Certificate of Need Application to the Minnesota Public Utilities Commission

Docket Number: IP-7002/CN-19-154

Jackson County, Minnesota
July 31, 2019

Prepared For:

Three Waters Wind Farm, LLC
4865 Sterling Drive, Suite 200
Boulder, CO 80301

Project Name:	Three Waters Wind Farm
Project Location:	The Project's Minnesota footprint spans approximately 48,000 acres in Ewington, Round Lake, Sioux Valley, Rost, Hunter, and Minneota Townships in Jackson County.
Applicant:	Three Waters Wind Farm, LLC, c/o Scout Clean Energy LLC
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ACRONYMS

AADT	Annual Average Daily Traffic
Applicant or Three Waters	Three Waters Wind Farm, LLC
AST	Aboveground Storage Tank
BBCS	Bird and Bat Conservation Strategy
Biennial Report	2017 Biennial Transmission Projects Report
BOP	Balance of Plant
CN	Certificate of Need
Commission	Minnesota Public Utilities Commission
CO_2	Carbon Dioxide
CPP	Clean Power Plan
CRP	Conservation Reserve Program
CSAH	County State Aide Highway
dB(A)	The dB(A) scale is A-weighted decibels
EBH	Environmental Bore Hole
EIA	U.S. Energy Information Administration
EPC	Engineering, Procurement and Construction
EWG	Exempt Wholesale Generator
Exemption Request	Request for Exemption from Certain Certificate of Need Application Content Requirements
FAA	Federal Aviation Administration
IRP	Integrated Resource Plan
ITC	Investment Tax Credit
LEGF	Large Electric Generating Facility
kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt hour
LHVTL	Large High Voltage Transmission Line
LiDAR	Light Range Detecting Unit
LWECS	Large Wind Energy Conversion System
Minn. R.	Minnesota Rules
Minn. Stat.	Minnesota Statutes
MISO	Midcontinent Independent System Operator
MnDOT	Minnesota Department of Transportation
MP	Minnesota Power

MPCA	Minnesota Pollution Control Agency
MVP	Multi Value Project
MW	Megawatt Alternating Current (AC)
MWh	Megawatt hour
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
POI	Point of Interconnection
PPA	Power Purchase Agreement
Project	Three Waters Wind Farm
PTC	Production Tax Credit
RES	Renewable Energy Standard
Scout	Scout Clean Energy LLC
SoDAR	Sonic Range Detecting Unit
SPCC	Spill Prevention Control and Countermeasure Plan
VSQG	Very Small Quantity Generator
WIRS	Wildlife Incident Reporting System

APPLICATION CONTENT CHECKLIST

Minnesota Rule	Required Information	Application Section(s)	Exemption Granted
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**		
A(1)	Accuracy of the applicant's forecast	4.1 6.0	Yes
A(2)	Effects of applicant's existing or expected conservation programs and state and Federal conservation programs	4.1 8.0	No
A(3)	Effects of promotional practices on demand	3.2.2 4.1	Yes
A(4)	Ability of current and planned facilities, not requiring certificates of need, to meet future demand	4.1	No
A(5)	Effect of proposed facility in making efficient use of resources	4.1	No
7849.0120	**Criteria – A more reasonable and prudent alternative has not been demonstrated**		
B(1)	Appropriateness of size, type, and timing	4.2.1	No
B(2)	Cost of facility and its energy compared to costs of reasonable alternatives	4.2.2	No
B(3)	Effects of the facility upon natural and socioeconomic environments compared to the effects of reasonable alternatives	4.2.3	No
B(4)	Expected reliability compared to reasonable alternatives	4.2.4	No
7849.0120	**Criteria – Facility will provide benefits to society**		No
C(1)	Relationship of proposed facility to overall state energy needs	4.3.1	No
C(2)	Effects of facility upon the natural and socioeconomic environments compared to the effects of not building the facility	4.3.2	No
C(3)	Effects of facility in inducing future development	4.3.3	No
C(4)	Socially beneficial uses of the output of the facility, including to protect or enhance environmental quality	4.3.4	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	4.4	No
7849.0210	**Filing Fees and Payment Schedule**	2.3	No
7849.0240	**Need Summary and Additional Considerations**		
Subp. 1	Need Summary – summary of major factors justifying	3.1	No

Minnesota Rule	Required Information	Application Section(s)	Exemption Granted
	need for facility		
Subp. 2(A)	Additional Considerations – Socially beneficial uses of the output of the facility, including to protect or enhance environmental quality	3.2.1	No
Subp. 2(B)	Additional Considerations – Promotional activities that may have given rise to the demand for the facility	3.2.2	Yes
Subp. 2(C)	Additional Considerations – Effects of the facility in inducing future development	3.2.3	No
7849.0250	**Proposed LEGF and Alternatives Application**		
A(1)	Description – Nominal generating capability and effects of economies of scale on facility size and timing	5.1.1	No
A(2)	Description – Anticipated operating cycle, including annual capacity factor	5.1.2	No
A(3)	Description – Type of fuel, reason for selection, projection of availability over life of facility, and alternative fuels	5.1.3	No
A(4)	Description – Anticipated heat rate	5.1.4	No
A(5)	Description – Anticipated areas where facility will be located	5.1.5	No
B(1)	Discussion of Alternatives – Purchased power	5.2.1.1	Yes
B(2)	Discussion of Alternatives – Increased efficiency of existing facilities	5.2.1.2	Yes
B(3)	Discussion of Alternatives – New transmission lines	5.2.1.3	Yes
B(4)	Discussion of Alternatives – New generating facilities of a different size and energy resource	5.2.1.4-10	Yes
B(5)	Discussion of Alternatives – Reasonable combination of alternatives	4.2.1.11	Yes
C	Proposed Facility and Alternatives	5.3	
C(1)	Capacity cost in current dollars per kilowatt	5.3.1	Yes
C(2)	Service life	5.3.2	Yes
C(3)	Estimated average annual availability	5.3.3	Yes
C(4)	Fuel costs in current dollars per kilowatt hour	5.3.5	Yes
C(5)	Variable operating and maintenance costs in current dollars per kilowatt hour	5.3.4	Yes
C(6)	Total cost in current dollars of a kilowatt hour provided by it	5.3.6	Yes
C(7)	Estimate of its effect on rates system-wide and in Minnesota	5.3.7	Yes
C(8)	Efficiency, expressed for a generating facility as the estimated heat rate	5.3.8	Yes
C(9)	Majoring assumptions made in providing information in subitems (1) to (8), including projected escalation	5.3	Yes

Minnesota Rule	Required Information	Application Section(s)	Exemption Granted
	rates for fuel costs and operating and maintenance costs, as well as projected capacity factors		
D	System Map	5.4	Yes
E	Other relevant information about the facility and alternatives that may be relevant to a determination of need		No
7849.0270	**Peak Demand and Annual Consumption Forecast**		Yes
Subp. 1	Scope – Application shall contain pertinent data concerning peak demand and annual electrical consumption within the applicant's service area and system	6.0	Yes
Subp. 2	Content of Forecast	6.0	Yes
Subp. 3	Forecast Methodology	6.0	Yes
Subp. 4	Data Base for Forecasts	6.0	Yes
Subp. 5	Assumptions and Special Information	6.0	Yes
Subp. 6	Coordination of Forecasts with Other Systems	6.0	Yes
7849.0280	**System Capacity**	7.0	Yes
7849.0290	**Conservation Programs**	8.0	Yes
7849.0300	**Consequences of Delay**	9.0	Yes
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**		
7849.0320	**Generating Facilities**		
A	Estimated range of land requirements, including water storage, cooling systems, and solid waste storage	11.1	No
B	Estimated amount of vehicular, rail, and barge traffic generated by construction and operation of facility	11.2	No
C	Fossil-fuel facilities – Fuel	11.3.1	No
D	Fossil-fuel facilities – Emissions	11.3.2	No
E	Water Use for Alternate Cooling Systems	11.4	No
F	Sources and types of discharges to water	11.5	No
G	Radioactive releases	11.6	No
H	Types and quantities of solid wastes in tons/year	11.7	No
I	Sources and types of audible noise attributable to facility operation	11.8	No
J	Estimated work force required for facility construction and operation		No
K	Minimum number and size of transmission facilities required to provide a reliable outlet for the generating facility		No
7849.0330	**Transmission Facilities**	5.2.1.10	Yes
7849.0340	**No-Facility Alternative**	5.2.1.9	Yes

1.0 EXECUTIVE SUMMARY

Three Waters Wind Farm, LLC ("Three Waters" or the "Applicant") submits this application for a Certificate of Need ("CN") to the Minnesota Public Utilities Commission (the "Commission"), pursuant to and in accordance with Minnesota Statutes Section 216B.243 and Minnesota Rules Chapter 7849. Three Waters respectfully requests that the Commission issue a CN for the up to 201 megawatt ("MW") Three Waters Wind Farm (the "Project"), a "large energy facility," as defined in Minnesota Statutes Section 216B.2421, subd. 2(1).[1] Minnesota Rules Section 7849.0010, subp. 13, in turn, defines a "large electric generating facility" ("LEGF") as an electric power generating unit or combination of units as defined by Section 216B.2421, subd. 2(1).

2.0 INTRODUCTION

2.1 THE THREE WATERS WIND FARM

Three Waters is an independent power producer that proposes to construct and operate the Project at a site within Jackson County in southwest Minnesota and Osceola and Dickinson Counties in northwest Iowa. The Project's Minnesota site permit boundary spans approximately 48,000 acres in Ewington, Round Lake, Sioux Valley, Rost, Hunter, and Minneota Townships in Jackson County. The Iowa portion of the Project encompasses approximately 11,000 acres. Three Waters is seeking the Certificate of Need determination and Site Permit approval for the entire 201 MW Project in Minnesota, but reserves the right to site up to 100 MW of the 201 MW Project within Osceola and Dickinson Counties in Iowa. The determination as to the distribution of the Project within Minnesota and Iowa will be made prior to construction and is dependent upon final micro-siting and engineering. For the purposes of this application, the analyses presented herein focus on the impacts to Minnesota land and Minnesota residents and include analysis of impacts to Minnesota land and Minnesota residents from turbines sited in Iowa. For example, the noise and shadow flicker models incorporate all proposed turbine locations in Minnesota and Iowa to determine the potential impact on occupied residences in Minnesota.

Three Waters has selected the GE 2.x wind turbine generator, which is currently a 2.82 MW wind turbine generator, as the primary wind turbine model for the Project. If the technology is economical and commercially proven, Three Waters may elect to utilize the GE 3.x machine, which is currently a 3.03 MW wind turbine generator, instead. It should be noted that GE and other turbine manufacturers are regularly improving and modifying their turbine technology. In the year long permit process, Three Waters expects changes to the turbine technology to make them more efficient and more effective at converting wind to electrical energy such that the nameplate capacity of the turbines could increase. For example, the nameplate for the GE. 2.x machine may change from a 2.82 to a 2.87 MW machine. It is important that this application account for minor changes such as this example.

[1] The Project is also a "Large Wind Energy Conversion System," as defined in Minnesota Statutes Section 216F.01, subd. 2.

In addition to wind turbines, the Project will consist of an electrical collection system, access roads, permanent meteorological towers, substation and interconnection facilities, laydown yard, batch plant[2], communications equipment, an operation and maintenance facility, and other infrastructure typical of a wind farm. The Project will interconnect at an existing 345 kV transmission line, owned by ITC Holdings Corp., that is located in Sioux Valley Township in the southeasterly portion of the Project footprint. Three Waters plans to construct the Project on a schedule that facilitates an in-service date as early as the fourth-quarter of 2021.

2.2 PROJECT OWNERSHIP

Three Waters' parent, Scout Clean Energy LLC ("Scout"), is based in Boulder, Colorado. Scout is a North American renewable energy development company focused on utility scale wind development. The Scout team has an extensive track record developing large-scale wind energy projects. Scout was officially formed in July 2016 with its headquarters in Boulder, Colorado. Three Waters does not have ownership or financial interests in any other operating Large Wind Energy Conversion Systems ("LWECS") in Minnesota.

Project experience since Scout began in 2016 includes the Sweetland 200-MW project in Hand County, South Dakota (application filed with South Dakota Public Utilities Commission on March 6, 2019), the Ranchero 300-MW project in Crockett County, Texas (under construction, anticipated commercial operations date of September 2019), and the Persimmon Creek 200-MW project in Woodward County, Oklahoma (commercial operations date of August 2018). Prior to forming Scout, members of the team were integral in the successful development, marketing, and financing of over five gigawatts of utility scale wind facilities across the United States and Canada.

Scout is a portfolio company of Quinbrook Low Carbon Power Fund LP and Quinbrook Low Carbon Power Parallel Fund (US) LP (collectively, the "Fund"). The Fund is an infrastructure fund with approximately $1.6 billion in capital raised with investments in the United States, Europe, and Australia. With support from the Fund, Scout has the experience, skills, personnel, financial backing, and proven capability to successfully manage wind project development, construction, and operations and maintenance ("O&M").

2.3 POWER PURCHASE AGREEMENT

A CN from the Commission is required for all "large energy facilities," defined to include generators greater than 50 MW in size, constructed in Minnesota, unless a statutory exemption applies.[3] Three Waters proposes to construct a LWECS of up to 201 MW in Jackson County, Minnesota. Therefore, absent an exemption, a CN will be required.

Three Waters has entered into a power purchase agreement ("PPA") with Minnesota Municipal Power Agency ("MMPA") whereby MMPA agreed to purchase up to 200 MW of the energy generated by the Project. MMPA is not seeking Commission approval of the Three

[2] The need for a batch plant will be determined by the contractor chosen at the time the Project is constructed.

[3] Minn. Stat. §§ 216B.243 and 216B.2421.

Waters PPA, nor does MMPA have a Commission-approved resource acquisition process. Accordingly, the Commission has not determined the need for the Project or approved the PPA. Therefore, Three Waters is proceeding with this application because the Project is not exempt from the CN requirement.

This application also demonstrates how this Project is needed to comply with Minnesota's carbon reduction goals, meet MMPA's internal goal of generating 100 percent of its energy needs from renewables and allowing MMPA to use the Project to help it meet any current of future Renewable Energy Standard ("RES") and other clean energy requirements in Minnesota. In addition to the foregoing, Three Waters has qualified the Project to receive federal Production Tax Credits ("PTC") and is thereby positioned to provide much needed renewable energy at a low-cost to utilities and their rate-payers. Three Waters was Production Tax Credit qualified in 2017 using the start of construction test, specifically on starting the manufacturing of a transformer. Securing power from a PTC qualified project, such as the Project, will allow MMPA to secure low-cost carbon-free energy before the PTC expires. Three Waters respectfully requests that the Commission issue a CN for the Project on the basis of a need for economical and carbon-free renewable energy for MMPA's customers. This approval will preserve the Project's ability to achieve the commercial operation date required to maintain its qualification for the PTC value and thereby preserve the Project's ability to generate low-cost, carbon-free energy for MMPA's customers and their ratepayers.

2.4 PROJECT CONTACTS

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2.5 FILING FEES AND PAYMENT SCHEDULE (MINN. R. 7849.0210)

The total fee for this CN application and the schedule for payment are shown in Table 2.5. The fee determination for the Project is based on a capacity of an up to 201 MW, per the requirements of Minn. R. 7849.0210, subp. 1. The payment schedule is based on Minn. R. 7849.0210, subp. 2.

Table 2.5: Certificate of Need Application Schedule of Payments

Fee Calculation	Amount
Fee Calculation Equation	$10,000 + $50/MW
Due with CN Application	$5,012.50
Due 45 days after Application submittal date	$5,012.50
Due 90 days after Application submittal date	$5,012.50
Due 135 days after Application submittal date	$5,012.50
Total Calculated Fee	$20,050.00

2.6 EXEMPTION REQUEST

Minn. R. Ch. 7849 sets forth the data an applicant must provide in a CN application. 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 February 12, 2019, Three Waters submitted a Request for Exemption from Certain Certificate of Need Application Content Requirements ("Exemption Request"). In its Exemption Request, Three Waters requested that the Commission grant its exemptions for an up to 200 MW project[4], pursuant to Minn. Stat. § 216B.243 and Minn. R. 7849.0200, from certain CN data requirements that are not necessary to determine the need for an independent power production facility, or a renewable energy facility designed to satisfy carbon reduction goals, the RES requirements set forth in Minn. Stat. § 216B.1691 or other clean energy standards.

On March 26, 2019, the Commission issued an order granting Three Waters the exemptions it requested in its Exemption Request.[5] Where appropriate in this application, Three Waters will reference the specific exemptions granted by the Commission.

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

3.1 NEED SUMMARY

Three Waters and MMPA entered into an up to 30-year PPA for the purchase and sale of all power generated by the Project on May 13, 2019. On July 31, 2018, MMPA filed its 2019 – 2033 Integrated Resource Plan (the "2018 IRP") under Minn. Stat. § 216B.2422 and Minn. R. 7843 for Commission review and approval.[6] On May 28, 2019, the Commission issued an Order accepting MMPA's 2018 IRP.[7]

MMPA, like other utilities, has a need to comply with Minnesota's carbon reduction goals, meet MMPA's internal goal of generating 100 percent of its energy needs from

[4] Since the Exemption Request was approved by the Commission, the requested nameplate capacity of the Project has been increased to up to 201 MW to account for the fact that if a GE 2.82 turbine is utilized the nameplate capacity of the Project will be 200.22 MWs. If the GW 3.03 turbine is utilized the nameplate capacity will be 199.98 MWs.

[5] *In the Matter of the Application of Three Waters Wind Farm, LLC for a Certificate of Need for an up to 200 MW Large Wind Energy Conversion System in Jackson County, Minnesota*, Docket No. IP-7002/CN-19-154, Order (March 26, 2019) and Order – Erratum Notice (April 16, 2019).

[6] *In the Matter of Minnesota Municipal Power Agency 2019-2033 Resource Plan*, Docket No. ET-6133/RP-18-524, Initial Filing (July 31, 2018).

[7] *In the Matter of Minnesota Municipal Power Agency 2019-2033 Resource Plan*, Docket No. ET-6133/RP-18-524, Order (May 28, 2019)

renewables and to use the Project to help it meet any current or future RES and other clean energy requirements in Minnesota. As discussed in Section 3.2.1 below, the Project will assist MMPA in reducing carbon dioxide ("CO_2") emissions and assist it in meeting the Minnesota Green House Gas Emissions Reduction Goal of 80 percent below 2005 levels by 2050. Pursuant to Minn. Stat. § 216B.1691, utilities that do not own a nuclear generating facility as of January 1, 2007, including MMPA, are required to provide 25 percent of their total retail electric sales from eligible renewable resources by 2025. As shown on Table 3.1, the Legislature also established interim milestones to ensure that utilities make progress towards the "25 by '25" requirement. MMPA is currently required to provide 17% of its total retail electric sales from eligible renewable resources and will be required to provide 20% by the end of 2020. On June 28, 2018, the Department of Commerce, Division of Energy Resources, found that MMPA was in compliance with its 2017 RES requirements.[8]

Table 3.1: 25 X '25 Interim Milestones

Year	MMPA Requirement
2016	17%
2020	20%
2025	25%

MMPA currently has five existing renewable energy resources (Black Oak Getty Wind Farm, Oak Glen Wind Farm, Buffalo Solar, Hometown Bioenergy, and Hometown Wind) and has signed a PPA with NextEra for 170 MW of generating capacity.[9] MMPA is positioned to meet its RES requirements in future years through a mix of purchases and resources, including the Project's PPA and other wind PPAs.[10] However, the Minnesota legislature has considered, but has not passed, legislation on multiple occasions in recent legislative sessions to modify Minnesota's renewable energy requirements to require utilities to obtain additional electricity from renewable sources beyond that which is currently required by the RES.[11] Accordingly, should the RES change in the future, the Project will assist MMPA in satisfying the increase in

[8] *In the Matter of Commission Consideration and Determination of Compliance with Renewable Energy Standards for Year 2017*, Docket Nos. E-999/M-18-78, E-999/PR-02-1240 and E-999/PR-18-12, Comments of the Minnesota Department of Commerce, Division of Energy Resources (June 28, 2018).

[9] 2018 IRP at 38, 39.

[10] 2018 IRP at 39.

[11] See E.g., Legislation would boost Standard for Renewable Energy, Mike Hughlett, Star Tribune (February 27, 2017), legislature considered bill to increase RES to 50% (http://www.startribune.com/legislation-would-boost-standard-for-renewable-energy/414886624/) introduced at H.F. No. 1772 on February 27, 2017; and Renewable Energy Developers Stand Ready to Help Minnesota Achieve New Clean Energy Milestones, Clean Grid Alliance (February 5, 2019), legislation proposed to increase RES to 85 percent by 2035 and establishes a 100 percent carbon-free standard by 2050 (https://cleangridalliance.org/press/48/renewable-energy-developers-stand-ready-to-help-minnesota-achieve-new-clean-energy-milestones); introduced as H. F. No. 1671 on February 25, 2019. See also the Clean Energy Act First introduced as H. F. No. 1956 on March 4, 2019.

the RES. For example, MMPA anticipates that in 2025 53% of its wholesale sales will come from renewable resources.[12]

On November 21, 2017, the Minnesota Transmission Owners jointly filed with the Commission the 2017 Biennial Transmission Projects Report (the "2017 Biennial Report"), which outlines the transmission upgrades needed to support development of renewable energy resources needed to meet RES requirements.[13] In the 2017 Biennial Report, "[t]he utilities recognize that additional transmission and generation will be necessary for 2020 and beyond in Minnesota, and that other demands for renewable energy will impact Minnesota's compliance status."[14] Minnesota utilities and utilities in the region must develop or purchase a significant amount of additional renewable generation in order to satisfy the RES and other clean energy and carbon reduction standards.[15] On August 2, 2017, the Commission found all utilities subject to the RES requirements were in compliance with the 2014 and 2015 RES requirements.[16] On April 5, 2018, the Department of Commerce, Division of Energy Resources, found utilities subject to the RES requirements in compliance with the 2017 RES requirements.[17]

More generally, a review of utilities' IRPs, requests for proposals, and similar documents confirms that utilities have and will continue to seek additional renewable generation resources in the next several years.[18] In some cases, utilities, such as MMPA, will be seeking additional renewable energy generation sources above and beyond that which is required by the RES due, in part, to the extension of federal renewable energy tax credits keeping the cost of renewable energy low.[19] For example, in the MISO region, utilities have expressed a need for more than

[12] 2018 IRP at 5.

[13] 2017 Biennial Transmission Projects Report, Docket No. E999/M-17-377, at 143 (Nov. 1, 2017) (the "2017 Biennial Report").

[14] 2017 Biennial Report at 143.

[15] *Id.* at 143-144.

[16] *In the Matter of Commission Consideration and Determination on Compliance with Renewable Energy Standards (RES)*, Docket No. E-999/M-16-83, Order finding Utilities in Compliance with Minn. Stat. § 216B.1691 (August 2, 2017).

[17] *In the Matter of Commission Consideration and Determination of Compliance with Renewable Energy Standards for Year 2017*, Docket Nos. E-999/M-18-78, E-999/PR-02-1240 and E-999/PR-18-12, Comments of the Minnesota Department of Commerce, Division of Energy Resources (April 5, 2018).

[18] *See e.g.*, Xcel Energy, Upper Midwest Resource Plan 2016-2030 (*In the Matter of Xcel Energy's 2016-2030 Integrated Resource Plan*, Docket No. E-002/RP-15-21, Initial Filing (Jan. 2, 2015)) (approved by the Commission on January 11, 2017); Xcel Energy Carbon Report 2019 (available at https://www.xcelenergy.com/environment/carbon_reduction_plan); Minnesota Power, 2015 Integrated Resource Plan (*In the Matter of Minnesota Power's 2016-2030 Integrated Resource Plan*, Docket No. E-015/RP-15-690, Initial Filing (Sept. 1, 2015) (approved by the Commission on July 18, 2016); Otter Tail Power Company, Application for Resource Plan Approval 2017-2031 (*In the Matter of Otter Tail Power Company's 2017-2031 Integrated Resource Plan*, Docket No. E-017/RP-16-386, Initial Filing (June 1, 2016) (approved by the Commission on April 26, 2017).

[19] *See e.g.*, Xcel Energy, Upper Midwest Resource Plan 2016-2030 (*In the Matter of Xcel Energy's 2016-2030 Integrated Resource Plan*, Docket No. E-002/RP-15-21, Initial Filing (Jan. 2, 2015).

1,000 MW of renewable energy (including wind) before 2020.[20] MMPA, and other utilities, will continue to require additional renewable energy generation between 2020 and 2030. Given this demand for renewable energy, a market exists for independently produced electricity generated from wind and other renewables, including the up to 201 MW to be generated by the Project.

In addition to satisfying RES requirements, the demand for renewable energy has increased because of its cost-competitiveness with traditional fuel sources such as coal and natural gas. Continuing declines in pricing for new wind projects makes wind an attractive resource for utility capacity additions, competitive with new natural gas-fueled capacity.[21] According to Lazard, an international economics firm, wind energy in the Midwest region is the least costly source of new power generation, even without accounting for federal tax incentives.[22]

The demand for wind energy in Minnesota is further demonstrated by Minnesota's continued presence as one of the top states for wind energy production and capacity. In 2018, Minnesota ranked 8th in wind energy share of electricity generation (17.9%), 7th in wind energy generation (11,346 MWh), 14th in new capacity additions in 2018 (90 MW), and 7th in cumulative capacity (3,778 MW).[23]

3.2 ADDITIONAL CONSIDERATIONS

3.2.1 Socially Beneficial Uses of Energy Output

Energy produced by the Project will provide significant, numerous, and varied societal benefits. First, the Project will provide a large amount of renewable energy with minimal environmental impact, as discussed in Section 10 in this application. Further, regional and national security and energy reliability can be enhanced through the development of diversified generation resources such as wind energy generation sources. The Project will also assist MMPA in reducing CO_2 emissions. The Minnesota Green House Gas Emissions Reduction Goal identifies greenhouse gas emission reduction targets of 30 percent below 2005 levels by 2025 and 80 percent below 2005 levels by 2050.[24] The up to 30-year term of the Project's PPA with MMPA will help MMPA achieve the 80% CO_2 reduction targets by 2050. Without the Project,

[20] *Id.*; *See also* MISO, *Results for MISO's Mid-Term Analysis of EPA's Final Clean Power Plan*, at 14 (Mar. 16, 2016) (stating that study results showed "that a cost effective way to achieve high levels of CO_2 reduction is to build wind in resource-rich areas and transmission to deliver it to the rest of MISO") (available at https://cdn.misoenergy.org/20160316%20PAC%20Item%2002b%20CPP%20Final%20Rule%20Analysis%20Mid%20Term%20Results89561.pdf).

[21] Minnesota Department of Commerce, *Energy Policy and Conservation Quadrennial Report 2016*, at 19 ("2016 Quad Report") (available at https://mn.gov/commerce-stat/pdfs/quad-report-2016.pdf); Electricity Markets & Policy Group, 2017 *Wind Technologies Market Report*, at 48-65 (available at https://emp.lbl.gov/wind-technologies-market-report).

[22] *Lazard's Levelized Cost of Energy Analysis – Version 10.0*, at 2, 9 (Dec. 2016) (available at https://www.lazard.com/media/438038/levelized-cost-of-energy-v100.pdf).

[23] *See* American Wind Energy Association, *U.S. Wind Industry Annual Market Report Year Ending 2018*, at 38-41 (the "AWEA 2018 Annual Report").

[24] Minn. Stat. § 216H.02

MMPA has reduced its Total Emissions (Lbs CO_2) and Emissions Rate (Lbs CO_2 / MWh) by 34% and 42% from 2005 levels, respectively, and anticipates an overall reduction of Total Emissions and Emissions Rates of 63% and 76%, respectively, by 2025 and 63% and 79%, respectively, by 2050.[25] With the Project in its portfolio, Three Waters' estimates MMPA can reduce its Total Emissions and Emissions Rate by 76% and 87%, respectively, by 2050, thereby allowing MMPA to nearly meet the Minnesota goal of an 80% reduction in Total Emissions and exceed the goal in Emission Rate.

The Project will also provide a supplementary source of income for the rural landowners and farmers on whose land the Project will be sited. The landowners in the Project footprint who host turbines will receive annual lease payments for each turbine sited on their property. Participating landowners in the footprint will also share in an energy payment, which will be based on the Project's annual energy production. Large-scale wind energy operations usually pay $10,000 or more per turbine each year to lease wind rights. Because only a portion of the land will be used for the Project, agricultural operations can continue largely undisturbed. Less than 2% of the land within the Project boundary will be removed from agricultural use over the life of the Project.

3.2.2 Promotional Activities Giving Rise to Demand

Three Waters was granted an exemption from Minn. R. 7849.0240, subp. 2(B), which requires that each LEGF CN application contain "an explanation of the relationship of the proposed facility to promotional activities that may have given rise to the demand for the facility." Three Waters has not engaged in promotional activities which could have given rise to the need for the electricity to be generated by the Project. Thus, consistent with its determinations in past CN proceedings, the Commission granted an exemption to Three Waters.

3.2.3 Effects of Facility in Inducing Future Development

The Project is not expected to negatively affect development in Jackson County. Additional wind energy infrastructure in the Project area will provide significant benefits to the local economy and local landowners. Landowners in the Project area will benefit from annual lease and good neighbor agreement payments. Additional wind energy infrastructure will also provide an additional source of revenue into the county and townships in which the Project is sited. For instance, the Project is estimated to provide annual production tax revenues of approximately $1 million.

Three Waters aims to be a good business neighbor by identifying and providing community outreach and charitable donations in the communities in and around Three Waters. Scout works with local communities and identifies needs that can be supported. For example, when a wildfire caused significant damage near Scout's operating Persimmon Creek Wind Farm in Oklahoma, Scout donated to the local fire department to aid in the recovery effort. Three Waters has initiated donations to local community programs in 2018 and 2019 and will continue to evaluate donation opportunities over the life of the Project.

[25] 2018 IRP at 39.

The Project will also provide significant income opportunities for local residents not affiliated with Project ownership. The Project is anticipated to generate up to 200 construction jobs over approximately 12 months. Construction and operation of a typical 201-MW wind project results in the injection of millions of dollars into the local economy throughout the life of the Project. These investments would be seen throughout the community, including at hotels, restaurants, gas stations, auto repair companies, tire companies, grocery stores, hardware stores, and other local businesses. During operation, the Project would employ approximately eight to ten full-time personnel as facility managers, site managers, and turbine technicians. The Project has already created consulting, management, and environmental work.

At the same time the Project is providing income to local residents, it will also help make the energy those residents rely upon less susceptible to volatility.[26] The development of wind energy technology now makes wind power's relative price competitive with, and likely, cheaper than new natural gas and coal-fueled generation.[27] The development of wind energy in Minnesota reduces dependence on potentially volatile fossil fuel markets and helps keep energy dollars in Minnesota.

4.0 COMPLIANCE WITH CERTIFICATE OF NEED CRITERIA (MINN. R. 7849.0120)

The Commission has established criteria to assess the need for a LEGF in Minn. R. 7849.0120. The Commission must grant a CN 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

[26] U.S. Dept. of Energy, *Wind Vision: a New Era for Wind Power in the United States*, at xxvi (March 2015) ("Increased wind power adds fuel diversity, making the overall electric sector 20% less sensitive to changes in fossil fuel costs.") (available at https://www.energy.gov/sites/prod/files/WindVision_Report_final.pdf); U.S. Dept. of Energy, *2015 Wind Technologies Market Report*, at 65 (Aug. 2016) (stating that wind power can provide a "hedge against rising and/or uncertain natural gas prices").

[27] *Id.* at 21 ("[R]ecent wind PPA prices are quite competitive with natural gas fuel cost projections."); *See also* U.S. Energy Information Administration ("EIA"), *Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2019*, at Tables 1a, 1b (Feb. 2019) (available at https://www.eia.gov/forecasts/aeo/electricity_generation.cfm).

> 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.

As discussed further below, the Project satisfies all four of the Commission's criteria for granting a CN for the Project.

4.1 THE PROBABLE RESULT OF DENIAL OF THREE WATERS' APPLICATION WOULD BE AN ADVERSE EFFECT ON THE ADEQUACY, RELIABILITY, AND EFFICIENCY OF THE REGIONAL ENERGY SUPPLY (MINN. R. 7849.0120(A)).

The Project will provide up to 201 MW of nameplate capacity to meet the electricity needs of Minnesota and the region. Three Waters has negotiated a PPA with MMPA for up to 200 MW of the energy generated by the Project and, if necessary due to unforeseen circumstances, Three Waters will offer the Project's output for sale on the wholesale market. Denying the application would result in the loss of a significant amount of electricity needed to satisfy state and regional demand and would deny MMPA and its customers the opportunity to purchase clean, low-cost energy that will count toward carbon reduction goals, satisfying the RES and/or other clean energy standards.

As discussed in Section 3.1, there is a significant body of state legislative policy requiring utilities to obtain a certain percentage of their total energy resources from renewable energy, which supports the need for reliable, efficient renewable resources, like the wind energy produced by the Project. MMPA currently anticipates meeting its 2025 RES requirements through a mix of purchases and resources, including the Project's PPA and other wind PPAs.[28]

In addition to the specific need for renewable energy to serve Minnesota utilities, many other states in the region have similar renewable energy requirements. For example, Illinois requires certain utilities to obtain 25 percent of eligible sales from renewables by 2025.[29] Similarly, North Dakota has adopted the national "25 by '25" initiative, which establishes a goal of having not less than 25 percent of total energy consumed within the United States come from renewable resources by January 1, 2025.[30] Although, as of April 2018, the MISO footprint contained 17,071 MW of total registered wind capacity,[31] the regional need for renewable resources, and the potential to produce renewable resources from wind, far exceeds this number.[32] As described in Section 3.1, the 2017 Biennial Report found that Minnesota utilities

[28] 2018 IRP at 39.

[29] 20 Ill. Comp. Stat. sec. 3855/1-75(c)(1).

[30] N.D. Cent. Code § 17-01-01.

[31] *See* MISO Transmission Enhancement Plan 2018 at 182 (describing wind capacity in the MISO footprint) (available at https://cdn.misoenergy.org/MTEP18%20Full%20Report264900.pdf).

[32] *See Id.*, at 42 (explaining that certain proposed transmission projects will facilitate the interconnection of "41 million MWh of wind energy to meet renewable energy mandates and goals").

and utilities in the region must develop or purchase a significant amount of additional renewable generation in order to satisfy the RES and other clean energy standards.[33] Based on this data, there is a need for more wind power to adequately, reliably, and efficiently meet the region's need for renewable energy than is currently available.

4.2 NO MORE REASONABLE AND PRUDENT ALTERNATIVE TO THE THREE WATERS WIND PROJECT HAS BEEN DEMONSTRATED (MINN. R. 7849.0120(B)).

Minn. R. 7849.0120(B) requires a CN 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.

4.2.1 Size, Type, and Timing.

When evaluating alternatives, the Commission examines whether the project is the appropriate size, whether it is the right type, and whether the timing is appropriate. With respect to other proposed wind projects, the Commission has concluded that the proper inquiry in evaluating the size of the project is the appropriateness of the size of the project to the overall state and regional need for renewable energy. As demonstrated in Section 3.1, the need for renewable energy in Minnesota in the coming years far exceeds the amount of energy to be supplied by the Project.

Regarding the type of facility, the Commission granted Three Waters 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 that will meet carbon reduction goals, satisfy the RES and other clean energy standards.

The Project is expected to be on-line and operational as early as the end of 2021, depending on completion of regulatory approvals and the MISO interconnection process. This will help MMPA secure necessary carbon-free energy to meet its energy and carbon reduction needs in a timely manner. The Project is the correct size and type of facility and will be delivered on the time frame required to meet MMPA's needs.

4.2.2 Cost Analysis.

Three Waters secured a PPA with MMPA for the sale of the energy to be produced by the Project at an attractive price and with attractive terms. MMPA selected the Project after reviewing proposals from multiple competitive wind projects and determined the Project to be the lowest-cost alternative of the projects considered by MMPA. As an independent power producer, the risk of otherwise not selling the Project's output, and the risk of construction and operational cost overruns, lies entirely with Three Waters, and not with the State of Minnesota or

[33] 2017 Biennial Report, at 138-39.

ratepayers. The Project will generate electricity at a lower cost per kilowatt hour than would other possible renewable energy options, such as solar, hydroelectric and biomass.[34]

4.2.3 Potential Environmental and Socioeconomic Impacts.

The purpose of this analysis is to compare the potential impacts of various renewable generation options. The Commission and the Department have previously concluded that the environmental impacts of a wind power project are minimal and significantly less than a fossil-fuel based facility. At the same time, the socioeconomic benefits of a utility-scale wind power project are considerable, as described in Section 4.3 below. For example, the Project will allow landowners to continue to use over 98% percent of the existing cropland for agricultural and other uses. Additional detail on the environmental impacts of the Project will be provided in the Site Permit application.

4.2.4 Reliability.

The Project turbines are expected to be available approximately 98 percent of the time, consistent with other utility-scale wind projects.

4.3 THE THREE WATERS WIND PROJECT WILL BENEFIT SOCIETY IN A MANNER COMPATIBLE WITH THE NATURAL AND SOCIOECONOMIC ENVIRONMENTS (MINN. R. 7849.0120(C))

Minn. R. 7849.0120(C) requires a CN applicant to address whether the proposed project will benefit society in a manner that is compatible with protecting natural and socioeconomic environments, including human health. Applying the factors set forth in Minn. R. 7849.0120(C), the energy produced by the Project will provide significant, numerous, and varied societal benefits, with minimal negative impacts.

4.3.1 Overall State Energy Needs

As discussed in Section 3.1 above, utilities continue to require renewable energy to meet the RES and other clean energy and carbon reduction standards, as well as to meet consumers' energy demands. Thus, the Project is compatible with Minnesota's energy needs.

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

Negative impacts to socioeconomic resources will be relatively minor. Only approximately 0.5 to 1.0% of land within the Project's site permit boundary will be permanently removed from production, and the areas surrounding each turbine will still be able to be farmed. Project construction will not negatively impact leading industries within the Project area. There

[34] *See* Energy Information Agency, *Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2019* (predicting that in 2021, the cost per megawatt hour of wind energy would be lower than that of other renewable energy options) (available at https://www.eia.gov/forecasts/aeo/electricity_generation.cfm (Feb. 2019)).

is no indication that any minority or low-income population is concentrated in any one area of the Project.

One of the greatest attributes of wind energy is its minimal impact on the environment. The Project will not release CO_2, sulfur dioxide, nitrogen oxides, mercury, or particulate matter. It will not require water for power generation and will not discharge wastewater containing any heat or chemicals during operation. It will produce energy without the extraction, processing, transportation, or combustion of fossil fuels. The Project will permanently impact less than 2 percent of the total acreage within the Project's boundaries, and will be sited so as to minimize environmental impacts.

The development of wind energy has been and will continue to be important in diversifying and strengthening the economic base of Jackson County and Minnesota. Local contractors and suppliers will be used for portions of construction when possible. Wages and salaries paid to contractors and workers in Jackson County 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 county and the state. Expenditures made by the Applicant for equipment, fuel, operating supplies, and other products and services will benefit businesses in the county and the state. Participating landowners within the Project footprint will receive annual lease payments for the life of the Project, and these payments will diversify and strengthen the local economy. On a Minnesota statewide basis in 2018, $10 million to $15 million was paid in land lease payments and 3,000 to 4,000 people were employed in wind industry jobs.[35]

Long-term benefits to the county's tax base as a result of the construction and operation of the Project will contribute to improving the local economy. For example, the Project will pay a Wind Energy Production Tax to the local units of government of $0.0012 per kWh of electricity produced, resulting in an annual Wind Energy Production Tax of approximately $1 million. On a Minnesota statewide basis in 2018, wind projects paid a total of $15.5 million in tax payments.[36]

During construction, a 200-MW wind project, such as this Project, typically generates an immediate need for approximately 200 temporary construction jobs over approximately 12 months with an approximate annual salary for the typical construction workers employed on a wind farm project of $17.5 million (See Table 4.3.2-1). Construction and operation of a typical 200-MW wind project results in the injection of millions of dollars into the local economy throughout the life of the Project. These investments would be seen throughout the community, including at hotels, restaurants, gas stations, auto repair companies, tire companies, grocery stores, hardware stores, and other local businesses. During operation, the Project would employ approximately eight to ten full-time personnel as facility managers, site managers, and turbine technicians with salaries for the operations staff totaling approximately $22.5 million over the 35-year life of the Project (See Table 4.3.2-2). Over the estimated 35-year life of the Project, the Project is expected to directly generate approximately $82.6 million in direct economic benefits

[35] AWEA 2018 Annual Report at 106.

[36] AWEA 2018 Annual Report at 106.

for local landowners, new local employees, local communities, and the State of Minnesota (see Table 4.3.2-3).

Table 4.3.2-1: Anticipated Construction Jobs and Employment Expenditures

Job Classification	Number	Estimated Annual Salary
Crane operators	10	$90,000
Civil workers	30	$85,000
Construction managers	4	$110,000
Collection workers	25	$65,000
Tower erectors	35	$75,000
Transmission workers	30	$75,000
Substation workers	25	$80,000
Foundation workers	20	$70,000
Testing & inspections	13	$85,000
Design engineers	8	$140,000
Total:	**200**	**$17,500,000**

Table 4.3.2-2: Anticipated Operation Jobs and Employment Expenditures

Job Classification	Number	Estimated Annual Salary
Turbine supplier site manager	1	$100,000
Turbine technicians	6	$52,000
Owner site manager	1	$115,000
Assistant site manager	1	$85,000
Administrative assistant	1	$31,200
Total:	**10**	**$643,200**

Table 4.3.2-3: Direct Economic Benefit from the Three Waters Wind Farm

Payment	Direct Beneficiary	Approximate Total
Wind Lease payments	Project landowners	$25.0 million
Operations and maintenance	~10 employees	$22.5 million
Taxes	Townships and Jackson County	$35.1 million

Not building an electrical generation facility would result in no physical impact to the environment in Jackson County. However, not building the Project would also withhold an additional source of tax revenues to the county, an increase in the income stream to residences and businesses, or an increase in the amount of low-cost, clean, reliable renewable energy available to state or regional utilities and their customers. The Project will have a minimal impact on the physical environment, while simultaneously providing significant benefits.

4.3.3 Inducing Future Development

The Project is not expected to directly affect development in Jackson County. The Project will provide significant benefits to the local economy and local landowners. Landowners in the Project area will benefit from annual lease payments, and installation of wind energy infrastructure will increase the local tax base in the county and townships in which the Project is sited. The Project will also provide significant income opportunities for local residents through the creation of temporary construction, permanent O&M positions as well as patronizing local businesses (i.e. restaurants, gas stations, motels, hardware stores, etc.).

4.3.4 Socially Beneficial Uses of Output

The Project will produce affordable, clean, renewable energy that will help meet carbon reduction and renewable energy demands of MMPA and the RES and other clean energy standards. It will produce enough energy to meet the energy needs for approximately 85,000 average Minnesota households annually. In addition, the local economy will benefit from the landowner lease payments for turbine siting, production taxes, income from jobs created, and local spending.

4.4 THE THREE WATERS WIND PROJECT IS CONSISTENT WITH FEDERAL, STATE, AND LOCAL RULES AND POLICIES (MINN. R. 7849.0120(D))

4.4.1 The Project is Consistent with Minnesota Energy Policy

The Project will provide a significant amount of renewable energy, which is consistent with Minnesota's policy to increase renewable energy use. Wind, as renewable energy, is a favored energy resource under Minnesota law.[37] In addition, as discussed previously, the RES includes the "25 by '25" requirement, which mandates increased electric generation from renewable resources.[38] The state has also set a goal to reduce statewide greenhouse gas

[37] Minn. Stat. § 216B.243, subd. 3a ("The commission may not issue a certificate of need under this section for a large energy facility that generates electric power by means of a nonrenewable energy source, or that transmits electric power generated by means of a nonrenewable energy source, unless the applicant for the certificate has demonstrated to the commission's satisfaction that it has explored the possibility of generating power by means of renewable energy sources and has demonstrated that the alternative selected is less expensive (including environmental costs) than power generated by a renewable energy source. For purposes of this subdivision, 'renewable energy source' includes hydro, wind, solar, and geothermal energy and the use of trees or other vegetation as fuel.").

[38] Minn. Stat. § 216B.1691, sub. 2a.

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.[39] Adding additional sources of electric energy with no emissions, like wind energy, is essential to meeting these goals.

MMPA's acquisition of the power generated by the Project will allow MMPA to reduce CO_2 emissions and diversify both the location and type of its energy supply. As previously mentioned, the Minnesota Green House Gas Emissions Reduction Goal identifies greenhouse gas emission reduction targets of 30 percent below 2005 levels by 2025 and 80 percent below 2005 levels by 2050.[40] Table 4.5.1 summarizes MMPA's greenhouse gas reductions from 2005 levels achieved 2015 and projected to be achieved in 2025.[41] The Project, through an up to 30-year PPA will help MMPA achieve these reductions in greenhouse gas emissions by 2050.[42] For example, Three Waters' estimates MMPA can reduce its Total Emissions and Emissions Rate by 76% and 87%, respectively, by 2050 by adding the Project to its portfolio, thereby allowing MMPA to nearly meet the Minnesota goal of an 80% reduction in Total Emissions and exceed the goal in Emission Rate.

Table 4.5.1: MMPA Greenhouse Gas Reductions from 2005 Levels

	2015	2025
Total Emissions (lbs CO_2)	34%	63%
Emission Rate (lbs CO_2/MWh)	42%	76%

Further support for the conclusion that the Project is consistent with state energy policy can be found in the favorable tax treatment that wind energy facilities receive. The state legislature has exempted all real and personal property of wind energy conversion systems from property taxes.[43] Wind energy conversion systems, as well as the materials used to manufacture, install, construct, repair, or replace wind systems, are also exempt from state sales tax.[44]

4.4.2 The Project is Consistent with Applicable Minnesota Statutory Provisions

In addition to the criteria set forth in Minn. R. Ch. 7849, there are a number of statutory provisions that may apply to a CN application. As discussed below, the Project is consistent with these statutory requirements.

[39] Minn. Stat. § 216H.02.

[40] Minn. Stat. § 216H.02

[41] 2018 IRP at 39.

[42] *See* U.S. Dept. of Energy, *Wind Vision: a New Era for Wind Power in the United States*, at xxxvii (March 2015) (noting benefits of decreased greenhouse gas emissions and air pollution arising from increase wind power).

[43] Minn. Stat. § 272.02, subd. 22.

[44] Minn. Stat. § 297A.68, subd. 12.

4.4.2.1 Renewable Preference

Minn. Stat. § 216B.243, subd. 3a provides a preference for renewable resources:

> The commission may not issue a certificate of need under this section for a large energy facility that generates electric power by means of a nonrenewable energy source, or that transmits electric power generated by means of a nonrenewable energy source, unless the applicant for the certificate has demonstrated to the commission's satisfaction that it has explored the possibility of generating power by means of renewable energy sources and has demonstrated that the alternative selected is less expensive (including environmental costs) than power generated by a renewable energy source. For purposes of this subdivision, 'renewable energy source' includes hydro, wind, solar, and geothermal energy and the use of trees or other vegetation as fuel.

Minn. Stat. § 216B.2422, subd. 4, is also applicable:

> The commission shall not approve a new or refurbished nonrenewable energy facility in an integrated resource plan or a certificate of need, pursuant to section 216B.243, nor shall the commission allow rate recovery pursuant to section 216B.16 for such a nonrenewable energy facility, unless the utility has demonstrated that a renewable energy facility is not in the public interest.

The Project consists of a renewable energy source and is therefore consistent with Minnesota's preference for renewable energy and satisfies these statutory criteria by furthering available resources to meet this renewable energy preference.

4.4.2.2 Distributed Generation

Minn. Stat. § 216B.2426 states that:

> The commission shall ensure that opportunities for the installation of distributed generation, as that term is defined in section 216B.169, subdivision 1, paragraph (c), are considered in any proceeding under section 216B.2422, 216B.2425, or 216B.243.

Pursuant to Minn. Stat. § 216B.169, subd. 1(c), "distributed generation" references projects of less than 10 MW. The Project's transmission opportunities and economies of scale make it a superior renewable resource choice as compared to distributed generation projects that have available transmission but not the economies of scale that will be realized through this Project.

4.4.2.3 Innovative Energy Preference

Minnesota also requires the Commission to consider an innovative energy project[45] before authorizing construction or expansion of a fossil-fueled generation facility. Minn. Stat. § 216B.1694, subd. 2(a)(4). Because the Project is not a fossil-fuel facility, this requirement is not applicable.

4.4.2.4 RES Compliance

Minn. Stat. § 216B.243, subd. 3(10) requires the Commission to evaluate whether a CN applicant is in compliance with Minnesota's RES. Three Waters, however, is not subject to the RES because it has no retail sales of electricity in Minnesota. Therefore, this requirement does not apply to the Project.

4.4.2.5 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. As the Commission and the Department of Commerce have determined, this statute does not apply to renewable generation facilities such as the Project.[46]

4.4.2.6 Transmission Planning Compliance

Minn. Stat. § 216B.243, subd. 3(10) requires the Commission to consider whether a utility seeking a CN is in compliance with certain transmission planning requirements to meet the RES. As an independent power producer, this statute does not apply to Three Waters.

4.4.3 The Project is Consistent with Federal Energy Policy

4.4.3.1 Clean Power Plan

The finalized Clean Power Plan ("CPP") was announced by President Obama and the United States Environmental Protection Agency on August 3, 2015. Under the CPP, carbon dioxide emissions will be cut from existing power plants by 32% from 2005 levels.[47] On October 10, 2017, the Environmental Protection Agency issued a notice for its proposal to repeal the CPP.[48] Despite a pending federal lawsuit, Minnesota has pledged to move forward with preparations to comply with the CPP even while the CPP was in dispute.

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[45] An "innovative energy project" is defined as a coal-burning facility employing innovative technology and located on the Iron Range. Minn. Stat. § 216B.1694, subd. 1.

[46] *In the Matter of the Application of Elm Creek Wind LLC for a Certificate of Need for a Large Wind Energy Conversion System*, Docket No. IP-6631/CN-07-789, Order at 12 (Jan. 15, 2008).

[47] *See e.g.*, https://www.pca.state.mn.us/air/clean-power-plan-rulemaking-minnesota.

[48] *See* https://www.epa.gov/stationary-sources-air-pollution/electric-utility-generating-units-repealing-clean-power-plan.

Regardless, Minnesota is a leader in clean energy policy that is on track to meet the emission reduction requirements of the CPP, even without federal regulation in place. The Minnesota Pollution Control Agency ("MPCA") provides that the Minnesota state plan "will need to consider current and new electricity production and pollution control policies in order to achieve necessary carbon pollution reductions while supporting reliable, affordable power for all Minnesotans."[49] The Project will help reduce CO_2 emissions and thus is consistent with the CPP, and even with the current uncertainty on the plan for federal regulation of power-sector CO_2 emissions, the Project is consistent with Minnesota policy.

4.4.3.2 Tax Incentives

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

The renewable electricity 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 December 31, 2019. The PTC is currently $0.025 per kWh and is phased down each calendar year for facilities commencing construction between January 1, 2017 and December 31, 2019. According to the Internal Revenue Service, commencement of construction is determined by either the 'physical work test' or the payment or incursion of five percent of the total cost of the project.[50] Three Waters achieved start of construction through a transformer order and the beginning of construction of that transformer in 2017.

4.4.4 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 12.4 in Section 12.4 provides a list of approvals the Project may need to obtain from governmental entities to demonstrate full compliance. Three Waters is committed to obtaining all necessary environmental and other approvals required under federal, state, and local requirements.

[49] *See* https://www.pca.state.mn.us/air/clean-power-plan-rulemaking-minnesota.

[50] *See* IRS Notice 2013-29 (clarified and modified in subsequent notices Notice 2013-60, 2013-44 I.R.B. 431, Notice 2014-46, 2014-46 I.R.B. 520, Notice 2015-25, 2015-13 I.R.B. 814, Notice 2016-31, 2016-23 I.R.B. 1025, and Notice 2017-04, 2017-04 I.R.B. 541; *See also* https://energy.gov/savings/renewable-electricity-production-tax-credit-ptc.

5.0 DESCRIPTION OF PROJECT AND ALTERNATIVES (MINN. R. 7849.0250)

5.1 PROPOSED PROJECT (MINN. R. 7849.0250(A))

The Project will consist of an electrical collection system, access roads, permanent meteorological towers, substation and interconnection facilities, laydown yard, batch plant[51], communications equipment, an operation and maintenance facility, and other infrastructure typical of a wind farm. The Project will interconnect to an existing 345 kV line that is located in the southeasterly portion of the Project footprint. The turbines will be interconnected by communication and electric power collection cables within the wind farm. See Figure 2.

Each turbine will be accessible via permanent all-weather gravel roads that are approximately 16 feet wide, depending on the turbine size selected, and will extend from public roads to the turbines. During construction, some of the access roads would have temporary widths generally not exceeding 50 feet. Three Waters estimates that approximately 19 miles of gravel access roads will be constructed, depending on the final design. Land will be graded on-site for the turbine pads. Drainage systems, access roads, crane paths, storage areas, O&M facilities and other infrastructure will be installed as necessary to fully accommodate all aspects of the construction, operation, and maintenance of the Project.

Three Waters has selected the GE 2.x MW wind turbine generator (currently a 2.82 machine) as the primary wind turbine model for the Project. If the technology is economical and commercially proven, Three Waters may elect to utilize GE 3.x MW turbines instead. Three Waters made its turbine selections based on optimization of wind and land resources, as well as cost-efficiency. The turbine selected will have Supervisory Control and Data Acquisition communication technology, which permits automatic, independent operation, and remote supervision that allows simultaneous control of the wind turbines. In addition, Three Waters will maintain a computer program and database to track each wind turbine's operational history.

Each tower will be secured by a concrete foundation that can vary in design depending on the soil conditions. A control panel inside each turbine will house communication and electronic circuitry. Each turbine will be equipped with a wind speed and direction sensor that communicates to the turbine's control system to signal when sufficient winds are present for operation. The turbines feature variable-speed control and independent blade pitch to assure aerodynamic efficiency.

At each turbine, whether that be in the nacelle or at the base of the tower, a step-up transformer will be installed to raise the voltage to the collection line voltage of 34.5 kV. Generally, the collection lines will be buried in trenches and at the public road the collection lines will continue underground, to the extent practicable. The collection lines will occasionally require an aboveground junction box when the collection lines from separate spools need to be spliced together.

[51] The need for a batch plant will be determined by the contractor chosen at the time the Project is constructed.

Power generated by the Project will reach the electric grid by traveling through approximately 82 miles of 34.5 kV collector circuits to the newly-constructed project substation. The Project will then interconnect on the existing 345 kV transmission line that is located in the southeasterly portion of the Project footprint. The electrical system design and the interconnection details will be determined as a result of studies currently being conducted by, and agreements with, MISO.

5.1.1 Nominal Generating Capacity and Effect of Economies of Scale

Each turbine will have a net nominal rating of 2.82 or 3.03 MW in the current technology. Larger wind projects, such as the Project, can realize economies of scale by spreading out the relatively fixed transaction, operation, and maintenance costs over the entire project, resulting in decreased costs per kWh of electricity produced.

5.1.2 Annual Capacity Factor

A net capacity factor of between approximately 51 percent and 53 percent, with projected average annual output of between approximately 880,000 and 940,000 MWhs, is anticipated for the Project.

5.1.3 Fuel

The wind turbines will be powered by the wind.[52]

5.1.4 Anticipated Heat Rate

The conversion of wind to electricity does not generate heat as combustion or nuclear electricity generation facilities would when generating electricity. Therefore, heat rates are not applicable to a wind project.

5.1.5 Facility Location

The Project will be located within Ewington, Round Lake, Sioux Valley, Rost, Hunter, and Minneota Townships in Jackson County, Minnesota, Marion Township in Osceola County, Iowa and Silver and Diamond Lake Townships in Dickinson County, Iowa. The closest Minnesota cities to the Project area are Lakefield, Round Lake, Rost, Sioux Valley, and Spafford. Minnesota. Three Waters currently has site control over approximately 20,000 acres in Minnesota. Of this total, approximately 67 acres or < 0.33 percent will be permanently impacted by the construction and installation of wind turbines, access roads, and ancillary facilities. Approximately 13 acres of the total would be associated with the construction of turbine pads, and approximately 37 acres of permanent impacts would be associated with the construction of access roads. Approximately 3 additional acres of land will be used for construction of the

[52] Minn. R. 7849.0250(A)(3) also requests information projecting the availability of the Project's fuel source and alternative fuels. The Commission has determined that these data requirements are inapplicable to a wind facility because Minnesota's wind resources are more than sufficient to support a wind facility, which cannot use an alternative fuel source. *See e.g., In the Matter of the Application of High Prairie Wind Farm II, LLC for a Certificate of Need for a Large Energy Facility*, Docket No. PT-6556/CN-06-1428, Order (Dec. 11, 2006).

proposed substation, 10 acres for the proposed switchyard and another 4 acres of land would be associated with construction of the proposed O&M facility. Approximately 20 additional acres of land will be used for a temporary construction laydown area and batch plant[53].

The Project area is rural with an agricultural-based economy. The Project site was selected based on its excellent wind resources, its close proximity to existing transmission infrastructure and substations, and the landowners' interest in participating in the Project.

5.2 AVAILABILITY OF ALTERNATIVES (MINN. R. 7849.0250(B))

Minn. R. 7849.0250(B)(4) requires an applicant to discuss the availability of new generating facilities of a different size or using a different energy source as an alternative to the proposed facility. The objective of this alternatives analysis is to determine whether there are other energy sources that can satisfy the need identified for the Project. The Commission granted Three Waters a partial exemption from this data requirement, and Three Waters will discuss only renewable alternatives.

Developing and operating generating sources that are cost-effective and use proven technology is particularly important to an independent power producer, like Three Waters. Three Waters does not have access to ratepayer funds that could provide a resource for retirement of capital investments. In addition, as a seller of electricity to MMPA, Three Waters must keep its prices – and, thus, its costs – low enough to remain competitive. For these reasons, Three Waters must exercise diligence in deciding where and when to pursue opportunities for capital investment in new power-generating facilities. As indicated in this application, the current pricing for wind energy is more cost effective than other renewable and non-renewable sources of electricity. Moreover, MMPA's selection of the Project after MMPA's careful review of multiple competitive projects indicated the Project is cost effective when compared to other wind energy projects.

Commercial feasibility and reliability with respect to the generation output needed are important considerations in selling the power generated, and wind is a proven and reliable resource. However, with respect to the alternatives discussed below, without a guaranty of long-term reliability and cost-effectiveness, it is difficult or impossible to convince customers that an unproven technology should be selected for purchase.

5.2.1 Alternatives Considered

5.2.1.1 Purchased Power

Three Waters is an independent power producer and does not purchase power. Instead, Three Waters will sell power to MMPA, or, if necessary, to other utilities or other potential customers. As such, this data requirement is not applicable, and the Commission granted Three Waters an exemption.

[53] The need for a batch plant will be determined by the contractor chosen at the time the Project is constructed.

5.2.1.2 Upgrades to Existing Resources

Three Waters has no existing facility in Minnesota for which it might seek improved operating efficiency. As such, this data requirement is not applicable, and the Commission granted Three Waters an exemption.

5.2.1.3 New Transmission

Three Waters has no plans to become involved in owning or operating transmission lines beyond the collection and feeder lines that will be needed for interconnection of the Project. The development, construction, and operation of transmission and distribution lines designed to deliver power to end use customers will be left to utilities with defined service area obligations to retail customers. As such, this data requirement is not applicable, and the Commission granted Three Waters an exemption.

5.2.1.4 Solar Power

Minnesota has a significant and important solar resource that can and is being used for capacity services within the State's generating portfolio. However, advances to make solar installations more dense would be needed to make solar a reasonable alternative to the Project. Specifically, Three Waters estimates that, for a solar project to meet the same amount of direct energy output as the Project, the solar project would need to have more than 579 MW of nameplate capacity covering more than 3,474 acres of land. In Three Waters' experience, assembling that large of a tract of land is prohibitively expensive. In addition, the current estimated levelized cost of solar is more expensive than wind.[54]

5.2.1.5 Hydropower

Hydropower is also not an alternative to the Project. In 2015, hydropower in Minnesota produced 849,054 MWh of power, up slightly from 840,410 MWh in 2011, and compared to 774,729 MWh in 2005.[55] According to the 2016 Quad Report, issues with hydropower relate to "[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."[56]

5.2.1.6 Biomass

Minnesota communities do have accessible and low-value biomass feedstocks. However, the cost of these feedstocks vary widely, and the supply of biomass feedstock is limited.[57]

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[54] *See* Energy Information Agency, *Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2019* (predicting that in 2021, the cost per megawatt hour of wind energy would be lower than that of other renewable energy options, including solar) (Feb. 2019) (available at https://www.eia.gov/forecasts/aeo/electricity_generation.cfm).

[55] 2016 Quad Report, at 28.

[56] *Id.*

[57] *Id.*, at 27.

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.

5.2.1.7 Emerging Technologies

New renewable emerging power generation technologies are being developed, and Three Waters believes that the current approaches are not sufficiently mature to provide the output needed to match the nameplate capacity of the Project or to be cost-effective and reliable.

5.2.1.7.1 Pumped Storage

The proposed site in Jackson County is not suited to a pumped storage application because the topography of the site is relatively flat and pumped storage requires the storage of large amounts of water in an elevated reservoir. Therefore, pumped storage is only commercially and technically viable in locations with certain existing geology for water storage and large (i.e., steep) elevation changes. In addition, there is currently no net generation from pumped storage in Minnesota.[58] Accordingly, this technology is not an alternative to the Project.

5.2.1.7.2 Compressed Air

Highly specialized geological sites are needed to make use of compressed air technology. Such sites are scarce in Minnesota, and those that do exist are not located in the vicinity of the site. This technology has been implemented on a limited basis; accordingly, it is not an alternative to the Project.[59]

5.2.1.7.3 Thermal Storage

This technology, which makes use of accumulated heat transferred to insulated repositories, is not yet commercially-proven. Moreover, the Project is intended to generate electricity, not store electricity. The storage of electricity is not being considered as a part of the Project. Accordingly, it is not an alternative to the Project.

5.2.1.7.4 Hydrogen and Fuel Cells

Hydrogen, and its use in fuel cells, has received a lot of attention for its potential to impact energy production and use. Fuel cells can be used to produce energy in the form of electricity and heat. This energy can be applied to power vehicles and buildings. Fuel cells use a chemical reaction rather than a combustion reaction. Fuel cells have a similar level of efficiency as natural gas combustion sources, and, when using hydrogen as fuel, have nearly no pollution. Hydrogen, however, is expensive, as it requires substantial amounts of energy to produce. While much research is being done regarding hydrogen and fuel cells, the technology is not yet available on a commercial scale.

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[58] EIA, Net Generation from Hydroelectric (Pumped Storage) Power by State by Sector (available at http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_1_12_a) (accessed April 29, 2019).

[59] *See e.g.*, http://www.powersouth.com/wp-content/uploads/2017/07/CAES-Brochure-FINAL.pdf (accessed April 29, 2019).

5.2.1.7.5 Non-CN Facilities (Minn. R. 7849.0120(A)(4))

Under Minn. Stat. §§ 216B.2421 and 216B.243, subd. 2, and Minn. R. Ch. 7849, a CN is required for the Project because it is a "large energy facility," *i.e.*, larger than 50 MW. As an independent power producer, Three Waters must compete with other available technologies to sell power on the wholesale market, if necessary. Due to the size of the Project, Three Waters has the advantage of additional economies-of-scale not available to smaller, non-CN facilities.

5.2.1.8 No Facility Alternative (Minn. R. 7849.0340)

The Commission granted Three Waters an exemption from Minn. R. 7849.0340, which 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. The Commission instead allowed Three Waters to provide data regarding the impact on the wholesale market of the "no facility" alternative. The 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).

Three Waters does not have a "system," nor does it have other generation and transmission facilities in Minnesota. As such, the requirements of Minn. R. 7849.0340 are not applicable to the Project and are not necessary to determine need for the facility. Instead, Three Waters will provide data regarding the impact of the "no facility" alternative on its potential customers and the region.

Given that the Project is designed to provide renewable energy to MMPA under the PPA, not building the facility is not an alternative. Not building the facility would result in no increase in renewable energy and, in turn, no opportunity for MMPA to purchase the Project's output to provide its customers with renewable energy that will help MMPA achieve MMPA's and Minnesota's target greenhouse gas reductions. Such an outcome is contrary to Three Waters' objective for the Project and will not satisfy the state and regional need for renewable energy.

Notwithstanding the foregoing, Three Waters respectfully incorporates by reference MMPA's 2018 IRP to meet the requirements of Minn. R. 7849.0340. The information found in 2018 IRP contain all relevant information related to MMPA's system and future resource needs.

Approval of Three Waters' application for a CN would allow MMPA to meet its energy requirements in a cost-effective and reliable manner. The alternative of not building the Project would require MMPA to purchase other wind or renewable energy to satisfy the RES and other clean energy and carbon reduction standards.

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

The Commission granted Three Waters an exemption from Minn. R. 7849.0330, which requires the applicant to provide certain data for each alternative that would involve construction of a large high voltage transmission line ("LHVTL"). Transmission facilities are not true alternatives to the Project, since the purpose of the Project is to increase the supply of available renewable energy. The Project will interconnect via a new switch yard located along the existing

345 kV transmission line that is located in Sioux Valley Township in the southeasterly portion of the Project footprint. Three Waters does not currently plan on installing any facilities that would be defined as an LHVTL. Thus, it is anticipated that the electricity generated will be transmitted via facilities owned or operated by others. For these reasons, Minn. R. 7849.0330 is not applicable, and the Commission granted Three Waters an exemption from this data request.

5.2.1.10 Combinations

No combination of the aforementioned alternatives would be appropriate because, as compared to the Project, they would not enable Three Waters to more efficiently or cost-effectively produce electric output to be purchased by MMPA or other utilities to provide needed energy and satisfy the RES and other clean energy and carbon reduction standards.

5.2.2 Economic Comparison

Table 5.2.2 below, taken from the EIA, demonstrates that wind energy has both a lower capital cost and a lower operating cost than other types of renewable resources. Wind continues to be the most practical of all renewable generation.

Table 5.2.2: Renewable Technology Costs[60]

Technology	Size (MW)	Total Overnight Cost in 2018 (2018 $/kW)	Variable O&M (2018 $/mWh)	Fixed O&M (2018 $/kW/yr).
Fuel Cells	10	7,197	46.56	0.00
Biomass	50	3,900	5.70	114.39
Conventional Hydropower	500	2,948	1.36	40.85
Wind	100	1,624	0.00	48.42
Solar PV - tracking	150	1,969	0.00	22.46
Solar PV – fixed tilt	150	1,698	0.00	22.46
Solar Thermal	100	4,291	0.00	72.84

5.2.3 Alternatives Summary

The Project is the best alternative for meeting the renewable energy needs in Minnesota and the region in the near term. All other potential alternatives reviewed by Three Waters, including the use of alternative renewable resources or emerging technologies, non-CN facilities, or the no-build alternative, fall short in one or more categories. Moreover, Three Waters competed with other sources of energy to obtain a power purchase agreement and was able to secure a PPA with MMPA. Three Waters' analysis demonstrates that the Project is a cost-

[60] The figures in Table 5.2.2 are taken from a report of the EIA, *Assumptions to the Annual Energy Outlook 2019, Electricity Market Module*, at 5 (February 2019) (available at http://www.eia.gov/forecasts/aeo/assumptions/pdf/electricity.pdf).

effective energy resource; the Project uses commercially proven and reliable generating technology for the electrical generation output needed; and the Project is the energy source appropriate for the site selected for the Project.

5.3 DISCUSSION OF PROPOSED FACILITY AND ALTERNATIVES (MINN. R. 7849.0250(C))

The Commission granted Three Waters a partial exemption from Minn. R. 7849.0250(C)(1) – (9), which requires a discussion of various details regarding both the proposed facility and each of the alternatives discussed in response to Minn. R. 7849.0250(B). Consistent with the Commission granting Three Waters a partial exemption from the data requirements in Minn. R. 7849.0250(B), thereby limiting 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 discussed above, no such alternatives exist. Therefore, only information regarding the Project is applicable.

Nonetheless, Three Waters incorporates by reference MMPA's 2018 IRP to fulfill the requirements of Minn. R. 7849.0250(C). MMPA's 2018 IRP discuss those options available to meet MMPA's resource needs, and includes an analysis of the cost-effectiveness of renewable energy alternatives. This information demonstrates the need for this Project and supports MMPA's decision to purchase the energy generated by the Project.

5.3.1 Capacity Cost

Wind energy projects are accredited by MISO at a fairly low capacity rate (currently about 15% of nameplate) and are most often used as energy resources.[61] For example, MISO's 2018 capacity credit for MMPA's owned 44 MW Oak Glen Wind Farm is 17.35%, or 7.6 MW, and MISO's 2018 capacity credit for the 78 MW Black Oak Getty Wind Farm (that has a PPA with MMPA) is 12.44%, or 9.7 MW.[62] Thus, costs for wind energy facilities are typically not expressed in terms of capacity costs. The Project will deliver energy and accredited capacity to MMPA on an as-generated basis and will receive payment for both in the form of a single $/MWh payment. Three Waters' estimated total cost for the Project per kW is provided in Appendix A, Section 5.3.1, which has been designated trade secret. The largest component in the total cost of the Project will be the wind turbines; however, infrastructure costs for access roads and electrical collection systems also are factors.

5.3.2 Service Life

With proper maintenance, service, and replacement of parts, the expected life of the Project is 35 years. Three Waters is confident that its maintenance program will result in excellent longevity for the Project.

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[61] *See e.g.,* MISO *Planning Year 2019-2020 Wind & Solar Capacity Credit* (Dec. 2018) (available at https://cdn.misoenergy.org/2019%20Wind%20and%20Solar%20Capacity%20Credit%20Report303063.pdf).

[62] 2018 IRP at 30, 31.

5.3.3 Estimated Average Annual Availability

Three Waters estimates that the Project turbines will be available approximately 98 percent of the year, which is consistent with industry standards.

5.3.4 Fuel Costs

The Project will be fueled by wind, which is free. The easements for the wind rights on the land where the turbines will be located will require annual lease payments. Nominal purchases of electricity will be necessary to provide 'house power' to run the portions of the Project that require electrical inputs, with Three Waters ultimately selling the Project's net output.

5.3.5 Variable Operating and Maintenance Costs

Three Waters' estimated variable operating and maintenance costs of turbines over a 35 year period is provided in Appendix A Section 5.3.5, which has been designated trade secret. An advantage of wind energy facilities is that they typically do not require going completely offline for maintenance. Individual turbines can be serviced while the rest of the facility continues to deliver energy.

5.3.6 Total Cost

Three Waters' estimated total capital cost per kWh for the Project is provided in Appendix A Section 5.3.6, which has been designated trade secret. This estimate assumes typical wind farm design, construction, and operational data for a 35-year estimated service life. The price for which Three Waters will sell the energy was determined as a result of PPA negotiations with MMPA.

5.3.7 Estimate of Facility's Effect on Rates

Minn. R. 7849.0250(C)(7) requires an applicant to estimate its proposed project's "effect on rates system wide and in Minnesota, assuming a test year beginning with the proposed in-service date." The Commission granted Three Waters an exemption from this requirement because it does not have a "system" as defined by the Rules, and it is not a utility with retail rates for the power it plans to generate. Moreover, the Commission does not regulate MMPA's rates. As such, the data are neither available to Three Waters nor necessary to determine the need for the Project. Instead, Three Waters proposes to submit data on the Project's impact on state or regional wholesale prices.

The Project's energy production will be modest in comparison to the annual energy consumption of Minnesota and the region and will likely not have a measurable effect on rates. However, the Project could ultimately play a role in stabilizing or even lowering rates by offering an alternative to conventional generation sources.[63] For instance, MMPA can purchase

[63] *See e.g.*, "Clean Power Green Jobs," Union of Concerned Scientists (2009) (analyzing impacts of meeting "25 by '25" nationally on consumer electric rates); "Wind and solar reducing consumer bills," Good Energy (Oct. 2015) (analyzing impact of renewable energy usage on electric rates in the United Kingdom).

output from the Project to partially replace energy from generation sources with higher or more volatile pricing, such as natural gas plants. In addition, the Project will not face the same cost-increasing hurdles to construction (*e.g.*, potential carbon regulation and higher permitting costs due to increased regulatory scrutiny) faced by conventional fossil-fuel generation sources. For example, the Project is consistent with the CPP's and State of Minnesota's goal of reducing carbon emissions. Minnesota and other states are moving forward with implementing clean energy policies, and it is anticipated that existing coal plants will be retired in an effort to comply with the CPP's requirements and state clean energy policies.[64]

5.3.8 Efficiency

Because no fuel is burned in the production of energy at the Project, this information is not applicable.

5.4 MAP OF SYSTEM (MINN. R. 7849.0250(D))

The Commission granted Three Waters an exemption from Minn. R. 7849.0250(D), which requires an applicant to include a map showing the applicant's system. As an independent power producer, Three Waters does not have a "system." The information requested is not available to Three Waters or relevant to the determination of need for the Project. Instead, maps showing the proposed site of the Project and its location relative to the power grid are included as Figure 2.

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

The Commission granted Three Waters 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." Three Waters does not have a "service area" or "system" and, as such, the requested data are inapplicable. Moreover, Three Waters will sell power generated by the Project to MMPA, or if necessary due to unforeseen circumstances, at wholesale to one or more buyers affiliated with different systems and serving different areas. Three Waters cannot reasonably forecast peak demand for those buyers' service areas and systems due to such information being unavailable to Three Waters. As an alternative to the requested data, Three Waters incorporates by reference MMPA's 2013 IRP and 2018 IRPs.[65] The relevant system and service area in this case is MMPA's system, which is described in MMPA's 2018 IRP. Three Waters also provides the following data regarding the regional demand, consumption, and capacity data from credible sources to demonstrate the need for the independently produced renewable energy that will be generated by the Project.

[64] *See e.g.*, Jim Spencer and David Shaffer, "Minnesota vows to move ahead with clean power," Star Tribune (Feb. 16, 2016); Jeffrey Tomich, "MISO projects additional coal retirements under Clean Power Plan," Midwest Energy News (Mar. 18, 2016); "Coal made up more than 80% of retired electricity generating capacity in 2015," EIA (Mar. 8, 2016).

[65] Initial Filing. *In the Matter of Minnesota Power's 2016-2030 Integrated Resource Plan.* Docket ID. E-015/RP-15-690 (September 1, 2015) eDockets ID No. 20159-113710-01 through 05.

A review of utilities' IRPs, requests for proposals, and similar documents confirms that utilities will seek additional renewable generation resources in the next several years.[66] For example, in the MISO region, utilities have expressed a need for more than 1,000 MW of renewable energy (including wind) before 2020. Utilities will continue to require additional renewable energy generation between 2020 and 2030. Given this demand for renewable energy, a market exists for independently produced electricity generated from wind and other renewables, including the up to 201 MW to be generated by the Project.

7.0 SYSTEM CAPACITY (MINN. R. 7849.0280)

Minn. R. 7849.0280 requires a CN applicant to provide information on the ability of its existing system to meet the forecasted demand. As an independent power producer, Three Waters does not have a "system" as defined by the Rules. Accordingly, the Commission granted Three Waters an exemption from this requirement and permitted Three Waters to instead provide regional demand, consumption, and capacity data from credible sources to demonstrate the need for the independently produced renewable energy that will be provided by the Project. This information is provided in Section 3.0.

Regardless, Three Waters incorporates by reference MMPA's 2018 IRP to meet the requirements of Minn. R. 7849.0280. The relevant system and service area in this case is MMPA's system. Three Waters requests that the Commission determine that the submission of MMPA's 2018 IRP fulfills this requirement, to the extent the previously granted exemption from this requirement may no longer be applicable.

8.0 CONSERVATION PROGRAMS (MINN. R. 7849.0290)

Because Three Waters is not a regulated utility, has no retail customers, and plans to sell the Project's output on the wholesale market, the Commission granted Three Waters 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.

Notwithstanding, Three Waters incorporates by reference MMPA's 2018 IRP, which contain relevant information related to MMPA's system, conservation and resource needs. The purpose of this rule is to determine need in light of a utilities' conservation efforts.

[66] *See e.g.*, Xcel Energy, Upper Midwest Resource Plan 2016-2030 (Initial Filing. *In the Matter of Xcel Energy's 2016-2030 Integrated Resource Plan*, Docket ID. E-002/RP-11-15-21 (Jan. 2, 2015) eDockets ID No. 20151-105858-01 through 10; 20151-105859-01 through 10; 20151-105861-01 through 08 (approved by the Commission on January 11, 2017); Xcel Energy Carbon Report 2019 (available at https://www.xcelenergy.com/environment/carbon_reduction_plan); Minnesota Power, 2015 Integrated Resource Plan (available at https://www.mnpower.com/Content/Documents/Environment/2015-resource-plan.pdf) (approved by the Commission on June 10, 2015); Otter Tail Power Company, Application for Resource Plan Approval 2017-2031 (available at https://www.otpco.com/media/1959/resource-plan.pdf) (approved by the Commission on April 26, 2017).

9.0 CONSEQUENCES OF DELAY (MINN. R. 7849.0300)

The Commission granted Three Waters an exemption from Minn. R. 7849.0300, which requires the applicant to "submit data on the consequences of delay on the potential customers and the region." Three Waters is not a utility and has no "system" as defined by the Rules. Thus, this data requirement is inapplicable to Three Waters and is unnecessary to determine the need for the Project. Instead, Three Waters provides the following data on the consequences of delay to MMPA and the region.

The primary consequences of delaying construction of the Project would be that Three Waters would not be able to fulfill its obligations to MMPA under the PPA to develop the facility. Delaying an up to 201 MW wind project has the potential to jeopardize MMPA's efforts to obtain wind energy in a cost-effective and reliable manner. In addition, the PTC is currently being phased down, meaning an extended delay could result in fewer tax benefits and potentially higher costs to the ratepayers in MMPA's member cities.

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

Three Waters is submitting a Site Permit application, in addition to this application for a CN. Included below is a summary of some of the impacts to key resources found within the Project area, including visual resources, land use, and wildlife. Additional environmental information is provided in Section 11, below, and in the Site Permit application.

10.1 IMPACTS TO VISUAL RESOURCES

10.1.1 Visual Impacts and Mitigation

The existing visual character of the Project area and surrounding region is that of an agricultural landscape dominated by cropland, farmsteads, and large open vistas. The majority of the landscape within the Project area may be classified as agricultural and rural open space and contains a number of operating wind farms to the northeast, west and south. The construction and operation of these adjacent wind farms has created a new visual character to the landscape in which turbines are a component. Based on significantly positive local support from land owners and government officials, this landscape has been accepted into the local character

Within the Project area, local vegetation is predominantly agricultural crops consisting of primarily corn and soybeans, which visually create a low uniform profile. Aside from the local vegetation and adjacent wind farms, the main focal points present in the agricultural landscape are the farm residences and outbuildings, with many dating back to the late nineteenth and early twentieth century.

The wind turbine arrays associated with the proposed Project will be prominent features in the landscape and will have an effect on the visual quality of the site and surrounding areas. The degree to which visual impacts are considered adverse is subjective, and can be expected to vary depending on each individual viewers' aesthetic responses. For some viewers, wind turbines could be perceived as a visual intrusion on the natural aesthetic character of the

landscape. For other viewers, wind turbines have their own positive aesthetic qualities, distinguishing them from other non-agricultural land uses. Although the turbines are high-tech in appearance, they are not expected to appreciably change the rural character and remote setting of the site and surrounding area.

Three Waters will avoid or minimize visual impacts during the final design and siting of the Project to the extent practicable and will work directly with landowners to identify and address concerns related to Project aesthetics. The following mitigation measures are proposed to reduce the level of visual impacts from the proposed Project:

- Turbines will be uniform in color;
- Project siting will minimize impacts to native habitats to the maximum extent practicable;
    - Turbines will be sited in agricultural fields to minimize impacts to grassland, forest, wetland and other native vegetation communities.
    - For the proposed turbine layout, all native prairie will be avoided to the maximum extent practicable.
- Turbines will be lit in accordance with FAA requirements;
- Collector lines will be buried to the extent practicable to minimize aboveground structures within the turbine array;
- Existing roads will be used for construction and maintenance where possible to minimize the number of new roads constructed; and
- Access roads created for the Project will be located on gentle grades to minimize the amount of erosion, visible cuts, and fills.

10.1.2 Shadow Flicker Impacts and Mitigation

Shadow flicker caused by wind turbines is defined as alternating changes in light intensity at a given stationary location, or receptor, such as the window of a home. In order for shadow flicker to occur, three conditions must be met: (1) the sun must be shining with no clouds to obscure it; (2) the rotor blades must be spinning and must be located between the receptor and the sun; and (3) the receptor must be sufficiently close to the turbine to be able to distinguish a shadow created by it. Shadow flicker intensity and frequency at a given receptor are determined by a number of interacting factors:

- Sun angle and sun path – As the sun moves across the sky on a given day, shadows are longest during periods nearest sunrise and sunset, and shortest near midday. They are longer in winter than in summer. On the longest day of the year (the summer solstice), the sun's path tracks much farther to the north and much higher in the sky than on the shortest day of the day (the winter solstice).

As a result, the occurrence and duration of shadow flicker at a given receptor will change significantly from one season to the next.

- Turbine and receptor locations – The frequency of shadow flicker at a given receptor tends to decrease with greater distance between the turbine and receptor. The frequency of occurrence is also affected by the sightline direction between turbine and receptor. A turbine placed due east of a given receptor will cause shadow flicker at the receptor at some point during the year, while a turbine placed due north of the same receptor at the same distance will not, due to the path of the sun. The model assumed homes had clear walls and any flicker outside the home would be noticed inside the home.

- Cloud cover and degree of visibility – As noted above, shadow flicker will not occur when the sun is obscured by clouds. A clear day has more opportunity for shadow flicker than a cloudy day. Likewise, smoke, fog, haze, or other phenomena limiting visibility would reduce the intensity of the shadow flicker.

- Wind direction – The size of the area affected by shadow flicker caused by a single wind turbine is based on the direction that the turbine is facing in relation to the sun and location of the receptor. The turbine is designed to rotate to face into the wind, and as a result, turbine direction is determined by wind direction. Shadow flicker will affect a larger area if the wind is blowing from a direction such that the turbine rotor is near perpendicular to the sun-receptor view line. Similarly, shadow flicker will affect a smaller area if the wind is blowing from a direction such that the turbine rotor is near parallel to the sun-receptor view line.

- Wind speed – Shadow flicker can only occur if the turbine is in operation. Turbines are designed to operate within a specific range of wind speeds. If the wind speed is too low or too high, the turbine will not operate – i.e., it will be stationary -- thereby eliminating shadow flicker. The turbines for this Project will not rotate during these conditions and will be stationary.

- Obstacles – Obstacles, such as trees or buildings, which lie between the wind turbine and the receptor have a screening effect and can reduce or eliminate the occurrence of shadow flicker. No credit was assumed in the model for any blockage due to obstacle, making the results of the study slightly more conservative.

- Contrast – Because shadow flicker is defined as a change in light intensity, the effects of shadow flicker can be reduced by increasing the amount of light within a home or room experiencing shadowing flicker.

- Local topography – Changes in elevation between the turbine location and the receptor can either reduce or increase frequency of occurrence of shadow flicker, compared to flat terrain. No credit was assumed in the model for any blockage due to topography, making the results of the study slightly more conservative.

Shadow flicker frequency calculations for the Project were modeled by 344 residences (receptors) in Minnesota with a windPRO model utilizing digital elevation data, the GE 2.x model turbine with a 114-meter tall tower. If an 89-meter tower is used then shadow flicker frequency would likely decrease. Results are presented as realistic shadow flicker, which accounts for weather impacts on turbine operation. The maximum predicted shadow flicker impacts that occurred at a Minnesota residence for each turbine layout are shown in Tables 10.1 and 10.2 attached as Appendix B.

10.2 IMPACTS TO LAND USE

Three Waters currently has leases and easements on approximately 20,000 acres of land within the Project area. Of this total, approximately 67 acres or < 0.33 percent will be permanently impacted by the construction and installation of wind turbines, access roads, and ancillary facilities. Approximately 13 acres of the total would be associated with the construction of turbine pads, and 37 acres of the total would be associated with the construction of access roads. Approximately 3 additional acres of land will be used for construction of the proposed substation, 10 additional acres of land will be used for the switchyard and another 4 acres of land would be associated with construction of the proposed O&M facility. A more accurate determination of impacts to agricultural lands will be made once the exact locations of turbines, access roads, and other associated Project facilities have been finalized.

The loss of agricultural land from the construction and operation of the proposed Project will reduce a minimal amount of land for agricultural production. However, only a very small portion of agricultural land within the Project area will be impacted, and this will not appreciably contribute to decreased crop production in the Project area or the surrounding region. Existing land uses will continue on the remainder of land unaffected by the Project. Three Waters does not anticipate any impact on woodlots or mining.

If damage to drain tile occurs as a result of construction activities, Three Waters will work with effected property owners to repair the damaged drain tile in accordance with the conditions contained in the existing lease agreement between Three Waters and the landowner. Conservation Reserve Program ("CRP") areas will be verified by evaluating current land lease agreements for participating landowners prior to construction. Three Waters plans to avoid CRP lands as it continues to develop the Project. However, if these lands are unavoidable, Three Waters will work collaboratively with the USDA and the landowner to remove the impacted portion of the parcel from the applicable program.

10.3 IMPACTS TO WILDLIFE

The overall impact of the proposed Project on wildlife is expected to be minimal because turbines, access roads, and other Project facilities will be placed on agricultural lands. Native vegetation communities such as grasslands, forested areas, shrublands, and wetlands will be avoided to the greatest extent practicable. Most of the wildlife species inhabiting the Project area include those typically found in heavily disturbed habitats. These species are typically opportunistic and are able to utilize rural, urban, or agricultural habitats. Most of these wildlife species are common and widely distributed throughout the Project area and the loss of some

individuals as a result of construction of the proposed Project would have a negligible impact on populations of these species throughout the region.

Collision risk may be introduced to avian and bat species that migrate, breed, or winter within the proposed Project area, and at least some degree of avian and bat mortality from collisions with turbines would be an unavoidable consequence of the operation of the proposed Project. Collisions may occur with resident birds and bats foraging and flying within the Project area or with migrant birds and bats seasonally moving through the area.

The Project has been sited and designed to be a low-risk site for birds and bats. Numerous studies have been performed to characterize the local species and habitat and can be found in the Project's LWECS Site Permit application. The Project area does not contain distinct topography, unique habitats or resources, or other features that could concentrate bird or bats. No indicators of high avian and bat risk in the Project area (e.g., presence of federally-listed species, impacts to high quality avian and bat habitat, high volume use as migration stopover habitat, etc.) were discovered during either the preliminary site evaluation or the pre-construction avian and bat surveys conducted for the Project. Based on available data from operational wind projects in other wind sites in southwestern Minnesota, bird and bat collisions at the Project are expected to occur at a low frequency and be comparable with that of other Midwest wind energy facilities. Impacts are not expected to occur to a degree which would adversely affect populations.

In order to minimize impacts to wildlife, Three Waters has incorporated the following mitigation measures into the siting, construction, and operational phases of the proposed Project:

- Prepare a Bird and Bat Conservation Strategy (BBCS) in accordance with the US Fish and Wildlife Service Wind Energy Guidelines that will be implemented to minimize impacts to avian and bat species during construction and operation of the Project. That BBCS will be submitted as an appendix to the LWECS Site Permit application;

- Rock and brush piles that could create habitat for raptor prey will be removed from turbine areas;

- All trash will be covered in containers and work sites will be cleared of any garbage and debris related to food;

- All of Three Water's employees and contractors working on site will receive worker awareness training for identifying and responding to encounters with sensitive biological resources, including avian and bat species;

- A carcass removal program will be implemented to minimize potential attractants for carrion-feeding raptors; and

- Feathering of blades to manufacturer's cut in speed from sunset to sunrise, when the temperature is above 50 degrees Fahrenheit from July 15 to September 30.

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

11.1 LAND REQUIREMENTS (MINN. R. 7849.0320(A))

The Project is located on land that is zoned for agricultural use. Three Waters has leases and easements on approximately 20,000 acres of land within the Project area. The Project area can support up to 71 GE turbines, associated wind rights, access roads, collection system, substation, and O&M facility. The primary turbine to be utilized at the site is the GE 2.x MW turbine. If the technology is economical and commercially proven, Three Waters may elect to utilize GE 3.x MW turbines instead. The final number of turbines will be determined by Three Waters based upon turbine availability and other economic considerations. Ultimately, the Project will impact approximately 67 acres during construction, which is <0.33 percent of the 20,000 acres under leases and easements. Typical wind farms require approximately one-half to one acre per turbine for the turbine pad, transformer, access road, and associated infrastructure.

The preliminary site layout includes a 5 to 10 rotor-diameter distance between turbines. Setbacks between roads and residences have been designed to minimize noise and shadow-flicker issues and maintain impacts within legal limits. Construction, maintenance, and operation of the turbines will require installation of approximately 19 miles of all-weather gravel access roads.

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.

11.1.1 Land Requirements for Water Storage

The Project will not require any land for water storage.

11.1.2 Land Requirements for Cooling System

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

11.1.3 Land Requirements for Solid Waste Storage

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

11.2 TRAFFIC (MINN. R. 7849.0320(B))

Existing roadway infrastructure in and around the Project area consists of county and township roads that generally follow section lines, with private unpaved farmstead driveways and farming access roads. Interstate Highway 90 runs along the northern boundary of the Project area. County State Aide Highway ("CSAH") 86 runs north/south approximately 1.5 miles east of the Project area. Various county and township roads (two-lane paved and gravel roads) provide access to the Project area.

Constructing the Project will require approximately 19 miles of newly constructed gravel access roads. During initial construction, the turbine access roads will be wide enough to accommodate construction traffic (up to 50 feet), but will be reduced to a permanent width of approximately 16 feet after the completion of construction.

The maximum construction workforce is expected to generate approximately 1,000 additional vehicle trips per day at the peak of construction. The functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day. Because the area roadways have annual average daily traffic ("AADTs") currently well below capacity, the addition of approximately 1,000 vehicle trips on a temporary basis would be noticeable, but similar to seasonal traffic increases such as observed during autumn crop harvest. Existing AADT of roadways currently serving the Project area is provided in Table 11.2.

Truck access to the Project area would be primarily served by Interstate 90, CSAH 86, and county roads throughout the Project area. Specific additional truck routes will be determined by the location required for delivery. Additional operating permits will be obtained for over-sized truck movements. Transportation of equipment and materials associated with the construction of wind projects involves oversized and/or overweight loads and road use that is not consistent with normal traffic in the Project area. All local road use will be subject to a road use agreement to be established with Jackson County and the townships. This agreement will address wear from the Project and specify repair requirements.

Once project construction is completed, maintenance crews will periodically use access roads within the Project area to monitor and maintain the wind turbines. There would be a slight increase in traffic for occasional turbine and substation repair, but no impacts to traffic function would result from this small increase. The Project is not expected to have any impact on rail or barge traffic during construction or operation.

Table 11.2: Existing AADT Along Road Segments Serving the Project

Table 11.2: Existing Daily Traffic Levels			
Road	**Number of Road Segments in Project**	**AADT (Range over Segments)**	**Total Miles within Project Area**
Interstate 90	2	8,400 - 8,600	3.6
CSAH 34	1	430	7.4
CSAH 9	3	200 - 360	10.1
CSAH 4	2	175 - 315	10.0

Table 11.2: Existing Daily Traffic Levels			
Road	**Number of Road Segments in Project**	**AADT (Range over Segments)**	**Total Miles within Project Area**
CSAH 5	2	100 - 285	6.8
CR 68	2	45 – 75	6.0
CR 67	1	60	5.2
CR 66	1	35	0.25

11.3 INFORMATION PERTAINING TO FOSSIL-FUELED ACTIVITIES (MINN. R. 7849.0320(C)-(D))

11.3.1 Fuel

The Project is not a fossil-fueled facility. The Project will be fueled by wind.

11.3.2 Emissions

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

11.4 WATER USAGE FOR ALTERNATE COOLING SYSTEMS (MINN. R. 7849.0320(E))

Wind power plants do not utilize cooling systems. Water requirements are, therefore, minimal, and 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.

11.5 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 dewatering may be required during construction for specific turbine foundations and/or electrical trenches. Water may be used during construction to provide dust control and water for concrete mixes and other construction purposes. If temporary dewatering is required during construction activities, discharge of dewatering fluid will be conducted under the National Pollutant Discharge Elimination System ("NPDES") permit program and addressed by the Project's Storm Water Pollution Prevention Plan, as required. 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.

11.6 RADIOACTIVE RELEASES (MINN. R. 7849.0320(G))

The Project will not produce any radioactive releases.

11.7 SOLID WASTE (MINN. R. 7849.0320(H))

The Project is not expected to generate significant quantities of solid waste during operation. The Project will require use of certain petroleum products such as gear box oil, hydraulic fluid, and gear grease. These materials will be recycled or otherwise stored and disposed of in accordance with applicable State and Federal regulations. In addition, some waste streams will be generated at the O&M facility. These materials will also be stored, recycled, and/or disposed of in accordance with applicable local, State, and Federal regulations.

11.8 NOISE (MINN. R. 7849.0320(I))

Background noise levels in the Project area are typical of those in rural settings, where existing nighttime noise levels are commonly in the 25 to 40 dB(A) range. The dB(A) scale is A-weighted decibels based on the range of human hearing. Low to mid-30 dB(A) are relatively low background sound levels at night and are generally representative of the site. Higher levels exist near roads and other areas of human activity.

When in motion, wind turbines emit a perceptible sound. The level of this sound varies with the speed of the turbine and the distance of the listener from the turbine. Sound is generated from the wind turbine at points near the hub or nacelle, and from the blade tips and trailing edges of the blades as they rotate. The wind turbines to be used within the Project site are warranted to generate a maximum apparent sound power level no greater than 110 dB(A). This translates to a sound pressure level of approximately 60 dB(A) at the base of the wind turbine.

Sound levels decrease as the sound moves further away from the turbine. The turbines are expected to generate less than 50 decibels between 1,000 and 1,500 feet. At a relatively close distance, the sound a turbine makes can be described as a "whoosh" sound when the rotors are moving. There is more noise on relatively windy days; however, the turbine sound levels can be masked by the same wind that creates the increased noise.

The MPCA establishes acceptable sound levels based on time of day and the use of an area. For example, higher sound levels are acceptable in industrial areas during the day than residential areas during the night. According to Minnesota Rules Chapter 7030.0040, night time sound levels in a Noise Area Classification 1 must be below 50 dB(A) 50 percent of the time within an hour (referred to as L50), and below 55 dB(A) 90 percent of the time within an hour (referred to as L10).[67]

Noise modeling was completed for the GE 2.x MW machine, CadnaA sound propagation modeling software. Results from the modeling indicated that the maximum sound pressure level at any occupied residential receiver in Minnesota was 50 dB(A). The analysis indicates that

[67] Household units, including farming houses are classified in noise area classification 1. Minn. R. 7030.0050. subp. 2.

operation of the proposed Project would not cause sound levels greater than 60 dB(A) during the daytime or greater than 50 dB(A) during the nighttime at any modeled receptor in Minnesota. In addition, the cumulative impact of background sound levels and turbine operational sound levels on any residence would be less than 60 dB(A) during the day and less than 50 dB(A) during the night when applying the measured average background level L50 of 38 dB(A) during the day and 33 dB(A) during the night. The sound profile for the GE 3.x MW machine is not yet available. If Three Waters elects to use the GE 3.x MW machine it will provide sound modeling to demonstrate the maximum sound pressure level at any occupied residential receiver in Minnesota is less than or equal to that which was modelled for the GE 2.x MW machine.

In summary, all modeled sound levels at the provided occupied residences in Minnesota are anticipated to be at or below 50 dB(A) for all scenarios (i.e., all layouts, all turbine models, all ambient noise scenarios), therefore the proposed Project would be in compliance with Minnesota's allowable sound levels as described in Minnesota Rules Chapter 7030.

11.9 WORK FORCE FOR CONSTRUCTION AND OPERATION (MINN. R. 7849.0320(J))

Onsite, physical construction of the Project is anticipated to be completed by as early as the end of 2021. During peak construction, approximately 200 construction-related personnel will be working on the Project. Up to 15 permanent positions will likely be created to operate the Project.

Three Waters anticipates engaging a single contractor ("Contractor") for Balance of Plant ("BOP") Engineering, Procurement and Construction ("EPC") of the Project. The BOP EPC Contractor will be the lead entity for the construction management of the Project. Three Waters anticipates that the BOP EPC Contractor will self-perform certain construction scope and may subcontract some scope to others. For subcontracted scope, the BOP EPC Contractor will consider the services of local contractors.

11.10 THREE WATERS WILL MANAGE THE OVERALL OPERATIONS AND MAINTENANCE OF THE PROJECT.

Three Waters anticipates contracting with the turbine supplier to perform certain turbine maintenance for a term of at least 5 years. Three Waters will also have an operations agreement with another entity for performance of BOP O&M. The BOP O&M provider will be either Scout, an affiliate of Scout or an experienced third party. O&M staff may initially be comprised of employees hired by the turbine vendor under the turbine supply agreement for the Project. Three Waters and its O&M contractors will hire employees or other appropriate contractors to complete operations and maintenance tasks.

11.11 NUMBER AND SIZE OF TRANSMISSION FACILITIES (MINN. R. 7849.0320(K))

At the base of each turbine, a step-up transformer will be installed to raise the voltage to the power collection line voltage of 34.5 kV. Power will be transported through an underground and/or overhead collection system. Generally, the electrical lines will be buried in trenches. At public roads, the power collection lines will either rise from underground to overhead lines or continue as underground lines. At this time, it is believed that all collection lines will be

underground unless site specific conditions warrant the need for aboveground collection lines. Regardless, the collection lines will occasionally require an aboveground junction box where the collection lines from separate spools need to be spliced together.

Power generated by the Project will reach the electric grid by traveling through 34.5 kV underground feeder circuits to a new Project substation. The power will be stepped up from 34.5 kV to 345 kV at the Project substation. Power will then move to the ITC owned switchyard for delivery to the transmission grid. The Project substation and ITC switchyard will be located on private land, and Three Waters has acquired all easements or purchase options necessary to construct and operate the Project's substation and ITC switchyard. From that location, the Project will interconnect at the existing 345 kV transmission line.

The interconnection details will be determined as a result of studies, discussions, and agreements with MISO. Access to transmission facilities beyond interconnection will be arranged by the utility or utilities purchasing the Project's energy output, and will depend on the buyer and the ultimate destination for the energy output.

12.0 OTHER FILINGS AND PERMITS

12.1 EXEMPTION REQUEST

On February 12, 2019, Three Waters requested an exemption from several of the informational requirements in Minn. R. Ch. 7849. On March 26, 2019, the Commission granted Three Waters' Exemption Request.[68]

12.2 ENVIRONMENTAL REPORT

Pursuant to Minn. R. 7849.1000 - .2100, the Department of Commerce is required to prepare an Environmental Report for any large energy facility for which a CN must be obtained.

12.3 SITE PERMIT

Three Waters will also submit to the Commission a Site Permit application for a LWECS, as required by Minn. Stat. § 216F.04.

12.4 OTHER PROJECT PERMITS

Project permits and approvals that may be necessary to complete the Project are listed in Table 12.4. Three Waters will obtain these approvals, as necessary, prior to Project construction.

[68] *In the Matter of the Application of Three Waters Wind Farm, LLC for a Certificate of Need for an up to 200 MW Large Wind Energy Conversion System in Jackson County, Minnesota*, Docket No. IP-7002/CN-19-154, Order (March 26, 2019) and Order – Erratum Notice (April 16, 2019).

Table 12.4: Project Permits and Approvals

Regulatory Authority	Permit/Approval
Federal Approvals	
U.S. Army Corps of Engineers	Wetland Delineation Approvals
	Jurisdictional Determination
	Federal Clean Water Act Section 404 and Section 10 Permit(s)
U.S. Fish and Wildlife Service	Review for compliance with Federal Endangered Species Act; Bald and Golden Eagle Protection Act
	Wetland and Grassland Easement(s) Crossing Agreements
Department of Defense	Federal Airways and Airspace Review Near Military Bases or Radar Installations
Environmental Protection Agency (region 5) in coordination with the Minnesota Pollution Control Agency	Spill Prevention Control and Countermeasure ("SPCC") Plan
Lead Federal Agency (National Historic Preservation Act)	Federal Section 106 Review, if necessary (Class I Literature Review / Class III Cultural Field Study)
Federal Aviation Administration	Form 7460-1 Notice of Proposed Construction or Alteration (Determination of No Hazard)
	Notice of Actual Construction or Alteration (Form 7460-2)
Federal Land Manager (BLM, USBR, Forest Services)	Right-of-Way Grant over Federal Lands
U.S. Department of Agriculture	Conservation / Grassland / Wetland Easement and Reserve Program releases and consents
	Farm Services Agency Mortgage Subordination & Associated Environmental Review
U.S. Department of Transportation – Federal Highway Administration	Utility Line Crossing License / Approval
Federal Communications Commission	Federally Licensed Microwave Study
	NTIA Communication Letter
Federal Energy Regulatory Commission	Exempt Wholesale Generator Self Cert. ("EWG")
	Waiver of Open Access Transmission

Regulatory Authority	Permit/Approval
	Tariff
	Open Access Same Time Information System
	Standards of Conduct for Transmission Providers
	Market-Based Rate Authorization
Federal Emergency Management Agency	Flood Plain Designation/Letter of Map Revision/Letter of Map Amendment
State of Minnesota Approvals	
Minnesota Department of Labor and Industry	Electrical Plan Review and Inspections
Minnesota Public Utilities Commission	Site Permit for Large Wind Energy Conversion System
	Certificate of Need
Minnesota State Historic Preservation Office	Cultural and Historic Resources Review and Review of State and National Register of Historic Sites and Archeological Survey
Minnesota Pollution Control Agency	Section 401 Water Quality Certification
	National Pollutant Discharge Elimination System Permit ("NPDES") – MPCA General Storm water Permit for Construction Activity
	Very Small Quantity Generator ("VSQG") License – Hazardous Waste Collection Program
	Aboveground Storage Tank ("AST") Notification Form
Minnesota Department of Health	Environmental Bore Hole ("EBH")
	Water Supply Well Notification
	Plumbing Plan Review
Minnesota Department of Natural Resources	License to Cross Public Land and Water
	Avian and Bat Protection Plan (Review as part of the PUC Site Permit process)
	Native Prairie Protection Plan (Review as part of PUC Site Permit process)
	Biological Surveys (Review as part of PUC Site Permit process)
	General Permit for Water Appropriations (Dewatering)
	Public Waters Work Permit

Regulatory Authority	Permit/Approval
Minnesota Department of Agriculture	Informal consultation and review of impacts to agricultural lands
Minnesota Department of Transportation	Utility Permits on Trunk Highway Right-of-way
	Oversize/Overweight Permit for State Highways
	Access Driveway Permits for MnDOT Roads
	Tall Structure Permit
Local Approvals	
Jackson County	Right-of-way permits, crossing permits for utilities installed across roads, driveway permits for access roads, address requests, conditional use permits for temporary meteorological towers, individual septic tank system permit for O&M building, ditch work order, oversize/overweight permits for County Roads
Townships	Right-of-way permits, crossing permits for utilities installed across roads, driveway permits for access roads, oversize/overweight permits for township roads
Jackson County Soil and Water Conservation Districts	Wetland Conservation Act Approvals
MISO	Generator Interconnection Agreement
	Turbine Change Study.

66826292.11

Certificate of Need Application to the Minnesota Public Utilities Commission

APPENDIX A

PUBLIC DOCUMENT

TRADE SECRET DATA HAS BEEN EXCISED

Docket Number: IP-7002/CN-19-154

Jackson County, Minnesota
July 31, 2019

Prepared For:

Three Waters Wind Farm, LLC
4865 Sterling Drive, Suite 200
Boulder, CO 80301

APPENDIX A: PROJECT COSTS

Section 5.3.1 Capacity Costs

Three Waters has estimated the cost for the Project to be between **[TRADE SECRET DATA HAS BEEN EXCISED]**/kW.

Section 5.3.5 Variable Operating and Maintenance Costs

Three Waters has estimated the variable operating and maintenance costs for the Project to be approximately **[TRADE SECRET DATA HAS BEEN EXCISED]**/kWh over a 35 year period.

Section 5.3.6 Total Cost

Three Waters estimates total capital costs to be between **[TRADE SECRET DATA HAS BEEN EXCISED]** /kWh.

Certificate of Need Application to the Minnesota Public Utilities Commission

APPENDIX B

TABLE 10.1 AND TABLE 10.2

Docket Number: IP-7002/CN-19-154

Jackson County, Minnesota
July 31, 2019

Prepared For:

Three Waters Wind Farm, LLC
4865 Sterling Drive, Suite 200
Boulder, CO 80301

Table 10.1 Three Waters Wind Farm - Participants
Real case shadow flicker results at dwellings within two miles of Project WTGs
Results using GE 2-127 114 m hub height WTGs
UTM NAD83 Zone 15 (meters)

Shadow Receptor #	Status	Easting (m)	Northing (m)	Elevation AMSL (m)	Real Case Shadow (hrs/year)
J204	Participating	313897.99	4827084.54	447.1	65:30
J141	Participating	316550.57	4825056.69	444.4	58:08
J304	Participating	311543.28	4832835.96	447.0	57:49
J263	Participating	311612.63	4830867.35	452.4	51:32
J100	Participating	313833.92	4823221.98	448.9	46:38
J123	Participating	311807.97	4823908.91	454.4	45:40
J129	Participating	309353.14	4824075.55	456.0	42:29
J264	Participating	313158.82	4830865.51	448.2	41:33
J120	Participating	314800.15	4823852.93	450.7	38:29
J107	Participating	316425.57	4823507.99	447.0	36:10
J253	Participating	316263.58	4829942.25	447.0	32:27
J262	Participating	313270.58	4830793.37	447.6	31:12
J331	Participating	314806.01	4834060.61	435.2	28:45
J130	Participating	317793.42	4824243.71	442.4	21:46
J45	Participating	317717.92	4819771.10	450.0	21:04
J310	Participating	313379.17	4833148.99	446.3	20:59
J289	Participating	317203.22	4831893.14	438.0	20:57
J247	Participating	314651.21	4829254.23	450.0	17:20
J145	Participating	316064.72	4825090.48	444.0	16:04
J317	Participating	316260.84	4833446.79	441.0	15:47
J79	Participating	317880.99	4822028.07	444.0	14:16
J50	Participating	318224.31	4820294.13	447.0	14:00
J198	Participating	319284.53	4826836.35	435.8	12:21
J298	Participating	314809.08	4832480.60	444.0	10:59
J256	Participating	313535.96	4830149.53	453.0	9:54
J254	Participating	320975.19	4829903.70	438.0	9:49
J308	Participating	318040.87	4832960.65	436.8	9:33
J229	Participating	320043.75	4828440.03	436.0	9:27
J312	Participating	314202.27	4833288.99	443.2	4:47
J244	Participating	317912.75	4828977.38	436.0	4:37
J39	Participating	312340.73	4819053.50	456.0	4:34
J115	Participating	318982.93	4823741.14	438.0	4:32
J54	Participating	306283.67	4820615.75	466.1	4:28
J227	Participating	322595.59	4828401.45	430.4	4:22
J330	Participating	313356.51	4833857.86	441.9	4:03
J133	Participating	307944.44	4824640.29	462.0	3:59
J183	Participating	313244.95	4826338.41	450.0	2:57
J279	Participating	318216.83	4831747.62	441.0	1:49
J139	Participating	318884.23	4824900.27	438.0	1:42

Table 10.1 Three Waters Wind Farm - Participants
Real case shadow flicker results at dwellings within two miles of Project WTGs
Results using GE 2-127 114 m hub height WTGs
UTM NAD83 Zone 15 (meters)
continued

Shadow Receptor #	Status	Easting (m)	Northing (m)	Elevation AMSL (m)	Real Case Shadow (hrs/year)
J63	Participating	317730.56	4820843.98	443.9	1:02
J64	Participating	317806.91	4820864.02	444.0	0:00
J238	Participating	312287.65	4828756.30	447.0	0:00
J306	Participating	317194.43	4832960.52	438.0	0:00
J318	Participating	309644.88	4833608.14	448.6	0:00

Table 10.2 Three Waters Wind Farm - Non-Participants
Real case shadow flicker results at dwellings within two miles of Project WTGs
Results using GE 2-127 114 m hub height WTGs
UTM NAD83 Zone 15 (meters)

Shadow Receptor #	Status	Easting (m)	Northing (m)	Elevation AMSL (m)	Real Case Shadow (hrs/year)
J269	Not Participating	311522.58	4831331.34	449.9	60:13
J124	Not Participating	308112.17	4823965.74	462.0	54:24
J187	Not Participating	319710.49	4826519.13	438.0	52:22
J203	Not Participating	312773.43	4827094.74	450.0	46:29
J300	Not Participating	313199.32	4832558.72	450.0	44:44
J58	Not Participating	304082.64	4820722.94	465.0	41:58
J309	Not Participating	318136.57	4833013.30	438.0	37:14
J323	Not Participating	317325.52	4833613.63	436.6	35:22
J196	Not Participating	320493.85	4826806.49	435.0	34:00
J102	Not Participating	308081.71	4823328.10	459.4	32:36
J96	Not Participating	304957.13	4823068.36	469.8	30:42
J101	Not Participating	308966.90	4823316.24	462.0	29:41
J136	Not Participating	312132.15	4824783.46	456.0	27:22
J206	Not Participating	321205.60	4827062.74	433.0	27:01
J125	Not Participating	308507.40	4823967.98	460.3	26:29
J104	Not Participating	310519.59	4823405.36	454.0	26:22
J138	Not Participating	318150.31	4824874.90	439.6	24:06
J53	Not Participating	316646.90	4820486.11	451.9	23:49
J56	Not Participating	303192.85	4820673.50	468.0	23:31
J165	Not Participating	316003.40	4825448.45	446.9	21:37
J305	Not Participating	314938.08	4832879.04	443.4	20:08
J272	Not Participating	314729.45	4831576.06	442.8	19:14
J220	Not Participating	316388.25	4828178.18	441.0	18:52
J333	Not Participating	312401.98	4834357.27	441.5	18:45
J207	Not Participating	316420.17	4827287.86	439.1	18:44
J65	Not Participating	304449.08	4821051.93	464.5	18:20
J95	Not Participating	316962.30	4822867.91	444.0	17:40
J274	Not Participating	316405.71	4831613.04	444.0	17:26
J42	Not Participating	311652.42	4819556.45	451.3	16:33
J103	Not Participating	306594.78	4823386.49	463.8	16:25
J246	Not Participating	316667.54	4829100.69	435.9	15:51
J290	Not Participating	310421.51	4832003.30	450.7	15:02
J132	Not Participating	307099.88	4824519.86	462.0	14:49
J233	Not Participating	322238.48	4828550.89	433.0	14:24
J315	Not Participating	310440.63	4833492.27	447.4	13:51
J93	Not Participating	316821.65	4822694.42	444.0	13:42
J199	Not Participating	321497.84	4826844.25	432.4	13:37
J43	Not Participating	313768.28	4819658.41	450.0	13:31
J117	Not Participating	315804.22	4823802.37	447.0	13:22

Table 10.2 Three Waters Wind Farm - Non-Participants
Real case shadow flicker results at dwellings within two miles of Project WTGs
Results using GE 2-127 114 m hub height WTGs
UTM NAD83 Zone 15 (meters)
continued

Shadow Receptor #	Status	Easting (m)	Northing (m)	Elevation AMSL (m)	Real Case Shadow (hrs/year)
J332	Not Participating	311682.18	4834109.88	444.1	12:39
J313	Not Participating	313223.39	4833319.93	445.4	12:38
J81	Not Participating	302838.30	4822419.30	466.6	12:20
J316	Not Participating	318299.25	4833418.15	435.0	12:17
J119	Not Participating	315852.45	4823809.24	447.0	12:12
J190	Not Participating	313930.27	4826635.52	448.6	12:10
J128	Not Participating	306493.66	4824104.99	459.0	11:35
J168	Not Participating	310705.16	4825557.36	453.0	10:55
J209	Not Participating	316106.97	4827442.08	441.0	10:53
J201	Not Participating	318601.33	4826949.96	438.0	10:46
J109	Not Participating	316119.63	4823693.84	447.0	9:53
J110	Not Participating	316092.05	4823697.02	447.0	9:49
J90	Not Participating	318959.30	4822608.74	445.3	9:36
J322	Not Participating	312775.42	4833661.07	444.0	9:25
J297	Not Participating	309932.84	4832393.66	445.7	9:24
J213	Not Participating	319373.32	4827570.45	438.0	9:15
J97	Not Participating	319025.33	4822914.48	444.0	8:59
J228	Not Participating	318166.60	4828458.95	437.1	8:58
J231	Not Participating	318898.28	4828514.76	438.5	8:52
J245	Not Participating	313188.03	4829125.22	449.8	8:31
J169	Not Participating	316152.90	4825519.98	447.0	8:26
J252	Not Participating	319241.32	4829867.40	438.0	8:17
J66	Not Participating	308020.55	4821013.63	460.6	8:13
J85	Not Participating	304224.00	4822588.12	465.0	8:12
J89	Not Participating	313581.06	4822598.68	450.7	8:08
J74	Not Participating	319345.88	4821677.76	443.2	7:27
J212	Not Participating	319474.11	4827565.51	438.0	7:19
J40	Not Participating	304845.90	4819436.38	468.9	7:15
J135	Not Participating	312453.08	4824763.34	456.0	6:48
J239	Not Participating	322992.11	4828630.54	432.0	6:44
J259	Not Participating	311355.12	4830342.20	451.0	6:38
J296	Not Participating	310137.36	4832353.95	446.8	6:38
J222	Not Participating	314163.03	4828243.22	446.0	6:29
J49	Not Participating	307963.04	4820227.24	465.2	6:24
J343	Not Participating	312728.61	4835004.74	444.0	6:02
J134	Not Participating	310375.94	4824760.15	459.0	5:52
J75	Not Participating	308132.76	4821899.43	465.0	5:18
J281	Not Participating	310013.38	4831886.25	453.0	5:10

Table 10.2 Three Waters Wind Farm - Non-Participants
Real case shadow flicker results at dwellings within two miles of Project WTGs
Results using GE 2-127 114 m hub height WTGs
UTM NAD83 Zone 15 (meters)
continued

Shadow Receptor #	Status	Easting (m)	Northing (m)	Elevation AMSL (m)	Real Case Shadow (hrs/year)
J230	Not Participating	321717.14	4828426.12	432.7	5:04
J76	Not Participating	320829.28	4821884.29	436.1	5:01
J84	Not Participating	309387.00	4822455.22	456.0	4:55
J111	Not Participating	313604.32	4823778.00	451.0	4:38
J116	Not Participating	318103.60	4823765.66	443.7	4:38
J108	Not Participating	313628.86	4823710.89	450.0	4:33
J122	Not Participating	313604.57	4823885.37	452.6	4:32
J352	Not Participating	312587.76	4835160.51	444.0	4:31
J59	Not Participating	309769.67	4820719.85	460.7	4:29
J121	Not Participating	314079.06	4823865.91	456.0	4:29
J182	Not Participating	312329.20	4826289.74	450.0	4:23
J359	Not Participating	314850.52	4835504.33	436.1	4:14
J114	Not Participating	313774.69	4823796.40	448.5	4:11
J180	Not Participating	316378.14	4826065.88	443.3	4:07
J248	Not Participating	322957.59	4829389.03	435.0	4:02
J112	Not Participating	313894.52	4823776.28	451.8	4:00
J178	Not Participating	316503.66	4825953.34	443.2	3:35
J92	Not Participating	319493.17	4822649.04	441.0	3:34
J349	Not Participating	313446.94	4835109.98	441.0	3:33
J348	Not Participating	314691.57	4835088.49	438.0	3:32
J88	Not Participating	320947.26	4822492.95	432.0	3:25
J179	Not Participating	316470.76	4826037.16	443.0	3:14
J52	Not Participating	312005.56	4820535.48	459.0	3:00
J295	Not Participating	319626.48	4831998.05	441.0	3:00
J345	Not Participating	314779.43	4835078.89	438.0	2:56
J47	Not Participating	306478.95	4819922.74	469.2	2:55
J255	Not Participating	321816.24	4830016.70	432.0	2:48
J240	Not Participating	319046.52	4828691.44	439.3	2:40
J77	Not Participating	321122.05	4821901.22	435.9	2:39
J181	Not Participating	316486.53	4826138.30	442.3	2:33
J57	Not Participating	309536.02	4820641.68	462.4	2:31
J91	Not Participating	317884.75	4822625.87	445.1	2:31
J70	Not Participating	316191.64	4821187.87	443.7	2:22
J87	Not Participating	307194.46	4822577.19	468.0	2:20
J271	Not Participating	319616.67	4831494.63	439.2	2:19
J105	Not Participating	303989.02	4823577.00	465.0	2:14
J184	Not Participating	316487.10	4826322.99	441.2	2:12
J171	Not Participating	317560.87	4825517.46	434.7	1:50

Table 10.2 Three Waters Wind Farm - Non-Participants
Real case shadow flicker results at dwellings within two miles of Project WTGs
Results using GE 2-127 114 m hub height WTGs
UTM NAD83 Zone 15 (meters)
continued

Shadow Receptor #	Status	Easting (m)	Northing (m)	Elevation AMSL (m)	Real Case Shadow (hrs/year)
J82	Not Participating	302104.59	4822437.98	471.5	1:48
J267	Not Participating	322996.83	4830922.44	435.4	1:48
J258	Not Participating	321605.15	4830172.43	432.0	1:46
J326	Not Participating	319061.52	4833718.98	435.0	1:39
J275	Not Participating	319827.30	4831583.05	438.7	1:36
J243	Not Participating	313101.50	4828924.80	448.2	1:33
J94	Not Participating	317791.72	4822840.19	444.0	1:16
J251	Not Participating	317504.03	4829872.50	435.0	1:15
J341	Not Participating	315255.46	4834964.05	438.0	1:03
J41	Not Participating	319831.08	4819437.86	448.8	0:00
J44	Not Participating	320770.77	4819581.90	441.0	0:00
J46	Not Participating	303525.17	4819945.46	468.0	0:00
J48	Not Participating	322539.66	4820027.18	432.0	0:00
J51	Not Participating	323158.09	4820303.38	436.7	0:00
J55	Not Participating	314928.46	4820521.75	447.0	0:00
J60	Not Participating	319886.46	4820710.38	441.6	0:00
J61	Not Participating	309068.17	4820890.72	462.7	0:00
J62	Not Participating	309105.72	4820933.24	463.2	0:00
J67	Not Participating	322997.15	4820847.53	437.6	0:00
J68	Not Participating	315404.96	4821078.84	448.5	0:00
J69	Not Participating	320955.27	4821066.22	435.4	0:00
J71	Not Participating	316267.29	4821514.77	447.0	0:00
J72	Not Participating	323132.73	4821435.04	432.0	0:00
J73	Not Participating	313725.26	4821714.16	444.0	0:00
J78	Not Participating	312217.31	4822006.98	445.0	0:00
J80	Not Participating	313907.96	4822234.93	450.0	0:00
J86	Not Participating	303466.86	4822618.72	468.0	0:00
J98	Not Participating	322632.57	4822881.56	434.3	0:00
J99	Not Participating	320725.17	4822934.14	432.0	0:00
J106	Not Participating	319823.23	4823427.80	435.0	0:00
J126	Not Participating	305493.98	4824032.87	459.0	0:00
J127	Not Participating	322666.55	4823904.74	432.0	0:00
J131	Not Participating	319582.01	4824351.61	432.0	0:00
J137	Not Participating	324484.98	4824652.48	432.2	0:00
J140	Not Participating	324041.18	4824939.98	438.0	0:00
J142	Not Participating	304329.27	4825201.75	465.3	0:00
J143	Not Participating	305070.05	4825199.02	465.0	0:00
J144	Not Participating	304354.09	4825224.97	466.3	0:00

Table 10.2 Three Waters Wind Farm - Non-Participants
Real case shadow flicker results at dwellings within two miles of Project WTGs
Results using GE 2-127 114 m hub height WTGs
UTM NAD83 Zone 15 (meters)
continued

Shadow Receptor #	Status	Easting (m)	Northing (m)	Elevation AMSL (m)	Real Case Shadow (hrs/year)
J146	Not Participating	304366.44	4825249.59	466.5	0:00
J147	Not Participating	304410.22	4825302.44	467.5	0:00
J148	Not Participating	304426.74	4825321.51	467.4	0:00
J149	Not Participating	304437.39	4825327.11	467.6	0:00
J150	Not Participating	304465.89	4825357.48	466.6	0:00
J151	Not Participating	302387.20	4825386.53	466.5	0:00
J152	Not Participating	320764.76	4825175.03	432.0	0:00
J153	Not Participating	304470.33	4825375.63	466.3	0:00
J155	Not Participating	304486.96	4825386.24	466.1	0:00
J156	Not Participating	304519.63	4825429.89	465.0	0:00
J157	Not Participating	302388.39	4825455.00	465.7	0:00
J158	Not Participating	304531.15	4825456.22	465.0	0:00
J159	Not Participating	304537.81	4825464.62	465.0	0:00
J160	Not Participating	306444.36	4825451.73	462.1	0:00
J161	Not Participating	304544.74	4825478.30	465.0	0:00
J162	Not Participating	321846.16	4825286.55	430.1	0:00
J163	Not Participating	304551.89	4825492.61	465.0	0:00
J164	Not Participating	323994.07	4825329.10	441.0	0:00
J166	Not Participating	324019.35	4825361.50	441.0	0:00
J167	Not Participating	324019.35	4825361.50	441.0	0:00
J170	Not Participating	305905.07	4825651.69	466.8	0:00
J172	Not Participating	307859.43	4825639.24	464.4	0:00
J173	Not Participating	309090.34	4825738.40	461.3	0:00
J174	Not Participating	306786.88	4825804.35	459.6	0:00
J175	Not Participating	302087.79	4825862.93	469.7	0:00
J176	Not Participating	323749.87	4825642.64	438.0	0:00
J177	Not Participating	309451.49	4825939.15	459.0	0:00
J185	Not Participating	305057.13	4826523.92	468.0	0:00
J186	Not Participating	308145.88	4826569.47	462.0	0:00
J188	Not Participating	303093.21	4826726.57	465.4	0:00
J189	Not Participating	303313.33	4826755.13	469.7	0:00
J191	Not Participating	324783.70	4826508.21	441.0	0:00
J192	Not Participating	303268.79	4826769.13	470.0	0:00
J193	Not Participating	303148.11	4826799.62	468.5	0:00
J194	Not Participating	309699.94	4826762.89	452.2	0:00
J195	Not Participating	308726.42	4826830.64	459.0	0:00
J197	Not Participating	322361.41	4826798.44	429.9	0:00
J200	Not Participating	310374.32	4827046.53	450.0	0:00

Table 10.2 Three Waters Wind Farm - Non-Participants
Real case shadow flicker results at dwellings within two miles of Project WTGs
Results using GE 2-127 114 m hub height WTGs
UTM NAD83 Zone 15 (meters)
continued

Shadow Receptor #	Status	Easting (m)	Northing (m)	Elevation AMSL (m)	Real Case Shadow (hrs/year)
J202	Not Participating	304977.34	4827134.68	465.0	0:00
J205	Not Participating	307207.92	4827219.06	465.0	0:00
J208	Not Participating	325115.37	4827301.62	447.0	0:00
J210	Not Participating	307874.75	4827561.02	456.0	0:00
J211	Not Participating	310117.22	4827570.16	450.3	0:00
J214	Not Participating	325540.66	4827722.48	447.0	0:00
J215	Not Participating	311982.58	4827964.28	450.0	0:00
J216	Not Participating	305298.67	4828075.19	465.0	0:00
J217	Not Participating	306172.71	4828109.03	462.0	0:00
J218	Not Participating	308339.44	4828148.16	459.0	0:00
J219	Not Participating	309915.37	4828245.53	452.4	0:00
J221	Not Participating	309678.19	4828280.93	453.5	0:00
J223	Not Participating	308096.12	4828333.62	459.0	0:00
J224	Not Participating	312353.26	4828345.51	450.0	0:00
J225	Not Participating	324827.97	4828263.84	450.0	0:00
J226	Not Participating	324221.87	4828329.10	438.0	0:00
J232	Not Participating	313396.69	4828603.21	449.9	0:00
J234	Not Participating	305902.15	4828758.28	456.0	0:00
J235	Not Participating	311089.36	4828714.13	450.0	0:00
J236	Not Participating	314144.75	4828703.64	447.0	0:00
J237	Not Participating	314124.97	4828706.54	447.3	0:00
J241	Not Participating	306273.97	4828907.49	458.7	0:00
J242	Not Participating	308917.53	4828944.09	456.0	0:00
J249	Not Participating	310533.03	4829647.30	451.5	0:00
J250	Not Participating	309869.41	4829744.11	454.4	0:00
J257	Not Participating	308123.13	4830213.97	457.2	0:00
J260	Not Participating	305908.39	4830473.59	459.2	0:00
J261	Not Participating	306738.56	4830465.10	459.0	0:00
J265	Not Participating	308286.40	4830992.12	455.2	0:00
J266	Not Participating	306671.16	4831033.74	457.1	0:00
J268	Not Participating	306681.12	4831171.22	456.6	0:00
J270	Not Participating	324096.31	4831388.12	444.0	0:00
J273	Not Participating	308610.62	4831697.59	453.0	0:00
J276	Not Participating	308386.22	4831779.06	452.0	0:00
J277	Not Participating	321157.98	4831672.99	435.0	0:00
J278	Not Participating	306677.46	4831873.50	455.7	0:00
J280	Not Participating	322480.25	4831725.84	444.0	0:00
J282	Not Participating	308402.24	4831915.46	451.7	0:00

Table 10.2 Three Waters Wind Farm - Non-Participants
Real case shadow flicker results at dwellings within two miles of Project WTGs
Results using GE 2-127 114 m hub height WTGs
UTM NAD83 Zone 15 (meters)
continued

Shadow Receptor #	Status	Easting (m)	Northing (m)	Elevation AMSL (m)	Real Case Shadow (hrs/year)
J283	Not Participating	308534.26	4831916.45	452.3	0:00
J284	Not Participating	322503.29	4831755.25	444.0	0:00
J285	Not Participating	308556.00	4831936.46	451.9	0:00
J286	Not Participating	306775.42	4831961.92	455.1	0:00
J287	Not Participating	306813.52	4831961.70	454.7	0:00
J288	Not Participating	306874.52	4831964.81	454.3	0:00
J291	Not Participating	320676.40	4831888.76	435.8	0:00
J292	Not Participating	306813.60	4832054.77	455.1	0:00
J293	Not Participating	306853.13	4832058.08	454.8	0:00
J294	Not Participating	306763.72	4832061.06	455.5	0:00
J299	Not Participating	306784.24	4832621.72	453.4	0:00
J302	Not Participating	306805.66	4832763.15	453.0	0:00
J303	Not Participating	306805.66	4832763.15	453.0	0:00
J307	Not Participating	324761.39	4832871.57	444.0	0:00
J311	Not Participating	321245.05	4833082.69	435.0	0:00
J314	Not Participating	319310.86	4833335.97	435.0	0:00
J319	Not Participating	306749.35	4833659.64	453.0	0:00
J320	Not Participating	307114.44	4833659.39	451.1	0:00
J321	Not Participating	308732.53	4833641.72	450.0	0:00
J324	Not Participating	323020.28	4833549.74	444.0	0:00
J325	Not Participating	323007.88	4833567.21	444.0	0:00
J327	Not Participating	322470.47	4833685.98	442.4	0:00
J328	Not Participating	306748.18	4833874.93	453.0	0:00
J329	Not Participating	321260.13	4833740.25	436.6	0:00
J334	Not Participating	308126.10	4834553.99	447.0	0:00
J336	Not Participating	306846.10	4834907.56	447.4	0:00
J337	Not Participating	308675.53	4834899.47	444.7	0:00
J338	Not Participating	322074.64	4834869.13	438.0	0:00
J339	Not Participating	318729.75	4834910.41	435.7	0:00
J340	Not Participating	317029.61	4834931.51	438.0	0:00
J342	Not Participating	320592.73	4834911.50	438.4	0:00
J344	Not Participating	317584.57	4835035.67	438.0	0:00
J346	Not Participating	315573.84	4835072.93	438.0	0:00
J350	Not Participating	311773.49	4835158.34	445.6	0:00
J351	Not Participating	311808.79	4835167.46	445.7	0:00
J353	Not Participating	308690.64	4835228.47	444.0	0:00
J354	Not Participating	309327.07	4835223.59	444.0	0:00
J355	Not Participating	307336.85	4835322.43	448.3	0:00

Table 10.2 Three Waters Wind Farm - Non-Participants
Real case shadow flicker results at dwellings within two miles of Project WTGs
Results using GE 2-127 114 m hub height WTGs
UTM NAD83 Zone 15 (meters)
continued

Shadow Receptor #	Status	Easting (m)	Northing (m)	Elevation AMSL (m)	Real Case Shadow (hrs/year)
J356	Not Participating	307903.84	4835369.56	447.0	0:00
J357	Not Participating	319778.24	4835289.55	438.0	0:00
J358	Not Participating	310071.63	4835520.90	444.0	0:00
J360	Not Participating	319630.40	4835462.56	437.7	0:00
J361	Not Participating	318307.46	4835550.62	437.4	0:00
J362	Not Participating	318195.00	4835834.55	438.0	0:00
J363	Not Participating	317055.63	4835888.94	439.5	0:00
J364	Not Participating	317022.66	4835894.46	439.6	0:00
J365	Not Participating	318199.19	4835969.17	437.7	0:00
J366	Not Participating	314890.78	4836066.81	435.0	0:00
J367	Not Participating	319005.62	4836529.82	438.0	0:00
J368	Not Participating	315383.14	4836604.61	435.0	0:00
J369	Not Participating	313403.54	4836629.87	439.3	0:00
J370	Not Participating	308190.73	4836697.84	444.8	0:00
J371	Not Participating	309547.47	4836728.32	444.0	0:00
J372	Not Participating	315807.12	4836672.94	437.9	0:00
J373	Not Participating	316885.43	4836669.17	434.5	0:00
J374	Not Participating	309275.92	4836860.48	444.0	0:00
J375	Not Participating	313573.26	4836873.96	438.4	0:00
J376	Not Participating	318132.36	4836825.35	435.9	0:00
J377	Not Participating	313158.17	4837445.57	438.0	0:00
J378	Not Participating	313193.16	4837451.52	438.0	0:00
N379	Not Participating	301377.75	4822432.27	470.6	0:00
N380	Not Participating	300147.39	4821969.44	471.0	0:00
J381	Not Participating	304724.19	4825701.12	465.0	0:00
J382	Not Participating	302963.38	4826763.50	468.3	0:00
J383	Not Participating	302935.97	4826761.43	468.6	0:00
J384	Not Participating	302870.34	4826749.48	469.0	0:00
N385	Not Participating	300915.52	4823298.21	471.0	0:00
N386	Not Participating	300927.31	4823625.02	469.9	0:00
N387	Not Participating	300891.12	4824175.78	474.0	0:00
J388	Not Participating	322636.53	4834649.55	441.5	0:00

Certificate of Need Application to the Minnesota Public Utilities Commission

FIGURES

Docket Number: IP-7002/CN-19-154

Jackson County, Minnesota
July 31, 2019

Prepared For:

Three Waters Wind Farm, LLC
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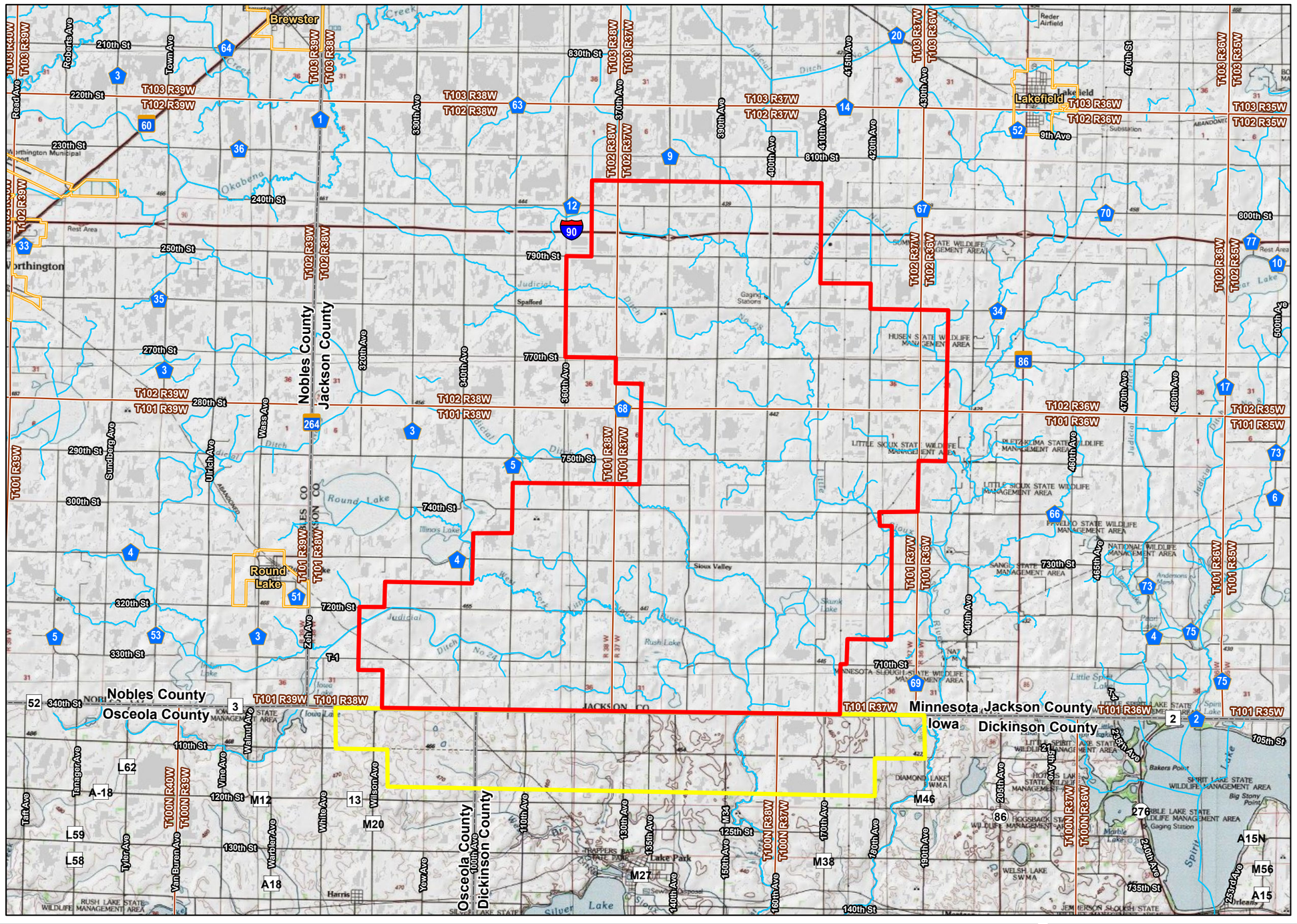


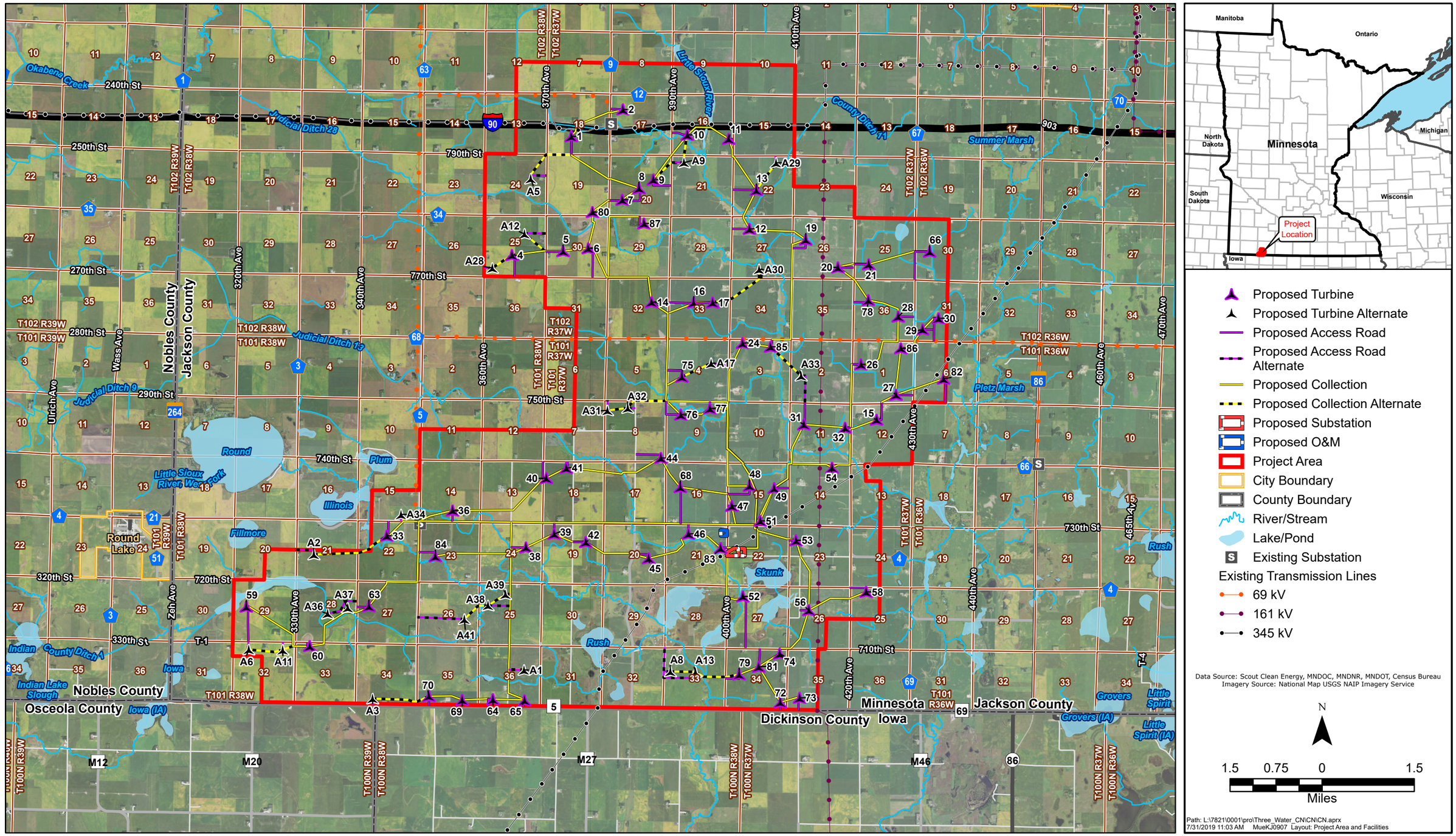
THREE WATERS WIND PROJECT - JACKSON CO, MINNESOTA

Project Location

SCOUT CLEAN ENERGY

JULY 2019

Figure 1



THREE WATERS WIND PROJECT - JACKSON CO, MINNESOTA

Project Area and Facilities

SCOUT CLEAN ENERGY

JULY 2019

Figure 2