation with a selected financing entity, will have an experienced team in place to perform all of the necessary functions that are required to bring the Project into commercial operation. The following is an overview of the key steps required to construct the Project and its associated facilities.

Land surveys will be completed prior to design of the Project by a Minnesota state-licensed land surveyor to ensure the Project has accurate mapping for Project designers and contractors to work from during design and construction phases. These maps will be amended after construction to accurately define the Project's final as-built information.

The soil qualification work for the Project will be performed by a Minnesota state-licensed engineer. This engineer and his associates (geo-tech firm) will coordinate the soil borings necessary for the Project, design work for the foundations, and design work for all roads. The geo-tech firm will also coordinate the required soil borings for the design of the underground collection lines. The geo-tech firm will be responsible for compaction testing, concrete testing, and onsite foundation inspections during construction.

A qualified electrical contractor will assist with the procurement of Project components and the design of the underground collection system, overhead transmission lines, and substation. Qualified and appropriately licensed electrical contractors will install all the Project's electrical components and electrical systems.

Local contractors will be solicited for site grading and road construction. Access road design will be based on soil borings and previous road experience from projects in this area and will accommodate a road matting and local aggregate combination with an overall capacity rating exceeding nine tons.

Independent balance-of-plant contractors will be solicited for the erection of the wind turbines. These contractors scope of work for the project may include foundation construction, in-tower wiring, and erection of the wind turbines.

Commissioning of the wind turbines will be within the scope of the turbine manufacturer and the balance-of-plant contractor. This team will work closely to ensure that the wind turbines achieve commercial operation in a timely basis.

An onsite project manager will coordinate all aspects of the work, including ongoing communication with local officials, citizens groups, landowners and the MPUC.

10.1 Road and Infrastructure

During the construction phase, several types of light, medium, and heavy-duty construction vehicles will travel to and from the site, as well as private vehicles used by the construction personnel. The busiest traffic will occur when the majority of the foundation and tower assembly is taking place. During this period, deliveries of aggregate, rebar, concrete, and turbine component to the turbine sites will constitute the bulk of the traffic. **Table 10.1** contains the approximately number of loads of the primary construction materials required per turbine to construct a typical wind energy project.

Table 10.1 – Primary Construction Materials Approximate Load Counts

Construction Material	Load Count	Use
Aggregate (Gravel)	50-55	Turbine access road, wide turns, & strengthen Twp. aggregate roads
Rebar	1-2	Turbine foundation
Concrete	40-45	Turbine foundation
Turbine Components	10-12	Wind Energy Conversation System

Erection of the wind turbines will also require the mobilization (delivery) of the main crane. Typically the main crane requires 22-27 loads to mobilize the crane to the project and an equal number of loads to de-mobilize the main crane. Mobilization is typical done once for a project, not for each turbine.

Improvements to existing access roads will typically consist of re-grading and adding gravel to the surface of aggregate roads to allow access even in inclement weather. Final road improvements will be dependent on geotechnical information obtained during the design phase. Getty expects that US Highway 71 and local paved highways will require no modifications and little to no reinforcement to accommodate turbine deliveries. Getty expects that local County and Township aggregate roads will need to be modified at intersections to facilitate turns and several roads will require some reinforcement. The extant of reinforcement required will be greatly influenced by the local weather and time of the year that the turbines are delivered. Temporary road radii at intersections will be required during the construction phase to allow the over-length and over-width loads to navigate the intersections. When construction is completed these intersections will be returned to pre-construction radiuses and road ditches restored.

All roads identified in the wind turbine manufacturer's turbine delivery plan will be accessed by the Project's geo-tech firm and the appropriate governing authority. The pre-construction condition of all roads within the project will be documented. Upon completion of construction, all roads utilized during construction of the Project will be returned to a pre-construction or better condition.

The Project will obtain all necessary over-weight, over-size permits from the appropriate governing authority and work with the county and townships to develop road use agreements prior to construction.

10.2 Access Roads

The individual wind turbines will each have a gravel access road constructed to the base of the turbine that allows access to the wind turbines year round. These roads are expected to be approximately 16 feet wide with a class-five gravel surface and geotextile fabric underlay. Getty will continue to work with the landowners

during micro-siting to reach agreements on the locations of the turbines, access roads, and collector system to minimize land use disruptions.

Access roads will be built adjacent to the wind turbines, allowing access both during and after construction. The final roads will be approximately 16 feet wide with a Class-5 gravel surface and fabric underlay. During construction only, those roads will be temporarily widened by an additional 16 feet of compacted soil, covered with geotextile/gravel, if required, to support the size and weight of heavy-duty cranes and turbine delivery vehicles. The final road design will be dependent on geotechnical information obtained during the engineering phase.

Based on the current layout Getty expects to build 2.6 miles to 5.6 miles of turbine access roads. The specific turbine placement will determine the amount of roadway that will be constructed for this Project. These roads will be sited in consultation with local landowners and completed in accordance with specified design requirements, and will be located to facilitate both construction (cranes) and continued operation and maintenance. Siting roads in areas with unstable soil will be avoided wherever possible. Roads may include appropriate drainage and culverts while still allowing for the crossing of farm equipment. The roads will consist of graded soil, overlain with geotextile and covered with gravel. Once construction is completed, the roads will be re-graded, filled, and dressed as needed. Local requirements will be followed wherever access roads join state or local roadways.

10.3 Associated Facilities

Up to two self-supporting lattice type permanent 80 or 100 meter meteorological towers may be constructed as part of the Project. The location and number of the permanent meteorological tower(s) is usually determined by the manufacturer of the Project's turbines.

An Operations & Maintenance (O&M) Facility may be constructed on or near the site. The location of the O&M facility has yet to be determined. It will most likely be off-site, in an established industrial park with proper transportation, communications facilities, and easy access to the Project. An existing facility, meeting the turbine manufacturer's criteria, could be utilized.

10.4 Turbine Site Location

Underground concrete foundations will be constructed to support the steel tubular towers of the wind turbines. Geotechnical surveys, turbine tower load specifications, and cost considerations will dictate final design parameters of the wind turbine foundations.

The Project's geo-tech firm will investigate, using one or more in-situ testing technologies to understand the ground conditions and soil parameters. Next, they will identify and analyze feasible foundation types. The analysis includes evaluation of bearing capacity, amount of settlement, stress levels, deformation levels, overall stability, ground improvement, and dynamic ground behavior. A foundation type that is reliable and economical is selected, and then the geo-tech firm will prepare specifications and drawings for construction that include details on foundation preparation, equipment, materials, and performance.

Getty anticipates using steel reinforced, spread footing concrete foundations for the towers. The foundation

will include a bearing pad of approximately 2,500 square feet, with a depth of up to 10 feet. The foundation will contain steel rebar reinforcement as specified by the geo-tech firm. The tower will be anchored to the foundation by approximately 128-144 anchor bolts that are fully embedded into the tower foundation.

The tower site will also contain an 80 by 100 foot gravel pad will be installed at the base of each turbine to create a lay-down area for turbine components and facility construction of the turbine.

10.5 Post-Construction Cleanup and Site Restoration

After construction, temporary construction areas, such as crane pads adjacent to the turbine pad and access road additional width, will be restored. The site will be graded to natural contours and soil will be loosened and seeded as necessary. Once construction is completed, the access roads will be regraded, filled, and dressed as needed. Although few, if any, temporary roads will be constructed with the project, all temporary roads will be decommissioned and restored. Erosion control methods will depend on the contours of the land, as well as requirements of the general contractor. The applicant anticipates that the post-construction clean-up and site restoration process will last approximately 30 days.

The Project will be commissioned after completion of the construction and testing phases. Inspection and testing will occur for each component of the wind turbines, as well as the communication system, meteorological system, the low- and high-voltage collector system, and the SCADA system. These commissioning procedures ensure that the generation units are performing to guaranteed levels and that the Project meets electrical system requirements. The turbine manufacturer will provide technical engineers to assist in the commissioning process. The engineers from the turbine manufacturer will continue until the turbine is capable of more than 72 hours of continuous operation.

10.6 Operation of Project

Getty will serve as the lead role in managing the ongoing operation of the Project, including monitoring, maintenance and repair activity. Much of this work will be performed under contract with operations and maintenance service providers.

Getty will enter into a contractual agreement with the turbine vendor to provide service and maintenance for the Project at least through the warranty period given by the turbine vendor. Thereafter, Getty will contract with a qualified contractor for service and maintenance for the Project. The service and maintenance activities will be performed by qualified technicians, trained specifically on the applicable wind turbines. Getty may choose to use a qualified operations manager. A determination has not been made at this time if this will be performed in-house or under a separate contract. The operations manager will oversee the maintenance and service program, ensure utility interconnection, and respond to turbine outages. The operations manager will be responsible for all management, administration, service and maintenance activities. Onsite service and maintenance activities include routine inspections, regular preventive maintenance on all turbines and related facilities, and unscheduled maintenance and repair. Routine minor maintenance on the wind turbines, electrical power system, and communications system may include maintenance of oil levels and filters, tightening of bolts, minor electrical repairs, upgrading of computer software, and system testing. Civil maintenance includes maintaining Project structures, access roads, drainage systems, and other facilities. The third party may also provide labor, services, consumables, and parts required to perform scheduled and

unscheduled major maintenance on the wind farm, including repairs and replacement of parts and removal of failed parts. Spare parts in relation to the electrical infrastructure will be maintained based on similar historic project demands. The Project staff will be complemented with the necessary service vehicles—light trucks, boom trucks, cranes, etc.—to ensure timely response. Turbine maintenance will be accomplished as an ongoing cyclical function during the life of the Project, so as to minimize downtime. Transformer maintenance will be accomplished on an annual basis and will be scheduled and performed during non- or low-wind periods.

Other maintenance activities include management of lubricants, solvents, and other hazardous materials; the hiring, training, and supervision of personnel; and the implementation of appropriate security methods. An operations and maintenance building will house consumables, spare parts, and some control functions.

During turbine commissioning and initial commercial operation, the Project will be inspected onsite daily to see that it is operating within expected parameters. Following the "break-in" period, the turbines will be remotely monitored on a continual basis with planned service and maintenance at the following anticipated intervals:

1. ***First service inspection*.** The first service inspection will take place one to three months after the turbines have been commissioned. Activities include tightening bolts, greasing bearings, and filtering gear oil.

2. ***Semiannual service inspection*.** Routine service inspections commence six months after the first inspection. The semiannual inspection consists of lubrication and a safety test of the turbine.

3. ***Annual service inspection*.** The annual service inspection consists of a semiannual inspection plus a full component check.

4. ***Two-year service inspection*.** The two-year service inspection consists of the annual inspection, plus the checking and tightening of terminal connectors.

5. ***Five-year service inspection*.** The five-year inspection consists of the annual inspection, an extensive inspection of the wind braking system, the checking and testing of oil and grease, a balance check and the tightening of terminal connectors.

10.7 Costs

Specific cost information is confidential to the business of Getty. Getty estimates that total installed capital costs for the Project will be between $68 and $76 million, including wind turbines, associated electrical and communication systems, and roads. Ongoing operations and maintenance costs and administrative costs are expected to be about two percent of the capital costs per year ($1.3 to $1.5 million per year), including payments to landowners for wind easement rights and taxes.

The overall cost of developing the project will depend primarily on turbine selection, site selection, and construction timing. Site-dependent costs will include: the relative ease of access to the individual wind turbine locations, site specific subsurface conditions that determine foundation design, site access road design and layout, ease of underground work, and the layout of the turbine arrays which affects road and electrical

cable cost. Both underground and aboveground cable may be employed to connect turbines, transformers, and the interconnect point. The underground placement of the cables is preferable. Final costs for the Project have not yet been confirmed. The actual cost of the project will be finalized after final design, procurement, construction, and contractual arrangements are complete.

10.8 Schedule

Getty is currently working to obtain additional wind energy lease and wind energy easement agreements from landowners within the northern portion of the Project boundary. The Applicant anticipates completing the additional agreements by the end of 2011. Approximately 1,360 acres of additional site control may be added within the Project boundary through these agreements. Wind energy only easement agreements may also be obtained for parcels that are outside of the Project's boundary if final turbine placement within the Project boundary requires additional wind rights beyond the Project boundary.

Getty plans to obtain its LWECS Site Permit in the first half of 2012. Getty will be responsible for obtaining all other required environmental reviews, permits, and approvals. This will include all necessary permits indicated in Section 11. Any additional permits or approvals required beyond the LWECS State site permit will be obtained prior to the start of construction.

Getty is responsible for financing predevelopment, development, and construction activities. Getty has financed the cost of predevelopment activities through internal member funds and is funding future development activities through an agreement with Geronimo Wind Energy, LLC. Long-term financing is being arranged with partner investors and will be completed prior to construction and commercial operation. The Project will be owned by ten Minnesota limited liability companies **(see Table 1.1 in Section 1)** who have planned to admit a long-term financial investor who will own the majority of the equity interests in the Project for a certain period of time, after which time, the local investors will own a majority of such equity interests. The long-term financial investor will fund capital costs with regard to turbine purchase, construction costs, and project management.

Turbines are currently available for the Project through the Project's preferred turbine manufacturer. Delivery of the turbines is anticipated to begin in the first or second quarter of 2012. Substation equipment will arrive within approximately three months after ordering. Collector system cable will arrive approximately nine months after ordering. It is estimated that the construction and commissioning phase will take approximately six to eight months to complete. Getty anticipates the construction will likely commence in the first half of 2012 and be completed by December of 2012.

Getty expects to begin commercial operations in the fourth Quarter of 2012. To qualify for federal tax incentives the Project must begin commercial operations no later than December 31, 2012.

10.9 Energy Projections

The Project will have a nameplate generation capacity of up to 40 MW and based on V-Bars June 2011 report, modeling the REpower MM100 turbine layout, the Project is projected to have a net capacity factor of between 39 to 44 percent with a 100 meter hub height. The Project's average annual output is projected to be between 136,656 and 154,176 MWh. Annual energy production output will depend on final design, site

specific features, and the wind turbine selected. It is expected that the Goldwind 87/1500 would produce slightly less annual output, due to decreased accumulative rotor surface area, and it is expected that the Vestas V112 would produce less annual output, due to decreased accumulative rotor surface area.

Gross average annual output to net average annual output calculations take into account, turbine availability, electrical losses, wake losses, turbine performance, blade contamination, and meteorological events. The average annual output losses for the Project are calculated to be between 13 to 15 percent of maximum output.

10.10 Decommissioning and Restoration

The Project decommissioning and restoration plan is in accordance with the requirements of Minn. R. part, 7836.0500, subp. 13. The anticipated Project life is 30 years beyond the date of first commercial operation. At the end of commercial operation, Getty will be responsible for removing wind facilities, and removing the turbine foundations to a depth of 48 inches. Getty will be responsible for costs to decommission the Project and associated facilities.

In addition to any requirements under the LWECS site permit, each individual land lease requires proper decommissioning of turbines. Decommissioning of the site would include removal of turbines and related facilities. Removal of related facilities would include access roads, equipment, towers, buildings, transformers, and cables or wires. Foundations will be removed to a depth of four feet below grade and backfilled. Additionally, any disturbed surfaces would be graded, reseeded, and restored as nearly too preconstruction conditions as is possible.

Getty reserves the right to extend options instead of decommissioning at the end of the site permit term. These options may include applying for an extension of the site permit, if necessary, and continuing operation of the Project. In this case, a decision may be made on whether to continue operation with existing equipment or to retrofit the turbines and power system with upgrades based on newer technologies.

Decommission Costs

Getty has anticipated decommissioning and restoration costs in the Project's financial pro forma. The estimated decommissioning cost in current dollars is expected to be around $74,500 per turbine site. Getty's current estimates for the salvage value of the turbines and associated facilities show that the cost to dismantle the turbines and restore the site will be offset by the salvage value of the turbines and associated facilities. Based on estimated costs of decommissioning and the salvage value of decommissioned equipment, the salvage value of the wind farm is expected to exceed the costs of decommissioning, but this will depend upon the prevailing rates for salvage value of the equipment and labor costs. This methodology provides a conservative estimate of the Project's residual value because: long-term average scrap metal prices were used instead of recent years' scrap metal values that are much higher, and during the majority of the wind farm's life, the components would be sold as used equipment at significantly higher prices than their underlying scrap metal value. The salvage value of the turbines and other components ensures that sufficient funds will be available to cover decommissioning and restoration costs.

Funding Decommission Costs

Due to uncertainty surrounding future decommissioning cost and salvage value increases with time, Getty will review and update the cost estimate of decommissioning and restoration 17 years after Project commissioning. This revised cost estimate of decommissioning and salvage value will then be submitted to the MPUC and Stearns County for review and comment. Beginning in year 18 of the Project's operational life, Getty will either create a reserve fund or enter into a surety bond agreement and create an escrow account, or provide for a combination of both a reserve and surety bond, that will ultimately fund decommissioning and site restoration costs after Project operations cease, to the extent that the salvage value does not cover decommissioning costs. The exact amount to be allocated for decommissioning will be determined by a third party study in year 17 that will assess the difference between estimated decommissioning costs and the salvage value.

Section 11 - Identification of Other Permits/Approvals

Agency	Permit/ Approval	Need for Permit/ Approval
Federal		
U.S. Army Corps of Engineers (USACE)	Review and Approval of Wetland Delineations	Required to determine extent of USACE jurisdiction, quantify impacts, or document avoidance.
	Jurisdictional Determination	The Project may be eligible for a Letter of No Jurisdiction if wetlands are avoided or impacts are limited to isolated wetlands.
	Federal Clean Water Act Section 404 Permit(s)	Project may require a USACE Regional General Permit or an Ind. Permit depending on amount and type of wetland impact proposed. Permit from USACE required if wetlands are jurisdictional and not avoidable.
U.S. Fish and Wildlife Service	Letter of No Effect for Threatened and Endangered Species	Federal endangered species review is needed to confirm that the Project will not adversely affect rare species and that no "incidental take" permit is needed.
Environmental Protection Agency (Region 5) (EPA) in coordination with the Minnesota Pollution Control Agency (MPCA)	Spill Prevention Control and Countermeasure (SPCC) Plan	May be required if turbine commissioning or construction activities will require oil storage in excess of 1320 gallons. May be required for O&M facility or if an oil storage tank is planned for this Project.
Lead Federal Agency	Federal Section 106 Review	Section 106 of the National Historic Preservation Act (NHPA) may be invoked by a Federal Agency if the Project requires federal land, funding, or permits.
Federal Aviation Administration	Form 7460-1 Notice of Proposed Construction or Alteration (Determination of No Hazard)	Determination of No Hazard to Air Navigation needed for each structure over 200 feet tall via form 7460-1.
	Notice of Actual Construction or Alteration (Form 7460-2)	Notify FAA of construction via Form 7460-2.
U.S. Department of Agriculture	Form AD-1006 *(for construction on soil categories except 'not prime farmland').*	May be required if Federal Agencies are involved then the Farmland Protection Policy Act (FPPA) requires a review of the conversion of prime farmland to other uses.
Federal Communications Commission	Non-Federally Licensed Microwave Study	Typical required for MN LWECS Site Permit compliance
	NTIA Comm. Study	Typical required for MN LWECS Site Permit compliance

Agency	Permit/ Approval	Need for Permit/ Approval
	Communication Study	Typical required for MN LWECS Site Permit compliance
	Signal strength assessment	May be required for MN LWECS Site Permit compliance
	Onsite Signal strength assessment	May be required for MN LWECS Site Permit compliance
FERC	Exempt Wholesale Generator Cert. (EWG)	Self-Certification - Needed after GIA is completed to sell power
	Market-based rate Authorization	Determine if MBA is needed
Department of Transportation (FHWA)	Utility Line Crossing License	May be required for transmission line crossing US Highway 71
Environmental Protection Agency	Phase 1 EA	Project Financing may require a Phase 1 ESA
State		
Minnesota Public Utilities Commission (MPUC)	Large Wind Energy Conversion System (LWECS) Site Permit	Required under Minnesota Statute Section 216F.03 for a LWECS that generates 5 MW or more of electricity.
	Certificate of Need (CON)	A CON is required under Minnesota Statute Section 216B.243 for a LWECS unless the project meets exemption criteria set forth within Minnesota Statutes.
	Power Purchase Agreements	C-BED PPA requires approval of MN PUC
Minnesota State Historic Preservation Office (SHPO)	Class I Literature Review / Class III Cultural Field Survey. Cultural and Historic Resources Review and Review of State and National Register of Historic Sites and Archeological Survey	Typical required for MN LWECS Site Permit compliance. Consultation with SHPO is recommended. Should Section 106 of the National Historic Preservation Act (NHPA) be triggered, consultation will be mandatory.
Minnesota Pollution Control Agency (MPCA)	Section 401 Water Quality Certification	Individual Section 401 Water Quality Certification or Waiver is required under the Federal Clean Water Act (CWA) for projects that require an Individual Section 404 Permit from the USACE to ensure that authorized activities do not violate state water quality standards.
	National Pollutant Discharge Elimination System Permit (NPDES) – MPCA General Storm water Permit for	Coverage under the MPCA General Storm water Permit for Construction Activity is required for projects that disturb more than one acre of land.

Agency	Permit/ Approval	Need for Permit/ Approval
	Construction Activity (MN R100001)	
	Very Small Quantity Generator (VSQG) License – Hazardous Waste Collection Program	May be required for O&M facility
	Aboveground Storage Tank (AST) Notification Form	The storage of oil is subject to regulation per Minnesota Rules Chapter 7151. Facilities with a storage capacity that exceeds 1,100 gallons must also meet Spill Prevention, Control, and Countermeasure (SPCC) requirements (EPA requirements concerning SPCC are discussed previously).
Minnesota Department of Health (MDH)	Environmental Bore Hole (EBH)	EBH's are regulated by the MDH and the contractor drilling the EBH must be a Minnesota licensed well contractor or Minnesota registered monitoring well contractor boring in conformance with Minnesota Rules Chapter 4725.7450
	Water Supply Well Notification	May be required for O&M facility
	Plumbing Plan Review	May be required for O&M facility
Minnesota Department of Transportation	Utility Agreements and Permits	Minnesota Statute Section 161 requires a permit to place utility facilities on trunk highway rights-of-way.
	Oversize/Overweight Permit for State Highways	Under Minnesota Statute Section 169, a permit is required for hauling construction equipment and materials that exceed height and weight limits on U.S., Interstate, and state highways through Minnesota.
	Tall Structure Permit	Structure more than 200 feet above ground level within 3 miles of an airport and increasing by 100 feet for each additional mile out to 6 miles and 500 feet
	Access Driveway Permits for MNDOT Roads (TP-1721)	Permit for temporary or permanent accesses and temporary widening of accesses points.
Minnesota Department of Natural Resources	License for crossing Public Lands and Waters (Minn. Stats. 84.415)	Required for wind farm facilities that cross or locate on State administered Public Lands or Waters
	Public Waters Work Permit (Minn. Stats. 103G)	Any construction activities that impact waterways, including Wetlands, applies to

Agency	Permit/ Approval	Need for Permit/ Approval
		public waters that are identified on MDNR public waters inventory maps
Local		
Stearns County	Road Agreements	Oversize/overweight permits and road repair agreement (may combine with TWPs)
	Development Agreement	May be required
	Building Permits Turbines	May be required
	Building Permits Substation	Required to start construction
	Building Permits Operation and Maintenance Building	Required to start construction
	Access road permits	Required to start construction
	CUP for T-Line	Required to start construction
	CUP for Substation	Required to start construction
Getty Township	Road Agreements	Oversize/overweight permits and road repair agreement (may combine with County)
	Development Agreement	May be required
	Building Permits Turbines	May be required
	Building Permits Substations	May be required
	Access road permits	Required to start construction
Grove Township	Road Agreements	Oversize/overweight permits and road repair agreement (may combine with County)
	Building Permit T-line	May be required
	Access road permits	Required to start construction
Sauk Centre Township	Road Agreements	Oversize/overweight permits and road repair agreement (may combine with County)
	Development Agreement	May be required
	Building Permits Turbines	May be required
	Access road permits	Required to start construction
Stearns County Soil and Water Conservation District	Approval Wetlands delineations	Onsite review of Wetlands delineation for Compliance with Wetland Conservation Act
Other		
MISO (RTO)	Turbine Change Study	May be required if final turbines differ from Interconnection Request
	Generator Interconnect Agreement (GIA)	Permission to connect and delivery power on Midwest ISO's high voltage transmission system.