BP Wind Energy North America Inc.

Mohave County Wind Farm Project

Plan of Development

Submitted to BLM Kingman Field Office

August 10, 2011 Revision

Signature Page

I certify that to the best of my knowledge, this document is accurate and fulfills the requirements for the Right of Way Grant process. This Plan of Development (POD) for the Mohave County Wind Farm Project site accompanies the SF299 which is completed in its entirety.

Name

Date

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ATTACHMENTS (Drafts)

ACRONYMS

ACEC	Area of Critical Environmental Concern
APE	Area of Potential Effect
BLM	Bureau of Land management
BMP	Best Management Practices
BPWENA	BP Wind Energy North America, Inc.
CFR	Code of Federal Regulations
COD	Commercial operation date
CRMP	Cultural Resources Management Plan
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FLPMA	Federal Land Policy and Management Act
H&S	Health and Safety
IGBT	Insulated gate bipolar transistors
IM	Instructional Memorandum
kV	Kilovolt
MSDS	Materials safety and data sheet
MW	Megawatt
NEPA	National Environmental Protection Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
O&M	Operations and Maintenance
OSHA	Operational Safety and Hazards Act
PCB	Polychlorinated biphenyl
PEIS	Programmatic Environmental Impact Statement
POD	Plan of Development
Project	Mohave County Wind Farm Project
RMP	Resource Management Plan
ROW	Right of Way
RPS	Renewable Portfolio Standard
SHPO	State Historic Preservation Office
SWPPP	Stormwater Pollution Prevention Plan
TBD	To be determined
TCP	Traditional Cultural Properties
USBM	U.S. Bureau of Mines
USDA-NRCS	U.S. Department of Agriculture – Natural Resources Conservation Service
USFWS	U.S. Fish and Wildlife Service

GLOSSARY OF KEY TERMS

Ancillary Facilities – Wind Turbine Generator (WTG) support components (i.e. transformers, electrical collection system, substations, O & M) that allow the electricity produced by the WTG to be connected to the existing electrical grid.

Anemometer – One of the components of a meteorological tower, the anemometer is a sensor that measures wind speed and direction.

Clearing & Grubbing – Process of removing top layer of soil and vegetation 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 or 3 to 6 inches below surface.

Collector Road – (per BLM 9113) Provides primary access to large blocks of land, and connects with, or is an extension of, the public road system. The Collector Roads will bring the large turbine components, construction and operations personnel from the public road system to the initial point of entry and inspection on the Project site.

Concrete Batch Plant – A manufacturing plant where cement is mixed before being transported to a construction site, ready to be poured. Equipment and materials including batchers, mixers, sand, aggregate, and cement are required for batching and mixing concrete.

Construction Corridor – Potential area of impact resulting from the proposed construction activities.

Electrical collection system – Consists of underground and overhead cables that carry electricity from and within groups of wind turbines and transmits it to a collection substation and point of interconnection switchyard, which transfers the electricity generated by the project to the regional power grid.

Electromagnetic fields (EMF) – A combination of invisible electric and magnetic fields of force. They can occur both naturally or due to human constructs.

Gearbox – A protective casing for a system of gears that converts the wind into mechanical energy.

Generator – A device for converting mechanical energy to electrical energy that is located in the Nacelle.

Grid (also "Power Grid" and "Utility Grid") – A common term referring to an electricity transmission and distribution system.

Local Roads – (per BLM 9113) Provide lower volume secondary road access and serves a smaller area than collectors, and connect to collectors or public road systems. Local Roads will provide access to each of the Wind Turbines that are in Turbine Line Corridor and access between Turbine Line Corridors.

Main Lay-down Area (also "Staging Area") – A designated secure area or space, adjacent to the construction site, where construction equipment and materials/supplies in transit are temporarily stored, assembled, or processed, as part of a construction operation. In addition, temporary construction trailers and vehicles may be parked within the boundary limits of this secure space.

Megawatt – A unit used to measure power, equal to one million watts.

Meteorological mast – One of the components of a meteorological tower, the meteorological mast supports the anemometers and data logger.

Meteorological towers – Wind measurement systems that can be of steel tube or lattice construction, and can be free-standing or guyed; they are equipped with sensors to measure wind speed and direction, temperature and pressure.

Met Tower – Meteorological towers erected to verify the wind resource found within a certain area of land.

Nacelle – The cover for the gearbox, drive train, and generator of a wind turbine that converts the energy of the wind into electrical energy. The Nacelle can rotate a full 360 degrees at the top of the tower to capture the prevailing wind and weighs as much as 50 tons.

Operations and Maintenance Facilities (O&M) – For storing equipment and supplies required during operation. Some maintenance facilities include control functions such as the supervisory control and data acquisition (SCADA) to provide two-way communication with each wind turbine.

Point of Interconnect (POI) – The geographical location where two electrical networks interconnect nd exchange electricity.

Power Grid (also "Utility Grid") – A common term referring to an electricity transmission and distribution system.

Resource Roads (per BLM 9113) – Typically consists of low volume spur roads that provide point access and connect to local or collector roads. The Resource Roads will be roads along the Turbine Line Corridors used during construction to construct the turbine foundations with concrete, deliver turbine towers and components and operation personnel to the turbine during operations.

Rotor – The blades and other rotating components of a wind energy conversion turbine.

SCADA – Supervisory Control and Data Acquisition; collects data throughout the wind farm to monitor and provide control from a remote location.

Sedimentation – Deposition of sediment into water bodies and wetlands.

Shadow flicker – The effect caused by the sun's casting shadows from moving wind turbine blades.

Soil erosion – A natural process in which soil particles are detached and removed by wind or water.

Staging Area (also "Main Lay-down Area") – A designated secure area or space, adjacent to the construction site, where construction equipment and materials/supplies in transit are temporarily stored, assembled, or processed, as part of a construction operation. In addition, temporary construction trailers and vehicles may be parked within the boundary limits of this secure space.

Switching Station/POI – A particular type of substation where energy, of the same voltage, is routed either from different sources or to different customers. Switching stations often contain circuit breakers, switches and other automated mechanisms that switch or divide their output between different distribution lines when system faults occur or shut down transmission altogether in the event of a serious problem

Transmission/Interconnection facilities – A collection substation terminates collection feeder cables and steps up the voltage to that of the transmission system to which the project ultimately connects.

Transmission Line Corridor – Potential route for overhead electrical lines connecting from the project substation to a determined point of interconnection at the existing system.

Turbine (also see "Wind Turbine") – A term used for a wind energy conversion device that produces electricity.

Utility Grid (also see "Power Grid") – A common term referring to an electricity transmission and distribution system.

Wind Energy (also see "Wind Power") – Power generated by converting the mechanical energy of the wind into electrical energy through the use of a wind generator.

Wind Generator – A wind energy conversion system designed to produce electricity.

Wind Load – The lateral pressure on a structure in pounds per square foot, due to wind blowing in any direction.

Wind Power (also see "Wind Energy") – Power generated by converting the mechanical energy of the wind into electrical energy through the use of a wind generator.

Wind Power Plant – A group of wind turbines interconnected to a common utility system.

Wind Project – Wind projects vary in size, from small projects of one to a few turbines (known as "behind the meter" or "distributed wind systems") serving individual customers, to large projects ("utility" or "commercial-scale" or "wind farms") designed to provide wholesale electricity to utilities or an electricity market.

Wind Turbine – A term used for a wind energy conversion device that produces electricity. Typically consists of three major mechanical components: tower, nacelle, and rotor.

Wind Turbine Lay-down Area – An area adjacent to the wind turbine foundation, where wind turbine components are temporarily stored, assembled, or processed, as part of the wind turbine assembly operation.

1.0 INTRODUCTION

BP Wind Energy North America Inc., ("BPWENA") has submitted an application for Commercial Wind Energy development and is requesting a right-of-way ("ROW") grant from the Bureau of Land Management ("BLM") Kingman Field Office to operate a wind farm with an estimated service life of 30 years.

The proposed Project would include the following:

- Roadways (also referred to as Collector Roads, Local Roads, and Resource Roads);
- Underground and above ground electrical collection system;
- Communication lines for the Project ("SCADA");
- Up to 283 wind turbines, including concrete foundations, tubular steel towers, nacelles, and blades;
- Up to 283 pad-mount transformers, one to be located beside the tower of each wind turbine;
- Overhead transmission line(s);
- Electrical substation(s);
- Electrical switching station; and,
- Two to four permanent meteorological masts.

The proposed Project will be located on lands administered by the BLM and Bureau of Reclamation ("BOR"). The proposed Project requires a new ROW grant for long-term commercial wind energy development pursuant to BLM IM 2006-216 dated August 24, 2006 and BLM IM 2009-043 dated December 19, 2008. This Plan of Development ("POD") is a required component of the accompanying commercial ROW grant application. The POD describes how the project will be built, operated, and decommissioned in a manner consistent with the requirements of the BLM. The POD is a living document and will continue to be refined during the BLM evaluation of the application and will be finalized for inclusion as part of the ROW grant.

In support of the National Environmental Policy Act ("NEPA") analysis that will be completed for this Project, detailed site specific resource studies and inventories will be conducted. The results of these site specific studies and inventories will be used to assess the potential impacts of the proposed Project, determine appropriate mitigation, and develop monitoring protocols to support adaptive management. As this site specific information becomes available it will be incorporated into this POD.

The project-specific Environmental Impact Statement ("EIS") incorporates the Best Management Practices ("BMPs") and mitigation measures, as appropriate, from the BLM's Final Wind Energy Development PEIS and Record of Decision (BLM 2005). Additional details are provided in Section 2.3 below regarding the NEPA process and other permits and approvals that may be needed from other federal, state and local agencies. BPWENA is committed to minimizing the environmental impacts from the proposed development consistent with BMP. BMPs are designed to provide good stewardship of the public lands involved. BMPs will be verified and included in the POD, design, construction and operation of the Project.

Since its inception in 2005, BPWENA has constructed eight wind farms in North America utilizing proven safety and environmental procedures. This POD includes the implementation of these continuously updated safety and environmental procedures utilized by BPWENA. Procedures will be developed after scoping meetings and throughout the EIS review as attachments to the POD to illustrate the level of detail in planning the Project.

2.0 GENERAL PROJECT INFORMATION

2.1 SUMMARY PROJECT DESCRIPTION

BP Wind Energy North America Inc. ("BPWENA") is proposing to construct, operate, maintain and decommission a wind generation facility in Mohave County, Arizona called the Mohave County Wind Farm ("MCWF"). BPWENA's proposed project, referred to as the Mohave County Wind Farm, MCWF or Project ("Project"), is located about 40 miles north of Kingman, Arizona, approximately 9 miles south of the Colorado River and approximately 20 miles southeast of Hoover Dam. The Project, as identified in Figure 2-1, consists primarily of lands managed by the U.S. Department of Interior, Bureau of Land Management ("BLM") and Bureau of Reclamation – Lower Colorado Region ("BOR"). BPWENA is the holder of a BLM and Reclamation wind energy testing and monitoring project area right-of-way ("ROW") covering 38,099 acres and 8,966 acres respectively within the Project area of 47,066 acres, with legal descriptions provided on Attachment 1. The Project would provide up to 425 megawatts ("MW") of wind energy and could consist of multiple phases:

The Project, which may be built in phases or all in one phase, would consist between 142 to 283 wind turbines, roads, an interconnection substation/switchyard, an Operations & Maintenance ("O&M") facility, permanent meteorological towers and collector lines to transmit approximately 425 megawatts ("MW") of generated electricity to the interconnection. The turbines would range in size from 1.5 MW to 3.0 MW each. To the extent possible, existing roads and 4x4 tracks would be used for ingress and egress to the Project, supplemented with Local and Resource roads to each turbine. Ancillary facilities would include pad mounted transformers, 34.5 kV electrical collection system between turbines, either a 345 or 500 kilovolt ("kV") electrical substation(s) and either a 345 or 500 kV overhead transmission line from the substation to a new switching station where the Project would interconnect to one of the major existing transmission lines in the area.

Please refer to Figure 2-1 and Attachment 2 for a map of the proposed Project area. The proposed turbines will be between 264 feet (80 meters) and 295 feet (90 meters) tall at hub height where the rotor rotates around and the blades of the turbines will extend between 157 feet (48 meters) and 197 feet (60 meters) above the hub for a total height of 420 feet (128 meters) to 492 feet (150 meters). It should be noted that the number and position of turbines could change depending upon turbine type optimally selected, however the turbine sizes would fall within the range highlighted above.

The Project is anticipated to have a commercial operation date ("COD") in 2013, depending primarily on the availability of transmission interconnection and service, status of permitting, and possible offtake of the power. Table 2-1 details the Project schedule. Table 2-2 outlines the anticipated process and timeframes for the NEPA analysis.

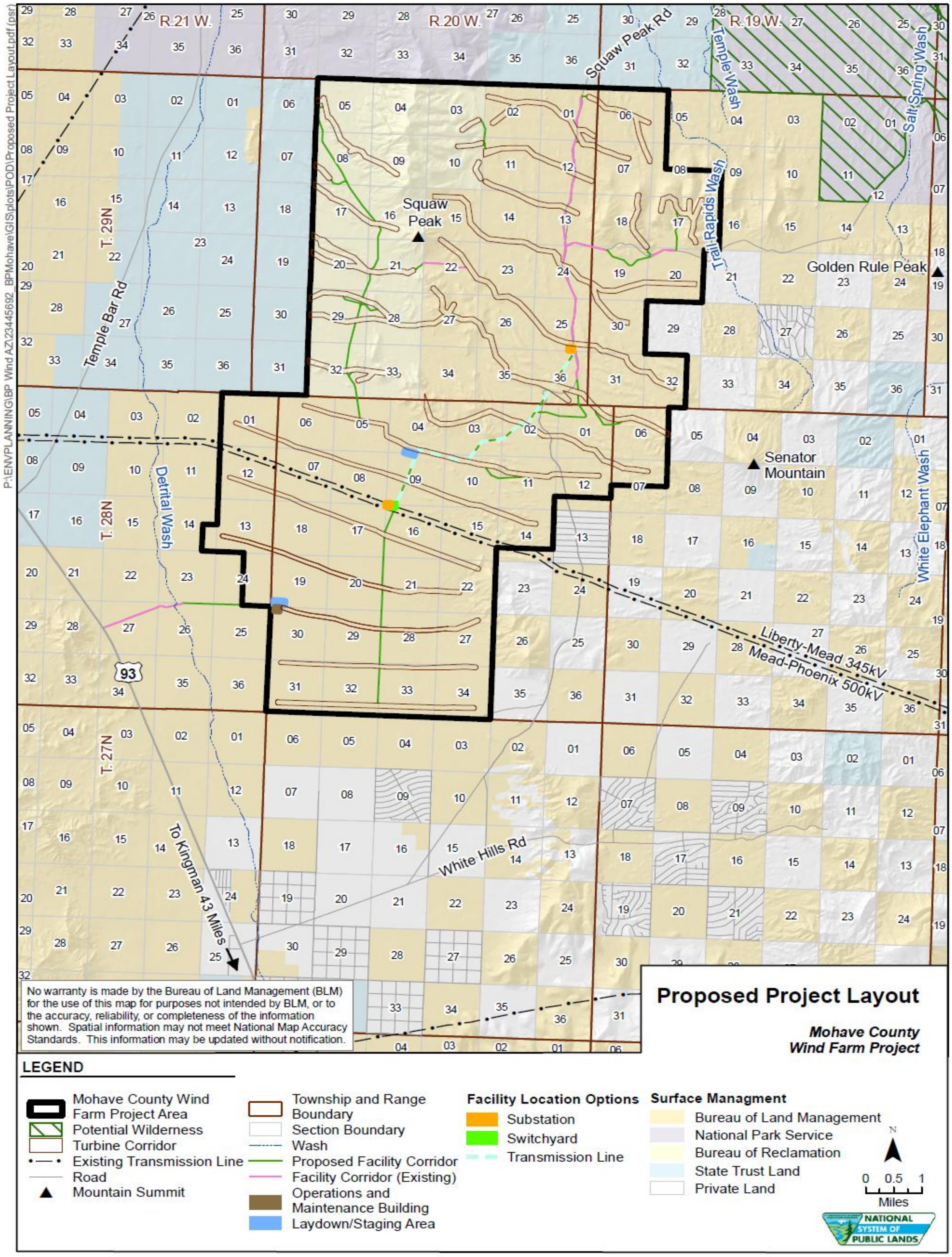


Figure 2-1: Proposed Mohave County Wind Farm Project Area

Table 2-1: Mohave County Wind Farm Project Timeline

Anticipated Project Schedule (subject to change)	
Interconnection Studies -System Impact Study -Facilities Study -Large Generator Interconnection Agreement Signed	 Summer 2009 Spring 2010 Late 2011
Wind Turbine Supply Contract	2012
EPC Contract executed	2012
Commencement of construction	2013
Testing	2013
Commercial Operation	2013

Table 2-2: Mohave County Wind Farm Project NEPA Timeline

NEPA- EIS Schedule	
Notice of Intent	Late 2009
Scoping	Late 2009 - 2010
Technical Studies	Summer 2009 – Spring 2012
Document development	Summer / Fall 2011
Issuance of Draft EIS	Late 2011
Public and Agency Review	Late 2011/ Spring 2012
Issuance of Final EIS	Summer 2012
Public and Agency review	Fall 2012
Record of Decision	Fall 2012

2.2 PURPOSE AND NEED

The Mohave County Wind Farm meets a number of objectives on the local, state and federal level. These include, but are not limited to:

- The need for additional energy supplies to serve the region.
- The priority placed on meeting these needs with clean, renewable energy.
- The BLM's commitment, via their wind energy development program, to promote the use of public lands for renewable energy development.

Additionally, a number of policy directives and agency actions at the federal level promote the development of renewable energy resources:

- President Executive Order (E.O.) 13212 (2001), "Actions to Expedite Energy-Related Projects," established a policy that federal agencies should take appropriate actions, to the extent consistent with applicable law, to expedite projects to increase the production, transmission, or conservation of energy.
- The National Energy Policy Development Group (2001) recommended to the President, as part of the National Energy Policy, that the Departments of the Interior, Energy, Agriculture, and Defense work together to increase renewable energy production.
- The Energy Policy Act of 2005 (P.L. 109-58). Section 211 states, "It is the sense of the Congress that the Secretary of the Interior should, before the end of the 10-year period beginning on the date of enactment of this Act, seek to have approved non-hydropower renewable energy projects located on the public lands with a generation capacity of at least 10,000 megawatts of electricity."

In response to the increased interest in wind energy development and to implement the National Energy Policy recommendation to increase renewable energy production, the BLM established a wind energy development program. This program supports the directives of E.O. 13212, the recommendations of the National Energy Policy, and Congressional direction provided in the Energy Policy Act of 2005 regarding renewable energy development on public lands.

The BLM Wind Energy Programmatic Environmental Impact Statement ("PEIS") of 2005 presented the agency's approach for managing wind energy development on BLM-administered public lands. The BLM's Wind Energy Development Program is a comprehensive approach for ensuring that potential adverse environmental impacts to public lands are minimized to the extent possible.

2.3 GOVERNMENT AGENCIES INVOLVED/PERMITTING REQUIREMENTS

The proposed Project will be reviewed by the BLM Kingman Field Office. An application for Commercial Wind Energy development has been submitted and the preparation for the EIS began in June 2009.

Additionally, the proposed project will be reviewed by the U.S. Fish and Wildlife Service ("USFWS"), the U.S. Army Corps of Engineers ("USACE") Arizona/Nevada Office, Arizona Game and Fish ("AZGF"), the Arizona State Historic Preservation Office, and the Federal Aviation Administration ("FAA"), Western Area Power Administration ("Western"), National Park Service – Lake Mead National Recreation Area ("NPS"), Bureau of Reclamation - Lower Colorado Region ("BOR"), and Mohave County. Table 2-3 identifies the potential permits and approvals that may be required for the project.

Table 2-3: Potential Permits and Approvals for the Mohave County Wind Project

Agency	Permit/Approval Required
FEDERAL	
BLM	Right-of-way grant - Notice To Proceed and accompanying NEPA review for Environmental Impact Statement (EIS)
U.S. Fish and Wildlife Service	Endangered Species Act, Migratory Bird Treaty Act, and Bald and Golden Eagle Protection Act
U.S. Army Corps of Engineers	Clean Water Act, Section 404/401 Permit for impacts to wetlands and water crossings (potentially required)
Federal Aviation Administration	Notice of Construction or Alteration pursuant to 49 USC 44718; Determination of No Hazard
Department of Defense	Concurrence that the Project will not affect military operations, military radar, or weather radar.
Tribes	Government to Government consultation
Advisory Council on Historic Preservation	Consultation under Section 106 of the National Historic Preservation Act
Federal Highway Administration	Encroachment Permit
Federal Aviation Administration	Determination of No Hazard
STATE	
Arizona Corporation Commission	CEC Permit for Transmission Lines
State Historic Preservation Office	National Historic Preservation Act, Section 106 consultation; Arizona Historic Preservation Act consultation on historic and archaeological resources
Arizona Game and Fish	Consultation related to state protected species
Arizona DEQ	AZPDES Permits for discharge related to construction site of over one acre (CWA Section 402)
Arizona Department of Transportation	Special permits for over-length, over-width, and over-weight, and over-height
LOCAL	
Mohave County	General Plan Amendment / Conditional Use Permit (if any project facilities are located on private lands)

Approval of the Project will require issuance of a ROW in compliance with the Federal Land Policy and Management Act of 1976 ("FLPMA") and accompanying analysis of the project under NEPA. The Environmental Impact Statement prepared for this project will incorporate, as appropriate, analysis, BMPs and mitigation measures from BLM's Final Wind Energy Development PEIS Record of Decision (collectively, BLM 2005). The project and ancillary facilities are planned to be on land under the jurisdiction of the BLM and BOR; however, in the event some facilities are located on private lands, an amendment to the Mohave County General Plan and a Conditional Use Permit may be required.

The BLM Kingman Office will be the lead federal agency under NEPA and will be responsible for conducting any agency consultation necessary for NEPA compliance for this project. BPWENA will assist the BLM in those consultations, as requested. Agencies expected to be consulted by the BLM may include: Western Area Power Administration, US Fish and Wildlife Service, Federal Aviation Administration, Department of Defense and Department of Homeland Security, as well as the appropriate state agencies, such as the Arizona Department of Game and Fish and State Historic Preservation Office, and the Mohave County Board of Supervisors. The BLM and BPWENA may jointly contact certain agencies, property owners, and other stakeholders early in the planning process to identify potentially sensitive land uses and issues; rules that govern wind energy development locally; and land use concerns specific to this project. BPWENA will maintain a list of key contacts for all phases of planning, construction, and operation of the project and send the Kingman BLM office a current list on a regular basis.

Design features, including Best Management Practices (“BMPs”), are measures and procedures that are integrated into the project. BPWENA is committed to incorporate design features to minimize the environmental impacts from the proposed development. These measures and procedures will be consistent with industry BLM BMPs and may be supplemented based on input from the BLM or other agencies in all permitted activities or following identification of potential significant impacts during field studies conducted as part of the NEPA compliance process.

If significant environmental impacts are identified, BPWENA is committed to integrating mitigation measures to avoid or reduce impacts as appropriate. If needed, additional mitigation measures would be developed in consultation with the appropriate regulatory agency (i.e., U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers). Any additional mitigation identified will be disclosed in the Final EIS.

BPWENA has used several early stage siting factors to reduce impacts. The process used to select the Project site and the locations of turbines, roads, interconnect and collection lines integrated ways to minimize impacts to sensitive resources and maximize production efficiencies. The project alternatives that were evaluated include: alternative project sizes, alternative turbine technologies, alternative road and interconnect designs, and the no-build alternative. The Project site was selected through a systematic process that considered (1) the location of wind resources; (2) the availability of existing roads and utility interconnections; (3) the availability of land with landowners willing to sign easements for their property; (4) community support for a wind project; (5) the presence of environmental constraints, including potential visual and noise impacts, FAA and FCC restrictions, impacts to waterways and important wildlife habitat; and (6) the presence of land use constraints including zoning and building restrictions. The selection process was designed to facilitate the evaluation of different potential project sites and turbine locations as BPWENA obtained property rights within a preferred project area sufficient to develop a wind energy facility.

The Mohave County Wind Project has been under development for several years, during which time BPWENA has evaluated alternative locations for the Project and has conducted several iterations of project design and layout to enhance success while limiting impacts to human health and the environment. The following section and associated attachments identify these design factors more specifically.

3.0 FACILITY DESIGN FACTORS

3.1 SITE LAYOUT

BPWENA is proposing to install and operate the Project on BLM land located within the jurisdiction of the BLM Kingman Field Office and Reclamation land located within the jurisdiction of the Bureau of Reclamation Lower Colorado Region. The Project is currently defined by the wind energy testing and monitoring ROW grant Serial No. AZA-32315. As proposed, the Project will require a ROW grant(s) for the construction, maintenance, and termination of a wind driven electric power generation facility, associated transmission lines and access roads across public lands administered by BLM.

The dimensions of major facility structures are as follows:

- Turbines between 264 feet (80 meter) to 314 feet (95 meters) hub height and up to 394 foot (120 meter) rotor diameter.
- Permanent project roads will be approximately 20 feet wide, including shoulders.
- Meteorological towers will be approximately 264 feet (80 meters) high.
- Two substations will occupy approximately 3-5 acres each; the switching station will occupy approximately 8-31 acres; the operations and maintenance (O&M) facility will be 5 acres
- One 345 or 500 kilovolt (kV) transmission line approximately 5 miles long using monopole or lattice structures.

Corridors of the locations of the proposed turbines are shown in Attachment 3. Based upon the layout of project components, it is estimated that construction activities will encompass approximately 1465 acres of disturbance, of which 331 acres will be permanent disturbance and the remainder will be temporary disturbance that will be restored. Table 3-1 identifies the permanent and temporary construction-related disturbance areas by Project facility and by impacted agency. It should be noted that the exact areas of each component are subject to change as the Project design develops. Detailed impact calculations will be compiled during the detailed design phase.

Table 3-1: Summary of Land Requirements Associated with the Project

Project Components	Impact Area	(Miles/Acres of Impact)			
		BLM		Reclamation	
		Temp.	Perm.	Temp.	Perm.
Two Laydown/Staging Areas and associated facilities such as parking area and temporary concrete batch plant	Collectively up to 20 acres	20 ac.	0 ac.	0 ac.	0 ac.
Wind turbines, including pad-mounted transformer	1.85 to 2.5 acres temporary disturbance per turbine; 0.065 permanent disturbance per turbine	483 ac.	15 ac.	78 ac.	2 ac.
Two Substations	Up to 5 acres per substation	10 ac.	10 ac.	0 ac.	0 ac.
Transmission Line to Switching Station	8 poles per mile: 100-foot radius per pole temporary disturbance, 6-foot radius per pole permanent disturbance	29 ac.	0.1 ac.	0 ac.	0 ac.
Switching Station for an interconnection to Liberty-Mead 345 kV line	Up to 12 acres	12 ac.	8 ac.	0 ac.	0 ac.
Switching Station for an interconnection to Mead-Phoenix 500 kV line	Up to 37 acres	37 ac.	31 ac.	0 ac.	0 ac.

Project Components	Impact Area	(Miles/Acres of Impact)			
		BLM		Reclamation	
		Temp.	Perm.	Temp.	Perm.
Operations and Maintenance Building and associated facilities such as parking	Up to 5 acres	5 ac.	5 ac.	0 ac.	0 ac.
Improvements to Existing Roads, including collector line trenches and any utility or communication lines to the O&M building	56-foot-width maximum development area for 36-foot temporary roads; 20-foot width for permanent roads (assumes existing road width of 20 feet or 2.5 acres of existing disturbance per mile)	20 ac.	0 ac. new (previous disturbed)	0 ac.	0 ac.
Development of New Access Roads, including collector line, utility lines, communication lines, and crane paths	56-foot-width maximum development area for 36-foot temporary roads; 20-foot width for permanent roads	571 ac.	204 ac.	176 ac.	62 ac.
Temporary Met Towers (assumes 20 total, including potential power curve testing, if required)	1.6 acres temporary disturbance; 0.03 acre permanent disturbance	25.6 ac.	0 ac.	6.4 ac.	0 ac.
Permanent Met Towers (assumes up to 4)	1.6 acres temporary disturbance; 0.03 acre permanent disturbance	4.8 ac.	0.09 ac	1.6 ac.	0.03 ac.
TOTAL GROUND DISTURBANCE		1205 ac.	267 ac.	260 ac.	64 ac.

3.2 PROJECT COMPONENTS

3.2.1 Wind Turbine Generators

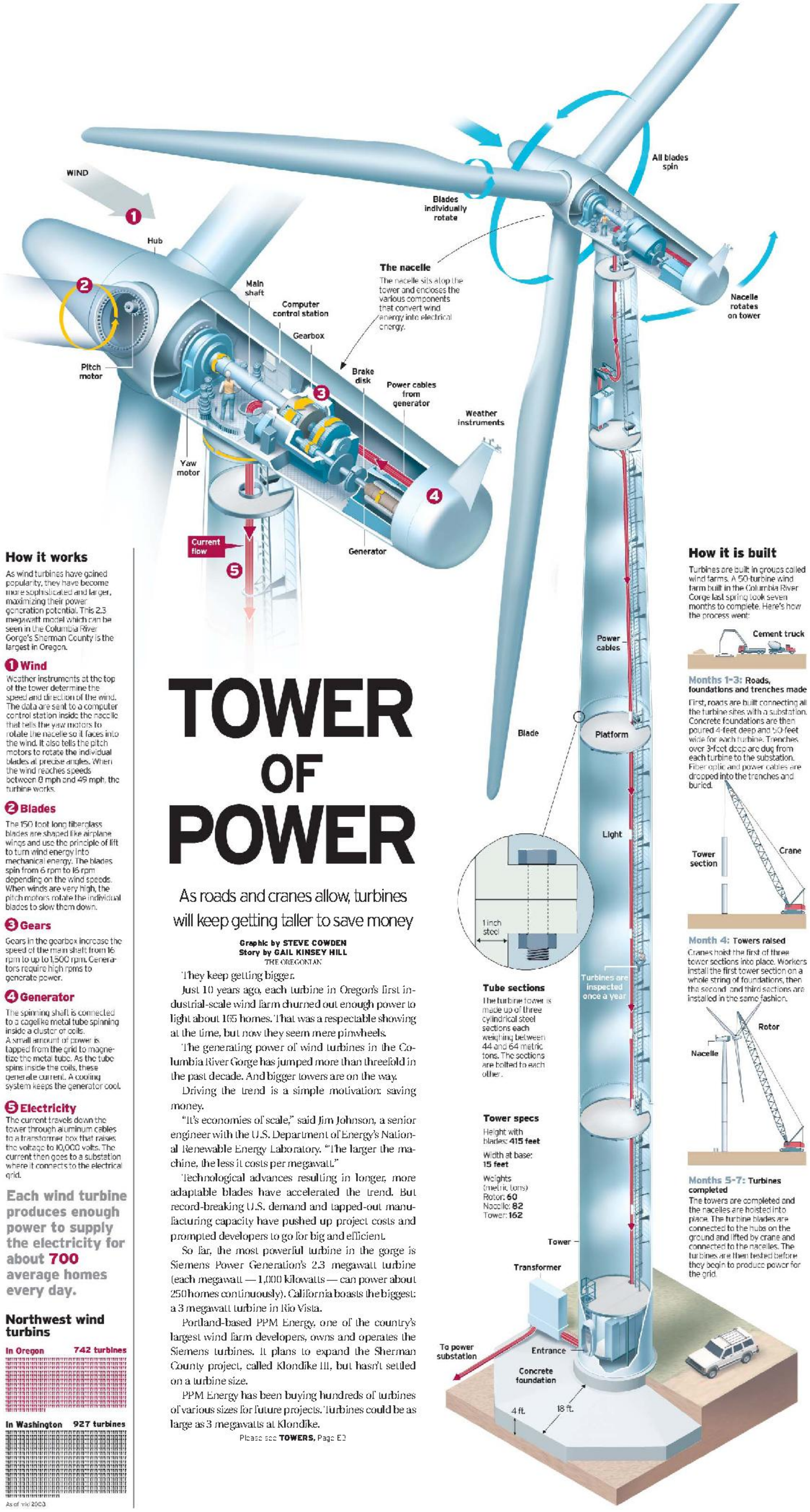
A wind turbine features a nacelle mounted on a tower that is assembled in three to four sections. The nacelle houses the generator and gearbox, and supports the rotor and blades at the hub. The turbine tower supports and provides access to the nacelle. In designing the tower and blades, calculations are made to reflect each characteristic load as well as a suitable safety factor. The variables that are considered are direct wind pressure, gust factor and force coefficient. The turbines are connected by power collection systems linked to electric substations. BPWENA is planning for the installation and operation of between 142 and 283 wind turbines and associated infrastructure to generate up to 425 MW of electricity from wind energy. The generator installed in each wind turbine will likely have a nameplate rating between 1.5 MW and 3.0 MW depending on final turbine selection. Each wind turbine generator contains approximately 50 gallons glycol-water mix, 85 gallons of hydraulic oil and 105 gallons of lubricating oil. Leak detection and containment systems have been engineered into the design of the wind turbine generators. As a result, potential for accidental spills resulting from malfunction or breach of the generators is low. For additional details on wind energy turbine facility components, please refer to Figure 3-1 and a sample manufacturer’s information brochure (Attachment 4). Wind turbines have been sited within corridors approximately 500 feet wide. Attachment 3 illustrates the anticipated layout of turbine locations utilizing the Vestas V100 1.8 MW wind turbine (this is for illustrative purposes only, and is not indicative of the final turbine locations that will be built). The maps and calculations of the environmental impacts of the project contained in this POD are based on the range of layouts for turbines sized between 1.5 MW and 3.0 MW turbines. Using a larger number of smaller MW turbines or a smaller number of larger MW turbines would not change significantly the location of the turbine strings shown in the maps contained in this POD, nor would it significantly change the calculations of permanent or temporary environmental impacts for the project.

The wind turbines are equipped with sensors which continuously monitor the wind speed and direction. Once the wind reaches a pre-determined wind speed, the cut-in speed, the wind turbine rotor and blades will begin to turn and the generator will produce alternating current electricity synchronized with the electric grid frequency at a voltage which can be stepped up to transmission level voltages. As the wind changes direction, the turbines will rotate to face the prevailing wind in order to maximize energy production. The turbines are pitch regulated which means that the angle of the blades adjusts once maximum power output is reached at around 30 mph (they do not adjust at wind speeds below maximum output). At a pre-determined maximum wind speed, the cut-out speed (approximately 55 mph), the wind turbines will shut down in order to limit the amount of stresses on the turbine.

Each wind turbine also contains a safety system which ensures automatic shutdown of the turbine in the event of any mechanical disorders, excessive vibration, grid electrical faults or loss of grid power. If grid electrical faults or loss of grid power occurs, the turbines will automatically be brought back to service when the disorder has been remedied. For mechanical disorders, the turbines will remain shut down until the cause of the disorder has been identified and resolved by the project operations and maintenance team.

The wind turbines have been spaced on the Project site in order to maximize the flow of wind across the project site to each wind turbine from the prevailing wind direction from the west and southwest, as measured at the site over the last four years. Spacing between the turbines minimizes inefficiencies associated with the wake effects each turbine creates in its immediate vicinity. Typical spacing between turbines side to side is 3 rotor diameters and up to 10 rotor diameters perpendicular to the prevailing wind.

Per the FAA guidelines: "Any temporary or permanent structure, including all appurtenances, that exceeds an overall height of 200 feet (61m) above ground level (AGL) or exceeds any obstruction standard contained in 14 CFR part 77, should normally be marked and/or lighted. Recommendations on marking and/or lighting structures can vary depending on terrain features, weather patterns, geographic location, and in the case of wind turbines, number of structures and overall layout of design." BPWENA will submit a Notice of Proposed Construction or Alteration to the FAA prior to construction of the facilities after which the FAA will issue a Determination of No Hazard which will include the lighting requirements for the facilities. A preliminary analysis has already been performed by BPWENA's consultant Aviation Systems Inc. which has not indicated any potential hazards posed by the facilities (see Attachment 5). BPWENA proposes to use standard white colored turbines, which will require a portion of the turbines to be lit at night with red synchronized lights (similar to communication towers in the area).



How it works

As wind turbines have gained popularity, they have become more sophisticated and larger, maximizing their power generation potential. This 2.3 megawatt model which can be seen in the Columbia River Gorge's Sherman County is the largest in Oregon.

1 Wind

Weather instruments at the top of the tower determine the speed and direction of the wind. The data are sent to a computer control station inside the nacelle that tells the yaw motors to rotate the nacelle so it faces into the wind. It also tells the pitch motors to rotate the individual blades at precise angles. When the wind reaches speeds between 8 mph and 49 mph, the turbine works.

2 Blades

The 150 foot long fiberglass blades are shaped like airplane wings and use the principle of lift to turn wind energy into mechanical energy. The blades spin from 6 rpm to 16 rpm depending on the wind speeds. When winds are very high, the pitch motors rotate the individual blades to slow them down.

3 Gears

Gears in the gearbox increase the speed of the main shaft from 16 rpm to up to 1,500 rpm. Generators require high rpms to generate power.

4 Generator

The spinning shaft is connected to a cagelike metal tube spinning inside a cluster of coils. A small amount of power is tapped from the grid to magnetize the metal tube. As the tube spins inside the coils, these generate current. A cooling system keeps the generator cool.

5 Electricity

The current travels down the tower through aluminum cables to a transformer box that raises the voltage to 10,000 volts. The current then goes to a substation where it connects to the electrical grid.

Each wind turbine produces enough power to supply the electricity for about 700 average homes every day.

Northwest wind turbins

In Oregon 742 turbines

In Washington 927 turbines

As of mid 2003

TOWER OF POWER

As roads and cranes allow, turbines will keep getting taller to save money

Graphic by STEVE COWDEN
Story by GAIL KINSEY HILL
THE OREGONIAN

They keep getting bigger.

Just 10 years ago, each turbine in Oregon's first industrial-scale wind farm churned out enough power to light about 165 homes. That was a respectable showing at the time, but now they seem mere pinwheels.

The generating power of wind turbines in the Columbia River Gorge has jumped more than threefold in the past decade. And bigger towers are on the way.

Driving the trend is a simple motivation: saving money.

"It's economies of scale," said Jim Johnson, a senior engineer with the U.S. Department of Energy's National Renewable Energy Laboratory. "The larger the machine, the less it costs per megawatt."

Technological advances resulting in longer, more adaptable blades have accelerated the trend. But record-breaking U.S. demand and tapped-out manufacturing capacity have pushed up project costs and prompted developers to go for big and efficient.

So far, the most powerful turbine in the gorge is Siemens Power Generation's 2.3 megawatt turbine (each megawatt — 1,000 kilowatts — can power about 250 homes continuously). California boasts the biggest: a 3 megawatt turbine in Rio Vista.

Portland-based PPM Energy, one of the country's largest wind farm developers, owns and operates the Siemens turbines. It plans to expand the Sherman County project, called Klondike III, but hasn't settled on a turbine size.

PPM Energy has been buying hundreds of turbines of various sizes for future projects. Turbines could be as large as 3 megawatts at Klondike.

Please see TOWERS, Page E3

Tube sections

The turbine tower is made up of three cylindrical steel sections each weighing between 44 and 64 metric tons. The sections are bolted to each other.

Tower specs

Height with blades: **415 feet**

Width at base: **15 feet**

Weights (metric tons)
Rotor: **60**
Nacelle: **82**
Tower: **162**

How it is built

Turbines are built in groups called wind farms. A 50-turbine wind farm built in the Columbia River Gorge last spring took seven months to complete. Here's how the process went:

Months 1-3: Roads, foundations and trenches made

First, roads are built connecting all the turbine sites with a substation. Concrete foundations are then poured 4-feet deep and 50-feet wide for each turbine. Trenches over 3-feet deep are dug from each turbine to the substation. Fiber optic and power cables are dropped into the trenches and buried.

Month 4: Towers raised

Cranes hoist the first of three tower sections into place. Workers install the first tower section on a whole string of foundations, then the second and third sections are installed in the same fashion.

Months 5-7: Turbines completed

The towers are completed and the nacelles are hoisted into place. The turbine blades are connected to the hubs on the ground and lifted by crane and connected to the nacelles. The turbines are then tested before they begin to produce power for the grid.

Figure 3-1: Diagram of Typical Wind Turbine

3.2.2 Foundations and Pad Mounted Transformers

The wind turbine foundation anchors the wind turbine structure securely to the ground. Two typical foundation designs are commonly used for wind turbine installations within the U.S. These foundations are commonly called the “mat” foundation and the “pier” foundation. The wind turbine foundation type and design will be determined based on the load information provided by the wind turbine manufacturer and the load bearing soil characteristics that are measured by the geotechnical test at the location of the wind turbines. Each foundation location will be surveyed, staked, and investigated for soil conditions prior to the construction of that foundation. The “mat” foundation design is the more common of the two and consists of a reinforced cement concrete spread foot foundation directly resting on the soil at a depth of approximately ten feet below ground. The MCWF intends to utilize the mat style foundation for each of its foundations, but may need to use pier or a combination of the two at some sites. The mat foundation is generally an octagon shape having dimensions ranging from 50 feet to 60 feet and a concrete pier on the top of the mat extending to the ground level. Typically, the amount of soil material excavated for a “mat” foundation ranges between 655-1045 cubic yards that is then replaced after completion of the foundation setup. The amount of concrete material needed to construct a typical foundation is approximately 350 to 500 cubic yards. Wherever possible, elements shall be incorporated into the foundation design that will facilitate demolition of the structure at the end of the project life. Figure 3-3 shows a photograph of a typical foundation being installed. Attachment 6 provides illustrations of proposed foundation design elements and typical grounding details for the electrical components.

Power from the turbines would be fed through a breaker panel at the turbine base inside the tower and would be interconnected to a pad-mounted step-up transformer. This 34.5kV transformer is placed adjacent to the concrete pier of each new turbine foundation to step up the voltage from the wind turbine (typically around 690 volts) to the 34.5 kV electrical collection system for the Project. The transformer foundation will be a concrete pad placed over compacted soil or granular material. Each pad-mounted transformer will contain approximately 500 gallons of mineral oil, to aid in cooling the electrical components located within the box. Leak detection and containment systems have been engineered into the design of these transformers. Each transformer undergoes an inspection prior to placement on the pad and is inspected during operations. As a result, potential for accidental spills resulting from malfunction or breach of the transformers is low. For additional details on the 34.5kV transformer and components, please refer to the manufacturer’s specification book (Attachment 7).

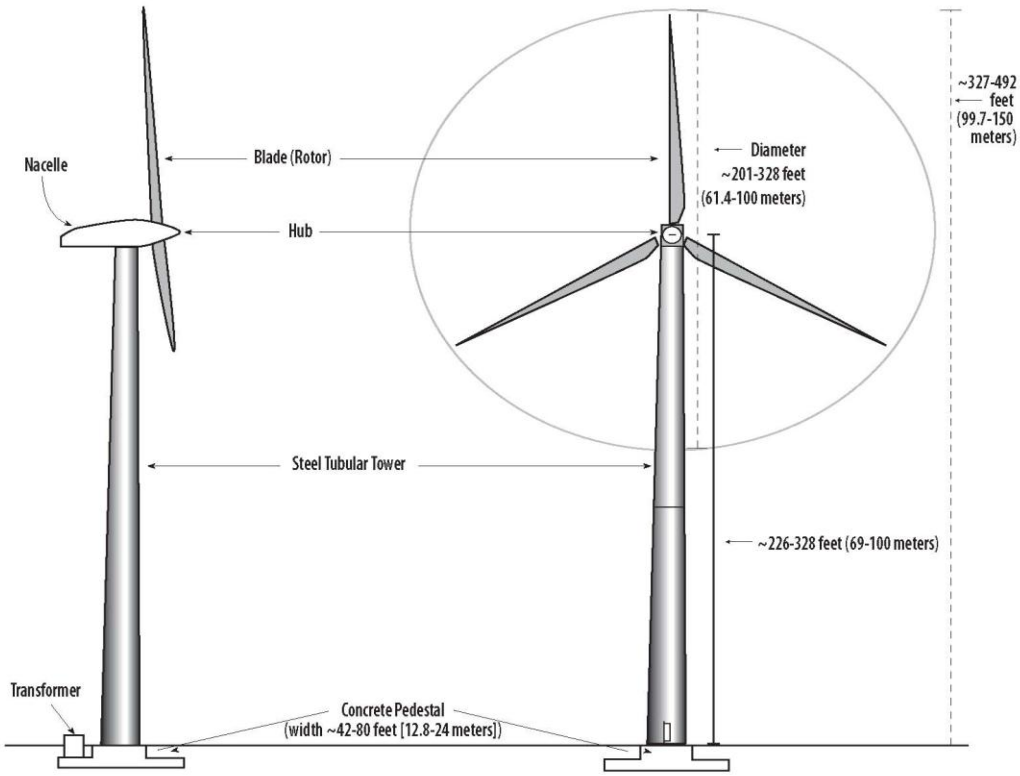


Figure 3-2: Typical turbine schematic

Figure 3-3: Photograph of a turbine foundation being poured

Figure 3-4: Photograph of typical pad-mounted transformer

3.2.3 Electrical Collection, Communication, and Distribution System

The Project's electrical system will consist of a power collection system which will collect energy generated by each wind turbine and increase the voltage through a pad-mounted transformer. The energy is then delivered via electric cables to the Project substations, where transformers will further increase the voltage so that it can be transmitted via a high-voltage transmission line to the purchasing utility. In order to connect the high voltage line from the project to the utility line, a switching station will also be necessary at the point of interconnection.

Power will be transmitted via 34.5 kV electric cables. The cables will be buried, 3 or more feet below the ground surface, in a trench up to 2 feet wide. In areas where collector cables from several strings of turbines follow the same alignment (for example, near the Project substation); multiple sets of cables could be installed in a wider joint trench. Design requirements will allow up to 30 MW of turbines to be connected electrically on one string of 34.5 kV conductors that are transmitted back to the Project substation. Please refer to section 4.7 for additional cable installation information. In some locations, the collector lines may be constructed aboveground, on pole or tower structures. Above ground structures allow the collector cables to span terrain such as canyons, native grasslands, wetlands, and intermittent streams, and in areas where multiple underground circuits might otherwise run in parallel, thus reducing environmental impacts. Overhead 34.5 kV structures will generally be about 35 feet tall and span approximately 250 ft.

Communications between the wind turbines and the substation will be achieved by using underground fiber optic cables and networked to a Supervisory Control and Data Acquisition (SCADA) system. The SCADA system allows for remote control and monitoring of the individual wind turbines located throughout the project. In the event of faults in the turbines, the SCADA system can also send signals/messages to a fax, pager, or cell phone to alert the operations staff. The network of cables will be buried above the electrical collection system cables utilizing the same trenches in order to minimize the impact to the environment. These cables will be only utilized to establish communications for the operation of the wind farm.

The Project will gather the generated electricity from the turbines via construction of a new either 345 kV or 500 kV substation for each phase. The substation facility will be a graveled (up to eight inches deep) and eight feet tall chain link fence topped with barbed wire up to 5 acres, with a parking area, various transformer(s), and switching equipment. Capacitor banks and other equipment may be installed at the substation to provide the voltage support necessary to meet the interconnection requirements for the project. A small pre manufactured control building that is approximately 20 feet long by 10 feet wide by 12 feet high will also exist within the substation for electrical metering equipment. Transformers are to be **non**-polychlorinated biphenyl ("PCB") oil-filled types. Each substation transformer contains approximately 12,000 gallons of mineral oil for cooling and has a specifically designed containment system to minimize the risk of accidental fluid leak discharge to the environment (see Figure 3-5 for a typical substation/switching station layout). Please refer to section 4.9 for additional construction information.

An overhead 345 kV or 500 kV transmission line will then leave the first substation and run approximately 5 miles to the project switching station where the Project would interconnect to either the WAPA 345 kV Mead-Peacock line or the Mead-Phoenix 500 kV line or run to the 500 kV El Dorado – Moenkopi line. The switching station facility will be a graveled and fenced area up to 31 acres and will be similar in nature to the substation, with a parking area and various electrical devices. Switching stations do not change system voltage from one level to another and therefore do not contain transformers. The switching components that will be installed within the facility will most likely be three-pole, single-throw, group-operated type. Please refer to section 4.9 for additional construction information.

Overhead 345 kV - 500 kV lattice type or monopole structures will generally be about 115-150 feet tall and span approximately 800 to 1200 ft. Please refer to section 4.8 for additional construction information. As currently planned, all of the transmission line would be located on BLM lands. Please refer to Attachment 3 for the proposed locations for the electrical components.

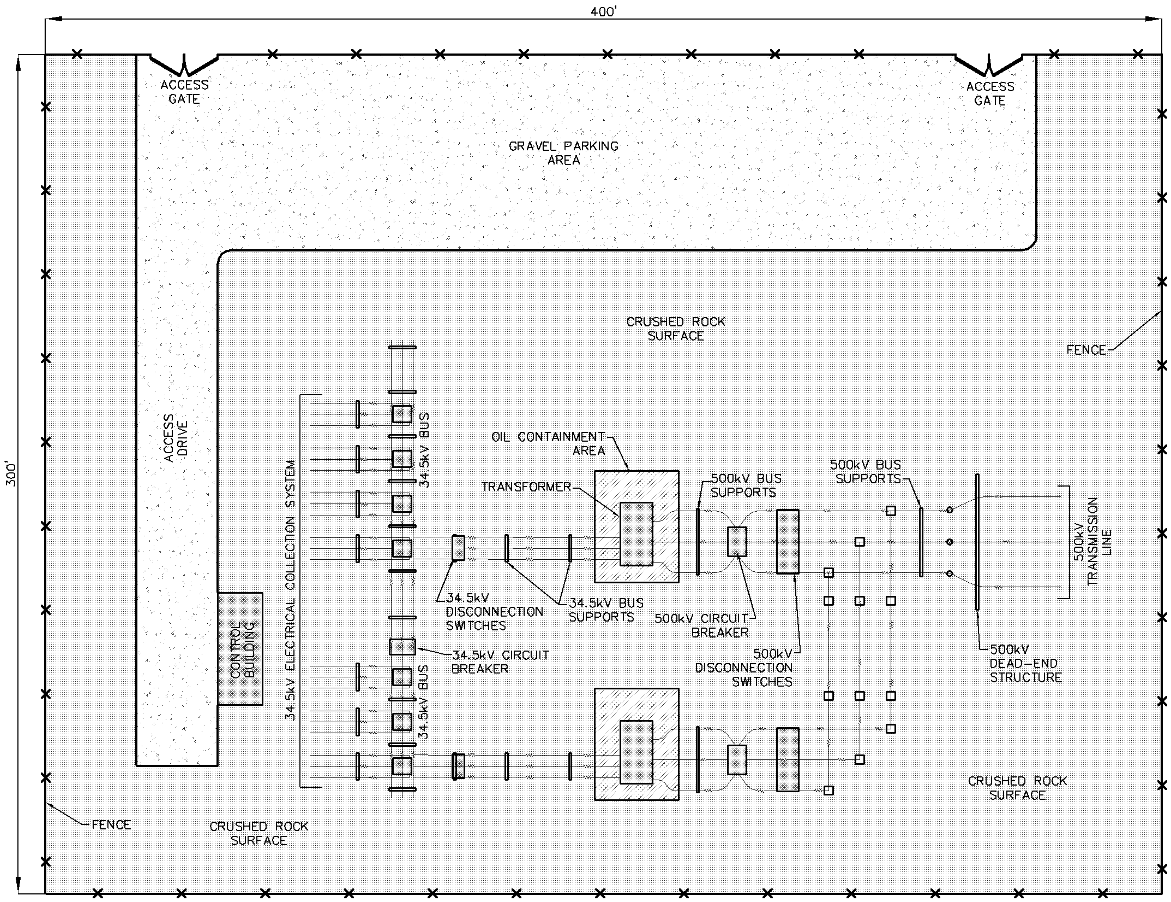


Figure 3-5: Typical Substation layout

3.2.4 Operations and Maintenance Building

The O&M facility will be located on a BLM parcel located within the right-of-way granted for the wind energy facility as detailed in Figure 3-6. This facility will include an eight foot fenced area of approximately 5 acres that includes the O&M building, graveled parking lot with a depth of 8 to 12 inches of small gravel, and a Project staging area (Figure 3-7) that will also contain gravel of the same size and depth. The O&M building will be approximately 60 ft by 100 ft wide typical steel building painted a color to blend into the environment with a roof that may contain solar panels.. The lighting of the O&M building externally will be minimal with downward directed lighting. The fence will be eight foot high with barbed wire with a roll away gate operated by O&M personnel. Attachment 8 includes a typical O&M building design specifications for reference. Power for the O&M building will be provided from a connection to the local electric provider (UniSource), and a station service transformer located in the collector substation will provide secondary power with possible rooftop solar and battery backup. Please refer to section 4.10 for additional information on construction of the O&M building.

Any sanitary waste from the O&M building will be contained and stored in portable septic system that will periodically removed by truck to an approved disposal facility under a service agreement. Preliminary analysis indicates that the O&M building will have water brought to the site by truck for potable domestic water needs. The feasibility of domestic water well is currently being investigated to provide service to the O&M building. If a well is deemed feasible, all necessary entitlements and permits through the AZ State Engineer's office will be acquired prior to construction and will follow permit requirements during construction.

A graveled parking area for employees, visitors, and equipment will be located in the vicinity of the building of an 8 to 12 inch depth of small compacted gravel. Limited quantities of lubricants, cleaners and detergents will be stored inside at the O&M building along with a minimum of two 55-gallon drums of virgin oil for continuing maintenance of the wind turbines in appropriate containers. The drums will be stored on a secondary containment pallet inside the O&M building which will contain any spilled oil. Waste fluids would be stored at the O&M building for short periods of time during project operations. Measures incorporated into the design of the O&M facility, including containment areas and signage, would ensure that the risk of accidental spill or release of materials at the facility would be low and would not be a risk to health and safety or the environment. No fuel will be stored on site. Additional Health and Safety information is provided in Section 6.

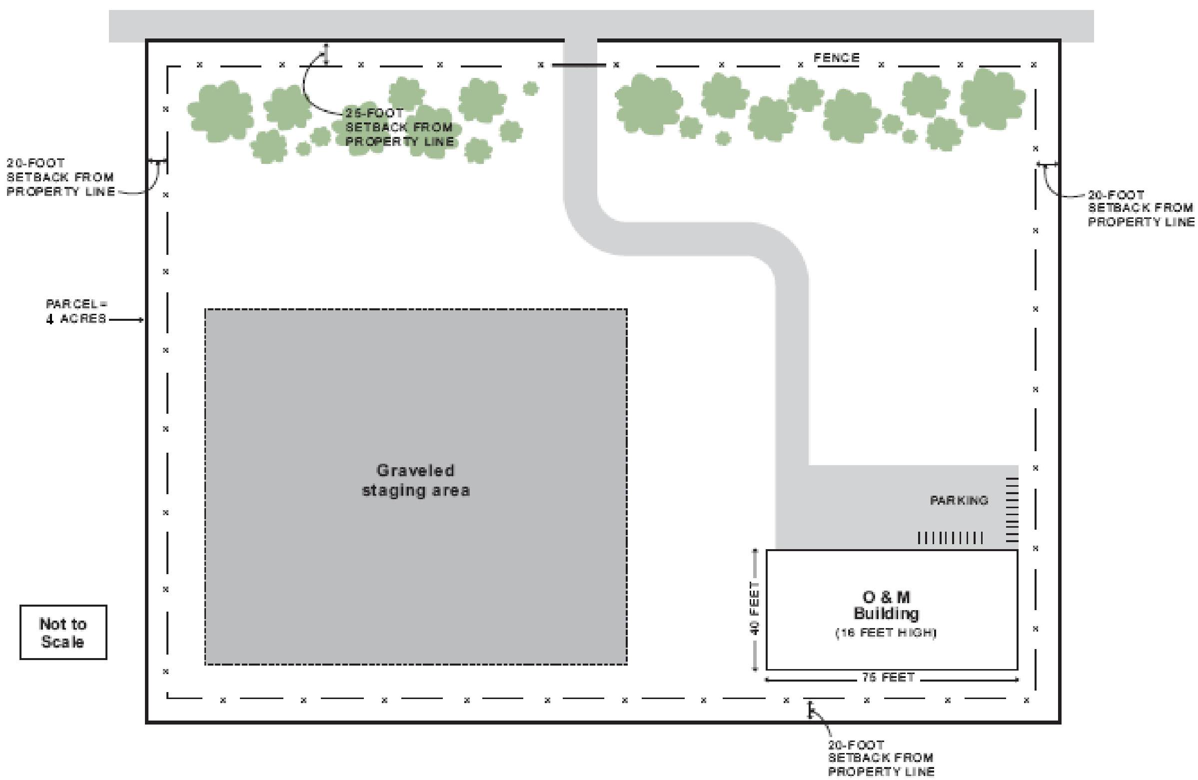


Figure 3-6: Typical O&M facility layout

3.2.5 Meteorological Stations

Eight temporary meteorological wind monitoring towers have been constructed at the site and are currently collecting data within the project area boundary. This data is being analyzed to determine the wind resources available at the site. The locations of these towers are included in Attachment 3. For additional details on the existing wind monitoring towers, please refer to the sample tower drawings included in Attachment 9.

In order to finalize the wind turbine array, power curve testing (PCT) for the site may need to be completed. Up to an additional ten (10) temporary met towers may be required to complete this analysis.

The location of these temporary PCT towers is not known at this time, but the expected ground area disturbance has been included in Table 3-1. These additional temporary towers will be designed in a manner consistent with BLM requirements and regulations, prior to construction and approved under an amendment to the Right-Of-Way application. For additional details on the PCT towers, please refer to the sample meteorological tower drawings included in Attachment 9.

At the completion of the Project, two to four permanent meteorological towers will be constructed within the Project area and will remain throughout the life of the Project. These towers will be un-guyed lattice structures up to approximately 85 meters (279 feet) tall painted off white with a synchronized red light per FAA requirements. The data from the meteorological stations will be used to forecast the energy anticipated from the Project (based on prevailing wind speeds). The location of these permanent MET towers is not known at this time, but the expected ground area disturbance has been included in Table 3-1. These MET towers will be designed in a manner consistent with BLM requirements and regulations, prior to construction and approved as part of the EIS application. For additional details on the permanent MET towers, please refer to the sample tower drawings included in Attachment 9.

3.2.6 Roads

The Project plans to enter the site along the planned route in Figure 3-7 following U.S. 93 to the road currently serving the BLM aggregate pit and from there into the site. This road will require approximately 3 miles of upgraded and new collector road to access the site area. Once the collector road has reached the site, access roads (consisting of both new roads and upgraded 2-tracks) up to 110 miles will be constructed. Access roads will connect the wind turbines, substations and operations and maintenance building, as shown on the Project layout in Attachment 3.

Temporary construction roads on the site will be 36 feet wide and will consist of 8 to 12 inches of gravel base over compacted native subbase material (refer to figure 4-2 for Typical Access Road Cross Sections). A geogrid or geotextile material or sub-grade preparation mix may be used in areas of poor subgrade soils as soil reinforcement and/or to reduce the gravel base thickness requirement. Roads will be engineered and constructed per BLM Manual 9113 (2005) and BLM Gold Book (2007) and will include up to a 20% maximum gradient. Any excess soil from the construction activities will be used only where needed to achieve grade or supplement the existing sub base and/or to blend the road into the surroundings grades by widening a curve radius and improving road prisms, as appropriate. Crossings at low spots or drainage courses will be at-grade with no culverts or extensive fill, unless needed due to threat of a wash out. Refer to Section 4.5 for additional information on road construction.

3.2.7 Main Lay-down/Staging Area

As general contractors mobilize at the project site, two secure 10 acres lay-down/staging areas will be established for temporary construction offices, temporary construction facilities (i.e. portable toilet trailer, portable amenities trailer, and mobile concrete batch plant), and materials/supply storage (i.e. turbine components and fuel for construction equipment). In addition, this staging area would be used to park construction vehicles, construction employees' personal vehicles, and other construction equipment (refer to figure 3-6 for an Aerial Photograph of a Typical Construction Laydown Area).

The location of the proposed staging areas are planned to be located at the two sites identified in Attachment 3. The locations were selected because they are relatively flat, near the site access point, adjacent to the proposed access road, and central to the proposed turbine sites. This will provide efficient access for materials and equipment being delivered to the staging area for disbursement to the proposed turbine sites. The location will be cleared of topsoil of 8 to 12 inches with a small gravel area replacing it. All chemicals, fuel, and oil will be stored in areas that provide for containment of spilled fluids and meet BLM requirements. Inside of the Main lay-down and staging area – there will be a secured temporary fence to provide security for the materials and equipment.

Due to the nature of the material being stored, and activities taking place within the staging area, stormwater runoff will be collected, conveyed, and stored in a manner compliant with BLM BMPs (refer to the Storm Water Pollution Prevention Plan for details). Following construction, the staging area will be restored to prior condition, as near as practicable (refer to Attachment 10 - Reclamation Plan).

Figure 3-7: Aerial Photograph of a Typical Construction Laydown Area

3.2.8 Concrete Batch Plant

During the construction process, a mobile concrete batch plant may be established within the main staging area to supply high strength concrete for wind turbine foundations and ancillary facility footings/slabs. The concrete batch plant will require a flat area (within the main staging area) of up to 2 acres. Temporary concrete batch plant facilities typically consist of loading bays, hoppers and mixing equipment, cement and admixture silos, concrete truck loading and washout areas, above ground water storage tanks, bins for aggregate and clean sand storage, and a temporary generator to power the facility.

The mobile batch plant will be capable of producing approximately 800 cubic yards of concrete per day. To operate such a plant, a total of approximately 180 tons of cement, 360 tons of sand, 810 tons of aggregate, and 25,000 gallons of water will be needed per day while mixing concrete at peak production. It is anticipated that an additional 1,500 gallons of water will be needed per hour for batch plant operations such as truck washing and hydrating aggregate before mixing.

The materials (i.e. aggregate, sand, cement, water) for the batch will be procured from the BLM aggregate pit adjacent to the site and from local sources and will be trucked in to the Project site. The Project is currently investigating the utilization of existing pits on the site or near the project area. The water will be stored in a temporary aboveground storage tank. The gravel and sand will be stored in bins located within the unloading/storage area, adjacent to the mixing plant. Cement and admixture materials will be stored in silos adjacent to the mixing plant.

The selected general contractor will be responsible for obtaining all necessary permits to construct and operate the concrete batch plant, and aggregate pit(s), as needed.

4.0 CONSTRUCTION PROCEDURES

4.1 CONSTRUCTION OVERVIEW

The actions necessary to construct the Project are described below. This section contains a general description of the construction steps for the major components for the project. This plan discusses the general activities and design approaches as currently understood and anticipated. The Project will remain in contact with the BLM as the project designs are finalized and specifics on construction are available. It is anticipated that construction will occur in one continuous phase, but may be extended into multiple phases depending upon market conditions, and is expected to take approximately eight to twelve months per phase.

Project construction will be performed in several continuous stages and will include the following main elements and activities:

- Onsite training of all site personnel to project specific requirements
- Surveying and establishing centerlines of linear facilities and identifying locations of wind turbine generators
- Installing flagging to identify the boundaries assigned to various elements of the project (access roads, turbine sites, transmission line corridors, and pole locations.
- Installing temporary signs identifying roads that can be utilized by construction staff and roads that are not permitted
- Salvaging vegetation as identified in AZ Department of Agriculture in the “Salvage Restricted Protected Native Plants” list and temporarily transplanting at a location selected by BLM and AZ Department of Agriculture near the Project site.
- Passing construction equipment through wash stations prior to use
- Grading of the field construction office and substation areas;
- General clearing and construction of access roads, crane pads and turn-around areas;
- Construction of turbine tower foundations;
- Installation of the electrical collection system;
- Assembling and erection of the wind turbines;
- Construction and installation of the substation;
- Construction and installation of the transmission line;
- Plant commissioning and energization;
- Final grading and drainage; and
- Restoration activities

Figure 4-1 details the estimated timing and sequence of construction activities to take place.

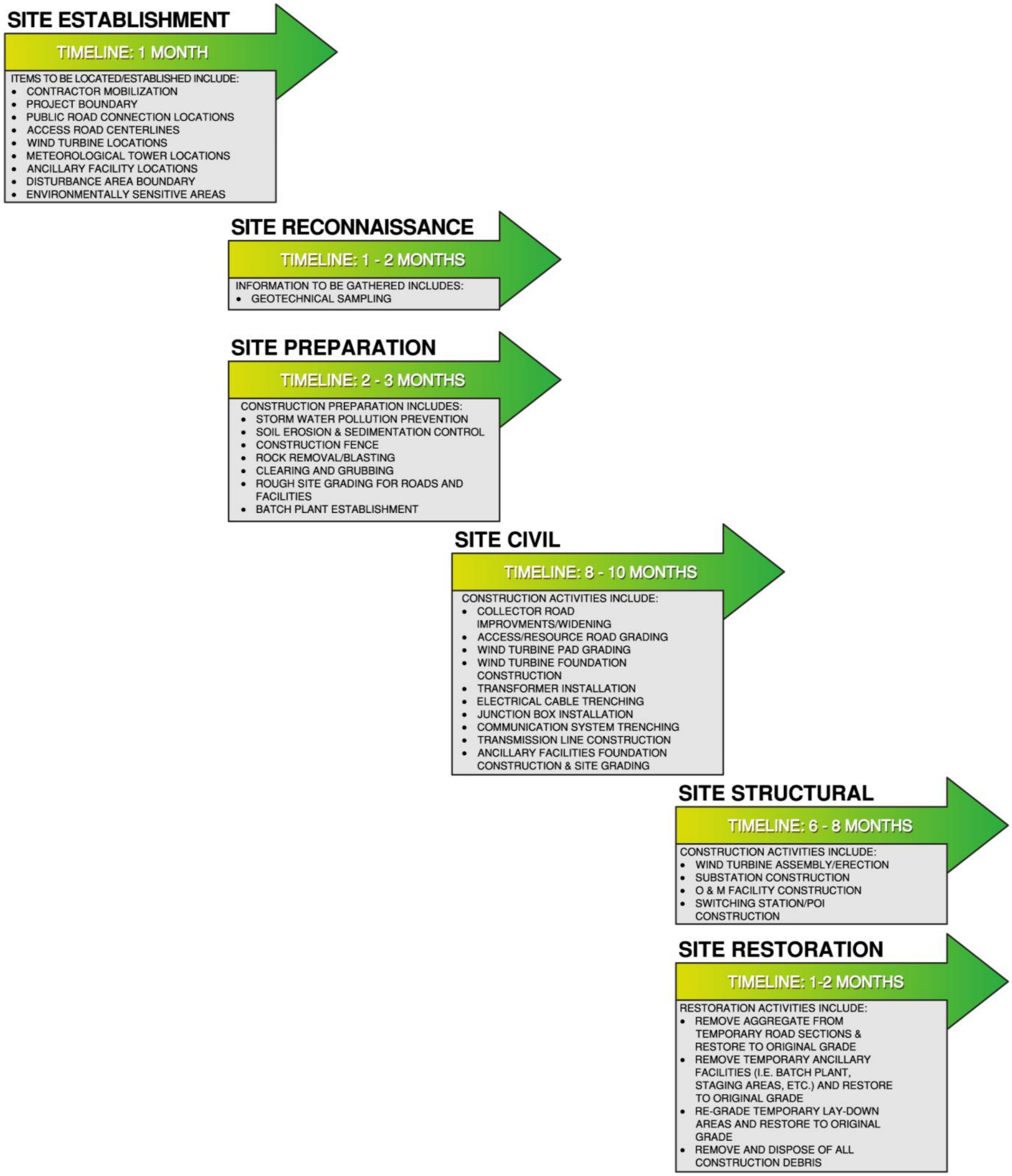


Figure 4-1: Typical Construction Sequence

All project construction will follow site-specific soil erosion and sediment control measures described in a Stormwater Pollution Prevention Plan ("SWPPP") prepared and implemented in accordance with a General Permit for Discharges of Storm Water Associated with Construction Activity for the project. The

SWPPP will be developed during the detailed engineering process and will be provided to the BLM at a later date (as Attachment 11).

Engineering, construction, and operation will be pursuant to BPWENA policies, procedures and specifications, and procedures and standards established by the following:

- National Electrical Safety Code ("NESC");
- National Electrical Manufacturer's Association ("NEMA");
- Insulated Power Cables Engineers Association ("IPCEA");
- National Electrical Testing Association ("NETA");
- American Society for Testing and Materials ("ASTM");
- Institute of Electrical and Electronic Engineers ("IEEE");
- American National Standards Institute ("ANSI");
- ICC/ANSI A117.1-1998;
- 2003 Arizona Plumbing and Mechanical Code;
- 2003 Uniform Mechanical Code ("IAPMO");
- 2003 Uniform Plumbing Code ("IAPMO");
- 2005 Arizona Electrical Code;
- 2005 National Electrical Code;
- 2002 National Electrical Safety Code;
- Occupational Safety and Health Act ("OSHA") – Part 1910; Subpart S; 1910.308;
- FAA at 49 CFR Part 77 and 14 CFR Part 77; and
- Environmental Protection Agency ("EPA") regulations at 40 CFR 355

4.2 PRE-CONSTRUCTION ACTIVITIES

To ensure that these specifications are understood, a pre-work conference will be held prior to construction where the contractor, supervisors, leads, monitors, inspectors, and contracted third party BLM inspectors will attend. Prior to beginning work at the construction site, all work crews will be oriented and trained in various policies and procedures. Example policies include project safety rules that prohibit camping, pets, and firearms on the project site. Crews will also be trained in the environmental compliance program, which will prevent disturbance of wildlife, especially during species specific reproductive seasons. Activities outside general working hours would only be required during exceptional circumstances. These circumstances include the deliveries of oversize and over mass components (including turbine towers, nacelles, blades and substation transformers), which may be necessary to transport these components outside of general working hours to avoid peak traffic volumes. In addition, extended hours may be necessary during the erection of turbine components by heavy lifting cranes or to complete foundation concrete pours. Construction waste will be minimized and properly disposed as discussed in Sections 6.2 and 6.3.

Before construction can commence, a site survey will be performed to stake out the exact location of the wind turbines, access roads, electrical lines, access entryway from the nearest public roads, and substation areas. Locations of sensitive resources (e.g., raptor nests, special-status plant species, cultural resource areas, unstable slopes, etc.) will also be flagged or otherwise clearly marked in and around the project work area to identify any possible conflicts. All temporary and permanent work/disturbance areas designated in the POD will be flagged or staked in accordance with Attachment 12 – Flagging Plan. Once the surveys are complete, a detailed geotechnical investigation will be performed to identify subsurface conditions which will dictate much of the design specifications of the access roads, foundations, underground trenching and electrical grounding systems. Typically the geotechnical investigation involves a drill rig, which bores to the engineer's required depths and a backhoe to identify the subsurface soil and rock types and strength properties by sampling and lab testing. Testing is also done to measure the soil's electrical properties to ensure proper grounding system design. A geotechnical investigation is generally performed at each turbine location, at the substation location, along the access roads and collection system routes, and at the O&M building site.

Geotechnical investigation will be completed using moderate-sized geotechnical drilling equipment mounted to either a truck or tracked vehicle. These vehicles will utilize existing or planned roads where ever possible. All roads will be located to minimize disturbance, avoid sensitive resources and maximize transportation efficiency during construction and maintenance activities. In limited cases where off road traffic is required, care will be taken to avoid previously marked off-limit and sensitive areas. Using all of the data gathered for the proposed project, including geotechnical information, environmental conditions, title information, and site topography, BPWENA will establish a set of site-specific construction specifications (these specifications will meet or exceed those set forth by the BLM, State, and local officials) during the final engineering process for the various portions of the proposed Project. The design and construction specifications will be custom tailored for site-specific conditions by qualified technical staff and engineers. BPWENA will ensure that all aspects of the specifications as well as the actual on-site construction comply with all applicable federal, state and local codes and good industry practice.

A licensed surveyor will survey and stake all road and turbine locations before construction begins so that construction areas are clearly identified. Additionally, disturbance area boundaries, and sensitive environmental and/or cultural resources will be flagged in the field to distinguish areas to be avoided. To further minimize impacts, sediment and erosion control measures will be implemented as included in the Storm water Pollution Prevention Plan (Attachment 11). About one week prior to the start of construction at any given site, an environmental inspector (if required), the contractor, and any subcontractors will conduct a walk-over of areas to be affected, or potentially affected, by proposed construction activities. These pre-construction walk-overs will occur regularly and are intended to identify sensitive resources to avoid, limits of clearing, location of drainage features (e.g., culverts, ditches), and the layout for sedimentation and erosion control measures. Upon identification of these features, specific construction procedures will be reviewed, and any modifications to construction methods or locations will be agreed upon before construction activities begin, and if necessary, documented with a Variance per Attachment 13 – Variance Procedures. Landowners and agency representatives will be consulted or included on these walk overs as needed.

All contractor vehicles and equipment would arrive at the job site clean and weed free. Prior to being allowed access to the right-of-way or facilities of the Project, third party BLM Compliance Inspectors would verify vehicles and equipment are free of soil and debris capable of transporting invasive, non-native weed seeds, roots, or rhizomes. Equipment brought to the Project after start up would meet the same requirement. Refer to Attachment 14 – Weed Management Plan.

4.3 CLEARING AND GRADING

Prior to the start of construction, BPWENA will review and document the general condition of the site, including type and abundance of vegetation and areas of existing disturbance. Arizona Blue Stake One-call (at 1-800-STAKE-IT) will be contacted to notify other utility companies and to locate existing underground utilities. As previously mentioned, a licensed surveyor will survey and stake all road and turbine locations before construction begins.

No clearing and grading activities will occur until sediment and erosion control measures have been installed (Refer to Attachment 11 – Stormwater Prevention Plan). Clearing and grading will occur in the following order: access road, lay-down area, turbine and other facility locations, interconnect routes, and transmission line. Clearing of trash, debris and scrub/shrub on those portions of the site where construction will occur will be performed by bulldozers and loaders in the initial stages of construction. Existing vegetation is sparse in most locations and clearing will be performed only where necessary for construction or fire fuel management. The grading will be limited to small amounts of filling in areas where local dips and gullies have formed and those small areas of uneven terrain. Prior to completion of construction, all remaining trash and debris will be removed from the site to an approved disposal facility, or piled in a separate pile near the area of removal and saved for later reclamation activities (Refer to Attachment 10 – Reclamation Plan).

During the operation phase of the project, public access to the Project site will be monitored at certain access points to provide for the safety of the public in and around the operating equipment. Cleanup from activities during routine daily maintenance will be performed at the time maintenance is performed by the O&M provider's personnel. Disposal of cutting and debris will be in an approved facility designed to handle such waste or at the direction of the BLM Authorized Officer.

4.4 BLASTING

Any and all blasting, if required, will be conducted in accordance with a Blasting Control Plan, to be provided for review by BLM and Cooperating Agencies prior to construction. All blasting shall be designed and carried out by a specialist contractor who has significant experience and expertise in this field and is licensed in the State of Arizona to carry out such works. A blast pattern and shot design shall be procured from the contractor, prior to each blast being made, for review and approval by BPWENA. Periodic seismograph monitoring of blasts shall be conducted as deemed appropriate and will be further detailed in future drafts of the Plan of Development after geotechnical investigations are complete. An outline of the Blasting Plan has been included in Attachment 15.

In order to construct the project access road, it may be necessary to conduct blasting of rock to reach the necessary slope and gradient for the road. Engineering drawings and on-the ground staking will be provided for these areas. Additionally, blasting may be required for foundation construction. For these areas, engineering drawings will be provided and on-the-ground engineering staking will occur. Each location shall be assessed with regard to apparatus or structures in the vicinity, and a determination made of the suitability of that location for blasting. Any foundation or road excavation deemed to be unsafe to blast shall be excavated by alternative means, such as a rock-hammer.

BPWENA will carry out controlled blasting operations no closer than 200 feet to any buried apparatus (pipelines, etc) or any structure. This information will be passed to the owners of all facilities and structures that can be identified, together with a layout plan, such that any concerns can be raised prior to blasting.

The Blasting Plan will include methods to mitigate fly rock, including use of blasting blankets as required. There is no method for calculating the extent of fly rock that can be anticipated from a blast and the safe distance from a blast in this regard is determined from site observations. Generally speaking, BPWENA will utilize blasting blankets and instigate a minimum clearance distance of 500 feet from any turbine foundation blasting operation and 1,500 feet from a major blast, such as the quarry or deep cuts on the site access road.

Research by establishments such as the U.S. Bureau of Mines (“USBM”) and the military has indicated that the zone within which non-elastic (i.e., permanent) deformation of the rock takes place during a blast is an inverted cone, with a base diameter at ground level of twice the blast depth. Beyond this zone, the energy generated by the blast dissipates as elastic vibration within the rock mass. Elastic deformation of the rock does not, by definition, alter or damage the integrity of the rock; therefore, structures contained within or on that rock will also experience induced, elastic vibration, but will not suffer damage. BPWENA does not anticipate any significant damage to rock integrity outside the zone of influence of the blasting operation and this will be confirmed if blasting is required by blasting calculations.

4.5 ROAD CONSTRUCTION

In order for construction equipment and personnel to reach the wind turbine locations, transportation routes will need to be determined. These routes will be determined based on goals to minimize disturbance, avoid sensitive resources and maximize transportation efficiency. Per BMPs, a transportation plan is being developed to evaluate alternative routes in consideration of federal, state, and local requirements (Attachment 16). The transportation plan will also discuss the design criteria for existing roads that may need to be modified and any new roads that may be required and will also discuss the involvement of BLM KFO and other staff familiar with potentially problematic areas for road construction and/or maintenance. The exact length of new and modified access roads will be determined upon finalization of the plan. The traffic management plan is also being developed that will incorporate measures to decrease impacts of increased truck traffic.

Construction of the Project will require constructing new roads to provide access for construction vehicles. Use of the new roads will continue during operation of the Project. Improvements for construction vehicles generally will involve providing an all-weather surface for roads with a gravel surface that is 6 to 12 inches of crushed gravel of varying size. Existing intersections will be widened as needed to allow trucks to maneuver into and out of the construction area. A turning radius of 130 to 150 feet is needed. All road improvements and new road routes will be marked by flagging or survey stakes, as required.

In areas where there are no roads near proposed wind turbine strings, new access roads (16 feet wide with 2-foot shoulders) will be constructed. Temporary turnaround areas will be situated at the end of each turbine strings that will provide the ability for the vehicles to turnaround. During construction, temporary disturbance will occur an average of 10 feet on each side of the road.

Upon completion of wind turbine construction, the construction road width of 36 feet will be reduced to a 20 foot service road width. Please refer to the Reclamation Plan (Attachment 10) and Figure 4-2. Reclamation of the road will involve the removal and transportation of the aggregate materials offsite for separating the salvageable material. Once aggregate base is removed, the ground shall be decompacted and restored to pre-existing conditions and contours. The on-site service roads will be re-graded smooth with low spots and ruts filled in with the reusable gravel base material. Any unused recycled aggregate will be offered to the local municipality for use on their roadways. Unwanted aggregate will be removed and hauled to a reprocessing site

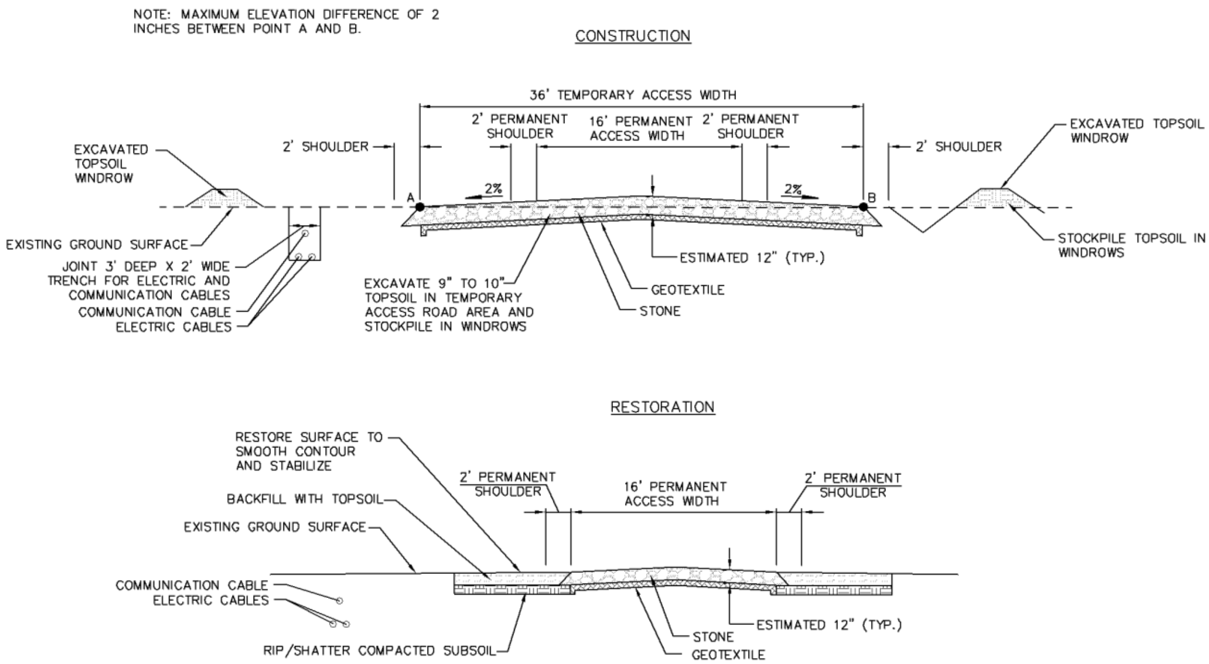


Figure 4-2: Typical Access Road Cross Sections

During site operations, roads will be inspected quarterly. Periodic grading and placement of gravel may be required to maintain road quality. Road maintenance will be scheduled during times of low or no wind to minimize airborne dust. As a guideline during operations, when wind speeds within two feet of ground level exceed 12 miles per hour (mph), road maintenance that would result in raising significant dust will be suspended until winds drop below this speed. Speed limits of 25 mph will be posted and required of all operation and maintenance personnel so as to minimize airborne dust and erosion of roads.

4.6 FOUNDATION CONSTRUCTION AND TOWER ERECTION

Foundation Construction

The foundation will be a spread-footing design or equivalent, as specified by the Project geotechnical/civil engineer. Illustrations of the proposed typical foundation design can be found in Attachment 6. Construction would likely require excavation approximately 9 to 10 feet deep and approximately 50 to 60 feet in diameter (655 to 1,045 cubic yards). Excavated material would be stockpiled for use as backfill adjacent to the turbine pad for approximately 14 to 28 days while the concrete cures. Control of possible erosion will be provided by specific BMPs included in the SWPPP.

Approximately 375 cubic yards to 600 cubic yards of concrete will be required for each wind turbine foundation. Transit mix trucks containing approximately 10 cubic yards of material will transport concrete form the temporary batch plant to each turbine site. Approximately 38 to 60 transit mix truck loads will be required for each wind turbine foundation. The cement is placed in two different periods – the first is the is the base pour and the second is the pedestal pour. The pedestal contains approximately 150 bolts arranged around the perimeter consisting of 1.5 inch threaded bolts that extend from outside the pedestal mounting surface down to the base of the foundation. Once the concrete cures, the stockpiled materials would be used for backfilling. At the base of each tower, a rectangular area approximately 60 by 45 feet will be developed as a gravel crane pad.

Crane Specifications, Movement, and Assembly

Two cranes will be required to complete the wind turbine erection. The primary or main crane will be a crawler/track mounted lattice boom crane and will be responsible for lifting the major components into place. The secondary or assist crane will be a rubber tire mounted telescoping boom crane.

The primary crane will be transported to the site in sections via semi-truck. It will be delivered to the first turbine site, assembled, and used to erect the wind turbine. Once complete, the crane will be “walked” to the next turbine site using the crane’s tracked base. Access roads will be designed, when possible, to meet the design parameters for moving the cranes. At locations where the road cannot be built within the tolerances for “walking” the crane, the crane will be disassembled, moved by a semi-trailer to the next site, and reassembled.

Turbine Component Delivery and Assembly

Approximately 12-14 trucks will deliver the wind turbine components to each wind turbine site. Table 4-1 outlines the truck size and number of truck movements need to deliver each component. The tower components for the wind turbines will be delivered to the site in 3 or 4 parts, depending on the wind turbine selected. Whenever possible, the delivery of turbine components would be scheduled so that they can be directly installed at each location, reducing the need for intermediate storage on site. When the trucks arrive at each site, the assist crane will remove the cargo that will require storage and place it according to the predetermined lay-down configuration. Each site will have a plan for the arrangement of major components before erection (Figure 4-3).

Table 4-1: Major Component Transportation Delivery Specification

	Tractor Trailer Specifications			
Project Component	Trailer Type	Trailer Length (ft)	Load Weight (1000-lbs)	One-Way vehicle movements*
Tower Base Assembly	Heavy Duty Expandable	±160	±130	167
Tower Mid Assembly	Heavy Duty Expandable	±160	±140	167
Tower Top Assembly	Expandable Drop Deck	±160	±80	167
Nacelle	Heavy Duty Expandable	±110	±200	167
Blades	Expandable Drop Deck	±150	±15	501
Hub	Double Drop Lowboy	±80	±40	167
Nose Cones	Flatbed	±50	-	167
Transformer	Flatbed	±50	-	41
Containers (8' x 40') & Misc.	Flatbed	±50	-	83
Project Totals			±605	1,627

*One-way vehicle movements based on 167 wind turbine generators.

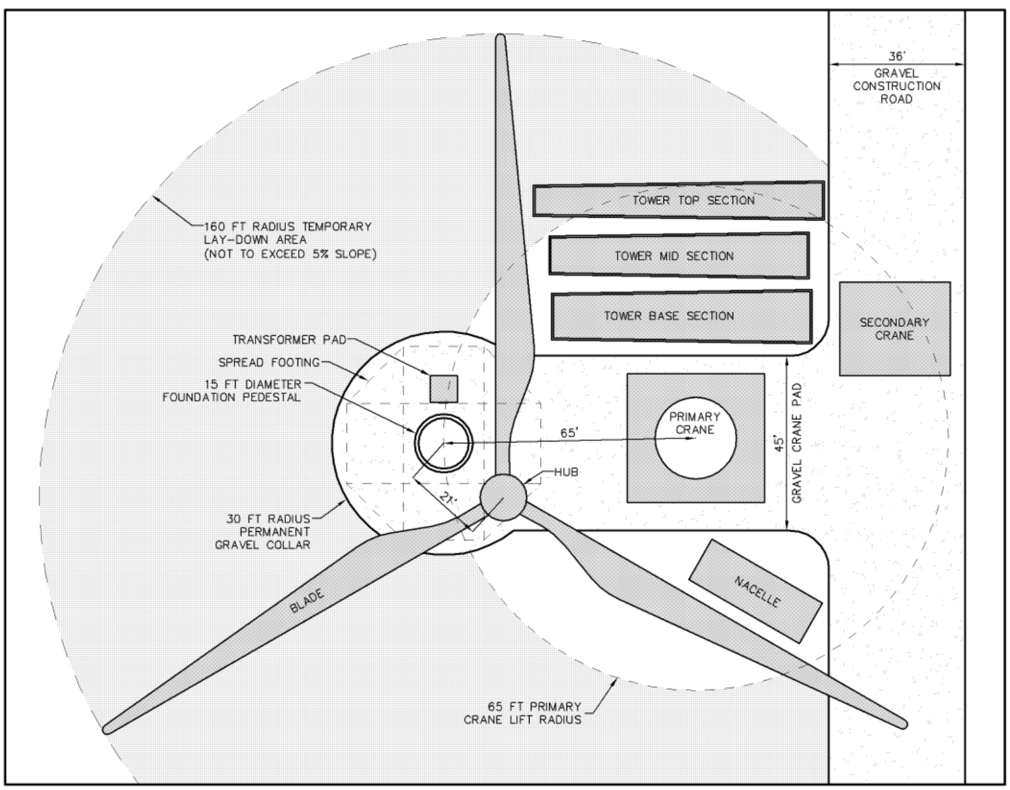


Figure 4-3: Wind Turbine Generator Component Staging and Assembly

Most of the major components will arrive in sections completely assembled and will be lifted in place. The rotor (consisting of the hubs and blades) will need to be assembled on the ground prior to lifting. The rotor will be placed with the nose up, and the assist crane will be used to lift blades so they can be attached to the rotor. Once these blades are attached, and the necessary hydraulic or electric connections are made between the hub and the blades, the complete rotor assembly will be ready for lift.

Towers and turbines will be assembled following completion and curing of the turbine foundations and in the following process.

- **Lift 1-4**: Assembly of the tower – the base assembly section is bolted to the foundation using a pneumatic wrench followed by a specific torque wrench, and then other sections are progressively bolted together.
- **Lift 5**: Installation of the nacelle – the nacelle is lifted and placed on top of the completed tower.
- **Lift 6**: Installation of the rotor – the assembled rotor is lifted, stabilized with assistance from the secondary crane and tag lines extending from the upper rotor assembly to personnel guiding them, and attached to the main shaft protruding from the nacelle.

Once the crane and all wind turbine components have arrived at the site, the assembly of the major components takes 1-2 days. The lifting of large turbine components can only be done during periods of high visibility and low winds. Weather delays could occur at some sites. Two or more large cranes may be simultaneously installing turbines. Figures 4-4 through 4-7 illustrate the tower erection process.

Figures 4-4 and 4-5: Photographs of first and second section of tower being lifted and placed by crane


Figures 4-6 and 4-7: Photographs of rotor placement by crane and a finished tower assembly

4.7 TRENCHING FOR UNDERGROUND ELECTRICAL AND COMMUNICATION LINES

All electrical collector lines will be buried in a manner that minimizes additional surface disturbance (e.g., along roads or other paths of surface disturbance where possible). The two main methods for the placement of electrical cables are plowing and open trenching. Although cable plowing is a less intrusive method of installation, certain site soil conditions may prohibit the use of this method. This method's feasibility will be evaluated based on the site soils investigation.

If open trenching is necessary, a trenching machine will be used for the placement of the electrical collection system cables and fiber optic communication lines. The trencher simultaneously excavates the trench to the desired depth (approximately 3 feet deep and 2 feet wide) and guides the cabling into the trench (Figure 4-8). A bare copper grounding cable and fiber optic communication cable would also be placed in the trench.

Underground utilities will be installed to minimize the amount of open trenches at any given time. This will be done by keeping trenching and backfilling crews close together and limiting the number of trenches left open overnight. In sensitive locations, such as stream or wetland crossings, the contractor would directionally bore beneath the stream or wetland.

Where trenches cannot be back-filled immediately, escape ramps will be constructed at least every ¼ mile. Escape ramps will be short lateral trenches or wooden planks sloping to the surface at a slope less than 45 degrees (1:1). Trenches that have been left open overnight will be inspected and animals removed prior to backfilling, especially where endangered species occur. Soft plugs will be used in areas crossed by a livestock trail to prevent washout of the backfill material. If groundwater is encountered during trenching activity, the trench will be dewatered. Trench dewatering devices will discharge into a sediment trap or sediment pond. Dewatering structures will not direct water into known cultural resources sites or locations of sensitive species and adhere to all permit requirements.

Prior to backfilling, the excavated bottom soil and clay would be inspected for rocks, debris, or sharp objects that may puncture the circuits. Trenches will be backfilled with originally excavated material as much as possible and will be backfilled and the area restored as near as practicable to pre-construction conditions. Excess excavation materials will be disposed of by using it to raise the elevation of roads or placing it on the inside of road curves to increase the road width in those areas or, if suitable, stockpiled for use in reclamation activities.

When possible, the underground cables will generally run beside the Project's roadways in order to reduce disturbance of additional ground. The underground collection cables feed to larger feeder lines, which run to the main substation. In locations where two or more sets of underground lines converge, pad-mounted three-way junction terminals will be utilized to tie the lines together into one or more sets of larger feeder conductors.

Buried underground infrastructure associated with the project will be installed with safety markings as required by law and the locations of the facilities will be on file with the one-call service.

Figure 4-8: Photograph of collection line installation with trenching machine

4.8 OVERHEAD DISTRIBUTION/TRANSMISSION LINES

An above-ground either 345 kV or 500 kV overhead transmission line is planned to be routed from the Project substation to connect with either the WAPA 345 kV Mead to Peacock line or the Mead-Phoenix 500 kV line, both of which are located in a right-of-way south of the project area or possibly to the Moenkopi – El Dorado line located to the south of the Project area. The Project overhead transmission line will be approximately 5 miles in length. The route for the transmission line is shown on the Project layout drawing in Attachment 3.

The structures proposed to be used for the majority of the transmission line are monopoles or lattice towers which are typically spaced 800 to 1200 feet apart, see Figure 4-9. Materials and tower components will be transported to the site via tractor trailer and will be staged and assembled (if necessary) at the location of installation. At the commencement of construction, material and components will be transported, as needed, from the staging area to the construction site.

A 15-300 foot wide strip is generally required to be cleared of all trees and shrubs down the center of the transmission line for tower installation and stringing purposes depending upon underground/aboveground installation respectively. However, due to the characteristically low-growing plant species present, vegetation clearance for the proposed transmission line will be minimal. The clearing of vegetation will take place, with the aid of a surveyor, along approved profiles, and in accordance with approved BLM guidelines that will be detailed in the draft EIS sections.

A 20 foot wide vehicle access road may be established to allow access along the entire length of the proposed transmission line. This access will consist of an at grade road that will be restored upon completion of transmission line construction. Existing resource roads will be utilized as much as possible, in an effort to reduce potential impacts associated with the construction of a new road.

Transmission line tower foundations are dependent on the type of terrain encountered, as well as the underlying geotechnical conditions. The actual size and type of foundation to be installed will depend on the soil bearing capacity. Foundations will be mechanically excavated using a tire mounted backhoe or auger. Concrete for the foundation will be transported from the temporary batch plant to the tower construction site via truck. The foundations will include a 20 to 30 foot steel rebar cage with mounting plate and anchor bolts that will be placed in the augured hole and backfilled with cement. The typical width of a 345 to 500 kV hole would be 6 to 10 feet in width. Transmission line towers will be lifted into place using a telescoping boom crane onto the cured foundations and bolted down with pneumatic wrenches. Once the towers are in place, a guide wire will be used to string the conductors between the towers. The conductor line is generally strung in sections (from bend to bend) and then tensioned at those same sections.

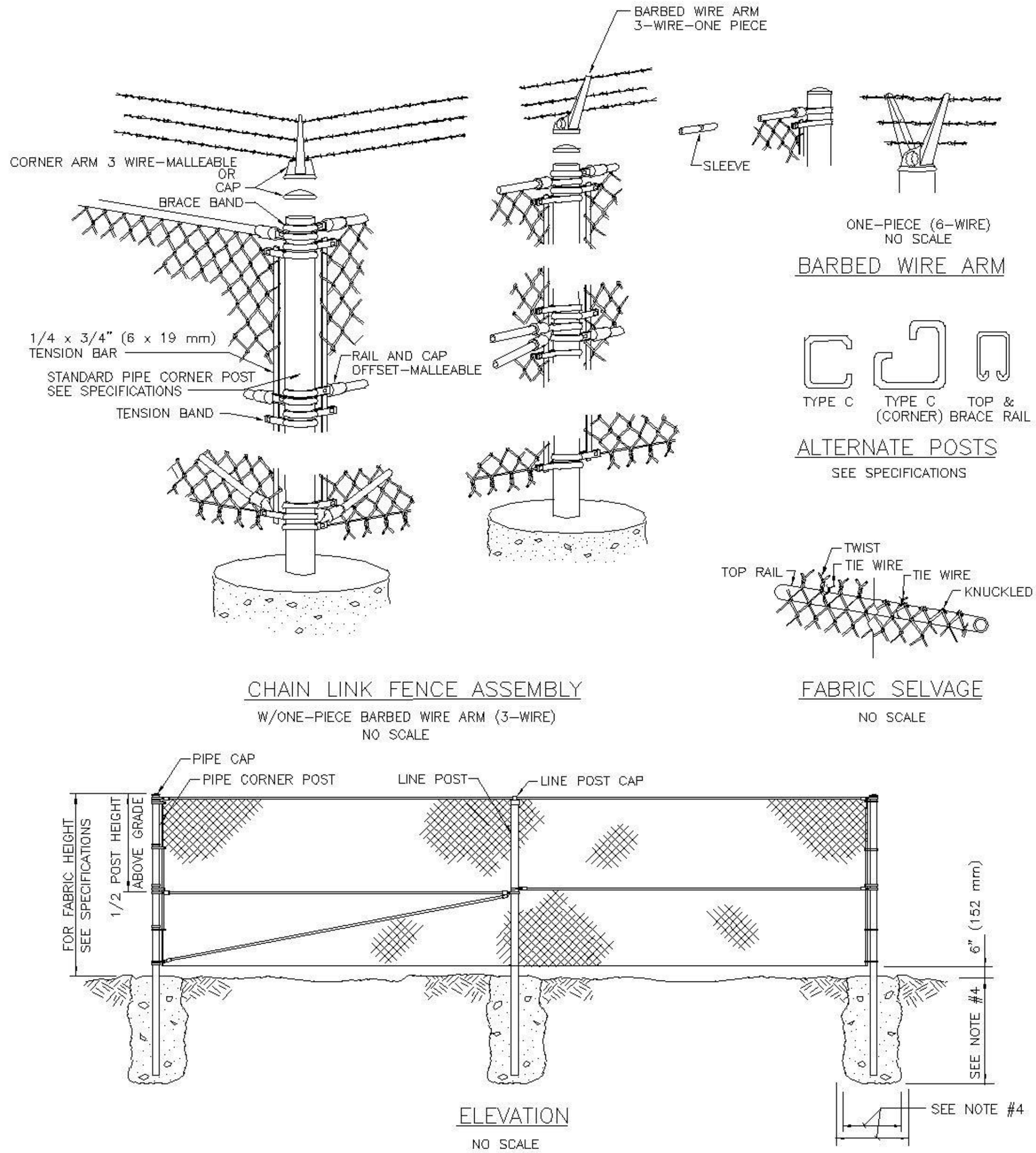
The construction steps of the transmission line are listed below.

- Survey/Stake Site (see Section 4.2)
- Vegetation salvage (see Section 4.3)
- Clear/Grub Site (see Section 4.3)
- Perform Site Grading (see Section 4.3)
- Drill/Auger holes for bolt cage and cement foundation
- Install transmission poles
- Wire stringing, tensioning, and clipping
- Terminate wires at substations

Figure 4-9: Photograph of transmission line monopole being installed

4.9 ELECTRIC SUBSTATION/SWITCHING STATION

Apart from variations in the types of electrical components that make up the substation and the switching station, the site construction process for both facilities will be very similar. Figure 4-8 illustrates a partially completed substation. The two substations will occupy an area of approximately 5 acres each and the switching station will occupy an area of approximately 8 to 31 acres. Following site staking, vegetation salvage and clearing; soil erosion measures will be implemented (refer to the SWPPP, Attachment 11) and the areas will be graded using dozers and graders. Both station yards will be graded flat to allow uniformity in foundation elevations and structure heights. In an effort to ensure public safety, a perimeter fence will be installed around both facilities (Figure 4-9).



NOTES:

1. POST SPACING: LINE POSTS SHALL BE EVENLY SPACED, CENTER TO CENTER.
2. BARBED WIRE ARM: SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.
3. TERMINAL LINE POSTS, & TOP/BRACE RAIL SHALL BE ACCORDING TO THE SPECIFICATIONS.
4. POST SETTING SHALL BE ACCORDING TO THE FOLLOWING TABLE:
5. THE METRIC CONVERSIONS ARE PROVIDED IN PARENTHESIS FOLLOWING THE ENGLISH UNITS.

POST SETTING REQUIREMENT			
TYPE OF POST	HOLE DIA. AT TOP*	HOLE DEPTH	POST EMBEDMENT
LINE	9" (229 mm)	38" (965 mm)	36" (914 mm)
TERMINAL	12" (305 mm)	38" (965 mm)	36" (914 mm)

*MIN. HOLE DIAMETER IN SOFT OR LOOSE SOIL SHALL BE 18" (457 mm).

Figure 4-10: Fencing Diagram

A backhoe will be used to excavate the foundations and slabs, as well as for the installation of below grade conduit, ductwork and grounding grid. Concrete produced within the on-site batch plant will be transported via transit-mix trucks to both facilities during foundation and slab construction. Foundation components will be designed during the detailed engineering process, therefore concrete volume quantities are not known at this time, but typically the depths of the foundations are 3 – 6 feet deep. As a part of the design process, elements that facilitate the demolition of these concrete structures will be included. 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 prior to their commencement. Once all of the sub-surface components have been installed, a gravel parking area will be constructed. This will provide an easily accessible area for construction equipment and component staging.

Following the completion of the required site work, the vertical steel structures will be installed. The three common structure profile configurations (classified from their general physical appearance and structural member components) are lattice, solid profile, and semi-solid profile. The lattice structure consists primarily of angle members forming the chords and lacing of a box truss acting as a beam or column. The solid-profile structure is made from wide flange shapes, pipes, tapered round or polygonal shapes and rectangular tube shapes, and is the most popular choice for equipment support structures. The third structure type is semi-solid profile. This type of structure is made from wide flange and pipes or tubes that form the major members, and is braced between these major members with angle bracing.

Following the completion of the equipment support structure, the electrical equipment will be installed. The specifications for this equipment are determined not only by its relationship to other equipment in the station, but also by pre-established system conditions and performance requirements. This process will be completed during detailed engineering. General components include Power Transformers, Circuit Breakers, Switchgears, Voltage Regulators, Capacitors, Air Switches, Arresters, and various monitoring instruments/equipment.

A list of the potential construction steps required for building the substation/switching station are listed below:

- Survey/Stake and Clear Site
- Install Sediment and Erosion Control Measures
- Vegetation Salvage
- Clear Site
- Perform Site Grading
- Install Foundations and Slab
- Install Below Grade Raceway (Conduit, Ductwork, Trench, etc.)
- Install Below Grade Ground Grid
- Install a Gravel Parking Area
- Install Steel Structures and Control Enclosures
- Install Electrical Equipment (Circuit Breakers, Transformers, Switches, Potential Transformers, etc.)
- Install Above Grade Ground Stringers
- Install Bus Conductors and Jumpers
- Install Control Relay and Communication Materials
- Install Secondary Control Power Cable and Terminations
- Install Perimeter Fence
- Install Final Layer of Crushed Rock Surfacing
- Perform Testing/Commissioning Activities
- Energize the Station

Figure 4-10: Photograph of wind facility substation

Following electrical interconnection of the Project's 345 kV or 500 kV overhead lines to the grid, the Project will be energized, tested and commissioned prior to commencing commercial operation and sale of renewable electricity. This incremental process includes energizing the switching station (interconnect substation) and testing the functionality of the wind turbines and safety systems. Each wind turbine is tested to verify that it is working in accordance with the manufacturer's testing and commissioning manual. This includes testing of the pitch systems, yaw system, lubrication pumps and demonstrating the power output of each wind turbine. Commissioning requires the participation of the contractor to ensure that all systems are operating in a manner consistent with the contract documents and that the contractor has provided the owner adequate system documentation and training.

4.10 OPERATIONS AND MAINTENANCE BUILDING

The O&M building will be a composite panel building of approximately 75 ft long by 40 ft wide. A trench approximately 1-3 ft wide will be dug around the perimeter of the building and filled with concrete. Beams will be put in place to form the floor. The building will be located within a fenced area of approximately 4 acres. Telecommunications and electrical lines will also be connected to the building. A summary of activities are listed below. Additional details on the construction of the O&M building will be provided as they are developed during the detailed engineering process.

The construction of the O&M building(s) will require the following activities:

- Survey/Stake Site
- Clear/Grub Site
- Perform Site Grading
- Install Perimeter Fence
- Install Foundations and Slab
- Install a Gravel Parking Area
- Install Building
- Install Communication and Electrical Lines

4.11 FENCES

BPWENA will post safety and warning signs informing the public of construction activities where the access road(s) enters the project area from a public road. During construction, access to the site will be monitored. During non-construction hours a security guard will patrol the site area. These measures will attempt to prevent unauthorized dumping via use of the new road. Off-road vehicle use is likely to remain unchanged from the present situation.

Temporary warning fences will be erected in areas where public safety risks could exist and where site personnel will not be available to control public access (such as excavated foundation holes and electrical collection system trenches). Similarly, fencing may 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. BPWENA will coordinate the fencing with the BLM. The project substation will be permanently fenced for safety.

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 high visibility fencing. Permanent fencing around the substation will be chain-link fencing as detailed in Figure 4-10.

4.12 CONSTRUCTION IN SENSITIVE AREAS

Construction within sensitive areas will be avoided when practicable. Sensitive areas could include endangered, threatened, proposed, and candidate species and their habitat; cultural resources; wetlands and riparian areas; rough and rocky terrain; and areas where undesirable species could be spread. Sensitive areas within or close to construction will be identified through ongoing site surveys and agency collaboration. Construction within such areas can require additional precautionary measures to avoid impacts. If sensitive areas are identified, BPWENA will work collaboratively with the BLM Project Manager and resource specialists to develop a site specific Construction Environmental Impact Minimization Plan to be utilized during Project construction activities.

Prior to construction, all construction staff will receive environmental training that will include education on sensitive resource identification, impact minimization measures, and reporting processes. The construction manager will establish a method for staff to formally report any issues associated with environmental impacts, to keep management informed, and allow for rapid response as needed. A third party Consultant Inspector will monitor construction to assure construction takes place in accordance with the grant, permits, and the POD. It is the intention of BPWENA that the mitigation measures be effective and that they keep any impacts to a minimum level. If the mitigation measures developed prior to commencement of construction are found to be ineffective, or unanticipated environmental impacts 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-Authorized Officer per Attachment 13 – Variance Procedures.

4.13 SITE CLEANUP AND RESTORATION

Clearing and disposing of trash, debris and shrub/scrub on those portions of the site where construction will occur will be performed at the end of each work day through all stages of construction. Existing vegetation is sparse in most locations, and clearing will be performed only where necessary. All excavations made by clearing activities will be backfilled with compacted earth/aggregate available on site (earth/aggregate will not be mined and only material generated by construction will be utilized) as soon as cable infrastructure is tested. Disposal of cuttings and debris will be in an approved facility designed to handle such waste or at the direction of the BLM-Authorized Officer.

Prior to completion of construction, all remaining trash and debris will be removed from the site. During the construction and operation phase of the project, the project access road will be equipped with a sign alerting the public to be cautious of the wind farm construction and operation, located where access road(s) intersects the Project boundary. Consequently, no unauthorized trash dumping is anticipated. Site cleanup will be performed on a continuous basis. Clean up from activities during routine daily maintenance will be performed at the time maintenance is performed by the O&M provider's personnel.

All temporarily disturbed areas will be returned to their original contour, and any debris will be removed and properly disposed of off-site. Because of very high winds and poor sandy soils with no topsoil, both of which commonly occur on this site, attaining reseeding success may be difficult. Restoration procedures will be followed per the Reclamation Plan (Attachment 10). Any material placed in the areas of the foundations or roads will be compacted to 80 percent or greater as required for soil stability. No soil stability problems are anticipated from Project construction.

A Construction Site Restoration Plan will be created, encompassing the various project restoration requirements from the NEPA processes and project permitting. A restoration punch-list will be developed and construction activities will not be deemed complete until the regulatory agencies with jurisdiction over the project have acknowledged that the restoration activities have been adequately implemented.

4.14 CONSTRUCTION AND ENVIRONMENTAL MONITORING

The Project site manager will be responsible for ensuring all environmental monitoring requirements are being followed. A Compliance and Monitoring Plan, developed by BLM and the Project and reviewed by relevant resource agencies, will be developed and implemented by the Project and third party Consultant contracted to administer the plan. This plan outlines provisions for environmental monitoring and reporting requirements, specific to the Project including reporting structure and timing.

4.15 CONSTRUCTION SCHEDULE AND PERSONNEL REQUIREMENTS

Construction is anticipated to begin soon after permitting is complete, and will take approximately twelve to eighteen months. Table 4-2 outlines the construction activities and their anticipated duration.

Table 4-2: Proposed Construction Schedule (approximate)

Facility	Start	Duration
Road Construction	Week 3	25 weeks
Substation Construction	Week 4	32 weeks
Transmission Line Installation	Week 6	20 weeks
Foundation Construction	Week 7	28 weeks
O&M Building	Week 8	16 weeks
Collection Line Installation	Week 9	22 weeks
Turbine Generator Installation	Week 11	35 weeks
Turbine Commissioning	Week 15	35 weeks
Site Restoration	Week 50	8 weeks

The number of construction personnel on site is expected to range from 90 to 275 (during peak construction). Construction traffic is expected to average around 150 trips per day and peak at approximately 240 one way trips per day during the construction period (based on 140 construction personnel vehicles leaving and entering the project site and 100 delivery trucks leaving and entering). This assumes 2 people per car for construction workers. This is likely to be the maximum possible amount of trips and would only occur for a short period of time. Table 4-3 outlines the estimated vehicle movements during construction. Personal vehicles of construction personnel will be parked at the main staging area for the site. From this point, only delivery trucks and on-site construction vehicles will be allowed on the construction access roads and will be required to operate within the speed limit of 20 mph.

Table 4-3: Estimated Construction Vehicle Movements

Item	Quantity	One-Way Vehicle Movements	Truck Type
Site Establishment/Preparation			
Survey Staking	60	60	Light Duty
Trailers/Offices/Fencing	15	15	Light Duty
Machinery	125	125	Flatbed
Batch Plant	8	8	Semi-Trailer
Road Construction			
Base Aggregate	308,000 yd^3	12,300	Dual Train Gravel Hauler
Dust Suppression	38,500 yd^3	1,560	5000 gal Tanker
Site Substation			
Foundations/Slabs	15 yd^3	2	Transit Mix/Concrete
Transformers	2	2	Flatbed
Electrical Components	8	8	Semi-Trailer
Control Room	10	10	Flatbed/Semi-Trailer
Crushed Rock	500 yd^3	20	Dual Train Gravel Hauler
Switching Station/POI			
Foundations/Slabs	15 yd^3	2	Transit Mix/Concrete
Electrical Components	8	8	Semi-Trailer
Control Room	10	10	Flatbed/Semi-Trailer
Crushed Aggregate	350 yd^3	14	Dual Train Gravel Hauler
Electrical Collection/Transmission			
34.5kV Underground Cable	240,000 ft	75	Flatbed
500kV Transmission Cable	10,000 ft	60	Flatbed
Transmission Tower	19	40	Flatbed
O&M Facility			
Foundations/Slabs	70 yd^3	7	Transit Mix/Concrete
O&M Building	20	20	Flatbed/Semi-Trailer
Crushed Aggregate	450 yd^3	18	Dual Train Gravel Hauler
Turbine Foundations			
Concrete	63,000 yd^3	2,520	Transit Mix/Concrete
Cement	10,500 yd^3	420	Dual Train Gravel Hauler
Sand	21,000 yd^3	840	Dual Train Gravel Hauler
Aggregate	31,500 yd^3	1,260	Dual Train Gravel Hauler
Water	19,000 yd^3	750	5000 gal Tanker
Reinforcement Steel	5,000 yd^3	500	Semi-Trailer
Steel Anchors	3,500 tons	200	Semi-Trailer
Wind Turbine Components			
Tower Base Assembly	167	167	Heavy Duty Expandable
Tower Mid Assembly	167	167	Heavy Duty Expandable
Tower Top Assembly	167	167	Expandable Drop Deck
Nacelle	167	167	Heavy Duty Expandable
Blades	501	501	Expandable Drop Deck
Hub	167	167	Double Drop Lowboy
Nose Cones	167	167	Flatbed
Transformer	167	41	Flatbed
Misc. Materials	167	83	Flatbed
General			
Construction Personnel (2/car)	65/day	16,250	Light Duty
General Deliveries	12/week	600	Light Duty
Waste Disposal	2/week	100	Roll-Off Dumpster
Potable Water	1/week	50	5000 gal Tanker
Fuel	1/week	50	3000 gal Tanker

Item	Quantity	One-Way Vehicle Movements	Truck Type
Site Restoration			
Road Reclamation	111,500 yd^3	4,500	Dual Train Gravel Hauler
Trailers/Offices/Fencing	15	15	Light Duty
Machinery Removal	125	125	Flatbed
Batch Plant Removal	8	8	Semi-Trailer
Waste Disposal	1/day	40	Roll-Off Dumpster
Project Totals:		44,200	

5.0 RESOURCES VALUES AND ENVIRONMENTAL ISSUES

5.1 LAND USE

The project area covered by the Wind Monitoring Right of Way totals approximately 47,066 acres. The total area utilized by the wind project (including temporary disturbance) is estimated to be approximately 1,465 acres. The percentage of land including all facilities and temporary disturbance is therefore roughly only 3% of the total. This figure is less than 1% when considering the permanent footprint. Large areas of open, undeveloped land will exist between the individual turbines. This space is necessary for the free-flow of wind, which results in efficient, safe, long-term operation of the wind turbines.

Figure 5-1: Typical undulating interfluvial basin topography in project area

5.1.1 Plan Conformance

BLM is authorized to issue ROWs under the Federal Land Policy Management Act (43 U.S.C. Section 1701 et seq., the FLPMA). Section 1761(a)(4) of the FLPMA states that ROWs may be authorized to allow the development and operation of "systems for generation, transmission and distribution of electric energy", such as the proposed project. In addition, the project does not conflict with any of the provisions of the Kingman Resource Area Management Plan approved by the Record of Decision dated March 7, 1995 (the Kingman RMP). The Kingman RMP anticipates that BLM will continue, throughout the 20 year planning period, to issue ROWs to "qualified individuals, businesses and governmental entities for the use of public lands".

Beginning in 2002, the Department of the Interior developed in a comprehensive Wind Energy Development Policy for the development of wind energy projects on lands under BLM management throughout the Western states. The Wind Energy Development Policy was the subject of a Programmatic Environmental Impact Statement and Record of Decision dated December 15, 2005 (collectively, BLM 2005). BLM 2005 includes a programmatic-level analysis of the impacts of wind energy development, as well as numerous BMPs. The NEPA analysis of this project will incorporate the analysis from BLM 2005 which is applicable to the project. The BLM 2005 BMPs will be applied to the project, as appropriate and to the extent not already made a part of the project by this POD, as mitigation measures.

5.1.2 Setback Conformance

BLM's December 19, 2008 Instruction Memorandum regarding the Wind Energy Development Policy (the 2008 IM) sets forth the following setbacks:

- Wind Setback: In the absence of any specific local zoning and management issues, no turbine will be positioned closer than 5 rotor-diameters from the center of the wind turbine to the right-of-way boundary in the dominant upwind or downwind direction to avoid potential wind turbulence interference issues with adjacent wind energy facilities, unless it can be demonstrated that site conditions, such a topography, natural features, or other conditions such as offsets of turbine locations, warrant a lesser distance.
- Safety Setback: Further, for safety reasons, no turbine on public land will be positioned closer than 1.5 times the total height of the wind turbine to the right-of-way boundary.
- Setback Waiver: In cases where the applicant holds a long-term lease right on adjacent Federal or non-Federal lands for wind energy development or the adjacent non-Federal landowner provides a setback waiver, these minimum setbacks may be eliminated, allowing turbines to be placed closer to the right-of-way boundary.

The Project complies with both the Wind Setback and the Safety Setback.

5.2 BIOLOGICAL RESOURCES

The following is a summary of data reviews and special status species that may occur within the vicinity of the project area. Through the environmental review and permitting processes, a site specific plan for avoiding and/or mitigating impacts to these biological resources will be created. Project-specific avoidance and mitigation measures will be incorporated into the final design, the EIS, and the Environmental Monitoring Plan.

5.2.1 Background

The project area is located within the White Hills range, situated along narrow interfluvial ridgelines. While the area along the ridge tops where turbines would be placed is relatively undisturbed due to the ruggedness of the terrain, the project also crosses open range areas that are bisected and paralleled by many dirt roads, fence lines, two-tracks, ephemeral drainages, earthen berms, and off-road vehicle traffic pathways. However, the disturbances associated with the open range practices are minor. The project area is located on the Senator Mountain NW and Senator Mountain NE, Arizona USGS 7.5-minute topographic quadrangle maps.

The climate in the wind resource area is arid, with mean annual precipitation ranging between nine and 12 inches (NRCS 2008). Topography is variable, ranging from gentle to steeply sloping ridges and elevations within the project area range from approximately 3,000 feet to 4,500 feet.

The site is underlain with several soil series and complexes, dependent upon topographic/landscape position. The majority of soils on site are formed in alluvium and colluvium that are derived from varied sources including volcanic rock and granite. These soils primarily consist of extremely gravelly sandy loams and very gravelly sandy loams (NRCS 2008).

5.2.2 Literature and Data Research

A pre-field literature review was conducted to determine which special-status plant species had potential for occurrence within the project area. The target species included:

- plant species listed as threatened or endangered by the US Fish and Wildlife Survey ("USFWS") under the Endangered Species Act ("ESA");
- species that have been formally proposed or are candidate species for federal listing,
- species listed as federal 'species of concern';
- species defined as threatened, endangered, or species of concern by the Arizona Game and Fish Department ("AGFD"), and;
- species designated as 'sensitive' by the BLM.

5.2.3 Vegetation

The project area falls within the Mohave Desert biotic province (MacMahon 1992) and the Mohave Desert scrub ecoregion. Biologists claim that the Mohave Desert is in actuality a transitional vegetation type wedged between the Great Basin Desert to the north and the Sonoran Desert to the south. The area is characterized by its warm temperate climate and a predominance of creosote (*Larrea tridentata*), burro-weed (*Ambrosia dumosa*), white burrobush (*Hymenoclea salsola*), brittlebush (*Encelia farinosa*), Joshua tree (*Yucca brevifolia*), Mohave yucca (*Yucca schidigera*), and other shrub species. The Mohave supports numerous species of cactus, including several endemics, such as Mojave pricklypear (*Opuntia erinacea*), beavertail (*O. basilaris*), and clustered barrel cactus (*Echinocactus polycephalus*).

Figure 5-2: Banana yucca (*Yucca baccata*) in bloom within the project area

5.2.4 Wildlife

Wildlife species in the area generally will be those associated with arid desert scrub habitats of the Mohave Desert. Species observed on site are common to this habitat and included common raven, black-throated sparrow, horned-lark, mule deer, coyote, desert horned lizard, and Mojave rattlesnake. Several raptor species, including red-tailed hawk, Cooper's hawk, northern harrier, golden eagle, American kestrel, and prairie falcon were observed in the area. Others raptors may also occur, but were not observed during surveys.

Figure 5-3: Typical desert pavement deposits (basalt) present on ridges. Lake Mead is also visible in the central portion of photograph

5.2.5 Special-Status Plant Species

For the rare plant survey, the target species included all plant taxa listed as ‘Endangered’ or ‘Threatened’ by the US Fish and Wildlife Service (“USFWS”) under the Endangered Species Act (ESA 1973) that potentially occur in the project area. In addition, taxa that have been formally proposed or are candidate species for federal listing, or taxa listed as ‘species of concern’ that potentially occur within the project area were also considered as target species. Target species also included all plant taxa identified as ‘sensitive’ by the BLM or state that are listed in Mohave County. A total of four special-status plant species were identified as potentially occurring in the project area (Table 5-1).

Table 5-1: Special status plant species with potential to occur within the project area.

Species	Status	Habitat	Potential for Occurrence In Project Area
Las Vegas bearpoppy (Arctomecon californica)	SC; SR	Barren, gravelly desert flats, shale, hummocks and slopes in the creosote bush zone that are heavily gypsiferous or otherwise chemically unusual (e.g., borate-bearing, lithium-bearing).	Unlikely, but possible (known occurrence near project area in Detrital Valley)
cottontop cactus (Echinocactus polycephalus var. polycephalus)	Former BLM-sen; SR	Rocky flats and washes, bajadas, rock ledges, and rocky, gravelly slopes in the driest parts of the Sonoran and Mohave deserts.	Likely; suitable habitat present within project area
silverleaf sunray (Enceliopsis argophylla)	BLM-sen	Warm desert scrub community on dry slopes and sandy washes, clay and gypsum cliffs to gravelly slopes.	Possible; suitable habitat may be present within project area
Navajo Bridge cactus (Opuntia polyacantha var. nicholii)	SR	Barren areas with saltbush and ephedra, limestone or red, sandy soils.	Possible; suitable habitat may be present within project area

SC = Federal Species of Concern; SR = Salvage Restricted, collection only with permit; BLM-sen = BLM Arizona Sensitive

5.2.6 Wildlife Baseline Studies

BPWENA's wildlife consultants reviewed existing information on species and habitats in the vicinity of the project area to identify potential concerns about wildlife impacts of the project. Based on previous studies of proposed and developed wind projects in the western U.S., preliminary investigations of the Mohave County Wind Farm project area, and early coordination with BLM personnel, BPWENA's wildlife consultants prepared a protocol for a wildlife studies and distributed it for review by BLM, AGFD, and FWS. Based upon these protocols, BPWENA consultants conducted numerous wildlife surveys beginning in April 2007 and continuing in 2009. Table 5-2 summarizes the wildlife studies conducted to date for the proposed Project.

The data collected during these studies suggests that the Mohave County Wind Farm project area is not within a high bird use area or major migratory pathway, either for diurnal or nocturnal migrants. The study area does not appear to provide important stopover habitat for migrant songbirds based on fixed-point bird use surveys. The density of raptor nests is low, as is the apparent use of the project area by sensitive species. Although construction and operation of the wind-energy facility may displace some types of birds, because the Mohave County Wind Farm project area will be sited in habitats that are common throughout the surrounding landscape, it is unlikely that displacement of birds would result in any population level impacts.

Table 5-2: Summary of studies conducted to date for the Mohave County Wind Farm

Survey	Seasons/date	Report Location
Avian Use	April 2007 – November 2008	Finalization Pending
Raptor Nest	April & May 2008, April 2009	Finalization Pending
Anabat Monitoring, Mist Netting, Mine Observations	May 2007 – Ongoing	Finalization Pending
Special Status Plants	April – May 2008	Finalization Pending
Special Status Wildlife	April – May 2008	Finalization Pending
Wetland/Waterbodies	TBD	Finalization Pending

The protocol for the baseline study was similar to protocols used at other wind-energy facilities across the nation, and is consistent with recommendations in the Arizona Wind Energy Development Guidelines (Arizona Game and Fish Department, Habitat Branch, July 2006), and the National Wind Coordinating Collaborative (Anderson et al. 1999). The survey protocol was designed to collect site-specific data to support an impact assessment for avian resources.

Avian Use Surveys

The protocol for the baseline study is similar to protocols used at over 50 wind-energy facilities across the nation where data are publicly available, and follows guidance of the National Wind Coordinating Collaborative (NWCC) as described in Anderson et al. (1999) and the Arizona Wind Energy Development Guidelines (Arizona Game and Fish Department, Habitat Branch, July 2006). The survey protocol was designed to collect site-specific data to support an impact assessment for avian resources, with a focus on raptors. The protocol was sent to the BLM for review in the spring of 2007. The BLM approved the protocol on November 26, 2007.

Results presented here are from fixed point bird use surveys conducted from April 16, 2007 to November 11, 2008. Eighteen points were established around the Project area. A total of 446 20-minute fixed-point surveys were conducted (Table 5-3) resulting in the identification of 44 species of birds.

The highest overall bird use occurred in the spring 2007 (3.80 birds/plot/20-min survey), followed by spring 2008 (3.36), fall 2008 (2.28), fall 2007 (2.07), and winter 2007/2008 (1.06). Spring and fall surveys showed relatively low raptor use and winter showed very low raptor use. A total of 96 raptors were observed during 446 individual surveys over the study period. Of the raptors recorded during the fall surveys, red-tailed hawks and American kestrels were the most abundant with 58 and 18 observations, respectively. There were no bird species observed during the fixed-point bird use surveys that are listed as threatened or endangered by the US Fish and Wildlife Service or the Arizona Game and Fish Department, as sensitive by the Kingman district office of the BLM, or as a tier one species of greatest conservation concern by the Arizona Game and Fish Department.

Table 5-3: Summary of bird use, species richness, and sample size by season and overall during the fixed point bird use surveys, April 2007- November 2008

Season	Number of Visits	Mean Use	# Species/ Survey	# Species	# Surveys Conducted
Spring 2007	3	3.80	2.31	26	54
Fall 2007	6	2.07	1.24	24	107
Winter 2007/2008	4	1.06	0.55	8	71
Spring 2008	5	3.36	2.02	24	81
Fall 2008	8	2.28	1.38	23	133
Overall	26	2.38	1.42	44	446

Raptor Nest Surveys

Raptor nest surveys were conducted from the ground on multiple days, including April 17-18, May 8-9 and May 29 in 2008. The survey focused on locating and identifying visible nest structures within ¼ mile of proposed turbine locations. Raptor nests were also searched for while traveling between survey stations each week of the avian use surveys (April 1 – May 15) in 2008. Additional raptor nests were noted during the course of other surveys in 2009. The 2008 survey focused on areas within ¼ mile of proposed development corridors. Nest surveys were conducted in areas such as rocky outcrops, cliffs, power lines and Joshua tree stands where nests would most likely be located. Five active raptor nests were located during the surveys, including four red-tailed hawk nests and one barn owl nest in a mine. Two inactive nests were also located during the surveys, one of which appeared to have been constructed by a red-tailed hawk. It is unknown whether three additional nests (one from a red-tailed hawk) were active or not. Five common raven nests were also located.

Special Status Plant Surveys

Pedestrian surveys for special-status plant species were conducted from April 25-May 6, 2008 to determine the presence or absence and spatial distribution of state and federal threatened and endangered species, state species of concern, BLM sensitive species, and other special-status plant species within the construction corridors proposed for the Mohave County Wind Farm Project.

No USFWS Endangered, Threatened, Proposed, or Candidate plant species, or BLM-sensitive plant species were encountered during the field surveys. Although no longer a BLM-sensitive species, cottontop cactus (*Echinocactus polycepahlus* var. *polycephalus*) was included in the targeted plant list for the special-status plant survey, per BLM direction. Thus, all individuals of the species encountered within the survey corridor were recorded and it was not included in the sampling for salvage restricted native plants.

A total of 182 individuals of *Echinocactus polycephalus* var. *polycephalus* were encountered in the northwest portion of the project area, immediately east of Squaw Peak. Individuals were scattered throughout the 800-foot survey corridor in these areas and typically occurred on gently sloping ground featuring an overall north or northeast aspect, on gravelly loam substrates. Dominant vegetation in the northwest portion of the project site is composed of widely-spaced creosote and burro-weed, with scattered Joshua tree.

Arizona Salvage Restricted Species

Arizona State Law (Title 3, Chapter 7, Arizona Revised Statutes) requires that the Arizona Department of Agriculture maintains a Salvage Restricted Protected Native Plants list. Per BLM direction (R. Peck, BLM Wildlife Biologist, prs. comm.; J. Priest, BLM Project Manager, prs. comm.), sampling was conducted concurrently with the special-status plant survey to obtain an estimate of the number of individuals of several plant families on the salvage restricted list that occur within the project footprint. These include members of the Cactaceae, Liliaceae (Agavaceae), and Fouquieriaceae.

A total of 30, 100-foot radius plots (one plot = 7,854 square feet) were sampled within the wind resource project area. A listing of the salvage restricted plant species encountered within the survey plots is included in Table 5-4. The total number of salvage restricted species encountered at each of the sample locations will be provided in the Special Status Plant Species final report (to be provided at a later date).

Table 5-4: Salvage restricted plant species encountered within the Mohave County Wind Resource Area

Common Name	Scientific Name
cottontop cactus	*Echinocactus polycephalus var. polycephalus**
Engelmann's hedgehog cactus	*Echinocereus engelmannii var. nicholii*
Johnson's fishhook cactus	*Echinomastus johnsonii*
desert barrel cactus	*Ferocactus cylandraceus var. lecontei*
common fishhook cactus	*Mammillaria tetrancistra*
buckhorn cholla	*Opuntia acanthocarpa*
beavertail cactus	*Opuntia basliaris var. basilaris*
teddy-bear cholla	*Opuntia bigelovii*
Mojave pricklypear	*Opuntia erinacea var. erinacea*
pencil cactus	*Opuntia ramosissima*
Joshua tree	*Yucca brevifolia*
Mohave yucca	*Yucca schidigera*
*Per BLM direction, species targeted for survey within entire project corridor, thus not included in Salvage Restricted Plant species sample plots.	

Special Status Wildlife Surveys

The USFWS lists 21 species protected under the federal Endangered Species Act as potentially occurring within Mohave County, Arizona. The proposed project area does not provide breeding habitat for any of these species. Some of the species of birds may occasionally fly or migrate through the project area; however, their occurrence is expected to be rare based on the lack of primary habitat (Table 5-5). Most of the listed plant species occur in limited regions in the very northern portion of the county within specific geologic formations. These formations are not known to occur in the project area. There were no bird species observed during the fixed-point bird use surveys that are listed as threatened or endangered by the US Fish and Wildlife Service or the Arizona Game and Fish Department, as sensitive by the Kingman district office of the BLM, or as a tier one species of greatest conservation concern by the Arizona Game and Fish Department. Four sensitive bat species were captured during mist netting surveys; the Allen's big-eared bats/big-free-tailed bat, California bat, Mexican free-tailed bat, and greater mastiff bat.

No designated critical habitats are present in the project area. The project occurs within the experimental range of the California condor. According to Chris Parish (Condor Project Coordinator), condors have rarely utilized the vicinity of the project area, although one condor was tracked to the area in the summer of 2006. The proposed project area may receive occasional use by California condors in the future; however, the area is not expected to receive high levels of use by California condors.

One desert tortoise (*Gopherus agassizii*) was observed incidentally during fixed-point surveys during 2008. The Mohave Desert population of the desert tortoise is considered a Tier 1a species of greatest conservation concern by the AGFD. Additional signs of desert tortoise presence, such as potential burrows and scat, were observed in 2009.

Figure 5-4: Representative photograph of desert tortoise (not taken at site)

Table 5-5: Federally listed endangered species that have the potential to occur within the Mohave County

Species	Status	Habitat	Potential to occur in Project area
Arizona Cliffrose (*Purshia subintegra*)	E	Characteristic white soils of tertiary limestone lakebed deposits	None. No potential habitat is present (USFWS 2006).
Bald Eagle (*Haliaeetus leucocephalus*)	T	Large trees near large bodies of water	Low. No breeding habitat in the project area. May occasionally fly through project area, but is expected to be a rare visitor.
California Brown Pelican (*Pelecanus occidentalis californicus*)	E	Coastal areas and large rivers or lakes.	Very Low. This is a rare visitor to Arizona's large lakes and rivers. A very remote potential exists for the species to fly through the project area.
California Condor (*Gymnogyps californianus*)	E	High desert Canyonlands and plateaus.	Low. The project is located within the experimental range of the release program; however, condors rarely visit the general area (C. Parish, Peregrine Fund, pers. comm.)
Desert Tortoise, Mohave populations (*Gopherus agassizii*)	T	Mohave desert scrub north and west of the Colorado River.	None. The project is located south and east of the Colorado River. A very low potential exists for members of the Sonoran population to occur (R. Peck, BLM, pers. comm.).
Holmgrem (*Paradox*) milk vetch (*Astragalus holmgreniorum*).	E	Limestone ridges and draws in gravelly clay soils.	Low. Occurs only on a few formations that are not known to be present in the project area (USFWS 2006).
Hualapai Mexican vole (*Microtus mexicanus hualpaiensis*)	E	Ponderosa Pine Forests	None. No potential habitat is present.
Jones cycladenia (*Cycladenia humilis var. jonesii*)	T	Mixed desert scrub, juniper, or wild buckwheat-mormon tea.	Low. Occurs only on a few formations that are not known to be present in the project area (USFWS 2006).
Mexican spotted owl (*Stric occidentalis*)	T	Canyons and dense forests	None. No potential habitat is present.

Species	Status	Habitat	Potential to occur in Project area
Siler pincushion cactus (*Pediocactus sileri*)	T	Desertscrub transitional areas of Navajo Sagebrush and Mohave desert.	None. Occurs only on one formation that is not known to occur in the project area (USFWS 2006).
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	Cottonwood, willow or tamarisk riparian areas	Very low. No potential habitat present. Some potential exists for the species to migrate through the project area.
Yuma clapper rail (*Rallus longirostris*)	E	Marshes	Very low. No potential habitat present. Some potential exists for the species to migrate through the project area.
Fickeisen plains cactus (*Pediocactus peeblesianus var. fickeiseniae*)	C	Kaibab limestone and Navajoan desert.	None. No potential habitat is present (USFWS 2006).
Relict leopard frog (*Rana onca*)	C	Wetlands, ponds, rivers and streams	Very Low. Project occurs outside of known range. No wetlands are present in project area.
Yellow-billed cuckoo	C	Large riparian woodlands	Very low. No potential habitat present. Some potential exists for the species to migrate through the project area.

Bat Acoustic Surveys

BPWENA initiated surveys of bats within the proposed project area in May 2007. The scope of the surveys included: acoustic surveys at fixed stations using Anabats; mist net surveys at water sources for bat use, and bat suitability surveys and exit counts of mine shafts to determine if large roosts exist in abandoned mines within the project area. An acoustic study was also initiated in 2008 to determine if a relationship existed between distance from occupied mines and overall bat use. Seven Anabat survey stations were established in the project area and each Anabat surveyed continuously during the night time hours over the study period. Eight sites were mist netted during 2007 surveys during one week periods in August, September and October 2007. Eighty-five mine shafts were surveyed for the potential to support roosting bats between late May and mid-October, 2007, and during June and July, 2008. Three locations were selected for the distance-from-mines acoustic study, placing five Anabat detectors along an array at each location, and moving the array between sites on a weekly basis between June and August, 2008.

The objective of the acoustic bat surveys was to estimate the seasonal and spatial use of the ridgelines in the study area by bats. A total of 24,039 bat passes were recorded during 2340 detector nights. Averaging bat passes across the seven locations resulted in a mean of 10.51 bat passes per detector-night. Activity was greatest during the spring (21.5 bat passes per detector night; March-May, 2008), peaking in late April. Most of the calls during spring were <35 kHz in frequency (e.g., Mexican free-tailed bat, Townsend's big-eared bat), and call rates were high among all monitoring stations, suggesting migration of individuals through the area. Bat activity was lowest during the winter (0.2; December 2007 – February 2008), indicating that bats either leave the area or hibernate during the winter months. Patterns of summer activity were moderate and similar in 2007 (12.4; May – August) and 2008 (9.3; June – August), reflecting activity of bats during the pup-rearing season and suggesting that bat use is similar between years. Fall bat activity was relatively low (4.2; September – November, 2007), and dominated by bats using calls ≥ 35 kHz (e.g., western pipistrelle, *Myotis* sp.), indicating a seasonal change in species composition.

Activity also varied spatially across the project area. One station in the southern portion of the project area recorded 70% of the calls during fall and summer, and greatly influenced overall and temporal activity patterns during these periods. Otherwise, bat activity was generally greater in the southeastern part of the project area, likely due to the relative abundance of water sources and abandoned mines in this area, and lowest in the northwest.

Sixty-one bats of nine species were captured during 1,929 net-length hours of mist net surveys, of which western pipistrelle (*Parastrellus hesperus*), California bat (*Myotis californicus*), and Townsend's big-eared bat (*Corynorhinus townsendii*) were most common. Other species captured were Mexican free-tailed bat

(*Tadarida brasiliensis mexicanus*), pallid bat (*Antrozous pallidus*), Allen's big-eared bat (*Idionycteris phyllotis*), big brown bat (*Eptesicus fuscus*), hoary bat (*Lasiurus cinereus*), and Yuma bat (*Myotis yumanensis*). Acoustic data also suggest the presence of greater mastiff bat (*Eumops perotis*) and big free-tailed bat (*Nyctinomops macrotis*). The largest and longest-standing open-water sources were located in the southeast quadrant of the study area.

Of the 70 abandoned mine shafts surveyed in the fall of 2007, 14 were found to contain bats. Between 126 and 165 bats were counted during a total of 42 exit counts, suggesting these shafts do not support large numbers of bats. In 2008, 29 mine shafts were again surveyed and found bats in 11 of them during the summer. Ten shafts that contained bats in 2007 no longer had bats in 2008, and 6 shafts were found to contain bats in 2008 where none had been found in 2007. This suggests that bats switch mine roosts at different times of year, likely due to different needs. Eight new mine shafts were identified in 2008, two of which contained bats. Between 118 and 144 bats during 40 exit counts were counted in 2008, again suggesting that these shafts do not support large numbers of bats. Two large mine complexes located outside the project area also did not contain large populations of bats.

The results from the acoustic array study indicate that bat activity tends to be higher at mine entrances than along ridgelines. However, bat activity did not gradually decrease with distance from mines as expected, suggesting that bats do not travel along ridgelines upon exiting mine roosts. The low-to-moderate levels of activity at stations along ridges does suggest that bats within the project area do cross ridges when commuting to foraging and drinking sites.

Bat monitoring continues at the proposed project through the fall of 2009. Continued monitoring includes elevating Anabats on met towers, to examine potential differences in call rates of ground versus elevated detectors. Additional analyses on existing data will also be conducted to determine the species detected during spring Anabat survey and the summer mine exit counts.

5.3 ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL RESOURCES

5.3.1 Literature and Records Search

The presence of archaeological sites and historic properties in the area of potential impact will be determined on the basis of a records search of recorded sites and properties in the area and/or, depending on the extent and reliability of existing information, an archaeological survey. BPWENA is currently in the process of retaining the services of a BLM approved cultural resource management firm to begin cultural resource investigations for the Mohave County Wind Energy Project BPWENA anticipates hiring a firm and conducting a literature review and records search in February 2009.

5.3.2 Archaeological Surveys

Cultural resource surveys for the overall project have not yet been conducted. However, an intensive pedestrian survey was conducted for each of the meteorological towers within the Project area with the approval of the BLM (BLM Permit Number AZ-000358). To prepare for this survey, a BPWENA consultant performed a background literature review to determine if the overall project area had been previously surveyed for cultural resources or if any archaeological sites have been located within the project area. To conduct this review, an archaeologist reviewed the Senator Mountain NW, Senator Mountain NE, Garnet Mountain NW, Senator Mountain SW, Senator Mountain, and Gold Basin USGS 7.5-minute topographic quadrangle maps at the BLM Kingman District Office and at the Archaeological Records Office at Arizona State Museum in Tucson and also searched the National Register of Historic Places web page and site files at http://www.nationalregisterofhistoricplaces.com/. These sources provided information on the nature and location of previously conducted archaeological surveys and previously recorded cultural resource sites. The background records review revealed that the project area had not been formally surveyed for archaeological resources and that there were no previously recorded cultural resources in the project area or immediate vicinity. No cultural resources were identified during the intensive pedestrian survey for meteorological towers within the project area.

Upon completion of a finalized facility layout, a cultural resource identification survey will be conducted within the area of potential effect ("APE"). Archaeological sites and historic properties found in the area of potential impact will be reviewed to determine whether they meet the criteria of eligibility for listing on the National Register of Historic Places ("NRHP"). If cultural resources that are eligible for listing in the NRHP are found to be present at the site that can not be avoided a cultural resources management plan

("CRMP") will be developed. This plan will address mitigation measures to be taken for cultural resources found at the site.

Avoidance of the specific location of the cultural resource found is the preferred mitigation option. Other mitigation options include archaeological survey and excavation (as warranted) and monitoring. If an area exhibits a high potential to contain cultural material, but no artifacts are observed during an archaeological survey, the plan may provide for monitoring by a qualified archaeologist during excavation and earthmoving in the high-potential area. A report will be prepared documenting these activities. The plan also will (1) establish a monitoring program, (2) identify measures to prevent looting/vandalism or erosion impacts to identified cultural sites, and (3) address the education of workers and the public concerning the consequences of unauthorized collection of artifacts and destruction of property on public land.

BPWENA will prepare an Unanticipated Discoveries Plan for Archaeological Resources to be implemented during construction activities. During ground-disturbing activities in the project area, a qualified archaeologist or trained construction workers will monitor the activities to prevent disturbance of identified cultural sites. If any culturally significant features are found during ground-disturbing activities, the proposed roadway and/or towers will be relocated if practicable. If relocation is not possible, mitigating measures such as study and cataloging will be proposed in consultation with the BLM and SHPO. If human remains are found, work would immediately cease and BLM and the local sheriff's office would be notified.

5.3.3 Native American Consultation

Pursuant to the NEPA, NHPA, or state requirements, Native American consultation shall be initiated early in the decision making process. The BLM will conduct government-to-government Native American consultations for the Project.

5.4 VISUAL QUALITY

Through the environmental review process, BPWENA will work with the BLM and other involved agencies to confirm that the Project meets the Visual Quality Objective set by the BLM and other plans that cover the area.

Heavy equipment construction in the arid Mojave Desert region has the potential to create significant dust, which would temporarily impact visual resources. Mitigation includes the use of water or chemical dust suppressants and appropriate construction techniques.

Turbine design elements will include visual uniformity, use of tubular towers, proportion and color of turbines, non-reflective paints, and no commercial messages on turbines. Other site design elements will be integrated with the surrounding landscape. The design elements to be addressed include prohibition of commercial symbols and lighting.

5.5 NOISE

The project will comply with all applicable federal, state and Mohave County requirements with respect to noise levels during construction and operation. Through the environmental review and permitting processes, a site specific plan for avoiding and/or mitigating noise impacts will be created. Project-specific avoidance and mitigation measures will be incorporated into the final design, EIS, and Environmental Monitoring Plan.

During the twelve to eighteen month construction period, short-term noise associated with the project will include noise generated by on-site construction activities and noise created by the transportation of workers and equipment which will increase noise levels along the roads to and from the project site.

With respect to noise from construction traffic, the project will generate approximately 240 daily trips along the road approaching the project site at the *peak* of activity (trip counts more fully described in section 4-15). With respect to noise levels from construction, the highest noise typically occurs with earth moving equipment such as bulldozers, excavators, backhoes etc. and road building equipment (compactors, scrapers, graders, etc). Typical operating cycles may involve one or two minutes at full power operation followed by three or four minutes at lower power settings.

If required, blasting may be an additional source of noise for this project during construction. Blasting will be limited to the hours of 8 am to 5 pm and nearby residences will be notified in advance. The amount of blasting, if any, is unknown at this time.

Federal codes, primarily the Occupational Safety and Health Act of 1970 (OSHA) regulate worker exposure noise levels and would apply during construction and maintenance of the project. These codes limit worker exposure to noise levels of 85 dB or lower over an 8-hour period.

During commercial operation the wind turbines will generate sound (swooshing as the blades pass through the air). The level of this sound diminishes with distance. For a typical configuration the sound would be barely audible at a distance of 1,500 feet under most atmospheric conditions. No turbines will be placed closer than 1,250 ft from existing residences. At a distance of two miles any sound generated by the wind farm is unlikely to be perceptible. BPWENA will conduct a detailed acoustical analysis to validate the Project’s compliance with any federal, state, or county noise requirements.

5.6 AIR QUALITY

During construction, local increased particulates will result due to increased airborne dust. Speed limits of 20 mph will be posted and enforced on the site to limit the amount of airborne dust which would result from vehicles. Through the environmental review and permitting processes, a site specific plan for avoiding and/or mitigating airborne dust impacts will be created. Project-specific avoidance and mitigation measures will be incorporated into the final design, EIS and Environmental Construction Plan.

Site roads will be brushed or scraped as required to minimize dust and mud deposits, especially at site entrances and any watercourse crossings. If necessary during dry weather, dust suppression may be achieved by spraying water onto the site roads to reduce the airborne dust particulates.

6.0 HEALTH AND SAFETY

The Project Health and Safety (H&S) Plan will be developed to address health and safety risks and requirements during the construction stage of the project. As the project moves into the operational stage, the components of the H&S Plan will be modified to adapt to Operational and Maintenance activities. Components of the Management System that will be addressed in the H&S Plan include, but are not limited to, risk management analysis, emergency response, H&S planning and procedures, implementation, monitoring and reporting results, setting performance targets, incident classification, investigation and reporting results, audits and inspections, and H&S management review. Examples of BPWENA typical H&S and environmental compliance documents will be developed as the project nears start of construction and consultations are complete (Attachment 17):

Attachment A: Operations Policies and Procedures: Employee Site Orientation

Attachment B: Operations Policies and Procedures: Emergency Response Plan

Attachment C: Operations Policies and Procedures: Facility Security Plan

Attachment D: Operations Policies and Procedures: Lock Out Tag Out Procedure

Attachment E: Operations Policies and Procedures: Permit to Work

Attachment F: Operations Policies and Procedures: Wildlife Incident Reporting System

Attachment G: Operations Policies and Procedures: Stormwater Pollution Prevention Plan

Attachment H: Operations Policies and Procedures: Spill Prevention, Control and Countermeasures Plan

Attachment I: Operations Policies and Procedures: Waste Management Plan

Attachment J: Operations Policies and Procedures: Job Safety Environmental Analysis forms

Minimum contractor H&S requirements will be included in the H&S 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 H&S plan is a collaborative effort between BPWENA and the selected contractors. Contractor Best Practices will be reviewed and incorporated into the H&S plan as appropriate. Also included in the H&S 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 H&S plan will be adjusted to provide a suitable solution to project risks. Observation of H&S 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.

6.1 EMERGENCY RESPONSE

BPWENA will prepare an H&S Plan specifically for the Project that will include an Emergency Response Plan. Copies of the Emergency Response Plan will be provided to all emergency services prior to the Project commencing construction. A sample Emergency Response Plan used for previous BPWENA projects is included in Attachment 17.

6.2 CONSTRUCTION WASTE AND HUMAN WASTE

Generation of wastes from construction will be minimized through precise estimating of materials needs and efficient construction practices. Waste generated during construction or operation of the Project will be recycled when feasible. For example, solid waste such as steel, wood, paper and other materials will be sorted and stored in dumpsters, and will be transported by a contracted local waste management company to the regional landfill that provides recycling services. Any concrete waste will be transported to the regional landfill or recycled. No project generated material will be disposed of on-site, including waste concrete generated during construction. Packaging wastes will be separated and recycled. Non-recyclable materials will be collected and transported to the regional landfill.

Concrete transit-mix trucks will "wash-out" at a location specifically directed in the Stormwater Pollution Prevention Plan. Wastewater from portable toilets will be pumped regularly by the toilet contractor. Water used during construction will likely come from an offsite permitted source capable of meeting the water demand for construction of the Project. Water will be used for dust suppression, road compacting and concrete mixing. This water will be transported to the Project via water truck and will be used only as needed for construction of the facility. Preliminary analysis indicates that the O&M building will have water brought to the site by truck for domestic water needs during operation. The feasibility of a domestic water service well, to service to the O&M building, will be investigated at the time of detailed engineering. If a well is deemed feasible, all necessary entitlements will be acquired prior to construction.

Little solid waste will be generated during the Project's operation. The primary solid waste from operation of the Project will be paper and other office waste such as food packaging and food scraps at the O&M building. Maintenance at the facility may generate waste such as oily rags and empty containers previously containing lubricants and cleaning supplies. Periodic replacement of turbine parts could also generate some solid waste. The local waste management company will be contracted to collect solid waste at the O&M building and transport it to a regional landfill. Unusable turbine parts, other equipment-produced solid waste and concrete waste will be disposed of at facilities licensed to receive that type of waste.

The Project will also generate used oils, which will be recycled. Universal wastes, such as light bulbs and batteries will also be generated, and recycled or disposed of in accordance with applicable regulations. Periodically, turbine rotors and other equipment may be washed. Operation of the Project will not generate any industrial wastewater.

6.3 INDUSTRIAL WASTES AND TOXIC SUBSTANCES

Wind turbines will typically use four lubricating oils and greases, none of which contain any compounds listed as hazardous by the Environmental Protection Agency ("EPA"). These are used in moderate quantities and are contained entirely within the spill trap and nacelle so that the possibility for accidental leakage is minimal. Lubricating oils are checked quarterly and filled and changed as needed. Waste oil will be recycled with a certified waste contractor. The oil change will be performed in the nacelle (at the top of the tower) where any accidental spills will be contained by the nacelle. No oils or greases will be stored on-site.

Transformers will contain cooling oil that will not contain polychlorinated biphenyls ("PCB"). The concrete foundation for the transformers is designed to serve as a spill trap and to contain 125% of the capacity of oil in the transformer in order to protect the site in case of a leak. Additional details on the transformers and their contents are provided in Section 3.2.2. Routine maintenance of the pad-mounted transformers and project substation includes regular oil checks, verification of all trip settings and tightening of connections in accordance with the manufacturer's maintenance manuals. This routine inspection and maintenance will occur every six months. Additional detail on maintenance activities is included in Section 7.2. Construction equipment and O&M trucks will be maintained at all times to minimize leaks of motor oils, hydraulic fluids and fuels. All vehicular maintenance will be performed off-site at an appropriate facility. Green-sol, or another similarly environmentally benign detergent, will be used to remove wind carried particulate matter from internal and external turbine mechanisms. No extremely hazardous materials (as defined in 40 CFR 355) are anticipated to be produced, used, stored or disposed of as a result this project. Hazardous materials are those chemicals listed in the EPA Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Re-authorization Act of 1986. Hazardous materials anticipated being used or produced during the implementation of the Proposed Action fall into the following categories:

- fuels: gasoline (potentially containing benzenes, toluene, xylenes, methyl-tert-butyl ether, and tetraethyl lead), and diesel fuel;
- combustion emissions: nitrogen oxide, carbon monoxide, and methane hydrocarbons;
- lubricants: grease (potentially containing complex hydrocarbons and lithium compounds) and motor oil;
- transmission line emissions: ozone and nitrogen oxide; and Explosives.

BPWENA agrees to indemnify the US against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, et seq. or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, et seq.) on this right-of-way (unless the release or threatened release is wholly unrelated to BPWE's activity on this right-of-way). This agreement applies without regard to whether a release is caused by BPWENA, their agent, or unrelated third parties.

All production, use, storage, transport and disposal of hazardous materials as a result of this project will comply with all applicable federal, state and local government laws and regulations. BPWENA will comply with the Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601, et seq.) with regard to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under the right-of-way 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 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Section 102b.

A copy of any report required or requested by any Federal agency or State government as a result of a reportable release of spill of any toxic substances shall be furnished to BLM concurrent with the filing of the reports to the involved Federal agency or state government.

BPWENA will establish safety procedures for all operation of equipment and for handling, maintenance and disposal associated with the Project. This Plan of Development includes the implementation of these continuously updated safety procedures that had been in use on wind plants in the area over the past 20 years. BPWENA’s proposed measures to avoid, reduce, and recycle materials will result in minimal impacts on the site or to adjacent land. They include storing all oily waste, such as rags or dirt, in sealable drums and removing it for recycling or disposal by a licensed contractor. In addition, spill kits containing items such as absorbent pads will be located on equipment and in the on-site temporary storage facilities to respond to accidental spills that may occur. Further, during construction, equipment (e.g., graders, dozers) will be available to respond to spills and to quickly construct berms or ditches for containment and cleanup if necessary.

BPWENA will manage all hazardous material in accordance with applicable EPA and OSHA regulations and by its own internal hazardous material program and guidelines that will be followed both during construction and operation. In accordance with the program, all hazardous materials that are on site will be catalogued, the material safety data sheets (“MSDS”) for the materials will be available, employees will receive training on the handling of hazardous material, and guidelines for the proper storage, transport, and disposal of hazardous materials will be posted.

To prevent the spilling of hazardous materials, BPWENA has a rigorous program to ensure that all components of operating equipment, transport systems, and site facilities will maintain structural integrity. All hazardous material will be stored inside where it is not exposed to the elements. In addition, BPWENA or its designated contractor will maintain hazardous material containment and cleanup kits on site at all times to contain all other potential hazardous material spills. Examples of a project Spill Prevention, Control and Countermeasures Plan and a Waste Management Plan are included as Attachments 18 and 19, respectively.

6.4 PESTICIDES, HERBICIDES AND OTHER CHEMICAL CONTROL PROCEDURES

There has been no identified need for the use of chemical control procedures during the construction phase, except for the use of a chemical binder to suppress dust as detailed in Section 6.6 below. To the extent the use of any pesticide or herbicide is required during commercial operation these will be agreed with the BLM and Mohave County. However, pesticides and/or herbicides may be utilized on the Project during control of weeds (refer to Attachment 14, Weed Management Plan – shall be formulated as the project provided at a later date). Application of pesticides and/or herbicides during implementation of the Weed Management Plan will only be a result of an approved Pesticides Use Permit.

6.5 AIR QUALITY

It should not be necessary to monitor air quality during either the construction or operation of the Project. However, during construction a program of road-spraying during hot weather will be implemented if necessary to suppress dust caused by traffic on site roads.

6.6 FUGITIVE EMISSIONS, OPEN BURNING, AND DUST CONTROL

Fugitive emissions have not occurred on any of BPWENA's previous wind farm construction projects and are not anticipated for this Project. In addition, there will be no open burning permitted during either the construction or the operational phase of the Project. Fugitive dust will be controlled through the implementation of the Dust and Emissions Control Plan (refer to Attachment 20 – shall be provided at a later date), which will be developed later in the project design process. The most common method of dust control on construction projects is water application. The disturbed area is sprinkled with water until the surface is wet and repeated as necessary.

For this project, water application as the primary method of dust control is not practical due to the expansive project area. It is estimated that the project would use upwards of 100,000 gallons of water per day that would be applied by irrigation trucks. In place of daily water application, it is anticipated that a chloride application (calcium chloride or magnesium chloride) will be used as the primary form of dust control. These products are hygroscopic which means they draw moisture from the air and keep the road surface damp. The chloride is applied using a sprinkler truck that carefully controls the amount of application and spreads it evenly over the road surface.

In order for the chloride treatment to be effective, the gravel must have a good gradation with a good percentage of fine aggregates. This creates a natural binding characteristic in the gravel road and the chloride treatment keeps the surface damp and tightly bound. The top two inches of gravel should be loose and close to optimum water content prior to application. This allows for the chloride to penetrate quickly and evenly across the road for optimum dust control. Occasional water sprinkling may be required in extremely dry periods during construction.

In addition to these dust control measures, access to the site will be controlled. Personal vehicles of construction personnel will be parked at the main staging area for the site. From this point, only delivery trucks and on-site construction vehicles will be allowed on the construction access roads and will be required to operate within the speed limit of 30 mph. The use of the access roads will also be phased during construction. All the wind turbines along any one access road will be constructed in the same relative time period. Once construction along this access road is complete and the crews have moved on to another string of turbines, the road will no longer be used for daily activities and, hence, will no longer require continuing dust control treatments on the road.

6.7 FIRE PREVENTION AND CONTROL

The wind turbines will be equipped with built-in fire prevention measures that allow the turbines to shut down automatically before mechanical problems create excess heat or sparks. The use of underground power collector cables substantially reduces the risk of fire from short circuits caused by wildlife or lightning. The Project's new access roads are typically oriented perpendicular to the prevailing winds and thus serve as effective fire breaks. After construction has been completed, there will be no welding, cutting, grinding, or other flame- or spark-producing operations near the turbines.

All onsite employees for both construction and operations will receive annual fire prevention and response training by a professional fire safety training firm. The appropriate fire departments will be asked to participate in this training. Employees will be prohibited from smoking outside of company vehicles during dry summer months. The details of the plan will be provided in Attachment 17 – Fire Plan

Each onsite company vehicle will contain a fire extinguisher, water spray can, shovel, Emergency Response procedures book, and a two-way radio for immediate communications with the O&M facility. The O&M facility staff will coordinate fire response efforts. Water-carrying trailers (water buffaloes) will be present at appropriate locations around the Project to be determined in consultation with the local fire departments. A water buffalo will be brought to any job site where there is a substantial risk of fire. Each water buffalo will have a capacity of 500 gallons and be equipped with a pump and hoses. The water buffaloes can be towed by a number of vehicles, including service trucks and pickup trucks; such vehicles will be at hand in sufficient numbers at all times during construction and operation of the Project. All local fire departments will have maps of the project site.

6.8 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 lightning 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 (2 ohm maximum resistance), they will install additional ground rods until the acceptable ground resistance is obtained.

The facility will have a continuous grounding system installed that will tie each turbine independently into the grounding loop that will include grounding transformers, greatly reducing the potential for any stray voltage created by the Project. In addition to having a site-specific grounding system, the power distribution system for the Project will be buried at a minimum depth of 36 inches, and the pad-mounted transformers will be encased in a base frame. In areas where the distribution cables are above ground, the cables will be designed in accordance with standard utility specifications and will have appropriate shielding. Refer to Attachment 13 for typical grounding details.

7.0 OPERATION AND MAINTENANCE

7.1 FINAL TESTING

Upon completion of the installation of the 345 or 500 kV Project overhead line and its interconnection with the turbines 34.5 kV system, the Project will be energized, tested and commissioned prior to commencing commercial operation and sale of energy. Prior to Project energization, pre-commissioning tests will take place to test the functionality of the wind turbines and safety systems. Following energization, commissioning and testing of each wind turbine will be in accordance with the manufacturer's testing and commissioning manual. All installations and inspections will be in compliance with applicable codes and standards including those listed in Section 4.1.

7.2 SITE OPERATION AND MAINTENANCE PROCEDURES

The modular nature of wind plants, which are comprised of many individual wind turbine generators, means that operations and maintenance activities will not affect the entire plant's operation. A wind plant does not require the shutdown of the entire facility to perform annual maintenance. Rather, annual maintenance is conducted on a turbine-by-turbine basis. Therefore, as the electricity generated by the plant will come from large numbers of individual turbines, conducting annual maintenance does not materially affect the performance of the plant. In addition, BPWENA will schedule annual maintenance for the plant during the season with the lowest expected wind resource in order to minimize impacts on the performance of the plant.

7.2.1 Maintenance Activities

While the turbine technology for the Project will not be selected until closer to construction, for the purpose of this POD BPWENA has assumed that the 1.5 MW General Electric SLE turbine will be utilized.

The operational staff will maintain the turbines, including routine maintenance, long-term maintenance, and emergency work. In all cases, the facility staff will be responsible for facilitating the needed repair either through internal resourcing or with the aid of additional contractor support.

After the first six months, the routine wind turbine maintenance and service occurs every six months. This includes the following:

- Hydraulic pressure checks
- Accumulators nitrogen recharge
- Oil level checks on all operating parts
- Visual checks for leaks
- Grease all bearings on moving parts
- Check all bolt torques
- General clean-up within the wind turbine
- Perform any additional modifications/replacements needed

Under normal operating conditions, the oil in the gearbox is changed every 18 months or after lab analysis of the lube oil indicates that the oil must be changed. Routine maintenance is generally completed by climbing the tower using the internal ladder and doing the work with normal hand tools and electrical testing equipment.

Long-term maintenance may include replacement/rebuilding and cleaning larger components such as generators and gearboxes, testing electrical components, and refurbishing blades.

Emergency work also may be required as the result of a system or component failure. Certain unplanned work such as blade repairs or repairs to other large components may require the use of a crane to complete the work.

BPWENA and its partners will demonstrate due diligence and timeliness in the repair, replacement, or removal of inoperative turbines.

7.3 RIGHT OF WAY MAINTENANCE

The Project access road during commercial operation will begin at the public road. During the Project operations period, roads will be specifically inspected for erosion, blockage of culverts, and damaged cattle guards twice annually; in addition, road conditions will be inspected after each rainfall of two inches. Periodic grading and placement of gravel may be required to maintain road quality. Road maintenance will be scheduled during times of low or no wind to minimize airborne dust. Speed limits of 30 mph will be posted and enforced for all O&M vehicles to minimize airborne dust and erosion.

8.0 POST-CONSTRUCTION MANAGEMENT

In addition to the measures discussed below, it is anticipated that the Project environmental review will result in restoration and post-construction monitoring requirements that are not currently known. Any requirements from Project permits will be incorporated into the EIS and the O&M plan, as appropriate.

8.1 MONITORING

8.1.1 Wind Farm Performance Monitoring

Wind turbines generally operate autonomously guided by sophisticated computers and software. The site manager and staff monitor the performance of the turbines and initiate manual control only as needed for maintenance and troubleshooting (see Section 7.2).

The plant management will continuously analyze the performance trends of individual wind turbines and the overall project to ascertain the overall efficiency of operation. This analysis will utilize data collected from the wind turbines and the permanent meteorological towers. Scheduled maintenance activities may be added or adjusted to improve the performance of the project. There are no environmental impacts expected due to project performance monitoring.

8.1.2 Environmental Monitoring

One of the major responsibilities of the site manager will be to ensure the proper environmental monitoring activities are being performed in accordance with the requirements of the Project H&S manual and Compliance and Monitoring Plan. The environmental monitoring program will incorporate monitoring required by the following plans and reports, as required: the Weed Management Plan (Attachment 14 – shall be provided at a later date), any wildlife monitoring and mitigation plans, the Cultural Resource Management Plan, and the Reclamation Plan (Attachment 10). Monitoring activities will also be adjusted based on ongoing monitoring observations, follow-up to avian and bat studies, and those resulting from additional mitigation measures that arise in order to minimize future environmental impacts. Results of the monitoring program will be reported to the BLM authorized officer.

8.2 SITE RESTORATION/CLEAN UP

The Reclamation Plan (Attachment 10) will provide details on Project reclamation activities. General restoration procedures that will be implemented follow.

All temporarily disturbed areas will be returned to their previous state, to the extent feasible, and any debris will be removed and properly disposed of off-site. Any material placed in the areas of the foundations or roads will be compacted to 80% or greater as required for soil stability. No soil stability problems are anticipated from the project construction.

Prior to the completion of construction, all rubbish, construction debris and landscape cuttings shall be removed and properly disposed of, and reseeded vegetation will be allowed to re-establish in disturbed areas..

Because active revegetation efforts such as seeding and active replanting is difficult in the desert due to the arid environment, re-seeding with a seed mixture developed in the Reclamation Plan will be practiced on the Project. The following methods will be implemented to assist with the revegetation of the construction work areas:

- Re-grade site to pre-construction contours. After foundations are poured and concrete cures to engineered strength, soils moved from foundation areas will be immediately replaced. Any excess fill will be packed around foundation bases or used to fill removed foundations at decommissioned turbines.
- Strip and segregate vegetation and topsoil where grading will occur to conserve the existing seedbank. Natural vegetation shall be cleared or trimmed only when necessary to provide suitable access for construction, and operation and maintenance of the facility. Where vegetation needs to be trimmed for construction and/or removal, but not for actual operations, it may be clipped or sheared at ground level to help facilitate resprouting.

- Store cut vegetation at the edge of the construction work areas, and respread during or after final grading to provide a mulch to trap seeds, shade seedlings, and conserve water for the revegetation of the construction work area;
- Respread topsoil evenly across the surface of the construction work area after construction is complete;
- Prepare soil. As determined necessary and practical, loosen soil surfaces which have become encrusted or compacted during construction and/or removal activities.
- Imprint disturbed soils with equipment (e.g., sheepsfoot) that will create indentations to catch seeds and water, aiding in the natural revegetation of the construction work area.

8.3 NOXIOUS WEED CONTROL

Arizona and the BLM each have programs in place to manage the growth and spread of noxious weeds and other undesirable plants. Any management required will be conducted according to the BLM's Integrated Weed Management Program and the guidance of the Arizona Invasive Species Advisory Council.

8.4 ABANDONMENT

At the time when the Project is no longer cost effective to continue operation, the site will be properly decommissioned as discussed in Section 9.0.

9.0 PROJECT DECOMMISSIONING PLAN

As with any energy project, the Mohave County Wind Farm Project will have a lifetime after which it may no longer be cost effective to continue operation. At that time, the project would be decommissioned, and the existing equipment removed. While it is possible the project owners may want to work with the BLM to repower the site (replace existing wind energy project with a new project on the same site), repowering is not being considered in this plan.

The goal of project decommissioning is to remove the installed power generation equipment and return the site to a condition as close to a pre-construction state as feasible. The major activities required for the decommissioning are as follows:

- Wind turbine and meteorological tower removal;
- Electrical system removal;
- Structural foundation removal per ROW grant requirements;
- Road removal;
- Re-grading; and
- Re-vegetation.

The decommissioning activity most notable to the general public will be the removal of the wind turbines and meteorological towers. The disassembly and removal of this equipment will essentially be the same as its installation, but in reverse order. The large components that make up a wind turbine will be dissembled in the reverse order they were assembled. The rotor (hub and blades) are removed from the nacelle and, with the help of a smaller crane, turned horizontally and set on the ground. Next, the nacelle will be removed from the top of the tower, followed by each portion of the tower. The meteorological tower will similarly be disassembled by a crane, starting with the upper tower section and moving downward. Once the turbine rotor has been removed, a crew and small crane will disassemble it into the hub and three loose turbine blades. The most efficient manner for component removal will be for each large component (other than the rotor) to be placed directly onto a truck bed when it is removed from the turbine. These trucks could then immediately take the component off the site. This approach will limit the need for clearing an area around the turbine base to just enough area to set down the rotor. When the rotor is disassembled, the blades will be placed into a carrying frame, which can then be loaded onto a truck for removal from the site. The hub can also be removed once it is disassembled from the blades.

Between each of the turbine locations will be a buried electrical cable and fiber optic cable. The project owners will discuss with the BLM at the time of decommissioning if it is desired to remove these cables, or leave them in place. Removing the cables will cause some environmental impact that would need to be mitigated, but leaving them in place could impact future uses for the site. If the cables are to be removed, a trench will be opened and the cables pulled out. The cables will be cut into manageable sections and removed from the site. The trenches will then be filled with native soil and compacted. Reclamation of the disturbed area will occur according to the Reclamation Plan (Attachment 10). Once the project and transmission line is de-energized, the substation will be disassembled. Major components will be removed from their foundations and placed onto trucks using a small crane. The steel structures and control building will be disassembled and removed from the site. The fence will be taken down, and fence posts removed. The gravel placed in the substation will be removed, and native rock will be scattered on-site.

The project owners will discuss with the BLM if the substation grounding grid is to be removed or left in place. Assuming the transmission line no longer serves a purpose for the site; it will be disassembled and removed. Initially, the wires will be removed from the tower hangers and collected for recycling. The tower structures will then be disassembled and removed, including grounding rods to 36 inches below grade. The areas around the poles, along with any access roads that were necessary, will be reclaimed.

The O&M building will also be removed. Any installed septic system will also be abandoned in a manner consistent with state and local health regulations.

When the wind turbines, meteorological towers, and substation components are removed from their foundations, the foundations will be removed per the requirements of the ROW grant. The concrete and steel within the deeper wind turbine foundations will be broken-up and removed to a depth of 36 inches below grade (industry standard). Fully removing the wind turbine foundations would require major excavation/disturbance at each tower site, as well as additional truck haul-away traffic. These factors could contribute to an unnecessary negative environmental impact to native plants and wildlife, as well as a potential reduction in air quality resulting from additional dust and truck emissions. The foundation sections bellow 36 inches, that are proposed to remain, are composed of non-leaching/natural elements that should not present a hazard to the environment. Shallow foundations, like that for the O&M building, will be removed in their entirety. All concrete and steel debris will be removed from the site. Voids left by the removed concrete foundations will be filled with native material and restored to original grade.

The BLM will have the choice when the project is decommissioned as to whether the project access roads are to be removed. To facilitate the various uses for the property, the BLM may choose to leave the roads in place. If the roads are left, maintenance of the roads will become the responsibility of the BLM. Once all the necessary equipment and materials have been removed from an area and the road to that area is no longer needed, it can be removed. The road surface and bed materials will be removed down to grade. Any materials native to the site will be scattered across the site, and foreign materials will be removed. For areas where equipment or materials are removed, those areas will be re-graded back to pre-construction contours (if possible). Holes where foundations have been removed to 36 inches will be refilled with native soils. Removed roads will be re-graded to original contours if cuts and fills make such re-grading practical. Crane pads will also be re-graded.

10.0 REFERENCES

AWEA. 2007. "Wind Energy Basics" http://www.awea.org/faq/wwt_basics.html

USDA. 2001. "Design Guide for Rural Substations" RUS Bulletin 1724E-300