LOOKOUT SOLAR PROJECT

Application to the South Dakota Public Utilities Commission for an Energy Facility Permit

December 2018

Lookout Solar Park I, LLC

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1 INTRODUCTION

Lookout Solar Park I, LLC ("Lookout Solar" or the "Applicant") respectfully submits this application (the "Application") to the South Dakota Public Utilities Commission (the "Commission") for a Facility Permit to construct and operate the Lookout Solar Project (the "Project"). Lookout Solar is proposing to construct a solar energy facility located on approximately 810 acres of privately owned land on the Pine Ridge Reservation in Oglala Lakota County, South Dakota (the "Project Area"). The proposed Project includes up to 500,000 solar panels, associated access roads, a new collector substation, and multiple 34.5 kilovolt ("kV") transmission lines in Custer County, South Dakota (the "Transmission Line Route").

The Transmission Line Route would begin at the edge of the Project Area, at the boundary of Custer County and Oglala Lakota County and be placed underground in the county highway along Riverside Road, 148th Avenue and Cottonwood Cutoff. The Project would interconnect to the high voltage transmission grid via the eighteen 34.5 kV transmission line in Custer County. A new collection substation would be constructed at the point of interconnection.

The Project would include the following components:

- 500,000 solar panels;
- An energy storage facility;
- Access roads to solar panels and associated facilities;
- Underground 34.5 kV electrical collector lines connecting the solar panels to the collection substation;
- Underground fiber-optic cable for communications co-located with the collector lines;
- A collection substation; and
- Temporary construction areas, including laydown areas.

2 FACILITY PERMIT APPLICATION

In accordance with South Dakota Codified Laws ("SDCL") Chapter 49-41B and Administrative Rules of South Dakota ("ARSD") Chapter 20:10:22, the Application provides information on the existing environment, potential Project impacts, and proposed avoidance, minimization, and/or mitigation measures for the following resources:

- Physical (geology, economic deposits, soils);
- Hydrology (surface water and groundwater);
- Terrestrial ecosystems (vegetation, wetlands, wildlife, threatened and endangered species);
- Aquatic ecosystems;
- Land use (agriculture, residential, displacement, sound, aesthetics, electromagnetic interference, safety and health, real estate values);
- Water quality;
- Air quality; and
- Communities (socioeconomics, transportation and emergency response, cultural resources).

The Project is located on land under the jurisdictional of the U.S. Bureau of Indian Affairs ("BIA") and interconnects to high voltage transmission lines under the jurisdiction of the U.S. Western Area Power administration ("WAPA"). Therefore, in addition to the requirements under South Dakota Law and the Commission's regulations, Lookout Solar must comply with the requirements of the U.S. National Environmental Policy Act ("NEPA"). The BIA issued a final Environmental Assessment ("EA") and a Finding of No Significant Impacts ("FONSI") for the Project Area in June 2016. WAPA currently is preparing an EA for the Transmission Line Route and anticipates issuing a final EA and FONSI in the spring of 2019. The EAs prepared by BIA and WAPA for the Project Area and the Transmission Line Route assess environmental impacts associated with the Project and identify management practices to avoid and mitigate impacts.

Pursuant to SDCL 49-41B-22, the information presented here establishes the following and thereby satisfied its burden of proof:

- The Project complies with applicable laws and rules;
- The Project would not pose a threat of serious injury to the environment or to the social and economic condition of inhabitants in, or near, the Project Area or Transmission Line Route;
- The Project would not substantially impair the health, safety, or welfare of the inhabitants; and

• The Project would not unduly interfere with the orderly development of the region, having given consideration to the views of the governing bodies of the local affected units of government.

3 COMPLETENESS CHECKLIST

The contents required for an application with the Commission are described in SDCL 49-41B and further clarified in ARSD 20:10:22:01(1) et seq. The Commission submittal requirements are listed in Table 3-1 with cross-reference indicating where the information can be found in this Application.

SDCL	ARSD	Required Information	Location
49-41B-11(1)	20:10:22:06	Names of participants required. The application shall contain the name, address, and telephone number of all persons participating in the proposed facility at the time of filing, as well as the names of any individuals authorized to receive communications relating to the application on behalf of those persons.	Chapter 4.0
49-41B-11(7)	20:10:22:07	Names of owner and manager. The application shall contain a complete description of the current and proposed rights of ownership of the proposed facility. It shall also contain the name of the project manager of the proposed facility.	Chapter 5.0
49-41B-11(8)	20:10:22:08	Purpose of facility. The applicant shall describe the purpose of the proposed facility.	Chapter 6.0
49-41B- 11(12)	20:10:22:09	Estimated cost of facility. The applicant shall describe the estimated construction cost of the proposed facility	Chapter 7.0
49-41B-11(9)	20:10:22:10	Demand for facility. The applicant shall provide a description of present and estimated consumer demand and estimated future energy needs of those customers to be directly served by the proposed facility. The applicant shall also provide data, data sources, assumptions, forecast methods or models, or other reasoning upon which the description is based. This statement shall also include information on the relative contribution to any power or energy distribution network or pool that the proposed facility is	Chapter 6.0

SDCL	ARSD	Required Information	Location
		projected to supply and a statement on the consequences of delay or termination of the construction of the facility.	
49-41B-11(2)	20:10:22:11	General site description. The application shall contain a general site description of the proposed facility including a description of the specific site and its location with respect to state, county, and other political subdivisions; a map showing prominent features such as cities, lakes and rivers; and maps showing cemeteries, places of historical significance, transportation facilities, or other public facilities adjacent to or abutting the plant or transmission site.	Chapter 8.0
49-41B- 11(6); 49- 41B-21-34A- 9-7(4)	20:10:22:12	 Alternative sites. The applicant shall present information related to its selection of the proposed site for the facility, including the following: (1) The general criteria used to select alternative sites, how these criteria were measured and weighed, and reasons for selecting these criteria; (2) An evaluation of alternative sites considered by the applicant for the facility; (3) An evaluation of the proposed plant, solar energy, or transmission site and its advantages over the other alternative sites considered by the applicant, including a discussion of the extent to which reliance upon eminent domain powers could be reduced by use of an alternative site, alternative waste handling method. 	Chapter 9.0
49-41B-11(2, 11); 49-41B- 22	20:10:22:13	Environmental information . The applicant shall provide a description of the existing environment at the time of the submission of the application, estimates of changes in the existing environment which are anticipated to result from construction and operation of the	Chapters 10.0, 11.0, 12.0, 13.0, 14.0, 15.0. 17.0, 20.0

SDCL	ARSD	Required Information	Location
		proposed facility, and identification of irreversible changes which are anticipated to remain beyond the operating lifetime of the facility. The environmental effects shall be calculated to reveal and assess demonstrated or suspected hazards to the health and welfare of human, plant and animal communities which may be cumulative or synergistic consequences of siting the proposed facility in combination with any operating energy conversion facilities, existing or under construction. The applicant shall provide a list of other major industrial facilities under regulation which may have an adverse effect on the environment as a result of their construction or operation in the transmission site, solar energy site, or siting area.	
49-41B-11(2, 11); 49-41B- 22	20:10:22:14	 Effect on physical environment. The applicant shall provide information describing the effect of the proposed facility on the physical environment. The information shall include: (1) A written description of the regional land forms surrounding the proposed plant or solar energy site or through which the transmission facility will pass; (2) A topographic map of the plant, solar energy, or transmission site; (3) A written summary of the geological features of the plant, solar energy, or transmission site; (3) A written summary of the description site using the topographic map as a base showing the bedrock geology and sufficial geology with sufficient cross-sections to depict the major subsurface variations in the siting area; (4) A description and location of economic deposits such as lignite, sand and gravel, and the sufficient of the solar energing. 	Chapter 11.0

SDCL	ARSD	Required Information	Location
		clay existent within the plant, solar energy, or transmission site;	
		(5) A description of the soil type at the plant, solar energy, or transmission site;	
		(6) An analysis of potential erosion or sedimentation which may result from site clearing, construction, or operating activities and measures which will be taken for their control;	
		(7) Information on areas of seismic risks, subsidence potential and slope instability for the plant, solar energy, or transmission site; and	
		(8) An analysis of any constraints that may be imposed by geological characteristics on the design, construction, or operation of the proposed facility and a description of plans to offset such constraints.	
49-41B-11(2, 11); 49-41B- 22	20:10:22:15	Hydrology. The applicant shall provide information concerning the hydrology in the area of the proposed plant, solar energy, or transmission site and the effect of the proposed site on surface and groundwater. The information shall include:	Chapter 12.0
		(1) A map drawn to scale of the plant, solar energy, or transmission site showing surface water drainage patterns before and anticipated patterns after construction of the facility;	
		(2) Using plans filed with any local, state, or federal agencies, indication on a map drawn to scale of the current planned water uses by communities, agriculture, recreation, fish, and wildlife which may be affected by the location of the proposed facility and a summary of those effects;	
		(3) A map drawn to scale locating any known surface or groundwater supplies	

SDCL	ARSD	Required Information	Location
		within the siting area to be used as a water source or a direct water discharge site for the proposed facility and all offsite pipelines or channels required for water transmission;	
		(4) If aquifers are to be used as a source of potable water supply or process water, specifications of the aquifers to be used and definition of their characteristics, including the capacity of the aquifer to yield water, the estimated recharge rate, and the quality of ground water;	
		(5) A description of designs for storage, reprocessing, and cooling prior to discharge of heated water entering natural drainage systems; and	
		(6) If deep well injection is to be used for effluent disposal, a description of the reservoir storage capacity, rate of injection, and confinement characteristics and potential negative effects on any aquifers and groundwater users which may be affected.	
49-41B-11(2, 11); 49-41B- 22	20:10:22:16	Effect on terrestrial ecosystems. The applicant shall provide information on the effect of the proposed facility on the terrestrial ecosystems, including existing information resulting from biological surveys conducted to identify and quantify the terrestrial fauna and flora potentially affected within the transmission site, solar energy site, or siting area; an analysis of the impact of construction and operation of the proposed facility on the terrestrial biotic environment, including breeding times and places and pathways of migration; important species; and planned measures to ameliorate negative biological impacts as a result of construction and operation of the proposed facility.	Chapter 13.0

SDCL	ARSD	Required Information	Location
49-41B-11(2, 11); 49-41B- 22	20:10:22:17	Effect on aquatic ecosystems. The applicant shall provide information of the effect of the proposed facility on aquatic ecosystems, and including existing information resulting from biological surveys conducted to identify and quantify the aquatic fauna and flora, potentially affected within the transmission site, solar energy site, or siting area, an analysis of the impact of the construction and operation of the proposed facility on the total aquatic biotic environment and planned measures to ameliorate negative biological impacts as a result of construction and operation of the proposed facility.	Chapter 14.0
49-41B-11(2, 11); 49-41B- 22	20:10:22:18	Land use. The applicant shall provide the following information concerning present and anticipated use or condition of the land: (1) A map or maps drawn to scale of the plant, solar energy, or transmission site identifying existing land use according to the following classification system: (a) Land used primarily for row and non-row crops in rotation; (b) Irrigated lands; (c) Pasturelands and rangelands; (d) Haylands; (e) Undisturbed native grasslands; (f) Existing and potential extractive nonrenewable resources; (g) Other major industries; (h) Rural residences and farmsteads, family farms, and ranches; (i) Residential;	Chapter 15.0

SDCL	ARSD	Required Information	Location
		 (j) Public, commercial, and institutional use; (k) Municipal water supply and water sources for organized rural water systems; and (l) Noise sensitive land uses; (2) Identification of the number of persons and homes which will be displaced by the location of the proposed facility; (3) An analysis of the compatibility of the proposed facility with present land use of the surrounding area, with special attention paid to the effects on rural life and the business of farming; and (4) A general analysis of the effects of the proposed facility and associated facilities on land uses and the planned measures to ameliorate adverse impacts. 	
49-41B-11(2, 11); 49-41B- 28	20:10:22:19	Local land use controls. The applicant shall provide a general description of local land use controls and the manner in which the proposed facility will comply with the local land use zoning or building rules, regulations or ordinances. If the proposed facility violates local land use controls, the applicant shall provide the commission with a detailed explanation of the reasons why the proposed facility should preempt the local controls. The explanation shall include a detailed description of the restrictiveness of the local controls in view of existing technology, factors of cost, economics, needs of parties, or any additional information to aid the commission in determining whether a permit may supersede or preempt a local control pursuant to SDCL 49-41B-28.	Chapter 16.0

SDCL	ARSD	Required Information	Location
49-41B-11(2, 11); 49-41B- 22	20:10:22:20	Water quality. The applicant shall provide evidence that the proposed facility will comply with all water quality standards and regulations of any federal or state agency having jurisdiction and any variances permitted.	Chapter 17.0
49-41B-11(2, 11); 49-41B- 22	20:10:22:21	Air quality. The applicant shall provide evidence that the proposed facility will comply with all air quality standards and regulations of any federal or state agency having jurisdiction and any variances permitted.	Chapter 18.0
49-41B-11(3)	20:10:22:22	Time schedule. The applicant shall provide estimated time schedules for accomplishment of major events in the commencement and duration of construction of the proposed facility.	Chapter 19.0
49-41B-11(2, 11); 49-41B- 22	20:10:22:23	 Community impact. The applicant shall include an identification and analysis of the effects the construction, operation, and maintenance of the proposed facility will have on the anticipated affected area including the following: (1) A forecast of the impact on commercial and industrial sectors, housing, land values, labor market, health facilities, energy, sewage and water, solid waste management facilities, fire protection, law enforcement, recreational facilities, schools, transportation facilities, and other community and government facilities or services; (2) A forecast of the impact on agricultural production and uses; (3) A forecast of the impact on agricultural production and uses; (4) A forecast of the impact on population, income, occupational distribution, and integration and cohesion of communities; 	Chapter 20.0

SDCL	ARSD	Required Information	Location
		 (5) A forecast of the impact on transportation facilities; (6) A forecast of the impact on landmarks and cultural resources of historic, religious, archaeological, scenic, natural, or other cultural significance. The information shall include the applicant's plans to coordinate with the local and state office of disaster services in the event of accidental release of contaminants from the proposed facility; and (7) An indication of means of ameliorating negative social impact of the facility development. 	
49-41B-11(4)	20:10:22:24	Employment estimates . The application shall contain the estimated number of jobs and a description of job and classifications, together with the estimated annual employment expenditures of the applicants, the contractors, and the subcontractors during the construction phase of the proposed facility. In a separate tabulation, the application shall contain the same data with respect to the operating life of the proposed facility, to be made for the first ten years of commercial operation in one-year intervals. The application shall include plans of the applicant for utilization and training of the available labor force in South Dakota by categories of special skills required. There shall also be an assessment of the adequacy of local manpower to meet temporary and permanent labor requirements during construction and operation of the proposed facility and the estimated percentage that will remain within the facility is located after construction is completed.	Chapters 20.0 & 21.0
49-41B-11(5)	20:10:22:25	Future additions and modifications. The applicant shall describe any plans for	Chapter 22.0

SDCL	ARSD	Required Information	Location
		future modification or expansion of the proposed facility or construction of additional facilities which the applicant may wish to be approved in the permit.	
49-41B-35(3)	20:10:22:33	Decommissioning of energy facilities. The applicant shall provide a plan or policy statement on action to be taken at the end of the energy conversion facility's on-line life. Estimates of monetary costs, site condition after decommissioning, and the amount of land irretrievably committed shall be included in this statement.	Chapter 23.0
49-41B-11(2, 11)	20:10:22:34	Transmission facility layout and construction. If a transmission facility is proposed, the applicant shall submit a policy statement concerning the route clearing, construction and landscaping operations, and a description of plans for continued right-of-way maintenance, including stabilization and weed control.	Chapter 24.0
49-41B-11(2, 11)	20:10:22:35	 Information concerning transmission facilities. If a transmission facility is proposed, the applicant shall provide the following information: (1) Configuration of the towers and poles, including material, overall height, and width; (2) Conductor configuration and size, length of span between structures, and number of circuits per pole or tower; (3) The proposed transmission site and major alternatives as depicted on overhead photographs and land use culture maps; (4) Reliability and safety; (5) Right-of-way or condemnation requirements; (6) Necessary clearing activities; and 	Chapter 25.0

SDCL	ARSD	Required Information	Location
		(7) If the transmission facility is placed underground, the depth of burial, distance between access points, conductor configuration and size, and number of circuits.	
49-41B-7; 49-41B-22	20:10:22:36	Additional information in application. The applicant shall also submit as part of the application any additional information necessary for the local review committees to assess the effects of the proposed facility pursuant to SDCL 49-41B-7. The applicant shall also submit as part of its application any additional information necessary to meet the burden of proof specified in SDCL 49-41B-22.	Chapter 26.0
49-41B-22	N/A	 Applicant's burden of proof. The applicant has the burden of proof to establish that: (1) The proposed facility will comply with all applicable laws and rules; (2) The facility will not pose a threat of serious injury to the environment nor to the social and economic condition of inhabitants or expected inhabitants in the siting area; (3) The facility will not substantially impair the health, safety or welfare of the inhabitants; and (4) The facility will not unduly interfere with the orderly development of the region with due consideration having been given the views of governing bodies of affected local units of government. 	Chapter 1.0 & Chapter 26.0
49-41B-11	20:10:22:39	Testimony and exhibits. Upon the filing of an application pursuant to SDCL 49- 41B-11, an applicant shall also file all data, exhibits, and related testimony which the applicant intends to submit in support of its application. The application shall specifically show the witnesses	Chapter 27.0

SDCL	ARSD	Required Information	Location
		supporting the information contained in the application.	

4 NAMES OF PARTICIPANTS ARSD 20:10:22:06

The Applicant, Lookout Solar, is a Delaware limited liability company that is registered to do business in South Dakota. Lookout Solar is a wholly owned subsidiary of Lookout Solar Park I Holdings, LLC. Lookout Solar Park I Holdings, LLC, is a Delaware limited liability company that is a wholly owned subsidiary of Wircon USA, Inc. Wircon USA, Inc. was incorporated in Delaware.

Individuals who are authorized to receive communications relating to the application on behalf of the Applicant include:

- Bob Lawrence Orrick, LLP 1152 15th Street NW Washington, DC 20005 rlawrence@orrick.com (202) 339-8430
- Shani Harmon Orrick, LLP 1152 15th Street NW Washington, DC 20005 sharmon@orrick.com (202) 339-8617

5 NAMES OF OWNER AND MANAGER

ARSD 20:10:22:07

The Applicant would be the sole owner and operator of the proposed Project. Bob Lawrence and Shani Harmon are the primary contacts.

6 PURPOSE OF THE ENERGY FACILITY; DEMAND FOR THE FACILITY ARSD 20:10:22:08; ARSD 20:10:22:10

The Project is located in an area of South Dakota with great solar potential. See Figure 1. The Project is consistent with South Dakota's commitment to growing its renewable energy portfolio and would help regional demand for renewable energy. The Project would generate electricity in the Southwest Power Pool ("SPP") regional grid. Accordingly, the Project would help SPP operators meet electricity demand in both immediate and surrounding control areas.

The Project also would benefit the state, local community, and local school districts through construction and operation jobs, increased business in the area, and tax revenue. Lookout Solar is still reviewing financial models to determine the amount of tax revenue that might be generated by the Project.



FIGURE 1: SOUTH DAKOTA SOLAR POTENTIAL MAP

If the Project is delayed, the Project's benefits would be greatly reduced. The Project must being construction by December 31, 2019, to fully utilize the Investment Tax Credit ("ITC"). Specifically, if the Project begins construction by December 31, 2019, then the Project would receive a credit equal to 30% of the qualified capital investment of the Project. If the Project begin construction

after December 31, 2019, the tax credit would decrease to 26% or lower in later years. Consequently, a delay could force Lookout Solar to reevaluate the financial viability of the Project.

7 ESTIMATED COST OF THE ENERGY FACILITY ARSD 20:10:22:09

Lookout Solar estimates that the Project would cost approximately \$100 million and that the transmission infrastructure would cost approximately \$15 million including interconnection and escalation costs. The Project costs include lease acquisition, permitting, engineering, procurement, and construction of turbines, access roads, an underground electrical collector system, a collection substation, interconnection facilities, and project financing. Capital costs could fluctuate as much as twenty (20) percent for the Project depending on final siting, interconnection costs, and fluctuation in the cost of solar panels due to tariffs.

8 GENERAL SITE AND PROJECT COMPONENT DESCRIPTION ARSD 20:10:22:11; 20:10:22:33:02

The Lookout Solar Project would consist of a solar generating facility located on the Pine Ridge Reservation (the Project Area); an underground transmission line running along Riverside Road, 148th Avenue, and Cottonwood Cutoff in Custer County (the Transmission Line Route); a substation and interconnection facilities located in Custer County that interconnects to WAPA's high voltage transmission lines (the Substation). See Figure 2.



		HOOKE 2				
	PROJECT OVERVIEW					
729	LOOKOUT SOLAR PARK I CUSTER & OGLALA LAKOTA COUNTIES, SD					
ed B	By: ES	Scale: 1" = 1 Mile	Date: 11/16/18	File: Fig2_ProjectOverview		

8.1 Project Area

The Project Area is approximately 810 acres of privately owned land on the Pine Ridge Reservation in Oglala Lakota County, South Dakota. The Project Area is located approximately 22 miles east of Buffalo Gap, South Dakota, in Township 41 North (T41N), Range 48 West (R48W), Section 36 and the southern portion of Section 35. See Figure 3 and Figure 4. The project is located on individually-owned Indian trust land on the Pine Ridge Reservation.





The proposed Project would have a capacity of 110 MW-AC and may include an energy storage facility. The proposed Project includes up to 500,000 solar panels. The Project Area also includes access roads, a generator step-up transformer, an operation and maintenance ("O&M") facility, buried transmission lines, parking areas, and laydown areas for construction.

To the extent feasible, existing public roads, private roads, and field paths would be used to access the Project. When necessary, new access roads would be constructed between existing roadways and Project components. The final access roads would depend on site-specific engineering requirements and avoidance of wetlands and other sensitive areas.

Generator step-up transformers would be installed near the solar arrays to raise the voltage of the electricity generated by the solar panels to the power collection line voltage of 34.5 kV. The 50 transformers are rectangular steel boxes measuring each approximately 8 by 8 meters (26.25 by 26.25 US survey feet). The transformers would be located on a concrete pad. The exact dimensions of the transformers and concrete pad would depend on the final engineering design, manufacturer specifications, and site-specific engineering requirements.

An O&M building will be constructed in the Project Area to provide access and storage for Project maintenance and operations. The final location of the O&M facility has not been determined.

The Project also will own and operate an energy storage system. The details of the storage system have not decided due to delays in the Southwest Power Pool's completion of the Definitive Interconnection System Impact Study for the Project.

8.2 Transmission Line Route

The Transmission Line Route would run approximately eleven (11) miles in Custer County. The transmission line for the Project would be eighteen (18) 34.5 kV electrical collector cables bundled together and placed underground in the 66-foot right of way in County roads. Specifically, the transmission line would originate from the step-up transformers in the Project Area on the border of Custer County and Oglala Lakota County. The transmission line would proceed west along Riverside Road until the intersection of Riverside Road and 148th Avenue. The Transmission line would then proceed north along 148th Avenue until the intersection of 148th Avenue and Cottonwood Cutoff. The transmission line would then proceed west along Cottonwood Cutoff to the alternate substation sites near Cottonwood Cutoff on Section 11 (parcel 003468) or Section 14 (parcel 003478) in Township 6 South (T6S), Range 8 East (R8E). The collector lines would be installed below ground and in the county highway right of way to avoid impacts to existing land uses. The total land temporarily impacted by construction of the transmission line would be up to 880 acres (1.375 square miles).¹

Lookout Solar would use horizontal directional drilling to cross the Cheyenne River, the Angostura Canal, and to avoid wetlands as necessary.

¹ This calculation assumes that all of the 66 foot right of way is impacted for 11 miles. The current planning assumes that only 30 feet of the 66 foot right of way is impacted by the temporary construction of the transmission lines.

8.3 Substation and Interconnection Facilities

The preferred location of the substation is on private land located near Cottonwood Cutoff on Section 14 (parcel 003478) in T6S, R8E. The alternate location of the substation is on federal land that is part of the Buffalo Gap National Grassland under the jurisdiction of the U.S. Forest Service located off of Cottonwood Cutoff on Section 11 (parcel 003468) in T6S, R8E. The substation will comprise approximately 10 acres. The final location of the substation would depend on site-specific engineering requirements and avoidance of wetlands and other sensitive areas.

The Project's transmission lines would connect to the substation, which would convert the electricity to 230 kV. The Project substation would be built according to good utility practices and Southern Power Pool standards. The substation would include a control house, power transformers, switches, metering and other equipment needed for safe electrical operations of the solar park and interconnection to the electrical grid. The area around the substation would be graveled and fenced. The substation area would be approximately 500 feet by 500 feet once construction is complete.

9 ALTERNATE SITES AND SITING CRITERIA ARSD 20:10:22:12

During scoping for the Project Area, many alternatives were considered, but eliminated from further study. Alternatives discussed and considered included four different project locations and/or project area sizes within the Pine Ridge Indian Reservation. These were eliminated from further study due to potential issues with geology, migratory birds, viewsheds, and/or access.

The current Project layout reflects the optimal configuration to best capture concentrated solar energy while avoiding wetlands, cultural resources, and wildlife habitat and minimizing impacts to existing land uses. The layout would be further refined for the purpose of eliminating and/or minimizing impacts to the environment and existing land uses based on ongoing coordination with local, state and federal authorities and with neighboring landowners.

Lookout Solar is not a public entity and therefore does not possess and would not rely on powers of eminent domain to acquire easements for the Project. The Project will be located on private land for which Lookout Solar has obtained property rights through voluntary agreements, within the right of way of the Custer County highway for which the County has authorized the Project to occupy, or on federal land for with a federal agency has authorized the Project occupy.

10 ENVIRONMENTAL INFORMATION ARSD 20:10:22:13

Sections 11.0 through 14.0 and Sections 17.0, 18.0, and 20.0 provide a description of the existing environment at the time of the Application submittal, potential changes to the existing environment that are anticipated as a result of the construction and operation of the Project, and irreversible changes that are anticipated to remain beyond the operation lifetime of the Project.

11 EFFECT ON PHYSICAL ENVIRONMENT ARSD 20:10:22:14

The following sections describe the existing physical environmental within the Lookout Solar Project Area and the Transmission Line Route and the potential effects of the proposed Project on the physical environment.

11.1 Existing Physical Environment

The following sections describe the existing geology, soil types, and seismic risks within the Lookout Solar Project Area and Transmission Line Route.

11.1.1 Geology

The area in which the Project Area and Transmission Line Route are part of the Northwestern Great Plains ecoregion.² This ecoregion is characterized by a semiarid rolling plain of shale, siltstone, and sandstone punctuated by occasional buttes and badlands. The particular area in which the Project Area and Transmission Line Route are located includes Semiarid Pierre Shale Plains and White River Badlands.

The geology of the area includes Eolian, Terrace and White River Group deposits as well as Pierre Shale.

Map Unit Symbol	Stratigraphic Unit	Age	Description
Qe	Eolian Deposits	Quaternary	Silt to medium-grained sand. Deposited as: sand sheets; barchan, linear, and domelike dunes; and as a veneer on uplands. Includes the Sand Hills Formation. Thickness up to 300 feet (91 m).
Qt	Terrace Deposits	Quaternary	Clay- to boulder-sized clasts deposited as pediments, paleochannels, and terrace fills of former flood plains. Thickness up to 75 ft (23 m).
Tw	White River Group (includes Chadron, Brule, Chamberlain	Oligocene and Eocene	Brule Formation: White, pink, light-green, and light-brown, massive to thin-bedded, bentonitic claystone, tuffaceous siltstone, and well-bedded, calcareous, tuffaceous

TABLE 1: STRATIGRAPHY OF THE PROJECT AREA AND TRANSMISSION LINE ROUTE³

² Ecoregions of North Dakota and South Dakota. U.S. Geological Survey, et al. Retrieved on November 5, 2018 from https://store.usgs.gov/assets/MOD/StoreFiles/Ecoregion/21629_nd_sd_front.pdf.

³ Geologic Map of South Dakota (2004). South Dakota Department of Environment & Natural Resources. Retrieved on November 5, 2018 from http://www.sdgs.usd.edu/pubs/pdf/G-10.pdf.

	Pass, and Slim Buttes Formations)		 quartz sandstone. Thickness up to 150 feet (46 m). Chadron Formation: Upper beds are gray to light-brown to maroon bentonite, claystone, siltstone, and tuffaceous fine-grained sandstone, with local silicified carbonate lenses. Basal portion consists of poorly cemented, white, coarse-grained arkose and conglomerate. Thickness up to 160 ft (49 m). Chamberlain Pass Formation: Pale-olive to pale-red, mottled mudstone containing white, cross-bedded channel sandstone with basal conglomerate. Thickness up to 32 ft (10 m). Slim Buttes Formation: White, grayish- to yellowish-orange, and pale-red to pink siltstone, clayey siltstone, bentonitic
			sandstone, and conglomerate. Thickness up to 48 ft (15 m).
Кр	Pierre Shale	Upper Cretaceous	Blue-gray to dark-gray, fissile to blocky shale with persistent beds of bentonite, black organic shale, and light-brown chalky shale. Contains minor sandstone, conglomerate, and abundant carbonate and ferruginous concretions. Thickness up to 2,700 feet (823 m).



FIGURE 2: GEOLOGIC MAP OF PROJECT AREA AND TRANSMISSION LINE ROUTE⁴

11.1.2 Soils

The location and type of soil varies with topography within Project Area and Transmission Line Route. Oglala Lakota County and Custer County are located in the Great Plains physiographic province.⁵ The soil survey identified 26 unique soil series; however, five of these soils constitute approximately 85% of the Project Area and Transmission Line Route. These predominant soil series include: Anselmo-Valentine complex (5 to 20% slopes), Pierre clay (3 to 9% slopes), Richfield-Altvan silt loams (0 to 3% slopes), Valentine sand (3 to 30% slopes), and Tuthill-Anselmo fine sandy loams (3 to 9% slopes). The Anselmo-Valentine complex comprises 432 acres (46%) of the Project Area and Transmission Line Route. These soils are well- to excessively-drained soils with a fine sandy loam texture. Anselmo-Valentine soils are derived from sandstone, and are found amongst hillslopes in Nebraska, Kansas, South Dakota, and

⁴ Geologic Map of South Dakota (2004). South Dakota Department of Environment & Natural Resources. Retrieved on November 5, 2018 from http://www.sdgs.usd.edu/pubs/pdf/G-10.pdf.

⁵ U.S. Department of Agriculture, Natural Resource Conservation Service ("NRCS"), Soil Survey of Custer and Oglala Lakota Counties (Soil Survey Staff 2018) and U.S. Department of Agriculture NRCS National Hydric Soil List (NRCS 2015).

Wyoming. The Anselmo-Valentine complex is not prime farmland, and its predominant land use includes rangeland production. Pierre clay is a well-drained soil derived from shale parent material found in hillslopes of Nebraska and South Dakota. This soil series comprises 140 acres (15%) of the Project Area and Transmission Line Route; and, while this series is not hydric, it is classified as farmland of statewide importance. Predominant land use includes rangeland and supplemental agricultural production. Richfield-Altvan silt loams and Tuthill-Anselmo fine sandy loam complexes comprise 122 acres (13%) and 34 acres (4%), respectively. These soils contain hydric soil components and are included on the South Dakota list of hydric soils.⁶ Similar to other soils in the Project Area and Transmission Line Route, these soils primarily serve rangeland production. The Valentine sand series is an excessively drained soil derived from Eolian sand parent material. This series is common amongst dunes in Nebraska, South Dakota, and Wyoming, and is not recognized as hydric or prime farmland. This series constitutes 68 acres (7%) of the Project Area and Transmission Line Route and primarily serves rangeland production. Of the 21 remaining soil series, most represent less than 1% of the Project Area. Table 1 contains the acreages of all 26 soil series in the Project Area and Transmission Line Route and their associated hydric soil rating and prime farmland classification.

Soil Series	Slope (%)	Landscape location	USDA Texture
Anselmo	5-20	Stable, uniform slopes	Sandy loam to fine sandy loam
Valentine	5-30	Shorter, steeper slopes and upper ridges and knolls	Loamy fine sand to coarse sand
Pierre	3-9	Gently sloping to rolling hillslopes on uplands	Clay to silty clay
Richfield	0-3	Uplands an high terraces	Silt loam to silty clay loam

⁶ U.S. Department of Agriculture NRCS National Hydric Soil List (NRCS 2015).




EXPLANATION



PROPOSED POWERLINE PROPOSED ACCESS ROAD SOILS (NRCS JULY 2018) RIGHT OF WAY BUFFER (33 & 50 FEET)

1,500 3,000

name	MUSYM	muname
iller silty clay loam, channeled, 0 to 2 percent slopes	Lo	Lohmiller silty clay loam
n loam, 0 to 2 percent slopes	Lp	Lohmiller silty clay, channeled, 0 to 3 percent slopes, occasionally flooded
n loam, 2 to 6 percent slopes	N658E	Pierre silty clay, 6 to 25 percent slopes
n loam, 6 to 9 percent slopes	N667E	Pierre-Samsil, moderately deep clays, 6 to 25 percent slopes
n loam, 0 to 2 percent slopes	NgA	Norka silt loam, 0 to 2 percent slopes
la loam, 0 to 3 percent slopes	NgB	Norka silt loam, 2 to 6 percent slopes
la loam, 0 to 3 percent slopes	NuA	Nunn clay loam, 0 to 2 percent slopes
on fine sandy loam, 0 to 6 percent slopes	NuB	Nunn clay loam, 2 to 6 percent slopes
on fine sandy loam, 6 to 9 percent slopes	NuC	Nunn Ioam, 6 to 9 percent slopes
mo-Valentine complex, 5 to 20 percent slopes	PeB	Pierre clay, 2 to 6 percent slopes
Ind	PeC	Pierre clay, 3 to 9 percent slopes
silt loam, 0 to 4 percent slopes	PeD	Pierre clay, 6 to 20 percent slopes
ard fine sandy loam	PhB	Pierre-Hisle complex, 0 to 9 percent slopes
ard loamy fine sand, 0 to 4 percent slopes	RaA	Richfield-Altvan silt loams, 0 to 3 percent slopes
con silt loam, 0 to 4 percent slopes	Rv	Riverwash
v silt loam, 9 to 40 percent slopes	SaE	Samsil clay, 15 to 40 percent slopes
r-Norka silt loams, 6 to 15 percent slopes	SbF	Samsil clay, 15 to 40 percent slopes
nbo loam, channeled	SeA	Satanta loam, 0 to 2 percent slopes
silty clay loam	SeB	Satanta loam, 2 to 6 percent slopes
ig-Kadoka silt loams, 9 to 18 percent slopes	SgA	Satanta-Beckton complex, 0 to 3 percent slopes
perg fine sandy loam	SmB	Savo silt loam, 2 to 6 percent slopes
perg fine sandy loam	SmE	Schamber-Eckley complex, 9 to 40 percent slopes
idge silt loam, 0 to 3 percent slopes	Ss	Samsil-Rock outcrop complex, 10 to 50 percent slopes
gravelly loam, 3 to 40 percent slopes	StE	Schamber-Samsil complex, 15 to 40 percent slopes
rson loam, 0 to 2 percent slopes, rarely flooded	Sw	Swanboy clay, 0 to 3 percent slopes
rson loam, channeled	SzB	Swanboy clay, 0 to 3 percent slopes
-Slickspots complex, 0 to 6 percent slopes	TnA	Tuthill-Anselmo fine sandy loams, 0 to 3 percent slopes
silt loam, 0 to 6 percent slopes	TnC	Tuthill-Anselmo fine sandy loams, 3 to 9 percent slopes
n silt loam, 0 to 1 percent slopes	TuB	Tuthill-Manter fine sandy loams, 3 to 5 percent slopes
n fine sandy loam, 0 to 3 percent slopes	VaE	Valent loamy fine sand, 6 to 25 percent slopes
n fine sandy loam, 2 to 9 percent slopes	VbD	Valent loamy fine sand, 6 to 25 percent slopes
n fine sandy loam, 3 to 9 percent slopes	Vs	Valentine sand, 3 to 30 percent slopes
clay, 0 to 2 percent slopes	W	Water
clay, 2 to 6 percent slopes	Wh	Whitelake fine sandy loam
clay, 6 to 9 percent slopes	Ww	Wortman-Wanblee silt loams, 0 to 6 percent slopes
ior silt loam. 0 to 3 percent slopes		

	_			FIGURE	7	
Trihyd	Iro	SOIL SURVEY OF THE PROJECT AREA AND TRANSMISSION LINE ROUTE				
CORPORATION ■ 1252 Commerce D Laramie, WY 820 www.trihydro.co (P) 307/745.7474 (F) 307	Drive 070 m 7/745.7729		LOOP CUSTER & OG	(OUT SOLA LALA LAK(AR PARK I OTA COUNTIES, SD	
Drawn By: BR C	Checked B	y: ES	Scale: 1" = 1,500'	Date: 11/16/18	File: Fig7_Soils	

11.1.3 Seismic Risk

The risk of seismic activity in the vicinity of the Project Area and the Transmission Line Route is low. The U.S. Geological Survey ("USGS") Earthquake Hazards program estimates less than a one (1) percent chance of damage from earthquakes.⁷ The 2014 USGS National Seismic Hazard Map indicates the peak ground acceleration ("PGA") with a two (2) percent change of exceedances in 50 years is 0.15 to 0.04g.⁸ According to the South Dakota Geological Survey ("SDGS"), no earthquakes have been recorded in Oglala Lakota or Custer County from 1872 to 2013.⁹ However, a magnitude 3.7 earthquake was recorded approximately 40 miles north of the Project Area in 1995. Available geologic mapping and information from the USGS Earthquake Hazards Program do not indicate any active or inactive faults within the Project Area.¹⁰

⁷ USGS (2017). Earthquake Hazards Program, Seismic Hazard Maps and Site- Specific Data. Retrieved November 5, 2018 from https://earthquake.usgs.gov/hazards/hazmaps/.

⁸ USGS (2017). Earthquake Hazards Program, Seismic Hazard Maps and Site- Specific Data. Retrieved November 5, 2018 from https://earthquake.usgs.gov/hazards/hazmaps/.

⁹ SDGS. (2013). Earthquakes in South Dakota. Retrieved November 5, 2018 from <u>http://www.sdgs.usd.edu/publications/maps/earthquakes/earthquakes.htm</u>.

¹⁰ Earthquake Hazards Program, Faults. Retrieved November 5, 2018 from https://earthquake.usgs.gov/hazards/qfaults/.

12 EFFECT ON HYDROLOGY ARSD 20:10:22:14

The following sections describe the exiting hydrology within the Solar Farm Project Area and Transmission Line Route and the potential effects of the proposed Project on hydrology.

12.1 Hydrology

The Project Area and Transmission Line Route are located above the Ogallala Aquifer (also known as the Arikaree Aquifer because the geologic units of the Ogallala and Arikaree aquifers constitute only parts of the groundwater system).¹¹ The predominant sources of public and domestic water supply in the area are wells and springs.

12.2 Surface Water Resources

The Cheyenne River originates from the confluence of several creeks in the Thunder Basin National Grassland, which is located within Converse County, Wyoming. The River flows east of its headwaters, into the southwestern boarder of South Dakota and ultimately serves as a tributary of the Missouri River in central South Dakota.¹² The Cheyenne River and Project Area are located within the Cheyenne Basin hydrologic unit that extends from southwestern South Dakota to northeastern Wyoming, to the northwestern portion of Nebraska. Within the Cheyenne Basin, the sub-basin watershed in which the Project Area is located is the Middle Cheyenne-Spring subbasin watershed. The drainage area for the Middle Cheyenne-Spring Basin encompasses approximately 1,000 square miles, extending into portions of Custer, Pennington, Oglala Lakota, and Fall River Counties. The majority of the catchment are for the Middle Cheyenne-Spring Basin consists of mostly undeveloped rangeland, with cultivated agricultural land concentrated near ephemeral water sources.

Two primary drainages occur in the Project Area; the Cheyenne River and Cottonwood Creek, the latter of which is a small tributary to the Cheyenne River. Numerous small drainages also intersect the proposed transmission line where culverts allow surface water to flow under the road and eventually to the Cheyenne River during high flow. The Angustora Canal is also crossed by the transmission line between the Cheyenne River crossing and the Cottonwood Creek crossing. This man-made canal flows north and eventually into Cottonwood Creek just upstream of its confluence with the Cheyenne River. In addition, a few small, closed depressional wetlands occur within the solar farm.

12.3 **Projects Impacts on Hydrology**

The Project will not require surface water appropriation, dewatering, or deep well injection, and water storage, reprocessing, or cooling will not be required for either construction or operation of the facilities. The facilities will not impact either municipal or private water uses in the Project vicinity.

¹¹ Filipovic, D. 2011. Hydrogeologic assessment of the High Plains Aquifer in Bennett County, South Dakota. Vermillion, South Dakota: Akeley-Lawrence Science Center 92-UR. 5-14. Available from: <u>http://www.sdgs.usd.edu/pubs/PDF/UR-92.pdf</u>.

¹² U.S. Geological Survey. 2017. Hydrologic Unit Maps. Available from: <u>https://water.usgs.gov/GIS/huc.html</u>.

Currently, the Project intends to use water from the Mni Wiconi Water District during construction and operation. Water would be used during construction for dust control. Water would be used during operation to periodically wash the solar modules and other equipment. The Project does not anticipate that the water use of the project would adversely impact local water and irrigation districts.

Impacts to groundwater as a result of the Project will be minor and temporary. Potential impacts to surface waters include the delivery of sediment into waters during Project construction due to excavation and the exposure of soils. Additionally, increased stormwater runoff due to an increase in impervious surfaces could result in increased sedimentation, a reduction of available flood storage, and impacts to drainage patterns. The use of Best Management Practices ("BMPs") during construction will control erosion and minimize sedimentation during precipitation events.

Project construction will require coverage under the General Permit for Storm Water Discharges Associated with Construction Activities, administered by the SDDENR. One condition of the permit is the development and implementation of stormwater pollution prevention plan ("SWPPP") that identifies potential sources of stormwater pollution at the construction site and specifies the structural and non-structural controls that shall be in place to minimize the negative impacts to receiving waters caused by stormwater discharges associated with the construction activities. The controls, or BMPs, may include silt fence, straw wattles, erosion control blankets, project staging, and other methods to control erosion and sedimentation. Due to the erosion and sediment controls that will be implemented during Project construction, negative impacts to water quality are not anticipated.

13 EFFECT ON TERRESTRIAL ECOSYSTEMS ARSD 20:10:22:16

The following sections describe the existing terrestrial ecosystem within the Solar Park Project Area and Transmission Line Route and the potential effects of the proposed Project on these terrestrial systems.

13.1 Vegetation

A field survey of the Project Area and the Transmission Line Route was completed in June 2018. A total of 74 plant species were recorded within the area, including 30 grass or grass-like plants, 11 woody plants (including trees and shrubs), and 33 forbs. Western prairie fringed orchid is included on the U.S. Fish and Wildlife Service ("USFWS") official species list for the Project Area and is listed as threatened in Oglala Lakota County by South Dakota Game Fish and Parks ("SDGFP"). The western prairie fringed orchid is a perennial orchid that inhabits tallgrass prairie and is found most often on unplowed, calcareous prairies and sedge meadows.¹³ Desktop review and an onsite habitat assessment indicated that suitable habitat for the species is not present. SDGFP notes that the counties indicated for western prairie fringed orchid are counties with potential habitat; however, currently there are no known populations of the species in South Dakota.¹⁴

Common Name	Scientific Name	Common Name	Scientific Name	
Grass and Gra	ass-like Plants	Forbs		
Crested Wheatgrass	Agropyron cristatum	Northern Water Plantain	Alisma triviale	
Short-awn Foxtail	Alopecurus aequalis	Prickly Poppy	Argemone polyanthemos	
Meadow Foxtail	Alopecurus pratensis	White Sagebrush	Artemesia Iudoviciana	
Purple Three-Awn	Aristida purpurea	Showy Milkweed	Asclepias speciosa	
Buffalo Grass	Bouteloua dactyloides	Cream Milkvetch	Astragalus racemosus	
Smooth Brome	Bromus inermis	Lambsquarters	Chenopodium album	
Field Brome	Bromus arvensis	Canada Thistle	Cirsium arvense	
Cheatgrass	Bromus tectorum	Wavy Leaf Thistle	Cirsium undulatum	
Shortbeak Sedge	Carex brevoria	Field Bindweed	Convolvulus arvensis	
Panic Grass	Dichanthelium sp.	Western Wallflower	Erysimum asperum	
Needle Spikerush	Eleocharis acicularis	American Licorice	Glycyrrhiza lepidota	
Common Spikerush	Eleocharis palustris	Curly Cup Gumweed	Grindelia squarrosa	
Streambank Wheatgrass	Elymus trachycaulus	Prairie Sunflower	Helianthus petiolaris	

TABLE 3: PLANT SPECIES WITHIN THE PROJECT AREA AND TRANSMISSION LINE ROUTE

¹³ USFWS. 1996. Western prairie fringed orchid recovery plan (Platanthera praeclara). U.S. Department of Interior. 101 pp. Available at: <u>https://www.fws.gov/southdakotafieldoffice/WPFO%20recovery%20plan.pdf</u>.

¹⁴ SDGFP. 2014. South Dakota wildlife action plan and data explorer. 583 pp. Available from: <u>https://gfp.sd.gov/wildlife-action-plan/</u>.

Common Name	ommon Name Scientific Name		Scientific Name
Horsetail	Equisetum sp	Prickly Lettuce	Lactuca serriola
Stinkgrass	Eragrostis cilianensis	Common	Lepidium densiflorum
		Pepperweed	
Needle and Thread	Hesperostipa comata	Alfalfa	Medicago sativa
Fescue	Festuca spp.	Yellow Sweet Clover	Melilotus officinalis
Inland Rush	Juncus interior	Wild Mint	Mentha arvensis
Prairie Junegrass	Koeleria macrantha	Scarlet Beeblossom	Oenothera suffretescens
Green needlegrass	Nassella viridula	Little Pricklypear	Opuntia fragilis
Western wheatgrass	Pascopyrum smithii	Plains Pricklypear	Opuntia polycantha
Kentucky bluegrass	Poa pratensis	Lilac Penstemon	Penstemon gracilis
Sandberg bluegrass	Poa secunda	Wooly Plaintain	Plantago patagonica
Tall fescue	Tall fescue Schedonorus arundinaceus		Rosa arkansana
Little bluestem	Schizachyrium scoparium	Curly Dock	Rumex crispus
Bulrush	Schoenoplectus spp.	Tall Tumblemustard	Sisybrium altissimum
Pale Bulrush	Scirpus pallidus	Scarlet Globemallow	Sphaeralcea coccinea
Prairie Cordgrass	Spartina pectinata	Common Dandelion	Taraxacum officinale
Narrowleaf Cattail	Typha angustifolia	Spiderwort	Tradescantia sp.
Soapweed Yucca	Yucca glauca	Western Salsify	Tragopogon dubius
		Common Mullein	Verbascum thapsus
		Hoary Vervain	Verbena stricta
		Hookedspur Violet	Viola andunca
	Woody	/ Plants	
Box Elder	Acer negundo	American Plum	Prunus americana
False Indigo Bush	Amorpha fruticosa	Narrowleaf Willow	Salix exigua
Spreading Dogbane	Apocynum androsaemifolium	Crack Willow	Salix fragilis
Sand Sagebrush	Artemesia filifolia	Western Snowberry	Symphoricarpos albus
Russian Olive	Elaeagnus angustifolia	Siberian Elm	Ulmus pumila
Plains Cottonwood	Populus deltoides		

The Project is located in the Northwestern Great Plains ecoregion.¹⁵ A total of 17 ecological systems have been mapped within the Project Area and Transmission Line Route using Gap Analysis Project ("GAP") National Terrestrial Ecosystem data.¹⁶ These ecological systems and their acreages within 0.5 miles of the Project Area, are presented in the table below. Northwestern Great Plains Mixedgrass Prairie habitat comprises the majority (45.8%) of the Project Area and

¹⁵ Ecoregions of North Dakota and South Dakota. U.S. Geological Survey, et al. Retrieved on November 5, 2018 from https://store.usgs.gov/assets/MOD/StoreFiles/Ecoregion/21629_nd_sd front.pdf.

¹⁶ U.S. Geological Survey (USGS). 2011. GAP/LANDFIRE national terrestrial ecosystems 2011, Version 3. Available at: <u>http://gapanalysis.usgs.gov/gaplandcover/</u>.

Transmission Line Route. A significant portion (34.0%) of the Project Area and Transmission Lien Route also is Western Great Plains Shortgrass Prairie.

Ecological System	Total Acres	Habitat Type	Percentage of Project Area and Transmission Line Route
Northwestern Great Plains Mixedgrass Prairie	4,494	Grassland	45.8%
Western Great Plains Shortgrass Prairie	3,333	Grassland	34.0%
Cultivated Cropland	842	Cropland	8.6%
Northwestern Great Plains - Black Hills Ponderosa Pine Woodland and Savanna	246	Other	2.5%
Pasture/Hay	221	Cropland	2.3%
Introduced Upland Vegetation-Perennial Grassland/ Forbland	180	Grassland	1.8%
Developed, High Intensity	128	Developed or Disturbed	1.3%
Western Great Plains Floodplain Systems	126	Wetland	1.3%
Open Water (Fresh)	65	Wetland	0.7%
Developed, Open Space	60	Developed or Disturbed	0.6%
Western Great Plains Depressional Wetland Systems	42	Wetland	0.4%
Western Great Plains Sand Prairie	30	Grassland	0.3%
Western Great Plains Sandhill Steppe	23	Grassland	0.2%
Developed, Low Intensity	6	Developed or Disturbed	0.1%
Western Great Plains Wooded Draw and Ravine	2	Other	0.0%
Rocky Mountain Foothill Limber Pine-Juniper Woodland	2	Other	0.0%
Western Great Plains Badland	1	Other	0.0%
Total Acres = 9,803			

TABLE 4: ECOLOGICAL SYSTEMS IN THE PROJECT AREA AND TRANSMISSION LINE ROUTE



EXPLANATION





Scale: 1 " = 4,000 ' Date: 11/16/18 File: Fig8_GAP_EcoSystems.mxd

13.3 **Project Impact on Vegetation**

Construction activities of the proposed Project would result in approximately 810 acres of temporary disturbance and 600 acres of permanent disturbance during the operational life of the Project. Direct impacts would occur due to construction of the solar array foundations, access roads, Project substation, and O&M facility.

The Project facilities have been sited to avoid native grasslands, to the extent practicable. In areas where impacts cannot be avoided, temporary impacts would be minimized through construction BMPs (*i.e.*, re-vegetation and erosion control devices). Other indirect impacts could include the potential spread of noxious weed species resulting from construction equipment introducing seeds into new areas, or erosion or sedimentation due to clearing ground in the construction areas. The spread of weeds is generally managed via use of appropriate seed mixes in non-cultivated areas and SWPPP compliance to restore vegetation in disturbed areas. If listed noxious weed infestations are found in non-cultivated disturbed areas after construction activities are completed, each area will be evaluated and addressed separately.

The Project would not involve tree clearing activities. The Project would be decommissioned after the end of the Project's operating life, and disturbed surfaces would be graded, reseeded, and restored to their preconstruction conditions to the extent possible. Therefore, after decommissioning for the Project is complete, no irreversible changes to vegetation would remain beyond the operating life of the Project.

13.3 Habitat Assessment

A habitat assessment was conducted on land within the Project Area and the Transmission Line Route and on land within 0.5 miles of the Project Area and the Transmission Line Route (the "Habitat Assessment Area"). The Habitat Assessment contains grassland, cropland, wetlands and riparian zones, and land that is developed or has been disturbed.

Ecological System	Total Acres	Percentage of Habitat Assessment Area
Grassland	8,060	82.2%
Cropland	1,063	10.8%
Wetland and Riparian	234	2.4%
Developed or Disturbed	195	2.0%
Other	251	2.6%

TABLE 5: HABITAT TYPE IN THE HABITAT ASSESSMENT AREA

13.3.1 Grassland

Grassland habitats comprise approximately 82 percent of the Habitat Assessment Area and consist of a mosaic of various short- and mixed- grass prairie types. Sand sagebrush (*Artemesia filifolia*) stands are present within a few grassland areas, including much of the solar farm. With the exception of these stands of sand sagebrush, grassland habitats are dominated by graminoids associated with mixed grass prairie, including western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Nassella viridula*), purple three-awn (*Aristida purpurea*), and prairie junegrass

(Koeleria macrantha). Graminoids more closely associated with the shortgrass prairie system include buffalo grass (Bouteloua dactyloides) and Sandberg bluegrass (Poa secunda). A number of invasive grasses including cheatgrass (Bromus tectorum) and field brome (Bromus arvensis) are common in grassland habitat, with smooth brome (Bromus inermis) present primarily adjacent to disturbed areas and along roads. In some grassland habitats, primarily on the eastern extent of the Project Area and Transmission Line Route, and in the proposed solar farm, stands of sand sagebrush are present with a lesser component of fringed sage (Artemesia frigida), soapweed yucca (Yucca glauca), and various forb species. Most of the grassland habitats are grazed by cattle. Wildlife species observed using grassland habitats are presented in Section 3.8 and include grassland specialists such as upland sandpiper (Bartramia longicauda), lark bunting (Calamospiza melanocorys), dickcissel (Spiza Americana), and sharp-tailed grouse (Tympanuchus phasianellus). One black-tailed prairie dog (Cynomys ludovicianus) colony was identified within 0.5 miles of the proposed transmission line and both burrowing owls and long-billed curlew (Numenius americanus) were observed using this patch of shortgrass prairie.

13.3.2 Riparian and Wetland

Riparian and wetlands habitats comprise approximately two percent of the Habitat Assessment Area; however, they provide essential habitat to a large number of species. There are two riparian areas within the Habitat Assessment Area; one along the Chevenne River and another along Cottonwood Creek, an intermittent tributary to the Cheyenne. Riparian areas are dominated by woody vegetation including eastern cottonwood (Populus deltoides), box elder (Acer negundo), and Russian olive (Elaeagnus angustifolia). Understory species in riparian systems vary considerably, but include western snowberry (Symphoricarpos occidentalis) and various grasses, typically dominated by smooth brome. A number of wetlands occur in the Habitat Assessment Area including emergent wetlands and scrub-shrub wetlands. Emergent wetlands are dominated by narrowleaf cattail (Typha angustifolia), bulrushes (Schoenoplectus spp.), spike rushes (Eleocharis spp.), prairie cordgrass (Spartina pectinata), and other hydrophytic species. Emergent wetlands adjacent to the two riparian areas described above, are dominated by cattails and bulrush whereas spikerush dominates closed depressional wetlands found in a few areas in the Solar Farm. Scrub-shrub wetlands are dominated by narrowleaf willow (Salix exigua). Open water habitats are also present and include small ponds and riverine systems including the Cheyenne River. Wildlife species observed using riparian and wetland habitats include a variety of waterfowl, snapping turtle (Chelydra serpentina), and songbirds birds such as red-winged blackbirds (Agelaius phoeniceus) and yellow-billed cuckoo (Coccyzus americanus). Great horned owls (Bubo virginanus) and hawks (Buteo spp.) were also observed nesting in riparian habitat along the Chevenne River.

13.3.3 Cropland

Croplands comprise approximately ten (10) percent of the Habitat Assessment Area and include cultivated crop fields and hay pastures. The primary agricultural crop in the Habitat Assessment Area is hay in the form of smooth brome, alfalfa (*Medicago sativa*), yellow sweet clover (*Melilotus officianalis*), and other herbaceous plants that are regularly harvested during the growing season. In addition, a small acreage of corn (*Zea mays*) is grown in irrigated fields adjacent to the Cheyenne River. A series of ditches provides water to irrigated cropland immediately west of the Cheyenne River. Croplands provide habitat to many wildlife species including deer, small mammals, and many avian species.

13.3.4 Developed or Disturbed

Developed or disturbed areas are typically associated with roads and other human disturbance such as residential and agricultural buildings. These habitat types comprise approximately two percent of the Habitat Assessment Area. Vegetation in and adjacent to developed and disturbed areas is dominated by introduced and invader species. These species can be primarily seen along roadways (including the area adjacent to and directly below the Cheyenne River bridge) and include smooth brome, yellow sweet clover, cheat grass, field brome, curly dock (Rumex crispus), Canada thistle (Cirsium arvense), field bindweed (Convolvulus arvensis), pepperweed (Lepidium latifolium), common mullein (Verbascum thapsus), and a small proportion of native species described above for grassland and riparian and wetland habitats. Although developed and disturbed areas typically do not support a diverse array of native wildlife species, they do provide value to some wildlife species including those habituated to human presence including European starlings (Sturnus vulgaris) and Eurasian collard doves (Streptopelia decaocto). Examples of wildlife observed using developed and disturbed areas also include cliff swallows (Petrochelidon pyrrhonota) and raccoon (Procyon lotor) which were observed using habitat under and adjacent to the Cheyenne River bridge. Above ground utility lines in the area provide excellent perches for a variety of birds and raptor species.

13.4 Wildlife

A raptor nest survey, a swift fox survey, a northern long-eared bat habitat assessment, a bat acoustic survey, and a migratory bird survey for the Project. The following species are protected under state and/or federal law and occur in the region of the Project.

Species	Status	Potential Occurrence in the Project Area or Transmission Line Route	Habitat in the Project Area or Transmission Line Route	Surveys	Documented During Survey
Whooping Crane (<i>Grus</i> <i>Americana</i>)	 Federally Threatened¹⁷ State Endangered¹⁸ 	Very Low	May occur during migration, but highly unlikely. May use wetlands and croplands near the Project Area	Habitat assessment	No
Red Knot (<i>Calidrus</i> <i>canutus</i>)	Federally Threatened	None	None	None	No

TABLE 6: FEDERALLY AND STATE PROTECTED SPECIES IN THE PROJECT REGION

¹⁷ These species are protected under the federal Endangered Species Act.

¹⁸ These species are protected under the South Dakota Endangered Species Act.

Species	Status	Potential Occurrence in the Project Area or Transmission Line Route	Habitat in the Project Area or Transmission Line Route	Surveys	Documented During Survey
Northern Long- Eared Bat (<i>Myotis</i> <i>septontrionalis</i>)	 Federally Threatened 	Low	Potential roost trees adjacent to the Project Area, primarily along the Cheyenne River and Cottonwood Creek	Habitat assessment	No
Western Prairie Fringed Orchid (<i>Platanthera</i> <i>prarclara</i>)	Federally Threatened	None	No suitable habitat in the Project Area. Very rare in SD. Typically associated with unplowed mesic to wet tallgrass prairie but has been found in old fields and roadside ditches.	Habitat assessment	No
Black-Footed Ferret (<i>Mustela</i> <i>nigripes</i>)	 Federally Endangered State Endangered 	None	Unlikely to occur in Project Area. Uses prairie dog colonies.	Habitat assessment	No
Swift Fox (<i>Vulpes velox</i>)	 State Threatened 	Moderate	May occur in grasslands throughout the Project Area.	Habitat assessment	No
Osprey (Pandion haliaetus)	State Threatened	Low	May occur along Cheyenne River. Potential nest sites, but nesting unlikely due to rarity of bird in this area.	Nest surveys within 0.5- mile of Project Area and Transmission Line Route	No
American Dipper	 State Threatened 	Low	Fast-moving, clear,	None. No impacts to	No

Species	Status	Potential Occurrence in the Project Area or Transmission Line Route	Habitat in the Project Area or Transmission Line Route	Surveys	Documented During Survey
(Cinclus mexicanus)			unpolluted streams with cascades, riffles, and waterfalls.	dipper habitats.	
Northern river Otter (<i>Lontra</i> <i>canadensis</i>)	 State Threatened 	Low	Rivers and beaver ponds.	None. No impacts to riverine habitats.	No
Blacknose Shiner (<i>Notropis</i> <i>heterolepis</i>)	 State Endangered 	None	Cheyenne River. River will be crossed with HDD	None. No impact to fish bearing streams or waters.	No
Longnose Sturgeon (<i>Catostomus</i> <i>catostomus</i>)	 State Threatened 	None	Cheyenne River. River will be crossed with HDD	None. No impact to fish bearing streams or waters.	No
Sturgeon chub (<i>Mcarhybopsis</i> gelida)	 State Threatened 	None	Cheyenne River. River will be crossed with HDD	None. No impact to fish bearing streams or waters.	No
Raptors	Federally Protected ¹⁹	High	Potential nesting habitat for Swainson's hawk, red- tailed hawk, ferruginous hawk, and great-horned owl	Nest survey within 0.5- mile buffer surrounding Project Area and Transmission Line Route	Yes

13.4.1 Raptor Nest Survey

A survey was completed to identify raptor nests within 0.5 miles of the Project Area. Binoculars and a spotting scope were used to scan potential habitats for nests or potential raptor breeding

¹⁹ Many raptors are protected under the federal Migratory Bird Treaty Act. Eagles are protected under the federal. Bald and Golden Eagle Act.

activity. A vehicle was used to access areas with good vantage points where potential nesting habitat could be best observed. Identified nests were observed and classified as either active or inactive. Active nests were nests in which two adults and/or young were observed at the nest during the survey. Inactive nests were nests in which no raptor activity was observed. In addition to characterizing nests as active or inactive, the nest type, nest substrate, nest height, nest species, and other observations were recorded.

A total of five raptor nests were documented in the Raptor Survey Area, including an active burrowing owl nest/territory, an active Swainson's hawk (*Buteo swainsoni*) nest, an active great-horned owl (GRHO) nest, and two inactive Buteo spp. nests (red-tailed hawk (*Buteo jamaicensis*) or Swainson's hawk).



EXPLANATION

	INTERMITTENT STREAM
	PROPERTY BOUNDARIES
0000	RIGHT OF WAY BUFFER (33 & 50 FEET)
1	1/2 MILE BUFFER ZONE AROUND ACCESS ROAD, PROPERTY BOUNDARIES, AND POWER LINES
	BLACK-TAILED PRAIRIE DOG COLONY
	APPROXIMATE RAPTOR NEST LOCATION

FOX CAMERA
PROPOSED ACCESS ROAD

BAT DETECTOR

BIRD OBSERVATION

- PROPOSED POWERLINE

2,000 4,000'



In addition, American kestrels (*Falco sparverius*) were observed in a few locations throughout the Raptor Survey Area, with multiple sightings south of the substation. It is likely that kestrels are nesting in the Raptor Nest Survey Area; however, these nests are often inconspicuous. A golden eagle (*Aquila chrysaetos*) and a northern harrier (*Circus cyaneus*) were observed flying over the Raptor Survey Area; however, there was no indication of breeding by either species. The table below presents a description of each documented raptor nest in the Raptor Survey Area.

Species	Status	Nest Material / Condition	Nest Substrate / Height (Feet)	Distance from Project Area (Miles)
Burrowing owl	Active	Prairie dog burrow / Excellent	Ground / 0	0.10
Great-horned owl	Active	Stick nest/cavity / unknown	Cottonwood/10-20	0.19
Swainson's hawk	Active	Stick nest / Good	Cottonwood/30	0.08
Buteo spp.	Inactive	Stick nest / Good	Cottonwood/40	0.25
Buteo spp.	Inactive	Stick nest / Good	Cottonwood/35	0.25

13.4.2 Swift Fox Survey

The Project is within the known range for swift fox and comprises potentially suitable short-grass prairie habitat for the species. A combination of pedestrian and vehicular-based surveys were used to search for swift foxes and their sign, which includes tracks, scat, or den sites. Binoculars and a spotting scope were also used to scan the area from good vantage points, such as hill tops. In addition to visual encounter surveys, two camera traps were set; one in the solar farm and the other at the substation. A fox scent lure combined with skunk essence was placed on a wood stake approximately 10 feet from each camera, and the camera was set to take photos whenever triggered by movement throughout the day and night. Each camera was deployed for 5 days and 4 nights. Photos were later reviewed to identify any footage of swift foxes.

Potential grassland habitat is present across much of the Wildlife Survey Area including the solar farm and substation. According to the South Dakota Department of Game, Fish and Parks 2018 status reviews, swift foxes have been documented in both Custer County (prior to 2000) and Oglala Lakota County (after 2000).²⁰ In 2009 and 2010, the Oglala Sioux Parks and Recreation Authority released 79 wild-caught swift fox onto the Pine Ridge Reservation in Oglala Lakota County. Four dens and six individuals were documented via camera and live trapping efforts in 2013 and 2014. However, the Swift Fox Survey Area is not within the mapped range of the species according to the South Dakota Wildlife Action Plan Explorer Tool.²¹

Neither swift foxes nor their sign were observed during the visual surveys or at either camera trap station. Much of the solar farm location consists of stands of sand sagebrush, which are not typically suitable habitat for swift fox. Elsewhere in the Wildlife Survey Area, farming and ranching

²⁰ SDGFP. 2018. State T&E species status reviews approved by SDGFP Commission 5 April 2018. Available at: https://gfp.sd.gov/UserDocs/nav/status-reviews.pdf.

²¹ SDGFP. 2014. South Dakota wildlife action plan and data explorer. 583 pp. Available from: https://gfp.sd.gov/wildlife-action-plan/.

practices have altered the landscape. Prey species including lagomorphs and prairie dogs were observed to be in relatively low abundance throughout the Wildlife Survey Area. In South Dakota, black-tailed prairie dogs comprise much of the swift fox's diet,²² and prairie dog colonies provide high quality habitat for swift fox due to an abundance of pretty and potential den sites.²³ Both rodent control and competition from other canids (i.e. coyote) have been cited as primary causes in the species' decline.²⁴ In particular, the elimination of prairie dog colonies has been implicated in reducing the quality of swift fox habitat across the species' range.²⁵ Prairie dog eradication in the Wildlife Survey Area is evident based on conversations with landowners in the area and from ground disturbance visible on aerial imagery in historic prairie dog colonies. In its current state, the Wildlife Survey Area appears to provide limited prey for swift fox.

13.4.3 Northern Long-Eared Bat Habitat Assessment

The USFWS indicates that the Project Area is within the "Area of Influence" of the northern longeared bat ("NLEB"). According to USFWS Summer Survey Guidance,²⁶ suitable summer habitat for the NLEB consists primarily of forests and woodlands, including riparian areas. However suitable habitats may also include nearby emergent wetlands and edge habitats such as fields and pastures adjacent to woodlands. Potential roost trees include live trees and/or snags ≥3 inches diameter breast height with loose bark, crevices, or cavities. Tree density and canopy cover within suitable habitats varies considerably. Isolated trees or clusters that have roost tree characteristics described above that are within 1,000 feet of other forested/wooded areas may be considered suitable habitat. NLEBs have also been observed roosting in buildings, barns, bridges, and bat houses; therefore, some human-made structures should also be considered potential summer habitat. Summer habitats are typically used from mid-May through mid-August.

Because the Project is not anticipated to result in adverse effects to NLEBs, surveys are not required by the USFWS as described in the 2018 Summer Survey Guidance.²⁷ However, NLEB, along with a number of other bat species of concern, may forage over the Project Area and potentially roost in adjacent areas. Therefore, two acoustic bat recorders were placed in the Project Area to assess species presence and composition; one along the Cheyenne River and another along Cottonwood Creek (Tributary to the Cheyenne River) where the transmission line crosses. Methods followed those described in the USFWS Indiana Bat 2018 Summer Survey

²² Uresk, D.W. and J.C. Sharps. 1986. Denning habitat and diet of the swift fox in western South Dakota. Great Basin Naturalist 46:249-253.

²³ Smiley, D.N. and D.A. Keinath. 2003. Species assessment for swift fox (Vulpes velox) in Wyoming. Prepared for the U.S. Department of Interior, Bureau of Land Management, Wyoming State Office, Cheyenne, Wyoming. 51 pp.

²⁴ Smiley, D.N. and D.A. Keinath. 2003. Species assessment for swift fox (Vulpes velox) in Wyoming. Prepared for the U.S. Department of Interior, Bureau of Land Management, Wyoming State Office, Cheyenne, Wyoming. 51 pp.

²⁵ Beauvais, G. P. 2000. Swift fox (Vulpes velox) in status report for rare vertebrates and plants in Laramie County, Wyoming. Beauvais, G. P. and W. Fertig. 2000. Prepared for the Wyoming Cooperative Fish and Wildlife Research Unit; U.S. Department of Interior Fish and Wildlife Service; and Laramie County, Wyoming by the Wyoming Natural Diversity Database, University of Wyoming, Laramie, WY.

²⁶ U. S. Fish and Wildlife Service (USFWS). 2018. Range-wide Indiana bat survey guidelines. U.S. Department of Interior. 62 pp. Available at: https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2018RangewidelBatSurveyGuidelines.pdf.

²⁷ U. S. Fish and Wildlife Service (USFWS). 2018. Range-wide Indiana bat survey guidelines. U.S. Department of Interior. 62 pp. Available at: https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2018RangewidelBatSurveyGuidelines.pdf.

Guidance.²⁸ Both bat detectors used were Wildlife Acoustics SM4Bat detectors combined with SMM_U2 ultrasonic microphones. Microphones were placed at the edge of potential bat flyways and elevated approximately 12-15 feet above the ground. Gain was set to 0 dB, the maximum recording length of each file was set to 5 seconds, and the detectors were set to record 30 minutes prior to sunset and 30 minutes after sunrise. Each detector was deployed for 4 nights for a total of 8 detector nights. Bat recordings were then analyzed using Kaleidoscope Pro Version 4.54 and auto-classified with a 0 balanced setting. Recordings were then hand-vetted to identify diagnostic call-sequences based on high-quality sequence recordings, with attention to primarily search-phase calls.

The Project Area is within the USFWS "Area of Influence" for NLEB, however, the known distribution of NLEBs is approximately 15 miles from the Project Area, in the Black Hills and approximately 40 miles to the east in Badlands National Park.²⁹ No suitable habitat was identified at either the solar farm site or the substation where permanent above ground structures will be placed. These parcels consist of grasslands with no trees or rock outcrops/caves that could provide hibernacula. As described above, there is potential NLEB habitat along the Cheyenne River and Cottonwood Creek. These two areas are shown on Figure 3 as bat detector locations. No potential roost trees were identified within the Project Area, including the transmission line right-of-way where clearing will occur. Large trees, primarily eastern cottonwood, are present along the two riparian areas described above. Some large snags with loose bark and crevices were observed. These may provide potential summer roost sites for NLEBs as well as a number of other tree roosting bat species. Although potential habitat for the NLEB is present along riparian areas adjacent to the transmission line route, no adverse impacts are expected due to the lack of potential roost trees in the Project Area where construction will occur. Any potential presence of NLEB would be limited to individuals foraging over the Project Area and potentially roosting in wooded riparian areas adjacent to the transmission line corridor.

13.4.4 Bat Acoustic Survey

A total of eleven bat species were auto-classified by Kaleidoscope Pro from 6,414 bat recordings over 8 detector nights. However, three of these species could not be verified as present based on a lack of diagnostic call characteristics during hand-vetting and/or a low number of calls with a high p-value equating to low confidence in the auto classifier. The results of the acoustic bat surveys are presented in Table 5.

Bat species verified as present include Townsend's big-eared bat (*Corynorhinus townsendii*), big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), western small-footed myotis (*Myotis ciliolabrum*), little brown bat (*Myotis lucifigus*), fringed myotis (*Myotis thysanodes*), and long-legged myotis (*myotis volans*). Fringed myotis, silver-haired bat, and Townsend's big-eared bat are each classified as a Species of Greatest Conservation Need by SDGFP.³⁰ At both detector sites, little brown bat and western small-footed myotis comprised the majority of recordings. Although a low number of Townsend's big-eared bat and fringed myotis calls were

²⁸ U. S. Fish and Wildlife Service (USFWS). 2018. Range-wide Indiana bat survey guidelines. U.S. Department of Interior. 62 pp. Available at: https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2018RangewidelBatSurveyGuidelines.pdf.

²⁹ SDGFP. 2014. South Dakota wildlife action plan and data explorer. 583 pp. Available from: https://gfp.sd.gov/wildlife-action-plan/.

³⁰ SDGFP. 2014. South Dakota wildlife action plan and data explorer. 583 pp. Available from: https://gfp.sd.gov/wildlife-action-plan/.

recorded, these recordings contained diagnostic features that are typically not confused with other bat species in the region. A total of 92 eastern red bat recordings were auto-classified by Kaleidoscope Pro; however, most of the calls contained call sequences that were suggestive of little brown bat. No diagnostic eastern red bat call sequences were identified during hand-vetting. A small number of call sequences were auto-classified as western long-eared myotis (*Myotis evotis*, 3 auto-IDs) and northern long-eared bat (*Myotis septentrionalis*, 10 auto-IDs). However, these species cannot be verified as present based on a combination of a lack of diagnostic call sequences, and a low number of recordings and subsequently high p-value (p=1).

13.4.5 Migratory Bird Survey

Surveys for migratory birds were completed using a combination of vehicular surveys (driving along the road and stopping at regular intervals to scan the surrounding area for wildlife) and pedestrian-based surveys in inaccessible areas or areas of high potential habitat (i.e. wetlands, riparian areas, prairie dog colonies). Bird nests, notes on habitat use, and relative abundance were documented in field notes.

A total of 43 bird species were documented in the Wildlife Survey Area including songbirds, waterfowl, raptors, upland game birds, and shorebirds. Of these 43 species, 10 were documented as nesting in the Project Area including burrowing owl, upland sandpiper, Canada goose (*Branta Canadensis*), mallard (*Anas platyrhynchos*), Swainson's hawk, killdeer (*Charadrius vociferous*), cliff swallow, American robin (*Turdus migratrius*), and mourning dove (*Zenaida macroura*). However, it is likely that other species are nesting as well. Three sharp-tailed grouse hens were observed near a stock tank and planted tree rows in the middle of the solar farm.

The whooping crane (*Grus Americana*) is a federally endangered species that was included on the USFWS official species list for the Project Area. Whooping Cranes in the Aransas-Wood Buffalo population migrate between the Aransas National Wildlife Refuge on the Gulf of Mexico and the Wood Buffalo National Park in northeastern Alberta and the southern Northwest Territories. The most recent population estimate for the population was 431 individuals. Whooping cranes may stopover nearly anywhere in South Dakota during their migration; however, the Missouri River corridor is preferred.³¹ Although unlikely, whooping cranes may use riparian and wetland habitats along the Cheyenne River and may forage in adjacent crop fields in the Survey Area during spring or fall migration.

Common Name	Scientific Name	Estimated Abundance	Nesting Habitat in Survey Area
Red-Winged Blackbird	Agelaius phoeniceus	High	Wetland
Grasshopper Sparrow	Ammodramus savannarum	High	Grassland
Green-Winged Teal	Anas carolinensis	Low	Wetland
Mallard	Anas platyrhynchos	Moderate	Wetland
Golden Eagle	Aquila chrysaetos	Low	Limited to tall trees in area

TABLE 7: AVIAN SPECIES DOCUMENTED IN THE SURVEY AREA

³¹ SDGFP. 2014. South Dakota wildlife action plan and data explorer. 583 pp. Available from: https://gfp.sd.gov/wildlife-action-plan/.

Common Name	Scientific Name Estimated Abundance		Nesting Habitat in Survey Area		
Burrowing Owl	Athene cunicularia	Ilaria Low Grassland			
Upland Sandpiper	Bartramia longicauda	High	Grassland		
Canada Goose	Branta canadensis	Low	Wetland, Riparian		
Great-horned Owl	Bubo virginanus	Low	Riparian, Trees		
Red-Tailed Hawk	Buteo jamaicensis	Low	Riparian, Trees		
Swainson's Hawk	Buteo swainsoni	Low	Riparian, Trees		
Lark Bunting	Calamospiza melanocorys Cathartes aura	High	Grassland		
Turkey Vulture	Cathartes aura	Low	Unlikely but possible in <i>Buteo</i> nests or riparian		
Killdeer	Charadrius vociferus	High	Wetland		
Lark Sparrow	Chondestes grammacus	Moderate	Grassland		
Common Nighthawk	Chordeiles minor	Moderate	Variable – ground nester		
Northern Harrier	Circus cyaneus	Low	Wetlands – ground nester		
Yellow-Billed Cuckoo	Coccyzus americanus	Low	Riparian Willows / Cottonwoods		
American Kestrel	Falco sparverius	Moderate	Tree cavities		
Barn Swallow	Hirundo rustica	High	Bridges and Buildings		
Orchard Oriole	Icterus spurius	Moderate	Riparian, Trees		
Red-Headed	Melanerpes	Low	Riparian, grassland		
Woodpecker	erythrocephalus		(on ground)		
Wild Turkey	Meleagris gallopavo	Low	Various, usually shrubs/trees		
Brown-Headed Cowbird	Molothrus ater	High	Grassland		
Long-Billed Curlew	Numenius americanus	Low	Various, usually shrubs/trees		
Blue Grosbeak	Passerina caerulea	Low	Riparian, trees/shrubs		
Cliff Swallow	Petrochelidon pyrrhonota	High	Bridges		
Ring-Necked Pheasant	Phasianus colchicus	Low	Ground nest in dense vegetation		
Black-Billed Magpie	Pica hudsonia	Low	Riparian, trees		
Common Grackle	Quiscalus quiscula	Moderate	Riparian		
Black Phoebe	Sayornis nigricans	High	Bridges, buildings		
Say's Phoebe	Sayornis saya	Low	Bridges, buildings		
Eastern Bluebird	Sialia sialis	Low	Tree cavities		
American Goldfinch	Spinus tristis	Low	Trees/shrubs		
Dickcissel	Spiza american	Moderate	Grassland or sand sage areas		
Eurasian Collard Dove	Streptopelia decaocto	Low	Trees, buildings		
Western Meadowlark	Sturnella neglecta	High	Grassland		
European Starling	Sturnus vulgaris	Moderate	Riparian, trees (cavity nester)		
Brown Thrasher	Toxostoma rufum	Low	, Riparian, trees/shrubs		

Common Name	Scientific Name	Estimated Abundance	Nesting Habitat in Survey Area
American Robin	Turdus migratorius	Moderate	Riparian, trees, buildings
Sharp-Tailed Grouse	Tympanuchus phasianellus	Low	Grassland
Western Kingbird	Tyrannus verticalis	Low	Riparian, tree/shrubs
Mourning Dove	Zenaida macroura	High	Grassland

13.4.6 Additional Wildlife Observations

The Project Area is within the primary range of pronghorn antelope (*Antilcapra americana*), mule deer (*Odocoileus hemionus*), and white-tailed deer (*Odocoileus virginanus*).³² All three species were observed in the Project Area, with pronghorn antelope the most abundant. White-tailed jack rabbit (*Lepus townsendii*), cottontail (*Sylvilagus sp.*), and black-tailed prairie dogs were observed in the Wildlife Survey Area. Only one jack rabbit was observed on the swift fox camera trap located at the solar farm. One cottontail was observed near the road on the west side of the Wildlife Survey Area. One small, 3 acre prairie dog colony was mapped to the south of the transmission line right-of-way. Sign of a raccoon was observed under the Cheyenne River bridge.

The official USFWS species list for the Project Area did not indicate potential occurrence of blackfooted ferret (*Mustela nigripes*). However, the species is listed as Threatened by SDGFP and is included on the Custer County species list. All current populations of black-footed ferret have resulted from reintroductions. The nearest known populations are to the west at Wind Cave National Park and to the northeast at Badlands National Park.³³ Black-footed ferrets feed primarily on prairie dogs and require black-tailed prairie dog colonies with an estimated 100-150 acres to support one ferret. Currently, suitable habitat is not present in the Project Area or Transmission Line Route.

Reptiles observed in the Survey Area include prairie rattlesnake (*Crotalus viridis*), garter snake (*Thamnophis sp.*), and snapping turtle (*Chelydra serpentine*). No amphibians were observed in the Project Area or Transmission Line Route.

13.5 **Project Impact on Wildlife**

The impact of the proposed Project on wildlife is expected to be minimal. There is potential for a small reduction in the available habitat that some wildlife uses for forage or cover; however, operation of the Project will not significantly change the existing land use.

The Applicant would implement the following measures to the extent practicable to help avoid potential impacts to wildlife during the construction and operation of the Project:

• Avoid and minimize siting solar panels in native prairie and native plant communities.

³² SDGFP. 2014. South Dakota wildlife action plan and data explorer. 583 pp. Available from: https://gfp.sd.gov/wildlife-action-plan/.

³³ SDGFP. 2014. South Dakota wildlife action plan and data explorer. 583 pp. Available from: https://gfp.sd.gov/wildlife-action-plan/.

- Avoid or minimize disturbance of individual wetlands or drainage systems during Project construction.
- Protect existing trees and shrubs by avoiding tree removal for access roads and underground collector lines.
- Maintain sound water and soil conservation practices during construction and operation
 of the Project to protect topsoil and adjacent resources and to minimize soil erosion. To
 minimize erosion during and after construction, BMPs for erosion and sediment control
 will be used. These practices include silt fencing, temporary seeding, permanent
 seeding, mulching, filter strips, erosion blankets, grassed waterways, and sod
 stabilization.
- Revegetate non-cropland and pasture areas disturbed during construction or operation with an appropriate native seeding mix.
- Inspect and control noxious weeds in areas disturbed by the construction and operation of the Project.
- Occupied raptor nests would be avoided during construction, following spatial buffers and timing recommendations by the USFWS.
- Ground clearing would not occur during the migratory bird nesting season (typically May to August 1) unless nest clearance surveys are performed prior to construction or nesting habitat is removed outside of the breeding season (*i.e.*, mowing).

The Applicant is committed to minimizing impacts on wildlife within the Project Area. Lookout Solar would consult with the wildlife agencies regarding appropriate mitigation measures for wildlife impacts.

14 EFFECT ON AQUATIC ECOSYSTEM ARSD 20:10:22:17

The following sections describe the existing aquatic ecosystems within the Project Area, the potential impacts to aquatic ecosystems as a result of the Project, and mitigation and minimization measures planned to ameliorate potential impacts to aquatic systems.

14.1 Aquatic Resources

Aquatic resources were delineated between June 11 and June 15, 2018, using the data collected from 29 field observation points. A total of 1.3 acres of aquatic resources were delineated within the Project Area including 0.9 acres of palustrine emergent wetlands ("PEM"), 0.3 acres of palustrine scrub shrub wetlands ("PSS"), 0.1 acres of R2UBG, less than 0.01 acres of palustrine open water ("POW"), and nine intermittent riverine streams ("R4SB"). Of the nine intermittent streams, eight were classified as vegetated streambed ("R4SB7") and one was classified as R4SBFx (Angustora Canal). In total, 22 unique aquatic resources (9 PEM, 1 PSS, 2 POW, 1 R2UBG, and 9 R4SB) were delineated in the Project Area. PEM wetlands comprised 0.9 acres, the single PSS wetlands comprised 0.3 acres, and the POW wetlands comprise less than 0.01 acres.

Approximately 100 feet of intermittent stream were delineated upstream and downstream of the Project Area and Transmission Line Route. A single, perennial riverine (R2UBG) feature was identified in Transmission Line Route using the NWI data and consists of the Cheyenne River. The Cheyenne River (R2UBG) comprises 0.2 acres. The largest wetlands were delineated adjacent to the Cheyenne River and immediately south of Cottonwood Creek. Additionally, nine intermittent streams (R4SB) that intersect the Project Area and Transmission Line Route were identified during the 2018 on-site assessment. Two of the intermittent streams are man-man features including the Angustora Canal and a small drainage ditch near Cottonwood Creek.

The Project Area was void of distinct drainage features and the wetlands delineated in this area consisted of PEM wetlands. The proposed substation did not contain any wetland features. The Transmission Line Route was intersected by PEM and PSS, R4SB, and R2UBG. A single PSS wetland was delineated along the southern bank of the Cheyenne River and was consistent with the PSS wetland layer identified using the National Wetlands Inventory data.

All palustrine wetlands were characterized as PEM or PSS. Most occurred in semi-open depressions located within the proposed solar farm. These depressions were dispersed geographically and isolated from drainage channels (i.e. Sample Points 1, 2, 4, and 6). Semiclosed depressions lack a defined exit channel, and are subject to inundation via overland flow in response to a large storm event. Limited surface water was present during the on-site assessment, but saturation was observed, indicating that water does not persist in these depressions. Additional PEM, PSS, and POW wetlands were characterized along the proposed transmission line cable route on the banks of the Cheyenne River. Wetlands identified within the Cheyenne River floodplain are likely subject to periods of temporary inundation during high flow conditions in response to storm events or seasonal snowmelt, resulting in the development of wetland indicators (i.e. Sample Points 7 and 8). The PEM wetlands that are not influenced by the Cheyenne River likely receive moisture from surrounding intermittent streams and ditches identified using the NWI data (Sample Points 9-12, and 15). The wetlands identified south of Cottonwood Creek are the largest of those delineated on-site. These wetlands boarder Cottonwood Creek and extend south to a series of roadside ditches (R4SBX) on the east and west side of County Road 719 (Figure 6). These roadside ditches likely receive surface water runoff during storm events, and the resulting flow temporarily inundates the wetlands delineated during the on-site assessment (Figures 6).

All nine drainages were characterized as Intermittent Riverine with Streambed substrate (R4SB), and the Cheyenne River was classified as Perennial Riverine (R2UBG). The R4SB features may ultimately serve as tributaries to the Cheyenne River during high flow conditions, and hydrologic connectivity.

Project Area Description	PEM Wetland Acres	PSS Wetland Acres	POW Wetland Acres	Riverine Open Water Acres	Total Acres
Project Area	0.413	0.000	0.000	0.000	0.413
Transmission Line Route	0.461	0.292	0.003	0.178	0.934
Substation	0.000	0.000	0.000	0.000	0.000
Total	0.874	0.292	0.003	0.178	1.347

TABLE 8: ACRES OF WETLAND AND RIVERINE OPEN WATER IN THE PROJECT AREA AND TRANSMISSION LINE ROUTE

TABLE 9: ACRES OF AQUATIC RESOURCES IN THE PROJECT AREA AND TRANSMISSION LINE ROUTE

Aquatic Resource	Acres
Wetlands	1.166
Ponds	0.003
River	0.178
Total	1.347



- NATIONAL HYDROGRAPHY DATASET (USGS FEB. 2016) PERENNIAL STREAM
- ---- INTERMITTENT STREAM
- NATIONAL WETLAND INVENTORY (USFWS OCT. 2017) FRESHWATER EMERGENT WETLAND FRESHWATER FORESTED/SHRUB WETLAND FRESHWATER POND

- R4SB7J (INTERMITTENT STREAM)
- R4SB7X DITCH
- R4SBFX (ANGUSTORA CANAL)
- R4SBX DITCH PEM



R2UBG

1,500 3,000

FIGURE 10

AQUATIC RESOURCES INVENTORY OF THE PROJECT AREA AND TRANSMISSION LINE ROUTE

LOOKOUT SOLAR PARK I CUSTER & OGLALA LAKOTA COUNTIES, SD

Trihydro CORPORATION

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Date: 11/16/18 File: Fig12_WetlandsLandscape



14.2 Projects Impact on Aquatic Resources

Impacts from the proposed Project to aquatic resources would be minimal because these features have been avoided during design of the Project to the extent possible, and those impacts that are required are managed in accordance with state and federal requirements. The primary potential for impact to aquatic ecosystems would be from increased sedimentation or increased total suspended solids due to soil erosion during Project construction. However, this risk is managed through BMPs and implementation of the SWPPP prior to construction.

15 LAND USE ARSD 20:10:22:18

The following sections describe the existing land use, sound, and aesthetics within the Project Area, the potential land use impacts of the Project, and measures that will be utilized to avoid, minimize, and/or mitigate potential impacts.

15.1 Existing Land Use

Land use within the Project Area is predominantly agricultural, consisting of a mix of cropland, hayland, pastureland, and rangeland. Occupied farm sites and rural residences are located throughout the Project Area and Transmission Line Route. The following land use classifications occur within the Project Area and Transmission Line Route:

- Land used primarily for row and non-row crops in rotation
- Irrigated lands
- Pasturelands and rangelands
- Haylands
- Undisturbed native grasslands
- Rural residences and farmsteads, family farms, and ranches
- Public, commercial, and institutional use

The following land use classifications were not identified within the Project Area:

- Existing and potential extractive nonrenewable resources
- Other major industries
- Municipal water supply and water sources for organized rural water systems
- Residential
- Noise sensitive land uses

In Custer County, there are approximately 446 farms comprising 623,206 acres.³⁴ The majority (78.4%) of the farmland is used as pastureland, primarily for cattle. Woodlands (12.7%) and cropland (7.5%) also constitute some of the farming operations in the County.

15.2 Project Impact on Existing Land Use

³⁴ Census of Agriculture (2012). U.S. Department of Agriculture. Retrieved on November 5, 2018 from <u>https://www.nass.usda.gov/Publications/AgCensus/2012/Online_Resources/County_Profiles/South_Dakota/cp46033.pdf</u>.

Construction of the Project will result in the conversion of land within the Project Area from existing agricultural land uses into a renewable energy resource during the life of the Project. Temporary impacts from the proposed Project will also result. Land use impacts associated with construction staging and laydown areas and underground collector lines will be temporary. Following construction, the areas will be returned to pre-construction land uses, which primarily consist of cultivated croplands and pastureland/grassland.

The proposed Project is compatible with the existing agricultural land uses in areas surrounding the Project facilities. The agricultural areas that would impacted by the construction and operation of the Project are primarily in the Project Area. The impacted agricultural land in the Project Area would not be more than 600 acres. Areas disturbed due to construction where Project facilities would not be located would be re-vegetated with vegetation types matching the surrounding agricultural landscape. The generating facility would be decommissioned after the end of the Project's operating life. The generating facility would be removed in accordance with applicable State and County regulations, unless otherwise agreed to by the landowner. Disturbed surfaces would be graded, reseeded, and restored as nearly as possible to their preconstruction conditions. After decommissioning for the Project is complete, no irreversible changes to land use would remain beyond the operating life of the Project.

There are approximately fourteen (14) residences neighboring the Project Area and along the Transmission Line Route. Based on the proposed Project layout of solar panels, access roads, collector lines, and associated facilities, there would be no displacement of residences or businesses due to construction of the Project facilities.

15.2 Public Lands

The only public lands that potential would be impacted by the Project is the parcel land that is part of the Buffalo Gap National Grassland. Buffalo Gap National Grassland could be impacted by construction of the transmission line and the construction of the substation if the substation is located in that area. The Lookout Solar has applied for a special use permit from the U.S. Forest for these potential impacts to the Buffalo Gap National Grassland and the permit will require that Lookout Solar avoid and mitigate potential impacts.

15.4 Sound and Noise Regulations

The Project Area and Transmission Line Route contains cropland, grassland, and rural residences scattered throughout. Farming activities and vehicular traffic are assumed to be the largest contributor to sound, although ambient sound measurements have not been recorded for the Project Area and Transmission Line Route at this time. There are no local, federal or state noise regulations applicable to this Project.

15.5 Visual Resources

Cropland, grassland, large open vistas, and gently rolling topography visually dominate the Project Area and Transmission Line Route landscape. Vegetation in and near the Project Area and the Transmission Line Route is predominantly cropland and grassland/pasture. Existing structures in the Project Area and Transmission Line Route consist of occupied residences dispersed throughout and scattered farm buildings. Riverside Road, 148th Avenue and Cottonwood Cutoff, and BIA Route 2 extend through the Project Area and the Transmission Line Route.

Construction of the Project would convert the Project Area from grazing land to a solar farm. The new construction and man-made attributes would add new colors and texture to the viewshed. The solar field panels and the information and office center building would be visible from the immediate surrounding area, including from BIA Route 2 (located to the south of the Project Area) and possibly from Red Shirt Table Overlook in the Badlands National Park. However, since the overlook is positioned to face the opposite direction of the Project Area and the topography of the area between the Project Area and Badlands National Park is dominated by a series of smooth hills and ridges with mixed grass prairie, the Project Area is not likely to impact the viewshed from the overlook. In addition, the proposed Lookout Solar Farm could be observed from the highest buttes in the Badlands National Park Stronghold South Unit. However, if a viewer were to observe the Lookout Solar Farm from this location, potential impacts to the viewer are expected to be minimal.

Lookout Solar intends to leave vegetation in the Project Area low or trimmed to lowest height tolerable for plant survival as part of BMPs and to reducing visual impacts of renewable energy facilities. Overall, potential impacts to visual resources immediately surrounding the Project Area (whether they are adverse or beneficial) would be minor because the area is not densely populated.



FIGURE 17: VIEW OF THE SOUTHERN BOUNDARY OF THE PROJECT FROM BIA ROUTE 2 FACING NORTH

FIGURE 18: VIEW OF THE APPROXIMATE MIDDLE OF THE PROJECT AREA FACING SOUTH



FIGURE 19: VIEW OF THE NORTHERN BOUNDARY OF THE PROJECT AREA FACING SOUTHWEST


16 LOCAL LAND USE CONTROLS ARSD 20:10:22:19

The Project would be located on the Pine Ridge reservation. Lookout Solar intends to pursue an ordinance from the Oglala Sioux Tribe that would authorize the Project. Lookout Solar is obtaining authorization from Custer County to locate the Project's transmission lines in the County's right of way in county roads, specifically Riverside Road, 148th Avenue and Cottonwood Cutoff. Lookout Solar also intends to obtain building permits from the Oglala Sioux Tribe and Custer County.

17 WATER QUALITY ARSD 20:10:22:20

Groundwater and surface water resources are discussed in Chapter 14.0. As discussed in Chapter 14.0, the excavation and exposure of soils during the construction of solar panels, access roads, underground collector lines, and other Project facilities could cause sediment runoff during rain events. This sediment may increase TSS loading in receiving waters. However, erosion control BMPs would keep sediments onsite that might otherwise increase sediment loading in receiving waters. Construction of the Project would require coverage under the General Permit for Storm Water Discharges Associated with Construction Activities issued by the South Dakota DENR. A condition of this permit is the development and implementation of a SWPPP. The SWPPP would be developed during civil engineering design of the Project and would prescribe BMPs to control blankets, temporary storm water sedimentation ponds, re-vegetation, or other features and methods designed to control storm water runoff and mitigate erosion and sedimentation. The BMPs may include use of silt for impacts to drainage ways and streams by sediment runoff. Because erosion and sediment control would be in place for construction of the Project, impacts to water quality are not expected to be significant.

18 AIR QUALITY ARSD 20:10:22:21

The entire State of South Dakota is in attainment for all National Ambient Air Quality Standard ("NAAQS") criteria pollutants. The primary emission sources that exist within the Project Area include agricultural-related equipment and vehicles traveling along roads.

During construction of the Project, fugitive dust emissions would temporarily increase due to truck and equipment traffic in the Project Area and the Transmission Line Route. Whoever, to the extent possible, the construction trucks and equipment would travel on apved rather than unpaved roads. Additionally, there would be short-term emissions from diesel trucks and construction equipment. However, air quality effects caused by dust or vehicle emissions would be short-term, limited to the time of construction or decommissioning, and would not result in any NAAQS exceedances for criteria pollutants. Implementation of the Project components would not result in a violation to Federal, State, or local air quality standards and, therefore, would not result in significant impacts to air quality. The operation of the Project would not produce air emissions that would impact the surrounding ambient air quality. Lookout Solar will implement of best management practices to suppress fugitive dust emissions during construction such as spraying the roads with water and avoiding unpaved roads to the extent possible.

19 TIME SCHEDULE ARSD 20:10:22:22

A variety of factors influence the timing of the Lookout Solar Project. The table below includes a best estimate of the schedule for construction and operation of the Project. The construction of the Project could be delayed or accelerated depending on a number of factors, including permitting, financing, solar panel supply, and availability of labor.

19.1 Land Acquisition

The Applicant would be responsible for all land acquisition and will obtain the necessary easements, leases or purchase agreements from landowners, Custer County, and federal government agencies. Lookout Solar has already entered into lease agreements for the Project Area and the substation. Lookout Solar intends to obtain authorization to locate the transmission line in the Custer County roads in Spring 2019. Any required federal authorizations are expected in Fall 2019 or sooner.

19.2 Sale of Power

Lookout Solar is actively marketing the sale of the electricity to third parties, both utilities and large power consumers/marketers. The sale of the electricity may take the form of a power purchase agreement or a sale of the Project to a utility.

19.3 Equipment Procurement, Manufacture and Delivery

Lookout Solar has begun procurement of project specific equipment and is in the process of procuring solar panels, transformer stations, inverters and mounting systems for the Project.

19.4 Construction

Lookout Solar will oversee the primary contractors performing onsite Project construction, including, but not limited to, roads, solar panel assembly, electrical, and communications work. Lookout Solar has begun procurement of project specific equipment and is in the process of procuring solar panels, transformer stations, inverters and mounting systems for the Project.

19.5 Construction Financing

Lookout Solar will be responsible for financing all predevelopment, development, and construction activities. Lookout Solar anticipates financing the cost of all predevelopment activities through internal funds. Construction will be financed with internal funds or a combination of internal funds and third-party sources of debt and equity capital.

19.6 Permanent Financing

Permanent financing will be provided with the Lookout Solar's internal funds or a combination of internal funds and third-party sources of debt and equity capital.

19.7 Expected Commercial Operation Date

Lookout Solar anticipates that the Project would begin commercial operation by second quarter 2021. The commercial operation date is dependent on the completion of the interconnection process, permitting and other development activities.

20 COMMUNITY IMPACT ARSD 20:10:22:23

This section describes the potential impacts of the proposed Project on neighboring communities and cultural resources.

20.1 Socioeconomic and Community Impacts

According to the most recent census, the population of Pine Ridge is 3,308. 94.2% of the residents are American Indian. The median household income is \$29,881 a year. 49.7% of residents are below the federal poverty line.

The population of Custer County is 8,216. 94.2% of the population is White and 2.9% of the population is American Indian. The median household income is \$52,891 a year. 11.6% of residents are below the federal poverty line.

The Project is expected to create both short-term and long-term positive impacts to the local economy. Impacts to social and economic resources from construction activities would be short-term. Local businesses, such as restaurants, grocery stores, hotels, and gas stations, would see increased business during this phase from construction-related workers. Local industrial businesses, including aggregate and cement suppliers, welding and industrial suppliers, hardware stores, automotive and heavy equipment repair, electrical contractors, and maintenance providers, would also likely benefit from construction of the Project.

20.2 Cultural Resources

A Level III Cultural Resource Inventory was completed for the Project in July 2018. The Level III Inventory covered 245.3 linear acres within a 66- to 200-foot-wide, 11.7-mile-long corridor for the proposed locations of the transmission line, the temporary access road, and the permanent access road and a 16.8-acre block centered on the proposed substation location.

During the Level III Inventory, two new cultural sites and portions of the Angostura Canal were identified. Both cultural sites are historic. 39CU4533 consists of two related dams recommended not eligible for the National Register of Historic Places. 39CU4534 is a historic grave site recommended eligible for the National Register of Historic Places. Lookout Solar will avoid these cultural resource by at least 25 feet and monitor if ground disturbance is to take place within this buffer.

A file search indicated that 33 sites have been previously documented within 3 miles of the project area. These include 21 Native American–affiliated sites that consist of artifact scatters, isolated finds (IFs), a quarry, and a site containing a stone circle and cairn; 11 historic-aged sites consisting of artifact scatters, farmsteads, an earthwork, a depression, a school, a well/cistern, a dam, and nonfarm ruins; and a cairn of unknown affiliation. All of the sites are either not eligible, recommended not eligible, or unevaluated for the NRHP, and all of the previously recorded sites fall outside the project direct APE. Records indicate that two unevaluated sites of potential tribal

significance are located within three miles of the project. These consist of an unknown cairn (39CU4177) located 0.23 mile northwest of the project area on a bluff overlooking the Cheyenne River valley, and a Native American site (39FA1768) containing a stone circle or circles and a cairn that is located 2.88 miles southwest of the project area. The proposed project infrastructure consisting of a buried transmission line collocated with the existing county road within the viewshed of 39CU4177 should not create any additional visual impacts to this resource, and no proposed project infrastructure is within the viewshed of 39FA1768.

Site/Isolate Number	Resource Type	NRHP Eligibility	In Direct APE?
39CU1808	Native American artifact scatter	Not Eligible	No
39CU1809	Farmstead; Euroamerican artifact scatter	Not Eligible	No
39CU1810	Native American IF	Not Eligible	No
39CU1811	Native American IF	Not Eligible	No
39CU2207	Earthwork	Unevaluated	No
39CU3068	Farmstead	Unevaluated	No
39CU3718	Euroamerican depression	Recommended Not Eligible	No
39CU3719	School foundation; well/cistern; Euroamerican depression	Recommended Not Eligible	No
39CU3733	Well/cistern; foundation; Euroamerican depression	Recommended Not Eligible	No
39CU3734	Euroamerican depression; Euroamerican artifact scatter; well/cistern	Recommended Not Eligible	No
39CU3737	Native American IF	Recommended Not Eligible	No
39CU3738	Euroamerican artifact scatter; Euroamerican depression	Recommended Not Eligible	No
39CU3739	Native American artifact scatter	Recommended Not Eligible	No
39CU3740	Native American artifact scatter	Not Eligible	No
39CU3741	Native American artifact scatter	Unevaluated	No

Table 2. Summary of Previously Identified Sites

Site/Isolate Number	Resource Type	NRHP Eligibility	In Direct APE?
39CU4177	Unknown cairn	Unevaluated	No
39FA0547	Native American quarry; Native American artifact scatter	Unevaluated	No
39FA0548	Native American quarry	Unevaluated	No
39FA0783	Late Archaic artifact scatter; Middle Archaic artifact scatter	Unevaluated	No
39FA1076	Farmstead; Euroamerican artifact scatter	Not Eligible	No
39FA1088	Native American IF	Not Eligible	No
39FA1089	Native American IF	Not Eligible	No
39FA1090	Native American IF	Not Eligible	No
39FA1091	Native American artifact scatter	Not Eligible	No
39FA1092	Nonfarm ruins	Not Eligible	No
39FA1764	Native American IF	Recommended Not Eligible	No
39FA1768	Native American artifact scatter; Native American stone circle; Native American cairn	Unevaluated	No
39FA2528	Dam	Not Eligible	No
39OL0002	Oglala Lakota IF	Recommended Not Eligible	No
39OL0003	Oglala Lakota artifact scatter	Unevaluated	No
39OL0005	Oglala Lakota artifact scatter	Unevaluated	No
39OL0006	Oglala Lakota artifact scatter	Unevaluated	No
39SH0257	Native American artifact scatter	Unevaluated	No

20.3 Economic Impacts

The proposed Project would provide significant economic benefits to the Oglala Sioux Tribe and Custer County through contractor expenditures in the area, local project purchases of materials and services, and short- and long-term employment opportunities in the area. During construction, Lookout Solar anticipates that the Project would employ an average of 150 workers . Lookout Solar anticipates that a portion of the construction, maintenance, and operation workforce would be hired locally from the Oglala Sioux Tribe and Custer County areas.

The proposed Project would be approximately \$100 million investment in Oglala Lakota and Custer Counties. Lookout Solar will pay taxes on the Project, which will provide revenue for the local communities, counties and state.

21 EMPLOYMENT ESTIMATES ARSD 20:10:22:24

The proposed Project would provide significant economic benefits to the Oglala Sioux Tribe and Custer County through contractor expenditures in the area, local project purchases of materials and services, and short- and long-term employment opportunities in the area. During construction, Lookout Solar anticipates that the Project would employ an average of 50 workers. Lookout Solar anticipates that a portion of the construction, maintenance, and operation workforce would be hired locally from the Oglala Lakota County and Custer County areas.

22 FUTURE ADDITIONS AND MODIFICATIONS

ARSD 20:10:22:25

The Applicant requests that the SDPUC approve the Project for up to 110 MW-AC and 500,000 solar panels.

23 DECOMMISSIONING OF ENERGY FACILITY ARSD 20:10:22:33

Lookout Solar intends for the Project to operate for approximately thirty (30) years. At the end of the project, the Lookout Solar would assess whether to cease operations at the Lookout Solar Farm or replace equipment (if needed) and attempt to enter into a new power purchase contract. If an entity is willing to enter into such an agreement, the Project could continue operating. If no arrangement is possible, the facilities would be decommissioned and dismantled, and the site would be reclaimed and restored to the approximate original site conditions. In general, the majority of decommissioned equipment and materials would be recycled. Materials that cannot be recycled would be disposed of at U.S. Environmental Protection Agency approved/permitted facilities.

- General decommissioning activities would typically include:
- Dismantling and removing above ground equipment (e.g., solar arrays, the substation and interconnection facilities, etc.), unless the equipment is sold to the landowners.
- Removing panel support posts.
- Abandoning underground utilities.

Decommissioning costs are expected to amount to approximately \$1,000,000, including removal and dismantling of rack, panels, and cables; removal of fencing; and re-vegetation.

24 TRANSMISSION FACILITY LAYOUT AND CONSTRUCTION ARSD 20:10:22:34

In selecting the current Transmission Line Route, Lookout Solar sought to avoid and minimize impacts to private land, federal land, and existing utility lines to extent possible. Lookout Solar has conducted survey of the Transmission Line Route that incorporated utilities with lines currently in the rights-of-way in the county roads marking the location of the lines. Additionally, Lookout Solar is coordinating with Golden West and local irrigation districts to gather additional information regarding the precise location of existing utility lines. Lookout Solar will avoid existing utility lines by placing the Project's transmission line on the opposite side of a county road or placing the transmission line enough distance away from existing utility lines to ensure that the existing utility lines are not damaged during construction and there is no between existing utility lines and the Project's transmission lines.

24.1 Route Clearing

The Transmission Line Route will be designed to meet or surpass applicable electrical codes, and comply with good utility practices. Surveyors will stake the construction corridor within the approved right-of-way in preparation for the construction crew arriving on site. Once the construction crew arrives, they will begin by clearing and grubbing out parts of the right-of-way to ensure that vegetation meets the standards and that the construction crew will have easy access to the construction site. The crew will use chain saws, lifts, tractors and bulldozers only where needed to clear vegetation. The crew will install temporary culverts and field approaches where needed to access the route and to maintain adequate access and drainage throughout construction.

24.2 Transmission Construction Procedures

Construction will begin after applicable federal, state, and local approvals have been obtained, property and right-of-way are acquired, soil conditions are established and final design is completed. The precise timing of construction will take into account various requirements that may be in place due to permit conditions, system loading issues, weather and available workforce and materials.

The Applicant will work with an experienced contractor to construct and maintain the transmission line in conjunction with the construction and operation of the Lookout Solar Project. Construction will follow industry best practices. These best practices address transmission specifics such as right-of-way clearing, staging, horizontal directional drilling, and placements of lines underground. They also address general construction best practices including but not limited to safety and storm water pollution prevention planning. Lookout Solar would consider the proposed schedule for activities, permit requirements, safety measures, prohibitions, maintenance guidelines, inspection procedures, and terrain characteristics throughout the Project's development, construction, and operations. In some cases these activities, such as schedules, would be modified to minimize impacts to sensitive animals or environments or to enhance safety.

The transmission line would be designed for installation at existing grades. Lookout Solar anticipates that only minimal grading will be needed because the route has very little elevation change and the transmission line will be places along the county road.

Typical construction equipment used on a project consists of mowers, backhoes, digger-derrick line trucks, track-mounted drill rigs, dump trucks, front end loaders, bucket trucks, bulldozers, flatbed tractor-trailers, flatbed trucks, pickup trucks, and various trailers. Many types of excavation equipment are set on wheel or track-driven vehicles.

Staging areas are generally established when constructing a transmission project. Staging involves delivering the equipment and materials to construct the new transmission line facilities. Structures are delivered to staging areas, sorted and loaded onto structure trailers for delivery to the staked location. The materials are stored until they are needed for the Project. In some cases, additional space (temporary laydown areas) may be required. These areas will be selected for their location, access, security, and ability to efficiently and safely warehouse supplies. The areas are chosen to minimize excavation and grading. Sufficient rights to use the temporary laydown areas outside of the transmission line right-of-way will be obtained from affected landowners through the lease agreements.

When it is time to install the solar arrays and the transmission line, structures are moved from the staging areas, delivered to the staked location and placed within the right-of-way until the structure is set. Typically, access to the transmission line right-of-way corridor is made directly from existing roads that run parallel or perpendicular to the transmission line right-of-way. In all cases where construction traffic and activities are within close proximity to local, county or state roadways, the contractor will coordinate with the governing body on traffic control and safety measures. In some situations, private roads or trails may need to be used for access. Permission from the property owner would be obtained prior to accessing the transmission line corridor outside of public rights-of-way. Once construction is complete the Transmission Line Route will be revegetated.

24.3 Restoration Procedures

The ground will be disturbed during the normal course of work (as is typical of most construction projects), which can take several weeks in any one location. The Applicant will take the steps necessary to lessen the impact of the Transmission Line Route on the surrounding environment by restoring areas disturbed by construction in accordance with BMPs and the Project's permit conditions. This will begin with a pre-construction survey that will identify areas requiring special restoration procedures. During construction, crews will also attempt to limit ground disturbance wherever possible. As construction on each parcel of land is completed, disturbed areas will be restored to its original condition to the maximum extent practicable. In addition, a management plan will be developed to prevent the spread of noxious and invasive weeds during construction and ongoing operations.

Portions of permanent vegetation that are disturbed or removed during construction of transmission lines will be reestablished to pre-disturbance conditions. Resilient species of common grasses and shrubs typically reestablish naturally with few problems after disturbance. Areas with significant soil compaction and disturbance from construction activities along the route will require assistance in reestablishing the vegetation stratum and controlling soil erosion. Commonly used BMPs to control soil erosion and assist in reestablishing vegetation that may be used on the Transmission Line Route include, but are not limited to:

- Erosion control blankets with embedded seeds
- Silt fences

- Hay bales
- Hydro seeding
- Planting individual seeds or seedlings of non-invasive native species

26.4 Maintenance Procedures

The estimated service life of the proposed transmission line is approximately forty (40) years. Transmission lines are designed to operate for decades and require only moderate maintenance, particularly in the first few years of operation.

The principal operating and maintenance cost for transmission facilities is the cost of inspections, which will be performed monthly by either truck. Inspections will be conducted to ensure that the transmission line is fully functional and that no vegetation has encroached so as to violate required clearances.

25 INFORMATION CONCERNING TRANSMISSION FACILITIES ARSD 20:10:22:35

25.1 Transmission Line Reliability

As previously mentioned, transmission lines are designed to operate for decades. Typically, they require only moderate maintenance, particularly in the first few years of operation. The estimated service life of the proposed Transmission Line is approximately forty years. Transmission infrastructure includes very few mechanical elements, which results in reliability. It is built to withstand weather extremes, with the exception of severe weather such as tornadoes and heavy ice storms. Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system. Such interruptions are usually momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure is very high, in excess of 99 percent.

25.2 Transmission Line Safety

The Transmission Line Route will be designed in compliance with local, state, and good utility standards regarding clearance to ground, clearance to utilities, clearance to buildings, strength of materials, and right-of-way widths. The Applicant's contracted crews will comply with local, state, and good utility standards regarding installation of facilities and standard construction practices. Lookout Solar will use proper signage and guard structures when stringing wire across roads and railroads. Installation of the guard structures and signage will be coordinated with the owner of the transportation corridor being protected. Guard structures can be temporary wood poles with a cross arm or line trucks with their booms used to hold the wire and protect the lanes of traffic.

The proposed transmission line will be equipped with protective devices, such as breakers and relays, to safeguard the public from the transmission line if a transmission line or pole falls or other accident occurs. Breakers and relays are located where the line connects to the substation, and will de-energize the line in the event of an emergency. In addition to protective devices, proper signage will be posted warning the public of the safety risks associated with the energized equipment.

25.3 Right of Way Requirements

Lookout Solar is obtaining authorization from Custer County to locate the transmission line in rights of way for county roads.

25.4 Necessary Clearing Activities

The Transmission Line would be located in county roads. No tree clearing would be necessary.

26 ADDITIONAL INFORMATION IN APPLICATION ARSD 20:10:22:36

The Applicant will be responsible for undertaking all required environmental review and will obtain all permits and licenses that are required following issuance of the Facility Permit. The potential permits or approvals that have been identified as being required for the construction and operation of the Project are in the table below.

Government Level	Agency	Permits/Approvals/Consultations	Timing
Federal	Western Area Power Administration	Interconnection Approval; Transmission System Upgrades; NEPA Review	Prior to Construction
Federal	Western Area Power Administration	National Historic Preservation Act ("NHPA") Section 106 Consultation Regarding Archaeological and Cultural Resources	Prior to Construction
Federal	U.S. Forest Service	Special Use Permit; NEPA Review (if required)	Prior to Construction
Federal	U.S. Army Corps of Engineers	Wetlands Jurisdictional Determination; Nationwide Permit Authorizations	Prior to Construction; Permit by Rule
Federal	U.S. Bureau of Indian Affairs	Approval of Lease; NEPA Review	Prior to Construction
Federal	U.S. Bureau of Reclamation	Approval for Crossing of Angostura Canal	Prior to Construction
Federal	U.S. Fish and Wildlife	Consultant Regarding Protected Species	Prior to Construction
State	South Dakota Public Utility Commission	Permit for an Energy Facility	Prior to Construction
State	South Dakota School and Public Lands	Easement for HDD under Cheyenne River	Prior to Construction

TABLE 10: GOVERNMENT APPROVALS FOR THE PROJECT

State	South Dakota Department of Environment and Natural Resources ("DENR")	Permit to Construct for a Non-PSD Minor Source of Air Emissions (if needed)	Prior to Construction
State	DENR	National Pollution Discharge Elimination System Construction Stormwater Discharge Permit	Prior to Construction
State	DENR	No Exposure Certification (for exclusion from stormwater discharges associated with industrial activities) (if needed)	Prior to Construction
State	South Dakota Game, Fish, and Parks	State-listed Endangered Species Review	Prior to Construction
State	South Dakota State Historical Society	NHPA Section 106 Consultation	Prior to Construction
Local	Custer County	Floodplain Development Permit	Prior to Construction
Local	Custer County	Grant of Right to Occupy County Right of Way in County Roads	Prior to Construction
Local	Custer County	Building Permit	Prior to Construction
Tribal	Oglala Sioux Tribe	Business License	Prior to Construction
Tribal	Oglala Sioux Tribe	NHPA Section 106 Consultation	Prior to Construction

The Applicant has addressed the matters set forth in SDCL Chapter 49-41B and in ARSD Chapter 20:10:22 (Energy Facility Siting Rules), related to energy facilities.

Pursuant to SDCL 49-41B-22, the information presented in this Application establishes that:

- The proposed energy and transmission facilities comply with applicable laws and rules.
- The facilities would not pose a threat of serious injury to the environment or to the social and economic condition of inhabitants in or near the Project Area.
- The facilities would not substantially impair the health, safety, or welfare of the inhabitants.

• The facilities would not unduly interfere with the orderly development of the region, having given consideration to the views of the governing bodies of the local affected units of government.

27 TESTIMONY AND EXHIBITS

The Applicant has filed testimony at the time of filing and may supplement the testimony after the initial public meeting and Commissioner's hearing.