# APPLICATION FOR A SITE PERMIT FOR THE RED ROCK SOLAR PROJECT

**SUBMITTED TO:**

## MINNESOTA PUBLIC UTILITIES COMMISSION

**DOCKET NO. 19-620**

**SUBMITTED BY:**


**RED ROCK SOLAR, LLC**

**C/O APEX CLEAN ENERGY, INC.**
**8665 HUDSON BLVD. NORTH, SUITE110**
**LAKE ELMO, MINNESOTA**
**55042**


**COTTONWOOD COUNTY, MINNESOTA**

**NOVEMBER 2020**

| | |
|---|---|
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# ACRONYM LIST

| | |
|---|---|
| AADT | Annual Average Daily Traffic |
| AC | alternating current |
| AIMP | Agricultural Impact Mitigation Plan |
| Apex | Apex Clean Energy Holdings, LLC |
| Applicant | Red Rock Solar, LLC |
| Application | Site Permit Application |
| AQI | Air Quality Index |
| 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 |
| BOP | Balance of Plant |
| CAA | Clean Air Act |
| CN | Certificate of Need |
| CO | carbon monoxide |
| Commission | Minnesota Public Utilities Commission |
| CON | Certificate of Need |
| CSAH | County State Aid Highway |
| CWI | County Well Index |
| dB | decibels |
| dBA | A-weighted decibels |
| DC | direct current |
| ECS | Ecological Classification System |
| Red Rock/Red Rock Solar | Red Rock Solar, LLC |
| EMF | electromagnetic field |
| EPA | U.S. Environmental Protection Agency |
| ESA | Endangered Species Act |
| FAA | Federal Aviation Administration |
| FEMA | Federal Emergency Management Agency |
| GPS | Global Positioning System |
| GIS | Geographic Information System |
| GW | gigawatt |
| IPaC | Information for Planning and Conservation |
| kV | kilovolt |
| $L_{10}$ | 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 |
| Mbps | megabytes per second |
| MDH | Minnesota Department of Health |
| mG | milliGauss |
| MISO | Midcontinent Independent System Operator |
| 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 |
| NPCs | native plant communities |
| 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 | operations and maintenance |
| $O_3$ | ozone |
| PEM | palustrine emergent wetland |
| PM | particulate matter |
| POI | point of interconnection |
| Prime Farmland Guidance | Minnesota Department of Commerce issued *Solar Energy Production and Prime Farmland: Guidance for Evaluating Prudent and Feasible Alternative* |
| Project Boundary | Approximately 846-acre area of privately-owned land for which Red Rock Solar, LLC has leases to allow siting and construction of the Project |
| Project Footprint | Approximate 483-acre area where Red Rock Solar, LLC proposes to build the Red Rock Solar Project facilities |
| PV | photovoltaic |
| PWI | Public Waters Inventory |
| RFP | Request for Proposal |
| RP | Route Permit |

| | |
|---|---|
| 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 |
| Solar Guidance | Minnesota Department of Natural Resources Commercial Solar Siting Guidance (2016) |
| Solar Project | Red Rock Solar Project |
| SSA | sole source aquifer |
| SSURGO | Soil Survey Geographic Database |
| SWAP | State Wildlife Action Plan |
| SWPPP | Stormwater Pollution Prevention Plan |
| 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 |
| 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; | 1.2.1 |
| 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; | 1.2.2 |
| 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; | 2.1, 2.2 |
| 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; | 1.2.1 |
| 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; | 4.2.9, 3.1.8, and 3.1.7 |
| 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

Red Rock Solar, LLC (Red Rock, Red Rock Solar, or Applicant), an indirect wholly owned subsidiary of Apex Clean Energy Holdings, LLC (Apex), 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.

Red Rock proposes to construct the Red Rock Solar Project (Solar Project or Project), a solar energy conversion facility with an up-to-60-megawatt (MW) alternating current (AC) nameplate capacity, in Midway Township, Cottonwood County, Minnesota (Figure 1 – Project Location). The Solar Project will generate up to 60 MW, enough energy to provide electricity for approximately 12,000 homes annually. Red Rock Solar plans to construct the Project on a schedule that facilitates an in-service date by the end of 2022.

The 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. Red Rock submitted a request to the Minnesota Department of Commerce for a size determination on June 29, 2020 in accordance with Minnesota Statutes Section 216E.021 (2019). On July 21, 2020 Minnesota Department of Commerce determined that the Red Rock Solar Project is not associated with any other current or planned solar projects in Minnesota (see Appendix A – Agency Correspondence). Red Rock 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 August 27, 2020. The Site Permit is the only site approval needed for construction of the Solar Project (Minnesota Statutes 216E.10, subd. 1.). Other permits and licenses required for the Solar Project are listed in Section 1.4.2.

Apex is an independent renewable energy company based in Charlottesville, Virginia. Since its founding in 2009, Apex has become one of the fastest-growing companies in the industry. More than a dozen Apex-originated wind and solar facilities are now operating around the country, totaling nearly three gigawatts (GWs), with another one GW scheduled to be brought online in the coming months. Operating assets under management have grown to 1.6 GW. Apex has signed contracts for the sale of more than 20 projects totaling over five GW of capacity, and our development portfolio of approximately 20 GW of wind, solar, and storage projects is one of the largest in the United States. Apex's mission-driven team of more than 200 renewable energy experts uses a data-focused approach to create solutions for the world's most innovative and forward-thinking customers.

## 1.1 Purpose and Need

Red Rock is proposing the up to 60 MW Solar Project as part of a hybrid wind/solar renewable project with the Big Bend Wind Project, also being developed by Apex. Together, the Big Bend Wind Farm and Red Rock Solar Project will generate up to 335 MW of renewable energy (275 MW of wind and 60 MW of solar) or up to 308 MW of only wind (see the Big Bend Wind Project in Docket No. IP7013/WS-19-619). The renewable energy generated by the Big Bend Wind Project and Red Rock Solar Projects will be transferred to the transmission grid via the 18-mile Big Bend Wind 161 kilovolt Transmission Line (see Docket No. IP7013/TL-19-621).

The Solar Project will provide renewable, solar energy to help meet the clean energy goals of a utility or commercial or industrial purchaser. Minnesota has a significant and important solar resource that can and is being used for capacity services within the State's generating portfolio. Solar is a good capacity resource, whereas wind is a good energy resource. Additionally, on average, wind and solar production profiles complement each other given the inverse nature of high winds and a bright sun. Using the solar and wind hybrid generation model can raise the renewable energy penetration level higher than solar or wind generation alone. As a result, these two technologies complement each other and are not true substitutes. There is a need for both wind and solar energy in Minnesota's renewable portfolio. As one of the state's first hybrid renewable projects, and one that is fairly close to the Twin Cities, the combined solar and wind project is much more attractive from a demand perspective. Pairing the solar with the larger wind project is significantly more cost efficient than developing solar as a standalone resource. Most of the larger substation and transmission infrastructure serves both solar and wind. Hence, the capital expenditure to procure the solar panels and PV inverters is significantly offset by the shared balance of plant facilities on a hybrid project relative to a standalone solar project.

## 1.2 Applicant Information

### 1.2.1 Statement of Ownership

Red Rock has entered into lease agreements with the landowners for the Solar Project site; Red Rock has a purchase option for the Solar Project Substation area. The Solar Project will be constructed, owned, and operated by Red Rock, a wholly owned subsidiary of Apex. The land is currently owned by C Larson Family Farm, James and Carol Dick, Down Family Farms, Bruce and Beverly Falk, Willard Frisen, Bradley Krehbiel, Steven Kremmin, Elain Regier, John and Amy Regier, Schwartz Farms, and Rodney Stenk.

### 1.2.2 Permittee and Contact Information

The permittee for the Site Permit will be:

Red Rock Solar, LLC
c/o Apex Clean Energy, Inc.
8665 Hudson Blvd. North, Suite 110
Lake Elmo, MN 55042

The contact persons regarding this Application are:

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## 1.3 Project Schedule

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

**Table 1.3-1**
**Project Schedule**

| Project Stage | Timing | Comments |
|---|---|---|
| Land Acquisition | Complete | Red Rock has solar easements for all land required for the Project facilities. |
| Site Permit | 3rd Quarter 2021 | Red Rock anticipates the Site Permit to be issued fall 2021 |
| Other Permits | 3rd Quarter 2021 | Red Rock will acquire all other permits necessary for the Project prior to construction. See Table 1.4-1. |
| Equipment Acquisition | 3rd Quarter 2021 | Final equipment selection 3rd Quarter 2021 |
| Construction | 2nd Quarter 2022 | Construction is anticipated to last seven months |
| Commercial Testing | 3rd Quarter 2022 | - |
| Commercial Operations | 4th Quarter 2022 | - |

## 1.4 Required Project Permits

### 1.4.1 Certificate of Need

A Certificate of Need (CN) 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 Solar Project is a generating plant larger than 50 MW, it meets the definition of a large energy facility and would require a CN prior to issuance of a Site Permit and construction. The Project does not currently fall within a statutory exemption from the CN requirements. Red Rock's CN Application is available in MPUC Docket No. IP-7014/CN-19-486.

### 1.4.2 Other Permits

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

**Table 1.4-1**
**Potential Permits and Approvals for the Red Rock Solar Project**

| 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 |
| **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 Natural Resources | Water Appropriation Permit | Required if trench dewatering is necessary | To be obtained prior to construction, if necessary |
| Minnesota Department of Labor and Industry | Request for Electrical Inspection | Required to comply with the state electrical code | To be obtained during construction. |
| State Historic Preservation Office | Review and Coordination | Provide concurrence on Phase I inventory | To be submitted 4th Quarter 2020 |
| **County/Local** | | | |
| Cottonwood County | Floodplain Development Permit | Required for development within a floodplain | Not applicable. There are no Federal Emergency Management Agency mapped floodplains in the Project Boundary |
| | County Entrance Permit | Required for access from county roads | To be obtained prior to construction |
| | Utility Permit | Required to place facilities within public road right-of-way | To be obtained prior to construction, if necessary |
| | Local government unit for Minnesota Wetland Conservation Act | Required for wetland impacts | To be obtained prior to construction, if necessary |

## 1.5 Request for Joint Proceeding with Certificate of Need Application

As described above, Red Rock has applied for a Certificate of Need for the Wind Project in Docket No. IP7014/CN- 7014/CN-19-486 and Big Bend Wind has filed a Site Permit Application in Docket No. IP- IP7013/WS-19-619, a Route Permit Application in Docket No. IP7013/TL-19-621, and Certificate of Need in Docket No. IP-7013/CN-19-408. Minnesota Statute section 216B.243, subdivision 4 and Minnesota Rule 7849.1900, subpart 4 permit the Commission to hold joint proceedings for the Certificate of Need and Route Permit in circumstances where a joint hearing is feasible, more efficient, and may further the public interest. Collectively, the Big Bend Wind Project, Red Rock Solar Project, and associated Big Bend Wind Transmission Line represent Minnesota's first hybrid wind/solar/transmission project. As such, Big Bend respectfully requests that the Commission order a joint regulatory review process for the Red Rock Solar Site Permit and Certificate of Need and Big Bend Route Permit, Site Permit, and Certificate of Need applications. Holding a joint proceeding is in the public interest because it will make it easier for members of the public to participate in the proceedings, provide a comprehensive record of all benefits, impacts and minimization measures related to the Wind Project, Solar Project, and the Transmission Line Project and improve administrative efficiency.

# 2.0 PROJECT DESCRIPTION

## 2.1 Overall Project Description

Red Rock Solar is currently developing the Red Rock Solar Project, an up to 60 MW solar photovoltaic (PV) facility located in eastern Cottonwood County, Minnesota. Additionally, Big Bend Wind, LLC, also an affiliate of Apex. is developing the Big Bend Wind Project. Together, the Big Bend Wind Project and Red Rock Solar Project represent Minnesota's first potential wind-solar hybrid renewable energy project. As proposed, the renewable energy generation could consist of up to 308 MW of wind, or a combination of wind and up to 60 MW of solar. Big Bend will need to build approximately 18 miles of 161 kV transmission line to connect the Solar Project and the Wind Project to the Blue Lake-Wilmarth-Interstate Junction 345 kV transmission line at Xcel Energy's Crandall switching station. The Big Bend Wind Project and Red Rock Solar Project have separate but collocated Project Substations. Because the proposed transmission line is 161 kV and more than 1,500 feet in length a Route Permit (RP) from the Commission will be required, pursuant to Minn. Stat. Ch. 216E and Minn. R. Ch. 7850. Big Bend's RP application is available in Docket No. IP7013/TL-19-621.

## 2.2 Size and Location

Red Rock is proposing to build its solar facility in Sections 1, 2, 11, 12, 14, 22, and 23, Township 106 North, Range 34 West, Cottonwood County, Minnesota (Figure 1 – Project Location). Red Rock has obtained leases for 846.2 acres of privately-owned land (Project Boundary; five acres of this privately owned land has a purchase option for the Solar Project Substation). Based on preliminary design, Project facilities will cover approximately 483 acres of the Project Boundary (Project Footprint). There are approximately 363.8 acres of the Project Boundary for which Red Rock has site control, but are currently not contemplated for occupation by solar facilities (Figure 2 – Project Boundary and Project Footprint). The 363.8-acre portion of the Project Boundary that will not be utilized by the Project is currently under lease with the underlying landowner; however, the landowner will be able to continue to farm this area for the life of the Project. The total nameplate capacity for the proposed Project facilities is up to 60 MW AC.

The Red Rock Solar Project is located four miles north of the City of Mountain Lake. Red Rock selected the specific Project Boundary based on significant landowner interest, optimal solar resource, and minimal impact on environmental resources (see Section 2.3).

In this Application, Red Rock is providing a preliminary Project layout (Figures 3 – Preliminary Project Layout and 4a-4e – Detailed Preliminary Project Layout; and displayed in more detail in Appendix B – Site Plan). The layout under consideration is within the Project Footprint and is subject to final micrositing. The Project's facilities are currently anticipated to be located within the Project Footprint and include solar panels and racking, inverters, security fencing, Solar Project Substation, electrical collection and communication lines, stormwater basins, laydown areas, and up to three weather stations (up to 10 feet tall).

This preliminary Project layout within the Project Footprint reflects Red Rock's effort to maximize the energy production of the Project and 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 Project Footprint set forth in this Application, but will not extend beyond the outer boundaries of the Project Boundary. While Red Rock expects that the final layout will remain considerably similar to the preliminary layout

presented in Figure 3 (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.

Red Rock has entered into lease agreements with landowners for all of the parcels on which the Project would be constructed. Red Rock would exercise its purchase options and hold title to the property it will purchase after the Site Permit is issued and prior to the start of construction. Concurrently, leased property that will be utilized by the Project will move into an operation term of the lease agreement and property currently under lease that is not utilized by the Project will be allowed to revert to previous land uses (e.g., farming).

## 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. An analysis of Red Rock's avoidance of exclusion areas and other sensitive environmental areas is provided below in Section 2.3.2.

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. The Red Rock Project Footprint is sited on prime farmland (see Section 4.5.3). Given the 60 MW net generating capacity of the Project, this rule would allow use of up to 30 acres of prime farmland for the Project. Approximately 217.9 acres of prime farmland and 270.4 acres of prime farmland if drained are located within the Project Footprint. Current land use within the Project Boundary is predominately agricultural – specifically, row crop production. The Project would result in the removal of these acreages from row crop production for the life of the Project. In May 2020, the Minnesota Department of Commerce issued *Solar Energy Production and Prime Farmland: Guidance for Evaluating Prudent and Feasible Alternative* (Prime Farmland Guidance; DOC, 2020). The Prime Farmland Guidance recognizes that, "the State of Minnesota has dual mandates to advance solar energy production and protect prime farmland" and is "meant to assist developers in defining feasible and prudent in relation to siting alternatives." An analysis of factors identified in the Prime Farmland Guidance with respect to site selection and alternative sites is provided in the following sections below.

### 2.3.1 Factors Driving Choice of Region

The Prime Farmland Guidance first directs an applicant to discuss why a project has been proposed in a particular region, including an assessment of: (1) the solar resource in the region; (2) available interconnection points; (3) and efforts to investigate developable sites (i.e., those

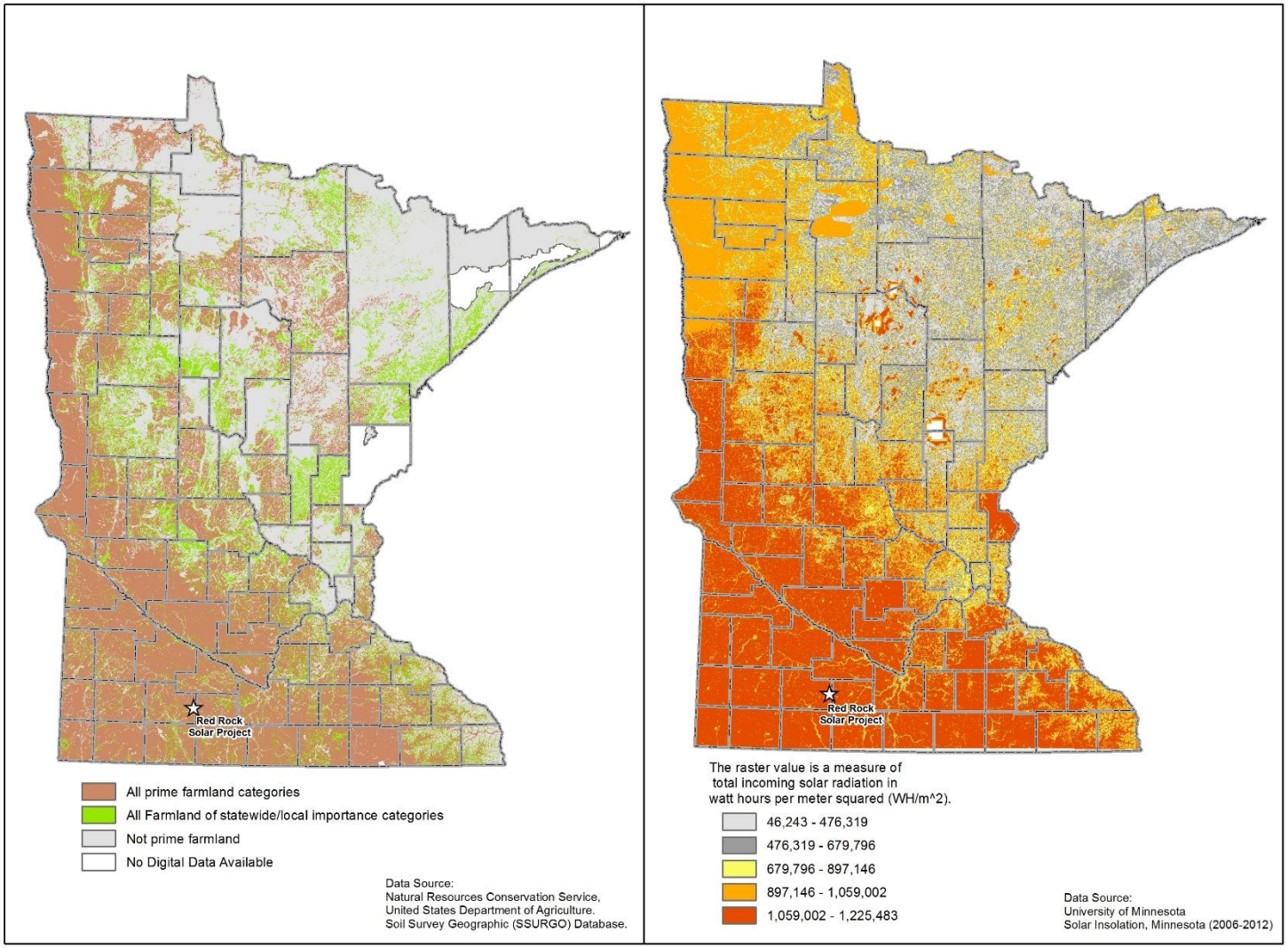
with appropriate topography and willing participants). Red Rock explored southwest Minnesota to identify a suitable area for a solar project based on several factors including the high solar resource in this portion of the state, nearby access to the 345 kilovolt (kV) transmission grid, and limited environmental constraints, as compared to other regions. Additionally, the Red Rock Solar Project would be developed with the Big Bend Wind Project, together creating Minnesota's first wind/solar hybrid renewable energy project. Therefore, wind resource and land availability to support the Wind Project also played a role in siting the Solar Project.

In Minnesota, there is a strong correlation between high solar resource and the prevalence of prime farmland (see Image 1). As displayed in Image 1, southwestern Minnesota is characterized by the prevalence of prime farmland and the highest solar resource. Conversely, areas without prime farmland generally have a lower solar resource.

In addition to the solar resource, transmission interconnection feasibility was also a factor in determining the Project's location. Between 2004 and 2017, CapX2020, a joint initiative of ten transmission-owning utilities in Minnesota, North Dakota, South Dakota, and Wisconsin, completed a buildout of nearly 800 miles of transmission to create a backbone of transmission that improved reliability and enabled more renewable energy generation to connect to the electric grid (approximately 3,600 MW so far; Capx2020, 2020). In Minnesota, the majority of these transmission projects occurred in the southern portion of the state and carry renewable energy from these rural wind- and solar-rich areas to metropolitan areas. Proximity to the existing transmission system is a key element in development of a renewable Project. The Red Rock Solar Project is located approximately 15 miles north of an existing 345 kV transmission line, which is the closest 345 kV line in the region. As previously mentioned, the Red Rock Solar Project would be developed with the Big Bend Wind Project, as the two projects have a hybrid wind/solar interconnection position in the Midcontinent Independent System Operator (MISO) queue. A hybrid project of this size is dependent on an interconnection to the 345 kV transmission system to support the additional energy load.

Because of the excellent wind resource and existing 345 kV transmission lines in southwestern Minnesota, there are several existing wind farms. Generally speaking, a landowner cannot hold leases with multiple development companies; therefore, a new project such as the Red Rock Solar Project and Big Bend Wind Project requires sufficient acreage to host facilities in an area without existing leases that is also conducive to development with respect to the wind and solar resources, topography, interconnection, and environmental constraints. These factors are described below in Section 2.3.2 specific to the Red Rock Solar Project.

## Image 1: Prime Farmland and Solar Resource in Minnesota



### 2.3.2 Factors to Consider when Prime Farmland is Present

The Prime Farmland Guidance further identifies factors to assess when prime farmland is present within a proposed project site, including: (1) alternative sites in nonprime farmland in proximity to an interconnection site; (2) avoidance of other prohibited areas; and (3) alternative configurations or technologies. As displayed on Image 1, Southwestern Minnesota, including Cottonwood County, contains the best solar resource in the state. This portion of the state is also well known for the excellent wind resource, as characterized by a rich history of wind development. Additionally, southwestern Minnesota is characterized by a long history of agricultural activities, in part due to the nutrient rich soil (MNDNR, 2020a). In Cottonwood County, approximately 84 percent of the soils are classified as prime farmland as defined under 7 CFR 657.5 paragraph (a). In neighboring Watonwan County, approximately 84 percent of the soils are classified as prime farmland. In consideration of Minnesota Rules 7850.4400 subp. 4, Red Rock examined the soils within the southwest Minnesota region. The prevalence of prime farmland is consistently high regardless of location in the region (see Figure 5 – Regional Prime Farmland). Prime farmland, and its sub-categories, are mapped throughout the region except along larger waterway drainages, lakes, and bedrock outcroppings associated with Red Rock Ridge, a 50-yard wide by 23-mile ridge that extends across Cottonwood County (MNHS, 2020; Figure 5 – Regional Prime Farmland). Accordingly, there is no area in the region with the best solar resource that is conducive to solar development of approximately 850 acres that is not defined as prime farmland, let alone the land required for the Wind Project that completes the hybrid Project.

With respect to avoidance of prohibited areas, Red Rock also evaluated several potential constraints during site selection to determine whether the Project has avoided other constraints to the maximum degree practicable and to determine which sections should be avoided. These include transmission interconnection, willing landowners to sell or lease land for project facilities, and environmental constraints that may prohibit or make development more challenging. The Solar Project Boundary is approximately 15 miles north of the proposed POI, the Xcel Energy Crandall Switching Station. Within 15 miles of the POI along the 345 kV transmission line, Red Rock avoided sections with environmental constraints that include sections:

- owned or managed by a state or federal agency (i.e., state park, WMA, or Waterfowl Production Area);
- within a municipality;
- within two miles of a public airport;
- under lease with a different developer;
- with Minnesota Department of Natural Resources (MNDNR) Sites of Biodiversity Significance (SOBS);
- with MNDNR mapped native plant communities (NPCs) and native prairie; and
- with MNDNR rare species records.

These constraints, and the sections most suitable for solar development without these features, are displayed on Figure 6 (Potential Solar Development Constraints). As shown on the Potential Solar Development Constraints map, Red Rock has sited the Red Rock Solar Project with voluntary leases within the Big Bend Wind Project Boundary to avoid the sensitive resources identified above. Furthermore, because this is a hybrid Project, both the wind and solar projects are sited on the closest available land to the 345 kV transmission line for interconnection and to minimize environmental impacts of both projects (see Figure 6 – Potential Solar Development Constraints).

During development of the Solar Project, Red Rock initially considered a different location for the solar site within the 2019 Wind Project area. Red Rock initially selected the 2019 Solar Project's location within the Wind Project boundary based on the relatively flat, unobstructed, generally contiguous parcels of land, with limited environmental constraints that were willing to host Project facilities in the central portion of the Wind Project boundary. This initial Project location consisted almost entirely of prime farmland, which is characteristic of relatively flat land that is also conducive to solar development in this region. When the Wind Project area shifted to increase the distance of turbines from the Jeffers Petroglyphs site, the Solar Project also shifted to the current proposed location to collocate with wind facilities (Wind Project Substation, operations and maintenance [O&M] building, and collection lines) and minimize environmental impacts, including impacts on prime farmland. Red Rock reviewed the Wind Project boundary for potential locations without prime farmland to site the solar project, however, the Wind Project boundary also contains 89 percent prime farmland. Compared to the 2019 solar boundary, the proposed Red Rock Solar Project boundary minimizes the following human and environmental impacts (see Figure 7 – Alternative Analysis):

- **Prime farmland** – the proposed Solar Project location is approximately 800 acres less than the boundary evaluated in 2019 and has 1.7 fewer miles of collection between the solar siting area and Solar Project Substation compared to the 2019 solar configuration.
- **Residences** – the proposed Project boundary includes fewer residences.
- **Native prairie** – the proposed Project boundary excludes MnDNR-mapped native prairie.
- **Public Waters Inventory (PWI)** – the proposed Project boundary excludes MnDNR defined PWI watercourses.
- **Cemeteries** – the proposed Project boundary excludes cemeteries.
- **Floodplain** – the proposed Project boundary excludes floodplains.

Red Rock has also considered several design options to minimize impacts on soils and prime farmland including minimizing the overall Project footprint, minimizing solar facility placement in areas with slopes that would require grading, reducing access road lengths, incorporating an electrical collection system that minimizes soil disturbance, and minimizing the space between rows. The Project Footprint has been designed to avoid areas that would require excess grading, such as the northern portion of the Project Boundary. Similarly, access road construction requires grading and soil segregation. Red Rock has minimized access roads to provide access to inverters; access roads do not traverse the perimeter of the Project Footprint, thereby reducing grading and soil disturbance. The installation of the electrical collection system involves trenching to a depth of 48 inches. Red Rock's design includes a hanging harness system for the DC collection system (cabling from the panels to the inverters). Implementing this type of collection system greatly reduces soil disturbance because trenching is not required along every row of panels. Finally, Red Rock has minimized the space between rows to 23 feet. This is a safe distance for O&M staff to access various portions of the Project Footprint with a bobcat or small pickup truck, but also minimizes the overall Project Footprint because wider row spacing results in a larger footprint. Together, these design considerations minimize the Project's impact on prime farmland.

### 2.3.3 Mitigations and Offsetting Benefits

In addition to the minimization measures described above, Red Rock includes an Agricultural Impact Mitigation Plan (AIMP) and Vegetation Management Plan (VMP) as mitigation measures, as well as offsetting benefits such as reducing nitrogen pollution. Each of these is described further below.

#### 2.3.3.1 Agricultural Impact Mitigation Plan

Red Rock has voluntarily developed an AIMP (Appendix C) detailing methods to minimize soil compaction, preserve topsoil, and establish and maintain appropriate vegetation that will help to ensure the Project is designed, constructed, operated and ultimately decommissioned and restored in a manner allowing the land to be returned to its original agricultural use in the future. Moreover, conversion of the Project Footprint to non-row-crop uses for the life of the Project may also have beneficial environmental impacts such as soil building, erosion control, habitat for wildlife, and protection of groundwater and surface water resources from nitrogen pollution (see Sections 2.3.3.3 and 4.5.3.1).

#### 2.3.3.2 Vegetation Management Plan

Red Rock has developed a VMP that provides a guide to site preparation, installation of prescribed seed mixes, management of invasive species and noxious weeds, and control of erosion/sedimentation (Appendix C). As discussed further below, shifting the land cover in the Project area to perennial vegetation instead of row crops for the life of the Project, could prove to be beneficial for limiting nitrogen infiltration into groundwater supply and nitrogen runoff, thereby improving groundwater and surface water quality. Additionally, 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 and pesticide and fertilizer application.

#### 2.3.3.3 The Project May Reduce Nitrogen Pollution and Avoid Impacts to Sensitive Groundwater Resources

Nitrogen, in the form of fertilizer, is a critical component to agricultural productivity. However, nitrogen is a potent water pollutant that is very difficult to contain once it's been introduced into the environment. Elevated nitrate levels can be harmful to fish and aquatic life and pollute drinking water wells as it moves both in surface water and in groundwater. In Minnesota, concern about nitrates, from nitrogen fertilizer, in groundwater has been well documented (MDA, 2019a).

A study by the Minnesota Pollution Control Agency (MPCA) found that more than 70% of nitrates in the Minnesota environment comes from cropland; the rest is from sources such as wastewater treatment plants, septic and urban runoff, forest, and the atmosphere (MPCA, 2013). Nitrate concentrations and loads in surface water are high throughout much of southern Minnesota, largely as a result of leaching through large areas of intensely cropped soils and into underlying drain tiles and groundwater.

Minnesota state agencies and private organizations are working to address nitrogen levels by evaluating irrigation and fertilizer application practices. The MNDNR, local soil and water conservation districts, and the University of Minnesota are all evaluating irrigation strategy improvements centered around smarter irrigation. They are developing tools that assess soil moisture levels, crop stage (maturity), and precipitation received. Researchers are also evaluating the economics of subsurface irrigation. These strategies are designed to more efficiently water crops when and where they need it while conserving groundwater resources and limiting the vehicle (i.e., water deposits on the land) by which nitrogen can pollute groundwater.

Similarly, the Minnesota Department of Agriculture (MDA) is working to protect groundwater from agricultural contamination. The agency passed the Groundwater Protection Rule in late 2018 (MDA, 2019b). The two-part rule minimizes potential sources of nitrate pollution to the state's groundwater and protects drinking water. Part one of the rule restricts fall application of nitrogen

fertilizer in areas vulnerable to contamination; part two outlines steps to reduce the severity of the problem in areas where nitrates in public water supply wells are already elevated.

While the State works to identify vulnerable areas for groundwater contamination and protect groundwater resources through a variety of programs, perhaps the most prudent method is to simply shift the cropping system on the vulnerable soils, as practicable, from a nitrogen-intensive row-crop agriculture to land cover that does not involve nitrogen applications. The Red Rock Solar Project does just that by converting acres of nitrogen-intensive cropland to perennial vegetation that will not receive nitrogen application and further acts as a mechanism of capturing nitrogen and reducing the ability of that nitrogen to leave the Project Boundary (Christianson et al., 2016). Despite the fact that the Project Boundary is considered prime farmland, shifting the land cover in the Project area to perennial vegetation instead of row crops for the life of the Project could prove to be beneficial for limiting nitrogen infiltration into groundwater supply and nitrogen runoff, thereby improving groundwater and surface water quality.

## 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, Red Rock is not required to analyze alternative sites pursuant to 7850.3100. As described in Section 2.3.1, Red Rock Solar evaluated another solar site within the Big Bend Wind Project that was not preferred for several reasons including additional human and environmental impacts compared to the Project Boundary presented in this Application.

## 2.5 Cost Analysis

The total installed capital costs for the Project are estimated to be approximately $86 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 | $81,054,689 |
| Development Expense | $1,145,511 |
| Interconnection | N/A uses Big Bend for T-line. All NU costs are in the BB model. |
| Financing | $3,959,074 |
| **Project Total** | **$86,159,274** |

## 2.6 Future Expansion

Red Rock's interconnection request is for 60 MW, the nameplate capacity of the Project. Red Rock does not have any plans for future expansion.

# 3.0 ENGINEERING AND OPERATIONAL DESIGN

Solar energy harvests energy from the sun to produce electricity. 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/transformer. The inverters/transformers 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 inverters/transformers, electrical cable will be buried below-ground for routing to the Solar Project Substation where the electricity will be stepped up from 34.5 kV to 161 kV before traveling approximately 18 miles to the existing Blue Lake-Wilmarth-Interstate Interconnection transmission line, where the power will again be stepped up from 161 kV to 345 kV to interconnect to the existing transmission infrastructure.

## 3.1 Design

The Project will utilize PV panels with tempered glass that are approximately three feet long by seven feet wide, and one to two 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, based on manufacturer, topography, and vegetation constraints could be up to 20 feet in height from the ground to the top of the panels when at a 45-degree angle (refer to Image 2 below). 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.

**Image 2: Panel Design on Tracking System**

### 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, parallel to the ground during mid-day, and then west toward the setting sun in the afternoon. The panels are rotated by a small motor connected to the tracking rack system to slowly track with the sun throughout the day. The tracking rack system allows the Project to optimize the angle of the panels in relation to the sun throughout the day, thereby maximizing production of electricity and the capacity value of the Project.

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.

### 3.1.2 Electrical Collection System

Electrical wiring (DC) 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 Solar Project Substation. The DC cabling will be mounted underneath the panels in a hanging harness system (see Image 3). Use of this system minimizes soil disturbance and trenching along every row of panels. The AC collection system between the inverters and Solar Project Substation 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 Solar Project Substation will be installed in trenches or plowed 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.

**Image 3: Hanging Harness System for DC Cabling between Panels and Inverters**

Inverters and transformers are housed together on a “skid.” This equipment converts approximately 1,500 volts of DC output of the PV panels to 34.5 kV of AC. Inverter skids will be

utilized at locations throughout the Project Footprint and include a transformer to which the inverters will feed electricity. 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 includes 16 central inverter skids (one inverter is required for every 3-4 MW). These skids provide the foundation for the inverter, transformer, and Supervisory Control and Data Acquisition (SCADA) system. The skids will be placed atop a concrete slab or pier foundations and typically measure 15 feet wide by 20 feet long, with a structure height of approximately 12 feet above grade. 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.

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.

### 3.1.3 Access Roads

The Project will include approximately 4.1 miles of graveled access roads that lead to the inverters. The final length of the access roads will depend on the equipment selected and final engineering. These roads are up to 20 feet wide along straight portions of the roads and wider along curves at internal road intersections and turn arounds (approximately 30 foot radius). There are seven access points to the Project from existing county roads. These entrances will have locked gates.

Some upgrades or other changes to the public roads may be required for construction or operation of the Project. Red Rock will work with Cottonwood 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. Road improvements may require a road use and repair agreement with Cottonwood County and/or Midway Township; Red Rock will continue to coordinate with both agencies as the Project develops. Driveway changes will require a county entrance permit from Cottonwood 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 Project Footprint. 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 seven 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 three to four strands of smooth wire will be used for a total height of 8-feet. However, the fencing around the Solar Project 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. Red Rock 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.

### 3.1.5 Associated Facilities

#### 3.1.5.1 Solar Project Substation

The Solar Project Substation will be a 34.5/161 kV step-up substation with metering and switching equipment. 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 300 feet by 200 feet once construction is complete.

#### 3.1.5.2 Operation and Maintenance Building

If needed, the O&M Facility may be a shared facility with the Big Bend Wind Project. As such, this facility is permitted with the Wind Project. A description of the O&M Facility, including size, location, and associated footprint of impacts are included in the Big Bend Wind Project Site Permit Application in Docket No. IP7013/WS-19-619.

#### 3.1.5.3 Stormwater Drainage Basins

Red Rock has preliminarily designed 10 drainage basins throughout the Project Footprint that range in size from 0.4 to 10.1 acres (see Figures 3 and 4a-4e – Preliminary Project Layout and Detailed Preliminary Project Layout). These basins are located in existing low areas for which the preliminary design for solar facilities has avoided. Basins will be vegetated with a wet seed mix that will help stabilize soils after rain events.

#### 3.1.5.4 Weather Stations

The Project will include up to three weather stations up to 10 feet in height. The weather stations will be within the Project Footprint; the final locations will be determined following final engineering.

### 3.1.6 Temporary Facilities

Red Rock will utilize three temporary laydown areas, one within the fenced solar facility and two outside of the fence, totaling 7.6 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, the laydown area within the fence will be restored and reseeded as described in Section 4.5.6. The two laydown areas outside the fence will be restored to pre-construction conditions and suitable for agricultural use by the landowner.

### 3.1.7 Transmission System

The Project will interconnect into the existing Blue Lake-Wilmarth-Interstate Interconnection 345 kV transmission line approximately 11 miles south of the southernmost portion of the Project Area

via a 161-kV overhead gen-tie transmission line of approximately 18 miles. As previously discussed, the Solar Project and Wind Project will connect to the Blue Lake-Wilmarth-Interstate Interconnection 345 kV transmission line at the Xcel Energy Crandall Switching Station. These POIs are approximately 1.9 miles apart along the 345 kV transmission line. Additional information on the POIs is presented in Big Bend's RP application (see Docket No. IP7013/TL-19-621).

### 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 Cottonwood County Renewable Energy Ordinance does not specify setback regulations for large solar energy systems. Setbacks are displayed on the detailed Site Plan in Appendix B.

The 846.2-acre Project Boundary includes three components: a 785.7-acre solar siting area for solar panels, inverters, access roads, stormwater basins, and laydown areas; a 5.4-acre Solar Project Substation siting area; and a 55.1-acre collection line corridor connecting the solar siting area to the Solar Project Substation (approximately 3.1 miles of underground collection). The collection line corridor is collocated with collection lines for the Wind Project; similarly, the Solar Project Substation is collocated with the Wind Project Substation.

## 3.3 Estimated Project Facility Acreages

Table 3.3-1 describes the Project facilities' estimated acreage within the 483.3-acre Project Footprint based on the preliminary design for the Project.

**Table 3.3-1**
**Estimated Project Facility Acreages within Project Footprint**

| Project Facilities | Acres |
|---|---|
| Access Roads | 10.1 |
| Inverters | 0.1 |
| Solar Project Substation | 5.4 |
| Laydown Areas[1] | 7.6 |
| Solar Panels (area within the fence) | 412.3 |
| Collection line outside the fence and between solar arrays and Solar Project Substation[2] | 24.1 |
| Stormwater Basins | 23.7 |
| **Project Total** | **483.3** |

[1] 5.8 acres of laydown areas will be restored after construction and returned to agricultural use
[2] All 24.1 acres will be restored to pre-construction conditions

## 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:

**Table 3.4-1**
**Construction Activities for the Red Rock Solar Project**

| Construction Stage | Activity |
|---|---|
| Pre-construction | Geotechnical analysis |
| | Design substation and electrical collection system |
| | Design solar array, access roads, and O&M building |
| | Underground utility discovery |
| | 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 collection system |
| | Install electrical enclosure/inverter |
| | Tracker installation |
| | PV panel installation |
| | Construct gen-tie line |
| Post-construction | Restore disturbed areas not intended for permanent above-ground facilities. Permanent above-ground facilities include the Solar Project Substation, O&M building, inverter skids and electrical cabinets, and access roads |
| | Test facility |
| | 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 eight 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 2021 harvest season. Alternatively, and depending on construction timing, Red Rock may plant a cover crop in Spring 2022 that is compatible with the Project's VMP (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 AIMP. 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 Stormwater Pollution Prevention Plan (SWPPP). 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 20-foot-wide road width. The subgrade materials will be compacted 32-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 four 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 (Global Positioning System [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 Solar Project Substation. The DC collection system would be installed underneath the panels in a hanging harness system; the AC collection system will be installed in a below-ground system.

Below-ground AC collection systems will be installed in trenches or plowed 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 Solar 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 Solar Project 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

Red Rock 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 Red Rock'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 VMP (Appendix C). The site will be seeded with site specific seed mixes developed in coordination with the MNDNR and include

three seed mixes: either a native low growing mix or grazing mix to be used throughout the site, and a wet mix for basin areas susceptible to holding water (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 outlines two vegetation maintenance strategies that may be implemented at the Project: mowing and grazing. Mowing would include a native array mix to be mowed once annually each fall. Alternatively, Red Rock may decide to use grazing with sheep as a long-term vegetation management technique. Grazing solar facilities with livestock is a developing management approach that Red Rock is considering for this Project. In either management strategy, the wet mix would be used for basins.

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 O&M 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 Red Rock, an affiliate, or a 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 at least 30 years, and Red Rock estimates that the Project will result in one full-time permanent position 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 Red Rock 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.

Qualified personnel will perform all maintenance activities. 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. Red Rock will manage all the monitored data on-site in addition to a qualified subcontractor that will remotely monitor the site 24 hours a day, seven 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 O&M 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) |
| | 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 |

## 3.6 Decommissioning and Repowering

At the end of the Project's useful life, Red Rock 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, inverters/transformers, electrical collection system, fencing, lighting, and substation;
- 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, Red Rock 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 from five to nine months to complete depending on seasonality, 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:

- Modules: Modules will be inspected for physical damage, tested for functionality, and disconnected and removed from racking. Functioning modules will be packed and shipped to an offsite facility for reuse or resale. Non-functioning modules will be packed, palletized, and shipped to the manufacturer or a third party for recycling or disposal.
- Racking: Racking and racking components will be disassembled and removed from the steel foundation posts, processed to appropriate size, and sent to a metal recycling facility.
- Steel Foundation Posts: All structural foundation steel posts will be pulled out to full depth, removed, processed to appropriate size, and shipped to a recycling facility. During decommissioning, the area around the foundation posts may be compacted by equipment and, if compacted, the area will be de-compacted in a manner to adequately restore the topsoil and sub-grade material to a density consistent for vegetation.
- Above-ground and below-ground Cables and Lines: below-ground cables (the AC collection system) and conduits contain no materials known to be harmful to the environment. Decommissioning will include removing underground cables buried above 48 inches. Topsoil will be segregated and stockpiled for later use prior to any excavation and the subsurface soils will be staged next to the excavation. The subgrade will be compacted to a density of approximately 90 percent of standard Proctor density. Topsoil will be redistributed across the disturbed area. Above-ground cables (the DC collection system) will be removed from the Project and taken to a recycling facility.
- Inverters, Transformers, and Ancillary Equipment: All electrical equipment will be disconnected and disassembled. All parts will be removed from the site and reconditioned and reused, sold as scrap, recycled, or disposed of appropriately, at the Owner’s sole discretion, consistent with applicable regulations and industry standards.

- Equipment Foundation and Ancillary Foundations: The ancillary foundation for Red Rock Solar are pile foundations for both equipment skids and met towers. As with the solar array steel foundation posts, the foundation piles will be pulled out completely. Duct banks will be excavated to a depth sufficient to remove all conduits, cables, etc. to a depth of 48 inches below grade. The remaining excavation will be filled with clean subgrade materials of quality comparable to the immediate surrounding area. All unexcavated areas compacted by equipment used in decommissioning will be de-compacted in a manner to adequately restore the topsoil and sub-grade material to a density of approximately 90 percent of standard Proctor density. All materials will be removed from the site and reconditioned and reused, sold as scrap, recycled, or disposed of appropriately, at the owner's sole discretion, consistent with applicable regulations and industry standards.
- Fence: All fence parts and foundations will be removed from the site and reconditioned and reused, sold as scrap, recycled, or disposed of appropriately, at the owner's sole discretion, consistent with applicable regulations and industry standards. The surrounding areas will be restored to pre-construction conditions to extent feasible.
- Access Roads: Facility access roads will be used for decommissioning purposes, after which removal of roads will be discussed with the Landowner, using the following process:
    - After final clean-up, roads may be left intact through mutual agreement of the landowner and the owner unless otherwise restricted by federal, state, or local regulations.
    - If a road is to be removed, aggregate will be removed and shipped from the site to be reused, sold, or disposed of appropriately, at the Red Rock's sole discretion, consistent with applicable regulations and industry standards. Clean aggregate can often be used as "daily cover" at landfills for no disposal cost. All internal service roads are constructed with geotextile fabric and eight inches of aggregate over compacted subgrade. Any ditch crossing connecting access road to 600$^{th}$ Avenue or 610$^{th}$ Avenue will be removed unless the landowner requests it remain. The subgrade will be de-compacted to a depth of approximately 18 inches using a chisel plow or other appropriate subsoiling equipment. All rocks larger than four inches will be removed. Topsoil that was stockpiled during the original construction will be distributed across the open area. The access roads and adjacent areas that are compacted by equipment will be de-compacted.

### 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 row crop agriculture.

Red Rock 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 the 10th year of the Project's operational life, Red Rock will provide security to Cottonwood County in the form of a (or combination of) performance bond, surety bond, letter of credit, corporate guarantee, or other form reasonably satisfactory to the county that is accessible by the county or landowner. This security 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 amount to be allocated for decommissioning will be equal to the Net Removal Cost, currently estimated at $16,983 per MW (see Section 1.5 of Appendix D – Decommissioning Plan). On the fifth year of operation and every five years thereafter until the end of the operational life of the Project (currently estimated at least 30 years), the Net Removal Cost will be reevaluated by a third-party Professional Engineer that will assess the difference between estimated decommissioning costs and the salvage value of project materials.

# 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 Red Rock's control, calculations are based on the Project Boundary (846.2 acres). This reflects the fact that final design may necessitate development in areas within the overall area Project Boundary. Additionally, for any discussions of resources that are located outside of the Project Area (such as parks within one mile), the Project Boundary is used in order to discuss the vicinity of these features from anywhere within the portion under Red Rock's control.

For approximating areas of temporary impact, the Project Footprint is used (approximately 483.3 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 Project Footprint is also referred to for "permanent impacts" discussions (i.e., "permanent" for the life of the Project). 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 six inches by four inches, with a surface area of approximately eight square inches because the I-beam is approximately 0.25-inches thick within the 6-inch by 4-inch I-shaped configuration.

## 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 is located within the North Central Glaciated Plains Section of the Prairie Parkland Province (251B) and in the Minnesota River Prairie ecological subsection.

The Minnesota River Prairie subsection coincides with large till plains flanking the Minnesota River. The subsection consists of a gently rolling ground moraine about 60 miles wide. The depth to bedrock in this subsection is typically 100 to 400 feet through glacial till; however, there are exposures of bedrock in Cottonwood County. Soils are loamy and well-drained with thick dark surface horizons. Annual precipitation in the Minnesota River Prairie subsection ranges from 25 inches in the west to 30 inches in the east and the average growing season lasts approximately 147 to 152 days in length. Prior to Euro-American settlement, vegetation in this subsection was predominantly tallgrass prairie, with many islands of wet prairies and forest restricted to the Minnesota River and other streams. However, there are few remnants of pre-settlement vegetation left (MNDNR, 2020a). Present day land use is dominated by agricultural fields, predominantly corn.

The Project is located in a rural area approximately 3.9 miles north of Mountain Lake (the Solar Project Substation is approximately 1.1 miles north of Mountain Lake). Residences are scattered throughout the rural area. County State Aid Highway (CSAH) 8 bisects the Project Boundary north

to south and CSAH 3 travels east to west, crossing the collection line corridor between the solar siting area and Solar Project Substation. Other roads in the Project vicinity are local county or township roads. The Solar Project Substation is located in an agricultural field on the northwest corner of the intersection of 360th Street and 590th Avenue. The Project is located on relatively flat fields conducive to solar development.

## 4.2 Human Settlement

Solar facilities have the potential to impact human settlements during construction and operation. Public health and safety issues during construction include injuries due to falls, equipment use, and electrocution. Health impact concerns related to the operation of the Project include health impacts from electric and magnetic fields (EMF), stray voltage, induced voltage, impaired air quality, and electrocution. Solar facilities also have the potential to displace homes or businesses, introduce new noise sources, affect the aesthetics and socioeconomics of the Project Boundary, be incompatible with local land use and zoning, and impact public services (e.g., transportation). These potential impacts are discussed in more detail below.

The Project is in a rural landscape in Cottonwood County away from population centers with farmsteads located along roads (Figure 1). The municipalities nearest to the Project are Mountain Lake (1.3 miles southwest), Darfur (2.4 miles northeast), and Butterfield (4.2 miles southeast). At the time of the 2010 U.S. Census, the population of Cottonwood County was 11,687 persons (U.S. Census Bureau, 2019).

### 4.2.1 Public Health and Safety

The Project is in rural Cottonwood County which, according to the U.S. Census Bureau's QuickFacts website, has a population density of 18.3 persons per square mile of land area (U.S. Census Bureau, 2019). If emergency personnel were needed at the Red Rock Solar Project, multiple agencies would likely respond, depending on the situation. These include the Cottonwood County Sheriff and city police departments, and city and community fire departments in Mountain Lake, Butterfield, Windom, St. James, Darfur, Comfrey and Jeffers, all of which are within 12 miles of the Project.

Ambulance response is provided by regional and local ambulance services. The Windom Ambulance Service provides response services to a 200-square-mile region surrounding Windom, Minnesota. The cities of Mountain Lake, St. James, and Jeffers also provide ambulance services (Minnesota Emergency Medical Services Regulatory Board, 2020).

Hospitals near the Project Boundary include Windom Area Health in Windom (Cottonwood County) and Madelia Community Hospital and Clinic in Madelia (Watonwan County). Smaller medical clinics or medical centers in the area include Sanford Health Mountain Lake Clinic in Mountain Lake, Mayo Clinic Health System in St. James and Comfrey, and various eye clinics, dental offices, and chiropractors.

There are three towers that are a part of the Allied Radio Matrix for Emergency Response (ARMER) in Cottonwood 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 Red Rock Solar Project; the nearest ARMER tower is located in the city of Mountain Lake, which is 1.3 miles southwest of the Project Boundary (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. Red Rock is gathering information to coordinate with all emergency and non-emergency response teams for the Project, including the Cottonwood County Sheriff, city police departments and city and community fire departments in Mountain Lake, Butterfield, Windom, St. James, Darfur, Comfrey and Jeffers, and ambulance services from Windom, Mountain Lake, St. James, and Jeffers and 911 services. The type and number of responding agencies will depend on the incident requiring emergency services. Red Rock 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.

While there is one ARMER tower in the Project vicinity (i.e., within 1.3 miles), the Red Rock 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). Red Rock anticipates the tallest solar facilities to be up to 20 feet above ground. As such, no mitigation is necessary.

#### 4.2.1.2 EMF

Electric and magnetic fields, or EMF, are present around any electrical device. Electric fields arise from the voltage or electrical charges while 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).

The sources of EMF related to the Project include electrical collection lines and from the transformers installed at each inverter. EMF from electrical collection lines and transformers dissipates rapidly with distance from the source (National Institute of Environmental Health Sciences [NIEHS], 2002). Generally speaking, higher voltage electrical lines produce higher levels of EMF at the source before dissipating with distance. There is no federal standard for transmission line electric fields. The Commission, however, has imposed a maximum electric field limit of eight kV/m measured at one meter (3.28 feet) above the ground[1]. There are presently no

[1] *In the Matter of the Route Permit Application for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota*, Docket No. ET-2/TL-08-1474, Order Granting Route Permit (*adopting*

Minnesota regulations pertaining to magnetic field exposure; however, the internationally accepted guideline for the general public exposed to magnetic fields is 833 milliGauss (mG) (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 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 161 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 of the Project's 27.5 kV collection lines, slightly lower voltage than the electrical collection lines proposed for the 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 Minnesota guidelines for electric fields (eight kV/meter) and international guidelines of 833 mG for magnetic fields. 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 506 feet and 1,122 feet to the nearest inverter, electrical collection line, and transformer (see Table 4.2-4 in Section 4.2.4 and Figures 3 and 4a-4e). At this distance, both electric and magnetic fields would have dissipated to background levels. As such, impacts will be negligible and no mitigation measures are proposed.

### 4.2.2 Displacement

There is one residence within the northeastern corner of the Project Boundary. In addition, there is a cluster of farm outbuildings on the north side of 330th Street, east of the intersection with 600th Avenue. Finally, while outside the Project Boundary, there is a second cluster of farm outbuildings on the east side of 600th Avenue, south of the intersection with 330th Street. The Project Boundary surrounds this small parcel but excludes it.

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Administrative Law Judge Findings of Fact, Conclusions and Recommendation at Finding 194 [April 22, 2010 and amended April 30, 2010]) (September 14, 2010).

### 4.2.2.1 Impacts and Mitigation

The existing residence and cluster of farm outbuildings that are within the Project Boundary have been excluded from the Project Footprint. Red Rock has coordinated with the landowner of the residence and the farm outbuildings and sited solar facilities at least 200 feet from these buildings. Because none of the structures in the Project Boundary will be removed, 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, and vehicles. 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: MPCA, 2008

The 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). 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. Red Rock 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 two minutes depending on the soil conditions; Red Rock anticipates this activity will take up to six 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 Red Rock 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 | SMA SC 4.0MVA | 233 | 63.3 |
| Tracker | Nextracker Gemini | 130 | 64.3 |

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 at 233 feet from the inverter, depending on which model is selected. Similarly, noise levels will be less than 50 dBA at 130 feet from the trackers.

As such, the Project has been designed to meet the nighttime L50 dBA noise standard, as the closest home to the facility is 506 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. The distance of the nearest inverter to a residence is 1,122 feet.

During construction, Red Rock plans to limit construction to daylight hours to the extent practicable. No noise impacts are anticipated during operation; therefore, no mitigation measures are proposed.

### 4.2.4 Aesthetics

The topography of the Project Boundary is generally flat with elevations ranging from 1,190 to 1,240 feet above sea level. As discussed in Section 4.1, land use within the Project Boundary is predominantly agricultural, with corn and beans being the most common crops. There are windbreaks around most farmsteads and former farmsteads with agricultural buildings still present in the Project vicinity.

There is one residence in the northeast corner of the Project Boundary and one residence and several agricultural buildings on parcels adjacent to the Project Boundary (see Figure 3 - Preliminary Project Layout). Table 4.2-4 provides distances to the nearest homes to the Project, including approximate distance to the Project Footprint boundary and approximate distance to the edge of solar arrays (per preliminary design). There are no residences on parcels that the collection line corridor crosses (see Figure 3 – Preliminary Project Layout).

**Table 4.2-4**
**Proximity of Residences to Red Rock Solar Facility**

| Residence | Distance to Project Footprint (feet) | Distance to Solar Arrays (feet) [1] | Distance to Nearest Inverter (feet) [1] |
|---|---|---|---|
| A | 364 | 506 | 1,122 |
| B | 498 | 613 | 1,370 |

[1] Based on preliminary design.

Residence A is located in the northeast corner of the Project Boundary along 610th Avenue facing east. This residence has existing vegetative screening around three sides of the farmstead, including north, west, and south adjacent to the Project. The property owner is a Project participant.

Residence B is located adjacent to the western portion of the Project Boundary. The residence faces east and has existing vegetative screening along the east, north, and west sides of the farmstead. This property owner is a Project participant.

#### 4.2.4.1 Impacts and Mitigation

The Project will convert approximately 451.8 acres of predominately agricultural land (see Table 4.2-7 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 Project Footprint 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 Red Rock 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 access roads will utilize the rest of the disturbed area. Most of the facility, including the solar arrays, will be low-profile. The Solar Project Substation will have a more vertical profile with equipment ranging in height from 80-120 feet.

The solar arrays will be visible from adjacent roadways and parcels but given their relative low profile and the fact that all the facilities will be fenced for security, they will not be visible from long distances. Additionally, Red Rock has designed the Project to avoid tree clearing. As previously mentioned, the closest residence to preliminary design is approximately 364 feet north of the northeast corner of the Project Footprint. Red Rock has coordinated with the owners of Residences A and B, and they have not expressed concerns with the Project.

Current conditions and a rendering of the proposed Project from 610th Avenue on the east side of the Project near Residence A is provided below in Images 4 and 5. Current conditions and an additional rendering along 600th avenue in the central portion of the Project Boundary is displayed in Image 6 and 7, respectively.

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.

**Image 4: Current Conditions from 610th Avenue near Residence A Looking Southwest**

**Image 5: Visual Rendering of Red Rock Solar Project from 610th Avenue near Residence A Looking Southwest**

**Image 6: Current Conditions from CSAH 8 (600th Avenue) Looking Northeast**

**Image 7: Visual Rendering of Red Rock Solar Project from CSAH 8 (600th Avenue) Looking Northeast**

### 4.2.5 Socioeconomics

Socioeconomic information for the Project Boundary is based on data from the U.S. Census Bureau's QuickFacts and Explore Census Data websites. The U.S. Census websites provide 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 Project Boundary, 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).

**Table 4.2-5**
**Socioeconomic Characteristics of the Project Vicinity**

| State/County | Population, Census, April 1, 2010[1] | 2018 Estimated Total Vacant Housing Units[2] | ACS 2018 Estimates Per Capita Income Level[3] (in 2018 U.S. dollars) | ACS 2018 Estimates Persons Living Below the Poverty Level [3] (%) | ACS 2018 Estimates Unemployment Rate[3] (%) |
|---|---|---|---|---|---|
| **Minnesota** | **5,303,925** | **252,672** | **36,245** | **10.1** | **3.9** |
| Cottonwood County | 11,687 | 585 | 27,209 | 12.5 | 4.1 |

1 U.S. Census Bureau, 2019
2 U.S. Census Bureau, 2018a
3 U.S. Census Bureau, 2018b

Data is provided at the county level to characterize the socioeconomics in the Project Boundary and at the state level for the purpose of comparison. The Project is in a rural area within Midway Township and no incorporated communities are located within the Project Boundary. The incorporated communities nearest to the Project are Mountain Lake (1.3 miles southwest), Darfur (2.4 mile northeast), and Butterfield (4.2 miles southeast). The nearest larger city is Fairmont which is approximately 29 miles southeast of the Project Boundary.

Cottonwood County has a very small population compared to the State of Minnesota as a whole, comprising less than one percent of the state's total population (see Table 4.2-5). The per capita income of Cottonwood County is $27,209, which is lower than the state average. The unemployment rate in Cottonwood County (4.1 percent) is slightly higher than the state average of 3.9 percent and the percentage of individuals classified as living below the poverty level in Cottonwood County is about two percentage points higher than the state average at 12.5 percent and 10.1 percent, respectively. The primary industries in Cottonwood County are classified as educational services, health care, and social assistance (23.2 percent), followed by manufacturing (20.0 percent), and retail trade (11.5 percent) (U.S. Census, 2018a).

According to the U.S. Census Bureau 2018: ACS 5-year Estimates Data Profiles, approximately 585 vacant housing units exist in Cottonwood County. In the nearest metropolitan area, Fairmont, there are approximately 619 vacant housing units (U.S. Census Bureau, 2018a). In addition, according to the Visit Fairmont website (visitfairmontmn.com, 2020) six hotels and motels, two resorts, and six campgrounds are available in the greater Fairmont area. These residence and temporary housing statistics suggest the local area could support an influx of construction workers, if needed.

### 4.2.5.1 Impacts and Mitigation

The Project is designed to be socioeconomically beneficial to the landowners, local governments, and communities. Landowner compensation is established by voluntary leases or purchase agreements between the landowners and Red Rock for Red Rock's lease or purchase of the land.

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. Red Rock will use local contractors and suppliers for portions of the construction process, as available. Red Rock will issue a Request for Proposal (RFP) to qualified Balance of Plant (BOP) contractors to

oversee and manage the construction of the Project. In this RFP, Red Rock intends to include a strong preference for bids that utilize local, union construction craft employees to the greatest extent feasible in accordance with the Project's timeline and safety requirements. Red Rock expects that the selected BOP contractor will collaborate with organized labor unions and other stakeholders to develop a workforce and hiring plan that maximizes the local economic benefits of the Project. In addition, 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.

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 O&M of the facility will require one long-term employee. The Project anticipates that sufficient temporary lodging and permanent housing will be available within Cottonwood County, or within the Fairmont 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 Cottonwood County of approximately $208,000 annually over 30 years for a total of approximately $6.2 million. Additionally, Midway Township will receive approximately $52,000 annually over 30 years for a total of approximately $1.6 million. In addition, lease and purchase payments paid to the landowners (approximately $965,000 annually and $29 million over 30 years) 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 Cottonwood County, Minnesota and according to the U.S. Census Bureau QuickFacts website, the majority of the population in Cottonwood County identifies as Caucasian with an ethnic background of European origin (U.S. Census Bureau, 2019). However, the Jeffers Petroglyphs Historic Site is a culturally important site for many Native American tribes in the region.

As described further in Section 4.3.3, cultural representation for both European and Native American groups in community events includes annual events like the Utschtallung (Heritage Fair) and the Mountain Lake Community Festival in the City of Mountain Lake and tours and other events at the Jeffers Petroglyphs Historic Site and Visitors Center (Mountainlakemn.com, 2018; MNHS, undated). The Utschtallung includes public tours, hosted by costumed tour guides, of 21 historic buildings in Heritage Village, an area of early Russian-Mennonite and German-Lutheran settlement on the southwest side of Mountain Lake. The annual Mountain Lake Community Festival includes a parade, tractor pull, animal petting zoo, performances by local artists, and

other events. Guided or solo tours of the Jeffers Petroglyphs Historic Site offer visitors a chance to learn more about the Native American groups who historically inhabited this region.

Other community events near the Project are centered more around seasonal events, national holidays, and municipal events than to those based in ethnic heritage. Examples of regional cultural events include summertime events like the Summer Sizzler and the Butterfield Threshing Bee in Butterfield (Butterfieldmn.com, undated). A more detailed discussion of these events is presented in Section 4.3.3.

#### 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 Project Boundary is located outside of municipal areas and over nine miles southeast of the Jeffers Petroglyphs Historic Site. Therefore, no impacts to cultural values are anticipated and no mitigation measures are proposed.

### 4.2.7 Recreation

There are no MNDNR Scientific and Natural Areas, state trails, state water trails, WMAs, Aquatic Management Areas, state parks, or migratory waterfowl feeding and resting areas within one mile of the Project Boundary. There are no mapped snowmobile trails within the Project Boundary; however, the Cottonwood and Jackson County Snowmobile Trail is located less than 400 feet south of the southern portion of the Project Boundary near the Solar Project Substation along 360th Street, and also runs north along 580th Avenue a mile west of the Project Boundary. The nearest MNDNR WMA is the Mountain Lake WMA, located 2.5 miles southwest of the Project Boundary (Figure 8 – Recreation).

Similarly, there are no county or city parks within one mile of the Project Boundary. The nearest city is the City of Mountain Lake, whose municipal boundary is located 1.3 miles south/southwest of the Solar Project Substation.

#### 4.2.7.1 Impacts and Mitigation

Snowmobilers will notice the different aesthetic along the portion of the snowmobile trail in the vicinity of the Red Rock Solar Project. With the existing alignment of the snowmobile trails near the Project, the Solar Project Substation will be most visible as the trail will pass the substation for approximately one-tenth of a mile along 360th Street. 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, and specifically the Solar Project Substation, 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 Red Rock Solar Project on the established trails. Therefore, any aesthetic impacts would be limited to the rider's duration in the Project vicinity. Therefore, no impacts to recreational opportunities are anticipated and no mitigation measures are proposed.

### 4.2.8 Land Use and Zoning

#### 4.2.8.1 Land Use

The Project is located within a rural landscape, and as such the primary land use in the Project Boundary is cultivated cropland (95.2 percent; MRLC, 2016; Table 4.2-6; Figure 9 - Land Use).

The remaining land within the Project Boundary consists of developed land (4.4 percent), a small amount of deciduous forest (0.2 percent), hay/pasture (0.1 percent), and barren land (0.1 percent). Most of the agricultural land is in row crops, specifically corn and soybeans. Developed land within the Project Boundary generally consists of public roads, including 610th Avenue, 330th Street, 600th Avenue, 340th Street, and 590th Avenue. The areas in the Project Boundary identified as deciduous forest by the U.S. Geological Survey (USGS) National Land Cover Database (NLCD) consist of windbreaks near an existing farmstead and two separate clusters of farm outbuildings. There are no wetlands or open water identified in the Project Boundary by the NLCD data. See Section 4.5.5 for more information on wetlands.

**Table 4.2-6**
**Land Use Within the Project Boundary**

| Land Use Type | Acres in Project Boundary | Percent of Total Acreage |
|---|---|---|
| Cultivated Crops | 805.4 | 95.2 |
| Developed (all categories) | 37.7 | 4.4 |
| Deciduous Forest | 2.0 | 0.2 |
| Hay/Pasture | 0.7 | 0.1 |
| Barren Land | 0.4 | 0.1 |
| **Total** | **846.2** | **100.0** |

Source: MRLC, 2016

Farmsteads are sparsely scattered in this area of Cottonwood County, and generally situated near public roads. Based on review of available aerial photography, there is one occupied residence within the Project Boundary and one occupied residence adjacent to the Project Boundary; however, the Project will not cause displacement or relocation of residences (see Section 4.2.2).

### 4.2.8.2 Zoning

Based on Cottonwood County zoning data, the Project is zoned as agricultural (Cottonwood County, 2016). As noted in Section 25 of the Cottonwood County Renewable Energy Ordinance (Renewable Energy Ordinance), development of large solar energy systems within the agricultural district is a conditionally permitted use (Cottonwood County, 2016). The Cottonwood County Renewable Energy Ordinance 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, the Cottonwood County Renewable Energy Ordinance does not apply (Cottonwood County, 2016), but Red Rock has applied county standards to the Project.

The Cottonwood County Renewable Energy Ordinance does not specify setback regulations for large solar energy systems. However, the Renewable Energy Ordinance does outline standards for large solar farms and solar facilities in general. Based on preliminary design, the Solar Project complies with the standards outlined in the Renewable Energy Ordinance.

### 4.2.8.3 Impacts and Mitigation

Table 4.2-7 provides the total acreage by land use type within the Project Footprint. Based on the USGS NLCD data, the Project would affect predominately cultivated cropland (99.2 percent). However, of the 479.4 acres of cultivated cropland within the Project Footprint only 451.8 acres

will be within the fenceline of the solar facility and the Solar Project Substation. The remaining 27.6 acres would be temporarily impacted during installation of the collection lines and use of the two laydown areas outside the fenceline of the solar facility. After construction, these 27.6 acres will be available to return to row crop production.

**Table 4.2-7**
**Land Use Impacts**

| Land Use Type | Acres in Project Footprint | Percent of Total Acreage |
|---|---|---|
| Cultivated Crops | 479.4 | 99.2 |
| Developed (all categories) | 3.7 | 0.8 |
| Deciduous Forest | 0.1 | < 0.1 |
| **Total** | **483.3** | **100.0** |

Source: MRLC, 2016

Agricultural land will be converted from an agricultural use to a solar energy use for the life of the Project. The conversion of agricultural land to solar energy production within the Project Footprint will have a minimal impact on the rural character of the surrounding area or Cottonwood County. As discussed further in Section 4.3, Land-based Economies, of the 415,360 acres that comprise Cottonwood County, approximately 370,389 acres (89 percent) are classified as agricultural land. Converting 451.8 acres of cultivated cropland to a solar facility 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, Red Rock has coordinated with 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 decommissioning and restoration procedures to avoid and minimize impacts to soil and site productivity such that pre-construction agricultural productivity (anticipated use, appropriate management) is rapidly returned to the site following decommissioning. Red Rock met with MDA in November 2019 to discuss the AIMP's contents and site-specific characteristics. MDA reviewed and approved the AIMP for the Red Rock Solar Project as attached as Appendix C (*see* Appendix A for agency correspondence).

Developed and deciduous forest land use types total about 0.8 percent of the Project Footprint. Red Rock has designed the Project to avoid impacts on developed land within the Project Footprint by setting solar facilities back 25 feet from the road rights-of-way. The electrical collection lines between the solar facilities and the Solar Project Substation will be directionally bored under county roads. Similarly, areas categorized as deciduous forest land will not be impacted by the solar facilities (Table 4.2-7). Red Rock has designed the solar facility to avoid tree clearing.

As noted above, development of solar energy systems within the Cottonwood County agricultural district is a conditionally permitted use (Cottonwood County, 2016). As the Red Rock 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 Project Boundary and impacts the Solar 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, potable water, sanitary systems, and utilities. Most rural residences in Cottonwood County are supplied water by wells (see Section 4.5.2) or by Red Rock Rural Water System (Red Rock Rural Water System, 2019). Sewage is serviced by residential septic tanks and/or drain fields. Landline telephone service in the area is provided to farmsteads, rural residences, and businesses by Spectrum and CableOne. Cellular service in the Project Area is provided by many carriers including AT&T, DISH network, Sprint, Standing Rock Telecommunications, TerreStar, T-Mobile, and Verizon.

Minnesota is prioritizing border-to-border high-speed internet access throughout the state. The Border to Border Broadband Development Grant Program was created in Minn. Stat. § 116J.395 in 2014. The legislative focus of this grant program is to provide state resources that help make the financial case for new and existing providers to invest in building broadband infrastructure to unserved and underserved areas of the state. Based on data from the Minnesota Department of Employment and Economic Development (MN DEED), the area within the Project Boundary is identified as an Unserved Area (no wireline broadband of at least 25 megabytes per second (Mbps) download and three Mbps upload [25M/3M]). A few smaller areas in Cottonwood County are identified as Underserved Area (wireline broadband of at least 25M/3M but less than 100M/20M; MN DEED,2019).

## Public Utilities

There are no transmission lines within the Project Boundary. In addition, there are no pipelines in the Project Boundary (National Pipeline Mapping System, 2020). There is a 69 kV transmission line approximately 1.5 miles west of the Solar Project (see Figure 10 – Existing Infrastructure and AADT).

## Transportation

The major roadway in the area is Highway 60, approximately 1.5 miles south of the Project Boundary. The roads that surround the Project Boundary are local county or township roads. The nearest road to the northern limits of the Project Boundary is 320th Street and the nearest road to the southern Project Boundary is 360th Street. The Project Boundary is bordered on the east by 610th Avenue and on the west by 590th Avenue. The portion of the Project Boundary that will host the solar arrays is bisected by 330th Street (traveling east to west) and CSAH 8 (600th Avenue; traveling north to south). The portion of the Project Boundary that will host the collection line crosses 340th Street, 350th Street, and 590th Avenue before connecting into the Solar Project Substation, just north of 360th Street.

The Minnesota Department of Transportation (MNDOT) conducts traffic counts on roads in Minnesota. The functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day, or Annual Average Daily Traffic (AADT). Based on 2018 data, the highest existing AADT for roads near the Project Boundary is 5,881 vehicles per day along Highway 60; traffic volumes along the other county and township roads range from 65 to 330 vehicles per day (MNDOT, 2019). Traffic volume data for roads near the Project Boundary are provided in Table 4.2-8 and displayed on Figure 10 – Existing Infrastructure and AADT.

| Table 4.2-8<br>Annual Average Daily Traffic in the Project Vicinity | | |
|---|---|---|
| **Roadway** | **Year** | **AADT Traffic Volume Total** |
| Highway 60 | 2019 | 5,881 |
| 330th Street | 2016 | 330 |
| 600th Avenue | 2014 | 65 |
| Source: MNDOT, 2019 | | |

There will be seven access points to the solar facilities and one access point to the Solar Project Substation. Six of the access points to the solar facilities will be from 600th Avenue and one access point will be from 610th Avenue; access to the Solar Project Substation will be from 590th Avenue.

There are no railroads within one mile of the Project Boundary. There is a Chicago & Northwestern Railroad that runs between Mountain Lake and Butterfield approximately 1.5 miles south of the Project Boundary that parallels Highway 60.

The nearest Federal Aviation Administration (FAA)-registered airport to the Red Rock Solar Project is the Windom Airport located approximately 10 miles southwest of the Project. This airport operates one runway.

#### 4.2.9.1 Impacts and Mitigation

**Public Services**

Red Rock 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. Red Rock will also conduct an American Land Title Association survey to identify the locations of underground utilities. Final design will minimize and avoid impacts to underground utilities; if conflicts are unavoidable Red Rock 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**

The Project will not impact existing utilities such as transmission lines and substations; as such, no mitigation is proposed.

**Transportation**

Access to the Project will be via existing county and township roads. With the limited possible exception of minor field access or driveway changes depending on final design, no changes to existing roadways will occur. The roads used for access to the Red Rock Solar Project are shown on Figure 10 (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 five truck trips/day during site preparation, 15 truck trips/day during solar panel installation, and three truck trips/day during the mechanical/electrical/commissioning stage. It is

anticipated that there will be an average of 100-150 workers on site during the construction period with a maximum 200 workers for limited periods. 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, Red Rock 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.

No impacts on FAA-registered airports would occur as a result of the Solar Project; therefore, no mitigation measures are proposed.

## 4.3 Land-Based Economies

### 4.3.1 Agriculture

According to the U.S. Department of Agriculture's (USDA's) 2017 Census of Agriculture, of the 415,360 acres that comprise Cottonwood County, approximately 370,389 acres (89 percent) are farmland. A total of 744 individual farms are located in Cottonwood County, with the average farm size at 498 acres. The top crops (in acres) include corn, soybeans, and foraging crops (hay and haylage, grass silage, and greenchop). Cattle tops the list of livestock inventory in Cottonwood County, followed by hogs and pigs and poultry (i.e., layers; USDA, 2017).

The market value of agricultural production in Cottonwood County in 2017 was approximately $382 million. Crop sales accounted for approximately 51 percent of the total value of agricultural production, while livestock, poultry, and their products accounted for the remaining 49 percent (USDA, 2017).

Prime farmland is discussed in Section 4.5.3.

#### 4.3.1.1 Impacts and Mitigation

The Project will impact approximately 479 acres of cultivated cropland land within the Project Footprint and will not result in a significant impact to land-based economies in the Project vicinity, as this acreage constitutes less than one percent of the agricultural land in Cottonwood County (370,389 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 leases and purchase options with the landowners. 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. Agricultural production would be allowed to continue in the area within the Project Boundary but outside the fence of the Project Footprint during construction and operation of the Project. Similarly, if the

grazing vegetation management strategy is used, some agricultural activities would continue within the Project Footprint.

Based on discussions with Project landowners, Red Rock Solar is aware of drain tile in the Project Footprint. Red Rock is coordinating with landowners on the presence of drain tile within the Project Footprint. In the event the remaining drain tile mapping cannot be identified, Red Rock will utilize other sources, including infrared aerial photographs, LiDAR data, and, if necessary, a site-specific tile locate survey. These features will be incorporated into the design of the solar facility. In the event that damage occurs to drain tile or private ditches as a result of construction activities or operation of the Project, Red Rock Solar will repair any damages. More detail on drain tile identification, design considerations, construction measures, and operational measures is included in the AIMP (Appendix C).

One poultry farm is located within the Project Boundary, but outside of the Project Footprint. The poultry farm is north of 330th Street, between CSAH 8 (600th Avenue) and 610th Avenue. The owner of the poultry farm is a non-participating landowner for Red Rock, but has a signed setback waiver for Big Bend and is a supporter of both projects. The landowner around the poultry farm consulted with the poultry farm owner prior to signing the solar lease and included a setback in his lease agreement for a potential future expansion of the poultry farm. Red Rock has agreed to maintain access to the poultry farm during construction of the Project. Temporary increases in noise during construction would occur, but these impacts would resolve when construction is complete. Therefore, impacts on the poultry farm would be minor and temporary.

### 4.3.2 Forestry

There are no forestry operations in the Project Boundary; therefore, the Solar Project will not affect forestry resources. One wooded area is located within the northeastern corner of the Project Boundary; the wooded area is a windbreak around an existing farmstead. Similarly, the poultry operation within and adjacent to the Project Boundary has a wind break, but this serves as screening and is not associated with a forestry operation.

#### 4.3.2.1 Impacts and Mitigation

These windbreaks and the associated farmstead and farm outbuildings that are within the Project Boundary have been excluded from the Project Footprint for the Project. As none of the trees in the Project Boundary are considered forestry resources, and all trees will remain, no mitigative measures are proposed.

### 4.3.3 Tourism

Tourism in the vicinity of the Project Boundary centers around various festivals and activities hosted by the cities near the Project, such as Butterfield and Mountain Lake, and outdoor recreational opportunities described in Section 4.2.7.

Located just outside of the municipal boundary of the City of Butterfield is Voss Park, a community park and campground where most of the public events hosted by the City of Butterfield are held (Butterfieldmn.com, undated). Butterfield Summer Sizzler is an annual community event that lasts for three days after the 4th of July holiday. The event is held at Voss Park and includes the Chicken Run (a community fun run), the Butterfield Community Club Auxiliary Flea Market, 1st Lutheran Church's ice cream social, a kid's fishing contest, a scavenger hunt, and various other family friendly events. The Summer Sizzler ends with a firework display over Butterfield Lake, which is

directly adjacent to Voss Park. The Butterfield Threshing Bee is held annually at Voss Park in mid-August. The event is hosted by the Butterfield Threshermen's Association, and includes a tractor pull, tractor parade, tractor and horse plowing demonstrations, and live entertainment on the park stage.

According to their website, the City of Mountain Lake hosts a number of public events annually (Mountainlakemn.com, 2018). Utschtallung (Heritage Fair), held the second Saturday in September, includes public tours, hosted by costumed tour guides, of 21 historic buildings in Heritage Village, an area of early Russian-Mennonite and German-Lutheran settlement on the southwest side of Mountain Lake. Scattered throughout the historic buildings are interpretive displays on early pioneer life in this area of southwestern Minnesota. One of the buildings in the tour is the Minnesota Hall of Fame Telephone Museum, a one-of-a-kind museum in the state.

The City of Mountain Lake also hosts the annual Mountain Lake Community Festival, an event that lasts for five days in mid-June. Activities Includes a parade, tractor pull, animal petting zoo, performances by local artists, and other events. Other tourism opportunities in Mountain Lake include the Island View Campground, and nearby Lawcon Park which boasts a 9-hole disk golf course available for public use during the non-winter months. The Island View Campground and Lawcon Park are both located in the northwest corner of the city.

The Jeffers Petroglyphs Historic Site is another tourist attraction in this area of southwestern Minnesota (MNHS, undated). The site and associated Visitor Center are located on 160 acres, approximately nine miles northwest of the Project Area boundary. About 5,000 prehistoric rock carvings are found at this site and visitors can choose between guided or solo tours; field trips for school groups are also available. In addition, 1.2 miles of maintained trails run through the site and are available for public use. The Visitor Center has interpretive displays and a short video presentation that provides information about Native American culture and prairie ecology, as well as a museum store. The Jeffers Petroglyphs Historic Site is open Tuesday through Sunday from late May to early September, Saturdays only between early September and mid-October, then only by reservation for groups of 10 or more for the rest of the year.

#### 4.3.3.1 Impacts and Mitigation

Red Rock Solar will construct the Project facilities within the limits of the Project Boundary. The annual events hosted by the cities of Butterfield and Mountain Lake or at the Jeffers Petroglyphs Historic Site do not occur within the Project Boundary; most of these events are held within city limits or in areas outside of the Project Boundary. No impacts to public access to these events is anticipated during construction or operation of the Project.

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

### 4.3.4 Mining

Based on MNDOTs Aggregate Source Information System and County Pit Map for Cottonwood County, there are no gravel pits in the Project Boundary (MNDOT, 2018; MNDOT, 2003). On the Cottonwood County Pit Map, the nearest active mines to the Project Boundary are near the City of Windom, approximately nine to 10 miles south and west of the Project Boundary.

#### 4.3.4.1 Impacts and Mitigation

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

## 4.4 Archaeological and Historical Resources

On behalf of the Big Bend Wind Project and Red Rock Solar Project, Apex voluntarily initiated coordination with stakeholders including Native American tribes, Minnesota Historical Society (MNHS), and the State Historic Preservation Office (SHPO) to actively generate feedback from interested parties regarding the Projects, including input regarding the proximity of the Projects to the Jeffers Site and the surrounding Red Rock Ridge, which were initially located within a mile of the 2019 Wind Project Area and about 1.75 miles northwest of the original Solar Project Boundary (see Figure 7). A summary of these ongoing coordination efforts is provided in Sections 5.1.2 and 5.1.3 of this Application. A detailed discussion of coordination with Native American tribes, MNHS, and SHPO to date is provided Big Bend Wind's Site Permit Application (Docket No. IP7013/WS-19-619).

The Phase Ia literature review evaluated the Project Boundary and one-mile buffer. The results of the Phase Ia literature review are presented below and included in Appendix E.

In addition, the plan for the Phase I Survey for the Wind and Solar Projects was developed in consultation with MNHS, SHPO, and the Minnesota Department of Commerce- Energy Environmental Review and Analysis staff in 2019, prior to the kick-off of surveys for both projects. As a result of continued coordination with Native American tribes between 2017 and 2020, two tribes (the Otoe-Missouria Tribe and the Upper Sioux Tribe) participated in the Phase I Survey of the Solar Project Boundary. The results of the Phase I Survey are also presented below. Coordination with Native American tribes is ongoing, and a number of tribes are participating in review of Phase I Survey report.

### 4.4.1 Phase Ia Literature Review and Phase I Survey

Red Rock hired Quality Services, Inc. (QSI) to conduct the Phase Ia literature review and a Phase I field inventory for the Project. Background research on known cultural resources was conducted in 2017, 2018, and 2019 by requesting information from SHPO. The National Register of Historic Places (NRHP) and the National Historic Landmark online databases were also reviewed. Data regarding known cultural resources information resulting from previous professional cultural resources surveys and reported archaeological sites and historic architectural resources was reviewed to identify the types of archaeological sites that may be encountered and landforms or geographic features that have a higher potential for containing significant cultural resources.

No previously recorded archaeological or historic sites, or historic architectural resources were noted within the Project Boundary. The literature review identified one historic bridge (Bridge No. 89504) within one mile of the Project Boundary; this bridge is not eligible for listing in the NRHP. A copy of Red Rock's Phase Ia literature review is provided in Appendix E.

QSI conducted a Phase I Survey in May 2020 of the 790-acre portion of Project Boundary where the solar facility will be installed; Phase I Survey for the collection line corridor and Solar Project Substation was conducted in October 2020. The Phase I Survey included systematic pedestrian survey along transects spaced 15 meters apart and subsurface shovel testing along transects placed 15 meters apart. Ground visibility at the time of survey ranged from 0 percent in unplowed

fields to 100 percent in plowed and planted fields; no cultural resources were identified as a result of survey. A copy of the Phase I Survey report is provided in Appendix E.

### 4.4.2 Impacts and Mitigation

No archaeological or historic sites, or historic architectural resources were identified during Phase I inventory of the Project Boundary; 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, and in coordination with Native American tribes, Red Rock 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. 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 Marshall, Minnesota. This station monitors for $O_3$ and $PM_{2.5}$. The AQI for Marshall for the past five years is provided in Table 4.5-1 (MPCA, 2020).

**Table 4.5-1**
**Days in Each Air Quality Index Category (Marshall, Minnesota)**

| Year | Good | Moderate | Unhealthy for Sensitive Groups | Unhealthy | Very Unhealthy |
|---|---|---|---|---|---|
| 2019 | 327 | 35 | 0 | 0 | 0 |
| 2018 | 333 | 32 | 0 | 0 | 0 |
| 2017 | 329 | 31 | 0 | 0 | 0 |
| 2016 | 336 | 19 | 1 | 0 | 0 |
| 2015 | 338 | 26 | 1 | 0 | 0 |

Source: MPCA, 2020.

Air quality has been considered good for the majority of the past five reported years in Marshall. Since 2015, 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

When necessary, dust from construction traffic will be controlled using standard construction practices such as watering of exposed surfaces, covering of disturbed areas, 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.

Soils at the Project are not susceptible to wind erosion, which may create dust. Therefore, construction-specific mitigation measures and BMPs related to dust control have not been identified. If wind erosion becomes an issue during construction, standard industry practices may be implemented, 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.

### 4.5.2 Geology and Groundwater Resources

The land surface in southwestern Minnesota was heavily influenced by the most recent glaciation. Ice sheets crossed the region several times during the Wisconsin glaciation, depositing a mantle of drift 100 to 600 feet thick in most places. The dominant landform in the Minnesota River Prairie ecological subsection is loamy ground moraine. Topography is level to gently rolling till plains, moraines, lake plains, and outwash plains.

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 Project is within the Western Province, which is characterized by clayey glacial drift overlying Precambrian and Cretaceous bedrock. In this province, groundwater is typically derived from limited extent surficial and buried sand aquifers. Fractured bedrock is usually buried deeply beneath glacial sediments and is only locally used as an aquifer (MNDNR, 2001).

Red Rock reviewed the Project Boundary 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 an 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 three wells in the Project Boundary: one associated with the farmstead in the northeast corner and two associated with the poultry operation (Figure 10 – 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 Project Boundary; the nearest WHPA is located in the town of Mountain Lake, approximately one mile southwest of the Project Boundary.

#### 4.5.2.1 Impacts and Mitigation

Impacts from the proposed Project to available geologic resources are likely to be limited. Due to the thickness of surficial materials (approximately 100 to 300 feet [Minnesota Geological Survey, 2018]), 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 will not affect the use of existing water wells because there are no wells within the Project Footprint (see Figure 10 – Existing Infrastructure and AADT). The closest well to the Project Footprint is 320 feet. 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, Red Rock 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. Based on the small amount of increased impervious surface area that will be created by Project components (access roads, inverter skids, and Solar Project Substation – 15.2 acres [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 Project Footprint) are located at least 364 feet from the nearest occupied residence, thereby minimizing the risk of impacts on private wells in the area. Construction of the Project facilities is not likely to require subsurface blasting; therefore, disturbances to groundwater flow from newly fractured bedrock are not anticipated.

A National Pollutant Discharge Elimination System (NPDES) permit application to discharge stormwater from construction facilities will be acquired by Red Rock 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), revegetation plans, and management of exposed soils to prevent erosion. Because the Project will disturb more than 50 acres, Red Rock will submit the SWPPP to MPCA for review and approval prior to construction and obtaining coverage under the NPDES.

### 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, 2020). 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, 2020). Table 4.5-2 lists the soil types located within the Red Rock Project Boundary.

**Table 4.5-2**
**Summary of Soils within the Red Rock Project Boundary**

| Map Unit Symbol | Soil Name | Acres | Percent of Project Boundary | Farmland Designation | Hydric Soil | K-Factor | Wind Erodibility Group |
|---|---|---|---|---|---|---|---|
| L83A | Webster clay loam, 0 to 2 percent slopes | 316.7 | 38% | Prime farmland if drained | Yes | .28 | 6 |
| L85A | Nicollet clay loam, 1 to 3 percent slopes | 207.6 | 24% | All areas are prime farmland | No | .28 | 6 |
| L79B | Clarion loam, 2 to 6 percent slopes | 140.6 | 16% | All areas are prime farmland | No | .24 | 6 |
| L84A | Glencoe clay loam, 0 to 1 percent slopes | 83.5 | 10% | Prime farmland if drained | Yes | .28 | 6 |
| L78A | Canisteo clay loam, 0 to 2 percent slopes | 72.5 | 9% | Prime farmland if drained | Yes | .28 | 4L |

**Table 4.5-2**
**Summary of Soils within the Red Rock Project Boundary**

| Map Unit Symbol | Soil Name | Acres | Percent of Project Boundary | Farmland Designation | Hydric Soil | K-Factor | Wind Erodibility Group |
|---|---|---|---|---|---|---|---|
| L167A | Mayer clay loam, depressional , 0 to 1 percent slopes | 19.7 | 2% | Prime farmland if drained | Yes | .28 | 4L |
| L98A | Crippin-Nicollet complex, 1 to 3 percent slopes | 3.0 | 0% | All areas are prime farmland | No | .24 | 4L |
| L107A | Canisteo-Glencoe complex, 0 to 2 percent slopes | 2.1 | 0% | Prime farmland if drained | Yes | .28 | 4L |
| L165A | Mayer loam, 0 to 2 percent slopes | 0.5 | 0% | Prime farmland if drained | Yes | .24 | 4L |
| | **Total** | **846.2** | **100%** | | | | |

Source: Soil Survey Staff, 2020

Approximately 59 percent of the Red Rock Project Boundary is underlain by hydric soils or soils containing hydric inclusions. Hydric soils are one of several characteristics that can indicate the presence of wetlands (see Section 4.5.5). All of the soils in the Red Rock Project Boundary have low to moderate susceptibility to erosion by water (i.e., K-factors from 0.1 to 0.4). All of soils in the Red Rock Project Boundary are in Wind Erodibility Group 4L or 6. Wind Erodibility Group values of 4L correspond to Wind Erodibility Indices of 86 tons/acre/year, and WEG values of six correspond to 48 tons/acre/year (USDA, NRCS, 2020).

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. Soils at the Red Rock Solar Project are prone to compaction and rutting (Appendix C – AIMP).

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, 2020).

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 4.5-2 lists the soils considered prime farmland and soils of statewide or local importance within the Red Rock Project Boundary. Figure 11 (Farmland Classifications) depicts the distribution of prime farmland, prime farmland if drained, and not prime farmland in the Project Boundary.

#### 4.5.3.1 Impacts and Mitigation

**Soils**

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

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. The northern portion of the Project Boundary is not currently proposed to be a part of the Project Footprint because this area is sloped to the north, and utilizing the land would require extensive grading to achieve proper alignment of the solar panels in relation to the sun. 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, access roads, and the Project Substation. Based on the electrical configuration, impacts to soils will be minimal. As described in Section 3.1.2, the DC cabling will be mounted underneath the panels in a hanging harness system to minimize soil disturbance, while the AC collection system between the inverters and Solar Project Substation will be located in a below-ground trench (approximately four feet deep and one to two feet wide). 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, Red Rock 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. Compaction and rutting are potential limitations in the Project Footprint. Red Rock will design construction access and manage construction passes to minimize the number of trips occurring on a given soil and will implement wet weather procedures any time that rutting is observed. Deep compaction is not anticipated to be a significant problem as the number of construction equipment passes over a given area is limited, and construction equipment consists of smaller, low-ground-pressure tracked vehicles.

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 35-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 451.8 acres 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 Solar Project Substation, inverters, and access roads which will be converted to developed land and impervious surfaces (14.9 acres). Seed mixes are discussed in more detail in Section 4.5. 6.

As discussed in section 3.4.4, Red Rock may decide to use grazing with sheep as a long-term vegetation management technique. Grazing solar facilities with livestock is a developing management approach that can have both positive and negative impacts to soils, depending on how it is implemented.

In human-controlled grazing systems, the detrimental or beneficial effects of grazing are largely determined by how and where grazing is used. The negative impacts of livestock grazing are often the result of misuse (USFWS, 2009b). The USFWS outlines the following soil impacts in their discussion of Prescribed Grazing:

> *"Reduced vegetative cover and disturbed soil surfaces may result in increased wind and water erosion (Belnap and Gillette 1998). However, organic components of feces and urine from grazing animals can build soil organic matter reserves, resulting in soils having increased water-holding capacity, increased water-infiltration rates, and improved structural stability. These changes can decrease soil loss by wind and water erosion (Hubbard et al., 2004).*
>
> *The most severe effect of trampling may be compaction of soils, which damages plant roots (Watkins and Clements 1978) and causes roots to become concentrated near the*

*soil surface (Dormaar and Willms, 1998). These changes may prevent plants from acquiring sufficient resources for vigorous growth (Belsky and Gelbard, 2000).*

*Hoof action of grazing livestock can incorporate plant materials into soil and increase organic material."*

**Prime Farmland**

As shown in Table 4.5-3, 100% 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, 2020).

**Table 4.5-3**
**Farmland Classifications within the Project Footprint**

| Farmland Classification | Area (acres) | Percent of Project Footprint |
|---|---|---|
| Prime Farmland | 217.8 | 45% |
| Prime Farmland if Drained | 265.5 | 55% |
| Farmland of Statewide Importance | -- | -- |
| Not Prime Farmland | -- | -- |
| **Total** | **483.3** | **100%** |

Source: Soil Survey Staff, 2020

Prime farmland within the Project Footprint will be placed in a permanent cover of prairie grasses according to seeding and management specifications in the VMP to the benefit of wildlife and the soil, regardless of which vegetation management strategy is implemented. As discussed in Section 2.3.2, removing the land from agricultural production may be beneficial for limiting nitrogen infiltration into groundwater supply, thereby improving groundwater quality. Upon decommissioning, the land would be returned to its pre-construction agricultural use. Red Rock anticipates that the property will be restored to agricultural use on decommissioning of the Project.

Initial post-construction revegetation efforts and maintenance of vegetation during O&M will consider selecting suited plants, managing seeding times for late spring early summer when soil moisture is optimum for germination, use of mulch and other BMPs. Existing tile drainage systems will be maintained during Project operations. During operations, the only impact to prime farmland is that the land will not be farmed for approximately 30 years.

### 4.5.4 Surface Waters and Floodplains

The Red Rock Solar Project is located in the Minnesota Watershed Basin (MNDNR, 2020b). There are no lakes or rivers in the Project Boundary; as such, there are no MNDNR PWI watercourses or waterbodies in the Project Boundary (see Figure 12 – Water Resources). The nearest PWI waterbodies are an unnamed stream that is adjacent to the northeast portion of the Project Boundary; the Watonwan River located approximately 0.1 mile to the west of the Project Boundary; and Mountain Lake, located approximately two miles southwest of the Project Boundary. Both the Watonwan River and Mountain Lake are listed by MPCA as impaired waters. During wetland delineations, Apex identified one perennial watercourse in the southern portion of the solar siting area of the Project Boundary (see Figure 12 – Water Resources and Appendix F – Wetland Delineation Report). A few small wetlands are present directly adjacent to but outside the southeastern Project Boundary area. Wetlands are valuable for surface and subsurface water

storage, nutrient cycling, retention of sedimentation, and plant and animal habitats, and are described further in Section 4.5.5.

Based on the Federal Emergency Management Agency (FEMA) data for Cottonwood County, the Project Boundary is not located in a designated flood hazard area (FEMA, 2019).

#### 4.5.4.1 Impacts and Mitigation

The Project has been designed to avoid impacts to the watercourse within the solar siting portion of the Project Boundary. Solar panels, access, roads, inverters, and the fenceline will not be sited in this drainage way. However, the collection line corridor will cross this watercourse. Red Rock will bore the collection lines beneath this watercourse to avoid impacts to this feature. Further, as discussed in Section 4.5.2.1, a SWPPP will be developed for the Project prior to construction that will include BMPs such as silt fencing (or other erosion control devices), revegetation plans, and management of exposed soils to prevent sediment from entering into waterbodies. Additionally, as described in Section 3.1.5.3, Red Rock has preliminarily designed 10 stormwater drainage basins within existing low-lying areas to help control runoff during rain events.

Because the Project is within one mile of an impaired water, Red Rock 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 Project Boundary was determined 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 solar siting area of the Project Boundary in May 2020 (*see* Appendix F). The wetland delineation identified one wetland complex immediately adjacent to the Project Boundary; however, since the wetland delineation was completed, the Project Boundary has been revised to exclude this area. The delineation also confirmed the absence of eight NWI-mapped wetlands in the solar siting portion of the Project Boundary that were identified during the initial desktop assessment (*see* Figure 12 – Water Resources and Appendix F). There are no NWI-mapped wetlands in the collection line corridor or Solar Project Substation portions of the Project Boundary.

#### 4.5.5.1 Impacts and Mitigation

The Project design avoids impacts to delineated wetlands. The collection line corridor and Solar Project Substation footprints will have wetland delineations completed in Fall 2020. If wetlands are present in these areas, Red Rock will consider design shifts or construction methods (i.e., boring collection) to avoid impacts. If there are unavoidable impacts, Red Rock anticipates the Project will fall under the impact threshold for U.S. Army Corps of Engineers (USACE) Nationwide Permit or Regional General Permit and in accordance with the Minnesota Wetland Conservation Act administered by the local government unit (LGU). Red Rock will coordinate with both the USACE and LGU prior to construction for wetland impacts.

### 4.5.6 Vegetation

The Red Rock Solar Project is located in the Minnesota River Prairie subsection of the North Central Glaciated Plains Section in the Prairie Parkland Province, as defined by the ECS of Minnesota (MNDNR, 2000). Historically, tallgrass prairie covered most of this area with many

islands of wet prairies throughout this subsection. Deciduous forests were present within floodplains along the Minnesota River and other streams. European settlement in the area resulted in conversion of tallgrass prairies and wet prairies to farmland. Today, this subsection is considered to be the heart of the Minnesota Corn Belt (MNDNR, 2020a) with vegetation consisting largely of agricultural crops. There are few remnants of pre-settlement vegetation left and most areas of wet prairie have been drained for agricultural use. Table 4.2-6 in Section 4.2.8.1 lists the total acreage per land use type within the Project Boundary.

Based on the USGS NLCD landcover data, the Project would affect predominately cultivated cropland (95.2 percent). Developed land (all types), deciduous forest, hay/pasture, and barren land within the Project Boundary make up the remaining 4.8 percent (*see* Figure 9 - Land Use). Deciduous forest land within the Project Boundary consists of windbreaks near an existing farmstead and two separate clusters of farm outbuildings. In addition, based on the wetland delineation discussed in Section 4.5.5, there are no wetlands located within the Project Boundary. Lastly, there are no rare plants documented in the Project Boundary.

#### 4.5.6.1 Impacts and Mitigation

As discussed in Section 4.2.8.3, approximately 451 acres of cultivated cropland (i.e., the area within the fenceline of the solar facility) will be converted from an agricultural use to solar energy use for the life of the Project. An additional 27.6 acres of cultivated crops would be temporarily impacted during installation of the collection lines and use of the two laydown areas outside the fenceline of the solar facility, but after construction these 27.6 acres will continue to be used for row crop production. Cultivated cropland within the fenceline of the solar facility will be converted to open, herbaceous cover with the exception of the Solar Project Substation, inverter skids, and access roads which will be converted to developed land and impervious surfaces (14.9 acres; the remaining 0.7 acre required for these facilities is already classified as developed land). Additionally, Red Rock has designed the Project to avoid any tree clearing; therefore, forested land will not be impacted by the Project.

Red Rock has identified three potential seed mixes for the Project that are designed to achieve Red Rock's goals for operating the solar facility including use of native plants, establishing stable ground cover successfully, reducing erosion and runoff, and improving infiltration. The solar array seed mix includes native plants designed to flower at various times of the summer that will also be used by pollinators. Should Red Rock implement grazing as a long-term management technique, a grazing seed mix composed of native and non-native species oriented toward soil stabilization, forage palatability, and grazing resilience would be installed that could also be used by pollinators. Finally, a wet seed mix would be used in any basin areas anticipated to hold water. Red Rock's VMP, including the three seed mixes proposed for the Solar Project, is included in Appendix C.

### 4.5.7 Wildlife

#### 4.5.7.1 Avian Species

The Red Rock Solar Project is located within the Mississippi Flyway, one of the primary north-south migration routes between migratory bird nesting and wintering habitat (Audubon, undated). The Project Boundary is also located within the Prairie Pothole Bird Conservation Region (BCR) (USFWS, 2008). The USFWS identified 29 species of birds within Prairie Pothole BCR as Birds of Conservation Concern (BCC); BCC are avian species that represent the agency's highest conservation priorities. The BCC species that may be found in Cottonwood County include

American bittern, black tern, black-billed cuckoo, bobolink, Franklin's gull, lesser yellowlegs, red-headed woodpecker, semipalmated sandpiper, Smith's longspur, and willet (USFWS, 2020b).

The Migratory Bird Treaty Act (MBTA) of 1918 (16 United States Code [U.S.C.] 703-712) regulates the taking, selling, transporting, and importing of migratory birds, their nests, eggs, parts, or products. The MBTA protects more than 800 species of birds that occur within the United States. Most birds within the Project Area would be afforded protection under this Act. The Bald and Golden Eagle Protection Act (BGEPA) protects and conserves bald eagles (*Haliaeetus leucocephalus*) 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). Bald eagles are unlikely to occur in the Project Boundary due to a lack of suitable habitat.

Land uses in the Project Boundary are primarily agricultural (95.1 percent), with some small amounts of developed areas (4.5 percent), forested land (0.2 percent), hay/pasture (0.1 percent), and barren land (0.1 percent). The forested land that is present is limited to windbreaks around residences. As a result, few migratory bird species that use trees or forested areas to roost or forage (such as bald eagle, black-billed cuckoo, and red-headed woodpecker) are present within the Project Boundary. The Project Boundary has very little open water (one watercourse in the southern portion of the solar siting area of the Project Boundary (see Section 4.5.4) and no wetlands (see Section 4.5.5). Thus, wetland- or water-dependent birds such as waterbirds are unlikely to nest within the Project Boundary. Species of migratory birds associated with grasslands are limited or absent. Overall, few if any BCC are likely to use the area within the Project Boundary 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 Project Boundary is highly fragmented given 99.6 percent is used for agriculture or is developed. If species of habitat fragmentation concern are present in the Project Boundary, they have adapted to the fragmentation and current land uses.

#### 4.5.7.2 Other Wildlife Species

In addition to birds, mammals, reptiles, and insects may occur in the Project Boundary. Mammals that may be present include red fox, Virginia opossum, striped skunk, white-tailed jackrabbit, eastern cottontail, raccoon, thirteen-lined ground squirrel, and coyote (MNDNR, 2020c). Reptile and amphibian species that may be present in the Project Boundary include Great Plains toad, northern leopard frog, and plains garter snake (MNDNR, 2020d). The open water in the Project Boundary is limited to one watercourse (see Section 4.5.4); thus, no fish species are likely to be present. Some pollinator insects may be present in the Project Boundary including native bees, butterflies, and moths.

#### 4.5.7.3 Impacts and Mitigation

Given that the Project landscape is primarily agricultural, occurrence of wildlife within the Project Boundary is limited. As a result, impacts on wildlife are expected to be minor. Restoration of the Project Footprint may result in wildlife benefits given that the area will be revegetated with a seed mix that is pollinator friendly. Common species of wildlife adapted to agricultural land use 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 may be present in the Project. During construction, highly mobile species of wildlife including deer, birds, and snakes are expected to divert to areas surrounding the Project. Less mobile species, ground nests, eggs, and chicks may be impacted; however, given that the Project Boundary is cropland, these impacts may have occurred due to agricultural practices regardless of the Project development. Overall, construction of the Project is expected to have minimal impacts on individuals of common wildlife species and no impact on their populations. During operations, any potential impacts on wildlife are also expected to be minimal and insignificant. Impacts related to vehicle traffic, including parking or mowing, may occur. Because any potential impacts on wildlife are anticipated to be minimal and insignificant, no species-specific mitigation is proposed.

After construction and during operations, the Project may provide more suitable wildlife habitat than the current land use provides. Red Rock will restore impacted areas with a seed mix designed to enhance habitat for wildlife, including grassland birds, rodents, reptiles, and insects. Although 15.2 acres within the Project will be converted to permanent facilities (i.e., access roads, Solar Project Substation, and inverters), 451.8 acres will be converted from crops to herbaceous cover, thereby restoring native plants throughout the area and potentially benefitting and attracting wildlife species.

### 4.5.8 Rare and Unique Natural Resources

Red Rock reviewed the USFWS Information for Planning and Conservation (IPaC) website to identify the federally endangered and threatened species, candidate species, and designated critical habitat that may occur within the Project Boundary (USFWS, 2020b). Red Rock 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 Project Boundary (MNDNR, 2020c). Red Rock also requested NHIS information from MNDNR for the Project Boundary and one-mile buffer on September 28, 2020. A copy of this request is included in Appendix E). 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 Project Boundary**

| Common Name | Scientific Name | Habitat | Within One Mile of Project Boundary | Within Project Boundary | Status [1] | |
|---|---|---|---|---|---|---|
| | | | | | State [2] | Federal [3] |
| ***Mammals*** | | | | | | |
| Northern Long-eared Bat (NLEB) [4] | *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, 2020c) | No | No | SC | T |

**Table 4.5-4**
**Federal and State Listed Species Documented within One Mile of the Project Boundary**

| Common Name | Scientific Name | Habitat | Within One Mile of Project Boundary | Within Project Boundary | Status [1] | |
|---|---|---|---|---|---|---|
| | | | | | State [2] | Federal [3] |
| ***Plants*** | | | | | | |
| Prairie Bush Clover [4] | *Lespedeza leptostachya* | Dry to mesic tallgrass prairies with gravelly soils (USFWS, 2009) | No | No | T | T |
| ***Invertebrates*** | | | | | | |
| Abbreviated Underwing | *Catocala abbreviatella* | Dry to mesic prairies and savanna communities where leadplant occurs (MNDNR, 2018a) | Yes | No | SC | N/A |

1 E = Endangered, T = Threatened, SC = Special Concern
2 MNDNR, 2013; MNDNR, 2020c
3 USFWS, 2020b
4 Red Rock's review of the NHIS did not indicate any records of the NLEB or prairie bush clover within a mile of the Project Boundary or within the Project Boundary; however, review of the USFWS' IPaC indicated that these two species have the potential to occur in Cottonwood County.

### 4.5.8.1 Federal Listed Species

According to Red Rock's review of the USFWS IPaC, two species that are listed as threatened or endangered under the federal Endangered Species Act (ESA) may occur in Cottonwood County, Minnesota: northern long-eared bat (NLEB) and prairie bush clover. There is no designated critical habitat within the Project Boundary (USFWS, 2020b).

**Northern Long-eared Bat**

The NLEB is listed as threatened under the ESA. Its range extends 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, 2015; USFWS, 2016). 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, 2015). 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, 2019). 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, 2015). The NLEB population has declined dramatically in recent years due to while-nose syndrome (WNS), a disease that affects hibernating bats.

The Project Boundary is primarily agricultural with only a small area of forested habitat (0.2 percent). The landscape surrounding the Project Boundary is also dominated by agriculture. However, during their active season (April 1 through October 31), NLEB may roost in the trees

within the Project Boundary. However, the Project is unlikely to impact NLEB, even if they are roosting in forested areas, because bats do not typically collide with stationary features.

**Prairie Bush Clover**

The federally threatened prairie bush clover (*Lespedeza leptostachya*) is a tallgrass prairie endemic native to the upper Mississippi River Valley. Its current range is limited to discrete locations in Minnesota, Illinois, Iowa, and Wisconsin. The species flowers in mid-July to early August producing pale-pink flowers arranged loosely on an open spike. Prairie bush clover occurs on dry-mesic prairies with gravelly soils on north-, northeast- or northwest-facing slopes in southwestern Minnesota. Remaining occurrences of the species are generally restricted to remnant prairies; in Minnesota, most populations occur in prairies that were formerly or are currently pasture. The primary threat to the species is habitat loss and destruction (MNDNR, 2020e; USFWS, 2009).

The Project Boundary is dominated by agricultural land (95.1 percent), with some small amounts of developed areas (4.5 percent), forested land (0.2 percent), hay/pasture (0.1 percent), and barren land (0.1 percent). The limited hay/pasture within the Project Boundary is associated with the poultry operation (see Figure 9 – Land Use). There is no tallgrass prairie within the Project Boundary. Thus, prairie bush clover is not expected to occur within the Project Boundary.

### 4.5.8.2 State Listed Species

Based on Red Rock's NHIS review, there are no records of state listed species within the Project Boundary. Within one mile of the Project Boundary, there is one record of the abbreviated underwing (*Catocala abbreviatella*), a state species of concern (Table 4.5-4). Red Rock submitted an NHIS request to MNDNR for concurrence of rare species within one mile of the Project Boundary on September 28, 2020.

The abbreviated underwing occurs in dry to mesic prairies and savanna communities where leadplant occurs; sites in western counties are relatively level to gently hilly mesic to dry prairies (MNDNR, 2018a). Suitable prairie habitat is not present in the Project Boundary, and thus, the abbreviated underwing is not expected to be present.

### 4.5.8.3 MNDNR High Value Areas

The MNDNR issued guidance for commercial solar sites entitled Commercial Solar Siting Guidance (Solar Guidance; May 2016) that recommends identification of high value resources during Project development. High value resources include (1) rare species and 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 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 Project Boundary.

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 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 Project Boundary.

**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 MNDNR-mapped native prairie in the Project Boundary.

**Species and Habitats Included in the 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 defines actions to prevent species from becoming listed under the state endangered species program or the ESA. 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 Project Boundary 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 Red Rock's review of the MNDNR's NHIS, no SGCN have been documented within the Project Boundary.

**Lakes, Wetlands, Streams, and Rivers**

Lakes, wetlands, streams, and rivers are discussed in sections 4.5.4 and 4.5.5. The Project Boundary includes one watercourse and no delineated or NWI-mapped wetlands.

**Large Block Habitats**

Large block habitats are grassland habitats of greater than 40 acres (MNDNR, 2016b). The Project Boundary is highly fragmented; 99.6 percent is used for agriculture or is developed. The Project Boundary 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 Project Boundary; 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 Project Boundary.

### 4.5.8.4 Impacts and Mitigation

**Federal Listed Species**

The USFWS published the 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, 2016). The Project Boundary is located within the USFWS-designated WNS Zone (USFWS, 2019). Per the USFWS' final 4(d) rule for NLEB, within the WNS Zone, incidental take due to tree removal is prohibited as follows:

- If it occurs within 0.25 mile 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, 2016).

Records of documented hibernacula and roost trees are maintained in the MNDNR's NHIS. Based on a review of NLEB NHIS records, Red Rock determined that there are no documented NLEB maternity roost trees within 150 feet of the Project Boundary or documented hibernacula within 0.25 mile of the Project Boundary. Although there are no records of NLEB in the MNDNR's NHIS and the species was not documented during acoustic surveys completed for the Big Bend Wind Project, the species may still be present in the Project Boundary. Overall, Red Rock does not anticipate that the Project will impact NLEB during construction or operations. Construction of the Project will not require tree clearing; thus, Red Rock will not impact NLEB, if present, 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 Project Boundary, but Red Rock anticipates that any impacts due to noise and human presence would be insignificant and similar to existing noise associated with farmsteads and agricultural activities.

The prairie bush clover is a tallgrass prairie endemic. No impacts on prairie bush clover are expected during Project construction and operations because no tallgrass prairie habitat is present within the Project Boundary.

**State Listed Species**

Based on Red Rock's NHIS review, no records of state listed species were documented within the Project Boundary. A record of one state listed species, the abbreviated underwing, a state species of special concern was documented within one mile of the Project Boundary. The habitat for the abbreviated underwing is dry to mesic prairies and savanna communities where leadplant occurs; sites in western counties are relatively level to gently hilly mesic to dry prairies. Suitable prairie habitat is not present in the Project Boundary. Therefore, Red Rock expects that there will be no impacts on these species due to the construction and operation of the Red Rock Solar Project.

Red Rock sent a Project introduction letter to MNDNR staff in May 2020 and followed up in June 2020 with an updated Project description. On July 7, 2020, the MNDNR responded to Red Rock with the following recommendations:

- Submit a Project-specific NHIS request;
- Avoid wetland areas with design;
- Review the MNDNR's Commercial Solar Siting Guidance (MNDNR, 2016a);
- Follow the Prairie Establishment & Maintenance Technical Guidance for Solar Projects (Revised July 2020; MNDNR, 2020f); and
- Use wildlife-friendly erosion control and invasive species prevention BMPs.

Red Rock reviewed the MNDNR Commercial Solar Guidance for the Red Rock Solar Project (see Section 4.5.8.3). Additionally, Red Rock will implement MNDNR guidance of wildlife-friendly fencing by installing agricultural woven wire fence that will extend approximately seven 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 three to four strands of smooth wire will be used.

Red Rock reviewed licensed NHIS data and has submitted an NHIS request for concurrence from MNDNR. Additionally, the Project design avoids impacts to wetlands. Lastly, the VMP was designed using the Prairie Establishment & Maintenance Technical Guidance for Solar Projects.

**MNDNR High Value Areas**

Federal and state listed species are described above. There are no additional MNDNR High Value Areas in the Project Boundary, 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 not be impacted and no mitigative measures are proposed.

## 4.6 Unavoidable Impacts

Red Rock designed the Project to avoid impacts to environmental resources whenever possible. In some cases, impacts to environmental resources could not be entirely avoided, but will 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 Application. Environmental impacts that will be minimized by the use of mitigation measures, but not entirely avoided are provided below. Most of these unavoidable impacts will occur during construction of the Project and will resolve with the completion of construction.

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

- noise emitted from vehicles and equipment during construction that will be audible to neighboring landowners;
- increased traffic on roads that bisect the Project Boundary;
- minor air quality impacts due to fugitive dust;
- potential for soil erosion; and
- Potential disturbance to and displacement of some species of wildlife.

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

- changes to existing aesthetics of landscape (from agrarian to solar facility), which will be visible from local roadways and parcels; and
- changes in land use and vegetation from agricultural land of predominately corn and beans to a solar facility with herbaceous vegetation underneath and around the Project Footprint.

# 5.0 AGENCY AND PUBLIC OUTREACH

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

## 5.1 Agency Involvement in Pre-Application

As part of pre-Application efforts, Red Rock 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 and MNDNR.

On May 20, 2020, Red Rock Solar sent an informal Project introduction letter and map to federal, state, and local agencies with jurisdiction in the Project Boundary. Red Rock 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 November 4, 2020 are included in Appendix A. A summary of responses and meetings with federal and state agencies is included below. Red Rock 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**
**Red Rock Solar Agency Correspondence**

| Agency | Response Date (Type) |
|---|---|
| **Federal** | |
| U.S. Army Corps of Engineer, St. Paul District | No response to date. |
| U.S. Army Corps of Engineer, Brainerd Office | No response to date. |
| U.S. Fish and Wildlife Service – Twin Cities Ecological Services Field Office | November 2, 2017 (Agency response)<br>December 19, 2017 (Meeting)<br>October 1, 2020 (Agency response) |
| **State** | |
| Minnesota Historical Society and State Historic Preservation Office | Ongoing |
| Minnesota Department of Commerce, Energy Environmental Review and Analysis (Size Determination Form) | July 21, 2020 |
| Minnesota Department of Natural Resources (MNDNR) – Energy Projects Review | July 7, 2020 (Agency response) |
| MNDNR – Region 4 (Southern Region) | No response to date. |
| MNDNR – Natural Heritage Information System Review | No response to date. |
| Minnesota Department of Health | No response to date. |

| Table 5.1-1<br>Red Rock Solar Agency Correspondence | |
|---|---|
| **Agency** | **Response Date (Type)** |
| Minnesota Department of Agriculture | November 26, 2019 (Meeting) |
| Minnesota Department of Transportation | No response to date. |
| Minnesota Department of Employment & Economic Development | No response to date |
| Minnesota Pollution Control Agency – Southwest Region Office, Marshall Office | No response to date. |
| Minnesota Department of Public Safety | No response to date. |
| **County** | |
| Southwest Regional Development Commission | No response to date. |
| Cottonwood County – Planning and Zoning Department, Land Management | No response to date. |
| Cottonwood County Highway Department | No response to date. |
| **Local Government Units** | |
| Midway Township | No response to date. |
| **Tribal Consultation** | |
| Lower Sioux Indian Community, Rosebud Sioux Tribe, Upper Sioux Indian Community, and Flandreau Santee Sioux Tribe | January 28, 2020 (Meeting) |

### 5.1.1 Federal Agencies

#### 5.1.1.1 U.S. Fish and Wildlife Service

On November 2, 2017, Red Rock requested data from the USFWS regarding listed bat roosts and hibernacula, eagle nests, and any other federally listed species that are known to occur in the Project vicinity. On December 19, 2017, Reg Rock met with USFWS to discuss results of the November 2017 data request and wildlife surveys for the Wind Project. Because the Project is within the Big Bend Wind Project Boundary, early coordination with USFWS included both projects; however, USFWS didn't provide any solar project specific comments or issues.

On October 1, 2020, USFWS provided a response indicating the federal agency relies on available web-based tools to provide initial technical assistance to project proponents. The letter further directed Red Rock Solar to complete an IPaC for the project, which was completed and described in Section 4.5.8.

### 5.1.2 State Agencies

#### 5.1.2.1 Minnesota Historical Society and State Historic Preservation Office

Similar to early coordination efforts with Native American tribes (see Section 5.1.2 below), Apex began coordinating with the MNHS and SHPO during early planning for the Big Bend Wind and Red Rock Solar Projects. A detailed discussion of coordination with MNHS and SHPO to date is provided Big Bend's Site Permit Application (Docket No. IP7013/WS-19-619). These early coordination efforts resulted in changes to the Big Bend Project Area and, subsequently, to the

location of the Solar Project to move the projects further from the Jeffers Petroglyphs site (see Section 2.4).

Coordination with MNHS and SHPO regarding the Jeffers Petroglyphs site is ongoing and updates to the status of these coordination efforts will be filed on the Big Bend Site Permit Application docket.

#### 5.1.2.2 Minnesota Department of Natural Resources

The MNDNR responded to Red Rock's Project notification letter on July 7, 2020 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.

#### 5.1.2.3 Minnesota Department of Agriculture

Red Rock met with representatives of the MDA on November 26, 2019 to discuss the Project. Red Rock and MDA discussed the Project's need to develop an AIMP and reviewed the AIMP's contents and site-specific characteristics. On October 14, 2020, Red Rock Solar provided a draft of the Red Rock AIMP to MDA; MDA reviewed and provided comments on the draft AIMP on October 29, 2020. Red Rock provided a redline version of the final AIMP, including updates to address the agency's comments on October 30, 2020. The final AIMP is included as Appendix C.

### 5.1.3 Native American Tribes

As discussed in Section 2.3.1, the Red Rock Solar Project would be developed with the Big Bend Wind Project, as the two projects have a hybrid wind/solar interconnection position in the MISO queue. While there is no federal nexus for the Project that requires consultation with Native American tribes, Big Bend voluntarily solicited their input due to the proximity of the Big Bend Wind Project to the Jeffers Petroglyphs site, Red Rock Ridge, and the well-documented cultural and historical significance of these resources. Big Bend began coordinating with Native American tribes that may have an interest in the area during the early planning stages of both the Wind and Solar Projects. A detailed discussion of Big Bend's coordination to date is provided Big Bend's Site Permit Application (Docket No. IP7013/WS-19-619). These early coordination efforts resulted in changes to the Big Bend Project Area and, subsequently, to the location of the Solar Project to move the projects further from the Jeffers Petroglyphs site.

In January 2020, Big Bend and Red Rock hosted a meeting with tribal representatives and staff from the Jeffers Petroglyphs site to review revised design of the Wind and Solar Projects and associated visual simulations, and to review the findings of field surveys for the Wind and Solar Projects to date. During the meetings, tribal representatives reiterated their request for regular updates on the status and findings of the field surveys and their desire to consult on site evaluations and the process for responding to unanticipated discoveries. At this meeting, the Rosebud Sioux Tribe suggested that the solar the size of the Solar Project should be expanded so that the number of turbines required for the Wind Project could be reduced.

In May 2020, the Otoe-Missouria Tribe and the Upper Sioux Tribe participated in cultural resources field investigations of the Solar Project Boundary, as depicted in this Application.

Coordination with Native American tribes is ongoing and a number of tribes are participating in review of Phase I cultural resources reports and development of Unanticipated Discoveries Plan for the Wind and Solar Projects. Updates to the status of Native American coordination efforts will be filed on the Big Bend Site Permit Application docket.

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