U.S. Department of the Interior
Bureau of Land Management

Lava Ridge Wind Project

Draft Environmental Impact Statement

January 2023

VOLUME 2a

Appendix 1. Plan of Development and Appendices A through M (1 of 2)

Prepared by:

U.S. Department of the Interior
Bureau of Land Management

In Cooperation with:

National Park Service
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
State of Idaho
Jerome County
Lincoln County
Minidoka County

Mission

The Bureau of Land Management's mission is to sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations.

U.S. Department of the Interior
Bureau of Land Management
400 West F Street
Shoshone, Idaho 83352

DOI-BLM-ID-T030-2021-0015-EIS

APPENDIX 1

Plan of Development

Lava Ridge Wind Project Plan of Development

Magic Valley Energy, LLC

October 2022

Table of Contents

Appendices

Figures

Tables

1.0 PROJECT DESCRIPTION

1.1 Introduction

This Plan of Development ("POD") is prepared in support of an application by Magic Valley Energy, LLC ("MVE" or "the Proponent") to the Bureau of Land Management ("BLM") for authorization to use federal lands for the construction, operation, maintenance, and decommissioning of an up to 400-turbine wind energy generating facility and ancillary facilities. The proposed project will be known as the "Lava Ridge Wind Project," sometimes referred to herein as the "Project" or "Facility." The Project is located approximately 25 miles northeast of Twin Falls, Idaho in the BLM Shoshone Field Office management area. The majority of lands required for Project implementation are managed by BLM, with relatively fewer potential parcels that are state or privately owned.

The Facility will generally comprise of wind turbine generators, new and improved access roads, electrical collector and transmission lines, onsite substations with associated components, fiber optic communications equipment, interconnecting substation additions, battery energy storage system, operations and maintenance facilities, temporary construction staging areas, batch plants, and other ancillary facilities. The Project's planned 500 kilovolt ("kV") generation intertie may interconnect at the existing Idaho Power Midpoint substation approximately seven miles south of Shoshone, Idaho, or at an alternative location along the permitted but not yet constructed Southwest Intertie Project – Northern Portion ("SWIP-North") (IDI-26446).

MVE's anticipated schedule for the Project includes: 1) a development period during which the applicable permits and approvals are sought, targeting completion of development during the second calendar quarter of 2023; 2) an approximately two year construction timeframe with initial commercial operations commencing during the fourth calendar quarter of 2025; 3) an operations period of up to 30 years; and 4) a two year decommissioning phase that would occur if the right-of-way ("ROW") grant is not renewed. The Project may be constructed in a phased manner depending on MVE's continued commercial analysis and the electrical market conditions at the end of the development period.

This POD is intended to provide BLM the information needed to prepare an Environmental Impact Statement ("EIS") as part of BLM's National Environmental Policy Act ("NEPA") review for the Project. The information in this POD reflects MVE's current proposal with respect to the Project design and plans for construction, operation and maintenance, and decommissioning. The POD will continue to be updated as additional information becomes available or as Project plans are refined. Following the issuance of a Record of Decision ("ROD") and ROW grant by BLM, MVE would prepare a final POD consistent with the terms and conditions of the ROD and ROW grant. The final POD would then be reviewed by the BLM and approved by the Authorized Officer prior to the start of construction. MVE would implement the Project in accordance with the approved final POD, as may be amended or supplemented with approval of the Authorized Officer.

1.2 Purpose and Need for the Project

MVE's purpose for the Project is to reliably and economically produce renewable energy with wind turbine generators for delivery to power markets in the western United States, including those markets accessed via interconnection to the existing Midpoint Substation or to an alternative new substation constructed along the permitted, but not yet constructed, Southwest Intertie Project – Northern Portion. Construction and operation of the Project will:

- provide a new economic and reliable renewable energy source;
- have the ability to serve multiple power markets in the western United States, including those accessible through use of the Southwest Intertie Project transmission corridor;
- provide economic benefits to the State of Idaho, and the local counties of Jerome, Lincoln and Minidoka, including the creation of new jobs;
- contribute to the achievement of renewable energy and carbon reduction goals.
- maximize the potential extraction of wind energy to make the resource economically attractive to customers while balancing environmental sensitivities

The need for the Project arises from regulatory, utility, and consumer driven objectives to incorporate increasing amounts of renewable/carbon free energy sources into energy supply portfolios. Substantial amounts of new renewable energy resources are required to meet this need. A majority of states in the western U.S. have specific renewable energy goals. These goals include:

- Idaho Power Company: 100% clean energy goal by 2045
- State of Nevada: 50% renewable supply by 2030; 100% carbon-free by 2050
- State of California: 50% renewable supply by 2025; 60% by 2030; 100% zero-carbon supply by 2045
- State of Arizona: 15% renewable supply by 2025
- State of Utah: 20% renewable supply by 2025
- State of Oregon: 50% renewable supply by 2040
- State of Washington: 100% carbon-free by 2045
- State of Montana: 15% renewable supply since 2015
- State of New Mexico: 50% renewable supply by 2030, 100% carbon-free supply by 2045
- City of Los Angeles: 100% carbon-free by 2045

If Idaho Power Company alone were to meet all of its clean energy goals with renewables it would need over two thousand megawatts by 2045.

A recent joint California agency analysis anticipates that nearly 900 MW of new wind generation needs to come online *annually* for the next 25 years in order to meet California's clean energy goals (CEC 2020).

For many western states, these clean energy goals are bold objectives that will require 10's of thousands of megawatts of incremental renewable energy resources to achieve these standards. In addition, providing reliable electric supply that is increasingly sourced from renewable energy will most likely require load serving entities to look beyond their immediate service territory to provide locational diversity of renewable generators. Renewable supply portfolios with greater locational diversity can hedge against localized weather conditions affecting their ability to provide reliable service to their customers and help achieve a more economic portfolio of supply resources. Existing and planned transmission pathways will enable the Project to deliver renewable energy to load serving entities in many of the western states listed above.

The proposed Project location was selected based on the quality of the wind resource in the area, the power markets accessible by existing and planned transmission lines in the area, the availability of suitable land, and the absence of land use constraints such as wildlife management areas, areas of critical environmental concern ("ACECs"), designated wilderness areas, wilderness study areas ("WSAs"), roadless areas, and other restrictive land use designations. Due to its location in relative proximity to existing population centers and infrastructure, the proposed siting of the Project will minimize environmental impacts and demands on local municipal services. Further, the Project will enhance the local economy by creating employment opportunities, tax revenues, and support of local businesses. Wind energy projects such as the proposed Project also help displace fossil-fuel electric generation with clean, renewable power, which reduces overall greenhouse gas (GHG) emissions.

1.3 General Facility Description, Design, and Operation

1.3.1 Project Location, Land Ownership, and Jurisdiction

The Project will be located primarily on public lands managed by the BLM Shoshone Field Office within the Idaho counties of Jerome, Lincoln, and Minidoka. Relative to the surrounding communities, the general area for development is on open range land east of Shoshone, north of Eden and Hazelton, and west of Minidoka. Dietrich is the closest community to the development area. Siting of wind turbine strings will concentrate in the higher elevation lands associated with several buttes in the Project area, with arrays of wind turbines located on mid-elevation lands between the buttes. The prominent buttes on the landscape within the development area include Wilson Butte, Cinder Butte, Owinza Butte, Sid Butte, and Kimama Butte.

The vast majority of Project features will be located on BLM managed lands. Several State of Idaho owned parcels are also present within the Project area and would provide opportunities to locate additional wind turbines, collector and transmission lines, and potentially other ancillary features. Tracts of privately owned parcels are adjacent to and interspersed within the development area. MVE may approach select private landowners where efficiencies in design may be realized by locating wind turbines or other Project features on those parcels.

1.3.2 Legal Land Description of Facility

A detailed legal land description of the Project area can be found in Appendix B: Legal Description.

1.3.3 Total Acreage and General Dimensions

Table 1-1 provides a summary of the anticipated project components and associated disturbance acreages. Table 1-2 provides additional details related to each Project component such as quantity, length, and further details on disturbance (e.g., anticipated road widths). These additional details can generally be found elsewhere in the POD as well. For example, Appendix J: Road Design, Traffic, and Transportation Plan provides a description of the different types of roads and details pertaining to each road type.

Table 1-1: Summary of Project Components and Disturbance Acreages

Project Component	Infrastructure Disturbance[1] (acres)	Work Area Disturbance[2] (acres)
Wind Turbines	319	2545
34.5 kV Collector System	253	494
230 kV Transmission System	116	222
500 kV Transmission System	74	157
Access Roads	826	1431
Crane Paths	0	284
Substations	101	26
Battery Energy Storage System	40	5
O&M Facilities	46	12
Staging Yards and Batch Plants	0	106
ADLS	1	8
Meteorological Towers	5	27
Range Improvements	2	199
TOTAL	**1783**	**5516**

[1] Infrastructure disturbance is expected to only undergo final reclamation at the end of decommissioning as described in Appendix E: Reclamation Plan. Infrastructure disturbance includes the footprint of the Project component and the area needed to support O&M activities.

[2] Work area disturbance is the additional disturbance needed to construct and decommission the Project. Work area disturbance will be reclaimed after construction. However, work area disturbance may be disturbed again after construction during the operations phase to accommodate larger equipment needed for certain O&M activities. For example, an intersection may be improved for construction in order to transport a turbine blade to the turbine pad. After construction, this intersection would be reclaimed down to a reasonable size for most operations activities. However, if a turbine blade needed to be replaced during operations, the reclaimed part of that intersection would need to be disturbed again to allow for transport of the blade and crane. Once the blade replacement is complete, the intersection would be reclaimed again.

Table 1-2: Additional Project Component Disturbance Details

Project Component	Quantity	Length (miles)	Infrastructure Disturbance	Work Area Disturbance[3]
Wind Turbines	400	N/A	0.80 acres per turbine	6.36 acres per turbine
34.5 kV Collector System				
Aerial Lines	Approximately 18 structures per mile	192	0.01 acres per structure	0.05 acres per structure
Buried Lines	N/A	56	0	Approximately 25-30 ft. wide during installation
Access	N/A	192	10 ft. wide	4 ft. of width
230 kV Transmission System				
Aerial Lines	Approximately 9 structures per mile	34	0.06 acres per structure	0.46 acres per structure
Access	N/A	51	16 ft. wide	8 ft. of width
500 kV Transmission System				
Aerial Lines	Approximately 6 structures per mile	19	0.23 acres per structure	0.92 acres per structure
Access	N/A	25	16 ft. wide	8 ft. of width
Main Access Roads				
New Roads	N/A	170	24 ft. wide	26 ft. of width
Existing Roads to be Used and/or Improved	N/A	148	24 ft. wide	26 ft. of width
Crane Paths	N/A	47	0	50 ft. wide
Substations				
Collector Substations	5	N/A	10 acres per substation	3.2 acres per substation
230/500kV Substation	1	N/A	25.5 acres	5 acres
Interconnection Substation	1	N/A	25.5 acres	5 acres
Battery Energy Storage System	1	N/A	40 acres	5 acres
O&M Facilities	3	N/A	46 acres total	12 acres total
Staging Yards and Batch Plants	7	N/A	0	106 acres total
ADLS	4	N/A	0.25 acres per ADLS	2 acres per ADLS
Meteorological ("met") Towers[4]				
Permanent Power Performance Met Towers	5	N/A	1 acre per met tower	1.76 acres per met tower
Power Performance Met Towers	7	N/A	0	2.6 acres per met tower
Calibration Met Towers[5]	12	N/A	0	0
Groundwater Wells	6	N/A	0.10 acres per well	0.25 acres per well
Range Improvements				
Temporary Fence[6]	N/A	395	0	8 ft. of width
Trough Sites	65	N/A	0.02 acres per trough site	1 acre per trough site
Pipeline	N/A	51	0	6 ft. wide

[3] The work area dimensions and disturbance per component represent the additional area needed during construction, certain O&M activities, and decommissioning.
[4] See Section 3.2 for additional details on the different types of met towers anticipated for the Project.
[5] As described in Section 3.2, the calibration met towers are anticipated to be placed at turbine locations and removed prior to the associated turbine installation. The footprint of the calibration met towers should be within the disturbance area of the associated turbine and, as a result, MVE does not anticipate that the calibration towers will contribute disturbance in excess of what is already included for the wind turbines.
[6] A portion of the temporary fence will be installed in areas where Work Area disturbance already occurs due to activities related to other Project components. As a result, it is anticipated that only a portion of the temporary fence mileage will contribute additional disturbance beyond what is included for the other Project features.

1.3.4 Number and Size of Wind Turbines

Several factors influence the number and size of wind turbines for any given project and make it impractical to identify with certainty the exact characteristics of the turbine during the early development stage. Manufacturers' advancement in turbine technology during the wind project development period can offer opportunities to deploy more efficient models that are better suited to the Project area's wind resource. Ultimately, the selection of a specific turbine model is an iterative process that considers the wind resource, siting constraints, mitigation requirements, and the timing of a specific turbine's availability in relation to the construction schedule. While the specific turbine model and its associated size characteristics will not be known until late in the development phase, MVE is able to define the anticipated range of potential wind turbine units that may be sited within the Project including the number of units as well as a range of key sizing characteristics.

A wind turbine typically consists of three main components: the nacelle, tower, and rotor blades. The nacelle houses the generator, gearbox, and (in some cases) the transformer while supporting the rotor and blades at the hub. The turbine tower supports and provides access to the nacelle. Lightning protection is included in modern wind turbine design with the details of the design varying by manufacturer. Typically, there is a lightning rod on the nacelle and lightning receptors in the blades that are designed to handle lightning strikes.

MVE expects the turbine hub will be between 260 and 460 feet above the ground, depending on the turbine model selected. The turbine blades would extend between 130 and 280 feet from the hub, meaning a rotor diameter between 260 and 560 feet and a rotor "swept area" between 53,100 and 246,400 square feet. When a blade is in-line with the tower, the maximum height will be between 390 and 740 feet. Refer to Figure 1-1 for a drawing showing these typical wind turbine sizes.

Table 1-3: Minimum and Maximum Turbine Characteristics

Characteristic	Minimum	Maximum
Hub Height (ft.)	260	460
Rotor Diameter (ft.)	260	560
Rotor Swept Area (sq. ft.)	53,100	246,400
Total Height (ft.)	390	740

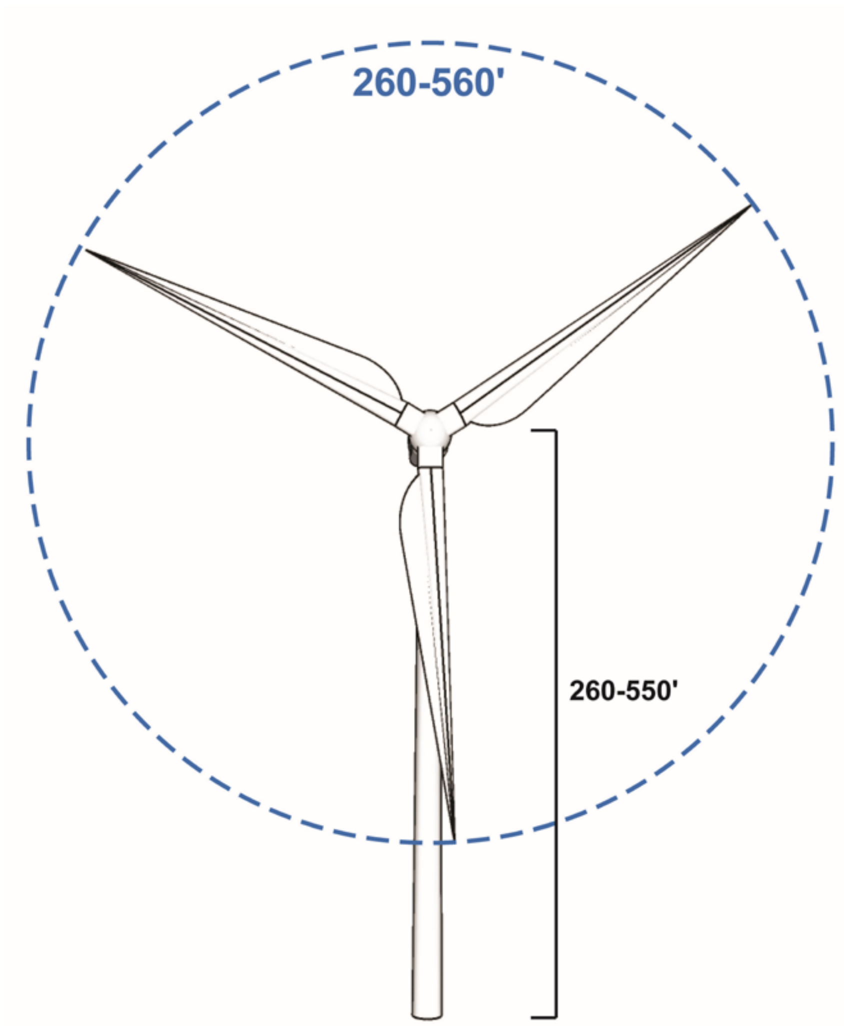


Figure 1-1: Typical Wind Turbine Sizes

The generating capacity of a specific turbine often closely correlates with its size. Turbine models with a relatively higher generating capacity tend to be taller with larger rotor swept areas. To achieve the intended overall Project generating capacity, a larger number of smaller individual turbines may deployed, or a smaller number of larger turbines may be deployed, or a mix of small and large turbines may be deployed based on turbine selection factors mentioned above.

MVE is proposing up to 400 total wind turbine generators for the Project. The total generating capacity of the Project would then depend on the individual capacity ratings of the turbine models selected for the Project. As an example, if a turbine model with a 3-megawatt (MW) generating capacity is determined to be best suited for the Project, constructing 400 of those individual turbines would equate to a 1,200 MW project. If a turbine model with a 4 MW generating capacity is ideal for the Project, 400 of those individual turbines would equate to a 1,600 MW project. As siting constraints, turbine technology and availability, and other factors listed above become refined during the development phase, MVE will be able to narrow the options for ultimate deployment.

1.3.5 Wind Turbine Configuration and Layout

MVE is proposing up to 400 individual turbines across the Project area to achieve the desired capacity of the Project. The turbines will be situated in rows (referred to as a “string” or “array” of turbines) that are expected to generally be in a north-south orientation based on the local prevailing wind direction. The separation between individual turbines within a given string and the distance between the strings themselves will be dependent on the size of turbine selected and other siting considerations. A preliminary turbine configuration and layout within the Project area is provided in Figure 6-1. This preliminary layout only considers placement of turbines on BLM managed and State lands. Turbine locations on neighboring private lands may be considered if mutually agreed to with the property owners.

The preliminary turbine locations have been proposed within siting corridors to allow for the flexibility to microsite individual turbines based on site-specific engineering or resource constraints. As shown on Figures 6-1 and 6-2, MVE has identified two types of corridors – “Combined Corridors” and “BOP Corridors”. The Combined Corridors designate areas where MVE will place turbines as well as supporting infrastructure (such as roads, t-line, collector, O&M facilities, etc.). The BOP Corridors designate areas where MVE will not place turbines, but will place supporting infrastructure for the Project. MVE has identified alternate turbine areas within the Combined Corridors to accommodate the relocation of turbines from the proposed turbine locations, at MVE’s discretion. Should MVE identify an engineering issue within the proposed turbine locations, or determine that relocating proposed turbines to alternate turbine areas will increase project efficiency, MVE may elect to make that adjustment. Access roads and collector systems in alternate turbine areas would only be utilized should there be a relocation of turbines to the associated alternate area. In most cases, this would translate to a reduction in access roads and collector lines from the Project corridor where turbines were removed. These siting corridors are represented in Figures 6-1 and 6-2.

The location of turbines and supporting infrastructure as shown in Figures 6-1 and 6-2 are preliminary and will likely move within the Combined and BOP Corridors as the development timeline progresses. Final placement of the Project components will be informed by environmental constraints and site-specific engineering considerations including, but not limited to, geotechnical, topographic, and wind resource properties. MVE will continue to use information gathered via surveys, site visits, and desktop analysis to support interim Project layouts. See Section 2.2 for more information related to additional geotechnical studies to support design.

1.3.6 Substations and Transmission Lines

<u>Collector Lines:</u> Each wind turbine will be connected to a system of overhead or underground electrical collector lines, typically designed to operate at 34.5 kV. Individual collector lines will run from turbine site to turbine site, and after connecting the optimum number of generators the line will proceed to a collector substation. The structures of the collector lines may be wood, steel, or concrete poles that are 60 – 90 feet tall and spaced 300 – 350 feet apart, depending on terrain.

Refer to Figure 1-2 for dimensions of a typical collector line and Figure 1-3 and Figure 1-4 for photos of a typical collector line. Preliminary routes of these collector lines are provided in Figure 6-1.

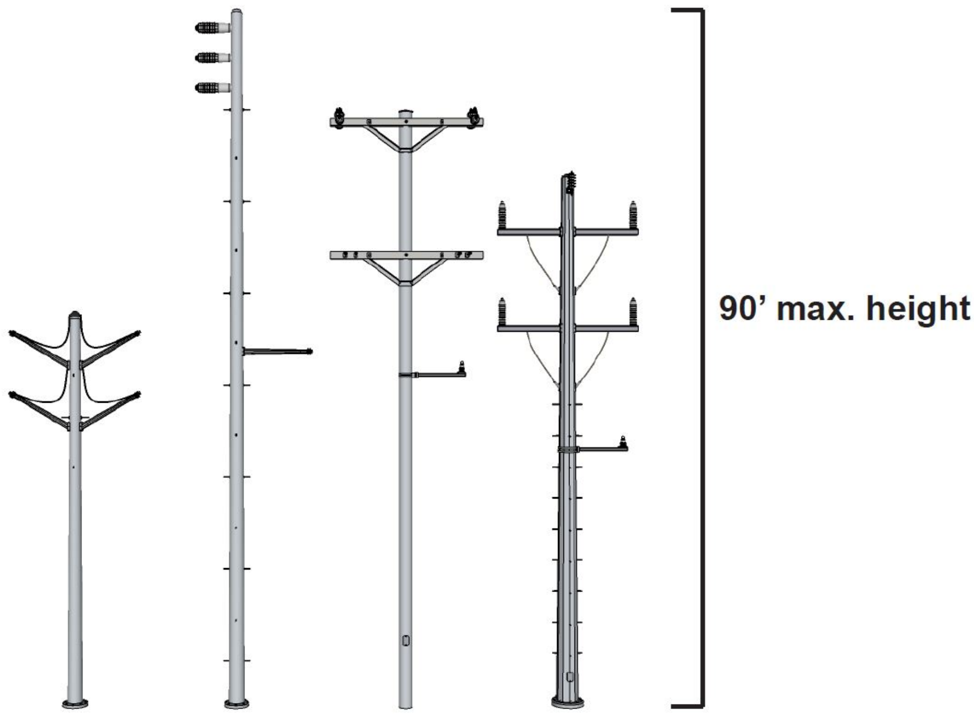


Figure 1-2: Typical Distribution Line Dimensions (Collector Line)

Figure 1-3: Typical Collector Line Structure

Figure 1-4: Typical Collector Lines

Junction Boxes: For long runs of underground cable, it will be beneficial to utilize a junction box in order to join segments together for a single circuit. Junction boxes are utilized to allow for ease of operations and maintenance in the event of a failure, and to allow for proper acceptance testing during installation. Junction boxes are typically located alongside an access road to allow for easy access. Similarly, at points in the underground portion of the collection system where the circuit needs to “branch” off in different directions to connect turbines, a three-way or four-way junction box is utilized to allow for efficient use of underground cable while lessening the overall disturbance.

Collector Substations: Up to five (5) 34.5 /230 kV collector substations, will be located throughout the Project area to aggregate individual collector lines from turbine strings in the vicinity and increase the voltage to 230 kV. The collector substations will include electrical equipment such as transformers, medium-voltage and high-voltage circuit breakers, capacitor banks, electrical bus work, meters, disconnect switches and an electrical control house. Lightning arresters, overhead shield wires, and lightning masts will be installed in the substation to protect against over-voltages caused by lightning strikes. While final engineering will determine the exact components and placement within the substation, it is likely that that highest structure will not exceed 75 feet in height. Instrument transformers, relays, and a communication network will be used to detect, isolate and clear electrical faults to ensure the safety of equipment, personnel, and the public. Protective relaying will meet Institute of Electrical and Electronic Engineers (IEEE) requirements and will be coordinated with grid protection to ensure system reliability and safety is maintained. Temporary warning fences or barricades (consisting of warning tape, barricades, plastic mesh, and/or warning signs) may be used during construction of substations with chain-link fence to be installed for the O&M phase.

Due to the size of the Project, the final design may utilize different size substations. For example, a large cluster of turbines may connect to a larger three-transformer substation, where a smaller cluster of turbines would connect to a smaller single-transformer substation. However, in order to minimize overall disturbance and provide a more efficient electrical design, MVE may elect to build multiple medium-sized substations as opposed to a single large substation in each area. See Figure 1-5 below for an example collector substation.

Figure 1-5: Example Collector Substation

230 kV Transmission Lines: A series of 230 kV overhead transmission lines will connect the collector substations to one larger substation where the voltage will be increased to 500 kV. The 230 kV transmission lines will parallel existing facilities and infrastructure to the extent practical in an effort to consolidate utility lines across the landscape. If lines cannot be co-located due to site limitations or engineering considerations, the most direct alignment will be prioritized to reduce unnecessary tall structures. In addition, support infrastructure will be limited in height so as to only be as tall as necessary. The 230 kV transmission lines may utilize single or double circuit lattice, H-Frame, or tubular monopole type structures that are comprised of angular steel, tubular steel, corten steel, concrete, wood, or a hybrid. The structure heights may range from 70 to 130 feet, and the average structure span may range from 400 to 1,000 feet. Examples of typical structure types and dimensions are provided in Figure 1-6 and Figure 1-7. The selection of specific tower type, height, and placement will be determined during the final design of the Project, taking into account any physical constraints, results of electrical studies, National Electric Safety Code Standards, and applicable environmental factors.

Access roads for the 230 kV transmission lines will be needed for the Project. Roads exclusive to the 230 kV transmission segments will typically be 24 feet wide during the construction phase, and reclaimed down to a 16-foot permanent width for access during the O&M phase. Road aprons at intersections or side-slope locations may require increases to these road widths. Road base or aggregate would only be placed if necessary on these roads. More information on roads can be found in Appendix J.

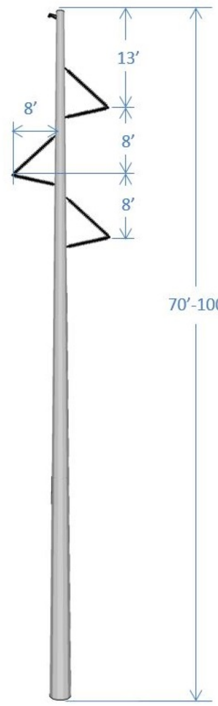


Figure 1-6: Typical 230 kV Monopole Structure

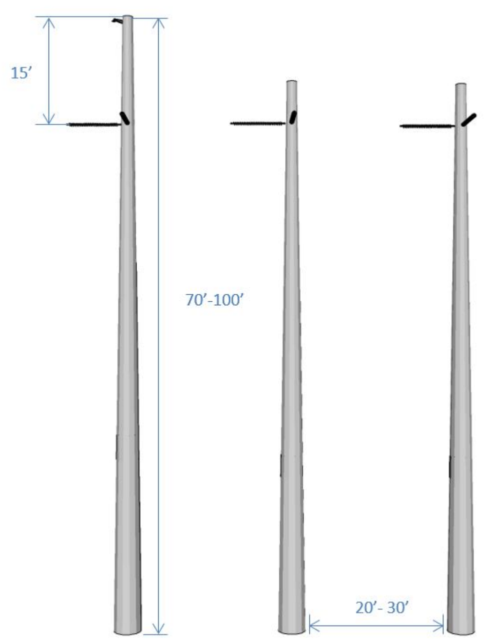


Figure 1-7: Typical 230 kV Monopole Angle Structure

The 230 kV transmission lines may be supported by concrete foundations, pre-cast concrete footings, direct-embedded structure segments, and may require the use of guy cables that are anchored to the ground. Where guy wires are used, appropriate guy guards would be installed at the base of the guy wires. The structures will support three (3) phases of conductor per circuit, spaced 10 to 20 feet apart depending on structure type. Insulators and associated hardware will be used to position and support the conductor while maintaining electrical design clearances between the conductors and the structure. The structures will also support two (2) overhead ground wires at the top of the structures to protect the system from lightning strikes. One of the overhead ground wires may incorporate a fiber optic component that could be used for voice and data communication, protective relay telemetering, and for supervisory control and data acquisition.

230/500 kV Substation: The Project will include a single 230/500 kV substation that will aggregate the 230 kV transmission lines from the collector substations and increase the voltage to 500 kV. Similar to the collector substations, the 230/500 kV substation will include equipment such as transformers, high-voltage circuit breakers, capacitor banks, electrical bus work, meters, disconnect switches and an electrical control house. Lightning arrestors, overhead shield wires, and lightning masts will be installed in the substation to protect against over-voltages caused by lightning strikes. Instrument transformers, relays, and a communication network will be used to detect, isolate and clear electrical faults to ensure the safety of equipment, personnel, and the public. Protective relaying will meet Institute of Electrical and Electronic Engineers (IEEE) requirements and will be coordinated with grid protection to ensure system reliability and safety is maintained. Refer to Figure 6-1 for the preliminary location of the 230/500 kV substation, and Figure 1-8 for a schematic drawing of typical substation components.

Typically, substations will have battery backups for redundancy of protection systems. However, diesel or propane backup generators may be required at substations. Backup generators are only intended to run during unplanned outage scenarios and predetermined operation cycles to confirm proper function. These occurrences are anticipated to be infrequent, short-duration activities with minimal noise impacts. Temporary warning fences or barricades (consisting of warning tape, barricades, plastic mesh, and/or warning signs) may be used during construction of substations with chain-link fence to be installed for the O&M phase.

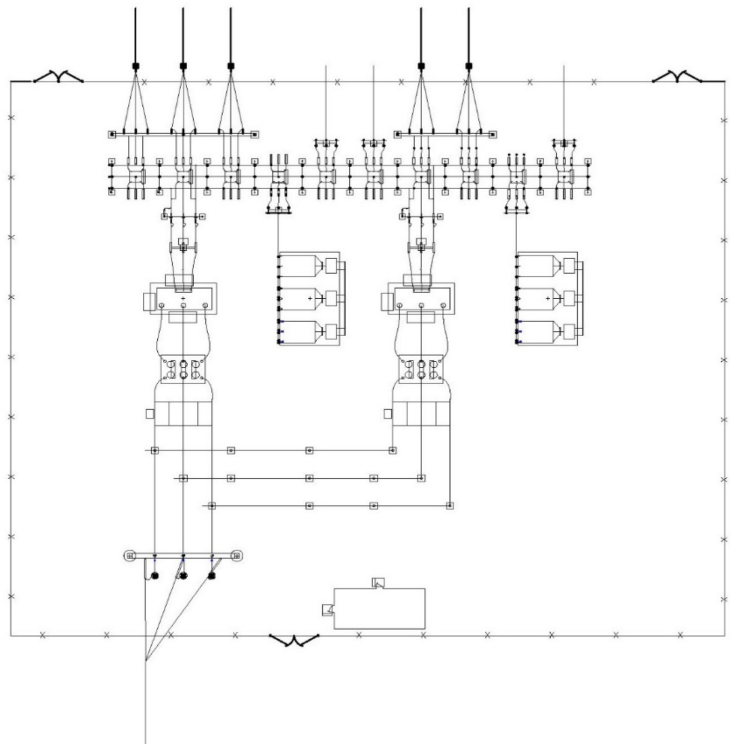


Figure 1-8: Typical Substation Layout

<u>500 kV transmission line:</u> An overhead 500 kV transmission line will connect the 230/500 kV substation to the Project's point of interconnection at Midpoint Substation or an alternative location along the SWIP-North alignment. The 500 kV transmission line will parallel existing facilities and infrastructure to the extent practical in an effort to consolidate utility lines across the landscape. If lines cannot be co-located due to site limitations or engineering considerations, the most direct alignment will be prioritized to reduce unnecessary tall structures. In addition, support infrastructure will be limited in height so as to only be as tall as necessary. Several types of transmission structures may be used for the 500 kV transmission line. The towers may be tubular steel guyed-V, lattice steel guyed-V, and self-supporting steel lattice, poles, and H-frame structures. The structures will be made of unpainted galvanized or Corten steel. The proposed tower configurations and typical heights are illustrated in Figures 1-9 through 1-14. Tower-to-tower span lengths will be dependent upon terrain and siting obstacles within or near the ROW, and will typically be 1,000 to 1,600 feet. The selection of specific tower type, height, and placement will be determined during the final design of the Project, taking into account any physical constraints, results of electrical studies, National Electric Safety Code Standards, and applicable environmental factors. Depending on final location of the transmission structures, it is expected that more than one type of transmission structure described in this section will be used to support the Project. For example, the tubular guyed-v structure (Figure 1-10) may be used for structures in a relatively straight line, while the tubular angle/crossing structure (Figure 1-13) may be used when the alignment needs to change direction by a certain number of degrees. There are many factors that

determines the best design for each structure location (physical constraints, environmental constraints, etc. as described above), thus the final design of the structures cannot be chosen until all factors are known and placement of the structures are final.

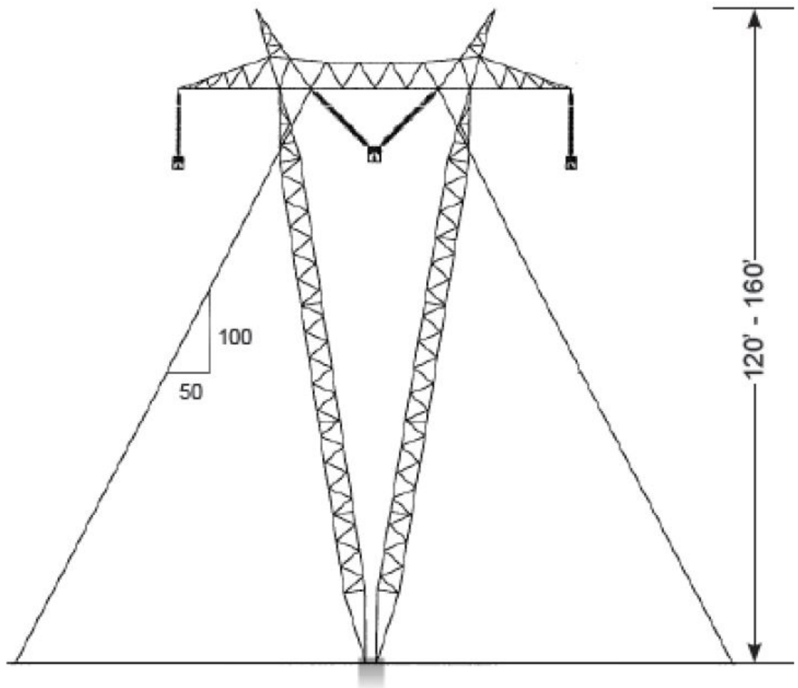


Figure 1-9: Typical Lattice Guyed V Tangent Tower

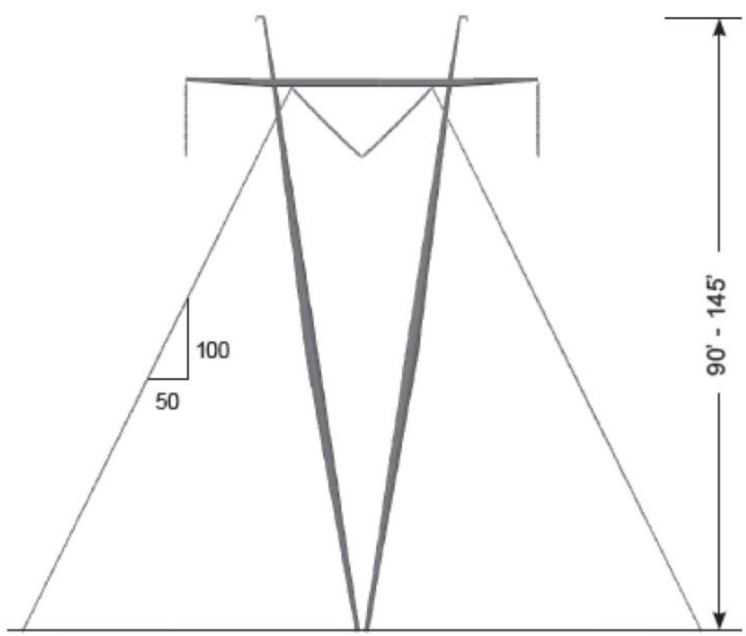


Figure 1-10: Typical Tubular Guyed V Tangent Tower

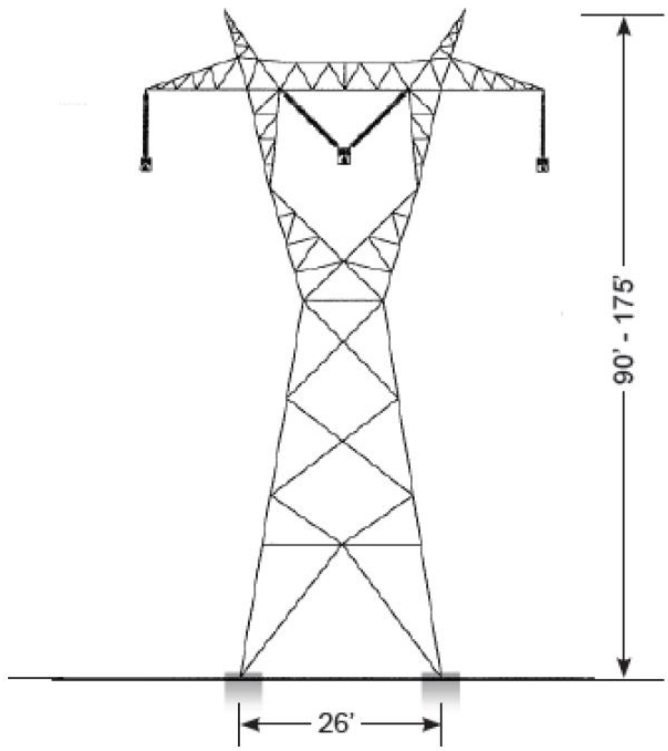


Figure 1-11: Typical Single Circuit Lattice Self-Supporting Tower

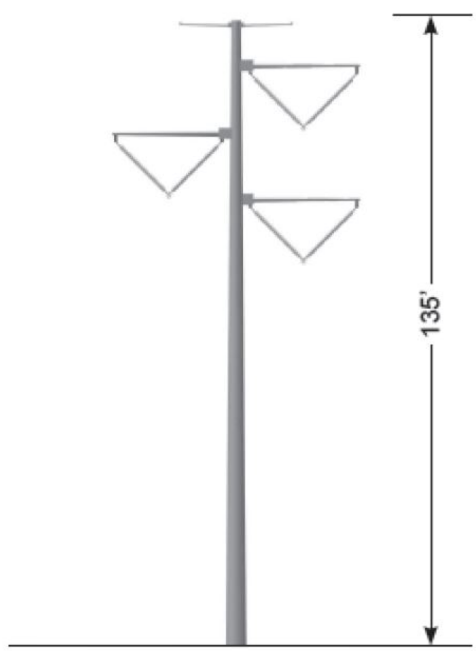


Figure 1-12: Typical Single Circuit Monopole Self-Supporting Tower

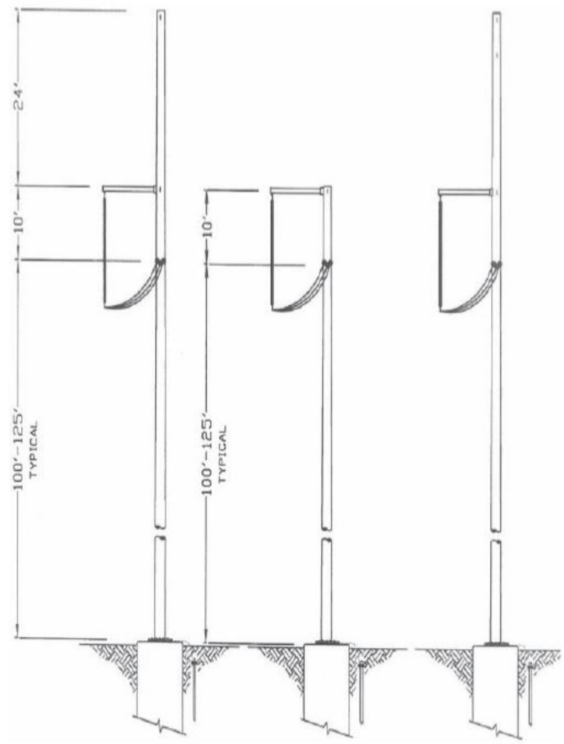


Figure 1-13: Typical Self-Supporting Tubular Angle/Crossing Tower

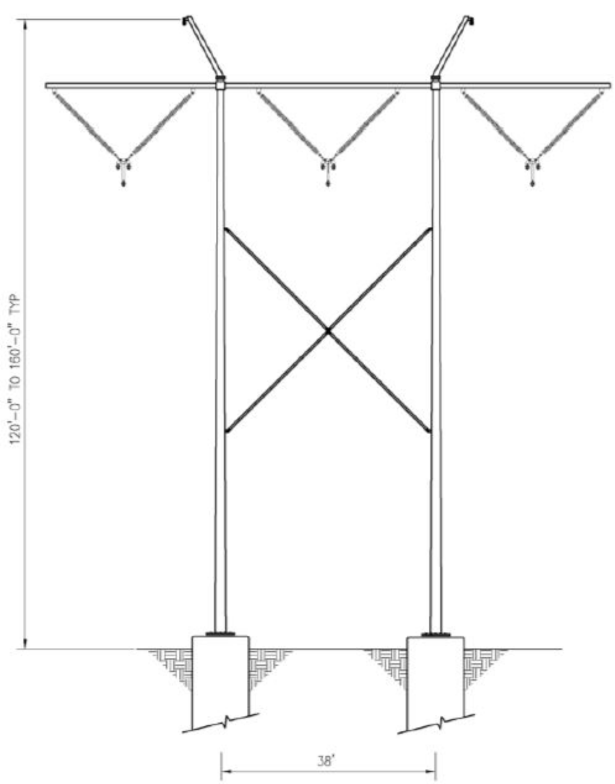


Figure 1-14: Typical Single Circuit H-Frame Tower

Guyed-V transmission structures will either be tubular or lattice steel with four supporting guy anchors. The foundation for the guyed-V structures will be precast spread footings or concrete drilled piers. The precast footings will be approximately 6.5 feet square and 4.75 feet deep. The concrete drilled piers will be approximately 4 feet in diameter and range from 8 to 30 feet in depth. Each guy anchor will be a grouted earth anchor, with a diameter of less than a foot and ranging in depth from 10 to 60 feet. The grout used with the anchors is similar to concrete. Guy anchors may alternatively consist of concrete drilled piers that are approximately 2 – 4 feet in diameter and 8 to 20 feet in depth

Self-supporting steel-lattice transmission structures will require four footings. The foundations for the steel-lattice towers will be cast-in-place concrete approximately 3 to 5 feet in diameter with a 15- to 20-foot depth.

Self-supporting steel pole transmission structures (three single poles for turning structures, as illustrated on Figure 1-7) have three poles and require one footing for each pole. H-frame structures (as illustrated on Figure 1-14) require two footings. Self-supporting tubular-steel structures will be installed on a single pier with anchor-bolt foundations or directly imbedded into the foundation. Foundations for these structures will typically be 6 to 10 feet in diameter and 25 to 55 feet in depth.

The conductor for the 500 kV circuit would consist of three phases, with a three-conductor bundle for each phase. Spacing between subconductors in a bundle would be approximately 18 inches. Aluminum-trapezoidal or aluminum-stranded nonspecular conductors with a steel-stranded reinforced core would be used. The aluminum carries the majority of the electrical current, and the steel provides tensile strength to support the aluminum strands. Minimum conductor height above the ground for the 500 kV lines would be 31 feet at 212 degrees Fahrenheit in accordance with the National Electric Safety Code ("NESC"). The exact height of each tower would be governed by topography and safety requirements for conductor clearance. Alternate materials or designs may be selected to optimize efficiency, reliability, and/or economics.

Three assemblies of insulators in the form of a "V" or "I" would be used to position and support each of the conductor bundles, while maintaining electrical design clearances between the conductors and the tower. Typically, "V" form insulators will be used for typical 500 kV tangent tower structures, while "I" form insulators will be used for 500 kV dead-end tower structures. Some towers may use a combination of both insulator forms.

To protect the 500 kV transmission line from direct lightning strikes, two overhead ground wires, approximately ½-inch in diameter, would be installed on the top of the structures. It is likely that a fiber optic line will be integrated with one of these overhead ground wires. Current from lightning strikes would be transferred through the ground wires and structures into the ground.

Ground rods will be installed next to the structure foundations to prevent a lightning strike from damaging the overhead conductors. After the ground rods have been installed, the grounding will be tested to determine the resistance to ground. If the measurements indicate a high resistance, counterpoise will be installed, which will consist of trenching in-ground wire with a ground rod driven at the end. The counterpoise will be contained within the limits of the transmission line or adjacent access road right-of-way, and may be altered or doubled back-and-forth to meet the requirements of the Project.

Access roads for the 500 kV transmission lines will be needed for the Project. Roads exclusive to the 500 kV transmission segments will typically be 24 feet wide during the construction phase, and reclaimed down to a 16-foot permanent width for access during the O&M phase. Road aprons at intersections or side-slope locations may require increases to these road widths. Road base or aggregate would only be placed if necessary on these roads. More information on roads can be found in Appendix J.

<u>Interconnecting Substation:</u> The 500 kV transmission line will interconnect with the existing Midpoint Substation operated by Idaho Power Company or an alternative new substation located along the SWIP-North alignment. The interconnection of the Project to the existing substation will require the addition of facilities such as addition of circuit breakers, busing, motor operated disconnect switches, additional relay panels in the existing control enclosures, various auxiliary substation equipment, and other electrical equipment. The scope of the additional equipment required for interconnection will be determined through electrical system impact and facilities studies. Interconnection of the Project to an alternative new substation along the SWIP-North alignment would require the construction of a facility similar to the 230/500 kV substation depicted in Figure 1-8, minus the voltage transformers.

<u>Battery Energy Storage System:</u> MVE is proposing to incorporate a battery energy storage system adjacent to an onsite project substation. The storage system will consist of racks of electrochemical batteries in a warehouse type building (resembling a data center; approximately 30 feet tall) or a series of containers which individually house batteries, AC/DC power conversion and electrical control equipment, electrical distribution and transmission facilities, communications equipment, operations and maintenance facilities, and other ancillary facilities. These facilities would encumber approximately up to 40 acres total. The capacity of the battery energy storage system will be determined in the final design phase, once a specific turbine is selected and commercial contracts for Project power are finalized. Forty acres will support the deployment of a battery energy storage system with thousands of megawatt-hours of storage potential.

1.3.7 Ancillary Facilities, and Buildings

<u>Communication Facilities:</u> A high-speed communication system is required for operation of the wind turbines, substations, transmission lines, battery energy storage system, and other Project facilities. Fiber optic lines will provide the primary communication pathway throughout the Project, and will most often be incorporated into the design of the collector and transmission lines. These communication pathways will be used for voice and data communication, protective relay telemetering, and supervisory control and data acquisition. While MVE is not seeking to conduct or lease commercial telecommunication services at this time, the system will be designed to

accommodate such requests. A redundant communications method may also be employed using microwave systems.

Operations and Maintenance (O&M) Buildings: The Project will include one or more O&M buildings to serve as office space, operations center, storage areas, and maintenance shops/warehouses. The office portion of the building will house facility staff and include facilities common to a business office such as a conference room, offices, break room, and restrooms. A control room, where facility staff monitor and control operation of the facility will also be located in this building. The facilities will also include maintenance shops and warehouses where staff can bring equipment for testing, repairs or maintenance.

Common ancillary features for the O&M facilities include staff parking areas, O&M yards, distribution power source, potable water source such as an onsite well or water line to an existing water source, septic system, and communication facilities. O&M staff necessary to operate the Project typically access the O&M facilities daily. Additional information can be found in Section 4.3.

Intermodal Yard: Given the proximity of the Union Pacific rail line to the Project area, efficiencies in turbine component delivery could be realized by transporting these parts to the Project via rail. A number of existing railroad sidings on private land in the Project vicinity are being explored for use as intermodal yards. Components would be delivered by rail to the intermodal yard and transferred to semi-trailers to complete the delivery to a construction staging yard or individual work area.

Meteorological Towers: Multiple permanent meteorological towers will be placed in the Project area to monitor the weather conditions and inform efficient operation of the wind turbines. Temporary meteorological towers may also be deployed for a limited time period during construction of the Project and for a short time period after operations begins in order to assess the performance of the wind turbines. Additional information can be found in Section 3.2.

1.3.8 Lighting

Wind Turbine Lighting: The Project will be permitted as necessary through the Federal Aviation Administration ("FAA"). Because the turbines would exceed heights of 200 feet above ground level, the turbines would be marked or lighted per FAA guidelines and an approved lighting plan. This will likely entail placing red lights on the nacelle of selected turbines to adequately warn aircraft pilots of the obstructions at night. Internal turbine lighting, such as within the nacelle and tower, will be extinguished when unoccupied unless there are regulations, requirements from the equipment manufacturer, O&M considerations, or safety concerns that require a portion or all of the internal lights to be on.

FAA night-time lighting requirements include the use of red, simultaneously flashing lights positioned on the outer perimeter of the wind turbine farm, each spaced no more than 0.5 mile from each other (FAA 2020). The FAA determines which turbines would require nighttime lights, but it is anticipated that about half of the turbines would be marked by red lights, particularly the turbines closest to the Project boundary or on high terrain.

The intensity of the nighttime flashing red lights is approximately 2,000 candelas (a measure of the intensity of light—roughly equivalent to a 1,666-watt bulb) and they flash about 22 times per minute with a flash duration between 100 and 2000 milliseconds. The lighting would be similar in appearance to a series of cell phone towers. The lights are designed to flash in unison and to concentrate the beam in the horizontal plane, thus minimizing light diffusion down to the ground.

MVE is investigating the ability to deploy an aircraft detection lighting system (“ADLS”) to mitigate the need for continuous operation of the red flashing lights during night-time hours. An ADLS system is comprised of one or more elevated radars that scan the region proximate to the Project area for aircraft, and only activate the red flashing lights on the turbines when an aircraft is detected within a specified distance. These systems must be approved by the FAA for deployment at a given wind facility. For the Project area, MVE anticipates up to four ADLS radar installations will be sufficient to provide coverage of the detection area proximate to the Project. The final number of ADLS stations and associated heights of the towers will be selected when an equipment provider is chosen and detailed engineering is performed to identify what is needed to cover the Project site.

Ancillary Facility Lighting: Ancillary structures will be designed in a manner that minimizes the need for and amount of lighting where possible. Lighting design would conform to National Electric Safety Code (“NESC”) requirements and other applicable lighting codes. Lighting at both the operation and maintenance facilities and substations located within half a mile of turbines will include at a minimum (these design features will be implemented to the extent that they align with NESC requirements and other applicable lighting codes to ensure safe and efficient operation of the Project):

- Lights with motion sensors, heat sensors, or manual switches will be utilized to keep lights off when not required. Where manual switches are utilized, Project personnel will be instructed to turn the lights off when lighting is not needed that area.
- Outdoor facility lighting will be designed with light caps and/or directed downward to minimize offsite glare.
- The use of high intensity lighting, steady-burning, or bright lights such as sodium vapor, quartz, halogen, or other bright spotlights will be minimized.

1.3.9 Roads and Parking Areas

The Project area is located in close proximity to several primary federal roadways including Interstate 84, US Highway 93, and Idaho State Route 24. Interstate 84 runs east/west just south of the Project area while US Highway 93 runs north/south along the western edge. In addition, Idaho State Route 24 bisects the Project area and offers a direct pathway to possible Project access roads and associated equipment and buildings. Existing roads will be necessary to transport Project components, workers, vehicles, and equipment. It is likely that MVE will need to make improvements to the existing roads to accommodate Project activity.

Main access roads, turbine and infrastructure access roads, and other roads/paths, such as cross-country crane paths, will be established to support the Project. The dimensions and design of any given road will depend on what the purpose of the road is – see Appendix J: Road Design, Traffic, and Transportation Plan for further detail on the anticipated road types, associated dimensions, and preliminary design.

MVE will obtain all necessary permits and approvals prior to improving existing roads and building new roads. All existing public roads that are used or improved by MVE during the course of construction will be left in a condition that is as good as or better than their condition when the construction period begins. See the attached Appendix J: Road Design, Traffic, and Transportation Plan for further details on access roads, traffic generation estimates, and additional information related to traffic and transportation.

1.3.10 Temporary Construction Workspace, Yards, and Staging Areas

Secure laydown and construction staging areas (up to 50 acres per area) will be established in the vicinity of the Project area as necessary to support construction logistics and activities. These areas will be used to receive and stage Project components and construction equipment, and serve as an assembling location for construction workers. The areas will include temporary construction offices and support facilities such as a portable toilet trailer and a portable amenities trailer. These temporary construction areas may also serve as the location of mobile concrete batch plants.

The location of the proposed staging areas will be strategically selected in an effort to avoid environmentally and culturally sensitive areas. Previously developed sites on non-federal lands in the Project vicinity may be considered as well. The temporary construction areas will be established in areas that are relatively flat and close to a primary access point for the Project. This would provide efficient access for materials and equipment being delivered to the staging area and disbursement to the active work sites.

1.3.11 Water Usage, Amounts, and Sources

Water will be needed for dust control, batching water for concrete production, and other washing needs (such as washing trucks, hydrating aggregate, etc.).

MVE estimates for civil scopes – including hydration/compaction, backfill, cement stabilization, and dust control – that around 60-90 million gallons of water will be required. In addition to the civil scopes, MVE expects to use approximately 36 gallons of water per yard of concrete that is batched for the wind turbine foundations. This equates to approximately 21,600 gallons of water per wind turbine foundation. The actual amount of water utilized during construction will depend on final design. With the water needed for civil scopes and batching concrete, MVE anticipates approximately 98 million gallons of water will be needed to construct the Project. 98 million gallons converts to about 300 acre-feet of water. Assuming a 2-year construction timeline, the Project would use approximately 150 acre-feet of water annually for construction. This amount of water is roughly equivalent to the water required to irrigate 80 acres of farm ground. The water required to support construction activities will not add to the cumulative use of water in the region. The Project's water for construction will draw from previously permitted sources that are already allocated for use. MVE will be leasing water through the Water Supply Bank, acquiring existing water rights, or purchasing water from commercial sources. MVE may divert the leased or acquired water rights to the proposed new wells within the Project area in an effort to minimize the need to truck water into the Project area.

Once in operation, the Project will have minimal ongoing water requirements. MVE anticipates approximately 18 million gallons of water will be needed throughout the life of the Project, resulting in water usage that is below the de minimis threshold established under Idaho water law. The water needs for the Project are expected to be served through a combination of existing commercial sources and new groundwater wells. Up to six (6) new groundwater wells are anticipated to support construction activities, four (4) of which may remain active to support operation and maintenance of the Project. The new groundwater wells will be located within or in close proximity to the proposed laydown yards and O&M facilities. Water will be stored in onsite tanks or ponds in sufficient quantities to support usage rates during peak periods. The water features that are part of the Project will have bird ladders to minimize effects on migratory birds. Water quality will determine the need for associated water treatment equipment to support potable use during the operations phase.

Water may also be trucked into the Project area from commercial sources in the region. Potential sources include canal companies, adjacent landowners, municipalities, or other commercial sources.

During construction, mobile water tank stands, frac tanks, or similar water storage devices may be strategically deployed throughout the project area to support proximate construction activities. Above or below ground water lines may also be deployed adjacent to access roads to assist with the conveyance of water to strategic use points. Select locations of water storage tanks and water lines placed adjacent to roads may be maintained throughout the operations period to assist with ongoing road maintenance, provide water access points to serve as a resource for potential wildland fire suppression activities (refilling rangeland firetrucks or helicopter dip-tanks), and potentially offer value as a supplemental water source to mitigate potential impacts to public land grazing operations.

Water will also be required to support decommissioning of the Project if the ROW grant is not renewed. However, it is not possible to predict the amount of water that will be needed with certainty due to the length of time between initial operations of the Project and when decommissioning would occur. There are many unknown variables such as what the ecological setting and the standard protocols for decommissioning will be. With the currently available information and assuming standard decommissioning protocols of today, MVE estimates that approximately 13 million gallons of water will be needed for decommissioning.

1.3.12 Erosion Control and Stormwater Drainage

See the Stormwater Pollution Prevention Plan ("SWPPP") attached as Appendix D: Stormwater Pollution Prevention Plan to the POD.

1.3.13 Vegetation Treatment, Weed Management, and Any Proposed Use of Herbicides

See the Noxious Weed Management Plan attached as Appendix R: Noxious Weed Management Plan to the POD.

1.3.14 Waste and Hazardous Materials Management

See the Waste Management Plan within Appendix F: Health and Safety Plan of the POD.

1.3.15 Fire Protection

See the Fire Protection and Prevention Plan within Appendix F of the POD.

1.3.16 Site Security and Fencing

MVE will post safety and warning signs informing the public of construction activities where roads enter the Project area from a public road. During construction, general public access to active work zones will be monitored and controlled to prevent public access during such times when it would not be safe for public on-road or off-road use. If theft or vandalism becomes an issue during non-construction hours, a security guard will patrol the Project area to prevent or minimize the threat of those incidents.

Restricted access will be limited to short durations on access roads, or longer durations at discrete work areas. Examples of a short-term road access restriction includes during the transport of oversize loads, blasting activities, turbine erection activities near existing roads, and during the stringing of electrical conductor across or above roadways. Examples of longer duration access restrictions include work areas with open trenches or excavations, and laydown yards. These types of access restrictions will be coordinated with existing authorized right-holders within the Project area.

Gates to fenced areas, including the substations, select lay down yards, and O&M area, will be locked at night or during non-construction hours. Gates or cattle guards will be installed where openings are needed along range fences. Fences may be installed around laydown areas, areas deemed hazardous, or areas where security or theft are of concern and would be removed at the completion of the construction period. Temporary warning fences or barricades (e.g., electric fence, warning tape, barricades, plastic mesh, and/or warning signs) will be erected in areas where public safety risks could exist, when livestock would need to be kept out of active construction or interim reclamation areas, or where site personnel would not be available to control public access (e.g., excavated foundation holes, electrical collection system trenches, unfinished turbine bases). If the size of an excavation or hole presents a safety concern and will be left overnight, a covering or fence may be placed around it. Covers will be secured in place and will be strong enough to prevent livestock or wildlife from falling through and into the hole.

Project fences will only be installed as necessary. A chain-link fence will be installed around the Project O&M facilities and substations for safety. In instances where permanent fences are meant to be a barrier only to livestock or vehicles, wildlife friendly fencing will be used. In other instances security fencing will be used as necessary to protect MVE property (e.g., O&M buildings, substations) or prevent injury to non-MVE personnel, livestock, and wildlife. In addition, turbine tower access doors will be locked to limit public access during operations.

1.3.17 Spill Prevention and Containment

See the Spill Prevention, Containment, and Control Plan ("SPCC") attached as Appendix G: Spill Prevention, Containment, and Control Plan to the POD.

1.4 Alternatives Considered by Applicant

See Alternatives Considered attached as Appendix C: Alternatives Considered by MVE to the POD.

1.5 Other Federal, State, and Local Agency Permit Requirements

Table 1-4: Federal, State, and Local Permits

Action Requiring Permit, Approval, or Review	Permit/Approval	Accepting Authority/ Approving/Consulting Agency	Statutory/Regulatory Reference
FEDERAL			
Right-of-Way over Land Under Federal Management	Right-of-Way Grant	BLM	Federal Land Policy and Management Act (FLPMA) 43 USC 1761-1771 and 43 CFR Part 2800
NEPA Compliance to Grant Right-of-Way	Environmental Assessment or	BLM	National Environmental Policy Act (NEPA), 42 USC 4321-4327,

Action Requiring Permit, Approval, or Review	Permit/Approval	Accepting Authority/ Approving/Consulting Agency	Statutory/Regulatory Reference
	Environmental Impact Statement		Council on Environmental Quality (CEQ) 40 CFR Part 1500
BLM Grant of Right-of-Way	National Historic Preservation Act Compliance	Idaho State Historic Preservation Office	National Historic Preservation Act of 1966 (NHPA), 16 USC 47 (Section 106), 36 CFR Part 800,
Impact to Bald or Golden Eagles	Eagle Take Permit	U.S. Fish and Wildlife Service (USFWS)	Bald and Golden Eagle Act, 16 USC 668 et seq
Impacts to Yellow-billed cuckoo	Endangered Species Act Consultation	USFWS	Endangered Species Act (ESA) Section 7
Dredge or fill activities in waters of the United States	Clean Water Act Section 404 Permit	U.S. Army Corps of Engineers (ACOE)	Clean Water Act, 33 USC 1344 (Section 404)
Any construction exceeding 200 feet above ground level	FAA Determination	Federal Aviation Administration (FAA)	14 CFR Part 77
STATE OF IDAHO			
Operation of a Concrete Batch Plant	Permit to Construct	Idaho Department of Environmental Quality	IDAPA 50.01.01
Water rights	IDWR Water Right Permit	IDWR	Chapter 2, Title 42 I.C. IDAPA 37.03.08
Impacts to water quality associated with discharges of dredged or fill materials in waters of the United States	401 Water Quality Certification, Clean Water Act	Idaho Department of Environmental Quality	33 USC 1344
Construction activities that result in the discharge of stormwater	Compliance with Stormwater General Permit	Idaho Department of Environmental Quality	40 CFR Section 122.26(b)(14); IDAPA 58.01.25
Crossing state or U.S. highways	Encroachment Permit	Idaho Department of Transportation (IDT)	IDAPA 39.03.42
Oversize / overweight loads	Oversize / overweight Permit	Idaho Department of Transportation (IDT)	IDAPA 39.03.04; IDAPA 39.04.05; IDAPA 39.03.06
Right-of-way or easement on State Lands	Right-of-Way or Easement	Idaho Department of Lands	I.C. Sec. 58-603; IDAPA 20.03.08

Action Requiring Permit, Approval, or Review	Permit/Approval	Accepting Authority/ Approving/Consulting Agency	Statutory/Regulatory Reference
LOCAL			
Construction of Building	Building Permit	Jerome County	Jerome County Code
Construction of Building	Building Permit	Lincoln County	Lincoln County Code
Construction of Building	Building Permit	Minidoka County	Minidoka County Code
Crossing of Highway District Roadway	License or Permit to Cross Road Easements or Rights-of-Way	Jerome Highway District	I.C. Sec 40-1310
Crossing of Highway District Roadway	License or Permit to Cross Road Easements or Rights-of-Way	Shoshone Highway District #2	I.C. Sec 40-1310
Crossing of Highway District Roadway	License or Permit to Cross Road Easements or Rights-of-Way	Dietrich Highway District	I.C. Sec 40-1310
Crossing of Highway District Roadway	License or Permit to Cross Road Easements or Rights-of-Way	Minidoka Highway District	I.C. Sec 40-1310

1.6 Financial and Technical Capability of Applicant

Magic Valley Energy, LLC is a Delaware limited liability company that is wholly owned by affiliates of the LS Power group of companies. Founded in 1990, LS Power is a privately held development, investment and operating company focused on power generation, energy infrastructure and related investments. Since its inception, LS Power affiliates have developed, constructed, managed and acquired more than 45,000 MW of competitive power generation and over 660 miles of transmission infrastructure.

LS Power is in a strong financial position and well positioned to meet the financial obligations of its projects. LS Power's financial position has long been considered one of its strengths, and it is highly respected within the financial community. LS Power has raised more than $48 billion in debt and equity for project financing, acquisitions or investment purposes all within the power sector. The common feature of all these financings is that a subsidiary created by LS Power raises the capital required to construct, acquire, and/or operate a power-related business, with equity support and asset management services provided by LS Power. Every LS Power sponsored project that has been taken to the financing community has been successfully financed.

Each LS Power developed project has been financed on the basis of a strong structure that includes project permits, real estate rights, and project documents such as long-term off-take contracts. As a result of this approach, LS Power has delivered on every power purchase agreement it has signed. LS Power has successfully developed many power generation facilities throughout the United States and been able to satisfy the credit requirements of numerous investor owned utilities, municipal utilities and electric cooperatives.

LS Power employs an integrated, multi-disciplinary approach, with a team of over 250 people covering every area of expertise required to successfully execute in the sector. Additionally, its projects have created thousands of construction and operations jobs in communities throughout the U.S.

2.0 CONSTRUCTION OF FACILITIES

The proposed design and layout of the Project components are described in detail above in Section 1.c. Information regarding the installation, construction process, timing, and sequence of construction activities is provided in the following subsections. The area disturbed by construction-related activities (i.e., footprint), such as laydown and borrow areas, will be kept to a minimum.

2.1 Laydown/Staging Areas

The temporary construction yards (up to 50 acres per area) will be established within or near the Project area to support construction activities. These temporary staging areas may be located on BLM or non-federal lands. Each laydown yard may be used for temporary construction offices and support facilities (e.g., portable toilet trailer, portable amenities trailer), a staging area for the receipt and temporary storage of Project infrastructure components (e.g. turbine components, transmission structures, electrical conductor, etc.), staging of construction vehicles and equipment, and potentially space for one or more mobile concrete batch plants. A typical construction laydown area is shown in Figure 2-1.

Figure 2-1: Typical Construction Laydown Area

The location of the proposed staging areas would be strategically selected in an effort to avoid environmentally and culturally sensitive areas. The temporary construction yards would be established in areas that are relatively flat with good access to area highways, and relatively close to interior Project roads. This would provide efficient access for materials and equipment being delivered to the staging area for disbursement to the proposed turbine sites.

If necessary, the temporary laydown areas will be leveled using civil equipment and capped with gravel or other appropriate material to form an acceptable work surface.

2.2 Geotechnical Studies

A detailed geotechnical investigation will be conducted and may include standard penetration test borings and other geotechnical testing methods at proposed turbine sites, substations, collector and transmission system routes, access roads, and other Project facilities to visually characterize the soils and to obtain samples for laboratory testing. Geotechnical borings are expected to be up to approximately 1 foot in diameter and up to 70 feet deep, though dimensions and depths may differ depending on the site conditions encountered. Test pits are anticipated to be approximately 3 feet wide, 10-15 feet long, and up to 12 feet deep. All test pits and soil boring locations would be backfilled after the soil samples are obtained per industry practice and in compliance with applicable regulations. In-situ electrical resistivity tests and bulk samples for thermal resistivity testing may be performed at some of the turbine boring sites and at the proposed substation locations. All test pits and soil boring locations will be back-filled after the soil samples are obtained per industry practice and in compliance with applicable regulations.

The bulk of geotechnical activities described above will be performed to inform final design. Additional geotechnical activities may be necessary if testing indicates a poor location for the designated Project component. For example, if a boring is performed to inform turbine foundation design and the results indicate the location is not suitable for a turbine, MVE will select a different location within the development corridors to test. If the new location is favorable, the turbine location will be moved to the new location and the associated Project infrastructure (collector line, access roads, etc.) will be adjusted to accommodate the relocated turbine.

2.3 Phased Projects, Approach to Construction and Operation

The Project is being proposed with the flexibility such that the entire development may be constructed in a single phase or divided into two or more individual phases that each entail a portion of the overall proposal. The amount of generating capacity sought by creditworthy counterparties, the structure of the resulting commercial agreements, and the results of interconnection studies will determine the size and timing of an individual Project phase.

If the Project is constructed in more than one phase, the design of Project infrastructure such as substations will accommodate the ability for expansion during successive construction phases while relying on previously developed components such as access roads, operations and maintenance facilities, and communication networks. Certain construction related Project features such as staging and laydown yards, batch plants, and water sources would likely be reestablished in the same manner and location as during prior phases.

Project phases may be constructed in succession, or may be constructed with a gap of time between phases. As stated above, the timing of the phases depends on the amount of generating capacity sought by creditworthy counterparties, the structure of the resulting commercial agreements, and the results of interconnection studies. MVE has provided example preliminary scheduling in the table below assuming phases are complete in succession. Note that the number of construction crews impacts the duration of construction. For example, in Scenario 2 below the 300 MW and 800 MW phases have similar overall durations. This is because there are 2 crews for the 300 MW phase and 3 crews for the 800 MW phase.

- Scenario 1: one phase with three crews. 1,100 MW installed.
- Scenario 2: two phases with two crews in the first phase and three crews in the second phase. 300 MW initially installed and 800 MW in phase 2.
- Scenario 3: two phases with three crews in the first phase and two crews in the second phase. 600 MW initially installed and 500 MW in phase 2.

Table 2-1: Example Construction Phasing Schedule Scenarios

Description	**Beginning Quarter**	**End Quarter**
Scenario 1:		
Mobilization	Q3 2023	Q3 2023
Civil	Q3 2023	Q3 2025
Electrical	Q3 2023	Q3 2025
Wind Turbines	Q2 2024	Q3 2025
COD	Q3 2025	Q3 2025
Scenario 2:		
Phase 1 (300 MW)		
Mobilization	Q3 2023	Q3 2023
Civil	Q3 2023	Q4 2024
Electrical	Q3 2023	Q4 2024
Wind Turbines	Q2 2024	Q4 2024
COD	Q4 2024	Q4 2024
Phase 2 (800 MW)		
Mobilization	Q4 2024	Q4 2024
Civil	Q4 2024	Q4 2025
Electrical	Q4 2024	Q4 2025
Wind Turbines	Q4 2024	Q4 2025
COD	Q4 2025	Q4 2025
Scenario 3:		
Phase 1 (600 MW)		
Mobilization	Q3 2023	Q3 2023
Civil	Q3 2023	Q4 2024
Electrical	Q3 2023	Q4 2024
Wind Turbines	Q2 2024	Q4 2024
COD	Q4 2024	Q4 2024
Phase 2 (500 MW)		
Mobilization	Q4 2024	Q4 2024
Civil	Q4 2024	Q4 2025
Electrical	Q4 2024	Q4 2025

Wind Turbines	Q1 2025	Q4 2025
COD	Q4 2025	Q4 2025

MVE is committed to working with the local grazing permittees to minimize impacts to grazing operations that share the public lands with the Project. MVE developed a Grazing Coordination Plan (“GCP”) that is attached to the POD as Appendix S. In response to feedback from permittees, MVE is proposing to separate the construction of Project infrastructure within the Star Lake allotment into a North Phase, South Phase, and West Phase so that construction occurs in approximately one-third of the Star Lake allotment at a time. The precise order of the construction phasing will be determined later. See Section S-3.3.1 of the GCP for further information regarding the Star Lake phased construction approach.

2.4 Access and Transportation System, Component Delivery, and Worker Access

See the Road Design, Traffic and Transportation Plan attached as Appendix J: Road Design, Traffic and Transportation Plan to the POD.

2.5 Construction Work Force Numbers, Vehicles, Equipment, and Timeframes

The workforce required to build the Project will be made up of a wide array of skillsets, including heavy civil work, iron work, concrete batching and placement, large mechanical assembly, crane work, electricians, and more. Some skillsets may be available locally or regionally, and MVE will direct the construction contractor to seek local skilled workers as available. If not available locally, workers experienced in the specific trades required for wind energy project construction will temporarily relocate to the region during construction. The number of construction personnel on site is expected to range from 400 to 850 during peak construction.

Construction traffic would be predominantly during weekdays, but some weekend and evening work may be required during peak construction periods. Most work done at night would be due to schedule constraints or would be to take advantage of favorable weather conditions. Specific lighting equipment to facilitate nighttime construction will vary by contractor and activity. Tow behind mobile light plants are an example of what is expected to be used.

Per U.S. Environmental Protection Agency (“USEPA”) guidance, the threshold for outdoor residential noise impacts is reached at 55 dB(A). While the majority of activities associated with the construction and decommissioning phases of the Project do not generate noise at or above this threshold near residential receptors, there may be times where activities could be louder. Any Project surface-disturbing activities that generate noise at or above 55 dB(A) at a residence would only be allowed to occur between the hours of 7 AM and 10 PM. In addition, MVE shall notify residents at least 24 hours prior to the start of any surface disturbance located within 1,000 feet of a residence.

The following equipment list represents what is typically needed for a scope similar to the Project. All construction equipment will have sound-control devices no less effective than those provided on the original equipment and would be adequately muffled and maintained. Stationary construction equipment (i.e., compressors and generators) will be located as far as practicable from nearby residences.

Pickup trucks – as required based on manpower counts.

Access Roads:
- Forklifts
- Flatbeds
- RT Cranes
- Dozers
- Compaction equipment
- Belly dumps
- Excavators
- Motor graders
- Scrapers
- Tractors
- Water trucks
- Loaders

Foundations:
- Excavators
- Dozers
- Compaction equipment
- Concrete trucks
- Flatbed trucks
- Loaders
- RT Cranes
- Concrete telebelts
- Forklifts

WTG Erection:
- Forklifts
- Flatbeds
- RT Cranes
- Crawler cranes
- Dozers
- Compaction equipment

Collection:

- Trenchers
- Dozers
- Motor grader
- Tractor and Reel Rigs
- Backhoe
- Conveyor Truck
- Wheel Loader

230 kV Transmission Lines:

- Texoma Drill Rigs
- Reel trailers with tractors
- Hydraulic Tensioning Trailers
- Pitman Pole Rigs
- Hi Ranger Bucket Trucks
- Pole Trailers with Tractors
- Lead Line Trucks
- Concrete Trucks

500 kV Transmission Lines:

- Texoma Drill Rigs
- Reel trailers with tractors
- Hydraulic Tensioning Trailers
- Pitman Pole Rigs
- Hi Ranger Bucket Trucks
- Pole Trailers with Tractors
- Lead Line Trucks
- Concrete Trucks

Substation:

- Dozers
- Excavators
- Drill rigs
- Bucket trucks
- Manlifts
- RT Cranes
- Skidloaders

2.6 Site Preparation

Prior to the commencement of major ground disturbing activities, land survey crews will perform surveys and stake/flag the location of Project facilities, the approved extents of disturbance, any environmentally sensitive areas to be avoided during construction, and other locations or alignments as appropriate. An environmental resource specialists will participate in locating occupied habitat for species listed as BLM Sensitive plants and wildlife species that require flagging or fencing, in accordance with Appendix P: Construction Monitoring Plan. A system of standardized and simplified exclusion markings will be used to reduce potential confusion during construction, and to minimize the risk of highlighting types of sensitive resources that could be targeted by vandals (e.g., if exclusions around archaeological sites were marked differently than those around sensitive natural resource areas, the sites would be at a higher risk of unauthorized artifact collecting or other disturbance). Specific flagging and staking procedures will be established per the Appendix K: Flagging, Fencing, and Signage Plan. Flagging will be maintained until final clean-up and/or reclamation is completed, after which they will be removed.

The aerial limits of construction activities will be predetermined. Standard survey flags and stakes will be installed before the start of Project construction. Project work sites will be marked by the construction contractor. Designated Project access roads, spur roads, parking areas, and pullout areas will be marked to facilitate travel throughout the Project Area.

Operators will reduce visual impacts during construction by clearly delineating construction boundaries and minimizing areas of surface disturbance. Minimization efforts may include preserving vegetation to the greatest extent feasible; utilizing undulating surface disturbance edges; stripping, salvaging and replacing topsoil; contoured grading; controlling erosion; using dust suppression techniques as required; and restoring exposed soils as closely as possible to their original contour and vegetation. Herbaceous plants and low-growing shrubs will be left in place if they do not interfere with the safety of electrical lines and equipment. Unless required by the BLM or needed for grazing or fire mitigation, wildlife habitat enhancements or improvements such as ponds, guzzlers, rock or brush piles for small mammals, bird nest boxes, nesting platforms, wildlife food plots, etc. will not be installed.

2.7 Site Clearing, Grading, and Excavation

Site clearing and grading activities will be required on nearly all active Project work areas. Large civil equipment such as bulldozers, scrapers, excavators, and motor graders are typically used to clear and level access roads and work areas to achieve a desired gradient. In work area disturbance areas, topsoil bearing organic components would be windrowed at the edge of work areas for use during the reclamation phase, in accordance with the Project’s Reclamation Plan (see Appendix E: Reclamation Plan). Excavated waste rock and/or mineral soil underlying the topsoil may be used where possible for fill material anywhere within the Project area (such as to achieve desired grades or extend road radii). Excavations will be necessary for the foundations of Project components such as wind turbines, transmission structures, substation equipment, O&M facilities, and the battery energy storage facilities. It may be necessary to blast rock to achieve the necessary slope and gradient for interior roads or for foundation construction.

Blasting will likely be required to support clearing, grading, and excavation activities in areas with shallow bedrock. MVE anticipates multiple blasts per day, with an average of two blasts per day, being required throughout the construction phase. All blasting would be conducted in accordance with a Blasting Plan (see Appendix I: Blasting Plan Methodology). The Blasting Plan establishes the appropriate safety protocols for the handling and use of explosives in the Project area. Procedures identified by the construction contractor for conducting such work, as well as applicable Federal and state regulations, would be followed. Explosive material would be handled only by a licensed, state-approved contractor that would have full responsibility for control and use of the material.

Sediment and erosion control measures would be implemented as grading activities progress throughout the Project in accordance with the Best Management Practices ("BMPs") found in the Project's SWPPP (Appendix D: Stormwater Pollution Prevention Plan). Unstable slopes and local factors that can induce slope instability will be identified. Operators will avoid creating excessive slopes during excavation and blasting operations. Special construction techniques will be utilized where necessary in areas of steep slopes, erodible soil, when creating excessive slopes cannot be avoided, and stream channel crossings. Areas to be cleared and graded include access roads, laydown areas, turbine and transmission structure locations, substations, and other facility work areas. Clearing would be performed only within the approved limits of disturbance. Actions related to fire and fuel management would be coordinated with BLM.

2.8 Gravel, Aggregate, and Concrete

Construction of the Project will require gravel and aggregate for use as road base, development of turbine work areas, substation surfacing material, and other potential uses. In addition, mineral materials will be required to batch concrete for Project foundations. Temporary concrete batch plants will likely be established within the Project laydown yards for preparing and mixing the concrete used for foundations of wind turbines, substation equipment, transmission structures, the operations and maintenance buildings, and other necessary Project facilities. Local concrete suppliers may also be used to provide truck deliveries of concrete. The batch plant complexes consist of a mixing plant, areas for sand and aggregate stockpiles, an access road, and truck load-out and turnaround areas. The batch plants themselves consist of cement storage silos, water and mixture tanks, aggregate hoppers, and conveyors to deliver different materials. The batch plants will be located within Project laydown yards or in separate temporary batch yards close to the sites where foundations are being poured. The batch plants will be relocated as needed to maintain an efficient operation.

Preliminary geotechnical investigations will inform whether the aggregate generated from onsite grading and excavation activities is appropriate for reuse as road base material in the Project area or as substrate for batching concrete. 43 CFR 2805.14 permits this use of common varieties of stone and soil which are necessarily removed during construction of the Project (without additional authorization or payment) within the authorized right-of-way. Material generated from onsite grading and excavation activities will be crushed either at the site where it is generated or at an approved work area. Crushing and transportation of these materials will follow BMPs found in the Dust and Emissions Control Plan ("DECP") to minimize fugitive dust generation (see Appendix O: Dust and Emissions Control Plan). In the event the material is not suitable for batching concrete, other commercial sources in the region will be used to fulfill Project needs. Mineral material may be sourced from within the ROW or other permitted sites.

2.9 Wind Turbines

The assembly and erection of the Project wind turbines will represent the most dynamic stage of the construction phase. Wind turbine construction involves multiple work crews performing a number of sequential tasks that proceed from turbine location to turbine location as efficiently as possible. MVE anticipates that construction crews will need to utilize an approximately 300-foot radius work area around each turbine to perform the installation.

Foundations: The wind turbine foundation anchors the turbine structure securely to the ground due to its size, weight, and configuration. The most common foundation design used for wind turbine installations within the United States is the inverted T spread footing foundation. An inverted T foundation is typically an octagon shape with dimensions ranging from 50 to 75 feet wide and 8 to 12 feet deep and a concrete pedestal up to 20 feet in diameter with anchor bolts that protrude for attachment of the tower. Typically, the amount of soil material excavated for a mat foundation ranges between 655 to 1,045 cubic yards; much of the excavated soil is typically reused to backfill over the concrete foundation and to perform the final grading around the turbine erection area or project roads. The amount of concrete material needed to construct a typical foundation ranges from 375 to 600 cubic yards. Rebar is used for structural support with about two to three truckloads of steel (20 to 50 tons) used per turbine site. Final foundation type and design will be determined in advanced engineering after geotechnical testing.

In the event of hard subgrade material, such as the basalt expected throughout the Project area, concrete and rebar material may be reduced, but additional labor will be required to remove native material by more intensive means such as drilling and blasting. If the quality of the material is not sufficient for backfill or final grading, additional material would be imported to the site or borrowed from other excavations on the site. If the material is not sufficient for backfill or final grading, it would be disbursed within the ROW and reclaimed.

After the concrete has cured, the excavated soil is backfilled so that only the concrete pier with anchor bolts on top of the mat remains visible. Topsoil would be used in the vicinity of where they are excavated to meet grading needs. Other excess soil from construction activities would be used where needed to achieve an appropriate grade, to supplement the existing sub-base of roads, and/or to blend the road into the surroundings grades by widening curves and improving road prisms, as appropriate. See Figure 2-2, Figure 2-3, and Figure 2-4 for a turbine foundation under construction, a complete turbine mat after curing, and a backfilled mat with only the concrete pier visible, respectively.

Figure 2-2: Turbine Foundation Under Construction

Figure 2-3: Complete Turbine Mat

Figure 2-4: Backfilled Turbine Mat

Turbine Component Delivery: With the wind turbine pad and foundation complete, the site is ready for off-loading of the turbine components. Each turbine component will be delivered to the turbine pad on a semi-tractor and trailer configured to accommodate the length and weight of the component. Each site will receive up to five tower sections (dependent upon the turbine model and manufacturer), three blades, one hub, one nacelle, two to four electrical components (such as down-tower assemblies, pad-mounted transformers, or switchgear), and crates of bolts and other components. The typical equipment used to off-load these components consists of rough terrain cranes, forklifts and a crawler crane. Typically, Schnabel trailers are used to deliver tower sections and are capable of lowering the towers onto dunnage without the use of additional equipment. Rough terrain cranes are used to off-load the blades by performing tandem picks at each end of the component. The hub is off-loaded using a single rough terrain crane. Depending on the weight and configuration of the nacelle, a crawler crane may be required to off-load the nacelle. The forklifts are used to place dunnage under the turbine components to keep them off the ground and stored in a secure manner prior to their erection. All of the components are placed within the turbine pad adjacent to the crane pad such that they are within the picking radius of the various cranes that will be used to erect that component. The typical process of unloading consists of the delivery truck pulling into the pre-determined position near the crane pad, the crane(s) then position next to the component and the rigging is attached to the component and the crane(s). The component is then lifted off the delivery truck, the truck pulls forward, the forklifts set the dunnage under the component and the crane(s) lower the component onto the dunnage. This process repeats until every turbine component is off-loaded (see Figure 2-5).

Figure 2-5: Typical Unloading of Turbine Components

<u>Tower Erection and Assembly:</u> After all the turbine components have been off-loaded, the site is ready to begin erection of the tower base and mid (or lower-mid for a 4+ segment tower) sections. Prior to any cranes arriving at the site, a forklift often places wooden crane mats on the crane pad (see Figure 2-6). This is done to support the crawler crane during its erection activities. The erection of the base and mid-sections is typically performed by a 200 to 300 ton crawler crane. The crawler crane walks itself onto the crane pad and mats that are adjacent to the foundation and staged turbine components. The crawler crane is accompanied by a smaller rough terrain “helper” crane that assists in lifting the tower sections from the ground to a vertical position if a “tipping shoe” is not used to stand the tower section. A forklift assists with moving dunnage and crane mats during the operation.

Figure 2-6: Crane Pad and Mats

The base tower section is prepared by placing the required rigging at each end of the tower. The crawler crane and helper crane hook onto the rigging and jointly lift the base tower section. The tower section is lifted to a vertical position and placed on crane mats to allow the rigging on the bottom of the tower to be removed. The crawler crane then lifts the tower section and it is placed on the anchor bolts that were left extended on the foundation pedestal. The base section is then leveled and bolted to the anchor bolt cage. The mid section is placed in the same manner and bolted to the base section of the tower. After that, grout is placed under the tower to form the final connection between the tower and foundation. An erected base tower section can be seen in Figure 2-7.

Figure 2-7: Erected Base Tower Section

After successfully erecting the base and mid sections and allowing sufficient time for the grout to set up, the next tower section is lifted and placed onto the tower base in a manner similar to that described above (see Figure 2-8). The two tower sections are then bolted together prior to the crane being released. Upon completion of the tower erection, the crawler crane then walks to the next site to perform the same operation. Some construction contractors may utilize slightly different sequencing for tower assembly and grouting, or save final tower section placement until the main erection crane arrives at that location.

Figure 2-8: Mid Tower Section Placement

Following installation of the turbine tower, the rotor is built. Certain turbine manufacturers allow the assembly of the rotor on the ground and then the erection of the complete rotor by the main erection crane (see Figure 2-9). When the rotor is assembled on the ground, the assembly typically consists of a 100 to 200 ton crawler crane and a forklift to assist its operation. The crawler crane lifts each blade and positions it into the opening in the hub. The crew bolts the blade to the hub and positions dunnage under the blade to support it. The crawler crane continues to lift and place the remaining blades on the hub until the rotor is complete. The crews tie down the assembled rotor to prevent it from moving until it is ready for erection. Upon completion of assembling the rotor, the crawler crane and forklift walk to the next site and repeat this operation.

Figure 2-9: Erection of Complete Rotor

The main erection crane is the next crawler crane to visit the turbine site. The main erection crane is typically a 400 to 600 ton crawler crane. The purpose of the main erection crane is to erect the remaining upper tower section(s), nacelle and hub. The main erection crane is assisted by a rough terrain “helper” crane and forklifts. The main erection crane walks onto the crane pad and mats to perform the erection activities. Similar to the installation of the base and mid-sections described above, the main erection crane and helper crane hook rigging onto each end of the upper tower section(s) and lift them to a vertical position (or the tower is tipped upright using the tipping shoe), the bottom rigging is then removed and the tower section is placed on those sections already assembled. Once all the tower sections have been erected and bolted together, the main erection crane will then be rigged to a beam that allows the nacelle to be lifted. The main erection crane will lift and position the nacelle over the top tower section's flange to allow it to be bolted together. The next step is to lift the assembled rotor and attach it to the nacelle. The crawler crane and helper crane lift the rotor together until it reaches a vertical position, at which time the rigging for the helper crane is removed. The crawler crane lifts and positions the rotor so that the bolt holes align with the nacelle and the two components fasten together. After the rotor is securely attached to the nacelle, the main erection crane removes its rigging from the rotor and walks to the next turbine site to repeat this operation.

Given the size and complexity of the large crawler cranes, efficient travel around the Project site is an important factor in the construction timeline. To minimize back-tracking down dead-end roads, temporary overland crane paths will be utilized. These travel pathways may require matting across softer soils or minor civil work on rock outcroppings to support their intended use.

While MVE expects to assemble the rotor on the ground and perform one lift to place it, there are certain turbine manufacturers that do not permit the rotor to be assembled on the ground. These manufacturers require that each individual blade be attached to the hub after the hub is erected. In this case, the turbine site may be visited by another crawler crane after the main erection crane has erected the nacelle and hub. It has not yet been determined if all main erection will be performed by a single crane at each site. The typical crane used for attaching the blades is a 200 to 300 ton crawler crane which is typically assisted by a forklift. The crane attaches to a beam specifically designed to lift each individual blade up to the hub (see Figure 2-10). The crane lifts the blade and positions it so that the bolts align with the opening in the hub. The blade is then inserted and bolted securely. After the blade is bolted securely, the crew in the turbine then rotates the hub in order to properly position it for the next blade. The crane then attaches to the next blade and repeats the procedure. After all three blades are securely fastened to the hub, the crawler crane walks to the next site to repeat the operation.

Figure 2-10: Crane Lifting Blade to the Hub

Once the major components of the wind turbine are assembled, work is performed inside the turbine to connect the generation equipment in the nacelle with drop cables in the tower and the control system in the base. All mechanical connections are secured and checked. When these activities are complete, typically over the course of two to four days, the turbine has achieved a state of mechanical completion and is ready for commissioning.

It is important to note that the procedure described above is general. Wind turbine manufacturers may have very specific procedures that differ somewhat from those described for each turbine model. The installation procedures for all current commercial turbine models are similar, however, and MVE does not expect significant deviation from the above procedures. Additionally, as the wind turbine technology progresses into larger turbine sizes, the need arises for larger cranes. Based on current turbines under consideration, MVE anticipates needing cranes that are up to 45 feet wide, 150 feet long, and weigh up to 1000 tons.

2.10 Electrical

Collector Lines: Power from the turbines would be fed through insulated electric cables and a breaker panel at the turbine base inside the tower would be connected to a pad-mounted step-up transformer. The specific placement of these facilities within the tower area is dependent upon the turbine manufacturer selected by MVE. Some turbine models have the transformer in the nacelle of the turbine which would remove the need for a pad-mounted transformer. For turbine models with a pad-mounted transformer, the 34.5-kV transformer is approximately 6 feet long by 6 feet wide and 6 feet high, and is typically placed on a concrete pad or manufactured oil containment box pad adjacent to the new turbine foundation. The transformer steps up the voltage from the wind turbine (typically around 690 volts) to 34.5 kV, which is the typical voltage carried on the electrical collection system. Each pad-mounted transformer would contain approximately 500 gallons of mineral oil used to cool the electrical components located within the box. Leak detection and containment systems have been engineered into the design of these transformers. As a result, potential for accidental spills resulting from malfunction or breach of the transformers is low.

MVE expects to construct both underground and overhead electrical collection systems, depending on final design and terrain. MVE's geotechnical investigations to date has revealed that the majority of the collection system will likely be overhead, however there may be areas of the Project where terrain and economics will drive the usage of underground collection. Industry standards for the location of an overhead collector line include a setback from the turbines by a distance equal to the turbine tip height (hub height plus blade length). Due to this setback requirement, there will be an underground portion of collector that connects each individual turbine to the overhead portion of the collection system. The most efficient route for these underground portions would be a straight line. However, the exact routing will be influenced by site-specific conditions (geotechnical, topographic, other infrastructure, etc.). The overhead portion of the collection system would then carry the power from the turbines to a substation.

The installation of the overhead collection system involves the placement of electrical poles and the stringing of cables between the poles. MVE intends to use wooden poles where possible and light-duty steel as needed. A minimal amount of clearing and/or grading may be required to provide necessary access to the structure work areas.

Installation of the two types of poles used in the overhead collection system generally involves the following steps:

- **Pole Framing**. The components of the structures (poles, cross-arms, insulators, and hangers) are brought to the locations of their installation to be assembled. This work is typically performed on the ground just prior to erection of the structures.
- **Setting Direct Embedded Poles**. The medium-voltage wooden poles under consideration are often embedded into the ground without the use of a separate foundation. The construction process consists of first excavating the holes for the structure to the required depth. This can be accomplished through the use of a vertical drilling rig or excavator. Once the excavation for a structure is completed, the structure is hoisted into place by either a boom truck or all-terrain crane. The structure is checked for proper embedment depth, alignment and plumb. The structure is held in place while it is backfilled with either aggregate/rock or concrete. The backfill is mechanically vibrated or tamped in lifts to eliminate voids and assure proper bearing pressure. Guy wires are attached from the pole to ground anchors as necessary, depending on pole design and location. After the pole is backfilled, it is released.
- **Foundations**. In the event that some overhead collection system poles require a concrete foundation, e.g. steel poles, such foundations would be installed 3 to 5 weeks ahead of the structure erection to allow concrete to reach design strength. The foundation site is excavated, and frames placed onto excavated soil or a mudmat. Steel reinforcement is added within the frame, and concrete is poured. Once the concrete has reached sufficient strength, the forms are removed and the area backfilled. As an alternative, MVE may choose to utilize precast foundations based on the soil conditions and technical requirements. The surface disturbance of either foundation design is similar.

Once the pole installation is complete, stringing can begin. Stringing involves the pulling of the conductors through stringing dollies with wires/ropes. The use of guard structures will be required when crossing public roads. Guard structures are simply temporary wood structures or nets that prevent the pulling lines or conductor from falling onto the roadway.

The stringing dollies are attached to the insulators at the time of framing, and a rope line is looped down the structure to aid in the pulling of the stringing line. The line is pulled through the dollies from a tensioner to a dead end point on the line and attached to conductors located on a reel trailer. The puller then pulls the conductor though the dollies. When the desired span or reel length is reached, the reel end of the cable is placed into the dead end structures and the proper tension is applied.

Once the proper tension and sag is obtained, the cable is clipped into place. This process involves the removal of the stringing dollies and the installation of the cable clamps to firmly hold the conductor. The clipping process can be performed by bucket trucks.

Installation of underground collection is typically completed using the single-pass trenching method or the open-trench method. For open-trench collection system installation, a separate trench would be utilized for each collection circuit. Typically, cables are suitable for direct burial and are buried at a depth of 2-4 feet below grade. Trenches would be excavated with a trenching machine or backhoe (see Figure 2-11); however, if competent rock is encountered at shallow depth, it would be necessary to jackhammer rock locally or drill and blast sections to open up a trench. If the rock content in local soil conditions is negligible, the collector cables and fiber-optic cables will be placed directly on the bottom of these trenches. The native material excavated from the trench will be sifted for rocks, backfilled on top of the cables, and compacted with a vibratory compactor. The excess material would be repurposed or reclaimed within the ROW. The backfill will be placed in lifts to achieve sufficient soil compaction and allow for the warning tape to be installed.

The single-pass trenching method utilizes a single-pass trenching machine that opens the trench, places bedding material, installs the cable, and backfills in one operation. The underground collection installation method that is implemented for the Project will depend on a number of factors, including but not limited to geotechnical properties of the collection line run, construction contractor preference, and equipment availability.

Figure 2-11: Typical Trenching with Trenching Machine

If the rock content in local soil conditions is high enough to cause risk of cable jacket damage during installation, bedding material (likely sifted backfill from elsewhere on the Project site, or possibly engineered backfill from off-site) will be placed in the trench prior to installing the collector cables and fiber-optics. In such rocky conditions, it is also likely that the soil excavated from the trench will have too much rock content to be used to backfill the trench without damaging the cables. In those instances, an engineered backfill (soil with good thermal dissipation properties that is free of rocks) will be utilized to backfill the trench. Such backfill may be obtained from within the site, or imported from an off-site quarry or pit. As described above, the backfill will be placed into the trench in lifts for compaction and warning tape installation.

Geotechnical testing in the area around the cables will determine the heat dissipation properties of the soil. If necessary, the engineered backfill for the trenches may include material necessary to improve the overall thermal properties. Such material improvements would be determined in the detailed collection system design.

Where splices are necessary in collection system cables, above-ground splice boxes will be installed above the collection cable trench. Similarly, in locations where two or more sets of underground lines converge, pad mounted switch panels would be used to tie the lines together into one or more sets of larger feeder conductors. These above-ground boxes are commonly four to six feet across and four feet high, constructed of plastic and fiberglass material appropriate for medium-voltage connections, and colored green. MVE would install concrete bollards around the boxes to avoid accidental damage by Project vehicles.

<u>Project Substations:</u> Construction of the Project substations will occur concurrently with other activities across the site. Each substation site is cleared and graded to subgrade elevation per the requirements of the final design. Structural footings and underground utilities, along with electrical conduit and a grounding grid are installed, followed by aboveground structures and equipment. A chain-link fence is constructed around each new substation for security and to restrict unauthorized persons, livestock, and wildlife from entering the substation. The site is then finish graded and gravel surfaced, and reclamation is initiated outside the substation fence.

Substation control buildings will likely be prefabricated, and will be assembled or placed onto concrete slabs within the substations. Major equipment to be installed inside the control buildings consists of relays, control panels, servers, communication equipment, power supplies, a battery bank for back-up power, and a heating/cooling system.

Steel structures are erected on concrete footings to support switches, electrical buswork, instrument transformers, lightning arrestors, and other equipment, as well as termination structures for incoming and outgoing transmission lines. Per common utility practice, these structures are fabricated from tubular steel and galvanized. Structures are grounded by thermally welding one or more ground wires to each structure.

Major equipment will be set by crane and either bolted or welded to the foundations. Oil spill containment basins will be installed around major oil-filled transformers and other equipment. Smaller equipment, including switches, current and voltage instrument transformers, insulators, electrical buswork, and conductors will be mounted on the steel structures.

Control cables are pulled from panels in the control building, through the underground conduits and concrete trench system, to the appropriate equipment. After the cables are connected, the controls are set to the proper settings, and all equipment is tested before the substation and transmission line are energized.

Figure 2-12: Example Collection Substation

230 kV Transmission Lines: The installation of the 230 kV transmission lines is similar with respect to that of the overhead collection system, however the size of the equipment involved is significantly larger. Clearing and grading will be performed to provide safe access to the transmission line structure sites for construction activities.

Installation of wooden or reinforced concrete H-frame transmission structures is very similar to those of the wooden overhead collection system poles previously described.

Installation of monopole or lattice steel transmission structures with concrete foundations generally involves the following steps:

- **Foundations**. Transmission foundations are typically installed 3 to 5 weeks ahead of the structure erection to allow concrete to reach design strength. The foundation site is excavated, and frames placed onto excavated soil or a mud mat. Steel reinforcement is added within the frame, and concrete is poured. Once the concrete has reached sufficient strength, the forms are removed and the area backfilled.
- **Structure Framing**. The components of the structures (pole pieces, cross-arms, insulators, and hangers) are brought to the locations of their installation to be assembled. This work is typically performed on the ground prior to erection of the structures. At sites where terrain or environmental constraints don't allow for on-site assembly, the framing will be done at a nearby staging area.
- **Setting Base Plate Poles**. Once the concrete has reached sufficient strength and the structures are framed, the structures can be erected onto the foundations. This is commonly done by cranes or boom trucks. The structure is hoisted off the ground and then set onto the foundation. The structure is checked for alignment and plumb, and if necessary leveled by adding shims or adjusting leveling nuts. Any structures supported by guy wires (design and location dependent) are affixed to ground anchors. If required for the design, grouting is then added to the base of the tower and allowed sufficient time (generally 2 to 4 weeks) to cure.

It is possible for steel monopole transmission structures to be installed by direct embedment. This process would be similar to that of the overhead collection poles previously described.

Once the structure installation has been completed, the conductor is strung per the overhead collector system procedure previously discussed.

500 kV Transmission Line:

Work Area Clearing and Grading Activities: Temporary and permanent work areas are required to support safe construction and maintenance activities on the transmission right-of-way. At each tower location, construction crews will need a clear, level work area to install foundations and guy-anchors, where required for the individual structure type. If the existing terrain and vegetation at a structure location inhibit safe construction methods, a temporary work area of up to 200 feet by 200 feet will be cleared and leveled with heavy equipment to support construction activities. If the terrain is sufficiently level but vegetation hinders safe construction methods, the vegetation at the temporary work area may be mechanically cleared with a hydro ax or similar mowing equipment. Structure work areas in difficult terrain may require expansion of a given work area up to 250 feet in length within the ROW to accommodate safe construction methods. Towers may not necessarily be located in the center of a designated structure work area. Overland travel outside of the temporary work areas may be required by construction equipment for specific in-and-out tasks such as anchor installation, tower erection, and access to sleeve points. During Project restoration activities, temporary work areas at structure locations will be partially reclaimed leaving, where terrain allows, an approximately 100-foot by 100-foot permanent disturbance area for use during maintenance activities.

Temporary work areas will also be required at pull and tension sites and mid-span splice sites. These areas are required to install the transmission conductors as well as the OPGW and static ground wire. Typically, tensioning and pulling sites are located at angle structures and at substation locations for stringing the conductor and ground wire. Distances between each site vary depending on the right-of-way alignment, terrain, the length of the conductor pull, and the accessibility by equipment. Pulling sites will be aligned with the transmission line centerline, but typically be located on the far side of the angle structure. At each pulling site, stringing equipment will be set up approximately 400 feet from the structure for leveraging the conductor pull safely. The positioning of the stringing equipment at individual pull and tension sites will be determined by terrain, height of adjacent structures, and applicable industry standards. Where construction occurs in rough terrain, these sites may require larger, less symmetrical pulling and tensioning sites. The work area disturbance area associated with each pull and tension site, and each mid-span splice site, is typically up to 200 feet by 500 feet. A clear, level work area is required at these sites to safely install the conductor and ground wires. If the existing terrain and vegetation at a pull and tension or splice location inhibit safe construction methods, the temporary work area of up to 200 feet by 500 feet will be cleared and leveled with heavy equipment to support construction activities. If the terrain is sufficiently level but vegetation hinders safe construction methods, the vegetation at the temporary work area may be mechanically cleared with a hydro ax or similar mowing equipment. During Project restoration activities, temporary work areas at the pull and tension and splice sites will be reclaimed.

While the majority of the alignment passes through low-lying scrub vegetation, the clearing of some natural vegetation along the proposed ROW may be required. Selective clearing would be performed only when necessary to provide for surveying, electrical safety clearances, line reliability, and maintenance. Topping or removal of mature vegetation, under or near the conductors, would be done to provide adequate electrical clearance as required by NESC standards. After line construction, all work areas not needed for normal transmission line maintenance would be graded to blend, as near as possible, with the natural contours, and revegetated and restored where required.

<u>Foundation and Guy-Anchor Installation:</u> Excavations for foundations will be made with power drilling and/or excavating equipment. In rocky areas, the foundation holes may be excavated by drilling and blasting, or special rock anchors may be installed. Safeguards (e.g., blasting mats) may

be employed when adjacent areas need to be protected. In extremely sandy areas, soil stabilization by water or a gelling agent may be used prior to excavation. Foundation holes left open or unguarded will be covered to protect the public and wildlife. If practical, fencing may be used. Spoil material (excavated subsoil) will be used for fill where suitable.

After excavations are completed, precast or cast-in-place footings will be installed. The precast footings will be lowered into the excavated foundation hole, positioned, and backfilled. The cast-in-place footings will be installed by placing reinforcing steel and a tower stub into the foundation hole, positioning the stub, and encasing it in concrete. Spoil material will be used for fill, where suitable. The foundation excavation and installation will require access to the site by a power auger or drill, a crane, material trucks, and ready-mix trucks.

For those tower types that include guy wires, anchors will be installed at the structure site with power drilling or excavation equipment. Grouted earth anchors and plate anchors are among those that may be installed, depending on site specific conditions. Anchors will be installed to a depth necessary to provide the required structural support to the transmission tower. Some anchor locations may be positioned such that the installation equipment will need to drive beyond a typical 200-foot by 200-foot work area within the right-of-way to properly set the anchor. The installation of grouted earth anchors often produces a small amount of hardened grout, similar to concrete, at the surface. These hardened grout spoils may be positioned to protect the anchor from damage from passing vehicles. Where guy wires are used, appropriate guy guards would be installed at the base of the guy wires.

Delivery of Materials to the Right-of-Way: Once temporary work sites and structure pads have been prepared, steel members and associated hardware will be delivered by truck. Trucks will be unloaded by forklifts, cranes, or other lifting equipment at identified work areas. Material handling and delivery will occur during much of the construction period to support efficient construction methods. After transmission tower component deliveries are completed, spools of conductor and ground-wire will be delivered to wire pulling and tensioning sites in advance of stringing activities.

Assembly and Erection of Transmission Structures: Depending on the specific tower type and the anticipated method of erection, transmission structures will be fully or partially assembled at each tower pad or in groups at construction yards. In easily accessible terrain, each structure will likely be assembled on its designated tower pad. Guy supported structures will likely be assembled completely on the ground and then erected in one piece with the use of a crane and forklift. Structures that are fully assembled on the ground may require that a forklift drive beyond a typical 200-foot by 200-foot work area within the right-of-way in order to assist with the erection of the structure. Self-supporting lattice or tubular structures will be partially assembled on the ground at each tower pad and then erected in sections using a crane. Insulators, hardware, and stringing sheaves are often attached to the structure before it is erected.

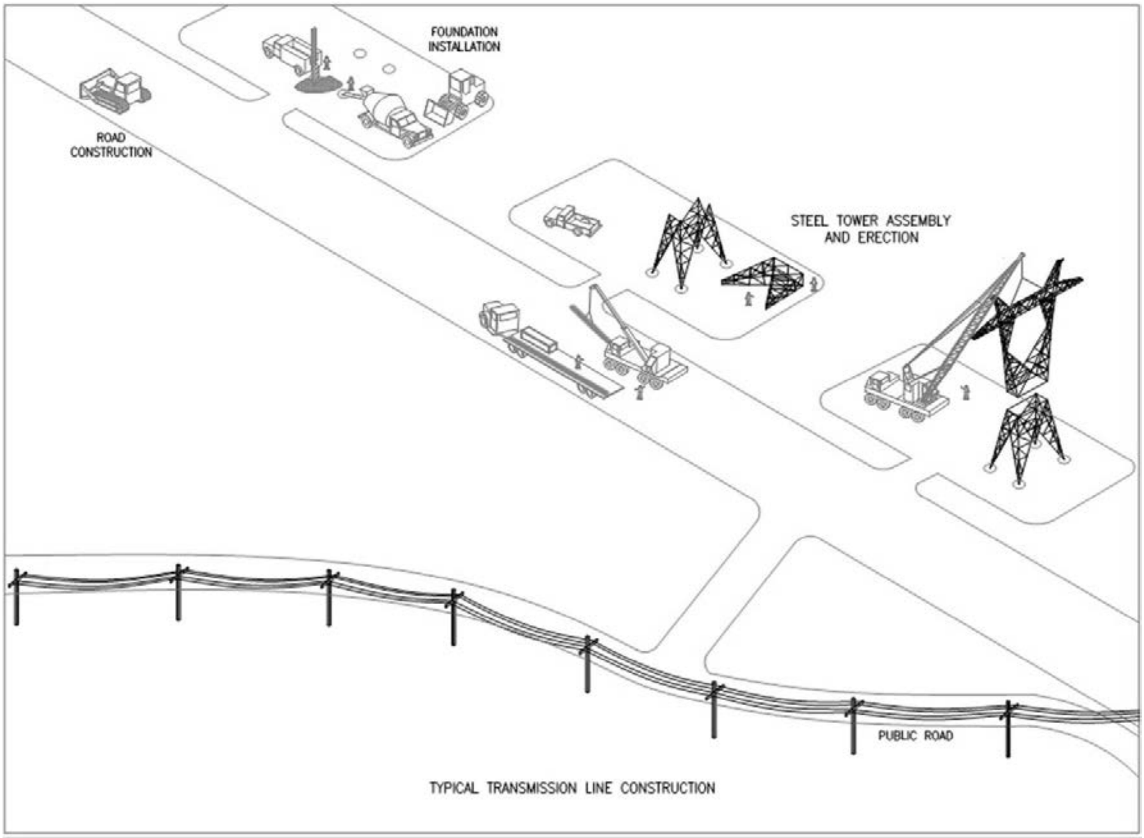


Figure 2-13: Foundation Installation, Tower Assembly, and Tower Erection

<u>Counterpoise Installation:</u> Part of standard construction practices prior to wire installation will involve measuring the resistance of tower footings. If the resistance to remote earth for each transmission tower is greater than 10 ohms, counterpoise (grounds) would be installed to lower the resistance to 10 ohms or less. Counterpoise may consist of a bare copper clad or galvanized steel cable buried a minimum of 12 inches deep, extending from one or more tower legs within the limits of the right-of-way and may be altered or doubled back-and-forth to meet the resistance standard. Typical equipment used for installing ground rods includes line trucks, backhoes, and trenchers.

<u>Conductor and Ground Wire Installation:</u> The towers will be rigged with insulator strings and stringing sheaves at each ground wire and conductor position.

Pilot lines will be pulled (strung) from tower to tower by either a helicopter or land operated equipment and threaded through the stringing sheaves at each tower. Following pilot lines, a stronger, larger diameter line will be attached to conductors to pull them onto towers. This process will be repeated until the ground wire or conductor is pulled through all sheaves.

Ground wires, fiber optic cable, and conductors will be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end of a conductor segment. Sites for tensioning equipment and pulling equipment will be approximately 2 to 3 miles apart. The tensioning and pulling sites will be an area approximately 200 feet by 400-600 feet, depending on the structure's purpose (e.g., mid-span or dead-end). Tensioners, pullers, line trucks, wire trailers, dozers, pickups, and tractors needed for stringing and anchoring the ground wire or conductor will be located at these sites. The tensioner, in concert with the puller, will maintain tension on the ground wire or conductor while they are fastened to the towers.

Tension will be maintained on all insulator assemblies to ensure positive contact between insulators, thereby avoiding sparking. Caution also will be exercised during construction to avoid scratching or nicking the conductor surface, which may provide points for corona to occur. See Figure 2-14 for a general illustration of this procedure.

For protection of the public during wire installation, guard structures will be erected over public roads, power lines, structures, and other barriers. Guard structures will consist of H-frame wood poles placed on either side of the barriers or by using boom trucks raising a guard cross beam. These structures will prevent ground wires, conductors, or equipment from falling across obstacles. Equipment for erecting guard structures will include augers, backhoes, line trucks, boom trucks, pole trailers, and cranes. Guard structures may not be required for small roads. In such cases, other safety measures such as barriers, flagmen, or other traffic control will be used. Following stringing and tensioning of all conductors, the guard structures will be removed and the area restored.

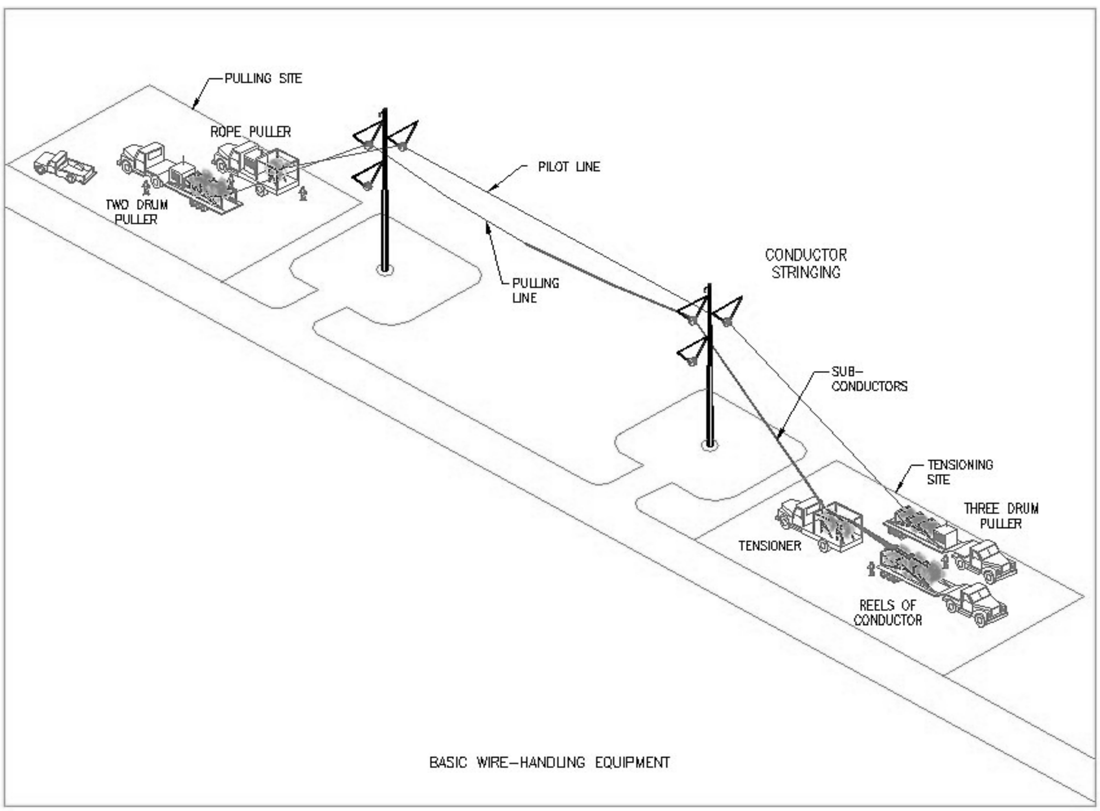


Figure 2-14: Typical Transmission Line Conductor Stringing Activities

2.11 Aviation Lighting

The Project will be permitted as necessary through the FAA. This will likely include red lights on select turbines to adequately warn aircraft pilots of the obstructions at night. The FAA determines which turbines would require nighttime lights, but it is anticipated that about half of the turbines would be marked by red lights, particularly the turbines closest to the Project boundary or on high terrain. The lights would either come pre-installed on turbine components or would be installed on the turbines during the turbine erection process which is described in Section 2.9 of the POD. See Section 1.3.8 of the POD for further detail on the turbine lights and FAA requirements.

MVE is investigating the ability to deploy an aircraft detection lighting system (“ADLS”) to mitigate the need for continuous operation of the red flashing lights during night-time hours. These systems must be approved by the FAA for deployment at a given wind facility. For the Project area, MVE anticipates up to four ADLS radar installations will be sufficient to provide coverage of the detection area proximate to the Project. The final number of ADLS stations and associated heights of the towers will be selected when an equipment provider is chosen and detailed engineering is performed to identify what is needed to cover the Project site.

An ADLS system typically contains a tower up to 200 feet in height with associated radar equipment attached. ADLS systems typically receive power from the wind project via the 34.5 kV collection system or an onsite generator. An access road will need to be constructed to accommodate a truck carrying the tower components and a crane that will be utilized to erect the tower. A construction pad roughly 300 feet by 300 feet will then be cleared. The hole for the foundations will then be excavated and the foundations will be installed and backfilled. After the foundations are complete, the tower and control building are erected. The fenced area to remain for the operations of the Project is anticipated to be approximately 100 feet by 100 feet per ADLS station.

2.12 Site Stabilization, Protection, and Reclamation

Site stabilization and protection practices will be implemented to prevent erosion of soils during wind and rainfall events. The potential for wind erosion will be minimized in accordance with the Project’s DECP attached as Appendix O to the POD. The potential for erosion during rainfall events will be minimized in accordance with the Project’s SWPPP, which includes BMPs such as weed-free straw wattles and silt fencing. Appendix R: Noxious Weed Management Plan of the POD details the control of noxious weeds and reseeding efforts that will be used in the Project area after disturbances.

Reclamation at the close of Project construction will be implemented in accordance with the Project’s Reclamation Plan attached as Appendix E to the POD. This plan specifies the procedures for restoration of those areas temporarily disturbed during construction and will address, as applicable, removal of temporary features (e.g., temporary access roads, pulling and tensioning sites, and offsite laydown areas), and revegetation.

2.13 Operations and Maintenance Buildings

The O&M buildings will be constructed utilizing conventional construction techniques for pre-engineered buildings. An access road will need to be constructed to accommodate the trucks carrying the building materials. The area where the building will be erected will be surveyed, staked, cleared, and graded. The foundation and underground facilities (water, power, communications, sewer, etc.) will then be installed. After the foundation and underground facilities are complete, the building structures and exterior enclosures are erected followed by the installation of interior equipment and finishes. Parking areas, drive areas, and security fencing around outdoor storage yards will also be installed for the O&M facilities.

2.14 Meteorological Towers

The detailed construction method utilized will depend on the type of meteorological (“met”) tower installed for the Project. The work area and infrastructure disturbance resulting from installation, removal, or maintenance activities related to the met towers will be kept to the minimum amount necessary to meet Project design requirements. Met towers will not be located in areas where ecological resources, known to be sensitive to human activities, are present. Installation of towers will be scheduled to avoid disruption of breeding activities or other important wildlife behaviors as described in Appendix M: Bird and Bat Conservation Strategy. Anticipated construction methods for the met towers are described below.

An access road will be constructed to accommodate a truck carrying the tower components and tower lifting equipment. A construction pad roughly 200 feet by 460 feet will then be established. The hole for the foundation will then be excavated and the foundation will be installed and backfilled. After the foundations are complete, the tower is erected. Final design may or may not include guy wires. For guyed meteorological tower designs, the guy wires will be affixed to ground anchors at the time of erection. In order to install the guy wires, additional disturbance areas will extend beyond the main work area. These guy wire disturbance areas will be approximately up to 40 feet wide and 220 feet long. Typically, a met tower site will result in a smaller area of permanent use around the base of the tower. The guy wire disturbance areas will also be utilized as needed throughout the operations phase in order to perform maintenance activities on the met towers.

3.0 Related Facilities and Systems

3.1 Transmission System Interconnect

3.1.1 Existing and Proposed Transmission System

Existing Transmission System: The Project site is crossed by three (3) existing 345 kV transmission lines, the Midpoint to Adelaide 345 kV transmission line, the Midpoint to Borah 345 kV transmission line, and the Midpoint to Kinport 345 kV transmission line. The alignment of these existing lines can be found on Figure 6-1.

Two other existing high-voltage transmission lines are in the general vicinity but do not directly cross the Project area, the Midpoint to Hemmingway 500 kV transmission line and the Midpoint to Valmy 345 kV transmission line. In addition, the right-of-way for the authorized but not yet constructed Southwest Intertie Project – Northern Portion (“SWIP-North”) 500 kV transmission line is located in the general vicinity of the Project area. SWIP-North is a planned point of interconnection for the Project. These additional facilities are also found on the map in Figure 6-1.

These existing transmission facilities all interconnect to the 230/345/500 kV Midpoint Substation which is located approximately 12 miles west of the Project near US Highway 93 in Jerome County. Midpoint Substation is a planned point of interconnection for the Project.

The Project area is bisected by a designated 3,500-foot wide West-Wide Energy Corridor (“WWEC”) identified as corridor 49-112. The Midpoint to Adelaide 345 kV transmission line is located within that utility corridor. Also in the region is a 3,500-foot wide WWEC identified as 112-226. The permitted SWIP-North and the existing Midpoint to Valmy transmission lines are located within that utility corridor.

Proposed Transmission System: A description of the Project’s 34.5 kV collector lines and 230 kV and 500 kV transmission lines can be found in Section 1. Section 2 provides information on the construction of these proposed facilities.

3.1.2 Ancillary Facilities and Substations

A description of the Project’s substations can be found in Section 1. Section 2 provides information on the construction of these proposed substations.

3.1.3 Status of Interconnect Agreement

MVE has executed a Large Generator Interconnection Agreement with Idaho Power Company (“IPC”). The next step of the process is for IPC to design, procure, and construct the interconnection facilities necessary to accommodate the Project.

3.2 Meteorological Towers

MVE currently has eight (8) temporary pre-construction meteorological towers (“met towers”) installed across the Project site to record wind conditions. MVE also deployed a LiDAR to record wind speeds at higher elevations and confirm other atmospheric conditions suggested by the met tower data. Temporary pre-construction met towers will be removed prior to or during construction (or at the end of their respective ROW term, if sooner).

Up to twelve (12) calibration met towers (“CMTs”) and up to twelve (12) power performance test met towers (“PPTs”) will be installed for the Project. Of the twelve PPTs installed, up to five (5) of the PPTs will remain as permanent meteorological towers (“PMMs”) throughout the operations phase of the Project. The PPTs that do not remain as PMMs will be removed once the performance of the installed wind turbine is confirmed against their warranted power curve, typically six to twelve (6-12) months after initial operation of the wind turbine. The CMTs will be installed at up to twelve turbine locations prior to installation of the associated turbines. The CMTs will be removed prior to the installation of the twelve turbines. The disturbance needed for the CMTs will be within the work area radius for the associated turbines. Thus, the CMTs will not cause additional disturbance acreage beyond what is described for the turbines.

The permanent met towers typically have heights at least to the wind turbine hub height. MVE is also exploring the feasibility of permanent measurement options utilizing a combination of meteorological towers at a height lower than hub height (60-80 meters, for example) and a LiDAR. For the reasons described in this section, MVE has not yet selected a design for the met towers, but anticipates that the towers will be steel monopole or lattice. MVE will explore the potential of using non-guyed towers, however site conditions may require guyed structures. Where guy wires are used, appropriate guy guards would be installed at the base of the guy wires. See Section 2.14 for construction information related to the permanent met towers.

Sensors on the met towers may include anemometers, wind direction vanes, air temperature proves, and humidity sensors. The output of these sensors will be connected via fiber optics to the nearest wind turbine, and then back to the operations center over the Project’s fiber optic network. All met towers will have appropriate lightning protection equipment installed to protect the structures from direct lightning strikes.

3.3 Other Related Systems

During construction, MVE may investigate means of improving the wireless communications on-site. Mobile radio repeaters and cellular stations may be placed on-site in areas already disturbed for Project construction. If any such equipment is used, it will be licensed with appropriate regulatory agencies and removed upon construction completion.

MVE will explore voice and data communication options through local providers for use during operation, most likely connected along the same overhead poles as the distribution power connection. It is possible there will also be a fiber optic connection to the Project's transmission provider.

4.0 Operations and Maintenance

4.1 Operation and Facility Maintenance Needs

The functionality of the wind turbines and safety systems will be tested to ensure they operate in accordance with the manufacturer's specification before the turbines are commissioned for operation. In general the order of energizing the system would be:

- Interconnection substation
- 345 kV or 500 kV transmission line
- 345 kV or 500 kV substation
- 230 kV transmission network
- Collection substations
- 34.5 kV collector lines
- Pad mounted transformers at each wind turbine
- Wind turbines

At each stage, testing would be performed to ensure the equipment has been installed correctly. When all systems have been tested and are operating properly, the Project would be commissioned for operation.

4.1.1 Scheduled Wind Turbine Maintenance

Due to the nature of wind farm facilities that are comprised of many individual wind turbines, turbine O&M activities are typically conducted on a turbine-by-turbine basis and does not usually affect the entire wind farm's operation. MVE would likely schedule maintenance during the season with the lowest expected wind resource in order to minimize impacts on the performance of the facility. All wind turbines will be properly maintained and inoperative wind turbines will be repaired, replaced, or removed in a timely manner.

The operational staff will perform routine maintenance, long-term maintenance, and emergency work. The facility staff will be responsible for arranging needed repairs either through internal resources or with the aid of additional contractor support.

Routine wind turbine maintenance typically occurs every six months to a year. The requirements for scheduled maintenance varies by turbine vendor. The following activities may apply:

- Visual and noise inspection of all major turbine components
- Torque checks on tower and component bolts
- Level and leak check on lubrication systems
- Lubricate appropriate seals and bearings
- Level and leak check and sampling of gearbox oil
- Replace gearbox oil filters

- Brake system inspections
- Test control and emergency systems
- Inspect aviation warning lights

Turbine fluids are only replaced when necessary, with an industry average frequency of about once every five years.

Long-term maintenance may include replacement/rebuilding and cleaning larger components such as generators and gearboxes, testing electrical components, and refurbishing blades. For most O&M work, MVE anticipates a permanent disturbance work area of a 100-foot radius around the turbine should be sufficient.

4.1.2 Unscheduled Wind Turbine Maintenance

MVE will ensure a comprehensive and effective scheduled maintenance program is in place, however there will be turbines that require unscheduled services or repairs. If the needed repair impacts the turbine's performance or the performance of any other component of the Project, MVE will perform the maintenance work as soon as practicable.

Most unscheduled maintenance consists of minor repairs internal to the turbine and will be performed as needed. If unscheduled maintenance activities requires work outside the turbine, then work will be performed as soon as weather allows. Certain unscheduled work, such as blade repairs or repairs to other large components, may require the use of cranes. In the instances where cranes are needed, a crane pad would be reconditioned and the cranes would be brought in on trucks and assembled at the turbine site. Certain work area disturbance areas will be reopened to perform certain necessary O&M activities. For example, if a large turbine component needs to be replaced and cranes are needed onsite, intersection/turn improvements and turbine work areas would need to be reopened to the work area disturbance dimensions to accommodate the space needed to perform the O&M activities. Upon completion of the O&M activities, the reopened areas would be reclaimed consistent with methods utilized post-construction.

4.2 Maintenance Activities

MVE will be in compliance with all control and mitigation measures established for the Project in the POD and the area disturbed by operational-related activities (i.e. footprint) will be kept to a minimum. As appropriate, the resource-specific management plans that are a part of the POD will be maintained and implemented throughout the operational phase. As needed, these control and mitigation measures will be reviewed and revised to address changing conditions or requirements throughout the operational phase. Existing improvements (fences, gates, etc.) will be repaired or replaced if they are damaged by Project activities, as agreed to by parties involved.

<u>Roads:</u> The Project roads will receive maintenance as needed. Road surfaces will be bladed and maintained so that safe access to all Project areas is provided while minimizing dust generation.

Periodic inspection and maintenance will be done for drainage and erosion control measures. Snow removal will be performed as required to ensure safe access for personnel. Snow removal will occur to accommodate daily traffic from public roads to the O&M facilities. Other Project roads will be plowed if O&M staff needs to gain access to a particular Project component to perform O&M activities.

Collection system: For the underground portions of the collector lines, most maintenance issues arise where the lines connect to the junction boxes. Junction boxes are installed above ground so that it is easy to access them. If an issue occurs away from a junction box, MVE will use testing to identify the location of the fault and would excavate a small portion of the cable and replace it. The excavation disturbance would then be reclaimed per the requirements of the reclamation plan.

The overhead portions of the collector lines would be inspected and repaired as needed. If a section of the overhead line needs replacement, it will be done in a manner similar to the original installation.

Substations: Preventative maintenance is often performed on an annual basis that usually includes a brief (less than 1 day) shut-down and de-energization. Substation maintenance can typically be performed within the substation fence and without large equipment. Typically, the work is performed at ground level or using utility boom trucks.

MVE will have technicians on-staff to perform and supervise substation maintenance. Personnel will also be prepared to perform any as-needed maintenance outside of the typical planned preventative maintenance.

Transmission lines: The transmission line will be inspected annually or as required by using fixed-wing aircraft, helicopters, drones, ground vehicles, all-terrain vehicles, or on foot. Maintenance will be performed as needed, and the comfort and safety of land users and local residents will be provided for by limiting noise, dust, and the danger caused by maintenance vehicle traffic.

Accepted standard utility practices, such as repeated tree trimming and brush removal, will be followed to maintain the ROW. Pursuant to Section 512(e) of the Federal Land Policy and Management Act of 1976 (Public Law 115-141), if vegetation or hazard trees have contacted or present an imminent danger of contacting an electric transmission or distribution line from within or adjacent to the ROW, the vegetation or hazard trees will be pruned or removed to avoid the disruption of electric service and eliminate immediate fire and safety hazards. MVE will notify the local BLM field or district office of such occurrence no later than 1 day after the date of the response to emergency conditions. MVE will comply with agency requirements regarding management of noxious weeds within the ROW, along access roads, and at temporary use areas.

Other facilities: The met towers will receive maintenance annually or as needed to replace sensors, check structure conditions, and check guy wire tension (if guy-wired structures are used).

The site buildings will receive as-needed maintenance.

4.3 Operations Workforce, Equipment, and Ground Transportation

The O&M buildings will be used to store equipment and supplies required for operations and maintenance of the Project, house control functions such as the control system used to provide two-way communication with each wind turbine, and provide facilities where O&M personnel can prepare documentation of work done on the Project. An O&M building (see Figure 4-1) typically houses the O&M crew, stores spare parts, and provides facilities to monitor the Project.

Figure 4-1: Example O&M Building

MVE intends that the telecommunications and electrical services for the O&M buildings will be from local providers. External lighting would be minimal with downward directed lighting. MVE may install a chain-link fence that would be up to 8 feet high and may be topped with barbed wire.

A water supply well, comparable in capacity and design to a residential well (typically 10- to 15-gallons per minute), may be drilled on the O&M sites to provide potable water to the O&M buildings for domestic water supplies. All necessary entitlements and permits will be acquired prior to construction and permit requirements will be followed during construction. Similarly, a septic system comparable in capacity and design to a residential system may be installed for the O&M buildings.

Limited quantities of lubricants, cleaners, and detergents would be stored near and within the O&M buildings. Waste fluids will be stored in accordance with applicable regulations at the O&M buildings for short periods of time during Project operations. BMPs incorporated into the design of the O&M facilities, including containment areas and warning signs, would minimize the risk of accidental spill or release of hazardous materials at the facilities. No risk to health and safety or the environment is anticipated.

The O&M buildings would be staffed during typical business hours, although there may be occasions when employees would work on weekends as well. Because turbines can be operated remotely, there is no need to have personnel on site 24 hours per day. It is anticipated that up to 20 full-time workers will be employed during the operations phase of the Project. When certain O&M activities occur, such as replacing a turbine component, additional personnel will be required. MVE anticipates up to 75 workers could be onsite periodically for specific O&M activities.

The O&M buildings would be located where primary access roads enter the Project site. This will provide easy access for the O&M staff and prevent unnecessary disturbance in the Project site.

5.0 Environmental Considerations

5.1 General Description of Site Characteristics and Potential Environmental Issues

Protecting the environment and working with local communities are two important factors of MVE's development philosophy. As such, MVE has been coordinating with various agencies, government officials, and local stakeholders since development of the Project began in 2019. MVE has made several modifications to the Project in order to minimize impacts to sensitive resources and local communities. This includes revisions to the Project area to remove previous corridors near the town of Dietrich and working with local grazers to develop a construction plan that will minimize impacts to grazing operations. Additionally, MVE will request that FAA permits the use of ADLS which will reduce visual impacts on night skies. MVE will continue to work with the BLM and other applicable agencies to promote a development plan that aims to avoid, minimize, and/or mitigate for impacts to environmentally sensitive areas.

The following sections provide a high-level overview of conditions and resources within the Project site and the proposed methods, procedures, and protocols for effectively identifying, monitoring, and evaluating those resources. Detailed information on resources within the Project area as well as potential impacts will be evaluated in the Environmental Impact Statement. MVE has incorporated numerous BMPs throughout the main body and appendices of this POD to address potential impacts. These measures may be further refined as resource impacts are assessed and Project stakeholders recommend actions that may further minimize environmental effects.

5.1.1 Sensitive Species and Habitats

MVE has retained an environmental consulting firm to prepare a study plan for conducting a suite of baseline wildlife and plant surveys at the Project site. The proposed studies follow guidance from the US Fish and Wildlife Service's ("USFWS") Land-based Wind Energy Guidelines ("WEG") for Tier 3 studies (USFWS 2012), Eagle Conservation Plan Guidance ("ECPG"; USFWS 2013), and the current rules for eagle take permits (USFWS 2016). These studies also incorporate resource specialists' experience working in Idaho with USFWS, Bureau of Land Management ("BLM"), and Idaho Department of Fish and Game ("IDFG"). Continued coordination with these agencies will ensure field surveys will be implemented in accordance with current agency protocols.

The initial study plan includes the following tasks: 1) meetings with federal/state agencies to gather additional information; 2) fixed-point avian use surveys; 3) eagle/raptor nest surveys; 4) desktop-level impact assessment for greater sage-grouse (Centrocercus urophasianus); 5) Ground checks of active and pending leks within the Project area; 6) Aerial reconnaissance for leks within or in proximity to the Project; 6) bat acoustic monitoring surveys as well as NABat acoustic monitoring surveys; 7) wetland delineation surveys; 8) sensitive plant surveys; and 9) pre-construction surveys for a suite of designated BLM sensitive species. Full study plans and methodologies, as approved by the requisite state/federal agencies, will be implemented to characterize the existing resource conditions in the Project area.

5.1.2 Special Land Use Designations

MVE has performed a desktop review of aerial imagery and land use planning information available in the public domain focused on existing and planned land uses, prime farmland, and zoning districts in Jerome, Lincoln, and Minidoka counties for the Project.

Existing land use: Existing land use in the Project area consists primarily of rangeland with pockets of center pivot-irrigated cropland and low-density, single-family residences associated with these agricultural uses. A network of dirt and gravel county roads, State Highway 24, and US Route 26 provide surface transportation in the Project area. In Lincoln County, a Union Pacific Railroad segment between the Dietrich Butte and Sid/Owinza Butte areas provides long-distance freight transport. Land that the State of Idaho manages exists in Sections 16 and 36 in several sections in and around the Project area. Existing utilities include electric power transmission and distribution lines.

Planned land use: In and around the Project area, planned land uses seek to continue existing agricultural uses. Per the 2018 Jerome County Comprehensive Plan, agriculture is the planned land use in and around the Project area. The Plan's objectives for land use include preserving agricultural uses. The 2013 Minidoka County Comprehensive Plan also seeks to preserve the rural atmosphere, whereby agricultural uses can continue to flourish. MVE does not consider a wind energy infrastructure to be a conflicting land use with agricultural uses.

Prime farmland: The United States Department of Agriculture ("USDA") designates prime farmland, which is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these land uses. Prime farmland has a combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods. In general, prime farmland has an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, and few or no rocks (USDA 2015).

In Idaho, state and local government resource agencies can also designate prime farmland and farmland of statewide or local importance, which include similar characteristics as prime farmland if managed according to acceptable farming methods. Farmland can also be defined as unique if it produces specialized crops. A preliminary review of soils data suggests that prime farmland may exist over a relatively small portion of the Project area. A more detailed review will be necessary to determine if prime farmland is present.

5.1.3 Visual Resource Management ("VRM") Designations

The Project is located within the Snake River Plain Section of the Columbia Plateau Physiographic Province, Intermountain Plateau Division. Basaltic plains punctuated by extinct lava buttes characterize the Project area. Cultivated areas and open range are dominant, with sagebrush and grassland covering most of the landscape not under cultivation.

The Project is located within a mix of private lands and federal lands, with sections of state-owned land regularly scattered throughout the area. Visual resources on BLM land are managed under the Visual Resource Management ("VRM") classification system, with VRM Class I being the most restrictive and VRM Class IV being the least restrictive designations. The Monument Resource Management Plan ("RMP") establishes VRM Classes on BLM land within the Project area.

A detailed analysis using BLM VRM contrast rating analysis specific to sensitive viewpoints will be used to determine constancy with established VRM Classes.

5.1.4 Cultural and Historic Resource Sites and Values

During the course of Project construction, operations, and maintenance, MVE, its contractors and all project personnel must comply with federal and state laws and regulations including, but not limited to:

- Section 106 of the National Historic Preservation Act (16 United States Code [USC] 470 [1966]); implementing regulations at 36 Code of Federal Regulations (CFR) 800 (2000), including Planning for Subsequent Discoveries Using a Programmatic Agreement (36 CFR 800.13(a)(1) [2000]) and Post-Review Discoveries Without Prior Planning (36 CFR 800.13(a)(2)(b) [2000]);
- Secretary of Interior's Professional Qualification Standards as described in 36 CFR 61;
- The Native American Graves Protection and Repatriation Act (25 USC 3001, implementing regulations at 43 CFR 10);
- The Archaeological Resources Protection Act (16 USC 470aa), implementing regulations at 43 CFR 7 for BLM;
- Idaho Code Title 67 Chapter 41: Idaho Historical Society; and
- Idaho Code Title 27 Chapter 5: Sections 27-502 through 27-504: Protection of Graves.

To initially evaluate the number of cultural resources within the proposed Project area and to establish a general impression of the archaeological sensitivity of the Project area and its surrounding environment, several databases and maps were consulted for the property as well as a 1.0-mile buffer beyond the Project areas boundaries. Sources included online databases for the NRHP listed properties, National Historic Trails, National Historic Landmarks, and historic General Land Office plat maps, and National Historic Trails maps; which were reviewed for the potential presence of those resources. MVE intends to conduct a detailed cultural resources investigation, and is currently working to complete a Class I literature review/file search in order to identify any newly or previously recorded cultural resources located in or near the Project Area.

Paleontological resources: During the course of Project construction, operations, and maintenance, the Proponent, its contractors and all project personnel must comply with federal and state laws and regulations including, but not limited to:

- Paleontological Resources Protection Act of 2009 (Public Law 111-011)
- Idaho Code Title 67 Chapter 41: Idaho Historical Society; Part 4119

The state geologic map was consulted to determine the potential for, and possible extent of paleontological resources within the proposed Project study area, and to establish a general impression of the fossil sensitivity of the Project area and its surrounding environment. Based on geologic understanding of a particular area, the BLM provides a Potential Fossil Classification ("PFYC") rating for geological units and their potential to produce fossils (USDOI 2016). These are summarized as:

Class 1: Very Low

Class 2: Low

Class 3: Moderate/Undetermined

Class 4: High

Class 5: Very High

A review of the state geological map shows that the entirety of the Project area falls within the Quaternary to Eocene Continental Volcanic and Intrusive Rocks ("QTb") geological unit, comprised of flows and cinder cones of olivine tholeiite basalt and shallow basalt intrusives. These types of deposits are typically rated as Class 1, suggesting that while possible, the potential for fossils to be present is very low.

5.1.5 Native American Tribal Considerations

The lead federal agency will be required to conduct Native American consultation with tribes in southern Idaho; specific tribes will be determined by the lead federal agency. Although no known Traditional Cultural Properties (TCPs) or traditional use areas occur in the Project study area, it is through this process that any potential Tribal concerns would be brought to light and addressed through the consultation process. It is possible that interested Tribes may include the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), the Shoshone-Bannock Tribes of the Fort Hall Indian Reservation, and other Shoshone-Paiute groups.

5.2 Other Uses on Project Site

Other utilizations of the Project site, such as existing authorized land uses, public access, and recreational activities will be reviewed and evaluated in consultation will all stakeholders. MVE continues to work with local grazers to lessen the impacts on ranching operations. Public open-houses have been held during development to generate constructive feedback from the local community. MVE will continue to solicit public input via its website and through meeting with stakeholder groups throughout the life of the Project. Consideration of such uses will be used to inform development of the Project and will influence design refinement.

MVE coordinated with various consultants with experience in the wind industry to establish appropriate setback distances for wind turbine placement in the current design of the Project. The incorporated setback distances are not required; however, they are considered to be best-practice in the industry and are widely utilized for wind project design across the U.S. to minimize potential impacts to surrounding sensitive receptors, such as residences and occupied buildings. Setback distances are typically defined by a fixed distance (e.g., 2 miles) or a function of the dimension of the selected wind turbine (e.g., 1.1 x tip-height). MVE will continue to incorporate appropriate industry best-practice setback distances in further iterations of the Project's design.

Additional issues and measures include:

- Appropriate setback distances (as described in the paragraph above) will be used for turbine placement to minimize potential impacts to surrounding residences and occupied buildings.
- MVE will consider the expertise and ideas from local landowners, working groups, and other federal, state, county, and private organizations during the development of the Project.
- MVE will comply with applicable Federal Communications Commission ("FCC") regulations and will design the Project to minimize electromagnetic interference where feasible. In the event the Project results in electromagnetic interference, MVE will work with the owner of the impacted communications system to resolve the problem.
- All turbines will be sited at least 1,000 feet from irrigation canals to minimize impacts to bats and avian species attracted to such features.
- Project components will be designed to blend in with the surrounding landscape, which may include minimizing the profile of the ancillary structures, burial of cables, and lighting. If situations occur where MVE's design cannot blend into the landscape, such as instances with safety concerns or the design would create an undue environmental or engineering burden, MVE will utilize standard designs that avoid drawing visual attention, such as avoiding vibrant paint color or reflective surfaces.

5.2.1 Aviation and/or Military Considerations

The following airports lie in the general vicinity of the Project:

- Dietrich Landing Area – approximately one mile south of the Dietrich Butte area in Lincoln County.
- Shoshone Landing Area – approximately 5.4 miles west of the Dietrich Butte area in Lincoln County.
- Klosterman Landing Area – approximately six miles southeast of the Kimama Butte area in Minidoka County.
- Reynolds Airport – approximately 6.3 miles northeast of the Dietrich Butte area in Lincoln County.
- Hazelton Municipal Airport – approximately 10 miles southwest of the Cheatgrass Reservoir area in Jerome County.
- Jerome County Airport – approximately 12 miles southwest of the Wilson Butte area in Jerome County.
- Fairbanks Airfield – approximately 15 miles southwest of the Cheatgrass Reservoir area in Jerome County.
- Laidlaw Corrals Airport – approximately 16 miles northeast of the Sid/Owinze Butte area in Lincoln County.

The Dietrich Landing Area is the closest airstrip to the Project study area. This private facility is not subject to Federal Aviation Administration ("FAA") regulations governing navigable airspace. Nevertheless, MVE plans to coordinate Project activities with this facility's owners to ensure that Project construction activities avoid interference with landing area operations to the greatest extent possible.

Given the distances between Project components and the county and municipal airports listed above, no impacts to airspace navigation are expected. To confirm this, a more detailed review of Project components, particularly wind turbine and transmission structure heights, site elevations, and coordinates will be conducted to determine whether these components may obstruct navigable airspace or cause interference with ground-based navigational aids.

The FAA/Department of Defense Preliminary Screening tool was used to determine potential FAA permitting processes for the Project area. The Long Range Radar screening tool indicates the Target Area is in a green zone, which signifies there are no anticipated impacts to Air Defense and Homeland Security radars. However, an aeronautical study, such as an obstruction evaluation and airport airspace analysis, will still be required by the FAA in order to be compliant with FAA objectives to promote air safety and the efficient use of the navigable airspace. The Next-Generation Radar screening tool also indicates impacts from development of the Project are not likely and National Oceanic and Atmospheric Administration will likely not perform a detailed analysis, but they still request to be informed of the Project. The preliminary review of the Military Operations screening tool did not return any likely impacts to military airspace. MVE will continue coordinating with the agencies listed above to ensure they are informed as design of the Project is refined.

5.2.2 Other Environmental Considerations

Soil resources: The dominant soil order in the Project region are Aridisols and Mollisols (USDA NRCS 2006). The soils in the area most dominantly have a mesic or frigid soil temperature regime, an aridic or xeric soil moisture regime, and mixed or smectitic mineralogy. They generally are well drained, clayey or loamy, and shallow or moderately deep.

The Soil Survey Geographic Database (SSURGO; USDS NRCS 2019) database identified 40 soil types that occurred in the Project area, most of which were composed of various types of complexes. Power-Owinza-Rock outcrop complex, 1 to 8 percent slopes, Snowmore-Minveno-Hoosegow complex, 2 to 10 percent slopes, Rock outcrop-Banbury-Paulville complex, 2 to 6 percent slopes; Paulville-McPan-Starbuck complex, 1 to 8 percent slopes, Catchell-Paulville complex, 2 to 10 percent slopes, Idow-Power-Minveno complex, 1 to 4 percent slopes, Vickery-Paulville complex, 2 to 8 percent slopes, Power-McCain complex, 1 to 6 percent slopes; these eight types compose approximately 80% of the Project area.

5.3 Design Criteria

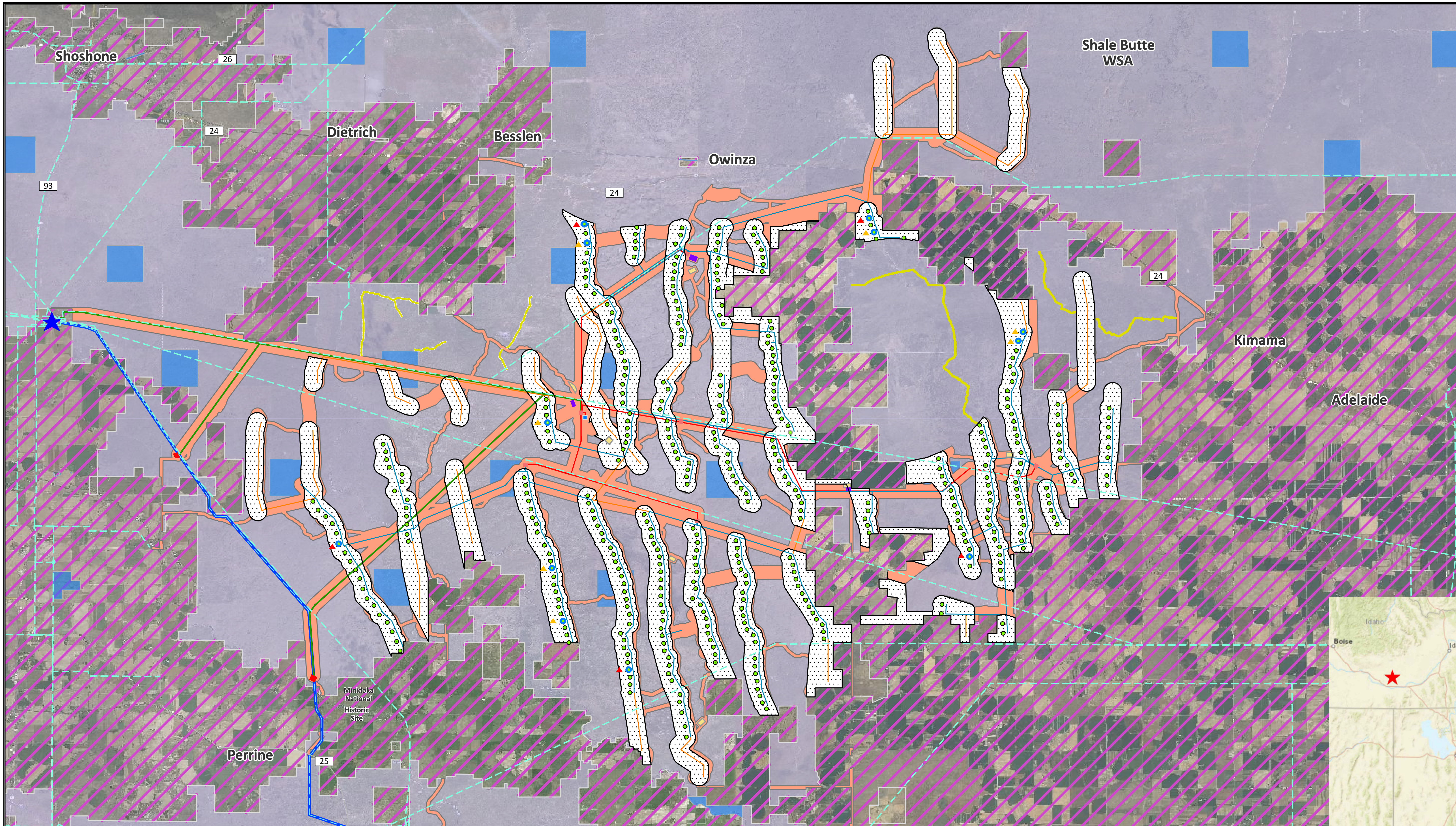
MVE has proposed design criteria and best management practices throughout this Plan of Development and associated appendices. MVE will use the results from the resource field studies to propose additional design criteria for various Project elements. MVE will look to implement best practices in all areas of Project design in order to avoid, minimize, or mitigate potential effects to environmental resources from construction and operation of the Project.

6.0 Maps

Representative drawings and figures of Project features are dispersed throughout this document. This section includes the following two maps:

Figure 6-1: Preliminary Electrical Design Overview Map

Figure 6-2: Preliminary Civil Design Overview Map



PROPOSED PROJECT FEATURES

- Combined Corridor
- BOP Corridor
- Range Improvement Corridor
- Wind Turbine
- 500kV Gen-Tie Options
- 230kV Transmission Line and Access
- 34.5kV Aerial Collector and Access
- 34.5kV Aerial Collector and Access (Alternate)
- Laydown Yard
- Substation
- Battery Energy Storage System
- O&M Facility
- Alternate POI Substation
- Permanent Met Tower
- Temporary Met Tower
- Calibration Met Tower

OTHER FEATURES

- BLM Land
- State Land
- Private Land
- Existing Transmission Line
- Midpoint Substation
- Planned SWIP-N Line

NORTH

0 1 2 3 Miles

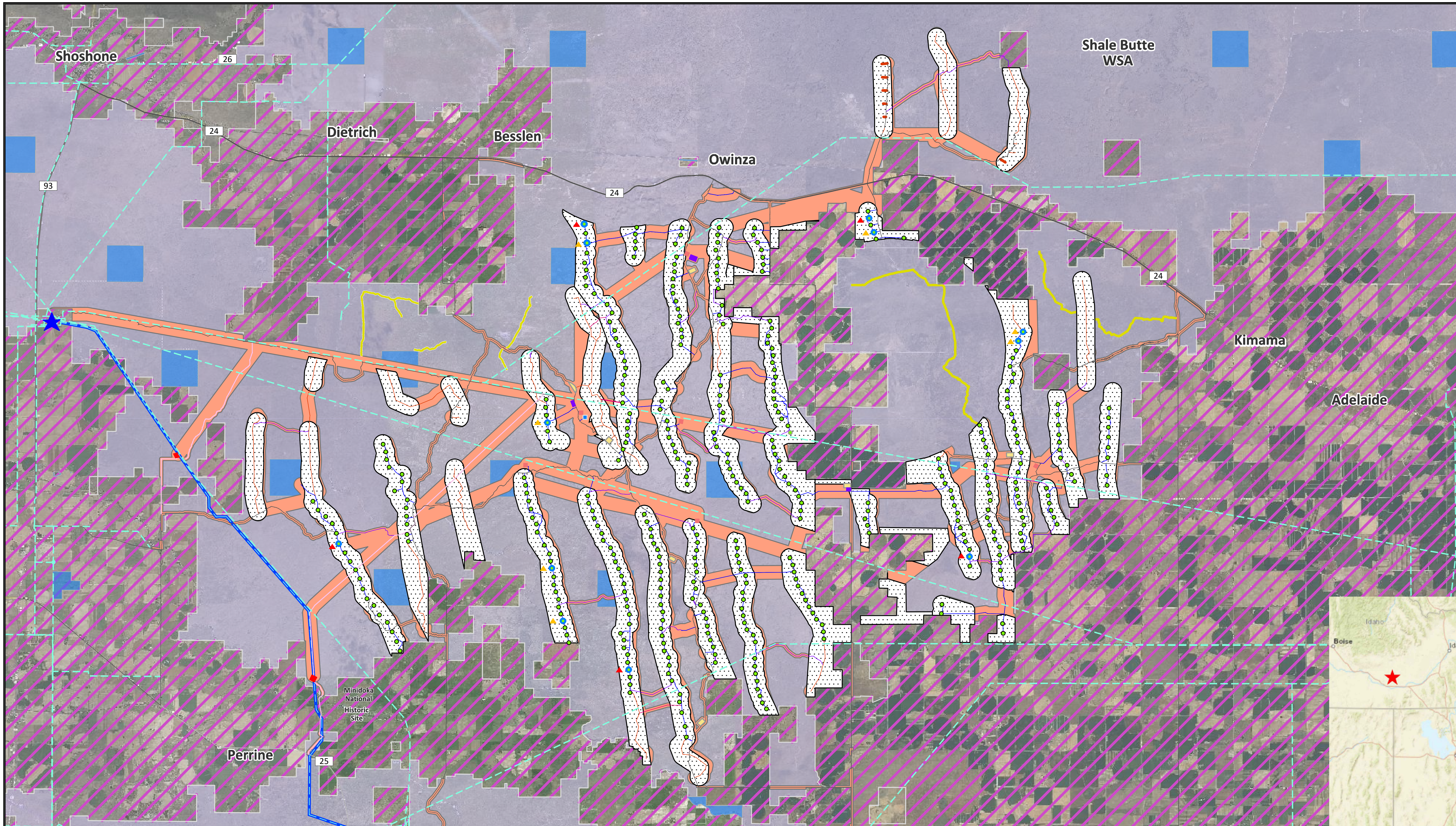
RRC POWER & ENERGY, LLC
7591 SW MOHAWK ST.
TUALATIN, OR 97062
503 -342 -4064
www.RRCcompanies.com

LAVA RIDGE WIND PROJECT
FIGURE 6-1. ELECTRICAL DESIGN OVERVIEW - DRAFT
LINCOLN COUNTY, JEROME COUNTY, MINIDOKA COUNTY, IDAHO

DESIGNED	DRAWN	CHECKED	APPROVED	DATE	REV
TKD	TKD	TKD	TKD	09/26/2022	DRAFT

9/29/2022 5:31:43 PM

R:\OPERATIONS\OP1\WIND\PROJECTS\LAVA RIDGE - MD2109035\08-ELEC AND BESS\03-DWG\LAVA RIDGE_ FIGURE 6.1-SEPTEMBER.DWG



PROPOSED PROJECT FEATURES

- Combined Corridor
- BOP Corridor
- Range Improvement Corridor
- Wind Turbine
- Access Road
- Access Road (Alternate)
- Existing Roads to be Used and/or Improved
- Alternate POI Access
- Crane Path
- Crane Path (Alternate)
- Laydown Yard
- Substation
- Battery Energy Storage System
- O&M Facility
- Alternate POI Substation
- Permanent Met Tower
- Temporary Met Tower
- Calibration Met Tower

OTHER FEATURES

- BLM Land
- State Land
- Private Land
- Existing Transmission Line
- Midpoint Substation
- Planned SWIP-N Line

NORTH

0 1 2 3 Miles

RRC

RRC POWER & ENERGY, LLC
7591 SW MOHAWK ST.
TUALATIN, OR 97062
503 -342 -4064
www.RRCcompanies.com

LAVA RIDGE WIND PROJECT
FIGURE 6-2. CIVIL DESIGN OVERVIEW - DRAFT
LINCOLN COUNTY, JEROME COUNTY, MINIDOKA COUNTY, IDAHO

DESIGNED	DRAWN	CHECKED	APPROVED	DATE	REV
TKD	TKD	TKD	TKD	09/26/2022	DRAFT

10/6/2022 2:01:18 PM

R:\OPERATIONS\OP1\WIND\PROJECTS\LAVA RIDGE - MD2109035\08-ELEC AND BESS\03-DWG\LAVA RIDGE_ FIGURE 6.2 -OCTOBER.DWG

7.0 References

16 United States Code (USC) §§ 470 et seq. 1966. Title 16 - Conservation; Chapter 1a - Historic Sites, Buildings, Objects, and Antiquities; Subchapter II - National Historic Preservation; Sections (§§) 470 Et Seq. Known as the National Historic Preservation Act of 1966. 16 USC 470 et seq. October 15, 1966. Available online: https://www.govinfo.gov/content/pkg/USCODE-2011-title16/pdf/USCODE-2011-title16-chap1A-subchapII-sec470.pdf

36 Code of Federal Regulations (CFR) 800. 2000. Title 36 - Parks, Forests, and Public Property; Chapter VIII - Advisory Council on Historic Preservation; Part 800 - Protection of Historic Properties. 36 CFR 800 §§ 800.01 et seq. 65 Federal Register (FR) 77725, December 12, 2000, as amended.

43 Code of Federal Regulations (CFR) 7. 1984. Title 43 - Public Lands: Interior; Part 7 - Protection of Archaeological Resources. 43 CFR 7 §§ 7.1 et seq. Public Law (PL) 96-95, 93 Statute (Stat.) 721, as amended; 102 Stat. 2983 (16 United States Code (USC) 470aa-mm) (Section (Sec.) 10(a).

43 Code of Federal Regulations (CFR) 10. 1995. Title 43 - Public Lands: Interior; Part 10 - Native American Graves Protection and Repatriation Regulations. 43 CFR 10 §§ 10.1 et seq. 60 Code of Federal Regulations (FR) 62158. December 4, 1995.

California Energy Commission, California Public Utilities Commission, and the California Air Resources Board (CEC). 2020. Available online: https://www.energy.ca.gov/event/workshop/2020-12/notice-senate-bill-100-draft-report-workshop

Federal Aviation Administration (FAA). 2020. AC 70/7460-1M: Obstruction Marking and Lighting. Available online: https://www.faa.gov/documentLibrary/media/Advisory_Circular/Advisory_Circular_70_7460_1M.pdf

Idaho Code (IC) 27-502 to 27-504. Title 27 - Cemeteries and Crematoriums; Chapter 5 - Protection of Graves; Section Title 27 Chapter 5, Sections 27-502 to 27-504.

Idaho Code (IC) 67-4111 to 67-4131. Title 67 - State Government and State Affairs; Chapter 41 – State Historical Society; Section 67-4119- Purpose- Protection of Archaeological and Vertebrate Paleontological Sites and Resources.

Paleontological Resources Preservation Act (PRPA). 2009. Public Law (PL) 111-011, Title VI, Subtitle D. March 2009.

US Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS). 2006. Soil Survey Geographic (Ssurgo) Database. USDA-NRCS, Fort Worth, Texas.

US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). 2015. Definition of Prime Farmland. Available online: https://efotg.sc.egov.usda.gov/references/public/CO/5a_Prime_Farmland_Definition.pdf

US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). 2019. Soils. Soil Survey Geographic (SSURGO) Database, USDA NRCS. Accessed October 2019. Information online: https://www.nrcs.usda.gov/wps/portal/nrcs/site/soils/home/

U.S. Department of Interior (USDOI). 2016. Potential Fossil Yield Classification System. Available online: https://www.blm.gov/sites/blm.gov/files/uploads/IM2016-124_att1.pdf

US Fish and Wildlife Service (USFWS). 2012. Land-Based Wind Energy Guidelines. March 23, 2012. 82pp. Available online: https://www.fws.gov/sites/default/files/documents/land-based-wind-energy-guidelines.pdf

US Fish and Wildlife Service (USFWS). 2013. Eagle Conservation Plan Guidance: Module 1 - Land-Based Wind Energy, Version 2. US Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. 103 pp. + front matter. Available online: https://www.fws.gov/sites/default/files/documents/eagle-conservation-plan-guidance.pdf

U.S. Fish and Wildlife Services (USFWS). 2016. Eagle Permits; Revisions to Regulations for Eagle Incidental Take and Take of Eagle Nests. Available online: https://www.federalregister.gov/documents/2016/12/16/2016-29908/eagle-permits-revisions-to-regulations-for-eagle-incidental-take-and-take-of-eagle-nests

Lava Ridge Wind Project

Draft Appendix A: Site Plans

Magic Valley Energy, LLC

October 2022

Placeholder for Site Plan Maps. Detailed maps will be provided prior to construction.

Lava Ridge Wind Project

Draft Appendix B: Legal Description

Magic Valley Energy, LLC

October 2022

Boise Meridian, Idaho
Bureau of Land Management

T. 7 S., R. 17 E.,
sec. 1, S1/2SW1/4, and S1/2SE1/4;
sec. 2, SE1/4SE1/4;
sec. 12, NE1/4.

T. 7 S., R. 18 E.,
sec. 6, lot 7, SE1/4SW1/4, and S1/2SE1/4;
sec. 7, lots 1 and 2, NE1/4, and E1/2NW1/4;
sec. 8, N1/2, and N1/2SE1/4;
sec. 9, S1/2NE1/4, NW1/4, N1/2SW1/4, and N1/2SE1/4;
sec. 10, SW1/4NE1/4, S1/2NW1/4, and S1/2;
sec. 11, NW1/4SW1/4, S1/2SW1/4, and S1/2SE1/4;
sec. 12, S1/2SW1/4, and S1/2SE1/4;
sec. 13, N1/2NE1/4, SE1/4NE1/4, N1/2NW1/4, and E1/2SE1/4;
sec. 14, N1/2NE1/4, SW1/4NE1/4, and W1/2;
sec. 15, SE1/4NE1/4, NE1/4SE1/4, and S1/2SE1/4;
sec. 21, SE1/4SE1/4;
sec. 22, NE1/4, NE1/4NW1/4, S1/2NW1/4, SW1/4, N1/2SE1/4, and SW1/4SE1/4;
sec. 23, NW1/4NW1/4, E1/2SW1/4, and SE1/4;
sec. 24, E1/2NE1/4, SW1/4SW1/4, and E1/2SE1/4;
sec. 25, NE1/4, N1/2NW1/4, and E1/2SE1/4;
sec. 26, E1/2, E1/2NW1/4, and E1/2SW1/4;
sec. 27, W1/2NW1/4;
sec. 28, E1/2, NE1/4SW1/4, and S1/2SW1/4;
sec. 29, SE1/4SE1/4;
sec. 32, E1/2NE1/4;
sec. 33, N1/2NE1/4, N1/2NW1/4, SW1/4NW1/4, and NW1/4SW1/4;
sec. 35, E1/2, E1/2NW1/4, and E1/2SW1/4.

T. 8 S., R. 18 E.,
sec. 1, lots 1 thru 4, S1/2NE1/4, S1/2NW1/4, N1/2SW1/4, and SE1/4;
sec. 2, lots 1 thru 3, S1/2NE1/4, SE1/4NW1/4, SW1/4, and N1/2SE1/4;
sec. 3, SW1/4NW1/4, N1/2SW1/4, N1/2SE1/4, and SE1/4SE1/4;
sec. 4, S1/2NE1/4, S1/2NW1/4, and W1/2SW1/4;
sec. 8, SE1/4NE1/4;
sec. 9, SW1/4NW1/4;
sec. 12, NE1/4NE1/4;
sec. 24, E1/2NE1/4, and E1/2SE1/4.

T. 6 S., R. 19 E.,
sec. 14, W1/2SW1/4;
sec. 15, SW1/4NW1/4, N1/2SW1/4, and N1/2SE1/4;
sec. 21, NW1/4SW1/4;
sec. 24, SE1/4SW1/4;
sec. 25, E1/2, and E1/2NW1/4;
sec. 28, NW1/4NW1/4.

T. 7 S., R. 19 E.,

Boise Meridian, Idaho

sec. 7, lots 7 and 8, SE1/4SW1/4, and SW1/4SE1/4;
sec. 10, NE1/4NE1/4;
sec. 11, lots 1 and 2, SW1/4NE1/4, N1/2NW1/4, SE1/4NW1/4, and SE1/4SE1/4;
sec. 12, lots 7 thru 9, SW1/4SW1/4, and SE1/4SE1/4;
sec. 13, N1/2NE1/4, SE1/4NE1/4, NE1/4NW1/4, NW1/4SW1/4, S1/2SW1/4, NE1/4SE1/4, and S1/2SE1/4;
sec. 14, NE1/4, and S1/2;
sec. 15, SW1/4NE1/4, S1/2NW1/4, and S1/2;
sec. 17, N1/2, SW1/4, N1/2SE1/4, and SE1/4SE1/4;
sec. 18, lots 1 thru 8, NE1/4, E1/2NW1/4, E1/2SW1/4, N1/2SE1/4, and SE1/4SE1/4;
sec. 19, lots 1 thru 8, NE1/4NW1/4;
sec. 21, N1/2, N1/2SW1/4, and SE1/4;
sec. 22, N1/2, N1/2SW1/4, and SE1/4;
sec. 23, N1/2NE1/4, and W1/2;
sec. 24, E1/2, N1/2NW1/4, and SE1/4SW1/4;
sec. 25, N1/2NE1/4, SW1/4NE1/4, NW1/4, N1/2SW1/4, SW1/4SW1/4, and SE1/4SE1/4;
sec. 26, SE1/4NE1/4, N1/2NW1/4, NE1/4SW1/4, S1/2SW1/4, and SE1/4;
sec. 27, N1/2NE1/4, SW1/4NE1/4, SE1/4NW1/4, NE1/4SW1/4, S1/2SW1/4, NW1/4SE1/4, and SE1/4SE1/4;
sec. 28, S1/2NW1/4, and SW1/4;
sec. 29, SE1/4NE1/4, and E1/2SE1/4;
sec. 30, lots 1 thru 8, E1/2NW1/4, and E1/2SW1/4;
sec. 31, lots 1 thru 8, E1/2NW1/4, and E1/2SW1/4;
sec. 32, E1/2NE1/4;
sec. 33;
sec. 34, NE1/4NE1/4, S1/2NE1/4, NW1/4, and S1/2;
sec. 35, N1/2NE1/4, SW1/4NE1/4, W1/2, NE1/4SE1/4, and S1/2SE1/4.

T. 8 S., R. 19 E.,

sec. 1, lots 1, 3, and 4, SE1/4NE1/4, and SW1/4NW1/4;
sec. 2;
sec. 3, lots 1 thru 4, S1/2NE1/4, S1/2NW1/4, SW1/4, N1/2SE1/4, and SW1/4SE1/4;
sec. 4, lots 1 thru 3, S1/2NE1/4, S1/2SW1/4, and SE1/4;
sec. 5, SW1/4NW1/4, NW1/4SW1/4, S1/2SW1/4, and S1/2SE1/4;
sec. 6;
sec. 7, lot 1, NE1/4, NE1/4NW1/4, and E1/2SE1/4;
sec. 8;
sec. 9, N1/2, N1/2SW1/4, and SE1/4;
sec. 10, W1/2, and SW1/4SE1/4;
sec. 11, NE1/4, E1/2NW1/4, E1/2SW1/4, and NE1/4SE1/4;
sec. 12, SW1/4NW1/4, and NW1/4SW1/4;
sec. 14, SW1/4NW1/4;
sec. 15, N1/2NE1/4, SE1/4NE1/4, and W1/2;
sec. 17, N1/2, N1/2SW1/4, SE1/4SW1/4, and SE1/4;
sec. 18, lot 4, NE1/4NE1/4, S1/2NE1/4, E1/2SW1/4, and SE1/4;
sec. 19, lots 1 thru 4, NW1/4NE1/4, E1/2NW1/4, and E1/2SW1/4;
sec. 20, N1/2NE1/4, and SE1/4NE1/4;
sec. 21;

Boise Meridian, Idaho

sec. 22, NW1/4, and S1/2;
sec. 23, SW1/4SW1/4;
sec. 26, W1/2NW1/4;
sec. 28, NE1/4, and E1/2NW1/4;
sec. 30, lots 1 thru 4, SW1/4NE1/4, E1/2NW1/4, E1/2SW1/4, and W1/2SE1/4;
sec. 31, lot 1, W1/2NE1/4, and NE1/4NW1/4.

T. 9 S., R. 19 E.,

sec. 6, lots 8 thru 10, E1/2SW1/4;
sec. 7, lot 1;
sec. 10, SE1/4SE1/4;
sec. 15, N1/2NE1/4, SW1/4NE1/4, SE1/4NW1/4, NE1/4SW1/4, and SE1/4;
sec. 22, E1/2NE1/4, and E1/2SE1/4;
sec. 26, NW1/4NW1/4.

T. 6 S., R. 20 E.,

sec. 21, E1/2SE1/4;
sec. 22, S1/2NE1/4, NE1/4NW1/4, S1/2NW1/4, N1/2SW1/4, SW1/4SW1/4, and N1/2SE1/4;
sec. 23, S1/2NW1/4, N1/2SW1/4, and SE1/4;
sec. 24, S1/2;
sec. 25, N1/2, and W1/2SW1/4;
sec. 26;
sec. 27, N1/2, NE1/4SW1/4, S1/2SW1/4, and SE1/4;
sec. 28, NE1/4, NE1/4NW1/4, S1/2NW1/4, and S1/2;
sec. 29, S1/2NE1/4, S1/2NW1/4, and S1/2;
sec. 30, lots 2 thru 4, SE1/4NE1/4, E1/2SW1/4, and SE1/4;
sec. 31, lots 1 thru 4, E1/2NE1/4, NE1/4NW1/4, SE1/4SW1/4, and S1/2SE1/4;
secs. 32 thru 34;
sec. 35, N1/2, N1/2SW1/4, and N1/2SE1/4.

T. 7 S., R. 20 E.,

sec. 1, lots 3 and 4, SW1/4NW1/4, SW1/4, and SE1/4SE1/4;
sec. 2;
sec. 3, lots 1 and 4, SE1/4NE1/4, SW1/4NW1/4, and E1/2SE1/4;
sec. 4, lots 1 thru 4, S1/2NE1/4, S1/2NW1/4, SW1/4, and W1/2SE1/4;
sec. 5;
sec. 7, lot 4, SE1/4SW1/4;
sec. 8, E1/2, E1/2NW1/4, and E1/2SW1/4;
sec. 9, NW1/4NE1/4, S1/2NE1/4, NW1/4, and S1/2;
sec. 10, E1/2NE1/4, and SW1/4SW1/4;
sec. 11, N1/2NE1/4, SW1/4NE1/4, NW1/4, and S1/2;
sec. 12, N1/2, SW1/4, N1/2SE1/4, and SW1/4SE1/4;
sec. 13, N1/2, SW1/4, N1/2SE1/4, and SW1/4SE1/4;
sec. 14, N1/2NE1/4, SW1/4NE1/4, and W1/2;
sec. 15, NE1/4NE1/4, S1/2NE1/4, W1/2NW1/4, W1/2SW1/4, and SE1/4;
sec. 17, NE1/4, E1/2NW1/4, and S1/2;
sec. 18, lots 1 thru 4, NW1/4NE1/4, S1/2NE1/4, E1/2NW1/4, E1/2SW1/4, and SE1/4;
secs. 19 thru 21;

Boise Meridian, Idaho

sec. 22, NE1/4, NW1/4NW1/4, S1/2NW1/4, and S1/2;
sec. 23, N1/2NW1/4, SW1/4NW1/4, and S1/2;
sec. 24, W1/2NE1/4, NW1/4, and S1/2;
secs. 25 and 26;
sec. 27, NE1/4, NW1/4NW1/4, S1/2NW1/4, SW1/4, N1/2SE1/4, and SE1/4SE1/4;
secs. 28 and 29;
sec. 30, lots 1 and 4, NE1/4, E1/2NW1/4, E1/2SW1/4, N1/2SE1/4, and SW1/4SE1/4;
secs. 31 thru 33;
sec. 34, NE1/4NE1/4, NW1/4, NW1/4SW1/4, S1/2SW1/4, and S1/2SE1/4;
sec. 35, N1/2, SW1/4, and W1/2SE1/4.

T. 8 S., R. 20 E.,

sec. 1, lot 1, SE1/4NE1/4, SW1/4, and S1/2SE1/4;
secs. 2 and 3;
sec. 4, lots 1 thru 4, S1/2NE1/4, S1/2NW1/4, and SW1/4;
sec. 5, lots 1 thru 4, S1/2NE1/4, SE1/4NW1/4, and SE1/4;
sec. 6, lot 1, lots 3 thru 9, and lot 11, SW1/4NE1/4, SE1/4NW1/4, E1/2SW1/4, and W1/2SE1/4;
sec. 7, lots 1 and 4, E1/2, E1/2NW1/4, and E1/2SW1/4;
sec. 8, E1/2NE1/4, and W1/2SW1/4;
sec. 9, W1/2NE1/4, NW1/4, and S1/2;
sec. 10, E1/2, N1/2NW1/4, SE1/4NW1/4, and E1/2SW1/4;
sec. 11, NE1/4, E1/2NW1/4, and S1/2;
sec. 12, E1/2, N1/2NW1/4, SW1/4NW1/4, NW1/4SW1/4, and S1/2SW1/4;
sec. 13, N1/2, W1/2SW1/4, NE1/4SE1/4, and S1/2SE1/4;
secs. 14 and 15;
sec. 17, W1/2NW1/4, NW1/4SW1/4, S1/2SW1/4, and S1/2SE1/4;
sec. 18, E1/2, E1/2NW1/4, and NE1/4SW1/4;
sec. 19, E1/2;
sec. 20, W1/2, and SW1/4SE1/4;
sec. 21, E1/2, and E1/2SW1/4;
secs. 22 and 23;
sec. 24, N1/2NE1/4, SE1/4NE1/4, W1/2, and E1/2SE1/4;
sec. 25, W1/2NE1/4, W1/2, NW1/4SE1/4, and S1/2SE1/4;
sec. 26, N1/2NE1/4, SE1/4NE1/4, NW1/4NW1/4, S1/2NW1/4, SW1/4, and E1/2SE1/4;
sec. 27, E1/2, N1/2NW1/4, SW1/4NW1/4, and W1/2SW1/4;
sec. 28, E1/2, and NE1/4NW1/4;
sec. 29, NW1/4NE1/4, and NE1/4NW1/4;
sec. 33, E1/2;
sec. 34, NE1/4, NW1/4NW1/4, S1/2NW1/4, and S1/2;
sec. 35;
sec. 36, SW1/4SW1/4.

T. 9 S., R. 20 E.,

sec. 1, lot 4, SW1/4NW1/4;
sec. 2;
sec. 3, lots 3 and 4, S1/2NW1/4, SW1/4, and S1/2SE1/4;
sec. 4, lots 1 and 8, SE1/4NE1/4, and NE1/4SE1/4;

Boise Meridian, Idaho

sec. 10, W1/2NE1/4, N1/2NW1/4, and SE1/4NW1/4;
sec. 11, lot 2, N1/2, NE1/4SW1/4, and SE1/4;
sec. 12, W1/2NW1/4, NW1/4SW1/4, and S1/2SW1/4.

T. 5 S., R. 21 E.,

sec. 27, SE1/4SW1/4, and SW1/4SE1/4;
sec. 32, NE1/4SE1/4, and S1/2SE1/4;
sec. 33, SW1/4;
sec. 34, E1/2, E1/2NW1/4, and E1/2SW1/4;
sec. 35, NW1/4SW1/4, S1/2SW1/4, and SE1/4;
sec. 36, NW1/4SW1/4.

T. 6 S., R. 21 E.,

sec. 1, lots 1 thru 3, S1/2NE1/4, SE1/4NW1/4, E1/2SW1/4, and SE1/4;
sec. 2, lot 4, SW1/4NW1/4, and W1/2SW1/4;
sec. 3, lots 1 thru 3, S1/2NE1/4, S1/2NW1/4, N1/2SW1/4, SE1/4SW1/4, and SE1/4;
sec. 4, lots 3 and 4, S1/2NW1/4, and S1/2;
sec. 5, lots 1 and 2, S1/2NE1/4, and E1/2SE1/4;
sec. 8, E1/2NE1/4, and E1/2SE1/4;
sec. 9, NW1/4NE1/4, NW1/4, and S1/2;
sec. 10, NE1/4, and S1/2;
sec. 11, W1/2NW1/4, NW1/4SW1/4, S1/2SW1/4, and SW1/4SE1/4;
sec. 12, E1/2, E1/2NW1/4, and E1/2SW1/4;
sec. 13, N1/2, SW1/4, N1/2SE1/4, and SW1/4SE1/4;
sec. 14, N1/2, N1/2SW1/4, and N1/2SE1/4;
sec. 15, NE1/4, and N1/2NW1/4;
sec. 17, NE1/4, SE1/4SW1/4, N1/2SE1/4, and SW1/4SE1/4;
sec. 19, lots 5 thru 12, S1/2NE1/4, and N1/2SE1/4;
sec. 20, W1/2NE1/4, NW1/4, and S1/2;
sec. 28, N1/2SW1/4, and SE1/4;
sec. 29, E1/2, E1/2NW1/4, and NE1/4SW1/4;
sec. 30, lots 2 and 3;
sec. 35, SE1/4NW1/4, and NE1/4SW1/4.

T. 7 S., R. 21 E.,

sec. 6, lot 7;
sec. 7, lots 1 thru 3, E1/2, E1/2NW1/4, and E1/2SW1/4;
sec. 8, SW1/4SW1/4;
sec. 17, W1/2NW1/4, and W1/2SW1/4;
sec. 18, lots 1 thru 3, E1/2, E1/2NW1/4, and E1/2SW1/4;
sec. 19, lot 4, NE1/4, SE1/4SW1/4, N1/2SE1/4, and SE1/4SE1/4;
sec. 20, W1/2NW1/4, SW1/4, NW1/4SE1/4, and S1/2SE1/4;
sec. 25, NE1/4SW1/4, S1/2SW1/4, and SE1/4;
sec. 26, S1/2SE1/4;
sec. 29, N1/2, and W1/2SW1/4;
sec. 30, lots 1 and 2, E1/2, and E1/2NW1/4;
sec. 31, lots 1 thru 4, NE1/4, E1/2SW1/4, NE1/4SE1/4, and S1/2SE1/4;
sec. 32, SW1/4NE1/4, NW1/4, and S1/2;

Boise Meridian, Idaho

sec. 33, S1/2;
sec. 34, NW1/4NW1/4, S1/2SW1/4, and S1/2SE1/4;
sec. 35, E1/2, and S1/2SW1/4.

T. 8 S., R. 21 E.,

sec. 1, lots 1 thru 4, S1/2NE1/4, SE1/4NW1/4, S1/2SW1/4, and SE1/4;
sec. 2, lots 1 thru 4, S1/2SW1/4, and S1/2SE1/4;
sec. 3, lots 1 thru 4, S1/2NE1/4, S1/2NW1/4, SW1/4, NW1/4SE1/4, and S1/2SE1/4;
sec. 4, lots 1 thru 4, SE1/4NE1/4, and E1/2SE1/4;
sec. 5, lots 1 thru 4, S1/2NE1/4, S1/2NW1/4, E1/2SW1/4, and SE1/4;
sec. 6, lots 1 thru 5, and lot 7, SE1/4NE1/4, and SE1/4NW1/4;
sec. 7, lots 1 thru 4, E1/2, E1/2NW1/4, and SE1/4SW1/4;
sec. 8, W1/2NE1/4, W1/2, and W1/2SE1/4;
sec. 9, NE1/4NE1/4;
sec. 10, NW1/4;
sec. 11, S1/2SE1/4;
sec. 12, NE1/4, E1/2NW1/4, SW1/4, N1/2SE1/4, and SE1/4SE1/4;
sec. 13, E1/2SW1/4, and SE1/4;
sec. 14, N1/2NE1/4, SW1/4NE1/4, NW1/4, N1/2SW1/4, SE1/4SW1/4, and W1/2SE1/4;
sec. 15, SE1/4NE1/4;
sec. 17, N1/2, N1/2SW1/4, SE1/4SW1/4, and SE1/4;
sec. 18, lots 1 thru 4, N1/2NE1/4, E1/2NW1/4, and E1/2SW1/4;
sec. 19, lots 1 thru 4, E1/2NW1/4, E1/2SW1/4, and W1/2SE1/4;
sec. 20, NE1/4, and E1/2SE1/4;
sec. 21, NW1/4, and S1/2;
sec. 22, S1/2NE1/4, and SE1/4NW1/4;
sec. 23, NE1/4, NE1/4NW1/4, and S1/2NW1/4;
sec. 24, N1/2NE1/4, SE1/4NE1/4, and N1/2NW1/4;
sec. 27, W1/2NW1/4, and W1/2SW1/4;
sec. 28, W1/2, and SW1/4SE1/4;
sec. 29, NE1/4NE1/4, S1/2NE1/4, NW1/4, and E1/2SE1/4;
sec. 30, lots 1 thru 4, N1/2NE1/4, SW1/4NE1/4, E1/2NW1/4, E1/2SW1/4, and W1/2SE1/4;
sec. 31, lots 1 thru 3, NW1/4NE1/4, S1/2NE1/4, E1/2NW1/4, E1/2SW1/4, and SE1/4;
sec. 32, NE1/4;
sec. 33, NW1/4NE1/4, and N1/2NW1/4;
sec. 34.

T. 9 S., R. 21 E.,

sec. 7, SE1/4SE1/4;
sec. 8, S1/2SW1/4, and S1/2SE1/4;
sec. 9;
sec. 10, SW1/4SW1/4;
sec. 15, W1/2NW1/4, and W1/2SW1/4;
sec. 17, NW1/4NE1/4, and N1/2NW1/4;
sec. 18, NE1/4NE1/4;
sec. 21, E1/2NE1/4, and E1/2SE1/4;
sec. 22, W1/2NW1/4, and W1/2SW1/4;

Boise Meridian, Idaho

sec. 33, E1/2NE1/4, and E1/2SE1/4;
sec. 34, W1/2NW1/4, and W1/2SW1/4;
tracts B, H, K, and M.

T. 10 S., R. 21 E.,

sec. 3, SW1/4SW1/4;
sec. 10, NW1/4NW1/4.

T. 6 S., R. 22 E.,

sec. 6, lots 6, 11, and 12;
sec. 7, lots 3, 4, 9, and 10;
sec. 18, lot 3;
sec. 32, lots 2 thru 4, N1/2SW1/4, and NW1/4SE1/4.

T. 7 S., R. 22 E.,

sec. 3, lots 2 thru 4, SW1/4NE1/4, S1/2NW1/4, SW1/4, and W1/2SE1/4;
sec. 5, S1/2;
sec. 6, lot 2, S1/2NE1/4, and NE1/4SE1/4;
sec. 8;
sec. 9, SW1/4NW1/4, and W1/2SW1/4;
sec. 10, W1/2NE1/4, W1/2, and W1/2SE1/4;
sec. 14, S1/2SW1/4;
sec. 15, W1/2NE1/4, W1/2, NW1/4SE1/4, and S1/2SE1/4;
sec. 17, N1/2, SW1/4, N1/2SE1/4, and SW1/4SE1/4;
sec. 19, SE1/4SW1/4, and S1/2SE1/4;
sec. 20, W1/2NE1/4, W1/2, NW1/4SE1/4, and S1/2SE1/4;
sec. 21, E1/2, E1/2NW1/4, and E1/2SW1/4;
sec. 22, N1/2NE1/4, SE1/4NE1/4, NW1/4, and E1/2SE1/4;
sec. 23, W1/2;
sec. 26, W1/2;
sec. 27, E1/2NE1/4, W1/2NW1/4, NW1/4SW1/4, S1/2SW1/4, NE1/4SE1/4, and S1/2SE1/4;
sec. 28, E1/2, E1/2NW1/4, NE1/4SW1/4, and S1/2SW1/4;
sec. 29;
sec. 30, lots 1, 2, and 4, E1/2, E1/2NW1/4, and E1/2SW1/4;
secs. 31 thru 33;
sec. 34, N1/2, SW1/4, and E1/2SE1/4;
sec. 35, N1/2NE1/4, and W1/2.

T. 8 S., R. 22 E.,

sec. 3, lot 4;
secs. 4 thru 7;
sec. 8, N1/2, and SW1/4;
sec. 17, W1/2;
sec. 18, lots 1, 2, and 4, N1/2NE1/4, SE1/4NE1/4, E1/2NW1/4, SE1/4SW1/4, NE1/4SE1/4, and S1/2SE1/4;
sec. 19, lots 1 thru 4, N1/2NE1/4, E1/2NW1/4, and SE1/4SE1/4;
sec. 20, W1/2.

Boise Meridian, Idaho
Idaho Department of Lands

T. 7 S., R. 18 E.,
sec. 36, E1/2NE1/4, and SE1/4.
T. 6 S., R. 19 E.,
sec. 36, E1/2.
T. 7 S., R. 19 E.,
sec. 16, S1/2NE1/4, NW1/4NW1/4, S1/2NW1/4, and S1/2;
sec. 36, NE1/4, SE1/4NW1/4, and S1/2.
T. 8 S., R. 19 E.,
sec. 16, E1/2NE1/4, NW1/4SW1/4, S1/2SW1/4, and E1/2SE1/4.
T. 7 S., R. 20 E.,
sec. 16;
sec. 36, E1/2, and E1/2NW1/4.
T. 8 S., R. 20 E.,
sec. 16, NE1/4, E1/2NW1/4, and S1/2.
T. 7 S., R. 21 E.,
sec. 36.
T. 10 S., R. 21 E.,
sec. 3, SW1/4SW1/4;
sec. 10, NW1/4NW1/4.

Lava Ridge Wind Project

Draft Appendix C: Alternatives Considered by MVE

Magic Valley Energy, LLC

October 2022

Table of Contents

C-1 Introduction

The alternatives discussed in this appendix are representative of options MVE has considered and steps MVE has taken up to this point. The alternatives developed and considered by the BLM will be included in the Environmental Impact Statement.

C-2 Alternative Project Locations

MVE spent more than a year performing due diligence on alternative wind development locations in south-central Idaho. Two alternative sites in particular were taken through advanced pre-application discussions with federal and state agencies and thoroughly vetted for critical issues that may pose challenges to development. One of these alternative sites was located in the area of China Mountain, southwest of Rogerson, Idaho (known as the "Rocky Canyon Project"). The other alternative location spanned lands managed by BLM and the U.S. Forest Service (Sawtooth National Forest) west of Oakley, Idaho (known as the "Big Cedar Project").

The Rocky Canyon Project location was previously analyzed in an Environmental Impact Statement ("EIS") as part of a prior application by others to develop a wind energy project. The prior permitting effort was ultimately halted due to uncertainties on pending sage grouse management directives. MVE began investigating the site in 2018 when it appeared some resolution on the ability to develop a wind generation facility in sage grouse habitat would be forthcoming in the 2019 amended sage grouse resource management plans. MVE retained leading sage grouse biologists to analyze existing sage grouse population data in the vicinity of China Mountain to refine sage grouse movement patterns near the site and develop models to predict the affect a wind energy facility would have on the local population. MVE also commissioned a critical issues analysis of the site and initiated certain avian use field survey efforts. Continued discussions with federal and state agencies in 2019 highlighted a capital intensive and prolonged development pathway with significant and continuing uncertainty in bringing the project to fruition. Both federal and state agencies encouraged MVE to seek alternative sites for wind development. MVE took similar steps to analyze the Big Cedar Project area. Significant time and resources were spent meeting with federal and state agencies, commissioning a critical issues analysis, initiating avian use field surveys, and pursuing the approval of a meteorological tower campaign on USFS lands. However, in 2019 MVE was informed of certain sage grouse population thresholds that would require management of the Big Cedar Project area similar to the Rocky Canyon Project location. The same concerns related to the intensive and prolonged development pathway for the Big Cedar Project area again lead federal and state agencies to encourage MVE to seek another alternative location for wind energy development.

MVE proceeded to renew its siting analysis with the help of the latest computer modeling software and assistance from leading consultants in meteorology and wind development. Special emphasis was placed on avoiding areas designated as priority or important sage grouse habitat. As a result of these extensive siting efforts, MVE has identified the current Project area and begun the requisite development steps to fully pursue the approval of a wind energy project.

C-3 Alternative Project Configurations

C-3.1 Project Alternatives Requiring a Resource Management Plan Amendment

MVE has considered alternative configurations where certain Project features are situated within areas with more restrictive management objectives, requiring a resource management plan amendment for implementation.

C-3.1.1 VRM Class III Layout

MVE considered placement of wind turbines and substations within a Visual Resource Management (VRM) Class III area along Highway 24. Placement of these facilities within the VRM Class III area would consolidate the new features with an existing transportation corridor, providing easier access to project features, reducing the lengths of project access roads (and associated disturbance) required to reach project features, and increasing overall Project efficiency by capturing a commercially viable wind resource with relatively less supporting infrastructure. However, it is not certain that wind turbines and substations will meet the VRM Class III management objectives. A visual resource inventory may further clarify whether wind turbines and substations may be permissible within the VRM Class III area. The current Proposed Action has removed all wind turbines and substations from the VRM Class III area.

C-3.1.2 Sage Grouse Lek Layout

MVE considered multiple layouts that placed Project features within the sage grouse lek avoidance buffers established by the 2015 Greater Sage Grouse Approved Resource Management Plan Amendment (2015 Sage Grouse ARMPA). MVE would have sought BLM's concurrence with a justifiable departure from the prescriptive avoidance areas as permitted by the methodology established in Appendix B to the 2015 Sage Grouse ARMPA. Attempts to rely on the justifiable departure methodology did not gain concurrence from BLM. MVE has revised the Proposed Action to remove all wind turbines and associated infrastructure from a 3.1-mile buffer from each active lek within the Project area.

C-3.2 Project Alternatives without Conservation Buffers

MVE has considered alternative configurations where certain Project features are situated in relative proximity to certain biological or cultural resources. No specific regulation or management plan restricts development within these conservation buffers

C-3.2.1 Golden Eagle Nest Layout

MVE considered placement of wind turbines and associated infrastructure on Crater Butte, north of Dietrich. The elevated terrain offers a commercially viable wind resource in proximity to an existing access corridor and favorable constructability features. However, during the 2020 eagle nesting season MVE biologists discovered an active golden eagle nest on a cliff face at Crater Butte. Further avian use field studies, coordination with federal and state wildlife agencies, micrositing, and potential operational mitigations could support further consideration of Project infrastructure on Crater Butte. The current Proposed Action has removed all wind turbines and electrical collection lines on Crater Butte.

C-3.2.2 Wilson Butte Cave Layout

MVE considered placement of wind turbines and associated infrastructure on Wilson Butte, in the western portion of the Project area. Wilson Butte offers a commercially viable wind resource in proximity to an existing access road and favorable constructability features. However, a cave feature located on Wilson Butte is listed on the National Register of Historic Places. While not specifically prohibited, BLM has advocated avoiding the placement of wind turbines in close proximity to the cave. The current Propose Action has removed all wind turbines within 1 mile of Wilson Butte cave.

C-3.2.3 Ferruginous Hawk Nest Layout

MVE considered placement of wind turbines in an area east of Star Lake, between Owinza and Wilson Buttes. This area offers a commercially viable wind resource in proximity to an existing access road and favorable constructability features. However, during the 2020 nesting season MVE biologists discovered an active ferruginous hawk nest. Further avian use field studies, coordination with federal and state wildlife agencies, micrositing, and potential operational mitigations could support further consideration of wind turbines in this area of the Project. The current Proposed Action has removed all wind turbines within 1 mile of the ferruginous hawk nest.

C-3.3 Project Alternatives Adjacent to the Community of Dietrich

MVE considered placement of wind turbines and associated infrastructure on Dietrich Butte and other development corridors adjacent to agricultural fields to the north, east, and south of Dietrich. During MVE hosted open house events, stakeholders in the Dietrich area expressed a preference for greater setbacks from their community to the proposed development corridors. Community engagement is an important factor of MVE's project development philosophy. As such, MVE has modified the Proposed Action to remove the corridors adjacent to Dietrich in response to the desires of the local community.

Lava Ridge Wind Project

Draft Appendix D: Stormwater Pollution Prevention Plan

Magic Valley Energy, LLC

October 2022

Table of Contents

D-1 Purpose and Objectives

MVE's construction contractor will prepare a fully developed Stormwater Pollution Prevention Plan ("SWPPP") in accordance with federal, state, and local regulations. This plan will be approved by the appropriate state or federal agency and BLM prior to the BLM signing the Notice to Proceed ("NTP"). The final SWPPP will be approved by the BLM prior to implementation. The SWPPP is prepared to provide temporary and permanent sediment and erosion control design to ensure the Project complies with applicable rules and regulations. The SWPPP will identify practices to implement for erosion and sediment control, temporary and permanent stormwater treatment (if necessary), and stormwater monitoring where applicable throughout construction, operation, and reclamation.

D-2 Timeline and Best Management Practices

The construction contractor will prepare the fully developed SWPPP prior to construction. Until the full SWPPP is developed, BMPs that will inform the SWPPP are listed below:

- The Project's SWPPP shall be implemented in accordance with the Idaho Department of Environmental Quality (IDEQ) requirements to obtain National Pollutant Discharge Elimination System (NPDES) compliance. The SWPPP will describe site-specific erosion control and stream crossing measures that will be implemented during the construction and operation phases of the Project.
- Stormwater BMPs will be maintained on all disturbed lands during construction activities, which will be described in the SWPPP.
- Erosion controls that comply with county, state, and federal standards will be utilized. Practices such as jute netting, silt fences, and check dams will be applied near disturbed areas where needed.
- Wetland delineations will be performed prior to construction to support CWA Section 404 permitting and to minimize Project impacts.
- Where impacts on wetlands are not avoidable, site-specific crossing plans and measures to mitigate impacts will be submitted to the appropriate regulatory agency. MVE will implement the applicable U.S. Army Corps of Engineers (USACE), Idaho Department of Water Resources (IDWR), and BLM standards (e.g., erosion and sediment control measures, culverts sized in accordance with USACE and BLM standards, etc.) for all road crossings or other work in wetlands or waters to ensure protection of water quality and to maintain the hydrology of affected areas.
- Access roads will be designed to minimize stream crossings where feasible. Structures crossing streams will be designed to not decrease channel stability or increase water velocity. Any required permits will be obtained.
- Creating hydrologic conduits between two aquifers during foundation excavation and other activities will be avoided.
- Access roads will be designed to be located away from drainage bottoms and avoid wetlands. If drainage bottoms and wetlands cannot be avoided, appropriate design features will be utilized to reduce erosion and sedimentation.
- Improvements to crossings will maintain water conveyance flows during and after construction.

- MVE will avoid altering existing drainage systems in sensitive areas such as erodible soils or steep slopes as practicable, with considerations given to scenarios such as road design and safety.
- A 100-foot no-ground-disturbance buffer would be applied to all wetlands, streams, and riparian areas. If disturbance to such areas cannot be avoided, MVE would prepare site-specific plans and measures (e.g., erosion and sediment control measures, culverts sized in accordance with USACE and BLM standards, etc.) to mitigate impacts. These plans would be incorporated into the final plan of development and submitted for approval by the Authorized Officer prior to issuance of a Notice to Proceed.
- Construction or maintenance activities will not be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts in excess of 5 inches deep for a distance of 100 feet or more, the soil will be deemed too wet to adequately support construction equipment.

Lava Ridge Wind Project

Draft Appendix E: Reclamation Plan

Magic Valley Energy, LLC

October 2022

Table of Contents

E-1 Introduction

This plan, which was developed in coordination with BLM, details the reclamation guidelines for restoration of areas that are impacted by the construction, operation and maintenance, and decommissioning phases of the Project.

E-2 Reclamation Implementation

E-2.1 Areas of Disturbance

Two types of disturbance are associated with the Project – work area and infrastructure. Work area disturbance is the disturbance needed to construct the Project. Work area disturbance will be reclaimed after construction. However, work area disturbance may be disturbed again after construction during the operations phase to accommodate larger equipment needed for certain O&M activities. For example, an intersection may be improved for construction in order to transport a turbine blade to the turbine pad. After construction, this intersection would be reclaimed down to a reasonable size for most operations activities. However, if a turbine blade needed to be replaced during operations, the reclaimed part of that intersection would need to be disturbed again to allow for transport of the blade and crane. Once the blade replacement is complete, the intersection would be reclaimed again. Infrastructure disturbance is expected to only undergo final reclamation, as defined in Section 2.4 below, at the end of decommissioning. Infrastructure disturbance includes the footprint of the Project component and the area needed to support O&M activities. The work area and infrastructure Project features and estimated disturbances are outlined in Table 1-1 of the POD.

Reclamation procedures will depend on the extent of alteration of the soils, vegetation, and topography caused by each construction activity. Final design and construction plans for the Project will be used to determine the disturbance limits. All areas to be disturbed will have boundaries marked using stakes delineating the area. For more information, see the POD Appendix K: Flagging, Fencing, and Signage Plan.

E-2.2 Reclamation Goals and Objectives

Reclamation aims to restore disturbed areas to a condition similar to the surrounding area at the time of reclamation. Reclamation objectives include the restoration of natural vegetation, hydrology, and wildlife habitats. Reclamation should occur as soon as practicable and prior to the next growing season after completion of ground disturbing activities to help limit the spread and establishment of noxious weed species in disturbed areas.

The intent of this plan is to prevent unnecessary degradation of the environment, restore work areas, and reclaim disturbed areas such that these areas are functionally and visually compatible.

Reclamation success is defined by the re-establishment of vegetation and topography compared to conditions in the surrounding area at the time of reclamation. Reclamation areas will be seeded with a BLM-approved seed mixture, using methods defined in Appendix R: Noxious Weed Management Plan of the POD. Seeding will be repeated if reclamation success standards are not met upon evaluation after the third growing season.

Reclamation success will be evaluated by comparing Project-affected treatment sites with control site conditions in terms of density and cover. Prior to initiating reclamation activities, MVE will submit a report to BLM documenting the characteristics of the control sites assigned to each planned area of reclamation. MVE will allow 30 days for BLM review and comment on the control site documentation prior to initiating reclamation. Control sites will be determined as representative areas that exhibit mean vegetation coverage and desired plant speciation for a given area of reclamation. Because the Project spans across different ecological settings, multiple control sites may be used to define expected reclamation success for each type of soil, land gradation, climate, or other ecological setting near each treatment site. Similarly, a single control site may be deemed to be representative of several different reclamation areas if the areas exhibit sufficiently similar characteristics. Areas with slopes of 25 percent or greater will be re-contoured, topsoiled, and seeded in accordance with the specifications in this plan but will not be measured against control sites since adequate vegetation is not expected to grow, or minimal success would be accomplished.

In comparison to control sites, an area will be deemed to have been successfully reclaimed when both of the following conditions have been achieved:

- the area exhibits healthy, reproducing vegetation reaching (on average) 80% of the basal vegetation cover found within applicable control sites; and
- the area exhibits no more than 10% coverage of undesirable non-native species.

If reclamation areas exhibit greater than 10% coverage of undesirable non-native species, remedial actions to reduce the coverage of such species will be implemented in accordance with Appendix R: Noxious Weed Management Plan of the POD.

Reclamation areas will be monitored until the success criteria is met or up to 5 years following the initial reclamation activities. Once a reclaimed area has met the success criteria, no further monitoring or reclamation efforts shall be required. If at the end of the fifth year of monitoring a reclaimed area does not meet the reclamation success criteria, MVE and the BLM Authorized Officer will discuss possible adjustments to the criteria or the use of adaptive management procedures to address revegetation challenges.

E-2.3 Interim Reclamation

Interim reclamation is implemented to reclaim work area disturbance areas. Disturbed areas that are not needed for operations and maintenance will be re-contoured to blend with the surrounding topography. Existing topsoil at the site will be spread over areas not needed for operations and revegetated with the BLM-approved seed mix, as specified in Appendix R: Noxious Weed Management Plan of the POD. Seeding activities will occur immediately after re-contouring activities, unless seasonal conditions are not appropriate for seeding. When seasonal conditions are not appropriate for seeding, seeding will take place during the next appropriate season. The appropriate season for seeding will depend on the BLM-approved seed mixture. Necessary operations and maintenance procedures may require personnel to drive, park, and disturb vegetation within areas where interim reclamation has been completed.

E-2.4 Final Reclamation

Final reclamation is implemented to reclaim infrastructure disturbance areas after the decommissioning phase of the Project. Infrastructure and structures will be removed in accordance with the Appendix L: Decommissioning Plan.

E-3 Pre-Construction Activities

Pre-construction surveys, such as those outlined in the POD and POD Appendix N: Historic Properties Treatment Plan, Appendix P: Lava Ridge Construction Monitoring Plan, and Appendix Q: Paleontological Resources Treatment Plan, focus on protection of sensitive areas and resources identified for preservation. The limitations of areas to be disturbed would be defined prior to the disturbance to support resource protection and to guide reclamation implementation. Limits would be staked or flagged as necessary. Construction activities would be limited to these areas to prevent adverse effects on sensitive areas. When construction and reclamation are complete, stakes and flags would be removed.

E-4 Interim and Final Reclamation Activities

Post-disturbance actions primarily focus on stabilizing and reclaiming disturbance areas to allow reoccupation of vegetation. Recommended reclamation actions are defined below and are generally organized by their sequence of implementation.

Earthworks: These activities may include (1) recontouring, (2) soil decompaction, and (3) application of appropriate soil erosion measures as needed. Earthmoving equipment shall replace the removed material so that the disturbed area blends into the contour of the existing landscape to restore the visual quality and provide stability to the slope. Soil decompaction may include ripping or scarifying to allow permeation of water into the ground.

Recontouring efforts include burying subsurface soils (backfilling holes) that may be excavated during disturbance activities so that the natural terrain contours are maintained. Excess subsoil from excavated or graded areas shall be evenly spread over disturbed areas, and moistened and compacted to a relative average density comparable to undisturbed adjacent material before respreading topsoil. Subsoils shall not be spread outside of the flagged areas, and are be restricted to areas of infrastructure disturbance, if possible.

Seed Bank Topsoil Replacement: Topsoil sources will meet the criteria detailed in Appendix R: Noxious Weed Management Plan of the POD. Topsoil shall be replaced without mixing with subsoil. The purpose of this practice is to prevent mixing fertile, shallow soils with deeper soils that may be less productive because of rock, gravel, sand, calcareous layers, salinity, or other chemical characteristics that would adversely affect desired vegetation. Topsoil shall be dispersed evenly across the disturbed site. Additional erosion control and soil stabilization may be required to minimize soil movement, especially for steeply sloped areas or for fine-textured soils. If necessary, topsoil may be imported from sources approved by the Authorized Officer. MVE will adhere to erosion and stormwater control efforts listed in Appendix D: Stormwater Pollution Prevention Plan of the POD.

Seeding: Reseeding involves planting new seed of appropriate species to establish vegetation within affected vegetation communities. A BLM specialist (e.g., botanist, range management specialist, or soil scientist designated by the BLM Authorized Officer) will provide the list of approved type and quantity of seed mixtures as mentioned in Appendix R of the POD. Seed mixes will be developed in advance of reclamation efforts to ensure seed availability. Prior to seeding and after seeding, BLM approved herbicides listed in Appendix R of the POD may be used for vegetation control.

Signage and Fencing: Reclamation areas may require informational signs pertaining to reclamation efforts with the intent of preventing further disturbance by humans within these recovering areas. Reclamation areas may have signs installed at appropriate intervals to deter vehicular damage to the site.

In coordination with BLM, MVE will close roads not needed for site operations or other public uses and restore the roadbeds consistent with the reclamation plan. Grazing and off-trail or otherwise unauthorized off-highway vehicle traffic have the potential to impede reclamation efforts. For example, livestock may trample or preferentially consume new growth from reclaimed vegetation, while off-highway vehicle traffic can destroy vegetation and disrupt surface soils. If necessary after reclamation, fencing meeting the standards specified in the POD Section 1.3.16 would be constructed to exclude livestock as detailed in Appendix S: Grazing Coordination Plan. MVE will not be responsible for meeting reclamation success criteria in the event reclaimed areas are impacted by non-Project related disturbances (e.g., grazing, public recreation, non-Project caused fires, etc.). In addition, MVE will not disturb or leave inoperable at anytime the livestock improvements in reclamation areas including, but not limited to, pipeline systems, fences, or water catchments. If they must be disturbed, MVE will consult with the grazing allottee to implement a mutually agreeable solution.

Lava Ridge Wind Project

Draft Appendix F: Health and Safety Plan

Magic Valley Energy, LLC

October 2022

Table of Contents

F-1 Introduction

MVE is committed to a program of responsible management in all areas of health, safety, security, and the environment. Compliance with federal, state, and local safety regulations as well as the safety and training requirements of MVE or MVE's contractors (the "Project Team") is mandatory for the Project. MVE will develop this plan in cooperation with BLM. The plan will be approved by the appropriate state or federal agency and BLM prior to the BLM signing the Notice to Proceed ("NTP"). A more detailed Health and Safety Plan ("HSP") will be developed by the Project Team prior to construction, with revisions to the plan and/or separate plans to be developed for the operations and maintenance and decommissioning phases, all of which will be submitted to the Authorized Officer for review and approval.

During construction, the construction contractor will be responsible for the actions and work performed by the subcontractors on the Project site. The construction contractor is responsible for implementing this HSP and any future revisions to this HSP. If a separate HSP is developed by the construction contractor or subcontractor, the more stringent policies and procedures will apply. MVE retains the right to suspend, stop work, dismiss or take any other disciplinary or remedial action with respect to any worker or visitor for any infraction of these safety requirements.

F-2 Health and Safety Statement

The Project Team must be committed to conduct themselves in a safe and responsible manner. Every employee and contractor has the responsibility to follow established safety, health, and environmental requirements as well as enforcing accident prevention procedures within their function of responsibility. If a situation arises that would cause harm to personnel, loss of property, or damage to the environment, the first person, whether MVE personnel, construction contractor, or subcontractor, to realize such a situation is authorized and required to stop the work until the safety concerns have been addressed. If there is knowledge of any practice, condition, or information that is contrary to the Health and Safety Plan or other policies and procedures authored by the construction contractor or subcontractors, it should be reported immediately to the appropriate supervisor and MVE representatives.

F-3 Health and Safety Plan Contents

A more detailed HSP will be developed by the Project Team prior to construction. As the Project moves into the operational stage, the HSP will be modified to adapt to operations and maintenance ("O&M") activities or a separate plan will be developed for O&M. Generally, the topics in the Health and Safety Plan will include:

- Key Safety Personnel
- Health and Safety Training Program
- Hazard Analysis
- Hazard Identification and Control
- Personnel Protective Equipment

- Site Control and Communications
- Incident Reporting
- Emergency Action Plan
- Fire Protection Plan
- Hazardous Materials Management
- Waste Handling Plan

The construction contractor or subcontractors will provide MVE with comprehensive HSPs prior to the start of construction. MVE will provide the BLM with a copy of these HSPs if requested.

F-4 Emergency Action Plan

A detailed Emergency Action Plan will be developed by the Project Team prior to construction. The purpose of an Emergency Action Plan is to provide clear procedures and information that will enable MVE, the construction contractor, and other entities to prepare for and effectively respond to emergency situations.

F-4.1 Emergency Communications

Effective communication and exchange of information is essential in every emergency response. The Emergency Action Plan will note the main options for communications during construction, which may include cellular phones and two-way radios. If cellular service is not available at the site of an emergency, two-way radios may be used to relay information to those able to dial 911. In addition to identifying 911 as the first contact phone number, the phone numbers of local police, fire, and EMS will be provided. The addresses of nearby hospitals will also be listed. The Emergency Action Plan will also include contact numbers for dedicated Project safety representatives and any supervisors needed to coordinate the response, depending on the type and scale of the event.

The Emergency Action Plan will provide construction crews with geographic coordinates or other common location references of Project structures, equipment yards, and main access roads to enable the crews to accurately convey the location of accidents to emergency responders which is critical during an emergency.

F-4.2 Emergency Response

Construction crews will receive instruction on the key initial steps of responding to an emergency situation. In most situations, these initial steps include dialing 911, administering first aid to injured persons, and assessing the situation/responding to hazards that remain in the immediate area. The construction contractor’s protocols for response to accidents, fires, and medical emergencies will be outlined in the Emergency Action Plan.

F-5 Waste Management Plan

Prior to construction, the Project Team will develop a Waste Management Plan that addresses hazardous waste determination procedures, waste storage locations, waste-specific management and disposal requirements, inspection procedures, and waste minimization procedures. Below is a list of BMPs currently under consideration to be included in the Waste Management Plan:

- Trash and food items will be disposed of properly in predator-proof containers with predator-proof lids to reduce the attractiveness of the area to opportunistic predators.
- Trash containers will be emptied and construction waste will be removed regularly from the Project area and disposed of in an approved landfill.
- Vehicles hauling trash to the landfill or transfer facility will be secured to prevent litter from blowing out along the road.
- Wastewater generated at the Project site will be removed periodically and transported to an appropriate facility. Temporary, portable sanitary facilities provided for construction crews will be adequate to support expected on-site personnel and will be removed at completion of construction activities.
- The ROW will be maintained in a sanitary condition at all times. Waste materials will be disposed of at an appropriate waste disposal site. “Waste” is defined as all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ash, and equipment that are a result of the Project Team’s activities.

F-5.1 Hazardous Materials Management Plan

The Hazardous Materials Management Plan is intended to reduce the risks associated with the use, storage, transportation, production, and disposal of hazardous materials (including hazardous substances and wastes). Prior to construction, the Project Team will develop a detailed Hazardous Materials Management Plan.

The Project Team will comply with the Toxic Substances Control Act of 1976 as amended, 15 U.S.C. § 2601 et seq. (1982) with regards to any toxic substances that are used, generated by or stored on the ROW or on facilities authorized under this ROW grant. (See 40 CFR Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR Part 117 will be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances will be furnished to the Authorized Officer concurrent with the filing of the reports to the involved Federal agency or State government. The Project Team will comply with all applicable Federal, State and local laws and regulations, existing or hereafter enacted or promulgated, with regard to any Hazardous Material, as defined in this paragraph, that will be used, produced, transported or stored on or within the ROW or any of the ROW facilities, or used in the construction, operation, maintenance or termination of the ROW or any of its facilities. "Hazardous material" means any substance, pollutant or contaminant that is listed as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. § 9601 et seq., as amended, (hereinafter "CERCLA") and its regulations. The definition of hazardous substances under CERCLA includes any "hazardous waste" as defined in the Resource Conservation and Recovery Act of 1976, 42 U.S.C. § 6901 et seq., as amended, (hereinafter "RCRA") and its regulations. The term hazardous material also includes any nuclear or byproduct material as defined by the Atomic Energy Act of 1954, 42 U. S. C. § 2011 et seq., as amended. The term does not include petroleum, including crude oil or any fraction thereof that is not otherwise specifically listed or designated as a hazardous substance under CERCLA section 101(14), 42 U.S.C. § 9601(14), nor does the term include natural gas.

The detailed Hazardous Materials Management Plan will clearly identify which legal requirements apply to specific types of hazardous materials and will identify best management practices which, although not legally required, will be followed to reduce risks associated with hazardous materials. Nothing in this document or in the detailed Hazardous Materials Management Plan shall be construed as an admission regarding the legal applicability of requirements or practices to any particular class of hazardous material.

In general, hazardous materials, hazardous wastes, and clean-up equipment will be stored in approved containers until they can be properly transported and disposed of at an approved treatment, storage, and disposal facility. Persons responsible for handling or transporting hazardous materials for the Project will be trained in the proper use/management of the materials and should be familiar with all applicable laws, policies, procedures, and mitigation measures related to such handling or transportation.

It is the responsibility of the construction contractor to maintain file records of proper training/certification for any individual(s) that may potentially handle hazardous materials for the Project. MVE reserves the right to audit any subcontractors to ensure compliance.

F-5.1.1 Guidelines for Developing the Hazardous Management Plan

The following sections provide specific guidelines for the construction contractor to prepare the detailed Hazardous Materials Management Plan. The construction contractor shall provide all information requested in any MVE-administered forms. In addition, the construction contractor shall complete any other required county, state, or federal forms.

F-5.1.1.1 Certifications

The construction contractor shall certify that all of the information provided in the Hazardous Materials Management Plan is accurate and complete to the best of their knowledge. The construction contractor also shall certify that they are committed to implementing the Hazardous Materials Management Plan as written.

F-5.1.1.2 Amendments

The construction contractor shall agree to make all necessary and appropriate amendments to the Hazardous Materials Management Plan, and submit any and all such amendments to MVE and the appropriate county agency (if required), state, or federal authorities within 7 days of finding that an amendment is necessary.

Amendments to the Hazardous Materials Management Plan shall be necessary under any of the following circumstances:

- Applicable laws or regulations are revised
- A 100 percent or more increase of a previously disclosed hazardous material occurs
- Any handling of a previously undisclosed hazardous material subject to inventory requirements
- A change in formulation of a previously disclosed hazardous material (e.g., solid to liquid)
- A change of business address, name, or ownership
- The list of emergency coordinators changes
- The list of emergency equipment changes

F-5.1.1.3 Designation of Coordinator/Responsible Person

The construction contractor shall identify an emergency coordinator for hazardous materials management and emergency response. Two alternates shall also be identified. Business, residential, and mobile phone or pager numbers shall be provided for all three persons, as necessary, to allow for contact on a 24-hour basis. Primary and alternate emergency response coordinators shall be knowledgeable of the chemicals and processes involved in construction of the Project, and will have the authority to commit construction contractor resources to implement the Hazardous Materials Management Plan. They also shall have stop-work authority in case of non-compliance or danger to human health or the environment.

F-5.1.1.4 Inventory

The construction contractor shall provide a complete inventory of all hazardous materials. The construction contractor shall be responsible for consulting with the relevant agencies if they handle extremely hazardous substances. All inventory forms shall be provided by the construction contractor to MVE as a part of their detailed Hazardous Materials Management Plan.

F-5.1.2 Overview of Hazardous Materials Proposed for Use

The following Project-specific measures pertain to all vehicle refueling and servicing activities as well as the storage, transportation, production, and disposal of hazardous materials/wastes. These measures are intended to prevent the discharge of fuels, oils, gasoline, and other harmful substances to waterways, groundwater aquifers, and/or other sensitive resource areas during Project construction and maintenance.

Hazardous materials used during Project construction may include petroleum products such as gasoline, diesel fuel, and hydraulic fluid; lubricating oils and solvents; cleansers; explosives; and other substances. Some of these materials will be used in relatively large quantities to operate and maintain equipment during construction. Explosives will be used for blasting rock where needed.

Smaller quantities of other materials, such as pesticides and fertilizers, paints, and chemicals (e.g., sulfur hexafluoride), may be used during Project operation and maintenance. Pesticides and herbicides are hazardous materials and they will be used according to labeling. The construction contractor will maintain an inventory of all hazardous materials used and Material Safety Data Sheets (“MSDS”) for all materials. The construction contractor shall maintain copies of the required MSDS for each hazardous chemical, and shall ensure that they are readily accessible during each work shift to all employees when they are in their work area(s). The MSDS will provide basic emergency response information for small and large releases of the hazardous materials. In the case that bulk hazardous materials are used, the Emergency Response Guidebook, produced by the U.S. DOT, is an acceptable reference.

The construction contractor should have a well-developed Hazardous Material Program in place and work to use non-hazardous substances in routine construction and maintenance activities, to the extent practicable.

F-5.1.3 Transportation of Hazardous Materials

Procedures for loading and transporting fuels and other hazardous materials will meet the minimum requirements established by the U.S. DOT, ITD, and other pertinent regulations. Prior to transporting hazardous materials, appropriate shipping papers shall be completed. Transportation of hazardous materials should be performed by a hazardous material transport firm in accordance with U.S. DOT regulations. In addition, the construction contractor(s) will ensure that all handling or packaging of hazardous materials and all paperwork for transport of hazardous materials is performed by properly trained personnel, in accordance with U.S. DOT and ITD regulations.

At all times, all hazardous materials used for the Project will be properly stored in approved U.S. DOT containers and labeled, including during transportation. Smaller containers will be used onsite to transport needed amounts of hazardous materials to a specific location. Transfer of materials from large to small containers will be performed using appropriate equipment, including pumps, hoses, and safety equipment; hand pouring techniques will not be utilized. These smaller (“service”) containers also will be clearly labeled. Special provisions apply to the transportation of explosives as described in Appendix I: Blasting Plan Methodology.

F-5.1.4 Storage of Hazardous Materials

Hazardous materials will be stored only in designated material yards. The following physical storage requirements shall apply:

- Storage Containers: Containers holding hazardous waste or materials shall be compatible with the wastes or materials stored. If the container is damaged or leaks, the waste must be transferred to a container in good condition. The construction contractor shall inspect containers at least weekly to verify the integrity of the containers and any containment systems. Containers used for transportation must comply with the U.S. DOT and ITD requirements.
- Incompatible Materials: Materials, including hazardous wastes, shall not be placed in containers that previously held an incompatible waste or material.
- Ignitable or Reactive Materials: Containers holding hazardous wastes or materials that may ignite or are reactive must be located at least 50 feet from the material yard's property line. "NO SMOKING" signs shall be conspicuously placed wherever there is a hazard from ignitable or reactive material.
- Container Management: Containers holding hazardous wastes shall be kept closed at all times, except when it is necessary to add or remove contents. Before the handling and/or transportation of containers carrying hazardous wastes, the containers should be inspected to ensure that they are sealed such that no material spillage occurs.
- Secondary Containment: Secondary containment will consist of bermed or diked areas that are lined and capable of holding 110 percent of the volume of the stored material and shall be provided for liquid hazardous materials stored on-site.
- Security: Hazardous wastes and materials will be stored in secure areas to prevent damage, vandalism, or theft. All storage containers shall remain sealed when not in use and storage areas shall be secured (gated, locked, and/or guarded) at night and/or during non-construction periods.
- Explosives: Storage of explosives is discussed in Appendix I.

F-5.1.5 Container Labeling Requirements

The construction contractor(s) shall comply with the following labeling requirements for any container (including tanks) used on-site to store accumulated hazardous wastes. The containers shall be labeled with the information below and as required in 40 CFR 262.

- The accumulation start date and/or the date the 90-day storage period began
- The words: "Hazardous Waste"
- The composition and physical state of the wastes
- Warning words indicating the particular hazards of the waste, such as: flammable, corrosive, or reactive
- The name and address of the facility that generated the waste

F-5.1.6 Disposal of Hazardous Waste

Hazardous wastes will be collected regularly and disposed of in accordance with all applicable laws and regulations. The construction contractor shall determine details on the proper handling and disposal of hazardous waste, and shall assign responsibility to specific individuals prior to construction of the Project.

Every effort will be made to minimize the production of hazardous waste during the Project including, but not limited to, minimizing the amount of hazardous materials needed for the Project; using alternative non-hazardous substances when available; recycling usable material such as oils, paints, and batteries to the maximum extent; and filtering and reusing solvents and thinners whenever possible.

F-5.1.7 Operations and Maintenance

During the Project's operation and maintenance phase, MVE will ensure that its facilities, personnel, and contractors comply with federal, state, and local laws and regulations pertaining to the use, storage, transport, and disposal of hazardous materials. The Project Team shall develop hazardous materials management and response plans and properly train employees for handling, packaging, and shipping hazardous materials and responding to emergency events. Petroleum product leaks and chemical releases will be remediated prior to completion of decommissioning.

F-6 Fire Protection and Prevention Plan

This plan details measures that should be implemented to: (1) reduce the risk of starting a fire, and (2) suppress a fire in the event one does occur within the work areas during Project construction, operation, and maintenance. MVE shall do everything reasonable to prevent and suppress wildfires on all structures, equipment, and facilities that are on the electric transmission and distribution line for which the ROW is granted, without regard to whether they are located within the ROW or on non-federal land, and where a failure or fire ignition could reasonable lead to adverse impacts to public land.

The purpose of this plan is to outline responsibilities, notification procedures, fire prevention measures and precautions, fire suppression equipment, initial response procedures, and post-fire rehabilitation strategies related to the Project. The goal is to minimize risk of Project-related fires and, in case of fire, provide for immediate suppression within the area.

This Project will be subject to state, county, and federally enforced laws, ordinances, rules, and regulations that pertain to fire prevention and suppression activities. Key regulatory agencies include the BLM and local fire protection agencies.

F-6.1 Responsibilities

F-6.1.1 Bureau of Land Management

The BLM Fire Management Officer ("FMO") will oversee all fire control activities in his or her administrative unit. The BLM has fire suppression responsibilities for wildfires that start or threaten public lands within the Project area during all phases of the Project. MVE will coordinate with the BLM to establish standard practices and communication methods to promptly respond in the event of a wildfire. The Project Team will be knowledgeable of the communication methods with BLM to allow for quick notification of and response to wildfires during the life of the Project. MVE will ensure any fire protection stipulations are communicated to MVE's contractors prior to performing onsite work related to the Project. MVE will include the FMO in these discussions when requested by the BLM.

As described in Appendix V: Environmental Compliance Monitoring Plan, MVE anticipates a third-party Compliance Inspection Contractor ("CIC") will be utilized to act on BLM's behalf to ensure adequate oversight during the construction phase of the Project. The CIC will be aware of the various construction activities occurring in the field and will report directly to the BLM.

F-6.1.2 Project Team

MVE will work with the BLM to either join an existing agreement between the BLM and another applicable fire suppression entity, such as a Rangeland Fire Protection Association ("RFPA"), or establish a new agreement that authorizes suppression activities in the Project area. MVE and the BLM will establish standard practices and communication methods to ensure a prompt response to fires. It will be the responsibility of the Project Team to notify the BLM when a Project-related fire occurs within, or adjacent to, a work area. The Project Team will be responsible for any fire started by its employees or operations, whether it is within or outside of the Project area. The Project Team will be responsible for taking immediate steps to suppress a Project-related fire, and will be responsible for post-fire rehabilitation. The Project Team will take aggressive action to prevent and suppress fires on and adjacent to the Project areas.

All federal, state, and county laws, ordinances, rules, and regulations that pertain to prevention, pre-suppression, and suppression of fires will be strictly adhered to by the Project Team. All personnel will be advised of their responsibilities under the applicable fire laws and regulations. Specific activities and safety measures will be implemented during the life of the Project in order to prevent fires and to ensure quick response and suppression in the event a fire occurs.

If a fire starts in the Project area, the Project Team will initiate fire suppression activities using the equipment described in section F-6.3 until relieved by appropriate fire authorities. Available Project Team personnel will be immediately alerted when a fire occurs in the Project area. Project tools, equipment, and trained workers will be sent immediately to control the fire.

The Project Team will designate a Fire Marshall that will be responsible for the points below during construction. During O&M and decommissioning, other members of the Project Team, such as maintenance crews or contract crews, will have these responsibilities:

- Conducting regular inspections of tools, equipment, and first aid kits for completeness.

- Conducting regular inspections of storage areas and practices for handling flammable fuels to confirm compliance with applicable laws and regulations.
- Posting smoking and fire rules at centrally visible locations.
- Coordinating initial response to Project Team-caused fires within the Project area.
- Accompanying agency representatives on fire inspections of the Project area.
- Ensuring that all Project Team personnel are aware of the contents of this Fire Prevention Plan.
- Remaining on duty when construction activity is in progress and any additional periods where fire safety is an issue.
- Reporting all wildfires in accordance with the notification procedures described in the notification section below.
- If a fire starts in the Project area, initiating and implementing fire suppression activities until relieved by the appropriate fire agencies. Fire suppression personnel and equipment (described in F-6.3) will be dispatched by the Project Team within 15 minutes from the time a fire is reported.
- Issuing current fire potential and fire safety warnings.

F-6.1.3 Notification

The Project Team's Fire Marshall will immediately notify the BLM fire dispatch center of a fire started in the Project area during construction. During O&M and decommissioning, other members of the Project Team, such as maintenance crews or contract crews, will be responsible for the immediate notification of a fire started in the Project area. The Project Team will have notification numbers readily available for all employees in case of fire.

F-6.2 Fire Prevention Measures

The following fire prevention measures will be implemented at all times during the life of the Project:

- No smoking will be allowed while operating equipment or while walking or working in areas with vegetation.
- Smoke only in cleared areas.
- In areas where smoking is allowed, completely extinguish all burning tobacco and matches and discard them in ash trays, not on the ground.
- Do not allow any fires or barbecues at temporary staging areas, along access roads, or other areas with an elevated fire risk.
- Instruct all field personnel about emergency response for fire events.
- Clear away and maintain clearance of all flammable material for a minimum of 10 feet, including snags (fallen or standing dead trees), from areas of operation where a spark, fire, or flame could be generated.

- If a fire does start by accident, the BLM will be immediately notified and immediate steps will be taken to extinguish it (if it is safe to do so) using available fire suppression equipment (described in F-6.3) and techniques taught at field crew emergency response training that will be provided by the Project Team.
- Project access roads will be properly maintained to allow for timely response of fire suppression activities. Well-maintained roads in combination with the measures described in Appendix R: Noxious Weed Management Plan will serve as fire breaks throughout the Project Area.
- Operation of equipment and infrastructure would be done in accordance with manufacturer's parameters.
- All Project facilities and infrastructure would be appropriately inspected to identify and respond to potential fire risk.

F-6.3 Minimum Fire Prevention and Suppression Equipment Required

The following fire prevention and suppression equipment will be readily available and maintained in good working order at all times during Project construction, operation, and maintenance.

All onsite service vehicles will have at least one fire extinguisher. At least one motorized vehicle in each active construction area shall contain:

- One long handled round point shovel
- One ax or Pulaski fire tool
- One 5-gallon water backpack (or other approved container) full of water or other extinguishing solution
- Hardhat, work gloves, and eye protection

In addition to the fire suppression equipment required in motorized vehicles, work sites shall comply with the following:

- Any power equipment (ATVs, chainsaws, and other such equipment) would be equipped with spark arresters and accompanied by one 5-pound ABC dry chemical fire extinguisher and a long handled, round point shovel when used away from a vehicle.
- Fuel service trucks shall contain one 35-pound capacity fire extinguisher charged with the necessary chemicals to control electrical and fuel fires.
- Wood cutting, welding, or other construction work sites that have a higher risk of starting fires shall have at least two long handled round point shovels and two 5-pound ABC dry chemical fire extinguishers available on-site.
- Every work site shall have at least one radio and/or cellular/satellite telephone to contact fire suppression agencies or the Project management.

Select locations of water storage tanks and water lines placed adjacent to roads during construction will be maintained throughout the operations period to provide water access points to serve as a resource for fire suppression activities (refilling rangeland firetrucks or helicopter dip-tanks). MVE will share the locations of these water resources with the BLM and other applicable fire response groups, such as RFPAs, so that the water tanks are quickly and easily accessible.

MVE will acquire and store a RFPA fire engine and other RFPA equipment at Project O&M facilities that will be available for use by the Project Team, the BLM, RFPAs, or other applicable fire response groups. On-site Project Team staff will be trained to respond to fires within the Project area utilizing the fire engine and equipment. Onsite Project Team staff will also be trained on standard practices and communication methods to allow for efficient coordination between the Project Team, BLM, and any other applicable fire response groups such as the RFPAs.

F-6.4 In Case of Fire – Initial Response and Emergency Contacts

If a fire does start in the Project area, including on Project infrastructure, the Project Team will immediately notify the BLM and other applicable fire response groups. In parallel with notifying the appropriate authorities and fire suppression groups, the Project Team will safely attempt to control the fire with a fire extinguisher or other available equipment which is described in F-6.3 (e.g., using shovel to throw dirt on the fire or remove small patches of vegetation). On-site Project Team personnel will receive training on initial fire suppression techniques, reporting requirements, how to determine if a fire is manageable and what control measures should be implemented by on-site field crews, and at what point field crews should evacuate. The training also will address how to respond to wildfires in the area and maintain knowledge of and plans for evacuation routes.

In the event that a fire requires aerial suppression methods, aerodynamic braking (typically referred to as "feathering") will be implemented in wind turbines proximate to the fire in order to increase the pilot's comfort while performing aerial fire suppression activities. The Project Team will work with the BLM to establish proper communication methods to ensure the operation of relevant turbines can be modified by the time the aircraft reaches the fire.

If the fire is unmanageable, field crews will evacuate and make all accommodations to allow immediate safe entry of firefighting apparatus and personnel. All fires must be reported to the BLM or other applicable jurisdictional fire agencies regardless of size and actions taken.

F-6.5 Post-Fire Coordination and Rehabilitation Strategies

If a fire ignites within the Project area, burns on to the Project area, or threatens the Project area, the Project Team will cooperate with the BLM in its efforts to respond to, investigate, and suppress all fires and will:

- Immediately report fires to the BLM or local fire dispatch and take all necessary fire suppression actions, when safe to do so on any fires they cause to ignite.
- Maintain the condition of the origin area of the fire from additional disturbance to enable the BLM to properly assess the origin area and cause of the fire.

- Defer to and follow the instructions of the BLM's Incident Commander or designee during fire suppression operations regarding activities within the boundaries of the fire including checking in and out of the fire, not entering the origin areas unless given permission to do so, and recognizing the BLM's primary authority over the fire scene.
- Share factual information with the BLM concerning fires, including, but not limited to, the names of Project Team's employees and invitees with knowledge of the fire; and to allow the Project Team's employees and their invitees to be interviewed by the BLM's investigators regarding the fire.
- Provide an account of actions taken at the scene of a fire by the Project Team and Project Team's employees and invitees.
- Minimize disturbance of potential evidence located at the scene, including by not engaging in any evidence collection or destruction without the BLM's express written consent; properly handling and preserving any evidence collected; and making all documents and other evidence, including expert reports, available to the BLM in a rapid and timely manner upon request of the BLM or its counsel. If the Project Team determines that evidence is under immediate threat of destruction due to the fire itself, suppression operations, weather, etc., that evidence may be collected at the scene if it is properly handled and preserved, and BLM is notified, in writing, in a timely manner.
- Not hamper the BLM's investigation of origin and cause of the fire and reasonably assist the BLM's investigation.
- Provide information upon request of the BLM or its counsel concerning the construction, monitoring, inspection, maintenance, or repairs of any of MVE's facilities that the BLM determines may be relevant to the BLM's investigation of a fire.

If the cause of a fire is determined to be a result of the Project, the Project Team will implement the following post-fire rehabilitation measures:

- After a fire has been extinguished, the burn areas will be rehabilitated in accordance with BLM requirements. Revegetation efforts will be completed as outlined in Appendix E: Reclamation Plan. Larger burn areas may require specific rehabilitation plans. Coordination with the BLM is necessary to determine requirements for each area, depending on the size and location of a fire, and the location of sensitive resources.
- To prevent the spread of noxious weeds and invasive species during post-fire rehabilitation, the measures as outlined in Appendix R: Noxious Weed Management Plan will be implemented by the Project Team.

Lava Ridge Wind Project

Draft Appendix G: Spill Prevention, Control, and Countermeasures Plan

Magic Valley Energy, LLC

October 2022

Table of Contents

G-1 Introduction

Construction, operation, and maintenance of the Project will require the use of certain potentially hazardous materials, such as fuels, oils, explosives, and herbicides. By definition, hazardous materials substances and wastes) have the potential to pose a significant threat to human health and the environment based upon their quantity, concentration, or chemical composition. When stored, used, transported, and disposed of properly, the risks associated with these materials can be reduced substantially.

This plan will be approved by the appropriate state or federal agency and BLM prior to the BLM signing the Notice to Proceed (“NTP”). MVE, the construction contractors shall be responsible for the implementation of procedural actions, best management practices, and other specific stipulations and methods of any and all applicable Spill Prevention Control and Countermeasure (“SPCC”) Plans. The construction contractor and subcontractors will ensure compliance with applicable federal, state, and local regulations applicable to the location of refueling, storage, water removal, and other activities involving fuels and petroleum products in coordination with MVE.

G-2 Spill Prevention

This section describes the practices that MVE will utilize to prevent spills. For spill prevention information regarding the storage, transportation, disposal, and types of hazardous materials, see the Hazardous Materials Management Plan within Appendix F: Health and Safety Plan.

G-2.1 Refueling and Servicing

Construction vehicles (trucks, bulldozers, etc.), helicopters (if required), and equipment (pumps, generators, etc.) generally will be fueled and serviced in designated areas. Refueling locations generally should be flat to minimize the change of a spilled substance reaching a stream. Fueling or refueling would not occur within 50 feet of a wetland or watercourse. In most cases, smaller rubber-tired vehicles will be refueled and serviced at local gas stations or material yards. Tracked vehicles typically will be refueled and serviced onsite. In some cases, pickup trucks or tankers will be used to refuel and service construction vehicles. Every effort will be made to minimize the threat of a fuel spill during refueling and servicing and secondary containment measures will be located at all fuel handling areas.

Washing of construction vehicles, such as concrete trucks, will be allowed only in designated areas. Washing areas will be contained, as necessary, with berms/barriers to prevent migration of wastewater and/or sediments into streams and waterways.

G-3 Spill Control and Countermeasures

The following section outlines the physical and procedural steps to be taken in the event of a spill, to be included in conjunction with any countermeasures identified in the SPCC. In general, the construction contractor will oversee all clean-up activities, including providing necessary materials and labor, and performing all reporting and documentation as required.

G-3.1 Physical and Procedural Response Measures

Physical response actions are intended to ensure that all spills are promptly and thoroughly cleaned up. However, the first priority in responding to any spill is personal and public safety. Construction personnel will be notified of evacuation procedures to be used in the event of a spill emergency, including evacuation routes. In general, the first person on the scene will:

- Attempt to identify the source, composition, and hazard of the spill
- Notify appropriately trained personnel immediately
- Isolate and stop the spill, if possible, and begin clean-up (if it is safe)
- Initiate evacuation of the area, if necessary
- Initiate reporting actions

Persons should only attempt to clean-up or control a spill if they have received proper training and possess the appropriate protective clothing and clean-up materials. Untrained individuals should notify the appropriate response personnel. In addition to these general guidelines, persons responding to spills will consult the Health and Safety Plan and the MSDS or U.S. DOT Emergency Response Guidebook (to be maintained by the construction contractor[s] onsite during all construction activities), which outlines physical response guides for hazardous materials spills.

In general, expert advice will be sought to properly clean up major spills. For spills on land, berms will be constructed, as necessary, to contain the spilled material and prevent migration of hazardous materials toward waterways. Contaminated soils will be collected using appropriate machinery, stored in suitable containers, and properly disposed of in appropriately designated and approved areas off-site. After contaminated soil is recovered, all machinery used will be decontaminated, and recovered soil will be treated as hazardous waste. Contaminated clean-up materials (absorbent pads, etc.) and vegetation will be disposed of in a similar manner. For spills, clean up may be verified by sampling and laboratory analysis, at the discretion of MVE.

If spilled materials reach water, appropriate materials such as booms and skimmers will be used to contain and remove contaminants. Other actions will be taken, as necessary, to clean up contaminated waters.

G-3.2 On-Site Equipment

The construction contractor is responsible for designating locations and contents of spill kits to be used during Project construction. The following guidance is provided in developing the contents of a spill kit. The location and minimum inventory for each spill kit must be documented in the hazardous Materials Management Plan.

Emergency spill response kits will be maintained at all locations where hazardous materials are stored, in sufficient quantities and based on the amount of materials stored onsite. Spill response equipment should be compatible with types of materials stored onsite, and should be inventoried regularly to ensure spill response equipment is adequate for the type and quantities of materials being used. The following are equipment examples of spill response equipment for use in clean-up situations:

- Shovels
- Absorbent pads/materials
- Personal protective gear
- Medical first aid supplies
- Bung wrench (non-sparking)
- Phone list with emergency contact numbers
- Storage containers
- Communication equipment

In addition, radios or other communication equipment will be maintained in construction vehicles and other easily accessible locations. Additional clean-up materials may be required.

G-3.3 Employee Spill Prevention/Response Training and Education

The construction contractor and subcontractors shall provide spill prevention and response training to appropriate construction personnel. Persons accountable for carrying out the procedures specified herein will be designated prior to construction and informed of their specific duties and responsibilities with respect to environmental compliance and hazardous materials. The training shall inform appropriate personnel of site-specific environmental compliance procedures. All training events should be documented, including the date and names of those personnel in attendance. This training may include the following:

- An overview of regulatory requirements
- Methods for the safe handling/storage of hazardous materials
- Spill prevention procedures
- Emergency response procedures
- Use of personal protective equipment
- Use of spill clean-up equipment
- Procedures for coordinating with emergency response teams
- Procedures for notifying agencies
- Procedures for documenting spills
- Identification of sites/areas requiring special treatment, if any

G-3.4 Notification and Documentation Procedures

Notification and documentation procedures for spills that occur during Project construction, operation, or maintenance will conform to applicable federal, state, and local laws and regulations. Adherence to such procedures will be the top priority once initial safety and spill response actions have been taken.

G-4 Operations and Maintenance

During the Project's operation and maintenance phase, MVE will adhere to required emergency response and clean-up procedures in the event of a hazardous material spill. MVE and all operations and maintenance subcontractors shall develop hazardous materials management and response plans and properly train employees for responding to hazardous materials spills.

Lava Ridge Wind Project

Draft Appendix H[Empty]

Magic Valley Energy, LLC

October 2022

Appendix H is intentionally left blank. MVE has integrated language previously housed in Appendix H into other sections of the POD.

Lava Ridge Wind Project

Draft Appendix I: Blasting Plan Methodology

Magic Valley Energy, LLC

October 2022

Table of Contents

I-1 Introduction

The Blasting Plan Methodology outlines methods to mitigate risks and potential impacts associated with blasting procedures that may be required for construction of the Project. Also included herein is a preliminary outline for the Blasting Plan to be prepared by the construction contractor prior to implementation. Once completed, the Blasting Plan will provide Project personnel with Project-specific information concerning blasting procedures, including the safe use and storage of explosives. The objective of the Blasting Plan to is to prevent adverse impacts to human health and safety, property, and the environment that could potentially result from the use of explosives during Project construction. This plan will be approved by the appropriate state or federal agency and BLM prior to the BLM signing the Notice to Proceed (“NTP”).

Blasting will be used only in areas where traditional excavation and earth moving equipment and practices are unable to accomplish the excavation. In addition, the construction contractor may elect to utilize implosive sleeves during line stringing activities to fuse conductor wire together.

I-2 Regulatory Compliance and Procedures

The blasting contractor will be responsible for preparing and implementing the Blasting Plan and must comply with all applicable federal, state, and local laws and regulations which pertain to explosives. No blasting operations will be undertaken until appropriate permits and approvals have been obtained from the applicable agencies. Failure to comply with such laws could result in substantial financial penalty and/or imprisonment.

The construction contractor will utilize a qualified, experienced, and licensed blasting contractor that will perform blasting using current and professionally accepted methods, products, and procedures to maximize safety during blasting operations. Blasting procedures will be carried out according to, and in compliance with, applicable laws and will be closely monitored.

I-3 Blasting Plan Guidance

Prior to blasting, the blasting contractor shall prepare a Blasting Plan for review by applicable parties. The plan will address safety as well as design for production and controlled blasting. The Blasting Plan also will contain the full details of the drilling and blasting patterns, as well as controls the blasting contractor proposes to use for both controlled and production blasting. Review of the plan by the parties shall not relieve the blasting contractor of the responsibility for the accuracy and adequacy of the Blasting Plan when implemented in the field.

I-4 Blasting Plan Contents

The Blasting Plan prepared by the blasting contractor may include the following information:

1. Purpose
2. Scope of the Blasting
3. Definitions
4. Responsibilities
   a. Management Organization
   b. Authority Responsibility
   c. Blaster-in-Charge (licensed in Idaho)
5. Location of Blasting Area
   a. Description of Blasting Area
   b. Description of Bedrock and Geological Problems
   c. Description of Adjacent Utility Facilities
6. Environmental Considerations
7. Safety Considerations
   a. General
   b. Warning Signs and Signals
   c. Procedures around Adjacent Utility Facilities
   d. Traffic Control
   e. Emergency Blast Initiation
   f. Safety Publications
   g. Fire Prevention
   h. Safety Hazards
   i. Emergency Services and Communication
   j. Minor or Non-Emergency Medical Care
   k. First Aid
8. Risk Management
   a. Protection of Adjacent Utility Facilities
   b. Lightning
   c. Flyrock
   d. Carbon Monoxide
   e. Ground Vibrations
   f. Seismically Sensitive Receptors
   g. Preblast Survey and Inspection
   h. Blast Damage Complaints
   i. Airblast
9. Blast Design Concept
   a. Station limits of proposed shot
   b. Plan and section views of proposed drill pattern, including free face, burden, blasthole spacing, blasthole diameter, blasthole angles, lift height, and subdrill depth
   c. Loading diagram showing type and amount of explosives, primers, initiators, and location and depth of stemming
   d. Initiation sequence of blastholes, including delay times and delay system
   e. Manufacturer's data sheets for all explosives, primers, and initiators to be employed

10. Procedures
    a. Delivery of Explosives
    b. Storage of Explosives and Blasting Agents
    c. Blast Hole Drilling
    d. General Handling of Explosives
    e. Blast Hole Loading
    f. Notification
    g. Initiation of Blast
    h. Misfire Management
    i. Test Blasting
11. Records
12. Attachments

I-5 Safety

Safe storage and use of explosive materials will be a top priority during construction. The safety measures discussed in this section are intended to prevent theft and/or vandalism of the explosive materials, protect them against fire, and to prevent personal injury and property damage. These measures are intended as general guidelines.

I-5.1 Storage

Explosives must be stored in an approved structure (magazine) and kept cool, dry, and well ventilated. The Project Proponent's Construction contractor will provide the Bureau of Alcohol, Tobacco, Firearms and Explosives (BATF) Regulatory Enforcement Office with a list of dates and locations for the explosives and blasting agent storage facilities to be used on the Project at least 14 days before the establishment of such storage facilities.

The following storage requirements will be implemented:

- Explosives must be stored in an approved structure (magazine), and storage facilities will be bullet-resistant, weather-resistant, theft-resistant, and fire-resistant
- Magazine sites will be located in remote (out-of-sight) areas with restricted access, kept cool, dry, and well ventilated, and will be properly labeled and signed
- Detonators will be stored separately from other explosive materials
- The most stringent spacing between individual magazines will be determined according to the guidelines contained in the BATF publication or state or local explosive storage regulations
- Both the quantity and duration of temporary on-site explosives storage will be minimized

The blasting contractor will handle and dispose of dynamite storage boxes in accordance with relevant federal, state, and local laws.

I-5.2 Fire Safety

The presence of explosive materials on the Project site could potentially increase the risk of fire during construction. Special precautions will be taken to minimize this risk including, but not limited to:

- Prohibiting ignition devices within 50 feet of explosives storage areas
- Properly maintaining magazine sites so that they are clear of fuels and combustible materials, are well ventilated, and are fire-resistant
- Protecting magazines from wildfires that could occur in the immediate area
- Posting fire suppression personnel at the blast site during high fire danger periods
- Prohibiting blasting during extreme fire danger periods

I-5.3 Transportation of Explosives

Transportation of explosives will comply with all applicable federal, state, and local laws, including Title 49 of the Code of Federal Regulations, Chapter III. These regulations are administered by the U.S. Department of Transportation (U.S. DOT) and govern the packaging, labeling, materials compatibility, driver qualifications, and safety of transported explosives. In general, these regulations require that vehicles carrying explosive materials must be well maintained, properly marked with placards, and have a non-sparking floor. Materials in contact with the explosives will be non-sparking, and the load will be covered with a fire- and water-resistant tarpaulin. Vehicles also must be equipped with fire extinguishers and a copy of the Emergency Response Guidebook (U.S. DOT 1993). Every effort will be made to minimize transportation of explosives through congested or heavily populated areas.

Prior to loading a vehicle that is appropriate for carrying explosives, the vehicle shall be fully fueled and inspected to ensure its safe operation. Refueling of vehicles carrying explosives shall be avoided. Smoking shall be prohibited during the loading, transporting, or unloading of explosives. In addition, the following specific restrictions apply to transport of other items in vehicles carrying explosives:

- Tools may be carried in the vehicle, but not in the cargo compartment
- Detonation devices can, in some cases, be carried in the same vehicle as the explosives, but they must be stored in a specially constructed compartment(s)
- Batteries and firearms shall never be carried in a vehicle with explosives
- Vehicle drivers must comply with the specific laws related to the materials being transported

Vehicles carrying explosives shall not be parked or left unattended, except in designated parking areas with approval of the State Fire Marshall. When traveling, vehicles carrying explosives will avoid congested areas to the maximum extent possible.

I-6 Environmental Protection Measures

Blasting has the potential to cause environmental impacts. Implementing the following practices/procedures will mitigate these impacts.

- Avoid potential rockslide/landslide areas to the maximum extent possible and consult a blasting geologist before blasting in such areas.
- Design blasts to minimize ground vibrations that can cause slope instability and impact wells and springs.
- Design blasts to minimize slopes while meeting excavation requirements. Safety measures will be developed (as outlined in Item no. 7 of Section I-4) to ensure blasting activities are performed in a safe and responsible manner.
- Limit hours of blasting to 7:00 a.m. to 7:00 p.m. when blasting within 3,000 feet of sensitive receptors.
- Avoid ground blasting within 1,000 feet of residences, water bodies, and wells to the maximum extent possible.
- MVE will notify residences that are within 1,000 feet of blasting activities.
- The Project-specific Blasting Plan will be developed by the construction contractor prior to construction and will include safety measures (as outlined in Item no. 7 of Section I-4) to ensure blasting activities are performed in a safe and responsible manner.

Lava Ridge Wind Project

Draft Appendix J: Road Design, Traffic and Transportation Plan

Magic Valley Energy, LLC

October 2022

Table of Contents

Figures

Tables

Appendices

J-1 Introduction

The purpose of this plan is to provide a summary of the manner in which transportation to the site and any associated traffic will be managed. This plan will be approved by the appropriate state or federal agency and BLM prior to the BLM signing the Notice to Proceed (“NTP"). MVE will comply with any required road design and will acquire any necessary permits related to traffic and transportation for the Project. Where practical, standards located in the BLM 9113 – 1 – Roads Design Handbook (BLM 2011) and the Surface Operating Standards for Oil and Gas Exploration and Development (i.e., the Gold Book) (BLM 2007) will be incorporated into road design, construction, and maintenance.

This plan primarily focuses on traffic during construction. There will be a small amount of transportation of equipment and traffic to the Project during the operations and maintenance of the facility. Oversized vehicles will be utilized for the delivery of turbine components. The majority of remaining components and construction equipment will be transported to the Project site via standard transport vehicles. MVE will coordinate with local planning authorities regarding increased traffic during the construction phase. Road construction and use will be coordinated with right-of-way and special use authorization holders. Specific issues of concern will be addressed and incorporated into this appendix.

MVE does not currently have information regarding the origin of turbine components, equipment, and materials. MVE will have limited control over what routes are used outside of the Project’s immediate surrounding area.

The details of the design methodologies and specifications included in this appendix should accommodate the known turbine delivery requirements as of 2022. As turbine technology evolves, there may be requirements for new turbine technologies that deviate from what is described in this appendix. MVE’s continued transportation planning will evaluate road use, aim to minimize traffic volume, and minimize associated impacts.

J-2 Surrounding Area

The Project area is located in close proximity to several primary federal roadways including Interstate 84 and US Highway 93. US Highway 93 runs north/south along the western edge of the Project site. In addition, Idaho State Route 24 bisects the Project area and offers a direct pathway for material delivery and worker access. Improvements to existing roads are likely, including improvements to the turn radius at intersections. Some of these improvements will be reclaimed after construction and some are intended to remain for the operations phase of the Project. On county- and state-maintained roads, caution signs will be posted on roads, where appropriate, to alert motorists of construction and warn them of slow traffic. Traffic control measures (e.g., traffic control personnel, warning signs, lights, barriers) will be used during construction to ensure safety and to minimize traffic congestion. Turning movements from public roadways onto Project access roads must be accessible by loaded component delivery trucks approaching from either direction. Numerous existing dirt and gravel roads can be found throughout in the Project area and offer access points for the disbursement of Project components and construction workers to active work areas.

Given the proximity of the Union Pacific rail line to the Project area, efficiencies in turbine component delivery could be realized by transporting these parts to the Project via rail. A number of existing railroad sidings on private land in the Project vicinity are being explored for use as intermodal yards. Components would be delivered by rail to the intermodal yard and transferred to semi-trailers to complete the delivery to a construction staging yard or individual work area.

J-3 Access Road Description

The dimensions of access roads will be tailored to their intended use, with the goal of developing the minimum footprint to limit disturbance. Access roads will be designed so that changes to surface water runoff are avoided and erosion is not initiated. If changes to surface water runoff cannot be avoided, design features will be implemented to minimize impacts. Final road dimensions will be influenced by turbine model selection and requirements from the engineering, procurement, and construction (“EPC”) contractor. Site-specific conditions such as side slope cut-and-fill, intersection radii, or other factors may warrant larger roadway dimensions. Much of the existing road network will require improvements. Improvements could include clearing overgrown vegetation, widening curves, re-grading, installing drainage structures, and installing road base or rock material. Turbine component delivery will likely require the expansion of intersections at existing roadways to accommodate larger loads. Where road intersection improvements are required to accommodate extra-long vehicles, potential upgrades could include relocating signs, placement of temporary paving, and the use of flaggers, as needed.

<u>Main Access Roads:</u> It is anticipated that main access roads will be constructed up to a 24-foot width (20-foot road surface with 2 feet of berm or ditch on either side). MVE anticipates passing lanes (or lay-bys) will be required every 1000 feet. These passing lanes would widen the surface of the road to an approximately 30-36 foot wide road surface for a length of approximately 250 feet. The widened portion of the road (portion that extends beyond the up to 24 foot width) is temporary and will be reclaimed after the construction phase. The actual dimensions of the main access roads may vary based on site-specific terrain and component delivery requirements.

<u>Turbine Access Roads:</u> Turbine access roads are anticipated to be up to 20 feet wide with temporary improvements for the construction phase as needed. The actual dimensions of the turbine access roads may vary based on site-specific terrain and component delivery requirements.

<u>Crane Travel:</u> Roads that will be traveled by the crane will require temporary disturbance area on either side of the road. MVE anticipates the crane width to be up to 45 feet. To accommodate a 45 foot wide crane, a 50 foot wide pathway will be utilized. For example, if a road is constructed with a 20 foot permanent width, that road will need 30 feet of temporary disturbance in order to reach the 50 foot total width for crane travel. This temporary disturbance will be compacted native material (aggregate only placed as necessary). In the event that there is a constraint on one side of the road (such as a fence) or MVE determines there is a realized efficiency, the temporary disturbance area may be completely on one side of the road or another proportion depending on the specific area. For example, MVE may determine that it is best to have 25 feet of the total 30 feet of temporary disturbance width on one side of the road leaving 5 feet for the other side. Cross-country crane paths are anticipated to be a 50 foot wide pathway

that is drive and crush where possible, but will be compacted native material where necessary. Road base or aggregate would only be placed if necessary on these pathways.

34.5 kV Collector Line Access: Roads exclusive to the 34.5 kV collection system will typically be 14 feet wide during construction, with a permanent footprint of 10 feet for long-term O&M access. These long-term access pathways to the collector lines are anticipated to be primarily two-track road. Road aprons at intersections or side-slope locations may require increases to these road widths. Road base or aggregate would only be placed if necessary on these roads.

230 kV and 500 kV Transmission Line Access: Roads exclusive to the 500 kV and 230 kV transmission segments will typically be 24 feet wide during the construction phase, and reclaimed down to a 16-foot permanent width for access during the O&M phase. Road aprons at intersections or side-slope locations may require increases to these road widths. Road base or aggregate would only be placed if necessary on these roads.

Ancillary Facility Roads: Access roads for the substations, meteorological towers, O&M facilities, and other ancillary facilities are anticipated to be up to 20 feet wide with temporary improvements for the construction phase as needed. The actual dimensions of the ancillary facility access roads may vary based on site-specific terrain and component delivery requirements.

Many of the new access roads that are established during construction will remain for the duration of the operations phase. Roads that are only established for use during construction will be evaluated for closure and reclamation at the conclusion of construction. Roads and road improvements that are reclaimed at the conclusion of construction would be re-established during the operations phase as needed to accommodate large equipment (e.g., replacing a wind turbine blade). All existing public roads that are used or improved by MVE during the course of construction will be left in a condition that is as good as or better than their condition when the construction period begins in accordance with the Project's agreements with the associated governing body. Roadways identified for use will be videotaped and accompanied by supporting notes prior to construction.

J-4 Access Road Design Methodology

Surface access to each Project component is required. Maximum use will be made of existing roads, thus keeping new construction to a minimum. Project access roads will be constructed to the appropriate standard necessary to accommodate the intended use. All roads will be designed, constructed, and maintained in a safe and environmentally responsible manner.

J-4.1 Natural Grade and Existing Topography

Access roads and turn radii are designed to accommodate the needs of construction, O&M, and component delivery for the Project. Access roads will generally follow the natural topography of the Project site, considering factors such as vehicle dimensions, weight, turning radius, and safety. The design of access roads should minimize the cut and fill required in order to achieve a cost effective and durable design. However, when steep topography is encountered, the vertical slope of roads and changes in grade will meet the specifications provided by the turbine component and other major equipment manufacturer’s requirements.

J-4.2 Horizontal and Vertical Roadway Alignment

The horizontal and vertical layout of access roadways is largely driven by wind turbine location, land availability, access to existing roads, and the vehicles/equipment used during construction and O&M. The shortest distance of access roadway, avoidance of steep terrain, wetlands, drainages (streams, washes, flood prone areas, etc.), environmental, and cultural resources are considerations in the selection of the horizontal roadway alignment. Vertical and horizontal roadway alignment are civil design considerations that must be addressed simultaneously during the road layout process in order to achieve a constructible and operable access roadway. The turbine supply agreement (“TSA”) will be consulted to ensure achievement of contractual turbine delivery requirements, however it is recommended that the maximum road gradient is under 6% wherever possible.

J-4.3 Longitudinal and Transverse Roadway Slopes

The longitudinal change in elevation on access roads should be designed to avoid a “high-center” or “bottoming-out” condition on component heavy haul transportation equipment, such as the transportation of wind turbine components and the main power transformers. A good standard to achieve this is a not-to-exceed design of 6 inches every 50 feet. It is ideal for transverse slopes or cross slopes to be at least 1% for drainage but should not exceed 2% slope. Access roads will be graded to self-drain and no drainage will be directed to flow longitudinally along roadways.

J-4.4 Subgrade and Aggregate Thickness

The specifications for the subgrade and aggregate thickness will be based on traffic loading information provided in any Road Use Agreements (“RUAs”) and specifications set forth by the TSA or other criteria for delivery of large components such as the main power transformers. At this time, there are no RUAs, TSA, or other agreements in place that specifies the necessary road composition, therefore example road section details are provided in Figures 4 through 6 in Appendix J-a.

Access roads for the Project will not be designed like major or urban highways because traffic on them will primarily consist of infrequent traffic as needed to support operations following construction. For this reason, the design approach for the roads will consider native materials and minimum aggregate thickness to meet Project design and safety requirements.

J-4.5 Turn Radii and Ground Clearance

Radii and ground clearances will be primarily driven by requirements for the delivery of large components such as wind turbine components and main power transformers. Ground clearances are also required adjacent to access roads (especially curved roads) to allow clearance for turbine blade tip swing. Radii dimensions and ground clearances cannot be defined without final selection of a turbine model, therefore MVE has provided example turn details for a 2.0-3.0 MW turbine in Figures 1 through 3 in Appendix J-a.

Separate from the turbine delivery road design specifications, main power transformer requirements will need to be incorporated into the design for access roads that will be utilized for main power transformer delivery. Access roads used in the delivery for main power transformers must be accessible by a lowboy trailer with a ground clearance of a few inches and typically between 13 and 19 axles.

J-4.6 Drainage

Access roads and culverts should be able to withstand and maintain operation under the conditions of a 25-year, 24-hour storm. The roadway grade and culvert size should be balanced to avoid head and velocity damage. Sufficient depth of cover for culverts according to manufacturer recommendations based on culvert material and size should be considered in the design. Culverts will be designed for minimum impact on aquatic life where practicable. Table 1 below details the drainage design criteria for a 25-year, 24-hour design storm in the Project area according to NOAA Atlas 2 Volume 5.

Table 1: Drainage Design Criteria

PARAMETER	VALUE	UNIT/NOTES
Design Storm – 25-year, 24-hour		
Precipitation	1.8	IN
Freeboard	12	IN
Cross-Slope	1-2	%
Low Water Crossing Flow Depth (max)	12	IN
Allowable Culvert Materials		
HDPE	YES	YES/NO
CMP	YES	YES/NO
RCP	YES	YES/NO
Inlet and Outlet Treatments of Culverts		
Flared Ends	YES	YES/NO
Headwalls	YES	YES/NO
Rip-rap	YES	YES/NO
Paving	YES	YES/NO
Beveled Ends	YES	YES/NO
Energy Dissipators	YES	YES/NO
Minimum Culvert Diameter	18	IN
Minimum Ditch Grades	0.5	%

As a result of following the natural topography (grade) of the Project site, access roads may be designed in a way that requires drainage to sheet flow over and across an access road. However, when drainage is impeded by the access road and not otherwise constrained by land use, roadside ditches and culverts should be utilized to prevent ponding of runoff storm water and to minimize erosion of aggregate road base. Poor drainage and incorrect aggregate material selection or improper subgrade compaction can dramatically impact the road service life and are carefully considered during the design phase of the access roads. In areas where it is not practical to install culverts, low water crossings may be used.

J-4.7 Erosion and Sedimentation Controls

The location and type of erosion and sedimentation controls required for the Project will be designated on drawings. Typical temporary controls generally consist of silt fencing, stabilized construction access, erosion control blankets, and hydro-mulching. Typical permanent controls generally consist of seeding, rock dams, rip-rap, and/or water quality structures, if required.

J-5 Post Construction Access Road Maintenance

The Project access roads will need to provide all-weather access and will require periodic maintenance throughout the life of the Project. Certain natural events, such as winter storms and major rainfall events, may require immediate access road maintenance. Typical maintenance activities include monitoring, blading, surface replacement, dust abatement, spot repairs, slide removal, ditch cleaning, culvert cleaning, litter cleanup, noxious weed control, and snow removal. Key maintenance considerations include regular inspections, reduction of ruts and holes, maintenance of crowns and outslopes to keep water off the road, replacement of surfacing materials, clearing of sediment blocking ditches and culverts, and noxious weed control.

J-6 Component, Equipment, and Materials Transportation

Project components will likely be delivered via semi-tractor and trailer or via rail to the Project site. Deliveries of equipment and materials are expected to occur during normal work hours and may occur at any time throughout the work day. Materials and equipment that will be used in real-time (e.g., gravel, concrete) or will be assembled and installed within a short timeframe may be delivered directly to the work area where that the equipment and material are to be used. Equipment that is due to be received and staged for longer periods will likely be delivered to and stored at one of the dedicated construction laydown yards.

J-7 Worker Access

The construction workforce will commute to the Project via public roads. MVE expects the labor force will use a variety of personal vehicles to commute to the Project site on a daily basis. Carpooling among construction workers will be encouraged in order to reduce the number of vehicles entering and exiting the site on a daily basis. Once workers arrive at the designated parking area (likely a construction staging yard), they will use on-site construction vehicles to travel within the Project site. Project personnel will be instructed and required to adhere to a speed limit of 25 mph or less on non-public Project roads, be alert for wildlife, and use additional caution in low-visibility conditions when driving any vehicle. Motorized equipment, including worker transportation vehicles, will be restricted to the designated and approved work limits or as required to support specific tasks requiring travel outside of developed work areas (e.g., tag line management). New access roads or cross-country vehicle travel outside of the ROW will not be permitted on federal lands without prior written approval by the Authorized Officer, except when necessary in emergency situations.

J-8 Trip Generation Estimate

A preliminary trip generation estimate was developed for the Project and can be found in Appendix J-b. The trips in the trip generation estimate are assumed to be one-way. Using one-way trips helps simplify the analysis and provides a more accurate result. For example, some vehicles enter and leave the Project site every day, while others may only enter or leave the Project site in a single day. The total amount of trips generated from construction of the Project is estimated to be 810,930 trips, with an average of 7,724 trips per week. The estimated minimum number of trips per week is 98 trips while the estimated peak trips per week is 14,198 trips. See Appendix J-b for more information and detail on the methodology and results of the trip generation estimate.

J-9 References

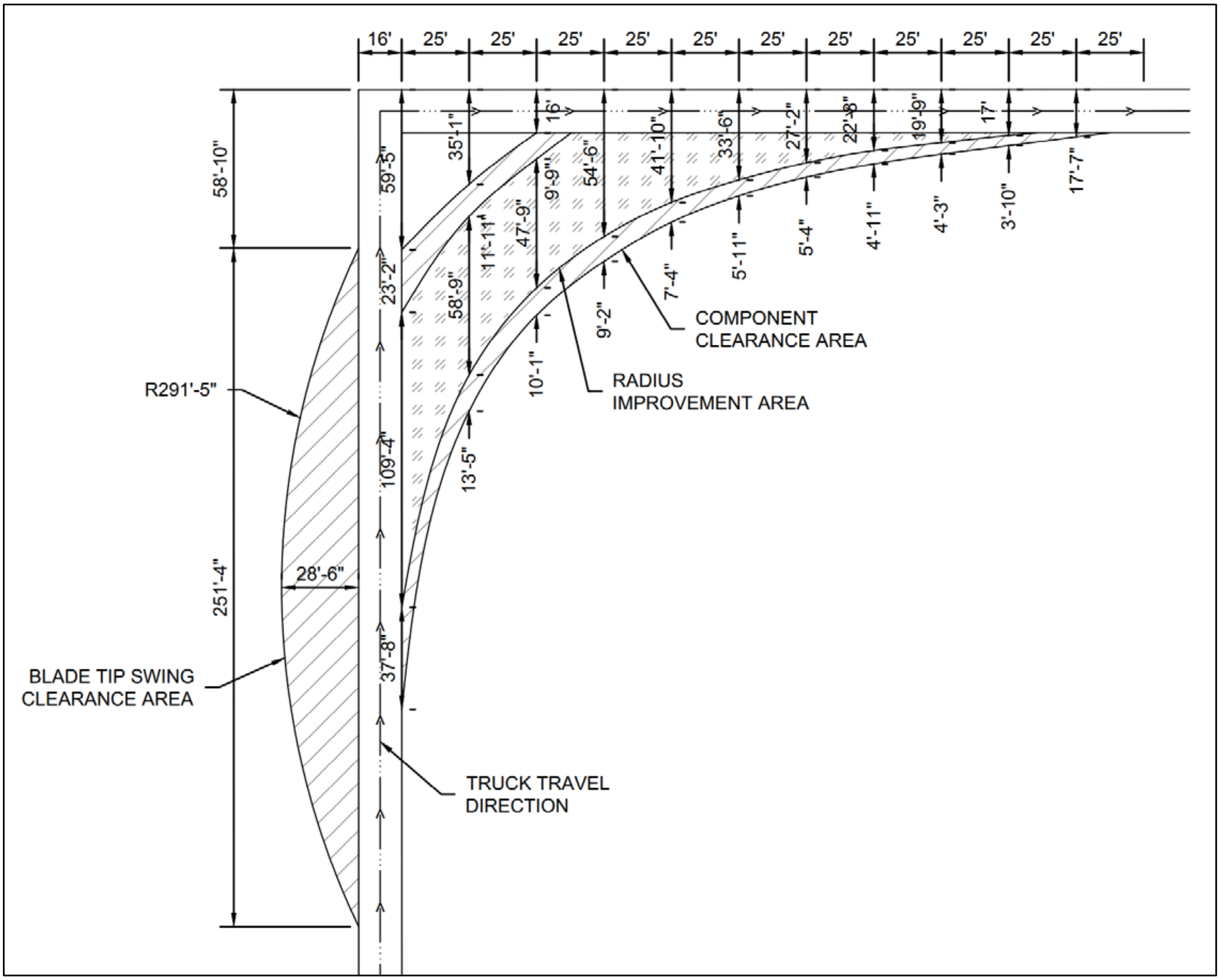
Bureau of Land Management (BLM). 2011. 9113 – 1 – Roads Design Handbook. Available online: https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_H-9113-1.pdf

Bureau of Land Management (BLM). 2007. Oil and Gas: Surface Operating Standards and Guidelines For Oil and Gas Exploration And Development. Available online: https://www.blm.gov/sites/blm.gov/files/Gold%20Book%202007%20Revised.pdf

National Oceanic and Atmospheric Administration (NOAA). 1973. Atlas 2, Precipitation-Frequency Atlas of the Western United States Volume V-Idaho. Available online: https://hdsc.nws.noaa.gov/hdsc/files25/Atlas2_Volume5.pdf

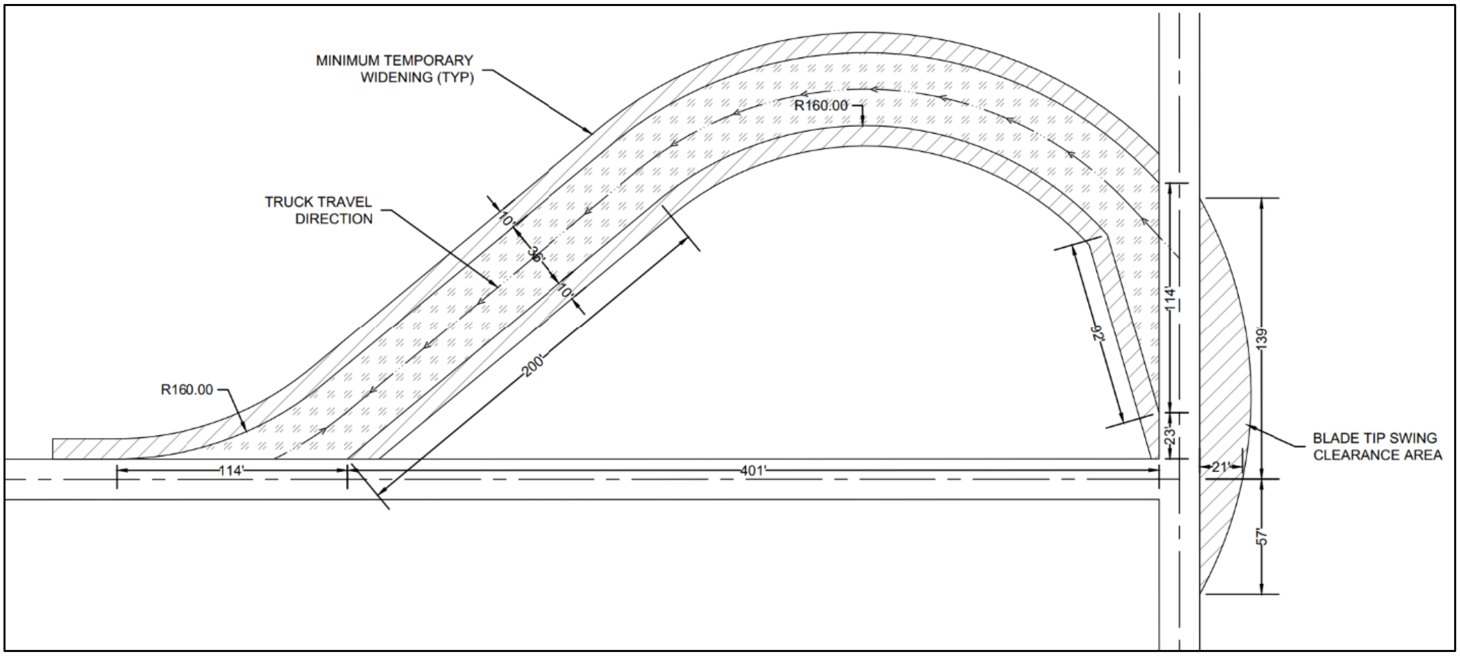
Appendix J-a: Figures

Figure 1: Cut-Through Turning Radius Typical Example



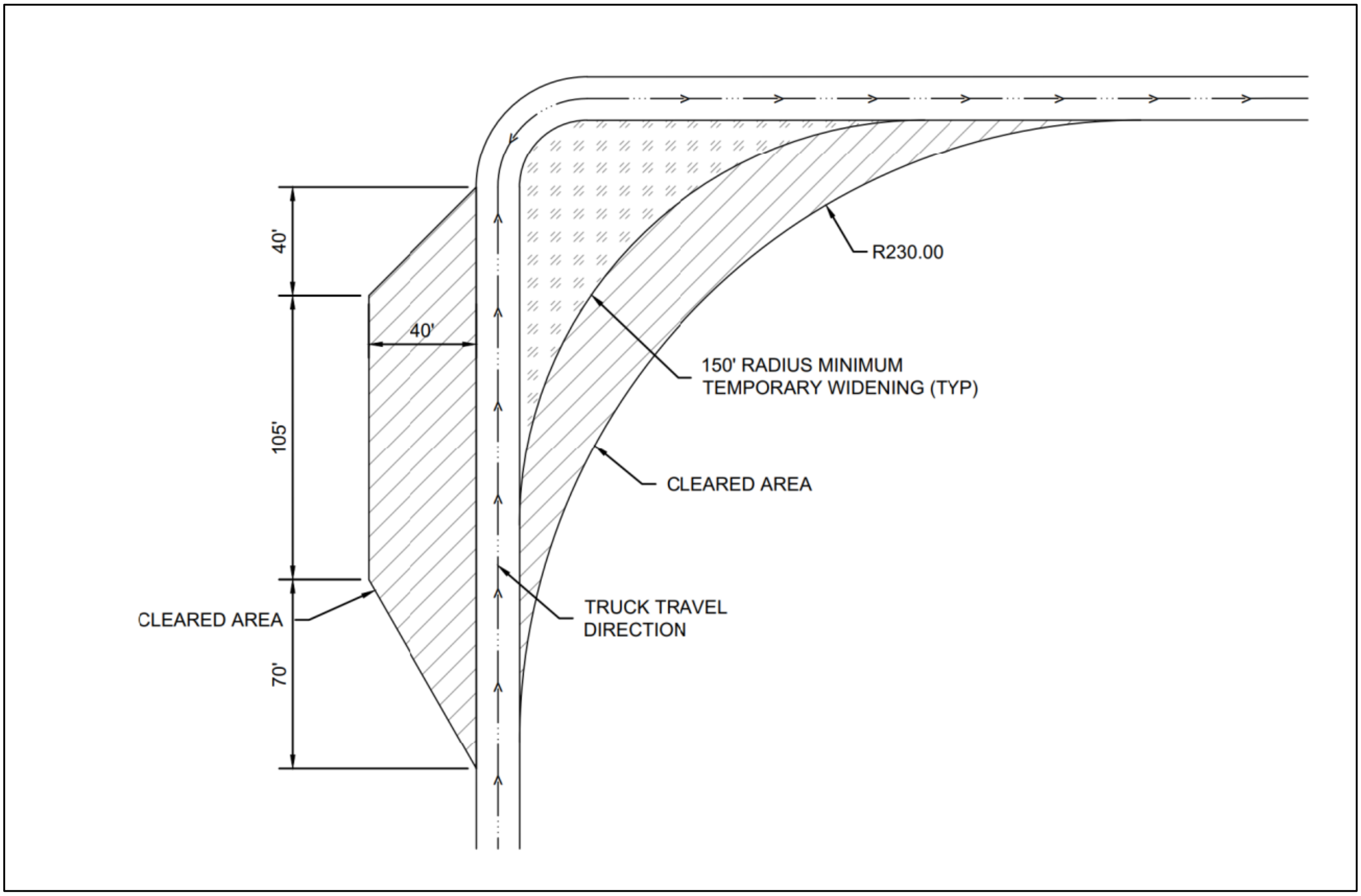
The figure above is for a typical cut-through turn radius for a 2.0 – 3.0 MW turbine with 107/116/127m rotor diameter and 80/87/90/94/114m tower height. Actual dimensions of the turn radius will vary depending on the turbine model selected and its varying tower heights and rotor dimensions.

Figure 2: Jug Handle Turning Radius Typical Example



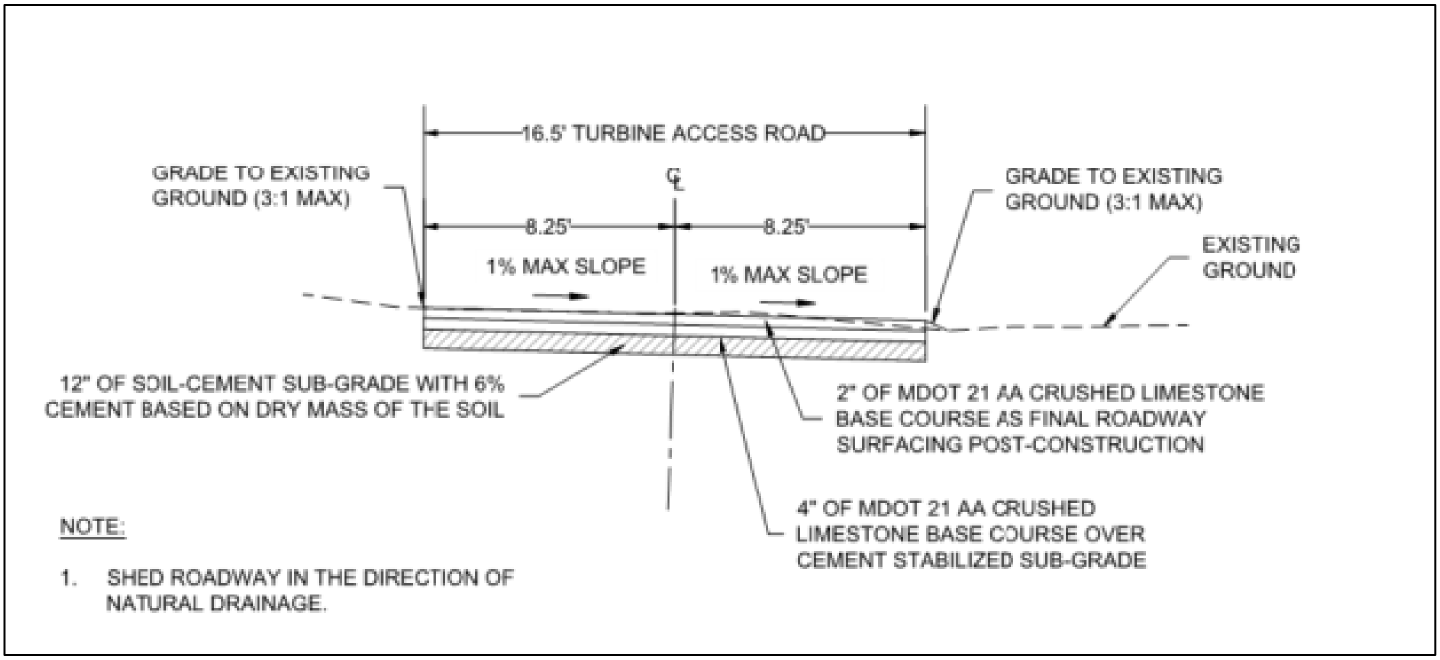
The figure above is for a typical jug handle turn radius for a 2.0 – 3.0 MW turbine with 107/116/127m rotor diameter and 80/87/90/94/114m tower height. Actual dimensions of the turn radius will vary depending on the turbine model selected and its varying tower heights and rotor dimensions.

Figure 3: 90 Degree Turning Radius Typical Example



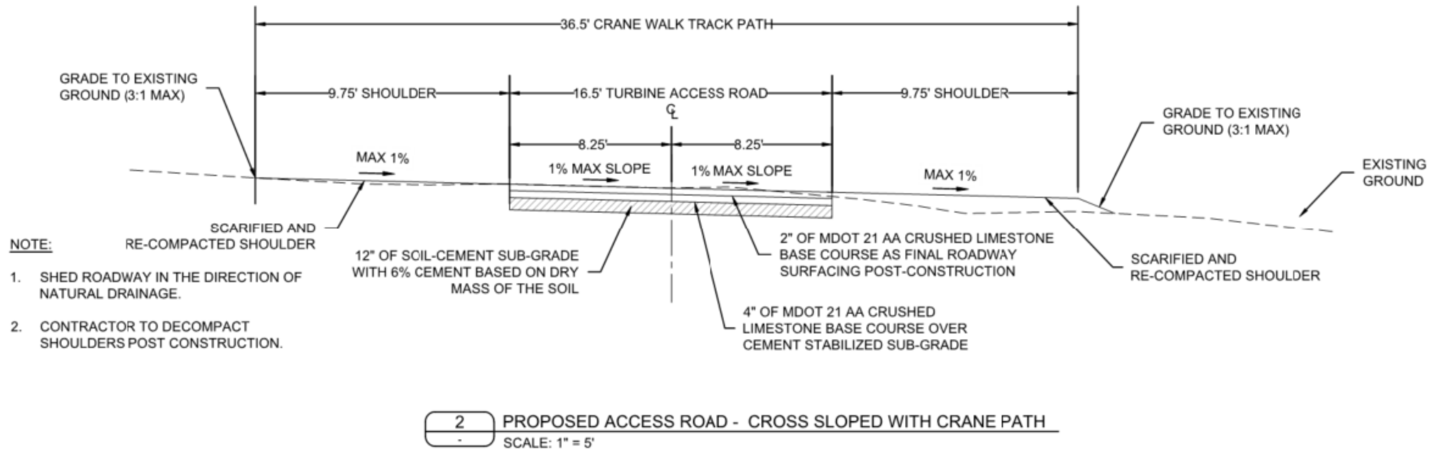
The figure above is for a typical 90 degree turn radius for a 2.0 – 3.0 MW turbine with 107/116/127m rotor diameter and 80/87/90/94/114m tower height. Actual dimensions of the turn radius will vary depending on the turbine model selected and its varying tower heights and rotor dimensions.

Figure 4: Cross-Sloped Access Road Detail Example



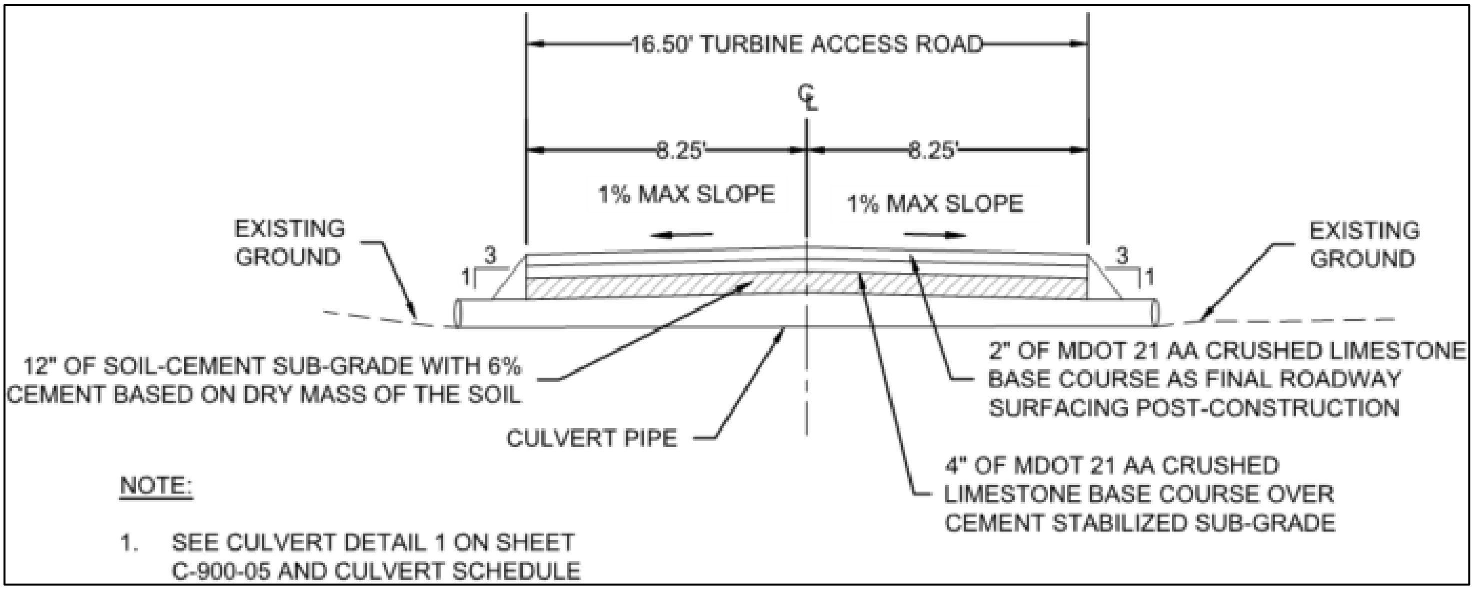
The figure above is a typical cross-sloped access road example for a 2.0 – 3.0 MW turbine. Actual dimensions and subgrade materials will vary depending on requirements from the turbine supply agreement and EPC contractor.

Figure 5: Cross-Sloped Access Road with Crane Path Detail Example



The figure above is a typical cross-sloped access road with crane path example for a 2.0 – 3.0 MW turbine. Actual dimensions and subgrade materials will vary depending on requirements from the turbine supply agreement and EPC contractor.

Figure 6: Crowned Access Road with Culvert Detail Example



The figure above is a typical crowned access road with culvert example for a 2.0 – 3.0 MW turbine. Actual dimensions and subgrade materials will vary depending on requirements from the turbine supply agreement and EPC contractor.

Appendix J-b: Trip Generation Estimate Report

Trip Generation Report

LAVA RIDGE WIND PROJECT
Lincoln, Jerome, and Minidoka
Counties, ID

Prepared By:

RRC

810 Hesters Crossing Road, Suite 120
Round Rock, TX 78681
512.992.2087 | www.RRCcompanies.com

RRC Project No. MD2109035
February 23, 2022

experience matters

REVISION HISTORY

Revision	Description	Performed by	Reviewed by	Issued Date
0	Issued for Review	S. Espinoza K. Petersburg	Alfred Fuentes	11/03/2021
1	Issued for Review	S. Espinoza K. Petersburg	Alfred Fuentes	11/08/2021
2	Issued for Review	S. Espinoza K. Petersburg	Alfred Fuentes	11/08/2021
3	Issued for Review	S. Espinoza K. Petersburg	J. Kenniston	02/17/2022
4	Issued for Review	S. Espinoza K. Petersburg	J. Kenniston	02/23/2022

Submitted by

Kimberly Ferguson
Project Manager

Prepared by

Sofia Espinoza & Katelyn Petersburg
Graduate Civil Engineers

Reviewed by

Jesse Kenniston
Civil Project Engineer, P.E.

TABLE OF CONTENTS

1.0 GENERAL

1.1 Purpose

This document establishes methodologies and results to create the delivery flow plan and trip generation for the proposed Lava Ridge wind project, located in the counties of Lincoln, Jerome, and Minidoka, Idaho. It is intended to assist the Client and Engineer in understanding the transportation aspect of this project while serving to meet the Client's requirements, and to satisfy applicable regulatory requirements, standards, and guidelines. This document is exclusive for use on the designated project and may not be used or reproduced in whole or part by any other party.

1.2 Objectives

The objectives of this trip generation report are:

- To estimate the amount of additional traffic expected to use the existing and proposed access roads, and the number of vehicles expected on site throughout construction, operation, and decommissioning.
- To provide information to aid in analyzing how the project will affect surrounding communities and roadways.

2.0 BACKGROUND

2.1 Considerations

The main goal of this trip generation analysis is to determine resulting traffic throughout the lifetime of the wind project. The project's resulting traffic is dependent on the number of workers expected on site, the number of turbines expected for construction, and the serviceability of existing roads and bridges. Although the turbine supplier source location is unknown, it is assumed that turbine components will arrive from the east rather than the west coast, due to a western project location. These major considerations, as well as concerns toward local and wildlife communities, have defined the trip generation report for this wind project.

2.2 Limitations

Access roads are required to allow entry for each wind turbine, substation, and transmission structure location. A vital prerequisite to perform the trip generation analysis is to establish a delivery flow plan by identifying which roads will be used and how the wind component delivery vehicles will travel throughout the site. By referencing the delivery flow plan in the trip generation report, its associated assumptions and constraints are inherited from the methodology describing the delivery flow plan (performed by RRC, Nov 2021). Limitations may include geometric constraints, load constraints, and possible community disruptions.

2.3 Alternatives

The process of narrowing a delivery flow plan seeks to exclude inaccessible routes for turbine component delivery vehicles. Routes are categorized as primary or secondary delivery haul routes, where primary routes are the main roadways outside the project boundary, and secondary routes are the roadways located in the project boundary.

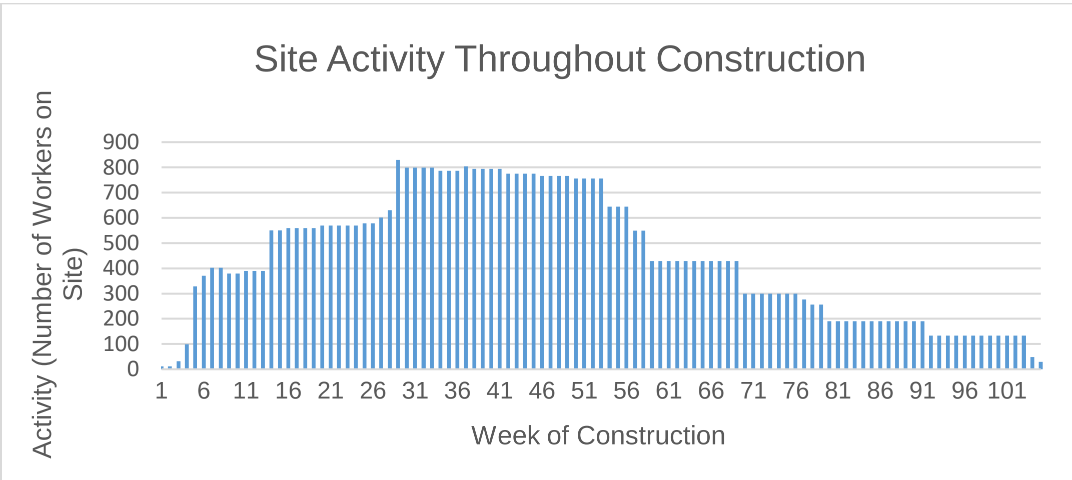
A primary delivery alternative access route is established for additional entrances onto the site to access turbines from eastern, western and southern regions of the project boundary. Worker access routes are specified to accommodate travelers from nearby communities.

3.0 METHODOLOGY

3.1 Construction

To first perform a trip generation for project construction, considerations are made to examine activities with respect to an estimated schedule, and the number of employees expected for each task. Estimates for the number of workers on site are organized by week and can be found in Figure 1 below. From here, peak activity is estimated to be 829 workers on site for week 29 of project construction.

Figure 1: Site Activity Throughout Construction



The next step to estimate a trip generation is to determine the types of vehicles and number of vehicles designated for each activity. The number of workers for each task is used to define the total number of passenger vehicles expected per week. The number of other vehicles expected depends on the duration and scope of each activity.

3.2 Operations and Maintenance

The operations and maintenance (O&M) involved after the construction of a wind farm contributes far less traffic to surrounding roadways than construction phases, due to significantly less activities involved. It is assumed that various activities will continue, such as management, routine maintenance repairs, inspection, and security.

The total number of workers estimated to continue day-to-day O&M is close to 40 people, which includes turbine maintenance workers, site management, and security. When a crane is required to perform maintenance, 20 additional people are expected to help deliver and erect the crane. It is also believed the project's access roads will occasionally require maintenance. Lastly, wind farm inspections may happen routinely throughout the project's lifetime post construction, but not as often as during construction.

3.3 Decommissioning

Once the project is ready for decommissioning, there will be a period of final activity to the project site. The decommissioning phase requires less labor than the construction phase, although the traffic is similarly produced to construction activities. Therefore, much of the decommissioned traffic assessment reflects adjusted values originating from the construction phase with respect to certain assumptions which consider the extent of decommissioning activities.

The total number of workers expected to contribute to decommissioning activities is 641 workers. It is expected that the workers may not work simultaneously throughout decommissioning, but during peak activity this number of workers can be expected on site at once. It may be worth noting that site access road deconstruction will be broken into phases, where they first must improve roads to prepare for crane paths and transporting heavy haul vehicles. As the turbines are disassembled, their respective access roads can be cleared and reclaimed to their original state. It is assumed that the only access roads that will be completely removed are the individual roads that access each turbine.

3.4 Assumptions

In order to complete this trip generation, certain assumptions have been made regarding the numbers of weeks, workers, and vehicles. A preliminary schedule provided by an EPC contractor serves a vital role in determining activity duration.

The EPC contractor preliminary schedule estimated 41 weeks for turbine deliveries, which would require about 10 deliveries per week in order to deliver the required 400 turbines. It is likely this estimate will change according to the turbine supply agreement and turbine model(s) selected. For now, it is reasonable to assume that the delivery vehicles will be able to make two roundtrips per week for turbine component deliveries. This assumption is also subject to change depending on the location of the turbine supplier. Note that one turbine typically requires 8 heavy haul vehicles, accompanied by 2 passenger vehicles on either side of the oversize truck.

Based on previous wind project experience, it is deduced that this wind project will require up to 6 cranes for erecting the turbines.

The preliminary EPC schedule predicts substations will be constructed one after the other with nearly a month of overlap between each substation's construction. This action resulted in worker and trip fluctuations spanning the activity.

It is believed a certain number of workers will carpool using passenger vehicles. To calculate total passenger cars, the number of workers (that were not expected to already occupy either a construction vehicle, heavy haul vehicle, or support vehicle) is divided by a carpool factor of 1.5. Therefore, it is predicted that half the number of workers will choose to carpool with another worker. There are a few exceptions to this depending on which activity the passenger vehicle is used for, such as surveying expected to regularly occupy 2 people per vehicle. Activities that do not anticipate carpooling include turbine deliveries, inspecting, blasting, and security. Other vehicles operated on site are expected to seat one worker.

Miscellaneous activities account for any instances of repairs for equipment, assistance to other activities, and site visitors. It is assumed these services will be most prevalent during the peak 50% of the construction schedule, when there are more moving parts occurring. It is also assumed that the project consists of 7-day work weeks.

Furthermore, it is important to note the number of workers for each activity (excluding substation construction) is held constant for every week the activity occurs for the sake of simplicity and conservation, as this is a preliminary analysis.

To estimate the number of trips generated during the decommissioning phase, the duration of related construction activity is assumed to be proportional to the extent of the activity's expected reclamation. For example, it is expected that only the top 3 feet of WTG foundations will be removed and then filled with soil, therefore this activity is not expected to take place identically to the related construction of foundations. Blasting one turbine foundation and excavating blasted debris may only take 1-2 days per turbine, whereas foundation construction requires rebar positioning and multiple phases of concrete pouring. Similarly, turbine disassembly will expect less time compared to erecting WTG components.

It is assumed that the only access roads that will be removed during the decommissioning phase are the individual roads that access each turbine. Roadways will require additional upgrades for crane use and other large vehicles to mobilize across the site. These roadway upgrades are typically reclaimed after decommissioning activities are completed.

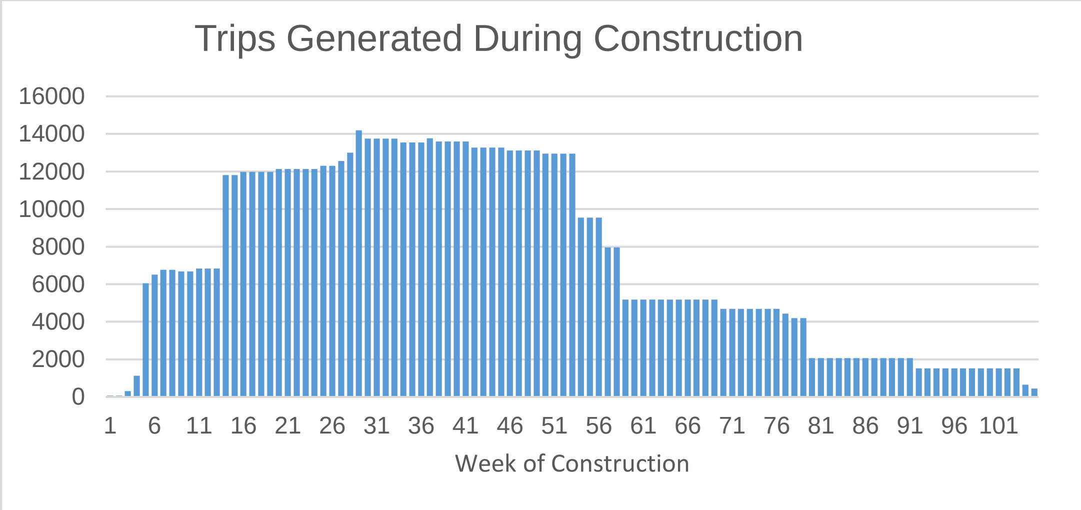
Structures to be removed include the above ground transmission, substation equipment, and WTGs. The O&M facilities are assumed to be donated or sold at the time of decommissioning, and underground collection lines are assumed to be left in place.

4.0 RESULTS

4.1 Construction

The total amount of trips generated from project construction is 810,930 trips, with an average of 7,724 trips per week. The week with the least number of trips is the first week of construction when only surveyors are on site, having an estimated number of 98 trips that week. The period of peak trips generated occurs between weeks 29 and 54, with an average of 13,415 trips per week and a maximum of 14,198 trips during week 29. The trips generated throughout construction is summarized in Figure 2.

Figure 2: Trips Generated Throughout Construction



Findings for the number of trips generated per vehicle type are summarized in Table 1, with detailed calculations in Appendix A. Passenger vehicles are typically used to travel on site, or to accompany oversize vehicles. Note that construction vehicles include all vehicles used for materials, equipment, concrete, and other aggregate. Heavy haul vehicles describe flatbed vehicles used for crane and turbine deliveries. Examples of support vehicles include, but may not be limited to bulldozers, graders, support cranes, compacters, and forklifts.

Table 1: Trips Generated per Vehicle Type During Construction

Type of Vehicle	Number of Vehicles	Trips Generated
Passenger	430	326,678
Construction	121	466,116
Heavy Haul	46	6,608
Support	105	11,528

Trip projections are categorized by trips per activity phase, as shown in Table 2.

Table 2: Trips Generated per Construction Activity

Activity	Total Trips	Trips Per Day During Peak Activity
Surveying	7,622	11
Access Roads	160,050	305
Underground Collection	33,440	120
Blasting Operations	18,300	35
Foundation Construction	102,720	367
Overhead Collection	53,460	142
230/500kV Collection	82,472	227

Activity	Total Trips	Trips Per Day During Peak Activity
Substation Construction	44,204	147
Turbine Deliveries	20,090	70
Turbine Erection	37,350	72
O&M Facility Construction	4,928	32
Environmental Monitors	17,248	28
Inspectors	28,000	40
Batch Plant	70,200	223
Engineering & Construction Management	29,920	49
Security	20,790	30
Civil Reclamation	25,284	37
Reseeding	43,956	64
Miscellaneous Activity	10,300	30
Crane Delivery	172	13
Laydown Yard Construction	512	37

4.2 Operations & Maintenance

Table 3 below summarizes O&M activity for an average year. The total number of trips in an average year is approximately 30,058 trips. For most days, the only activities occurring are site management and security, which is expected to produce an average of 38 trips per day. These values are subject to change if project construction requires additional road maintenance, or if there are greater than 6 crane deliveries within a year for turbine maintenance. It is estimated that if all activities occur on the same day during the O&M phase, it will produce a peak of 134 trips per day. Tabulated calculations for O&M are presented in Appendix B.

Table 3: Trips Generated per O&M Activity

Activity	Total Trips Per Year	Trips Per Day During Peak Activity
Inspection	72	6
Site Management	2864	8
Security	10950	30
General Turbine Maintenance	15752	44
Crane Delivery	180	30
Road Maintenance	240	16

4.3 Decommissioning

Table 4 breaks down the trip generation for decommissioning into four vehicle types, as described in Section 4.1.

Table 4: Trips Generated per Vehicle Type During Construction

Type of Vehicle	Number of Vehicles	Trips Generated
Passenger	446	370,620
Construction	129	323,960
Heavy Haul	60	13,560
Support	96	10,024

Table 5 summarizes the number of trips generated from project decommissioning. While not all activities will occur simultaneously throughout the decommissioning, the peak activity may produce up to 1,826 trips per day. The total number of trips estimated is 711,124 trips over 80 weeks. Tabulated calculations for decommissioning are presented in Appendix C.

Table 5: Trips Generated per Decommissioning Activity

Activity	Total Trips	Trips Per Day During Peak Activity
Surveying	7,040	13
Access Roads Reclamation	95,152	358
Blasting Operations	70,500	202
Overhead Collection Disassembly	97,680	233
Substation Demolition	15,180	145
Turbine Disassembly	152,100	290
Environmental Monitors	4,480	8
Inspectors	22,400	40
Engineering & Construction Management	28,000	50
Security	16,800	30
Reseeding	199,840	357
Miscellaneous Activity	8,280	40
Crane Delivery & Erection	116	17
Laydown Yard Construction	596	43

APPENDICES

APPENDIX A: Trip Generation Calculations For Construction

Activity	Weeks	Workers/Week	Passenger Vehicle	Construction Vehicle	Heavy Haul Vehicle	Support Vehicle	Workers per Passenger Vehicle	Workers per Construction Vehicle	Workers per Heavy Haul Vehicle	Workers per Support Vehicle	Trips per Week per Passenger Vehicle	Trips per Week per Construction Vehicle	Trips per Week per Heavy Haul Vehicle	Trips per Week per Support Vehicle	Total Trips	Peak Trips Per Day During Activity Phase
Surveying	103	12	5			2	2	1		1	14			2	7622	11
Site Access Roads	75	66	30	11		10	1.5	1		1	14	154		2	160050	305
Underground Collection	40	29	11	8		5	1.5	1		1	14	84		2	33440	120
Blasting Operations	75	20	8	2		10	1	1		1	14	56		2	18300	35
Foundation Construction	40	82	42	10		10	1.5	1		1	14	196		2	102720	367
Overhead Collection	54	53	28	6		5	1.5	1		1	14	98		2	53460	142
230/500Kv Collection	52	96	32	40		9	1.5	1		1	14	28		2	82472	227
Substation Construction	43	60	30	6		10	1.5	1		1	14	98		2	44204	147
Turbine Deliveries	41	135	80		40	5	1		1	1	4		4	2	20090	70
Turbine Erection	75	56	35			4	1.5	1		1	14	14		2	37350	72
O&M Facility Construction	22	17	7	2		5	1.5	1		1	14	56		2	4840	32
Environmental Monitors	88	20	14				1.5				14				17248	28
Inspectors	100	20	20				1				14				28000	40
Batch Plant	45	50	10	25		10	1.5	1		1	14	56		2	70200	223
Engineering & Construction Management	88	37	24			2	1.5			1	14			2	29920	49
Security	99	5	5				1				42				20790	30
Civil Reclamation	98	23	13	1		3	1.5	1		1	14	70		2	25284	37
Reseeding	99	18	6	5		5	1.5	1		1	14	70		2	43956	64
Miscellaneous Activities	50	22	10	2		5	1.5	1		1	14	28		2	10300	30
Crane Delivery & Erection	2	30	14		6	3	1.5		1	1	4		4	2	172	13
Laydown Yard Construction	2	13	6	3		2	1.5	1		1	14	56		2	512	37
Totals	1291		430	121	46	105					326678	466116	6608	11528	810930	

Appendix A: Calculations for Appendix A estimates the numbers of workers per week, and number of vehicles per activity based on installing 400 turbines and their supplemental components and facilities within their allotted duration according to an EPC contractor schedule.

The number of workers is divided by different vehicle types for each activity. For example, since it is expected that substation construction will use 6 construction vehicles and 10 support vehicles, the number of passenger vehicles needed is a result of subtracting the total number of other vehicles (16) by the number of total workers for the activity (60), which is then divided by the carpool factor (1.5) in order to obtain a result of 30 passenger vehicles. This formula does not apply to turbine and crane deliveries due to the number of workers/drivers directly dependent on the number of vehicles to transport relevant components.

Appendix B: Trip Generation Calcuations for Operation and Maintenance

Activity	Days of Activity Per Year	Worker/Days	Passenger Vehicles	Heavy Haul Vehicles	Support Vehicle	Workers Per Passenger Vehicle	Workers per Heavy Haul Vehicle	Workers per Support Vehicle	Trips per Passenger Vehicle per Day	Trips per Heavy Haul Vehicle per Day	Trips per Support Vehicle per Day	Total Trips per Year	Peak Trips per Day
Inspectors	12	3	3			1			2			72	6
Site Management	358	5	3		1	1.5		1	2		2	2864	8
Security	365	5	5			1			6			10950	30
General Turbine Maintenance	358	30	17		5	1.5		1	2		2	15752	44
Crane Delivery	6	20	11	2	2	1.5	1	1	2	2	2	180	30
Road Maintenance	15	10	3		5	1.5			2		2	240	16
Total		73	42	2	13				16	2	8	30058	134

Appendix B: In the event a crane is required to preform maintenance, there will be one crane delivery for each instance of maintenance. Crane unloading may require a support crane nearby.

While the trips generated from management and general turbine workers accounts for them coming to the site each day, it is common for turbine employees to monitor turbines remotely. For this exercise, they are assumed to arrive each day.

APPENDIX C: Trip Generation Calculations For Decommissioning

Activity	Weeks	Workers/Week	Passenger Vehicle	Construction Vehicle	Heavy Haul Vehicle	Support Vehicle	Workers per Passenger Vehicle	Workers per Construction Vehicle	Workers per Heavy Haul Vehicle	Workers per Support Vehicle	Trips per Week per Passenger Vehicle	Trips per Week per Construction Vehicle	Trips per Week per Heavy Haul Vehicle	Trips per Week per Support Vehicle	Total Trips	Peak Trips Per Day During Activity Phase
Surveying	80	12	6			2	2			1	14			2	7040	13
Site Access Roads	38	66	44	33		20	1.5	1	1	1	14	56	4	2	95152	358
Blasting Operations	50	20	20	20		5	1	1		1	14	56		2	70500	202
Overhead Collection Disassembly	60	130	87	25		30	1.5	1	1	1	14	14	14	2	97680	233
Substation Demolition	15	60	40	16		2	1.5	1		1	14	28		2	15180	145
Turbine Disassembly	75	189	130		45	14	1.5		1	1	14		4	2	152100	290
Environmental Monitors	80	20	14				1.5				4				4480	8
Inspectors	80	20	20				1				14				22400	40
Engineering & Construction Management	80	37	25				1.5			1	14				28000	50
Security	80	5	5				1				42				16800	30
Reseeding	80	40	27	30		10	1.5	1	1	1	14	70	28	2	199840	357
Miscellaneous Activities	30	22	15	2		5	1.5	1		1	14	28		2	8280	40
Crane Delivery & Erection	1	30	10		15	8	1		1	1	4		4	2	116	17
Laydown Yard Construction	2	13	9	3		2	1.5	1		1	14	56		2	596	43
Totals		664	446	129	60	96					370620	323960	13560	10024	711124	1826

Appendix C: The number of weeks for each decommissioning activity is proportional to the number of weeks for the related construction activity. The estimated schedule for decomissioning lasts 80 weeks.

More workers were added to reseeding to aid in restoring the land vegetation and soils.

Lava Ridge Wind Project

Draft Appendix K: Flagging, Fencing, and Signage Plan

Magic Valley Energy, LLC

October 2022

Table of Contents

Tables

K-1 Introduction

This Flagging, Fencing, and Signage Plan describes the methods that will be used in the field to delineate Project features and sensitive environmental resource areas and warnings during Project construction. These methods are intended to ensure that ground disturbance is limited to previously approved areas, to ensure that Project personnel stay on approved access routes and within approved work areas, and to establish Project notifications (i.e., warning, speed limit, and sensitive area signs). The measures described in this plan are an integral part of the environmental compliance program for avoiding and minimizing impacts to sensitive resources.

The purpose of this plan is to provide information on the field markings (i.e., flagging, staking, fencing, and signage) that will be used to identify approved Project work areas, as well as sensitive resource areas where construction is to be excluded. It serves as an informational guide on restrictions and safety precautions to all individuals that will have access to the Project right-of-way. This Flagging, Fencing, and Signage plan will help to avoid adverse impacts to the environment, human health and safety, and property that could potentially result from the activities associated with the construction of the Project. This plan will be approved by the appropriate state or federal agency and BLM prior to the BLM signing the Notice to Proceed (“NTP”).

K-2 Methods

Signs, flags, and/or fencing will be used to delineate and protect sensitive environmental resources in the vicinity of construction activities. A system of standardized and simplified exclusion markings will be used to reduce potential confusion during construction, and to minimize the risk of highlighting types of sensitive resources that could be targeted by vandals (e.g., if exclusions around archaeological sites were marked differently than those around sensitive natural resource areas, the sites would be at a higher risk of unauthorized artifact collecting or other disturbance).

K-2.1 Flagging

This section establishes flag color designations to be used during construction of the Project. The objective is to identify a wide variety of proposed activities in the field using colored plastic ribbon or paint. Flagging placement and intervals will be adjusted as reasonably necessary to support the construction activity or provide adequate protection to a particular resource of concern.

Table 1 below shows the colors of plastic flagging with identified purpose for each color. Colors may be changed with agreement among BLM, MVE, and construction contractor.

Table 1: Flagging Purpose with Corresponding Colors

Purpose	Feature Color
Boundaries of work areas: WTG construction sites, transmission structure construction sites, O&M building area, storage/staging areas, and substations	Blue and white striped
Transmission line centerline	Orange
Edge boundaries of linear types of ROW and/or reference stakes	Blue
Environmentally sensitive areas: sensitive plants, cultural sites, nest buffers, etc.	Yellow
Access roads	Red
Underground crossings	Green

K-2.2 Fencing

To delineate the limits of construction near sensitive resources that require a high level of protection from inadvertent Project disturbance, a combination of one or more of the following fencing materials will be installed by the construction contractor:

- Rope (1/4-inch diameter in yellow or orange coloring)
- Plastic or fabric tape
- Safety fencing

Roping with periodic marking by exclusionary signs or lengths of tape is a highly visible and effective exclusion device. In most cases, it is anticipated that the materials will be installed at the margins of the sensitive resource (including any required buffers), rather than at the edge of the work area.

K-2.3 Signage

Signs may be used to help identify Project features, such as access roads and certain Project facilities. Signs will be installed on metal posts, wooden stakes, or attached to exclusion fencing/roping, as appropriate. Background colors will vary to enhance sign recognition from a distance. Signage intended to protect a specific resource or the public will be placed at or beyond the buffer zone or resource being protected.

Table 2 provides some standards for marking Project features that may be needed during Project construction. Temporary warning signage will be employed to alert the public of blasting, as required.

Table 2: Signage Examples

Feature	Feature Color	Sign Text Example	Comments
Speed limit signs	White	Speed Limit XX mph	To be located at various locations along approved

Feature	Feature Color	Sign Text Example	Comments
			Project access roads, depicting allowed speed limits.
Direction sign	White	WTG #77 Ahead	To be located along approved Project access roads and points of intersection, to provide direction to various Project features being constructed.
Cultural sites, special-status wildlife areas, wetlands, drainages, and noxious weed infestations adjacent to construction areas.	Yellow	Sensitive Resource Area Keep Out	Signs to be installed, as needed, in addition to exclusion fencing and flagging.
Areas temporarily closed to construction due to special status wildlife breeding, nesting, or seasonal use range.	Yellow	Sensitive Resource Area Keep Out	Signs to be installed, as needed, at logical points of entry (i.e., access road and/or centerline travel route) to excluded zone.
Unapproved access road, closed roads	Yellow	Non-Project Road Do Not Enter	To be located at juncture of approved access roads.
Blasting Areas	Orange	Caution – Blasting Zone Ahead	Located at appropriate points to warn the public of blasting activities.

K-2.4 Installation, Monitoring, Maintenance, and Removal of Flagging, Fencing, and Signage

The success of this Flagging, Fencing, and Signage Plan hinges on the proper installation, monitoring, and maintenance of staking, flagging, and fencing. The construction contractor or the designated surveying contractor(s) will be responsible for the installation and maintenance of the field marking of construction features (e.g., towers, work area boundaries, anchors, substations). These markings will be installed in advance of construction activities in the area, maintained during the course of construction, as necessary, and removed during clean-up activities.

Environmental exclusions, signs, flags, and fencing for general inventory purposes and to denote exclusionary zones will be installed by flagging and fencing crew(s), along with the assistance of appropriate resource specialists (e.g., botanists, biologists, archaeologists), as necessary. Project fencing will only be installed as necessary. These environmental exclusions will be installed prior to the start of construction within a work area. Resources Specialists will be consulted if there is uncertainty regarding the type or location of needed exclusion devices for botanical, wildlife, wetlands, or archaeological sites.

Routine Project monitoring will include an ongoing assessment of the need for replacement or repair of exclusionary flagging or fencing. Maintenance needs related to exclusionary devices will either be corrected at the time of observation or will be documented as a future need. Maintenance of exclusionary flagging or fencing within active construction areas will be prioritized. Maintenance of signs, flagging, and fencing within dormant areas will be implemented as necessary. Upon completion of construction activities, and following clean-up and/or reclamation, all staking and flagging will be removed and disposed of by the construction contractor.

Lava Ridge Wind Project

Draft Appendix L: Decommissioning Plan

Magic Valley Energy, LLC

October 2022

Table of Contents

Figures

L-1 Introduction

The purpose of this Decommissioning Plan is to detail the intended means and methods by which Project infrastructure and associated civil works will be removed. Final reclamation goals and methodologies can be found in Appendix E: Reclamation Plan. Decommissioning of the Project is intended to take place at the end of the ROW term, should a term renew not be requested by MVE or granted by BLM. This Decommissioning Plan details components which may be removed and the general process by which decommissioning will proceed. The exact requirements for equipment removal, including the depth to which buried components are extracted, will depend upon final permit requirements and typical industry practices at the time of decommissioning. This plan will be approved by the appropriate state or federal agency and BLM.

L-2 Disposal of Project Components

MVE will prioritize the re-use, recycling, or scrap value of decommissioned Project components over direct disposal in approved landfill facilities. Many of the metal project components have potential for re-use or scrap value, depending on the market value of the metals at the time of decommissioning. New industrial technologies that recycle turbine blades are currently gaining traction in the marketplace and are expected to increase in utilization over the lifespan of the Project. Should these re-use, recycling, or scrap disposal methods become uneconomic by the end of the Project lifespan, MVE would seek appropriate industrial disposal sites or landfill locations that are permitted to accept the Project components. MVE would not seek to force landfill facilities to accept the disposal of components if the facility objects to their disposal.

L-3 Decommissioning Sequence

The process of decommissioning a wind facility involves several phases and a number of activities within each phase. While there is no single universal approach to accomplish the decommissioning process, an outline of typical process is provided in Figure 1 below followed by a more detailed description.

Site Prep for Cranes
Paths and pads for cranes will be reconditioned to accommodate the cranes required for dismantling the turbines.

Above Ground Component Removal
Turbines, met towers, substations, and other above ground infrastructure will be removed.

Foundation Removal
Foundations for decommissioned above ground infrastructure will be removed to a minimum of three feet below surrounding grade and covered with soil.

Below Ground Component Removal
Underground cables buried less than two feet below grade will be removed, and cables buried more than two feet will remain in place.

Road & Access Path Removal
Based on the preference of individual landowners or land management agencies, access roads will either be removed or left in place.

Final Reclamation
See Section L-4.

*All phases and processes will employ appropriate sediment and erosion controls

Figure 1: General Decommissioning Sequencing

MVE, BLM, and any other applicable agencies will meet prior to formal decommissioning to determine whether specific infrastructure or civil works offer public benefits be remaining in place (i.e. specific roadways or infrastructure). If these agencies determine that it is in the public interest for some Project infrastructure to remain, appropriate steps will be taken to secure the necessary approvals and/or transfer of ownership.

All dismantling, removal, recycling, and disposal of materials generated during decommissioning will comply with rules, regulations, and prevailing laws at the time decommissioning is initiated, and will use approved local or regional disposal or recycling sites as available. Recyclable materials will be recycled to the furthest extent practicable. Non-recyclable materials will be disposed of in accordance with state and federal law.

Water will be required to support decommissioning of the Project. However, it is not possible to accurately predict the amount of water that will be needed with certainty due to the length of time between initial operations of the Project and when decommissioning would occur. There are many unknown variables such as what the ecological setting and the standard protocols for decommissioning will be. With the currently available information and assuming standard decommissioning protocols of today, MVE estimates that approximately 13 million gallons of water will be needed for decommissioning.

L-3.1 Site and Road Preparation

As is required for assembly of the wind turbines, large industrial cranes will also be necessary to disassemble the turbines. Due to the size of these cranes, the Project will need to have crane paths and pads reconditioned to facilitate their use on-site. It is expected that the same preparation and site accommodations made during construction of the Project will be used for disassembly of the turbines. The same network of crane paths is expected to be reestablished and those same access pathways that were widened for construction will also be widened to allow for crane movements and component egress during decommissioning. Widening of the existing roadways is expected to be accomplished by compacting soils in-place to create crane shoulders on those roads that were designed to accommodate crane movements during construction. All ground impacts will be limited to the permit corridors. In general, preparations for crane movements will include compaction of the native soils, construction of temporary road crossings, and preparation of crane mat crossings, low water crossings, and/or temporary culverts to cross streams. Following disassembly of the wind turbines, the temporary crossings will be removed and the crossing areas will be restored to meet the standards specified by US Army Corps of Engineers or the Authorized Officer. The soil on the crane paths will be de-compacted and restored as specified in Appendix E: Reclamation Plan.

In addition to those activities described above, the large industrial cranes used for disassembly will also require a pad to be reconditioned at each turbine location. These pads, used during the dismantling of each turbine, may also need to be temporarily altered to allow for crane movements required to disassemble the above ground components of the turbine. Prior to such temporary alteration being made, topsoil will be stripped and isolated such that it may be re-applied after the dismantling of the turbine has been completed. Isolated topsoil will be temporarily stored in piles adjacent to the disturbance area and stabilized and protected using BMPs detailed in the Appendix D: Stormwater Pollution Prevention Plan.

L-3.2 Wind Turbines

Decommissioning of the wind turbines will include removal of the tower wiring and dismantling of the wind turbine. Turbine wiring removal typically occurs prior to dismantling of the wind turbine.

After a crane pad is reconditioned at the turbine site, a main erection crane will be deployed to remove the wind turbine piece by piece. Rough terrain helper cranes and forklifts will assist the main erection crane in turbine dismantling. Dismantling wind turbines typically occurs in the reverse order and process of turbine installation as shown below:

- Remove the rotor
- Remove the nacelle
- Remove the tower sections from top to bottom

The blades may be removed from the nacelle while the rotor is attached to the wind turbine, or after the rotor has been placed on the ground. After turbine components are dismantled, the components are loaded onto trucks and transported off-site.

L-3.3 Foundation Removal

The most common foundation design used for wind turbine installations within the United States is the inverted T spread footing foundation. An inverted T foundation is typically an octagon shape with dimensions ranging from 50 to 75 feet wide and 8 to 12 feet deep and a concrete pedestal up to 20 feet in diameter with anchor bolts which protrude for attachment of the tower. Foundations for decommissioned above ground infrastructure will be removed to a minimum of three feet below surrounding grade. Foundation fragments will be transported off-site for recycling as aggregate or appropriate disposal.

L-3.4 Road Removal

Based on the preference of individual landowners or land management agencies, access roads will either be removed or left in place. Removal of access roads will consist of removal of the base aggregate and any other materials used in construction of the roadways. This material will be removed using bulldozers, wheeled loaders, and/or backhoes. Once removed the material will be transported off-site via dump truck to be recycled or properly disposed of. Geotextile fabric under the road aggregate will be removed and deposited at an off-site disposal facility, if used. While work to remove the roadway material is underway, topsoil adjacent to either side of the road will be stripped and stockpiled in a parallel corridor for use in final reclamation.

All road removal will be sequenced to begin at the turbines and proceed to points of access from private/public roads or roadways that will be left in-place for future use. This will ensure suitable access is available throughout the decommissioning process.

L-3.5 Collector System

The electrical collection and transmission system will be disassembled and transported off-site for re-use, recycling, scrap, or industrial disposal. Heavy construction equipment such as cranes, lifts, dozers, wire pullers, and transport vehicles may be used to gather conductor, dissemble towers or poles, and transport the material off-site. Underground cables buried less than two feet below grade will be removed, and cables buried more than two feet will remain in place.

L-3.6 Substations

Much of the materials and equipment at the substations will be disassembled, recycled, or re-used off-site. This includes all steel-framing, conductors, switch-gear, transformers, and security fence, along with several other components. Bulldozers, wheeled loaders, and backhoes will be used to remove the rock base which will be recycled or deposited at an appropriate disposal facility. Any facilities constructed for stormwater management, such as retention basins, will also be removed.

L-3.7 Operations and Maintenance Facilities

The operations and maintenance (“O&M”) facilities will likely be a steel structure used to support Project staff and house various equipment. Materials such as hydraulic oil and lubricants may be stored at the building during the operational lifespan of the Project. See Appendix G: Spill Prevention, Control and Countermeasure Plan mitigation measures regarding spilled materials.

It is unlikely that the control building will be at the end of its useful life at the time of decommissioning. It is anticipated that the building may be sold or donated rather than demolished. However, should demolition be undertaken, all materials will be recycled or appropriately disposed of at off-site facilities.

L-3.8 Meteorological Towers

All Project meteorological (“met”) towers would be removed and taken off-site. The process for removing the meteorological towers is typically the installation steps in reverse order (see Section 2.14 of the POD for a description of met tower construction).

L-4 Reclamation

Final reclamation goals and methodologies can be found in Appendix E: Reclamation Plan. The Reclamation Plan aims to ensure the vegetation cover, composition, and diversity of the disturbed areas will be restored to values commensurate with the ecological setting at the time of decommissioning.

L-5 Timeline

It is anticipated that the decommissioning activities for the Project can be completed over a two-year period. The estimated schedule length for decommissioning are tied to assumptions about the amount of equipment mobilized, crew sizes, weather and climate conditions, and overall productivity.

L-6 Health and Safety

Work will be conducted in strict accordance with Appendix F: Health and Safety Plan. The construction contractor hired to perform the decommissioning will also be required to prepare a site-specific health and safety plan. All site workers, including subcontractors, will be required to read, understand, and abide by the plans. A site safety officer will be designated by the construction contractor to ensure compliance. This official will have stop-work authority over all activities on the site should unsafe conditions or lapses in the safety plan be observed.

Lava Ridge Wind Project

Draft Appendix M: Bird and Bat Conservation Strategy

Magic Valley Energy, LLC

October 2022

Draft Bird and Bat Conservation Strategy

Lava Ridge Wind Project

Lincoln, Jerome, and Minidoka Counties, Idaho

Prepared by:

Magic Valley Energy, LLC

16150 Main Circle Drive, Suite 310
Chesterfield, Missouri 63017

September 2021

Revised October 2022

DOCUMENT PRODUCTION

Name	Role	Organization
David Wilson	Project Development	Magic Valley Energy, LLC
Melanie McCormack	Project Manager/ Report Reviewer	Western EcoSystems Technology, Inc.
Joel Thompson	Senior Reviewer	Western EcoSystems Technology, Inc.
Todd Mabee	Report Writer	Western EcoSystems Technology, Inc.
Jeanette Haddock	Report Writer	Western EcoSystems Technology, Inc.

REPORT REFERENCE

Magic Valley Energy, LLC. 2021. Draft Bird and Bat Conservation Strategy, Lava Ridge Wind Project, Lincoln, Jerome, and Minidoka Counties, Idaho. Magic Valley Energy, LLC, Chesterfield, Missouri. September 2021.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION

1.1 Background

Magic Valley Energy, LLC (MVE) has proposed the development of the Lava Ridge Wind Project (Project) in Lincoln, Jerome, and Minidoka counties, Idaho (Figure 1). The Project will be located on approximately 104,000 acres (ac; 42,087 hectares [ha]; Project area) of federal, state, and private land in the North American Desert Ecoregion that covers a large region of the western US. The Project is expected to be operational by the end of 2024 and will consist of approximately 400 wind turbine generators of one or more sizes. The wind facility will include support structures and ancillary facilities, such as on-site substations, collector lines, overhead transmission lines, meteorological towers, and operations and maintenance (O&M) facilities, all of which will be built within the Project area (Figure 2). Access to the turbines will be by existing public roads (including those improved to accommodate Project requirements) and access roads constructed for the Project. The location of Project infrastructure has not yet been finalized, and MVE anticipates changes to the proposed turbine layout presented herein prior to construction.

A number of wildlife studies were conducted in support of Project development. The focus area for each study ((Study Areas) varied between studies and over time, in response to the evolving nature of land control (i.e., leased lands), area suitable for development, avoidance of environmental resources, and other constraints. Three Plans of Development (PODs) were issued for the Project with a Project area of varying sizes: February 2020 (140,000 acres), January 2021 (104,000 acres) and June 2021 (73,000 acres; current Project area), and are referenced for each study. All environmental studies conducted near or within the current Project area that provided information relevant to the current Project layout were included in this Bird and Bat Conservation Strategy (BBCS). Eagles are included in all study results provided herein, but eagle protection measures will be addressed under a separate Eagle Conservation Plan (ECP).

1.2 Purpose and Objectives

This BBCS was developed to provide a written record of MVE's efforts to characterize avian and bat resources within the Project area, to assess potential impacts to these resources, and to document conservation measures that have been or will be taken to avoid, minimize, and/or mitigate those potential impacts. The studies followed a tiered approach consistent with the *Land-Based Wind Energy Guidelines* (WEG; US Fish and Wildlife Service [USFWS] 2012; Table 1). The survey and risk assessment information in this BBCS was used by MVE to develop Project plans that avoid and minimize impacts to birds and bats and to develop strategies for post-construction monitoring and adaptive management under the framework of the USFWS WEG. It is understood that although this document may provide background information for the NEPA analysis regarding MVE's development of the Proposed Action, this document is not intended to replace the information and analysis in the Environmental Impact Statement (EIS), which is the basis for determining the potential impacts of the Proposed Action.

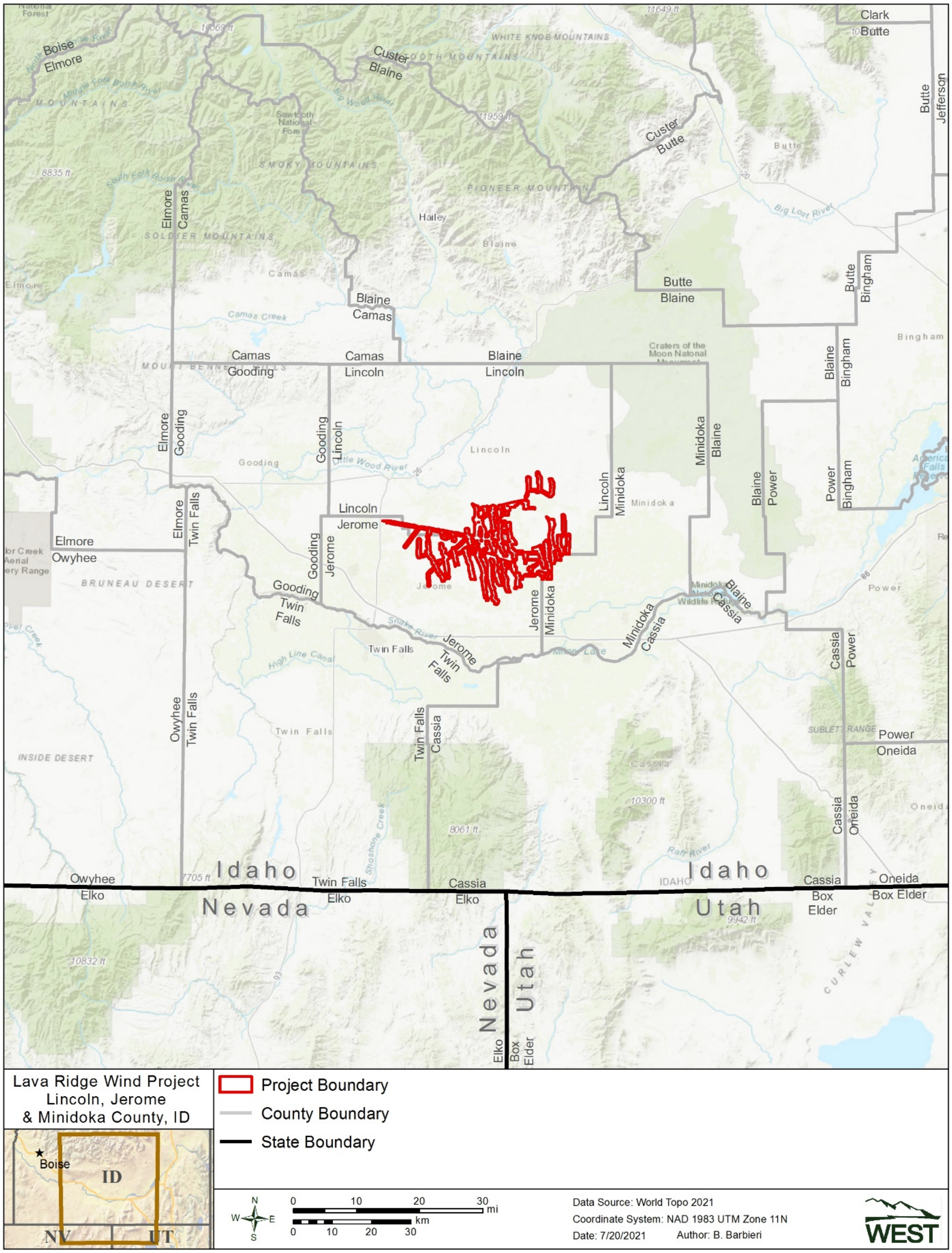


Figure 1. Location of the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho.

1

Table 1. Relationship between Lava Ridge Wind Project Bird and Bat Conservation Strategy (BBCS) sections and US Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines sections (USFWS 2012).

BBCS	USFWS Wind Energy Guidelines
Section 2: Tier 1 and 2 Site Characterization	Tier 1: Preliminary Site Evaluation/Tier 2: Site Characterization
Section 3: Field Studies Section 4: Potential Impacts to Birds and Bats	Tier 3: Field Studies to Document Site Wildlife and Habitat and Predict Project Impacts
Section 5: Avoidance and Minimization Measures	Best Management Practices
Section 6: Post-construction Avian and Bat Monitoring	Tier 4: Post-construction Studies to Estimate Impacts
Section 7: Adaptive Management	All Tiers

1.2.1 Objectives

The objectives of the BBCS are as follows:

1) Document correspondence with federal and state agencies throughout the development of the Project.
2) Document the results of the Project's desktop and field surveys and its progression through the WEG Tiers.
3) Identify measures that, when implemented during construction, operation, maintenance, and decommissioning of the Project, will avoid and minimize potential impacts to birds and bats.
4) Describe post-construction monitoring and adaptive management procedures.

1.2.2 Relationship with Other Documents and Processes

This BBCS is a living document that will evolve throughout the life of the Project, as needed and in response to changing conditions. This BBCS covers the anticipated 30-year functional life of the Project and potential extended operations and/or decommissioning period. Should the Project be re-powered, the BBCS will remain in effect until decommissioning occurs. The BBCS will work alongside other documents developed by MVE to minimize impacts to wildlife and sensitive resources throughout the construction and operational phases of the Project. In addition, the BBCS provides an overview of potential Project impacts to birds and bats, and proposed measures to minimize impacts that can be used as a baseline document for the Project's associated NEPA analysis.

1.3 Project Components and Environmental Setting

1.3.1 Project Components

The proposed Project components include up to 400 wind turbine generators with the potential for multiple models (specifications outlined in Table 2). Overhead or underground collector lines (34.5-kilovolt [kV]) will be connected to each turbine. Up to five 34.5/230kV collector substations will be located throughout the Project area to aggregate individual collector lines. A series of 230kV overhead transmission lines will connect the collector substations to one larger substation.

A single 230/500kV substation will aggregate the 230kV transmission lines from the collector substations. An overhead 500kV transmission line will connect the 230/500kV substation to the Project's point of interconnection at Midpoint Substation or an alternative location.

Table 2. Minimum and maximum wind turbine characteristics for the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho.

Characteristic	Minimum	Maximum
Hub Height (feet [ft])	260	460
Rotor Diameter (ft)	260	560
Rotor Swept Area (square ft)	53,100	246,400
Total Height (ft)	390	740

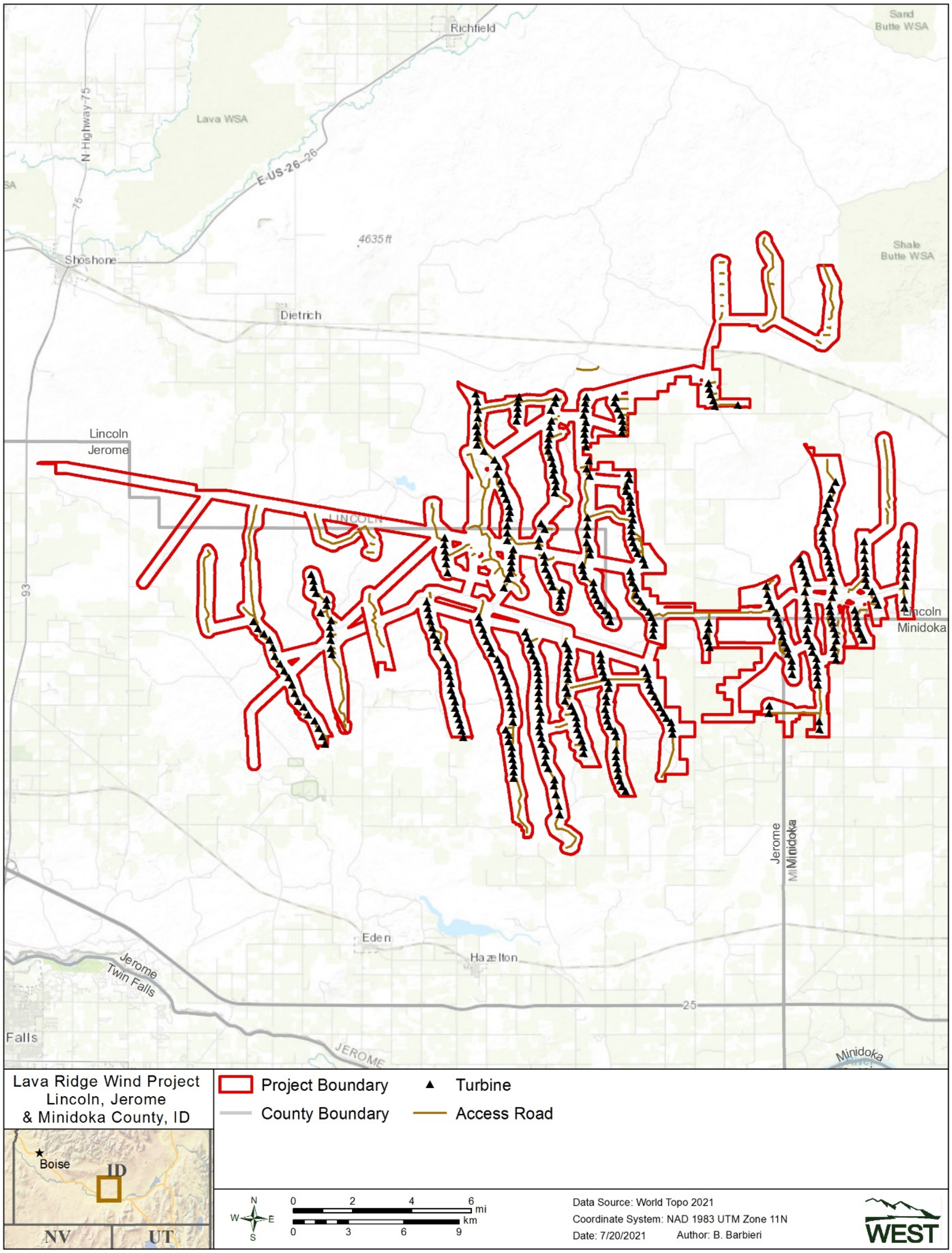


Figure 2. Project infrastructure (proposed) at the Lava Ridge Wind Project, Lincoln, Jerome, and Minidoka counties, Idaho.

1.3.2 Land Ownership

The vast majority of the Project area is composed of federal land administered by the Bureau of Land Management (BLM). State owned lands administered by the Idaho Department of Fish and Game (IDFG) and the State Department of Lands are scattered throughout the Project area (Figure 3).

1.3.3 Environmental Setting

The Project is located within the Snake River Basin Level III Ecoregion within the North American Desert Ecoregion (US Environmental Protection Agency 2017). The Snake River Basin is part of the dry Intermontane West, and is characterized by shallow stony soils, though barren lava fields also occur in the region. Topography within the Project area is primarily flat with low rolling hills; steeper terrain is located in the northwest corner of the Project area. Elevation ranges from approximately 4,050 feet (ft; 1,234 meters [m]) to 5,077 ft (1,547 m) above mean sea level. Few trees or water resources are found within the Project area. Sagebrush (*Artemisia* spp.) and bunchgrass *Festuca,* and *Poa* spp.) are the principal native vegetation species. Land use within the Project area is primarily open range livestock grazing.

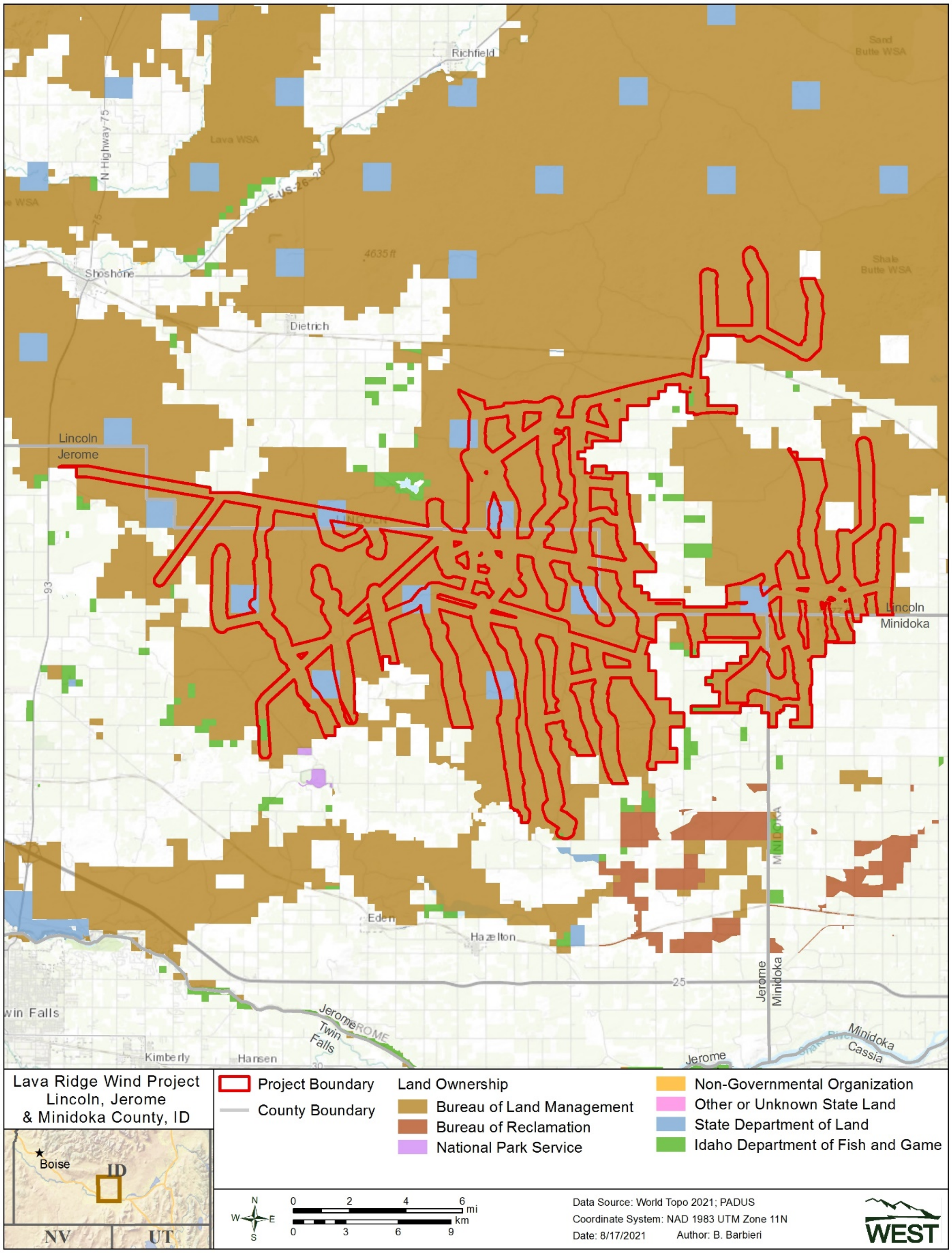


Figure 3. Land ownership within and around the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho.

1.4 Regulatory Context

1.4.1 Endangered Species Act

The Endangered Species Act (ESA) of 1973 (16 US Code [USC] §§ 1531 et seq.) provides for the listing, conservation, and recovery of federally endangered and threatened species. The USFWS implements the ESA to conserve terrestrial species and resident fish species. Section 9 of the ESA prohibits the unauthorized take of listed species. Under the ESA, "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" a listed species (ESA § 3[19], 16 USC 1532[19]). The term "harm" has been further defined in agency regulations to include habitat modification that kills or injures a federally listed species.

1.4.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703−712 [1918]) assigns legal authority to the USFWS to protect over 1,000 species of raptors, diurnal migrants, and passerine migratory birds from take. The USFWS maintains a list of species protected by the MBTA at 50 Code of Federal Regulations (CFR) 10.13 (1973). The MBTA states, "Unless and except as permitted by regulations…it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, kill … possess, offer for sale, sell … purchase … ship, export, import … transport or cause to be transported … any migratory bird, any part, nest, or eggs of any such bird… [The MBTA] prohibits the taking, killing, possession, transportation, import and export of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior" (16 USC 703 [1918]). The word "take" is defined by regulation as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR 10.12 [1973]). A series of legal opinions have been issued since 1978 regarding the issue of "incidental" or "non-purposeful" take under the MBTA.

1.4.3 Idaho Administrative Procedure Act § 13.01.06

The Fish and Game Commission (Commission) of the IDFG has the legal authority to manage wildlife in Idaho. The general powers, duties, and authority of the Commission to classify wildlife are authorized by Idaho Code Sections 36-104 and 36-201. Amongst other groups of wildlife, this includes game birds (Section 102), threatened or endangered species (Section 150), and protected nongame species (Section 200), including all species of bats and birds (all native species, except game birds). Section 300 (Protection of Wildlife) states that game species (including upland game birds) may be taken only in accordance with Idaho law and Commission rules. No person may take or possess those species of wildlife classified as Protected Nongame, or Threatened or Endangered at any time or in any manner, except as provided in Idaho Code (including Sections 36-106[e], and 36-1107), and Commission rules. Protected Nongame status is not intended to prevent unintentional take of these species, protection of personal health or safety, limit property and building management, or prevent management of animals to address public health concerns or agricultural damage. No permit is available for take of state-listed species in Idaho.

1.4.4 Federal Land Management and Policy Act of 1976

The Federal Land Management and Policy Act (FLMPA) of 1976 provides a regulatory framework for the management and allocation of public lands. Under the FLMPA, the BLM is required to develop Resource Management Plans (RMPs) for all lands managed by the agency. RMPs include conditions for resource development on BLM lands, including wind energy development, to protect sensitive resources. Guidance documents applicable to the Project under the FLMPA include the Monument Resource Management Plan (1985) and the 2015 Approved Resource Management Plan Amendment (ARMPA) for greater sage-grouse.

1.4.5 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act provides a regulatory framework for protecting eagles. The BGEPA provides that "unless permitted to do so as provided in the BGEPA," it is unlawful to "take, possess, sell…any bald eagle…or any golden eagle, or any part, nest, or egg thereof….". In 2009, the USFWS promulgated a final rule on two new permit regulations that specifically authorized the non-purposeful (i.e., incidental) take of eagles and eagle nests, which provided a mechanism whereby the USFWS may legally authorize the non-purposeful take of eagles if the "take is compatible with the preservation of each species". The USFWS ECP Guidance further provided its approach to issuing programmatic eagle take permits, including guidance to applicants and biologists for conservation practices and adaptive management necessary to meet standards required for issuance of these permits and to comply with the BGEPA.

1.5 Corporate Policy

MVE maintains a commitment to work cooperatively to minimize adverse impacts to protected birds and bats. Through the planning stages of the Project, the Project developer and consultants have worked in coordination with federal and state agency personnel regarding necessary wildlife studies and siting considerations to ensure that all parties understand the scope of the Project and potential issues are identified and addressed early in the planning process. MVE will continue to work with the agencies to implement conservation measures intended to avoid, minimize, and/or mitigate potential impacts to bird and bat species, including those measures identified in this BBCS.

1.6 Agency Consultation

Agency meetings and correspondence were conducted in 2020 and are continuing in 2021. Key meetings or correspondence, such as USFWS Project coordination and pre-kickoff coordination meetings related to designing wildlife studies, are listed chronologically below and provide the date, location, attendees, and main discussion topics. Any National Environmental Policy Act-(NEPA) related meetings including interactions with the BLM and IDFG will be available in the Environmental Impact Statement (EIS) in development for the Project.

1.6.1 March 26, 2020

Virtual meeting: USFWS (Matt Stuber); MVE (Brandon Pollpeter [Project Developer], Luke Papez [Project Manager]); Western EcoSystems Technology, Inc. (WEST; Melanie McCormack [Project Manager], Chad LeBeau [Research Biologist], Eric Hallingstad [Research Biologist]).

Presentation and discussion topics during this meeting included USFWS recommendations of two years of baseline wildlife studies, an eagle take permit (ETP) , and surveys in the northwest corner of the Project area due to eagle use in that area. The NEPA permitting process was discussed including a universal agreement to expedite the ETP application process.

1.6.2 August 31, 2020

Virtual Meeting: USFWS (Matt Stuber); MVE (Brandon Pollpeter [Project Developer], Luke Papez [Project Manager]); BLM (BLM Team); WEST (Melanie McCormack [Project Manager], Chad LeBeau [Research Biologist], Eric Hallingstad [Research Biologist]), Joel Thompson [Senior Manager]).

Presentation and discussion topics included the USFWS recommending siting turbines outside the two-mile buffer for the golden eagle (*Aquila chrysaetos*) nest. If this was not possible, further discussion would be needed. Additionally, avian use interim results incited a discussion of species of concern such as ferruginous hawk (*Buteo regalis*), burrowing owl (*Athene cunicularia*), short-eared owl (*Asio flammeus*), and long-billed curlew (*Numenius americanus*). BLM noted that a one-mile disturbance buffer for ferruginous hawk and a 0.25-mile buffer for burrowing owl nests are recommended in their vegetation treatment plan (BLM 2020).

1.6.3 March 11, 2021

Virtual Meeting: USFWS (Matt Stuber); MVE (Brandon Pollpeter [Project Developer], Luke Papez [Project Manager]); WEST (Melanie McCormack [Project Manager], Chad LeBeau [Research Biologist], Eric Hallingstad [Research Biologist]).

Presentation and discussion topics included updates that the Project area has been shifted away from the golden eagle nest on Crater Butte, and no infrastructure will be sited within two miles of the nest. USFWS agreed with siting turbines away from Crater Butte. Additionally, the ETP timing and process were discussed.

1.6.4 July 8, 2021

Conference call. Attendees: Bureau of Land Management (Kasey Prestwich, Codie Martin, Ethan Ellsworth, Jesse Rawson, Pam Murdock, Paul Makela, Colton Baratti), USFWS (Matt Stuber and Katie Powell), MVE (Luke Papez and Brandon Pollpeter), WEST (Melanie McCormack and Eric Hallingstad).

Discussion: Purpose was to discuss coordinating the ETP application and permitting process with the Lava Ridge EIS. Discussed ETP process, timing of USFWS take estimation and the EIS timeline, Project boundary changes following the first year of studies, and mitigation options. USFWS expressed intent to work alongside the EIS process, and that it would prioritize developing take estimates for incorporation into the Draft EIS once an application and the Project data are received.

1.6.5 April 19, 2022

Conference Call. Attendees: USFWS (Matt Stuber), MVE (Luke Papez, David Wilson), WEST (Melanie McCormack, Chad LeBeau, Eric Hallingstad).

Discussion: WEST presented updated study results for the Project and discussed timeline for updated take estimate to meet Draft EIS deadline. Revisions to proposed avoidance and minimization measures provided to MVE as ETP conditions were also discussed. USFWS provided a revised set of avoidance and minimization measures following the meeting.

2.0 TIER 1 AND 2 – ENVIRONMENTAL STUDIES

Characterization of biological resource issues early in the development phase of a wind project helps identify, avoid, and minimize potential wildlife impacts associated with Project development. MVE contracted WEST to conduct a Critical Issues Analysis (CIA) prior to moving forward with Project development. The CIA followed the guidelines of Tier 1 and 2 studies within the WEG. Biological resources found within the 73,131-acre Project area evaluated in the Tier 1 and 2 studies (See Figure 4) were evaluated by a desktop review of existing data. Available data used in the review included spatial datasets with information about topography, elevation, land use/land cover, wetlands, and wildlife distributions in Idaho, as well as information from the USFWS, IDFG, BLM, eBird, The National Audubon Society, and publicly available data from other wind energy facilities in the region. The CIA was based on a preliminary Project area which has changed over time; as such, the data presented below that was included in the CIA has been updated to apply to the current Project boundary.

2.1 Land Cover and Vegetation

The two major land cover types in the Project area are herbaceous (79.2%) and shrub/scrub (19.3%; National Land Cover Database [NLCD] 2016; Table 3, Figure 4). The remaining land cover types compose less than 2.0% of the Project (Table 3, Figure 4).

Table 3. Land cover types, cover, and percent composition for the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho.

Land Cover Types	Cover (Acres)	Percent Composition
Herbaceous	5,7904	79.2
Shrub/Scrub	14,136	19.3
Developed, Open Space	798	1.1
Cultivated Crops	253	0.4
Hay/Pasture	29	<0.1
Developed, Low Intensity	10	<0.1
Open Water	2	<0.1
Developed, Medium Intensity	<1	<0.1
Total[1]	**73,131**	**100**

Source: National Land Cover Database (2016)
[1]Sums of values may not add to total value shown, due to rounding.

In addition, the LANDFIRE database (2017) provides more detail on vegetation types in the Project area. Introduced upland vegetation-annual grassland (33.6%) and introduced upland vegetation-perennial grassland and forbland (22.1%) are the most common vegetation types followed by inter-mountain basins big sagebrush shrubland (13.4%), Columbia Plateau steppe and grassland (8.7%), inter-mountain basins big sagebrush steppe (6.0%), northern Rocky Mountain lower montane-foothill-valley grassland (5.0%), inter-mountain basins semi-desert shrub-steppe (4.6%), inter-mountain basin desert grassland (1.5%), and developed-roads (1.2%; LANDFIRE 2017). The remaining vegetation types each compose <1.0% of the Project area (LANDFIRE 2017).

2.2 Aquatic Resources

A wetlands desktop assessment was conducted to provide an initial understanding of wetland and water resources present in the Project area, including potential "Waters of the US" (WOTUS), early in Project development. The assessment identified a variety of aquatic resources, including hundreds of small wetland features and intermittent drainage lines. Based on a preliminary review of aerial imagery, the majority of wetland features identified by National Wetlands Inventory (NWI) are isolated (i.e., no hydrologic connection or adjacency to WOTUS), and therefore non-jurisdictional. Similarly, the majority of drainage features appear to lack an ordinary high water mark, and therefore are likely non-jurisdictional (Markhart et al. 2021). The assessment was followed by a desktop screening to evaluate individual features for potential jurisdictional status and to use the results to design field studies. A total of 426 aquatic resources were identified by NWI within the current Project area (Figure 5). In addition, there were 115 National Hydrography Dataset features, all of which overlapped NWI riverine features. NWI features included freshwater emergent wetlands, freshwater forested/shrub wetlands, freshwater ponds, and riverine. Based on the results of the aquatic resources inventory, the majority of NWI wetland features are isolated playa wetlands, and riverine features are either potential drainage features or irrigation canals and ditches (Flaig et al. 2021). With the current definition of WOTUS in flux, irrigation canals were the only features identified that may fall under US Army Corps of Engineers jurisdiction, and are the only perennial streams within the Project area. A number of isolated freshwater emergent or forested/shrub wetlands were identified in the NWI database, the majority of which are playas.

Forty-six of these features were evaluated during the field survey, sixteen of which met wetland criteria and could provide nesting and foraging habitat for a number of wildlife species. The remaining playas were ephemeral resources which, during periods of heavy rain or snowmelt, may also provide wildlife habitat.

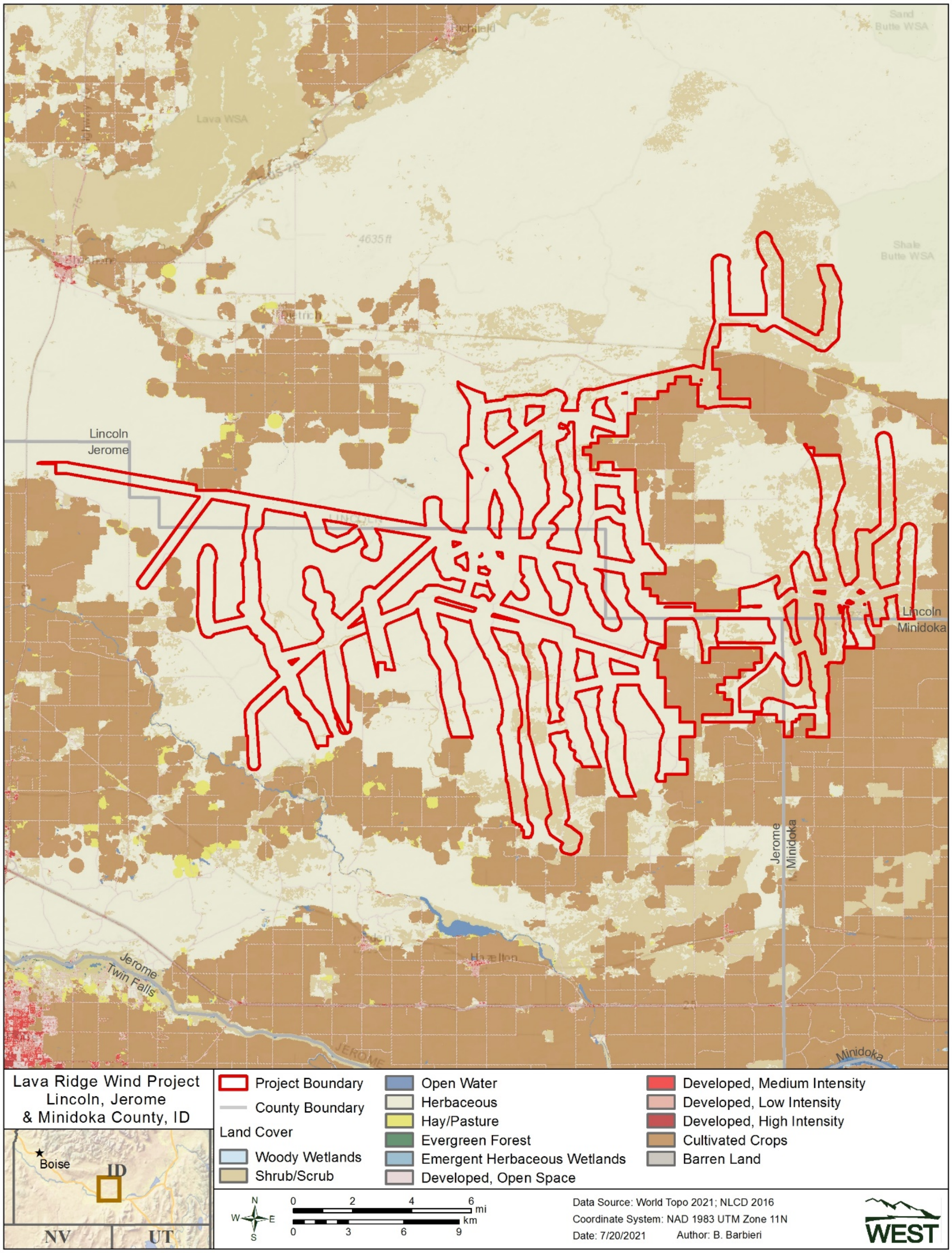


Figure 4. Land cover types within the Lava Ridge Project area in Lincoln, Jerome, and Minidoka counties, Idaho.

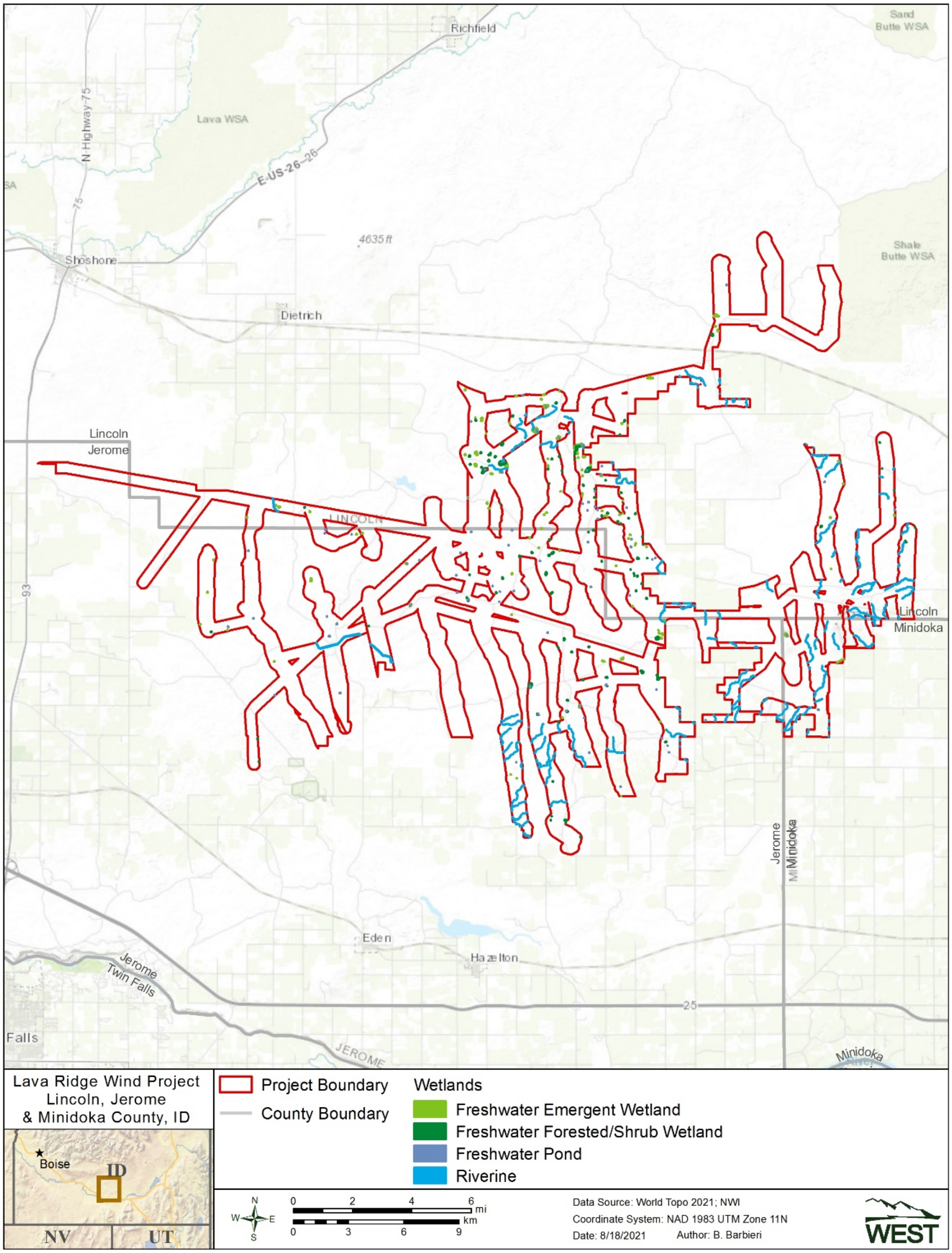


Figure 5. Aquatic resources identified during the desktop assessment and screening in the Lava Ridge Wind project in Jerome, Lincoln, and Minidoka counties, Idaho.

2.3 Protected Areas and Special Status Lands

There are no Important Bird Areas (IBA) within the Project area; however, Craters of the Moon National Monument and Preserve occurs in northern Lincoln and Minidoka counties, approximately nine miles from the Project area. This IBA is designated as globally important due to its high diversity of birds and high quality migrating, breeding, and wintering habitat. According to The National Conservation Easement Database and the Protected Areas Database of the US, several small conservation easements occur in Jerome County; however, no easements are located within the Project area.

2.4 Wildlife Species of Concern

A review of publicly available records identified 73 bird and bat species of concern that could occur within the Project area, of which 59 are bird species (Table 4) and 14 are bat species (Table 5). The avian and bat species of concern lists (Tables 4 and 5) were developed based on WEST's review of USFWS Birds of Conservation Concern (BCC)Great Basin Bird Conservation Region (BCR) 9 (USFWS 2021), BLM sensitive species (BLMSS) list for Idaho, Shoshone Field Office (BLM 2022), the Idaho Species of Greatest Conservation Need (SGCN) in the State Wildlife Action Plan (IDFG 2017, 2019a,b), and the International Union for Conservation of Nature (2017).

<u>Avian Resources</u>

One federally listed bird species (yellow-billed cuckoo [*Coccyzus americanus*], currently listed as federally threatened), 39 SGCN, 21 BLMSS, and 28 BCC for BCR 9 are known to occur in Jerome, Minidoka, and Lincoln counties, Idaho, and, based on range habitat requirements, have the potential to occur in the Project area. Two species, bald and golden eagle, are also listed as protected under the Bald and Golden Eagle Protection Act (BGEPA 1940). Twenty of the 59 avian species of concern were observed during pre-construction surveys for the Project (Table 4). Two additional species (calliope hummingbird and northern goshawk) were reported as eBird observations within the Project area (IDFG 2020). Further detail regarding species occurrence, including number and frequency of observations, can be found in the avian use study reports for the Project (McCormack and LeBeau 2021, McCormack et al. 2022).

Table 4. Avian species of concern with potential to occur at the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho.

Common Name	Scientific Name	Status
Birds		
American avocet[1]	*Recurvirostra Americana*	BCC
American bittern	*Botaurus lentiginosus*	SGCN
American white pelican[1,2]	*Pelecanus erythrorhynchos*	SGCN
bald eagle[1]	*Haliaeetus leucocephalus*	BGEPA, BLMSS
black rosy-finch	*Leucosticte atrata*	BCC, SGCN
black swift	*Cypseloides niger*	BCC
black tern	*Chlidonias niger*	SGCN
bobolink	*Dolichonyx oryzivorus*	SGCN
black-throated sparrow	*Amphispiza bilneata*	BLMSS

Table 4. Avian species of concern with potential to occur at the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho.

Common Name	Scientific Name	Status
broad-tailed hummingbird	*Selasphorus platycercus*	BCC
burrowing owl[1,2]	*Athene cunicularia*	BLMSS, SGCN
California gull[1,2]	*Larus californicus*	BCC, SGCN
Calliope hummingbird[2]	*Selasphorus calliope*	BCC
Cassia crossbill	*Loxia sinesciurus*	BCC, SGCN
Caspian tern	*Hyroprogne caspia*	SGCN
Cassin's finch	*Haemorhous cassinii*	BCC
Clark's grebe	*Aechmophorus clarkii*	BCC, SGCN
Clark's nutcracker	*Nucifraga Columbiana*	SCGN
Columbian sharp-tailed grouse	*Tympanuchus phasianellus*	SGCN
common loon	*Gavia immer*	SGCN
common nighthawk[1,2]	*Chordeiles minor*	SGCN
evening grosbeak	*Coccothraustes verpertinus*	BCC
ferruginous hawk[1,2]	*Buteo regalis*	BLMSS, SGCN
flammulated owl	*Psiloscops flammeolus*	BCC, BLMSS
Forester's tern	*Sterna forsteri*	BCC
Franklin's gull[1]	*Leucophaeus pipixcan*	SGCN
golden eagle[1,2]	*Aquila chrysaetos*	BGEPA, BLMSS, SGCN
grasshopper sparrow[1]	*Ammodramus savannarum*	BLMSS, SGCN
great gray owl	*Strix nebulosa*	SGCN
greater sage-grouse[1,2]	*Centrocercus urophasianus*	BLMSS, SGCN
green-tailed towhee[1]	*Pipilo chlorurus*	BLMSS
lesser yellowlegs	*Tringa flavipes*	BCC
Lewis's woodpecker	*Melanerpes lewis*	BCC, BLMSS, SGCN
loggerhead shrike[1,2]	*Lanius ludovicianus*	BLMSS
long-billed curlew[1,2]	*Numenius americanus*	BLMSS, SGCN
long-eared owl	*Asio otus*	BCC
marbled godwit	*Limosa fedoa*	BCC
olive-sided flycatcher	*Contopus cooperi*	BLMSS, SGCN
northern goshawk[2]	*Accipiter gentilis*	BLMSS
northern harrier[1,2]	*Circus hudsonius*	BCC
olive-sided flycatcher	*Contopus cooperi*	BCC
pectoral sandpiper	*Calidirs melanotos*	BCC
pinyon jay	*Gymnorhinus cyanocephalus*	BCC, BLMSS
ring-billed gull	*Larus delawarensis*	SGCN
rufous hummingbird	*Selasphorus rufus*	BCC
sage thrasher[1,2]	*Oreoscoptes montanus*	BCC, BLMSS, SGCN
sagebrush sparrow[1]	*Artemisiospiza nevadensis*	BLMSS, SGCN
sandhill crane[1]	*Antigone canadensis*	SGCN
short-eared owl[1,2]	*Asio flammeus*	BCC, BLMSS, SGCN
snowy plover	*Charadrius nivosus*	BCC
trumpeter swan	*Cygnus buccinator*	BLMSS, SGCN
Virginia's warbler	*Leiothlypis virginiae*	BCC, BLMSS
western grebe	*Leiothlypis virginiae*	BCC, SGCN
white-faced ibis[1]	*Plegadis chihi*	SGCN

Table 4. Avian species of concern with potential to occur at the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho.

Common Name	Scientific Name	Status
white-headed woodpecker	*Picoides albolarvatus*	BLMSS, SGCN
willet	*Tringa semipalmata*	BCC
willow flycatcher	*Empidonax traillii*	BLMSS
yellow-billed cuckoo	*Coccyzus americanus*	FT, SGCN
yellow rail	*Coturnicops noveboracensis*	BCC

[1] Species observed during pre-construction surveys conducted at the Project.

[2] Species observations within the Project since 2000 in the IFWIS database (IDFG 2020)

BCC = US Fish and Wildlife Service Bird of Conservation Concern, BLMSS = Bureau of Land Management Sensitive Species; FT = Federally listed as Threatened; BGEPA = Bald and Golden Eagle Protection Act; SGCN = Species of Greatest Conservation Need.

Sources: USFWS Birds of Conservation Concern for BCR 9, Great Basin (USFWS 2021), BGEPA (1940), Federal Endangered Species Act (1973), Idaho Department of Fish and Game (2017, 2019a,b), International Union for the Conservation of Nature (2018), BLM (2015).

The yellow-billed cuckoo, federally listed as threatened, is primarily found in open woodland, typically near riverine habitat or other waterways (Hughes 2015). It is unlikely that the yellow-billed cuckoo will occur within the Project area because no forest or riparian habitat is present.

<u>Bat Resources</u>

A review of publicly available resources identified fourteen bat species of concern that occur in Jerome, Minidoka, and Lincoln counties, Idaho. (BLM 2015, IDFG 2019a,c, International Union for Conservation of Nature 2018). None of the 1 bat species are federally or state-listed, although the USFWS is currently conducting a Species Status Assessment for the little brown myotis (*Myotis lucifugus*), which is being considered for listing under the federal Endangered Species Act. Five of the 1 potentially occurring species are SGCN, and all are listed as BLMSS in the Shoshone Field Office (IDFG 2019a,c, BLM 2022; Table 5). Twelve of the 14 bat species of concern were recorded during pre-construction bat studies conducted for the Project (Bishop-Boros and McCormack 2021a, Bishop-Boros and McCormack 2022).

Table 5. Bat species of concern with potential to occur at the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho.

Common Name	Scientific Name	Status
big brown bat[1]	*Eptesicus fuscus*	BLMSS
California bat[1]	*Myotis californicus*	BLMSS
canyon bat[1]	*Parastrellus hesperus*	BLMSS
fringed bat	*Myotis thysanodes*	BLMSS
hoary bat[1]	*Lasiurus cinereus*	SGCN (Tier II), BLMSS
little brown bat[1,2]	*Myotis lucifugus*	SGCN (Tier III), BLMSS
long-legged bat[1]	*Myotis volans*	BLMSS
pallid bat[1]	*Antrozous pallidus*	BLMSS
silver-haired bat[1]	*Lasionycteris noctivagans*	SGCN (Tier II), BLMSS
spotted bat	*Euderma maculatum*	BLMSS
Townsend's big-eared bat[1]	*Corynorhinus townsendii*	SGCN (Tier III), BLMSS
western long-eared bat[1]	*Myotis evotis*	BLMSS
western small-footed bat[1]	*Myotis ciliolabrum*	BLMSS
Yuma bat[1]	*Myotis yumanensis*	BLMSS, SGCN (Tier III)

[1] Species was recorded during pre-construction surveys for the Project (Bishop-Boros and McCormack 2021a, Bishop-Boros and McCormack 2022)

[2] Species is being considered for listing under the Endangered Species Act

SGCN=species of greatest conservation need, Tier I species are the highest priority, Tier II species are secondary priority, Tier III species are lowest priority (IDFG 2016); BLMSS=Bureau of Land Management Sensitive Species.

Sources: BLM 2015; International Union for Conservation of Nature 2018; Idaho Department of Fish and Game (2019a,c);

2.5 Tier 1 and 2 Summary

Two federally protected (bald eagle and golden eagle) avian species are known to occur in the current Project area, while no suitable habitat is present within the Project area for the regionally occurring and federally threatened yellow-billed cuckoo. Additionally, 39 avian species listed as SGCN, 21 avian BLMSS, and 28 Birds of Conservation Concern for BCR 9 are known to occur in Lincoln, Jerome, and Minidoka counties and have the potential to occur in the Project area. Craters of the Moon National Monument and Preserve is an important IBA and is located in northern Lincoln and Minidoka counties 9.0 miles (mi; 14.5 kilometers [km]) from the Project area. This IBA is designated as globally important due to its high diversity of birds and high quality migrating, breeding, and wintering habitat.

Fourteen bat species occur in Lincoln, Jerome, and Minidoka counties, twelve of which were confirmed present during pre-construction studies. All are listed as BLMSS, fiveare SGCN, and one (little brown bat) is being considered for listing under the ESA. Two species (hoary bat and silver-haired bat) are ranked as Tier II species of medium priority concern.

3.0 TIER 3 STUDIES

Pre-construction baseline surveys were initiated in March 2020 for the Project. Studies relevant to the BBCS, all of which were conducted over two years, include surveys to document greater sage-grouse leks, raptor nests, avian use and bat activity (Table 6). Methods and results of these studies are presented below, with the dates and referenced reports summarized in Table 6. Figures providing the results for each study include the Study Area used for each study, which varied between study years based on the Project boundary available at the time studies were initiated.

Table 6. List of pre-construction field survey reports from the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho.

Survey Dates	Study	Citation
Spring 2020	Greater Sage-Grouse Lek Survey Greater Sage-Grouse Conservation Strategy	McCormack et al. 2020a LeBeau et al. 2021
Spring 2021	Greater Sage-Grouse Lek Survey	Harvey et al. 2021
March 22 – July 23, 2020	2020 Raptor Nest Survey	McCormack et al. 2020b
April 3 – March 31, 2021	Year One Avian Use Study	McCormack and LeBeau 2021
April 13 – November 1, 2020	Bat Activity and North American Bat Surveys	Bishop-Boros and McCormack 2021a

April 16 – May 5, 2021	Bat Feature Assessment	Bishop-Boros and McCormack 2021b
March – July 2020	2021 Raptor Nest Survey	Harrison and McCormack 2021
March 2021 – April 2022	Year 2 Avian Use Study	McCormack et al. 2022
July 7 – August 29, 2021	2021 Bat Acoustic Monitoring Surveys	Bishop-Boros and McCormack 2022

3.1 Birds

3.1.1 *Greater Sage-Grouse Lek Survey Results* (McCormack et al. 2020a; Harvey et al. 2021)

The objective of the lek surveys was to count the number of individual greater sage-grouse (GRSG*; Centrocercus urophasianus*) attending known leks and, in 2020, search for previously unknown leks within identified suitable habitat within 6.0 mi (9.7 km) of the 140,000-acre Project area to support Project planning. IDFG provided locations and counts for leks located near the Project area, three of which (4L152, 4L159, and 4L160; Figure 6) were located within the Project area and were included in survey efforts, which are summarized below.

In 2020, WEST conducted a desktop habitat assessment to identify suitable GRSG habitat within and near the Project area to be searched for leks, which was verified by IDFG prior to the survey. Field surveys included one round of aerial surveys using aerial flight transects oriented north to south and spaced 0.5 mi (0.8 km) apart, and two rounds of ground surveys. No previously undocumented leks were observed during the aerial searches. Displaying males were recorded at two of the three leks (4L152 and 4L159) during ground and aerial surveys. Although no displaying males were recorded at lek 4L160 during surveys, IDFG reported that three males were observed by an IDFG biologist. The report included a review of GRSG telemetry data provided by IDFG, which indicate that the three leks within the Project area appear to be isolated from other GRSG breeding populations in the area, and insufficient data is available to determine whether there is movement between the three leks within the Project area.

Lek monitoring was conducted by WEST in 2021, and GRSG were observed at all three leks during the 2021 surveys. Lek 4L160 had a peak male count of 10 individuals, Lek 4L159 had a peak male count of 16, and Lek 4L152 had a peak male count of three (Figure 6). Lek records for 4L152 began in 2010. Counts at this lek have generally been on a downward trended, with 36 males recorded in 2010, 18 in 2018, and eight in 2019. Trend data is unavailable for leks 4L159 and 4L160, which were discovered in 2018 and 2019, respectively.

3.1.2 *Greater Sage-Grouse Conservation Strategy* (LeBeau et al. 2021)

The objective of the GRSG Conservation Strategy (Strategy) was to determine if and how construction and operation of the Project would affect the local GRSG population. The Strategy used the best available information to evaluate the potential impacts of the Project on the local GRSG population, demonstrated ways the Project can minimize impacts through siting design, and proposed mitigation strategies to offset any residual impacts. Impacts were evaluated at the landscape scale and local scale. At the landscape scale, the Project's potential impacts were placed into context with the surrounding GRSG population. At the local scale, the Project's potential impacts were evaluated using detailed GIS habitat layers, lek locations, and an understanding of the level of existing anthropogenic impacts. Lastly, using the methods outlined in the IDFG habitat quantification tool (HQT), the change in GRSG habitat function was calculated to determine the number of functional acres impacted by the Project (IDFG 2019).

The results of the analysis indicated the Project will likely have some impact on the local GRSG populations and that these impacts are likely to be small at the level of the regional subpopulation, given the small local population and marginal habitat near the Project identified in the assessment. Placement of project infrastructure in areas with existing development and avoidance of placement in functional GRGS habitat to the extent possible has the potential to minimize the impact of new disturbance to the landscape by co-location. As such, the Project was modified to remove turbines from federal land within 3.1 mi of the three grouse leks in the Project area.

[This figure contains confidential biological resources information and is therefore redacted from the public version of the document. The figure is included in confidential Appendix M-b (Confidential Biological Resources Mapping).]

Figure 6. Active greater sage-grouse leks located within the Lava Ridge Wind Project area in Lincoln, Jerome, and Minidoka counties, Idaho.

3.1.3 Raptor Nest Surveys

The objective of the raptor nest surveys was to characterize the raptor nesting community in the vicinity of the Project area to support Project planning. Surveys were completed over two breeding seasons in accordance with the USFWS *Eagle Conservation Plan Guidance* (ECPG; USFWS 2013) and Final Eagle Rule (USFWS 2016). Nest survey protocols for the Project were reviewed by Matt Stuber, eagle coordinator for USFWS Region 1. WEST contacted US Geological Survey (USGS; M. Kochert) and IDFG (C. Moulton) for historical records of eagle nests within the Project area and were informed there were no known records of eagle or raptor nests within the Project area or the 10-mi (16-km) buffer (survey area). Data for all raptor nests recorded included location (collected using a Global Positioning System [GPS]), species, occupancy status, and nest substrate. Occupancy was determined using the following definitions:

- Occupied nest—a nest structure at which one of the following is observed: an adult raptor in an incubating position, a pair of adults perched near the nest during the nesting season, evidence of fresh greenery or new nest material, an adult in an incubating position, or the presence of eggs, nestlings, or chicks.
    - An occupied nest can be further classified as active or inactive. A nest is classified as active if a breeding attempt was made, as evidenced by an incubating adult or the presence of eggs or young in the nest. A nest where no evidence of breeding is recorded is classified as inactive, as not all pairs of raptors attempt to nest or nest successfully every year.
- Unoccupied nest—a nest structure not selected by raptors for use in the current nesting season.
- Productivity—the number of juveniles fledged from an occupied nest, often reported as a mean over the sample of nests.

<u>2020 Raptor Nest Survey Memo (McCormack et al. 2020b)</u>

The survey area for the 2020 raptor nest surveys was based on the 140,000-acre Project area in the February 2020 POD (Figure 7). Aerial and ground-based raptor nest surveys were conducted to record raptor nests within 1.0 mi (1.6 km) of the Project area. Aerial surveys were also completed out to 10 mi for eagle nests.

Two rounds of aerial surveys were completed, one on March 22, 2020, and one on May 29, 2020. Three rounds of ground-based surveys were also completed between April and July, 2020. Formal productivity checks were conducted for golden eagle and ferruginous hawk, both state SGCN (IDFG 2016) and BLMSS (BLM 2014). During the 2020 surveys, 20 raptor nests were documented within 1.0 mile of the February 2020 Project area (Figure 7). Of these, 13 were unoccupied. Of the remaining seven nests, one was occupied by golden eagle, one was occupied by ferruginous hawk, four were occupied by red-tailed hawk (*Buteo jamaicensis*), and one was occupied by great horned owl (*Bubo virginianus;* Figure 7). The area surrounding the golden eagle nest has since been removed from the Project. The ferruginous hawk nest was monitored throughout the breeding season and one fledgling was observed near the nest on July 23. Three active burrowing owl nests were also discovered incidentally within the June 2020 Project area

(Figure 7), as aerial surveys are not expected to detect burrowing owl nests due to the lack of a visible nest and adults and fledglings are unlikely to be above ground until later in the nesting season. Burrowing owl nests were discovered while on site for other surveys based on the presence of adult owl(s)observed outside the burrow during the nesting season (June - July), along with pellets and whitewash.

<u>2021 Raptor Nest Survey Memo (Harrison and McCormack 2021)</u>

The aerial survey methods were consistent with the 2020 nest surveys but were conducted within 2.5 mi of the Project based on the 104,000-acre Project boundary in the February 2021 POD (Figure 8). The survey are was reduced from 10.0 mi to 2.5 mi based on updated guidance from USFWS regarding eagle nest surveys. Aerial surveys were conducted on March 19 and May 26, 2021. Ground surveys were completed following the second aerial survey at ferruginous hawk nests.

There were 56 raptor nests recorded during 2021 nest surveys (Figure 8). Of these, 30 were occupied by raptors, seven were occupied by common raven (*Corvus corax*), and 19 were unoccupied. The golden eagle nest identified in 2020 was occupied again in 2021, with one nestling observed during the second aerial survey. There were two occupied ferruginous hawk nests, 14 occupied red-tailed hawk nests, five occupied Swainson’s hawk (*Buteo swainsoni*) nests, four occupied great horned owl nests, two occupied burrowing owl nests, and three occupied unknown species nests identified during the 2021 surveys.

The majority of occupied nests identified during the 2021 surveys are outside the current Project area. Of the 56 nests identified, one ferruginous hawk nest, two red-tailed hawk nests, and one burrowing owl nest are located within the current Project area. In addition, one common raven nest is within the Project area that was used by red-tailed hawks in 2020. One additional ferruginous hawk nest, two red-tailed hawk nests, one burrowing owl nest, and one common raven nest previously used by red-tailed hawks are located within 1.0 mi of the current Project area (Figure 8).

[This figure contains confidential biological resources information and is therefore redacted from the public version of the document. The figure is included in confidential Appendix M-b (Confidential Biological Resources Mapping).]

Figure 7. Raptor nests identified during 2020 surveys conducted within 10.0 miles of the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho.

[This figure contains confidential biological resources information and is therefore redacted from the public version of the document. The figure is included in confidential Appendix M-b (Confidential Biological Resources Mapping).]

Figure 8. Raptor nests identified during 2021 surveys conducted within 2.5 miles of the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho.

3.1.4 Year One Avian Use Study (McCormack and LeBeau 2021)

The objective of the avian use study was to estimate the level of use within the Project area by birds, particularly eagles, raptors, and species of concern. The surveys followed the recommendations in the USFWS ECPG (2013), USFWS WEG (2012), and Final Eagle Rule (2016). Ninety avian use points (Figure 9), providing approximately 34% coverage of the 140,000-acre Project Area in the February 2020 POD (Study Area), were randomly selected. Ten-minute (min) surveys were completed for small birds within a 100-m (328-ft) radius plot, followed by 60-min surveys for large birds in an 800-m (2,625-ft) radius plot. Surveys were conducted once per month throughout the study period. Small bird surveys were conducted for one year, while large bird surveys will be conducted for two years.

Overall, 1,080 avian use surveys were conducted during the first year of surveys. Twenty-six species of large birds and 4,178 observations were recorded during the study. Forty-one observations of golden eagles were recorded, while no bald eagles were recorded. Golden eagles are a species of concern and listed as BCC, BLMSS, and SGCN. Golden eagle mean use was 0.03 observations/800-m radius plot/60-min survey across all seasons. Sixty-one golden eagle exposure minutes were recorded from 28 golden eagle observations. Spatially, golden eagle exposure minutes were recorded at 19 of 90 survey points. Golden eagle exposure minutes per survey hour were highest at survey Point 57, which was located near an eagle nest that was occupied in 2020. Golden eagle flight heights were recorded most frequently within the rotor swept height (RSH; 63.0%).

Large corvids had the highest use of all large bird types, and common raven (*Corvus corax*) had the highest use among large bird species. Roughly half (47.9%) of large birds were recorded within the RSH. The highest large bird use values were recorded at Point 4, Point 83, and Point 37. Diurnal raptors were recorded in every season, with percent of use being highest in the summer (39.7%), primarily from northern harrier (*Circus hudsonius*; 12.0%) and red-tailed hawk (9.9%) observations. Frequency of occurrence, for diurnal raptors, was highest in the summer (35.2%) and fall (35.6%). Mean use by point for diurnal raptors was highest (1.50 observations/800-m radius plot/ 60-min survey) at Point 10, followed by points 27, 37, 41, and 77 with 1.33 observations/800-m radius plot/ 60-min survey. Spatially, diurnal raptor use was highest at points in the southeast and south-central portions of the Study Area.

Twenty-two species of small birds were recorded within 4,571 observations during the study. Small bird mean use was relatively consistent across seasons and ranged from 3.62 observations/100-m radius plot/10-min survey in winter to 4.47 in fall. Passerines were the only small bird type recorded, with the grassland/sparrows subgroup accounting for more than half of all small bird use. Small bird flight heights were mainly below the RSH. The highest use for small birds was recorded at Point 6 and Point 49. Horned lark (*Eremophila alpestris*) had the highest use among small bird species, followed by western meadowlark (*Sturnella neglecta*).

Sixteen species of concern were recorded; no federally threatened or endangered species recorded. Eleven large bird species of concern observed during surveys included golden eagle

(BCC, BGEPA, BLMSS, and SGCN), American white pelican (*Pelecanus erythrorhynchos*; SGCN), long-billed curlew (BCC, BLMSS, and SGCN), California gull (*Larus californicus;* SGCN), burrowing owl (BLMSS, SGCN), common nighthawk (*Chordeiles minor*; SGCN), ferruginous hawk (BCC, BLMSS, SGCN), greater sage-grouse (BCC, BLMSS, SGCN), northern harrier (BCC), sandhill crane (*Antigone canadensis*; SGCN), and short-eared owl (BLMSS, SGCN). Five small bird species of concern observed during surveys included grasshopper sparrow (*Ammodramus savannarum*; BLMSS, SGCN), green-tailed towhee (*Pipilo chlorurus*; BCC, BLMSS), loggerhead shrike (*Lanius ludovicianus*; BCC, BLMSS), sage thrasher (*Oreoscoptes montanus*; BCC, BLMSS, SGCN), and sagebrush sparrow (*Artemisiospiza nevadensis*; BCC, BLMSS, SGCN).

3.1.5 Year Two Avian Use Study

A second year of avian use surveys were conducted for large birds following the same protocol for 60-min surveys as the Year 1 study. The Study area was based on the current 73,000-acre Project area, and defined by minimum convex polygons of proposed turbine corridors per the ECPG. Twenty-four of the 90 points surveyed in Year 1 were removed from the Year 2 study as they were located outside of the current Project area. Fifty-four new points were established in Year 2 to provide sufficient coverage of the Study Area, resulting in 120 survey points (Figure 9).

Overall, 1,430 avian use surveys were conducted during the second year of surveys. Thirty-eight species of large birds and 7,561 observations were recorded during the study. Fifty-three observations of golden eagles were recorded. Golden eagle mean use was 0.02 observations/800-m radius plot/60-min survey in summer, 0.04 in fall, and 0.07 in winter. There were 149 golden eagle exposure minutes recorded from 53 golden eagle observations. Spatially, golden eagle exposure minutes were recorded at 38 of 120 survey points. Golden eagle exposure minutes per survey hour were highest at survey points 83 and 106, at 1.17 minutes per hour of survey. Golden eagle flight heights were recorded most frequently below the rotor swept height (RSH) of 55 m (70.0%).

Three bald eagle observations were recorded during the second year of surveys. Bald eagle mean use was less than 0.01 observations/800-m radius plot/60-min survey in fall and winter, and zero (not observed) in spring and summer. Eleven bald eagle exposure minutes were recorded from the three observations. Bald eagle use was highest at Point 54. Bald eagle flight heights were recorded most frequently below the RSH (66.7%).

Large corvids had the highest use of all large bird types, and common raven (*Corvus corax*) had the highest use among large bird species. The highest large bird use values were recorded at Point 83 and Point 53, and were largely attributed to waterfowl observations. Diurnal raptors were recorded in every season, with percent of use being highest in the spring (47.3%) and summer (34.8%). Among diurnal raptors, *Buteo*s and harriers accounted for the majority of raptor use in all seasons. Mean use by point for diurnal raptors was highest (1.42 observations/800-m radius plot/ 60-min survey) at Point 122, followed by points 126 and 159 (1.33 and 1.25

observations/800-m radius plot/ 60-min survey, respectively). Spatially, diurnal raptor use was highest at points in the eastern portions of the Study Area.

Fifteen species of concern were recorded; no federally threatened or endangered species recorded. Twelve large bird species of concern observed during surveys included golden eagle (BCC, BGEPA, BLMSS, and SGCN), bald eagle (BGEPA; BLMSS), American white pelican (*Pelecanus erythrorhynchos*; SGCN), long-billed curlew (BCC, BLMSS, and SGCN), California gull (*Larus californicus;* SGCN), Franklin's gull (*Leucophaeus pipixcan;* SGCN), burrowing owl (BLMSS, SGCN), white-faced ibis (*Plegadis chihi*; SGCN), common nighthawk (*Chordeiles minor*; SGCN), ferruginous hawk (BCC, BLMSS, SGCN), greater sage-grouse (BCC, BLMSS, SGCN), short-eared owl (BLMSS, SGCN). Three small bird species of concern were recorded as incidengal observations during the Year 2 study: grasshopper sparrow (*Ammodramus savannarum*; BLMSS, SGCN), loggerhead shrike (*Lanius ludovicianus*; BCC, BLMSS), and sage thrasher (*Oreoscoptes montanus*; BCC, BLMSS, SGCN).

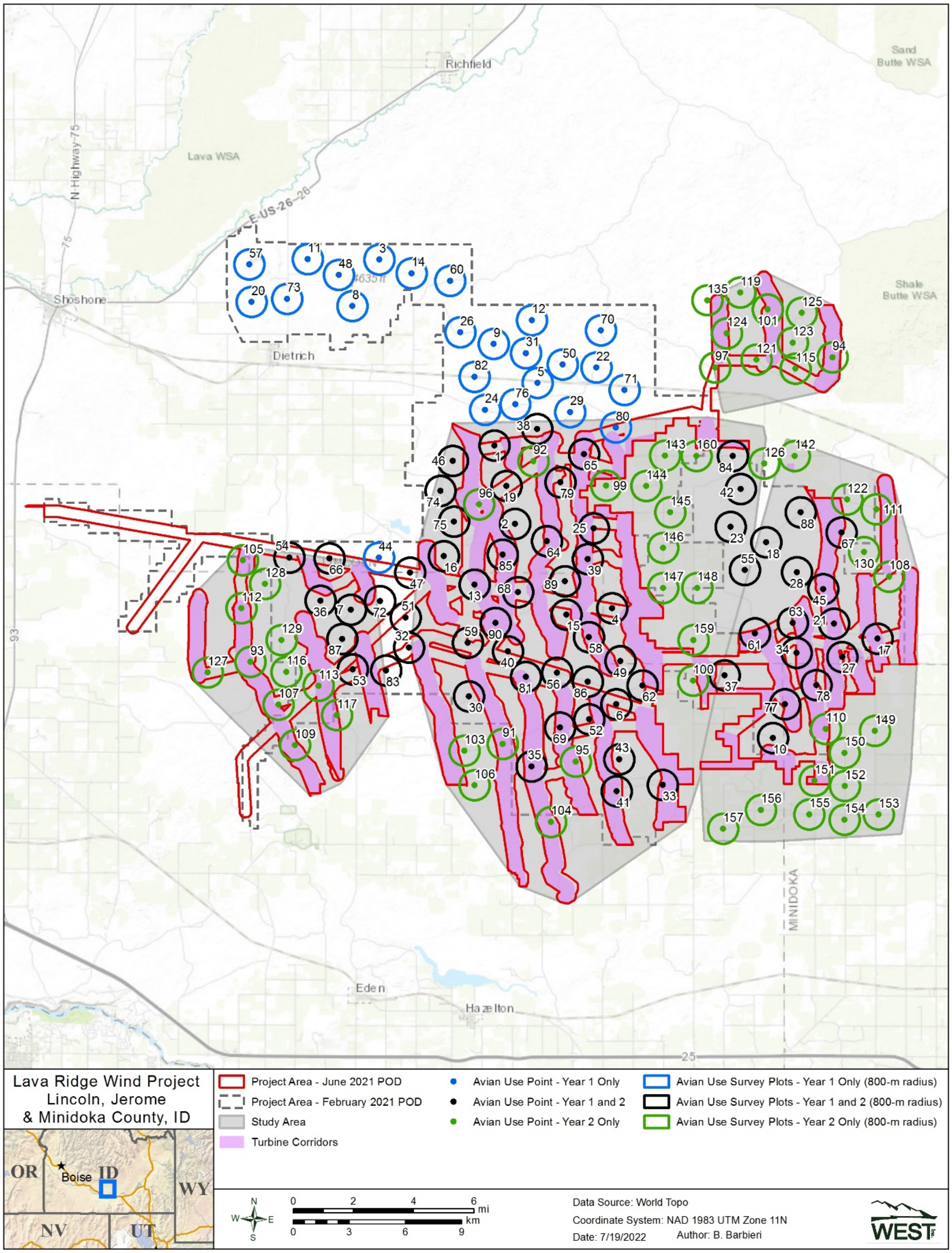


Figure 9. Avian use survey points and plots surveyed during the two-year avian use study conducted at the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho.

3.2 Bats

3.2.1 Bat Activity and North American Bat Surveys (Bishop-Boros and McCormack 2021a)

Objectives of the bat acoustic monitoring study were three-fold and included evaluating bat activity within the Project area to: 1) assess seasonal and temporal variation in bat activity, 2) assess spatial and altitudinal variation in bat activity, and 3) evaluate species composition to determine bat species that may be impacted by the Project. The study followed the recommendations of the USFWS WEG (2012), Kunz et al. (2007), IDFG, and BLM Shoshone Field Office. Long-term acoustic monitoring stations were used to monitor seasonal and temporal variation in bat activity throughout the spring, summer, and fall seasons. North American Bat Monitoring (NABat) surveys were conducted to document species composition and spatial use of the Project area during the summer maternity season. Qualitative call verification of automated species classifications were conducted for both survey types to provide data on species composition within the Project area.

Acoustic studies to monitor bat activity were conducted within the 140,000-acre Project area in the February 2020 POD (Study Area) from April 13 − November 1, 2020, using full-spectrum Song Meter SM3BAT ultrasonic detectors. Detectors were deployed in two locations, one near the northwest portion of the Study Area and one in the southeastern portion of the Study Area (Figure 10). Each detector had a ground-level (g) and raised (r) microphone, for a total of four stations. Both detectors were located in grassland/herbaceous and shrub/scrub habitat. The study was divided into three survey periods: spring (April 13 – May 14), summer (May 15 – August 15), and fall (August 16 – November 1). Mean bat activity was also calculated for a standardized Fall Migration Period (FMP), defined as July 30 – October 14. For each station, bat passes were sorted into three groups based on their minimum call frequency: high frequency (HF; >30 kHz), low frequency (LF; 15-30 kHz), very low frequency (VLF; <15 kHz). A detector-night was defined as one station operating for one entire night.

Bat activity was monitored over 737 detector-nights at the four stations between April 13 and November 1, 2020. Overall bat activity was lowest in the spring and summer and highest in the fall. Acoustic activity increased in late August and peaked at 15.36 bat passes per detector-night during the week of September 8 – 14, 2020. During the FMP, bat activity was recorded as 6.55 bat passes per detector-night at ground stations. Weekly bat activity decreased from late September through the end of the study. Overall, HF bat activity was highest in summer (1.08 ± 0.10), and LF bat activity was highest in fall (3.91 ± 0.70). Activity at the ground stations was higher (3.84 and 3.83 bat passes per detector-night), compared to the raised stations (1.32 and 1.79 bat passes per detector-night). Species composition was similar between ground and raised stations; however, LF bat calls represented a larger proportion of bat passes at raised stations (97.3%) compared to the ground stations (53.8%).

Of the total bat passes recorded, 65.8% were classified as LF (e.g., big brown bats, hoary bats, and silver-haired bats), 34.0% were classified as HF (e.g., 40 kHz Myotis bats), and 0.2% were classified as VLF. Qualitative call review confirmed eight of the 13 species that could occur within the Project area, including hoary bat (*Lasiurus cinereus*; n = 153 calls), silver-haired bat (*Lasionycteris noctivagans*; n = 21), western small-footed myotis (*Myotis ciliolabrum*; n = 10), Townsend's big-eared bat (*Corynorhinus townsendii*; n = 6), little brown myotis (*Myotis lucifugus*;

n = 5), big brown bat (*Eptesicus fuscus*), Yuma myotis (*Myotis yumanensis*; n = 3), and fringed myotis (n = 1). Four passes were identified as big free-tailed bat (*Nyctinomops macrotis*) calls, a species not expected to occur in Idaho and therefore not considered in the list of potential list of species that could occur at the Project.

NABat monitoring was conducted between July 16 and 21, 2020 at 21 stations located in four NABat grids that overlap the Study Area (Figure 10). NABat stations were deployed for a total of 91 detector-nights. Spatially, the highest number of bat passes per detector-night was recorded at stations 7562-SW and 7562-SE (35.00 and 32.50 bat passes per detector-night, respectively), which were located along an irrigation canal in the northwest area of the Project. The next station with highest activity (16.75 bat passes per detector-night) was at station 3466-SW, located 85 ft (26 m) from a stock pond. Both Kaleidoscope analysis and qualitative review identified more bat passes and higher species diversity at the NABat stations with the largest and highest quality water resources. A resources qualitative review of 444 files confirmed calls of four species; hoary bat, big brown bat, western small-footed myotis, and little brown myotis. The Myotis group (HF) composed 89% of all bat passes.

Nine confirmed bat species of concern were recorded in the Study Area during activity or NABat surveys including little brown myotis (SGCN, BLMSS), western small-footed myotis (BLMSS), Yuma myotis (SGCN), big brown bat (BLMSS), fringed myotis (BLMSS), hoary bat (SGCN, BLMSS), silver-haired bat (SGCN, BLMSS), Townsend's big-eared bat (SGCN, BLMSS), and big free-tailed bat (IDFG 2016, BLM 2015). The big free-tailed bat is not a species of concern in Idaho, but is designated as a BLMSS in Utah.

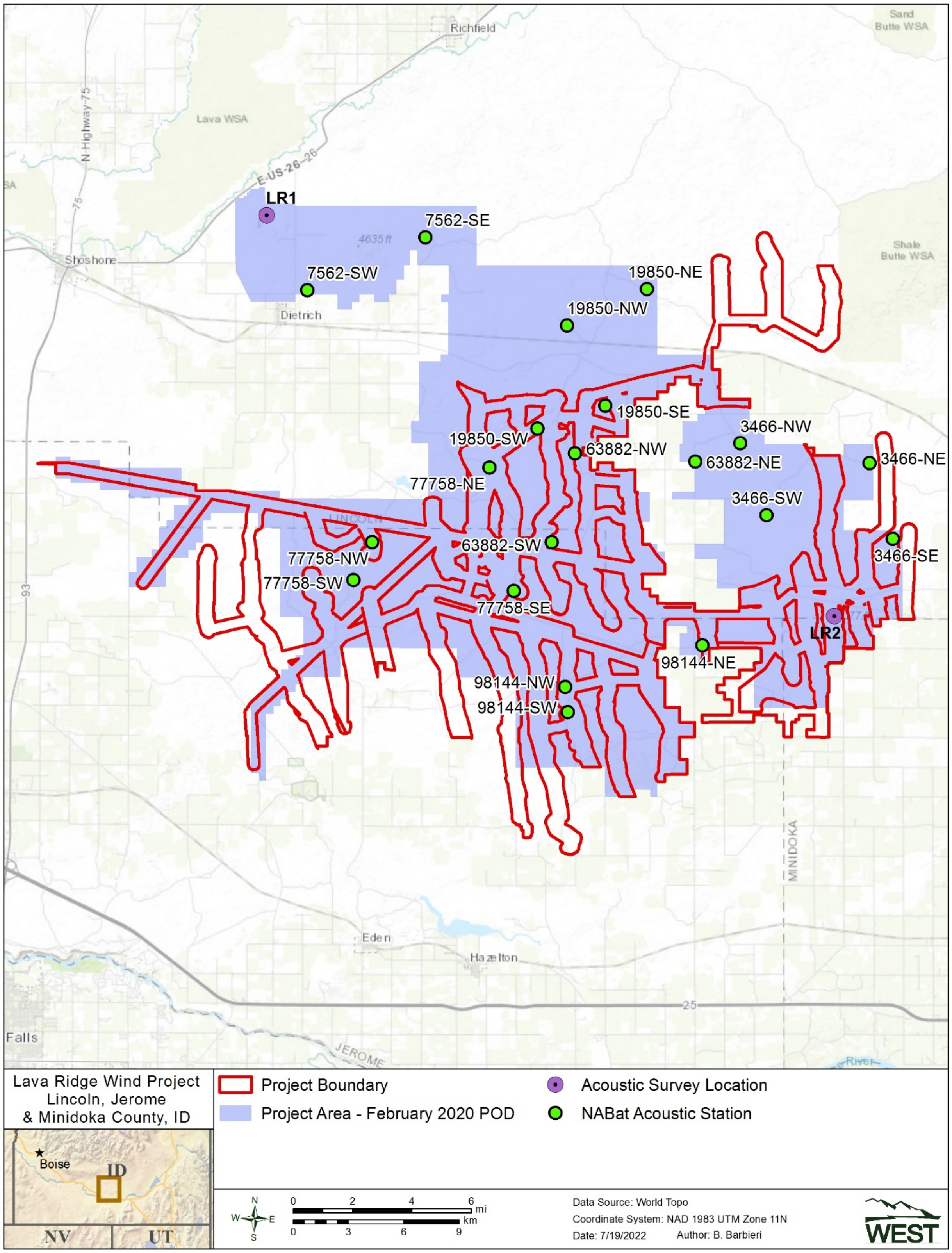


Figure 10. Location of bat acoustic survey stations and NABat acoustic stations at the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho.

*3.2.2 Bat Feature Assessment (*Bishop-Boros and McCormack. 2021b)

The objectives of the bat feature assessment was to determine the potential for bat occupancy in potential bat roosts within the 140,000-acre Project area in the February 2020 POD(Study Area), and to determine the suitability of water features found within the Study Area for bat foraging and drinking activities. Bat features were assessed according to their suitability as transient or migratory stopover, maternity, or wintering sites, and whether these features included the relevant minimum criteria, as outlined in the Bat Survey Protocol for Assessing Use of Potential Hibernacula (USFWS 2006). Due to concerns over potential transmission of white-nose syndrome (WNS) and COVID-19, all bat roost features in the Study Area were visually surveyed externally for the potential suitability as bat roosting features, but not physically entered. All surveys utilized field methods outlined in the current USFWS Range-Wide Indiana Bat Summer Survey Guidelines (USFWS 2020).

An initial desktop assessment was completed to determine the quantity of potentially suitable drinking and foraging aquatic resources in the Study Area, followed by a site visit in April 2021 to assess the suitability of the potential bat features. Roosting and water feature assessment surveys were completed from April 16 – May 5, 2021 between 0830 and 1900 hours. Four caves, four lava tubes, six lava vents, and a lava crater were assessed for potential roosting, and the lava tube and lava vent features were assessed for suitability of use during summer maternity or spring and fall migratory seasons (Figure 11).

Two of the four caves included in the assessment are located within the current Project area. While all caves were determined to be potentially suitable as night roosts in spring, summer, and fall, and as day roosts during the spring and fall migratory season, only the two unnamed caves could provide suitable roosting habitat during the summer maternity or winter hibernation season. A high degree of human disturbance, which could inhibit bat use, was observed at the two named caves (Wilson Butte and Kimama). No openings or access points were documented at any of the digitized lava tubes, vents, or craters. None of the lava tubes or vents have potential to be used by large colonies of bats, although it is possible for bats to use all features as night roosts. The lava crater had the greatest potential to be used during migratory stopover, although this feature is no longer within the Project area.

According to the desktop assessment, there were approximately 372.0 ac (150.0 ha) of smooth (drinkable) water surfaces in the Study Area. The majority (54%) of water sources are intermittent lakes or ponds and unlikely to provide a suitable drinking resource year-round. Approximately 14 ac of perennial lakes/ponds provide the highest quality drinking resource year-round. Additionally, there were approximately 42.0 ac (17.0 ha) of canals or ditches. An additional 109.3 ac (44.2 ha) were considered playas, which may or may not have water depending on the time of year.

During the feature assessment, only water features that were passed incidentally en route to roosting features were surveyed to determine potential suitability for bat foraging and drinking. Numerous drinking resources are available to bats throughout the Study area, although many are ephemeral resources that may not be available throughout all seasons. The highest quality (perennial) water sources with potential to concentrate bat activity were the canals, which provide a reliable year-round water source with a smooth surface and cleaner water than would be available in stock ponds.

3.2.3 2021 Acoustic Monitoring Surveys

Bat acoustic studies were conducted in 2021 to provide further data on spatial use of the current 73,000-acre Project area, with a focus on features and habitat types that may attract bats. Detectors were placed at 22 stations throughout the Project area, including areas between portions of the Project boundary, at features identified as potential bat roosting or foraging habitat during the feature assessment. Stations included features within five of the six NABat grids sampled in 2020, two detectors at caves, and two detectors placed at a canal (Figure 12).To capture acoustic data during both the maternity period and fall migratory period, bat detectors were deployed for 14 consecutive nights at each station in two different seasons: 1) Summer - between mid-June and mid-July and 2) Fall - between August 20 and September 10, 2021. The total number of bat passes per detector-night, regardless of species, was used as an index for bat activity at each detector location.

The highest number of bat passes at NABat stations was recorded at the 89781-NE station (81.05 ± 14.65 bat passes per detector-night), which was located at the edge of a small crater in shrub/steppe habitat. The activity rate at 89781-NE was more than double the activity rate recorded at other stations, and temporal variation in activity at the station indicated use of the crater by rooting bats. The next highest stations, 3466-SW (33.95 ± 10.35 bat passes per detector-night) and 3466-SE (22.67 ± 7.28), were located near stock ponds. The NABat stations with the fewest detected passes did not exhibit rock or water features: 77758-SE (0.26 ± 0.12) and 98144-SW (0.28 ± 0.11). Among the potential bat features, the canal stations had the highest level of activity (88.25 passes/detector-night) when compared with the cave features (3.95 passes/detector-night) and all of the NABat stations (10.44 passes/detector-night).

Temporally, bat activity was highest during the fall migration period, which coincides with the period when the majority of fatalities have been reported from post-construction monitoring studies at other wind energy projects in the region (typically August and September; Arnett et al. 2008, Arnett and Baerwald 2013).

Fifteen species were identified in 2021 by Kaleidoscope automatic classification, and twelve species were confirmed through qualitative review. AnaLook was used to qualitatively review all calls in zero cross and SonoBat was additionally used to qualitatively review all potential *Myotis* and *Antrozous* calls in full spectrum to increase the certainty of these calls that are best identified in full spectrum. Western small-footed myotis composed the highest number of bat passes qualitatively identified to species level (73.7%), followed by hoary bat (21.3%). Spotted bat and fringed myotis were the only potentially occurring species not recorded

[This figure contains confidential biological resources information and is therefore redacted from the public version of the document. The figure is included in confidential Appendix M-b (Confidential Biological Resources Mapping).]

Figure 11. Potential bat features surveyed in spring 2021 at the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka Counties, Idaho.

[This figure contains confidential biological resources information and is therefore redacted from the public version of the document. The figure is included in confidential Appendix M-b (Confidential Biological Resources Mapping).]

Figure 12. Location of acoustic detectors deployed to monitor bat activity in 2021 at the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka Counties, Idaho.

3.3 Tier 3 Summary

A variety of biological baseline resource studies were conducted as recommended by the USFWS, BLM, and IDFG to characterize the biological resources within the Project area. The completed Tier 3 studies recommended by the agencies as listed in the 2020 Study Plan (WEST 2020) and relevant to this BBCS are listed in Table 6. Key points highlighted during agency correspondence throughout Project development included the BLM noting application of buffers to nesting sensitive species based on distances provided in in their vegetation treatment plan (BLM 2020), and the USFWS suggested siting turbines away from the golden eagle nest located on Crater Butte.

Three occupied GRSG leks had a combined peak count of 33 males in 2020, and 29 males during the 2021 surveys. Twenty raptor nests were documented within one mi of the Project area. Of these, 13 were unoccupied and the remaining seven nests were occupied by ferruginous hawk (one), golden eagle (one), red-tailed hawk (four), and great horned owl (one). Three occupied active burrowing owl nests were also discovered within the Project area. Nineteen avian species of concern were documented during the two-year avian use study. Fourteen large bird species of concern and five small bird species of concern were documented during the study. No federally threatened or endangered species were documented.

During 2020 bat studies, nine bat species were confirmed, eight of which were also recorded during the 2021 study (big free-tailed bat was only recorded in 2020). In addition, four new bat species were identified in 2021: the pallid bat, long-legged myotis, California myotis, and canyon bat. Overall, thirteen of the 15 species with the potential to occur at the Project site have been recorded over two years of acoustic studies. Spotted bat and fringed myotis were the only potentially occurring species not recorded. Higher levels of bat activity were associated with higher quality water resources, such as canals, and a crater feature. Caves were identified during the feature evaluation as potentially suitable night roosts in spring, summer, and fall, and as day roosts during the spring and fall migratory season, although regular disturbance is likely to inhibit use at Kimama and Wilson Cave. The two unnamed caves were surveyed with acoustic stations in 2021, and had lower activity compared with canals and most other NABat stations.

4.0 POTENTIAL IMPACTS TO BIRDS AND BATS

Birds and bats are key species groups of concern for the development and operation of wind energy facilities (WEF), and patterns of avian and bat fatalities have been summarized in the US to address this concern (AWWI 2018, 2019). Our understanding of wind energy-related bird and bat fatalities depends on the extent of post-construction fatality monitoring conducted at WEF, which is highly variable across sites, largely due to variable agency requirements across states or regions.

Impacts to wildlife from the construction and operation of a WEF can be *direct* or *indirect*. *Direct* impacts primarily occur during operation from interactions with facility infrastructure, such as collisions with turbines or buildings, or interactions with power lines. Direct impacts from movement of vehicles or machinery may also occur during construction. *Indirect* impacts can occur during construction, operation, and decommissioning of a facility and can be difficult to predict, especially at locations where they have not been studied. Displacement and barrier effects are examples of potential indirect impacts, with displacement the main potential indirect impact from wind energy development on wildlife. Habitat loss, fragmentation, or alteration are all examples of potential direct or indirect impacts from wind energy development. Impacts that occur during construction and decommissioning may be more intensive due to rapid change in habitats and disturbance by the presence of workers, but impacts during the operational phase of a facility are potentially more important because they represent long-term, ongoing impacts.

This section focuses on impacts that are most likely to occur at the Project, particularly collisions with turbines, avian power line interactions, and displacement, which were determined from the results of the Tier 1, 2, and 3 studies and WEST's experience with WEF in the US. These impacts will be described for all birds and bats along with avian and bat species of concern.

4.1 Methods

The assessment of potential impacts to avian and bat species at the Project was informed by the Tier 1–3 studies conducted for the Project along with publicly available information on impacts to wildlife from wind energy. Tier 1–3 studies provided information on 1) the likelihood of species of concern occurring at the Project, 2) the actual occurrence of species of concern observed across all studies conducted at the Project, and 3) the spatial and temporal patterns of species occurrences at the Project. Project-specific information was contextualized by including publicly available information at multiple spatial scales on 1) avian and bat species richness, 2) avian and bat fatality estimates, 3) species composition of fatalities of avian and bat species of concern, and 4) temporal patterns of avian and bat fatalities. In addition, factors influencing potential avian power line interactions and potential indirect impacts for birds and bats are discussed in the context of the Project.

Patterns of avian and bat fatalities are conditioned on the extent of post-construction fatality monitoring conducted in each region of the US and the availability of monitoring results in the public domain. The analysis conducted in this document of direct impacts to birds and bats resulting from collision of wind turbines relies primarily on the WEST Renew database that has compiled publicly available fatality data from 482 studies across 221 WEFs in the US since 1994 (WEST 2019). Fatality estimates for birds and bats were summarized at multiple spatial scales (e.g., state, BCR, USFWS region, Environmental Protection Agency [EPA] ecoregions, and US) to provide a landscape-scale context, and by different groups of birds and bats (i.e., all birds, diurnal raptors, small birds, all bats). For this Project, the landscape scales corresponded to Idaho, Great Basin BCR (BCR 9), USFWS Pacific Region (Region 1 - Idaho, Washington, Oregon, Hawaii), EPA Level I Ecoregion (10, North American Desert), and the lower 48 states of the US (Figure 13). Fatality studies were screened to provide "comparable" information across WEFs by including annual fatality estimates that 1) were calculated from turbines greater than 0.5 megawatt (MW), 2) were calculated from the Huso, Shoenfeld, or GenEst estimators, 3) covered adequate sampling time for taxa of interest when most fatalities have been observed (i.e., two seasons for bats, three seasons for birds), and 4) were averaged for each WEF when multiple fatality studies were conducted at a facility.

Another source of summary information on direct impacts to birds and bats resulting from collision of wind turbines in the US is available from the American Wind Wildlife Information Center (AWWI 2019). Although the exact methods used to screen studies were not provided in the report, the independent assessment and summary of avian and bat fatality estimates also provide valuable context at a landscape scale.

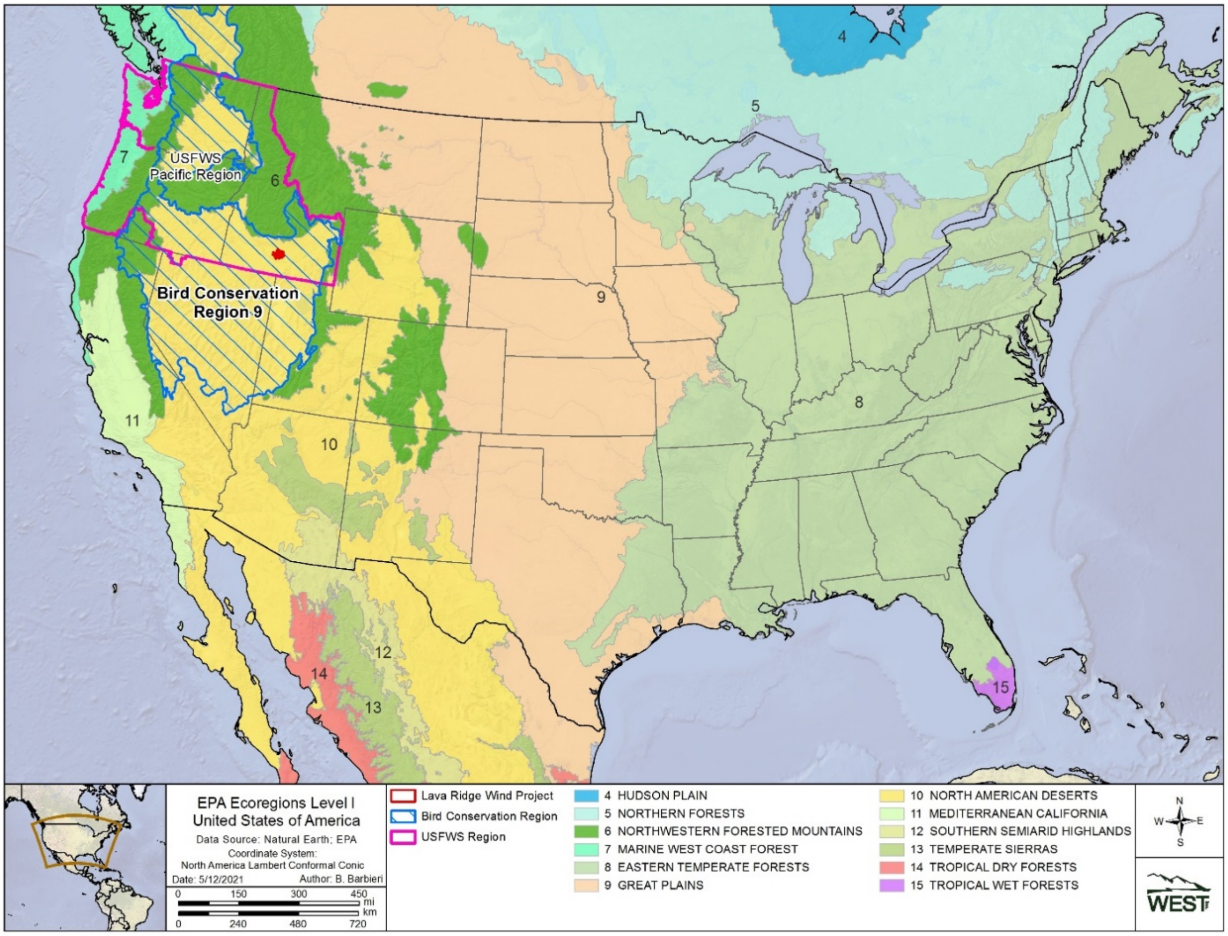


Figure 13. Spatial scales (Bird Conservation Region 9, USFWS Pacific Region, EPA Level I [North American Deserts]) examined for avian or bat impacts relative to the Lava Ridge Wind Project, Lincoln, Jerome, and Minidoka counties, Idaho.

4.2 Birds

Avian species richness (i.e., the number of species) is one metric that describes the avian community in a location. Forty-eight species of birds were documented in or near the Project across all avian studies at the Project, which account for approximately 18% of the 268 avian species that have been reported in Lincoln, Jerome, and Minidoka counties (eBird 2021), 11–12% of the 385–432 species reported in Idaho (eBird 2021, IDBRC 2020), and 10% of the 498 avian species reported in the Great Basin BCR (eBird 2021) over the last 10 years. Overall, the Project appears to contain a low number of avian species relative to these broader landscape scales, and the species typically observed were those commonly found throughout similar habitats in the region.

4.2.1 Direct Impacts: Collisions with Wind Turbines

Impacts to birds from land-based WEFs have been documented in the US since the late 1980s (Orloff and Flannery 1992) and 336 species of birds have been recorded as fatalities at WEF in the US (WEST 2019). Several reviews have discussed causal factors of avian fatalities (e.g., Strickland et al. 2011, Thaxter et al. 2017, Watson et al. 2018, AWWI 2019), and although it is difficult to generalize the impacts of WEFs on birds, what is clear is 1) many species are susceptible to collisions with turbines, 2) certain species or species groups appear to be more prone to collisions than others, 3) life history attributes such as longevity and reproductive potential influence the likelihood of population-level impacts, and 4) there are patterns in the timing of fatalities for some species groups. Given the continued concern over bird species' vulnerability to collision fatalities at WEFs (Thaxter et al. 2017, AWWI 2019), understanding the magnitude of these impacts at multiple spatial scales is critical for responsible management of species of concern.

<u>Fatality Estimates</u>

All Birds

The AWWI has compiled publicly available data from 193 studies across 130 WEFs in the US and reported 281 species of birds as fatalities during surveys, and an additional 13 species as incidental observations (AWWI 2019). Of the studies between 2002 and 2017, fatality estimates ranged from approximately zero to 12.00 birds/MW/year, with a median value of 1.80 (AWWI 2019).

Fatality estimates from WEST's Renew database (WEST 2019) ranged from zero to 9.15 fatalities/MW/year in the US. Across all spatial scales, median and mean estimates ranged from 2.28–2.66 (median) to 2.50–2.90 (mean; Table 7; WEST 2019). Fatality estimates from scales with low sample sizes (e.g., Idaho) should be interpreted with caution.

The closest operating WEF to the Project with public post-construction fatality data is the Horse Butte wind facility, a 32-turbine facility located approximately 105 mi (169 km) northeast of the Project on the eastern edge of the Columbia Plateau and the western edge of the Middle Rocky Mountains in Idaho. All-bird fatality estimates from Horse Butte were 1.9 birds/MW/year in 2012, 2.6 birds/MW/year in 2013, and 3.5 birds/MW/ year in 2014 (SWCA 2015). These estimates are within the range of estimates from BCR 9 and larger spatial scales.

Table 7. Summary of fatality estimates for all birds from multiple spatial scales in the US.[1]

	Fatality estimates (birds/MW/year)					
Spatial Scale	**Min**	**Max**	**Median**	**Mean**	**Facilities[2]**	**Studies[3]**
Idaho	2.66	2.66	2.66	2.66	1	3
Great Basin BCR	0.24	8.45	2.44	2.68	23	33
USFWS Pacific Region	0.36	8.45	2.45	2.90	21	31
North American Deserts	0	8.45	2.28	2.50	35	56
US	0	9.15	2.45	2.83	89	129

1. Data on fatality rates from the Renew database (Western EcoSystems Technology, Inc. 2019).
2. Facilities are individual wind projects.
3. Number of studies is reported because multiple studies may occur at a given facility in different years.

BCR = Bird Conservation Region; USFWS = US Fish and Wildlife Service; MW=megawatt.

Diurnal Raptors

Raptors are known to be strongly affected by wind turbines, primarily through direct mortality (collisions) and secondarily through habitat alteration and loss (Watson et al. 2018). Most raptors and vultures are long-lived species that have high natural adult survival and low reproductive potential relative to short-lived species, increasing their potential for population-level impacts (Schaub 2012). Many raptor species known to collide with turbines are taxonomically related and share similar flight morphology and foraging habits (Herrera-Alsina et al. 2013), including buteos (e.g., red-tailed hawk) and small falcons (e.g., American kestrel [*Falco sparverius*]) in the US (Smallwood and Thelander 2008, ICF International 2015). The likelihood of collision is highly variable and dependent upon the interaction of site location, season, and species-specific behaviors (Marques et al. 2014).

The AWWI has compiled publicly available raptor fatality data from the US between 2002 and 2017, and raptor fatality estimates ranged from approximately zero to 1.00 birds/MW/year, with a median value of less than 0.01 (AWWI 2019). Fatality estimates for diurnal raptors from WEST's Renew database (WEST 2019) ranged from zero to 0.77 fatalities/MW/year. Across all spatial scales, median and mean estimates ranged from 0.06–0.08 (median) to 0.10–0.13 (mean; Table 8).

Table 8. Summary of fatality estimates for diurnal raptors from multiple spatial scales in the US.[1]

	Fatality estimate (birds/MW/year)					
Spatial Scale	**Min**	**Max**	**Median**	**Mean**	**Facilities[2]**	**Studies[3]**
Idaho	na	na	na	na	0	0[4]
Great Basin BCR	0.01	0.29	0.07	0.13	17	20
USFWS Pacific Region	0.01	0.29	0.08	0.13	17	19
North American Deserts	0	0.29	0.06	0.10	25	17
US	0	0.77	0.06	0.11	57	75

1. Data on fatality rates from the Renew database (Western EcoSystems Technology, Inc. 2019).
2. Facilities are individual wind projects.
3. Number of studies is reported because multiple studies may occur at a given facility in different years.
4. No diurnal raptor fatality estimate was available from the Horse Butte Wind Facility.

BCR = Bird Conservation Region; USFWS = US Fish and Wildlife Service; MW=megawatt.

Small Birds

Passerines are another group of concern because of impacts from WEF, although most small species (e.g., songbirds) appear less vulnerable to collisions with wind turbines on an individual level than raptors (Allison et al. 2019). Most songbirds are short-lived species and have low natural annual survival and high reproductive potential relative to long-lived species (e.g., raptors). This combination of life-history traits reduces their potential for population-level impacts from collisions with wind turbines or other forms of anthropogenic development (Stahl and Oli 2006).

Small passerines, including both resident and nocturnal migrating songbirds, are the most abundant and diverse group of landbirds in the US, and most avian fatalities at wind projects in the US and Canada are passerines (Erickson et al. 2014, Allison et al. 2019, AWWI 2019). Passerines accounted for approximately 62.5% of the fatalities in 116 studies in the US and Canada, where 156 species of passerines totaling 3,110 fatalities were found (Erickson et al. 2014). It was estimated that approximately 134,000 to 230,000 fatalities occurred each year in the US and Canada combined, equaling a rate of 2.10 to 3.35 small birds/MW of installed capacity (Erickson et al. 2014).

Fatalities were distributed among several species of passerines in the Erickson et al. (2014) analysis, such that impacts to individual species were a low (<0.1%) percentage of their respective estimated continental populations. Small passerines accounted for 56.5% of fatalities in the US and 51.3% in the Pacific Region (AWWI 2019).

AWWI (2019) summarized small bird fatalities across the US and small bird fatality estimates ranged from approximately zero to 6.0 birds/MW/year, with a median fatality estimate of 1.2. Fatality estimates for small birds from WEST's Renew database (WEST 2019) ranged from zero to 8.61 fatalities/MW/year; median and mean estimates ranged from 2.00 to 2.14 (median) and 2.21 to 2.55 (mean) across all spatial scales (Table 9).

Table 9. Summary of fatality estimates for small birds from multiple spatial scales in the US.[1]

	Fatality estimate (birds/MW/year)					
Spatial Scale	**Min**	**Max**	**Median**	**Mean**	**Facilities[2]**	**Studies[3]**
Idaho	na	na	na	na	0	0[4]
Great Basin BCR	0.15	7.59	2.12	2.40	19	26
USFWS Pacific Region	0.23	7.59	2.14	2.55	18	25
North American Deserts	0	7.59	2.00	2.21	31	49
US	0	8.61	2.00	2.35	75	108

1. Data on fatality rates from the Renew database (Western EcoSystems Technology, Inc. 2019).
2. Facilities are individual wind projects.
3. Number of studies is reported because multiple studies may occur at a given facility in different years.
4. No small bird fatality estimate was available from the Horse Butte Wind Facility.

BCR = Bird Conservation Region; USFWS = US Fish and Wildlife Service; MW=megawatt.

Species Composition

All Birds/Small Birds

Of the approximately 500 avian species from the Pacific Region, 114 have been recorded as fatalities (WEST 2019, AWWI 2019). AWWI (2019) summarized species of avian fatalities for the Pacific avifaunal biome (containing the Project) with the top five species including the western meadowlark (*Sturnella neglecta*), American kestrel, red-tailed hawk, red-winged blackbird (*Agelaius phoeniceus*), and horned lark (AWWI 2019). In the WEST Renew database, the top five species found as fatalities in the Pacific Region include horned lark (*Eremophila alpestris*), gray partridge (*Perdix perdix*), golden-crowned kinglet (*Regulus satrapa*), ring-necked pheasant (*Phasianus colchicus*), and chukar (*Alectoris chukar*; WEST 2019). Seventeen species of avian fatalities were found during post-construction fatality monitoring at the Horse Butte wind facility in Idaho, with the top three species including eared grebe (*Podiceps nigricollis*), gray partridge, and common redpoll (*Acanthis flammea*; SWCA 2015).

Diurnal Raptors

AWWI (2019) summarized raptor fatalities for the Pacific avifaunal biome, and found red-tailed hawk, American kestrel, and Swainson's hawk placing 8th, 9th, and 23rd, respectively, in the top 25 most reported avian fatalities (AWWI 2019). Diurnal raptors accounted for 8.2% of fatalities in the US and 22.3% in the Pacific avifaunal biome (AWWI 2019). Per WEST data, the top five raptor species found as fatalities in the Pacific Region were American kestrel, red-tailed hawk, Swainson's hawk, rough-legged hawk (*Buteo lagopus*) and golden eagle (WEST 2019). American kestrel, golden eagle, red-tailed hawk, rough-legged hawk, and Swainson's hawk were all found as fatalities at the Horse Butte wind facility in Idaho (SWCA 2015).

Temporal Patterns of Fatalities

Temporal patterns at multiple spatial scales show peak bird fatalities during spring and/or fall migration seasons (Figure 14; WEST 2019), and are particularly evident at spatial scales with larger sample sizes (i.e., Great Basin BCR, USFWS Pacific Region, North American Deserts, US). Fatality patterns from scales with low sample sizes (e.g., Idaho) should be interpreted with caution.

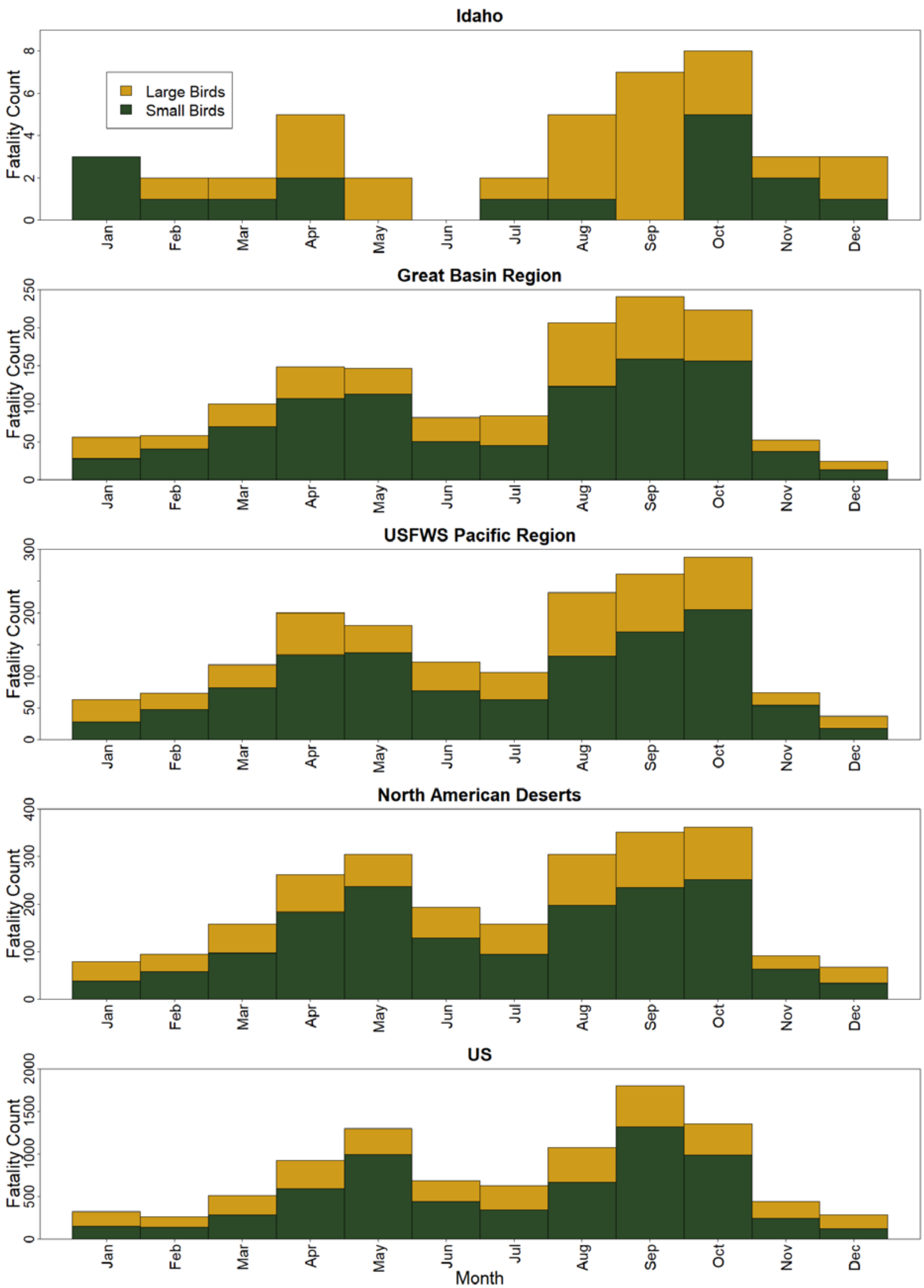


Figure 14. Fatalities of large and small birds at multiple spatial scales in the US.

1

Species of Concern

A comprehensive review of species of concern based on the results of Tier 1–3 studies identified 46 species of concern that have the potential to occur within the Project (Table 10). Of these 46 species, 28 (AWWI 2019) to 37 (WEST 2019) of these species have been recorded as fatalities at WEF at one of the spatial scales of interest in the US (Table 10). Nine of the bird species of concern in Table 10 have not been recorded as fatalities in the US (WEST 2019). Species of concern that may occur at the Project that were found during post-construction fatality monitoring at the Horse Butte wind facility in Idaho included Brewer's sparrow, black rosy-finch (*Leucosticte atrata*), Columbian sharp-tailed grouse (*Tympanuchus phasianellus*), eared grebe, and golden eagle (SWCA 2015).

4.2.2 Direct Impacts: Avian Power Line Interactions

Potential impacts to birds from power line operation include electrocution and collision risks, which depend on line location, voltage, and configurations relative to area habitats and bird presence/use. Depth to bedrock is shallow across large portions of the Project likely necessitating overhead 34.5kV collector lines from the turbines to collection substations. To minimize potential electrocution and/or collision risks to birds, the aboveground 34.5kV collector lines will be designed to meet Avian Power Line Interaction Committee (APLIC) guidelines (APLIC 2006 and 2012, respectively).

These design considerations will incorporate either sufficient clearances for this voltage or installation of cover-up material to minimize avian electrocution risk to perching birds. No avian electrocution risk would apply to the 7.05 mi (11.35 km) of 230kV transmission line connecting the Project substations to the interconnection to the electric grid. A perching bird's dimensions are integral in assessing the potential for it to make phase-to-phase (i.e., energized-to-energized) or phase-to-ground (i.e., energized-to-ground or to a neutral) contact on a power line structure. For 230kV voltage, the required clearances from the National Electrical Safety Code will far exceed the recommended clearances for birds. The suggested clearances for birds on 230kV voltage includes 94 inches (in; 237 centimeters [cm]) horizontal and 74 in (187 cm) vertical for phase-to-phase and 75 in (189 cm) horizontal and 55 in (139 cm) vertical for phase-to-ground.

Avian collision risk with overhead lines is not uniform. Determining the relative risk or exposure to birds is generally governed by the type of electrical infrastructure in proximity to bird species potentially present and site-specific factors, such as habitat, line orientation relative to use areas, topography, weather, bird morphology, flight characteristics, and level of human influences. Proximity of power lines to locations where birds are landing or taking off is important in assessing the potential collision risk or exposure, particularly during daily movements and migration (APLIC 2012). Upon siting the aboveground 34.5kV collector lines and 230kV transmission lines, MVE will assess whether an avian collision risk assessment is warranted, based on line location relative to areas that may attract concentrated bird use. If applicable, this risk assessment would be completed in accordance with APLIC guidelines (2012).

Table 10. Avian species of concern at the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho, and the associated number of fatalities recorded at multiple spatial scales in the US.[1]

Species	Scientific name	Idaho	BCR 9	USFWS Pacific Region[1]	North American Deserts	US
American white pelican[2]	*Pelecanus erythrorhynchos*	0	0	0	0	12
bald eagle	*Haliaeetus leucocephalus*	1	1	3	1	55
black rosy-finch	*Leucosticte atrata*	1	1	1	1	1
black tern	*Chlidonias niger*	0	0	0	0	1
black-throated sparrow	*Amphispiza bilineata*	0	1	1	3	4
Bobolink	*Dolichonyx oryzivorus*	0	0	0	0	28
burrowing owl[2]	*Athene cunicularia*	0	0	0	3	25
California gull[2]	*Larus californicus*	0	0	0	0	1
Caspian tern	*Hydroprogne caspia*	0	0	0	1	1
Cassin's finch	*Haemorhous cassinii*	0	0	0	1	2
Clark's grebe	*Aechmophorus clarkii*	0	0	0	2	2
Columbian sharp-tailed grouse	*Tympanuchus phasianellus*	1	1	1	1	11
common loon	*Gavia immer*	0	0	0	0	1
common nighthawk[2]	*Chordeiles minor*	0	9	9	11	57
eared grebe	*Podiceps nigricollis*	5	7	5	13	22
ferruginous hawk[2]	*Buteo regalis*	0	3	5	7	23
flammulated owl	*Psiloscops flammeolus*	0	0	0	1	2
Franklin's gull	*Leucophaeus pipixcan*	0	0	0	0	1
golden eagle[2]	*Aquila chrysaetos*	2	8	15	14	117
grasshopper sparrow[2]	*Ammodramus savannarum*	0	1	1	2	23
great gray owl	*Strix nebulosa*	0	0	0	0	0
greater sage-grouse[2]	*Centrocercus urophasianus*	0	0	0	2	4
green-tailed towhee[2]	*Pipilo chlorurus*	0	0	0	7	8
lesser yellowlegs	*Tringa flavipes*	0	0	0	0	0
Lewis's woodpecker	*Melanerpes lewis*	0	0	0	0	0
loggerhead shrike[2]	*Lanius ludovicianus*	0	0	0	2	16
long-billed curlew[2]	*Numenius americanus*	0	1	1	1	3
marbled godwit	*Limosa fedoa*	0	0	0	0	0
northern goshawk	*Accipiter gentilis*	0	0	0	0	0
olive-sided flycatcher	*Contopus cooperi*	0	1	1	1	2
peregrine falcon	*Falco peregrinus*	0	0	0	0	6
ring-billed gull	*Larus delawarensis*	0	4	4	4	26
sage thrasher[2]	*Oreoscoptes montanus*	0	2	2	3	5
sagebrush sparrow[2]	*Artemisiospiza nevadensis*	0	1	1	3	4
sandhill crane[2]	*Antigone canadensis*	0	0	0	0	2
short-eared owl[2]	*Asio flammeus*	0	9	10	12	22
trumpeter swan	*Cygnus buccinator*	0	0	0	0	0
Virginia's warbler	*Leiothlypis virginiae*	0	0	0	0	0
western grebe	*Aechmophorus occidentalis*	0	2	2	13	24
white-faced ibis	*Plegadis chihi*	0	0	0	1	1
white-headed woodpecker	*Picoides albolarvatus*	0	0	0	0	0

Table 10. Avian species of concern at the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka counties, Idaho, and the associated number of fatalities recorded at multiple spatial scales in the US.[1]

Species	Scientific name	Idaho	BCR 9	USFWS Pacific Region[1]	North American Deserts	US
willet	*Tringa semipalmata*	0	0	0	0	1
Williamson's sapsucker	*Sphyrapicus thyroideus*	0	1	1	1	1
willow flycatcher	*Empidonax traillii*	0	0	0	0	0
yellow-billed cuckoo	*Coccyzus americanus*	0	0	0	0	81

[1] Data represent unadjusted fatality counts and inform the potential species composition of fatalities that may occur at the Project. Data from the Renew database (Western EcoSystems Technology, Inc. 2019).

[2] Species observed during pre-construction surveys conducted at the Project.

BCR = Bird Conservation Region; USFWS = US Fish and Wildlife Service.

4.2.3 Indirect Impacts

Construction of the Project could result in habitat impacts that may lead to displacement of local avian species. Displacement effects are one type of indirect impact to birds caused by the avoidance of turbines or other infrastructure at WEFs. Displacement effects are defined as "the displacement of birds from areas within and surrounding wind farms due to visual intrusion and disturbance that can amount effectively to habitat loss" (Drewitt and Langston 2006). Displacement may occur during both the construction and operation of a wind project, and may be caused by the presence of the turbines and/or other disturbances such as vehicle and personnel movements, as well as noise disturbance created by blasting, equipment use, and other construction and maintenance activities.

The scale and degree of displacement effects varies according to site and species-specific factors. The scale of disturbance caused by wind projects varies greatly and is likely to depend on multiple factors, including seasonal and daily patterns of use by birds, location to important habitats, availability of alternative habitats, and turbine and wind project specifications (Drewitt and Langston 2006, Lange et al. 2018). Similarly, the degree of the behavioral responses will vary among species and individuals, and may depend on factors such as life cycle stage (e.g., wintering, molting, and breeding), flock size, and degree of habituation AWWI (2017). Research has indicated that indirect impacts of wind turbines on grassland nesting birds from displacement vary across years, species, sites, and distance from turbines (Leddy et al. 1999, Johnson et al. 2000, Erickson et al. 2004, Young et al. 2006, Shaffer and Johnson 2009, Hale et al. 2014, Hale 2016, Johnson 2016, Shaffer and Buhl 2016).

An example of a negative association between wind energy development and raptors exists from the Columbia Plateau Ecoregion. Nest success of ferruginous hawk, red-tailed hawk, and Swainson's hawk was studied in relation to wind turbine density within their home range (Kolar and Bechard 2016). Nest success for ferruginous hawk decreased in areas with greater turbine density whereas there was no effect for red-tailed hawk and Swainson's hawk. Juvenile hawks of all three species from areas of greater turbine density were more likely to die from predation or starvation after fledging than those from areas with lower turbine density. Although the authors noted the cause of this negative association was unknown, they speculated it was some combination of breeding adults colliding with turbines, disturbance from activities associated with wind energy development in the area, or displacement from portions of their home range (Kolar and Bechard 2016).

4.2.4 Summary

Although a range of direct and indirect impacts are anticipated to result from Project construction and operation, the primary impacts anticipated are those due to collisions with turbines and other Project infrastructure. The multi-scale summaries of bird fatality information from Idaho, Great Basin BCR, USFWS Pacific Region, North American Deserts, and the US provide insight into the number, species composition, and timing of turbine-related fatalities that could be expected at the Project. Information from Tier 1–3 studies also provide information on factors that may influence the likelihood of fatalities at the Project.

Pre-construction studies at the Project identified 48 species of birds in the Project area, 17 of which are species of concern. Diurnal raptor use was highest during summer and fall and was relatively consistent across survey points. No patterns of spatial or temporal use for small birds were noted. One ferruginous hawk and three burrowing owl nests were located in the Project area. Three greater sage-grouse leks were observed in the Project area.

Taking into account the information from the Tier 1–3 studies and the publicly available information on bird fatalities at WEFs, the impacts anticipated at the Project are expected to be within the range of bird fatality estimates observed in the USFWS Pacific Region and Great Basin BCR. Similarly, the species composition of fatalities and timing of fatalities for birds at the Project may be expected to be consistent with the timing of fatalities in the USFWS Pacific Region and Great Basin BCR. In all these predictions, however, there is some uncertainty because of the limited number of studies and facilities with publicly available data in Idaho. In addition, there is no fatality data available for larger turbine models (3.0 MW or larger) being considered for the Project. Impacts to avian species of concern will be minimized through the avoidance and minimization measures identified in Section 5 and measured during post-construction fatality monitoring (Section 6) for the Project.

4.3 Bats

Fourteen species of bats have geographic ranges overlapping the Project area out of 47 species in the continental US and Canada. One additional species (big free-tailed bat) not known to occur in Idaho was documented in the Project during Tier 3 surveys and was therefore included on the list of potentially occurring species (Table 11). None of these species are state or federally listed as threatened or endangered. The Project contains a moderate number of species relative to broader landscape regions in the US, and most of these species are typical of those commonly found throughout shrub-steppe and grassland habitats in the region.

Impacts to bats from the construction and operation of the Project could include both direct and indirect impacts. Potential direct impacts to bats are described below. The bat species of concern list (Table 11) was developed based on WEST's review of the BLM sensitive species list in Idaho (BLM 2014), the Idaho Species of Greatest Need (IDFG 2016, 2021), International Union for

Conservation of Nature (IUCN 2017), along with species of concern identified during Tier 1, 2, or 3 reports. Thirteen of the 15 bat species that could occur within the Project were documented during pre-construction surveys at the Project (Table 11).

Table 11. Bat species with the potential to occur at the Lava Ridge Wind Project, Lincoln, Jerome, and Minidoka Counties, Idaho.

Common Name	Scientific Name	Status[1]	Documented as a Fatality at WEFs[2]
big brown bat[3]	*Eptesicus fuscus*	BLMSS	Yes
big free-tailed bat[3]	*Nyctinomops macrotis*	None	Yes
California myotis[3]	*Myotis californicus*	BLMSS	Yes
canyon bat[3]	*Parastrellus hesperus*	BLMSS	Yes
fringed myotis	*Myotis thysanodes*	BLMSS	No
hoary bat[3]	*Lasiurus cinereus*	BLMSS, SGCN Tier II	Yes
little brown myotis[3]	*Myotis lucifugus*	BLMSS, SGCN Tier III	Yes
long-legged myotis[3]	*Myotis volans*	BLMSS	Yes
pallid bat[3]	*Antrozous pallidus*	BLMSS	No
silver-haired bat[3]	*Lasionycteris noctivagans*	BLMSS, SGCN Tier III	Yes
spotted bat	*Euderma maculatum*	BLMSS	No
Townsend's big-eared bat[3]	*Corynorhinus townsendii*	BLMSS, SGCN Tier III	No
western long-eared myotis[3]	*Myotis evotis*	BLMSS	Yes
western small-footed myotis[3]	*Myotis ciliolabrum*	BLMSS, SGCN Tier III	Yes
Yuma myotis[3]	*Myotis yumanensis*	BLMSS	Yes

[1] SGCN = Species of Greatest Conservation Need in Idaho; Tier I species are the highest priority, Tier II species are secondary priority, Tier III species are lowest priority (IDFG 2016). BLMSS = BLM Sensitive Species (BLM 2014).

[2] Species with documented fatalities at wind energy facilities in the US (WEST 2019, IDFG 2020).

[3] Species documented at the Project during Tier 3 studies.

4.3.1 Direct Impacts

Collision fatalities at WEFs are considered to be one of the greatest threats to bat populations in North America (O’Shea et al. 2016) raising concerns about cumulative impacts on bat populations (Arnett et al. 2016, Frick et al. 2017). Most species of bats have low reproductive rates, increasing their potential for population-level impacts.

Arnett et al. (2016) conducted a global review and summarized that the characteristics of species (i.e., aerial hawking and relatively fast-flying, open-air species) most often killed at wind energy developments was consistent across North America, Mexico, and Europe. The primary cause of bat fatalities at WEFs are collisions with moving turbine blades (Grodsky et al. 2011, Rollins et al. 2012) and 27 of 47 bat species in the continental US and Canada have been found as fatalities at WEFs (e.g., AWWI 2018, WEST 2019, IDFG 2020, R. Dixon, IDFG, pers. comm. 2021). It is unknown why bats regularly fly in close proximity to operating wind turbines (Cryan and Barclay 2009) although many of the hypotheses consider that at least some bat species may be attracted to turbines (Barclay et al. 2017).

Fatality Estimates

The AWWI (2018, 2020) has compiled publicly available data from WEFs in the US and adjusted bat fatality estimates range from less than one to 50 bats/MW/year. The median adjusted fatality estimate was 2.6 (AWWI 2018, 2020).

Based on studies in the Renew database (WEST 2019) overall bat fatality estimates ranged from zero to 40.20 fatalities/MW/year in the US. Across all spatial scales, median and mean estimates ranged from 1.18 to 7.40 (median) and 1.46 to 7.40 (mean; Table 12). Fatality estimates from scales with low sample sizes (e.g., Idaho) should be interpreted with caution.

Table 12. Summary of fatality estimates for bats from multiple spatial scales in the US.[1]

	Fatality estimate (bats/MW/year)					
Spatial Scale	**Min**	**Max**	**Median**	**Mean**	**Facilities[2]**	**Studies[3]**
Idaho	7.40	7.40	7.40	7.40	1	3
USFWS Pacific Region	0.08	7.40	1.30	1.48	23	33
North American Deserts	0.00	7.40	1.18	1.46	37	49
US	0.00	40.20	2.18	6.16	114	164

[1] Data on fatalities from the Renew database (Western EcoSystems Technology, Inc. 2019).

[2] Facilities are individual wind projects.

[3] Studies can be repeated at individual projects by sampling different years.

USFWS = US Fish and Wildlife Service.

The Horse Butte wind facility reported bat fatality estimates of 5.12, 7.80, and 9.27 bat fatalities/MW/year across three years of study (SWCA 2015). Cattle grazing, grassland/herbaceous and hay/pasture, as well as sagebrush-steppe habitat are prevalent at both Horse Butte and the Project, although Horse Butte also includes forested habitat and riparian areas, which could provide roosting habitat. Roosting habitat within the Project is limited, although foraging habitat (open canal features) are present.

Species Composition

To date, post-construction monitoring studies at WEFs show migratory tree-roosting species (e.g., eastern red bat [*Lasiurus borealis*], hoary bat, and silver-haired bat) compose approximately 78% of reported bat fatalities. The majority of fatalities occur during the fall migration season (July through October), and most fatalities occur on nights with relatively low wind speeds (e.g., less than 6.0 meters per second; Arnett et al. 2008, Arnett and Baerwald 2013, Arnett et al. 2013, WEST 2019).

According to AWWI (2018), the percentage of fatalities from hoary bat (31.0%), eastern red bat (24.0%), silver-haired bat (16.1%), Mexican free-tailed bat [*Tadarida brasiliensis*]; 10.0%), and four additional species (little brown myotis [5.1%], big brown bat [5.0%], tri-colored bat [*Perimyotis subflavus*; 1.7%], and evening bat [*Nycticeius humeralis*; 1.6%]) collectively account for more than 95% of all recorded bat fatalities in the US.

Nine of the 17 species of bats in the USFWS Pacific Region have been recorded as fatalities at WEFs with the top five species including the hoary bat, silver-haired bat, little brown myotis, big brown bat, and western small-footed myotis (WEST 2019). Nine species of bat in Idaho have also been recorded as fatalities from three WEFs in eastern Idaho, with the top four species including the hoary bat (46.2%), silver-haired bat (29.3%), big brown bat (12.9%), and little brown myotis (5.0%; IDFG 2020, Table 13). At the Horse Butte wind facility, the dominant species of fatalities were hoary bat (49%) and silver-haired bat (42%), followed by unidentified bats (5%), big brown bat (2%), and western small-footed myotis (2%; SWCA 2015).

In the Pacific Northwest, Rodhouse et al. (2019) found evidence of a region-wide decline for the hoary bat during summer since 2010, and suggested that this decline is consistent with the hypothesis that the longer duration and greater geographic extent of the wind energy stressor have impacted this species. Similarly, Frick et al. (2017) used expert elicitation and population projection models to suggest that wind energy development could pose a substantial threat to populations of hoary bats in the next several decades.

<u>Temporal Patterns of Fatalities</u>

Temporal patterns at multiple spatial scales show peak bat fatalities for migratory tree bats and all bats during the late summer and fall migration seasons (Figure 15, WEST 2019). Although fatality patterns from scales with low sample sizes (e.g., Idaho) should be interpreted with caution, the pattern for Idaho is quite consistent with all other scales based on the available data (Figure 15).

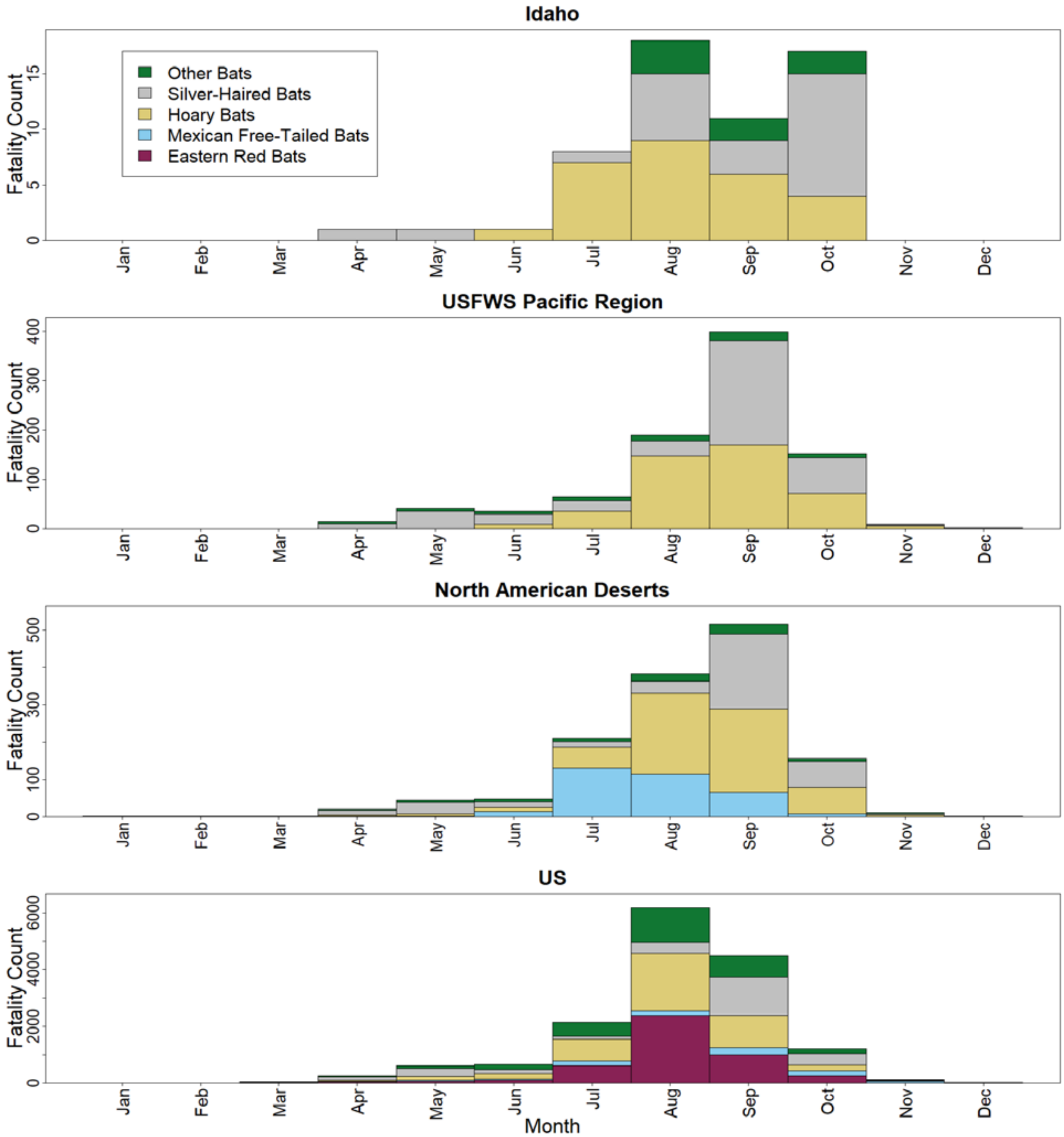


Figure 15. Bat fatality counts from multiple spatial scales in the US.

<u>Species of Concern</u>

Fifteen bat species of concern have the potential to occur in the Project (Table 13), and all except fringed myotis, pallid bat, spotted bat, and Townsend's big-eared bat have been recorded as fatalities at WEFs at multiple spatial scales of interest in the US (WEST 2019, AWWI 2019; Table 12, 13). Hoary bat, silver-haired bat, and western small-footed myotis were recorded as fatalities at the Horse Butte wind facility in Idaho (SWCA 2015).

Fatality patterns for species of concern, including migratory tree bats (hoary bat, silver-haired bat) and all bats (Table 13), are best characterized by the USFWS Pacific Region and North American Deserts ecoregion scales because of the low samples sizes from Idaho (Figure 13). Migratory tree bat fatalities occur most frequently during July through October, which is consistent with the timing of peak activity (September) at the Project (Bishop-Boros and McCormack 2021), therefore the timing of peak activity for migratory tree bats may be expected to encompass the timing of most bat fatalities at the Project. The Project is at least 11.0 mi (17.7 km) from Craters of the Moon National Monument and Preserve that contains the nearest maternity colony of Townsend's big-eared bat. Impacts to this species are not expected based on the lack of fatalities in the US and its foraging behavior at low altitudes. The limited number of studies and facilities with publicly available data in Idaho adds uncertainty to the timing and magnitude of fatality predictions for bat species of concern in Idaho.

Table 13. Bat species of concern at the Lava Ridge Wind Project in Lincoln, Jerome, and Minidoka Counties, Idaho and their associated number of fatalities from multiple spatial scales in the US.[1]

Species	Scientific name	Idaho	USFWS Pacific Region	North American Desert	US
big brown bat[2]	*Eptesicus fuscus*	1	9	19	1,190
big free-tailed bat[2]	*Nyctinomops macrotis*	0	0	6	8
California myotis[2]	*Myotis californicus*	0	0	1	2
canyon bat[2]	*Parastrellus hesperus*	0	0	0	1
fringed myotis	*Myotis thysanodes*	0	0	0	0
hoary bat[2]	*Lasiurus cinereus*	27	487	702	6,914
little brown myotis[2]	*Myotis lucifugus*	0	18	18	1,046
long-legged myotis	*Myotis volans*	0	0	0	0
pallid bat	*Antrozous pallidus*	0	0	0	0
silver-haired bat[2]	*Lasionycteris noctivagans*	23	432	424	4,149
spotted bat	*Euderma maculatum*	0	0	0	0
Townsend's big-eared bat	*Corynorhinus townsendii*	0	0	0	0
western long-eared myotis[2]	*Myotis evotis*	0	0	0	1
western small-footed myotis[2]	*Myotis ciliolabrum*	1	1	1	1
Yuma myotis	*Myotis yumanensis*	0	0	0	0

[1] Data represent unadjusted fatality counts and inform the potential species composition of fatalities that may occur at the Project. Data from the Renew database (Western EcoSystems Technology, Inc. 2019).

[2] Species documented as a fatality at wind energy facilities in the US (WEST 2019).

USFWS = US Fish and Wildlife Service.

Sources: WEST 2019, IDFG 2020.

4.3.2 Indirect Impacts

Understanding how wind energy development could affect bats through indirect effects such as disturbance or displacement is limited by the lack of knowledge on this topic (Kunz et al. 2007). Potential bat roosting habitat within the Project area includes four potentially suitable caves, exposed rocks along eroded lava tubes, piles of lava rocks, human-made structures (e.g., buildings, stock pumps, maintenance sheds, and culverts), and crevices and cracks in cliffs. The extent that bats use this potential habitat for roosting is largely unknown at the Project, although a field assessment conducted for lava features and caves for the Project determined that lava tubes evaluated are eroded and unlikely to provide habitat for roosting bats. In addition, two known caves within the Project, Kimama and Wilson, were found to already be heavily disturbed by human activity. Any bats roosting in the Project area may be temporarily disturbed by human activities and it is not anticipated that operation of the Project would permanently disturb or displace bats.

4.3.3 Summary

The summaries of the bat fatalities that have occurred in Idaho, the USFWS Pacific Region, North American Deserts, and the US provide insight into the number, species composition, and timing of fatalities that may be expected at the Project. Information from Tier 1–3 studies also provide information on factors that may influence the likelihood of fatalities at the Project.

Acoustic monitoring studies at the Project identified 13 species of bats in the Project area, 12 of which are species of concern. Hoary bat and western small-footed myotis composed the highest number of bat passes recorded during the 2020 and 2021 acoustic studies, respectively. There was no spatial variation between the two long-term detector locations, but over half (61%) of the bat activity at the NABat detectors came from two detectors located on irrigation canals in 2020, and canal stations had higher activity again in 2021. A crater feature was added to surveys in 2021 and had the highest rates of bat activity among the 22 stations. Altitudinal variation existed among call rates, with higher bat activity at ground stations than raised stations. Although acoustic monitoring provides valuable information on the species composition and timing of activity, it does not provide the ability to predict the level of bat fatalities at WEFs (Hein et al. 2013, Solick et al. 2020b). Bat activity was lowest during spring and summer and highest in the fall migration period.

Taking into account the information from the Tier 1–3 studies and the publicly available information on bat fatalities at WEF, the impacts anticipated at the Project are expected to be within the range of bat fatality estimates observed in the USFWS Pacific region and North American Deserts ecoregion. Similarly, the species composition of fatalities anticipated at the Project are expected to be similar to those observed in the USFWS Pacific Region, with hoary bat and silver-haired bat expected to comprise the majority of fatalities. Lastly, the timing of fatalities for migratory tree bats at the Project may be expected to be consistent with the timing of fatalities in the USFWS Pacific Region. In all these predictions, however, there is some uncertainty because of the limited number of studies and facilities with publicly available data in Idaho. Impacts to bat species of concern will be minimized through avoidance and minimization measures identified in Section 5, and evaluated during post-construction fatality monitoring (Section 6) to inform adaptive management measures (Section 7) for the Project.

5.0 AVOIDANCE AND MINIMIZATION MEASURES

The Project was sited in accordance with the WEG and ECPG to avoid and minimize impacts to environmental resources. In addition, avoidance and minimization measures will be implemented through construction and operation of the Project.

5.1 Preconstruction Siting and Design

5.1.1 Phase 1 Risk Assessment

The Project location was chosen based on the results of a Critical Issues Analysis, which indicated that sensitive resources, although present, could reasonably be avoided through careful siting of Project infrastructure. MVE considered a number of sites in Idaho for development prior to moving forward with the Project, two of which were removed from consideration based on the results of preliminary wildlife studies that indicated sensitive resources could not be reasonably avoided during development. A number of steps are being taken by MVE throughout the development process to minimize impacts to bird and bat species and their habitats that may result from the Project.

5.1.2 Turbine Siting

The locations of proposed turbines have been changed a number of times throughout Project development in response to environmental and other constraints identified during wildlife and other studies. Specific actions taken by MVE to reduce impacts to birds and bats through turbine siting include:

- All turbines were removed from within a 2-mi (3.2-km) buffer of Crater Butte, where an occupied golden eagle nest is located. Due to additional considerations, the nest is greater than 4.0 miles from the Project.
- Turbines were removed within the 1-mi disturbance buffer of an occupied ferruginous hawk nest.
- The Project layout was revised to remove all Project infrastructure on BLM-managed lands within a 3.1-mi buffer of greater sage-grouse leks in compliance with the BLM's Approved Resource Management Plan Amendment, which will minimize impacts to native sagebrush habitats within the Project.
- All turbines will be sited at least 1,000 feet from irrigation canals to minimize impacts to bats and avian species attracted to such features.
- Roads, turbine pads, and other Project infrastructure were designed to utilize existing roads to the extent feasible to minimize habitat impacts and reduce habitat fragmentation and wildlife displacement.
- Conservation easements and protected lands have been avoided. Impacts to wetlands and other waters were avoided to the greatest extent practicable.
- Permanent and free-standing met towers were sited to avoid sensitive habitats and areas where ecological resources known to be sensitive to human activities were present.

5.1.3 Turbine Design

- Turbine towers have been designed and will be constructed to discourage bird nesting and wildlife attraction.

5.1.4 Lighting

- All unnecessary lighting at the Project will be deactivated at night to limit wildlife attraction, particularly migratory birds.
    - Aviation hazard lighting complies with Federal Aviation Administration (FAA) requirements and strobed, minimum-intensity red lights will be installed on turbines at the Project, as recommended by the FAA and in the WEG (USFWS 2012) to avoid attracting birds or bats. With FAA approval, MVE will deploy an aircraft detection lighting system ("ADLS") to mitigate the need for continuous operation of the red flashing lights during night-time hours. See Section 2.11 of the Plan of Development for further information regarding ADLS systems.
- Motion detectors or timers and hoods will be installed on exterior lights at the O&M building and substation to minimize skyward light.
- Turbine doors will not have exterior lights installed at the entrance.

5.1.5 Collector and Transmission Lines

- The Project substations will be monitored occasionally for any potentially unusual wildlife impacts.
- Where practicable, collection lines will be installed underground to minimize eagle collision and electrocution risk associated with aboveground lines. All transmission lines and collector lines will be designed and constructed in compliance with APLIC guidelines (APLIC 2006, 2012) in order to reduce impacts to avian species.

5.2 Construction

The following Best Management Practices (BMPs) will be incorporated into the design and construction of the Project's facilities, as relevant and applicable:

- MVE will comply with all applicable federal, state, and local environmental laws, orders, and regulations.
- Contractors will participate in training on the BMPs used to avoid and minimize impacts to environmental resources and ensure all contractor personnel receive such training. Contractor personnel will be trained to not approach or harass wildlife and to avoid all wildlife to the greatest extent possible. Additionally, personnel will be trained to minimize activities that attract wildlife. Interpretation for non-English speaking workers for all training materials will be provided. The names of on-site personnel who participate in the trainings will be kept in the Project's field office.
- Tree or native vegetation clearing will occur outside the migratory bird nesting season as listed in Table A1 of Appendix P of the POD, to the extent practicable, considering issues such as critical path construction tasks, continuous operations such as concrete pours, and worker safety. Tree or vegetation clearing conducted during the nesting season will be done under the supervision of a compliance monitor to who will identify nests for avoidance prior to construction.

- Contractor will be instructed to notify the designated development personnel for any injured animals and all carcasses discovered on-site during construction activities.
- A Storm Water Pollution Prevention Plan will be prepared for the Project. The plan will include standard sediment control devices (e.g., silt fences, straw bales, netting, soil stabilizers, check dams) to minimize soil erosion during construction and will provide measures to stabilize disturbed areas once construction is completed.
- Storm water management practices will be implemented to minimize open water resources that may attract birds and bats.
- All water features that are part of the Project will have bird ladders to minimize effects on migratory birds.
- Existing trees, vegetation, water resources, and wildlife habitat will be protected and preserved to the extent practical.
- If feasible, existing roads and previously disturbed areas will be used during construction to minimize impacts to native habitat.
- Speed limits will be set to ensure safe and efficient traffic flow. Project personnel are required to drive 25 mph or less on non-public Project roads, be alert for wildlife, and use additional caution in low-visibility conditions when driving any vehicle
- Any garbage/waste observed will be collected and disposed of in an appropriate trash receptacle securely protected from wildlife.
- Spark arrestors will be used on any power equipment (ATVs, chainsaws, and other such equipment) and maintained fire extinguishers will be in all on-site service vehicles.
- The establishment and spread of invasive species and noxious weeds within the Project area will be reduced through implementing the Noxious Weed Plan for the Project.
- MVE will use free standing structures where possible, to limit the use of guy wires. Where guy wires are necessary and appropriate, bird collision diverters would be used, if doing so would not cause a human safety risk.
- Avian diverters will be installed and maintained on all guy wires/lines of all existing or any new temporary meteorological (MET) towers, and appropriate guy guards would be installed at the base of the guy wires.
- Avian diverters will be installed and maintained on all guy wires for tubular guyed-V transmission structures located within 3.1 miles of a lek.
- Project activities will be located outside of 3.1 miles of known leks to ensure there will be no repeated or sustained behavioral disturbance (e.g., visual, noise over 10 dbA at lek, etc.) to lekking birds from 6:00 pm to 9:00 am within 2 miles (3.2 km) of leks during the lekking season.
- MVE will install the minimum amount of fencing needed to ensure the safety and security of Project features and to provide for mitigation of impacts to grazing operations.

- When practicable for collector lines, MVE will use tubular structures to reduce ability of birds to perch and to reduce risk of collision.
- MVE shall determine the presence of active raptor nests (i.e., raptor nests used during the breeding season). Measures to reduce raptor use at a project site shall be considered.
- MVE will avoid construction within species-specific time constraints and nest buffers for all sensitive species raptors, BLM special status bird species, and other migratory birds as further detailed in Appendix P of the POD. If seasonal nest restrictions cannot be applied for construction activities, a biological monitor would monitor the nesting birds. If construction activities appear to agitate the birds (as evidenced by alarm calls or disruption of normal nesting activities [i.e., incubating or feeding young]), construction activities would cease within the previously identified buffers until the nest has fledged or failed from natural causes.
- MVE will conduct pre-construction pedestrian or aerial nest surveys in suitable habitat during the appropriate nesting time periods needed to identify new raptor nest locations, and to establish the status of previously identified raptor nests.
- MVE will conduct clearance surveys and establish non-disturbance buffers for migratory bird nests prior to construction in accordance with POD Appendix P.

5.3 Operations and Maintenance

The following BMPs will be implemented during the O&M phase of the Project, as relevant and applicable:

5.3.1 Operational Procedures

<u>Facility Operation</u>

MVE will feather the turbine blades when wind speeds are below the manufacturer's cut-in speed, which will significantly reduce rotational speed during periods when the turbines are not generating power.

<u>General Measures</u>

- MVE and its contractors are committed to compliance with all applicable federal, state, and local environmental laws, orders, and regulations.
- Maintenance vehicle movement will be restricted to pre-designated access, Project personnel or contractor-required access, or public roads. If feasible, existing roads and previously disturbed areas will be used during operation and maintenance to minimize impacts to native habitat.
- All personnel will obey posted speed limits (25 mph or less) on Project roads.
- Birds and bats discovered on-site will be addressed in conformance with the Project's post-construction monitoring protocol.
- Any deterrent devices designed and installed on the Project's power line infrastructure will be maintained as part of the standard O&M plans.

- A carcass removal protocol with be established with site personnel and private landowners. Site personnel will be instructed to look for carcasses or animal behavior suggesting a carcass is present. All dead medium to large-sized animals found will be disposed of within 48 hours outside the line-of-sight of turbines. An agreement will be made with private landowners to ensure all livestock carcasses are removed. If not possible to remove a carcass, it will be covered to prevent scavenging.
- Natural material (e.g. woody debris) and tall vegetation (i.e. tall forbs, grass, and weeds) will be removed/maintained within 10 meters of the base of each turbine to reduce shelter and forage for small mammals. All Project-related materials, parts, and equipment must be stored in designated storage areas.

5.3.2 Training

- All contract operations personnel will be provided training on practices to be used to avoid and minimize impacts to wildlife and other biological resources by MVE and/or competent contractor personnel. This training will include identification of potential wildlife conflicts and the proper response, sensitivity to birds and other wildlife, and education on wildlife laws. Training will be conducted at least once every three years.
- Operations personnel will be trained to document bird or bat casualties observed during routine maintenance work and at other times that they are within the Project area.
- All operations personnel will be directed to extinguish nighttime exterior lights at the Project when not in use and when not needed to ensure security, and operations personnel will be briefed on the importance of minimizing nighttime light use at the Project.

6.0 TIER 4 – POST-CONSTRUCTION AVIAN AND BAT MONITORING

6.1 Fatality Monitoring Procedures

The goals of post-construction monitoring (PCM) are to estimate bird and bat fatality rates at the Project turbines, evaluate the circumstances under which fatalities occur, and provide an efficient, long-term survey protocol for detecting large-bird (e.g., large raptor, vulture, eagle) carcasses that may occur over the life of the Project. PCM results will be used to inform the need for adaptive management, described in Section 7. In accordance with the WEG (USFWS 2012), the Project will analyze bird and bat carcass monitoring data to accomplish the following:

- Estimate bird and bat fatality rates for the Project
- Evaluate the distribution of bird and bat carcasses within the Project in relation to site characteristics
- Compare estimated fatality rates at the Project to fatality rates at existing projects in similar landscapes with similar species composition
- Assess whether fatality data suggest the need for measures to reduce impacts

Standardized carcass surveys will include four primary components:

1) Standardized carcass surveys
2) Searcher efficiency trials
3) Carcass persistence trials
4) Adjusted fatality estimates

Standardized carcass surveys will be conducted for a minimum of two years. Standardized circular search plots will be established at 1/3 of Project turbines, and would have a radius at least half the height of the turbine. The search plot radius would be determined based on available carcass density distribution models (i.e. Hull and Muir, Hallingstad et. al) to minimize area correction (which accounts for the probability of carcasses falling outside of the search plot). Search interval will be a minimum of 14 days and may be adjusted by season and in response to carcass persistence trial results to achieve a detection probability that will provide robust fatality estimates.

While all fatalities found at the site will be recorded, only fatalities found during standardized searches within search plots will be included in the PCM analysis, which will be conducted using peer-reviewed fatality models such as GenEst (a generalized estimator of fatality; Dalthorp et al. 2018, Simonis et al. 2018), or the Huso estimator (Huso et al. 2018). Searcher efficiency and carcass persistence trials will be conducted for small birds, large birds, and bats using representative carcasses for each size class. The results of fatality searches and trials, along with an area correction factor that accounts for carcasses that may fall outside of search plots, will be incorporated into fatality estimates. Methods will be designed to provide estimates with confidence intervals comparable to other PCM studies, to allow comparison of fatality rates with other wind projects.

6.2 Monitoring of Live Wildlife

The goal of monitoring of live wildlife would be to provide post-construction data on use of the Project area by wildlife species of concern. Incidental observations of wildlife species of concern and nesting raptors, including new nests that may be constructed within the Project area, will be recorded during post-construction fatality monitoring studies. Wildlife species of concern will include those listed as BLMSS and SGCN.

6.3 Long-term Monitoring

MVE will implement a Wildlife Incidental Reporting Strategy (WIRS) for the life of the Project (Appendix M-a). The purpose of the WIRS procedure is to standardize and describe the actions taken by Project personnel in response to wildlife incidents found at the Project. The Project will record all dead or injured birds and bats found incidentally in the Project over the entire life of the Project.

Following the completion of standardized fatality monitoring, assuming no further monitoring is required under adaptive management (Section 7.0), MVE will continue with their internal WIRS monitoring program to monitor for and document significant events. Each incident will be documented on a data sheet, logged in a tracking spreadsheet, reported to the designated Environmental Affairs contact, and reviewed periodically by MVE.

6.4 Permits and Wildlife Handling Procedures

6.4.1 Permits

MVE plans to obtain federal and state wildlife collection permits for handling carcasses. Carcasses will be handled in accordance with the applicable permits.

6.4.2 Wildlife Handling Procedures

All carcasses identified will be reported to the site manager within 8 hours of discovery and removed from the site (i.e., beyond line-of-sight of Project infrastructure) within 48 hours of notification or upon receiving permission by the property/animal owner if applicable. If it is not possible to remove a carcass, it must be covered to prevent scavenging. If an injured bird or bat is found, MVE will contact the appropriate authorities and/or wildlife rehabilitator.

6.5 Reporting

An annual PCM report will be prepared at the conclusion of each year of standard PCM, and provided to USFWS, BLM, and IDFG for review. In addition, reporting of fatalities will be conducted on an annual basis per conditions of an eagle take permit and any other applicable permits acquired for carcass collection.

7.0 ADAPTIVE MANAGEMENT

The goals of adaptive management are to enable the incorporation of results from the post-construction fatality monitoring, O&M incidental reporting, industry research, and new regulatory developments into the Project's bird and bat avoidance and minimization strategy. MVE will coordinate with the USFWS, BLM, IDFG, and Idaho Office of Species Conservation to determine whether adaptive management measures are necessary and appropriate to address impacts based on the results of PCM studies, which will be conducted to estimate avian and bat mortalities at the Project. In the instance that the results of the Tier 4 studies indicate fatalities above acceptable mortality levels, adaptive management measures will be considered to further avoid, minimize, or compensate for significant unanticipated Project impacts to wildlife. Thresholds for considering an adaptive response may include:

- Levels of mortality for a particular bird or bat species of concern that could result in population-level impacts as determined through consultation between MVE, USFWS, and BLM based on best available science; or
- ”Mass casualty” events where more than 10 fatalities are recorded at a turbine during a single search.

If the above levels of mortality are exceeded, post-construction monitoring data will be further evaluated to determine if the probable cause of the mortality is associated with collision with wind turbine blades or possible other causes (e.g., predation), evaluate if the primary species being impacted are of conservation concern, and whether feasible mitigation options are available to reduce impacts. Conservation benefits realized from existing mitigation commitments from MVE as outlined in Appendices T (Eagle Conservation Plan) and U (Greater Sage Grouse Mitigation Plan) will also be considered in the evaluation of impacts for their benefit to species of concern beyond those targeted for mitigation. Additional on-site studies may be considered to further understand impacts before mitigation options are implemented, such as focused avian surveys, site evaluations of potential attractants (i.e., prey base, perching substrate), more intensive fatality monitoring studies, or other focused studies. Adaptive management options that MVE will consider, depending on the results of the post-construction mortality monitoring and taking into account economic feasibility, include, but are not limited to, the following:

- Addition or modification of anti-perching, anti-nesting, or electrocution protection devices on project facilities;
- Providing physical samples to the U.S. Geological Survey or other agencies interested in analyzing such samples;
- Providing funding for research or conservation efforts to be implemented for the benefit of impacted species;
- Installation of bat deterrents at selected turbines (such as those commercially available from NRG Systems, https://www.nrgsystems.com/products/bat-deterrent-systems) based on the most effective options available at the time of implementation;
- Development of a strategic curtailment program, with operational adjustments as further defined below; and,
- Any additional mitigation measures which may be required under the adaptive management framework implemented per the Eagle Take Permit conditions from USFWS.

A strategic curtailment plan will be considered in the instance other adaptive management measures are insufficient to reduce impacts below acceptable thresholds, and only if such efforts are demonstrated to be cost-effective relative to other mitigation measures. The goal of a strategic curtailment plan would be to develop a cost-effective strategy to reduce fatalities, with the understanding that curtailment aimed to reduce impacts to a specific species or group would result in reduced impacts of all bird and bat species to varying degrees. For example, curtailment implemented in response to eagle fatalities would also reduce collision risk for other birds and bats.

Strategic curtailment procedures would focus on periods and locations of peak risk to birds and bats based on the results of post-construction monitoring. Curtailment strategies to be considered by MVE include, but will not be limited to, the following:

- An operational curtailment strategy, which would involve feathering turbine blades within wind speed ranges defined based on species of concern, to be implemented during peak migratory periods at locations shown to significantly contribute to fatalities. Peak periods and locations would be identified based on post-construction fatality monitoring results, acoustic monitoring data, and/or radar studies;

    - A model-driven curtailment (MDC) strategy, which would be developed based on correlations between bat activity and weather conditions and implemented during peak risk periods at locations significantly contributing to fatalities. Predictive models would be developed using acoustic data, in conjunction with meteorological data collected as part of standard operations. Bat acoustic data would be analyzed in relation to date, time and weather data to determine patterns of bat activity. Weather conditions to be included in the model would be wind speed, air temperature, wind direction, change in barometric pressure, and precipitation. MDC strategies assume integration with turbine operation systems will be possible with the turbine type selected for the Project; or

- An informed curtailment strategy implemented during peak risk periods at locations significantly contributing to fatalities, whereby turbine curtailment would be manually or automatically triggered when an observation of eagles or other raptor species of concern are made by biological monitors, on-site personnel, or commercially available and effective detector systems.

MVE will rely on additional specific, targeted monitoring studies to measure the effectiveness of adaptive management measures and modify or discontinue measures as appropriate based on monitoring results. The results of such additional monitoring studies would be submitted to USFWS, BLM, and IDFG in accordance with Section 6.5 above, and MVE would continue to implement adaptive management measures in coordination with the agencies as needed to reduce Project impacts.

8.0 KEY RESOURCES

Resource	Contact Information
US Fish and Wildlife Service **Pacific Region (Region 1)** **Eastside Federal Complex** 911 N.E. 11th Ave. Portland, OR 97232-4181	https://www.fws.gov/pacific/ecoservices/endangered/index.html
US Department of Interior **Bureau of Land Management** **Shoshone Field Office** 400 West F Street Shoshone, Idaho 83352	https://www.fws.gov/le/ 208-732-7200
Idaho Fish and Game Boise, ID 83709	208-378-5243 http://www.fws.gov/idaho/ ifwo@fws.gov
NEPA	NA
Magic Valley Energy, LLC 16150 Main Circle Drive, Suite 310 Chesterfield, MO 63017	636-532-2200
Wildlife Rehabilitators **Earthfire Institute**	208-456-0926 https://earthfireinstitute.org/wildlife-rehabilitation/
Operations and Maintenance	TBD

9.0 REFERENCES

9.1 Acts, Laws, Regulations

16 United States Code (USC) §§ 1531-1544. 1973. Title 16 - Conservation; Chapter 35 - Endangered Species; Sections 1531-1544. 16 USC 1531-1544. Available online: https://www.fws.gov/le/USStatutes/ESA.pdf

16 United States Code (USC) §§ 703-711. 1918. Title 16 - Conservation; Chapter 7 - Protection of Migratory Game and Insectivorous Birds; Subchapter II - Migratory Bird Treaty; Sections (§§) 703-711. 16 USC 703-711. Available online: http://www.gpo.gov/fdsys/pkg/USCODE-2010-title16/pdf/USCODE-2010-title16-chap7-subchapII.pdf

Bald and Golden Eagle Protection Act (BGEPA). 1940. 16 United States Code (USC) Section (§) 668-668d. Bald Eagle Protection Act of 1940, June 8, 1940, Chapter 278, § 2, 54 Statute (Stat.) 250; Expanded to include the related species of the golden eagle October 24, 1962, Public Law (PL) 87-884, 76 Stat. 1246. [as amended: October 23, 1972, PL 92-535, § 2, 86 Stat. 1065; November 8, 1978, PL 95-616, § 9, 92 Stat. 3114.].

Endangered Species Act (ESA) § 9. 1973. Section 9 - Prohibited Acts. [As amended by Public Law (PL) 94-325, June 30, 1976; PL 94-359, July 12, 1976; PL 95-212, December 19, 1977; PL 95-632, November 10, 1978; PL 96-159, December 28, 1979; PL 97-304, October 13, 1982; PL 98-327, June 25, 1984; and PL 100-478, October 7, 1988; PL 107-171, May 13, 2002; PL 108-136, November 24, 2003.].

Idaho Administrative Code 13.01.06. 2016. IDAPA 13 Administrative Rules - Department of Fish and Game; Title 1; Chapter 6; 13.01.06 - Rules Governing Classification and Protection of Wildlife. Available online: https://adminrules.idaho.gov/rules/2016%20Archive/13/0106.pdf

Idaho Legislation. 2020. Idaho Statutes. Title 36-104 Fish and Game. Chapter 1 Fish and Game Commission. Boise, Idaho.

Idaho Legislation. 2020. Idaho Statutes. Title 36-201 Fish and Game. Chapter 1 Fish and Game Commission. Boise, Idaho.

Migratory Bird Treaty Act (MBTA). 1918. 16 United States Code (USC) Sections (§§) 703-712. July 13, 1918.

9.2 Literature Cited

Allison, T. D., J. E. Diffendorfer, E. F. Baerwald, J. A. Beston, D. Darake, A. M. Hale, C. D. Hein, M. M. Huso, S. R. Loss, J. E. Lovich, M. D. Strickland, K. A. Williams, and V. L. Winder. 2019. Impacts to Wildlife of Wind Energy Siting and Operation in the United States. Ecological Society of America, Issues in Ecology. Report Number 21. Fall 2019. Available online: https://www.esa.org/wp-content/uploads/2019/09/Issues-in-Ecology_Fall-2019.pdf

American Wind Wildlife Institute (AWWI). 2018. Bats and Wind Energy: Impacts, Mitigation, and Tradeoffs. AWWI, Washington, D. C. November 15, 2018. Available online: https://awwi.org/wp-content/uploads/2018/11/AWWI-Bats-and-Wind-Energy-White-Paper-FINAL.pdf

American Wind Wildlife Institute (AWWI). 2019. AWWI Technical Report: A Summary of Bird Fatality Data in a Nationwide Database. AWWI, Washington, D. C. February 25, 2019.

American Wind Wildlife Institute (AWWI). 2020. Wind Turbine Interactions with Wildlife and Their Habitats: A Summary of Research Results and Priority Questions. Last updated with latest publicly available information July 2020. Available online: https://awwi.org/wp-content/uploads/2020/07/AWWI-Wind-Power-Wildlife-Interactions-Summary-2020.pdf

Arnett, E. B., K. Brown, W. P. Erickson, J. Fiedler, B. L. Hamilton, T. H. Henry, A. Jain, G. D. Johnson, J. Kerns, R. R. Koford, C. P. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersley, Jr. 2008. Patterns of Bat Fatalities at Wind Energy Facilities in North America. Journal of Wildlife Management 72(1): 61-78.

Arnett, E. B. and E. F. Baerwald. 2013. Impacts of Wind Energy Development on Bats: Implications for Conservation. Pp. 435-456. In: R. A. Adams and S. C. Pederson, eds. Bat Ecology, Evolution and Conservation. Springer Science Press, New York.

Arnett, E. B., C. D. Hein, M. R. Schirmacher, M. M. P. Huso, and J. M. Szewczak. 2013. Evaluating the Effectiveness of an Ultrasonic Acoustic Deterrent for Reducing Bat Fatalities at Wind Turbines. PLoS ONE 8(6): e65794. doi: 10.1371/journal.pone.0065794.

Arnett, E. B., E. F. Baerwald, F. Mathews, L. Rodrigues, A. Rodríguez-Durán, J. Rydell, R. Villegas-Patraca, and C. C. Voigt. 2016. Impacts of Wind Energy Development on Bats: A Global Perspective. Pp. 295-323. In: C. C. Voigt and T. Kingston, eds. Bats in the Anthropocene: Conservation of Bats in a Changing World. Springer, Cham, Switzerland.

Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Public Interest Energy Research Program (PIER) Final Project Report CEC-500-2006-022. Edison Electric Institute, APLIC, and the California Energy Commission. Washington D.C. and Sacramento, California.

Avian Power Line Interaction Committee (APLIC). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Edison Electric Institute and APLIC, Washington D.C.

Bald and Golden Eagle Protection Act (BGEPA). 1940. 16 United States Code (USC) Section (§) 668-668d. Bald Eagle Protection Act of 1940, June 8, 1940, Chapter 278, § 2, 54 Statute (Stat.) 250; Expanded to include the related species of the golden eagle October 24, 1962, Public Law (PL) 87-884, 76 Stat. 1246. [as amended: October 23, 1972, PL 92-535, § 2, 86 Stat. 1065; November 8, 1978, PL 95-616, § 9, 92 Stat. 3114.].

Barclay, R. M. R., E. F. Baerwald, and J. Rydell. 2017. Bats. Pp. 191-221. In: M. Perrow, ed. Wildlife and Wind Farms - Conflicts and Solutions, Volume 1. Onshore: Potential Effects. Pelagic Publishing, United Kingdom.

Bishop-Boros, L. and M. McCormack. 2021a. Bat Activity and North American Bat Surveys for the Lava Ridge Wind Project, Lincoln, Jerome, and Minidoka Counties, Idaho. Draft Report. April 13 – November 1, 2020. Prepared for Magic Valley Energy, LLC. Prepared by Western Ecosystems Technology, Laramie, Wyoming. April 27, 2021.

Bishop-Boros, L. and M. McCormack. 2021b. Bat Feature Evaluation, Lava Ridge Wind Project, Lincoln, Jerome, and Minidoka Counties, Idaho. Report: April 16 – 18, 2021. Prepared for Magic Valley Energy, LLC. Prepared by Western EcoSystems Technology, Inc. (WEST), Laramie, Wyoming. June 9, 2021.

Bishop-Boros, L. and K. McCormack. 2022. Year 2 Bat Acoustic Monitoring Surveys for the Lava Ridge Wind Project. Draft Report: July 7 – August 29, 2021. Prepared for Magic Valley Energy, LLC, Chesterfield, Missouri. Prepared by Western EcoSystems Technology, Inc. (WEST), Laramie, Wyoming. July 12, 2022.

Buehler, D. A. 2000. Bald Eagle (*Haliaeetus leucocephalus*), Version 2.0. P. G. Rodewald, ed. In: The Birds of North America. Cornell Lab of Ornithology, Ithaca, New York. doi: 10.2173/bna.506. Retrieved from The Birds of North America Online: http://birdsna.org/Species-Account/bna/species/baleag

Bureau of Land Management (BLM). 2014. Bureau of Land Management - Idaho Species Status Animal Species: 2014 Change 1. Available online: https://www.blm.gov/sites/blm.gov/files/Programs_FishandWildlife_BLMIdaho%20Special%20Status%20Species%20Animals.pdf

Bureau of Land Management (BLM). 2020a. Migratory Bird Planning Guidance and Best Management Practices for Idaho BLM Vegetation Treatments. Final. April 6, 2020. Available online: https://www.blm.gov/sites/blm.gov/files/policies/IDIB2020-014a1.pdf

Bureau of Land Management (BLM). 2015. BLM-Idaho Special Status Animal Species: 2014. Available online: https://www.blm.gov/download/file/fid/12087

Bureau of Land Management (BLM). 2020b. Lava Ridge Wind Project Environmental Impact Statement Draft Preparation Plan. US Department of the Interior Bureau of Land Management. Shoshone, Idaho. August 2020.

Cryan, P. M. and R. M. R. Barclay. 2009. Causes of Bat Fatalities at Wind Turbines: Hypotheses and Predictions. Journal of Mammalogy 90(6): 1330-1340.

Dixon, Rita. pers. comm., Idaho Department of Fish and Game, 2020, 2021.

Drewitt, A. L. and R. H. W. Langston. 2006. Assessing the Impacts of Wind Farms on Birds. Ibis 148(S1: Wind, Fire and Water; Renewable Energy and Birds): 29-42.

eBird. 2019, 2020, 2021. Ebird: An Online Database of Bird Distribution and Abundance. eBird, Cornell Lab of Ornithology, Ithaca, New York. Accessed November 2019. Information online: http://ebird.org/content/ebird/

Electric Power Research Institute (EPRI). 2020. Relationship between Bat Fatality Rates and Turbine Size at Wind Farms across the Continental US And Southern Canada: An Investigation into the Occurrence of Bat Fatalities in Relation to Turbine Size. Report No. 3002017927. EPRI, Palo Alto, California. June 2020.

Endangered Species Act (ESA) § 9. 1973. Section 9 - Prohibited Acts. [As amended by Public Law (PL) 94-325, June 30, 1976; PL 94-359, July 12, 1976; PL 95-212, December 19, 1977; PL 95-632, November 10, 1978; PL 96-159, December 28, 1979; PL 97-304, October 13, 1982; PL 98-327, June 25, 1984; and PL 100-478, October 7, 1988; PL 107-171, May 13, 2002; PL 108-136, November 24, 2003.].

Erickson, W. P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Annual Report: July 2001 - December 2003. Technical report peer-reviewed by and submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee. Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. December 2004. Available online: http://www.west-inc.com/reports/swp_final_dec04.pdf

Erickson, W. P., M. M. Wolfe, K. J. Bay, D. H. Johnson, and J. L. Gehring. 2014. A Comprehensive Analysis of Small Passerine Fatalities from Collisions with Turbines at Wind Energy Facilities. PLoS ONE 9(9): e107491. doi: 10.1371/journal.pone.0107491.

Esri. 2020. World Imagery and Aerial Photos. (World Topo). ArcGIS Resource Center. Environmental Systems Research Institute (Esri), producers of ArcGIS software, Redlands, California. Information online: https://www.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=10df2279f9684e4a9f6a7f08febac2a9

Esri. 2021. World Imagery and Aerial Photos (World Topo). ArcGIS Resource Center. Environmental Systems Research Institute (Esri), producers of ArcGIS software, Redlands, California. Accessed April 2021. Information online: https://www.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=10df2279f9684e4a9f6a7f08febac2a9

Flaig, K. 2020. Aquatic Resources Inventory, Cedar Creek Wind Project, Bingham County, Idaho. Draft Report. Prepared for Cedar Creek Wind, LLC, Portland, Oregon. Prepared by Western EcoSystems Technology Inc. (WEST), Cheyenne, Wyoming. October 2020.

Flaig, K. and M. McCormack. 2020. Lava Ridge Wind Project – Vegetation Assessment Memo. Prepared for Magic Valley Energy. Prepared by Western EcoSystems Technology. December 15, 2020.

Frick, W. F., E. F. Baerwald, J. F. Pollock, R. M. R. Barclay, J. A. Szymanski, T. J. Weller, A. L. Russell, S. C. Loeb, R. A. Medellin, and L. P. McGuire. 2017. Fatalities at Wind Turbines May Threaten Population Viability of a Migratory Bat. Biological Conservation 209: 172-177. doi: 10.1016/j.biocon.2017.02.023.

Gibson, D., E. J. Blomberg, M. T. Atamian, S. P. Espinosa, and J. S. Sedinger. 2018. Effects of Power Lines on Habitat Use and Demography of Greater Sage-Grouse (Centrocercus Urophasianus). Wildlife Monographs 200: 1-41. doi: 10.1002/wmon.1034.

Grodsky, S. M., M. J. Behr, A. Gendler, D. Drake, B. D. Dieterle, R. J. Rudd, and N. L. Walrath. 2011. Investigating the Causes of Death for Wind Turbine-Associated Bat Fatalities. Journal of Mammalogy 92(5): 917-925. doi: 10.1644/10-MAMM-A-404.1.

Hale, A. M., E. S. Hatchett, J. A. Meyer, and V. J. Bennett. 2014. No evidence of displacement due to wind turbines in breeding grassland songbirds. The Condor 11(3):472-482.

Hale, A. M. 2016. Interpreting failure to reject null hypothesis of displacement from wind turbines in three species of grassland birds: response to Johnson (2016). The Condor. 118(3):676-679.

Harrison and McCormack 2021. Raptor Nest Survey, Lava Ridge Wind Project in Jerome, Minidoka, and Lincoln Counties, Idaho. Draft. Prepared for Magic Valley Energy LLC, Chesterfield, Missouri. Prepared by Western EcoSystems Technology, Inc. (WEST), Laramie, Wyoming. August 5, 2021.

Harvey, T., K. Smith, and M. McCormack. 2021. 2021 Greater Sage-Grouse Lek Survey Results for the Lava Ridge Wind Project. Prepared for Magic Valley Energy. Prepared by Western EcoSystems Technology. June 1, 2021.

Hein, C. D., J. Gruver, and E. B. Arnett. 2013. Relating Pre-Construction Bat Activity and Post-Construction Bat Fatality to Predict Risk at Wind Energy Facilities: A Synthesis. A report submitted to the National Renewable Energy Laboratory (NREL), Golden Colorado. Bat Conservation International (BCI), Austin, Texas. March 2013. Available online: https://tethys.pnnl.gov/sites/default/files/publications/relating-preconstruction-bat-activity.pdf

Herrera-Alsina, L., R. Villegas-Patraca, L. E. Eguiarte, and H. T. Arita. 2013. Bird Communities and Wind Farms: A Phylogenetic and Morphological Approach. Biodiversity and Conservation 22: 2821-2836.

Hughes, J. M. 2015. Yellow-Billed Cuckoo (*Coccyzus Americanus*), Version 2.0. A. Poole, ed. *In:* The Birds of North America. Cornell Lab of Ornithology, Ithaca, New York. doi: 10.2173/bna.418. Retrieved from The Birds of North America Online: http://birdsna.org/Species-Account/bna/species/yebcuc

ICF International. 2015. Altamont Pass Wind Resource Area Bird Fatality Study, Bird Years 2005-2013. A Summary of Findings in the Final Year. Report M106. Prepared for the Alameda County Community Development Agency, Hayward, California. Prepared by ICF International, Sacramento, California. July, 2015. Available online: http://www.acgov.org/board/bos_calendar/documents/CDAMeetings_12_31_15/SpecialPlanningMeeting/m106_draft_apwra_2013_bird_year_results.pdf

Idaho Bird Records Committee. 2020. Idaho Bird Checklist. Accessed May 2021. Available online: https://ibrc.idahobirds.net/sites/default/files/2020-07/idaho_birds_checklist_2020.pdf

Idaho Department of Fish and Game (IDFG). 2016. Species Conservation Status. Idaho Species. IDFG, Boise, Idaho. Updated September 28, 2016. Accessed April 2021. Available online: https://idfg.idaho.gov/species/taxa/list

Idaho Department of Fish and Game (IDFG). 2017. Idaho State Wildlife Action Plan. Prepared for US Fish and Wildlife Service, Region 1, Office of Migratory Birds & State Programs, Wildlife & Sport Fish Restoration, 911 NE 11th Avenue, Portland, Oregon 97232-4181 January 28, 2017. Prepared by IDGF, Boise Idaho. Available online: https://idfg.idaho.gov/sites/default/files/state-wildlife-action-plan.pdf

Idaho Department of Fish and Game (IDFG). 2019a. Idaho Fish and Wildlife Information System (Ifwis), Species Diversity Database. Idaho Natural Heritage Data. IDFG, Boise, Idaho. Accessed November 2019. Information online: https://idfg.idaho.gov/species/request-data

Idaho Department of Fish and Game (IDFG). 2019b. Idaho Species. Explore Idaho's Plants & Animals. Accessed: November 2019. Available online: https://idfg.idaho.gov/species/taxa/explore?name=bat&category=49&idapa=All

Idaho Department of Fish and Game (IDFG). 2019c. Idaho Fish and Wildlife Information System (Ifwis), Species Diversity Database. Idaho Natural Heritage Data. IDFG, Boise, Idaho. Accessed November 2019. Information online: https://idfg.idaho.gov/species/request-data

Idaho Department of Fish and Game (IDFG). 2020. Response to US Fish and Wildlife Service Information Request: Species Status Assessment for the Little Brown Myotis (Syn. Little Borwn Bat; Myotis Lucifugus). Prepared for US Fish and Wildlife Service (USFWS), Great Lakes Regional Office, Bloomington, Minnesota. Idaho Department of Fish and Game, Boise, Idaho. June 1, 2020. 17 pp. + cover letter.

Idaho Department of Fish and Game (IDFG). 2021. Idaho Species. Bats. IDFG, Boise, Idaho. Accessed: January 2021. Available online: https://idfg.idaho.gov/species/taxa/392

International Union for Conservation of Nature (IUCN). 2017. IUCN Red List of Threatened Species: Texas Bat Species. Version 2017-3. Accessed January 2018. Information online: www.iucnredlist.org

International Union for Conservation of Nature (IUCN). 2018. The IUCN Red List of Threatened Species. Version 2018-2. Updated 14 November 2018. Accessed February 2019. Information online: http://www.iucnredlist.org/

Johnson, G. D., W. P. Erickson, M. D. Strickland, M. F. Shepherd, and D. A. Shepherd. 2000. Final Report: Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-Year Study. Final report prepared for Northern States Power Company, Minneapolis, Minnesota, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. September 22, 2000. 212 pp.

Johnson, D .H. 2016. Comment on “No evidence of displacement due to wind turbines in breeding grassland songbirds”. The Condor 118:674-675.

Kirol, C. P., J. L. Beck, S. V. Huzurbazar, M. J. Holloran, and S. N. Miller. 2015. Identifying Greater Sage-Grouse Source and Sink Habitats for Conservation Planning in an Energy Development Landscape. Ecological Applications 25: 968-990.

Kirol, C. P., K. T. Smith, N. E. Graf, J. B. Dinkins, C. W. LeBeau, T. L. Maechtle, A. L. Sutphin, and J. L. Beck. 2020. Greater Sage-Grouse Response to the Physical Footprint of Energy Development. Journal of Wildlife Management 84: 989-1001.

Kochert, M. N., K. Steenhof, C. L. Mcintyre, and E. H. Craig. 2002. Golden Eagle (*Aquila Chrysaetos*), Version 2.0. A. Poole and F. B. Gill, eds. *In:* The Birds of North America. Cornell Lab of Ornithology, Ithaca, New York. doi: 10.2173/bna.684. Retrieved from The Birds of North America Online: http://bna.birds.cornell.edu/bna/species/684

Kolar, P. S. and M. J. Bechard. 2016. Wind Energy, Nest Success, and Post-Fledging Survival of Buteo Hawks. Journal of Wildlife Management 80(7): 1242-1255. doi: 10.1002/jwmg.21125.

Kunz, T. H., E. B. Arnett, B. M. Cooper, W. P. Erickson, R. P. Larkin, T. Mabee, M. L. Morrison, M. D. Strickland, and J. M. Szewczak. 2007. Assessing Impacts of Wind-Energy Development on Nocturnally Active Birds and Bats: A Guidance Document. Journal of Wildlife Management 71(8): 2449-2486. doi: 10.2193/2007-270.

LANDFIRE. 2017. Existing Vegetation Type Layer. Landscape Fire and Resource Management Planning Tools Project (LANDFIRE). Department of the Interior (DOI) US Geological Survey (USGS). Last modified February 2017. Information available online at: http://landfire.cr.usgs.gov/viewer/

Lange, C. J., B. M. Ballard, and D. P. Collins. 2018. Impacts of Wind Turbines on Redheads in the Laguna Madre. Journal of Wildlife Management 82(3): 531-537. doi: 10.1002/jwmg.21415.

LeBeau, C. W., J. L. Beck, G. D. Johnson, R. M. Nielson, M. J. Holloran, K. G. Gerow, and T. L. McDonald. 2017a. Greater Sage-Grouse Male Lek Counts Relative to a Wind Energy Development. Wildlife Society Bulletin 41(1): 17-26. doi: 10.1002/wsb.725.

LeBeau, C. W., G. D. Johnson, M. J. Holloran, J. L. Beck, R. M. Nielson, M. E. Kauffman, E. J. Rodemaker, and T. L. McDonald. 2017b. Greater Sage-Grouse Habitat Selection, Survival, and Wind Energy Infrastructure. Journal of Wildlife Management 81(4): 690-711. doi: 10.1002/jwmg.21231.

LeBeau, C., K. Smith, and M. McCormack. 2021. Greater Sage-Grouse Conservation strategy Lava Ridge Wind Energy Facility. Prepared for Magic Valley Energy, LLC. Prepared by Western EcoSystems Technology, Laramie, Wyoming. January 29, 2021.

Leddy, K. L., K.F. Higgins, and D. E. Naugle. 1999. Effects of wind turbines on upland nesting birds in Conservation Reserve Program grasslands. The Wilson Bulletin 111(1):100-104.

Markhart, E., M. McCormack, and L. Martinson. 2021. Wetlands and Waters Desktop Assessment for the Lava Ridge Wind Project Jerome, Lincoln, and Minidoka Counties, Idaho. Prepared for Magic Valley Energy, LLC. Chesterfield, Missouri. Prepared by Western EcoSystems Technology, Inc. February 11, 2021.

Marques, A. T., H. Batalha, S. Rodrigues, H. Costa, M. J. Ramos Pereira, C. Fonseca, M. Mascarenhas, and J. Bernardino. 2014. Understanding Bird Collisions at Wind Farms: An Updated Review on the Causes and Possible Mitigation Strategies. Biological Conservation 179: 40-52. doi: 10.1016/j.biocon.2014.08.017.

McCormack, M., K. Smith, and C. LeBeau. 2020a. Greater Sage-grouse Lek Survey Results for the Lava Ridge Wind Project. Prepared for Magic Valley Energy. Prepared by Western EcoSystems Technology, Laramie, Wyoming. July 28, 2020.

McCormack, M., C. LeBeau, and E. Hallingstad. 2020b. Lava Ridge Wind Project – 2020 Raptor Nest Survey Memo. Prepared for Magic Valley Energy, LLC. Prepared by Western EcoSystems Technology, Laramie, Wyoming. August 13, 2020.

McCormack, M. and C. LeBeau. 2021. Avian Use Study Lava Ridge Wind Project Lincoln, Jerome, and Minidoka counties, Idaho. Final Report. April 2020 – March 2021. Prepared for Magic Valley Energy LLC, Chesterfield, Missouri. Prepared by Western EcoSystems Technology, Inc., Laramie, Wyoming. July 16, 2021.

McCormack, M., J. Pollock, and C. LeBeau. 2022. Avian Use Study Lava Ridge Wind Project Lincoln, Jerome, and Minidoka counties, Idaho. April 2021 – April 2022. Prepared for Magic Valley Energy LLC, Chesterfield, Missouri. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. June 30, 2022.

National Audubon Society (Audubon). 2020. Important Bird Areas. Audubon, New York, New York. Accessed December 2020. Information online: https://www.audubon.org/important-bird-areas

National Land Cover Database (NLCD). 2016. *As cited includes*:

Yang, L., S. Jin, P. Danielson, C. Homer, L. Gass, S. M. Bender, A. Case, C. Costello, J. Dewitz, J. Fry, M. Funk, B. Granneman, G. C. Liknes, M. Rigge, and G. Xian. 2018. A New Generation of the United States National Land Cover Database: Requirements, Research Priorities, Design, and Implementation Strategies. ISPRS Journal of Photogrammetry and Remote Sensing 146: 108-123. doi: 10.1016/j.isprsjprs.2018.09.006.

and

Multi-Resolution Land Characteristics (MRLC). 2019. National Land Cover Database (NLCD) 2016. Multi-Resolution Land Characteristics (MRLC) Consortium. US Geological Survey (USGS) Earth Resources Observation and Science (EROS) Center, MRLC Project, Sioux Falls, South Dakota. May 10, 2019. Information online: https://www.mrlc.gov/data. NatureServe. 2021. NatureServe Explorer. NatureServe Explorer: An online encyclopedia of life. Version 2.0. NatureServe, Arlington, Virginia. Updated March 2019. Accessed April 2021. Information online: http://explorer.natureserve.org

North American Datum (NAD). 1983. NAD83 Geodetic Datum.

Orloff, S. and A. Flannery. 1992. Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991. Final Report P700-92-001 to Alameda, Contra Costa, and Solano Counties, and the California Energy Commission, Sacramento, California, by Biosystems Analysis, Inc., Tiburon, California. March 1992.

O'Shea, T. J., P. M. Cryan, D. T. S. Hayman, R. K. Plowright, and D. G. Streicker. 2016. Multiple Mortality Events in Bats: A Global Review. Mammal Review 46(3): 175-190. doi: 10.1111/mam.12064.

Rodhouse, T. J., R. M. Rodriguez, K. M. Banner, P. C. Ormsbee, J. Barnett, and K. M. Irvine. 2019. Evidence of Region-Wide Bat Population Decline from Long-Term Monitoring and Bayesian Occupancy Models with Empirically Informed Priors. Ecology and Evolution 9(19): 11078-11088. doi: 10.1002/ece3.5612.

Rollins, K. E., D. K. Meyerholz, G. D. Johnson, A. P. Capparella, and S. S. Loew. 2012. A Forensic Investigation into the Etiology of Bat Mortality at a Wind Farm: Barotrauma or Traumatic Injury? Veterinary Pathology 49(2): 362-371.

Schaub, M. 2012. Spatial Distribution of Wind Turbines Is Crucial for the Survival of Red Kite Populations. Biological Conservation 155: 111-118.

Shaffer, J. A. and D. H. Johnson. 2009. Displacement effects of wind developments on grassland birds in the Northern Great Plains. Pages 57-61 in Proceedings of the NWCC Wind Wildlife Research Meeting VII (PNWWRM VII), Milwaukee, WI. October 28-29, 2008. Prepared for the Wildlife Workgroup of the National Wind Coordinating Collaborative by RESOLVE, Inc., Washington, DC, Susan Savitt Schwartz, ed. 116 pp.

Shaffer, J. and D. Buhl. 2016. Effects of wind-energy facilities on breeding grassland bird distributions. Conservation Biology, 30:59–71. doi: 10.1111/cobi.12569.

Smallwood, K. S. and C. Thelander. 2008. Bird Mortality in the Altamont Pass Wind Resource Area, California. Journal of Wildlife Management 72(1): 215-223.

Solick, D., L. Bishop-Boros, and G. Palmer. 2020a. Bat Activity Study for the Horizon Hill Wind Project, Logan County, Oklahoma. Prepared for Horizon Hill Wind, LLC, Calgary, Alberta, Canada. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, USA. August 10, 2020.

Solick, D., D. Pham, K. Nasman, and K. Bay. 2020b. Bat Activity Rates Do Not Predict Bat Fatality Rates at Wind Energy Facilities. Acta Chiropterologica 22(1): 135-146. doi: 10.3161/15081109ACC2020.22.1.012.

Stahl, J. T. and M. K. Oli. 2006. Relative Importance of Avian Life-History Variables to Population Growth Rate. Ecological Modelling 198: 23-29. doi: 10.1016/j.ecolmodel.2006.04.001.

Strickland, M. D., E. B. Arnett, W. P. Erickson, D. H. Johnson, G. D. Johnson, M. L. Morrison, J. A. Shaffer, and W. Warren-Hicks. 2011. Comprehensive Guide to Studying Wind Energy/Wildlife Interactions. Prepared for the National Wind Coordinating Collaborative (NWCC), Washington, D.C., USA. June 2011. Available online: https://tethys.pnnl.gov/sites/default/files/publications/Comprehensive-Guide-to-Studying-Wind-Energy-Wildlife-Interactions.pdf

SWCA Environmental Consultants (SWCA). 2015. Post-Construction Avian and Bat Fatality at the Horse Butte Wind Facility, Years 1–3. Prepared for Horse Butte Wind I, LLC, New York, New York. Prepared by SWCA, Salt Lake City, Utah. November 2015.

Thaxter, C. B., G. M. Buchanan, J. Carr, S. H. M. Butchart, T. Newbold, R. E. Green, J. A. Tobias, W. B. Foden, S. O'Brien, and J. W. Pearce-Higgins. 2017. Bird and Bat Species' Global Vulnerability to Collision Mortality at Wind Farms Revealed through a Trait-Based Assessment. Proceedings of the Royal Society B 284: 20170829. doi: 10.1098/rspb.2017.0829.

US Environmental Protection Agency (USEPA). 2017. Ecoregion Download Files by State - Region 10: Idaho. Ecoregions of the United States, Ecosystems Research, USEPA. Last updated February 8, 2017. Accessed October 2019. Information online: https://www.epa.gov/eco-research/ecoregion-download-files-state-region-10#pane-10

US Fish and Wildlife Service (USFWS). 2006. Bat Survey Protocol for Assessing Use of Potential Hibernacula. Available online: https://www.fws.gov/midwest/Endangered/mammals/inba/pdf/inba_srvyprtcl.pdf

US Fish and Wildlife Service (USFWS). 2021. Birds of Conservation Concern 2021. May 2021. Division of Migratory Bird Management, Arlington, Virginia. Available online: https://www.fws.gov/media/birds-conservation-concern-2021pdf

US Fish and Wildlife Service (USFWS). 2011. Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use and Phase I Cave/Mine Portal Assessment Data Sheet. USFWS, West Virginia Field Office, Elkins, West Virginia. Available online: https://www.fws.gov/westvirginiafieldoffice/PDF/Caveassessment.pdf

US Fish and Wildlife Service (USFWS). 2012. Land-Based Wind Energy Guidelines. March 23, 2012. 82 pp. Available online: http://www.fws.gov/cno/pdf/Energy/2012_Wind_Energy_Guidelines_final.pdf

US Fish and Wildlife Service (USFWS). 2013. Eagle Conservation Plan Guidance. Module 1 - Land-Based Wind Energy. Version 2. Division of Migratory Bird Management, USFWS. April 2013. Available online: http://www.fws.gov/migratorybirds/Eagle_Conservation_Plan_Guidance-Module%201.pdf

US Fish and Wildlife Service (USFWS). 2015. Birds of Conservation Concern. What are Birds of Conservation Concern? Last updated September 25, 2015. Accessed March 8, 2019. Information online: https://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php

US Fish and Wildlife Service (USFWS). 2016. Eagle Permits; Revisions to Regulations for Eagle Incidental Take and Take of Eagle Nests; Final Rule. 50 CFR 13 and 22. Department of the Interior Fish and Wildlife Service. 81 Federal Register (FR) 242: 91494-91554. December 16, 2016.

US Fish and Wildlife Service (USFWS). 2020. Range-Wide Indiana Bat Survey Guidelines. USFWS Midwest Region Endangered Species. March 2020. 65 pp. Available online: https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/FINAL%20Range-wide%20IBat%20Survey%20Guidelines%203.23.20.pdf

US Geological Survey (USGS) Gap Analysis Project (GAP). 2020. Protected Areas Database of the United States (PAD-US) 2.1. UGSG data release. Accessed April 2021. Information online: https://doi.org/10.5066/P92QM3NT

Watson, R. T., P. S. Kolar, M. Ferrer, T. Nygård, N. Johnston, W. G. Hunt, H. A. Smit-Robinson, C. J. Farmer, M. Huso, and T. E. Katzner. 2018. Raptor Interactions with Wind Energy: Case Studies from around the World. Journal of Raptor Research 52(1): 1-18.

Western EcoSystems Technology, Inc. (WEST). 2019. Regional Summaries of Wildlife Fatalities at Wind Facilities in the United States. 2019 Report from the Renew Database. WEST, Cheyenne, Wyoming. December 31, 2019.

Western EcoSystems Technology, Inc. (WEST). 2020. Baseline Wildlife Surveys Study Plan for Lava Ridge Wind Energy Project, Jerome, Minidoka, and Lincoln counties, Idaho. Prepared for Magic Valley Energy, LLC. Chesterfield, Missouri. Prepared by WEST, Laramie, Wyoming. May 2020.

Western EcoSystems Technology, Inc. (WEST) and POWER Engineers, Inc. 2020. Environmental Critical Issues Analysis for the Proposed Midpoint Wind Energy Project Jerome, Minidoka, Lincoln Counties, Idaho. Prepared for Magic Valley Energy, LLC. Chesterfield, Missouri. Prepared by WEST and POWER Engineers. January 2020.

Young, D. P., J. D. Jeffrey, W. P. Erickson, K. J. Bay, V. K, Poulton, K. Kronner, B. Gritski, and J. Baker. 2006. Eurus Combine Hills Turbine Ranch Phase 1: Post Construction Wildlife Monitoring First Annual Report, February 2004-February 2005. 49 pp. Available online: http://wind.nrel.gov/public/library/young7.pdf

Appendix M-a. Wildlife Incidental Reporting System

[Currently In Development]