Revised September 6, 2019

Minnesota Public Utilities Commission

Application for a Site Permit

PUC Docket No. IP7003/GS-19-395

Regal Solar Project

Benton County, Minnesota

Submitted by:
Regal Solar, LLC
7650 Edinborough Way
Suite 725
Edina, MN 55435

GERONIMO® ENERGY
a nationalgrid company

REGAL SOLAR

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ACRONYM LIST

AADT	Annual Average Daily Traffic
AC	alternating current
AIMP	Agricultural Impact Mitigation Plan
Applicant	Regal Solar, LLC
Application	Site Permit Application
AQI	Air Quality Index
Area M	Area M Consulting
ARMER	Allied Radio Matrix for Emergency Response
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
BMPs	best management practices
CAA	Clean Air Act
CO	carbon monoxide
Commission	Minnesota Public Utilities Commission
CON	Certificate of Need
CWI	County Well Index
dB	decibels
dBA	A-weighted decibels
DC	direct current
ECS	Ecological Classification System
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
GAP	Gap Analysis Program
Geronimo	Geronimo Energy, LLC
GPS	Global Positioning System
GIS	Geographic Information System
IPaC	Information for Planning and Conservation
kV	kilovolt
Land Control Area	Approximate 802-acre area of privately-owned land for which Regal Solar, LLC has a purchase option
L_{10}	ten percent of any hour
L_{50}	fifty percent of any hour

LGU(s)	local government unit(s)
MBTA	Migratory Bird Treaty Act
MBS	Minnesota Biological Survey
MDH	Minnesota Department of Health
mG	milliGauss
MISO	Midcontinent Independent System Operator
MNBBA	Minnesota Breeding Bird Atlas
MNDNR	Minnesota Department of Natural Resources
MDA	Minnesota Department of Agriculture
MNDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NHIS	Natural Heritage Information System
NIEHS	National Institute of Environmental Health Sciences
NLEB	northern long-eared bat
NO_2	nitrogen dioxide
NPC	native plant community
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWP	Nationwide Permit
O&M building	operations and maintenance building
O_3	ozone
Pb	lead
PEM	palustrine emergent wetland
PM	particulate matter
Preliminary Development Area	Approximate 711-acre area where Regal Solar, LLC proposes to build the Regal Solar Project facilities
Project	Regal Solar Project
PV	photovoltaic
Regal/Regal Solar	Regal Solar, LLC
SCADA	Supervisory Control and Data Acquisition
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Office
SGCN	Species of Greatest Conservation Need

SO_2	sulfur dioxide
SOBS	Sites of Biodiversity Significance
SSA	sole source aquifer
SSURGO	Soil Survey Geographic Database
SWAP	State Wildlife Action Plan
SWPPP	Stormwater Pollution Prevention Plan
TEP	Benton County Technical Evaluation Panel
TWh	terawatt hour
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USG	unhealthy for sensitive groups
USGS	U.S. Geological Survey
VMP	Vegetation Management Plan
WCA	Wetland Conservation Act
WHPA	Wellhead Protection Area
WMA	Wildlife Management Area
WNS	white-nose syndrome

Application Content Requirements Completeness Checklist

Project Permit Application Requirements (Minn. Rules 7850.1900, Subp. 1)	Application Section
A. a statement of proposed ownership of the facility as of the day of filing and after commercial operation;	1.2
B. the precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the permit may be transferred if transfer of the permit is contemplated;	1.2
C. at least two proposed sites for the proposed large electric power generating plant and identification of the applicant's preferred site and the reasons for preferring the site;	2.4
D. a description of the proposed large electric power generating plant and all associated facilities, including the size and type of the facility;	3.1, 3.2
E. the environmental information required under subpart 3;	See Environmental Information below
F. the names of the owners of the property for each proposed site;	1.2
G. the engineering and operational design for the large electric power generating plant at each of the proposed sites;	3.1, Appendix B
H. a cost analysis of the large electric power generating plant at each proposed site, including the costs of constructing and operating the facility that are dependent on design and site;	2.5
I. an engineering analysis of each of the proposed sites, including how each site could accommodate expansion of generating capacity in the future;	2.6 and 3.1
J. identification of transportation, pipeline, and electrical transmission systems that will be required to construct, maintain, and operate the facility;	3.1.7 and 3.1.8
K. a listing and brief description of federal, state, and local permits that may be required for the project at each proposed site; and	1.4.2
L. a copy of the Certificate of Need for the project from the Public Utilities Commission or documentation that an application for a Certificate of Need has been submitted or is not required.	1.4.1

Environmental Information Requirements (Minn. Rules 7850.1900, Subp. 3)	Application Section
A. a description of the environmental setting for each site or route;	4.1
B. a description of the effects of construction and operation of the facility on human settlement, including, but not limited to, public health and safety, displacement, noise, aesthetics, socioeconomic impacts, cultural values, recreation, and public services;	4.2
C. a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;	4.3
D. a description of the effects of the facility on archaeological and historic resources;	4.4
E. a description of the effects of the facility on the natural environment, including effects on air and water quality resources and flora and fauna;	4.5
F. a description of the effects of the facility on rare and unique natural resources;	4.5.8
G. identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route; and	4.6
H. a description of measures that might be implemented to mitigate the potential human and environmental impacts identified in items A to G and the estimated costs of such mitigative measures.	4.1 – 4.5

1.0 INTRODUCTION

Regal Solar, LLC (Regal, Regal Solar, or Applicant), a wholly owned subsidiary of Geronimo Energy, LLC (Geronimo), a National Grid Company, respectfully submits this Site Permit Application (Application) to the Minnesota Public Utilities Commission (Commission) for a Site Permit pursuant to the Minnesota Power Plant Siting Act (Minnesota Statutes Chapter 216E) and Minnesota Administrative Rules Chapter 7850.

Regal Solar proposes to construct the Regal Solar Project (Project), a solar energy conversion facility with a 100-megawatt (MW) alternating current (AC) nameplate capacity, in Langola Township, Benton County, Minnesota (Figure 1 – Project Location). The Project will generate up to 100 MW, enough energy to provide electricity for approximately 23,000 homes annually and avoid the emission of approximately 150,000 metric tons of carbon annually.[1] Regal Solar plans to construct the Project on a schedule that facilitates an in-service date by the end of 2021.

The Regal Solar Project falls within the definition of a Large Electric Power Generating Plant in the Power Plant Siting Act and, thus, requires a Site Permit from the Commission prior to construction. Regal Solar submitted a request to the Minnesota Department of Commerce for a size determination on March 13, 2019 in accordance with Minnesota Statutes Section 216E.021 (2014). In accordance with Minnesota Rules Pursuant to 2014 Session Laws, Chapter 254, Regal Solar seeks approval of its Application under the alternative review process provided for under Minnesota Statute 216E.04 and Minnesota Rules 7850.2800-7850.3900 and a notification letter was filed with the Commission on June 11, 2019. The Site Permit is the only site approval needed for construction of the Project (Minnesota Statutes 216E.10, subd. 1.). Other permits and licenses required for the Project are listed in Section 1.4.2.

Regal Solar is a wholly owned subsidiary of Geronimo, a National Grid Company. Geronimo is a utility-scale renewable energy development company headquartered in Edina, Minnesota that has developed multiple operating wind farms and solar projects throughout the United States. Over 2,400 MW of wind and solar projects developed by Geronimo are either under construction or operational. Geronimo has a multi-gigawatt development pipeline of wind and solar projects in various stages of development throughout the United States and over 250 MW of solar development completed. Geronimo provides custom renewable energy development solutions for utilities, independent power purchasers and corporations looking to harness renewable energy for business growth. Geronimo's founder has an agricultural background and the first Geronimo project is sited solely on his land. Geronimo prides itself on developing wind farms and solar facilities that are farmer-friendly, community-driven, and beneficial for rural communities.

1.1 Purpose and Need

Regal Solar does not currently have a signed Power Purchase Agreement (PPA), but is actively marketing the sale of electricity generated by the Project to third parties, including utilities and

[1] Based on EPA Greenhouse Gas Equivalencies Calculator and 210,000,000 kWh (210,000 MWhs) annual production PVSYST model.

large energy consumers. As an independent power producer, Regal Solar is not limited to the needs of one region and is able to bid into multiple wholesale markets across the country. 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, ability of solar to reliably meet demand for electricity (i.e., high capacity value), environmental benefits, and existing and potential renewable energy policies.

The electric power sector is one of the largest consumers of energy in the United States and the U.S. Energy Information Administration estimates that U.S. electricity consumption will continue to grow from 2018 to 2050.[2] The Regal Solar Project is needed to meet the growing demand for additional renewable resources needed to meet the renewable energy standards and other clean energy requirements in Minnesota and neighboring states. Eleven of the Midcontinent Independent System Operator (MISO) states, including Minnesota, currently have either mandated or voluntary renewable portfolio standards or policies.[3] Minnesota requires Xcel Energy to obtain 30 percent of its energy from renewable resources by 2020, and all other utilities to obtain 25 percent of their energy from renewable resources by 2025.[4] In addition, Minnesota investor-owned utilities are required to obtain 1.5 percent of their energy from solar by 2020.[5] Under current state standards, total United States renewable portfolio standard demand will increase from 290 terawatt hours (TWh) in 2018 to 540 TWh in 2030.[6] Given existing renewable energy capacity, an additional 180 TWh increase in renewable resources will be required to meet demand through 2030.[7] In addition, the regional transmission grid is being expanded to deliver renewable energy generation in a cost-effective manner.[8] Although the current Production Tax Credit and Investment Tax Credit for renewables are set to begin a phasedown in upcoming years, many utilities in the MISO region are developing long-term resource plans, which include increased levels of renewable energy.[9]

In addition to traditional utility demand for solar energy, a growing number of corporations are turning to renewable energy to save money on energy and meet sustainability goals. Over 6,530 MW of renewable energy was purchased by non-utilities by the end of 2018.[10] That compares to

[2] U.S. Energy Information Administration, *Annual Energy Outlook 2019* (January 2019), at 28, 90. Accessed online May 29, 2019. Retrieved from https://www.eia.gov/outlooks/aeo/pdf/aeo2019.pdf.

[3] *MTEP18 MISO Transmission Enhancement Plan*, at 182. Accessed online May 29, 2019. Retrieved from https://cdn.misoenergy.org/MTEP18%20Full%20Report264900.pdf.

[4] Minn. Stat. § 216B.1691.

[5] Minn. Stat. § 216B.1691.

[6] Lawrence Berkeley National Laboratory, *U.S. Renewable Portfolio Standards 2018 Annual Status Report* (November 2018), at 20. Accessed online May 20, 2019. Retrieved from http://eta-publications.lbl.gov/sites/default/files/2018_annual_rps_summary_report.pdf.

[7] *Id.* at 21.

[8] MTEP18 MISO Transmission Enhancement Plan, at 42.

[9] MTEP18 MISO Transmission Enhancement Plan, at 144.

[10] Business Renewables Center. (2018). Corporate Renewable Deals 2013-2018 YTD Chart. Accessed online May 20, 2019. Retrieved from http://businessrenewables.org/corporate-transactions.

2,780 MW procured by non-utilities in 2017 and approximately 1,730 MW in 2016. Further, corporations such as Apple, Google, and Facebook along with many others, have set goals to obtain 100 percent of their energy from renewables.[11]

The proposed Regal Solar Project would install up to 100 MW of solar generating capacity in Minnesota that can contribute to satisfying utilities' and consumers' demands for renewable energy, and potentially meet utility renewable requirements or individual sustainability goals, depending on the ultimate power purchaser.

1.2 Applicant Information

1.2.1 Permittee and Contact Information

The permittee for the Site Permit will be:

Regal Solar, LLC
7650 Edinborough Way, Suite 725
Edina, MN 55435

The contact persons regarding this Application are:

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1.2.2 Statement of Ownership

Regal Solar has a purchase option with the landowners for the Project site. The Project will be constructed, owned, and operated by Regal Solar, a wholly owned subsidiary of Geronimo. Geronimo is a privately held renewable energy developer with headquarters in Edina, Minnesota. The land is currently owned by Walter and Bonnie Parkins.

[11] *See* http://there100.org/companies.

1.3 Project Schedule

The anticipated schedule for the Site Permit, construction, testing, and commercial operation is outlined below:

- **Land acquisition**: Complete. Regal Solar has a purchase option for the Project site. After issuance of the Site Permit and prior to construction of the Project, Regal Solar will purchase the Project site from the underlying landowner.
- **Site Permit:** Regal Solar anticipates the Site Permit will be issued in the Summer of 2020.
- **Other Permits:** Regal Solar will acquire all other permits necessary for construction of the Project prior to conducting the work for which the permit is required. Refer to Table 1.4-1 Potential Permits/Approvals.
- **Equipment Acquisition:** Regal Solar is in the process of evaluating and procuring solar equipment for the Project facilities. The equipment will be allocated to the Project after meteorological and economic studies are completed to achieve the best match of technology and facility location.
- **Construction:** Regal Solar anticipates that construction will begin as early as fall of 2020 and will be completed by the end of 2021. Section 3.4 of this Application provides additional information on the construction timeline and process.
- **Commercial Testing:** Testing for the Project is expected to begin as early as the third quarter 2021, following the completion of construction.
- **Commercial Operations:** Commercial operation for the Project is scheduled to begin by the end of 2021, following the completion of construction and testing.

1.4 Required Project Permits

1.4.1 Certificate of Need

A Certificate of Need (CON) is required for all "large energy facilities," as defined in Minnesota Statutes Section 216B.2421, subd. 2(1), unless the facility falls within a statutory exemption from the CON requirements. Because the Project is a generating plant larger than 50 MW, it meets the definition of a large energy facility and would require a CON prior to issuance of a Site Permit and construction. The Project does not currently fall within a statutory exemption from the CON requirements.

1.4.2 Other Permits

Regal Solar will obtain all permits and licenses that are required for the Project, following issuance of the Site Permit. The permits or approvals that Regal Solar has identified as potentially being required for the construction and operation of the Project are shown in Table 1.4 1. Copies of agency correspondence are included in Appendix A.

Table 1.4-1 Potential Permits/Approvals

Agency	Permit	Applicability	Permit Status and Timing
Federal			
U.S. Army Corps of Engineers (USACE)	Section 404 Permit for wetland impacts.	Dredging or filling jurisdictional waters of the United States	To be obtained prior to construction, if necessary
U.S. Environmental Protection Agency	Spill Prevention, Control, and Countermeasures Plan	Required if any facility associated with the Project (O&M building or substation) has oil storage of more than 1,320 gallons	To be obtained prior to construction, if necessary
State			
Minnesota Public Utilities Commission	Site Permit	Construction of energy conversion facility	To be obtained prior to construction
	Certificate of Need	Required for generating plants larger than 50 MW	Filed concurrent with the Site Permit
Minnesota Pollution Control Agency	Section 401 Certification	Required for filling in jurisdictional waters of the United States and if a Section 404 permit is required from the USACE	To be obtained prior to construction, if necessary
	National Pollutant Discharge Elimination System General Permit (includes Stormwater Pollution Prevention Plan)	For stormwater discharges from construction activities with disturbances greater than one acre	To be obtained prior to construction
Minnesota Department of Health	Well construction permit	Required for installation of a well	To be obtained prior to construction of low-volume well at O&M building
Minnesota Department of Labor and Industry	Request for Electrical Inspection	Required to comply with the state electrical code	To be obtained during construction.
Minnesota Department of Natural Resources	Water Appropriation Permit	Required if trench dewatering is needed	To be obtained prior to construction, if necessary
State Historic Preservation Office	Review and Coordination	Provide concurrence on Phase I inventory	Completed (Appendix A)
County/Local			
Benton County	Subsurface Sewage Treatment System Permit	Required prior to installation of any septic system in Benton County	To be obtained prior to construction for the O&M building

Table 1.4-1 Potential Permits/Approvals

Agency	Permit	Applicability	Permit Status and Timing
	Floodplain Development Permit	Required for development within a floodplain	Not applicable. There are no Federal Emergency Management Agency mapped floodplains in the Land Control Area
	Building Permit	Required for construction within Benton County	To be obtained prior to construction for the O&M Facility, if required
	Local Government Unit for Minnesota Wetland Conservation Act	Required for wetland impacts	To be obtained prior to construction
	County Entrance Permit	Required for access from county roads	To be obtained prior to construction

2.0 PROJECT DESCRIPTION

2.1 Overall Project Description

Regal Solar is currently developing the Regal Solar Project, an up to 100 MW solar PV facility located in northwest Benton County, Minnesota. The Project would interconnect into the Platte River Substation, which is adjacent to the Project. Regal selected this location based on a number of factors, but a key consideration in the selection process was the Project's proximity to existing electrical and transportation infrastructure, including the Platte River Substation which is directly adjacent to the Project Site. Existing infrastructure in the immediate vicinity allows Regal to minimize the need to construct ancillary facilities beyond the main Project footprint.

2.2 Size and Location

Regal is proposing to build its solar facility in Sections 12 and 13, Township 38 North, Range 32 West, and Sections 18 and 19, Township 38 North, Range 31 West, Benton County, Minnesota (Figure 1 – Project Location). Regal has a purchase option for 802 acres of privately-owned land (Land Control Area). Based on preliminary design, Project facilities will cover approximate 711 acres (Preliminary Development Area). There are approximately 91 acres of the Land Control Area for which Regal has site control, but are currently not contemplated for occupation by solar facilities (Figure 2 – Land Control and Preliminary Development Areas). The total nameplate capacity for the proposed Project facilities is up to 100 MW AC.

The Project is directly west of U.S. Highway 10, approximately 1.5 miles southeast of Royalton and about 230 feet west of the municipal boundary of Rice. Regal selected the specific Land Control Area based on significant landowner interest, transmission and interconnection suitability, optimal solar resource, and minimal impact on environmental resources (see Section 2.3).

In this Application, Regal is providing a preliminary Project layout for both a below-ground electrical collection system (Figures 3 – Below-Ground Preliminary Project Layout and 4a-4e – Detailed Below-Ground Preliminary Project Layout; and displayed in more detail in Appendix B – Site Plan) and an above-ground electrical collection system (Figures 5 – Above-Ground Preliminary Project Layout and 6a-6e – Detailed Above-Ground Preliminary Project Layout). A hybrid Project layout with a combined below-ground and above-ground electrical system would have an array layout consistent with the Below-Ground Preliminary Project Layout. All layouts under consideration are within the Preliminary Development Area and subject to final micrositing. The Project's facilities are currently anticipated to be located within the Preliminary Development Area and include solar panels and racking, inverters, security fencing, laydown areas, Project substation, an Operation and Maintenance building (O&M), on-site below-ground or above-ground electrical collection and communication lines, and up to two weather stations (up to 20 feet tall). This preliminary Project layout within the Preliminary Development Area reflects Regal's effort to maximize the energy production of the Project, follow applicable setbacks, while minimizing impacts to the land, environment, and surrounding community. The final site layout may, however, differ from the preliminary layout and the current boundaries of the Preliminary Development Area set forth in this Application, but will not extend beyond the outer boundaries of the Land Control Area. While Regal expects that the final layout will remain considerably

similar to and could include a combination of the preliminary layout presented in Figures 3 and 5 (Below-Ground Preliminary Project Layout and Above-Ground Preliminary Project Layout) and Appendix B (Site Plan), changes may occur as a result of ongoing site evaluation, permitting process, neighboring landowner preferences, and micro-siting activities. Project facilities are described in more detail in Section 3.0.

Regal has entered into a Purchase Option Agreement with the landowner for all of the parcels on which the Project would be constructed. Regal would exercise its purchase option and hold title to all the property after the Site Permit is issued and prior to the start of construction.

2.3 Prohibited and Exclusion Sites

Minnesota Rules 7850.4400 subp. 1 prohibits power generating plants from being sited in several prohibited areas, including: national parks; national historic sites and landmarks; national historic districts; national wildlife refuges; national monuments; national wild, scenic and recreational riverways; state wild, scenic, and recreational rivers and their land use districts; state parks; nature conservancy preserves; state scientific and natural areas; and state and national wilderness areas. The Project facilities are not located within any prohibited areas.

Additionally, Minnesota Rules 7850.4400 subp. 3 requires that applicants avoid siting power generating plants in several exclusion areas unless there is no feasible and prudent alternative. These exclusion areas include: state registered historic sites; state historic districts; state Wildlife Management Areas (WMAs); county parks; metropolitan parks; designated state and federal recreational trails; designated trout streams; and state water trails. The Project facilities are not located within any exclusion areas.

Subject to certain exceptions, Minnesota Rules 7850.4400, subp. 4 prohibits large energy power generating plants from being sited on more than 0.5-acre of prime farmland per MW of net generating capacity unless there is no feasible and prudent alternative. There is no prime farmland in the Land Control Area. Soils are discussed in further detail in Section 4.5.3.

2.4 Alternatives Considered but Rejected

Per Minn. Stat. 216E.04, Subd. 2(8), the Project qualifies for the alternative review process specified in Minn. R. 7850.2800-7850.3900. Accordingly, Regal is not required to analyze alternative sites pursuant to 7850.3100. Regal did not consider alternative sites other than the Project site because of the proximity of the site to electrical transmission infrastructure, a willing Project participant, and the minimal environmental impacts expected from the construction of the Regal Solar Project at the Project site.

2.5 Cost Analysis

The total installed capital costs for the Project are estimated to be approximately $146 million, with Project cost depending on variables including, but not limited to, construction costs, taxes, tariffs, and panel selection, along with associated electrical and communication systems, and access roads. Costs associated with the various Project components are detailed in Table 2.5-1.

Table 2.5-1 Estimated Project Costs	
Project Components	**Cost**
Engineering, Procurement, Construction Contractor	$122.8 million
Development Expense	$7.3 million
Interconnection	$9 million
Financing	$6.9 million
Project Total	**$146 million**

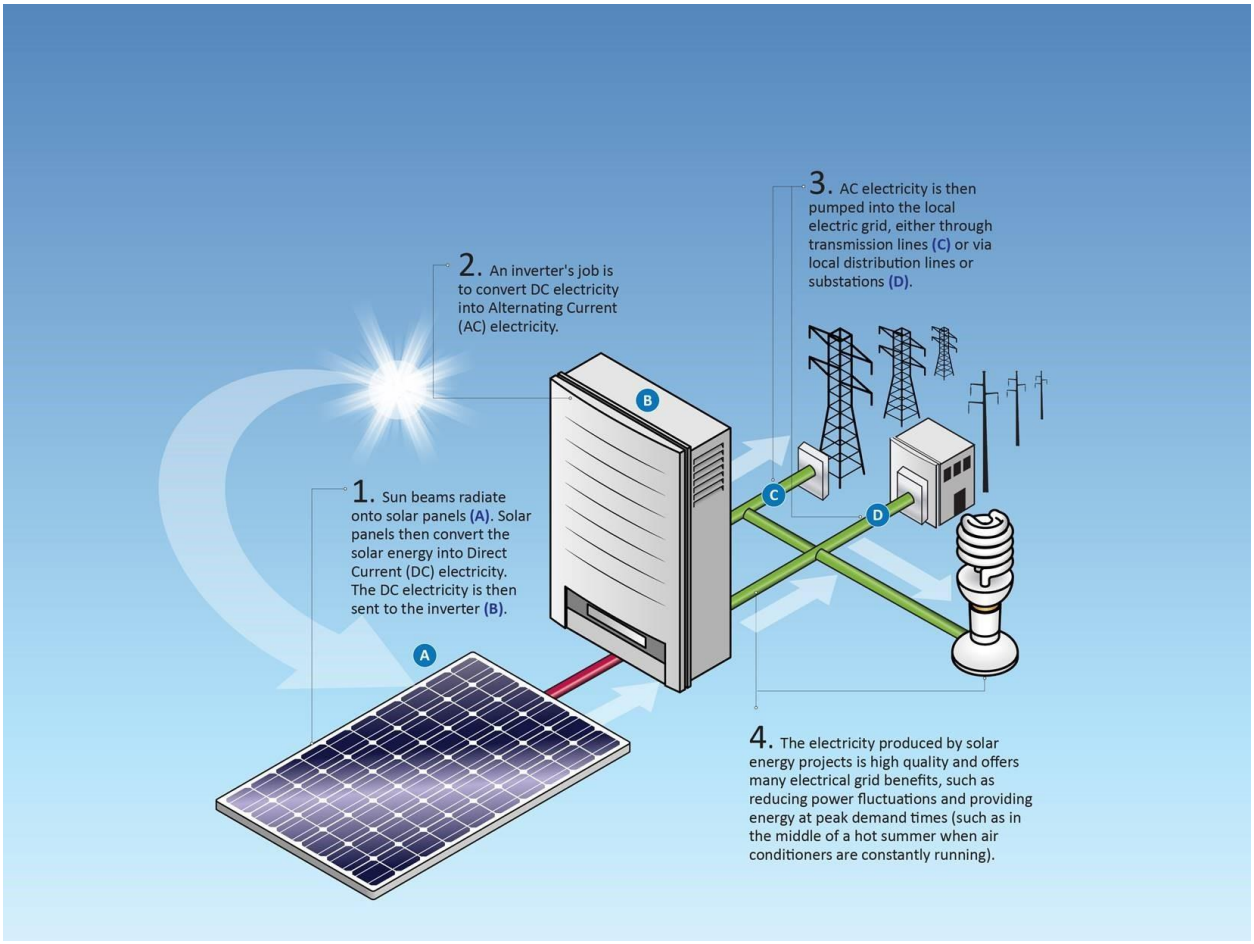
2.6 Future Expansion

Regal's interconnection request is for 100 MW, the planned output of the Project. Regal does not anticipate expanding the proposed Project at this time.

3.0 ENGINEERING AND OPERATIONAL DESIGN

Image 1 below outlines the process of converting solar energy and connecting it to the transmission grid. The process begins with solar panels converting energy from sun into direct current (DC) electrical power. Sets of panels will be electrically connected in series and terminated at an inverter. The inverters will convert the DC power (approximately 1,500 volts) from the panels to AC power (650-950 volts depending on the inverter specifications). Next, a transformer will step up the AC voltage of generated electricity from the inverter output voltage to 34.5 kV. From the transformers, electrical cable will be buried below-ground, or pole mounted above-ground for routing to the Project substation where the electricity will be stepped up from 34.5 kV to 115 kV to interconnect to the existing transmission infrastructure.

Image 1: Harvesting Solar Energy



Source: Geronimo Energy

3.1 Design

The Project will utilize photovoltaic (PV) panels with tempered glass varying in size approximately 4 to 6.5 feet long by 2 to 3.5 feet wide, and 1 to 2 inches thick. The panels will be

installed on a tracking rack system that utilizes galvanized steel and aluminum for the foundations and frame with a motor that allows the racking to rotate from east to west throughout the day. Each tracking rack will contain multiple panels. On the tracking rack system, panels will be approximately 15 feet in height from the ground to the top of the panels when at a 45-degree angle (refer to Image 2 below). Height may vary due to manufacturer, topography and vegetation constraints and could reach a height of approximately 20 feet from the ground. Depending on the technology selected, the PV panels may have an aluminum frame, silicon, and weatherized plastic backing or a side-mount or under-mount aluminum frame, heat strengthened front glass, and laminate material encapsulation for weather protection.

To limit reflection, solar PV panels are constructed of dark, light-absorbing materials. Today's panels reflect as little as two percent of the incoming sunlight depending on the angle of the sun and assuming use of anti-reflective coatings. The solar array will occupy most of the Project site for the solar facilities.

3.1.1 Linear Axis Tracking Rack System

A linear axis tracking rack system allows the PV panels to track the solar resource throughout the day. 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, perpendicular to the ground during mid-day, and then west toward the setting 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.

The tracking rack system is mounted on top of steel piers that are typically driven into the ground, without a need for excavation or concrete to install the piers.

The footprint of the arrays is the same for the below-ground and hybrid below-ground / above-ground collection systems, but is slightly different for the above-ground collection systems (see Figures 3-6). The difference is a result of above-ground poles potentially casting shadows on the arrays. To avoid shadows on the arrays, for the above-ground electrical system, there is approximately 100 feet between the arrays and the access road located to the south of the arrays, and the above-ground collection line with poles is located on the south side of the access road parallel to the access road. As a result of the additional spacing requirements for an above-ground collection system, some arrays were shifted within the Preliminary Development Area. For example, in the layout using the above-ground collection system (Figure 5 – Above-Ground Preliminary Project Layout), arrays were shifted to the perimeter of the Preliminary Development Area along U.S. 10 and in the west-central portion of the Project (compare Figures 3 and 5 - Below-Ground Preliminary Project Layout and Above-Ground Preliminary Project Layout, respectively).

Images 2-4 below visually show the general racking equipment and dimensions of a linear axis tracking rack system.

Image 2: Tracking Rack System

Image 3: Approximate Tracking Rack System Dimensions

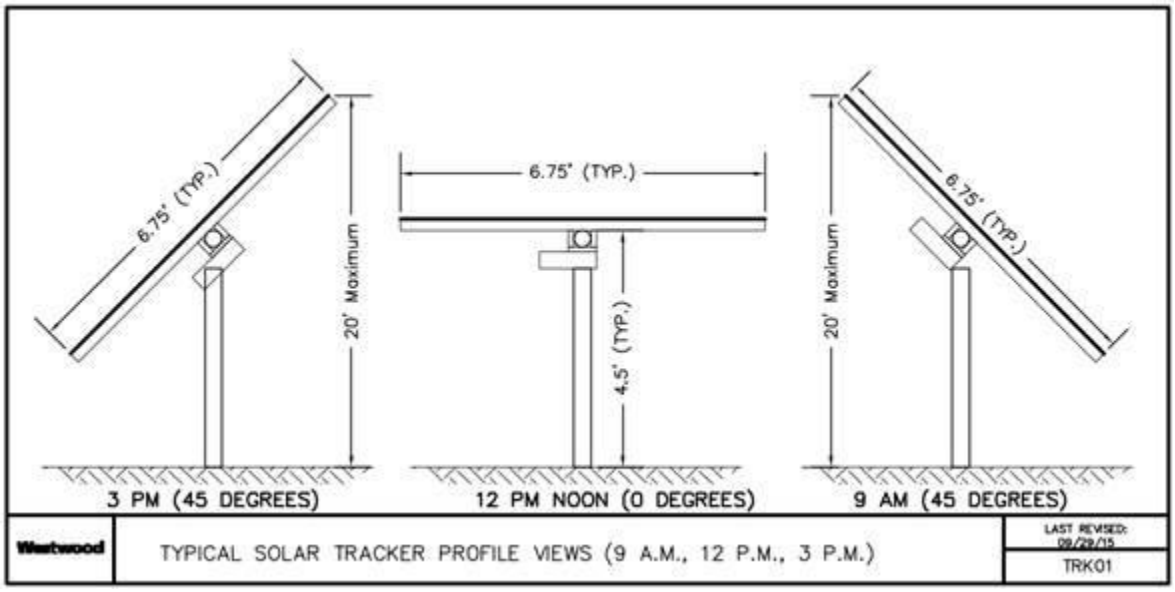


Image 4: Standard Steel Pier Foundations

3.1.2 Inverters, Transformers, and Electrical Collection System

Electrical wiring will connect the panels to inverters, which will convert the power from DC to AC. The AC will be stepped up through a transformer from the inverter output voltage to 34.5 kV and brought via the collection cables to the Project substation. The electrical collection system will be installed below-ground, above-ground, or a combination of both. The type of electrical system will be determined prior to construction based on technology, availability of materials, and costs. It should be noted that both the below-ground and above-ground collection systems are currently used at utility-scale solar projects. The inverters and electrical cables that would be used for each type of electrical collection system are described below.

3.1.2.1 Inverters – Below-ground Electrical Collection System

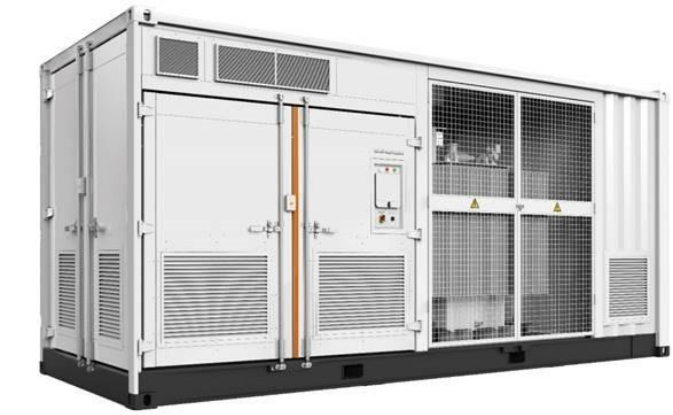
Inverters convert approximately 1,500 volts of direct current (DC) output of the PV panels to between 650-950 volts of AC. Then a step-up transformer converts the inverter AC voltage to an intermediate voltage of 34.5kV. The panels deliver DC power to the inverters through cabling that will be located in a below-ground trench (approximately four feet deep and one to two feet wide). Below-ground AC collection systems from the inverter skids to the substation will be installed in

trenches or ploughed into place at a depth of at least four feet below grade. During all trench excavations the topsoil and subsoil will be removed and stockpiled separately in accordance with the AIMP. Once the cables are laid in the trench, the area will be backfilled with subsoil followed by topsoil. Electrical collection technology is rapidly evolving and 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.

For belowground cabling, inverter skids will be utilized at locations throughout the Preliminary Development Area and include a transformer to which the inverters will feed electricity (Image 5). The final number of inverters for the Project will depend on the inverter size, as well as inverter and panel availability. The Project's preliminary design assumes below-ground cabling to represent the maximum potential impacts and has proposed 40 central inverter skids (one inverter is required for every 2-3 MW). These skids provide the foundation for the inverter, transformer, and SCADA system. The skids will be placed atop a concrete slab or pier foundations and typically measure 10 feet wide by 25 feet long, with a structure height of approximately 12 feet above grade (Image 5). Concrete foundations will be poured onsite or precast and assembled off-site.

The inverters are within the interior of the Project along access roads. Typical drawings of inverters are included in the Site Plan in Appendix B and Image 5 below shows a central inverter and step-up transformer station.

Image 5: Typical Inverter and Transformer Station



3.1.2.2 Above-ground Electrical Collection System

An above-ground electrical system is being considered for the Regal Solar Project for several reasons including ease of access for operations and maintenance, reduced ground disturbance, and cost considerations. If above-ground cabling is utilized, the DC collection cables will be strung under each row of panels on steel arms and a steel cable attached to the piles. At the end of each row, hanging brackets would connect several racks/rows of cables to a common collection point near their assigned inverter/transformer skid where the cables will be routed below-ground at a minimum depth of at least four feet below grade to the inverter/transformer skid where the current is converted to AC and voltage is stepped up to 34.5 kV. A typical drawing of the hanging brackets at the end of each row is provided below in Image 6. The electrical cables will then be routed

below-ground at a minimum depth of at least four feet below grade to a distribution-type pole. These poles would be made of wood, approximately 18" in diameter, up to 30 feet in height, and spaced approximately 200 feet apart. Image 7 provides a schematic of the above-ground collection system components and configuration. The electrical cables will then be strung on poles to the Project substation. Above-ground medium voltage collection technology is rapidly evolving and, if utilized, the number of poles will be determined based on final engineering. Cables connecting each unit of solar arrays will be directionally bored under or spanned over county roads.

For above-ground cabling, inverter skids will be utilized at locations throughout the Preliminary Development Area and include a transformer to which the inverters will feed electricity (Image 4). The final number of inverters for the Project will depend on the inverter size, as well as inverter and panel availability. The Project's preliminary design for above-ground cabling represents the maximum potential impacts and has proposed 40 central inverter skids (one inverter is required for every 2-3 MW). These skids provide the foundation for the inverter, transformer, and SCADA system. The skids will be placed atop a concrete slab or pier foundations and typically measure 10 feet wide by 25 feet long, with a structure height of approximately 12 feet above grade (Image 5). Concrete foundations will be poured onsite or precast and assembled off-site.

The inverters are within the interior of the Project along access roads. Typical drawings of inverters are included in the Site Plan in Appendix B and Image 5 above shows a central inverter and step-up transformer station.

Image 6: Typical Above-Ground Collection Hanging Bracket

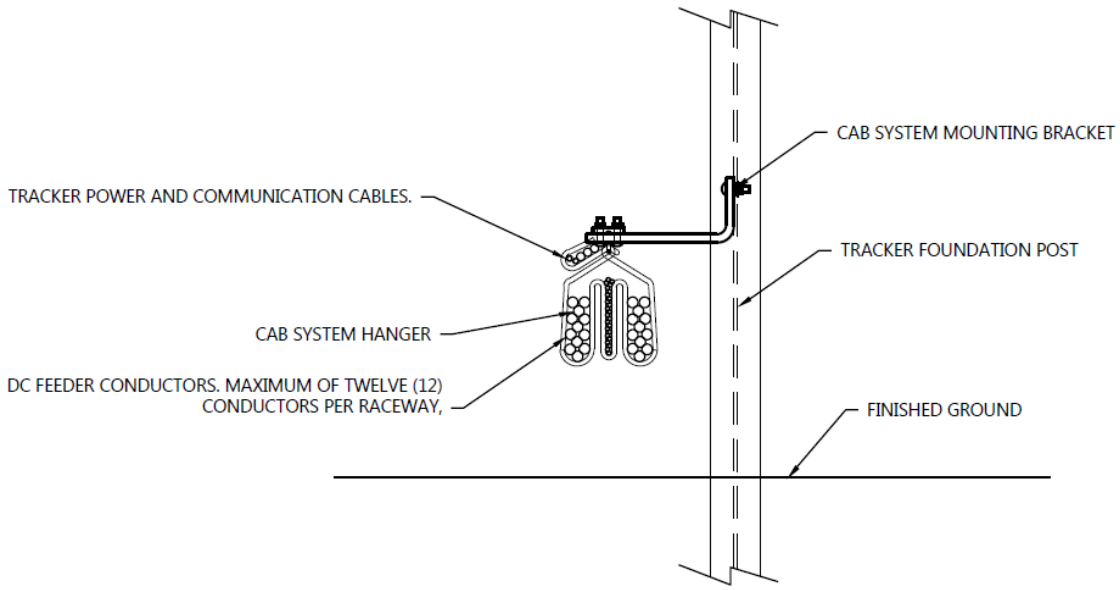
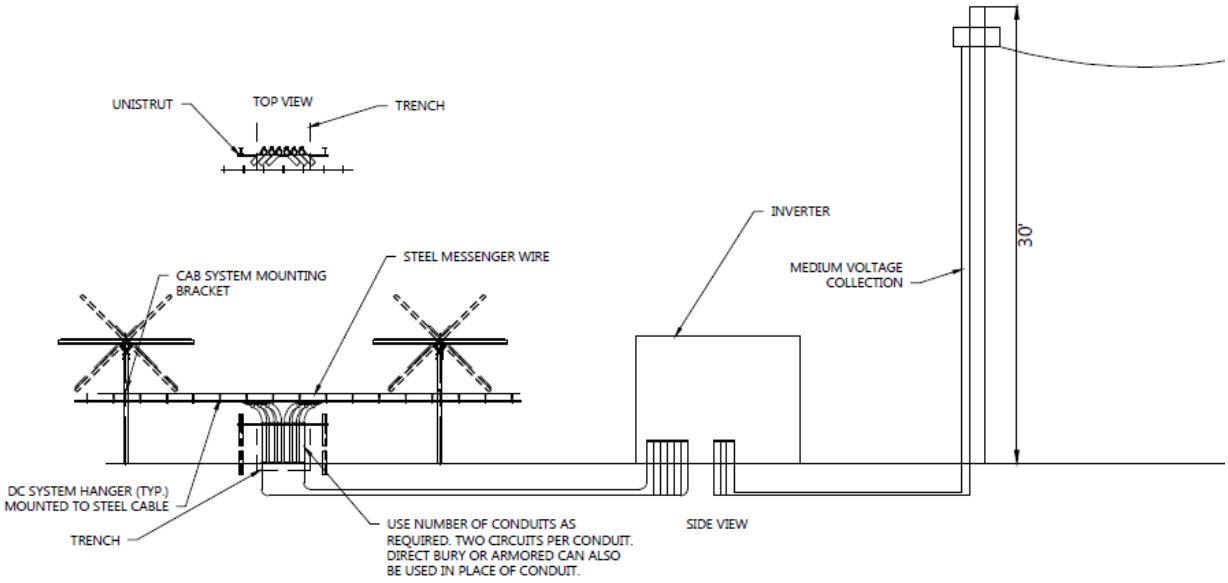


Image 7: Typical Above-Ground Collection System Components and Configuration



3.1.2.3 Hybrid Below-ground and Above-ground Electrical Collection System

A hybrid below-ground and above-ground electrical system is also being considered for the Regal Solar Project for several reasons that are also advantageous to the above-ground electrical system, including ease of access for operations and maintenance, reduced ground disturbance, and cost considerations. Similar to the above-ground system, the DC collection cables will be strung under each row of panels on steel arms and a steel cable attached to the piles. At the end of each row, hanging brackets would connect several racks/rows of cables to a common collection point near their assigned inverter/transformer skid where the cables will be routed below-ground at a minimum depth of at least four feet below grade to the inverter/transformer skid where the current is converted to AC and voltage is stepped up to 34.5 kV. A typical drawing of the hanging brackets at the end of each row is provided above in Image 6. The electrical cables will then be routed below-ground at a minimum depth of at least four feet below grade to the Project substation. Cables connecting each unit of solar arrays will be directionally bored under county roads.

For the hybrid below-ground and above-ground cabling, inverter skids will also be utilized at locations throughout the Preliminary Development Area and include a transformer to which the inverters will feed electricity (Image 5). The final number of inverters for the Project will depend on the inverter size, as well as inverter and panel availability. The Project's preliminary design for the hybrid below-ground and above-ground cabling represents the maximum potential impacts and has proposed 40 central inverter skids (one inverter is required for every 2-3 MW). These skids provide the foundation for the inverter, transformer, and SCADA system. The skids will be placed atop a concrete slab or pier foundations and typically measure 10 feet wide by 25 feet long,

with a structure height of approximately 12 feet above grade (Image 5). Concrete foundations will be poured onsite or precast and assembled off-site.

The inverters are within the interior of the Project along access roads. Typical drawings of inverters are included in the Site Plan in Appendix B and Image 5 above shows a central inverter and step-up transformer station.

3.1.3 Access Roads

The Project will include approximately 12.4 miles of graveled access roads for the below-ground and hybrid below-ground and above-ground configurations and 12.5 miles of graveled access roads for the above-ground configuration that lead to the inverters and Project substation for operation and maintenance. The final length of the access roads will depend on the equipment selected and final engineering. These roads are up to 16 feet wide along straight portions of the roads and wider along curves at internal road intersections (approximately 45 feet). There are four access points to the Project from existing county roads. These entrances will have locked gates.

Per the request of Benton County and Langola Township, Regal has included an access road around the parameter of the Project to provide an additional buffer from the railroad adjacent to Highway 10 to mitigate concerns related to passing trains potentially producing sparks. Access roads around entire facilities this large are necessary for effective and efficient access for operations and maintenance and for safe ingress and egress of employees, visitors and emergency responders. Regal has minimized the amount of access roads within the Preliminary Development Area. Prior versions of the site plan had access roads between every block of racking, which resulted in approximately 15.6 miles of access roads. The site plan included in this Application has removed ancillary access roads that don't provide direct access to inverters resulting in a nearly 20% decrease in the miles of access roads included in the Project design.

Some upgrades or other changes to the public roads may be required for construction or operation of the Project. Regal will work with Benton County to facilitate and pay for required upgrades that meet the required public standards. Upgrades or changes could include, but are not limited to, road improvements, additional aggregate, and driveway changes. Driveway changes will require a county entrance permit from Benton County, which will be obtained prior to construction.

3.1.4 Safety Features

Permanent security fencing will be installed along the perimeter of the solar arrays and Preliminary Development Area. Fencing will be secured to posts which will be directly embedded in the soil or set in concrete foundations as required for structural integrity. The fencing will consist of an agricultural woven wire fence and will extend approximately 6 feet above grade. At the request of MNDNR, barbed wire will not be used around the perimeter of the Project, and instead one foot of 3-4 strands of smooth wire will be used. However, the fencing around the substation will be a 6-feet above grade chain-link fence and include one foot of barbed wire to comply with the National Electric Code. This fencing will be designed to prevent the public from gaining access to electrical equipment which could cause injury. Additionally, the fencing will prevent larger wildlife from entering the facility.

The Project will also have security cameras. Regal will have security lighting at the entrances that will be down lit. The typical pole height will be ten feet and manual by switch as well as motion activated if an intrusion is detected. There will be lights at each inverter that will be down lit and switch controlled for repair purposes. For more detail about the lighting proposed at the Project site, see Appendix B.

3.1.5 Associated Facilities

3.1.5.1 Project Substation

The Project substation will be a 34.5/115 kV step-up substation with metering and switching gear required to connect to the transmission grid. It will be designed according to regional utility practices, Midcontinent Independent Transmission System Operator Standards, Midwest Reliability Organization Standards, National Electrical Safety Code, and the Rural Utility Service Code. The area within the substation will be graveled to minimize vegetation growth in the area and reduce fire risk. The substation will be fenced with a 6-foot chain-link fence, topped with one foot of barbed wire for security and safety purposes. The substation's area will be approximately 150 feet by 150 feet once construction is complete.

3.1.5.2 Operation and Maintenance Building

An O&M building will provide access and storage for Project maintenance and operations and will be located adjacent to the Project substation. The Project will obtain a building permit for the O&M building from Benton County prior to construction. The O&M building will measure approximately 60 feet long by 40 feet wide and will be made of metal (similar to a pole barn). It will contain an office for the onsite Plant Manager, a technician room, restroom, and storage area for equipment to operate and maintain the Project. Equipment includes a Supervisory Control and Data Acquisition (SCADA) cabinet, spare panels, spare parts for the substation and equipment to operate the substation, as well as safety equipment for working with live electricity.

A SPCC Plan is required by the Environmental Protection Agency (EPA) if any facility associated with the Project (O&M or substation) has oil storage of more than 1,320 gallons. The Project substation will contain a single, industry-standard main power transformer, which will require a SPCC Plan. Other onsite storage at the O&M facility may include hydraulic oil stored in a plastic or poly tote or 55-gallon drums on secondary containment pallets and potentially a fuel tank, for maintenance vehicles, that would be a double walled tank with additional secondary containment. Additionally, the Project's Stormwater Pollution Prevention Plan (SWPPP) will describe pollution prevention measures for storage, handling and disposal of hazardous materials, solid waste, concrete and equipment wash water, portable toilets, construction products and materials.

3.1.5.3 Parking

A parking lot will be located adjacent to the O&M building and will be approximately 500 square feet with the final size being determined in accordance with the Benton County Development Code. The parking lot will be gravel or paved depending on the size to comply with the off-street parking provisions detailed in Section 9.2 of the Benton County Development Code (Benton County, 2016).

3.1.5.4 Weather Stations

The Project will include up to two weather stations up to 20 feet in height (see Image 8 below). Both weather stations will be within the Preliminary Development Area; the final locations will be determined following final engineering.

Image 8: Weather Station

3.1.6 Temporary Facilities

Regal will utilize four temporary laydown areas within the Preliminary Development Area, totaling approximately 7.0 acres. These areas will serve both as a parking area for construction personnel and staging areas for Project components during construction. These laydown areas have been sited to avoid any tree clearing. After construction, they will be reseeded using a pollinator friendly seed mix as described in Section 4.5.6.

3.1.7 Transmission System

The Project will interconnect into the existing Platte River Substation via a 115-kV overhead gen-tie transmission line of less than 1,500 feet. There will be a single dead-end structure within the Project substation and likely 2-3 additional structures to enter the Platte River Substation with an overall length currently estimated to be approximately 300 feet, pending final engineering. The structures will likely be made of wood and will be less than 150 feet tall. The type of conductor will be determined following the completion of detailed electrical design. Per Minn. Stat. 216E.01 subd. 4, the transmission line does not meet the high voltage transmission line definition because

it's less than 1,500 feet. As such, a separate route permit from the Commission will not be required for the gen-tie line.

3.1.8 Pipeline System

Minnesota Rules 7850.1900, subp. 1(J) is not applicable to the Project because no pipelines will be accessed or built as part of the Project.

3.2 Project Layout

The Project's final layout will optimize electrical generation and efficiency of the solar Project while avoiding and minimizing environmental, cultural, and infrastructure impacts. The Project's facilities will be sited to comply with the county's setback requirements, where applicable. To the extent applicable, the Project will also comply with all other local, state, and federal regulatory standards.

The township and county road and utility setback regulations are provided in Table 3.2-1. Regal will meet all county setbacks. Setbacks are displayed on the detailed Site Plan in Appendix B.

Table 3.2-1 Benton County Setback Requirements

Feature	Setback Requirement (feet)	Project Design
U.S. Highway 10	100' from ROW	At its closest, Project facilities are at least 145 feet from these features
County Road	125' from centerline	
Township Road	65' from centerline	
Rear Yard	30'	
Fence	Outside of ROW	

The Project's proposed components include PV panels mounted on a linear axis tracking system, inverters, transformers, and weather stations. The panels vary in size with approximate dimensions of 4 to 6.5 feet long by 2 to 3.5 feet wide, and 1 to 2 inches thick. The Project will use driven steel piles for the tracking and tracker system foundations. Geotechnical soil testing and pile pull testing will determine the final pile specifications and embedment depth requirements.

Sets of panels will be electrically connected in series and terminated at an inverter. The inverters will convert the DC power (approximately 1,500 volts) from the panels to AC power (650-950 volts depending on the panels). Next, a transformer will step up the AC voltage of generated electricity to 34.5 kV. From the transformers, electrical cable will be buried below-ground, or pole mounted above-ground for routing to the Project substation where the electricity will be stepped up to 115 kV to interconnect to the existing transmission infrastructure.

The Project will use a SCADA system, which allows remote control and monitoring of the status of the Project. The monitoring system provides status views of electrical and mechanical data, operation and fault status, meteorological data, and grid station data. For security, the Project will be fenced and have site security cameras. Access to Preliminary Development Area is through lockable gates.

3.3 Estimated Project Facility Acreages

Table 3.3-1 describes the Project facilities' estimated acreage within the approximately 711-acre Preliminary Development Area based on the preliminary design for the below-ground, hybrid below-ground and above-ground and above-ground electrical collection configurations. For all three configurations, the Preliminary Development Area, footprint of the laydown areas, inverters, Project substation, and O&M facility are the same. However, as described in Section 3.1.1, the configuration of arrays access roads, and the fence are slightly different between the below-ground and hybrid system, which are essentially the same and the above-ground system.

Table 3.3-1 Estimated Project Facility Acreages within Preliminary Development Area

Project Facilities	Acres	
	Below-Ground Configuration	Above-Ground Configuration
Access Roads	24.5	24.6
Inverters	0.4	0.4
Project Substation and O&M Building	1.4	1.4
Laydown Areas	7.0 [1]	7.0 [1]
Fenced Area with Solar Panels	673.2 [2]	677.4 [2]
Preliminary Gen-tie Routing Area	0.6	0.6
Project Total	**707.1**	**711.4**

[1] The laydown areas are temporary impacts to be used only during construction
[2] The impacts associated with solar panels include 16-foot-wide grass area between every row of panels

3.4 Project Construction

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

- Pre-construction
  - Geotechnical analysis;
  - Design substation and electrical collection system;
  - Design solar array, access roads, and O&M building;
  - Underground utility discovery; and
  - Procure all necessary facility components (solar panels, tracking system, transformers).
- Construction
  - Site preparation, grubbing, and grading;
  - Construct laydown areas and set up temporary job site trailers;
  - Construct fencing;
  - Civil construction of access roads;
  - Install PV mounting posts;
  - Install below-ground or above-ground collection system;
  - Install electrical enclosure/inverter;
  - Tracker installation;
  - PV panel installation; and

    - Construct gen-tie line.
- Post-construction
    - Restore disturbed areas not intended for permanent above-ground facilities. Permanent above-ground facilities include the substation, O&M building, inverter skids and electrical cabinets, and access roads;
    - Test facility; and
    - Begin commercial production.

3.4.1 Construction Activities

During construction, equipment and work vehicles will travel to and from the site. Daily construction duration is anticipated to be consistent throughout the construction season when the majority of the access road construction, electrical and substation work is taking place. Typical construction equipment such as scrapers, dozers, dump trucks, watering trucks, motor graders, vibratory compactors and pile drivers, pickup trucks, and backhoes will be used during construction. Specialty construction equipment that may be used during construction will include:

- Skid steer loader;
- Medium duty crane;
- All-terrain forklift;
- Concrete truck and boom truck;
- High reach bucket truck; and
- Truck-mounted auger or drill rig.

Upon completion of construction, heavy equipment will be removed from the site. An overview of construction activities follows.

3.4.1.1 Geotechnical

Geotechnical and pull testing studies will be performed to determine the topsoil and subsoil types, and the mechanical properties of the soils. These variables will be used to engineer the solar array foundation system. Typically, the foundation is a steel pile, which is driven into the ground with a hydraulically powered high-frequency hammer mounted on a tracked carrier. The piles are installed at pre-defined locations throughout the array area to an embedment depth of 8 feet to 14 feet below grade, depending on soil properties and other factors.

3.4.1.2 Site Clearing & Vegetation Removal

After the necessary permits are received, construction will begin with the initial site preparation work, including utility locates within the Project boundary. Depending on timing of the start of construction, the Project may require the clearing of residual row-crop debris from the 2020 harvest season. Alternatively, and depending on construction timing, Regal may plant a cover crop in Spring 2020 that is compatible with the Project's Vegetation Management Plan (Appendix C). This cover crop will stabilize soils if row crops are not planted that year.

3.4.1.3 Earthwork

Areas of the site to be graded will have topsoil and organic matter stripped and segregated from the subsoil (depending on the depth of grading cut) in accordance with the Project's Agricultural Impact Mitigation Plan (AIMP), as discussed in Section 4.2.8.3. Some grading will be required to provide a more level workspace and maintain soil stability in areas with a slope greater than five percent. Topsoil shall have temporary and permanent erosion control and soil stabilization measures established in accordance with the Project's storm water pollution prevention plan. The earthwork activities will be completed using typical civil construction equipment – scrapers, bulldozers, front-end loaders, back-hoes or skid-steers.

3.4.1.4 Access Road Construction

As a component of earthwork, permanent access roads and permanent turnouts will be developed. This work will start with the stripping and segregating of topsoil materials from the anticipated 16-foot-wide road width. The subgrade materials will be compacted 16-feet wide to the specified compaction requirements as laid out by the civil and geotechnical engineer. After compaction is reached and verified, the road will be installed as designed, typically done with or without geo-fabric depending on the soil type, and then, with a surface of 4 to 12 inches of gravel. The gravel will be placed level with the existing grade to facilitate drainage and minimize ponding.

After gravel is installed and compacted to engineers' requirements, the Project drainage ditches will be shaped as identified on the final grading plan. Finally, the previously stripped and windrowed topsoil material will be re-spread throughout the Project area.

Topsoil removed from permanent access roads will be removed to suitable locations near the site of removal and spread across existing topsoil for storage. Storage locations will be identified (GPS boundary and depth) and recorded on site maps to facilitate final reclamation after decommissioning.

3.4.1.5 Solar Array Construction

Once grading activities are complete, the racking system supports will be constructed using steel piles driven into the ground. The solar facilities will be constructed in blocks, and multiple blocks could be constructed simultaneously. Construction of the blocks will include pre-positioning and driving piles, mounting the tracking rack system to the piles, pre-positioning of panel pallets, mounting panels to the tracking rack system, the completion of electrical connections, terminations and grounding, and installation of cable management systems. In some situations where soils are low strength or consist of loose, non-cohesive sand, helical screw or auger-type foundation posts may be used. Foundations are typically galvanized steel and used where high load bearing capacities are required. The pile is driven using a hydraulic ram that moves along tracks and is operated by two workers. Soil disturbance would be restricted to the hydraulic ram/ screw machinery, about the size of a small tractor, temporarily disturbing soil at each pile insertion location and while driving between drilling locations.

The remainder of the tracking rack system will be installed by construction crews using hand tools and all-terrain tracked equipment to distribute materials. Array racking will be bolted on top of the foundation piling to create a "rack" to which the solar panels can be fastened.

During array and racking assembly, multiple crews and various types of vehicles will be working within the Project Area. To the extent practicable, vehicular traffic will be limited to permanent and temporary access roads to minimize soil disturbance, mixing and compaction; however vehicular traffic will occur off of roads throughout the Project during construction. These vehicles include flatbed trucks for transporting array components, small all-terrain vehicles, rough-terrain forklifts and skid-steers, as well as pick-up trucks for transporting equipment and workers throughout the Project Area. Panels will be staged in advance throughout the Project Area and brought to specific work areas for installation by wagon-type trailers pulled by small tractors or by all-terrain tracked equipment. The solar panels will be installed by multiple crews using hand tools. Installation crews will proceed in serpentine fashion along staked temporary access roads in a pre-established route to minimize off-road traffic.

3.4.1.6 Electrical Collection System

Electrical wiring will connect the panels to inverters, which will convert the power from DC to AC. The AC will be stepped up through a transformer from the inverter output voltage to 34.5 kV and brought via the collection cables to the Project substation. These cables may be installed in an above-ground or below-ground system. Above-ground DC collection cables will be strung under the panels on steel arms and a steel cable attached to the piles. The collection will hang on the steel cable with cable hangers and be pole mounted along access roads at the end of rows. If above-ground AC collection cabling is utilized, the poles will be wood, up to 18 inches in diameter and up to 30 feet in height. From the transformer, above-ground cables will be routed to the Project substation.

Below-ground AC collection systems will be installed in trenches or ploughed into place at a depth of at least four feet below grade. During trench excavation the topsoil and subsoil will be removed and stockpiled separately in accordance with the AIMP. Once the cables are laid in the trench, the area will be backfilled with subsoil followed by topsoil. Electrical collection technology is rapidly evolving and 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.

3.4.1.7 Project Substation Construction

Construction work within the substation site will include site preparation and installation of substructures and electrical equipment. Installation of concrete foundations and embedments for equipment will require the use of trenching machines, concrete trucks and pumpers, vibrators, forklifts, boom trucks, and large cranes. Above-ground and below-ground conduits from this equipment will run to a control enclosure that will house the protection, control, and automation relay panels. A station service transformer will be installed for primary AC power requirements. Batteries and battery chargers will be installed inside the enclosure for auxiliary power to the switchyard's control system. Crushed rock will cover the area of the substation and adequate lighting will be installed around the substation for worker safety during construction and operation.

One of two methods will be used to install substation foundations. Option 1 would be to use a small rubber tire backhoe to dig out major foundations prior to pouring the concrete slabs. Option 2 would use an auger/drill type machine for minor foundations.

In both scenarios, the limit of disturbance will be within the footprint of the substation for both the foundation equipment and the concrete delivery trucks. All topsoil from the Substation footprint will be removed to a pre-established suitable location for storage. The storage area would be near the site where the soil was removed, accurately located (GPS boundary, soil depth) and graded to facilitate revegetation. Subsoil would be removed, if necessary, to an acceptable preestablished and approved area for storage. After decommissioning, subsoil will be returned to the area from which it was excavated (as needed), topsoil will be replaced, and the area will be brought back to pre-construction contours.

3.4.2 Construction Management

Regal will designate an on-site construction manager. This manager's responsibilities include scheduling and coordinating the activities of engineering, procurement and construction contractors. The construction manager will be supported by other members of Regal's team who specialize in engineering, permitting, meteorology, environmental compliance, real estate and Geographic Information Systems (GIS) mapping.

Throughout the construction phase, ongoing coordination occurs among the Project's development, design, and construction teams. The construction manager coordinates execution of the work. This coordination includes safety and quality control programs, cost and schedule forecasting, as well as site security and ongoing communication with local officials, citizen groups, and landowners.

3.4.3 Commissioning

During and upon completion of the construction phase, the Project will undergo inspection testing and commissioning. Inspection and testing will occur for each component of the solar array, as well as the associated communication, meteorological, collection, and SCADA systems.

3.4.4 Restoration

Following construction, areas that will not contain permanent facilities (area under the arrays and the laydown yards) will be stabilized with sediment stabilization and erosion control measures such as silt fence and biologs and re-vegetated according to the Vegetation Management Plan (VMP; Appendix C). The site will be seeded with site specific seed mixes developed in coordination with the MNDNR and include three native seed mixes: a low growing mix within the arrays, an open mix, and a wet mix (Appendix B – Site Plan). Additionally, a cover crop will be planted with the native mixes to stabilize the soil and prevent erosion during the time it takes for the native seeds to establish.

The VMP provides a guide to site preparation, installation of prescribed seed mixes, management of invasive species and noxious weeds, and control of erosion/sedimentation. The required restoration management is designed to continue for three years. The VMP outlines vegetation management tasks during the establishment and perpetual maintenance phases including monitoring for and treating any invasive species, mowing, and re-seeding. Additionally, vegetation community establishment targets are defined for each of the first three years of implementation of the VMP.

3.5 Project Operation and Maintenance

Following commissioning and commercial operation, the care, custody, and control of the facility transfers from the construction team to the operations staff. The construction manager works with the operations staff, the equipment suppliers, and other construction and maintenance personnel to ensure a smooth transition from the start of construction to the commercial operation date of the Project. The operations staff will have full responsibility for the facility to ensure operations and maintenance are conducted in compliance with approved permits, prudent industry practice and the equipment manufacturer's recommendations.

The Project will be professionally maintained and operated by Regal, an affiliate, or contractor. Primary tasks include scheduled monthly and quarterly inspection(s) of electrical equipment, vegetation management as well as snow removal on access drives.

The expected service life of the Project is 25 to 40 years, and Regal estimates that the Project will result in up to five full-time permanent positions to operate and maintain the Project facilities. A maintenance plan will be created for the Project to ensure the performance of the solar facilities, including a scheduled check of the main items and a predictive maintenance approach of the devices subjected to derating/degradation. Derating/degradation refers to the known process of components losing some efficiency or otherwise degrading over the course of the Project's life cycle; like all technology and physical components, a certain amount of this is unavoidable, and Regal will plan for it and maintain the facility as needed. Once construction is complete, the solar facility will see one to two trucks on site daily, and at intervals associated with the maintenance schedule in Section 3.5.5 during normal operations. The main scheduled activities are described in more detail below in Sections 3.5.2 through 3.5.4.

All maintenance activities will be performed by qualified personnel. Maintenance activities will be performed during the day to the extent that they do not disrupt energy production. As an example, if a panel needs repair, that particular section of the array can be disconnected from the array by opening the combiner box circuit. The panel can then be replaced, and the combiner box circuit closed. Additionally, the power production circuits are separated from the tracking circuits. This allows the PV panels to operate during an unscheduled outage of the tracker system. Upon occasion, it may be desirable to perform maintenance when the sun is down. Activities that have the potential for substantial noise generation will be performed during the day to minimize impacts in areas where residents are present.

There will be an area for the storage of the spare parts and the tools as described in Section 3.1.5.2. The generating facility will be operated through a real-time control system for most operations functions.

3.5.1 Supervisory Control and Data Acquisition System

The solar arrays will communicate directly with the SCADA system for remote performance monitoring, energy reporting and troubleshooting. The SCADA system provides data on solar generation and production, availability, meteorology, and communications. The SCADA system allows monitoring of, and communications with, the Project and relays alarms and communication errors. All the monitored data will be managed by Regal on-site in addition to a qualified

subcontractor that will remotely monitor the site 24 hours a day, 7 days a week through the SCADA system.

3.5.2 Equipment Inspection

Inspection of the main equipment will occur at regular intervals, including:

- PV panels: visual check of the panels, tracking system and surrounding grounds to verify the integrity of the panels and tracking structure, the presence of animals and nests, etc.
- Inverters, transformer and electrical panels: visual check of the devices including the connection cabinet and the grounding network. Check for presence of water and dust;
- Electrical check: measurement of the insulation level and dispersion. Check of the main switches and safety devices (fuses);
- Noise: check of abnormal sounds; and
- Cabling and wiring: visual check of the buried and aerial electrical line and connection box to verify their status.

3.5.3 Performance Monitoring

Performance monitoring of the Project facilities will consist of a weekly or monthly download of the data acquired by the onsite meteorological stations (energy produced, alarms, faults, etc.).

3.5.4 Facility Maintenance

Housekeeping of the Project facilities will include road maintenance, vegetation maintenance (method is to be determined; either traditional mowing or sheep and/or lamb grazers will be utilized), fence and gate inspection, lighting system checks, and PV panel washing (if required; minimal to no washing is anticipated to be needed at Project facilities due to the naturally occurring and frequent precipitation).

3.5.5 Maintenance Schedule

Table 3.5-1 provides more information on the anticipated frequency of the operations and maintenance tasks associated with the Project. The table represents the anticipated preliminary frequency of these tasks; the frequency of inspection may be varied based on facility demands and experience with performance of certain components and Project features.

Table 3.5-1 Operations and Maintenance Tasks and Frequency

Plant Device	Task	Preliminary Frequency
Photovoltaic (PV) Field	PV Panels visual check	Once Yearly
	Wirings and junction boxes visual check	Once Yearly
	PV strings measurement of the insulation	Once Yearly
	PV strings and string boxes faults	Once Yearly
	PV panels washing	No regular washing planned (only as site-specific conditions warrant)

Table 3.5-1 Operations and Maintenance Tasks and Frequency		
Plant Device	**Task**	**Preliminary Frequency**
	Vegetation Management (if necessary at site)	Up to three times a year depending on site conditions
Electric Boards	Case visual check	Once Yearly
	Fuses check	Once Yearly
	Surge arresters check	Once Yearly
	Torque check	Once Yearly
	DC voltage and current check	Once Yearly
	Grounding check	Once Yearly
Inverter	Case visual inspection	Once Yearly
	Air intake and filters inspections	Once Yearly
	Conversion stop for lack of voltage	Once yearly
	AC voltage and current check	Once yearly
	Conversion efficiency inspection	Once yearly
	Datalogger memory download	Once yearly
	Fuses check	Once yearly
	Grounding check	Once yearly
	Torque check	Once yearly
Support Structures	Visual check	Once yearly
	PV panels toque check on random sample	Once yearly

3.5.6 Operations and Maintenance Building

As described above, the O&M building will be located adjacent to the Project substation. The size of a typical building used for this purpose is between 2,000-4,000 square feet and constructed of metal (similar to a pole barn). It will house the necessary equipment to operate and maintain the Project. The O&M building will allow maintenance staff to conduct on-site diagnostics, repairs, predictive maintenance, and preventive maintenance activities. This facility will also serve as an office space for the on-site Plant Manager and a warehouse for critical spare parts outlined in Section 3.1.5.2.

3.6 Decommissioning and Repowering

At the end of the Project's useful life, Regal will either take necessary steps to continue operation of the Project (such as re-permitting and retrofitting) or will decommission the Project and remove facilities. Decommissioning activities will include:

- Removing the solar arrays, transformers, electrical collection system, fencing, lighting and substations, and possibly the O&M facility (the O&M facility may be useful for other purposes);
- Removal of below-ground electrical cables to a depth of four feet (cables buried below four feet will be left in place);
- Removal of buildings and ancillary equipment to a depth of four feet;

- Removal of surface road material and restoration of the roads to substantially the same physical condition that existed immediately before construction. If the Project is decommissioned and the land sold to a new owner, Regal would retain any access roads the new landowner requested be retained;
- Grading, adding or re-spreading topsoil, and reseeding according to the Natural Resources Conservation Service (NRCS) technical guide recommendations and other agency recommendations, areas disturbed by the construction of the facility or decommissioning activities, grading and soil disturbance activities will be kept to the minimum necessary to restore areas where topsoil was stripped in construction, topsoil in decommissioned roads and compaction only in areas that were compacted during decommissioning activities so that the benefits to the soil that were achieved over the life of the Project are not counteracted by decommissioning; and
- Standard decommissioning practices would be utilized, including dismantling and repurposing, salvaging/recycling, or disposing of the solar energy improvements, and restoration.

3.6.1 Timeline

Decommissioning is estimated to take six to twelve months to complete and the decommissioning crew will ensure that all equipment is recycled or disposed of properly.

3.6.2 Removal and Disposal of Project Components

The removal and disposal details of the Project components are found below.

- Panels: Panels inspected for physical damage, tested for functionality, and removed from racking. Functioning panels packed and stored for reuse (functioning panels may produce power for another 25 years or more). Non-functioning panels packaged and sent to the manufacturer or a third party for recycling or another appropriate disposal method;
- Racking: Racking uninstalled, sorted, and sent to metal recycling facility;
- Steel Pier Foundations: Steel piles removed and sent to a recycling facility;
- Wire: below-ground wire abandoned in place at depths greater than four feet. Wire above four feet removed and packaged for recycling or disposal;
- Conduit: Above-ground conduit disassembled onsite and sent to recycling facility;
- Junction boxes, combiner boxes, external disconnect boxes, etc.: Sent to electronics recycler;
- Inverter/Transformer: Evaluate remaining operation life and resell or send to manufacturer and/or electronics recycler;
- Concrete pad(s): Sent to concrete recycler;
- Fence: Fence will be sent to metal recycling facility and wooden posts for the agricultural fence will be properly disposed; and
- Computers, monitors, hard drives, and other components: Sent to electronics recycler. Functioning parts can be reused.

3.6.3 Restoration/Reclamation of Facility Site

After all equipment is removed, the facility would be restored to an agricultural use, in accordance with the AIMP or to another use if the economic conditions at that time indicate another use is an appropriate use for the site. Holes created by steel pier foundations and fence poles, concrete pads, re-claimed access road corridors and other equipment will be filled in with soil to existing conditions and seeded. Grading and other soil disturbance activities during decommissioning will be kept to the minimum necessary to effectively decommission the site to maintain the soil benefits realized during the long-term operation of the Project, such benefits include: building topsoil through plant matter decay, carbon capture, and beneficial, soil bacteria that are often absent from soil subject to rowcrop agriculture. This will include the revegetation.

Regal reserves the right to extend operations instead of decommissioning at the end of the site permit term. In this case, a decision may be made on whether to continue operation with existing equipment or to retrofit the facilities with upgrades based on newer technologies. If the decision is made to continue operations, the Project will be re-permitted.

3.6.4 Financial Resource Plan

Beginning in year fifteen of the Project's operational life, Regal will either create a reserve fund, enter into a surety bond agreement, create an escrow account, or provide another form of security that will ultimately fund decommissioning and site restoration costs after Project operations cease, to the extent that the salvage value does not cover decommissioning costs. The exact amount to be allocated for decommissioning will be determined by a third-party study in year fourteen that will assess the difference between estimated decommissioning costs and the salvage value.

4.0 ENVIRONMENTAL INFORMATION

For the discussion in the following sections, the following terminology, assumptions and approach are used.

For existing conditions within the portions of land under Regal's control, calculations are based on the Land Control Area (802.4 acres). This reflects the fact that final design may necessitate development in areas within the overall area under Regal's land control. Additionally, for any discussions of resources that are located outside of a facility (such as parks within one mile), the Land Control boundary is used in order to discuss the vicinity of these features from anywhere within the portion under Regal's control.

For approximating areas of temporary impact, the Preliminary Development Area is used (approximately 711 acres); this reflects the possibility for resources to be temporarily impacted within the area that preliminary design indicates is needed for construction and operation of the facility. For some resources, such as land cover, and agricultural production or other land uses, the Preliminary Development Area is also referred to for "permanent impacts" discussions (i.e., "permanent" for the life of the Project). For calculating anticipated permanent impacts for resources such as land use, wetlands, and soils, the permanent impacts are calculated using the preliminary design for permanent solar array components such as access roads, inverters, and the Project substation. It should be noted that preliminary design does not identify locations of the posts for the solar arrays, so detailed calculations of impacts are not included. However, due to the fact that the posts of the solar arrays are anticipated to be installed via vibration or a pile driver for the majority of the locations, the permanent impacts associated with these features are expected to be negligible. To illustrate, the I-beam shaped posts are anticipated to be approximately 6 inches by 4 inches, with a surface area of approximately 8 square inches because the I-beam is approximately 0.25-inches thick within the 6-inch by 4-inch I-shaped configuration. Similarly, the footprint for 198 18-inch diameter wooden poles for the above-ground electrical configuration is not included in the detail calculations. The footprint for these poles is 350 square feet or 0.008 acre.

4.1 Environmental Setting

The MNDNR and the U.S. Forest Service have developed an Ecological Classification System (ECS) for ecological mapping and landscape classification in Minnesota that is used to identify, describe, and map progressively smaller areas of land with increasingly uniform ecological features (MNDNR, undated). Through the ECS, the State of Minnesota is split into Ecological Provinces, Sections, and Subsections. The Project facility is located within the Minnesota and Northeastern Iowa Morainal Section of the Eastern Broadleaf Province (222M). The Project is in the Anoka Sandplain ecological subsection.

The Anoka Sandplain ecological subsection is characterized a flat, sandy lake plain and terraces along the Mississippi River. Topography is level to gently rolling. The depth to bedrock in this subsection is usually less than 200 feet, with Cambrian and Ordovician dolomite, sandstone, and shale underlain. Soils are derived primarily from the fine sands of the sandy plain. Most of these sandy soils are droughty, upland soils, but there are organic soils in the ice block depressions and tunnel valleys and poorly drained prairie soils along the Mississippi River. Annual precipitation

in the Anoka Sandplain subsection ranges from 27 inches in the west to 29 inches in the east and the average growing season lasts approximately 136 to 156 days in length. Prior to Euro-American settlement, vegetation in this subsection was oak barrens and openings. Upland prairie formed a narrow band along the Mississippi River, as did areas of floodplain forest. Currently land used in this subsection is agricultural activity and urban development (MNDNR, 2019a).

The Project is in a rural area directly west of U.S. Highway 10 and Rice and Royalton located less than 0.1 mile east/southeast and 1.5 miles north/northwest, respectively. Residences are scattered throughout the rural area where the land use is dominated by center-pivot irrigation with tree rows serving as wind breaks along portions of most roads and some field edges. The major roadway in the area is U.S. Highway 10 along the east border of the Land Control Area. The Land Control Area is bisected by Halfway Crossing Road (County Road 40) in an east-west direction and 45th Avenue Northwest in a north-south direction (County Road 73). There is a Burlington Northern railroad adjacent to the east portion of the Land Control Area. The Project is located on relatively flat fields conducive to solar development.

4.2 Human Settlement

4.2.1 Public Health and Safety

The Project is in rural Langola Township which according to the 2010 U.S. Census, has a population density of 22.8 persons per square mile of land area (U.S. Census Bureau, 2010). If emergency personnel were needed at the Regal Solar Project, multiple agencies would likely respond, depending on the situation. These include the Benton County Sheriff, City of Rice and/or Royalton police departments, fire services from the City of Rice and/or City of Royalton, and ambulance services from CHI St. Gabriel's Health Hospital in Little Falls, approximately 12 miles north of the Project.

There are three towers that are a part of the Allied Radio Matrix for Emergency Response (ARMER) in Benton County (Minnesota Department of Public Safety, 2018). These ARMER towers are a part of Minnesota's Statewide Communication Interoperability Plan, which aims to improve communication for emergency responders. The ARMER radio system operates by line of sight, talking to other ARMER towers. In order for the system to operate effectively, multiple towers are needed to produce a solid blanket of coverage. The system can be interrupted if tall objects are proposed within the line-of-sight, typically at or near the top of a tower over 150 feet tall. There are no ARMER towers within one mile of the Project; the nearest ARMER tower is located in the city of Royalton, which is 2.2 miles north of the Land Control Area (Minnesota Department of Public Safety, 2018).

4.2.1.1 Impacts and Mitigation

Construction and operation of the Project will have minimal impacts on the security and safety of the local populace. Regal is gathering information to coordinate with all emergency and non-emergency response teams for the Project, including law enforcement agencies (Benton County Sheriff, Cities of Rice and Royalton police departments), fire departments from Rice and Royalton, and ambulance services from CHI St. Gabriel's Health Hospital in Little Falls and 911 services. The type and number of responding agencies will depend on the incident requiring emergency

services. Regal will develop an Operations and Emergency Action Plan that outlines local contacts (first responders and internal operation and maintenance staff) and emergency procedures for evacuation, fire response, extreme weather, injury, and criminal behavior. Additionally, construction will comply with local, state, and federal regulations regarding installation of the Project facilities and standard construction practices. Established industry safety procedures will be followed during and after construction of the Project; these include clear signage during all construction activities, and fencing of all Project facilities to prevent public access. Finally, Regal included an access road around the perimeter of the Project to provide an additional buffer from the railroad and any potential sparks that could ignite adjacent vegetation. This additional buffer serves as a safety measure to keep fire out of the solar facility. The access road around the entire perimeter of the facility is also necessary to provide effective and efficient access for operations and maintenance activities and safe ingress and egress for employees, visitors and emergency responders.

While there are ARMER towers in the Project vicinity (i.e., within 2.2 miles), the Regal Solar Project will not impact this communication system as Project facilities are proposed well below the typical height of a tower and line-of-sight near the top of these towers (i.e., greater than 150 feet above ground). Regal Solar anticipates the tallest solar facilities and transmission facilities to be approximately 15 feet (with a maximum height of 20 feet) and up to 150 feet above ground, respectively. As such, no mitigation is proposed.

4.2.1.2 EMF

The term electromagnetic field (EMF) refers to electric and magnetic fields that are present around any electrical device. Electric fields arise from the voltage or electrical charges and magnetic fields arise from the flow of electricity or current that travels along transmission lines, power collection lines, substation transformers, house wiring, and electrical appliances. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors (wire). EMF can occur indoors and outdoors. The general consensus is that electric fields pose no health risk to humans (National Radiation Laboratory, Ministry of Health, New Zealand, 2008).

With the proposed Regal Solar Project, the sources of EMF will be from electrical collection lines, either buried below-ground or hung above-ground, the gen-tie transmission line, and from the transformers installed at each inverter. EMF from electrical collection lines, regardless of whether they are below-ground or above-ground, transmission lines, and transformers dissipates rapidly with distance from the source (National Institute of Environmental Health Sciences [NEIHS], 2002). Generally speaking, higher voltage electrical lines produce higher levels of EMF at the source before dissipating with distance. The internationally accepted guideline for the general public exposed to electric fields is 4.2 kV/m and 833 milliGauss (mG) for magnetic fields (NEIHS, 2002).

4.2.1.3 Impacts and Mitigation

Levels of EMF from the Project will be considerably below acceptable guidelines. Project-specific EMF levels were not modeled for the 34.5 kV electrical collection lines, 115 kV overhead gen-tie transmission line, or inverters and transformers. However, several studies have documented EMF

exposure of various high voltage transmission lines. The National Institute of Environmental Health Sciences provides typical EMF levels for power transmission lines (NIEHS, 2002). For 115 kV transmission lines, the lowest voltage with typical EMF levels reported in the study, electric fields directly below the transmission line were reported at 1.0 kV/m before dissipating to 0.5 kV/m at 50 feet (approximate edge of right-of-way). Similarly, average magnetic fields directly below the transmission line were reported at 29.7 mG before dissipating to 6.5 mG at 50 feet (NIEHS, 2002). A Canadian study of collection lines at a wind facility measured EMF (magnetic fields) of the Project's 27.5 kV collection lines, slightly lower voltage than the electrical collection lines proposed for the Regal Solar Project. This study found magnetic fields associated with buried electrical collection lines to be within background levels at 1m above ground and up to 16.5 mG directly beneath overhead 27.5 kV lines (McCallum et al., 2014). As demonstrated here, both electric and magnetic fields will be well below the international guidelines of 4.2 kV/m and 833 mG, respectively. Additionally, since the transformers are enclosed in a grounded metal case (shielded), they typically do not emit much EMF.

Stray voltage is often a concern in agricultural areas, particularly dairy farms. Stray voltage is an unintended transfer of electricity between two grounded objects, and is typically caused by improperly grounded electrical equipment in farm buildings or by a faulty utility connection. All electrical components in the Project, including inverters and transformers, will be grounded in accordance with National Electric Safety Code. Soil resistivity measurements will be taken on site as part of the Project's geotechnical analysis, and that data will be used to help design grounding systems. For these reasons, the potential for stray voltage as a result of the Project will be negligible. Should a fault occur during operation of the Project, it would be quickly identified by Project monitoring systems and corrected. The nearest residence to solar arrays is 319 feet and even greater distances to the nearest inverter, electrical collection line, and transformer. At this distance, both electric and magnetic fields would have dissipated to background levels. As such, impacts will be negligible and mitigation measures are proposed.

4.2.2 Displacement

There are no residences, business, or structures such as barns or sheds in the Land Control Area.

4.2.2.1 Impacts and Mitigation

Because there are no building structures in the Land Control Area, there will not be any displacement; as such, no mitigation is proposed.

4.2.3 Noise

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 decibel 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. According to ANSI/ASA S12.9-

2013/Part 3, rural residential areas have a typical daytime noise level of 40 dBA and a typical nighttime noise level of 34 dBA.

Background noise in the vicinity of the Project facilities is typically a result of farming equipment/operations, wind, vehicles, and the railroad. A comparison of typical noise-generating sources is outlined below in Table 4.2-1.

Table 4.2-1 Common Noise Sources

Sound Pressure Level (dBA)	Common Noise Source
110	Rock band at 5 m
100	Jet flyover at 300 m
90	Gas lawn mower at 1 m
85	Food blender at 1 m
75	Shouting at 1 m
70	Vacuum cleaner at 3 m
60	Normal speech at 1 m
55	Large business office
50	Dishwasher in next room, quiet urban daytime
40	Library, quiet urban nighttime
30	Bedroom at night
20	Quite rural nighttime
0	Threshold of hearing

Source: Minnesota Pollution Control Agency (MPCA), 2008

The Minnesota Pollution Control Agency (MPCA) has the authority to adopt noise standards pursuant to Minnesota Statute Section 116.07, subd. 2. The adopted standards are set forth in Minnesota Rule Chapter 7030. The MPCA standards require A weighted noise measurements. Different standards are specified for daytime (7:00 AM to 10:00 PM) and nighttime (10:00 PM to 7:00 AM) 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}). Household units, including farmhouses, are included in Noise Area Classification 1. Table 4.2-2 shows the MPCA state noise standards.

Table 4.2-2 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

4.2.3.1 Impacts and Mitigation

During construction, noise will be emitted by the construction vehicles and equipment. The amount of noise will vary based on what type of construction is occurring at the Project on a given

day. Construction associated noise will likely be perceptible at adjacent residences (see Section 4.2.4 for locations) and the Two Rivers Campground (see Section 4.2.7 for its location). Grading equipment, bobcats, and other construction equipment are anticipated to emit noise between 76-85 dBA at 50 feet (USDOT, 2017). Noise associated with these types of equipment will primarily occur during the initial site set up – grading and access road construction which is expected to last approximately four weeks. Regal anticipates pile driving of the rack supports to create the most noise measured at 101 dBA at 50 feet (USDOT, 2017). Installation of each rack support takes between 30 seconds to 2 minutes depending on the soil conditions; Regal anticipates this activity will take up to 8 weeks across the site. Finally, installation of the solar panels on the tracking similar would emit noise levels similar to general construction equipment described above. Typically, a forklift is used to place individual panels on the tracking rack system. The noise from any of these construction activities would dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and receptor. Note that construction activities will be sequenced; site preparation may occur at a portion of the site while pile driving occurs at a different location. As stated above, these noise impacts will be temporary and limited to daytime hours.

The main source of noise from the Project during operation will be from the inverters, which includes the air conditioners housed in each, and to a lesser extent from the transformers and rotation of the tracking system. Table 4.2-3 summarizes the anticipated distance to reach the most stringent MPCA noise standard (50 dBA) from a range of inverters and trackers under consideration for use at the Regal Solar Project. Table 4.2-3 also provides the dBA at 50 feet so noise levels can be calculated at greater distances.

Table 4.2-3 Inverter and Tracker Noise Levels

Facility Type	Equipment Model	Distance to 50 dBA	dBA at 50 feet
Inverter	TMEIC Solar Ware Ninja PVU-L0920GR	58 feet	51
	SMA Sunny Central 2750-EV-US	160 feet	60
	ABB PVS980	260 feet	64
Tracker	ATI DuraTrack HZ v3	5 feet	30
	NexTracker	82 feet	54

The results of noise modeling conducted by technology manufactures outlined in Table 4.2-3 show that noise levels will be less than 50 dBA between 58 and 260 feet from the inverter, depending on which model is selected. Similarly, noise levels will be less than 50 dBA between 5 and 82 feet from the trackers, depending on which model is selected. As such, the Project has been designed to meet the nighttime L_{50} dBA noise standard, as the closest home to the facility is 319 feet away from the edge of a solar array. Further, because the inverters are typically located within the middle of the solar arrays, the noise levels from Project equipment are not expected to be discernible from background noise levels at homes in the vicinity.

During construction, Regal plans to limit construction to daylight hours. No noise impacts are anticipated during operation; therefore, no mitigation measures are proposed.

4.2.4 Aesthetics

The topography of the Land Control Area is flat with elevations ranging from 1070 to 1080 feet above sea level. As discussed in Section 4.1, land use within the Land Control Area is predominantly agricultural as center-pivot irrigation, with corn and potatoes being the most common crops. There are windbreaks along most roads and some property boundaries in the Project vicinity. The Burlington Northern railroad, U.S. Highway 10, and a portion of a snowmobile trail are adjacent to the eastern boundary of the Land Control Area. Additionally, an existing substation, communication tower, and distribution lines all occur within or adjacent to the Land Control Area and are current man-made focal points. There are three residences and a campground on parcels adjacent to the Land Control Area (see Figures 3 and 5 (Below-Ground Preliminary Project Layout and Above-Ground Preliminary Project Layout, respectively).

There are no residences within the Land Control Area; there are three residences on parcels adjacent to the Land Control Area. Additionally, there are no businesses, barns, or other agricultural structures in the Land Control Area. Table 4.2-4 provides distances to the nearest homes to the Project, including approximate distance to the Preliminary Development Area boundary and approximate distance to the edge of solar arrays (per preliminary design). Residences are also shown on the Figures 3 and 5 (Below-Ground Preliminary Project Layout and Above-Ground Preliminary Project Layout, respectively).

Table 4.2-4 Proximity of Residences to Regal Solar Facility

Residence	Distance to Development Boundary (feet)	Distance to Solar Arrays[1]
A	95	319 to the north 332 to the south
B	178	345
C	560	470

[1] Based on preliminary design

Residence A is located immediately adjacent to the Land Control Area in the center of the Project. This is a newly constructed home by a relative of the current landowner of the Land Control Area. While there is not currently existing vegetative screening around the homesite itself, there is an existing vegetative screening/wind break along Halfway Crossing Road and around the wetland the home is built on that would provide screening at various vantage points.

Residence B is located adjacent to the central portion of the Land Control Area south of Halfway Crossing Road. This residence has vegetative screening around most of the property and will also be at least partially screened by the wind break along Halfway Crossing Road.

Residence C is located west of the central portion of the Land Control Area with a long (two-thirds of a mile) driveway south off of Halfway Crossing Road. This residence has existing vegetative screening around most of the homesite; the driveway is adjacent to a field edge and is not screened.

The Two Rivers Campground is located adjacent to the southern portion of the Land Control Area, south of 145th Street NW. This seasonal campground is located at the confluence of the Mississippi and Platte Rivers and has existing vegetative screening around the property, including existing vegetative screening along 145th Street NW, within the Land Control Area that will not be removed for the Project.

As mentioned in Section 4.2.5, the municipal boundary of Rice is approximately 230 feet west of the Land Control Area and zoned as heavy and light industrial. The closest building to the Project that is within City limits is approximately 0.84 miles to the southeast of the Land Control Area on the east side of U.S. Highway 10. The closest residence to the Land Control Area that is within City limits is approximately 0.56 miles to the southeast of the Land Control Area. The Land Control Area is not located within an orderly annexation area for the City of Rice.

4.2.4.1 Impacts and Mitigation

The Project will convert approximately 706.5 acres of predominately agricultural land (see Table 4.2-6 in Section 4.2.8 and associated discussion) to a solar facility characterized by complex geometric forms, lines, and surfaces that may be divergent from the surrounding rural landscape. Most of the Preliminary Development Area will be utilized with rows of solar PV panels. Solar PV employs glass panels that are designed to maximize absorption and minimize reflection to increase electricity production efficiency. The images in Section 3.1.1 provide a reference for how the Regal Solar Project will appear during operation. To limit reflection, solar PV panels are constructed of dark, light-absorbing materials and covered with an anti-reflective coating. Today's panels reflect as little as two percent of the incoming sunlight depending on the angle of the sun and assuming use of anti-reflective coatings.

The solar arrays will occupy most of the disturbed area for the solar facility. The electrical transformers and inverters, a substation and O&M building, and access roads will utilize the rest of the disturbed area. Most of the facility, including the solar arrays, will be low-profile. The Project substation will be of similar vertical profile as the existing Platte River Substation adjacent to the Land Control Area. In the above-ground electrical configuration, poles would be up to 30 feet in height and predominately parallel access roads. From outside the facility, these poles would be most visible from existing roadways. However, along some roads, like 45th Avenue NW, there is existing vegetative screening that would help minimize the pole aesthetic. Most poles on the interior of the facility would not be visible outside the facility due to a combination of line of sight with other components (arrays, inverters), distance from observer, and existing vegetative screening.

Regal coordinated with the landowners of Residences A, B, C, and the Two Rivers Campground. Residence C requested additional vegetative screening along their driveway. Regal will install vegetative screening along the Project fence for approximately 970 feet to mitigate any aesthetic concerns. The vegetative screening is displayed on Figure 3 – Below-Ground Preliminary Project Layout and in Appendix B – Site Plan.

The 2-3 transmission structures of less than 150 feet in height will be limited to the area between the proposed Project substation and the existing Platte River Substation, approximately 300 feet apart. This area already hosts distribution lines (see Section 4.2.9 and Figure 9 – Existing Infrastructure and AADT). These structures will be visible from the local roadways and blend with the two existing substations, communication tower, distribution lines, and railroad.

The solar arrays will be visible from adjacent roadways and parcels but given their relative low profile, they will not be visible from long distances. Additionally, Regal has designed the Project to avoid tree clearing of windbreaks and pine plantations, as defined by Benton County for the

solar arrays, access roads, inverters, substation, and O& building. There is one location at the crossing of Halfway Crossing Road that may require tree removal should above-ground electrical configuration be used. Regal would coordinate with Benton County for any tree removal. Alternatively, Regal may bore collection under the road and associated trees if below-ground collection is used. In addition, the existing vegetative screening along roads, around residences, and along property lines will remain. The solar facility will be visible to vehicles on adjacent roads, snowmobilers, local residences, and the Two Rivers Campground; more information on potential impacts to recreation, including snowmobilers and the Two Rivers Campground is provided in Section 4.2.7. As previously mentioned, the closest residence to preliminary design is approximately 319 feet immediately adjacent to the west side of the Preliminary Development Area. Regal has coordinated with the owners and they have not expressed concerns with the Project. A rendering of the proposed Project from U.S. Highway 10 is provided below in Image 9 for the below-ground configuration and Image 10 for the above-ground configuration.

Image 9: Visual Rendering of Regal Solar Facility from U.S. Highway 10 (below-ground configuration)

Image 10: Visual Rendering of Regal Solar Facility from U.S. Highway 10 (above-ground configuration)

Operation of the Project will require down lit security lighting at the entrance of the Project and there will be down lit, switch controlled lights at each inverter for repair purposes. Impacts to light-sensitive land uses are not anticipated given the rural Project location coupled with minimal required lighting for operations.

4.2.5 Socioeconomics

The Project is in a rural area within Langola Township and no incorporated communities are located within the Land Control Area. The incorporated communities that are geographically closest to the Land Control Area are Rice (less than 0.1 mile [approximately 230 feet outside of the municipal boundary] east/southeast), Royalton (1.5 miles north/northwest), St. Stephen (3.9 miles southwest), and Bowlus (5.9 miles west/northwest). The nearest metropolitan area is St. Cloud which is approximately 12.8 miles south of the Project.

Table 4.2-5 presents population and economic information gathered from the U.S. Census Bureau 2010 Census and 2013-2017 American Community Survey 5-year Estimates about Minnesota and Benton County (U.S. Census Bureau, 2010 and 2017). The 2010 U.S. Census gathered a wide variety of data points. The discussion herein does not address every socioeconomic measure, but instead addresses the most applicable statistics related to the Project. The socioeconomic statistics that best characterize the demographic and economic context of the Land Control Area, and represent the socioeconomic characteristics that potentially could be affected by construction and operation of the Project, include: total population, vacant housing units, per capita income, the percentage of the population below poverty level, and the unemployment rate (see Table 4.2-5).

Based on the 2010 U.S. Census, the population of Benton County is 38,451 persons, which represents less than 1 percent of the total population of Minnesota. The per capita income of Benton County is $27,018, which is lower than the state average. Although the unemployment rate in Minnesota and Benton County is relatively low at 4.3 and 4.2 percent, respectively, slightly more than 11 percent of individuals in the state and 14 percent of individuals in the county are classified as living below the poverty level. The primary industries in Benton County are classified as educational services, health care, and social assistance (24.7 percent), followed by manufacturing (14.0 percent) and retail trade (13.2 percent) (U.S. Census, 2017).

According to the U.S. Census Bureau 2013-2017 American Community Survey 5-year Estimates, approximately 1,061 vacant housing units exist in Benton County. In the nearest metropolitan area, St. Cloud, there are approximately 1,899 vacant housing units (U.S. Census Bureau, 2017). In addition, according to the Visit Greater St. Cloud website (Visitstcloud.com, n.d.) 29 hotels, motels, and campgrounds are available in the greater St. Cloud area. These residence and temporary housing statistics suggest the local area could support an influx of construction workers, if needed.

Table 4.2-5: Socioeconomic Characteristics of the Project Vicinity					
State/County	Total Population (2010)	Vacant Housing Units	Per Capita Income (U.S. Dollars)	Individuals Below Poverty Level (percent)	Unemployment Rate (percent)
Minnesota	5,303,925	259,974	34,712	10.5	4.3
Benton	38,451	1,061	27,018	14.1	4.2

Sources: U.S. Census Bureau, 2010 and 2017.

4.2.5.1 Impacts and Mitigation

The Project is designed to be socioeconomically beneficial to the landowner, local governments, and communities. Landowner compensation is established by voluntary purchase agreements between the landowner and Regal for Regal's purchase of the land. Regal will establish the Regal Education Fund upon commercial operation, to which Regal will contribute $20,000 annually for the first 20 years of Project operation. Because the Project is located within the Royalton and Sauk Rapids-Rice school districts, the fund will be distributed to both. Regal will continue to coordinate with both of these school districts on establishing the fund as the Project develops.

Construction of the Project would provide temporary increases to the revenue of the area through increased demand for lodging, food services, fuel, transportation and general supplies. The Project will also 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. 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.

General skilled labor is expected to be available in Benton County 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 and much of the workforce needed to construct a solar facility must be comprised of Minnesota licensed electricians because most of the assembly and wiring work for solar installations is considered electrical work under the Minnesota State Electrical Code.

Effects on temporary or permanent housing are anticipated to be negligible. During construction, out-of-town laborers will likely use lodging facilities nearby. The operations and maintenance of the facility will require approximately five long-term personnel. The Project anticipates that sufficient temporary lodging and permanent housing will be available within Benton County, and within the St. Cloud metropolitan area, to accommodate construction laborers and long-term personnel.

In general, the socioeconomic impacts associated with the Project will be positive; therefore, no mitigative measures are proposed. Wages will be paid, and expenditures will be made to local businesses and landowners during the Project's construction and operation. The Project will provide production tax payments to Benton County of approximately $176,000 annually for 25

years. Additionally, Langola Township will receive approximately $44,000 annually for 25 years. In addition, purchase payments paid to the landowner will offset potential financial losses associated with removing a portion of their land from agricultural production.

4.2.6 Cultural Values

Cultural values include those perceived community attitudes or beliefs that provide a framework for community unity. The Project is in Benton County, Minnesota and according to the U.S. Census Bureau (2010), the majority of the population in Benton County identifies as Caucasian with an ethnic background of European origin. Cultural representation in community events appears to be more closely tied to geographic features (such as the Platte River), seasonal events, national holidays, and municipal events than to those based in ethnic heritage. Examples of regional cultural events include annual winter holiday festivals, such as Christmas on the Platte in Royalton, and summertime events like Platte River Days and the Rough Fish Contest hosted by the City of Royalton (royaltonmn.com, 2011).

4.2.6.1 Impacts and Mitigation

Construction and operation of the Project would not impact public participation in the regional community cultural events noted above, as the Land Control Area is located outside of municipal areas. Therefore, no impacts to cultural values are anticipated and no mitigation measures are proposed.

4.2.7 Recreation

There are various recreational opportunities in or near the Land Control Area, including snowmobile trails, a private campground, and the Mississippi and Platte Rivers (refer to Figure 7 - Recreation). Each of these offers recreation opportunities that attract residents and tourists.

Snowmobile trails are mapped by MNDNR and managed locally by each county and their respective snowmobile clubs. There is one snowmobile trail within the Land Control Area, managed by the Benton County Snowmobile Club, that runs southeast along Highway 10 and then turns south through the eastern portion of the Land Control Area.

As discussed in Section 4.2.4, the Two Rivers Campground is just south of the Land Control Area on the south side of 145th Street NW at the confluence of the Mississippi and Platte Rivers (Tworiverscampground.net, 2017). The campground is privately owned, seasonally operated, and provides 221 campsites, a large campground lodge, pool area, mini golf, boat access, and innertube rentals for tubing on the Platte River.

WMAs are managed to provide wildlife habitat, improve wildlife production, and provide public hunting and trapping opportunities. These MNDNR lands were acquired and developed primarily with hunting license fees. There are no WMAs within 1 mile of the Land Control Area. The nearest MNDNR WMA is the Sartell WMA, located 2.4 miles east of the Land Control Area.

There are no MNDNR Scientific and Natural Areas, state trails, state water trails, Aquatic Management Areas, state parks, or migratory waterfowl feeding and resting areas within one mile

of the Land Control Area. Similarly, there are no county or city parks within one mile of the Land Control Area.

The nearest city is the City of Rice, whose municipal boundary is located less than 0.1 mile southeast of the Land Control Area.

4.2.7.1 Impacts and Mitigation

Due to the location of the snowmobile trail within the Preliminary Development Area, Regal will coordinate with the Benton County snowmobile club to reroute the trail around the solar facility. Based on an informational discussion with the Benton County snowmobile club, they indicated that the reroute of the snowmobile trail will occur after the Project receives its site permit and prior to construction. While the specific location of the re-route has not been discussed with the Benton County snowmobile club, it is likely the trail would be rerouted to follow the railroad right-of-way for an additional 1,900 feet to get beyond the proposed fence along the perimeter of the Preliminary Development Area before turning south through the agricultural fields. Because snowmobile trails are often located on private land, rerouting trails is a common practice as land uses change. In addition to re-routing the snowmobile trail, snowmobilers will notice the different aesthetic along the portion of the snowmobile trail in the vicinity of the Regal Solar Project. Instead of riding through center-pivot irrigation fields that are open space during the winter months, the trail would route around the facility and the rider would encounter the agricultural fence along the perimeter and solar arrays and access roads on the interior. In general, snowmobile trails form a network between cities. While portions of snowmobile trails pass more rural areas, other portions pass through municipalities and various developments. The introduction of a solar facility is not expected to affect the snowmobile trail's use. Finally, by its nature, snowmobiling is a mobile activity; snowmobilers are expected to pass the Regal Solar Project on the established trails. Therefore, any aesthetic impacts would be limited to the rider's duration in the Project vicinity.

Impacts to the campground and Mississippi River access during construction would be temporary and minor and related to transportation, aesthetics, and noise. From a transportation standpoint, Regal Solar will construct the Project facilities within the limits of the Land Control Area and no road closures are anticipated to be necessary during active construction. Recreation users of the Two Rivers Campground and those obtaining boat access to the Mississippi River may experience additional traffic on roadways that bisect the Project. Traffic during 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. 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.

The presence of construction equipment and vehicles across the road from the campground will create a different aesthetic than the current agricultural use. However, the Project has been designed to avoid tree clearing near Two Rivers Campground; the existing vegetative screening along 145th St NW will remain intact. Immediately adjacent to the campground, the existing vegetative screening is approximately 75 feet wide, providing a dense screen towards the Regal Solar Project.

Finally, users of the campground may experience construction noise because of construction activities. Potential noise levels are described in Section 4.2.3.1.

During operation, impacts would be visual in nature. As discussed in above, Regal has designed the Project to avoid tree clearing, including windbreaks and pine plantations, as defined by Benton County. The existing vegetative screening along roads, including 145th Street NW will also remain.

4.2.8 Land Use and Zoning

4.2.8.1 Land Use

The Regal Solar Project is within a rural landscape, and as such the primary land use in the Land Control Area is agricultural (95.8 percent; U.S. Geological Survey [USGS], 2011; Table 4.2-6; Figure 8 – Land Use). The remainder of the Land Control Area consists of developed land (2.6 percent) and a small amount of forested land (1.5 percent), shrubland (<0.1 percent), introduced and semi natural vegetation (< 0.1 percent) and open water (<0.1 percent). Most of the agricultural land in the Land Control Area is center-pivot irrigation. Corners around the center-pivots are also generally farmed or hayed. Developed land within the Land Control Area generally consists of public roads, namely Halfway Crossing Road and 45th Avenue NW. Forested land is a category in the U.S. Geological Survey (USGS) Gap Analysis Program (GAP) data used for Regal's environmental analysis; however, forested land within the Land Control Area consists of isolated rows of relatively young trees that were planted for use as shelter belts or wind breaks along the edges of agricultural fields and roads. The is a very small area of shrubland associated with Residence A within the Land Control Area. Similarly, the very small area (0.1 acre) of open water in the Land Control Area is associated with the wetland/pond near Residence A. There are no wetlands identified in the Land Control Area by the USGS GAP data. See Section 4.5.5 for more information on wetlands.

Table 4.2-6 Land Use Within the Land Control Area

Land Use Type	Acres in Land Control Area	Percent of Total Acreage
Agricultural	768.7	95.8%
Developed	20.6	2.6%
Forested	12.0	1.5%
Shrubland	0.8	0.1%
Introduced & Semi Natural Vegetation	0.2	<0.1%
Open Water	0.1	<0.1%
Total	**802.4**	**100%**

Source: USGS, 2011

Farmsteads are sparsely scattered throughout the Project vicinity, generally situated near public roads. Based on review of available aerial photography, there are three occupied or occupiable residences located on parcels adjacent to the Land Control Area; however, the Project will not cause displacement or relocation of residences (see Section 4.2.2).

4.2.8.2 Zoning

Based on Benton County zoning data, the Land Control Area is zoned as agricultural (Benton County, 2019a). As noted in Section 7.1 of the Benton County Development Code, development of solar energy systems within the agricultural district is a permitted accessory use in accordance with Section 9.20.3 (Benton County, 2019b). Section 9.20.3 of the Development Code applies to solar energy systems that are not otherwise subject to siting and oversight by the State of Minnesota under the Minnesota Power Plant Siting Act (Minnesota Statute 216E); because the Project requires a Site Permit from the State of Minnesota, Section 9.20.3 of the Benton County Development Code does not apply (Benton County, 2016).

4.2.8.3 Land Use and Zoning Impacts and Mitigation

Table 4.2-7 provides the total acres of each land use type impacted by both the below-ground and above-ground configurations. Based on the USGS GAP landcover data, the Project would affect predominately agricultural land (98.8 percent for below-ground configuration and 98.7 percent for above-ground configuration). Developed, forest, shrubland, and introduced & semi natural vegetation within the Preliminary Development Area total 1.2 percent for the below-ground configuration and 1.3 percent for the above-ground configuration. While within the Preliminary Development Area, Regal will not impact developed land. Solar facilities will be setback from the two roads that bisect the Project (125 feet from the road centerline). Electrical cables that connect the three main units of panels will be directionally bored under or spanned over county roads. Similarly, areas categorized as forest & woodland land will not be impacted by the solar facilities. Regal has designed the solar facility to avoid tree clearing.

Table 4.2-7 Land Use Impacts

Land Use Type	Below-Ground Configuration		Above-Ground Configuration	
	Acres	Percent	Acres	Percent
Agricultural	698.6	98.8%	702.6	98.7%
Developed	6.9	1.0%	6.9	1.0%
Forest & Woodland	1.5	0.2%	1.9	0.3%
Introduced & Semi Natural Vegetation	0.1	<0.1%	0.1	<0.1%
Total	**707.1**	**100.0%**	**711.4**	**100%**

Source: USGS, 2011.

Agricultural land will be converted from an agricultural use to solar energy use for the life of the Project. The conversion of agricultural land to solar facility within the Preliminary Development Area will have a minimal impact on the rural character of the surrounding area or Benton County. As discussed further in Section 4.3, Land-based Economies, of the 261,120 acres in Benton County, approximately 72 percent (approximately 188,735 acres) are classified as agricultural land. Impacts of up to 702.6 acres of agricultural land within the solar facility (above-ground configuration) would reduce the amount of agricultural land in the County by less than one percent.

Due to the amount of agricultural land impacted by the Project, Regal has coordinated with Minnesota Department of Agriculture (MDA) on an AIMP (Appendix C). This AIMP has been

designed to incorporate best management practices (BMPs) into siting procedures; pre-construction, construction, and post construction methods; operational procedures; and closure 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 closure. Regal met with MDA on April 9, 2019 to discuss the AIMP's contents and site-specific characteristics. On May 23, 2019, Regal Solar provided a draft of the Regal AIMP; MDA reviewed and provided comments the draft AIMP on June 27, 2019. Regal provided a redline version of the final AIMP, including updates to address the agency's comments on July 16, 2019.

As noted above, development of solar energy systems within the Benton County agricultural district is a permitted accessory use (Benton County, 2019b). As the Regal Solar Project is subject to siting and oversight by the State of Minnesota under the Minnesota Power Plant Siting Act, the Site Permit will serve as the land use permit.

4.2.9 Public Services and Infrastructure

This section describes the public services and infrastructure within the Land Control Area and impacts this Project may have on public services.

Public Services

Public services are those typically provided by a government entity to its citizens and those services are used to benefit public health and safety. These services can include emergency services (i.e., Benton County Sheriff, City of Rice and/or Royalton police departments, fire services from the City of Rice and/or City of Royalton, and ambulance services from CHI St. Gabriel's Health Hospital in Little Falls), potable water, sanitary systems, and utilities. The city of Rice is the closest municipality to provide emergency services. Most rural residences outside of Rice have wells that supply their water (see Section 4.5.2). Sewage is serviced by residential septic tanks and/or drain fields. Telecommunication services are provided by Benton Cooperative Telephone or InteleCONNECT, Inc. (Benton County, 2019c).

Public Utilities

The Project is adjacent to the existing Minnesota Power Platte River Substation and the Great River Energy/East Central Energy Langola Substation. There are several distribution lines operated by Minnesota Power and East Central Energy (Minnesota Geospatial Commons, 2018) along the roads in the Project vicinity that provide power to rural residents. Approximate locations of these distribution lines are displayed on Figure 9 – Existing Infrastructure and AADT based on Google Earth. There are no pipelines in the Land Control Area.

Transportation

The major roadway in the area is U.S. Highway 10 along the east border of the Land Control Area. The Land Control Area is bisected by Halfway Crossing Road (County Road 40) in an east-west direction and 45th Avenue Northwest in a north-south direction (County Road 73). Average Annual Daily Traffic (AADT) counts based on Minnesota Department of Transportation's

(MNDOTs) 2017 Publication of traffic volumes for Benton County are provided in Table 4.2-8 and displayed on Figure 9 – Existing Infrastructure and AADT (MNDOT, 2017).

Table 4.2-8 Average Annual Daily Traffic in the Project Vicinity

Roadway	Year	AADT Traffic Volume Total
US-Highway 10	2017	23,000
Halfway Crossing Road between US 10 and Royalton	Prior to 2013	270
45th Ave NW between Halfway Crossing Road and 125th St NW	Prior to 2013	980

Source: MNDOT, 2017

There will be four access points to the Project: two off of Halfway Crossings NW and two off of 45th Ave NW. The Project will not be accessed from U.S. Highway 10.

MNDOT provided early review comments on the Regal Solar Project on March 5, 2019. These early comments revolved around access, vegetation management, and permitting. Regal held a follow-up meeting with MNDOT on May 9, 2019 and confirmed, that according to its records, mesic prairie is not located within the Land Control Area near Highway 10 and vegetative screening along Highway 10 is not necessary due to the existing vegetation present along the highway and overall low potential for glare.

There is a Burlington Northern railroad adjacent to the east portion of the Land Control Area.

The nearest Federal Aviation Administration (FAA)-registered airport to the Regal Solar Project is the Little Falls/Morrison County-Lindbergh Field Airport located approximately eleven miles north of the Project. This airport operates two runways, one asphalt and one turf. Based on aerial imagery, there appears to be an unregistered landing strip (Fussy) located three miles west of the Project.

4.2.9.1 Impacts and Mitigation

Public Services

Regal will coordinate with Gopher State One Call before and during construction to fully understand infrastructure locations and safety concerns and to avoid possible structural conflicts. Regal Solar will also conduct an American Land Title Association (ALTA) survey to identify the locations of underground utilities. Final design will minimize and avoid impacts to underground utilities; if conflicts are unavoidable Regal will coordinate with the utility to develop an approach to reroute or otherwise protect the utility. Underground utilities will be marked prior to construction start.

Public Utilities

As described in Section 3.1.7, the Project will interconnect into the existing Platte River Substation via a gen-tie 115 kV transmission line of less than 1,500 feet. Multiple System Impact Studies will be completed by MISO to review the direct electrical connection of the Project to the Platte

River substation. The System Impact Study contains information about the adequacy of the electrical interconnection equipment and serves to protect Regal and other users of the Platte River Substation and the larger electrical system. The information contained in the System Impact Study will determine the impacts to all systems, answer all electrical interconnection questions and dictate the electrical updates that are necessary for Regal to safely and effectively interconnect the Project to the electrical transmission system. Regal is responsible for all costs associated with MISO's review of the Project and with all upgrade costs MISO determines to be necessary to safely and effectively interconnect the Project at the Platte River Substation. During interconnection, customers will experience short outages when the Platte River Substation is shut down and temporary service is being established. The timing and duration of any service interruptions would be determined and communicated by the interconnecting utility (Minnesota Power).

Transportation

Access to the Project will be via existing county roads. With the limited possible exception of minor field access or driveway changes depending on final design, no changes to existing roadways will occur. The roads used for access to the Regal Solar Project are shown on Figure 9 (Existing Infrastructure and AADT). During the construction phase, temporary impacts are anticipated on some public roads within the vicinity of Project facilities, primarily through additional traffic and slow-moving construction vehicles.

Construction traffic will use the existing county roadway system to access the Project facilities and deliver construction materials and personnel. Traffic during 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. 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. Overweight or oversized loads are unlikely. If they are required, Regal will obtain the appropriate approvals prior to construction. For purposes of comparison, the functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day (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.

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.

The Project has been designed to avoid impacts to the Burlington Northern railroad. The closest Project facility to the railroad is the perimeter agricultural fence, which, at its closest is 95 feet to the railroad centerline and 55 feet to the railroad right-of-way. The closest distance of the solar racks and panels to the railroad centerline is 120 feet. Additionally, as discussed in Section 3.1.3, Regal included an access road around the perimeter of the Project to provide an additional buffer

from the railroad and any potential sparks that could ignite adjacent vegetation. This additional buffer serves as a safety measure to keep fire out of the solar facility. The access road around the entire perimeter is also necessary to provide effective and efficient access for operations and maintenance and safe ingress and egress for employees, visitors and emergency responders.

Regal filed FAA 7460-1 Notice of Proposed Construction forms for the perimeter of the Land Control Area. On October 12, 2018, the FAA provided Determinations of No Hazard to air navigation for each of the seven points around the Land Control Area. As such, Project facilities will not exceed obstruction standards and would not be a hazard to air navigation. No mitigation measures are necessary or proposed for air traffic.

4.3 Land-Based Economies

4.3.1 Agriculture

According to the U.S. Department of Agriculture's (USDA's) 2012 Census of Agriculture, of the 261,120 acres that comprise Benton County, approximately 188,735 acres (72 percent) are farmland. A total of 958 individual farms are located in Benton County, with the average farm size at 197 acres. The top crops (in acres) include corn, soybeans, foraging crops (hay and haylage, grass silage, and greenchop), wheat (predominantly spring wheat for grain), oats, barley, and other vegetables harvested for sale. Cattle tops the list of livestock inventory in Benton County, followed by poultry (layers), hogs and pigs, and sheep and lambs (USDA, 2012).

The market value of agricultural production in Benton County in 2012 was approximately $167 million. Livestock, poultry, and their products accounted for approximately 55.9 percent of the total value of agricultural production, while crop sales accounted for the remaining 44.1 percent (USDA, 2012).

As discussed further in Section 4.5.3, no prime farmland is present within the Land Control Area.

4.3.1.1 Impacts and Mitigation

The Project will impact up to 702.6 acres of agricultural land within the Preliminary Development Area and will not result in a significant impact to land-based economies in the Project vicinity, as this acreage constitutes less than one half of one percent of the agricultural land in Benton County (188,735 acres). Agricultural production would continue in the surrounding areas during construction and operation of the Project. The revenue lost from removing land from agricultural production will be offset by the purchase option with the landowner. Areas disturbed during construction will also be repaired and restored to pre-construction contours and characteristics to the extent practicable. This restoration will allow the Project's land surfaces to drain properly, blend with the natural terrain, re-vegetate, and avoid erosion.

Center-pivot irrigation systems are present within the Preliminary Development Area. These wells will then be marked with flagging and a five-foot buffer around them fenced so as to avoid impacts to these structures. If Regal identifies a need for wells during operations, these wells may be uncapped or new wells will be installed.

Based on discussions with Project landowners, Regal Solar does not believe drain tile is present in the Land Control Area. However, Regal Solar will gather additional information about the existence of drain tile from landowners and other data sources, possibly including, but not limited to, infrared aerial photographs. In the event that damage occurs to drain tile or private ditches as a result of construction activities or operation of the Project, Regal Solar will repair any damages.

No areas used for animal husbandry are located within the Land Control Area; therefore, no impacts to livestock are anticipated.

4.3.2 Forestry

There are no forestry operations in the Land Control Area; therefore, no forestry resources will be affected by the Project. Additionally, Regal has designed the Project to avoid any tree clearing. This includes wooded areas classified by Benton County as pine plantations and windbreaks and areas along roads that run within or along the boundary of the Land Control Area.

4.3.2.1 Impacts and Mitigation

As none of the trees in the Land Control Area are considered forestry resources, and all trees will be allowed to remain, no mitigative measures are proposed.

4.3.3 Tourism

Primary tourism activities in the vicinity of Project facilities are associated with the recreational activities discussed in Section 4.2.7, and local community festivals and other events.

Two Rivers Campground is just south of the Land Control Area on the south side of 145th Street NW (Tworiverscampground.net, 2017). The campground is privately owned, seasonally operated, and provides 221 campsites, a large campground lodge, pool area, mini golf, and shuttle access and innertube rentals for tubing on the Platte River.

According to their website, the Town of Royalton hosts a few annual events and festivals including Platte River Day, Alzheimer's Ride for the Mind, Rough Fish Contest, and Christmas on the Platte (royaltonmn.com, 2011). With the exception of Christmas on the Platte, which is held the first Saturday of December, these events are held during the summer months.

Review of the City of Rice's website did not identify any annual festivals hosted by the city beyond the Rice City Wide Garage Sale (Cityofrice.com, 2019). In 2019, the city-wide garage sale will be held between May 30th and June 2nd.

4.3.3.1 Impacts and Mitigation

Regal Solar will construct the Project facilities within the limits of the Land Control Area and no road closures are anticipated to be necessary during active construction. The annual events hosted by the Town of Royalton and the City of Rice do not occur within the Land Control Area; most of these events are held within city limits or in areas outside of the Land Control Area. No impacts to public access to these events is anticipated during construction or operation of the Project.

Impacts to the Two Rivers Campground are discussed in Section 4.2.7.1 (Recreation); no additional impacts to tourism are anticipated and therefore no additional mitigative measures are proposed.

4.3.4 Mining

Based on MNDOTs Aggregate Source Information System and County Pit Map for Benton County, there are no gravel pits in the Land Control Area (MNDOT, 2018; MNDOT, 2002). On the Benton County Pit Map, three gravel pits are shown between 0.7- and 0.9-mile northwest of the Land Control Area, near the Platte River.

4.3.4.1 Impacts and Mitigation

No impacts to mining operations are anticipated and therefore no mitigative measures are proposed.

4.4 Archaeological and Historical Resources

Area M Consulting (Area M) conducted a Phase I cultural resources investigation of the Land Control Area. A copy of the Phase I inventory report is provided in Appendix D.

The Phase I inventory included a review of documentation on file at the Minnesota State Historic Preservation Office (SHPO), as well as various historical maps (i.e., Century Public Land Survey maps, Andreas maps, General Land Office maps, Trygg maps, and historic aerial photographs), to identify archaeological or historic sites, historic architectural resources, and previous cultural resource inventories within one-half mile of the Land Control Area. Area M also reviewed the online database of archaeological data managed by the Office of the State Archaeologist and conducted extensive review of LiDAR imagery as part of the Phase I inventory. No previously recorded archaeological or historic sites, historic architectural resources, or previous cultural resources inventories were noted within one-half mile of the Project.

Area M conducted a Phase I field inventory of the entire 802-acre Land Control Area in June 2018. The Phase I field inventory included systematic pedestrian survey along transects spaced 3 meters apart and subsurface shovel testing along transects placed 15 meters apart. Ground visibility at the time of survey ranged from 50 to 100 percent; no cultural resources were identified as a result of survey.

Area M submitted the Phase I inventory report for the Project to the Minnesota SHPO in March 2019. In a letter dated April 18, 2019, the Minnesota SHPO concurred with Area M's recommendations that the Project would not affect historic properties listed in or eligible for listing in the National Register of Historic Places (NRHP). A copy of the Minnesota SHPO's letter is provided in Appendix A.

4.4.1 Impacts and Mitigation

No archaeological or historic sites, or historic architectural resources were identified during Phase I inventory of the Land Control Area; therefore, the construction and operation of the Project will not impact historic properties listed in, eligible for, or potentially eligible for listing in the NRHP.

Before construction of the Project begins, Regal will prepare an Unanticipated Discoveries Plan that will outline the steps to be taken if previously unrecorded cultural resources or human remains are encountered during construction.

4.5 Natural Environment

4.5.1 Air

Section 109(b) of the Clean Air Act (CAA) requires that the U.S. Environmental Protection Agency (EPA) establish National Ambient Air Quality Standards (NAAQS) "requisite to protect" public health and welfare (40 Code of Federal Regulations Part 50). The CAA identifies two classes of NAAQS: primary standards, which are limits set to protect the public health of the most sensitive populations, such as asthmatics, children and the elderly; and secondary standards which are limits set to protect public welfare, such as protection against visibility impairment or damage to vegetation, wildlife and structures. The EPA has promulgated NAAQS for six criteria pollutants: ozone (O_3), particulate matter ($PM_{10}/PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and lead (Pb). Minnesota has been in compliance with the primary and secondary NAAQS for all criteria pollutants since 2002 (MPCA, 2019a).

In Minnesota, air quality is tracked using air quality monitoring stations across the State. The MPCA uses data from these monitors to calculate the Air Quality Index (AQI), on an hourly basis, for O_3, $PM_{2.5}$, SO_2, NO_2, and CO. The pollutant with the highest AQI value for a particular hour sets the overall AQI for that hour. The AQI is used to categorize the air quality of a region as one of five levels of quality: good, moderate, unhealthy for sensitive groups (USG), unhealthy, or very unhealthy (MPCA, 2019b).

The Project is located nearest to the air quality monitor in St. Cloud, Minnesota. This station monitors for O_3 and $PM_{2.5}$. The AQI for St. Cloud for the past five years is provided in Table 4.5-1 (MPCA, 2019c).

Table 4.5-1
Days in Each Air Quality Index Category (St. Cloud, Minnesota)

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2017	329	36	0	0	0
2016	338	28	0	0	0
2015	327	27	1	0	0
2014	318	40	0	0	0
2013	312	47	0	0	0

Source: MPCA, 2019c.

Air quality has been considered good for the majority of the past five reported years in St. Cloud. Since 2013, the largest number of days classified as moderate or USG occurred in 2015. No days have been classified as unhealthy or very unhealthy.

4.5.1.1 Impacts and Mitigation

Soils at the Regal Solar Project are susceptible to wind erosion, creating dust. The AIMP (Appendix C) outlines several BMPs related to dust control, particularly with the sandy soils, including mulching exposed soils, wetting exposed soils, maintaining vegetative cover (both cover crops and permanent vegetation), and reduced speed limits. Emissions from construction vehicles will be minimized by keeping construction equipment in good working order. Overall, dust emissions currently experienced annually in the area through farming activities will be reduced for the life of the Project through the establishment of perennial vegetative cover.

4.5.2 Geology and Groundwater Resources

The major landform in the Anoka Sandplain ecological subsection is a broad sandy lake plain, which contains small dunes, kettle lakes, and tunnel valleys. Topography is level to gently rolling and there are small inclusions of ground moraine and end moraine. The other important land form is a series of sandy terraces associated with historic levels of the Mississippi River (MNDNR, undated).

Minnesota is divided into six groundwater provinces based on bedrock and glacial geology. The aquifers within these provinces occur in two general geologic settings: bedrock, and unconsolidated sediments deposited by glaciers, streams, and lakes. The Regal Solar Project is within the Central Province, which is characterized by sand aquifers in generally thick sandy and clayey glacial drift overlying Precambrian and Cretaceous bedrock. In this province, groundwater is typically derived from surficial sand and gravel aquifers versus fractured bedrock (MNDNR, 2001).

Regal reviewed the Land Control Area for EPA designated sole source aquifers (SSA), wells listed on the Minnesota County Well Index (CWI), and Minnesota Department of Health (MDH) Wellhead Protection Areas (WHPAs).

The EPA defines a SSA or principal source aquifer area as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer, where contamination of the aquifer could create a significant hazard to public health, and where there are no alternative water sources that could reasonably be expected to replace the water supplied by the aquifer (EPA, 2016). There are currently no EPA-designated SSAs in the Project vicinity (EPA, 2017).

The CWI is the most complete record of well construction and location in Minnesota and is kept up-to-date and maintained by the Minnesota Geological Survey, in cooperation with the MDH. A search of the CWI (MDH, 2019a) identified seven active wells used for irrigation within the Land Control Area (Figure 9 – Existing Infrastructure and AADT).

Under the Safe Drinking Water Act (SDWA), each state is required to develop and implement a Wellhead Protection Program to identify the land and recharge areas contributing to public supply wells and prevent the contamination of drinking water supplies. The SDWA was updated in 1986 with an amendment requiring the development of a broader-based Source Water Assessment Program, which includes the assessment of potential contamination to both groundwater and surface water through a watershed approach. A WHPA encompasses the area around a drinking water well where contaminants could enter and pollute the well.

Public and non-public community water supply source-water protection in Minnesota is administered by the MDH through the Wellhead Protection program. WHPAs for public and community water-supply wells are delineated based on a zone of capture for 10-year groundwater time-of-travel to the well and are available through a database and mapping layer maintained by MDH (2019b). A search for WHPAs in the MDH database indicated there are none in the Land Control Area; the nearest WHPA is located in the town of Rice, approximately 1.1 miles southeast of the Regal Project.

4.5.2.1 Impacts and Mitigation

Impacts of the proposed Project to available geologic resources are likely to be limited. Due to the thickness of surficial materials (approximately 151-250 feet [Setterholm, 2010]), excavation or blasting of bedrock is extremely unlikely.

Impacts to geologic resources are not anticipated and mitigation is not expected to be necessary. Project facilities are not likely to affect the use of existing water wells because the facilities will not be sited within 319 feet of occupied residences. Any dewatering required during construction will be discharged to the surrounding surface, thereby allowing it to infiltrate back into the ground to minimize potential impacts. If dewatering is necessary, Regal will obtain a Water Appropriation Permit from MNDNR.

Impacts to groundwater resources, including aquifers, are not anticipated as water supply needs will be quite limited. It is probable that operations and maintenance water requirements will be satisfied with a single domestic-sized water well. Based on the small amount of increased impervious surface area that will be created by Project components (access roads, inverter skids, and Project substation/O&M building - 26.3 acres for the below-ground configuration and 26.4 acres for the above-ground configuration [see Table 3.3-1 in Section 3.3]), the Project will likely have minimal impacts on regional groundwater recharge. The foundations of the tracking rack system will likely be a driven steel pier and will likely not require concrete, although some concrete foundations may be required. Geotechnical soil testing will determine final installation process. Similarly, the exterior agricultural fence may require concrete foundations in some locations. If concrete is needed, it will be locally sourced; an on-site concrete batch plant will not be required for the Project.

In addition, Project facilities (i.e., the Preliminary Development Area) are located at least 319 feet from the nearest occupied residence, thereby minimizing the risk of impacts on private wells in the area. Per the purchase option agreement with the landowner, the landowner will be required to remove irrigation equipment and cap existing wells prior to construction.

A National Pollutant Discharge Elimination System (NPDES) permit application to discharge stormwater from construction facilities will be acquired by Regal from the MPCA. BMPs will be used during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion, whether the erosion is caused by water or wind. Practices may include containment of excavated material, protection of exposed soil, stabilization of restored material, and treating stockpiles to control fugitive dust. A SWPPP will be developed for the Project prior to construction that will include BMPs such as silt fencing (or other erosion control devices such as fiber logs or erosion control blankets), revegetation plans, and management of exposed soils to

prevent erosion. Because the Project will disturb more than 50 acres, Regal will submit the SWPPP to MPCA for review and approval prior to construction and obtaining coverage under the General Construction Stormwater Permit.

4.5.3 Soils and Prime Farmland

Soil characteristics within the study area were assessed using the Soil Survey Geographic database (SSURGO) (Soil Survey Staff, 2019). The SSURGO database is a digital version of the original county soil surveys developed by NRCS for use with GIS. It provides the most detailed level of soils information for natural resource planning and management. Soil maps are linked in the SSURGO database to information about the component soils and their properties (USDA, NRCS, 2019). Table 4.5-2 lists the soil types located within the Regal Land Control Area.

Less than one percent of the Land Control Area is underlain by hydric soils or soils containing hydric inclusions, indicating few, if any, wetlands as one of many wetland characteristics is hydric soil (see Section 4.5.5). All of the soils in the Land Control Area (with the exception of areas mapped as "Water") have low to moderate susceptibility to erosion by water (i.e., K-factors from 0.1 to 0.4). All of soils in the Land Control Area are in Wind Erodibility Group 2 or 3 which correspond to Wind Erodibility Indices of 134 tons/acre/year and 86 tons/acre/year, respectively (USDA NRCS, 2019).

Soils prone to compaction and rutting are subject to dramatic and adverse changes in soil porosity and structure as a result of mechanical deformation caused loading by equipment during construction. Compaction and rutting are related to moisture content and texture and are worse when medium and fine textured soils are subject to heavy equipment traffic when wet. Compaction and rutting are not anticipated to be significant issues because the soils are coarse textured and are typically excessively drained. None of the soils are particularly susceptible to compaction.

Table 4.5-2 Summary of Soils within the Regal Land Control Area

Map Unit Symbol	Soil Name	Acres	Percent of Study Area	Farmland Designation	Compaction Prone	Hydric Soil	K-Factor	Wind Erodibility Group
D20A	Isan-Isan, frequently ponded, complex, 0 to 2 percent slopes	3.7	0.5%	Not prime farmland	0.0	Yes	.20	3
D67A	Hubbard loamy sand, 0 to 2 percent slopes	462.3	57.6%	Not prime farmland	0.0	No	.02	2
D67B	Hubbard loamy sand, 1 to 6 percent slopes	308.4	38.4%	Not prime farmland	0.0	No	.02	2
D67C	Hubbard loamy sand, 2 to 12 percent slopes	26.4	3.3%	Not prime farmland	0.0	No	.02	2
D8E	Sandberg loamy coarse sand, 6 to 30 percent slopes	1.6	0.2%	Not prime farmland	0.0	No	.15	2
		802.4	**100%**		**0.0**			

Source: Soil Survey Staff, Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture (USDA), 2019.

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pasture, woodland, or other lands). Urbanized land and open water cannot be designated as prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods and is not subject to frequent or prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating) (USDA NRCS, 2019).

The NRCS also recognizes farmlands of statewide importance, which are defined as lands other than prime farmland that are used for production of specific high-value food and fiber crops (e.g., citrus, tree nuts, olives, fruits, and vegetables). Farmlands of statewide importance have the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops when treated and managed according to acceptable farming methods. Farmland of statewide importance is similar to prime farmland but with minor shortcomings such as greater slopes or less ability to store soil moisture. The methods for defining and listing farmland of statewide importance are determined by the appropriate State agencies, typically in association with local soil conservation districts or other local agencies.

Table 4.5-3 lists the soils considered prime farmland and soils of statewide or local importance within the Land Control Area. Figure 10 (Farmland Classifications) depicts the distribution of prime farmland, prime farmland if drained, and not prime farmland in the Project vicinity.

Table 4.5-3 Farmland Classifications within the Land Control Area

Farmland Classification	Area (acres)	Percent of Land Control Area
Prime Farmland	0.0	0%
Prime Farmland if Drained	0.0	0%
Farmland of Statewide Importance	0.0	0%
Not Prime Farmland	802.4	100%
TOTAL	**802.4**	**100%**

Source: Soil Survey Staff, NRCS, USDA, 2019. Web Soil Survey.

4.5.3.1 Impacts and Mitigation

Impacts and mitigation for soils are described at a high level below. A more detailed discussion is provided in the AIMP (Appendix C).

The sandy soils that will be impacted by the Project are typically excessively-drained and suited for the existing agricultural production. The Project is located on level to nearly-level topography, which is consistent with the current agricultural production.

As shown in Table 4.5-3, none of the soils impacted by the Project are classified as prime farmland soils, or prime farmland if drained; however, it is important to note that the prime farmland designation is independent of current land use (USDA NRCS, 2019).

Impacts to soils will occur during the construction and decommissioning stages of the Project. Construction may require some amount of grading to provide a level surface for the solar arrays. Because the Project location is on relatively level existing agricultural fields, the Project will minimize grading to the extent practicable (preliminary estimates are 230 acres). Additional soil impacts during construction will come from the installation of the direct-embedded piers that support the structural framework of the solar arrays, and small areas of foundations for the inverter skids, the Project Substation, and O&M structures. Based on the electrical configuration, impacts to soils will differ. Should the below-ground collection configuration be used, installation of electrical cables will require trenching all of the cables to a depth of four feet below grade for installation. If the hybrid below-ground and above-ground collection system is used, soil impacts due to trenching will be limited to the areas between the rows of panels to the inverter / transformer skids and then to the Project Substation. Conversely, should the above-ground configuration be used, soil impacts due to the below-ground installation of the electrical cables will be limited to the areas between the rows of panels and the inverter / transformer skid and then to the wooden poles and to the direct imbedding of approximately 198 18-inch diameter wooden poles. From a soils perspective, the above-ground collection configuration would have least amount of soil impacts because only a small portion of the DC and AC collection would be trenched into the ground (see Image 7 in Section 3.1.2.2). The hybrid below-ground and above-ground collection system will have the more soil impacts than the above-ground system, but less than the below-ground system. Details about construction and operation activities for the Project are provided in Sections 3.4 and 3.5, respectively.

Areas of the site to be graded will have topsoil and organic matter stripped and segregated from the subsoil. Topsoil shall have temporary and permanent stabilization measures established in accordance with the Project's SWPPP. Internal roads will be constructed of inorganic fill (road aggregate base) to match the surrounding existing ground elevations to allow existing drainage patterns to persist. Once the necessary grading is complete, subsoil will be placed followed by topsoil, blending the grade into existing topography

Following construction, Regal will restore disturbed areas to pre-construction conditions to the extent practicable. Soil erosion will be minimized by implementing environmental protection measures. These measures will include BMPs for erosion and sediment control, such as temporary seeding, permanent seeding, mulching, filter strips, erosion blankets, and sod stabilization. The soils at the Regal Solar Project are not susceptible to compaction (Table 4.5-2).

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. Writing in Cleantechnica, one of the world's top cleantech-focused news sites, engineer Jeff Briberg highlights the utility and specific benefits of using native plants on solar sites (Briberg, 2016 and Selbig and Balster, 2010).

> *"[Compared to row crops,] storm water runoff is reduced 23 percent for the 2-year storm (2.9 inches of rain) and 8 percent for the 100-year storm.*
>
> *Further, we expect a mix of prairie plants to provide superior hydrologic performance compared to monocrop turf-grasses that are common on solar sites in some areas of the country. In 2008, the U.S. Geological Survey completed a five-year storm water study in*

cooperation with a consortium of 19 cities and towns in the area of Madison, Wisconsin that revealed "striking differences between turf and prairie vegetation.

The study found "prairie vegetation had greater median infiltration rates than those with turf grass," and roots in the prairie vegetation plot were "found to a depth of 4.7 feet compared with 0.46 feet in the turf."

In addition to superior stormwater management, native plants improve the soil with organic matter over the 20 to 30-year life the Project, allowing microorganisms and soil fauna to recover after years of intensive compaction, pesticide and fertilizer application. And, over time, native plants out-compete weeds allowing ground cover to be maintained with just a single annual mow, reducing operating costs."

With the proper implementation of environmental protection measures intended to prevent, minimize, and/or reclaim soil erosion effects, no unmitigated loss of soil will result from the Project. Additionally, taking 674.3 acres for the below-ground (and hybrid) configuration and 678.2 acres for the above-ground configuration of agricultural land out of production will give the soils an opportunity to rest and regenerate. Agricultural land within the fenced area of the solar facility will be converted to open, herbaceous (i.e., grassland) cover with the exception of the substation and O&M building, inverters, and access roads which will be converted to developed land and impervious surfaces (24.3 acres and 24.4 acres for the below- (and hybrid) and above-ground configurations, respectively). Seed mixes are discussed in more detail in Section 4.5.6.

4.5.4 Surface Waters and Floodplains

The Regal Solar Project is located in the Mississippi River-Sartell Watershed Basin. Surface waters in the Project vicinity include the Mississippi and Platte Rivers. The Mississippi River is listed by MPCA as an impaired water. There are no lakes or rivers in the Land Control Area; as such, there are no MNDNR Public Waters Inventory watercourses or waterbodies in the Land Control Area. Surface waters in the Land Control Area are limited to wetlands, which are valuable for surface and subsurface water storage, nutrient cycling, retention of sedimentation, and plant and animal habitats. Wetlands are described further in Section 4.5.5.

The Regal Solar Project is in an area mapped by the Federal Emergency Management Agency (FEMA) as Flood Zone X, an area of minimal flood hazard.

4.5.4.1 Impacts and Mitigation

Because the Project is within one mile of an impaired water, Regal will submit the SWPPP to MPCA for review and approval prior to construction and obtaining coverage under the General Construction Stormwater Permit. The Project will not impact any FEMA-mapped floodplains.

4.5.5 Wetlands

The potential for wetlands within the Land Control Area was identified by reviewing desktop resources (i.e., National Wetlands Inventory (NWI) data, aerial photography, hydric soils map unites, LiDAR, and digital elevation models) followed by a formal wetland delineation within the Land Control Area in June 2018 (see Appendix E). At the time of the delineation, two palustrine

emergent wetlands (PEM) were identified at least partially within the Land Control Area. Additionally, Regal confirmed absence of an NWI-mapped north-south drainage through most of the Land Control Area. The Project boundary was revised post-delineation to avoid the wetland in the northwest portion of the Land Control Area (Wetland 1). Wetland 2 is located in the southeast portion of the Land Control Area, with the majority of the wetland located outside of the Land Control Area boundary. Two additional farmed PEM wetlands were identified within the Land Control Area during a field review of the Project by the Benton County Technical Evaluation Panel (TEP) on April 23, 2019 (see Figure 11 – Water Resources and Appendix E).

4.5.5.1 Impacts and Mitigation

The Project has been designed to avoid permanent fill to wetlands. The two farmed PEM wetlands identified by the Benton County TEP will be temporarily impacted by construction activities. Neither of the wetlands will be impacted by "permanent" facilities (i.e., those requiring permanent fill such as access roads, inverters, substation/O&M). Rather, they are both located in areas that will have racking and associated pilings. Driven pilings are not considered fill or impact that would require a wetland permit. Regal will permit temporary impacts associated with construction access and trenching within the wetlands under U.S. Army Corps of Engineers (USACE) Nationwide Permit (NWP) 51 – Land-Based Renewable Energy Generation Facilities and by the Local Government Unit (LGU) for the Minnesota Wetland Conservation Act (WCA). Regal will coordinate with both the USACE and LGU prior to construction for temporary wetland impacts. Additionally, these wetlands will be restored with a wet seed mix (Appendix C). Impacts to these two seasonal depressions that are farmed during years of normal precipitation are not expected to affect surface water drainage or off-site wetlands.

4.5.6 Vegetation

The Regal Solar Project is in the Anoka Sand Plain Subsection of the Eastern Broadleaf Forest Province (MNDNR, 2019a). The Anoka Sand Plain Subsection consists of flat, sandy lake plain and terraces along the Mississippi River. Pre-settlement vegetation consisted of oak barrens and openings. Table 4.2-6 in Section 4.2.8.1 provides the total acres of each land use type within the Preliminary Development Area. Based on the GAP landcover data, the Project would affect predominately agricultural land (98.8 percent for below-ground [and hybrid] and 98.7 percent for above-ground configurations). Developed, forest, shrubland, and introduced & semi natural vegetation within the Preliminary Development Area total 1.2 percent and 1.3 percent, respectively, for the below- (and hybrid) and above-ground configurations. Forested land within the Land Control Area consists of isolated rows of relatively young trees that were planted for use as shelter belts or wind breaks along the edges of agricultural fields and roads. In addition, based on the wetland delineation discussed in Section 4.5.5, there are three wetlands located within the Land Control Area. A discussion of wetland impacts is provided in Section 4.5.5.1.

4.5.6.1 Impacts and Mitigation

As discussed in Section 4.2.8.3, agricultural land will be converted from an agricultural use to solar energy use for the life of the Project, but most will be preserved, and the soils given the opportunity to rest and regenerate (674.3 acres for the below-ground and hybrid configurations and 678.2 acres for the above-ground configuration). Agricultural land within the Preliminary

Development Area will be converted to open, herbaceous (i.e., within the racking area) cover with the exception of the substation and O&M building, inverter skids, and access roads which will be converted to developed land and impervious surfaces (24.3 acres for the below-ground and hybrid configurations and 24.4 acres for the above-ground configuration). As noted in Sections 3.1.3 and 4.2.1, Regal has included an access road around the perimeter of the Project to provide an additional buffer from the railroad and any sparks that may ignite a grass fire.

Additionally, Regal has designed the Project to avoid any tree clearing. This includes wooded areas classified by Benton County as pine plantations and windbreaks and areas along roads that run within or along the boundary of the Land Control Area.

Typically, a solar site has a shorter prairie mix within the panel footprint, taller prairie plantings in the open space between the agricultural fence and array, and a wet seed mix for any wetlands or areas anticipated to hold water. The mixes are designed to be native and are developed with prairie specialists in coordination with the MNDNR to design a mix that will achieve Regal's goals for operating the solar facility, promote pollinator habitat, establish stable ground cover successfully, reduce erosion, reduce runoff, and improve infiltration. Regal's Vegetation Management Plan, including the three seed mixes, is included in Appendix C.

4.5.7 Wildlife

4.5.7.1 Avian Species

The Regal Solar Project is within the Mississippi Flyway, one of the primary north-south migration routes between migratory bird nesting and wintering habitat (Audubon, undated). The Land Control Area is also located within the Prairie Hardwood Transition Bird Conservation Region (BCR) (U.S. Fish and Wildlife Service [USFWS] 2008). The U.S. Fish and Wildlife Service (USFWS) identified 30 species of birds within Prairie Hardwood Transition BCR as Birds of Conservation Concern (BCC); BCC are avian species that represent the agency's highest conservation priorities. The BCC in the Prairie Hardwood Transition BCR include the bald eagle (*Haliaeetus leucocephalus*), upland sandpiper (*Bartramia longicauda*), red-headed woodpecker (*Melanerpes erythrocephalus*), brown thrasher (*Toxostoma rufum*), black-billed cuckoo (*Coccyzus erythropthalmus*), and dickcissel (*Spiza americana*) (USFWS, 2008).

Migratory birds are federally protected under the Migratory Bird Treaty Act (MBTA), and bald eagles are protected under the MBTA and Bald and Golden Eagle Protection Act (BGEPA) (USFWS, 2007; USFWS, 2018a). The MBTA protects migratory birds and most resident birds that are native to the U.S. from impacts and take. BGEPA protects and conserves bald eagles and golden eagles (*Aquila chrysaetos*) from intentional take of an individual bird, chick, egg, or nest, including alternate and inactive nests (USFWS, 2007). Unlike the MBTA, BGEPA prohibits disturbance that may lead to biologically significant impacts, such as interference with feeding, sheltering, roosting, and breeding or abandonment of a nest (USFWS, 2007).

Land uses in the Land Control Area are primarily agricultural (95.8 percent), with some small amounts of developed areas (2.6 percent), forested land (1.5 percent), shrub (0.1 percent), and open water (<0.1 percent). The forested land that is present is generally limited to shelter belts along roads. As a result, few migratory bird species that use trees or forested areas as habitat will be

present, such as bald eagle, black-billed cuckoo, and red-headed woodpecker. The Land Control Area also has little open water and two farmed wetlands; thus, few wetland- or water-dependent birds such as waterfowl and waterbirds would use the Land Control Area for nesting, although some species may forage in the agricultural fields currently present in the Land Control Area. Species of migratory birds associated with grasslands would also be limited or absent. Overall, few if any BCC are likely to use the Land Control Area as habitat.

The USFWS is also concerned about avian species that are at risk from habitat fragmentation. Species of habitat fragmentation concern are impacted when larger areas of habitat are divided into smaller areas with concomitant reductions in habitat connectivity (USFWS, 2012). At present, the Land Control Area is highly fragmented given 98.4 percent is used for agriculture or is developed. If species of habitat fragmentation concern are present in the Land Control Area, they have adapted to the fragmentation and current land uses.

4.5.7.2 Other Wildlife Species

In addition to birds, other groups of wildlife that may occur in the Land Control Area include mammals, reptiles, amphibians, and insects. Mammals that may be present include white-tailed deer (*Odocoileus virginianus*), striped skunk (*Mephitis mephitis*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), and coyote (*Canis latrans*). Reptiles and amphibians that may occur in the Land Control Area are northern leopard frog (*Lithobates pipiens*), gopher snake (*Pituophis catenifer*), plains gartersnake (*Thamnophis radix*), eastern hognose snake (*Heterodon platirhinos*), and common gartersnake (*Thamnophis sirtalis*) (MNDNR, 2019b). Given the small open water amount (<0.1 acre) in the Land Control Area, no fish species are present. Some pollinator insects may be present in the Land Control Area including native bees, butterflies, and moths.

Based on the Land Control Area's proximity to the Mississippi River, wildlife species that live in or near the river or use the river as a corridor may occasionally move through or forage in the Land Control Area. These species may include river otter (*Lontra canadensis*), North American beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), Canada geese (*Branta canadensis*), and other waterfowl; however, overall use by these species is anticipated to be low.

4.5.7.3 Impacts and Mitigation

Given that the Project is comprised primarily of agricultural lands, occurrence of wildlife within the Project is likely low. As a result, impacts on wildlife are expected to be minor, regardless which electrical configuration is implemented. Restoration of the Preliminary Development Area may result in wildlife benefits because will be revegetated with a seed mix that may promote pollinators. Common species of wildlife adapted to agricultural land use may be present in the Project such as white-tailed deer, red fox, striped skunk, wild turkey (*Meleagris gallopavo*), ring-necked pheasant (*Phasianus colchicus*), sandhill crane (*Grus canadensis*), passerines, rodents, snakes, and insects. During construction, highly mobile species of wildlife including deer, birds, and snakes are expected to divert to areas surrounding the Project. Less mobile species and ground nests of birds, eggs, and chicks may be impacted; however, given that the Land Control Area is cropland, these impacts may have occurred regardless of the Project. Overall, construction of the Project is expected to have minimal impacts on individuals of common wildlife species, and no impact on populations of these species. During operations, any potential impacts on wildlife are

also expected to be minimal and insignificant. These impacts may be related to vehicle traffic and parking or mowing. Although some individuals of common wildlife species may be impacted, no impacts would occur at the population-level, and no species-specific mitigation is proposed.

After construction and during operations, the Project may provide more wildlife habitat than the current land use provides. Regal will restore with a pollinator-friendly seed mix that may provide habitat for wildlife, including grassland birds, rodents, reptiles, and insects. In sum, although 26.3 acres for the below-ground and hybrid configurations or 26.4 acres for the above-ground configuration within the Project would have permanent facilities (i.e., access roads, Project substation and O&M building, and inverter skids) and would not serve as wildlife habitat during operations, 680.8 acres for the below-ground and hybrid configurations or 685.0 acres for the above-ground configuration would be restored as herbaceous cover, including a seed mix with some native plants, thereby potentially benefitting and increasing the overall populations of wildlife species in the area, including birds, small mammals such a moles and voles, reptiles, and pollinator insects.

4.5.8 Rare and Unique Natural Resources

Regal reviewed the USFWS Information for Planning and Conservation (IPaC) website for the federal endangered and threatened species, candidate species, and designated critical habitat that may occur in Benton County, Minnesota (USFWS, 2019). Regal also reviewed the MNDNR's Natural Heritage Information System (NHIS) for documented occurrences of federally listed species, state-listed species, and state species of concern within one mile of the Land Control Area (MNDNR, 2019c and Appendix A). Although these reviews do not represent a comprehensive survey, they provide information on the potential presence of protected species and habitat (refer to Table 4.5-4).

Table 4.5-4
Federal- and State-Listed Species Documented within One Mile of the Land Control Area

Common Name	Scientific Name	Habitat	Within One Mile of Land Control Area	Within Land Control Area	Status [a]	
					State [b]	Federal [c]
Mammals						
Northern long-eared bat [d]	*Myotis septentrionalis*	In winter, hibernates in caves and mines. In fall, swarms in forested areas surrounding hibernation sites. During late spring and summer, forages and roosts in upland forests (USFWS, 2018b)	No	No	SC	T
Birds						

Table 4.5-4
Federal- and State-Listed Species Documented within One Mile of the Land Control Area

Common Name	Scientific Name	Habitat	Within One Mile of Land Control Area	Within Land Control Area	Status [a]	
					State [b]	Federal [c]
Loggerhead Shrike	*Lanius ludovicianus*	Breeding habitat is upland prairies, agricultural fields, and grasslands with scattered shrubs and trees. In winter, migrates to southern U.S. and Mexico (Minnesota Breeding Bird Atlas [MNBBA], 2019a)	Yes	Yes	E	None
Lark Sparrow	*Chondestes grammacus*	Breeding habitat includes oak savannas, dry grasslands, and pastures with scattered shrubs and trees. In winter, occurs in Texas through Central America (MNBBA, 2019b)	Yes	No	SC	None
Freshwater Mussels						
Black Sandshell	*Ligumia recta*	Preferred habitat is medium to large rivers with sand or gravel substrates (MNDNR, 2019d).	Yes	No	SC	None

[a] E = Endangered, T = Threatened, SC = Special Concern
[b] MNDNR, 2019c
[c] USFWS, 2019
[d] Regal's review of the NHIS did not indicate any records of the northern long-eared bat within a mile of the Land Control Area or within the Land Control Area; however, review of the USFWS IPaC indicated that the species has the potential to occur in Benton County.
[e] Regal's review of the NHIS also showed four records of two other freshwater mussel species within one mile of the Land Control Area, but these species are not listed as state threatened, endangered, or special concern.

4.5.8.1 Federal Listed Species

According to Regal's review of the USFWS IPaC, the northern long-eared bat (NLEB) (*Myotis septentrionalis*) is the only species that is listed as threatened or endangered under the federal Endangered Species Act (ESA) that may occur in Benton County, Minnesota. There is no federally designated critical habitat in Benton County (USFWS, 2019).

The NLEB is listed as threatened under the federal ESA. It is medium-sized bat species that occurs across the eastern and central U.S. (Caceres and Barclay, 2000). The annual life history of the

NLEB includes an inactive period when the species is hibernating and an active period when the species forages, raises its young, and breeds. Hibernation generally occurs in caves and mines between November 1 and March 31 (USFWS, 2016a; USFWS, 2016b). In April, the species emerges from its hibernacula and moves to summer habitat. NLEB typically forage on flies, moths, beetles, caddisflies, and other insects in the understory of wooded areas (USFWS, 2016b). Adult females form breeding or maternity colonies that are variable in size, ranging from a few individuals to as many as 60 adults (Caceres and Barclay, 2000; Wisconsin Department of Natural Resources, 2015). During the summer, the species roosts in live and dead trees in cavities and crevices and under bark (Timpone et al., 2010). The NLEB forages primarily in forested areas (USFWS, 2016b). The NLEB is currently seeing a population decline due to a disease that affects hibernating bats called white-nose syndrome (WNS).

The Land Control Area is primarily agricultural lands with small amounts of forested areas and developed lands. During their active season (April 1 through October 31), NLEB may roost in the trees within the Land Control Area or may fly through the Land Control Area to forage in larger forested areas near the Mississippi and Platte Rivers.

4.5.8.2 State Listed Species

State-listed species with documented occurrences within one mile of the Land Control Area are shown in Table 4.5-4. Based on Regal's NHIS review, there is one record of a state-endangered loggerhead shrike that partially overlaps the Land Control Area. Two species of special concern were documented within one mile of the Land Control Area, lark sparrow and black sandshell.

Loggerhead shrike occur in grasslands, agricultural fields, and upland prairies with suitable perches for hunting for prey and scattered shrubs and trees for nesting. Farms with fence lines, shelterbelts, and hedgerows may be particularly suitable. Loggerhead shrike nest within narrow windbreaks and hedgerows or in isolated trees near grasslands, pastures, and agricultural fields. The diet of loggerhead shrike includes large insects and small mammals, birds, and reptiles; prey is often impaled on barbed wire or a thorny shrub prior to consumption (MNBBA, 2019a). Habitat for the loggerhead shrike is likely present within the Land Control Area, given the predominance of agriculture along with the isolated rows of trees along the edges of agricultural fields and roads.

The lark sparrow is an edge-dependent species of open-country habitats, including dry grasslands, oak savannahs, and pastures with scattered small trees and shrubs. The species is often present in small flocks even in the breeding season. It typically nests on the ground at the base of a small woody plant or forb or in small trees and shrubs. The lark sparrow is an omnivore that eats primarily arthropods and seeds (MNBBA, 2019b). Because habitats used by the lark sparrow are not present within the Land Control Area, no lark sparrows are expected to nest within the Land Control Area.

Black sandshell inhabit the riffle and run areas of medium to large rivers with sand or gravel substrates. Like other species of freshwater mussels, the black sandshell has a complex reproductive cycle. Fish hosts of the species' glochidial larvae include largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), white crappie (*Pomoxis annularis*), and sauger (*Stizostedion canadense*) (MNDNR, 2019d). No rivers are located in the Land Control Area, and thus, no black sandshell will be present.

4.5.8.3 MNDNR High Value Areas

The MNDNR issued guidance for commercial solar sites entitled Commercial Solar Siting Guidance (May 2016) (Solar Guidance) that recommends identification of high value resources during Project development. High value resources include (1) rare species and native plant communities (NPCs); (2) native prairie; (3) species and habitats included in the Wildlife Action Network and Minnesota Wildlife Action Plan; (4) lakes, wetlands, streams, and rivers; (5) large block habitats; (6) public conservation and recreation lands; and (7) properties in government programs or with conservation easements (MNDNR, 2016a).

Rare Species and Native Plant Communities

Rare species including federal- and state-listed species are discussed in Sections 4.5.8.1 and 4.5.8.2. This includes records of federal and state-listed species tracked by the MNDNR in the NHIS database. Additionally, the MNDNR has classified native plant communities (NPCs) within the state using plant species, soils, and other site-specific data from vegetation plots. The current NPC classification covers most of the wetland and terrestrial vegetation in the state and was completed in 2003. It is a six-level hierarchical classification that accounts for vegetation structure and geology, ecological processes, climate and paleohistory, local environmental conditions, canopy dominants, substrate, and environmental conditions (Aaseng et al., 2011). Based on a review of the MNDNR's data, there are no NPCs or mapped native prairie within the Land Control Area.

MNDNR's Minnesota Biological Survey (MBS) assesses Minnesota landscapes for NPCs, rare animals, rare plants, and animal communities through desktop review and follow-up field survey. Based on this assessment, MBS designates and assigns rankings to Sites of Biodiversity Significance (SOBS), based landscape context, NPC, and occurrence of rare species populations. The MBS groups and ranks SOBS for each Minnesota's system subsections for the purpose of designating and cataloguing the state's most notable examples of NPCs and rare species. There are four ranks for SOBS: outstanding, high, moderate, and below (MNDNR, 2009). Based on a review of the MNDNR's data, there are no SOBS within the Land Control Area.

Native Prairie

Native prairie is defined as a grassland that has not been plowed with plant species typical of prairies (MNDNR, 2016a). The MNDNR's railroad prairie rights-of-way are native prairie remnants that occur along railroad rights-of-way. The railroad rights-of-way program was instituted in 1997 by the Minnesota legislature in the Prairie Parkland and Eastern Broadleaf Forest ECS Provinces. The MNDNR ranks railroad rights-of-way into three categories: very good, good, and fair. There is no DNR-mapped native prairie in the Land Control Area. The Land Control Area is adjacent to a railroad prairie right-of-way that was ranked as fair in 1998; a ranking of fair means that the prairie remnant has greater than 25 percent native grass cover, greater than 5 percent native forb cover, and less than 50 percent woody cover.

Wildlife Action Network and Minnesota Wildlife Action Plan

The Wildlife Action Network is comprised of areas with high concentrations or persistent or viable populations of Species of Greatest Conservation Need (SGCN), in addition to SOBS, Lakes of

Biological Significance, and streams with exceptional indices of biological integrity. Minnesota's State Wildlife Action Plan (SWAP) (2015-2025) proactively addresses the state's conservation needs and catalyzes actions to prevent species from becoming listed under the state or federal ESAs. The SWAP also entailed revisions to the state's list of SGCN. SGCN are native animals with rare, declining, or vulnerable populations and species for which the state has a stewardship responsibility (MNDNR, 2016b).

The Land Control Area does not intersect any habitats within the Wildlife Action Network including SOBS, lakes of biological significance, or streams with exceptional indices of biological integrity. Based on Regal's review of the MNDNR's NHIS, no SGCN have been documented within the Land Control Area.

Lakes, Wetlands, Streams, and Rivers

Lakes, wetlands, streams, and rivers are discussed in sections 4.5.4 and 4.5.5. There are no lakes, streams or rivers in the Land Control Area; there are two farmed wetlands in the Land Control Area.

Large Block Habitats

Large block habitats are grassland habitats of greater than 40 acres (MNDNR, 2016b). The Land Control Area is over 95 percent agricultural land use and contains no large block habitats.

Public Conservation and Recreation Lands

Public conservation and recreation lands include state lands administered by the MNDNR or by counties; scientific and natural area units; publicly accessible state WMAs; state forest statutory boundaries and management units; state parks, recreation areas, and waysides; state trails of Minnesota; public water access sites in Minnesota; and state aquatic management area acquisitions (MNDNR, 2016a). There are no public conservation and recreation lands in the Land Control Area; public conservation and recreation lands in the Project vicinity are discussed in Section 4.2.7.

Properties in Government Programs or with Conservation Easements

Based on the MNDNR's Solar Guidance, properties in government programs or with conservation easements include MNDNR Native Prairie Bank, Reinvest in Minnesota, Forest Legacy easements, and USFWS conservation easements (MNDNR, 2016a). There are no properties in government programs or with conservation easements in the Land Control Area.

4.5.8.4 Impacts and Mitigation

Federal Listed Species

The USFWS published a final 4(d) rule for the NLEB on January 14, 2016. In the final 4(d) rule, the agency limited prohibitions for the species to those that would protect the bat in WNS-affected geographic areas during the most vulnerable stages in the species' life history—specifically, during hibernation, spring staging, fall swarming, and pup rearing (USFWS, 2016a). The Land Control Area is located within the USFWS-designated WNS Zone (USFWS, 2018c). Per the USFWS

Final 4(d) for the NLEB, within the WNS Zone, incidental take due to tree removal is prohibited as follows:

- If it occurs within 0.25 mile of a documented hibernaculum, or
- If it involves a documented maternity roost tree or other trees within 150 feet of the documented maternity roost tree during June or July.

In addition, all take within known hibernacula is prohibited (USFWS, 2016a).

Records of documented hibernacula and roost trees are maintained in the MNDNR's NHIS. Based on a review of NLEB NHIS records, Regal determined that there are no documented NLEB maternity roost trees within 150 feet of the Land Control Area or hibernacula within 0.25 mile of the Land Control Area. Although there are no records of NLEB, the species may still be present in the Land Control Area. Under Section 7(a)2 of the federal ESA, federal action agencies may rely upon the Programmatic Biological Opinion for the Final 4(d) Rule developed by USFWS on January 5, 2016 to meet its Section 7 consultation responsibilities for the NLEB (USFWS, 2016b). Under the Programmatic Biological Opinion, Project proponents may use a streamlined approach involving an online NLEB 4(d) rule determination key and consultation form. After submittal of the consultation form, the USFWS has 30 days to respond. If no response is received, the federal action agency can assume that the Project may affect but is not likely to cause prohibited take of individual NLEB, and consultation requirements for the species under Section 7(a)2 are complete. Regal will use the streamlined approach and Programmatic Biological Opinion for the Final 4(d) rule and will submit an online NLEB consultation form for the Regal Solar Project prior to construction.

Overall, Regal does not anticipate that the Project will impact NLEB during construction or operation. Construction of the Project will not require tree clearing; thus, Regal does not anticipate that any individuals would be injured or killed due to clearing of occupied trees during the species' active window (April 1 – October 31). NLEB may be temporarily disturbed during construction activities due to human presence or noise if they are roosting in the trees within the Land Control Area, but Regal anticipates that any impacts due to noise and human presence would be insignificant.

State Listed Species

Based on Regal's NHIS review, one state-endangered species, the loggerhead shrike, was documented within one mile of the Land Control Area; this species' record also intersects and is within the Land Control Area (refer to Table 4.5-4). Potential impacts on the loggerhead shrike would be related to tree clearing and disturbance from equipment or humans during construction. Tree-nesting birds such as the loggerhead shrike may be affected during tree clearing if nests with eggs or chicks are present in the trees that are cleared. No tree clearing is needed for construction and operation of the Regal Solar Project. Thus, no impacts on nests are anticipated. Loggerhead shrike in the area are acclimated to human activity and equipment because of the predominant agricultural land-use in the Land Control Area and surrounding areas. Regal will implement the BMPs for the loggerhead shrike recommended by the MNDNR in their October 11, 2018 letter on the Project. Specifically, Regal has designed the Project to avoid tree and shrub removal.

Additionally, Regal will also report any loggerhead shrike sightings to the MNDNR. Overall, impacts on loggerhead shrike due to the Project are expected to be insignificant.

Regal's review of MNDNR's NHIS records showed two records of state species of special concern within one mile of the Land Control Area, lark sparrow and black sandshell; there are no records of state species of special concern within the Land Control Area (refer to Table 4.5-4). The state's designation as a species of special concern for these two species does not afford protections under the Minnesota Endangered Species Statute (Minnesota Statutes, Section 84.0895). Regal does not expect any impacts on the lark sparrow due to Project construction or operations. Habitat used by the lark sparrow (i.e., dry grasslands, oak savannahs, and pastures with scattered small trees and shrubs) is not present in the Land Control Area, and thus, Regal does not expect that Project construction would impact any lark sparrow nests. After restoration and during operation, habitat more suitable for the lark sparrow may be present. However, lark sparrow are not expected to nest in the Land Control Area given the solar panels and associated facilities present and the abundance of more suitable habitat in the Project vicinity. Regal also does not anticipate impacts on the black sandshell because no suitable aquatic habitat is present in the Land Control Area.

MNDNR High Value Areas

Federal- and state-listed species are described above. There are two farmed wetlands in the Preliminary Development Area. There are no additional MNDNR High Value Areas in the Land Control Area, including NPCs; native prairie; SGCN species; large block habitats; lakes, streams, and rivers; public conservation and recreation lands; and properties in government programs or with conservation easements. As such, impacts to MNDNR High Value Areas will be minimal and no mitigative measures are proposed.

4.6 Unavoidable Impacts

Regal developed the Project to avoid impacts to environmental resources whenever possible. In some cases, impacts to environmental resources could not be entirely avoided, but could be minimized by implementation of mitigation measures. A detailed discussion of the environmental impacts of the proposed Project, as well as the mitigation measures that would be used to minimize impacts is presented in Sections 4.1 through 4.5 of the Site Permit Application. Environmental impacts that would be minimized by the use of mitigation measures, but not entirely avoided are provided below. Most of these unavoidable impacts would occur during construction of the Project and would resolve with the completion of construction.

Unavoidable impacts related to the Project that would last only as long as the construction period include:

- noise emitted from vehicles and equipment during construction that will be audible to neighboring landowners, including the Two Rivers Campground;
- increased traffic on roads that bisect the Land Control Area;
- minor air quality impacts due to fugitive dust;
- potential for soil erosion; and
- disturbance to and displacement of some species of wildlife.

Unavoidable impacts related to the Project that would last as long as the life of the Project would include:

- changes to existing aesthetics of landscape (from agrarian to solar facility), which will be visible from local roadways, parcels, a snowmobile trail, and Two Rivers Campground;
- a snowmobile trail will be rerouted around the solar facility; and
- changes in land use and vegetation from agricultural land of predominately corn with above-ground irrigators to a solar facility with herbaceous vegetation underneath and around the Preliminary Development Area.

5.0 AGENCY AND PUBLIC OUTREACH

This section describes outreach efforts conducted by Regal Solar and discusses pre-Application involvement by federal, state, and local agencies as well as the public information outreach campaign. Throughout the process, Regal Solar provided opportunities for stakeholders and potentially affected landowners to participate in the siting process. This engagement provided Regal Solar with valuable insight into landowner and public agency preferences regarding development of Project facilities.

5.1 Agency Involvement in Pre-Application

As part of pre-Application efforts, Regal Solar initiated its outreach campaign to public agencies through in person meetings and Project notification letters. Many agencies, stakeholders, landowners, and interested parties, were contacted to gather feedback on the Project (refer to Table 5.1-1). This included meetings with the MDA, MNDOT, and township and county officials.

On September 11, 2018, Regal Solar sent an informal Project introduction letter and map to federal, state agencies (Appendix A). On March 13, 2019, Regal sent an introduction letter and map to local agencies and stakeholders with jurisdiction in the Land Control Area. Regal requested input with respect to the resources under their jurisdiction as well as the identification of permits and/or approvals that may be potentially required for the Project.

A representative letter and responses received as of July 2019 are included in Appendix A. A summary of responses and meetings with federal and state agencies is included below. Regal Solar will continue to coordinate with township and county officials as the Project moves forward and will seek any necessary local permits. Table 5.1-1 identifies agencies that were contacted through meetings or a notification letter and the date that the consultation was conducted.

Table 5.1-1
Regal Solar Agency Correspondence

Agency	Response Date (Type)
Federal	
U.S. Army Corps of Engineer, St. Paul District and Brainerd Field Office– Regulatory Branch	October 22, 2018 (Agency response) May 13, 2019 (Agency response)
U.S. Fish and Wildlife Service – Twin Cities Ecological Services Field Office	No response to date
Federal Aviation Administration	October 12, 2018 (Agency response)
State	
Minnesota Historical Society – State Historic Preservation Office	April 18, 2019 (Agency response)
Minnesota Department of Natural Resources – Energy Projects Review – State Office and Region 3 (Central Region)	October 12, 2018 (Agency response) April 18, 2019 (Agency response)
Minnesota Department of Natural Resources – Natural Heritage Information System Review	October 11, 2018 (Agency response)

Table 5.1-1 Regal Solar Agency Correspondence	
Agency	**Response Date (Type)**
Minnesota Department of Agriculture – Commissioner's Office	October 5, 2018 (Agency response) April 9, 2019 (Meeting) June 27, 2019 (Agency Response) July 16, 2019 (Agency Response)
Minnesota Department of Transportation – District 3 (Central Region)	March 5, 2019 (Agency response) May 9, 2019 (Meeting)
Minnesota Department of Employment & Economic Development	No response to date
Minnesota Pollution Control Agency – Brainerd Office	December 6, 2018 (Agency response)
County	
Benton County – Board of Commissioners	May 7, 2019 (Letter of support)
Benton County – Department of Development	May 6, 2019 (Agency response)
Local Government Units	
Langola Township – Board of Supervisors	May 1, 2019 (Letter of support) March 12, 2019 (Meeting) April 4, 2019 (Meeting)
City of Rice – Mayors Office	No response to date
City of Royalton – Mayors Office	April 4, 2019 (Meeting)
Sauk Rapids-Rice School District	March 12, 2019 (Meeting)
Royalton School District	No response to date

5.1.1 Federal Agencies

5.1.1.1 U.S. Army Corps of Engineers

The Project may require authorization from the USACE for wetland impacts under Section 404 of the Clean Water Act. On October 22, 2018, the USACE responded to the Project introduction letter and provided information regarding the potential permitting process for the Project including requirements under Section 10 of the Rivers and Harbors Act, Sections 404 and 401 of the Clean Waters Act, as well as additional consultations that may be required for the Project.

On May 13, 2019, the USACE provided concurrence with the wetland delineation report submitted to the agency on May 3, 2019. The boundaries shown on the wetland delineation report accurately reflect the limits of the aquatic resources in the review area.

Regal will work with the USACE on temporary impacts to two farmed PWM wetlands identified by the Benton County TEP. Temporary impacts are anticipated to be authorized under NWP 51 – Land-Based Renewable Energy Generation Facilities.

5.1.1.2 Federal Aviation Administration

As noted in Section 4.2.9, Regal filed FAA 7460-1 Notice of Proposed Construction forms for the perimeter of the Land Control Area. On October 12, 2018, the FAA provided Determinations of

No Hazard to air navigation for each of the seven points around the Land Control Area. As such, Project facilities will not exceed obstruction standards and would not be a hazard to air navigation.

5.1.2 State Agencies

5.1.2.1 Minnesota State Historic Preservation Office

As discussed in Section 4.4, Regal Solar submitted a copy of its Phase I cultural resources inventory report to the Minnesota SHPO in March 2019. On April 18, 2019, the Minnesota SHPO responded and concurred with Area M's recommendations that the Project would not affect historic properties listed in or eligible for listing in the NRHP.

5.1.2.2 Minnesota Department of Natural Resources

The MNDNR responded to Regal Solar's Project notification letter on October 12, 2018 and provided copies of guidance documents the MNDNR has prepared for commercial solar projects, "Commercial Solar Siting Guidance" and "Prairie Establishment and Maintenance Technical Guidance for Solar Projects." These documents contain general guidelines and standard recommendations specific to commercial-scale solar projects. The agency also recommended that any new utility lines be built underground to avoid avian collisions; or, if underground lines are not feasible, that swan type bird diverters should be placed on any overhead transmission lines. Regal will coordinate with MNDNR on the use of bird diverters.

On October 11, 2018, the MNDNR NHIS program provided a response for rare species or other significant natural features known to occur within a one-mile radius of the Regal Solar Project. The state agency noted records of loggerhead shrike (state-listed endangered bird) and lark sparrow (bird of special concern) in the vicinity of the Project. MNDNR provided recommendations to minimize potential impacts to these birds (if the Project boundary contains undisturbed grassland) including avoiding tree and shrub removal during the breeding season (April – July), reporting loggerhead shrike sightings to MNDNR, and referencing a loggerhead shrike fact sheet. Regal has implemented these recommendations.

Regal Solar contacted the MNDNR on April 2, 2019 to request review of seed mixes that would be used to restore the Land Control Area after the Project facilities are installed. On April 18, 2019, the MNDNR responded with approval of the seed mixes proposed by Regal Solar.

5.1.2.3 Minnesota Department of Agriculture

On October 5, 2018, the MDA responded to the initial Project notification letter and requested a meeting with Regal Solar to discuss the Project and the siting decision process to date.

Regal Solar met with representatives of the MDA on April 9, 2019 to discuss the Project. Regal Solar and MDA discussed the Project's need to develop an AIMP and reviewed the AIMP's contents and site-specific characteristics. On May 23, 2019, Regal Solar provided a draft of the Regal AIMP; MDA reviewed and provided comments the draft AIMP on June 27, 2019. Regal provided a redline version of the final AIMP, including updates to address the agency's comments on July 16, 2019. The final draft AIMP is included as Appendix C.

5.1.2.4 Minnesota Department of Transportation

MNDOT provided early review comments on the Regal Solar Project on March 5, 2019. These early comments revolved around access, vegetation management, and permitting. Regal held a follow-up meeting with MNDOT on May 9, 2019 and confirmed that, according to MNDOT records, mesic prairie is not located within the Land Control Area and vegetative screening along Highway 10 is not necessary due to the existing vegetation present along the highway and overall low potential for glare.

5.1.2.5 Minnesota Pollution Control Agency

On December 6, 2018, the MPCA responded to the initial Project notification letter and provided information about construction and operational stormwater permits, including SWPPP development requirements, that may apply to the Project.

5.1.3 Benton County and Local Government Units/Stakeholders

Regal Solar hosted a meeting with LGUs on March 12, 2019 to provide an overview of the Project and an informational meeting on April 4, 2019 to introduce the Project to landowners within a quarter mile of the Land Control Area in addition to LGUs. Attendance from LGU representatives at these meetings is summarized in Table 5.1-1.

5.1.3.1 Benton County

On May 7, 2019, Regal received a letter of support from the Benton County Board of Commissioners. The Board of Commissioners stated that the Project, "…represents cost effective renewable energy generation…" and would enhance economic development in the county, contribute to tax revenues at the county and township level, benefit local school districts through the Education fund, and increase employment opportunities.

5.1.3.2 Benton County Department of Development

On May 6, 2019, the Benton County Department of Development provided a Notice of Decision concurring with the wetland boundaries and types in the amended wetland delineation report (April 22, 2019). Regal will coordinate with the Benton County Department of Development for temporary impacts to two farmed wetlands under the Minnesota WCA.

5.1.3.3 Langola Township

On May 1, 2019, Regal received a letter of support from the Langola Township Board of Supervisors. The Board of Supervisors stated its belief that the Project will have a positive economic impact on Benton County and Langola Township.

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