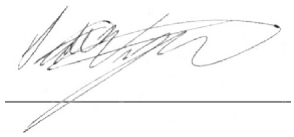
Minnesota Public Utilities Commission Certificate of Need Application for a Solar Energy Generating System and 345 kV Transmission Line

Byron Solar, LLC
Olmsted and Dodge Counties, Minnesota
Submitted August 27, 2021
Docket No. IP-7041/CN-20-764

Byron Solar, LLC
10 NE 2nd Street, Suite 400
Minneapolis, MN 55413

Project Name:	Byron Solar Project
Project Location:	The Project encompasses 1,853.7 acres in Kalmar Township in Olmsted County and Canisteo and Mantorville Townships in Dodge County, Minnesota
Applicant:	Byron Solar, LLC, c/o EDF Renewables, Inc.
Authorized Representative:	Scott Wentzell
Signature:	
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ACRONYMS

2020 Quad Report	Minnesota Department of Commerce, Energy Policy and Conservation Quadrennial Report 2020
AADT	Annual Average Daily Traffic
AIMP	Agricultural Impact Mitigation Plan
Alternating Current (AC)	The direction of current flowing in a circuit is constantly being reversed back and forth. See also Direct Current.
Applicant or Byron Solar	Byron Solar Project, LLC
Application	Certificate of Need Application
BMPs	Best Management Practices
BOP	Balance of Plant
C&I	Commercial and Industrial
CN	Certificate of Need
Commission	Minnesota Public Utilities Commission
CO_2	Carbon Dioxide
CUP	Conditional Use Permit
dBA	The dBA scale is A-weighted decibels
Decibel (dB)	A logarithmic unit used to express the absolute level of sound pressure, using the ratio between power and intensity.
Development Area	Approximate 1,552.6 acre area where the Applicant proposes to build the Solar Facility
Direct Current (DC)	The unidirectional flow of electric charge. Direct current is produced by sources such as batteries and solar cells.
DOC-EERA	Minnesota Department of Commerce Energy Environmental Review and Analysis
EDFR	EDF Renewables, Inc.
EIA	United States Energy Information Administration
ER	Environmental Review
ESA	Endangered Species Act
Exemption Request	Request for Exemption from Certain Certificate of Need Application Content Requirements
GHG	Greenhouse Gas
HVTL or Transmission Line	The proposed 3-mile 345 kilovolt High Voltage Transmission Line or Transmission Line and associated facilities to support the Solar Facility.
HVTL Proposed Route or Proposed Route	The 52.7 acres of physical land area with a 150-foot right-of-way (75 feet on both sides of the transmission line centerline) over which easement rights are required to safely construct, operate, and maintain a transmission line.

IPaC	Information for Planning and Consultation
IRPs	Integrated Resource Plans
ITC	Investment Tax Credit
kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt hour
IPP	Independent Power Producer
L_{10}	Ten Percent of Any Hour
L_{50}	Fifty Percent of Any Hour
Land Control Area	Parcels that have lease agreements with the Applicant and may extend beyond the Solar Facility boundary.
LEGF	Large Electric Generating Facility
LHVTL	Large High Voltage Transmission Line
MBS	Minnesota Biological Survey
Minn. R.	Minnesota Rules
Minn. Stat.	Minnesota Statutes
MNDOC	Minnesota Department of Commerce
MISO	Midcontinent Independent System Operator
MNDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
Megawatt (MW)	A megawatt is a unit for measuring power that is equivalent to one million watts.
Megawatt hours (MWh)	Equal to 1,000 kilowatts of electricity used continuously for one hour. It is about equivalent to the amount of electricity used by about 330 homes during one hour.
NAC 1	Noise Classification Area 1
NLEB	Northern long-eared bat
NPC	Native Plant Community
NPDES	National Pollutant Discharge Elimination System
NRIS	Network Resource Interconnection Service
O&M	Operations and Maintenance
POI	Point of Interconnect
PPA	Power Purchase Agreement
Project	Byron Solar Project; Includes the Solar Facility and HVTL
Project Area	The 1,853.7 acres of land that includes the Solar Facility (1,801 acres) and HVTL (52.7 acres)

Project Substation	A substation is a high voltage electric system facility. It is used to switch generators, equipment, and circuits or lines in and out of a system. It also is used to change AC voltages from one level to another. Some substations are small with little more than a transformer and associated switches. Others are very large with several transformers and dozens of switches and other equipment.
PV	Photovoltaic
RECs	Renewable Energy Credits
RES	Renewable Energy Standards
RFP	Request for Proposal
SCADA	Supervisory Control and Data Acquisition
SES	Solar Energy Standards
SMMPA	Southern Minnesota Municipal Power Agency
SOBS	Site of Biodiversity Significance
Solar Facility	The proposed up to 200 megawatt (MW) photovoltaic (PV) solar energy generating facility and associated systems on 1,801 acres
SWPPP	Storm Water Pollution Prevention Plan
TWh	Terawatt hours
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VMP	Vegetation Management Plan
WNS	White-nose Syndrome

APPLICATION CONTENT REQUIREMENTS COMPLETENESS 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	No
A(2)	Effects of applicant's existing or expected conservation programs and state and Federal conservation programs	4.1	No
A(3)	Effects of promotional practices on demand	4.1/3.2.2	No
A(4)	Ability of current and planned facilities, not requiring certificates of need, to meet future demand	5.2.1.8	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**		
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**	2.4	No
7849.0240	**Need Summary and Additional Considerations**		
Subp. 1	Need Summary – summary of major factors justifying need for facility	3.1	No
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

Minnesota Rule	Required Information	Application Section(s)	Exemption Granted
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 - partial
B(5)	Discussion of Alternatives – Reasonable combination of alternatives	5.2.1.11	Yes
C	Proposed Facility and Alternatives	5.3	
C(1)	Capacity cost in current dollars per kilowatt	5.3.1	Yes - partial
C(2)	Service life	5.3.2	Yes - partial
C(3)	Estimated average annual availability	5.3.3	Yes - partial
C(4)	Fuel costs in current dollars per kilowatt hour	5.3.4	Yes - partial
C(5)	Variable operating and maintenance costs in current dollars per kilowatt hour	5.3.5	Yes - partial
C(6)	Total cost in current dollars of a kilowatt hour provided by it	5.3.6	Yes - partial
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 - partial
C(9)	Majoring assumptions made in providing information in subitems (1) to (8), including projected escalation rates for fuel costs and operating and maintenance costs, as well as projected capacity factors	5.3	Yes - partial
D	System Map	5.4	Yes
E	Other relevant information about the facility and alternatives that may be relevant to a determination of need	-	-
7849.0260	**Proposed LHVTL and Alternatives Application**	--	Yes[1]
A(1)	Description – Design Voltage	5.1.6	Yes

[1] The Commission determined that Byron Solar's proposed HVTL does not qualify as a Large High-Voltage Transmission Line (LHVTL) as defined in Minn. Stat. § 216B.2421, subd. 2(2). Therefore, the data requirements of Minn. R. 7849.0260 are not applicable.

Minnesota Rule	Required Information	Application Section(s)	Exemption Granted
A(2)	Description – Number, the sizes, and the types of conductors	5.1.6	Yes
A(3)	Description – expected losses under projected maximum loading and under projected average loading in the length of the transmission line and at terminals and substations	5.1.6	Yes
A(4)	Description – approximately length of the proposed transmission line and the portion of that length in Minnesota	5.1.6	Yes
A(5)	Description – approximate location of AC substations, which information shall be on a map of the appropriate scale	5.1.6	Yes
A(6)	Description – list of all counties reasonably likely to be affected by construction and operation of the proposed line	5.1.6	Yes
B(1)	Discussion of Alternatives – New generation of various technologies, sizes, and fuel types	5.3.9	Yes
B(2)	Discussion of Alternatives – Upgrading of existing transmission lines or existing generating facilities	5.3.9	Yes
B(3)	Discussion of Alternatives – Transmission line with different design voltages or with different numbers, sizes, and types of conductors	5.3.9	Yes
B(4)	Discussion of Alternatives – Transmission lines with different terminals or substations	5.3.9	Yes
B(5)	Discussion of Alternatives – Double circuiting of existing transmission lines	5.3.9	Yes
B(6)	Discussion of Alternatives – DC transmission line	5.3.9	Yes
B(7)	Discussion of Alternatives – Underground transmission line	5.3.9	Yes
B(8)	Discussion of Alternatives – any reasonable combinations of the alternatives list in subitems (1) to (7)	5.3.9	Yes
C(1)	Discussion of Project and Alternatives – total cost in current dollars	5.1.6/5.3.9	Yes
C(2)	Discussion of Project and Alternatives – service life	5.1.6/5.3.9	Yes
C(3)	Discussion of Project and Alternatives – estimated average annual availability	5.1.6/5.3.9	Yes
C(4)	Discussion of Project and Alternatives – estimated annual operating and maintenance costs in current dollars	5.1.6/5.3.9	Yes
C(5)	Discussion of Project and Alternatives – estimate of its effect on rates systemwide and in Minnesota, assuming a test year beginning with the proposed in-service date	5.1.6/5.3.9	Yes
C(6)	Discussion of Project and Alternatives – efficiency, expressed for a transmission facility as the estimated losses under projected maximum loading in the length of the transmission line and at the terminals or substations, or expressed for a generating facility as the estimated heat rate.	5.1.6/5.3.9	Yes
C(7)	Discussion of Project and Alternatives – major assumptions	5.1.6/5.3.9	Yes

Minnesota Rule	Required Information	Application Section(s)	Exemption Granted
D	System Map	5.4	Yes
E	Other relevant information about the facility and alternatives that may be relevant to a determination of need.	--	Yes
7849.0270	**Peak Demand and Annual Consumption Forecast**		
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**	10.0, 11.0	No
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	11.9, 11.10	No
K	Minimum number and size of transmission facilities required to provide a reliable outlet for the generating facility	11.11	No
7849.0330	**Transmission Facilities**	5.2.1.10	Yes
7849.0340	**No-Facility Alternative**	5.2.1.9	Yes

BYRON SOLAR PROJECT

1.0 EXECUTIVE SUMMARY

Byron Solar, LLC (Byron Solar or Applicant), submits this Application (Application) for a Certificate of Need (CN) to the Minnesota Public Utilities Commission (Commission), pursuant to and in accordance with Minn. Stat. § 216B.243 and Minn. R. Ch. 7849. Byron Solar respectfully requests that the Commission issue a CN for the up to 200 megawatt (MW) photovoltaic (PV) solar energy generating facility and associated systems (Solar Facility), and 345 kilovolt (kV) high voltage transmission line and associated facilities (HVTL or Transmission Line) and associated facilities (collectively, the Solar Facility and Transmission Line are referred to as the Byron Solar Project or Project), in Kalmar Township in Olmsted County and Canisteo and Mantorville Townships in Dodge County, Minnesota.

The Project is a "large energy facility" (LEF), as defined in Minn. Stat. § 216B.2421, subdivision 2(1), and a "large electric generating facility" (LEGF) as defined in Minn. R. 7849.0010, subpart 13. Byron Solar is concurrently applying for a Site Permit and a Route Permit pursuant to the Minnesota Power Plant Siting Act (Minn. Stat. § 216E) and Minn. R. Ch. 7850 in Docket Nos IP-7041/GS-20-763 and IP-7041/TL-20-765.

2.0 INTRODUCTION

2.1 THE BYRON SOLAR PROJECT

Byron Solar is an independent power producer (IPP) that proposes to construct and operate the proposed Solar Facility and HVTL in the townships of Mantorville and Canisteo in Dodge County, Minnesota, and Kalmar Township in Olmsted County, Minnesota (**Map 1**). The power generated by the Project will be offered for sale to Minnesota utilities and corporate purchasers that have identified a need for additional renewable energy.

The Project is generally located between the cities of Byron and Kasson in southeastern Minnesota. Combined, the Solar Facility and HVTL encompass 1,853.7 acres (Project Area).

The Solar Facility is situated on approximately 1,801 acres of predominantly agricultural land and refers to all land within the Solar Facility boundary under agreement with a landowner. References to "Development Area" refers to portions of the Solar Facility hosting solar equipment. The preliminary Project design shows a Development Area of 1,552.6 acres within the proposed fence. The remaining 248.4 acres are not hosting solar equipment and are considered undeveloped land. The Applicant has secured lease agreements for 100 percent of land for the proposed Solar Facility. An additional 1,227 acres beyond the Solar Facility boundary has also been secured through easements and lease agreements. In total, the Applicant has secured 3,028 acres of lease agreements and easements, which is referred to as the Land Control Area.

Energy from the solar panels will be directed through an underground electrical collection system to inverters where the power is converted from direct current (DC) to alternating current (AC) power. A new Project Substation will be constructed as part of the Solar Facility and will be located just south of U.S. Highway 14 near 640th St/265th Ave in Dodge County.

The HVTL will connect to the Solar Facility via the Project Substation (*see* **Map 2**). The 345 kV HVTL will be approximately three miles long and will connect the Project Substation to the existing Byron Substation in Kalmar Township, Olmsted County, Minnesota. The proposed HVTL route is located on predominantly agricultural land in Mantorville Township in Dodge County, and Kalmar Township in Olmsted County. References to the "HVTL Proposed Route" within this Application refers to the 3-mile 345 kV Transmission Line for which the Applicant is seeking voluntary easement agreements. The Applicant has acquired a 150-foot-wide permanent right-of-way along the Proposed Route.

Byron Solar has not made a final selection of solar panels but anticipates using approximately 594,048 PV panels for the Project. In addition to solar panels, the Project will consist of racking system, inverters, fencing, an electrical collection system, Project Substation, an Operation and Maintenance (O&M) facility, electrical cables, conduit, switchgear, step-up transformers, supervisory control and data acquisition (SCADA) system, metering equipment, access roads, several weather stations, stormwater basins, laydown yard, and other infrastructure typical of a utility-scale solar facility. The Project also includes an approximately 3-mile long above-ground 345 kV Transmission Line that is needed to interconnect the Project to the grid at the existing Byron Substation in Kalmar Township, Olmsted County, Minnesota. Byron Solar is anticipating construction to begin in 2023 with commercial operation by the end of 2024.

A Route Permit is required for high-voltage transmission lines greater than 100 kV and 1,500 feet in length. (Minn. Stat. §216E.01, subd. 4 and Minn. Stat. § 216E.03, subd. 2.) Thus, the HVTL requires a Route Permit from the Commission prior to construction (Minn. Stat. § 216E.03, subd. 2).

A Site Permit is required for a solar energy generating system that is greater than 50 MW. (Minn. Stat. § 216E.021 and Minn. Stat. § 216E.03, subd. 1.) Byron Solar submitted a request to the Minnesota Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA) for a size determination on October 12, 2020 in accordance with Minn. Stat. § 216E.021. DOC-EERA issued its size determination on October 20, 2020.

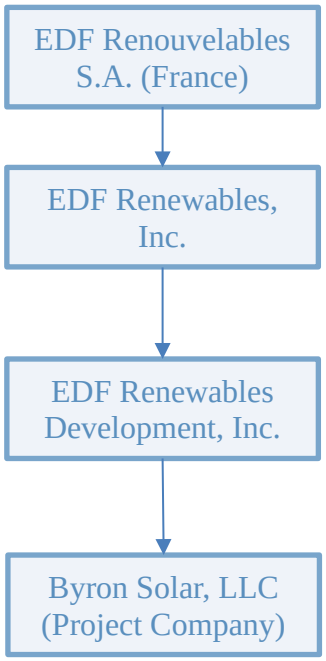
Byron Solar plans to file a Joint Application for a Site Permit and HVTL Route Permit for the Project under docket numbers IP-7041/GS-20-763 and IP-7041/TL-20-765. Minn. R. Ch. 7850 provides for three different procedures for obtaining a site permit and route permit: full review, alternative review, and local review. In accordance with Minn. Stat. § 216E.04, subd. 2(4), Byron Solar is seeking approval of its joint site and route permit application under the alternative review process provided for under Minn. Stat. § 216E.04 and Minn. R. 7850.2800–7850.3900. Byron Solar filed a Notice of Intent to Submit a Site Permit and HVTL Route Permit Application under the Alternative Permitting Process to the Commission on June 4, 2021.

The Site Permit and Route Permit are the only site approvals needed for construction of the Project (Minn. Stat. § 216E.10, subd. 1).

2.2 APPLICANT INFORMATION

Byron Solar is an IPP and wholly-owned subsidiary of EDFR. EDFR is a renewable energy development company that will construct, own and operate the proposed Project. EDFR is a world

leader in renewable energy electricity generation with its United States headquarters located in San Diego, California. EDFR is a market leading IPP and service provider that delivers grid-scale power, including wind, solar photovoltaic, and storage. EDFR develops, builds and operates clean energy power plants in more than 20 countries. EDFR has developed 16,000 MW in North America and has 11,000 MW currently under a long-term O&M contract. Since 2016, EDFR's projects have contributed more than $104 million in leaseholder payments and generate enough power to offset approximately 1.6 million homes. The following ownership chart shows the ownership structure for Byron Solar:



** All ownership percentages = 100%

While neither Byron Solar nor EDFR currently operate any other solar energy generating systems in Minnesota that were permitted or otherwise subject to the jurisdiction of the Commission, EDFR has permitted over 1,200 MWs of large wind energy conversion systems in Minnesota, including the Lakefield, Red Pine, Wapsipinicon, and Nobles Wind Projects. EDFR is also currently planning the Andyville Solar Project, an up to 200 MW PV solar-energy generating system and accompanying 161 kV transmission line in Mower County, Minnesota through its subsidiary Andyville Solar Project, LLC; Louise Solar Project, an up to 50 MW PV solar-energy generating system and accompanying 161 kV transmission line in Mower County, Minnesota through its subsidiary Louise Solar Project, LLC; and Minneota Solar, an up to 200 MW solar-energy generating system in Lyon County, Minnesota.

2.3 PROJECT CONTACTS

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

The total fee for the CN Application and the schedule of payments are shown in **Table 1**. The fee determination for the Project is based on a capacity of 200 MW, per the requirements of Minn. R. 7849.0210, subp. 1. The payment schedule is based on Minn. R. 7849.0210, subp. 2.

Table 1: Certificate of Need Application Schedule of Payments

Fee Calculation	Amount
Fee Calculation Equation	$10,000 + $50/MW
Due with CN Application	$5,000.00
Due 45 days after Application submittal date	$5,000.00
Due 90 days after Application submittal date	$5,000.00
Due 135 days after Application submittal date	$5,000.00
Total Calculated Fee	$20,000.00

2.5 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 October 12, 2020, Byron Solar submitted a Request for Exemption from Certain Certificate of Need Application Content Requirements (Exemption Request). In its Exemption Request, Byron Solar requested that the Commission grant exemptions, 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 the Renewable Energy Standards (RES) or the Solar Energy Standards (SES) requirements set forth in Minn. Stat. § 216B.1691, or other clean energy standards.

On January 15, 2021, the Commission issued an order granting Byron Solar the exemptions it requested in its Exemption Request, consistent with the recommendations filed by the

Department of Commerce, Division of Energy Resources.[2] Where appropriate in this Application, Byron Solar will reference the specific exemptions granted by the Commission.

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

3.1 NEED SUMMARY

Byron Solar is proposing to construct this facility to sell energy, capacity and renewable energy credits, either bundled or unbundled, to one or more electric utilities and/or commercial customers. Byron Solar is actively marketing the Project to a number of potential off-takers and may sell the power in the form of a Power Purchase Agreement (PPA), or the Project could be owned directly by a utility. Utilities and other customers seeking to diversify and build their energy generation portfolios are attracted to solar energy projects because of long-term, fixed, competitive pricing, high-capacity value, environmental benefits, and existing and potential renewable energy policies. The proposed Project would install up to 200 MW of solar generating capacity in Minnesota that would contribute to satisfying utilities' and consumers' demands for renewable energy and meet utility renewable requirements or individual sustainability goals.

The demand for PV in Minnesota has increased rapidly in recent years.[3] According to the Minnesota Department of Commerce's (MNDOC) most recent Energy Policy and Conservation Quadrennial Report, Minnesota solar capacity grew rapidly in 2017, adding 403 MW AC of capacity compared to 170 MW AC in 2016, and increased by 287 MW AC in 2018 and 152 MW AC in 2019.[4] According to the 2020 Quad Report, preliminary data from Xcel Energy shows that developers added 140 MW AC of community solar gardens for a total of more than 1,200 MW AC as of December 2020 (based on preliminary estimates).[5] Solar electricity accounted for nearly three percent of electricity generated within Minnesota in 2020.[6]

As Minnesota's utilities strive to achieve ambitious renewable energy targets, "significant renewable additions"[7] will be necessary. For example, Xcel Energy's "Upper Midwest Integrated Resource Plan" alone calls for 80 percent carbon emissions reductions from 2005 levels by 2030, and 100 percent reductions by 2050. By Xcel Energy's estimation, these are "some of the most

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[2] Order Approving Notice Plan, Approving Exemption Requests, and Granting Variances, *In the Matter of the Application of Byron Solar Project, LLC for a Certificate of Need for the up to 200 MW Byron Solar Project and 345 kV Transmission Line in Olmsted and Dodge Counties, Minnesota*, Docket No. IP-7041/CN-20-746 (Jan. 15, 2021) (eDockets No. 20211-169865-01).

[3] Minnesota Department of Commerce, Energy Policy and Conservation Quadrennial Report 2020 at 9 (March 1, 2021), https://mn.gov/commerce-stat/pdfs/20210301_quad_report.pdf (hereinafter, the "2020 Quad Report").

[4] 2020 Quad Report at 133-134.

[5] 2020 Quad Report at 134.

[6] 2020 Quad Report at 133.

[7] Xcel Energy, 2020-2034 Upper Midwest Integrated Resource Plan Supplement (June 30, 2020), Docket No. E002/RP-19-368, available at: https://www.xcelenergy.com/staticfiles/xe-responsive/Company/Rates%20&%20Regulations/Resource%20Plans/Upper-Midwest-Energy-Plan-Supplement-063020.PDF.

ambitious carbon reduction goals of any utility in the U.S."[8] Translating these goals into action, Xcel Energy's preferred plan proposes to add 3,500 MW of cost-effective, utility-scale solar generation by 2030 and approximately 2,250 MW of wind by 2034.[9]

Similarly, other Minnesota utilities are advancing efforts to transition to renewable energy. Otter Tail Power will be at 30 percent renewable energy by 2022, and ALLETE's Minnesota Power is targeting 50 percent renewables by end of 2021.[10] Likewise, Southern Minnesota Municipal Power Agency (SMMPA) announced its plan for a 90 percent reduction in carbon dioxide (CO_2)emissions from 2005 levels and 80 percent carbon-free energy on an annual basis in 2030.[11] Additionally, the Minnesota Transmission Owners' Biennial Transmission Report's compliance filing outlining gaps between existing and planned transmission lines and the transmission system that will be required to meet the companies' publicly stated clean energy goals lists the following clean energy goals of Minnesota utilities:

- Dairyland Power Cooperative is transitioning to a more diverse generation portfolio, with carbon reduction and system reliable stated as "central issues";
- Great River Energy has a goal to serve its all-requirements member-owner cooperatives with energy that is 50 percent renewable by 2030;
- Minnesota Municipal Power Agency has a goal to have 100 percent renewable generation "when economical";
- Minnkota Power Cooperative is committed to finding opportunities to reduce carbon emissions; and
- Rochester Public Utilities has a goal to transition to 100 percent renewable energy by 2030.[12]

Byron Solar is well-positioned to help meet the renewable resource needs of Minnesota's electric utilities.

Beyond aiding with utility compliance towards voluntary renewable commitments and Minnesota's existing RES, Byron Solar can also help meet other state policies and goals. For example, Minn. Stat. § 216C.05 identifies energy planning and policy goals that include "the

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[8] *Id.*

[9] Xcel Energy, 2020-2034 Upper Midwest Integrated Resource Plan Supplement (June 30, 2020), Docket No. E002/RP-19-368, available at: https://www.xcelenergy.com/staticfiles/xe-responsive/Company/Rates%20&%20Regulations/Resource%20Plans/Upper-Midwest-Energy-Plan-Supplement-063020.PDF.

[10] Minnesota Power (ALLETE), *EnergyForward*, https://www.mnpower.com/Environment/EnergyForward.

[11] Southern Minnesota Municipal Power Agency, *SMMPA plans to be 80% carbon-free in 2030* (Feb. 5, 2020), available at: https://smmpa.com/news/2020/2/5/smmpa-plans-to-be-80-carbon-free-in-2030#:~:text=The%20plan%20would%20result%20in,an%20annual%20basis%20in%202030.

[12] Compliance Filing, *In the Matter of the Minnesota Transmission Owners' 2019 Biennial Transmission Projects Report*, Docket No. E002/M-19-205 (Aug. 14, 2020) (eDockets No. 20208-165906-02).

development and use of renewable energy resources wherever possible."[13] In addition, Minn. Stat. § 216H.02 sets forth greenhouse gas (GHG) emissions reductions goals and planning requirements. Minnesota has thus far fallen short of reaching these goals, and in the Minnesota Pollution Control Agency's 2019 Greenhouse Gas Legislative Report, the Minnesota Pollution Control Agency (MPCA) details that Minnesota's GHG reductions thus far have declined 12 percent versus 2005 levels. This is notably below the "goal of a 15 percent emissions reduction by 2015,"[14] and suggests that Minnesota will risk missing its goal of 30 percent reduction by 2025 without significant additional progress. By providing additional, carbon-free generation, Byron Solar can help further eliminate CO_2 and other greenhouse gas emissions from Minnesota's power sector, where significant emissions continue to originate. Similarly, Governor Walz issued Executive Order 19-37 establishing a Climate Change Subcabinet to "[i]dentify policies and strategies that will put Minnesota back on track or meet or exceed" those goals.[15]

Governor Walz recently announced a set of policy proposals that are designed to lead Minnesota to 100 percent clean energy in Minnesota's electricity sector by 2040.[16] Given that just over 25 percent of Minnesota's electric generation came from clean energy at the time of Governor Walz's announcement,[17] Minnesota will need additional renewable generation like that provided by the Project to meet this goal. President Biden issued Executive Order 14008 ("Tackling the Climate Crisis at Home and Abroad") promoting renewable energy development – in addition to directing the United States on a path to achieve "net-zero emissions, economy-wide, by no later than 2050," it sets out to attain "a carbon pollution-free electricity sector no later than 2035." [18]

Clean energy requirements in Minnesota and neighboring states further demonstrate the need for the Project. Thirty-seven U.S. states, 11 of which are Midcontinent Independent System Operator (MISO) states, currently have either mandated or voluntary renewable portfolio standards or policies.[19] This includes Minnesota. The Minnesota Legislature established interim milestones to ensure that utilities make progress toward the "25 by '25" requirement, which includes the requirement to have 20 percent of the electric utility's total retail electric sales be generated by renewable sources by 2020, and 25 percent of sales to be generated by renewable sources by 2025. As shown in **Table 2**, utilities[20] in Minnesota are also required to provide 1.5 percent of their total

[13] Minn. Stat. § 216C.05, subd. 1.

[14] Minnesota Pollution Control Agency & Minnesota Department of Commerce, *2019 Greenhouse Gas Legislative Report* (Jan. 2019), https://www.pca.state.mn.us/sites/default/files/lraq-2sy19.pdf.

[15] Executive Order 19-37 (Dec. 2, 2019).

[16] Office of Governor Tim Walz, *Governor Walz, Lieutenant Governor Flanagan, House and Senate DFL Energy Leads Announce Plan to Achieve 100 Percent Clean Energy in Minnesota by 2040* (Jan. 21, 2021), available at: https://mn.gov/governor/news/?id=1055-463873.

[17] *Id.*

[18] Executive Order 14008 (Jan. 27, 2021), https://www.govinfo.gov/content/pkg/FR-2021-02-01/pdf/2021-02177.pdf.

[19] National Conference of State Legislatures, *State Renewable Portfolio Standards and Goals* (Apr. 17, 2020), https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx; *MTEP18 MISO Transmission Enhancement Plan*, at 182. Accessed online February 2, 2021. Retrieved from https://cdn.misoenergy.org/MTEP18%20Full%20Report264900.pdf.

[20] Minnesota Power, Ottertail Power Company, and Xcel Energy are subject to the SES. The SES statute excludes cooperative and municipal utilities.

retail electrical sales from electricity generated by solar energy by the end of 2020.[21] Minnesota's Legislature has declared that the energy goal of the state is to have 10 percent of the retail electric sales in Minnesota be generated by solar energy by 2030.[22] Renewable resources, such as the Project, are needed to meet these clean energy requirements in both Minnesota and in neighboring states.

The Minnesota Legislature has also considered legislation that would increase Minnesota's renewable energy requirements by compelling utilities to obtain additional electricity from renewable sources beyond that currently required by the RES and further reduce carbon from energy sources. For example, the Minnesota Legislature considered bills that would have increased the RES to 50 percent[23] or establish a 100 percent carbon free standard by 2050.[24] Although these types of measures have not yet passed, their continued consideration shows that utilities need to prepare for a potential increase to the RES and plan to reduce carbon emissions from energy sources by seeking additional renewable energy generation sources beyond what the RES currently requires. The Minnesota Legislature is currently considering proposed legislation that would quicken the push for carbon-free energy in Minnesota.[25]

Table 2: Solar Energy Standard Milestones

Year	Utility Requirement
2020	1.5%
2030	10.0%

Jurisdictions surrounding Minnesota also have renewable policies. For example, the North Dakota legislature codified the national "25 by '25" initiative, with the stated goal that, "not later than January 1, 2025, the agricultural, forestry, and working land of the United States should provide from renewable resources not less than twenty-five percent of the total energy consumed in the United States[.]"[26] Additional renewable resources will be needed to meet the 25 by '25 initiative in North Dakota and similarly situated states.

Under current state policies, the total United States renewable portfolio standard demand will increase from 310 terawatt hours (TWh) in 2019 to 600 TWh in 2030.[27] Given existing

[21] Minn. Stat. § 216B.1691, subd. 2f(a).

[22] Minn. Stat. § 216B.1691, subd. 2f(e).

[23] H.F. No. 1772, 90th Legis. (Feb. 27, 2017).

[24] H.F. No. 1671, 91st Legis. (Feb. 25, 2019). *See also* H.F. No. 1405, 91st Legis. (Feb. 19, 2019), which would impose requirements on utilities, the Commission, and the Minnesota Department of Commerce to encourage the transition to renewable energy if enacted.

[25] *See, e.g.*, H.F. No. 164, 92nd Legis. (Introduced Jan. 19, 2021) (update and expand the state's energy conservation programs to include electrification measures and higher energy savings goals for utilities); H.F. No. 10, 92nd Legis. (Introduced Jan. 7, 2021) (require utilities to generate 100 percent of their electricity from carbon-free resources by 2040).

[26] NDCC § 17-01-01.

[27] LAWRENCE BERKELEY NAT'L LAB., U.S. RENEWABLES PORTFOLIO STANDARDS at 24 (July 2019).

renewable energy capacity, an additional 270 TWh increase in renewable resources will be required to meet demand through 2030.[28] In addition, the regional transmission grid is being expanded to deliver renewable energy generation in a cost-effective manner.[29] Although the current Production Tax Credit and Investment Tax Credit (ITC) for renewables are set to begin a phasedown in upcoming years, many utilities in MISO are developing long-term resource plans, which include increased levels of renewable energy such as solar.[30] Recent solar pricing has shown that the costs of energy and capacity of utility scale solar are on par with those of gas peaking and combined cycle.[31]

Further, in addition to traditional utility demand for renewable energy, a growing number of corporations are turning to renewable energy to save money on energy and meet sustainability goals. Commercial and industrial (C&I) customers either purchase renewable energy directly or obtain renewable benefits and cost savings through financially settled contracts, sometimes called virtual PPAs. Similarly, many utilities are creating "green tariffs," which allow customers to purchase up to 100 percent renewable energy from the utility. Corporations such as Apple, Google and Facebook, along with many others, have recently set goals to obtain 100 percent of their energy from renewables. These clean energy goals fuel the demand for corporate renewables procurement and subsequent PPAs.

According to Wood Mackenzie's report titled an "*Analysis of Commercial and Industrial Wind Energy Demand in the United States,"* the United States is "at the beginning stage of a corporate renewables procurement boom," with approximately "85 gigawatts of renewable energy demand" from the "largest U.S. companies" alone through 2030.[32] Another Wood Mackenzie report titled "*US Corporate Procurement of Wind and Solar 2020*" lists 2019 as "the largest year for megawatts of annual wind and solar C&I capacity additions and the largest year on record for new wind and solar C&I PPAs signed." These growth trends are expected to continue, and 2020 saw an immense demand for C&I renewable energy PPAs. Corporate PPA volumes in MISO have increased each of the past five years and Minnesota has seen an increase in cumulative operational and in-development C&I renewable capacity, which highlights the broader trend of increased demand for renewables across the United States.[33] Similarly, according to a 2019 research report, corporate contracts accounted for 22 percent of 2018 power purchase agreements for renewables

[28] *Id.* at 25.

[29] *MTEP 18 MISO Transmission Enhancement Plan* at 42.

[30] *MTEP 18 MISO Transmission Enhancement Plan* at 144.

[31] Lazard's Levelized Cost of Energy Analysis 13.0, 2019.

[32] Wood Mackenzie, *Corporates usher in new wave of US wind and solar growth* (Aug. 20, 2019), https://www.woodmac.com/our-expertise/focus/Power--Renewables/corporates-usher-in-new-wave-of-u.s.-wind-and-solar-growth/.

[33] *Id.*

in the United States.[34] Further, the buyers are not just large corporations; smaller companies are entering into aggregated purchasing models and further driving additional market expansion.[35]

Many of Minnesota's largest companies also have aggressive sustainability and carbon reduction goals, as evidenced by their participation in and support of the Minnesota Sustainable Growth Coalition's *"Clean Energy Vision,"* which calls for "surpassing the State of Minnesota's current economy-wide greenhouse gas emissions targets of 30 percent reduction by 2025 and 80 percent reduction by 2050."[36] EDFR and the Project will help attract and retain corporate entities with Environmental, Sustainability, and Governance goals in Minnesota by providing reliable renewable energy that helps to reduce greenhouse gas emissions.

Given the demand for renewable energy, a market exists for independently produced electricity generated from solar and other renewables, including the up to 200 MW to be generated by the Project. In sum, Minnesota has a wide array of needs that Byron Solar can help address. The clean, renewable power that Byron Solar will produce can help meet utility commitments, achieve GHG reduction targets, address environmental justice needs, and provide much needed short- and long-term economic benefit.

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 well as avoided environmental costs, as discussed in Sections 10 and 11 in this Application. Further, regional and national security and energy reliability can be enhanced through the development of diversified generation resources such as solar energy generation from the Project.

The Project is also designed to be socioeconomically beneficial to landowners, local governments, and communities. Landowner compensation is established by a combination of voluntary lease, purchase, or easement agreements between landowners and Byron Solar. Byron Solar has entered into lease, purchase, or easement agreements with the landowners that own the land on which the Project would be constructed. The Applicant has secured lease agreements for 100 percent of land for the proposed Solar Facility. The final Solar Facility design is expected to occupy approximately 1,552.6 acres or less. The excess acreage (248.4 acres) allows for planned buffers and flexibility in overall design. An additional 1,227 acres beyond the Solar Facility boundary has also been secured through easements and lease agreements. In total, the Applicant

[34] Emma Foehringer Merchant, *Corporate Renewables Procurement Accounted for Nearly a Quarter of All Deals in 2018* (Feb. 5, 2019), https://www.greentechmedia.com/articles/read/corporate-renewables-procurements-quarter-ppa-2018.

[35] Emma Foehringer Merchant, *2018 Was Record Year for Corporate Clean Energy Contracts* (Jan. 31, 2019), https://www.greentechmedia.com/articles/read/reports-confirm-a-record-year-for-corporate-clean-energy-contracts#gs.nxat51.

[36] Minnesota Sustainable Growth Coalition, *Clean Energy Vision*, https://environmental-initiative.org/work/minnesota-sustainable-growth-coalition/.

has secured 3,028 acres of lease agreements and easements (Land Control Area). The Applicant has secured 100 percent of the total necessary private easements from landowners for the 52.7 acres of right-of-way required for the Proposed Route.

The Project will also create new local job opportunities for various trade professionals that live and work in the area as it is typical to advertise locally to fill required construction positions. Opportunity exists for sub-contracting to local contractors for gravel, fill, and civil work. Additional personal income will also be generated by circulation and recirculation of dollars paid out by the Project as business expenditures and state and local taxes. Byron Solar will issue a Request for Proposal (RFP) to Balance of Plant (BOP) contractors to construct the Project. Byron Solar will include preferences for contractor bids that utilize local, union construction craft employees to the greatest extent feasible in accordance with the Project's budget, timeline, industry standards and requirements, and corporate safety policies. The BOP contractor selected will be required to work with labor unions, local subcontractors, and other vendors to implement a Project construction staffing model that maximizes local hiring and local economic benefits for the Project, while ensuring the Project is safely built on time and on budget. Typical onsite construction staff levels will depend on the number of concurrent tasks being performed and the phasing of the Project. The Project is expected to support 293 jobs during the construction and installation phases, and up to five indirect and four direct, full-time permanent skilled jobs during the operations phase.[37] The four full-time permanent positions would be based in Minnesota, and individuals hired may share responsibilities at other solar sites that EDFR is developing. Up to four full-time employees would be needed at Byron, and additional positions would be added if staff share responsibilities at other project sites. As described in the *Economic Impact of Byron Solar Project*, indirect jobs, or induced jobs, are modeled FTEs that are spurred by on-going local investment and additional dollars exchanged in the community (e.g. gas station attendants, staff at local restaurants, vegetation management contractors, etc.).[38] Temporary construction jobs within Dodge County will generate indirect economic benefits as employees spend their income on local goods and services and pay local sales tax. As an operating facility, the Solar Facility will annually generate over $1.4 million in new local long-term earnings for the State of Minnesota, and over $452,000 in new local long-term earnings for Dodge County, annually.[39]

The Project offers an opportunity to maximize the economic attributes that benefit the local community and deliver an overall cost-competitive energy project. The Project's strong solar resource, proximity to existing electrical and transportation infrastructure, and ability to create a construction-efficient layout are some of the major benefits of the Project.

3.2.2 Promotional Activities Giving Rise to Demand

Byron Solar 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." Byron Solar is not a utility and has not engaged in promotional activities which could have given

[37] *Economic Impact of Byron Solar Project*, David G. Loomis, Strategic Economic Research, LLC, at 16 (June 2021).

[38] *See id.*

[39] *See id.*

rise to the need for the Project's anticipated generated electricity. Thus, consistent with its determinations in past CN proceedings, the Commission granted an exemption to Byron Solar.

3.2.3 Effects of Facility in Inducing Future Development

The Project is not expected to directly affect development in Olmsted and Dodge Counties or hinder future development that can otherwise occur in surrounding agricultural areas.

The Project is designed to be socioeconomically beneficial to landowners, local governments, and communities. Landowner compensation is established by voluntary leases or purchase agreements between the landowner and Byron Solar for Byron Solar's lease or purchase of the land. Solar energy infrastructure will also provide an additional source of revenue to the townships and county in which the Project is sited.

The Minnesota solar energy production tax rate is $1.20 per megawatt hours (MWh), which equates to about $400,000 to $450,000 annual county property tax revenue, and $100,000 to $125,000 annual township property tax revenue. The Project is expected to generate over $15.6 million in local tax revenues over the life of the Project. Annual lease payments to landowners will exceed $1 million in the first year and will increase every year with scheduled increments. This equates to about $65 million paid to landowners over the lifespan of the Project.

As discussed in Section 3.2.1, the Project will create new local job opportunities for various trade professionals that live and work in the area, and it is typical to advertise locally to fill required construction positions. The Project is expected to support 293 temporary jobs during the construction and installation phases, and up to five indirect and four full-time permanent skilled jobs during the operations phase.[40] Construction jobs within Dodge County will generate indirect economic benefits as employees spend their income on local goods and services and pay local sales tax. As an operating facility, the Solar Facility will annually generate over $1.4 million in new local long-term earnings for the State of Minnesota, and over $452,000 in new local long-term earnings for Dodge County, annually.

General skilled labor is expected to be available in Olmsted and Dodge Counties or Minnesota to serve the Project's basic infrastructure and site development needs. Specialized labor will be required for certain aspects of the Project. It may be necessary to import specialized labor from other areas of Minnesota or neighboring states because the relatively short construction duration often precludes special training of local or regional labor. Because most of the assembly and wiring work for solar installations is considered electrical work under the Minnesota State Electrical Code, much of the workforce needed to construct a solar facility must be comprised of Minnesota-licensed electricians.

Construction of the Project would provide temporary increases to the revenue of the area through increased demand for housing, lodging, food services, fuel, transportation, and general supplies. Additional personal income will also be generated by circulation and recirculation of dollars paid out by the Project as business expenditures and state and local taxes. At the same time the Project is providing income to residents, an increase in renewable energy will also help to

[40] *Economic Impact of Byron Solar Project,* David G. Loomis, Strategic Economic Research, LLC, at 16 (June 2021).

lessen wholesale energy market volatility.[41] The development of solar energy technology now makes solar power's relative price competitive with other generators, including natural gas and coal.

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

The Commission has established criteria to assess the need for an 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
>
> 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.[42]

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 BYRON SOLAR'S 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 200 MW of nameplate capacity to meet the electricity needs of Minnesota and the region. Byron Solar plans to negotiate one or more power purchase agreements, or the sale of the Project, with utilities that have a need to purchase or produce renewable energy to serve their customers. Applicant may also offer the Project's output for sale on the wholesale market or to a corporate purchaser. Denying the Application would result in the

[41] U.S. Dep't of Energy, *The Use of Solar and Wind as a Physical Hedge against Price Variability within a Generation Portfolio*, at 35 (August 2013) (stating that "Solar and wind generation significantly reduces the exposure of electricity costs to natural gas price uncertainty in fossil-based generation portfolios on a multi-year to multi-decade time horizon.")

[42] Minn. R. 7849.0120.A–D.

loss of a significant amount of electricity needed to satisfy state and regional demand and would deny utilities and other purchasers the opportunity to purchase clean, low-cost energy that will count toward satisfying applicable RES and goals.

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 solar energy produced by the Project.

The Project has no air emissions and extremely low environmental impacts with some environmental benefits. It will displace pollutants emitted by fossil fuel-fired generating resources, including CO_2, which is considered a significant contributor to climate change and GHG emissions. It will meet the needs of many of the state's electric consumers at a competitive cost and assist the off-taker in meeting its renewable energy objectives while enhancing the economic base and energy security in Olmsted and Dodge Counties.

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.[43] Similarly, North Dakota has adopted the national "25 by '25" initiative, which establishes a goal of having not less than 25 percent total energy consumed within the United States come from renewable resources by January 1, 2025.[44] Under current state standards, total United States renewable portfolio standard demand will increase from 290 TWh in 2018 to 540 TWh in 2030.[45] Given existing renewable energy capacity, an additional 180 TWh increase in renewable resources will be required to meet demand through 2030.[46] In addition, the regional transmission grid is being expanded to deliver renewable energy generation in a cost-effective manner.[47] Further, Minnesota's SES requires utilities to provide 1.5 percent of their total retail electrical sales from electricity generated by solar energy by the end of 2020 and 10 percent by 2030.[48] Based on this data, there is a need for more solar power to adequately, reliably, and efficiently meet the region's need for renewable energy than is currently available.

As discussed in more detail in the Site Permit Application, EDFR conducted a detailed analysis to identify the current point of interconnect (POI) and solar site location for development. EDFR identified the existing Byron Substation as having available capacity and low interconnection costs. The Project site was chosen over others for its good solar resource, proximity to the POI, supportive landowners, and no competition with other potential renewable energy projects (i.e., available land not currently participating in other renewable energy projects). Accordingly, Byron Solar makes efficient use of the regional transmission system by developing

[43] 20 Ill. Comp. Stat. sec. 2855/1-75(c)(1).

[44] *See* N.D.C.C. § 17-01-01.

[45] LAWRENCE BERKELEY NAT'L LAB., U.S. RENEWABLES PORTFOLIO STANDARDS at 24 (July 2019).

[46] *Id.* at 21.

[47] *MTEP18 MISO Transmission Enhancement Plan*, at 42.

[48] Minn. Stat. § 216B.1691, subd. 2f(a).

a no-emissions solar energy project at a location with low-cost interconnection and few required upgrades.

4.2 NO MORE REASONABLE AND PRUDENT ALTERNATIVE TO THE BYRON SOLAR 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. The 345 kV Transmission Line also is the most appropriate voltage to meet Project needs by reducing line losses and interconnecting at the voltage of the POI.

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 renewable energy 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 the coming years far exceeds the amount of energy to be supplied by the Project.

Regarding the type of facility, the Commission granted Byron Solar an exemption from Minn. R. 7849.0250(B) with respect to evaluating non-renewable alternatives because such alternatives do not meet the Project's objective of providing energy that will satisfy renewable energy and other clean energy standards and goals.

With respect to timing, the Project is expected to be on-line and operational by the end of 2024, depending on completion of regulatory approvals and the MISO interconnection process. This will help Minnesota and other electric utilities achieve the necessary renewable energy levels required to meet pending clean energy standards milestones.[49]

4.2.2 Cost Analysis

The Project will also generate electricity at a lower cost per kilowatt hour than would other possible fossil fuel and renewable energy options, such as coal and biomass.[50] Even though the Solar ITC phases down over the next several years, solar generation growth is anticipated to continue because the costs for solar continue to fall faster than for other sources.[51] In addition, although the Project has yet to secure arrangements for the sale of energy it will produce, Byron Solar is confident it will be able to secure long-term purchasers at attractive prices and terms.

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[49] *Id.*

[50] *See* EIA, LEVELIZED COST AND LEVELIZED AVOIDED COST OF NEW GENERATION RESOURCES IN THE *ANNUAL ENERGY OUTLOOK* 2020 (2020), https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf.

[51] *See* EIA, ANNUAL ENERGY OUTLOOK 2020 at 72 (Jan. 2020), https://www.eia.gov/outlooks/aeo/pdf/aeo2019.pdf.

Importantly, as an IPP, Byron Solar, rather than the state or its ratepayers, bears the risk of not securing a PPA or otherwise not selling the Project's output.

4.2.3 Potential Environmental and Socioeconomic Impacts

The purpose of this analysis is to compare the potential impacts of various renewable generation options. As demonstrated in Sections 10 and 11 of this Application, the environmental impacts of the Project will be minimal and significantly less than a fossil-fuel based facility. One of the greatest attributes of solar 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 be sited to minimize environmental impacts. Additionally, recent research on the environmental impacts of solar farms indicates that there could be some net benefits to soil resources over the lifecycle of the Project.[52]

4.2.4 Reliability

The Project will have an average expected annual net capacity factor of 25 percent.

4.3 THE BYRON SOLAR 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 various 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 Minnesota SES, and other clean energy and GHG reduction standards and goals, as well as to meet consumers' energy demands. Thus, the Project is not only compatible with Minnesota's energy needs, but it is wholly consistent with it.

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

In general, the socioeconomic impacts associated with the Project will be positive. Wages will be paid and expenditures will be made to local businesses and landowners during the Project's construction and operation. The construction and operation of the Project will increase Olmsted and Dodge Counties' tax bases. In addition, lease and purchase payments paid to the landowners

[52] *See* Jeffrey S. Briberg, *Utility and Community Solar Should Use Native Landscaping* CLEANTECHNICA (Mar. 15, 2016), https://cleantechnica.com/2016/03/15/utility-and-community-solar-should-use-native-landscaping/.

will offset potential financial losses associated with removing a portion of their land from agricultural production.

The Solar Facility will impact approximately 1,529.7 acres of agricultural land within the anticipated Development Area by taking land out of row-crop production but will not result in a significant impact to land-based economies in the Project vicinity as this acreage constitutes well under one percent of the farmland in Dodge County (248,036 acres) and in Olmsted County (285,944 acres). Of the 281,600 acres in Dodge County, the majority is classified as agricultural land. Impacts to approximately 1,529.7 acres of agricultural land within the Solar Facility footprint would reduce the amount of agricultural land in the county by less than one percent (0.6 percent). The Project Substation and O&M Facility will affect approximately 9.4 acres of cultivated cropland. Approximately 49.2 acres of cultivated cropland is crossed by the HVTL right-of-way. Of the remaining 3.5 acres, 3.0 acres are developed land and 0.5 acre are herbaceous/hay/pasture lands.

As demonstrated by other transmission line projects in the Midwest, agricultural practices continue throughout construction and operation. Agricultural production would be allowed to continue within the Project Area but also outside the fence of the Development Area during construction and operation of the Project. Similarly, if haying or grazing vegetation management strategies are used, some agricultural activities would continue within the Development Area. In addition, taking land that has been farmed for more than 100 years temporarily out of production results in benefits to the soil at the end of the Project's useful life. According to the United States Department of Agriculture (USDA), establishing and maintaining permanent cover of either introduced or native grasses, legumes and forbs for nesting cover, winter cover, brood cover, pollinator habitat, and food for wildlife can reduce soil erosion, improve water and air quality, enhance plant diversity, and increase soil organic matter and overall soil health.[53]

One of the greatest attributes of solar energy is its minimal impact to 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 be sited in a way that minimizes environmental impacts.

The development of solar energy has recently become and will continue to be important in diversifying and strengthening the economic base of Minnesota. As discussed in Section 3.2.1, Byron Solar will issue an RFP to BOP contractors to construct the Project. Byron Solar will include preferences for contractor bids that utilize local, union construction craft employees to the greatest extent feasible in accordance with the Project's budget, timeline, industry standards and requirements, and corporate safety policies. The BOP contractor selected will be required to work with labor unions, local subcontractors, and other vendors to implement a Project construction staffing model that maximizes local hiring and local economic benefits for the Project, while ensuring the Project is safely built on time and on budget. Additionally, much of the workforce needed to construct a solar facility must be comprised of Minnesota licensed electricians because

[53] United States Department of Agriculture, Natural Resources Conservation Service, *Conservation Choices: Conservation Cover*, https://www.nrcs.usda.gov/wps/portal/nrcs/detail/null/?cid=nrcseprd413671.

most of the assembly and wiring work for solar installations is considered electrical work under the Minnesota State Electrical Code, which in turn requires that Minnesota licensed electricians complete that work. Wages and salaries paid to contractors and workers in Olmsted and Dodge Counties will contribute to the total personal income of the region. At least part of the wages paid to temporary and permanent Project workers will be circulated and recirculated within the counties and the state. Expenditures made by the Applicant for equipment, fuel, operating supplies, and other products and services will benefit businesses in the county and the state. In addition, lease and purchase payments paid to the landowners will more than compensate for potential financial losses associated with removing a portion of their land from agricultural production, and these payments will diversify and strengthen the local economy.

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 Minnesota solar energy production tax rate is $1.20 per MWh, which equates to about $400,000 to $450,000 annual county property tax revenue and $100,000 to $125,000 annual township property tax revenue. The Project is expected to generate about $15.6 million in local tax revenues over a 30-year period.

Not building an electrical generation facility would result in no physical impact to the environment in Olmsted and Dodge Counties. However, not building the Project would also not provide an additional source of tax revenues to the county, an increase in the income stream to residents 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

Although the Project is not expected to directly affect development in Olmsted and Dodge Counties, the Project will provide significant benefits to the local economy and local landowners. Landowners in the Project Area will benefit from the purchase, lease and easement payments, and installation of solar energy infrastructure will increase the local tax base in the townships and county in which the Project is sited. The Project will also provide significant income opportunities for local residents through the creation of temporary construction and permanent O&M positions.

4.3.4 Socially Beneficial Uses of Output

The Project will provide up to 200 MW of capacity and roughly 435,000 MWh annually of clean and reliable electricity. The Project will produce affordable, clean, renewable energy that will help meet energy demands and the RES, the SES and other clean energy and carbon reduction standards. According to the United States Environmental Protection Agency's (USEPA's) Greenhouse Gas Equivalencies Calculator (USEPA, 2021a), the Project will offset approximately 307,563 metric tons of CO_2, the equivalent of 66,447 passenger vehicles driven for one year, 338.9 million pounds of coal burned, and 35,491 homes' energy consumption for one year. In addition, the local economy will benefit from the landowner purchase payment for the Project, production taxes, income from jobs created, and local spending. It will also provide carbon-free energy that will assist in meeting carbon and GHG reduction goals.

4.4 THE BYRON SOLAR 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. Solar, as renewable energy, is a favored energy resource under Minnesota law.[54] In addition, as discussed previously, the SES mandates increased electric generation from solar resources.[55] The state has also set a goal to reduce statewide GHG emissions across all sectors producing those emissions to a level at least 80 percent below 2005 levels by 2050.[56] Governor Walz recently announced a set of policy proposals that are designed to lead Minnesota to 100 percent clean energy in Minnesota's electricity sector by 2040.[57] Just over 25 percent of Minnesota's electric generation came from clean energy at the time of Governor Walz's announcement.[58] Adding new sources of electric energy with no emissions, like solar energy, is essential to meeting these goals.

Further support for the conclusion that the Project is consistent with state energy policy can be found in the favorable tax treatment that solar energy facilities receive. The state legislature has exempted all real and personal property of solar energy conversion systems from property taxes.[59] Solar energy conversion systems are also exempt from state sales tax.[60]

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 several statutory provisions that may apply to a CN application. As discussed below, the Project is consistent with these statutory requirements.

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[54] *See* 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.")

[55] Minn. Stat. § 216B.1691, subd. 2f.

[56] Minn. Stat. § 216H.02, subd. 1.

[57] Office of Governor Tim Walz, *Governor Walz, Lieutenant Governor Flanagan, House and Senate DFL Energy Leads Announce Plan to Achieve 100 Percent Clean Energy in Minnesota by 2040* (Jan. 21, 2021), available at: https://mn.gov/governor/news/?id=1055-463873.

[58] *Id.*

[59] Minn. Stat. § 272.02, subd. 24.

[60] Minn. Stat. § 297A.67, subd. 29.

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 is 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" refers to projects of no more than 10 MW. The Project is a utility-scale Project and will not provide distributed energy to the system as defined by Minnesota law. However, Byron Solar believes that the need for new energy resources is so great that it also will not displace any opportunities for installation of renewable energy. Additionally, the Project's transmission opportunities and economies of scale make it an exceptional electrical resource that will provide great benefits to the state and the local economy.

4.4.2.3 *Innovative Energy Preference*

Minnesota also requires the Commission to consider an innovative energy project[61] before authorizing construction or expansion of a fossil-fueled generation facility.[62] Because the Project is not a fossil-fuel facility, this requirement is not applicable.

4.4.2.4 *RES and SES Compliance*

Minn. Stat. § 216B.243, subd. 3(10) requires the Commission to evaluate whether a CN applicant is in compliance with Minnesota's RES and SES. Byron Solar, however, is not subject to the RES or SES 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 MNDOC have determined, this statute does not apply to renewable generation facilities such as the Project.[63]

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 complies with certain transmission planning requirements. As an IPP, this statute does not apply to Byron Solar.

4.4.3 The Project is Consistent with Federal Energy Policy

The Project will provide a significant amount of renewable energy, which is consistent with Federal energy policy favoring renewable projects. Federal energy policy provides significant United States federal tax incentives to attract investment in renewable energy projects, including solar projects like the Project. For example, the solar ITC provided by Section 48 of the Internal

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[61] An "innovative energy project" is:

> a proposed energy-generation facility or group of facilities which may be located on up to three sites: (1) that makes use of an innovative generation technology utilizing coal as a primary fuel in a highly efficient combined-cycle configuration with significantly reduced sulfur dioxide, nitrogen oxide, particulate, and mercury emissions from those of traditional technologies; (2) that the project developer or owner certifies is a project capable of offering a long-term supply contract at a hedged, predictable cost; and (3) that is designated by the commissioner of Iron Range resources and rehabilitation as a project that is located in the taconite tax relief area on a site that has substantial real property with adequate infrastructure to support new or expanded development and that has received prior financial and other support from the board.

Minn. Stat. § 216B.1694, subd. 1.

[62] Minn. Stat. § 216B.1694, subd. 2(a)(4).

[63] *In the Matter of the Application of Elm Creek Wind, LLC for a Certificate of Need for a Large Energy Facility, the Elm Creek Wind Project in Jackson and Martin Counties*, Order Granting Certificate of Need at 12, Docket No. IP6631/CN-07-789 (Jan. 15, 2008).

Revenue Code permits qualifying entities to elect to claim a credit of 30 percent of qualifying costs for a project that has "begun construction" for federal income tax purposes through 2019. As modified by the Consolidated Appropriations Act, 2021 that was signed into law on December 27, 2020, the amount of the ITC steps down to 26 percent for projects that begin construction in 2020, 2021 or 2022, and to 22 percent for projects that begin construction in 2023 (in each case, as long as the project is placed in service prior to January 1, 2026). Solar projects that begin construction in 2024 or later are eligible for a 10 percent ITC. Byron Solar expects to utilize the ITC as part of the Project's long-term financing structure.

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** in Section 12.3 provides a list of approvals the Project may need to obtain from governmental entities to demonstrate full compliance. Byron Solar is committed to obtaining all necessary environmental and other approvals required under federal, state, and local requirements.

The Project will comply with all relevant requirements and will fulfill important state energy policies with respect to renewable energy and environmental protection. In particular, the facility meets the requirements of Minn. Stat. §§ 216B.2422, subd. 4 and 216B.243, subd. 3a, which state that the Commission may not approve a nonrenewable energy facility unless it determines that a renewable facility is not in the public interest, or more expensive than the nonrenewable facility including consideration of environmental costs. It is further consistent with state policies relating to the reduction of GHGs.

The Project offers a cost-competitive and environmentally superior alternative to fossil fuel generators that is clearly in the public interest and can reliably deliver accredited capacity, energy, renewable energy credits (RECs) and other environmental attributes. Approval of the Project is in the public interest because it meets all of Minnesota's laws supporting acquisition of clean, renewable energy and provides an opportunity for utilities and other customers seeking to diversify and build their energy generation portfolios.

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

5.1 PROPOSED PROJECT

The Project is an up to 200 MW AC solar PV facility and 345 kV transmission line located in Kalmar Township in Olmsted County and Canisteo and Mantorville Townships in Dodge County, Minnesota. The Project is generally located between the cities of Byron and Kasson in southeastern Minnesota. Combined, the Solar Facility and HVTL encompass 1,853.7 acres (Project Area).

The proposed Solar Facility is located on approximately 1,801 acres of predominantly agricultural land in the townships of Mantorville and Canisteo in Dodge County. The Applicant has secured lease agreements for 100 percent of land for the proposed Solar Facility. The final Solar Facility design is expected to occupy approximately 1,552.6 acres or less. The excess acreage (248.4 acres) allows for planned buffers and flexibility in overall design. An additional 1,227 acres

beyond the Solar Facility boundary has also been secured through easements and lease agreements. In total, the Applicant has secured 3,028 acres of lease agreements and easements, which is referred to as the Land Control Area. The Project will interconnect to the grid via a proposed approximately 3-mile long above-ground 345 kV Transmission Line.

The Project's primary components include PV panels mounted on a linear axis tracking system (**Figure 1**), centralized inverters, a Project Substation, and a 345kV HVTL. For descriptive purposes, an individual tracker row is used as a basic unit of the Solar Facility. A tracker row is made up of panels mounted on a flat beam oriented north-south, with a break in the middle where the gear box is located. The tracker rows, which tilt east-west to follow the sun throughout the day, are connected together in groups and, depending on the manufacturer, served by a single motor. The racking system consists of all the components involved in fastening the panels to the tracker rows, plus the tracker beams, gearboxes, motors, and pier foundations.

Associated facilities include electrical cables, conduit, switchgears, step-up transformers, SCADA systems, and metering equipment. The Project will include an O&M Facility, a temporary laydown yard, and Project access roads. The Solar Facility will include a perimeter fence that will be gated at access points and will include security locks. After construction is complete, disturbed areas will be seeded with a beneficial seed mix to enhance soil and water retention and reduce stormwater runoff and erosion throughout the Solar Facility. The Applicant will work collaboratively with the MNDNR to maximize the opportunity to establish and manage the vegetation at the Project site pursuant to the Agricultural Impact Mitigation Plan (AIMP) (Joint Site Permit and Route Permit Application, Appendix D) and the Vegetation Management Plan (VMP) (Joint Site Permit and Route Permit Application, Appendix E). In some areas, trees and shrubs may be planted to provide screening between the Project and nearby residences.

Figure 1: Typical solar tracker row design.

The solar array at the Project will consist of PV solar panels, a racking system, inverter skids, security fencing, and several weather stations.

The Applicant proposes to use panels affixed to tracking mechanisms that would allow the panels to "track" the sun from east to west on a daily basis. The panels and tracking rack system are generally aligned in rows north and south with the PV panels facing east toward the rising sun in the morning, parallel to the ground during mid-day, and then west toward the setting sun in the afternoon. The panels are rotated by a small motor connected to the tracking rack system to slowly track with the sun throughout the day. The tracking rack system allows the Project to optimize the angle of the panels in relation to the sun throughout the day, thereby maximizing production of electricity and the capacity value of the Project.

When the sun is directly overhead, the PV panels will be at a zero-degree angle (level to the ground) and four to six feet off the ground. The tracker rows will follow the sun from approximately 60 degrees east to 60 degrees west through the course of the day. At 60 degrees (tilted to the highest position), the edge of the panels will be a maximum of 15 feet off the ground and a minimum of 2-3 feet, pending final design. The design will involve no spinning machinery, no thermal cycle, and no water use (except for infrequent module washing). The Project will require approximately 594,048 PV panels to make up the up to 200 MW-AC Solar Facility.

To the extent practical, the racking system foundations will be a driven pier and will not require concrete, although some concrete foundations may be required depending upon site specific soil conditions and geotechnical analysis.

While equipment selection has not been finalized, the Applicant plans to use the JA Solar 510W MBB Half-cell Solar Module (JAM72D30 510/MB) mounted on single axis trackers with the SMA Solar Technology 4200 UP-US inverter in the provided site layout. The JA Solar 510W Solar Module is assembled with high efficiency 11BB PERC cells that deliver higher power output, better temperature-dependent performance (operates between -97.25 °F and 185 °F), reduced shading effect on the energy generation, lower risk of hot spot, and enhanced tolerance for mechanical loading from one of the leading companies in the solar industry. While the current design anticipates JA Solar technology, other panels and manufactures are under consideration. Any changes in technology moving forward are anticipated to build upon current Solar Facility efficiencies presented in this Application. The Applicant will consider the costs and performance of each technology option as well as environmental and safety standards when making its final selection.

While equipment selection has not been finalized, the Applicant has designed the system using 7,680 ground-mounted linear single-axis trackers. Several racking and trackers are under consideration, including: the ATI DuraTrack, GameChange Solar's Genius Tracker, NEXTracker's NX Horizon, PV Hardware's Axone/Monoline, and Soltect's SF7/SF7 Bifacial model (**Figure 2**). Racking infrastructure and trackers will be selected closer to the procurement stage to ensure performance standards are met.

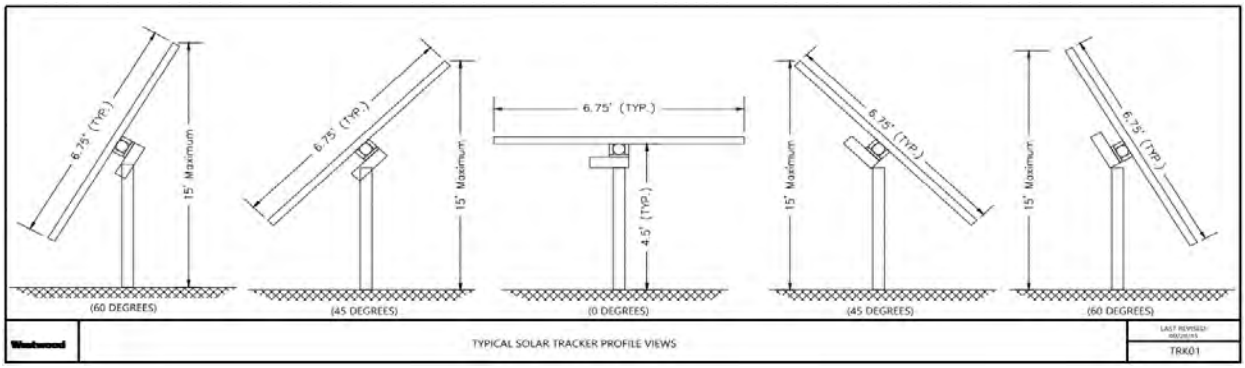

Figure 2: Typical solar tracker profile.

The solar panels deliver DC power to the inverters through cabling that will be buried in an underground trench or ploughed in place (at least four feet deep and two to four feet wide). The depth to cables may be deeper for installation under existing utilities or other features requiring avoidance. The specific electrical collection technology used will be site-specific depending on geotechnical analysis, constructability, and availability of materials. Final engineering and procurement will help determine the construction method for the electrical collection system. Underground cabling will be installed in accordance with the AIMP.

The Project Substation is proposed for an area about two miles southwest of the existing Byron Substation, which is just west of Byron. The Project Substation will be located outside the fenced solar arrays and is estimated to occupy 6.8 acres of agricultural land. It will include a 34.5/345 kV step-up substation with metering and switching gear required to connect the Project to the transmission grid. It will be designed in accordance with regional utility practices and codes. The Project Substation will consist of supporting structures for high voltage electrical structures, breakers, transformers, lightning protection, and control equipment according to the specifications of the Interconnection Agreement with MISO. The Project Substation location will be graded and overlain with crushed rock; secondary containment areas for the transformer will be installed as necessary. The fenced area of the Project Substation footprint will be approximately 160 feet x 175 feet in size (subject to final substation layout). Underground 34.5 kV collector lines from the Solar Facility will deliver solar generated energy to the Project Substation. The collector system voltage will then be stepped up from 34.5 kV to 345 kV and transmitted to the existing Byron Substation via the 3-mile HVTL.

The Applicant proposes the construction of a single circuit 345 kV (AC) HVTL that will be approximately three miles long and will connect the Project Substation to the existing Byron Substation. The HVTL will be constructed using weathering steel monopoles (poles or structures) that generally range in height from 90 feet to 170 feet tall. Structures will be spaced approximately 232 to 974 feet apart. Approximately 24 structures will be installed to facilitate the connection between the Project Substation and the existing Byron Substation. Of these 24 structures, two shorter structures will be used within the Project Substation and Byron Substation to tie-in to the larger structures. The three types of structures that will be used between the Project Substation and the Byron Substation include:

- Tangent: for in-line (straight) segments.
- Small Angle: used in locations where the alignment slightly shifts direction.

- Deadend: used within the Project Substation, at 90 degree turns, and as the HVTL approaches and enters the Byron Substation.

The entire HVTL 3-mile route will include a 150-foot wide right-of-way (75 feet on each side of the proposed HVTL route centerline), supporting the path of the Transmission Line. As mentioned in Section 1.0, the route will start at the Project Substation and end at the existing Byron Substation. Pole heights will vary along the route based on topography, type of pole used and location, and the crossing of roads, railroad tracks, and existing infrastructure. The HVTL will be designed to meet or surpass all relevant local and state codes, and other recognized standards such as the RUS Bulletin 1724E-200, Design Manual for High Voltage Transmission Lines, National Electrical Safety Code C2-2017, ASCE, ACI and the AISC Steel Construction Manual, North American Electric Reliability Corporation standards, and the NESC. Appropriate standards will be met for construction and installation, and applicable safety procedures will be followed during and after installation.

The Applicant believes that the selected Project location in Olmsted and Dodge Counties is advantageous for solar development based upon a good solar resource, willing landowner participants, consistency with local land use designations and zoning, the excellent proximity to existing electric transmission infrastructure, and minimal impact to natural and cultural resources.

5.1.1 Nominal Generating Capability and Effect of Economies of Scale

The total nameplate capacity for the proposed Project facilities is up to 200 MW AC. The facility will be designed utilizing a DC to AC ratio that optimizes the accredited capacity of the array according to MISO guidelines, the site-specific interconnection capacity and the losses associated with cable losses, thermal losses, and other associated derates. The Project will generate up to 200 MW and is expected to offset approximately 307,563 metric tons of CO_2, the equivalent of 66,447 passenger vehicles driven for one year, 338.9 million pounds of coal burned, and 35,491 homes' energy consumption for one year.[64] Larger solar projects, such as the Project, can realize some economies of scale by spreading out the relatively fixed transaction, operation, and maintenance costs over the entire Project, resulting in decreased costs per kilowatt hour (kWh) of electricity produced.

Generally, economies of scale (system size) do not affect the generation characteristics of the proposed facilities since the efficiency of a photovoltaic system depends primarily on the characteristics of the individual panels and the inverter. This allows excellent flexibility to adjust system size for the site-specific constraints without impacting the facilities' overall efficiencies.

The Solar Facility is estimated to cost about $252.8 million. The amount is an engineering estimate and expected to reflect actual Solar Facility costs within approximately 20 percent. Operating costs are estimated to be approximately $3.2 million dollars on an annual basis, including labor, materials, and property taxes. The HVTL is estimated to cost about $3.2 million. The amount is an engineering estimate and expected to reflect actual HVTL costs within

[64] USEPA. 2021a. Greenhouse Gas Equivalencies Calculator Widget. Available online at https://developer.epa.gov/greenhouse-gas-equivalencies-calculator-widget/. Accessed March 2021.

approximately 20 percent. The cost associated with O&M is estimated at approximately $9,000 per year. The total installed capital costs for the Project are estimated to be approximately $256 million. Project cost will depend on variables including, but not limited to, construction costs, taxes, tariffs, and panel selection, along with associated electrical and communication systems, and access roads.

5.1.2 Annual Capacity Factor

The Project is anticipated to have a net capacity factor of between approximately 24 percent and 25 percent, with projected average output of approximately 430,000 MWh annually of reliable, deliverable on-peak energy.

5.1.3 Fuel

The Project will generate electricity from sunlight; therefore, no fuel is required.

5.1.4 Anticipated Heat Rate

The conversion of solar 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 solar project.

5.1.5 Facility Location

The Applicant is proposing to build the Solar Facility in Canisteo and Mantorville Townships in Dodge County. The HVTL is proposed to be built within Mantorville Township in Dodge County, and Kalmar Township in Olmsted County, Minnesota. **Maps 1** and **3** depict the location of the proposed Project, Project facilities, and the existing Byron Substation. **Table 3** provides the Township, Range, and Section of areas included within the respective political boundaries.

Table 3: Project Location

Component/County	Township	Range	Section (s)
Solar Facility			
Dodge	106N	16W	2, 3, 10, 11, 12, 13, 14, 15
	107N	16W	35
HVTL			
Dodge	107N	16W	25, 35, 36
Olmsted	107N	15W	31

The municipalities nearest to the Project Area are Kasson and Byron. The municipal boundary of Kasson is approximately 1.1 miles northwest of the Project Substation and 1 mile west of the HVTL right-of-way. The municipal boundary of Byron is about 1.5 miles northeast of the Project Substation and approximately 0.2 miles south of the Proposed Route.

Combined, the Solar Facility and HVTL encompass 1,853.7 acres (Project Area). The Applicant has 100 percent land control for the Solar Facility, which is 1,801 acres of private, predominately agricultural land under lease. The Applicant estimates that 1,552.6 acres of the 1,801 acres is necessary to accommodate the final design of the up to 200 MW Solar Facility. The excess acreage (248.4 acres) allows for planned buffers and flexibility in overall design. The Applicant has secured 100 percent of the total necessary private easements from landowners for the 52.7 acres of right-of-way required for the Proposed Route.

Maps 3 and **4** depict the preliminary layout and associated infrastructure of the proposed Solar Facility. The Solar Facility infrastructure will include a Project Substation, racking systems, an O&M Facility, underground electrical collection system, approximately 64 inverters, a security fence/gate, a temporary laydown yard, several weather stations, and gravel access roads. The locations of the weather stations are not yet final and not shown on **Maps 3** and **4**.

This preliminary layout reflects Byron Solar's effort to maximize the Project's energy production, follow applicable setbacks, and minimize impacts to the land, environment, and surrounding community. Although Byron Solar expects the final layout to remain similar to the preliminary layout, changes may occur as a result of ongoing site evaluation, permitting processes, landowner preferences, and engineering activities.

5.1.6 Large High Voltage Transmission Line (Minn. R. 7849.0260(A) and (C))

Minn. R. 7849.0260(A) requires that a LHVTL CN applicant provide "a description of the type and general location of the proposed line, including" (1) the design voltage; (2) the number, the sizes, and the types of conductors; (3) the expected losses under projected maximum loading and under projected average loading in the length of the transmission line and at the terminals or substations; (4) the approximate length of the proposed transmission line and the portion of that length in Minnesota; (5) the approximate location of DC terminals or AC substations, which information shall be on a map of appropriate scale; and (6) a list of all counties reasonably likely to be affected by construction and operation of the proposed line. Minn. R. 7849.0260(C) requires an applicant to provide additional details regarding the LHVTL. The Commission determined that Byron Solar's HVTL is not an LHVTL as defined in Minn. Stat. § 216B.2421, subd. 2(2), and therefore the data requirements of Minn. R. 7849.0260 are not applicable.

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 better satisfy the need identified for the Project. The Commission granted Byron Solar a partial exemption from this data requirement, and Byron Solar will discuss only renewable alternatives as outlined in that exemption.

Developing and operating generating sources that are cost-effective and use proven technology is particularly important to an IPP like Byron Solar. Byron Solar does not have access to ratepayer funds that could provide a resource for retirement of capital investments. In addition,

Byron Solar must keep its prices—and thus, its costs—low enough to remain competitive. For these reasons, Byron Solar 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 solar energy is cost effective when compared to other renewable and non-renewable sources of electricity.

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

A solar project of smaller or larger size may be competitive within the marketplace, but Byron Solar believes the proposed Project size provides a number of advantages. EDFR, Byron Solar's parent company, has generally found that 50 MW is the threshold at which construction costs are competitive for solar projects connecting at transmission level voltages and economies of scale can be realized on the procurement of the project's components. For this site, the transmission interconnection costs are very competitive for a 200 MW solar project. As compared to a smaller solar farm, the Project provides economies of scale which the Applicant believes will reduce per megawatt hour costs of energy by spreading fixed costs over more MWh and provides efficiencies in transmission capacity utilization.

A larger solar farm, by contrast, may present additional construction cost and equipment procurement economies of scale, but at this site and at many others across the MISO region, interconnection costs are much higher on a per MW basis for a larger solar project due to expected network upgrades.

As it relates to the environmental impacts, a smaller or larger solar farm would be similar on a per solar panel basis but adjusted at scale to the size of the project.

In this rapidly growing solar market, the availability of projects of varying sizes provides cost-effective solar solutions to a wider range of potential customers, as not every potential customer has the capacity to purchase energy from a larger project, while many large customers may find a 200 MW project ideal for their needs.

5.2.1 Alternatives Considered (Minn. R. 7849.0250(B))

5.2.1.1 *Purchased Power*

Byron Solar is an IPP and does not purchase power. Instead, Byron Solar will sell power to utilities or other potential customers. As such, this data requirement is not applicable, and the Commission granted Byron Solar an exemption.

5.2.1.2 *Upgrades to Existing Resources*

Byron Solar 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 Byron Solar an exemption.

5.2.1.3 *New Transmission*

Byron Solar has no plans to become involved in owning or operating transmission lines beyond the collection, and feeder lines and Project Transmission Line 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 in not applicable, and the Commission granted Byron Solar an exemption.

5.2.1.4 *Wind Power*

Minnesota has a significant and important wind resource that can and is being used for energy and capacity services within the state's generating portfolio. Although wind is a good energy resource, solar is a good capacity resource. As a result, these two technologies complement each other and are not true substitutes. There is need for both wind and solar energy in Minnesota's renewable portfolio, and Byron Solar will be increasing the state's solar generation as part of an effort to increase solar energy's contribution to that portfolio.

5.2.1.5 *Hydroelectric Power*

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 2010, and compared to 774,729 MWh in 2005.[65] 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."[66] There is not sufficient new hydro resources in Minnesota to replace the output of the Project.

5.2.1.6 *Biomass*

Minnesota communities do have accessible and low-value biomass feedstocks. However, the costs of these feedstocks vary widely, and the supply of biomass feedstock is limited.[67] Further, the environmental impacts of a biomass facility may be greater than those of 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 a good alternative to the Project.

5.2.1.7 *Emerging Technologies*

New renewable emerging power generation technologies are being developed, and Byron Solar 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.

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[65] Minnesota Department of Commerce, *Energy Policy and Conservation Quadrennial Report 2016* (hereinafter, 2016 Quad Report), at 28.

[66] 2016 Quad Report at 28.

[67] 2016 Quad Report at 27.

5.2.1.7.1 Pumped Storage

The proposed site is not suited to a pumped storage application because the topography of the site is relatively flat with slopes ranging from one to six percent, 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 new generation from pumped storage in Minnesota.[68] This technology is therefore 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. This technology has been implemented on a limited basis and creates no net new energy generation. Compressed air is therefore not an alternative to the Project.

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 energy. The storage of energy is not being considered as a part of the Project. Accordingly, this 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.

5.2.1.7.5 Battery Storage

As prices for the technology fall, lithium-ion batteries have begun to receive attention for their potential to store energy at low demand times for use during times of peak demand. However, grid-scale lithium-ion battery projects have been minimal across the United States to date, and the majority have been deployed for power quality benefits supporting the electric grid, a different purpose than electric generation. In no case do batteries generate their own energy, and therefore batteries are not an alternative to solar as they do not help utilities and non-utility customers in satisfying the need for renewable energy.

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[68] EIA, ELECTRIC POWER MONTHLY: HYDROELECTRIC (PUMPED STORAGE) POWER BY STATE BY SECTOR (Aug. 25, 2020), https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=table_1_12_a.

5.2.1.8 *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 IPP, Byron Solar must compete with other available technologies to sell power on the wholesale market, if necessary. Due to the size of the Project, Byron Solar has the advantage of additional economies-of-scale not available to smaller, non-CN facilities.

5.2.1.9 *No Facility Alternative (Minn. R. 7849.0340)*

The Commission granted Byron Solar 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 rule also requires an analysis of "equipment and measures that may be used to reduce the environmental impact of the alternative of no facility."[69]

Byron Solar 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, Byron Solar 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 increase the amount of energy available for purchase on the wholesale market that will satisfy clean energy standards, 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 utilities to purchase the Project's output to satisfy clean energy standards. Such an outcome is contrary to Byron Solar's objective for the Project and will not satisfy the state and regional need for renewable energy.

5.2.1.10 *Facility Information for Alternatives Involving Construction of an LHVTL (Minn. R. 7849.0330)*

The Commission granted Byron Solar an exemption from Minn. R. 7849.0330, which requires the applicant to provide certain data for each alternative that would involve construction of an LHVTL. Transmission facilities are not true alternatives to the Project, since the purpose of the Solar Facility is to increase the supply of available renewable energy and the purpose of the Transmission Line is to deliver the output from the facility to increase the supply of renewable energy to the purchaser to meet its renewable, clean energy, or sustainability obligations. The Project is planned to connect to the existing Byron Substation in Olmsted, County, Minnesota. Access to transmission facilities beyond the point of 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. Thus, except for the 345 kV transmission line necessary for interconnection to the existing Byron Substation, 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 Byron Solar an exemption from this data request.

[69] Minn. R. 7849.0340(C).

5.2.1.11 *Combinations*

No combination of the aforementioned alternatives would be appropriate because, as compared to the Project, they would not enable Byron Solar to more efficiently or cost-effectively produce electric output to be purchased by utilities or private corporations to provide needed energy and satisfy the RES and other clean energy and carbon reduction standards. The Commission granted Byron Solar an exemption from this data request.

5.2.2 Economic Comparison

Table 4 below, taken from the United States Energy Information Administration (EIA), demonstrates that solar energy generated by a PV tracking facility has a competitive capital cost and a lower operating cost than other types of renewable resources. The Project will generate electricity at a lower cost per kW hour than would other possible fossil fuel and renewable energy options, such as coal and biomass.[70] As discussed in Sections 4.2.2 and 4.4.3, even though the ITC will phase down over the next several years, solar generation growth is anticipated to continue because the costs for solar continue to fall faster than for other sources.[71]

Table 4: Renewable Technology Costs[72]

Technology	Size (MW)	Total Overnight Cost (2020$/kW)	Variable O&M (2020$/MWh)	Fixed O&M (2020$/kW-yr)
Fuel Cells	10	6,866	0.59	30.94
Biomass	50	4,078	4.85	126.36
Conventional Hydropower	100	2,769	1.40	42.01
Wind	200	1,846	0.00	26.47
Solar PV – tracking	150	1,248	0.00	15.33
Solar Thermal	115	7,116	0.00	85.82

5.2.3 Alternatives Summary

The Project is the best alternative for meeting the capacity and renewable energy needs in Minnesota and the region in the near term. All other potential alternatives reviewed by Byron Solar fall short in one or more categories. Byron Solar's analysis demonstrates that the Project is a cost-effective energy resource; the Project uses commercially proven and reliable generating

[70] *See* EIA, ANNUAL ENERGY OUTLOOK 2021, Narrative at 19 (2021), https://www.eia.gov/outlooks/aeo/pdf/AEO_Narrative_2021.pdf.

[71] EIA, ANNUAL ENERGY OUTLOOK 2021, Narrative at 7, 16 (2021), https://www.eia.gov/outlooks/aeo/pdf/AEO_Narrative_2021.pdf.

[72] The figures in Table 3 are taken from EIA's Assumptions to AEO2021: Electricity Market Module at 6 (Feb. 2021), https://www.eia.gov/outlooks/aeo/assumptions/pdf/electricity.pdf.

technology for the electrical generation output needed. Moreover, 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 Byron Solar 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 Byron Solar 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). As discussed above, no good alternatives exist. Therefore, only information regarding the Project is applicable.

5.3.1 Capacity Cost

Solar energy projects are accredited by MISO at a medium to high percentage of nameplate capacity. MISO provides accreditation of 50 percent of its Network Resource Interconnection Service (NRIS) value for projects with no operating history. Once operating data is obtained, the Project receives capacity credit based on its output in the peak months of June, July and August. Accordingly, Byron Solar may provide 100 MWs or more of accredited capacity in subsequent years. Nevertheless, costs for renewable energy facilities are typically not expressed in terms of capacity costs. The Project will likely deliver energy and accredited capacity to the off-taker on an as-generated basis and will receive payment for both in the form of a single $/MWh payment. Byron Solar's 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 components in the total cost of the Project will be the solar panels, tracking rack system, and installation labor; 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 or longer. Byron Solar is confident that its maintenance program will result in excellent longevity for the Project.

5.3.3 Estimated Average Annual Availability

Byron Solar estimates that the Project facilities will be available approximately 99 percent of the year, which is consistent with industry standards.

5.3.4 Fuel Costs

There are no fuel costs associated with the Project. Rights to the land on which the Project will be located will require annual lease payments. Nominal purchases of electricity will be necessary to run the Project, and that power will be acquired from local electricity utility, similarly to any other commercial or industrial business, or supplied by the Project's own generation equipment.

5.3.5 Variable Operating and Maintenance Costs

Most solar operating costs are fixed. Byron Solar expects that O&M costs will average $5-8 per kW-year over the life of the Project. The expected variable O&M costs per kWh are provided in Appendix A, Section 5.3.5. An advantage of solar energy facilities is that they typically are not required to go completely offline for maintenance. Small sections of the solar array can be serviced while the rest of the facility continues to deliver energy.

5.3.6 Total Cost

Byron Solar's 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 solar farm design, construction, and operational data for a 35-year estimated service life. The price for which Byron Solar will sell the energy will be determined as a result of negotiations with purchaser(s).

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 Byron Solar a partial 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. As such, the data are neither available to Byron Solar nor necessary to determine the need for the Project. Instead, Byron Solar 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.[73] For instance, utilities could purchase 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 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 state's clean energy policies.[74]

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[73] *See e.g.*, Christian Roselund, *Renewables reduced wholesale power costs by $5.7 billion in Texas*, pv magazine (Nov. 6, 2018) (reporting that wind, and to a lesser degree solar, "are bringing down wholesale power prices and making them more stable"); Union of Concerned Scientists, *Benefits of Renewable Energy Use* (Updated Dec. 2017); Good Energy, *Wind and solar reducing consumer bills*, (Oct. 2015) (analyzing impact of renewable energy usage on electric rates in the United Kingdom).

[74] *See, e.g.*, NRDC Issue Paper, *Clean Energy and Efficiency Can Replace Coal For a Reliable, Modern Electricity Grid* (Mar. 2017) (available at: https://www.nrdc.org/sites/default/files/clean-energy-replace-coal-modern-electricity-grid-ip.pdf); Xcel Energy, Upper Midwest Resource Plan 2020-2034, at 5, 2020-2034 Upper Midwest Integrated

5.3.8 Efficiency

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

5.3.9 Alternatives to LHVTL (Minn. R. 7849.0260(B) and Minn. R. 7849.0260(C))

Minn. R. 7849.0260(B) requires that an LHVTL CN applicant provide a discussion of the availability of alternatives to the facility. Minn. R. 7849.0260(C) requires an applicant to provide additional details regarding alternatives to the LHVTL. The Commission determined that Byron Solar's HVTL is not an LHVTL as defined in Minn. Stat. § 216B.2421, subd. 2(2), and therefore the data requirements of Minn. R. 7849.0260 are not applicable.

5.4 MAP OF SYSTEM (MINN. R. 7849.0250(D) AND MINN. R. 7849.0260(D))

The Commission granted Byron Solar an exemption from Minn. R. 7849.0250(D), which requires an applicant to include a map showing the applicant's system. As an IPP, Byron Solar does not have a "system." The information requested is thus not available to Byron Solar nor 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 **Map 5**.

Minn. R. 7849.0260(D) requires that an LHVTL CN applicant provide a map showing the applicant's system or load center to be served by the proposed LHVTL. The Commission determined that Byron Solar's HVTL is not an LHVTL as defined in Minn. Stat. § 216B.2421, subd. 2(2), and therefore the data requirements of Minn. R. 7849.0260 are not applicable.

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

The Commission granted Byron Solar 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." Byron Solar does not have a "service area" or "system" and, as such, the requested data are inapplicable.

As an alternative to the requested data, Byron Solar 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. If a PPA is executed for the Project's output, Byron Solar will also provide the Commission with additional system-specific information.

A review of utilities' integrated resource plans (IRPs), requests for proposals, and similar documents demonstrates that utilities will seek additional renewable generation resources in the

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Resource Plan Docket No. E002 /RP-19-368 (planning for Minnesota-based retirements); EIA, *Nuclear and coal will account for majority of U.S. generating capacity retirements in 2021* (Jan. 12, 2021) (available at: https://www.eia.gov/todayinenergy/detail.php?id=46436.).

next several years.[75] Xcel Energy has announced plans to reduce carbon emissions at least 80 percent Company-wide by 2030, and to provide 100 percent carbon-free electricity across its service territory by 2050.[76] To reach this goal, Xcel plans to eliminate all coal generation on its system by 2030, and to add 3,500 MW cumulative utility scale solar resources, in addition to approximately 2,250 MW of cumulative wind by 2034 to replace wind that is set to retire.[77] Similarly, in an August 14, 2020, compliance filing, the Minnesota Transmission Owners summarized their publicly-stated clean energy goals, which generally included increasing carbon-free energy and a discussion of the transmission system that will be needed to do so.[78]

More broadly, retirements of coal-based generating units are expected across the MISO region, and renewable generation resources are expected to fill the resulting capacity needs.[79] Additional demand is being driven by corporate and industrial consumers, who are increasingly entering into longer power purchase agreements for renewable energy.[80]

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 IPP, Byron Solar does not have a "system" as defined by the rule. Accordingly, the Commission granted Byron Solar an exemption from this requirement and permitted Byron Solar 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.

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[75] Xcel Energy, 2020-2034 Upper Midwest Resource Plan , at 5, 2020-2034 Upper Midwest Integrated Resource Plan Docket No. E002 /RP-19-368; Xcel Energy, 2020-2034 Upper Midwest Resource Plan Supplement, at 2 (June 30, 2021), Xcel Energy, 2020-2034 Upper Midwest Resource Plan Reply Comments, at 119 (June 25, 2021); *see also* Minnesota Power, 2015 Integrated Resource Plan (available at: http://www.mnpower.com/Content/documents/Environment/2015-ResourcePlan.pdf) (approved by the Minnesota Public Utilities Commission on June 10, 2015); Otter Tail Power Company, Application for Resource Plan Approval 2017-2031 (available at: https://www.otpco.com/media/838904/resource-plan.pdf).

[76] Xcel Energy, 2020-2034 Upper Midwest Resource Plan Supplement, at 2, 3 (June 30, 2021); *see also* Xcel Energy, Reply Comments at 26, 119 (June 25, 2021).

[77] Xcel Energy, 2020-2034 Upper Midwest Resource Plan Supplement, at 62 (June 30, 2021). In its June 25, 2021 Reply Comments, Xcel Energy outlined its Alternate Plan, which proposes to add approximately 3,150 MW of utility scale solar by 2034 (starting in 2024) and approximately 2,650 MW of wind by 2034. Xcel Energy, 2020-2034 Upper Midwest Resource Plan Reply Comments, at 6 (June 25, 2021).

[78] Compliance Filing, *In the Matter of the Minnesota Transmission Owners' 2019 Biennial Transmission Projects Report*, Docket No. E002/M-19-205 (Aug. 14, 2020).

[79] U.S. Energy Information Administration, *Annual Energy Outlook 2017*, at 22 (available at: https://www.eia.gov/outlooks/aeo/pdf/0383(2017).pdf); NRDC Issue Paper, *Clean Energy and Efficiency Can Replace Coal For a Reliable, Modern Electricity Grid* (Mar. 2017) (available at: https://www.nrdc.org/sites/default/files/clean-energy-replace-coal-modern-electricity-grid-ip.pdf).

[80] American Wind Energy Association, *Consumer demand drives record year for wind energy purchases* (Jan. 30, 2019) (available at: https://www.awea.org/resources/news/2019/consumer-demand-drives-record-year-for-wind-energy); *see also* Business Renewables Center, *Corporate Renewable Deals 2014-2018* (available at: https://businessrenewables.org/corporate-transactions/#wpcf7-f942-p471-o1).

8.0 CONSERVATION PROGRAMS (MINN. R. 7849.0290)

The Commission granted Byron Solar 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.

9.0 CONSEQUENCES OF DELAY–SYSTEM (MINN. R. 7849.0300)

The Commission granted Byron Solar 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." Byron Solar is not a utility and has no "system" as defined by the rule. Thus, this data requirement is inapplicable to Byron Solar and is unnecessary to determine the need for the Project. Instead, Byron Solar provides the following data on the consequences of delay to Minnesota and the region.

The primary consequences of delaying construction of the Project would be the failure to capture the ITC, which allows the Project to offer even more competitive rates for its likely utility customer, which helps keep a utility's rates low to its end use customers. As set forth in Section 4.4.3, the ITC is phasing down to 26 percent for projects that begin construction in 2020, 2021 or 2022, and to 22 percent for projects that begin construction in 2023. In addition, delay negatively impacts the state's interest in achieving its renewable energy and climate change goals as quickly as possible.

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

10.1 VISUAL IMPACTS AND MITIGATION

Siting utility-scale solar projects in rural environments can change the overall aesthetics of the landscape by introducing a commercial-like facility into an otherwise agricultural setting. Similar to wind farms, solar arrays may be viewed by some as a disruption to the existing agricultural landscape, and by others as a welcomed complimentary use to farming practices (harvesting solar energy, soil resting and pollinator-friendly habitats). Consequently, aesthetics related to utility-scale solar is largely one of personal perspective and preference.

Land use in the Project Area is characterized as agricultural with 96.9 percent converted to row crop agriculture. Aside from agricultural fields, the landscape also supports a patchwork of woodlands, wetlands and drainages. The topography of the Project Area is generally flat with slopes generally ranging from one to six percent. Minimal areas with slopes greater than six percent are present in the Project Area. The settlements in the vicinity are residences and farm buildings (inhabited and uninhabited farmsteads) scattered along rural county and township roads. Most of these farmsteads are at least partially surrounded by woodlands or shelterbelts, which fractionally prevent uninterrupted views of the surrounding landscape.

The Project Substation is located just south of U.S. Highway 14 in an agricultural field and is not surrounded by woodlands or otherwise obstructed by vegetation or trees. Additionally, there are several transmission lines within or adjacent to the Project Area that interrupt natural

agricultural views. At least six transmission lines extend south of the existing Byron Substation and one additional line extends to the north. Transmission line easements between the cities of Byron and Kasson house several of the identified transmission lines, several others travel alongside U.S. Highway 14. Views in the area are naturally interrupted by U.S. Highway 14 immediately north of the Solar Facility, and other county and township roadways. The existing transmission lines, substation, and surrounding roadways are the current man-made focal points, along with multiple wind turbines at several operating wind farms. Wind farms in close proximity to the Project include the McNeilus Wind Farm (~5.6-miles), the Pleasant Valley Wind Farm (~8.1 miles), and Wapsipinicon Wind (~12.4 miles).

There are no residences, businesses, or structures such as barns or sheds located within the Development Area. While several residences and structures are located within close proximity to Solar Facility components, the Applicant will adhere to a minimum distance of 200 feet from a residence. There are 17 residences and several agricultural buildings on parcels adjacent to the Solar Facility (*see* **Map 3**). **Table 5** provides distances to the nearest residences to the Solar Facility, including approximate distance to the Development Area boundary and approximate distance to the edge of preliminary solar array locations.

Table 5: Proximity of Residences to Byron Solar Facility

Residence[1]	Distance to Development Area (feet)	Distance to Solar Arrays (feet)[2]	Distance to Nearest Inverter (feet)[2]	Vegetative Screening from Solar Facilities
1	345	468	943	The existing vegetation on the western side of the property will screen the residence from the proposed solar facilities.
2	315	414	1,285	Residence is surrounded by existing vegetative screening along all sides of the farmstead.
3	485	570	1,255	Residence has existing vegetative screening along all sides of the property.
4	170	275	544	Residence has existing vegetation and will be screened from the proposed solar facilities.
5	165	205	818	Residence is surrounded by existing vegetative screening along the sides of the farmstead.
6	335	384	965	Residence has some existing vegetative screening along the southern side of the farmstead, screening the residence from the solar panels.
7	190	234	830	Residence has existing vegetative screening along all sides, which will fully screen the residence from the solar panels.

Table 5: Proximity of Residences to Byron Solar Facility

Residence[1]	Distance to Development Area (feet)	Distance to Solar Arrays (feet)[2]	Distance to Nearest Inverter (feet)[2]	Vegetative Screening from Solar Facilities
8	402	492	522	Residence has existing vegetative screening along the west, south, and east sides of the property. Several agricultural buildings screen the residence to the north.
9	183	224	833	Residence has existing vegetative screening along all sides of the property, including towards the proposed solar panels to the south.
10	237	327	1,216	Residence has existing vegetative screening around all sides of the farmstead, including the northern side adjacent to the Solar Facility.
11	435	495	1,287	Residence has existing vegetative screening around the northern and western sides of the farmstead, screening the residence from the proposed solar infrastructure to the north.
12	334	402	979	Vegetation and trees are present on all sides of the farmstead, sufficiently screening the home from the proposed solar infrastructure.
13	513	636	1,470	Residence surrounded by trees and vegetation, screening the residence from the proposed solar infrastructure.
14	350	527	1,360	Residence has screening on the western side of the property, adjacent to the proposed solar panels.
15	30	152	595	Residence has existing vegetative screening around all sides of the farmstead, including the eastern side adjacent to the Project.
16	150	203	818	Residence has existing vegetative screening along all sides of the property.
17	335	435	1,095	Residence has existing vegetative screening along all sides of the property.

[1] Residences 8, 9, and 12 are participating landowners.
[2] Based on preliminary Project layout. The final layout will be adjusted after parcel lines and neighboring buildings are surveyed to maintain the minimum setbacks required.

The nearest residence is located about 225 feet south of the HVTL right-of-way near 270th Avenue and the railroad tracks. Several other backyards are just south of the railroad tracks, but the residences are set back between 296 feet and 1,178 feet from the HVTL right-of-way.

It is expected that there will be minimal visual impacts from the Solar Facility and associated facilities. Locations where visual impacts may potentially be the greatest are adjacent to residences and along public roadways and trails. The solar arrays will be visible from adjacent roadways, parcels and snowmobile trail, but given their relative low profile, and the fact they will be fenced for security, they will not be visible from significant distances. Photographs showing current conditions, followed by visual renderings, depict how the facility is anticipated to look from three separate vantage points around the Solar Facility. Visual renderings showing current conditions and an additional rendering showing how the facility is anticipated to look from three separate vantage points around the Project Area are included below.

Trees will be largely avoided with equipment installation which will maintain natural visual barriers from surrounding parcels and homes. The average distance from nearby homes to sited solar panels based on the preliminary layout is nearly 380 feet. As described above, all of the nearest 17 residences are at least partially surrounded by natural vegetation screening, which should help block direct views of the Solar Facility to some extent. The Applicant has coordinated with adjacent landowners and has proposed a variety of visual screening treatments at different areas throughout the Solar Facility to minimize and mitigate the visual effects. The Applicant will continue to coordinate with adjacent landowners.

Operational lighting will be required at gates and perimeter areas as necessary for safety and security. Lighting will be motion-activated and down lit to minimize impacts and effects. Impacts to light-sensitive land uses are not anticipated given the rural location coupled with minimal required lighting for operations.

Construction of a 6.8-acre Project Substation and 2.6-acre O&M Facility in an existing agricultural field will also present a new visual impact. Two structures will be within the Project Substation: the collector pole at 60 feet tall and a dead-end pole at 95 feet tall. These poles will on average have the profile of a single-story building and will consist of high voltage electrical equipment. The O&M Facility will include the SCADA system, and provide a place for maintaining and storing equipment, and employee parking. In addition, down-shielded lighting will help to maintain security while minimizing lighting impacts.

The transmission line structures and conductors would create aesthetic impacts that are anticipated to be minimal to moderate. While there are several transmission lines connected to the existing Byron Substation, including 345 kV lines, the additional HVTL will result in visual impacts in an area where there are fewer existing transmission lines. The HVTL will alter the current landscape through construction of steel poles of 90 to 170 feet tall. The Applicant has minimized aesthetic impacts by proposing a route where the transmission line is most harmonious with the landscape, such as along roads, railroads, and field edges. Other minimization measures include crossing streams using the shortest distance possible (i.e., perpendicular to the waterbody), avoiding placing structures directly in front of residences, and using construction methods that minimize damage to vegetation near the Transmission Line.

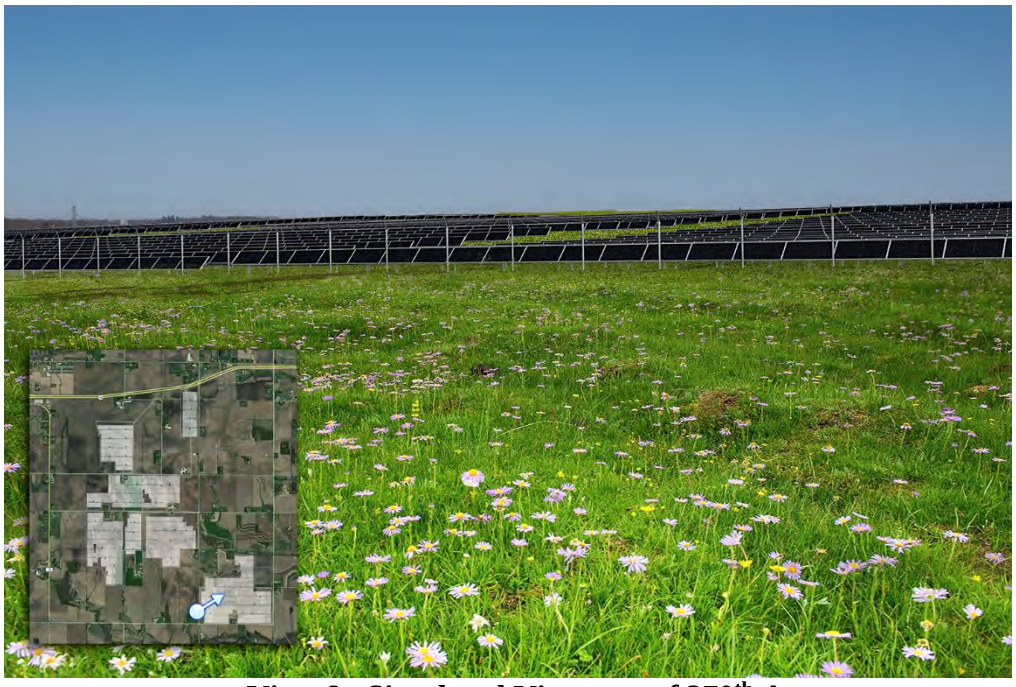
View 1: Existing View south of 650th Street

View 2: Simulated View south of 650th Street

View 3: Existing View north of 655th Street

View 4: Simulated View north of 655th Street

View 5: Existing View east of 270th Avenue



View 6: Simulated View east of 270th Avenue

10.2 WILDLIFE

Impacts to wildlife are expected to be minimal. The proposed establishment of stable, year-round herbaceous cover post-construction will likely benefit many wildlife species (i.e., ground-nesting birds, pollinators, et cetera.). Common species of wildlife adapted to agricultural land use may be present in the Project Area such as white-tailed deer, red fox, striped skunk, wild turkey

(*Meleagris gallopavo*), ring-necked pheasant (*Phasianus colchicus*), and an array of passerines, rodents, and insects. During Project construction, wildlife within the Project Area are likely to be temporarily displaced; however, as the current land use within the HVTL Route right-of-way is predominately agricultural, and surrounding land use is rural residential and commercial, these species would be impacted by human activity regularly. Overall, construction of the Project is expected to minimally impact wildlife or their populations. During operations, any potential impacts to wildlife are also expected to be minimal (e.g., excluding large mammals from site access from fencing). As the potential impacts to wildlife are anticipated to be minimal or temporary, no species-specific mitigation is proposed.

The potential for bird collision with the overhead transmission line would depend on the line's location. Avian collision risk may be greater for certain at-risk species (e.g., waterfowl, waterbirds) during certain behaviors such as flushing, courtship displays, and aerial displays, potentially increasing risk if birds are distracted. Collision risk may increase if a power line bisects daily movement corridors (such as between roost, feeding, or nesting areas).

Electrocution risk is minimized with the 345 kV transmission line, based on the increase in horizontal space between lines when compared with smaller transmission lines. To reduce the potential for avian collisions or exposure during line operation, the Applicant will consider implementing measures to increase overhead shield wire and other suggested practices outlined by APLIC's collision manual.

10.2.1 Federal and State Listed Species

The USFWS Information for Planning and Consultation (IPaC) database was reviewed for the potential occurrence of federally-listed species, candidate species, or designated critical habitat that may occur within or near the Project Area. MNDNR's Natural Heritage Information System (NHIS) documents occurrences of federal or state-listed species, state Species of Concern, and rare habitat. A data request for records within a 1-mile buffer of the Solar Facility and Proposed Route was submitted on March 10, 2021 and is currently pending. Although these reviews do not represent a comprehensive survey, they provide information on the potential presence of protected species and habitat within the vicinity of the Project (refer to **Table 6**).

Table 6: Species Potentially Occurring within the Project Area or within 1 Mile

Common Name	Scientific Name	Habitat	Within 1 Mile	Within Project Area	State	Federal
Birds						
Loggerhead shrike	*Lanius ludovicianus*	Inhabits short, open, upland grassland with hedgerows, isolated shrubs, and trees (MNDNR, 2018).	Yes	No	E	N/A
Fish						
Northern brook lamprey	*Ichthyomyzon fossor*	Adults are found in swift water over a course substrate; ammocoetes are found burrowed in fine sediment or	Yes	No	SC	N/A

Table 6: Species Potentially Occurring within the Project Area or within 1 Mile

Common Name	Scientific Name	Habitat	Within 1 Mile	Within Project Area	State	Federal
		organic debris associated with quiet water. Requires warm, clean, clear streams typically averaging 19 meters wide and 0.7 meter deep (MNDNR, 2018).				
Ozark minnow	*Notropis nubilus*	Found in clean, clear, small to medium sized perennial streams; in Minnesota, populations are restricted to the Zumbro, Root, and Cedar River and their tributaries (MNDNR, 2018).	Yes	No	SC	N/A
Mammals						
Eastern spotted skunk	*Spilogale putorius*	Can be found in agricultural and open lands that provide adequate cover, such as shelterbelts, woodlands, outbuildings, and other structures (MNDNR, 2018).	No	No	T	N/A
Reptiles						
North American racer	*Coluber constrictor*	Opportunistic forager that can be found in a variety of woodland and grassland habitats; in Minnesota, it is limited to the Minnesota, Mississippi, and St. Croix River Valleys (MNDNR, 2018).	No	No	SC	N/A
Wood turtle	*Glyptemys insculpta*	Relies upon forested riverine systems, specifically watercourses that are small to medium in size and fast-flowing; sandy areas adjacent to watercourses that are not flood prone are especially important for nesting (MNDNR, 2018).	Yes	No	T	N/A
Mussels						
Ellipse	*Venustaconcha ellipsiformis*	This species is typically found in gravel riffles of rivers and silty areas of stream banks; known to occur in the Cannon, Zumbro, Root, Cedar, and Upper Iowa River systems of Minnesota (MNDNR, 2018).	Yes	No	THR	N/A
Plants						
Prairie bush-clover	*Lespedeza leptostachya*	Found in dry to mesic tallgrass prairies with gravelly soils (USFWS, 2009).	No	No	T	T

Table 6: Species Potentially Occurring within the Project Area or within 1 Mile

Common Name	Scientific Name	Habitat	Within 1 Mile	Within Project Area	State	Federal
American ginseng	*Panax quinquefolius*	Found in upland hardwood forests dominated by sugar maple (*Acer saccharinum*), American basswood (*Tilia americana*), or red oak (*Quercus rubra*); grows only in well-develop forests soils that are typically a mesic loam (MNDNR, 2018).	Yes	No	SC	N/A
E = Endangered, T = Threatened, SC = Species of Concern						

10.2.1.1 *Federal Listed Species*

According to the USFWS IPaC (2021), three federally-listed species may occur within or near the Project Area: the federally-threatened northern long-eared bat (NLEB) *(Myotis septentrionalis)*, Leedy's roseroot (*Rhodiola integrifolia ssp. leedyi*), and prairie bush-clover (*Lespedeza leptostachya*). The USFWS's final 4(d) rule for NLEB limits prohibitions for the incidental take of the species to those that would protect the bat in white-nose syndrome (WNS)-affected areas. The Project Area is located within the USFWS-designated WNS Zone. Also, although not identified in the USFWS IPaC (2021) the federally-endangered rusty patched bumble bee (RPBB) (*Bombus affinis*) has potential to occur within the Project Area based on the Low Potential Zone that extends into the Project Area, as identified by the USFWS RPBB habitat connectivity model. These species are further discussed below.

Potential impacts to the rare and unique natural resources described below include incidental take of NLEB predominately through tree removal, and physical habitat disturbance during construction for RPBB, Leedy's roseroot, and prairie bush-clover.

10.2.1.1.1 Northern Long-eared Bat

The NLEB is listed as threatened under the federal ESA, due to population-level declines primarily due to a fungal infection that manifests as WNS. The USFWS published a final 4(d) rule for NLEB on January 14, 2016. The USFWS's final 4(d) rule for NLEB limits prohibitions for the incidental take of the species to those that would protect the bat in WNS-affected areas. The Project Area is located within the USFWS-designated WNS Zone. Per the USFWS Final 4(d) rule for NLEB, within the WNS Zone, incidental take due to tree removal is prohibited as follows:

- If it occurs within 0.25-mile (0.4 kilometer) of a documented hibernaculum; or
- If it involves a documented maternity roost tree or other trees within 150 feet (47 meters) of the documented maternity roost tree during June or July.
- In addition, all take within known hibernacula is prohibited.

While the Project Area is primarily agricultural lands with only a small area of forested habitat, adjacent landscape surrounding the Project Area includes riparian corridors; therefore, the probability of NLEB occurrence within the Project Area is moderate.

Overall, Byron Solar does not anticipate that the Project will impact NLEB during construction or operations. A review of the MNDNR NHIS licensed data did not indicate NLEB species occurrences within or near the Project Area. According to the MNDNR and USFWS, there are no known hibernacula or maternity roost trees in Dodge or Olmsted Counties; however, the species may still occur within or near the Project Area. The Byron Solar Project determination indicated that the Project may affect NLEB; however, the Project layout has been designed to avoid the removal of trees during Project construction. Any tree clearing that might be required would be accomplished outside of the NLEB pup-rearing season. Therefore, the Applicant determined the Project is No Effect for NLEB based on little to no tree clearing and any necessary tree clearing occurring outside of NLEB pup-rearing season.

10.2.1.1.2 Rusty Patched Bumble Bee

The primary threats to RPBB populations include habitat loss and degradation and the intensification of farming practices. The USFWS adapted a habitat connectivity model to identify the zones around current (2007-2017) records. The model produces discrete zones where there is a potential for the species to be present. The zones are referred to as High Potential Zones or Low Potential Zones. High Potential Zones contain extant sites and the surrounding area and are considered to have greatest potential for species presence. Low Potential Zones include Primary Dispersal Zones, which models the maximum dispersal potential of the species from sites with recent records surrounding High Potential Zones, which assumes the presence of species where suitable habitat is present; and Uncertain Zones, which contain the maximum dispersal potential from historic records of the species observed between 2000 and 2006.

RPBB have been observed and collected in a variety of habitats including prairies, woodlands, marshes, agricultural landscapes, and residential parks and gardens. The RPBB requires areas that support sufficient food (nectar and pollen from diverse and abundant flowers), undisturbed nesting sites in proximity to floral resources, and overwintering sites for hibernating queens. Nesting sites include underground and abandoned rodent cavities or clumps of grass, and overwintering sites include patches of undisturbed soil.

As the Project Area is primarily agricultural lands with only a small area of forested habitat (less than one percent) and herbaceous habitat (2.3 percent), and the landscape surrounding the Project Area is dominated by agriculture, the probability of RPBB occurrence within the Project Area is low.

There is approximately 205 acres of Low Potential Zone mapped within the Project Area and 6,060 acres mapped within the 1-mile buffer. However, as the Project Area is predominately agricultural land, it is unlikely that RPBB will be impacted by Project construction or operation.

10.2.1.1.3 Leedy's Roseroot

Leedy's Roseroot grows in only four areas in Minnesota and two areas in New York; one of those areas is in Olmsted County, Minnesota. The primary threat to Leedy's roseroot is ground water contamination from pesticides and fertilizers, and changes in hydrology. This species grows in a very specific and rare habitat, called a maderate cliff, which is characterized by the cracks in the cliff that extends from the cliff face to underground caves. Leedy's roseroot grows near these cracks, where the cool air escape from the underground caves.

As the Project Area is primarily agricultural lands with relatively flat topography, the probability of Leedy's roseroot occurrence within the Project Area is low. Leedy's Roseroot is not anticipated to occur within the Project Area due to the lack of maderate cliff habitat. Therefore, no impacts are anticipated. Similarly, no impacts to prairie bush clover are expected during Project construction or operation as no tallgrass prairie habitat has been identified within the Project Area. There is no online determination tool for Leedy's roseroot impacts.

10.2.1.1.4 Prairie Bush-Clover

The federally-threatened prairie bush-clover is a tallgrass prairie endemic native to the upper Mississippi River Valley. Its current range is limited to discrete locations in Minnesota, Illinois, Iowa, and Wisconsin. Prairie bush clover occurs on dry mesic prairies with gravelly soils on north, northeast- or northwest-facing slopes in southwestern Minnesota. Remaining occurrences of the species are generally restricted to remnant prairies; in Minnesota, most populations occur in prairies that were formerly or are currently pasture. The primary threats to prairie bush-clover include loss of tallgrass prairie habitat and the intensification of farming practices.

As the Project Area is primarily agricultural lands with only a small area of herbaceous habitat (1.6 percent), and the landscape surrounding the Project Area is dominated by agriculture, the probability of prairie bush-clover occurrence within the Project Area is low. There is no online determination tool for prairie bush clover impacts.

10.2.1.2 *State Listed Species*

A record of one state-special concern vascular plant, one state-endangered vertebrate animal, two state-threatened vertebrate animals, three state-special concern vertebrate animals, and one state-threatened invertebrate animal was documented within one mile of the Solar Facility and proposed HVTL Route (**Table 6**). These records were reviewed using a 2020 MNDNR data request and internal MNDNR NHIS database license LA-980 (2021); a 2021 MNDNR NHIS data request is pending.

10.2.1.2.1 American Ginseng

American ginseng (*Panax quinquefolius*) is found in upland hardwood forests dominated by sugar maple (*Acer saccharinum*), American basswood (*Tilia americana*), or red oak (*Quercus rubra*). This plant grows only in well-developed forests soils that are typically a mesic loam. No tracts of mature upland forest were observed onsite during field studies.

10.2.1.2.2 Loggerhead Shrike

The loggerhead shrike (*Lanius ludovicianus*) is a small predatory songbird that inhabits short, open, upland grassland with hedgerows, isolated shrubs, and trees. Listed as state-endangered, the loggerhead shrike's population decline can be at least partially attributed to encroachment of trees on grasslands and intensive row crop agriculture practices. Although the Project Area is heavily dominated by row crop agriculture, small areas of pasture with scattered oak trees were observed.

10.2.1.2.3 Wood Turtle

The wood turtle (*Glyptemys insculpta*) is a largely aquatic reptile that relies upon forested riverine systems, specifically watercourses that are small to medium in size and fast flowing; sandy areas adjacent to watercourses that are not flood prone are especially important for nesting. Factors contributing to population declines include habitat loss and fragmentation, stream siltation, and nest area flooding. No suitable wood turtle habitat was observed onsite during wetland and watercourse delineations in 2020 and 2021.

10.2.1.2.4 Eastern spotted skunk

The eastern spotted skunk (*Spilogale putorius*) can be found in agricultural and open lands that provide adequate cover, such as shelterbelts, woodlands, outbuildings, and other structures. According to the MNDNR, six eastern spotted skunks have been documented in Minnesota in the last two decades.

10.2.1.2.5 North American Racer

The North American racer (*Coluber constrictor*) is an opportunistic forager that can be found in a variety of woodland and grassland habitats; in Minnesota, it is limited to the Minnesota, Mississippi, and St. Croix River Valleys. Extensive row crop agricultural land use within the Solar Facility and HVTL Route suggests limited habitat is present onsite.

10.2.1.2.6 Ozark Minnow

The Ozark minnow (*Dionda nubila*) is found in clean, clear, small to medium-sized perennial streams; in Minnesota, populations are restricted to the Zumbro, Root, and Cedar Rivers and their tributaries. One perennial watercourse (Cascade Creek) within the Zumbro River watershed flows through the Project Area.

10.2.1.2.7 Northern Brook Lamprey

The northern brook lamprey (*Ichthyomyzon fossor*) is a small, non-parasitic fish that feeds on detritus, algae, bacteria, and other drifting or suspended nutrients. Threatened due to habitat degradation and lampricide treatments, this species requires moderately warm, clean, clear streams that are typically 19 meters wide and 0.7 meters deep. Adults prefer swift water flowing over a course substrate, while ammocoetes are found burrowed in sediments of slow-flowing side channels. No suitable streams were observed within the Solar Facility and HVTL Proposed Route during 2020 and 2021 wetland and watercourse delineations.

10.2.1.2.8 Ellipse

The ellipse (*Venustaconcha ellipsiformis*) is a freshwater mussel found in the Cannon, Zumbro, Root, Cedar, and Upper Iowa River systems of Minnesota. This species is typically found in gravel riffles of rivers and silty areas of stream banks. One small, perennial watercourse within the Zumbro River watershed flows through the Project Area.

10.2.1.2.9 Impacts and Mitigation

No impacts to any Minnesota state endangered, threatened, or special concern species are anticipated throughout construction or operation of the Solar Facility and HVTL. Although limited potentially suitable habitat for loggerhead shrike is present within the Project Area, no tree clearing is proposed; if any is required, it will take place outside of the breeding season to avoid any potential take. Similarly, BMP's will be used to avoid siltation, sedimentation, or other impacts to streams or water quality, thus minimizing risk to sensitive aquatic species with potential habitat within the Project Area, such as the ellipse and Ozark shiner. Most species, including American ginseng, prairie bush-clover, wood turtle, North American racer, eastern spotted skunk, and northern brook lamprey are not anticipated to be located within the Project Area due to lack of suitable habitat.

10.2.2 Wildlife Action Network and Minnesota Wildlife Action Plan Species

The Wildlife Action Network is comprised of areas with high concentrations or persistent or viable populations of Species of Greatest Conservation Need (SGCN). SGCN are defined as native animals with rare, declining, or vulnerable populations and species for which the state has a stewardship responsibility. Minnesota's State Wildlife Action Plan (SWAP) (2015-2025) proactively addresses the state's conservation needs and catalyzes actions in an attempt to prevent species from needing to be listed under the state's endangered species law. No SGCN were documented within the Project Area based on the MNDNR NHIS ER response (ERBD #20200305).

10.2.3 MNDNR High Value Habitats

The Applicant reviewed the MNDNR Commercial Solar Siting Guidance (Solar Guidance) that recommends identification of high value resources during Project development.

There are no native plan communities (NPCs) mapped within the Proposed Route right-of-way or Solar Facility. However, there are 19 NPCs mapped within one mile of the Solar Facility and one NPC mapped within one mile of the Proposed Route right-of-way. One is identified as southern dry cliff, one is mesic limestone, two are oak-shagbark hickory woodland, two are southern dry-mesic oak forest, three are red oak-white oak (sugar maple) forest, three are southern mesic oak-basswood forest, three are sugar maple-basswood (bitternut hickory) forest, and five are identified as southern wet-mesic hardwood forest. The nearest NPC is a southern mesic oak-basswood forest located 0.08 mile southwest of the Solar Facility, just east of 250th Avenue .

There are no Minnesota Biological Survey (MBS) railroad rights-of-way prairies mapped within or within one mile of the Solar Facility or Proposed Route right-of-way. The nearest identified native prairie is approximately two miles east of the Solar Facility. During desktop and

field native prairie reviews, no native prairies were observed within the Solar Facility or Proposed Route right-of-way.

The Project will use BMPs to minimize impacts to the wetlands and watercourses within the Solar Facility and Proposed Route right-of-way. No other MNDNR High Value Habitats were identified within the Solar Facility or Proposed Route right-of-way. No native prairies were observed during the native prairie assessment. As such, permanent impacts to MNDNR High Value Habitats will be avoided and no mitigation measures are proposed.

10.2.4 Wildlife Action Network and Minnesota Wildlife Action Plan Habitat

The MBS designates and assigns ranks to Site of Biodiversity Significance (SOBS) based on the presence of NPCs, rare animals and plants, and landscape (i.e., context and ecological function). MBS SOBS are classified as outstanding, high, moderate, or below. There are no MBS SOBS within the Solar Facility or Proposed Route right-of-way. However, there are five within one mile of the Solar Facility. They are located south of the Project and all five are considered sites with moderate biodiversity significance. The MBS sites are associated with the 20 NPCs identified in the 1-mile buffer (see above). The Project does not intersect any habitats identified in the Wildlife Action Network.

10.2.4.1 *Lakes, Wetlands, Streams, and Rivers*

According to the National Hydrography Dataset (NHD), 10 watercourses and one NHD waterbody are mapped within the Solar Facility. The Proposed Route right-of-way includes four NHD flowlines, including Cascade Creek. No NHD waterbodies were identified within the Proposed Route right-of-way. No MNDNR Public Waters Inventory features were identified within the Solar Facility or Proposed Route right-of-way.

10.2.4.2 *Large Block Habitats*

Large block habitats are grassland or woodland areas of greater than 40 acres (MNDNR 2016b). Land cover within the Project Area has largely been modified for anthropogenic purposes (approximately 97 percent). There are no large block habitats within the remaining approximate three percent of land cover within the Project Area, and what does remain is less than 40 acres.

10.2.4.3 *Public Conservation and Recreation Lands*

Public conservation and recreation lands include lands administered by federal, state, or local agencies, or conservation easements. No public conservation lands are located within or within one mile of the Solar Facility and Proposed Route right-of-way. Recreational land in the form of a snowmobile trail traverses the Solar Facility.

10.2.4.4 *Properties in Government Programs or with Conservation Easements*

Based on the MNDNR Solar Guidance, properties in government programs or with conservation easements include MNDNR Native Prairie Bank, Reinvest in Minnesota, Forest Legacy easements, and USFWS or private conservation easements. There are three CRP lands

located within the Solar Facility. There are an additional 31 CRP lands within one mile of the Solar Facility. There are no CRP lands within the Proposed Route right-of-way, however there are five CRP lands within one mile of the Proposed Route right-of-way. There are no other properties in government programs or with conservation easements in the Project Area or one-mile buffer.

10.2.4.5 *Impacts and Mitigation*

Three CRP lands will be impacted by the Development Area. No MBS SOBS, large block habitats, or public conservation and recreation lands are located within the Solar Facility and Proposed Route right-of-way; therefore, no impacts are anticipated. Regardless, the Applicant will implement a VMP that includes minimizing chemical use in sensitive areas by avoiding broadcast applications of herbicide and employing spot treatments for control of invasive species.

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

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

The Project is located within a rural landscape, and the primary land use in the Project Area is agricultural (96.9 percent) followed by herbaceous/hay/pasture (1.6 percent), developed lands (1.5 percent), and the remaining identified land uses include a minor amount of deciduous forest (0.1 percent) (refer to **Table 7**).

Table 7 summarizes the land use types within the Project Area. Most of the agricultural land in the Project Area is subject to row-crop agriculture, such as corn and soybeans. Developed land within the Project Area generally consists of public roads, namely U.S. Highway 14, County Road 15, County Road 6, 280th Street, 650th Street, 655th Street, and 262nd Avenue. The small area (28.8 acres) of herbaceous/hay/pasture lands within the Project Area is associated with roadside ditches and unnamed streams. The minor amount of deciduous forest identified in the Project Area is associated with the rural homestead and agricultural buildings in the southeastern portion of the Project Area.

Table 7: Land Use Within the Project Area (in acres)

Land Use Type	Acres in Project Area	Percent of Total Acreage
Agricultural	1,795.6	96.9
Herbaceous/Hay/Pasture	28.8	1.6
Developed	27.3	1.5
Deciduous Forest	1.9	0.1
Total	**1,853.7**	**100.0%**

Farmsteads are sparsely scattered outside of the Project Area, generally situated near public roads. Based on review of available aerial photography, there are 17 residences (1-17 located on

parcels near the Solar Facility and one parcel near the HVTL right-of-way as highlighted in Section 10.1).

The Solar Facility will change the land use from agricultural to solar energy use within the Development Area (**Map 2**). The conversion of agricultural land to the Solar Facility will have a relatively minimal impact on the rural character of the surrounding area or Dodge County. Of the 281,600 acres in Dodge County, the majority is classified as agricultural land. Impacts to approximately 1,529.7 acres of agricultural land within the Solar Facility footprint would reduce the amount of agricultural land in the county by less than one percent (0.6 percent). The Project Substation and O&M Facility will affect approximately 9.4 acres of cultivated cropland.

Approximately 49.2 acres of cultivated cropland is crossed by the HVTL right-of-way. Of the remaining 3.5 acres, 3.0 acres are developed land and 0.5 acre are herbaceous/hay/pasture lands.

Expected land use impacts within the Solar Facility Development Area and HVTL right-of-way are provided in **Table 8**.

Table 8: Expected Land Use Impacts

Land Use Type	Acres in Solar Facility Development Area	Acres in Proposed Route Right-of-Way[1]
Agricultural	1,529.7	49.2
Herbaceous/Hay/Pasture	14.2	0.5
Developed	8.7	3.0
Total	**1,552.6**	**52.7**

[1] The Proposed Route includes the 150 right-of-way (75 feet on both sides of the transmission line centerline) for a total of 52.7 acres. Construction is anticipated to impact only 25 feet on both sides of the transmission line centerline for a total of 17.4 acres. The remaining 35.3 acres allows for design flexibility, provides space to maneuver construction vehicles, provides for Minimum Vegetation Clearance Distances per NERC Reliability Standards, and provides a buffer for line sway on windy days.

Note: The total shown in this table may not equal the sum of addends due to rounding.

Even though the Project proposes impacting a relatively small percentage of available farmland in Dodge and Olmsted Counties, the Applicant has coordinated with the Minnesota Department of Agriculture (MDA) on an AIMP (Joint Site Permit and Route Permit Application, Appendix D). This AIMP has been designed to incorporate BMPs into siting procedures; pre-construction, construction, and post-construction methods; operational procedures; and decommissioning and restoration procedures to avoid and minimize impacts to soil and site productivity such that pre-construction agricultural productivity (anticipated use, appropriate management) is rapidly returned to the site following decommissioning. The Applicant circulated the draft AIMP to MDA staff on June 18, 2021.

Normal agricultural activities can continue within portions of the Project not converted to solar panels, access roads, and fencing. After the useful life of the Solar Facility, the current agricultural land use could be restored by removing the Project components. While there is no land

in the Solar Facility site currently used as residential or commercial, land use may also be converted to these uses after the useful life of the Solar Facility. The Solar Facility is not anticipated to preclude current or planned land use on adjacent parcels; and upon decommissioning and removal of the Project, the affected parcels may be returned to the existing agricultural use or potentially transitioned to other planned land uses.

The Project Substation footprint will measure approximately 160 feet by 175 feet on a 6.8-acre gravel pad. The O&M Facility building footprint will measure approximately 70 feet by 35 feet on a 2.6-acre gravel pad. The remaining areas within the gravel pads will be used to accommodate the fence setback, employee parking, and equipment storage and maintenance. The Applicant completed wetland delineations in Spring 2021 to confirm the 6.8-acre Project Substation will occur in cultivated crops and uplands; the Project Substation is not anticipated to impact wetlands or require wetland fill. For the purposes of this Application, the Applicant conservatively assumed permanent impacts to the entire 6.8-acre construction workspace. The Project Substation components will be mounted on concrete pads on a graveled surface to maintain the area free of vegetation, and a fence will be installed to prevent unauthorized entry by individuals and wildlife.

Components of the Solar Facility will not be located in the City of Kasson's Urban Expansion District, as shown on Exhibit D-2 of the Dodge County Zoning Ordinance. Construction of the Solar Facility would not preclude the future orderly extension of these services across property under the Applicant's control as these extensions would likely be accomplished by utilizing existing public rights-of-way, which will not be impacted by the Project.

Construction and operation of the HVTL is not expected to have a significant impact on land use within Olmsted and Dodge Counties. Existing land uses along the Proposed Route will experience minimal, short-term impacts during the period of construction. The Applicant sited the HVTL to be co-located with existing transmission and railroad rights-of-way for about 1 mile of its length to minimize impacts to non-developed areas. When Transmission Line construction is complete, the Applicant will restore the workspaces and land uses will be allowed to continue as before. The Proposed Route crosses areas zoned as agricultural in Dodge and Olmsted Counties. No areas zoned as residential, commercial, or industrial are crossed by the Proposed Route; therefore, no mitigation measures are proposed.

The Project has been designed in compliance with the goals and policies of the Dodge County Comprehensive Plan (2019), specifically protecting the environment, preserving agricultural land, promoting compatible development and uses to prevent land use conflicts, and protecting groundwater as described throughout this Application. The goals and policies of the Dodge County Comprehensive Plan are exercised through Dodge County's zoning power, and as previously outlined, the Project meets the Agricultural zoning district goals to retain, conserve, and enhance agricultural land in Dodge County and to protect this land from scattered residential development (Dodge County, 2019).

The Project has been designed in compliance with the goals and policies of the Olmsted County General Land Use Plan. The Olmsted County Land Use Plan map shows the Proposed Route is located entirely within the Urban Service Area (Olmsted County, 2021a). According to the Olmsted County General Land Use Plan, Chapter 4, the Urban Service Area consists of

municipalities and additional developed and undeveloped land around each municipality needed to accommodate development over the next 25 to 50 years. The intent of the Urban Service Area designation is to (1) delineate the best areas for urban growth until the year 2040, (2) accommodate uses and development patterns compatible with future urban growth, and (3) allow for the continuation of agricultural and other resource uses (Olmsted County Planning Advisory Commission, 2014). The Proposed Route is compatible with the General Land Use Plan and is consistent with the Urban Service Area land use and development policies of compatibility with adjacent land uses (transmission lines already surround the Byron Substation), and the continuation of agricultural activities within the HVTL right-of-way.

While the Olmsted County General Land Use Plan does not address transmission lines in the Urban Service Area, it does include a policy for siting transmission lines in Resource Protection areas. The policy states that the location of high voltage transmission lines "should be controlled to the extent allowable to minimize potential aesthetic and other public health or welfare impacts including property impacts." The HVTL has been routed to be co-located with existing transmission and railroad rights-of-way for about one mile of its length to minimize aesthetic impacts to non-developed areas.

Because the Site and Route Permits supersede local permits, no zoning or land use permits are required for construction of the Project from Dodge or Olmsted Counties, or associated townships.

The proposed Solar Facility and HVTL are located in the Agricultural Zoning District in Dodge County (Dodge County, 2018). Dodge County Zoning Ordinance Sections 8.4.18 and 16.46 states that solar farms (exceeding 40 kW nameplate capacity) are permissible in the Agricultural district upon approval of a conditional use permit (CUP). Dodge County Zoning Ordinance Section 8.4.5 states that a Major Essential Service - Transmission (exceeding 34.5 kV) must acquire a CUP prior to construction. Per the Dodge County Ordinance, the Project uses are compatible with local land use regulations for solar energy facilities and transmission lines. The County has determined that these types of land uses are acceptable in the Agricultural Zoning District upon approval of a CUP (Dodge County, 1995). The Dodge County Zoning Ordinance applies to solar energy systems that are not otherwise subject to siting and oversight by the State of Minnesota under the Minnesota PPSA (Minn. Stat. § 216E). The Minnesota PPSA (Minn. Stat. § 216E.10, subd. 1), states that the Site Permit and Route Permit are the only site approvals required for construction of the Project. *See* Section 1.4 for details the preemption of local permits. The Applicant is coordinating with local and county officials regarding the Project and has applied county standards to the Project where feasible.

The proposed HVTL is located in the A-2 Agricultural Zoning District in Olmsted County (Olmsted County, 2021a). According to the Olmsted County Zoning Ordinance, the HVTL is considered part of the solar energy farm as defined in Section 2.02, which states a solar energy farm is "a group of interconnected solar collection systems connected to a public or private utility system through a system of transformers, distribution lines, which may include a substation. Operation, control, and maintenance functions are often centralized through a network of computerized monitoring systems, supplemented by visual inspection." Additionally, a solar collection system has the primary purpose of providing the collection, inversion, storage, and distribution of solar energy for electricity generation. Olmsted County Zoning Ordinance

Section 5.02 states that a CUP is required for solar energy farms located in the A-2 Agricultural Protection District. Although the Olmsted County Zoning Ordinance does not apply because the HVTL requires a Route Permit, which supersedes and preempts all zoning ordinances authorized by the County, the Applicant will continue to apply county standards, where feasible, and coordinate with local and county officials regarding the Project. The Proposed Route has been sited on predominantly agricultural land, along existing roadways and property lines, and avoids residential areas. These areas correspond to the Agricultural District.

Because no permanent land use or zoning impacts are anticipated, no additional mitigation measures are proposed beyond those described in the prepared AIMP.

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

The Project is located in a sparsely populated rural area in between the cities of Byron and Kasson, Minnesota. Residences are scattered throughout the rural area where the land use is dominated by agricultural fields, predominately corn and soy. With the exception of U.S. Highway 14, roads that surround the Project are county or township roads. The Solar Facility is bordered on the north by U.S. Highway 14, on the south by County Road 6 (670th Street), and by County Road 15 (270th Ave) and 280th Avenue to the east. Agricultural fields border the Solar Facility to the west. The HVTL is generally north of U.S. Highway 14 and west of Byron. The Project is located on relatively flat agricultural land that is conducive to solar and transmission line development.

Access to the Project will be via existing state, county, and township roads. With the limited possible exception of minor field access or driveway changes depending on final design, no changes to existing roadways are planned. The major roadway in the area is U.S. Highway 14, which bisects the Project and borders the northern perimeter of the Solar Facility. Other roads surrounding the Project are county and township roads. The Proposed Route crosses U.S. Highway 14 just west of the intersection of U.S. Highway 14 and County Road 15 (270th Ave), east of Kasson. Any occupation of state highway right-of-way requires a Utility Permit from the MnDOT, per Minn. R. 8810.3100 to 8810.3600. Minnesota Department of Transportation's (MnDOT) Accommodation Policy provides requirements and guidelines for the installation of utility facilities in and along MnDOT rights-of-way, which the HVTL was developed to meet. The Applicant has begun coordinating with MnDOT and will continue to work with MnDOT throughout the Route Permit process to ensure that the Proposed Route meets MnDOT permit requirements.

Construction traffic will use the existing state and county roadway system to access the Project facilities and deliver construction materials and personnel. Traffic during the 12-18 months of active construction is estimated to be approximately on average 50-100 pickup trucks, cars, and/or other types of employee vehicles onsite for the majority of construction. However, the number of vehicles traveling to and from the site each day will depend largely on the activities being performed and is anticipated to fluctuate throughout the construction timeline. It is estimated that approximately 10-20 semi-trucks per day will be used for delivery of facility components. Semi-truck delivery will vary per day depending on time of construction and delivery timeline of equipment. For purposes of comparison, the functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day (Annual Average Daily Traffic (AADT)). Since the area roadways have AADTs that are well below capacity, this increased traffic may be perceptible to

area residents, but the slight increase in volume is not expected to affect traffic function. Slow-moving construction vehicles may also cause delays on smaller roads, similar to the impact of farm equipment during planting or harvest. However, these delays should be minimal for the relatively short construction delivery period. Overweight or oversized loads will be limited to transporting the main power transformers. If they are required, Applicant will obtain the appropriate approvals prior to construction.

Temporary road or lane closures may occur during the construction process to ensure safety of the construction crews and the traveling public. While the line is being constructed, the electrical conductors will be strung on support structures using a pulley system or a tensioner. At road crossings, roads or lands may be temporarily closed for safety purposes when stringing electrical conductors between support structures. These closures could range in duration from minutes to hours based on the width of the road and the complexity of the crossing. Temporary closings are not expected to have significant impacts on transportation in the area because of the generally rural nature of the area and subsequent low traffic levels on most roads. Crossings would be scheduled during low traffic volume periods to reduce potential delays and impacts to the transportation system. Once an aerial crossing is completed, the road(s) will be reopened to allow normal traffic flow.

After construction is complete, traffic impacts during the operations phase of the Project will be negligible. A small maintenance crew driving through the area in pickup trucks on a regular basis will monitor and maintain the facilities as needed, but traffic function will not be impacted as a result.

There are no railroads that cross the Solar Facility, so rail traffic will not be affected by the construction of solar infrastructure. The Proposed Route crosses the Canadian Pacific Railway just west of the intersection of County Road 34 and County Road 15, east of Kasson. The HVTL route parallels the railroad for about 1 mile near 270th Avenue. Along this segment, the HVTL right-of-way is about 85 feet north of the railroad tracks. The HVTL will be constructed in such a way that it will not affect normal railroad operations. The Proposed Route does not cross any additional railroads. Impacts to the Canadian Pacific Railway are not anticipated as a result of construction and operation of the Project.

According to the Federal Aviation Administration (FAA), there are no operating public-use airports or heliports in the Project Study Area. The nearest FAA-registered airport is Dodge Center Municipal Airport located 5.2 miles west of the Solar Facility in Dodge Center, Minnesota. This airport operates one paved runway and one turf runway.

The Project is not expected to impact barge traffic.

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 the sun.

11.3.2 Emissions

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

Minor temporary effects on air quality are anticipated during construction of the proposed Project and associated Transmission Line as a result of exhaust emissions from construction equipment and other vehicles, and from fugitive dust that becomes airborne during dry periods of construction activity.

The magnitude of air emissions during construction is influenced by weather conditions and the type of construction activity. Exhaust emissions, primarily from diesel equipment, will vary with the phase of construction. Emissions from construction vehicles will be minimized by using modern equipment with lower emissions ratings. Adverse effects on the surrounding environment are expected to be negligible because of the short and intermittent nature of the emission and dust-producing construction phases.

BMPs will be used during construction and operation of the Project to minimize dust emissions if wind erosion becomes an issue. If construction activities generate problematic dust levels, the Applicant may employ construction-related practices to control fugitive dust such as application of water or other commercially available dust control agents on unpaved areas subject to frequent vehicle traffic, reducing the speed of vehicular traffic on unpaved roads, and covering open-bodied haul trucks. Other practices may include containment of excavated material, protection of exposed soil, soil stabilization, reducing speed limits within construction zones, and treating stockpiles to control fugitive dust. A Storm Water Pollution Prevention Plan (SWPPP) will be developed prior to construction that will include BMPs to minimize the potential for fugitive dust. Overall, dust emissions currently experienced annually in the area through farming practices are likely to be reduced through the establishment of perennial vegetative cover.

The Project will have no air emissions and will avoid emissions associated with fossil generation facilities. Byron Solar undertook analysis using USEPA data for emissions and generation data for the MISO-Minnesota Zone to calculate avoided emissions related to the Project. **Table 9** provides a summary of the estimated reduction in pollutants from the Project based on the EPA's avoided emissions and generation tool calculator.[81]

Table 9 Estimated Avoided Pollutants

Pollutant	Tons or Pounds/Year
CO_2E	247,203 metric tons
NOX	440,000lbs
PM2.5	Cannot find data to support
SO2	615,500lbs

[81] Located at: https://www.epa.gov/egrid/power-profiler#/MROW.

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

The Project will not use any water for alternate cooling systems. Minimal to no washing is anticipated to be needed at Project facilities due to the naturally occurring and frequent precipitation.

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 sanitary facilities will be provided during construction, which will be installed in accordance with applicable regulations.

Temporary dewatering may be required during construction for electrical trenches. Water may be used during construction to provide dust control and water for concrete mixes, if applicable, 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 SWPPP as required.

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

The Project will not generate any radioactive or solid waste under normal operating procedures. No parts require greasing or oiling on a regular basis.

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 may occasionally 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. 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))

Noise is defined as unwanted sound. It may be made up of a variety of sounds of different intensities, across the entire frequency spectrum. Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more "weight." The A-weighted scale (dBA) is used to reflect the selective sensitivity of human hearing. This scale puts more weight on the range of frequencies that the average human ear perceives, and less weight on those that we do not hear as well, such as very high and very low frequencies.

Common sound sources within an agricultural and/or rural environment include, but are not limited to, sound from farm equipment such as tractors and combines, sound generated from traffic on roadways, sounds from birds, and wind rustling through the vegetation. Typically, the ambient acoustic environment of a rural or agriculturally oriented community has equivalent

continuous sound levels (Leq, which is an energy-based time-averaged noise level) ranging from 30 dBA to 60 dBA.

The background noise in the vicinity of the Project facilities is typically a result of farming equipment/operations, wind, and vehicles. A comparison of typical noise-generating sources is outlined in **Table 10.**

Table 10 Common Noise Sources

Sound Pressure Level (dBA)	Common Noise Source
140	Jet Engine (at 25 meters)
130	Jet Aircraft (at 100 meters)
120	Rock and Roll Concert
110	Pneumatic Chipper
100	Jointer/Planer
90	Chainsaw
80	Heavy Truck Traffic
70	Business Office
60	Conversational Speech
50	Library
40	Bedroom
30	Secluded Woods
20	Whisper

The MPCA has the authority to adopt noise standards pursuant to Minn. Stat. §116.07, subd. 2(c). The adopted standards are set forth in Minn. R. Chapter 7030. The MPCA standards require A-weighted noise measurements. Different standards are specified for daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) hours. The noise standards specify the maximum allowable noise volumes that may not be exceeded for more than 10 percent of any hour (L_{10}) and 50 percent of any hour (L_{50}). The Project Area is considered a Noise Area Classification 1 (NAC 1) with daytime noise allowances of 60 decibels (dBA) and nighttime noise allowances of 50 dBA according to the Minn. Stat. §116.07 and Minn. R. Chapter 7030 noise ordinance. **Table 11** depicts the MPCA state noise standards.

Table 11 MPCA State Noise Standards - Hourly A-Weighted Decibels

Noise Area Classification	Daytime (7:00 a.m. – 10:00 p.m.)		Nighttime (10:00 p.m. – 10:00 a.m.)	
	L_{10}	L_{50}	L_{10}	L_{50}
1 – Residential	65	60	55	50
2 – Commercial	70	65	70	65
3 – Industrial	80	75	80	75

Source: Minn. R. 7030.0040

During construction, noise will be emitted by the construction vehicles and equipment onsite. The amount of noise will vary based on what type of construction is occurring at the Project on a given day. These noise impacts will be temporary and limited to daytime hours. Construction associated noise will likely be perceptible at nearby residences although none are located within the Project Area.

The Applicant anticipates impact driving of the pilings to be the most significant source of construction noise. The Roadway Construction Noise Model (RCNM) was used to determine maximum sound levels based on distance from receptors. The Applicant used the RCNM to determine the noise level created by an Impact Pile Driver measured at 200 feet from a residence (the minimum distance between a residence and solar array). Based on the results, the maximum Leq would be 82 dBA (FHWA, 2006). The noise from construction activities would dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and receptor. The average distance from area homes to the proposed solar arrays is roughly 380 feet. Construction activities will likely be sequenced across the Project, with site preparation occurring at some array locations and pile driving at others. Additionally, construction and staging activities are scheduled to occur during daytime hours to minimize noise impacts to nearby residences.

The main sources of noise from the Solar Facility during operation will be from the inverters and the Project Substation transformer. All electrical equipment will be designed to National Electrical Manufacturer Association (NEMA) Standards. The Applicant plans to use SMA Solar Technology, or equivalent, inverters, which were modeled for the Solar Facility.

The Applicant conducted a noise propagation and modeling assessment for the proposed inverters and proposed Project substation transformers (Refer to Joint Site Permit and Route Permit Application, Appendix I). Predicted noise levels were determined using Cadna-A noise propagation and modeling software. Existing background noise levels were assumed to be 40 dBA, in accordance with ANSI S12.9-13/Part 3 Category 6: Very Quiet Rural Residential. Noise levels for the inverters were provided by the manufacturer. Transformer noise was modelled according to maximum allowable levels published in NEMA-TR1. Using this data, noise contours for project noise were generated for the Project Area and presented in Exhibit 5. Additionally, future noise levels, (project contribution plus ambient) were calculated for all identified receptors within a screening distance of 500 feet.

The loudest predicted level at a receptor is 42 dBA (receptor 4), well below the daytime limit of 60 dBA. There are no predicted impacts, and the Project complies fully with Minn. R. 7030.0010-7030.0080.

Construction noise will be temporary in duration, limited to daytime hours and relatively minimal, and will return to background levels of 40 dBA during the day and 34 dBA at night once construction is finalized. The Project is required to comply with Minn. R. 7030.0010-7030.0080. The loudest predicted level at a receptor is 42 dBA (Receptor 4), well below the daytime limit of 60 dBA. The predicted noise concentration zones and propagation model are shown in the Joint Site Permit and Route Permit Application, Appendix I. There are no predicted impacts, and the Project fully complies with Minn. R. 7030.010-7030.0080. During construction, the Applicant plans to limit construction to daylight hours. Equipment used for construction will be in good

working condition and properly muffled to reduce sound generation to the greatest extent practicable.

Solar Facility noise modeling of inverter and substation equipment determined that ambient levels were generally reestablished within the Solar Facility boundary, and therefore no increased sound levels are expected outside the Solar Facility or at nearby occupied dwellings. Because no noise impacts from operation of the Solar Facility are expected, no additional mitigation is proposed.

A transmission line can generate a small amount of sound due to corona activity. Corona is the manifestation of energy loss through the line, and this energy loss can produce sound, such as buzzing or crackling. This noise can be greater in rainy or foggy conditions. During heavy rains, the sound of the rain generally is greater than the noise emitted from the transmission line and thus the transmission line noise is not noticeable. Transformers and transmission lines are equipped with circuit breakers which open to de-energize the transformers and transmission lines for fault conditions and for maintenance. As such, the circuit breakers are rarely opened and closed, at which time there is sound associated with the mechanical operation of the breakers. Circuit breakers do not emit a humming noise.

Corona noise levels depend on the presence of foul weather, the transmission line conductor design, operating voltage, and the distance from the transmission line. As mentioned above, potentially significant corona-generated noise is only produced during inclement weather. The closest residence is located approximately 225 feet from the Proposed Route right-of-way. Several other backyards are just south of the railroad tracks, but the residences are setback between 296 feet and 1,178 feet from the HVTL right-of-way.

During fair conditions, noise from the transmission line is anticipated to be inaudible. The Transmission Line may produce noise during rainy conditions due to the corona effect. It is likely, however, that most of the time when climatic conditions result in corona, the noise levels of falling rain would exceed the corona noise making the noise from the Transmission Line inaudible. Any minor corona or wind-related noise from the Transmission Line maybe be heard at nearby residences given the closest is 225 feet away and is partially separated from the Transmission Line by a garage and scattered trees. Based on the distance, and distances of the remaining residences (296 feet and 1,178 feet from the HVTL right-of-way), operation of the HVTL is not expected to create noise impacts and no additional mitigation is proposed.

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

The Project is expected to support 293 temporary jobs during the construction and installation phases, and up to five indirect and four direct, full time permanent skilled jobs during the operations phase.[82]

[82] *Economic Impact of Byron Solar Project,* David G. Loomis, Strategic Economic Research, LLC, at 16 (June 2021).

11.10 Byron Solar will manage the overall Operations and Maintenance of the Project

Byron Solar anticipates having an operations agreement with another entity for performance of BOP O&M. The BOP O&M provider will be an experienced third party. Byron Solar 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))

Electrical wiring will connect the panels to inverters, inverters will transform the power from DC to AC current. Underground 34.5 kV collector lines from the Project will deliver solar generated energy to the Project substation. The collector system voltage will then be stepped up from 34.5 kV to 345 kV and transmitted to the existing Byron Substation via the approximately 3-mile 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 entity or entities 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 Environmental Report

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

12.2 Site & Route Permits

Byron Solar will also submit to the Commission a joint Site Permit and Route Permit Application pursuant to the Minnesota Power Plant Siting Act (Minnesota Statutes Chapter 216E) and Minnesota Administrative Rules Chapter 7850.

12.3 Other Project Permits

Project permits and approvals that may be necessary to complete the Project are listed in **Table 12**. Byron Solar will obtain these approvals, as necessary, prior to Project construction.

Table 12: Potential Permits/Approvals

Agency	Permit	Applicability	Permit Status & Timing
Federal			
U.S. Army Corps of Engineers (USACE)	Section 404 Permit	Dredging or filling jurisdictional Waters of the United States (wetlands/waterways)	To be obtained prior to construction, as needed
	Wetland and Waters Delineation Approval	Needed to determine extent of USACE jurisdiction, quantify impacts, or document avoidance	To be obtained prior to construction, as needed
	Approved Jurisdictional Determination (AJD)	An AJD is optional at the applicant's request – an AJD is not necessary for the USACE to process an application	To be obtained prior to construction, as needed
	Preliminary Jurisdictional Determination (PJD)	A PJD is optional at the applicant's request – a PJD is not necessary for the USACE to process an application	To be obtained prior to construction, as needed
U.S. Fish and Wildlife Service (USFWS)	Section 7 Endangered Species Act (ESA) Consultation	Any Project with a federal nexus that may adversely affect a federally-listed endangered, threatened, or candidate species as determined by the lead federal agency	The Applicant is unaware of a federal nexus on the project but will pursue if needed.
	Section 10 Endangered Species Incidental Take Permit (ITP)	Potential impacts on federally endangered or threatened species	To be obtained prior to construction, as needed
U.S. Environmental Protection Agency (USEPA)	Spill Prevention, Control, and Countermeasure (SPCC) Plan	Project facilities with oil storage of more than 1,320 gallons	To be obtained prior to construction, as needed
State			

Table 12: Potential Permits/Approvals

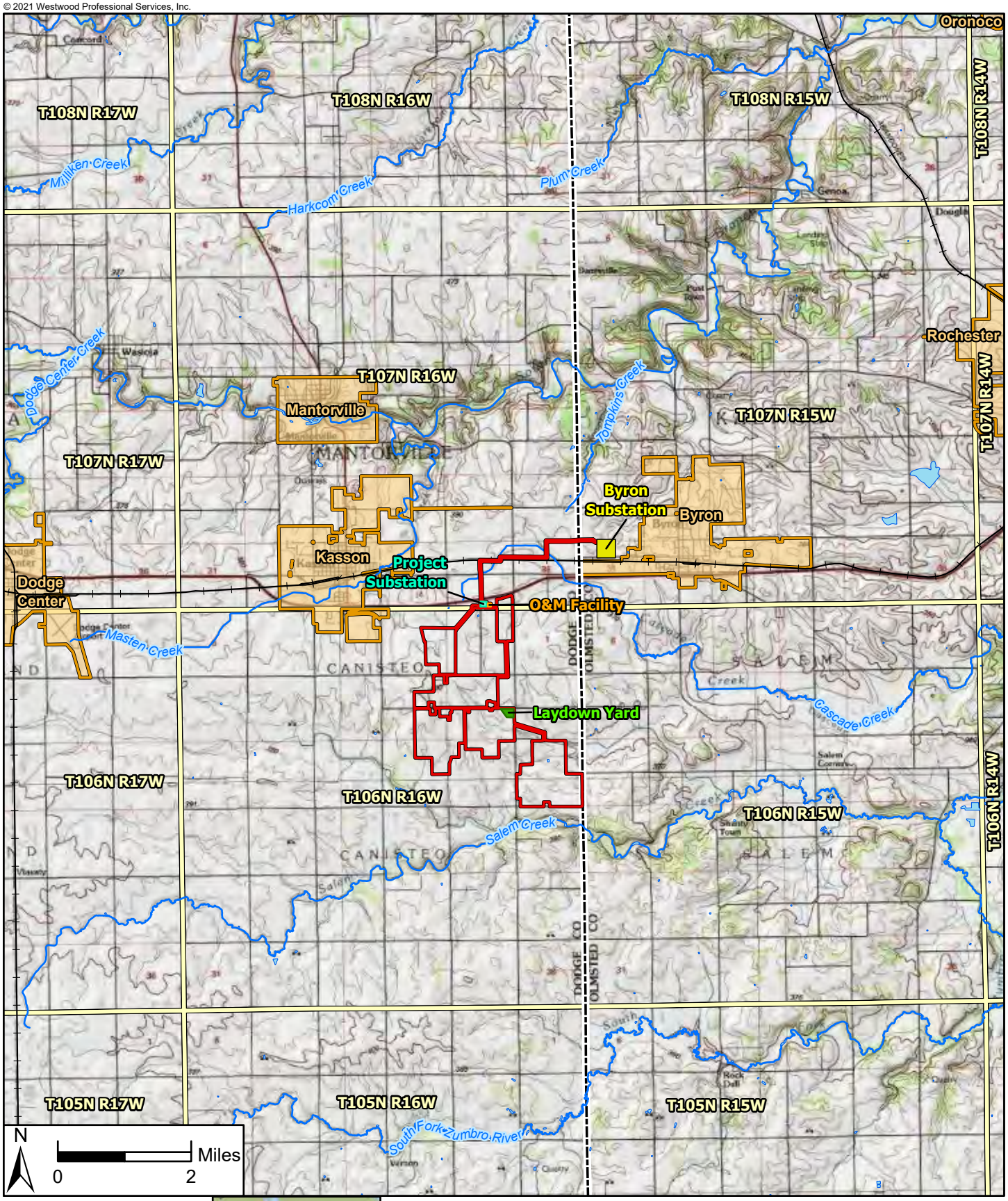
Agency	Permit	Applicability	Permit Status & Timing
Minnesota Public Utilities Commission (MPUC)	Certificate of Need	Required for LEFs (electric power generating plant or combination of plants at a single site with a combined capacity of 50 MWs or more and transmission lines directly associated with the plant that are necessary to interconnect the plant to the transmission system)	To be obtained prior to construction and filed concurrent with the Site Permit and Route Permit Joint Application
	Site Permit	Site Permit required for Large Electric Generating Facilities greater than 50 MW	To be obtained prior to construction
	Route Permit	Route Permit required for High Voltage Transmission Lines (HVTL) of 100 kV or more and greater than 1,500 feet in length	To be obtained prior to construction
Minnesota Pollution Control Agency (MPCA)	Section 401 Water Quality Certification	Required for Section 404 Individual and Nationwide Permits	To be obtained prior to construction, as needed
	National Pollutant Discharge Elimination System General Permit and Stormwater Pollution Prevention Plan	Construction activity that disturbs one or more acre of soil	To be obtained prior to construction
Minnesota Department of Health (MDH)	Well construction permit	Installation of a water supply well	To be obtained prior to construction (for O&M building), as needed
Minnesota Department of Labor and Industry	Electrical inspection of installed equipment	Necessary to comply with state electrical codes	Inspection to be conducted during construction and prior to operation
Minnesota Department of Natural Resources (MNDNR)	Water Appropriation/ Dewatering Permit	Required for all users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year (dewatering)	To be obtained prior to construction, as needed
	Consultation and Review of State Threatened and Endangered Species	Potential effects on State threatened and endangered species	To be obtained prior to construction, as needed

Table 12: Potential Permits/Approvals

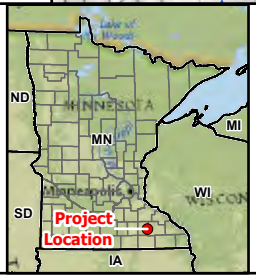
Agency	Permit	Applicability	Permit Status & Timing
Minnesota DNR, Division of Lands & Minerals	Utility Crossing License	Required to cross state land with utility infrastructure	To be obtained prior to construction, as needed
Minnesota State Historic Preservation Office (SHPO)	Cultural and Historic Resources Review; State and National Register of Historic Sites Review	Projects that require State permits or affect State register properties or require Section 106 compliance	Obtain Phase I inventory concurrence prior to construction
Minnesota Department of Transportation (MnDOT)	Application for Utility Accommodation on Trunk Highway Right-of-Way	Installing utilities along, across or within trunk highway right-of-way	To be obtained prior to construction, as needed
	Access (Driveway) Permit	Required for construction of a driveway/access road utilizing MnDOT rights-of-way	To be obtained prior to construction, as needed
	Oversize/ Overweight Permit	Vehicles delivering equipment, materials and supplies that exceed applicable MnDOT height/length limits and weight limits	To be obtained prior to equipment deliveries, as needed
County/Local			
Dodge County	Septic System Permit	Required prior to installation of any septic system in Dodge County	To be obtained prior to construction, as needed
	Moving Permit	Required for transporting oversized and overweight loads on county roadways	To be obtained prior to construction, as needed
	Application for Driveway/ Entrance	Required for moving, widening or creation a new driveway access to county road.	To be obtained prior to construction, as needed
	Work in the right-of-way permit	Required to work within county state aid highways, county municipal streets, and county highway rights-of-way	To be obtained prior to construction, as needed
	Utility Permit	Required for installation of a utility, tile inlet/outlet, or other object of any kind within the right-of-way	To be obtained prior to construction, as needed

Table 12: Potential Permits/Approvals

Agency	Permit	Applicability	Permit Status & Timing
	Zoning Permit	Required for accessory solar energy system structures	To be obtained prior to construction, as needed
Olmsted County	Oversize/Overweight Vehicle Permit	Required for transporting oversized and overweight loads on county roadways	To be obtained prior to construction, as needed
	Access Permit	Required for any changes to driveway access along county highways	To be obtained prior to construction, as needed
	Utility Permit	Required for work in the county highway road rights-of-way	To be obtained prior to construction, as needed
	Minnesota Wetland Conservation Act Approval	Activities affecting water resources	To be obtained prior to construction, as needed
Dodge County Soil and Water Conservation District (SWCD)	Minnesota Wetland Conservation Act Approval	Activities affecting water resources	To be obtained prior to construction, as needed
Olmsted County Soil and Water Conservation District (SWCD)	Minnesota Wetland Conservation Act Approval	Activities affecting water resources	To be obtained prior to construction, as needed
Canadian Pacific Railway (CPR) Crossing	Utility or right-of-way access	Approvals needed to work under, over, or beside Canadian Pacific Railway tracks	To be obtained prior to construction, as needed



Data Source(s): Westwood (2021); MNDNR (Various Dates); US Census Bureau (2019); NED (2016); USGS NHD Dataset(2013); USFWS NWI (2017); Esri USGS Topo Basemap (Accessed 2021).



Legend

- Project Area Boundary
- Existing Substation
- Laydown Yard
- O&M Facility
- NHD Flowline
- NHD Waterbody
- Railroad
- County Boundary
- Municipal Boundary
- PLS Township Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Location

MAP 1

Westwood

Phone (952) 937-5150
Fax (952) 937-5822
Toll Free (888) 937-5150

12701 Whitewater Drive, Suite #300
Minnetonka, MN 55343
westwoodps.com

Westwood Professional Services, Inc.

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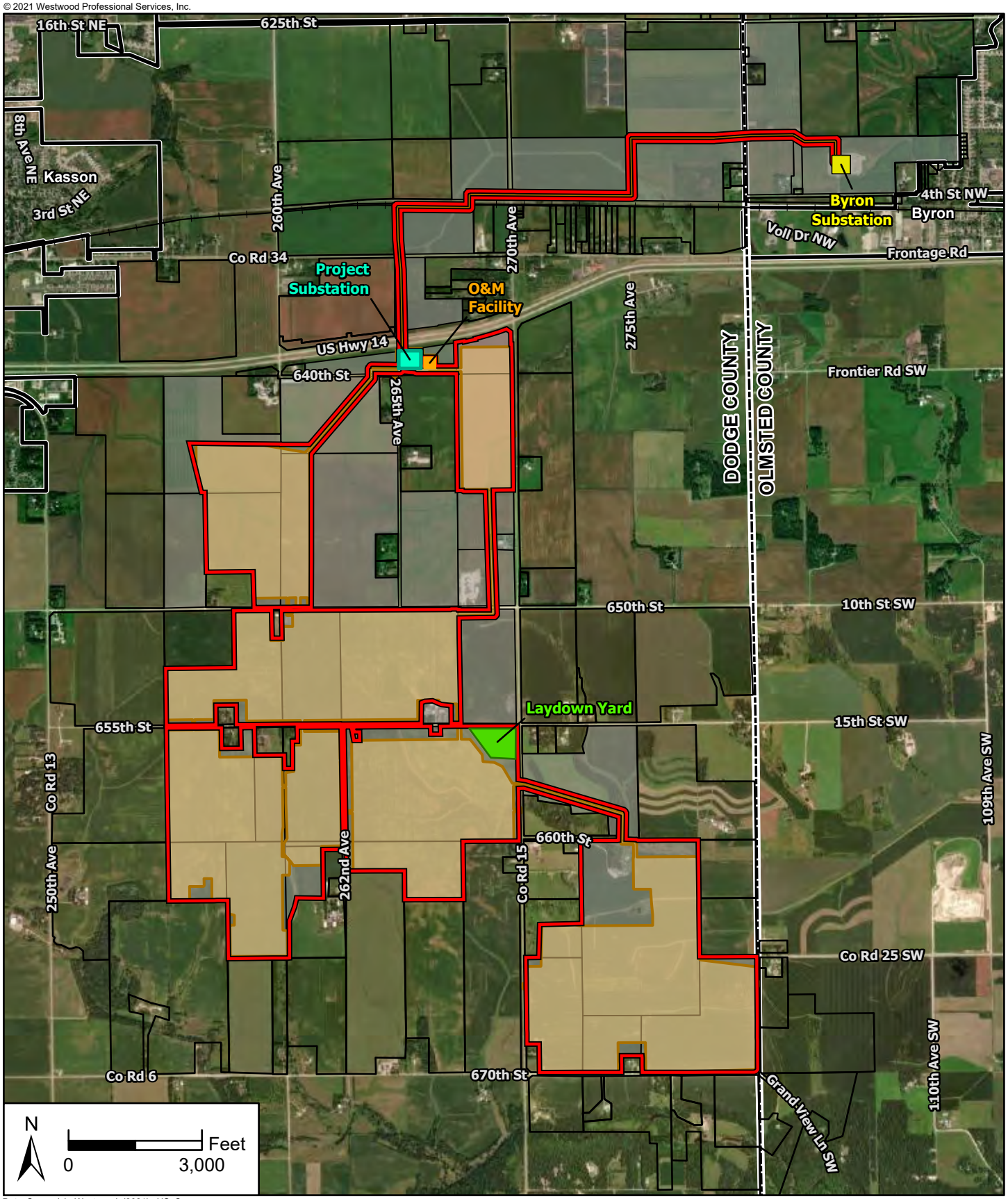

Data Source(s): Westwood (2021); US Census Bureau (2019); Dodge County GIS (2020); Olmsted County GIS (2020); Esri World Imagery Basemap (Accessed 2021).

Legend

- Project Area Boundary
- Participating Parcel
- Non-Participating Parcel
- Development Area
- Existing Substation
- Project Substation
- Laydown Yard
- O&M Facility
- Railroad
- County Boundary
- Municipal Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Land Control & Development Areas

MAP 2

Westwood

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Toll Free (888) 937-5150

12701 Whitewater Drive, Suite #300
Minnetonka, MN 55343
westwoodps.com

Westwood Professional Services, Inc.

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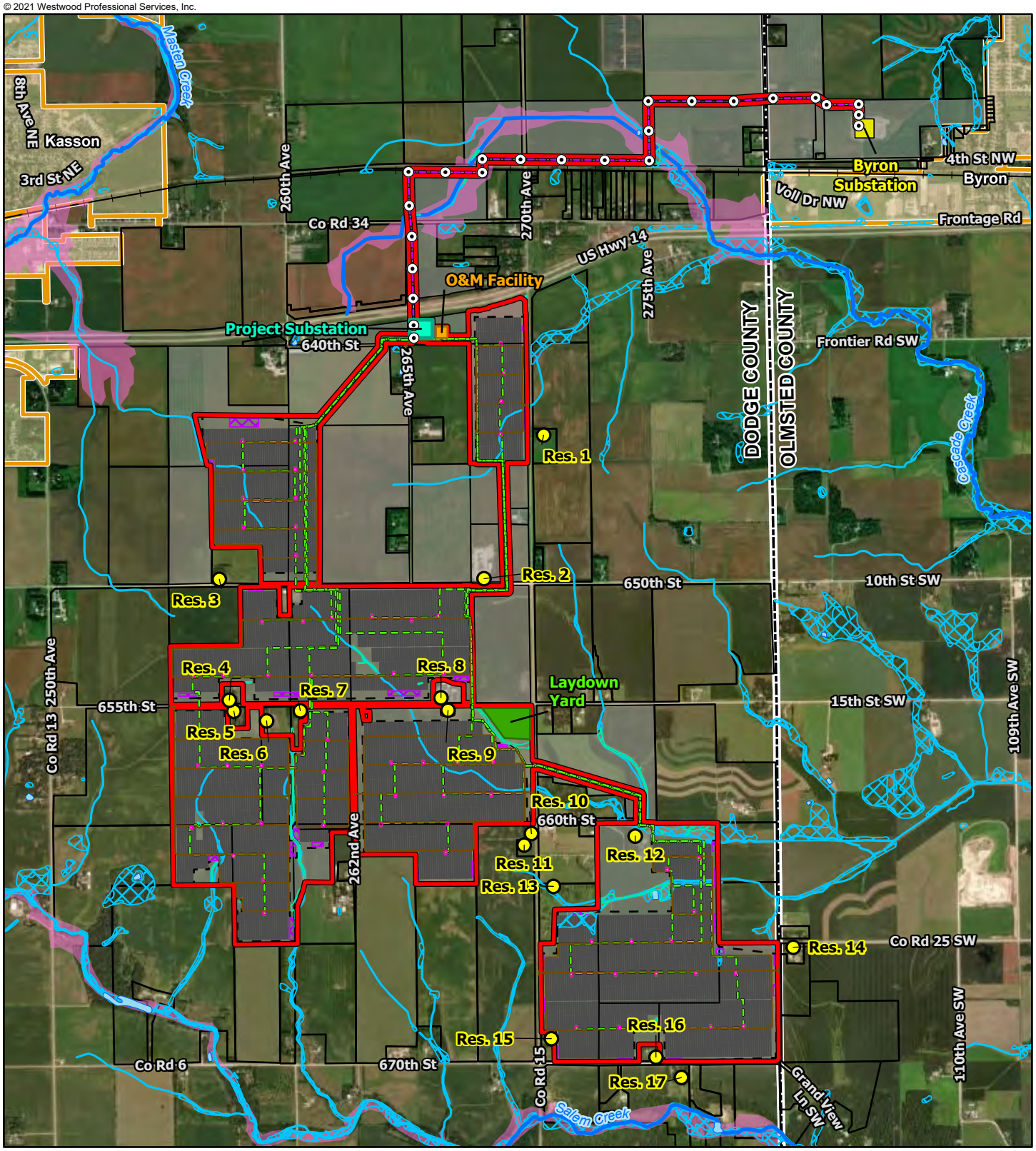

Data Source(s): Westwood (2021); US Census Bureau (2019); Dodge County GIS (2020); Olmsted County GIS (2020); Ventyx (2021); Esri World Imagery Basemap (Accessed 2021).

Legend

- Project Area Boundary
- Adjacent Residence
- Existing Substation
- Project Substation
- O&M Facility
- Laydown Yard
- Solar Array
- Proposed Fence
- Proposed Collection
- Proposed Transmission Line
- Power Pole
- Proposed Access Road
- Stormwater Pond
- NHD Waterbody
- NHD Flowline
- FEMA Flood Zone
- NWI Wetland
- Participating Parcel
- Non-Participating Parcel
- Railroad
- Municipal Boundary
- County Boundary

N

Feet

0 3,000

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Layout

MAP 3

Westwood

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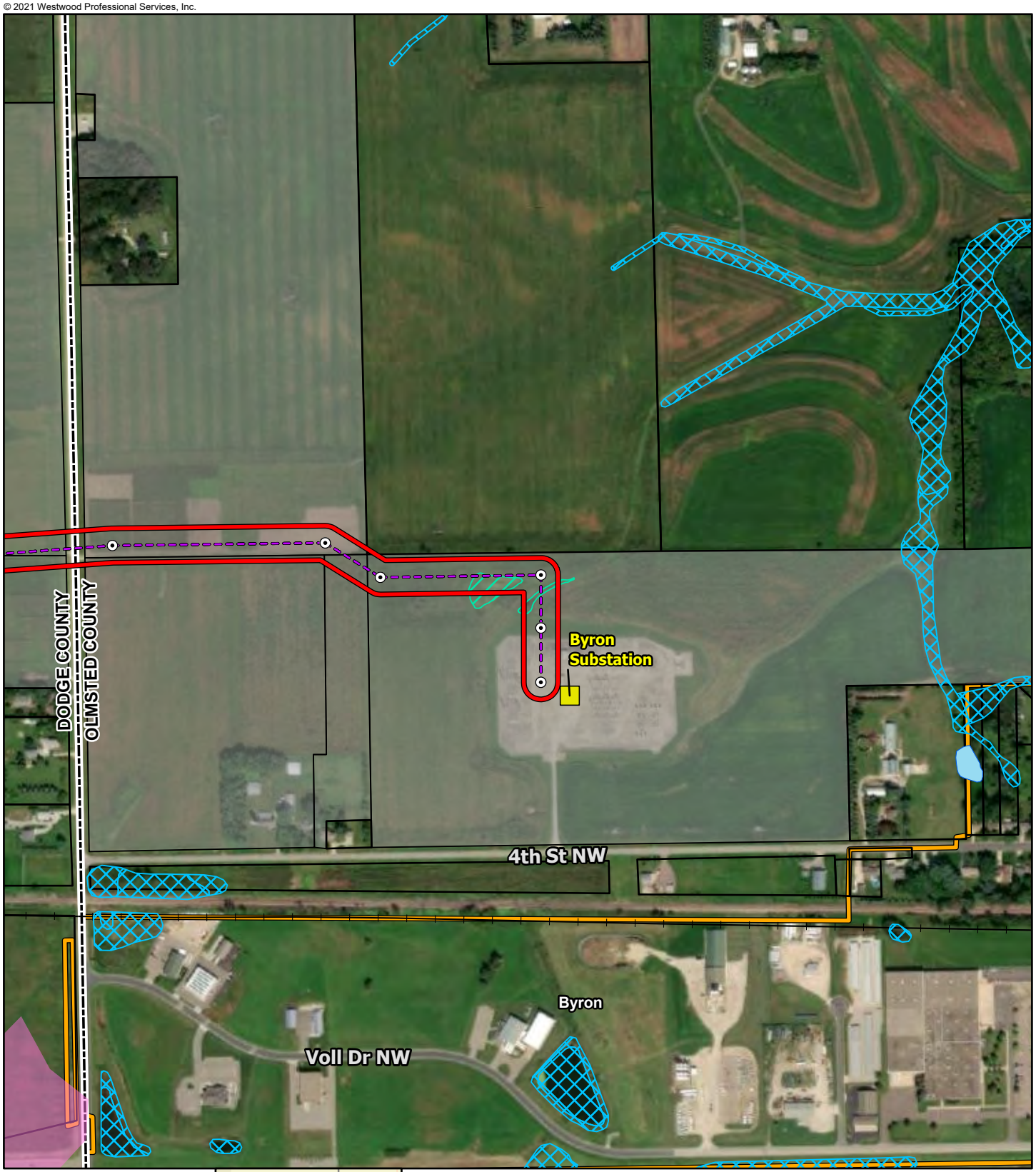

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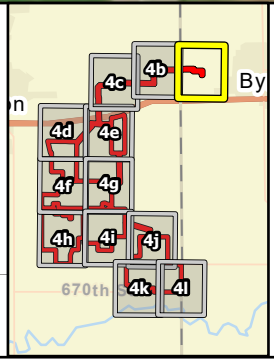

- Project Area Boundary
- Power Pole
- Adjacent Residence
- Existing Substation
- Project Substation
- O&M Facility
- Laydown Yard
- Proposed Transmission Line
- Inverter
- Proposed Access Road
- Proposed Collection
- Delineated Wetland
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- FEMA Flood Zone
- Railroad
- Participating Parcel
- Non-Participating Parcel
- County Boundary
- Municipal Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Layout

MAP 4a

Westwood

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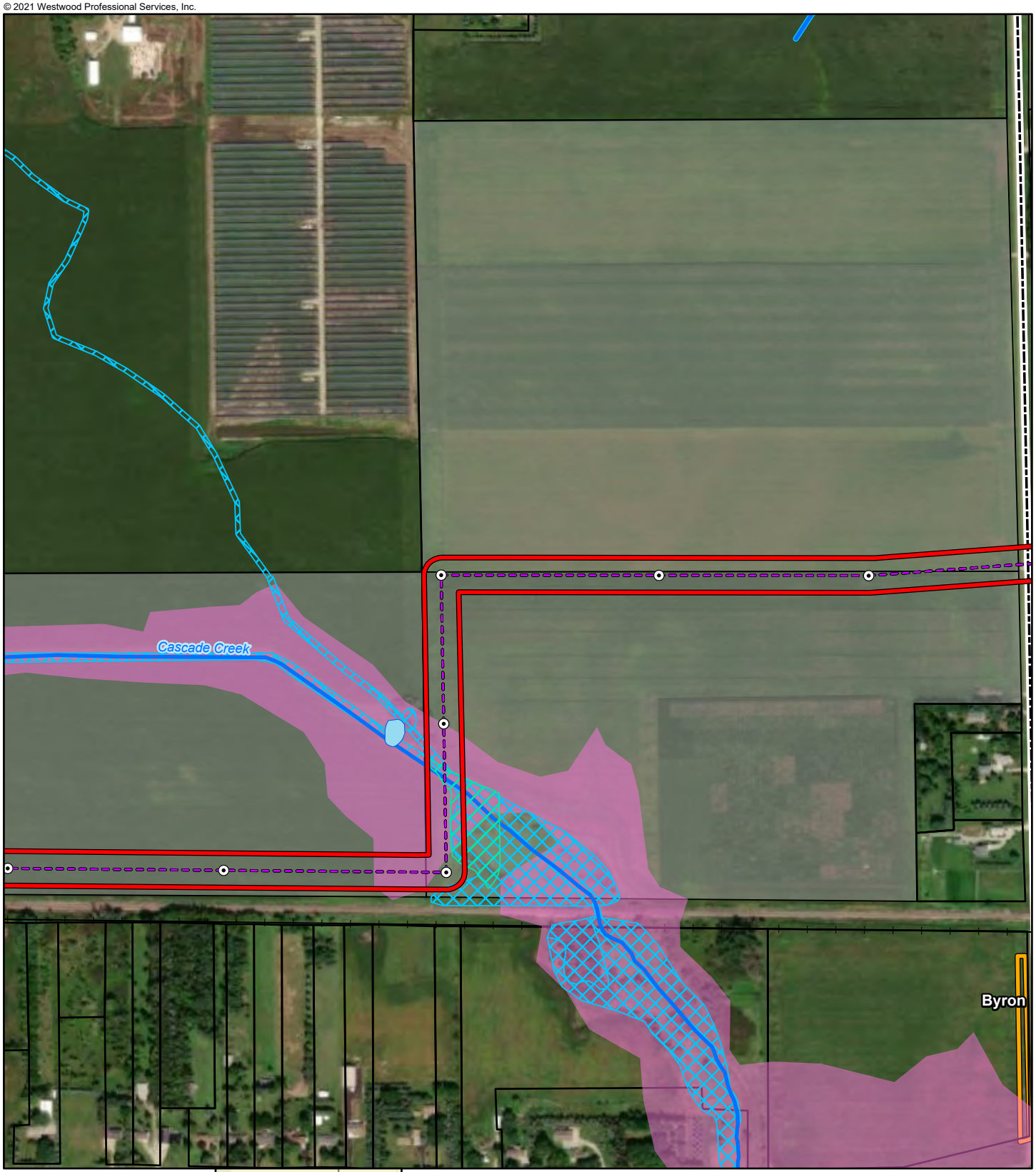

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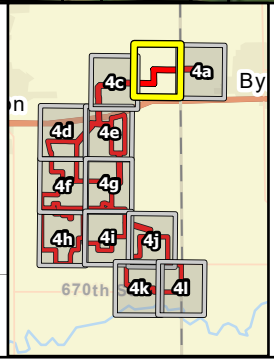

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- Railroad
- Participating Parcel
- Non-Participating Parcel
- County Boundary
- Municipal Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Layout

MAP 4b

Westwood

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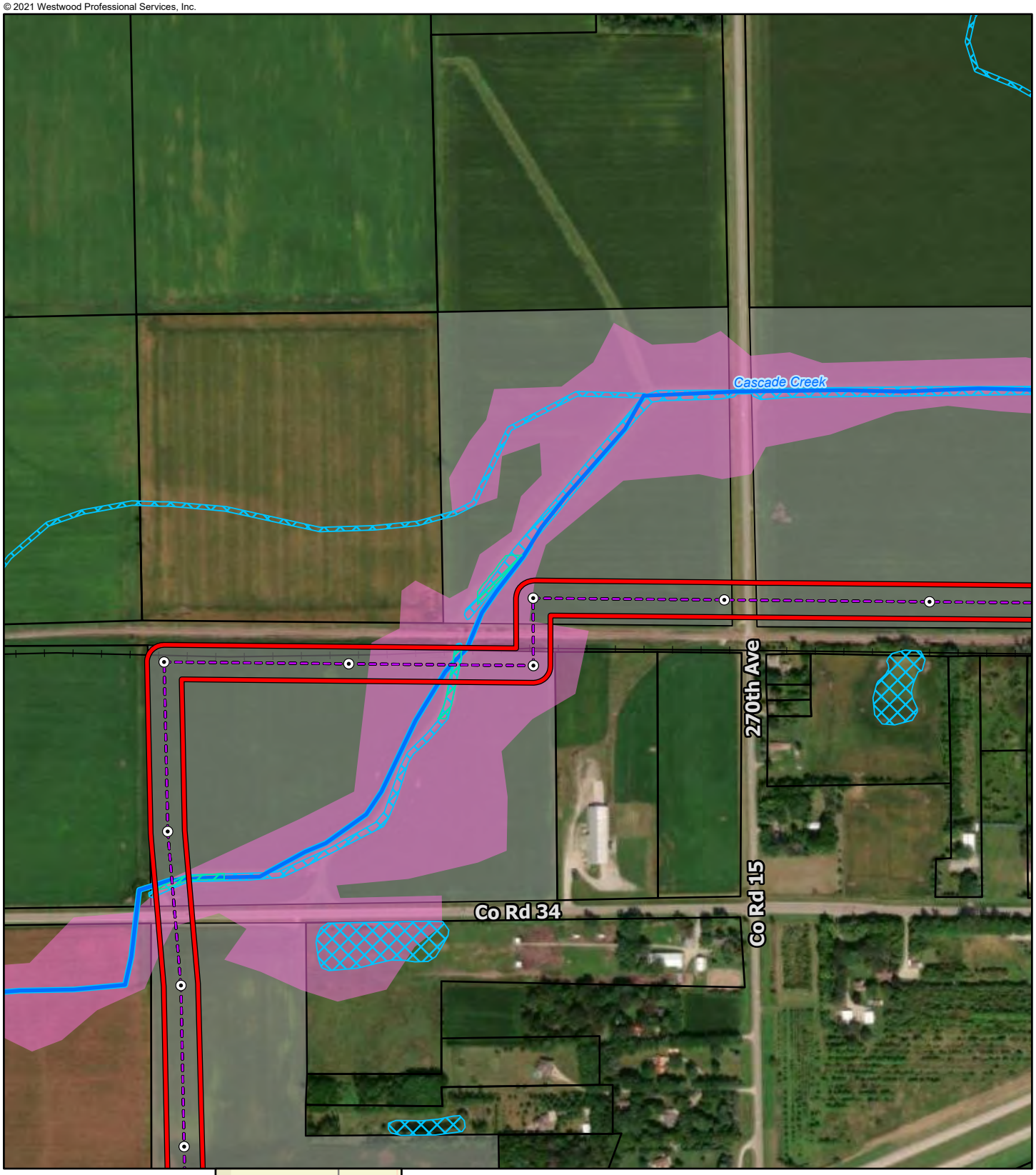

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Feet

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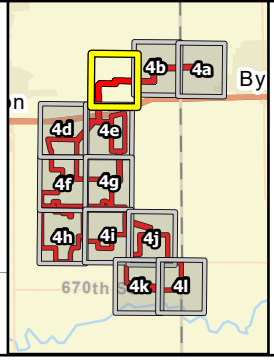

- Project Area Boundary
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- Solar Array
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- NHD Flowline
- NWI Wetland
- FEMA Flood Zone
- Railroad
- Participating Parcel
- Non-Participating Parcel
- County Boundary
- Municipal Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Layout

MAP 4c

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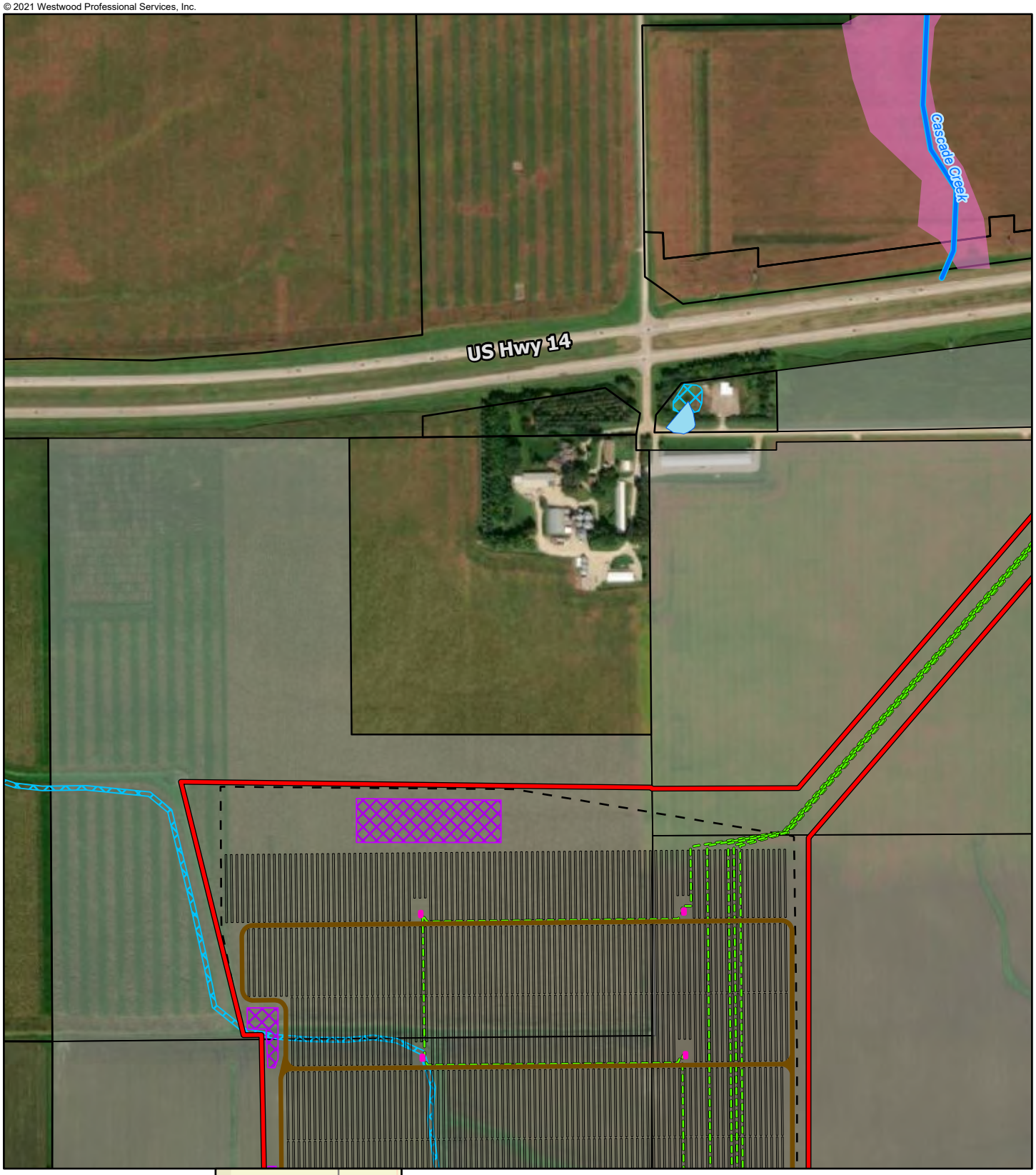

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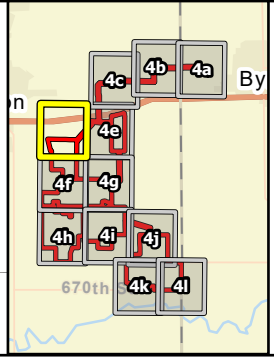

- Project Area Boundary
- Power Pole
- Adjacent Residence
- Existing Substation
- Project Substation
- O&M Facility
- Laydown Yard
- Proposed Transmission Line
- Inverter
- Proposed Access Road
- Proposed Collection
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- NHD Waterbody
- NHD Flowline
- NWI Wetland
- FEMA Flood Zone
- Railroad
- Participating Parcel
- Non-Participating Parcel
- County Boundary
- Municipal Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Layout

MAP 4d

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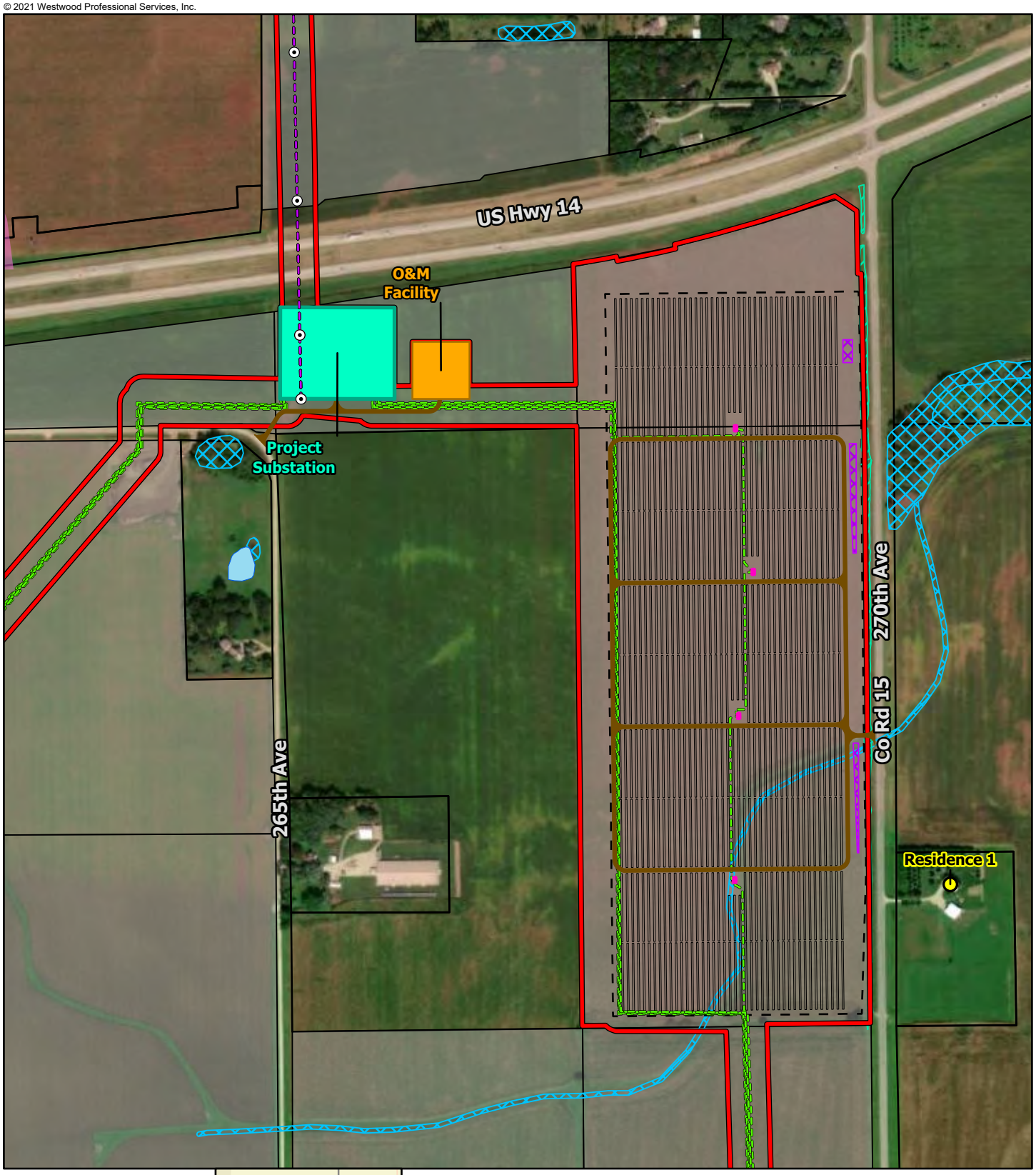

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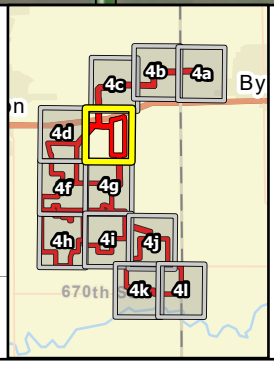

- Project Area Boundary
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- FEMA Flood Zone
- Railroad
- Participating Parcel
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- County Boundary
- Municipal Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Layout

MAP 4e

Westwood

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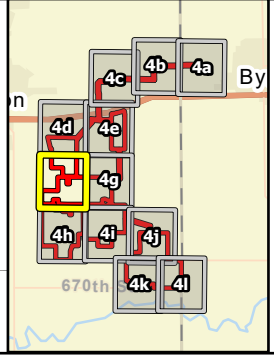

- Project Area Boundary
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- Railroad
- Participating Parcel
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- County Boundary
- Municipal Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Layout

MAP 4f

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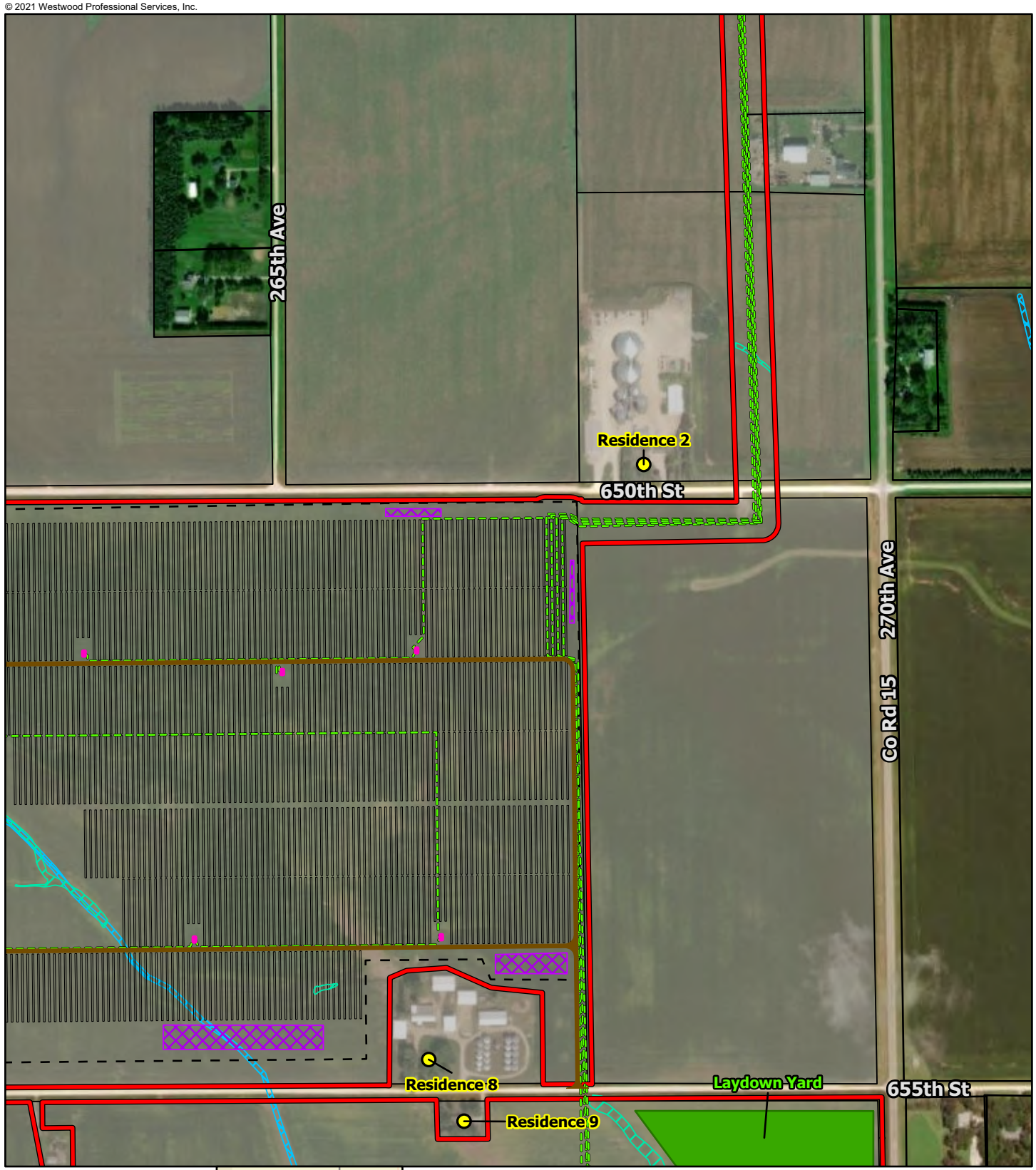

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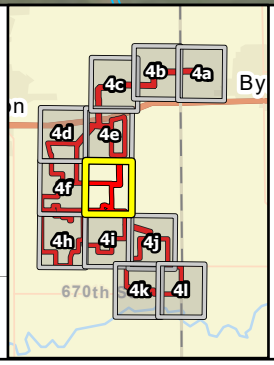

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- Inverter
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- FEMA Flood Zone
- Railroad
- Participating Parcel
- Non-Participating Parcel
- County Boundary
- Municipal Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Layout

MAP 4g

Westwood

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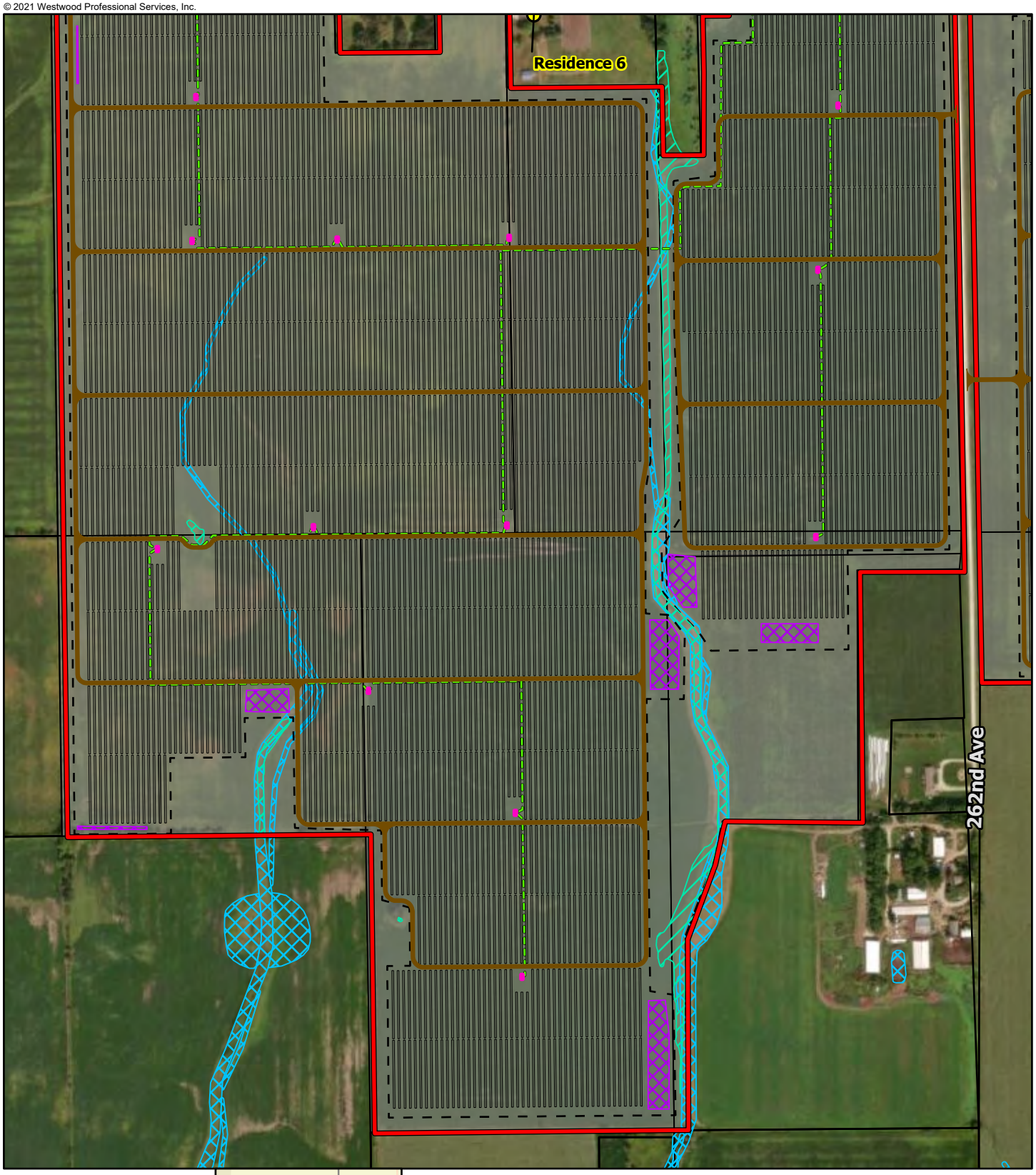

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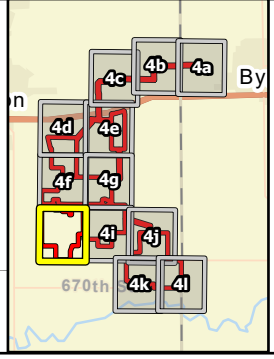

- Project Area Boundary
- Power Pole
- Adjacent Residence
- Existing Substation
- Project Substation
- O&M Facility
- Laydown Yard
- Proposed Transmission Line
- Inverter
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- FEMA Flood Zone
- Railroad
- Participating Parcel
- Non-Participating Parcel
- County Boundary
- Municipal Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Layout

MAP 4h

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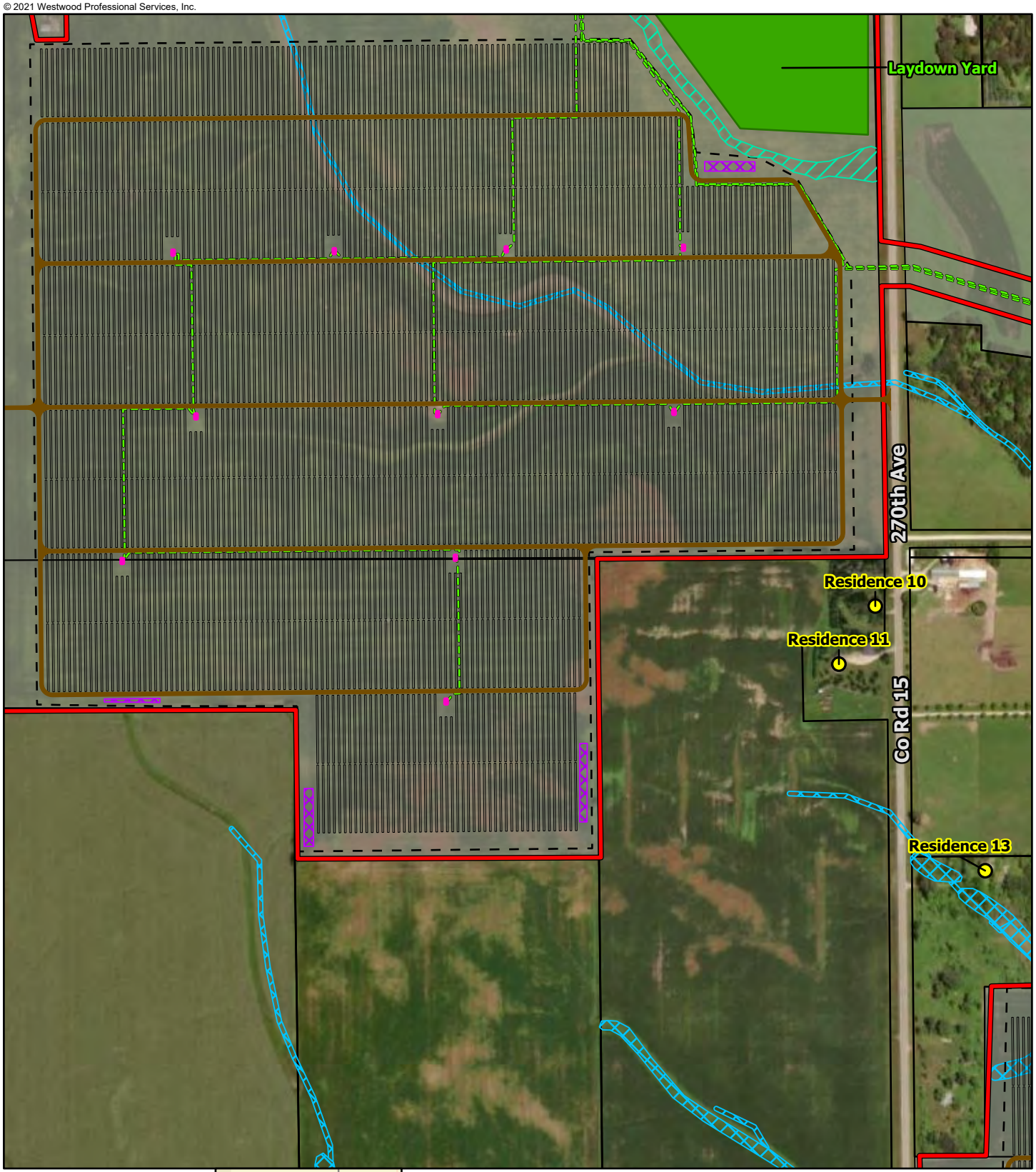

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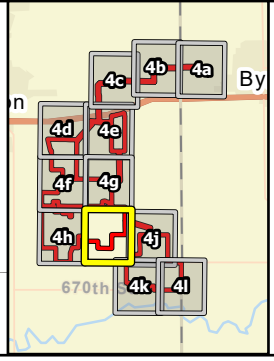

- Project Area Boundary
- Power Pole
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- Railroad
- Participating Parcel
- Non-Participating Parcel
- County Boundary
- Municipal Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Layout

MAP 4i

Westwood

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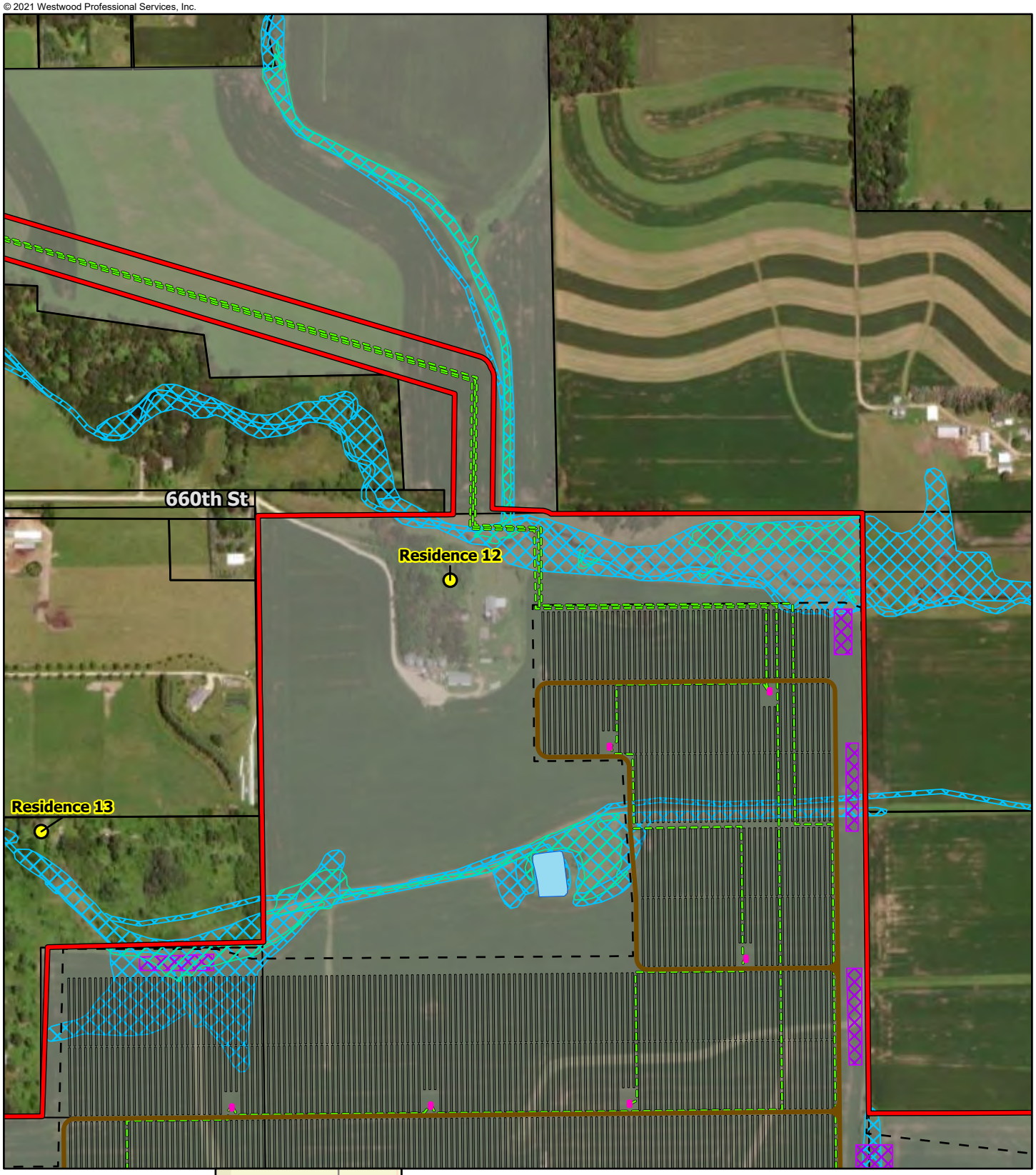

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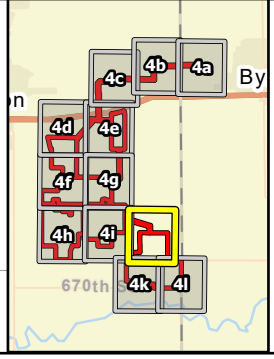

- Project Area Boundary
- Power Pole
- Adjacent Residence
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- Laydown Yard
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- Inverter
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- Railroad
- Participating Parcel
- Non-Participating Parcel
- County Boundary
- Municipal Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Layout

MAP 4j

Westwood

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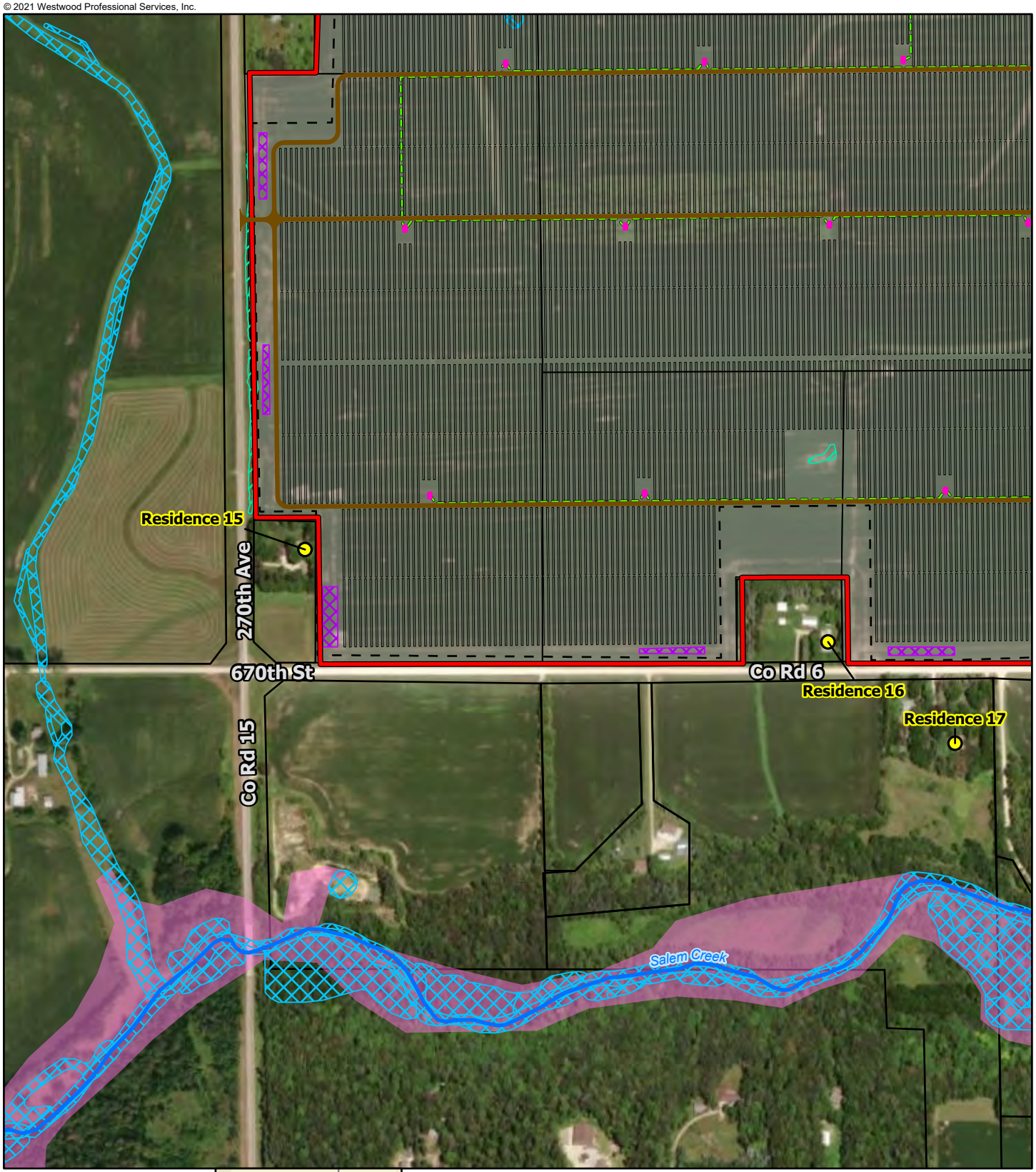

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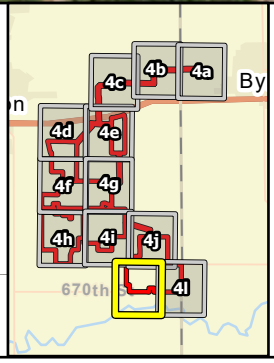

- Project Area Boundary
- Power Pole
- Adjacent Residence
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- Railroad
- Participating Parcel
- Non-Participating Parcel
- County Boundary
- Municipal Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Layout

MAP 4k

Westwood

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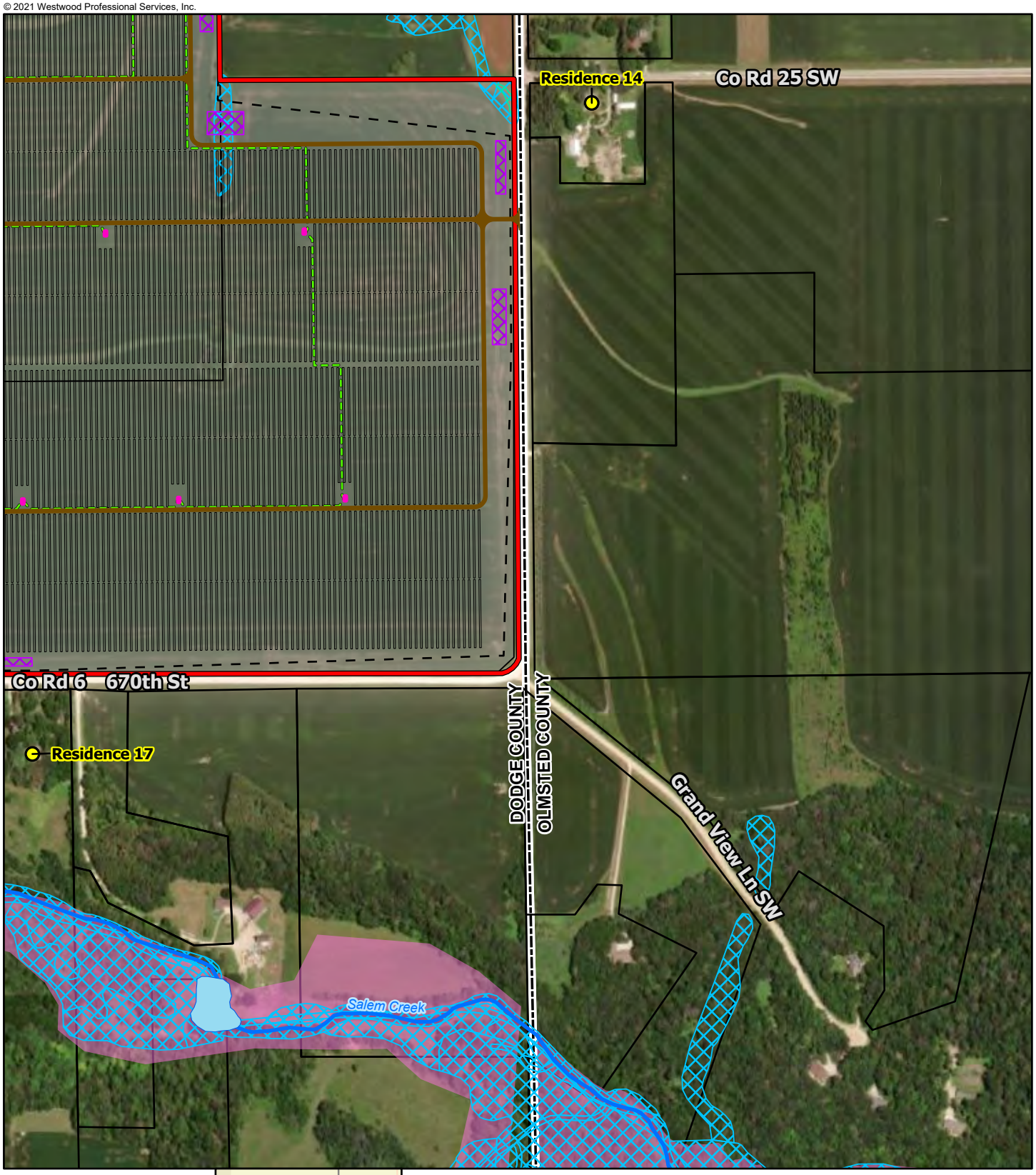

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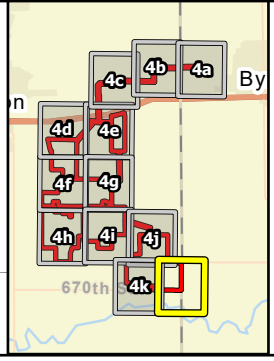

- Project Area Boundary
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- Non-Participating Parcel
- County Boundary
- Municipal Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Project Layout

MAP 4I

Westwood

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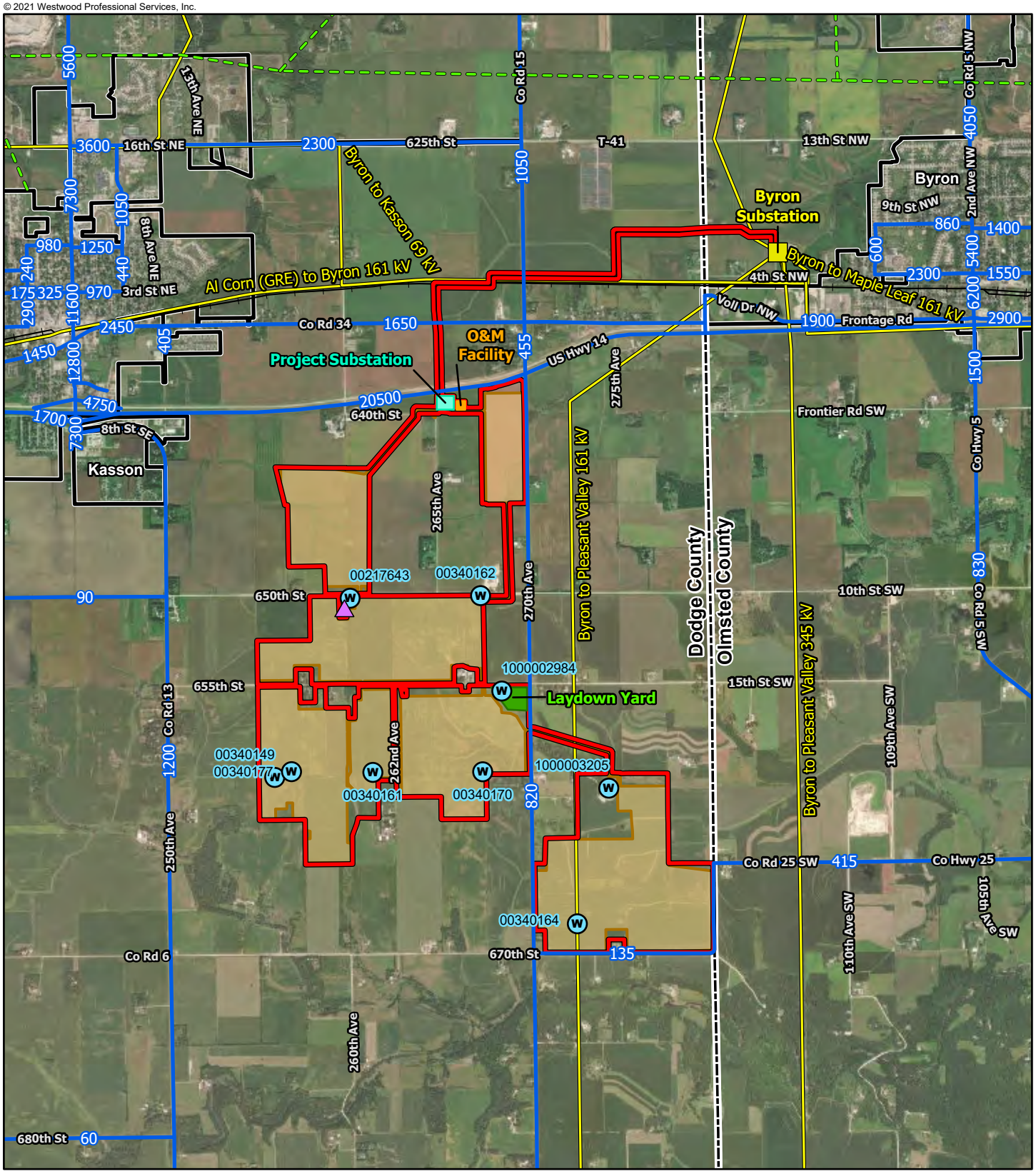

Data Source(s): Westwood (2021); US Census Bureau (2019); Dodge County GIS (2020); Olmsted County GIS (2020); Ventyx (2021); MN DOT (2021); Dodge and Olmsted County DOQ Imagery (2019).

N

0 Feet 4,000

Legend

- Project Area Boundary
- Development Area
- Existing Substation
- Project Substation
- O&M Facility
- Laydown Yard
- Tower
- Natural Gas Pipeline
- Transmission Line
- AADT Count
- County Boundary
- Municipal Boundary

Byron Solar Project

Dodge and Olmsted Counties, Minnesota

Existing Infrastructure

MAP 5

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