Section 5.0 Preliminary Construction Plans

5.1 Project Facilities Description

Each of the three Mud Springs wind projects will consist of several types of faciliites including the wind turbines, crane pads, underground power collection system, above ground transmission systems and substations, access roads and operations and maintenance facility. Each component is described below and is based on the Project's preliminary design information available at this stage.

Building Permits: Carbon County does not administer a building permit system. Septic system permit will be obtained from the County Sanitarian. Buildings permits when required will be obtained from the State of Montana, Building Codes Bureau. Electrical permits will be obtained from the State of Montana Building Codes Bureau.

Wind Turbine Conponents: Each of the 80 MW Project phases will have 40 wind turbines. The wind turbine refers to the entire structure that produces elecrical power. Each wind turbine consists of several mechanical parts, including three large rotor blades connected at the rotor hub located at the front of the housing unit call the nacelle. Inside the nacelle, the rotor hub is connected to a drive shaft or rotor which is connected to the genrator via a great box. The entire nacelle and rotor hub are mounted atop of tubular tower which is anchored to a tower foundation. Each of these turbine components is discussed in this section. The Applicant propose to use state of the art commercial wind turbine generators which will be between 2.0 MW and 3 MW name plate rating. The size of these machines is very similar. The final selection of one or more turbine suppliers will depend upon final contract negotations with suppliers regarding price, warrenty and efficency parameters. The wind turbines will be mounted on top of steel towers which will have an approximate height of 100 meter (328 feet). The wind turbines will weight approximately 80 tons. Each wind turbine will be delivered on specialty delivery truck that is equiped to carry heavy loads. The major compoenents of the wind turbines are described in this section. See Figure 9 for an illustration of the major componenets of the wind turbines.

The rotor for a typical utility-scale wind turbine includes three high-tech blades, a hub, and a spinner. The blades are one of the most critical aspects for a wind turbine and are considered a strategic component by wind turbine. Each manufacture creates multiple blade types for a single wind turbine in order to enhance performance in different wind conditions. The Project will utilize blades made of laminated materials that have high strength-to-weight ratios. These materials are molded into airfoils to generate lift which causes the rotor to turn. The blades also often include material to protect against lightning strikes. They are bolted onto the hub, with a pitch mechanism interposed to allow the blade to rotate about its axis to take advantage of varying wind speeds.

The hub is made of a ductile cast iron and weighs approximately 10 tons. The blades are connected to the hub which is connected to the generator. The hub is designed to be rigid yet able to absorb a high level of vibration. The hub is covered by a nose cone. The nose cone is designed primarily with aesthetics in mind but can protect the hub slightly from the environment. The nose cone is manufactured with composites similar to those used for the blades.

The nacelle of a wind turbine is the box-like component that sits atop the tower and is connected to the rotor. The nacelle contains the majority of the mechanical components of the wind turbine such as the gearbox, generator, main frame, and controllers. The nacelle housing is made of fiberglass and protects the internal components from the environment. The nacelle cover is fastened to the main frame, which also supports all the other components inside the nacelle. The main frames are large metal structures that must be able to withstand large fatigue loads.

The electricity generating system is inside the nacelle. The spinning rotor drives a large shaft into a gearbox, which steps up the revolutions per minute to a speed suitable for the electrical generator. A wind turbine gearbox must be robust enough to handle the frequent changes in torque caused by changes in the wind speed. The gearbox requires a lubrication system to minimize wear.

The yaw drive system is located in the nacelle and is used to keep the rotor facing into the wind. The yaw drive system usually consists of an electric or hydraulic motor mounted on the nacelle which drives a pinion mounted on a vertical shaft through a reducing gearbox. The yaw drive system also has a brake in order to be able to stop a turbine from turning and stabilize it during normal operation.

Each wind turbine is equipment with a controller system to automatically control the functioning of the wind turbine, it is fitted with a number of sensors to read the speed and direction of the wind, the levels of electrical power generation, the rotor speed, the blades' pitch angle, vibration levels, the temperature of the lubricants and other variables. A computer processes the inputs to carry out the normal operation of the turbine, with a safety system which can override the controller in an emergency. The control system protects the turbine from operating in dangerous conditions and ensures that the power generated has the proper frequency, voltage, and current levels to be supplied to the grid.

Steel tubular towers will be used to place the wind turbines at sufficent height to effectively harvest the wind and allow the blades to rotate. A tower with a maximum hub height of 100 meters is proposed for the Project. Depending upon the terrain, some tower heights may be as low as 80 meter (262.5 ft) lower and will depend upon the terrain for each specific tower location. The 100 meter tower will have four segments. The bottom segment will weight approximately 80 tons. Each tower segment will be delivered to the project on specialy delivery trucks equipment for transporting wind turbine towers. The towers will consist of four tapering sections which are bolted together during erection. The tower is constructed of heavy rolled steel with a smooth exterior surface which will be painted with a neutral color. A locked steel door will provide secured access to the tower based. A computerized control cabinet is located inside of the tower. Power and control cables will extend from the nacelle to the control cabinet located at the base of the tower near the entrance door. Power cables will pass through the foundation in preset conduits and come out of the tower into a small pad mounted power transformer cabinet. Power cables will all be underground. The pad mounted transformer will convert the generated power from 600 volts to the collection system voltage of 34.5 kV. A ladder and lift systems with platforms at each tower segment will extend within the tower interior from the base access door to the nacelle to provide maintenance crews access to the nacelle.

The blades which will connect to the rotor will be compose of expoxy wrapped carbon fiber materials for greater stiffness and reduced weight. Each wind turbine generator will have three blades that will be an approximate length of 50 meter (164 ft). These blades will weigh approximately 8 tons each. Each 50 meter blades will be delivered on a specialty deliver truck that is equiped for extra long loads.

Foundations: The Wind turbines will sit atop steel and concrete foundations designed for the specific subsurface conditions at the individual turbine sites. Geotechnical drilling will occur at each foundation location area to determine the subsurface conditions. Foundations w will be designed by a registered engineer licensed in the State of Montana who will select the appropriate foundation design for each with turbine location based on the site specific geotechnical information, load bearing recommendations of the geotechnical engineer and specifications of the wind turbine supplier. The foundation designs will conform to State and County requirements and standard industry practices. The type of foundation that is anticipated for this Project is the inverted T foundation. This is a spread footing type of foundation that employs a concrete base with a large diameter. The depth of the base will be approximately 10 to 15 feet below grade and is expected to be between 50 and 65 feet in diameter. The top of the concrete pedestal will extend between 1 to 2 feet above finish grade and will be up to 24 feet in diameter. The turbine

tower is fastened to the foundation by tensioned anchor bolts that run through the tower base flange down into the concrete base. A layer of grout 2 to 3 inches thick and a steel ring are typically located between the turbine tower base flange and the concrete pedestal. See Figure 15 contains an illustration of a typical foundation.

Crane Pads: Construction of the wind turbines will require the construction of a crane pad adjacent to each turbine foundation. The crane pad is approximately 100 feet by 100 feet. The crane pad is a permanent parking area needed for the construction and long term maintenance and eventual decommission of the turbine equipment. The crane pad is constructed of crush and compacted rock and is the location where the large assemble crane will sit while lifting the various wind turbine generator component into place. Typically, each turbine assemble area for material lay down, hub assemble and crane equipment operations will require approximately 3 acres or an area approximately 350 feet in diameter surrounding the turbine foundation. Most of this area is used to layout the blades and assemble them to the hub, before the hub with the blades is lifted into place as an assembled unit. Disturbed areas are reseeded after construction, leaving only the access road, crane pad and wind turbine tower. Drainage is designed to flow storm water away from the foundation areas and crane pad areas to the natural drainage in the area. The crane pad is considered a permanent facility which will be reused over the life of the project to facilitate maintenance of the wind turbines.

Electrical Power Collection System: The generator housed in the nacelle of each turbine will produce electricity at 660 volts. Lower voltage cables located inside of the tower will carry the electricity from the nacelle through the tower to a transformer mounted on a concrete pad adjacent to the base of the tower. The transformer concrete pad will be 8 to 10 feet square and 2 feet thick and have a metal roof shelter over the top of it. The transformer located on the pad will be approximately 5 feet high and located in a fully enclosed locked cabinet. The transformer will raise the voltage from 660 volts to the collection system voltage of 34.5 kilovolts (kV). Electricity will be transmitted from the transformers into the 34.5 kV underground power cable installed as part of the power collection system which collects the power from each wind turbine. The power collections system between wind turbines within each Phase will be placed underground except where it is not reasonable to do so because of on site-specific physical conditions such as drainages or to avoid other utilities such as the buried gas pipelines that are in the project area. Underground cables are installed in excavated trenches or directly plowed into the earth at depth of 4 feet below the ground surface. Whenever possible, multiple circuits will be co-located in common trenches. A network of underground power collection cables between wind turbines will be used to collect the full 80 MW of generator power within each phase.

Junction boxes that merge multiple incoming cables into one set of outgoing lines will be installed at various locations within each of the phase areas to facilitate the collection of the power from the turbines. Each 34.5 kV circuit (3 power cables per circuit) will carry up to 25 MW of power. Approximately four circuits of 34.5 kV power cables will be required to evacuate the power from each 80 MW generator area to the collection substation.

Power collection cables from the Phase 2 area will be run to the collection substation in an underground utility trench(s). This trench will follow the east side of Railbed Road from the Phase 2 access road to the collection substation for approximately 2.3 miles. A Carbon County Encroachment Permit has been filed for this underground utility trench. All buried power cable routes will be clearly marketed and built to IEC standards.

In Phase 1 and Phase 3, once the 34.5 kV collection circuit has reach its maximum capacity of 25 MW, the underground power cables within Phase 1 and Phase 3 will be then connected to 34.5 kV overhead power lines placed on wood pole structures to deliver the power to the central collection substation. These overhead 34.5 kV lines will cross private lands within the project area to reach the collection substation.

Collection Substation: The power collected at each of the three wind turbine project's will be taken to a common collection substation where all of the underground collection lines are interconnected into a common bus bar within the collection substation. This common substation will be sized to accommodate interconnection from Mud Springs I, II and III projects totaling 240 MW of power. A large 34.5 / 230 kV electrical transformer will be located at the collection substation for the Project. This transformer further increase, or steps up, the voltage from the 34.5 kV power collection systems from the Project turbines to the 230 kV voltage power of the regional transmission grid. There will be disconnect switches needed to isolate the Project's Generator Lead Line from the Collection Substation. A Collection substation will include a modular building that contains the substation's control and communication equipment. This modular building will contain the metering and operating computer systems, back up batteries, and the state of the art, Supervisory Control and Data Acquisition (SCADA) System which will communicate operations information with the Rocky Mountain Power transmission control information system. The completed substation will occupy approximately 5 acres. The substation will be designed to meet the standards of the National Electric Safety Code the requirements of PacifiCorp and Rocky Mountain Power of interconnection to their system. The 5 acres collection substation will be covered with gravel base and have a grounding system and approximately 3 acres will be surrounded by a chain link fence. Approximately one acre of this substation yard will be used as a maintenance yard. A vehicle shelter will be constructed adjacent to the collection substation instrumentation equipment building which will store spare parts, road maintenance vehicles and snow removal equipment.

230 kV Transmission Generator Lead Line: The 230 kV transmission line or generator lead line, will connect the Collection Substation to the Point of Interconnection Substation near Frannie, Wyoming. The 230 kV transmission line will start at the collection substation in T. 8 S., R 25 E. Section 8 and parallel Railbed Road to Quarry Road. An Encroachment Permit has been submitted to Carbon County for use of the 60 foot wide County right-of-way along Railbed Road for the placement of the power poles. See Figure 4d for a map of the general route of the transmission line along Railbed Road. The pole structures will be placed a minimum of 5 feet outside of the existing road surface. The Applicant will use single pole structures along Railbed Road. See Figure 25 and Attachment 15 for illustrations of the typical design.

At Quarry Road the 230 kV transmission line will then turn west and cross over Highway 310 and the BNSF Railroad near Warren, Montana. Single pole structures will be used when paralleling Quarry Road Upon crossing the BNSF Railroad, the 230 kV line will generally use H-frame wood structures for cross country routes outside of the County Road easements..

There are three alternative routes are under review for crossing Highway 310 and the BNSF railroad and then crossing through or around the State of Montana lands west of Highway 310.

- Alternative 1, the primary route option, would cross Highway 310 near the Quarry Road junction at Warren, Montana. The line would span Highway 310 and the BNSF Railroad siding in one span using tall mono-pole structures with foundations located on a private easement from Warren Trucking located near the intersection of Quarry Road and Highway 310.. This route would pass north of the Montana Limestone Company bagging plant at the Warren rail siding. A private easement has been obtained from Montana Limestone Company for this route crossing the rail siding. The route would then head west across private land easements from Crosby Ranch, crossing the existing PacifiCorp power line on the private lands and then following County right-of-way along Cottonwood Road to west of Section 16. This route plan anticipates crossing the

northern boundary of State of Montana land in T. 9 S. R. 25 E, Section 16 by using the Carbon County easement along the Cottonwood Road. Single pole structures would be used along the Cottonwood Road right-of-way. The poles would be located along the southern shoulder of Cottonwood Road. Upon reaching the western boundary of Section 16, the route would then turn south along private easements, paralleling along the western boundary of the State of Montana land in Section 16, continuing south to the Point of Interconnection substation in Park County, Wyoming. The private landowners along this route from Cottonwood Road south have entered into Easement Agreements with the Applicant for the transmission line Route. H-frame wood pole structures would be used for the transmission line on the private land easements. A Carbon County Encroachment Permit has been filed with the County for use of the County Right-of-way along the south side of Cottonwood Road.

- Alternative 2, a secondary option, would cross Highway 310 and the BNSF Railroad siding in the same location as Alternative 1 and head west across private land easements until the line reaches the existing transmission line corridor. At this point the transmission line would cross the exiting power line and turn south and then across approximately 1 mile of State of Montana lands in section 16 before reaching private land easements where it would continue to the Point of Interconnection substation in Park County, Wyoming. H-frame wood poles would be used for the entire length of this alternative route. An application for an easement across the State of Montana Lands has been filed with the Montana Department of Department of Natural Resources, Conservation Trust Lands Management Division.
- Alternative 3, the shortest route option, would cross Quarry Road at the intersection of Quarry Road and Railbed Road and follow a private easement to a location south of the existing Montana Limestone Company conveyor belt crossing of Highway 310. The line would cross Highway 310, the BNSF Railroad and Sage Creek and then turn southwest across approximately 3,500 feet of State of Montana lands in Section 16. A combination of H-frame and single pole structures will be used along this route depending upon the site constraints. The new transmission line would then cross the existing PacifiCorp power line on private lands south of State of Montana lands in Section 16 and continue south parallel to the existing power line to the Point of Interconnection substation in Park County, Wyoming.. An application for an easement across the State of Montana Lands has been filed with the Montana Department of Department of Natural Resources, Conservation Trust Lands Management Division. The private landowners along this route have entered into Easement Agreements with the Applicant for the transmission line Route.

The Applicant seeks approval of the primary route from Carbon County. If the State of Montana issues an easement for either Alternative 2 or Alternative 3, the Applicant will submit a modification to the Mud

The majority of the general route of the transmission line is within a designated "energy corridor". Under Section 368 of the Energy Policy Act of 2005, Public Law 109-58 (H.R. 6) enacted August 8, 2005, the Secretaries of Agriculture, Commerce, Defense, Energy and Interior were directed to designate under their respective authorities, corridors in 11 Western States for oil, gas, hydrogen pipelines and electricity transmission and distribution facilities, i.e. "energy corridors". The proposed Mud Springs Wind Ranch 230 kV transmission line west of Highway 310 is within Energy Corridor Zone #79-216 designated under Section 368. This corridor is approximately 3,500 feet wide on federal lands. The Mud Springs Wind Ranch transmission line easement alternatives west of Highway 310 are all within this designated corridor area. Those segments of the general route that are east of Highway 310 are within Carbon County's Railbed Road utility easement.

Construction access for the transmission line (all alternatives) will be from existing county roads and from private roads and single track trails across the private land easements and the existing maintenance road that currently provides access along the existing transmission line corridor. County roads that will be used to access the transmission line include Railbed Road, Quarry Road and Cottonwood Road. West of Highway 310 the majority of the structures will be H-frame wood pole structures with

approximately 300 to 500 foot spacing. Along the Railbed Road, Quarry Road and Cottonwood Road segments of the route, wood monopole structures will be used with approximately 200 to 300 foot spacing. At the critical crossing points at Highway 310 and the BNSF railroad crossing larger steel mono-poles or laminated wood mono-pole structures with foundations will be used to allow for sufficient height and span clearance. The type of structure to be used will be determined by final engineering design. Guy wires will be used to secure poles at critical angle points and dead-end structures. The design of the new 230 kV transmission line will include poles and cross arms that are "avian friendly" per APLIC standards which provide for greater separation between high voltage circuits to avoid electrocution of birds that may roost on the power poles.

Point of Interconnection Substation: The Project's point of interconnection with PacifiCorp's 230 kV transmission line will be at a new substation located in Park County Wyoming. A Park County Conditional Use Permit will be obtained from Park County Wyoming for this facility. Access to the Point of Interconnection substation will be existing private roads within the easement area.

Construction Access Roads: Each Project area will have a several primary trubine constrction road. These turbine construction and maintenace access roads will be private roads. Whenever possible, these project access roads will be constructed at existing farm entry locations along Pryor Mountain Road, South Pryor Mountain Road and Railbed Road. Project roads entering onto Pryor Mountain and Railbed Road will obtain Encouchment Permits from the County Road Department for each entry point. A permanent road will be constructed to each wind turbine location. See Figures 11a through 11d for maps of the general locations of the turbine access routes. Final engineering design will determine the exact grade and location of these roads. The turbine access road system will be designed and constructed to allow the large erection crane and other specialized equipment including long load tractor trailer delivery trucks and support cranes access to each wind turbine generator foundation area and to be able to move between turbine locations with mimumun crane disassemble and reassemble required. The proposed crane and utility corridor roads system design assumes a maximum 50 foot width compacted subgrade to allow the large crane to walk from turbine location to turbine location. The final road width with gravel surface will be narrowed to 16 to 20 feet. Final design of road widths, cuts and fills will depend upon the detail plans and profiles, togporgaaphic mapping and crane configurationn requirements. Typical crawler tractor cranes of a size sufficeinent to errect wind turbine generator facilities generally require a 20 to 40 foot wide cleared and compacted walking area. Typical mobile ruber tire crane eqipment is used to support the large errection crane for off loading and swinging equipment components into place for the heay lifting. The large crane must be capable to lift the 80 ton necelle assemply 100 meter (536 feet) to the top of the tower. This reqires a very wide based tracker crawler crane.

Laydown Yards: Large components for the wind turbine, including the Necelle, blades, hub and tower segments will be delivered to each turbine foundation site for rapid assembly. In addition to the material laydown area next to each wind turbine foundation, a centralized equipment parking area and material storage area will be constructed at the locatin of the Collection Substation along Railrbed Road. There will also be smaller project laydown areas in each of the three project areas. The Project construction offices and the crew assembly areas will be also located at the Collection Substation laydown yard.

Operations and Maintenance Building: Mud Springs LLC will be purchasing an existing building, (Olsen Ranch) in the project area for a project office, and parts storage center. Separate building permits will be obtained for any remodeling or expansion of the building for the Operations Office. The operations office will be located near the Collection Substation. Separate building permits will be obtained for the operations control building. WTG operations will be remotely controlled from this central facility. Operations and Maintenance crews will travel daily to the project site to maintain the individual wind turbine facilities.

Water Supply, Solid Waste and Sewage Disposal: Construction water for the concrete batch plan, road construction and dust abatement will come from the existing sources and wells near Quarry Road and State Route 310 and the existing water wells in each of the project easement Areas. Bottled water will be provided by contractors for the construction work force. Portable toilets will be provided by contractors working on the Project during the construction phase. The portable toilets will be serviced regularly and the sanitary effluent trucked off site for disposal by the contractor. During construction and operations, trash and other related packing materials and crates and other packing dunnage will be collected daily and put in covered bins for removal to the local landfill. The operations and maintenance office building, construction trailers will obtain septic permits from Carbon County Sanitarian. Bottled water will be supplied to the operations at remote turbine sites.

5.2 Preliminary Construction Documents and Plans

The detailed engineering design of the Mud Springs Wind Ranch Project will be based on the following general design plans.

5.2.1 Drainage Crossings, Drainage Control, Water Resource Protection.

All drainages in the Wind Energy Easement area and along the transmission line route and at the Collection Substation location are part of the Sage Creek drainage. There are no significant wet lands or riparian habitats that will be directly affected by construction. See Figure 10 for a map of the drainage crossing areas that may be affected by the planned roads that will be constructed at the Mud Springs Wind Ranch Project. Project roads and underground cable trenches will cross intermittent and ephemeral streams channels. The Applicants will obtain any necessary permits for crossing jurisdictional waters of the U.S. Army Corps of Engineers and Montana Department of Environmental Quality (MDEQ). All crossings will affect less than 300 linear feet of stream and should qualify for a nationwide permit from the U.S. Army Corps of Engineers. The Storm Water Pollution Prevention Plan approved by MDEQ will establish standards for protection of water quality and water resources.

Piney Creek, an intermittent stream is crossed by Railbed Road. This current culvert crossing is not expected to be affected by project improvements to the Railbed Road right of way that are near this crossing. Sage Creek is an intermittent stream channel which will be crossed by several project related roads. The existing Quarry Road crossing of Sage Creek is not expected to be affected by the project. The existing Pryor Mountain Road crossing of Sage Creek is not expected to be affected by the project. Other road crossings of Sage Creek are along private ranch roads and may require modification of the existing crossing with the placement of a new culvert.

Placement of culverts at crossings of Sage Creek and other ephemeral tributaries, may be permitted under the U.S. Army Corps of Engineers nationwide Permit Rules 12, 14, and 51 if these features are determined to be jurisdictional waters. These rules regulate construction of "Utility Lines" (Rule 12); Linear Transportation Projects (Rule 14) and "Land-Based Renewable Energy Generation Facilities" (Rule 51). These rules allow for discharges of dredged or fill material into stream beds for the construction of roads, underground and overhead utilities and renewable wind energy production facilities. Such facilities which are permitted under the nationwide permit system include the infrastructure related to the proposed wind facility including but not limited to roads, parking lots and storm water management facilities. The discharge must not cause a loss of greater than ½ acre of non-tidal waters including the loss of no more than 300 linear feet of stream bed per crossing. If necessary a waiver can be obtained from the Army Corp of Engineers' District Engineer for greater than 300 linear feet of steam bed disturbance for an intermittent or ephemeral stream bed provided the construction will have minimal effect. It is anticipated that all culvert placement, collection system trenching and road

construction in the Sage Creek drainage will not exceed the 300 linear foot rule at each steam channel crossing. The Applicant will provide notice to the Army Corps District Engineer prior to commencing the activity when required by the specific Nation Wide Rule.

The Project facilities will not affect existing water rights. Wind turbines do not use water. Ground water source will be utilized from existing wells for the batch plant and dust suppression during construction. All wind turbine foundations will be located over 100 feet from all existing wells. The Carbon County Flood Plain Management plan policy was review. The project WTG areas are not located in flood plains or drainages with potential flash flood areas. Culverts at road crossing of the affected drainages will be sized for the 100 year event. Drainage areas surrounding the wind turbine generator locations will be diverted away from cane pads and tower foundations to the topographic drainage. See Attachment 4 for a copy of the letter from the Montana Natural Resource Commission, Water Resource Divisions Flood plain maps for the Sage Creek Valley and for a map of the Sage Creek floodplain. The project facilities wind turbine facilities will not be located in the FEMA identified flood plain. Buried transmission line routes, road routes and overhead transmission line routes will cross the flood plain. All new road crossings of Sage Creek will be designed with culverts that have capacity for a 100 year flood event.

5.2.2 Erosion Control and Best Management Practices

The Projects have filed a Notice of Intent for permit coverage under the Montana Department of Environmental Quality,, Pollutant Discharge Elimination System (MPDES) Storm Water General Permit for storm water discharges associated with the proposed construction activities and has been assigned Permit Number This permit and Storm Water Pollution Prevention Plan establishes the limits of earth disturbance and the measures to be employed to control storm water, drainage, and erosion in the construction area of each phase. The Applicants will require that compliance with the specifications and best management practices associated with the Storm Water General Permit will be stipulated in all construction contracts.

5.2.3 Storm Water Pollution Prevention Plan

The Mud Springs Wind Ranch has an approved Storm Water Pollution Prevention Plan (SWPPP) from the Montana Department of Environmental Quality for all construction activities. (Permit Number MTR105482). This common SWPPP will be incorporated into each operating company's scope. The common SWPPP will be applicable to for each project phase will include a temporary and permanent soil stabilization plan for each stage of the project, including initial land clearing and grubbing to project completion and achievement of final stabilization. The primary purpose of the SWPPP is to reduce and/or eliminate erosion and sedimentation during the construction phase of the project and maintain drainage control features over the life of the projects. Erosion control measures will be designed and installed in accordance with the standards and specifications outlined in the SWPPP. Three basic methods will be used to control erosion: soil stabilization, sediment control and runoff/drainage control. The first step to implementing the basic methods to control erosion and storm water runoff is to limit areas of disturbance to the extent possible. After limiting disturbance to the extent practicable, both vegetative and structural erosion and sediment control measures will be utilized during construction. Vegetative controls are used for soil stabilization and basic erosion control by providing soil cover and protecting existing natural resources. Examples of vegetative controls include plantings and seeding to provide perennial vegetative cover, spreading of preserved topsoil material, and mulching. Temporary structural measures are used during construction to prevent off-site sedimentation and the length of time that they are function varies. Examples of temporary structural measures include the use of seed free straw bales, jute mats and silt fences. Permanent runoff and drainage control features will include

culvert placement, drainage ditch placement, and catchment basins. Attachment 5 contains a copy of the Notice of Intent and SWPPP approved for the Mud Springs Wind Ranch projects.

5.2.4 Public Road Improvements

The primary access route into the project area for all phases of the Mud Springs Wind Ranch will be via Railbed Road. Approximately 12.8 miles of county roads in the Project Area will be used for construction access. New access roads to the wind turbine locations will require 12 new intersections and turning radius improvements involving County Roads right of ways. Large trucks and oversize load vehicles will be required to enter the Project Area from the south via Quarry Road intersection at State Route 310 and then north along Railbed Road. A northern approach to the project area will be via Pryor Road intersection with State Route 310 will be a secondary entry route. No major equipment loads or material deliveries will be allowed to use Pryor Road from State Route 310. Only the eastern segments of Pryor Mountain Road, which are located in project area and accessed from Railbed Road will be used for construction activity and delivery of major equipment components. See Figure 5 for a map of the County access roads that will be used and Figure 11 for a map of the project roads that will be developed.
One of the problems frequently found in wind project construction is that road bends and intersections with reduced turning radius often need additional widening to allow the passage of long load trucks carrying wind turbine components. The biggest problems as associated with delivery of the blades which are 160 feet long. It is noteworthy that most of the delivery trailers for wind turbine component transportation allow for steering or orientating the rear wheels independently from the guiding front wheels. A preliminary evaluation of the County Roads in the project area has identified locations where road widths and turning radius improvements are anticipated. County Encroachment Permits have been filed with the Carbon County Road Department for these locations.

See Figure 12 for a map of the location of Cottonwood Road; an existing County road off Highway 310 near Warren, Montana. Cottonwood Road will be used to access the transmission line right of way. No changes are needed to this existing County Road. The primary use of this road will be for the delivery of transmission line poles and other materials to the transmission line easement west of Highway 310.

Long load deliveries include the wind turbine blades and tower segments. The blades are the longest loads to be delivered to the project site. The blades will be approximately 50 meter long (164 feet) and the tracker trailer configurations require a large turning radius. Figures 13a through Figure 13c illustrate the typical road improvement problems and solutions. Detailed engineering will be completed to provide final design of these improvements. Final design of all county road improvements will be submitted to the Carbon County Road Department for review prior to construction. When necessary to construct the improvements outside of the County right-of-way, the Applicant has obtained private easements on adjacent property.

Figure 13a illustrates a typical trajectory problem with long load trucks negotiating reduced radius turns. In this case the tractor unit follows a path in the center of the road and the rear wheels of the trailer will need additional road widening before the beginning of the road turn and the inside radius of the turn. Also the area adjacent to the outside turning radius of the turn needs to be evaluated for the transit of the blade tip which extends over the end of the trailer. When possible, road width and turning radius solution will utilize County right-of-way. In some areas solutions will require additional area from adjacent properties outside of the County right-of-way. These solutions are used only when the adjacent property owner is a participating party to the project through either a wind energy easement or a road easement agreement.

Figure 13b illustrates an example of widening only the interior radius of a turn.

Figure 13c illustrates a turn improvement where improving the interior radius of the turn is not possible because of a boundary or other physical restriction. This turn solution requires expanding the outside turning radius of the road pathway. In general, this solution requires additional area outside of the County right-of-way and is only employed with the Applicant has obtained permission from the adjacent land owners to move fences and increase the turning radius.

Figures 13d through Figure 14e describe the road improvements anticipated by the Applicant for Quarry, Railbed, and South Pryor Mountain and Pryor Mountain roads.

Southern Access Approach: The Southern access approach to the project will follow Railbed Road. This route will be used for all oversized and heavy loads. This route will be the designated large load delivery route. These loads will include the wind turbine generator nacelle unit, hub, tower segments, blades and towers and the majority of the other equipment and materials. The heavy equipment and material needed to construct all phases of the Mud Springs Wind Ranch Project will be required to use the designated delivery route via Highway 310 to Warren, Montana. The equipment and material deliveries will use Quarry Road and Railbed Road and segments of Pryor Mountain Road to reach the project areas. Pryor Mountain, South Pryor Mountain, Quarry and Railbed roads are Carbon County Roads. The Applicants will obtain a road use agreement with Carbon County Road Department for use of these roads by oversize loads and will bond the repair of the County Roads. County roads will be photo surveyed prior to use by Project. Additional rock will be placed on the County Roads as needed to improve the surface and grade at the Highway 310 intersection.

The Quarry Road and Highway 310 intersection currently has adequate safety turning lanes for truck traffic. Some improvements of shoulder areas and grade will be completed on Quarry Road approach landing to Highway 310 intersection. No additional Right of Way will be needed. Quarry Railroad intersection is currently used to access the existing rock quarry mine operations and the existing limestone cement processing mill at the intersection of Quarry Road and State Route 310.

The project loads will also use a private road entrance off Highway 310, south of Warren, Montana. This road is an existing truck entrance onto Montana Limestone Company's property. A private easement has been obtained by the Applicant to use this access road. This access road will be improve to allow long load trucks to approach the Railbed Road and Quarry Road junctions from the south. This route will require the long loads to cross Quarry Road. Additional signs and flagging operations will be used to facilitate safe crossing of Quarry Road by long load trucks and trailers

The turning radius at the entry onto Railbed Road from Quarry Road will also require widening within the County right-of-way to improve turning radius for all trucks entering Railbed Road and to provide adequate approach for the long loads crossing Quarry Road onto Railbed Road from the private truck by-pass road south of the Quarry Road and Railbed Road intersection.

All Project road segments constructed for the wind project will be gravel roads. Some additional placement of gravel and dust palliative on the surface of the county roads is anticipated to improve the load bearing capacity and to control dust. Truck safety turnouts will also be constructed along Railbed Road and Pryor Mountain Road at locations that will not affect the drainage and at intervals to be determined by final design. Truck turnouts will involve grading a wider shoulder at appropriate locations. The location and design of road shoulder improvements within the County Right of Way, to improve safety turnouts and the turning radius, will be approved by the County Road Department prior to construction.

The general location of major improvements to segments of Quarry Road, Railbed Road and Pryor Mountain Road right-of- ways are shown in Figure 13d through 14c. Encroachments permits have been submitted for all improvements to County Roads. Turning radius and intersection improvements to County roads will include the following:

See Figure 13d for a map of the shoulder area improvements needed at the intersection of Quarry Road and Highway 310. This improvement will involve the placement of gravel to expand the shoulder areas within the existing right of way and to raise the grade of Quarry Road to lessen the elevation difference between Quarry Road and Highway 310 to minimize potential for low clearance trailers from bottoming out. The majority of construction equipment, material deliveries and crews will enter the project area by using the Quarry Road and Highway 310 intersection.

See Figure 13e for a map of the proposed long load truck route bypass of the intersection of Quarry Road and Railbed Road. Long loads delivery turbine blades and tower segments have longer turning radius requirements than normal semi-truck loads. The existing Railbed and Quarry road intersection has existing buried utility infrastructure and a cell tower which will make construction of an adequate turning radius for long loads difficult. Applicant will improve the turning radius of the existing intersection by widening existing shoulders. The Applicant has also obtained a private road easement to construct a by-pass of Quarry Road / Railbed Road intersection. The by-pass will involve using the existing Montana Limestone Company access road, located south of the Quarry Road junction at Highway 310. The by-pass route will involve improving the existing roads on Montana Limestone Company property to allow the long loads to exit Highway 310 at an existing entrance located just south of the conveyor belt overpass of Highway 310 at Warren, Montana. This entry has better sight lines then the Highway 310 intersection with Quarry Road. The by-pass will approach the Railbed Road junction from the south, allowing for long loads to cross Quarry Road and access Railbed Road. The Applicant will be responsible for relocating any existing utilities within the County easement, if necessary, to widen this intersection to the full 60 feet of the existing the existing County rights of way on Railbed and Quarry Roads to allow to allow incoming loads to access Railbed Road.

See Figure 13f for a map of the proposed straightening of Railbed Road near the Piney Creek crossing. This improvement is needed to straighten the road approach to the existing culvert crossing for incoming long loads. The improvements will be made within the existing County Right of Way south of Piney Creek and will improve the long load truck and trailer configurations ability to negotiate this narrow crossing.

See Figure 13g for a map of the proposed straightening of Railbed Road near the King Creek culvert. This improvement will be made north of the existing culvert. A slight S-turn in Railbed Road will be straightened by this improvement to the eastern shoulder of Railbed Road.

See Figure 14a for a map of the proposed turning radius improvement to the intersection of Railbed Road and South Pryor Mountain Road. The existing intersection has insufficient turning radius to allow for long loads. The expansion of this intersection will be completed within the existing County Right of Way. Should drainage controls require additional right of way, the Applicants have obtained an easement to expand this segment of road beyond the county right of way if necessary. Applicant will move the cattle crossing and relocate fences to accommodate this intersection improvement. Applicant has an easement agreement with the Bowler Flat Ranch, the adjacent land owner of both sides of this intersection.

See Figure 14b for a map of the proposed turning radius improvement along South Pryor Mountain Road where it makes a right angle turn to the north. The existing road path has insufficient turning radius to allow for long loads. The Applicant has obtained an easement from Bowler Flat Ranch to expand this segment of road beyond the county right of way if necessary.

See Figure 14c for a map of the proposed turning radius improvement at the intersection of South Pryor Mountain Road and Pryor Mountain Road. This improvement will involve minor grading and placement of gravel on the inside turns to long load trailers to negotiate this intersection.

See Figure 14d for a map of turning radius improvements along Pryor Mountain road near the historic community of Bowler. Pryor Mountain road at this point is making a long S-turn as it climbs in elevation. The existing road path has will be widened to provide sufficient turning radius for long load trailers. The improvements will be made within the existing County Right of Way.

Northern Access Approach: The northern approach to the project area involves use of Pryor Mountain road from Highway 310 to the project area. The Applicants will designate the southern approach as the primary access path to the project area. The northern approach may be used by construction crews and delivery trucks bringing light loads of construction equipment and materials to the project following Pryor Mountain Road from Highway 310. Typical loads using this approach will deliver miscellaneous materials and smaller equipment used in the construction of wind turbines but will not include any large over-length and over-weight supper loads. Approximately 20% of the total traffic including some of the empty loads but largely consisting of personal and crew vehicles may exit the Project via Pryor Mountain Road to the north. Empty trucks which have delivered their heavy and long loads to the project area will be directed to use the Quarry Road exit. Occasionally, empty trucks may be diverted to the northern access route to avoid congestion with delivery loads using the Southern approach. Long load trailers will be shortened to standard lengths upon completion of the delivery and prior to entry to the public road system. The northern approach to the project will not require any improvements to the Pryor Mountain Road and Highway 310 intersection.

Cotton Wood Road Access: Cotton Wood Road is an existing County ranch road access off Highway 310 approximately 4,600 feet north of Quarry Road, See Figure 12, for the location of this existing intersection with Highway 310. This County Road will be utilized to access the transmission line right or way that is west of Highway 310. No improvements are needed to use this road.

County Road Approach Permits: Approximately 16 new or rebuilt private access road approaches are required for the construction access roads needed to construct and operate the wind turbines. Applicants will obtain Carbon County Approach permits for all new and rebuilt private road approaches to the County roads from the Carbon County Road Department prior to construction.

Road Encroachment Permits: Applicants have applied for 8 encroachment permits for County Road improvements areas of road right-of- ways to improve the road alignments and turning radius of County Roads. (See Figures 13d through 14d) Applicant will obtain Carbon County Encroachment permits for all road improvements made in the County Right of Way.

Transmission Line Encroachment Permits: Applicants have applied for 2 Encroachment Permits for placement of the 230 kV transmission line. Mud Springs Phase IV has applied for use of 6.9 miles of Railbed Road right-of-way and for use of 1700 feet of Cottonwood Road for placement of transmission poles and overhead transmission line. The applicants have applied for two Encroachment Permits for placement of underground power collection cables. Mud Springs Phase III has applied for use of 1330 feet of Pryor Mountain Road right of way for placement of underground collection lines and Mud Springs Phase II has applied for use of 2.5 miles of Railbed Road to bring collected power from Phase II to the Collection Substation located in Mud Springs Phase 1.

5.2.5 Foundation Design

The wind turbines will sit atop of steel reinforced concrete foundations designed for the specific subsurface conditions at each wind turbine. Figure 15 illustrates a typical foundation. Figure 16 is a photo of a typical rebar reinforcement of a foundation. Figure 17 is a photo of a typical finished foundation. A typical foundation will require 400 cubic yards of concrete which will require approximately 44 red mix truck loads per turbine foundation.

5.2.6 Tower Design

The wind turbine nacelles will sit atop of a rolled steel tubular tower. The tower will consist of four tapered sections that are bolted together with tensioned bolts. Figure 18 illustrates a typical tower. Figure 19 is a photo of a typical tower section prior to placement. Figure 20 is a photo of a base section of a tower bringing lifted into place. Tower design is the responsibility of the turbine supplier. Tower components and the turbine components are typically laid down adjacent to the foundation area for assemble by the crane.

5.2. 7 Typical Erection Plan Laydown

Turbine erection areas are typically 300 X 300 feet in size. This is a temporary disturbance area where components are laid down and equipment operations occur during assemble. All wind turbine tower locations will have a permanent crane pad for erection and maintenance of the wind turbine. The erection of the tower will involve delivering of the component parts of the wind turbine to the crane pad area. The major components of the wind turbine, including the tower segments, blades, hub and nacelle will be laid down near the crane pad. Figure 21 illustrates a typical material lay down at the wind turbine locations. Crane pads are typically made of timbers laid over a level, compacted and graveled parking area approximately 100 X 100 feet in size which is used to park the large lifting crane. This permanent pad is maintained over the life of the project to allow for use of cranes in future maintenance work. Multiple cranes are often used to erect the wind turbine, with at least one smaller crane assisting the large crane in assemble of the tower and turbine components.

5.2.8 Project Electrical System

The function of the electrical system will be to collect the electricity produced by the Project turbines and convert it to higher voltage electricity to be fed into the regional power grid for delivery to various purchasers.

The Project's electrical system will consist of four primary components:

- The power collection system from each wind turbine generator, which consist a a series of power cables which are is typically placed underground,
- Project collection system bus bar into which all power collection system cables will connect and is located at the a common project collection substation which will be located near the center of the project and adjacent to the existing PacifiCorp 230 kV transmission line.
- Project transformer is located at the Collection Substation and converts the collected power from the WTG to the regional voltage of the interconnecting utility.
- The Generator Lead Line which connects the Project's Collection Substation to the Point of Interconnection substation. The Generator Lead Line is estimated to be 12.5miles long and will terminate in Park County Wyoming at the Point of Interconnection Substaiton with PacifiCorp's regional transmission system and Wyoming Service Territory.
- The Point of Interconnection Substation which will contain disconnect switches, and metering equipment, will be located in Park County Wyoming..
- The existing PacifiCorp Yellowknife to Frannie 230 kV transmission line will be the transmission system into which the power is delivered for regional consumption under a Power Purchase Agreement with PacifiCorp.

Power Collection System: The power collection system has been configured to generally follow the Project road system within each Phase. Power collection cables from each wind turbine facility will be placed underground or on wood pole structures when necessary and feasible to do so. The generator

housed in the nacelle of each turbine will produce electricity at 660 volts. Lower voltage cables located inside of the tower will carry the electricity from the nacelle through the tower to a transformer mounted on the concrete pad adjacent to the base of the tower. The transformer pad will be 8 to 10 feet square and 2 feet thick concrete foundation. The transformer, located on the pad, will be approximately 5 feet high and located in a fully enclosed lockable cabinet. The transformer will raise the voltage from 660 volts to the collection system voltage of 34.5 kilovolts (kV). Electricity will be transmitted from the transformer into a 34.5 kV underground power cable installed as part of the power collection system. A network of underground power collection cables will connect the turbines in each Phase area. A combination of overhead and underground cables will deliver the power to the Project's substation. Junction boxes that merge multiple incoming cables into one outgoing line will be installed at various locations within the Project area to facilitate the collection of the power from the turbines. Each 34.5 kV circuit will carry up to 25 MW of power. Several circuits will be required to evacuate power from all wind turbine generators to the project collection system substation. . See Figure 22 for a photograph of a typical underground power cable routes. All buried power cable routes will be clearly marked and built to IEC standards. The power collection system within each phase will be placed underground except where it is not reasonable to do so based on site-specific physical conditions (i.e. railroad crossings or rocky terrain). Underground cables will be installed in excavated trenches or direct plowed into the earth at a depth of 4 feet below the ground surface. Whenever possible, multiple circuits will be co-located in common trenches. The majority of the power collection system cable routes will be on easement lands. Segments of the collection system will follow County rights of way and will cross the Railbed Road right of way. Applicant will obtain easements from the County for use of the County's right of way for the placement of the collection system power cables. Both overhead and underground cable runs will be installed depending upon the land owner's preference and environmental and geotechnical conditions.

Power Collection System Homeruns: Phase 1 and Phase 3 project areas are over 1 mile from the Collection Substation. To reduce line loss associated with underground cables and to minimize trenching through pasture lands, and pipeline crossings, power from Phase 1 and Phase 3 will brought to the Collection Substation with overhead power lines. Within Phase 1 and Phase 3, the underground collection cable trenches from each wind turbine will bring power cables to a common location and sweep them up and onto an overhead 34.5 kV transmission line. The 34.5 kV overhead transmission line "homeruns" will bring the collected 80 MW of power from each phase to the Collection Substation. The Collection Substation is located in Phase 2. The underground collection power cables in Phase 2 will deliver 80 MW of power directly to Collection Substation. The underground 34.5 kV collection lines will use the County right of way along Railbed Road to connect Phase 2 to the Collection substation. An Encroachment Permit has been applied for the use of Railbed Road right of way to bring these underground power cables to the Collection substation.

Project Power Collection Substation: An electrical substation will be needed in the Project area to collect all underground and overhead 34.5 kV power cables into a common bus bar which will be connected to the Point of Interconnection substation via the new 230 kV interconnection line. The power collection substation and transmission line is Phase IV of the Mud Springs Wind Ranch and will be a commonly owned facility. The purpose of the collection substation is to gather multiple collection power cables from each of the three phases of wind turbine generator (approximately 4 collection cable systems per phase) and interconnect them into one common feed bus bar from the 34.5 kV power collection systems and deliver that power to the 34.5/230 kV transformers which will be located at the Collection Substation. Two redundant 34.5/230 kV step up transformers will be installed at the collection substation to provide output power at the 230 kV voltage of the regional power grid. The location of the Project's Power Collection Substation is shown in Figure 7. Figure 23 is a photograph of a typical collection substation with collection bus bar and transformer. In addition to the bus bar, transformer, disconnect switches, and metering relays, the substation will have a small metering and operating building that will house the power generation control and relaying equipment, station batteries, and the on-site Supervisory

Control and Data Acquisition (SCADA) System, which will communicate operations information with the transmission control information system. The entire substation area will be cleared, graded and covered with gravel and surrounded by a chain link fence. The completed substation will occupy approximately five acres of which approximately 3 acres will be fenced and the remaining area used for storage. The substation will be designed to meet the standards of the National Electric Safety Code and the requirements of the PacifiCorp / Rocky Mountain Power interconnection system. Approximately one acre within the substation security fence will contain a maintenance yard and vehicle shelter will be constructed adjacent to the substation metering and control build and will store spare parts, road maintenance vehicles and equipment for snow plowing. The collection substation is a commonly owned facility. See Attachment 15 for preliminary design information on the collection substation.

Generator Lead Line: Phase IV of the Mud Springs Wind Ranch will include a commonly owned Generator Lead Line which will travel approximately 12.5 miles from the Collection Substation to the Point of Interconnection with PacifiCorp in Park County Wyoming. The power will be delivered to the Point of Interconnection via a wood pole power line which utilizes both single and H-frame structures. Figure 24 contains figures and photographs of typical H-frame wood structure that will be used on the 230 kV transmission line. Single pole structures will be used along Railbed Road. The larger H-frame structures will be used on the private and State of Montana easement lands west of Highway 310. Figure 24 contains a photograph of the existing H-frame transmission line west of Highway 310. The new 230 kV Generator Lead Line will generally follow south along the Railbed Road right of way to Quarry Road. Private easements have been obtained for the transmission line route where it turns west at Quarry Road and crosses Highway 310 and the BSNF Railroad to reach the State of Montana lands. The transmission line will then cross the State of Montana lands to intersect with the existing transmission line corridor. The 230 kV line will then follow private easements paralleling the existing power line to the Point of Interconnection Substation located just across the state boundary in Park County, Wyoming. The new 230 kV transmission line will be located on a separate easement from the existing PacifiCorp transmission line. Figure 25 contains a photograph of the existing PacifiCorp transmission line. The Applicants have obtained private easements from local ranches for the entire length of the transmission line outside of the Railbed Road County Right of Way and the State of Montana Lands from the Collection Substation to the Wyoming boarder. Steel monopole structures in excess of 120 feet in height may be used at the Highway 310 and BNSF Railroad crossings. These larger poles will allow for sufficient clearance to span both the highway and railroad.. Separate permits will be obtained from the State of Montana Department of Transportation for the highway crossing. A railroad crossing permit will be obtained from the BNSF Railroad. See Attachment 15 for the 230 kV transmission line plan details.

Point of Interconnection Substation: The Point of Interconnection substation will be located along the existing PacifiCorp 230 kV transmission line in Park County Wyoming. The Point of Interconnection must be located in Wyoming for the projects to qualify for the PURPA contract pricing offered in Wyoming. This substation will have disconnect switches, metering devises, and control equipment and a control house. The entire substation area will be cleared, graded and covered with gravel and surrounded by a chain link fence. The substation will be designed to meet the standards of the National Electric Safety Code and the requirements of the PacifiCorp / Rocky Mountain Power interconnection system. A separate Conditional Use Permit will be obtained from Park County Wyoming for the land use approval of this facility.

PacifiCorp's Transmission Line: All of the Project's power output will be sold to Rocky Mountain Power under a long term power sales contract. Rocky Mountain Power will require Mud Springs LLC to pay for any upgrades that may be required to this existing 230 kV power line to accommodate the evacuation of all of the power from the Mud Springs Wind Project's three 80 MW phases. Improvements in Montana associated with the Mud Springs Wind Project development will include installation of a new fiber optic communications cable along the existing transmission line poles from

Frannie to Yellowknife substations. The project's 230 kV transmission line is expect to cross over PacifiCorp's transmission line along Railbed Road. This crossing point may require installation of two 120 foot tall steel monopoles in the County Right of Way to facilitate this crossing of the two power lines.

5.2.9 Existing Sage Creek Valley Easements

There are five pipeline easements, a high voltage power line easement, a lower voltage distribution power line easement and a communication cable easement in the project area. See Figure 3 for a map of the existing pipeline and high voltage transmission line easements. The location, and set back of all existing easements will be identified prior to final design. Crossing permits will be obtained from the appropriate easement holders to identify design criteria for road crossings and power collection system trench crossing of pipelines. Project contractors will be required to locate existing easements prior to construction and coordinate construction activities with the easement holder.