Application for Certificate of Need

Dodge County Wind, LLC

Large Wind Energy Conversion System

MPUC Docket Number: IP6981/CN-17-306

June 29, 2018

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

ACRONYM/TERM	DEFINITION
AGL	Above Ground Level
ABPP	Avian Bat Protection Plan
AC	Alternating Current
Applicant or DCW	Dodge County Wind, LLC
Capacity	The capability of a system, circuit, or device for storing electronic charge
Phase I	Cultural Resources Reconnaissance Survey – physical inspection and identification of cultural resources within a specific area.
Commission	Minnesota Public Utilities Commission
CON	Certificate of Need
dB	Decibels
Distribution	Relatively low-voltage lines that deliver electricity to the retail customer's home or business
EWG	Exempt Wholesale Generator
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
GE	General Electric
Generator	A machine by which mechanical energy is changed into electrical energy
Geotechnical	A science that deals with the application of geology to engineering
Hub	The central component of the wind turbine which connects the rotors to the generator.
Hz	Hertz
Interconnection	Location of project connection to the power grid.
kV	kilovolt
kV/m	Kilovolt per meter

ACRONYM/TERM	DEFINITION
kW	kilowatt
Leq	Equivalent Sound Level
LGU	Local Government Unit
LHVTL	Large High Voltage Transmission Line
LWECS	Large Wind Energy Conversion System
MBS	Minnesota Biological Survey
MET	Meteorological Towers
MF	Magnetic Field
Micrositing	The process in which the wind resources, potential environmentally sensitive areas, soil conditions, and other site factors, as identified by local, state and federal agencies, are evaluated to locate wind turbines and associated facilities.
MISO	Midcontinent Independent Transmission System Operator
MN/DOT	Minnesota Department of Transportation
MMPA	Minnesota Municipal Power Authority
MPCA	Minnesota Pollution Control Agency
MW	megawatt
NHIS	Natural Heritage Inventory System
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NTIA	National Telecommunications and Information Administration
NWI	National Wetlands Inventory
O&M	Operations and maintenance facility
OSA	Office of State Archaeologist

ACRONYM/TERM	DEFINITION
OSHA	Occupational Safety and Health Administration
POI	Point of Interconnection
PPA	Power Purchase Agreement
Project	DCW Project
PTC	Production Tax Credit
PWI	Public Waters Inventory
RES	Renewable Energy Standard
Rotor	The rotor consists of three blades mounted to a rotor hub
RD	Rotor Diameter: Diameter of the rotor from the tip of a single blade to the tip of the opposite blade
ROW	Right-of-Way
SCS	Site Characterization Study
SHPO	Minnesota State Historic Preservation Office
SME	Subject Matter Expert
SMMPA	Southern Minnesota Municipal Power Agency
SNA	Scientific and Natural Area
SPCC	Spill Prevention, Control, and Countermeasure Plan
Step-up Transformer	A transformer that increases voltage
SWPPP	Storm Water Pollution Prevention Plan
USACE	US Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
V	Volt
Windlogics	Windlogics, Inc.
WMA	Wildlife Management Area

ACRONYM/TERM	DEFINITION
WPA	Waterfowl Protection Area
WRP	Wetlands Reserve Program

Rule	Required Information	Application Section(s)	Exemption
7849.0120	**Criteria – Probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the applicant, the applicant's customers, or to the people of Minnesota and neighboring states**	5.1	--
A(1)	Accuracy of the applicant's forecast	5.1, 7.0	No
A(2)	Effects of applicant's existing or expected conservation programs and state and federal conservation programs	5.1	No
A(3)	Effects of promotional practices on demand	5.1, 6.3.1.11	No
A(4)	Ability of current and planned facilities, not requiring certificates of need, to meet future demand	5.1, 6.2.4.5	No
A(5)	Effect of proposed facility in making efficient use of resources	5.1	No
7849.0120	**Criteria – A more reasonable and prudent alternative has not been demonstrated**	5.2	--
B(1)	Appropriateness of size, type, and timing	5.2.1	No
B(2)	Cost of facility and its energy compared to costs of reasonable alternatives	5.2.2	No
B(3)	Effects of the facility upon natural and socioeconomic environments compared to the effects of reasonable alternatives	5.2.3	No
B(4)	Expected reliability compared to reasonable alternatives	5.2.4	No
7849.0120	**Criteria – Facility will provide benefits to society**	5.3	--
C(1)	Relationship of proposed facility to overall state energy needs	5.3.1	No
C(2)	Effects of facility upon the natural and socioeconomic environments compared to the effects of not building the facility	5.3.2	No
C(3)	Effects of facility in inducing future development	5.3.3	No
C(4)	Socially beneficial uses of the output of the facility, including to protect or enhance environmental quality	5.3.4	No
D	Facility or suitable modification will not fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments	5.4	No
7849.0210	**Filing Fees and Payment Schedule**	2.0	No
7849.0240	**Need Summary and Additional Considerations**	4.0	--
Subp. 1	Need Summary – summary of major factors justifying need for facility	4.1	No
Subp. 2(A)	Additional Considerations – Socially beneficial uses of the output of the facility, including to protect or enhance environmental quality	4.2, 4.2.1	No
Subp. 2(B)	Additional Considerations – Promotional activities that may have given rise to the demand for the facility	4.2.2	Partial

Rule	Required Information	Application Section(s)	Exemption
Subp. 2(C)	Additional Considerations – Effects of the facility in inducing future development	4.2.3	No
7849.0250	**Proposed LEGF and Alternatives Application**	6.0	--
A(1)	Description – Nominal generating capability and effects of economies of scale on facility size and timing	6.1.1	No
A(2)	Description – Anticipated operating cycle, including annual capacity factor	6.1.2	No
A(3)	Description – Type of fuel, reason for selection, projection of availability over life of facility, and alternative fuels	6.1.3	No
A(4)	Description – Anticipated heat rate	6.1.4	No
A(5)	Description – Anticipated areas where facility will be located	6.1.5	No
B(1)	Discussion of Alternatives – Purchased power	6.2.1	Yes
B(2)	Discussion of Alternatives – Increased efficiency of existing facilities	6.2.2	Partial
B(3)	Discussion of Alternatives – New transmission lines	6.2.3	Partial
B(4)	Discussion of Alternatives – New generating facilities of a different size and energy resource	6.2.4	Yes
B(5)	Discussion of Alternatives – Reasonable combination of alternatives	6.2.5	Partial
C	Proposed Facility and Alternatives	6.3	--
C(1)	Capacity cost in current dollars per kilowatt	6.3.1.1	Yes - Limited
C(2)	Service life	6.3.1.2	Yes - Limited
C(3)	Estimated average annual availability	6.3.1.3	Yes - Limited
C(4)	Fuel costs in current dollars per kilowatt hour	6.3.1.4	Yes - Limited
C(5)	Variable operating and maintenance costs in current dollars per kilowatt hour	6.3.1.5	Yes - Limited
C(6)	Total cost in current dollars of a kilowatt hour provided by it	6.3.1.6	Yes - Limited
C(7)	Estimate of its effect on rates system-wide and in Minnesota	6.3.1.7	Partial
C(8)	Efficiency, expressed for a generating facility as the estimated heat rate	6.3.1.8	Yes - Limited
C(9)	Majoring assumptions made in providing information in subitems (1) to (8), including projected escalation rates for fuel costs and operating and maintenance costs, as well as projected capacity factors	6.3.1.9	Yes - Limited
D	System Map	6.3.1.10	Yes
E	Other relevant information about the facility and alternatives that may be relevant to a determination of need	--	--

Rule	Required Information	Application Section(s)	Exemption
7849.0260	**Proposed LHVTL and Alternatives Application**		--
A(1)	Description – Design voltage	--	Section not applicable to Application
A(2)	Description – Number, the sizes, and the types of conductors	--	Section not applicable to Application
A(3)	Description – expected losses under projected maximum loading and under projected average loading in the length of the transmission line and at the terminals or substations	--	Section not applicable to Application
A(4)	Description – approximate length of the proposed transmission line and the portion of that length in Minnesota	--	Section not applicable to Application
A(5)	Description – approximate location of AC substations, which information shall be on a map of appropriate scale	--	Section not applicable to Application
A(6)	Description – list of all counties reasonably likely to be affected by construction and operation of the proposed line	--	Section not applicable to Application
B(1)	Discussion of Alternatives – New generation of various technologies, sizes, and fuel types	--	Section not applicable to Application
B(2)	Discussion of Alternatives – Upgrading of existing transmission lines or existing generating facilities	6.3.1.2	Section not applicable to Application
B(3)	Discussion of Alternatives – Transmission lines with different design voltages or with different numbers, sizes, and types of conductors	6.3.2.2	Section not applicable to Application
B(4)	Discussion of Alternatives – Transmission lines with different terminals or substations	6.3.2.3	Section not applicable to Application
B(5)	Discussion of Alternatives – Double circuiting of existing transmission lines	6.3.2.4	Section not applicable to Application
B(6)	Discussion of Alternatives – DC transmission line	6.3.2.5	Section not applicable to Application
B(7)	Discussion of Alternatives – Underground transmission line	6.3.2.6	Section not applicable to Application
B(8)	Discussion of Alternatives – any reasonable combinations of the alternatives listed in subitems (1) to (7)	6.3.2.7	Section not applicable to Application
C(1)	Discussion of Project and Alternatives – total cost in current dollars	6.3.2.8	Section not applicable to Application

Rule	Required Information	Application Section(s)	Exemption
C(2)	Discussion of Project and Alternatives – service life	6.3.2.9	Section not applicable to Application
C(3)	Discussion of Project and Alternatives – estimated average annual availability	6.3.2.10	Section not applicable to Application
C(4)	Discussion of Project and Alternatives – estimated annual operating and maintenance costs in current dollars	6.3.2.11	Section not applicable to Application
C(5)	Discussion of Project and Alternatives – estimate of its effect on rates systemwide and in Minnesota, assuming a test year beginning with the proposed in-service date	6.3.2.12	Section not applicable to Application
C(6)	Discussion of Project and Alternatives – efficiency, expressed for a transmission facility as the estimated losses under projected maximum loading and under projected average loading in the length of the transmission line and at the terminals or substations, or expressed for a generating facility as the estimated heat rate	6.3.2.13	Section not applicable to Application
C(7)	Discussion of Project and Alternatives – major assumptions	6.3.2.14	Section not applicable to Application
D	System Map	--	Section not applicable to Application
E	Other relevant information about the facility and alternatives that may be relevant to a determination of need	--	Section not applicable to Application
7849.0270	**Peak Demand and Annual Consumption Forecast**	7.0	Partial
7849.0280	**System Capacity**	8.0	Partial
7849.0290	**Conservation Programs**	9.0	Yes
7849.0300	**Consequences of Delay**	10.0	Partial
7849.0310	**Environmental Information – Provide environmental data in response to part 7849.0250, Item C, or 7849.0260, Item C, and information as requested in part 7849.0320 to 7849.0340**	11.0	No
7849.0320	**Generating Facilities**	12.0	No
A	Estimated range of land requirements, including water storage, cooling systems, and solid waste storage	12.1	No
B	Estimated amount of vehicular, rail, and barge traffic generated by construction and operation of facility	12.2	No
C	Fossil-fuel facilities – Fuel	12.3.1	No
D	Fossil-fuel facilities – Emissions	12.3.2	No
E	Water Use for Alternate Cooling Systems	12.4	No
F	Sources and types of discharges to water	12.5	No
G	Radioactive releases	12.6	No

Rule	Required Information	Application Section(s)	Exemption
H	Types and quantities of solid wastes in tons/year	12.7	No
I	Sources and types of audible noise attributable to facility operation	12.8	No
J	Estimated work force required for facility construction and operation	12.9	No
K	Minimum number and size of transmission facilities required to provide a reliable outlet for the generating facility	12.10	No
7849.0330	**Transmission Facilities**	-	Yes
7849.0340	**No-Facility Alternative**	6.2.4.6	Partial

1.0 INTRODUCTION

Dodge County Wind, LLC (DCW or Applicant) respectfully submits this Application for a certificate of need (CON) to the Minnesota Public Utilities Commission (Commission) in accordance with Minnesota Statutes (Minn. Stat.) § 216B.243, and Minnesota Rules (Minn. R.) Chapter 7849.

DCW is a wholly-owned indirect subsidiary of NextEra Energy Resources, LLC (NEER). NEER is a national renewable energy marketing and development company that owns and operates over 19,000 megawatts (MW) of electric generating capacity in 29 states and Canada. NEER has ownership and financial interests in: (1) the formerly operating 26.3 MW Buffalo Ridge Wind Energy Center in Lincoln County, which has been decommissioned; (2) the 98.2 MW Mower County wind facilities in Mower County; and (3) the to-be-decommissioned 102.8 MW Lake Benton II project in Pipestone County.

1.1 The Dodge County Wind Project

DCW respectfully requests that the Commission issue a CON for the approximately 170 MW Dodge County Wind Project and its associated facility (the Project).[1] The Project is a "large energy facility" as defined in Minn. Stat. § 216B.2421, subd. 2(1).

DCW is an independent power producer (IPP) that will develop, construct, own, and operate the Project. The Project includes turbines, a project collector substation, collection lines, an operation and maintenance (O&M) building, permanent meteorological tower(s), gravel access roads, and an approximately 23-mile 345 kilovolt (kV) generation tie line that is an associated facility of the Project.[2] The wind facility portion of the Project site is located on 52,085 acres (81.4 square miles) in the western part of Dodge County and the eastern part of Steele County and will produce up to approximately 170 MWs, supported by 62 General Electric (GE) 2.5 MW wind turbines and 8 GE 1.715 MW wind turbines. The associated 345 kV generation tie line connects the wind generation facility to the electric transmission grid at the Southern Minnesota Municipal Power Agency (SMMPA) Byron Substation at the western edge of Olmsted County. The initial Project Notice Area for the generation tie line covers an area of approximately 89 square miles and is approximately 3 to 5 miles wide and 20 miles long. DCW's anticipated

[1] Dodge County will also be requesting a Site Permit in Docket No. IP6981/WS-17-307 and a Route Permit in Docket No. IP6981/TL-17-308.

[2] Minn. Stat. § 216B.2421, Subd. 2(1) defines a "large energy facility" for which a CON is required as "any electric power generating plant or combination of plants at a single site with a combined capacity of 50,000 kilowatts or more ***and transmission lines directly associated with the plant that are necessary to interconnect the plant to the transmission system***." Emphasis added.

commercial operations date for the Project, including the associated facility generation tie line, is December 31, 2019.

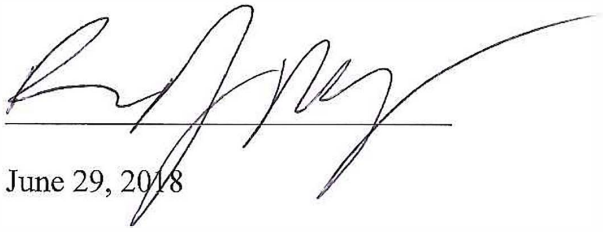
DCW has entered into a Power Purchase Agreement (PPA) with the Minnesota Municipal Power Agency (MMPA). In the PPA, MMPA agreed to purchase the full output of the Project for a 30-year term. The Project, as a generator of wind energy, qualifies as an "eligible energy technology" for the purposes of the Minnesota Renewable Energy Standard (RES), as set forth in Minn. Stat. § 216B.1691, and, therefore, will serve as a significant renewable generation addition to assist MMPA in meeting and exceeding its RES requirements.

1.2 Project Contacts

The authorized representatives for the Applicant are:

Mike Weich
Project Manager Renewable Development
Dodge County Wind, LLC
700 Universe Blvd
Juno Beach, FL 33408
Mike.Weich@nexteraenergy.com
(561) 694-3987

Brian J. Murphy
Senior Attorney
NextEra Energy Resources, LLC
700 Universe Blvd
Juno Beach, FL 33408
Brian.J.Murphy@nee.com
(561) 694-3814



June 29, 2018

2.0 FEES AND PAYMENT SCHEDULE (MINN. R. 7849.0210)

The total fee for the Application and the schedule for payment are shown in **Table 1**. The fee determination for the Project is based on a capacity of up to approximately 170 MW, per the requirements of Minn. R. 7849.0210, subp. 1. The payment schedule is based on Minn. R. 7849.0210, subp. 2.

Table 1: Certificate of Need Application Schedule of Payments

Fee Calculation	Amount
Fee Calculation Equation	$10,000 + ($50*MWs)
Due with CN Application	$4,625.00
Due 45 days after Application submittal date	$4,625.00
Due 90 days after Application submittal date	$4,625.00
Due 135 days after Application submittal date	$4,625.00
Total Calculated Fee	**$18,500.00**

3.0 FILING REQUIREMENT EXEMPTION REQUEST

The Commission's CON rules as set forth in Minn. R. Ch. 7849 permit applicants to request exemptions from the filing requirements that are not applicable to their project. Specifically, an applicant may be exempted from providing certain information if the applicant requests an exemption in writing that shows that the data requirement is either unnecessary to determine the need for the proposed facility or may be satisfied by submitting another document. Minn. R. 7849.0200, subp. 6.

On April 20, 2017, DCW filed with the Commission a request for exemptions from certain CON filing requirements based on DCW's status as an IPP. On July 7, 2017, the Commission issued an Order granting the following requested exemptions from the CON filing requirements:[3]

1. Exemption for the following rules conditioned upon DCW providing equivalent data from the purchaser of the output of the Project:

    - 7849.0240, subp. 2 (B): Promotional Activities;
    - 7849.0250 (B) 2, 3, and 5: Description of Certain Alternatives;
    - 7849.0250 (C) 7: Effect of Project on Rates System-wide;
    - 7849.0270: Peak Demand and Annual Consumption Forecast;
    - 7849.0280: System Capacity;
    - 7849.0300: Consequences of Delay—System; and
    - 7849.0340: The Alternative of No Facility.

2. Exemption from the following parts or portions of the rules:

    - 7849.0250 (B) 1 and 4: Description of Certain Alternatives;
    - 7849.0250 (C) 1 to 6, 8 and 9: Availability of Alternatives to the Facility;
    - 7849.0250 (D): Map of Applicant's System;
    - 7849.0290: Conservation Programs; and
    - 7849.0330: Alternatives Involving a Large High Voltage Transmission Line (LHVTL).

[3] *In the Matter of Petition of Dodge County Wind, LLC for a Certificate of Need for the 200 MW Large Wind Energy Conversion System and an Associated 345 kV Transmission Line in Dodge County, Minnesota*, Docket No. IP-6981/CN-17-306, Order Granting Exemptions (July 7, 2017) (Dodge County Wind Order Granting Exemptions). In the Commission's Order (attached as Appendix A), the Commission also approved DCW's Notice Plan filed pursuant to Minn. R. 7829.2550. A copy of DCW's Request for Exemptions is included as Appendix B.

3. Exemption from the following parts or portions of the rules based on a determination that they are not applicable:

    - 7849.0260 (A)(3) and C(6): Line Loss Data
    - 7849.0260 (B)(1): Alternatives to the Transmission Line
    - 7849.0260 (C)(5): Details Regarding Alternatives
    - 7849.0260 (D): Map of Applicant’s System

4.0 NEED SUMMARY AND ADDITIONAL CONSIDERATIONS (MINN. R. 7849.0240)

4.1 Need Summary (Minn. R. 7849.0240, subpart 1)

The Project and its associated facility are needed to assist in providing for the electricity needs of MMPA's members and to further MMPA's efforts to exceed the Minnesota RES and other clean energy requirements. As background, the Next Generation Energy Act of 2007 requires that utilities in Minnesota provide 25 percent of their total retail electric sales from eligible renewable resources by 2025.[4] Additionally, the Minnesota legislature has specified aggressive goals for the reduction of greenhouse gas emissions across all sectors, including the electric sector. The legislature's specific goal is to "reduce statewide greenhouse gas emissions across all sectors producing those emissions to a level at least 15 percent below 2005 levels by 2015, to a level at least 30 percent below 2005 levels by 2025, and to a level at least 80 percent below 2005 levels by 2050".[5] Between the RES and state greenhouse gas emission reduction goals, additional renewable resources will continue to be needed in Minnesota. Therefore, the Project will serve to meet this broader legislative need as well as the specific renewable energy needs of MMPA.

4.2 Additional Considerations (Minn. R. 7849.0240, subpart 2)

4.2.1 Socially Beneficial uses of the Output

The Project and its associated facility will produce affordable, clean, renewable energy that will help MMPA to: (i) exceed its RES requirements; (ii) assist it in meeting the energy demands of its members; and (iii) further the state's goals of reducing carbon emissions. The Project will produce enough clean, renewable energy to meet the full electrical needs of approximately 51,000 Minnesota households annually. In addition, as described in greater detail below, the local economy will benefit from the landowner lease payments for turbines, transmission right-of-way (ROW), production taxes, the income from temporary and permanent jobs associated with the Project, and local spending.

4.2.2 Promotional Activities That May Have Given Rise to the Demand for the Facility

DCW was granted an exemption from the requirement of Minn. R. 7849.0240, subp. 2(B), conditioned on MMPA providing equivalent data on its promotional activities. MMPA,

[4] Minn. Stat. § 216B.1691.

[5] Minn. Stat. § 216H.02, subd. 1.

however, has indicated that it has conducted no promotional activities associated with the Project, and, therefore, there is no information to submit.[6]

4.2.3 Effects of the Facility in Inducing Future Development

The Project is not expected to directly induce development in Dodge, Steele, or Olmsted Counties. However, the Project will positively impact those counties by adding infrastructure, temporary and permanent jobs, increasing the counties' tax base, and providing lease payments to Project participants. For example, landowners involved in the Project will benefit from annual lease payments, while DCW will pay property tax and production taxes on the land and energy production to the local governments. For example, the Project will pay a Wind Energy Production Tax to the local units of government of $0.0012 per kilowatt-hour (kWh) of electricity produced. This would result in an annual Wind Energy Production Tax ranging from approximately $60,000 to $700,000 in the first year, and between $570,000 and $700,000 annually after the first year in Dodge County, and approximately $15,000 to $160,000 in the first year, and between $130,000 and $160,000 annually after the first year in Steele County. During the first year, Energy Production Taxes may not be maximized due to partial energy generation during the startup months when the facility is not running at optimal capacity and may also only include a partial calendar year of energy production.

In addition, communities near the Project are also expected to receive positive economic benefits as construction will necessitate the need for temporary and full time positions. The Project anticipates creating approximately 200 temporary construction and approximately 5 full time O&M jobs are expected as part of the Project. DCW plans to use local contractors and suppliers, where feasible, for portions of construction which will contribute to the overall economy of the region. The local and regional purchase of products such as fuel, equipment, services, and supplies necessary to construct and operate the facilities will benefit businesses in the counties as well as in the state. The benefits to the local economy may indirectly induce future development.

[6] Avant Energy, Inc., acting as agent for MMPA, provided DCW with confirmation of the MMPA representations set forth in this Application.

5.0 CERTIFICATE OF NEED CRITERIA (MINN. R. 7849.0120)

The Commission has established criteria to assess the need for a large electric generating facility (LEGF) in Minn. R. 7849.0120. The Commission must grant a CON to an applicant upon determining that:

> A. [T]he probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states;
>
> B. [A] more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record;
>
> C. [B]y a preponderance of the evidence on the record, the proposed facility, or a suitable modification of the facility, will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health; and
>
> D. [T]he record does not demonstrate that the design, construction, or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments.

5.1 The Probable Result of Denying the DCW CON Application Would be an Adverse Effect upon the Future Adequacy, Reliability, or Efficiency of Energy Supply (Minn. R. 7849.0120(A))

The Project and its associated facility are needed to help meet the electricity needs of MMPA's members and assist MMPA in its efforts to exceed the Minnesota RES and other clean energy requirements. Denying the Application would deny MMPA energy from a clean, low-cost renewable resource that would count toward exceeding its RES requirements and which MMPA has contracted for under the PPA.

The Project is the result of DCW and MMPA working together to bring additional renewable energy to MMPA's members. In its 2013 Integrated Resource Plan, MMPA explained it was exploring adding additional renewable resources through PPAs with wind developers.[7] This exploration led to MMPA's execution of the PPA with DCW in which MMPA agreed to purchase the full output of the Project for a 30-year term. MMPA's commitment to renewable energy and surpassing its RES requirements is supported by its 12 member utilities. These member utilities have a combined population of nearly 150,000 and provide power to 72,330

[7] MMPA Application for Integrated Resource Plan Approval 2014-2028 at 38 (December 20, 2013), *available at:* https://mmpa.org/wp-content/uploads/2015/10/MMPA-IRP-2013_Public.pdf.

homes and businesses across Minnesota.[8] Denial of this application, therefore, would thwart MMPA's efforts to exceed the RES requirements and provide renewable energy to its members.

In addition to providing renewable energy for purposes of exceeding RES requirements, the Project is also designed to reliably and efficiently deliver the energy produced by the Project to MMPA. Both the voltage of 345 kV and the point of interconnection (POI) at the Byron Substation were selected to ensure the reliable and efficient delivery of the Project's wind energy output, and, accordingly, were included as requirements under the PPA. The voltage level and POI are designed to limit line losses in delivering the output from the Project to the Byron Substation and to minimize curtailments of the Project. The use of a 345 kV voltage level generation tie line provides significant benefits related to the deliverability of output from the Project to the POI when compared to generation tie lines of other voltage levels. These benefits are discussed in greater detail in **Section 6.3.2.2** below.

The Project's ability to reliably and efficiently deliver wind energy also advances the goal of adding zero-carbon generation resources to Minnesota's energy mix in keeping with the state's long-term plans to reduce greenhouse gas emissions, as discussed in **Section 4.1**.

Accordingly, the Project will improve the adequacy, reliability, and efficiency of renewable wind energy supply to MMPA and its member utilities; assist MMPA in exceeding its RES requirements; and advance Minnesota's long-term plans to reduce greenhouse gas emissions statewide. Without the Project, both MMPA and electric customers in Minnesota would need to identify alternative renewable resources to meet these needs.

5.2 A More Reasonable and Prudent Alternative to the Project Has Not Been Demonstrated (Minn. R. 7849.0120(B))

Minn. R. 7849.0120(B) requires a CON applicant to examine possible project alternatives so that the Commission can determine whether a more reasonable and prudent alternative exists. Applying the factors set forth in Minn. R. 7849.0120(B), the Project has many advantages when compared to other renewable alternatives.

5.2.1 Size, Type, and Timing

The Project and its associated facility are intended to help satisfy the RES needs of MMPA and the state's carbon reduction goals, which can only be satisfied by eligible energy technologies that will reduce carbon emissions. In recognition of this limitation, the Commission granted DCW an exemption from Minn. R. 7849.0250(B) with respect to evaluating fossil fuel alternatives because such alternatives do not meet the Project's objective of providing energy to

[8] MMPA 2016 Annual Report at 2, available at: https://mmpa.org/wp-content/uploads/2017/07/MMPA-AnnualReport16-Spreads-150dpi.pdf.

MMPA that will satisfy the RES and other clean energy standards.[9] Of the remaining eligible technologies, wind energy is the most proven and low-cost resource at the size contemplated for the Project (approximately 170 MW), and a resource that can be in commercial operation by the end of 2019. The Project timing also takes advantage of federal production tax incentives (discussed in **Section 5.4.3**), which translates into additional competitive pricing in the PPA. Therefore, the type of resource, a wind generation facility, is appropriate to help exceed MMPA's RES requirements and the transition of the production of energy to zero-based emissions. Similarly, the size and timing of the development of the Project is congruent with MMPA's RES needs and advances the clean energy goals of Minnesota.

5.2.2 Cost Analysis

The Project, along with its associated facility, will provide renewable electricity to MMPA at a cost that is likely lower than other renewable technologies. The PPA associated with DCW is the result of an arms-length negotiation between MMPA and DCW, and, thus, the price and other terms that were attractive to MMPA given its needs. Also, the Project will likely generate electricity at a lower cost per kilowatt hour than would other possible renewable energy options, such as solar and biomass. Therefore, the Project will provide competitively-priced wind energy at a lower-cost than other renewable energy resource alternatives.

5.2.3 Potential Natural and Socioeconomic Impacts

The Project's generation of a renewable form of energy will provide significant natural and societal benefits. As a zero-emission energy resource, the Project has significant positive attributes on the natural environment when compared to fossil generating plants. For example, the Project will not discharge air pollutants that can affect the environment, such as particulate matter, mercury, or carbon dioxide. The Project will also not need valuable water resources to generate electricity and will not release pollutants into any water body. The land area impacted by the Project is also significantly less than other renewable technologies such as solar. While the Project site encompasses approximately 52,000 acres, only an average 0.7 acres of land per turbine will be taken out of agricultural production for the siting of turbine pads and access road construction. Also, landowners may continue to plant crops near, and graze livestock up to, the turbine pads. In addition, as a renewable natural resource, wind power does not require the extraction, processing, or combustion of fuel as does a fossil fuel plant or biomass facility. DCW is consulting with the Minnesota Department of Natural Resources (MNDNR), the Minnesota State Historic Preservation Office (SHPO) and the United States Fish and Wildlife Service (USFWS) to assist with the design of the Project in order to minimize any potential impact on birds, bats, and wildlife habitat.

[9] Dodge County Wind Order Granting Exemptions.

From a socioeconomic impact, the Project will provide benefits to participating landowners in the form of a supplementary source of income for easements to site wind turbines, obtain wind rights, and site transmission towers. For example, crops will be able to be planted up to turbine pads and access roads. Changes in agricultural equipment maneuvering routes around turbine structures will be required, but this maneuvering should only have a nominal effect on overall production.

Moreover, the Project will create approximately 200 temporary construction and approximately 5 full time O&M jobs for the wind component of the Project. Separately, the associated facility generation tie line will create 30-40 temporary construction jobs. No full time O&M jobs are expected to be created for the associated facility. Many of these jobs will be filled by local or regional sources. Wages and salaries paid to contractors and workers in Dodge, Steele, and Olmsted Counties will contribute to the total personal income of the region. At least part of the wages paid to temporary and permanent Project workers will be circulated and recirculated within the counties and the state. Expenditures made by the Applicant for equipment, fuel, operating supplies, and other products and services will benefit businesses in the counties and the state.

Also, as mentioned, county's tax base as a result of the construction and operation of the Project will contribute to improving the local economy ranging from approximately $570,000 and $700,000 annually after the first year in Dodge County, and approximately $130,000 and $160,000 annually after the first year in Steele County.

5.2.4 Reliability

The projected annual net capacity factor for the Project is approximately 41.2% to 49.5%. The projected average annual output of approximately 671,471 megawatt-hour (MWh) is anticipated for the Project. The Project's reliability is enhanced by its associated 345 kV generation tie line that ensures a high-level of reliable deliverability and reduces the likelihood of curtailments.

Wind generation in the Midcontinent Independent System Operator, Inc. (MISO) region has been susceptible to curtailments, and building a 345 kV generation tie line connecting into a 345 kV substation, such as the Byron Substation, strengthens this connection and infrastructure so as to mitigate against curtailments. Further, DCW will execute a provisional Generation Interconnection Agreement with MISO and will be required to pay for any necessary transmission system upgrades. The 345 kV generation tie line was selected because it was the least expensive and most efficient solution to interconnect and transfer the wind energy from the Project to the MISO wholesale market. A 345 kV interconnection provides for more wind integration in Minnesota's wind-rich area into MISO's 345 kV backbone system. Additionally, injecting into MISO's 345 kV transmission system allows the generation tie line to evolve in the future into part of the regional backbone transmission system, which will serve to preserve and

enhance reliability, improve environmental performance, increase transmission resiliency, and minimize costs.

The 345 kV technology selected represents the predominant voltage class in operation in the MISO region, and provides for transmission capacity and operating flexibility, with minimal losses in the delivery of energy. Additional explanation of the reliability benefits of the 345 kV generation tie line are discussed in **Section 6.3.2**, below.

5.3 The Project will Provide Benefits to Society in a Manner Compatible with Protecting the Natural and Socioeconomic Environments (Minn. R. 7849.0120(C))

Minn. R. 7849.0120(C) requires a CON applicant to address whether the proposed project will benefit society in a manner that is compatible with protecting the natural and socioeconomic environments, including human health. The following application of the factors set forth in Minn. R. 7849.0120(C) shows the energy produced by the Project will provide significant societal benefits.

5.3.1 Overall State Energy Needs

As explained in **Section 5.1** above, the Project and its associated facility address two state energy needs: (i) the RES requirement and (ii) the reduction in statewide carbon emissions. Thus, the Project is compatible with Minnesota's energy needs.

5.3.2 Potential Environmental and Socioeconomic Impacts Compared to No-Build Alternative

As explained in **Section 5.2.3**, the Project and its associated facility provide significant socioeconomic benefits, while, also, designed to minimize the impact on the natural environment. A non-build alternative would not provide these same socioeconomic benefits to the local community, and, also, would not provide the benefit of increasing the amount of renewable energy generation in the state. Therefore, the Project has significant socioeconomic and other benefits and minimal impact on the environment in comparison to a no-build alternative.

5.3.3 Inducing Future Development

The Project and its associated facility are not expected to directly induce the development in Dodge, Steele, or Olmsted Counties. As described in **Section 5.2.3**, the Project will, however, provide significant benefits to the local economy and local landowners, which, in turn, may induce future development in these counties.

5.3.4 Socially Beneficial Uses of Output

The Project and its associated facility will produce affordable, clean renewable energy that will help MMPA to meet its RES requirements and the energy demands of its members, and will

further the state's goals of reducing carbon emissions. The Project will produce enough energy to meet the energy needs for approximately 51,000 average Minnesota households annually. In addition, as described above, the local economy will benefit from the landowner lease payments for turbines and transmission ROW, production taxes, income from the additional jobs created, and local spending.

5.4 The Project Complies with Relevant Policies, Rules and Regulations of Other State and Federal Agencies and Local Governments (Minn. R. 7849.0120(D))

5.4.1 The Project is Consistent with Minnesota Energy Policy

As explained, the Project and its associated facility are consistent with Minnesota's energy policies for the production of electricity, including the RES, preference for renewable energy sources, and state goals to reduce carbon emissions. With respect to the reduction of carbon emissions, the state goal is to reduce statewide greenhouse gas emissions across all sectors producing those emissions to a level at least 30 percent below 2005 levels by 2025 and to a level at least 80 percent below 2005 levels by 2050. Adding the Project is consistent with meeting these goals.

Irrespective of the change of presidential administrations in January 2017 and shifts in federal energy policy, Minnesota remains committed to achieving its renewable energy goals. Both Governor Mark Dayton and former Lieutenant Governor, now Senator, Tina Smith have publicly reflected that Minnesota will not reverse course on its clean energy goals or abandon the ambitions of the Next Generation Energy Act.[10]

Further support for the conclusion that the Project is consistent with state energy policy can be found in the favorable tax treatment for wind energy facilities. The state legislature has exempted all real and personal property of a wind energy conversion system from property taxes. A wind energy conversion system, as well as the materials used to manufacture, install, construct, repair, or replace the wind system are also exempt from state sales tax.

5.4.2 The Project is Consistent with Applicable Minnesota Statutory Provisions

Minnesota law provides a preference for renewable resources. Minn. Stat. § 216B.243, subd. 3a provides a preference for renewable resources in CON proceedings. Additionally, Minn. Stat. § 216B.2422, subd. 4 requires a finding that a renewable energy resource is not in the public interest before approving a new or refurbished nonrenewable energy facility. The Project is consistent with Minnesota's preference for renewable energy and satisfies these statutory criteria by furthering available resources to meet this renewable energy preference.

[10] Office of the Governor Newsroom, Statements from Governor Dayton, Lt. Governor Smith, and Commissioners on President Trump's Executive Order to Roll Back Progress on Climate Change, Clean Water (March 28, 2017) available at https://mn.gov/governor/newsroom/?id=1055-298010#/detail/appId/1/id/285412

5.4.2.1 Distributed Generation

Pursuant to Minnesota Statutes § 216B.2426, the Commission is required to "ensure opportunities for the installation of distributed generation" are considered in CON proceedings. Distributed generation projects are less than 10 MW in size, and, therefore, do not offer the same economies of scale and efficiencies of a utility-scale facility like the Project. Thus, the Project is more appropriately sized to achieve the state's renewable energy policies efficiently and in a cost-effective manner.

5.4.2.2 Innovative Energy Preference

Minnesota also requires the Commission to consider an innovative energy project before authorizing construction or expansion of a fossil-fueled generation facility. Minn. Stat. § 216B.1694, subd. 2(a)(5). Because the Project is not a fossil-fuel facility, this requirement is not applicable.

5.4.2.3 Environmental Cost Planning

Minn. Stat. § 216B.243, subd. 3(12) requires the Commission to evaluate the extent to which an applicant has considered the risk of environmental costs and regulation. This statute, however, does not apply to renewable generation facilities such as the Project.[11]

5.4.2.4 Transmission Planning Compliance

Minn. Stat. § 216B.243, subd. 3(10) requires consideration of whether the entity seeking a CON is in compliance with applicable provisions of Minn. Stat. §§ 216B.1691 and 216B.2425, subd. 7. These statutes involve compliance with the states renewable energy objectives and reporting requirements for owners of existing transmission and distribution. Neither statute is applicable to DCW. While the Project supports the state's renewable energy objective by providing renewable energy to a retail provider in the state, as an IPP, DCW is not itself subject to these requirements since it does not own existing transmission and distribution infrastructure.

5.4.3 The Project is Consistent with Federal Energy Policy

Federal energy policy provides significant U.S. federal tax incentives to attract investment in renewable energy projects, including wind projects like the Project.

The renewable electricity Production Tax Credit (PTC) provided by Section 45 of the Internal Revenue Code provides for a federal income tax credit for each qualified kilowatt hour sold by a project during the tax year for the first ten years of the life of the project. In December 2015, the Consolidated Appropriations Act extended the expiration date for the PTC for wind facilities to

[11] *Elm Creek*, Docket No. IP6631/CN-07-789, Commission Order Granting Certificate of Need at 12 (Jan. 15, 2008).

December 31, 2019. The PTC is currently $0.023 per kWh and is phased down for facilities commencing construction after December 31, 2016. The Project's safe harbor turbines enable DCW to qualify for the full PTC.

In addition, the Investment Tax Credit (ITC) permits qualifying entities to elect to claim a credit of 30 percent of qualifying costs in lieu of the PTC for wind projects, with a step down of the credits from 2016 to 2019. Election of the ITC allows this credit to be claimed when a project is operational, and specifically decreases a project's depreciable basis by 50 percent of the value of the credit.

5.4.4 The Project Complies with Federal, State, and Local Environmental Regulation

The Project will meet or exceed the requirements of all applicable federal, state, and local environmental laws and regulations. **Table 2** lists the approvals the Project may need from applicable governmental entities. DCW is committed to obtaining all necessary environmental and other approvals required under federal, state, and local requirements.

Table 2: List of Approvals and Consultations

Regulatory Authority	Permit/Approval
FEDERAL	
Federal Energy Regulatory Commission	• Exempt Wholesale Generator Self Cert. (EWG) • Authorization to sell wholesale power at Market Based Rates
Federal Aviation Administration	• Form 7460-1 Notice of Proposed Construction or Alteration (Determination of No Hazard) • Form 7460-2 Notice of Actual Construction or Alteration
Federal Communications Commission	• Non-Federally Licensed Microwave Study • NTIA Communication Study
U.S. Army Corps of Engineers	• Clean Water Act Section 404 coordination (General, Individual, or Nationwide permit if required)
U.S. Fish and Wildlife Service	• Informal consultation under Section 7 of the Endangered Species Act
Environmental Protection Agency (region	• Spill Prevention Control and Countermeasure

Regulatory Authority	Permit/Approval
5) (EPA) in coordination with the Minnesota Pollution Control Agency (MPCA)	(SPCC) Plan
U.S. Department of Agriculture	• Informal consultation if required for properties in Conservation / Grassland / Wetland Easement and/or Reserve Programs
Federal Emergency Management Agency	• Coordination of Flood Plain Designation
STATE	
Minnesota Public Utilities Commission	• Site Permit for Large Wind Energy Conversion System • Certificate of Need for Large Wind Energy Conversion System • Route Permit for high-voltage transmission line
Minnesota Department of Labor and Industry	• Electrical Plan Review, Permits, and Inspections
Minnesota Department of Agriculture	• Informal coordination and preparation and/or approval of an Agriculture Impact Mitigation Plan
Minnesota State Historic Preservation Office (SHPO)	• Informal SHPO consultation for Cultural and Historical resources review including State and Natural Register of Historic Sites review
Minnesota Pollution Control Agency	• National Pollutant Discharge Elimination System/State Disposal System Permit (NPDES/SDS) – General Storm Water Permit for Construction Activity • License for a Very Small Quantity Generator of Hazardous Waste • Spill Prevention Control and Countermeasure (SPCC) Plan • Aboveground Storage Tank Notification Form • Clean Water Act Section 401 Water Quality Certification
Minnesota Department of Health	• Environmental Bore Hole approval for

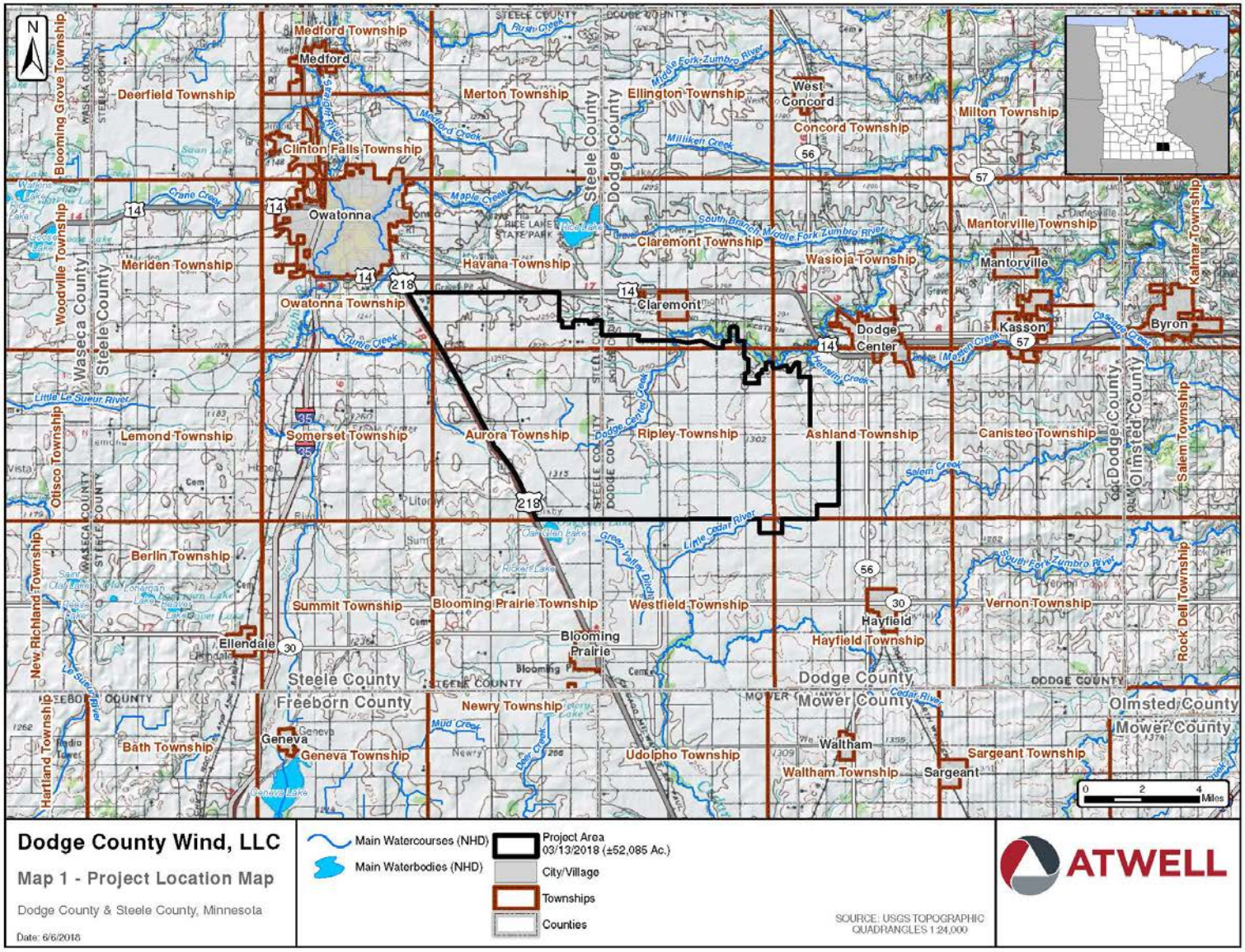
Regulatory Authority	Permit/Approval
	subsurface geotechnical studies • Plumbing Plan Review if required for O&M building • Water Well Permit if required for O&M building
Minnesota Department of Natural Resources	• Informal coordination for Endangered Species Statutes • Coordination on and/or approval of an Avian and Bat Protection Plan • General Permit for Water Appropriations, Dewatering • Wetlands/Waters coordination for Public Waters Work Permit and/or License to Cross Public Lands and Waters
Minnesota Department of Transportation	• Oversize/Overweight Permit for State Highways • Access Driveway Permits for MN/DOT Roads • Tall Structure Permit • Utility Access Permit
LOCAL	
Dodge, Steele, and Olmsted County	• Roadway Access Permit • Drainage Permit • Working in Right-of-Way Permit • Overweight/Over-Dimension Permit • Utility Permit
Dodge/Steele/Olmsted County Soil and Water Conservation District	• Wetland Conservation Act Approvals
Townships	Right-of-way permits, crossing permits, road access permits, and driveway permits for access roads and electrical collection system, as needed
OTHER	
MISO	• Turbine Change Study • Generator Interconnection Agreement

6.0 DESCRIPTION OF LEGF AND ALTERNATIVES (MINN. R. 7849.0250)

6.1 Proposed Project (Minn. R. 7849.0250(A))

The Project will consist of an array of 70 wind turbines. The turbines will be located in the eastern part of Dodge County and the western part of Steele County. There will be two different models of turbines used for the Project: 62 will be GE 2.5 MW wind turbines, and 8 will be GE 1.715 MW wind turbines. GE 2.5 MW turbines will have 116 meter blades with 90 meter towers, while GE 1.79 MW turbines will have 103-meter blades with 80-meter towers. Power from each turbine will be fed to a pad-mounted step-up transformer, which steps the voltage up from 690 volts to 34.5 kV. The 34.5 kV collector lines run underground from each turbine to the DCW collector substation proposed for construction approximately 7 miles southwest of the city of Dodge Center, Minnesota, where the voltage will be stepped up to 345 kV for the generation tie line. In all, the wind component of the Project includes turbines, a project collector substation, collection lines, an O&M building, permanent meteorological tower, and gravel access roads. A map showing the location of the wind component of the Project is provided below in **Figure 1**, with more detailed Project maps provided in **Appendix C (Wind Project Site Maps)**.

Figure 1: Project Layout



As noted, the Project includes as an associated facility a 345 kV generation tie transmission line extending from a new collector substation in the western portion of Dodge County, Minnesota, to the existing SMMPA Byron Substation in western Olmsted County, near Byron, Minnesota. DCW has identified two routes between the two Project endpoint: Route A and Route B. The length of the generation tie line will be approximately 23 miles (Route A is approximately 21 miles in length and Route B is approximately 26 miles). Route A would involve paralleling of approximately 3.2 miles with the existing Byron to Pleasant Valley 345 kV transmission line, which extends from the southeast portion of the study area to the Byron Substation. Route B would only involve a short segment of paralleling with this existing transmission line near the Byron Substation. A map of the transmission component of the Project is included with this application as **Appendix D (Transmission Line Overview Map)**.

6.1.1 Nominal Generating Capacity and Effect of Economies of Scale (Minn. R. 7849.0250 A (1))

The total nominal generating capacity of the Project is approximately 170 MW. The Project size produces economics of scale gains in procurement, construction, O&M, and interconnection costs. For example, mobilization costs for delivery of turbines and construction of the Project are lower on a per-turbine basis than they would be for a smaller wind project with fewer turbines. The Project size also cost-justifies the use of a 345 kV generation tie line, which results in a more reliable and efficient delivery of electricity to the Byron Substation. The result of gains in the economics of scale is a lower cost of production for electricity.

6.1.2 Annual Capacity Factor (Minn. R. 7849.0250 A (2))

The projected annual net capacity factor for the Project is approximately 41.2% to 49.5%. The projected average annual output of approximately 671,471 MWh is anticipated for the Project.

6.1.3 Fuel (Minn. R. 7849.0250 A (3))

The fuel for the Project is wind.

6.1.4 Anticipated Heat Rate (Minn. R. 7849.0250 A (4))

Heat rates are specific to fossil generation, and, therefore, are not applicable to a wind generation facility.

6.1.5 Facility Location (Minn. R. 7849.0250 A (5))

The Project's wind turbine array will be located in the eastern part of Dodge County and western part of Steele County within the townships of Ashland, Aurora, and Ripley. The estimated size of the Wind Project area is 52,000 acres (81 square miles) of mostly agricultural land. The new collector substation will be sited approximately seven miles southwest of the city of Dodge Center, Minnesota. From the collector substation, the associated approximately 23-mile, 345 kV

generation tie line will travel through Dodge County in the Townships of Ripley, Ashland, Canisteo, Mantorville, and Kalmar to the western edge of Olmsted County in Kalmar township, where it will connect to the Byron Substation. The O&M facility will be located within the Project area.

6.2 Availability of Alternatives (Minn. R. 7849.0250(B))

Consistent with the Commission-granted partial exemption, non-renewable energy sources have been excluded from this alternatives analysis.[12] Thus, the criteria used in this analysis includes whether: (i) the energy source is cost-effective; (ii) the energy source is commercially-proven and reliable for the electrical generation output needed; and (3) the energy source is appropriate for the site selected.

Developing and operating generating sources that are cost-effective and use proven technology is particularly important to an IPP like DCW. DCW does not have access to ratepayer funds that could provide a resource for retirement of capital investments. In addition, as a seller of electricity within the terms of an agreed-upon PPA price, DCW must keep its prices – and, thus, its costs – low and competitive.

Commercial feasibility and reliability with respect to the generation output needed are important considerations in selling the power generated. Wind is a proven and reliable resource. Further, the site chosen for the Project is appropriate given the ability to achieve the approximately 41.2% to 49.5% capacity factor, while minimizing the impact to the environment and human settlement.

6.2.1 Purchased Power (Minn. R. 7849.0250 B (1))

DCW is an IPP, and, therefore, does not purchase power. Instead, DCW will sell power to the MMPA pursuant to a PPA. As such, this data requirement is not applicable, and the Commission granted DCW an exemption.[13]

6.2.2 Upgrades to Existing Resources (Minn. R. 7849.0250 B (2))

DCW has no existing facilities in Minnesota. Therefore, there is no facility for DCW to improve. However, consistent with DOC's recommendations on DCW's request for certain CON exemptions, DCW agreed to provide equivalent data from the purchaser of the Project's output. According to MMPA, it knows of no generating resource upgrade that could serve as an alternative to the Project. Since MMPA is in need of additional renewable energy, there is no potential upgrade to an existing MMPA facility suitable to produce approximately 170 MWs of wind energy.

[12] Dodge County Wind Order Granting Exemptions at 1.
[13] Dodge County Wind Order Granting Exemptions.

6.2.3 New Transmission (Minn. R. 7849.0250 B (3))

DCW has no plans to own or operate transmission voltage level lines beyond the generation tie line needed for the interconnection of the Project. According to MMPA, there is no viable transmission alternative that would provide approximately 170 MWs of wind energy as only a wind generating plant can produce the approximately170 MW of renewable energy contracted for in the PPA.

6.2.4 New Generating Facilities (Minn. R. 7849.0250 B (4))

6.2.4.1 Solar Power

Solar is not an alternative to the Project. The cost and reliability of wind power continues to be more favorable than for solar power despite recent substantial decreases in cost for solar. Wind continues to be more cost-effective than solar-powered electricity and remains the lowest-cost new source of renewable energy. For example, the levelized total system cost for wind power in the EIA's Annual Energy Outlook 2018 was $48.1/MWh compared with $57.7/MWh for solar photovoltaic.[14] Also, from a land-use perspective, a MW of solar requires more land be temporarily used for the life of the project to achieve the same number of MW. Further, as explained, crop production with the Project will not be significantly impacted, whereas for a solar facility the acres used would be taken out of use for the life of the solar plant. Thus, the Project, as wind generating facility, has benefits over a solar facility.

6.2.4.2 Hydropower

There has been very little increase in the use of hydropower in Minnesota over the last decade. The use of hydropower increased from 774,729 MWh in 2005 to 849,054 MWh in 2015, an increase of less than 10% over that 10-year period.[15] In that same time period, electricity generated from wind power increased more than 517%.[16] According to the 2016 Quad Report, the reason for the minimal investment in hydroelectric power is likely due to the "[c]osts of maintaining and operating dams compared to other sources of energy. . . as well as increased concern about the potential negative effect dams can have on Minnesota's river ecosystems." Finally, hydropower facilities of the same size as the Project do not qualify under the RPS, and,

---

[14] U.S. Energy Information Administration, Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2018, *available at:* https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf.

[15] Minnesota Department of Commerce, Energy Policy and Conservation Quadrennial Report 2016 at 28 (the 2016 Quad Report) available at: http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwivscvd09jbAhWOrVkKHRYyDv8QFggnMAA&url=http%3A%2F%2Fmn.gov%2Fcommerce-stat%2Fpdfs%2Fquad-report-2016.pdf&usg=AOvVaw1esivJ8In3md_S5ubtiO_P

[16] *Id.*

thus, do not meet the objective of the Project. Therefore, hydropower is not an alternative to the Project.

6.2.4.3 Biomass

Minnesota communities do have accessible and low-value biomass feedstocks. However, the cost of these feedstocks vary widely, and the unsubsidized levelized cost of energy from biomass tends to be much greater than that of wind. Further, the environmental impacts of a biomass facility may be greater than the Project, due to both the facility itself and the machinery and equipment needed to gather and transport the biomass fuel. For these reasons, a biomass plant is not an alternative to the Project.

6.2.4.4 Emerging Technologies

Emerging renewable power technologies continue to be developed. These technologies are not sufficiently mature to provide the output needed or to be cost-effective and reliable.

Pumped Storage

The proposed site in Dodge County is not suited to pumped storage, because of the need to store large amounts of water in an elevated reservoir. In addition, there is currently no net generation from pumped storage in Minnesota. Therefore, this technology is not an alternative to the Project.

Compressed Air

Highly specialized geological sites are needed to make use of compressed air technology. Such sites do exist are not located in the vicinity of the Project site. Also, this technology is not yet commercially-proven; accordingly, it is not an alternative to the Project.

Superconducting Magnets

This technology, which makes use of coils that can store electric energy, is not yet commercially-proven. Accordingly, it is not an alternative to the Project.

Hydrogen and Fuel Cells

While much research is being done regarding hydrogen and fuel cells, the technology is not yet available on a commercial scale. It is possible, however, that as research and commercial applications advance in years to come, this technology may be used to enhance other renewable technologies, such as the Project.

Table 3 provides comparative costs for the above mentioned technologies and compares them to the costs of wind generation.

Table 3: Renewable Energy Technology Costs[17]

Technology	Size (MW)	Total Overnight Cost in 2015 (2015 $/kW)	Variable O&M (2015 $/MWh)	Fixed O&M (2015 $/kW/yr)
Fuel Cells	10	7,132	45.64	0.00
Biomass	50	3,837	5.58	112.15
Conventional Hydropower	500	2,898	1.33	40.05
Wind	100	1,657	0.00	47.47
Photovoltaic	150	2,105	0.00	22.02
Solar Thermal	100	4,228	0.00	71.41

6.2.4.5 Non-CON Facilities (Minn. R. 7849.0120(A)(4))

Under Minn. Stat. §§ 216B.2421 and 216B.243, subd. 2, and Minn. R. Ch. 7849, a CON is required for the Project because it is a "large energy facility," *i.e.*, larger than 50 MW. As an IPP, DCW executed a PPA with MMPA through an arms-length negotiation, with MMPA determining that the Project was well-suited to meeting its renewable energy needs. Smaller facilities that do not require a CON would not be able to economically provide the amount of electricity that MMPA is seeking, and, therefore, MMPA chose the Project as the best solution for its needs. In addition, DCW has the advantages of economies of scale, which would not be available to smaller facilities.

6.2.4.6 Reasonable Combinations of Alternatives (Minn. R. 7849.0120(B)(5))

There is no combination of the aforementioned renewable alternatives that would be appropriate to consider as a substitute for the Project, because, as compared to the proposed Project, they would not produce electric output more cost-effectively or reliably than the Project.

6.2.4.7 No Facility Alternative (Minn. R. 7849.0340)

Minn. R. 7849.0340 requires an applicant to submit data for the alternative of "no facility," including a discussion of the impact of this alternative on the applicant's generation and transmission facilities, system, and operations. This rule also requires an analysis of "equipment and measures that may be used to reduce the environmental impact of the alternative of no facility." Minn. R. 7849.0340(C). DCW does not have a "system," nor does it have other generation and transmission facilities in Minnesota, and, therefore, the Commission provided a

[17] The figures in this table are taken from a report of the U.S. Energy Information Administration, *Assumptions to the Annual Energy Outlook 2018: Electricity Market Module* (Apr. 2018), at 4, available at: https://www.eia.gov/outlooks/aeo/assumptions/pdf/electricity.pdf.

partial exemption of this requirement, conditioned upon DCW providing equivalent data from MMPA regarding a no build alternative.[18] On this point, MMPA represents that the "no-facility" alternative would have a detrimental impact to MMPA in that the purpose of the Project is to help it address and exceed its RES requirements and provide carbon-free energy to its customers and the state. Therefore, consideration of the no facility alternative is not appropriate or warranted given the needs of MMPA and the state.

6.2.4.8 Facility Information for Alternatives Involving Construction of a LHVTL (Minn. R. 7849.0330)

Minn. R. 7849.0330 requires the applicant to provide certain data for each alternative that would involve construction of a LHVTL. Transmission facilities are not true alternatives to the Project, since the purpose of the Project is to increase the supply of available renewable wind energy. The proposed 345 kV generation tie line is an associated facility of the Project to be constructed for the sole purpose to connect the Project to the transmission system. Access to transmission facilities beyond the POI will be arranged by the grid operator, MISO, and MMPA, as applicable. Thus, the electricity generated by the Project will be transmitted over transmission and distribution facilities owned or operated by others (with the exception of the 345 kV generation tie line). For these reasons, Minn. R. 7849.0330 is not applicable, and the Commission granted DCW an exemption from this data request.[19]

6.3 Discussion of Proposed Facility and Alternatives (Minn. R. 7849.0250(C))

The Commission granted DCW a partial exemption from Minn. R. 7849.0250(C)(1)-(6), (8)-(9), which would require an analysis of various details pertaining to both the proposed facility and each of the alternatives discussed in response to Minn. R. 7849.0250(B).[20] Consistent with the Commission granting DCW a partial exemption from the data requirements in Minn. R. 7849.0250(B), which limits the discussion required to only renewable alternatives, the Commission also limited the information required under this data requirement to only those renewable alternatives discussed in response to Minn. R. 7849.0250(B)(4) that could provide electric power at the asserted level of need. As explained above, there is no such alternative. Therefore, consistent with the partial exemption, only information regarding the Project is applicable.

[18] Dodge County Wind Order Granting Exemptions at 1.

[19] *Id.*

[20] *Id.*

For the associated generation tie line, Minn. Rule 7849.0260, subpart B (1) was found to be inapplicable.[21] Also, as explained, there is no viable alternative to the generation tie line as it is required to deliver the wind energy to the transmission grid. Moreover, the size and location of the generation tie line are appropriate given the potential for higher network upgrade costs and losses with the use of a lower voltage generation tie line. In addition, production cost simulations indicate that using a lower voltage line to interconnect elsewhere would likely result in transmission congestion in the future – potentially requiring the siting and construction of additional transmission infrastructure. Further justification for the size and location of the generation tie line is provided in **Section 6.3.2.2** below.

6.3.1 Wind Facility

6.3.1.1 Capacity Cost (Min. R. 7448.0250 C (1))

Costs for wind energy facilities are typically not expressed in terms of capacity costs. Rather, the Project will deliver energy to the MMPA on an as-generated basis and will receive payment in the form of a $/kWh payment. DCW's estimated cost for the wind component of the Project is $300 million, equating $1,765 per kilowatt.

6.3.1.2 Service Life (Minn. R. 7849.0250 C (2))

The Project's service life of 30 years has been assumed to estimate annualized capital costs, which is based on the extensive experience of affiliates of DCW with other wind generating plants.

6.3.1.3 Estimated Average Annual Availability (Minn. R. 7849.0250 C (3))

DCW estimates that the Project will be available at least 95 percent of the year.

6.3.1.4 Fuel Costs (Minn. R. 7849.0250 C (4))

The Project will be powered by wind, and, therefore, does not have fuel costs like fossil generation. DCW will make nominal purchases of emergency station service when the wind turbines are idle, and this station service may involve a generation mix that includes embedded fuel costs.

6.3.1.5 Variable Operating and Maintenance Costs (Minn. R. 7849.0250 C (5))

Variable maintenance costs will likely range between $0.0050 and $0.0075 per kWh. An advantage of a wind energy facility the size of the Project is that it typically does not require a

[21] *Id.*

complete plant outage for maintenance. Individual turbines can be serviced, while the rest of the facility continues to deliver energy.

6.3.1.6 Total Cost (Minn. R. 7849.0250 C (6))

The capital expenditure for the wind component of the Project is estimated to be $300 million. This includes all costs associated with development, design, and construction. General costs associated with project O&M, initial spare parts, operating equipment and operating supplies will be $2.5 million the first year and $750,000 over 29 years.

6.3.1.7 Effect of Project on Rates System-wide (Minn. R. 7849.0250 (C) 7)

The Commission provided a partial exemption of Minn. R. 7849.0250 (C) 7, requiring DCW to seek information on the effect of the Project on rates system-wide from the purchaser, MMPA.[22] MMPA expects the impact of the Project on rates to be minimal to none.

6.3.1.8 Efficiency (Minn. R. 7849.0250 C (8))

No fuel is burned in the production of energy at the Project, and, therefore, there is no information to provide on this subject.

6.3.1.9 Assumptions (Minn. R. 7849.0250 (C) (9))

There are no specific assumptions other than those already identified that impacted the provision of information in response to Minn. R. 7849.0250 (C) (1-8).

6.3.1.10 Map of System (Minn. R. 7849.0250(D))

The Commission granted DCW an exemption from Minn. R. 7849.0250(D), which requires an applicant to include a map showing the applicant's system.[23] As an IPP, DCW does not have a "system." In lieu of a system map, DCW provides maps showing proposed site of the Project and the associated facility relative to the transmission grid in **Appendices C and D (Wind and Transmission Line Maps)**.

6.3.1.11 Promotional Activities (Minn. R. 7849.0240 (B))

The Commission granted DCW a partial exemption from Minn. R. 7849.0240, subp. 2 (B), requiring that it request the purchaser, MPPA, to provide equivalent data on promotional

[22] Dodge County Wind Order Granting Exemptions at 1

[23] *Id.*

activities.[24] According to MPPA, it has not conducted promotional activities associated with the Project.

6.3.2 Transmission Gen Tie Associated Facility [25]

6.3.2.1 Upgrading of Existing Transmission Lines or Existing Generating facilities (Minn. R. 7849.0260 (B) (2))

There are no existing transmission lines or existing generating facilities that can be upgraded to deliver the wind energy from the Project to the Byron Substation. The location and size of the Project and the requirements of the PPA to construct a 345 kV generation tie to the Byron Substation cannot be met through upgrading existing transmission lines or an existing generation facility.

6.3.2.2 Transmission Lines with Different Voltages, Numbers, Sizes, and Types of Conductors (Minn. R. 7849.0260 (B) (3))

As an alternative, the Project could be interconnected at 161 kV at the Byron substation, but such an action would increase transmission congestion over time and necessitate costly network upgrades to the local transmission infrastructure. For instance, DCW expects the transmission upgrades for the 345 kV generation tie line will be in in the range of $16-38 million, while the use of a 161 kV generation tie line will require upgrades be in the range of $58-122 million.

Further, there are other reasons why a 345 kV generation tie line is the appropriate voltage level to deliver the Project's output:

- The higher operating voltage and resulting increased thermal capacity of a 345 kV generation tie line offer an improved efficiency relative to 161 kV. The 345 kV line incurs less than one-quarter of the power losses of the 161 kV line to carry the same amount of power, assuming the same conductor is used.

- The 345 kV generation tie line efficiently uses available ROW, requiring less land to deliver equivalent amount of power compared to the 161 kV options. The typical MISO ROW requirements for single circuit 345 kV construction are smaller (175 feet) than three 161 kV single circuits (300 feet) to move the equal amount of power.

[24] *Id.*

[25] The DOC Comments indicated that Minn. R. 7849.0260 requires data regarding applications for an LHVTL, and, thus, none of the data requirements are applicable to DCW, because the generation tie line is an associated facility and not an LHVTL. In the Commission's July 7, 2017 Order on the CON Exemptions it ruled: "The Commission agrees with and adopts the recommendations of the Department of Commerce, which are attached and hereby incorporated into the order." Nonetheless, the information related to Minn. R. 7849.0260 (B) and (C) is provided to ensure there is a complete record of the DCW generation tie line as an associated facility with the Project.

- Higher voltage lines typically present less challenge for wind farms in passing low voltage ride through (LVRT) or high voltage ride through (HVRT) during transmission faults. Higher voltage lines generally use high speed protections that clear faults faster than lower voltage lines, which support LVRT and HVRT passage. This is important for the transmission system in the Byron area where voltage stability has been limiting transmission transfer capability for years.

- Higher voltage transmission line tends to have higher availability, expressed in the probability of occurrence of single phase-to-ground, phase-to-phase faults, or phase-to-phase faults that evolve into three-phase faults. This is due in part to the physical separation among the phases. The probability of a single phase-to-ground or phase-to-phase fault is lower for 345 kV than lower voltage lines.

6.3.2.3 Transmission Lines with Different Terminals or Substations (Minn. R. 7849.0260 (B) (4))

No other alternative terminal or substation studied offers the same benefits as the Byron substation. The point of initiation, the Project's collection substation, is the necessary origination point for the generation tie line, while the end point, the Byron 345kV substation, provides a path for the wind energy to be delivered into the 345 kV backbone transmission of the MISO grid. During the evaluation of POIs for the Project, DCW considered various project cost components including network upgrade cost and future operational constraints such as transmission congestion. DCW also performed production cost simulations and the results show minimum wind production curtailment at Byron for the 345 kV interconnection option. If the POI is not carefully selected, transmission congestion in the western MISO region can cause significant curtailment to wind energy production. Based on a careful analysis, the Byron substation was selected to be the POI for DCW, and, thus, the PPA requires that DCW interconnect into the Byron substation.

6.3.2.4 Double Circuiting of Existing Transmission Lines (Minn. R. 7849.0260 (B) (5))

There is no existing transmission line that is located to deliver the energy from the Project's collector substation to the Byron Substation or any other substation, and, thus, the double circuiting of an existing transmission line is not feasible.

6.3.2.5 The Use of DC Transmission Line (Minn. R. 7849.0260 (B) (6))

A DC transmission line is generally employed to deliver generation over a considerable distance, in some instances several hundred miles, to a load center. The DC technology is not a technically viable for a wind project delivering to an immediate substation, such as the Byron Substation.

6.3.2.6 Use of Underground Transmission Lines (Minn. R. 7849.0260 (B) (7))

Given the land use impacts, cost, and distance involved in undergrounding the associated 345 kV generation tie line, undergrounding is neither cost effective nor feasible from industry standard practice. Undergrounded transmission lines are more typical in area not acceptable for overhead transmission, such as in large cities, and at a much lower voltage, such as 69 kV.

6.3.2.7 Any Reasonable Combination of the above (Minn. R. 7849.0260 (B) (8))

There is no reasonable combination of the above 7849.0260 (B) factors that could result in alternative approach to the development, construction, and operation of the Project's generation tie line.

6.3.2.8 Total Cost (Minn. R. 7849.0260 (C) (1))

The estimate total costs of the generation tie line range from approximately $40 million to $47 million depending on the route selected in the Route Permit proceeding.

6.3.2.9 Service Life (Minn. R. 7849.0260 (C) (2))

The service life of the generation tie line matches the Project life of 30 years.

6.3.2.10 Estimated Annual Availability (Minn. R. 7849.0260 (C) (3))

The estimated annual availability of the generation tie line is very high, and is expected to be available in excess of 99% of the time.

6.3.2.11 Annual O&M (Minn. R. 7849.0260 (C) (4))

Annual O&M costs for transmission lines in Minnesota and surrounding states vary; however, for voltages from 69 kV through 345 kV, past experience shows that annual O&M costs are approximately $900 per mile.

6.3.2.12 Estimate of System-Wide Rates (Minn. R. 7849.0260 (C) (5))

The Commission determined Minn. R. 7849.0260 (C) 5 was not applicable, and, therefore no information is provided for this requirement.[26]

[26] Dodge County Wind Order Granting Exemptions at 1.

6.3.2.13 Efficiency of the Transmission Line (Minn. R. 7849.0260 (C) (6))

The 345 kV generation tie line provides the following efficiencies: (i) it reduces losses from the collector substation to the POI; (ii) it mitigates congestion and curtailments; and (iii) it does not require as many system upgrades as lines connecting to a different POI or at lower voltages.

6.3.2.14 Major Assumptions (Minn. R. 7849.0260 (C) (7))

There are no specific assumptions other than those already identified that impacted the provision of information in response to Minn. R. 7849.0260 (C) (1-6).

7.0 PEAK DEMAND AND ANNUAL CONSUMPTION FORECAST (MINN. R. 7849.0270)

The Commission granted DCW an exemption from Minn. R. 7849.0270, subps. 1-6, which require the applicant to provide "data concerning peak demand and annual electrical consumption within the applicant's service area and system."[27] DCW does not have a "service area" or "system" and, as such, the requested data is inapplicable to DCW. The Commission, however, required DCW to provide a general overview of the purchaser's system and future renewable resource needs.[28]

MMPA is comprised of 12 member municipal utilities. MMPA's member communities include Anoka, Arlington, Brownton, Buffalo, Chaska, East Grand Forks, Elk River, Le Sueur, North St. Paul, Olivia, Shakopee, and Winthrop. MMPA provides electricity to its municipal utility members who then deliver and sell that electricity to customers in their communities. According to MMPA's annual report, its members are growing, with increases in both residential and business customers.[29] MMPA's members have a combined population of nearly 150,000 and provide power to 72,330 homes and businesses across Minnesota.[30]

MMPA's most recent Integrated Resource Plan (IRP) was filed with the Minnesota Public Utilities Commission on December 20, 2013, and the next IRP is due to be filed August 1, 2018.[31] In its 2013 IRP, MMPA stated that its projected annual growth rate for the 2014 to 2018 period is less than two percent, and during the 2019 to 2028 period is around one percent.[32] MMPA also indicated that it was projected to sell 1,478,593 MWh of energy to its eleven member municipal utilities in 2013.[33] MMPA further projected that its annual REC requirements are expected to grow from 174,000 MWh in 2014 to 509,000 MWh in 2028.[34]

---

[27] *Id.*

[28] *Id.* at 6.

[29] MMPA 2016 Annual Report at 2.

[30] *Id.*

[31] *See* Docket No. ET-6133/RP-17-468, Order re Minnesota Municipal Power Agency (MMPA) Request for a One-Year Extension to August 1, 2018 to file its Integrated Resource Plan (July 28, 2017).

[32] At the time of the 2013 IRP, MMPA projected its Non-Coincident Peak and Coincident Peak to grow at approximately 1% in the 2019-2028 period. MMPA Application for Integrated Resource Plan Approval 2014-2028 (December 20, 2013).

[33] MMPA Application for Integrated Resource Plan Approval 2014-2028 at 4 (December 20, 2013).

[34] *Id.* at 56.

8.0 SYSTEM CAPACITY (MINN. R. 7849.0280)

Minn. R. 7849.0280 requires a CON applicant to provide information on the ability of its existing system to meet the forecasted demand. As an IPP, DCW does not have a "system" as defined by these rules. Accordingly, the Commission granted DCW an exemption from this requirement, with the understanding that DCW would provide a general overview of the purchaser's system and future renewable resource needs.[35]

As stated in its most recent IRP, MMPA needs additional renewable capacity for the future. MMPA will begin serving Elk River Municipal Utilities as a new member on October 1, 2018. Therefore, starting with summer of 2019, MMPA's capacity requirements increase by 71 MW.[36] In 2013, MMPA projected its need for additional capacity to grow from 9 MW in 2016 to 156 MW in 2028.[37]

[35] Dodge County Wind Order Granting Exemptions at 1, 6.

[36] MMPA Application for Integrated Resource Plan Approval 2014-2028 at 2 (December 20, 2013).

[37] *Id.*

9.0 CONSERVATION PROGRAMS (MINN. R. 7849.0290)

The Commission granted DCW an exemption from Minn. R. 7849.0290, which requires an applicant to describe its energy and conservation plans, including load management, and the effect of conservation in reducing the applicant's need for new generation and transmission facilities.[38]

[38] Dodge County Wind Order Granting Exemptions at 1.

10.0 CONSEQUENCES OF DELAY (MINN. R. 7849.0300)

The Commission granted a partial exemption of this requirement with the understanding that DCW would seek equivalent data from the purchaser, MMPA.[39] According to MPPA, delay of the Project would detrimentally impact MMPA's ability to address the RES requirements, and would likely result in the cancellation of the PPA that has competitive pricing which is based, in part, on lower costs due to the PTC. With the PTC being phased out, the cost of replacement renewable energy, if available, is likely to be higher than the PPA price for the renewable energy from the Project. Hence, delay would also likely result in a lost opportunity to provide MMPA and the state with clean, cost-effective renewable energy. Delay of the Project could also nullify the environmental, policy, and socioeconomic benefits of the Project set forth herein, including the creation of jobs and the advancement of the greenhouse gas emissions reduction goals.

[39] *Id.*

11.0 ENVIRONMENTAL INFORMATION FOR PROPOSED PROJECT AND ALTERNATIVES (MINN. R. 7849.0310)

Concurrently, with this Application, DCW is submitting a Site Permit application and a Route Permit application. The following is a summary the environmental information set forth in the Site Permit application and the Route Permit application.

11.1 Wind Facility

11.1.1 Impacts to Visual Resources

Wind turbines will alter the visual surroundings of the landscape within and near the Project Area. Wind turbines are not currently present within the Project Area; however, wind turbines occur within the regional vicinity of the Project Area. Turbines will likely be viewed in one of three perspectives: (i) as a visual disruption; (ii) as generally compatible with the rural agricultural heritage of the area, which includes windmills, silos and grain elevators; or (iii) as adding a positive aesthetic quality to the landscape.

The installation of wind turbines will not significantly alter the character of the regional landscape given the presence of existing wind farms in the vicinity; however, the degree of visual impact will vary based on the type of observer and individual preference.

The two turbine models proposed for the Project, the GE 2.5 MW and GE 1.79 MW, are similar in appearance with three blades, a hub and a monopole, but differ in rotor diameter size and the number of turbines. In general, the larger the rotor diameter, the fewer turbines are required to produce the same energy output. The Project proposes 68 GE 2.5 MW turbines, which have a rotor diameter of 116 meters (381 feet), and 8 GE 1.715 MW turbines, which have a rotor diameter of 103 meters (338 feet).

The turbines will be uniform in color and painted with a non-reflective/off-white color designed to minimize visual impacts. The towers and blades will be of a color, design, operation, and appearance consistent with other turbines in the area. No advertising or graphics will be placed on any part of the tower or blades; however, the turbines will be clearly numbered for identification and emergency response. The towers will not be illuminated except as required by the Federal Aviation Administration (FAA).

The use of 68 GE 2.5 MW turbines helps to mitigate the visual impact of the Project by minimizing the number of turbines compared to the use of less MW producing turbines. DCW will implement the following mitigation measures to minimize potential visual impacts:

- Turbines will be uniform in color;
- Turbines will not be located in sensitive areas such as public parks, Wildlife Management Areas (WMAs), Scientific and Natural Areas (SNAs) or Waterfowl Production Areas (WPAs);

- Turbines will be illuminated to meet the minimum requirements of FAA regulations for obstruction lighting of wind turbine projects;
- Electric collection lines will be buried to minimize above-ground structures within the Project Area;
- Existing roads will be used for construction and maintenance, as appropriate, to minimize the number of new roads constructed; and
- Temporarily disturbed areas will be converted back to cropland or otherwise reseeded with native seed mixes appropriate for the region.

11.1.2 Shadow Flicker Impacts

With respect to wind turbines, shadow flicker can be defined as an intermittent change in the intensity of light in a given area resulting from the operation of a wind turbine due to its interaction with the sun. While indoors, an observer experiences repeated changes in the brightness of the room as shadows cast from the wind turbine blades briefly pass by windows as the blades rotate. In order for this to occur, the wind turbine must be operating, the sun must be shining, and the window must be within the shadow region of the wind turbine – otherwise there is no shadow flicker. An idle wind turbine only generates a stationary shadow similar to any other structure.

A Project-specific shadow flicker analysis was conducted using the software package, WindPRO. The WindPRO modeling was further refined by incorporating sunshine probabilities and wind turbine operational estimates by wind direction over the course of a year. The values produced by this further refinement are known as the "expected" shadow flicker. The results of the shadow flicker analysis will be included in Appendix E to the Site Permit application. Appendix E will include details regarding the methodology and results of the assessment, and presents calculated annual hours of shadow flicker at identified receptors based upon a worst-case scenario and an expected case scenario.

The predicted expected annual shadow flicker duration ranged from 0 hours, 0 minutes per year to 34 hours, 57 minutes per year. The maximum expected flicker was at a pending participation receptor (#410). The maximum expected flicker at a non-participating receptor (#173) was 27 hours, 26 minutes. The majority of the receptors (536) were predicted to experience no annual shadow flicker. 102 locations were predicted to experience some shadow flicker but less than 10 hours per year. The modeling results showed that 51 locations would be expected to have 10 to 30 hours of shadow flicker per year. Five receptors are expected to have over 30 hours of flicker per year, none of which are non-participating receptors. The modeling results are conservative in that modeling receptors were treated as "greenhouses" and the surrounding area was assumed to be without vegetation or structures (bare earth).

The Project was designed to minimize shadow flicker exposure of the residences in the area. DCW will use site specific mitigation measures to address shadow flicker impact, as appropriate, including the following:

- Meeting with the homeowner to determine the specifics of their complaint;
- Investigating the cause of the complaint; and
- Providing the homeowner with mitigation alternatives including shades, blinds, awnings or plantings.

11.1.3 Impacts to Land Use

The Project Area encompasses approximately 52,085 acres. The Project Area is located in western Dodge County and eastern Steele County in southeastern Minnesota, immediately southwest of Dodge Center and north of Blooming Prairie, Minnesota. Land use primarily consists of agricultural activity, including row cropping and livestock production. Temporary and permanent impacts to agricultural activities will include the removal of land from row crop production and pasture during the construction and operation of the Project. Additionally, temporary and permanent impacts to pastureland are expected to be minimal and restricted to removing small amounts of land from use. Only the land for the turbines and associated pads, certain electrical equipment, and access roads will be permanently taken out of crop production. After construction is completed, remaining land surrounding the turbines and access roads may still be farmed. The permanent loss of approximately 49 acres of agricultural land total for the Project will not result in the loss of agricultural-related jobs or net loss of income. Thus, land use impacts will be minimal.

11.1.4 Impacts to Wildlife

The USFWS Land-based Wind Energy Guidelines were issued on March 23, 2012 to provide a structured and scientific approach to wildlife concerns during all stages of land-based wind energy development (USFWS 2012). The guidelines use a tiered approach to collecting information, with each tier increasing in the detail of research and information. The tiered approach provides the opportunity for evaluation and decision-making at each step of a Project to enable the developer to abandon or proceed with development or to collect additional information.

A Tier 1 and Tier 2 Site Characterization Study was completed for the Project Area in March 2017 (Atwell 2017a). Information for this study was gathered through MNDR and the USFWS database research, additional resources, and a site visit by a qualified biologist in January 2017. Tier 1 questions help determine potential environmental risk at the landscape scale, while Tier 2 questions help to determine potential environmental risk at the project scale (USFWS 2012). Tier 3 wildlife studies that have been completed for the Project include an Acoustic Bat Use Study in 2014 (Normandeau Associates, Inc. 2014), a Year 1 Avian Use Study in 2017 (HDR 2017), a Bald Eagle and Raptor Nest Aerial Survey in 2017 (Atwell 2017b), and a Targeted

Loggerhead Shrike and Henslow's Sparrow Inventory Survey in 2017 (Atwell 2017c). A Year 2 Avian Use Study is currently underway. To the extent completed, the results of these studies will be summarized in further detail in the Site Permit application.

Field and desktop studies indicate that impacts to wildlife and wildlife habitat are expected to be minimal because grasslands, wooded areas, shrublands, and other areas identified as important to wildlife are limited within the Project Area and will largely be avoided via Project design. Minor impacts to grasslands, shrublands, and wetlands may occur.

Bird and bat mortalities that may occur at the Project during operations are unlikely to affect populations of most species, including species of conservation concern. Impacts to birds and bats as a result of the Project are not expected to differ markedly from those reported by other previous studies in agricultural settings within Minnesota (Poulton 2010, WEST 2015, Westwood 2015).

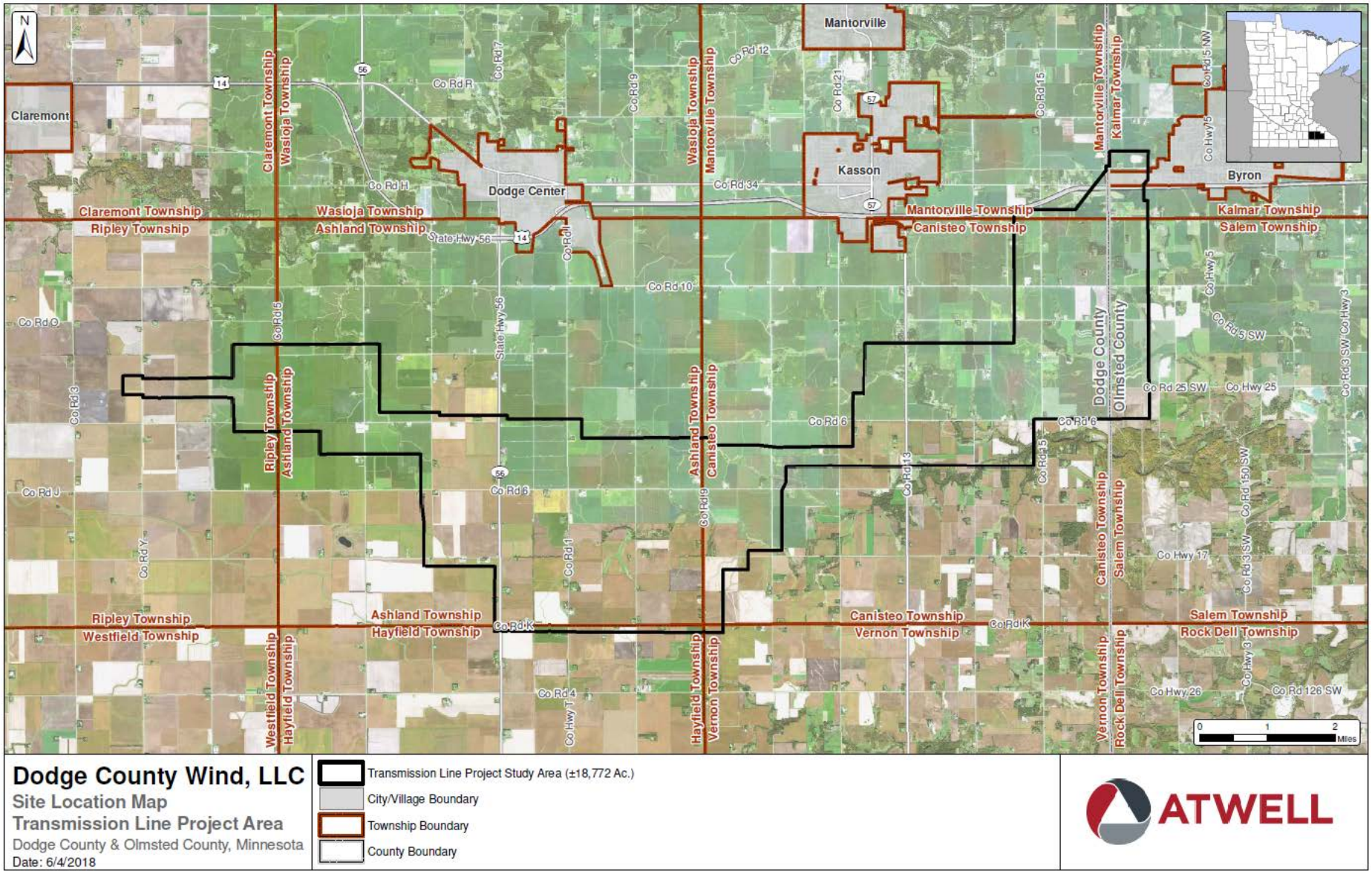
The Applicant has carefully sited the Project so as to avoid sensitive areas identified by MNDNR. This has included, among other efforts, placing all turbines and project infrastructure outside of the west-central portion of the Project Area delineated by MNDNR in a letter dated May 26, 2017. Careful siting and continued project planning includes avoidance of sensitive features and wildlife habitat. The Applicant will coordinate with the appropriate agencies regarding mitigation measures to avoid potential impacts to wildlife and Rare and Unique Natural Features in the Project Area during selection of the turbine locations and Project development and operation. In addition, the Applicant has developed a draft Avian and Bat Protection Plan for implementation during construction and operation of the Project.

11.2 Transmission Gen Tie Associated Facility

11.2.1 Project Study Area

The Project Study Area is located in the eastern portion of Dodge County and the western portion of Olmsted County in southeastern Minnesota. The Project Study Area includes portions of Ripley, Ashland, Hayfield, Canisteo, and Mantorville townships in Dodge County; portions of Salem and Kalmar townships in Olmsted County; and the City of Byron in Olmsted County as shown on **Figure 2** below.

Figure 2: Generation Tie Line Project Study Area



11.2.2 Description of Environmental Setting

The Project Study Area is dominated by cropland and a moderately extensive network of agricultural ditches and intermittent and ephemeral streams, many of which support herbaceous riparian buffers. The general topography of the area is described as undulating, rolling relief. Approximate elevations within the Project Study Area range between 1,125 and 1,347 feet above mean sea level. The Project Study Area generally slopes east and contains Salem Creek, a tributary of the Zumbro River that eventually flows to the Mississippi River.

11.2.3 Geomorphology and Physiography

According to the MNDNR Ecological Classification System, the Project Study Area is located within the Eastern Broadleaf Forest Province, a transition zone between the western prairies and eastern mixed conifer/deciduous forest (MNDNR 2018a). This province is further divided into Sections and Subsections. The Project Study Area is within the Minnesota and Northeast Iowa Morainal Section (222M), characterized by deciduous forest, woodland, and prairie in a hummocky morainal landscape, and the Oak Savanna Subsection (222Me), which was historically covered by bur oak savanna, patches of tallgrass prairie, and maple-basswood forest on gently rolling hills. The Project Study Area also occurs within the Paleozoic Plateau Section (222L), characterized by highly eroded bluffs and valleys, and the Rochester Plateau Subsection (222Lf), an area of transition from rolling plateau to dissected landscapes (MNDNR 2018a).

The Project Study Area is primarily made up of agricultural, rural lands. Primary water features within the Project Study Area include Salem Creek and Cascade Creek.

According to the general soil data for Dodge and Olmsted Counties (USDA 2018), the dominant soil series within the Project Study Area are: (i) considered to be silty, silty clay loam, or loam; (ii) used for agricultural purposes; and, (iii) well-to-poorly drained. The majority of the Project Study Area is classified as Prime Farmland, Prime Farmland if drained, or Farmland of Statewide Importance according to the soil surveys.

11.2.4 Land Use and Human Settlement

a) Land Use

Land use within the Project Study Area is primarily agricultural. The dominant land cover is cultivated crops, most notably corn varieties (*Zea mays*) and soybean (*Glycine max*). Pasture grasses, such as alfalfa (*Medicago sativa*) and winter wheat (*Triticum aestivum*) account for a smaller percentage of the land cover. Natural land cover is limited to isolated woodlots, narrow forested riparian corridors, treed fence lines, treed homesteads, wetlands, drain buffer vegetation, and a few parcels that appear consistent with grassland restoration. Rural residences are scattered throughout the landscape with minimal commercial and industrial facilities.

b) Displacement

Based on a review of the proposed Project routes, displacement of residences is not anticipated. Should removal or relocation of non-residential buildings be necessary, DCW will work with landowners on a case-by-case basis. Existing linear features and residences were incorporated into the design of the Project in order to minimize impacts to commercial, industrial, and residential properties. No impacts to commercial or industrial development are expected.

c) Aesthetics

The viewshed of the Project Study Area currently includes farmsteads, overhead electric transmission and distribution lines, a railroad, and wind turbines. Snowmobile trails are also present within the Project Study Area. Those likely to be most impacted by the Project are the residents of Dodge and Olmsted counties and the recreationalists using the designated snowmobile trails. The proposed Project will alter the visual appearance of the Project Study Area by adding additional vertical and horizontal man-made structures to the existing landscape. The height of the proposed transmission structures will be dependent on the terrain and span length. Transmission structures will be installed at the shortest height possible while maintaining all possible clearances.

Based on a review of the proposed Project routes, the proposed Project will not create a new feature type within the landscape as existing overhead electric transmission and distribution lines are present within the surrounding landscape. Siting the transmission line in the vicinity of other transmission lines and wind farms will reduce the amount of new visual impacts. The Applicant sited the Project in coordination with landowners to minimize visual impacts, address aesthetics, and to utilize natural screening to provide a buffer between the infrastructure and observers, where feasible.

d) Socioeconomics

Socioeconomic data was gathered for Ripley, Ashland, Canisteo, Vernon, Hayfield, and Mantorville townships in Dodge County and for Salem Township, Kalmar Township, and Byron City in Olmsted County to ascertain the estimated socioeconomic conditions present within the Project Study Area. Data was also acquired for Dodge County, Olmsted County, and the State of Minnesota for comparison.

According to the U.S. Census Bureau 2016 population estimates, the total population of the townships and city through which the Project Study Area extends is approximately 11,875 people. This accounts for approximately 0.22% of the total population of the state of Minnesota. Of these 11,875 individuals, approximately 99% are Caucasian with total minorities accounting for approximately 3% (U.S. Census Bureau 2018).

According to the 2012-2016 American Community Survey 5-Year Estimates, the median household income for the counties, townships, and city along the Project Study Area is higher than the state average of $63,217, with a range of $64,792 to $109,722. In addition, unemployment rates and the percent below poverty are generally better within the counties, townships, and city within the Project Study Area than the state averages of 4.8% and 10.8%, respectively (U.S. Census Bureau 2018).

Construction of the Project is not anticipated to significantly impact the permanent population size or demographics of the counties, townships, or city that the Project Study Area traverse as the Project is anticipated to create 30-40 temporary construction jobs. However, the population size and demographics may temporarily increase and change with the addition of construction personnel. This temporary increase in population is likely to result in a small financial gain for the local economy, as the Project and its personnel will utilize products and services from a variety of local businesses, including infrastructure maintenance services, industrial supplies, and hospitality services. No additional socioeconomic impacts are anticipated through the development of the Project.

e) Cultural Values

The cultural values associated with the Project Study Area are likely related to the agriculturally dominated landscape. It can be assumed that the protection of land to allow for the continuation of farming for local residents is important in Dodge and Olmsted counties. This is supported by the Dodge County Board Mission Statement: "To efficiently operate within a budget while providing excellent service, maintaining a rural character, and preparing the county to operate effectively for years to come" (Dodge County Board 2013).

Cultural values are not expected to be impacted by the construction of the Project. The Project will not alter the rural character of the Project Study Area nor will it substantially impact the continuation of farming for local residents. While a small amount of land will be taken out of agricultural production (approximately 6ft-12ft radius), landowners may continue to plant crops and graze livestock near the transmission line structures. Farming activities may be temporarily impacted during the construction of the Project, but the Applicant will work closely with each landowner to ensure these impacts are minimized and appropriately mitigated.

f) Recreation

Dodge and Olmsted counties provide a variety of recreational opportunities including hiking, fishing, hunting, camping, nature viewing, and snowmobiling. Dodge County operates four (4) traditional recreational parks and one campsite at Creek Park. In addition, Dodge County owns and maintains 4.6 miles of hiking trails and the Wasioja Seminary Park, a historic site. Olmsted County offers two camping locations, several parks, Oxbow Park & Zollman Zoo, and extensive miles of both hiking and skiing trails.

None of the aforementioned parks, campsites, hiking trails, or wildlife areas are located within the Project Study Area. However, two designated snowmobile trails occur within the Project Study Area, the Kasson-Mantorville Trails and the Dodge County Trails. One MNDNR WMA (Bud Jensen WMA) is located within the Project Study Area. One additional WMA (Tri-cooperative WMA) is located within one mile of the Project Study Area. These WMAs are publically accessible areas that provide good opportunities for wildlife observation and hunting (MNDNR 2018b).

Although the Bud Jensen WMA is located within the Project Study Area, proposed routes are located outside of this feature. The Project could impact hunting on private property and snowmobiling activities on the Kasson-Mantorville Trails and Dodge County Trails. Construction sounds and equipment may temporarily relocate wildlife from an area, negatively impacting viable hunting locations. Construction sounds and equipment may also temporarily diminish the aesthetic quality and scenery of the snowmobile trails. The Project may also require the temporarily closing or relocating of part of the snowmobile trails or cutting off access to hunting locations to ensure the safety of construction personnel and recreationalists during construction activities. These aforementioned impacts will be temporary as they should only occur during the construction of the Project. The Applicant has initiated coordination with the snowmobile clubs and will continue to coordinate with the clubs regarding the placement of pole structures in the vicinity of the trails and construction timing. Following the construction of the Project, the construction equipment will be removed and wildlife should return as normal. However, recreationalists using the snowmobile trails may be impacted by the change in aesthetics when they are in proximity to the transmission line.

g) Public Services & Transportation

Within the Project Study Area, water and wastewater services are expected to be provided through privately-owned water wells and septic systems. Municipal water and sewer are likely present within the small portion of the Project Study Area that crosses the City of Byron.

The Project Study Area primarily consists of paved and unpaved county and township roads that typically follow section lines. Unpaved two-track/dirt roads, likely used for farming and private access, are also present within the Project Study Area. The two largest roadways within the Project Study Area are US-14 and State Highway 56. There is one active railroad within the Project Study Area and it is owned by Dakota, Minnesota and Eastern Railroad (DM&E).

Construction of the Project is not anticipated to have permanent impacts on roadways or traffic within the Project Study Area. However, the Project will likely result in temporary impacts including road and lane closures and an increase in traffic congestion. Temporary road and lane closures will be necessary to safely and efficiently install the transmission line across roadways, as necessary. Road and lane closures may cause delays, but most crossings will be able to be completed within 24-48 hours. Once the transmission line has been installed near a road or lane

closure, the road and/or lanes would be re-opened and traffic flow would resume as normal. The Applicant will coordinate with DM&E in order to acquire the appropriate railroad crossing permits and to ensure the safety of all construction and railway personnel.

Dodge Center Airport (TOB) is located approximately 2.9 miles north of the Project Study Area. At this proximity, and based on a maximum transmission structure height of 135' above ground level (agl), it is expected that transmission structures in Route A would require filing a Form 7460-1, Notice of Proposed Construction or Alteration (notice) to the FAA prior to construction. This process allows the FAA to determine the effect a structure could have to the safe and efficient use of navigable airspace. To facilitate route selection and structure design, DCW conducted their own internal aeronautical evaluation. To assist in this evaluation DCW contracted Capital Airspace Group to study the general Project Study Area using the same obstruction evaluation process used by the FAA to identify areas where structures could be restricted below 135' agl. Based on the study conducted by Capital Airspace Group, the proposed routes do not cross through the most restrictive areas identified and the maximum structure height being proposed is 115' agl. Therefore, no impacts to TOB are anticipated as a result of the Project. Following final structure design and siting, DCW will identify and file all structures that require notice to the FAA. Based on DCW's internal review, no obstruction issues are expected to result from the FAA aeronautical study.

11.2.5 Land-Based Economies

a) Agriculture

Land use within the Project Study Area is primarily agricultural. According to the 2012 USDA Agricultural Census Report, over 80% of the land in Dodge County (roughly 225,418 acres) was used for agriculture on approximately 620 farms. Corn, soybeans, and wheat are the primary crops grown in Dodge County, while swine and cattle are the predominant livestock raised in the county. The total market value of agricultural products sold in the County for 2012 was approximately $288.1 million, with crop markets totaling approximately $177.6 million and livestock markets totaling approximately $110.5 million (USDA 2014).

Agricultural land use within Olmsted County is less than Dodge County, at approximately 63% of the County. Roughly 264,407 acres were used for agriculture on approximately 1,150 farms in 2012, according to the USDA Agricultural Census Report. The total market value of agricultural products sold in the County in 2012 was approximately $293.05 million, with crop markets totaling approximately $164.4 million and livestock markets totaling approximately $85.6 million (USDA 2014).

The use of feedlots is a common practice in raising livestock in the state of Minnesota. The MPCA administers rules regulating livestock feedlots in Minnesota. According to MPCA's What's In My Neighborhood, there are 602 registered feedlots in Dodge County and 710 registered feedlots in Olmsted County (MPCA 2018). Livestock in pastureland may be

temporarily disrupted during construction, but appropriate measures will be made to ensure fenced pastureland is secure. Temporary fencing may be put in place if fencing is impacted and will be repaired or replaced after construction.

Land that is used for agricultural production will largely remain unchanged. Short and long-term effects on agricultural land will be minimal. Crops will be able to be planted up to transmission line structures. Changes in agricultural equipment maneuvering routes around transmission structures will be required in some areas, but should have a nominal effect on overall production. When construction occurs outside of winter months there is a higher possibility that minor temporary impacts could occur. Soil compaction, loss of planting opportunity, crop damage, and terrace and drain tile damage could occur due to construction, although impacts are anticipated to be minor. The only farmland that will remain permanently altered will be land where transmission line structures are erected and positioned. This negligible loss of agricultural land will not result in the loss of agricultural-related jobs or net loss of income.

The Applicant will coordinate with landowners to identify property features, such as terraces and drain tiles that need to be avoided during construction activities. Should incidental soil compaction occur as a result of temporary construction activities, appropriate measures will be taken to ensure farmland is restored in accordance with the lease agreement between the landowner and the Applicant.

b) Forestry

There are no economically important forestry resources within Project Study Area. Most wooded areas within the Project Study Area consist of shelterbelts or small woodlands surrounding active farmsteads or bordering streambanks. Therefore, no impacts to economically important forestry resources are expected to occur.

c) Tourism

Generally, tourism in Dodge and Olmsted counties focuses on promoting the area's parks, art, and hospitality facilities, as well as recreational activities. There are no WPAs, SNAs, or WRP conservation easements within the Project Study Area. Two designated snowmobile trails occur within the Project Study Area.

Transmission line structures are expected to be located mostly on private lands, and, therefore, there will be relatively few direct impacts, if any, to existing recreational facilities and tourism activities. The Applicant has initiated coordination with the snowmobile clubs and will continue to coordinate with the clubs regarding the placement of pole structures in the vicinity of the trails and construction timing. Impacts to snowmobile trails will be mostly visual in nature. The transmission line structures are not anticipated to have a negative effect on area tourism.

d) Mining

Based on review of MnDOT County Pit Maps and MnDOT Aggregate Source Information System (ASIS), there are no economically significant mining resources within the Project Study Area (MnDOT 2002, 2018). According to current aerial imagery and the 7.5 Minute Series USGS topographic map for Hayfield, Minnesota (USGS 1966), a minor sand or gravel operation appears to occur within the Project Study Area southwest of the intersection of 240th Avenue and 670th Street in Dodge County. Quarries, gravel, and sand pits exist throughout Dodge and Olmsted counties but are largely inactive, abandoned, or their use is limited to a private landowner. Project infrastructure will not be located within sand or gravel operations and the Project is not expected to impact the mining industry.

11.2.6 Archaeological and Historical Resources

The Project Study Area is located in the Southeast Riverine Archaeological Region. The Southwest Riverine Archaeological Region covers the southwestern most corner of Minnesota, including all of Dodge County and all of Olmsted County (Hudak et al. 2002). Archaeological resources are predominantly concentrated near wooded areas and along major river terrace systems; specifically archeological resources would be expected near water sources on terraces, bluffs, and hilltops. However, archaeological resources have been documented in a large variety of landforms within the region.

SHPO and Minnesota Office of the State Archaeologist (OSA) were visited in May 2017, in February 2018, and again in March 2018 to gather cultural resources records related to the Project Study Area. Cultural resources data maintained by the SHPO and OSA include National Register of Historic Places (NRHP) records, Minnesota State Historic Sites Network (MSHSN) records, Minnesota State Monument (MSM) records, Minnesota State Register of Historic Places (MSRHP) records, "state site" or "state archaeological site" records, records related to previous professional architectural and archaeological surveys, and records related to reported architectural inventory resources and archaeological sites.

The literature review indicated there are currently 10 NRHP listings (sites, structures, properties or districts) in Dodge County and 25 NRHP listings in Olmsted County (National Park Service 2018). None of these NRHP listings are located within the Project Study Area. Cultural resources listed on the MSHSN, MSM, and MSRHP are not located within the Project Study Area. The Project Study Area also does not contain previously recorded archaeological sites. The Project Study Area contains nine known architectural inventory resources. These nine architectural inventory resources have not been evaluated for listing on the NRHP.

While DCW implements an avoidance strategy for cultural resources, the proposed construction activities for the Project may have the potential to encounter unidentified archaeological sites. Should impacts to cultural resources that appear eligible for listing on NRHP be unavoidable, DCW will consult with the SHPO and/or OSA on whether or not the resource is eligible for

listing on the NRHP. In addition, should DCW encounter unidentified archaeological sites during Project construction, DCW will follow an unanticipated discovery plan (UADP) to address any unanticipated discoveries of cultural resources, including archaeological sites and possible human remains. Further information concerning the UADP is discussed below.

Nine known architectural inventory resources are located within the Project Study Area. The Project would cross over architectural inventory resources Trunk Highway 14 and Trunk Hwy 56. Examination of aerial imagery indicates these highways are currently traversed by existing distribution and transmission line routes. Therefore, indirect (i.e., visual) impacts to these highways would not increase from the current impacts created by existing distribution/transmission line routes within the vicinity of the Project. Accordingly, direct and/or visual impacts are not anticipated to affect these architectural inventory resources.

Previously recorded archaeological resources are not located within the Project Study Area. Therefore, impacts to previously recorded archaeological resources would not occur as a result of construction of the Project. A Phase I archaeological survey will be conducted within high probability areas prior to construction to identify and avoid unrecorded archaeological sites which may be present.

DCW will avoid impacts to any discovered significant archaeological or architectural resources to the extent practicable during all phases of the Project, including development micrositing, construction, and operation. Utilization of existing transmission line corridors reduces impacts to cultural resources compared to construction of new transmission line. Attempts were made to design the Project to utilize existing transmission line and utility corridors to the extent possible. If significant archaeological resources are identified during the Phase I archaeological surveys, the integrity and significance of the resource(s) will be assessed in terms of the potential for NRHP eligibility. If the identified archaeological resource(s) are determined to be significant and cannot be avoided by the Project, further investigation and/or mitigation of the resource may be needed and will be coordinated with the SHPO and/or OSA. While avoidance of archaeological resources would be the preferred option, mitigation of impacts to NRHP-eligible archaeological resources may be necessary. The results of this additional investigation or mitigation will be described and documented on a case-by-case basis by compilation into a report, or reports, and shared with the SHPO and/or the OSA.

While there are no state regulations which require an UADP, DCW will prepare such a plan. Should Project construction and/or operation inadvertently encounter previously undocumented archaeological resources or human remains, the discoveries will be reported to the SHPO and/or OSA, as applicable. Should human remains be inadvertently discovered the UADP will address Minnesota's *Damages; Illegal Molestation of Human Remains; Burials; Cemeteries; Penalty; Authentication Statute* (MS 307.08), which protects known or suspected human burials and burial grounds regardless of land ownership status.

11.2.7 Hydrologic Features

The Project Study Area is located within the Upper Mississippi River Basin and is found within the Zumbro watershed (HUC8 07040004) (USEPA 2018). Within this drainage basin, numerous intermittent and ephemeral watercourses, and a few perennial watercourses, are scattered across the Project Study Area. The Project Study Area contains few lakes. The majority of wetland features within the Project Study Area are associated with watercourses.

11.2.8 Groundwater

The State of Minnesota contains six distinct groundwater areas based on information from the MNDNR (2001). The Project Study Area is located partially within South-central Province 2 and Southeastern Province 3 in the southeastern corner of the state. Province 3 has thin or no unconsolidated sediments over bedrock, however the bedrock has productive aquifers. Province 2 has clayey overburden with limited use surficial or buried sand aquifers. The sedimentary bedrock is commonly used for a groundwater supply (MNDNR 2001). Overall, impacts to groundwater resources are not anticipated since continuous need for groundwater use will not be required and intrusion into groundwater systems is not projected to occur.

11.2.9 Surface Water

The majority of wetland features within the Project Study Area are associated with watercourses. The USFWS National Wetland Inventory (NWI) data mapping indicates that many of these wetlands associated with watercourses are categorized as emergent, shrub/scrub, or forested wetlands. According to the USFWS NWI database (USFWS 2018a), the Project Study Area contains approximately 252 mapped NWI wetlands which equates to approximately 566 acres. In addition, some NWI mapped wetlands within the Project Study Area are present in cultivated fields and may be actively farmed.

The MNDNR Public Waters Inventory (PWI) was also reviewed to identify public wetlands, waters, and watercourses. PWI streams within the Project Study Area include Salem Creek, the North Fork of Salem Creek, Cascade Creek, and two unnamed streams. No PWI lakes are located within the Project Study Area.

Routing of the Project included identifying and avoiding potential jurisdictional wetland and non-wetland areas to the extent feasible. Wetland resources will be field-verified and officially delineated prior to construction. Transmission line structures will be sited so as to avoid or minimize adverse impacts to the extent feasible. Overall, impacts to wetlands should generally be minor. A grid network of county and township roads currently exist within the Project Study Area that will offer considerable access, further reducing the potential for wetland impacts.

Permanent impacts to lakes, rivers, streams, and ditches are not expected to occur from the development of the Project as pole structures are not planned within these features. Temporary impacts may consist of temporary culverts/ crossings below the ordinary high water mark to allow for construction access and temporary sedimentation from construction runoff.

11.2.10 Floodplains

Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps are available for most of the Project Study Area (only the Olmsted County portions of the associated facility generation tie line Project Study Area are not mapped by FEMA). Within Dodge County, there are approximately 592 acres (3.2%) of mapped 100-year floodplains (Zone A) associated with Salem Creek, Cascade Creek, and associated tributaries within the Project Study Area (FEMA 2018).

Extensive planning and analysis efforts were made to site the Project such that floodplain areas were avoided and that where floodplain crossings were necessary, that crossings could be made in locations narrow enough to facilitate pole spanning so as to avoid placement of transmission structures within floodplains. During detailed design, to the extent feasible, transmission structures will avoid floodplain areas. Should the placement of transmission structures in floodplains be necessary, permitting will be sought and any necessary mitigation will be implemented. Any impacts to floodplains resulting from a limited number of pole placements would be minor and would not impact the function of the floodplain.

11.2.11 Vegetation and Wildlife

Within the Oak Savanna Subsection (222Me), the pre-settlement vegetation consisted of bur oak savanna which can be characterized as scattered, mature trees with minimal closed forest canopy and continuous tallgrass prairie and forb understory. Within the Rochester plateau Subsection (222Lf), pre-settlement vegetation consisted of hardwood forest, particularly maple-basswood forest, and wetland/grassland. Today, the majority of both ecological subsections consists primarily of row crop agriculture (a minimum of at least 69% agricultural coverage; (MNDNR 2006). Similarly, the majority of the Project Study Area is agricultural row crop. The 2011 National Land Cover Database (Homer et al. 2015) indicates that the Project Study Area contains approximately 16,084 acres of cultivated land, or about 86% of this study area.

Herbaceous/grassland (3.6%) and hay/pasture (2.5%) classification represent the majority of natural land cover within the Project Study Area. Approximately 1.4% of the Project Study Area consists of deciduous woodland (Homer et al. 2015). Based on a preliminary aerial interpretation of the natural vegetation areas along the proposed Project routes, most deciduous woodland areas consist of isolated wooded areas or small riparian corridors.

The Minnesota Biological Survey (MBS) identifies seven *Sites of Biodiversity Significance* that are located completely within and/or partly overlap the Project Study Area (MBS 2017). The

MBS uses classification ranking system to denote the level of biological diversity characteristics of a particular site. Ranking classifications are based on the degree to which the occurrences of the rarest species, including rarest native plant communities or the most intact native ecosystems, are present (MNDNR 2018c). Three of the sites within the Project Study Area are given a biodiversity significance ranking of *below* and four are given a biodiversity significance ranking of *moderate*. There are eight MNDNR designated native plant communities within the Project Study Area totaling approximately 123 acres.

Based on review of the proposed Project routes, construction, and subsequent maintenance of the Project is expected primarily to impact crop cultivation and common vegetation associated with roadside ditches. Minimal other natural vegetation is anticipated to be permanently impacted during establishment of the Project ROW. More than 98% of the ROW associated with each of the proposed Project routes (Route A and Route B) will be avoiding impacts to natural flora communities. Additionally, based on a review of the proposed Project routes, impacts are not expected to occur to high quality MBS *Sites of Biodiversity Significance* (i.e., ranked moderate, high, or outstanding) or Native Plant Communities.

11.2.12 Rare and Unique Natural Resources

a) Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is federally protected through the *Bald and Golden Eagle Protection Act* (BGEPA 1940) and the National Bald Eagle Management Guidelines (NBEMG; USFWS 2007) guides development projects that may have impacts on nesting eagle pairs and nest sites. The bald eagle nests within the Dodge-Olmsted County region. Bald eagle nest surveys were conducted within the Project Study Area via helicopter in 2017 and no active nests were identified. However, a single confirmed active eagle nest within Dodge County (Canisteo Township) was delineated approximately 442 feet outside of the Project Study Area boundary. The NBEMG specifies a 660-foot construction activities avoidance buffer for any known eagle nests during a specifically designated breeding season. The ROW associated with either proposed Project route is a greater distance away from the single, known active bald eagle nest than the established 660-foot construction avoidance area (please refer to USFWS 2007). Direct impacts to the nest tree are not anticipated given its distance from the proposed routes. Additionally, Avian Power Line Interaction Committee guidance will be utilized to determine suitable line marking procedures to prevent avian collision.

b) Federal and State-Listed Threatened and Endangered Species

The USFWS provides distribution lists of federally-listed threatened, endangered, and candidate species on a county-by-county basis. These lists were reviewed for Dodge and Olmsted counties. Additionally, the USFWS IPaC (USFWS 2018b) was used to assess which federally listed species occur within the near vicinity of the Project Study Area. Broad-scale data analysis indicated that three (3) federally threatened species may occur within the Project Study Area: the

northern long-eared bat (*Myotis septentrionalis*), Leedy's roseroot (*Rhodiola integrifolia* ssp. *Leedyi*), and prairie bush-clover (*Lespedeza leptostachya*). None of these species have officially designated critical habitat.

The Applicant requested a formal Natural Heritage Information System (NHIS) data summary of rare species and other significant natural resource features review from the MNDNR Natural Heritage Program for a broad study area encompassing the Project Study Area. This database represents the single most up-to-date repository of records for rare or significant species occurrences. The MNDNR replied with a data assessment and general review. The MNDNR assessment further incorporated data from a 1-mile buffer around this review area, which yielded records for a total of 18 species. These species represent a variety of terrestrial and aquatic species, including seven vascular plant species. Three of these species possess "watchlist" status and are tracked by MNDNR but do not have specific legal protections within the state.

c) Northern Long-eared Bat

Dodge and Olmsted counties are within the range (i.e., has documented records and/or has the potential to harbor critical habitat) of the federally threatened northern long-eared bat. This *Myotis* bat utilizes a forested landscape where summer roosting habitat depends on availability of suitable roost tree substrate (USFWS 2015). Preliminary data within Dodge County indicate that northern long-eared bat may be resident within the sparsely forested landscape in the vicinity of the Project Study Area (Normandeau Associates, Inc. 2014). Based on a preliminary desktop habitat review, the majority of the proposed Project routes pose no impact to northern long-eared bat, but specific habitat crossings near Salem Creek – North Fork could impact potential habitat.

Impacts to northern long-eared bats are not anticipated. However, the USFWS has published tree clearing recommendations to mitigate for direct impact to this species (USFWS 2015). No known northern long-eared bat roost trees are known to exist within the ROW associated with either proposed Project route. Should the Applicant identify or receive information indicating a roost tree is near or within the Project Study Area, no tree clearing would occur within 150 feet of a known roost between June 1 and July 31 in keeping with the USFWS 4(d) rule for this species within the white nose syndrome zone, which includes all of Minnesota (USFWS 2018e).

d) Leedy's Roseroot

Leedy's roseroot (also listed as state endangered) is an exceedingly rare plant in the United States and occurs in widely spaced populations in South Dakota, Minnesota, and New York (USFWS 2018c). In southeastern Minnesota, this rare flowering plant is known from a handful of isolated populations tied to maderate cliffs in the drainages of the Root River and Whitewater River (MNDNR 2005, USFWS 2018c). The Project Study Area does not appear to traverse cliffside karst formations that fit the habitat profile to harbor this threatened species.

e) Prairie Bush-clover

Prairie bush-clover (also state threatened) is a Midwestern bush clover endemic to healthy tallgrass prairie systems, particularly those maintained through periodic prescribed fire (USFWS 2018d). MNDNR (MNDNR 2018d) indicates that remnant populations in southwestern Minnesota typically occur on dry-mesic prairie slopes with populations concentrated in concave bowls containing gravely soils. Populations in southeastern counties are associated with upper slopes of bluff prairies, which may contribute to increase scarcity in this region of the state. MNDNR presumes that remnant populations in level prairie areas have long since been plowed under and remain exceedingly rare if not extirpated. The Project Study Area includes approximately 4.4 acres of Southern Mesic Prairie and approximately 0.3 acres of Southern Wet Prairie, that occur in a level prairie setting which may contain suitable habitat for this species.

The proposed Project routes and associated ROW span a landscape that intersects few biodiverse habitat assemblages. Based on land cover data and review of NHIS data, the probability that the ROW associated with either proposed Project route will intersect and subsequently impact federally threatened or endangered species is relatively low, particularly for the listed flowering plants noted above. Additionally, the ROW associated with either proposed Project route avoids existing native plant communities delineated by the MNDNR.

To the greatest extent possible, a majority of sensitive natural resources were avoided during Project planning. The Applicant will coordinate closely with MNDNR and USFWS, as appropriate, to develop best management practices to minimize or mitigate impacts to sensitive resources.

Overall, no adverse impacts to rare or unique resources, such as direct take or disturbance, are anticipated through construction of the Project. Through the vast majority of the ROW, existing vegetation types would remain the same following Project construction.

Some disturbance to wildlife likely will occur during construction. The Applicant will coordinate with applicable agencies for guidance on appropriate avoidance and/or mitigation steps.

12.0 FACILITY INFORMATION FOR PROPOSED PROJECT AND ALTERNATIVES INVOLVING CONSTRUCTION OF A LEGF (MINN. R. 7849.0320)

12.1 Land Requirements (Minn. R. 7849.0320(A))

The Project is located on land that is zoned for agricultural use. The wind facility will remove approximately 49 acres of land from agricultural use, while the generation tie transmission line will (depending on which route is selected) impact between approximately 240 and 300 acres. Typical wind projects require approximately one-half acre per turbine for the turbine pad, transformer, access road, and associated infrastructure. The land requirements for the Project are consistent with the requirements for wind projects of a similar size. No relocation of people or businesses will be necessary for the Project.

12.1.1 Land Requirements for Water Storage

The Project and associated facility will not require any land for water storage.

12.1.2 Land Requirements for Cooling System

The Project and associated facility will not require any land for a cooling system.

12.1.3 Land Requirements for Solid Waste Storage

The Project and associated facility will require minimal space for maintenance of the facilities, used for the storage of used oil and other lubricants, as well as for spare parts and tools.

12.2 Traffic (Minn. R. 7849.0320(B))

Temporary impacts are expected to public roads during the construction phase of development as materials, personnel and equipment will be brought in via existing U.S. Highways, county roads, and township roads. U.S. Highways 218 and 14 are the main access routes into the Project Area and would likely be used as corridors to bring materials and equipment to the Project site; however, the exact routes will be determined closer to construction and in coordination with local jurisdictions as appropriate. The maximum amount of construction traffic is expected to be approximately 500 trips per day during peak construction. Local roads can accommodate this traffic as the functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day. However, some minor, short-term traffic delays within and near the Project site may occur during turbine and equipment delivery and construction activities.

Construction of the transmission generation tie line is not anticipated to have permanent impacts on roadways or traffic within the proposed routes. However, construction of the transmission facilities will likely result in temporary impacts including road and lane closures and an increase in traffic congestion. Temporary road and lane closures will be necessary to safely and

efficiently install the transmission line across roadways, as necessary. Road and lane closures may cause delays, but most crossings will be able to be completed within 24-48 hours. Once the transmission line has been installed near a road or lane closure, the road and/or lanes would be re-opened and traffic flow would resume as normal. Most of the roads to be affected have minimal daily traffic, and road and/or lane closures should not have significant impacts on local traffic. There may be some traffic impacts at the crossings of US-14 and State Highway 56.

The Project will temporarily increase traffic congestion within the route width and surrounding areas. However, due to the rural setting and generally low traffic present within a majority of the routes, this temporary increase is not anticipated to have a significant impact on local traffic. Rail and barge impacts are not expected.

12.3 Information Pertaining to Fossil-Fueled Activities (Minn. R. 7849.0320(C)-(D))

12.3.1 Fuel

The Project is not a fossil-fueled facility.

12.3.2 Emissions

The Project is not a fossil-fueled facility and will not release any emissions from the power generation process.

12.4 Water Usage for Alternate Cooling Systems (Minn. R. 7849.0320(E))

Wind power plants do not utilize cooling systems. Water requirements therefore are limited to potable water needs for Project personnel. The water requirements of the O&M building will be met through the local rural water service or the installation of a well in accordance with applicable regulations.

12.5 Water Discharges (Minn. R. 7849.0320(F))

No wastewater discharges will occur as a result of the construction or operation of the Project except for domestic-type sewage discharges of Project personnel. Temporary sanitary facilities will be provided during construction, and the O&M building may require a septic system, which will be installed in accordance with applicable regulations.

12.6 Radioactive Releases (Minn. R. 7849.0320(G))

The Project and its associated facility will not produce any radioactive releases.

12.7 Solid Waste (Minn. R. 7849.0320(H))

Hazardous materials used and stored within the Project Area during construction may consist of fuel, lubricating oil, hydraulic oil, propylene glycol, and other materials. Additionally, during operation of the wind farm, hazardous materials, such as hydraulic oil, lube oil, grease, and

cleaning solvents will be used and stored on-site as they are necessary to maintain wind turbines and other equipment. Also, pad mounted and grounding transformers required for the operation of the Project contain large quantities of cooling fluids, typically consisting of mineral oil.

Due to the presence of hazardous materials during Project construction and operations, there is the potential for Project spills and/or leaks to occur. The primary concerns associated with these potential spills and/or leaks are the potential impacts to surface and ground water resources and the potential for soil contamination within the Project Area. To avoid potential impacts to water and soil resources, hazardous materials stored outdoors will be stored within secondary containment. Secondary containment will prevent impacts and will ensure that leaks, if they occur, will be contained. Additionally, a Spill Prevention, Control, and Countermeasure Plan (SPCC) will be developed for both the construction and operational phases of the Project. The SPCC will detail the appropriate storage, cleanup, and disposal of hazardous wastes to ensure potential impacts are avoided.

12.8 Noise (Minn. R. 7849.0320(I))

The highest predicted worst-case sound level from the Project wind turbines is below the 50 dBA limit at all modeled receptors. The highest L50 sound level is 47 dBA at non-participating receptor #210. Nighttime measurements showed non-wind-turbine ambient L50 broadband sound levels range from 25 to 56 dBA when ground-level wind speeds were at or below 11 mph and winds at hub height corresponded to conditions in the modeling. These measured sound levels exceeded 50 dBA at five of the six locations during the measurement program. Ambient sound levels in the Project Area fluctuate due to sound sources such as ground-level winds and vegetation rustle, both of which can cause ambient sound levels to exceed the MPCA L50 nighttime limit of 50 dBA. The highest predicted worst-case Project Only L50 sound level at a modeling receptor is 47 dBA, and, therefore, is below the most restrictive MPCA sound limit of 50 dBA. DCW Site Permit Appendix D (Pre-construction Sound Analysis) provides further details of the sound modeling analysis.

DCW has designed the wind project to meet the MPCA state noise standards and to minimize the sound levels due to the wind turbines at the homes in the community as much as possible, while also meeting the other constraints of the project design and regulatory requirements.

12.9 Work Force for Construction and Operation (Minn. R. 7849.0320(J))

Approximately 200 temporary construction and approximately 5 full time O&M jobs are expected as part of this Project. The construction of the associated facility generation tie line is expected to add another 30-40 temporary jobs.

12.10 Number and Size of Transmission Facilities (Minn. R. 7849.0320(K))

The one generation tie line will be at 345 kV and approximately 23 miles in length, which will start on the high-side (345 kV) of the DCW collector substation and connect to the transmission grid at the Byron Substation.

13.0 REFERENCES

BGEPA (1940). Bald and Golden Eagle Protection Act. In 16 United States Code (U.S.C.) § 668 et seq.

Dodge County Board (2013). Dodge County Board. *Dodge County Minnesota*. [Online.] Available at http://co.dodge.mn.us/county_board/index.php.

FEMA (2018). Flood Map Service Center. [Online.] Available at http://msc.fema.gov/portal/.

Homer, C., J. Dewitz, L. Yang, S. Jin, P. Denielson, G. Xian, J. Coulston, N. Herold, J. Wickham, and K. Megown (2015). Completion of the 2011 National Land Cover Database for the Conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering & Remote Sensing 81:345–354.

MBS (2017). MBS Sites of Biodiversity Significance. [Online.] Available at ftp://ftp.gisdata.mn.gov/pub/gdrs/data/pub/us_mn_state_dnr/biota_mcbs_sites_of_biodiversity/metadata/metadata.html.

MNDNR (2001). Figure 1: Minnesota Ground Water Provinces. [Online.] Available at http://files.dnr.state.mn.us/natural_resources/water/groundwater/provinces/gwprov.pdf.

MNDNR (2005). CTs43 Southern Maderate Cliff Factsheet (Cliff/Talus System-Southern Floristic Region). [Online.] Available at http://files.dnr.state.mn.us/natural_resources/npc/cliff_talus/cts43.pdf.

MNDNR (2006). Rochester Plateau: Subsection Profile. [Online.] Available at http://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/cwcs/profiles/rochester_plateau.pdf.

MNDNR (2018a). Ecological Classification System: Ecological Land Classification Hierarchy. [Online.] Available at http://www.dnr.state.mn.us/ecs/index.html.

MNDNR (2018b). Wildlife Management Areas. *Minnesota Department of Natural Resources*. [Online.] Available at http://www.dnr.state.mn.us/wmas/index.html.

MNDNR (2018c). MBS Site Biodiversity Significance Ranks. *Minnesota Department of Natural Resources*. [Online.] Available at http://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html.

MNDNR (2018d). Species profile: Lespedeza leptostachya (Prairie Bush Clover). *Minnesota Department of Natural Resources Rare Species Guide*. [Online.] Available at http://dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDFAB27090.

MnDOT (2002). County Pit Maps: Dodge County Minnesota. [Online.] Available at http://www.dot.state.mn.us/materials/maps/copitmaps/dodge.pdf.

MnDOT (2018). Aggretate Sources - Viewing with Google Earth. *Minnesota Department of Transportation ASIS Map - Google Earth*. [Online.] Available at https://www.dot.state.mn.us/materials/asis_GE.html.

MPCA (2018). What's In My Neighborhood. *Minnesota Pollution Control Agency (MPCA)*. [Online.] Available at http://pca-gis02.pca.state.mn.us/wimn2/index.html.

National Park Service (2018). National Register of Historic Places. *National Park Service*. [Online.] Available at https://npgallery.nps.gov/nrhp.

Normandeau Associates, Inc. (2014). Bat Monitoring Final Report for the Dodge County Wind Resource Area Dodge County, Minnesota.

U.S. Census Bureau (2018). American FactFinder - Community Facts. *United States Census Bureau*. [Online.] Available at https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml.

USDA (2014). Table 1. County Summary Highlights: 2012. In 2012 Census of Agriculture: United States Summary and State Data. Geographic Area Series Part 51:227–252.

USDA (2018). Web Soil Survey. *U.S. Department of Agriculture, Natural Resources Conservation Service*. [Online.] Available at http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm.

USEPA (2018). Zumbro Watershed -- 07040004. *U.S. Environmental Protection Agency*. [Online.] Available at https://cfpub.epa.gov/surf/huc.cfm?huc_code=07040004.

USFWS (2007). National Bald Eagle Management Guidelines. [Online.] Available at http://www.fws.gov/southdakotafieldoffice/NationalBaldEagleManagementGuidelines.pdf.

USFWS (2015). Endangered and Threatened Wildlife and Plants; Threatened Species Status for the Northern Long-Eared Bat With 4(d) Rule. In 79 FR 20073. pp. 17973–18033.

USFWS (2018a). National Wetlands Inventory [NWI]. *U.S. Fish and Wildlife Service - NWI Wetland Mapper*. [Online.] Available at http://www.fws.gov/wetlands/Data/Mapper.html.

USFWS (2018b). IPaC - Information for Planning and Consultation. [Online.] Available at http://ecos.fws.gov/ipac/.

USFWS (2018c). Species Profile for Leedy's Roseroot (Rhodiola integrifolia ssp. leedyi). *Environmental Conservation Online System*. [Online.] Available at https://ecos.fws.gov/ecp0/profile/speciesProfile?sId=285.

USFWS (2018d). Species Profile for Prairie Bush Clover (Lespedeza leptostachya). *Environmental Conservation Online System*. [Online.] Available at https://ecos.fws.gov/ecp0/profile/speciesProfile?sId=4458.

USFWS (2018e). Northern Long-Eared Bat Final 4(d) Rule: White-Nose Syndrome Buffer Zone Around WNS/Pd Positive Counties/Districts. [Online.] Available at https://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf.

USGS (1966). Hayfield, Minnesota.