3.0 CONSTRUCTION

The actions necessary to construct the Cotterel Wind Power Project are described below. Where helpful, photos of similar activities from the construction of other wind energy projects have been added for illustration. Unless otherwise mentioned in the text, all photos are from the installation of a 950 kW Vestas V54 wind turbine in Palmdale, California, in July 2004.

3.1 HEALTH, SAFETY, AND ENVIRONMENTAL PLAN

The Cotterel Wind Power Project HSE Plan will be developed to address HSE risks and requirements during the construction stage of the project. As the project moves into the operational stage, the components of the HSE plan will be modified to adapt to Operational and Maintenance activities.

Components of the Management System that will be addressed in the HSE plan include, but are not limited to, risk management analysis, emergency response, HSE planning and procedures, implementation, monitoring and reporting results, setting performance targets, incident classification, investigation and reporting results, audits and inspections, and HSE management review.

Minimum contractor HSE requirements will be included in the HSE plan. These requirements include personal protective equipment, housekeeping, maintaining a safe workplace, fire prevention, safe work practices, etc. Contractors are expected to comply with these requirements at a minimum. Contractor safety plans will be reviewed for compliance.

Development of the HSE plan is a collaborative effort between Windland and the contractors. Contractor Best Practices will be reviewed and incorporated into the HSE plan as appropriate.

Also included in the HSE plan is a risk register, which identifies potential hazards and the risks associated with them. Contractors are expected to address these risks and develop mitigation plans for incorporation into the register. The risk register is a document that will be used and updated on a continuous basis to identify and mitigate risks as they surface. It is conceivable that mitigation plans as developed may not prove to be sufficient as anticipated. In this case, the HSE plan will be adjusted to provide a suitable solution to project risks.

Observation of HSE performance is a key to avoiding incidents. Project personnel will be expected to regularly observe work practices and provide positive reinforcement and guidance to fellow employees. Work practices that may be considered to place employees or the environment at risk will be identified, evaluated, and modified as necessary to eliminate or substantially reduce the risk.

3.2 PROJECT CONSTRUCTION PLAN

This section contains a general description of the construction steps for the major components of the project. More details on specific construction activities, and their potential impacts to the environment and public safety, are provided later in Section 3.

This plan discusses the general activities and design approaches as currently understood and anticipated. Windland will remain in contact with the BLM/IDL as the project designs are finalized and specifics on construction are available.

In general, the design approach for the Cotterel Mountain project will have two objectives.

The first is the concept of minimizing the overall environmental impact of the project, while maintaining cost effectiveness and safety standards. This will include minimizing the amount of cut and fill required for the roads and foundations, and the use of as much excavated soil and rock as possible on project roads.

The second design objective is the concept of "adaptive management", in which the project design will be done to complement the natural characteristics of the site. Examples of adaptive management include allowing for the current level of public access on the existing road while also limiting public access on the improved roads. Adaptive management will also be employed during construction by allowing for some specifics to be modified to adapt to actual site conditions (subsequent to BLM/IDL approval).

Prior to the start of construction, Windland will review and document the general condition of the site, including the levels of vegetation and areas of disturbance. When construction is completed Windland will conduct re-vegetation and reclamation to return the site to a near pre-construction condition. This would include re-seeding areas exposed during civil construction, weed control measures, and returning land contours and drainage to conditions similar to those that existed prior to construction.

Windland understands and respects that the land on Cotterel Mountain is held in public trust, and as such the public have a right to expect access to the site not to change. Public access will only be limited during construction to those specific areas where the construction activities could cause public safety concerns. These activities include, but may not be limited to, wind turbine erection, foundation excavation, electrical collection system trenching, and substation construction. Once these activities are completed, public access will resume to its current state.

3.2.1 Roads and Turbine Pads

In order for equipment and personnel to reach the wind turbine locations, roads will need to be constructed on the site. A road from Highway 81 to the top of Cotterel Mountain sufficient to allow for truck traffic during the project construction will be built. Additionally, an access road that runs adjacent to each turbine site and the project substation will also be built. The access road will be located to minimize disturbance, avoid sensitive resources (e.g., raptor nests, cultural resource sites, sage-grouse habitat, etc.) and maximize transportation efficiency during construction and maintenance activities. A picture of an access road under construction for the Albany wind energy project in Australia is shown in Figure 3-1 below.

Figure 3-1. Turbine Access Road Under Construction.

The access road will provide vehicular access (construction and maintenance) to the following permanent and temporary areas associated with the project:

Permanent access:

- Each wind turbine
- Meteorological tower
- Substation
- O&M building

Temporary access (during construction):

- Concrete batch plant
- Construction parking and lay-down

Many of the trucks bringing wind turbine components to the site will be extra-long (for blade transport) and heavy-load (for wind turbine nacelles).

Construction zones will be built around each wind turbine site. The area around each site will need to be clear and level enough to allow for the wind turbine components to be delivered, and for a crane to be set-up. Designers will work to minimize the amount of work required at each site, and where possible only a minimal amount of vegetation will be removed to allow for component delivery. It is likely that, at most sites, the location for the crane will require the same amount of earthwork as the roads (described below), although these pads can then be removed and the site restored to a natural state once construction is complete.
To the greatest extent possible, the area of construction and operation of the project (often referred to as the project "footprint") will be consolidated for efficient land use in order to minimize disturbance to the existing ecosystem.

When practical, the routing of existing roads will be improved rather than constructing new roads. However, overall public access from Highway 81 will not be improved beyond current conditions. Also, the cut and fill required for the access road will be balanced to the extent possible, to minimize the amount of materials that would need to be brought onto or removed from the site.

The design of the road will utilize the flow of the natural contours; however, in order to maintain safety during construction and maintenance activities, the following design criteria will also be implemented:

- Existing BLM design standards, such as 9113 Manual (BLM 1985), or the design standards suitable for wind energy development, approved by the BLM, indicated below.
- Maximum access road slope of 10 percent
- Maximum road slope between turbines (turbine string road) between 7 and 10 percent.
- Maximum road width
  - Access road width of 20 feet
  - Turbine string road width of 38 feet (required for crane movement on site), or 20 feet with an extra track about 18 feet off the road for crane movement
- Minimum turn radius (inside radius of road way) of 115 feet (based on transporting three turbine blades at a time) wherever possible, or 76 feet (based on transporting one turbine blade at a time) where necessary.
- Road surface will be that of an all weather gravel road.
- Design speed of 15 MPH maximum on the turbine string road, and 25 MPH on the site access road.

The site access and turbine string roads will generally be constructed in the following sequence:

- Stake centerline of access and turbine string roads (see Section 3.4.1 for details)
- Install temporary stabilization features, such as silt fences, straw bales and other controls at the limits of construction
- Clear and grub area associated with the access and turbine string road (see Section 3.4.4 for details.)
- Separate and stockpile top soil for later use
- Grade roads to slopes/design indicated on construction drawings (see Section 3.4.5 for details)
- Compact sub-grade
- Install aggregate all weather road surface
- Install final stabilization/re-vegetation on disturbed areas associated with the roadway corridor
- Remove temporary stabilization measures once final stabilization measures are established

Once the construction of the roads and turbine pads are complete, reclamation will be performed around the areas disturbed by the civil construction. The materials cut from the mountain during the road construction will be used to return contours to near pre-construction conditions. Any remaining cut materials will be distributed across the mountain in a manner that will not increase dust and erosion, nor change drainage conditions, but will keep the materials on the mountain. To the extent possible, the materials cut from land administered by IDL will be segregated from other materials, and only used within the IDL sections. Any exposed areas that are not covered by road materials will be re-vegetated using a seed mixture specified by the BLM/IDL. Noxious weed control will continue on-site during the re-vegetation process and during the life of the project.

3.2.2 Electrical Collection System

Each wind turbine in the Cotterel Mountain Wind Power Project will be connected to an underground electrical cable to allow the generated energy to be sent to the project substation. These cables will be direct-buried (rather than placed in conduit) using cable specifically designed for this application. The voltage of this system will be 34.5 kV, but could potentially be from 12 kV to 46 kV.

If possible, the cables will be buried directly into the soil and materials found on-site. However, if those native materials are found to provide insufficient thermal conductivity (i.e., allow heat to dissipate from the cables), Windland may need to bring in engineered backfill. This backfill will be a soil of a type sufficient to radiate the heat from the cables. The engineered backfill would only be used in the trenches with the cables, and only to an amount sufficient to radiate the necessary heat from the cables. The remaining depths of the cables will be filled.

To install the electrical collection system, the following construction activities will be performed:

- Survey/Stake Site (see Section 3.4.1)
- Trenching (see Section 3.4.9)
- Buried Cable Placement (see Section 3.6.1)

In almost all areas, the cable will be run along the side of the project roads, in an area already disturbed by the road construction. The cable will not be run in the center of the road to avoid unnecessary stress on the cables due to vehicle traffic, as well as the potential for cable damage during road maintenance. For areas near the substation where several runs of cable will all be in the same area, Windland may use both sides of the road for the cable trenches. Cables will be installed in a manner similar to that described above, and then re-contoured to a state similar to pre-construction and re-vegetated with BLM/IDL-approved seed.

3.2.3 Wind Turbine Foundations

The wind turbine base foundation anchors the wind turbine structure (consisting of the tower, hub, blades, and nacelle) securely to the ground. For most projects, the construction of the wind turbine foundations constitutes the largest volume impact of earth excavation, although

some foundation designs allow for much of the excavated material to be backfilled in and around the foundation itself.

Two foundation designs are typically used for wind turbine installations in the U.S., the specific one for the project being determined by the soil conditions and wind turbine requirements. The first foundation type is a "mat" foundation, and is shown in Figure 3-2. The second foundation type is a "pier" foundation, and is shown in Figure 3-3. Mat foundations are wide and shallow, and pier foundations are narrow and deep. There are variations on these foundations. The exact foundation type is dependent on completion of the geotechnical investigation. Under known conditions most foundations will be pier design.

Figure 3-2. Mat Foundation Installation.

Figure 3-3. Pier Foundation Installation.

At the top of both foundation types is the turbine base. The base consists of a metal ring and series of anchor bolt connections to mate the foundation to the bottom of the wind turbine tower. The turbine base is cast into the concrete reinforced structure that makes up the remainder of the foundation. An electrical earthing mat is typically cast in place when the concrete for the foundation is poured. The casting and the subsequent backfilling of the foundation is typically done prior to the delivery of the wind turbine tower to allow the lowest sections of the wind turbine tower to be placed upon delivery.

To build a wind turbine foundation, the following tasks are required. Any additional tasks or deviations will be approved by the BLM/IDL prior to their commencement.

- Survey/Stake Site (see Section 3.4.1)
- Clear/Grub Site (see Section 3.4.4)
- Perform site grading (see Section 3.4.5)
- Install Foundations
  - Rock Removal and Blasting (if necessary, see Section 3.4.3)
  - Excavation (see Section 3.4.7)
  - Place rebar (see Section 3.5.2)
  - Place turbine base
  - Place forms (see Section 3.5.3)
  - Pour concrete (see Section 3.5.4)
- Install Below Grade Raceway (Conduit, Ductbank, Trench, etc.)
- Install Below Grade Ground Grid/mat
- Install a Sub-layer of Crushed Rock Surfacing
- Back fill with required aggregate

While most of the project site is on land administered by the BLM, some portions are administered by IDL. IDL has indicated that all excavated materials from their lands should be used within the boundaries of their land. If Windland determines that some native materials will need to be removed from IDL land, or excavated materials from BLM land brought onto IDL land, Windland will seek approval for such activities from IDL and the BLM.

Windland will perform an extensive geotechnical investigation prior to construction to determine the soil conditions at each site. While very unlikely, it is possible that when the foundation site is excavated, the soil conditions could be found to be very different from expected and not conducive to wind turbine installation. In that case, the excavated soils will placed back into the hole, and then compacted to a level as close to pre-excavation as possible. The surface of the site will be re-vegetated using BLM/IDL-approved seed.

3.2.4 Wind Turbine Installation

The wind turbines themselves are the primary generation equipment in the project. Their installation requires specialized equipment and crews and careful planning. Once construction has fully begun on-site, components will be delivered directly to their installation locations as they arrive at the project. Lower tower sections will be placed immediately on foundations, with the remaining components placed around the site in

planned laydown arrangements. Crane crews will erect the turbines soon after all components arrive to minimize the amount of time the equipment is on the ground. The only exception may be if components begin to arrive in the spring before the site is available for construction (due to snow on the site, or sage-grouse lekking). In such an instance, some components may be temporarily stored near the O&M facility site until full project site access is available.

Figure 3-4. Wind Turbine and Crane.

The construction activities necessary for the installation of a wind turbine that are not discussed above include:

- Turbine component delivery and storage (see Section 3.7.1)
- Crane movement or assembly (see Section 3.7.2)
- Wind turbine component lifts (see Section 3.7.3)

3.2.5 Meteorological Tower Installation

Three meteorological towers will be installed on site to take accurate weather readings used to track the performance of the wind turbines. These readings will include wind speed and direction, barometric pressure, humidity, and ambient temperature. The towers will be assembled on site. Due to terrain, wind, and icing conditions at the site, Windland has determined that guyed-monopole towers are the most effective design for use at meteorological towers. These towers will use anti-perch points on horizontal surfaces of the tower to prevent the perching and nesting of birds. An example guyed meteorological tower is shown in Figure 3-5.

To build a meteorological tower, the following tasks are generally required. It is expected that these tasks will be performed for the meteorological towers at the Cotterel Mountain site. Once the detailed engineering is performed, it will be determined if additional tasks will also be required. Any additional tasks will be approved by the BLM/IDL prior to their commencement.

- Survey/Stake Site (see Section 3.4.1)
- Clear/Grub Site (see Section 3.4.4)
- Perform Site Grading (see Section 3.4.5)
- Install Foundations
    - Excavation (see Section 3.4.7)
    - Place Rebar (see Section 3.5.2)
    - Place Forms (see Section 3.5.3)
    - Pour Concrete (see Section 3.5.4)
- Install Below Grade Ground Grid (see Section 3.6.2)
- Install Communications and Electrical Lines (see Section 3.6.1)
- Erect Meteorological Tower (see Section 3.7.3)

Figure 3-5. Meteorological Tower.

3.2.6 Substation

The energy generated by the wind turbines will be delivered to the substation via the underground collection system. At the substation, voltage of the energy will be increased from the collection system level of 34.5 kV to the transmission level of 138 kV. Also, capacitor banks and other equipment will be installed at the substation to provide the voltage support necessary to meet the interconnection requirements for the project. A small control building will exist within the substation for electrical metering equipment, and the supervisory control and data acquisition (SCADA) system for the wind turbines.

To build a substation, the following tasks are required. Once the detailed engineering is performed, it will be determined if additional tasks would also be required. Any additional tasks will be approved by the BLM/IDL prior to their commencement.

- Survey/Stake Site (see Section 3.4.1)
- Clear/Grub Site (see Section 3.4.4)
- Perform Site Grading (see Section 3.4.5)
- Install Foundations
  - Excavation (see Section 3.4.7)
  - Place Rebar (see Section 3.5.2)
  - Place Forms (see Section 3.5.3)
  - Pour Concrete (see Section 3.5.4)
- Install Below Grade Raceway (Conduit, Ductbank, Trench, etc.)
- Install Below Grade Ground Grid
- Install Perimeter Fence
- Install a Sub-layer of Crushed Rock Surfacing
- Install Substation Steel Structures and Control Enclosures
- Install Substation Electrical Equipment (Circuit Breakers, Transformers, Disconnect Switches, Potential Transformers, etc.)
- Install Above Grade Ground Stingers
- Install Substation Bus Conductors & Jumpers
- Install Control/Relay & Communication Materials
- Install Secondary Control/Power Cable and Terminations
- Install Final Layer of Crushed Rock Surfacing
- Perform Substation Testing/Commissioning Activities
- Energize Substation

3.2.7 Transmission Line

To interconnect the Cotterel Wind Power Project with the existing electrical transmission grid, a 19.7 mile 138 kV transmission line will be required. Approximately seven miles of this line will be on public lands administered by the BLM. Five and one-half miles will be on IDL land. The line will be routed northeast from the project substation to a point where it will meet the existing Raft River Electric Cooperative transmission line. The project line will then cross over the Raft River line and parallel the ROW of that line north until it reaches the Snake River. The project line will cross the Snake River to the west of Lake Walcott, then proceed northeast to the interconnection point with the Idaho Power transmission line north of Minidoka Dam. The transmission line and towers will include devices to prevent raptor perching, including anti-perching triangles and surge arrestor caps.

The construction steps of the transmission line are listed below.

- Survey/Stake Site (see Section 3.4.1)
- Clear/Grub Site (see Section 3.4.4)
- Perform Site Grading (see Section 3.4.5)
- Install transmission poles
- Wire stringing, tensioning, and clipping
- Terminate wires at substations

Figure 3-6. Transmission Line Under Construction.

3.2.8 O&M Building

The Cotterel Mountain Wind Power Project will require the establishment of an O&M Building. This building will house storage for small parts, offices for the project staff, computers and control equipment for the wind turbines, and shop facilities. This building will be pre-engineered, and assembled and finished on-site. It will be located on IDL land at the north end of the project. The O&M Building will be located where indicated in the FEIS as shown in Figure 2-1 of this plan. A picture of the O&M Building from the Colorado Green project near Lamar, Colorado, is shown in Figure 3-4. The O&M Building will be painted an earth-tone color. The O&M Building will also have bathrooms and a septic system will be installed on IDL land.

The construction of the O&M Building will require the following activities:

- Survey/Stake Site (see Section 3.4.1)
- Clear/Grub Site (see Section 3.4.4)
- Perform Site Grading (see Section 3.4.5)
- Install Foundations
  - Excavation (see Section 3.4.7)
  - Pour Concrete (see Section 3.5.4)
- Install Communications and Electrical Lines (see Section 3.6.1)

Figure 3-7. Typical Wind Energy Facility O&M Building.

3.2.9 Construction Schedule

The exact schedule of construction will depend upon the approval date for the project, weather, delivery schedules for the turbines, steel, cement, and electrical components, and seasonal restrictions during which construction must be delayed for wildlife protection. In general, a typical schedule for the construction of wind energy projects of this scale is shown below.

Activity	Month
Mobilization	1
Access Roads, Laydown Areas Complete	3
Substation Construction	3-6
Transmission Construction	3-6
Foundations	4-8
Wind Turbine Generator Erection	5-11
Commissioning	11-12
Acceptance Testing	12-13

The schedule for construction on Cotterel Mountain will include a demobilization of outdoor work on the mountain for winter, between November and March. Any interior work, such as the commissioning of the wind turbines and finishing of the O&M Building, can occur during this period, as can the construction of the transmission line. The schedule will also account for lower levels of productivity due to construction restrictions during the sage-grouse mating periods of March 15 to May 15.

3.3 GENERAL CONSTRUCTION ACTIVITIES

3.3.1 Good Housekeeping

Good housekeeping is very important for all construction sites, and wind energy projects are no different. Good housekeeping can drastically reduce the incidents of injuries on site, as well as minimize the environmental impact. At the end of each work shift, care will be taken to remove debris from turbine sites and disposed of in a BLM/IDL approved landfill. Materials still needed at the turbine site will be assembled and secured at the site, and those materials no longer needed, will be returned to the construction laydown area.

One designated area will be used for "washing out" concrete trucks. The washout area will include catchment with an impermeable liner. Washout water will be recycled in the batch plant or pumped into tank trucks and removed from the site. The location for disposal will be approved by the BLM/IDL.

3.3.2 Truck Deliveries

Heavy vehicle traffic will be accessing the site during the construction phase of this project. Many of these vehicles will be specialized vehicles for turbine component delivery (such as the blade truck in Figure 3-8, obtained from Vestas). Included in the normal heavy duty truck traffic on site will be cement trucks used for delivering cement for the construction of the turbine bases, dump trucks to move aggregate from base excavations, and water tankers to wet down the site roads for dust control. Trucks will be confined within the site boundary for safety, fire control, and noxious weed control (see Section 3.8.5). Signs on the public roads utilized by these trucks will be erected warning the public of the increased heavy construction traffic on these roads. When possible, delivery times will be coordinated with the use patterns of the roads (especially Interstate 84 and Highway 81) to avoid traffic congestion. All trucks will be washed down at a location approved by the BLM/IDL for noxious weed control prior to entering the site.

3.3.3 Materials Receipt, Handling, and Storage

With the large amount of items and material arriving on-site, a plan must be developed for receipt, handling, and storage. A construction lay-down yard will be developed at the site of the O&M Building along the north access road approximately two miles south of Highway 81, on IDL land, where most construction materials will be offloaded and stored. Wind turbine components will be delivered directly to the site where they will be installed, although deliveries taken before the site is available (either due to weather or road construction) will be off-loaded in the lay-down yard. Likewise, materials needed for the concrete batch plant, substation construction, or electrical collection system will be offloaded near their use sites.

Figure 3-8. Wind Turbine Blade Delivery Truck.

3.3.4 Fencing

Windland will post warning signs along the access roads informing the public of construction activities, and recommending the public stay off the site. Access will be barred from the new site access road by a fence and locked gate with a guard during operating hours. The existing site access road (old road) will remain open.

For those areas where public safety risks could exist and site personnel will not be available to control public access (such as excavated foundation holes and electrical collection system trenches), temporary warning fences will be erected. Similarly, fencing will be installed around any lay-down areas. Other areas deemed hazardous, or where issues with security or theft are of concern, may also be fenced. Windland will coordinate the fencing with the BLM/IDL. The project substation will be permanently fenced for safety.

Temporary fencing for lay-down areas will be chain-link. Temporary fencing around unfinished turbine bases are designed more to warn people of the potential danger than to bar access, and therefore this fencing is typically a high visibility plastic mesh. Excavations will be fenced with chain-link or other livestock fencing to protect livestock. Permanent fencing around the substation will be palisade fencing.

3.4 CIVIL CONSTRUCTION ACTIVITIES

3.4.1 Surveying and Staking

Construction surveying and staking are the first construction activities associated with the project. Field crews will use survey equipment and known reference points to locate points in the field that correspond to critical project design locations. When a critical point is found, it

is marked with a survey stake (a wooden stake with a colored plastic flag, driven into the ground one to two feet). The project site is accessed by a pick-up truck or similar vehicle. Teams of two or more surveyors walk across the site to perform the surveying and staking.

The items to be surveyed and staked include:

- the centerline of the access road
- the centerline of the turbine string road
- wind turbine locations
- meteorological tower locations
- substation boundary
- O&M Building boundary
- disturbance areas
- construction facilities

Once surveying and staking are completed, a joint inspection will be completed by the BLM and IDL Authorized Officers, construction manager, and design engineer. During the inspection, if areas of concern regarding sensitive species, cultural sites, springs, wetland, or other issues arise, the Authorized Officers, construction manager, and design engineer will correct the deficiencies or engage in the process of adaptive management to determine a reasonable outcome in accordance with the ROW grant.

Potential environmental impacts during the surveying and staking process include:

- Wildlife: Sage-Grouse (see Section 3.8.2)
- Plant Species: Pediocactus (see Section 3.8.4)
- Noxious Weed Control (see Section 3.8.5)

3.4.2 Geotech Sampling

The primary objective of the geotechnical investigation is to characterize the strength characteristics of the bedrock and determine dynamic properties for the turbine foundation design. The investigation will consist of coring specific locations along the turbine alignment. Coring will be completed using moderate-sized geotechnical drilling equipment mounted to either a truck or tracked vehicle. The coring process will obtain samples of rock core that will be logged. Samples of the cores will be sent to a geotechnical for laboratory strength testing. The coring process leaves holes at the test site approximately three inches in diameter and up to 40 feet deep. Upon completion, each hole will be backfilled in accordance with Federal and state requirements. Test pits dug with a backhoe or similar equipment may also be utilized to evaluate whether the bedrock can be excavated.

Additional geotechnical investigation includes several seismic refraction survey lines. The seismic refraction lines will be used to determine dynamic soil properties of the underlying bedrock and will also be used to confirm bedrock strength. The seismic refraction lines will be completed using an extremely low energy sources, (a sledgehammer and plate). The seismic analysis will also include multichannel surface-wave analysis, which utilizes background vibrations such as vehicles to generate seismic noise.

Figure 3-9. Typical Coring Truck and Support Vehicle.

Figure 3-10. Typical Coring Tracked Vehicle.

Potential environmental possible during geotech sampling include:

- Wildlife: Sage-Grouse (see Section 3.8.2)
- Plant Species: Pediocactus (see Section 3.8.4)
- Noxious Weed Control (see Section 3.8.5)
- Noise (see Section 3.8.7)
- Water Resources (see Section 3.8.8)

3.4.3 Rock Removal/Blasting

Bedrock at the site is competent basalt that will require blasting to remove. Blasting and excavation will be completed in accordance with applicable regulations and sound engineering practice, using methods and techniques that will minimize overbreak beyond the limits indicated on the drawings and which will preserve the rock beyond these limits in the soundest possible condition. Controlled blasting techniques including presplitting and line drilling will be utilized. Prior to commencement of blasting operations, a blasting plan will be prepared. The blasting plan will include specific detailed information on all procedures, materials, and equipment to be used. The blasting plan will describe procedures and precautions to be taken with regard to the public, environmental and natural resources, and protection of existing structures. The blasting plan will indicate specific drilling, blasting, mucking, and hauling operations. All blasting will be performed in accordance with the approved blasting plan. Pre-blast surveys and blast monitoring will be required for blasting within 500 feet of any existing structures. Additional monitoring will also be required for blasting near identified springs (see Section 3.8.8).

Potential environmental impacts during rock removal and blasting include:

- Public Safety (see Section 3.8.1)
- Wildlife: Sage-Grouse (see Section 3.8.2)
- Livestock (see Section 3.8.3)
- Plant Species: Pediocactus (see Section 3.8.4)
- Noxious Weed Control (see Section 3.8.5)
- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)
- Water Resources (see Section 3.8.8)
- Cultural Resources (see Section 3.8.11)

3.4.4 Clearing & Grubbing

Clearing work will include clearing and removing all trees within the areas indicated on the design drawings; cutting and removal of all brush, shrubs, debris, and vegetation to approximately flush with the ground surface; and disposal of all cuttings and debris. Disposal of cuttings and debris will be in an approved facility designed to handle such waste or at the direction of the BLM/IDL Authorized Officer.

Grubbing work will include the complete removal and disposal of all stumps and roots larger than approximately two inches in diameter, including matted roots, regardless of size.

Grubbing will extend to a minimum depth of approximately four inches below the natural surrounding ground surface.

All excavations made by clearing and grubbing activities will be backfilled with compacted earth/aggregate available on site.

Potential environmental impacts during the clearing and grubbing process include:

- Wildlife: Sage-Grouse (see Section 3.8.2)
- Wildlife: Golden Eagles (see Section 3.8.2)
- Wildlife: Migratory Birds (see Section 3.8.2)
- Wildlife: Mule Deer (see Section 3.8.2)
- Wildlife: Mountain Lions (see Section 3.8.2)
- Plant Species: Pediocactus (see Section 3.8.4)
- Noxious Weed Control (see Section 3.8.5)
- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)
- Cultural Resources (see Section 3.8.11)

3.4.5 Site Grading

There are three phases associated with the grading activities for the project. The first (road grading) is the construction of the roadways associated with the project. The roads will be constructed based on the lines and grades indicated on the detail design drawings. At the same time the roads are being constructed, or very shortly after they are completed, the second phase (rough grading) associated with the turbine sites, substation, and O&M building will begin. Once the turbine sites, substation, and O&M building are completed, the third phase (final grading) activities will be completed with these facilities.

All ground surface areas disturbed by construction activities will be graded. The grading will be finished to the contours and elevations indicated on the drawings or match contours and elevations of the original undisturbed ground surface. The final grading will provide a smooth, uniform surface and minimize the impact to existing water runoff patterns.

The overall goal of the detail design associated with grading activities is to achieve a cut and fill balance. Such a balance ensures that a minimum of material is required to be transported on or off the site.

Potential environmental impacts during the site grading process include:

- Wildlife: Sage-Grouse (see Section 3.8.2)
- Wildlife: Golden Eagles (see Section 3.8.2)
- Wildlife: Migratory Birds (see Section 3.8.2)
- Wildlife: Mule Deer (see Section 3.8.2)
- Wildlife: Mountain Lions (see Section 3.8.2)
- Livestock (see Section 3.8.3)
- Plant Species: Pediocactus (see Section 3.8.4)

- Noxious Weed Control (see Section 3.8.5)
- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)
- Water Resources (see Section 3.8.8)
- Cultural Resources (see Section 3.8.11)

3.4.6 Road Base Construction

The road base (aggregate) will be placed on graded areas in 6-inch to 12-inch (maximum) deep compacted layers, to the finished grade as indicated on the engineering drawings. The depth of a compacted layer will be based on the compaction standard required in the engineering drawings approved by the BLM. Geotextile may be required for separation between the road subgrade and the aggregate, except where otherwise specifically noted.

Aggregate materials will be made from crushing the excavated rock from the foundation holes, and therefore will be materials from the project site, to the extent possible. Any additional aggregate materials will be from private sources located off-site. As the access and initial project roads will need to be built before any foundations are excavated, initial quantities of aggregate will need to be imported from a nearby source. The exact source of the aggregate will be determined once a civil construction contractor is selected.

Potential environmental impacts during the road base construction include:

- Public Safety (see Section 3.8.1)
- Livestock (see Section 3.8.3)
- Noxious Weed Control (see Section 3.8.5)
- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)
- Water Resources (see Section 3.8.8)
- Spill Prevention Plan (see Section 3.8.9)
- Cultural Resources (see Section 3.8.11)

3.4.7 Excavation

Excavation involves the removal of earth and rock to allow for the construction of roads and foundations. Excavation for structures will be completed to the designated lines and elevations indicated on the detail design drawings. Machine excavation will be controlled to prevent undercutting the subgrade elevations indicated on the drawings.

Excavated materials that meet the specified requirements may be used for the fills, embankments, and backfills. Vertical faces of excavations will not be undercut to provide for extended footings.

Material excavated below the bottom of concrete structures to be supported on the subgrade will be replaced with concrete placed monolithically with the concrete above. Rock fill or lean concrete may be used, if acceptable to the design engineer and the BLM/IDL Authorized Officer.

Excavated materials will be crushed for road aggregate or placed back into the center of the foundation hole. Most rock material will be crushed and used as road aggregate. Remaining excess excavated materials, if any, will be used on the site for road maintenance, and will not be hauled off-site unless absolutely required and approved by the BLM/IDL Authorized Officer.

Potential environmental impacts during excavation include:

- Public Safety (see Section 3.8.1)
- Wildlife: Sage-Grouse (see Section 3.8.2)
- Livestock (see Section 3.8.3)
- Plant Species: Pediocactus (see Section 3.8.4)
- Noxious Weed Control (see Section 3.8.5)
- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)
- Water Resources (see Section 3.8.8)
- Spill Prevention Plan (see Section 3.8.9)
- Cultural Resources (see Section 3.8.11)

3.4.8 Compaction

During construction of roads and foundation structures, it is critical that the earth under them is solid. To achieve this, the earth is compacted. Compaction associated with the Cotterel Mountain Wind Power Project will meet the following standards:

- For roads, the requirements outlined in the BLM Road Standards (Manual Section 9113). The manual indicates that the top 12 inches of subgrades of all roads that are to be surfaced will be compacted to 95 percent of the maximum density as determined by AASHTO T-99.
- Rock fill will be compacted in eight-inch uncompacted thickness to 70 percent relative density as determined by ASTM D4253 and D4254. Compaction will be performed with vibrating mechanical compactors.

Potential environmental impacts during compaction include:

- Wildlife: Sage-Grouse (see Section 3.8.2)
- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)
- Water Resources (see Section 3.8.8)

3.4.9 Trenching

Open trenching is necessary for the placement of electrical collection system cables and fiber optic lines. The extent of the open trench at any given time will be minimized to only those distances necessary to conduct work. Trenches that are not backfilled by the end of the day will be covered or fenced. Covers will be secured in place and will be strong enough to prevent livestock or wildlife from falling through and into the trench and or hole.

Potential environmental impacts during trenching include:

- Public Safety (see Section 3.8.1)
- Wildlife: Sage-Grouse (see Section 3.8.2)
- Wildlife: Golden Eagles (see Section 3.8.2)
- Wildlife: Migratory Birds (see Section 3.8.2)
- Wildlife: Mule Deer (see Section 3.8.2)
- Wildlife: Mountain Lions (see Section 3.8.2)
- Livestock (see Section 3.8.3)
- Noxious Weed Control (see Section 3.8.5)
- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)
- Water Resources (see Section 3.8.8)
- Cultural Resources (see Section 3.8.11)

3.4.10 Stormwater Pollution Prevention

A Storm Water Pollution Prevention Plan (SWPPP), which includes erosion control measures, will be generated and implemented on site for the project. The SWPPP will be based on the Environmental Protection Agency (EPA) document entitled "Storm Water Management for Construction Activities-Developing Pollution Prevention Plans and Best Management Practices". The SWPPP will be developed with the civil design of the project, and per the design approval process discussed in Section 2.7, will be reviewed by the BLM/IDL Authorized Officer.

3.4.11 Erosion Control

The erosion control features will be clearly stated within the SWPPP.

3.5 STRUCTURAL CONSTRUCTION ACTIVITIES

3.5.1 Concrete Supply

A batch plant will be set up on-site at the location shown on the attached location maps to provide for the significant amounts of concrete necessary for base foundations of the wind turbines and substation equipment. Attempting to bring onto the site trucks with pre-mixed concrete is not feasible with the distances to the nearest concrete batch plants and especially the time needed to negotiate the mountain. Attempting such deliveries also would pose a hazard to public safety and a greater impact on the environment.

A batch plant capable of producing approximately 50 cubic yards of concrete per hour will be needed for this project. To operate such a plant, a total of 30 tons of sand, 45 tons of aggregate, 15 tons of cement, and 3,000 gallons of water will be needed per hour while mixing concrete at peak production. The gravel and cement will be trucked to the batch plant and temporarily stored next to the batch plant. The gravel and cement will be from private sources located off-site. The water will be stored in a temporary aboveground storage tank. The gravel and cement will be trucked to the site on as close to an on time use schedule as possible to minimize storage.

Potential environmental impacts during the batch plant operational life include:

- Public Safety (see Section 3.8.1)
- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)
- Water Resources (see Section 3.8.8)
- Spill Prevention Plan (see Section 3.8.9)

3.5.2 Steel Placement

The construction of the numerous turbine foundations will require a considerable amount of steel reinforcement. A lay down area adjacent to the O&M area on State of Idaho land at the north end of the project will be needed to store this rebar until it is needed in the construction process. A fabrication area within the laydown area will also be needed to prefabricate sections of rebar before they are transported to the turbine base excavation. The lay down area is shown on the attached location map.

Typically rebar placement follows the following sequence:

- Fabricate at shop and bend all material
- Ship to site all project materials
- Shake out steel onsite in fabrication/lay down area
- Begin assembly of large mats to reduce in place assembly
- Place prefabricated sections
- Tie-in miscellaneous pieces
- Complete pre-pour inspection

Potential environmental impacts during steel placement include:

- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)

3.5.3 Formwork

Depending on the type of turbine foundation selected (Section 3.2.3), formwork may be necessary. Formwork is timber or steel shuttering used to form a shape into which rebar is placed and then concrete is poured. The formwork shuttering is then removed when the concrete has cured. The shuttering may be reused but in the case of timber shuttering it may be discarded. Proper disposal methods will be used to discard shuttering no longer fit for reuse.

There are no expected environmental impacts with the placement of formwork, as this will occur after excavation but before steel and concrete placement.

3.5.4 Concrete Placement

Concrete placement will involve two different approaches based on the discussion in Section 3.2.3. The foundation sequence will involve the following steps:

- Excavate foundation area
- Level bottom of excavation, pour mud mat (if required)
- Set forms for base slab (if required)
- Set and brace side wall forms
- Install reinforcing steel
- Install anchor bolts
- Check forms and reinforcing steel for correctness
- Placement of concrete
- Finish top of concrete
- Placement of soil or gravel over below-grade portions of foundation, as appropriate

Potential environmental impacts during concrete placement activities include:

- Public Safety (see Section 3.8.1)
- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)
- Water Resources (see Section 3.8.8)
- Spill Prevention Plan (see Section 3.8.9)

3.6 ELECTRICAL CONSTRUCTION ACTIVITIES

3.6.1 Buried Cable Placement

There are two methods for the placement of the electrical collection system cable. The first is open trench placement, where a trench is dug to the required depth of cable placement, the cable is placed in the trench, and the trench is then refilled. An example of an open trench is shown in Figure 3-11. The second placement method is direct placement using a trenching machine. These machines cut an opening just large enough for the cable, place the cable, and refill the hole in a combined single pass (see Figure 3-11). While very efficient, these machines are hampered in areas where the soil conditions are very rocky. If the geotechnical investigation shows that the soils present on-site will not conduct heat away from a buried cable properly, it may be necessary to bring to the site an "engineered backfill" material to be placed around the cable for heat dissipation. If such backfill is necessary, the open trench approach will be required. Until the geotechnical investigation is completed, it is not known which method will used at Cotterel Mountain. As discussed in Section 3.4.7, excess materials excavated from trenches will be used for road fill or aggregate.

The medium-voltage electrical collection system cable will be placed a minimum of 48 inches below grade. The fiber optic communications cable will be placed a minimum of 18 inches below grade. The final depths will be determined by the geotechnical conditions of the area, and the manner in which the cable is installed. Direct buried cable will have a warning tape placed over the top at a depth of 12 inches, which will act as a visual reminder of the cable's presence for future site work.

Figure 3-11. Open Trench Example.

Figure 3-12. Trenching Machine Example.

Potential environmental impacts during buried cable placement include:

- Public Safety (see Section 3.8.1)
- Plant Species: Pediocactus (see Section 3.8.4)
- Noxious Weed Control (see Section 3.8.5)
- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)
- Cultural Resources (see Section 3.8.11)

3.6.2 Grounding

Every wind turbine foundation will have a grounding mat cast in place when the base is constructed. This consists of a copper cable mat that discharges electric energy into the earth when the wind turbine builds up an electrical charge by being struck by lightening or equipment malfunction. The substation will also have a grounding grid laid below grade, in

trenches around the substation site, to protect equipment and personnel in the case of electrical malfunction or lightning strike.

Transmission poles also require grounding. The grounding crew will follow behind the pole assembly and erection crew installing the grounds. This crew will install the proper number of ground rods and measure the ground resistance. If the proper ground resistance is not initially achieved, they will install additional ground rods until the acceptable ground resistance is obtained.

Potential environmental impacts during grounding activities include:

- Public Safety (see Section 3.8.1)
- Plant Species: Pediocactus (see Section 3.8.4)
- Noxious Weed Control (see Section 3.8.5)
- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)

3.6.3 Buswork and Electrical Line Connections

The majority of the electrical work performed within the BLM/IDL land will be underground. Some overhead electrical line and buswork (rigid overhead meter conductors) connections will be made at the project substation. The electrical collection system will come into the substation underground, then transition overhead into the 34.5kV buswork. This buswork connects the turbines connected on different feeder lines (each line connected to 10 to 12 wind turbines) to a common bus. Any necessary voltage regulation devices will also connect to this buswork, which then connects to the low-voltage side of the substation transformer. On the high-voltage side of the transformer, an overhead connection will be made to the project transmission tie-line using a riser structure.

This buswork will be constructed using small overhead cranes, scissor-lifts, and other similar devices. These components will be bolted together on-site, and placed on small foundations for support. All of this work will be performed within the fence of the project substation. Figure 3-13 shows an example of buswork construction being performed.

Potential environmental impacts during the buswork and electrical line connections include:

- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)
- Spill Prevention Plan (see Section 3.8.9)

Figure 3-13. Substation Buswork Construction.

3.6.4 Communications Systems Installation

Communications between the wind turbines and the substation will be achieved by using underground fiber optic cables. These cables will be buried above the electrical collection system cables utilizing the same trenches in order to minimize the impact to the environment. Communications to the substation will be achieved by a fiber optic line to the O&M Building.

Potential environmental impacts during communication systems installation include:

- Public Safety (see Section 3.8.1)
- Plant Species: Pediocactus (see Section 3.8.4)
- Noxious Weed Control (see Section 3.8.5)
- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)

3.6.5 Aviation Lighting on Wind Turbines

Federal Aviation Administration (FAA) regulations require aircraft warning markings on all structures taller than 200 feet. The wind turbine designs being considered for this project would all be taller than 200 feet, so marking will be required. Once the project layout is finalized, a project lighting plan will be developed using the guidance from *FAA Technical Note: Developing Obstruction Lighting Standards for Wind Turbine Farms*, published by FAA in November 2005. Aviation warning for a wind energy project include medium intensity red strobe warning lights, placed on the nacelles of the turbines on each end of a turbine "string" plus every third or fourth turbine. Once the exact marking plan is determined, it will be submitted to the FAA for review. Windland has been working with FAA from the beginning of the project on lighting.

Figure 3-14. Typical Aviation Warning Light.

There are no environmental impacts expected for the installation of the lights themselves. The lights will be installed on top of the nacelles, thus partially shielding their light from sight on the ground while maintaining full visibility to aircraft. The operation of the wind turbine with the lights installed is considered in Section 4-2 (note the light shown above is mounted on the side of the nacelle, in a configuration different from that to be used on Cotterel Mountain).

3.7 WIND TURBINE/METEOROLOGICAL TOWER ERECTION

3.7.1 Turbine Component Delivery and Storage

As wind turbine components arrive at the Cotterel Mountain site, they will be routed to the turbine site where they are to be installed. When trucks arrive at each site, a small crane mounted on rubber tires (rather than tracks) will remove the cargo. Each site will have a plan for the arrangement of major components before erection. These major components include the tower sections, nacelle, rotor hub, and blades (see Figure 3-15 for an example). If the wind turbine foundation has had sufficient time to cure before the lowest tower section arrives, that section will be off-loaded directly onto the foundation.

Turbine deliveries may begin before the site opens in the spring, before the site roads are ready for truck traffic, or outside lekking periods when traffic on the site must be minimized. In these instances, some major components may be offloaded and temporarily stored at the lay-down area near the O&M Building (see Section 3.2.8). These components will then be moved to their turbine site as soon as feasible.

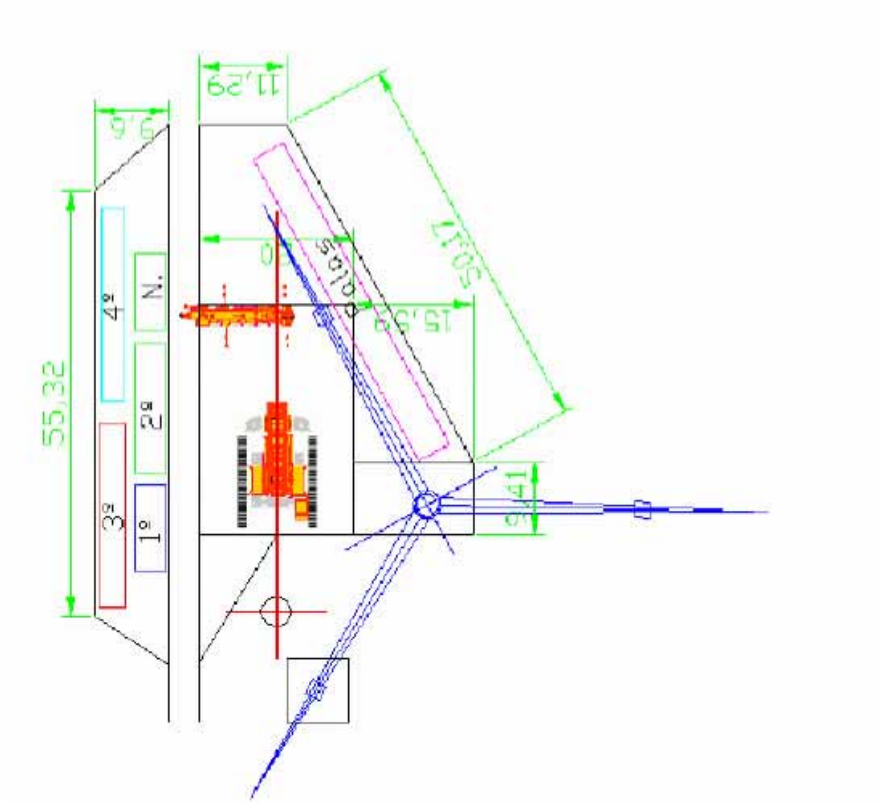

Figure 3-15. Example Schematic of Turbine Assembly Area Plan.

While most of the major components will arrive in completed form, the rotor (consisting of the hub and blades) will need to be assembled. The rotor will be placed with the nose up, and a small crane will be used to lift blades so they can be attached to the rotor. Once these blades are attached, and any hydraulic or electrical connections are made between the hub and blades, the completed rotor package will be ready to be lifted. A picture of a rotor being assembled is shown in Figure 3-16.

Potential environmental impacts during turbine component delivery and storage include:

- Public Safety (see Section 3.8.1)
- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)

Figure 3-16. Rotor Assembly.

3.7.2 Crane Movement or Assembly

When a large crane first arrives onto the project site, it will be taken to the location for its first turbine installation. The crane will be assembled on that site, and then used to install the wind turbine. Once the turbine at that site is erected, the crane will be "walked" to the next turbine site using the crane's tracked base (see Figure 3-17). The requirements for walking the cranes will set many of the design parameters for the turbine string road, including road width and slope. At locations where the road cannot be built within the tolerances for walking the crane, the crane will be disassembled, moved to the next site, and reassembled.

Potential environmental impacts during crane movement or assembly include:

- Public Safety (see Section 3.8.1)
- Wildlife: Sage-Grouse (see Section 3.8.2)
- Livestock (see Section 3.8.3)
- Plant Species: Pediocactus (see Section 3.8.4)
- Noxious Weed Control (see Section 3.8.5)
- Dust (see Section 3.8.6)
- Noise (see Section 3.8.7)
- Spill Prevention Plan (see Section 3.8.9)

Figure 3-17. Tracked Crane on Crane Pad.

3.7.3 Wind Turbine Component Lifts

Wind turbines are installed in large, pre-assembled components that are interconnected in the field. The tower, which usually consists of three or four sections, is installed first. The sections are lifted one at a time, and bolted together in place as shown in Figure 3-18. Once the last tower section is in place, the nacelle is secured to the top of the tower as shown in Figure 3-19. Finally, the rotor (hub and blades) are lifted into place and secured onto the nacelle. The rotor can be lifted into position as a complete unit, in some instances the hub will first be fitted onto the nacelle, and then the blades are lifted into position and fixed to the hub. The rotor lift requires the use of a small "helper" crane, as shown in Figure 3-20.

Once the crane and all wind turbine components have arrived at a site, the assembly of the major components takes one to two days. The lifting of large turbine components can only be done during periods of high visibility and low winds. Weather delays can occur at some sites. Two or more large cranes may be simultaneously installing turbines.

The types of potential impacts of wind turbine component lifts include:

- Public Safety (see Section 3.8.1)
- Noise (see Section 3.8.7)

Figure 3-18. Mid-Section Tower Assembly.

Figure 3-19. Nacelle Placement.

Figure 3-20. Complete Rotor Pick-Up.

3.8 POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES DURING CONSTRUCTION

The identified potential environmental impacts of the construction of the Cotterel Mountain Wind Power Project are discussed below. Construction staff site orientation will include education on these issues and the project mitigation and monitoring practices. The construction manager will establish a method for staff to formally report any issues associated with the environmental impacts, to keep management informed, and allow for rapid response. It is the intention of Windland that the mitigation measures discussed below be effective and keeps any impacts to a minimum level. If mitigation measures are found to be ineffective, or unanticipated environmental aspects are found on the site, the mitigation and monitoring practices will be adapted to address these conditions. Any adaptations will be made with the approval of the BLM/IDL Authorized Officer.

3.8.1 Public Safety

Given that the site is publicly-owned, the public has a right to access the site and use it for recreation. This right will be balanced with the protection of public safety, a key aspect of the project HSE plan. To accomplish this, Windland will perform public education, site access control, fencing, and limited supervision activities.

Public Education: A project web site will be established to describe the status of the project and disclose the upcoming activities. A kiosk will also be established that will also explain current activities and provide recommendations regarding safe practices on the project site. Additional outreach will be performed as necessary.

Site Access Control: The project cannot limit public access to the site to a level lower than it was prior to the start of construction, except in those areas where public safety could be jeopardized (or where theft-control measures are appropriate). As the road onto the north end of Cotterel Mountain from Highway 81 will be heavily used by construction vehicles, Windland will close this road to the public during construction. Keeping the public off this road while the construction vehicles and equipment are using it will enhance the safety both for the public and for the project construction personnel. Other existing roads onto the mountain will not be altered or closed. The north road will not be closed to livestock grazing permit holders, and Windland will work with the livestock grazing permit holders to coordinate use of the road and construction traffic. Also, signs will be added at other commonly-used access roads to the mountain indicating the north road is closed, and asking the public not to use the project roads during the construction period.

Windland will improve the lower portion of the north access road for construction traffic. At a point about halfway from Highway 81 to the top of Cotterel Mountain, the construction road will diverge from the existing road. At this divergence point, the new road will be gated and locked when construction vehicles are not using the road. When construction is not occurring (such as during weekends and holidays), the lower portion of the access road will be opened, so the public will have roughly the same level of access to the top of Cotterel Mountain as they do now.

As site access control is one of the primary means to provide for public safety, it will be closely monitored. Windland will work with the BLM/IDL to make any necessary changes during the construction period to improve public safety.

Fencing: For those areas where public safety could be endangered, Windland will install temporary fencing. The areas where temporary fencing will be used include open trenches and excavations where a fall hazard exists. Temporary fencing will also be placed around the construction lay-down area to limit the potential for theft and public injury. Permanent fencing will be placed around the substation area, per the legal and safety requirements of the electric utility industry. The intention is to install chain-link fencing around the lay-down areas, and around danger areas if livestock are present on the site. If no livestock are present, plastic warning fencing may be used around dangerous areas to minimize environmental impact.

Limited Supervision: During short-duration construction activities such as wind turbine assembly, Windland will have crews on-site performing the activity and monitoring overall safety. Construction crew members and safety monitors will be trained to ask members of the public to maintain a safe distance from the work zone. Neither the crew members nor the safety officers have the authority or responsibility of keeping all members of the public away from the construction zone, especially if members of the public choose to ignore posting signs or requests for them to keep some distance from the construction zone.

3.8.2 Wildlife

Sage-Grouse

Impacts: The success of the sage-grouse is directly dependent on the health of the sagebrush shrub-steppe community. Construction activity including land grading and clearing is the primary disturbance to sage-grouse.

Mitigation: Clearing of sagebrush communities will be minimized at the project site. In addition, methods of avoiding or minimizing fragmentation of the community will be taken into account prior to clearing.

Six leks (spring courtship grounds) have been identified in the project area. Development will avoid the leks and minimize clearing, grubbing, or otherwise disturbing natural vegetation in the vicinity, especially the sagebrush shrub community. There will be no construction activities within one-half mile of known leks during the spring mating season, defined to be between one-half hour before sunrise and 11:00 a.m. (construction will be allowed after sage-grouse are no longer observed at the lek) between March 15 and May 15. Construction activity is only allowed during daylight hours. Construction activities include the operation of large equipment such as earthmovers, cranes, and semi trucks (traffic from pickups and cars are acceptable). Off-limit areas during the mating season will be appropriately marked so that workers in the area are aware of these sensitive areas. Notification will also be placed in areas frequented by on-site personnel (such as break rooms and restrooms) to advertise the importance of avoiding these areas.

Monitoring: Signage for restricted activity areas will be checked at minimum once each week to insure presence and proper placement. Damaged or missing signage will be replaced as soon as possible. Site managers will observe restricted areas and be responsible for taking appropriate actions if entry to these areas is violated. Persons responsible for environmental compliance will be cognizant of site clearing activities and insure that impacts to the sagebrush community are minimized to the extent possible.

Construction staff will also be asked to report any sightings of sage-grouse on the project site, especially near the leks during the spring mating season. Sage-grouse found in areas without identified leks will be reported to the BLM/IDL for further inspection.

Golden Eagles

Impacts: Golden Eagles are protected under the Bald Eagle Protection Act. Three golden eagle nests were observed within or near the boundary of the project site, and were active during the avian monitoring performed in 2003. As with other birds, the loss of vegetation within the project site could lead to a loss of habitat for the source of food for the eagles.

Mitigation: To avoid direct impacts on the golden eagles, the project has established exclusion areas one-quarter mile centered around the golden eagle nests. No wind turbines will be installed within these areas.

Monitoring: The project site will be visually monitored on a weekly basis, at minimum. Any golden eagle carcasses discovered will be brought to the attention of the BLM/IDL Authorized Officer and to the US Fish and Wildlife Service.

Migratory Birds

Impacts: The Migratory Bird Treaty Act provides protection to many birds found in or migrating through the project area. On this basis impacts to migratory species could result from removal of vegetation (clearing, grubbing, etc.) during site preparation or lesser impacts such as unnecessary trampling of vegetation.

Mitigation: The removal of natural vegetation (grassland, shrub, and forest communities) will be minimized to the extent possible during construction. In addition the movement of personnel and equipment on site will be limited to construction areas to avoid unnecessary trampling of area vegetation.

Monitoring: No particular monitoring for impacts to migratory birds will be performed during construction.

Mule Deer

Impacts: Mule deer are common in the project area and are expected to avoid the site during construction due to noise and related activities. The project will result in the unavoidable permanent loss of a small amount of mule deer habitat. Operation of the facility is expected to have no effect on mule deer once the deer have adjusted to the presence of the wind turbines.

Mitigation: The permanent loss of habitat will be avoided to the extent possible. Indirect effects that could cause degradation of remaining habitat will be minimized by controlling activities that would result in the spread of noxious weeds, avoiding impacts to areas not associated with the project, and re-vegetating areas with native vegetation where feasible.

Monitoring: The project site will be visually monitored on a weekly basis, at a minimum, to insure that construction sites, laydown areas, roadways, and associated activities potentially impacting habitat are limited to areas agreed to prior to construction. Irregularities and/or violations will be reported immediately to project management and corrective actions taken.

Mountain Lions

Impacts: Mountain lions have been observed on Cotterel Mountain. These animals, however, are reclusive and during construction are expected to avoid the project site. Operation of the facility is not expected to directly affect the animals as they are expected to adjust to the presence of the wind turbines and use the area much as they do presently. Mountain lions could be indirectly affected if food resources, such as the mule deer population, were significantly reduced but this is not anticipated.

Mitigation: No specific mitigation is provided. Personnel on site are expected to be advised of the potential for occurrence of mountain lions in the area.

Monitoring: No specific monitoring program is anticipated. Incidents of mountain lions being impacted directly by construction, either by being scared away from the site, or by being injured or killed by construction vehicles, will be reported to the BLM/IDL for further action. Personnel on-site will be notified via signage of the potential for occurrence of Mountain lions in the area.

Big Horn Sheep

Big horn sheep are not currently known to occur on Cotterel Mountain. Therefore no impacts are anticipated and no mitigation is provided.

3.8.3 Livestock

Impacts: The project is expected to result in the permanent loss of about 203 acres of rangeland from turbines, roads, and related structures, plus the temporary loss of an additional 165 acres due to other construction activities. In addition to these direct effects, indirect impacts could result in degraded rangeland conditions caused by the spread of invasive and noxious weeds, which in turn is caused by the ground disturbances associated with the construction and operation of the project. The livestock are expected to adjust to the increased traffic during construction, as well as the presence of the wind turbines and associated structures.

Mitigation: Initial mitigation will be in the form of re-vegetation efforts applied to areas disturbed by construction activities (165 acres). Re-establishment of desirable native vegetation will take several years. Throughout the life of the project, it will be important to control invasive and noxious weeds. Also, any open trenches or pits that are left unattended will be fenced for safety, and existing cattle guards will be left in place. If livestock are expected to be on-site during these times, the safety fencing will be chain-link rather than plastic. There are livestock watering tanks and pipes on the project site. If Windland damages any portions of the livestock watering system, while livestock are on the project site, the system will be repaired as soon as possible, or supplemented water will be provided. If livestock are not present, the system will be repaired before livestock are brought back to the site.

Monitoring: The project site will be visually monitored on a weekly basis, at minimum, to insure that construction sites, laydown areas, roadways, and associated activities potentially impacting grazing lands are limited to areas agreed upon prior to construction. Irregularities and/or violations will be reported immediately to project management and corrective actions taken.

Construction staff will be asked to report any incidents of interaction with livestock, or livestock found close to the construction areas. If livestock are found to be attracted to the construction traffic or activities that increase their risk of injury, further mitigation measures will be discussed with ranchers, which may include the project relocating the livestock to off-site grazing areas for the remainder of construction. Such relocation will be with the agreement of and no cost to the rancher.

3.8.4 Protected Plant Species

No threatened or endangered species listed by the federal Endangered Species Act are found on the project. Simpson's hedgehog cactus (*Pediocactus simpsonii*) occurs at the site and is listed by the BLM as a special status species.

Pediocactus simpsonii

Impacts: Nearly every portion of Cotterel Mountain supports populations of *Pediocactus simpsonii* (Simpson's hedgehog cactus). The primary impact to the cactus population will be from surface disturbance. Clearing, grading, and excavation of any type will remove plants in those specific locations. In addition, trampling plants by equipment or individuals, accidental spills, or burning could affect the species as well as its habitat. The extent of direct impact to the species is limited to the construction area of the project site. The same impacts listed above can result in indirect impacts to the cactus.

Mitigation: Project construction personnel will be encouraged to avoid damaging or removing Simpon's hedgehog cactus wherever possible. Where impacts are unavoidable, it may be possible to move the cactus to unaffected areas of the project site, but this tactic will be discussed with appropriate BLM/IDL personnel familiar with the plant prior to moving the cactus.

Monitoring: Large Simpson's hedgehog cactus populations in close proximity to construction activities will be field marked for avoidance. These sites will be monitored at least once each week during the construction phase. Damaged or missing signage will be replaced as soon as possible. Site managers will casually observe these restricted areas and be responsible for taking appropriate actions if these areas are violated.

3.8.5 Noxious Weed Control

Impacts: Clearing, grading, and excavation activities associated with construction potentially creates new habitat for the invasion by weeds. The same is true where trampling, accidental spills, burns, and similar actions degrade existing native habitat. The effects of these impacts are usually permanent or at least require years to heal in arid environments like that found in the project region. Adjacent undisturbed areas are indirectly impacted by the invasion of weed species due to proximity.

Mitigation: The control of noxious weeds is difficult. Some weeds can enter the site on equipment and vehicles, while others may spread from distant areas by spores blowing onto the site in the wind. Windland will design and build the project so that the amount of ground disturbance necessary will be minimized, exposing the least amount of soil possible. Large construction equipment that will be traveling off project roads will be required to be cleaned prior to entering the site. Windland also will work with the BLM/IDL and the Cassia County Weed Control office to establish a weed control program for the project. This may entail spot spraying with an approved herbicide along disturbed areas for noxious and invasive weed species. The frequency of the spraying will be based on the season and the amount of water used for dust control, and will be adapted based on monitoring results.

Monitoring: A noxious weed inventory will be performed before the start of construction. Windland will work with the Cassia County Weed Control office to perform monthly weed surveys on the project site during the spring and summer months of the construction phase of the project.

3.8.6 Dust

Impacts: Temporary and localized impacts from dust will occur from the construction phase due to vehicular traffic, grading, other soil disturbances, and particulate matter emissions from the concrete batch plant.

Mitigation: During construction some localized increase in dust levels will be unavoidable. To minimize these levels, Windland will use water or other dust control measures on heavily used roads, and traffic speed will be held to appropriate levels. Disturbed areas will be re-vegetated as soon as possible following disturbance.

Monitoring: Periodic observations will be made from off-site to determine the amount of dust being generated, and the amount leaving the site. If the mitigation measures are found to be ineffective, alternative measures will be determined in coordination with the BLM/IDL.

3.8.7 Noise

Local noise levels will be affected temporarily by construction activities (such as equipment movement and blasting), but due to the remote nature of the site no impacts are anticipated to residences or businesses. Wildlife may avoid the project area to some degree due to construction noise but for the most part is expected to return to the area upon completion of construction.

Impacts: The project site is remote and unpopulated with the nearest single residence approximately two miles away. Albion, the nearest community is five miles away. Impacts during construction are expected to be limited to construction workers on-site, and wildlife and livestock in the immediate vicinity. If blasting is necessary this could be heard several miles away under the right weather circumstances. Once wind turbines begin operation, their noise impacts will not be significant, since the design of modern turbines results in minimal sounds even at close range.

Mitigation: All construction will take place during daylight hours. If blasting is necessary, the duration will be short and it will also take place during daylight hours to minimize any impacts to residences and communities in the area.

Monitoring: Through communications with the local communities, Windland will be kept informed of any noise complaints. If significant noise complaints are received, noise measurements will be taken along the project boundary or near the complaint sources to ascertain the true noise levels. If noise levels are found to be unsatisfactory, alternative mitigation measures will be explored.

3.8.8 Water Resources

Impacts: Ground disturbances associated with the construction of the project and its access road pose the greatest potential for impact to surface water resources in the form of sedimentation due to soil erosion. Spills or leaks of fuels, oils, or hazardous materials may affect local water resources. Several springs occur in the project area could be affected by blasting activities.

Mitigation: The use of best management practices will avoid impacts to water resources. A SWPPP and spill prevention control and countermeasures program (SPCCP) will be prepared for the project. Local springs will be monitored for changes in flow due to blasting activities during construction.

Monitoring: The SWPPP and SPCCP will include site investigation protocols. The flow through local springs near blasting areas will be monitored within an hour before and after blasting activities to determine if any changes occurred. Also, seismic monitoring will be performed at identified springs within one mile of blasting activities to ascertain the potential impacts to the spring.

3.8.9 Spill Prevention Plan

Impacts: All equipment has the potential to leak fuels, oils, and other liquids. Various fuels and lubricant products will be used at the project site, which pose spill or leak potential.

Mitigation: A SPCCP will be prepared for the project as part of the storm water program (see Section 3.4.10) as required under 40 CFR Part 112. If necessary, a site specific program will be crafted to address any issues considered unique to this project, such as:

- Inspections of truck bottoms during weed control activities
- Inspection of trucks that stay on-site for long periods (such as concrete trucks and cranes)
- Special considerations for fuel trucks
- Inspection practices for wind turbine hydraulic lines and coolant systems
- Spill clean-up protocol
- Fuel tanks should be double walled or should be located in a secondary (bunded) containment area. The secondary containment area should be able to contain at least 110% of the full volume of the fuel tank.

Monitoring: The SPCCP will include the spill monitoring protocol.

3.8.10 Fire Prevention Plan

Impacts: Fires are not common on wind energy sites as a direct result of wind energy electrical generation, because no combustion occurs as part of the generating process. However, it is possible the site could be threatened by wildfires ignited during construction activities, by lightning, or human activity on the site and in the Cotterel Mountain area. A large fire could destroy a significant amount of vegetation in the project area, and be a threat

to wildlife, livestock, and visitor safety. Such a fire could also seriously damage the wind turbines and substations.

Mitigation: The project HSE Manual will provide a list of emergency contacts and protocols in case of a fire. During construction, fire extinguishers, five-gallon backpack hand water pumps, and fire-fighting hand tools, such as shovels, pulaskis, or mcleods, will be located in the base of each wind turbine tower, in each project construction vehicle, in the substation control building, and the O&M building. Personnel performing "hot work", such as welding, will be required to have the same fire-fighting equipment listed above. Vegetative materials removed during construction will be treated or removed to reduce fire vulnerability. The water tank truck used for dust abatement will be left full of water and fuel at a location designated by the fire management officer for the BLM so that it is in a condition where it could be readily used in case of a fire. Smoking and off-road parking will be restricted to designated areas. Windland will work with the BLM Authorized Officer to establish these designated areas. Signs will be posted in strategic locations on the site to remind personnel of the emergency response procedures, liabilities, and telephone contact numbers for fire emergencies.

Normally, any ignitions that cannot be immediately controlled by project personnel acting within the purview of their training and equipment will be responded to appropriately by initial attack forces from the BLM South Central Idaho Fire Organization located in Shoshone, Burley, and Twin Falls, Idaho. However, if fire danger levels warrant additional protection, or if preparedness levels on either a local or national level become such that local forces are spread too thin to provide immediate initial attack response, the authorized officer may require that one or more wildland fire engines, of a type to be specified by the authorized officer, be stationed on the construction site for initial attack purposes. These engines may be either agency owned or private hires under Emergency Equipment Rental Agreements (EERA). They will be provided by the BLM and funded by the ROW grant holder. Contract engines will meet the minimum National Wildfire Coordinating Group (NWCG) standards for equipment used in wildland firefighting and will be inspected by Burley BLM Fire Personnel before being placed in service. Assurance of continued compliance with NWCG standards will be the responsibility of the BLM.

Mitigation will be dependent on fire conditions and other special circumstances prevailing in the project area. If necessary, site-specific actions could include but not be limited to actions such as:

- Establishment of spotter positions on key locations within the project area
- Pre-positioning fire suppression capabilities (e.g., contracted engine crews) under high or extreme fire conditions
- Restriction of certain on-site high risk activities (e.g., welding) or suspension of all construction activities when red flag conditions occur
- Avoidance of sensitive sites and/or those having high fire potential when extreme fire conditions occur
- Road closures or travel restrictions when fire dangers are high.

Determinations of need for additional protection measures will be made by the Authorized Officer.

Monitoring: If project site personnel find a fire, they will respond within the guidelines of the HSE manual and their levels of training and available equipment. If a fire is located on the site that cannot be immediately extinguished, a call will be made for emergency support and the site will be evacuated until the fire is extinguished. All fire restrictions that apply to the public also apply to work crews in the project area unless special provisions are in place and approved by the Authorized Officer.

3.8.11 Cultural Resources

Impacts: The FEIS identified 31 possible Areas of Potential Effects (APE) on Cotterel Mountain. These areas may contain artifacts of historical significance, as defined by the National Register of Historic Places. Construction within these APEs could impact, damage, or destroy these artifacts, and could degrade the cultural value of the sites. These APEs have been surveyed for cultural artifacts, and the artifacts located were left in place.

Mitigation: The anticipated boundaries of the identified APEs that are within the project construction area have been plotted on the project civil design drawings. Windland will work to avoid construction within the APEs. If construction within an APE is required to develop an efficient project, a detailed survey of the area will be performed, and any artifacts that would be impacted will be removed from the site and handled per the guidance of the BLM/IDL and either the Idaho State Historic Preservation Office or appropriate Native American Nation.

Monitoring: Field personnel will be instructed to watch for potential artifacts, especially in areas in or near identified APEs. If any artifacts are located, work in that area will cease and the BLM/IDL authorized officer or designee will be consulted. More information regarding artifact handling is provided in Section 2.6.5.