Appendix B
Additional Design Features

APPENDIX B – ADDITIONAL DESIGN FEATURES

In addition to the design features specific to each of the Proposed and Connected Actions described in Section 2.1 through 2.4, West Butte Wind would implement features that would apply equally to activities on both private and BLM-managed lands. These design features would apply to overall construction and operation practices, or would target minimization of impacts to specific environmental resources, as further detailed below. These features would also be incorporated into Alternative 2, discussed in Section 2.5.

Project Construction Practices

- All control and mitigation features described above for the Proposed and Connected Actions, and the resource-specific management plans described below, would be maintained and implemented throughout construction, operation, and maintenance of the Project.
- The area disturbed by construction and operation of the Proposed and Connected Actions (both Alternative 1 and Alternative 2) would be kept to a minimum. The number and size/length of access roads, temporary fences, lay-down areas, and borrow areas would be minimized to allow for the safe and efficient construction of the project. West Butte Wind would minimize new road construction by improving and using existing roads and trails where possible.
- Construction would be conducted primarily during the dry-weather seasons when site access is safe, unrestricted due to weather conditions, and soil erosion by water is minimized. If grading needs to be done outside of the dry season, West Butte Wind would coordinate the work with the appropriate agencies and follow all applicable guidelines. Rainy season erosion control measures would be used to control runoff and erosion in the event that revegetation is not completed prior to the rainy season.
- West Butte Wind would identify unstable slopes and local factors that can induce slope instability (such as groundwater conditions, precipitation, earthquake activities, slope angles, and the dip angles of geologic strata). West Butte Wind would also avoid creating excessive slopes during excavation and blasting operations. Site-specific appropriate construction techniques would be used where applicable in areas of steep slopes, erodible soil, and stream channel crossings to ensure long term stability and erosion prevention.
- Erosion controls that comply with county, state, and federal standards would be applied. Practices such as jute netting, silt fences, and check dams would be applied near disturbed areas in accordance with the SWPPP. Diversion structures and spot grading would be used to reduce siltation into adjacent drainages during grading and construction activities. Grading on slopes steeper than 2:1 would be designed to minimize surface water runoff.
- On-site surface runoff controls would be maintained in accordance with state standards to minimize potential for increased localized soil erosion.

- Areas temporarily disturbed by construction would be restored and revegetated. This would be completed by implementing a restoration plan that would include (but not be limited to) the following major components:
    - revegetation, soil stabilization, and erosion reduction measures that would be implemented to ensure that all temporary use areas are successfully restored in a timely manner;
    - topsoil from all excavations and construction activities would be salvaged and reapplied during reclamation. Excess topsoil stockpiled on site would be segregated from other soils to facilitate future land restoration. Stockpiled soils would be protected from wind and water erosion;
    - grading to restore the ground contour to pre-construction conditions would be completed after temporary construction activities;
    - reseeding procedures would be established, including an appropriate native species seed mix (e.g., bluebunch wheat grass, Idaho fescue, Thurber's needle grass, prairie junegrass, bottlebrush squirelltail, Douglas and Ross sedge, and western needle grass);
    - reseeding would be completed as soon as possible after construction is completed using appropriate equipment (e.g., rangeland drill) and application rates;
    - rancher coordination would be conducted to identify the timing and numbers of livestock that would be allowed to graze in the area during the restoration process (to minimize grazing pressure during the early phases of restoration);
    - noxious weed control procedures would be followed. This would include monitoring, education of personnel on weed identification, the manner in which weeds spread, and methods for treating infestations. The use of certified weed-free mulch would be required. A controlled inspection and cleaning area would be established to inspect construction equipment arriving at the project area and clean equipment to remove and collect seeds that may be adhering to tires and other surfaces. A containment area would be established to ensure that any waste water or soils generated through cleaning are captured to ensure containment of seeds brought in by construction equipment. These seed contaminated waste water and soils would be disposed of at a location pre-approved by the County Weed Master to prevent future spread of weeds. Additionally, only clean fill material from a weed-free source would be used. If pesticides are used on the site, an integrated pest management plan would be developed to ensure that applications would be conducted within the framework of BLM policies and entail only the use of EPA-registered pesticides. Pesticide use would be limited to nonpersistent, immobile pesticides and would only be applied in accordance with label and application permit directions and stipulations for terrestrial and aquatic use; and

- monitoring would be completed to identify when corrective actions (e.g., additional temporary erosion control measures, reseeding, noxious species control) are needed and to confirm appropriate restoration standards are achieved.

West Butte Wind would develop this restoration plan in consultation with the appropriate stakeholders, experts, and agencies (e.g., BLM, Oregon Department of Agriculture, Oregon State University Extension, the private landowner, and the local weed master). No construction would begin on BLM lands until this plan has been reviewed and approved by the BLM's Authorized Officer.

- Locations for temporary storage of construction equipment would be designated.
- Borrow material would be obtained only from authorized and permitted sites. Existing sites would be used in preference to new sites.
- A final Grading and Drainage Plan, designed to minimize erosion, would be submitted to Crook and Deschutes Counties and BLM for review and approval. The Plan would detail any proposed temporary or permanent erosion control structures. The Plan would be approved prior to construction. Emphasis would be given to consideration of temporary erosion control structures, such as trench plugs and water bars, on moderately steep slopes.
- Soil elevation/topography would be restored consistent with the approved Grading and Drainage Plan.
- Excavations, including foundations and trenches, would be backfilled with originally excavated material as much as possible. Excess excavation materials would be disposed of only in approved areas to control soil erosion and to minimize leaching of hazardous constituents. Rock too large to crush would be stockpiled on site. Soil would be salvaged for revegetation. Soils found to be less resilient may require numerous reseeding efforts to be successful.
- During trenching or other excavating operations, the topsoil and subsoil would be separated from the underlying less productive soil substratum and bedrock. Refilling of the trench would occur first with soil substratum and bedrock, followed by subsoil material, and finally with topsoil that contains organic matter and live soil organisms to increase the success of seeding and rehabilitation efforts.
- Areas to receive fill would be stripped of vegetation, organic topsoil, debris, and other unsuitable material. Engineered fill would be placed in layers not exceeding 12 inches in loose thickness, properly moistened and compacted, and tested for 90 percent compaction.

Management of Hazardous Materials and Wastes

- "Good housekeeping" procedures would be developed to ensure that during operation the site would be kept clean of debris, garbage, fugitive trash or waste, and graffiti; to prohibit scrap heaps and dumps; and to minimize storage yards.

- West Butte Wind would develop a hazardous materials management plan (HMMP) addressing storage, use, transportation, and disposal of each hazardous material anticipated to be used at the site. The plan would establish inspection procedures, storage requirements, storage quantity limits, inventory control, nonhazardous product substitutes, and disposition of excess materials. The plan would also identify requirements for notices to federal, state and local emergency response authorities and include emergency response plans. The HMMP would be submitted to Crook and Deschutes counties for approval prior to introducing any such materials onto the site.
- West Butte Wind would develop a waste management plan identifying the waste streams that are expected to be generated at the site and addressing hazardous waste determination procedures, waste storage locations, waste-spill prevention and control methods, waste-specific management and disposal requirements, inspection procedures, and waste minimization procedures. This plan would address all solid and liquid wastes that may be generated at the site.
- Secondary containment would be provided for all on-site hazardous materials and waste storage, including fuel. In particular, fuel storage (for construction vehicles and equipment) would be a temporary activity occurring only for as long as is needed to support construction activities. Refueling vehicles would have a sign listing pertinent contacts to notify in the event of a spill.
- Locations for construction fueling would be designed to capture any spilled fuel to avoid ground pollution and located to avoid sensitive areas.
- Wastes would be properly containerized and removed periodically for disposal at appropriate off-site permitted disposal facilities.
- In the event of an accidental release to the environment, West Butte Wind would document the event, including a root cause analysis, appropriate corrective actions taken, and a characterization of the resulting environmental or health and safety impacts. Documentation of the event would be provided to BLM and other federal and state agencies, as required.
- All equipment would be adequately maintained to minimize operational losses of hazardous materials and to reduce the risk of accidental spillage.

Water Resources

- West Butte Wind would apply to the U.S. Army Corps of Engineers for permits needed to construct in waters of the U.S., if needed.
- West Butte Wind would obtain coverage under the Oregon Department of Environmental Quality 1200-C NPDES Construction Stormwater permit. As part of this coverage, West Butte Wind would prepare and implement a SWPPP to prevent off-site migration of contaminated stormwater or increased soil erosion.

Biological Resources

- In the spring of the first year of construction a helicopter survey of the construction area would be made to locate any raptor nests. These nests would be flagged and avoided in conformance with ODFW requirements for setbacks from nest areas.
- Sensitive raptor nest trees would be flagged and monitored. The environmental monitor would work with the construction contractor to avoid construction work in these areas during periods when the nests are active. Protective buffers would be established based on available state or federal recommendations to protect the specific species.
- West Butte Wind would identify and remove all carcasses of livestock, big game, etc. from within the project site, or off site areas near turbines, that may attract foraging eagles or other raptors.
- Prior to construction, West Butte Wind would flag all sensitive habitat areas (including raptor nests) near the proposed areas of construction activity to denote areas that would be restricted or "off limits" to all construction personnel. (Note: It would not be possible to avoid impacts to the green-tinged paint brush, but construction personnel would be instructed to minimize impacts where possible.)
- Designated construction zones would be enforced. Construction personnel would avoid driving over, or otherwise disturbing areas outside the designated construction areas.
- West Butte Wind would avoid construction in sensitive areas such as riparian zones, wetlands, forests, etc. where feasible. Construction in sensitive areas such as documented rare plant populations, seasonal pools, and wetlands would be restricted. These sites would be delineated within construction zones.
- West Butte Wind would implement the following design features specifically to minimize potential impacts to sage grouse:
    - Prior to construction, the area within 0.25 mile of the known and active lek on West Butte would be flagged and designated as "off limits" to all construction personnel.
    - Construction activities, including blasting, on West Butte proper (the area of a known and active lek) west of the substation would be restricted to the period of July 1 to February 1 of the project construction year.
    - During project operations, access to the West Butte area during the sage grouse lekking season (generally late February to late May) would be limited. Maintenance vehicles and general access onto West Butte proper would be restricted until after 11:00 a.m. during lekking season, each year.
- Prior to construction, training would be provided to construction staff explaining restrictions that protect wildlife, habitat, and critical area features in or near the construction zones.

- Environmental sensitivity training, including protection of existing native habitats, would be given to all personnel on site whether they are employees of the operating company or its contractors.
- All construction employees would be instructed to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship and nesting) seasons.
- Pets would not be permitted on-site during the life of the project, including facilities located on public and private lands.
- Observations of potential wildlife problems on BLM-managed lands, including wildlife mortality, would be reported to the BLM-authorized officer immediately.
- West Butte would require as a stipulation of employment that construction or operation personnel are prohibited from hunting in the project area during all phases of the project.
- West Butte Wind would provide continuing access to the Singhose/West Butte Ranch for BLM, the counties, and ODFW to enable monitoring of habitat enhancement and revegetation efforts.

Visual Resources

- West Butte Wind would reduce visual impacts during construction by minimizing areas of surface disturbance, controlling erosion, using dust suppression techniques, and restoring exposed soils as closely as possible to their original contour and vegetation.
- Construction materials and excavated materials would be stored out of the viewshed of public roads, whenever possible, to reduce impacts on mountain views.
- Construction activities and materials storage would be confined to within the WTG ROW.

Cultural Resources

- Prior to construction, a Phase I Archaeological Survey would be conducted over all areas that would be directly disturbed by project construction.
- West Butte Wind would avoid cultural resource properties on both private and BLM-managed public lands. If any cultural resource sites are discovered during subsequent surveys, West Butte Wind would redesign the proposed project to avoid sites, or retain features associated with significant sites. The layout of the proposed project would be adjusted around each site to avoid impacting important cultural resources. If site avoidance is not possible West Butte Wind would have an approved cultural resources firm (with Native American oversight) design a treatment program for that particular site.
- Ground disturbances in all areas containing archaeological materials would be monitored by a county-approved archaeologist and Native American monitor to ensure that any outstanding resources previously unidentified are recorded. In the event these types of resources are encountered, construction would be temporarily

redirected until the find can be evaluated and recorded pursuant to Oregon State Historic Preservation Office (SHPO) requirements.

- When working on BLM-managed lands, unexpected discoveries of cultural or paleontological resources during construction would be brought to the attention of the responsible BLM authorized officer immediately. Work would be halted in the vicinity of the find to avoid further disturbance to the resources while they are being evaluated and appropriate mitigation measures are being developed.
- With respect to the isolates discovered during surveys on BLM-managed public land, West Butte Wind would comply with BLM's recommendations for their treatment.

Air Quality and Noise Emissions

- Dust abatement techniques would be used before and during surface clearing, excavation, or blasting activities. West Butte Wind would use water or dust abatement chemicals for dust suppression when construction requires movement of earth during wind conditions. Chemicals used for dust abatement may be necessary in limited situations. The chemicals used would be from naturally occurring substances such as magnesium chloride, selected for its effectiveness in controlling fugitive dust, as well as minimizing potential environmental impacts. Prior to the use of any chemicals for dust abatement, West Butte Wind would confer with BLM's authorized officer to obtain approval.
- Construction materials and stockpiled soils would be covered if they are a source of fugitive dust.
- All equipment would have sound-control devices no less effective than those provided on the original equipment. All construction equipment used would be adequately muffled and maintained.
- Based on the results of geotechnical analyses and final facility siting, it may be necessary to use explosives to assist with rock excavation. If blasting or other noisy activities are required during construction, such activities would be limited to the period of 7:00 a.m. to 7:00 p.m., on weekdays, and nearby residents would be notified in advance.
- West Butte Wind would ensure that equipment used during construction, operation, and decommissioning of the project is maintained in proper operating condition and that emission-control systems are installed on all gasoline-powered equipment.
- West Butte Wind would maintain all WTGs in excellent working order to minimize operational noise impacts.
- The WTGs would be operated so that noise emissions meet the applicable provisions of the Oregon Department of Environmental Quality noise regulations.

Transportation, Public Services and Land Use

- A transportation plan would be developed, particularly for the transport of turbine components, main assembly cranes, and other large pieces of equipment. The plan would consider specific object sizes, weights, origin, destination, and unique handling

requirements, and would evaluate alternative transportation approaches. In addition, the process to be used to comply with unique state requirements and to obtain all necessary permits would be clearly identified.

- A traffic management plan would be prepared for site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted. This plan would incorporate measures such as informational signs, flaggers when equipment may result in blocked throughways, and traffic cones to identify any necessary, temporary lane configuration changes. The plan would be submitted to the Oregon Department of Transportation, and to Crook and Deschutes counties for review and approval.
- West Butte Wind would consult with local planning authorities, including Crook and Deschutes Counties and the Oregon Department of Transportation, regarding increased traffic during the construction phase of the project, including an assessment of the number of vehicles per day, their size, and type. Specific issues of concern (e.g., location of school bus routes and stops) would be identified and addressed in the traffic management plan.
- Signs would be placed along construction roads to identify speed limits, travel restrictions, and other standard traffic control information. Signs will only be placed on BLM lands with prior BLM review and approval.
- Ongoing ground transportation planning would be conducted to evaluate road use, minimize traffic volume, and ensure that roads are maintained adequately to minimize associated impacts.
- During the construction process, West Butte Wind would coordinate with the landowner regarding livestock grazing rotations and appropriate steps to minimize impacts on grazing operations (e.g., fence and gate maintenance). Any existing fencing affected during project construction would be repaired to BLM or the private landowner's specifications.

Health and Safety

- A safety assessment would be conducted to describe potential safety issues and the means that would be taken to mitigate them, including issues such as site access, construction, safe work practices, security, heavy equipment transportation, traffic management, emergency procedures, and fire control.
- A health and safety program would be developed to protect both workers and the general public during construction, operation, and decommissioning of the project. Regarding occupational health and safety, the program will identify all applicable federal and state occupational safety standards; establish safe work practices for each task (e.g., requirements for personal protective equipment and safety harnesses; Occupational Safety and Health Administration (OSHA) standard practices for safe use of explosives and blasting agents; and measures for reducing occupational electric and magnetic fields exposures); establish fire safety evacuation procedures; and define safety performance standards (e.g., electrical system standards and lightning

protection standards). The program would identify hazard training requirements for workers for each task and establish procedures for providing required training to all workers. Documentation of training and a mechanism for reporting serious accidents to appropriate agencies would be established.

- West Butte Wind would develop a safety policy and a detailed set of guidelines for safety within the project. The policy would identify the chain of command for enforcing guidelines, the actions to be taken to correct unsafe or potentially unsafe conditions, and the penalties for safety violations.
- Open ditches would be fenced using construction fencing; ditches left open at end of day would be sloped.
- West Butte Wind would develop a fire management strategy to implement measures to minimize the potential for a human-caused fire and, if necessary, respond to a fire during construction and operation of the project. West Butte Wind would coordinate this strategy with BLM, the Oregon Department of Forestry (ODF) and local fire districts.
- Because personnel are on site during daylight working hours and are in frequent communication with central operations, any fires seen would be noted immediately and reported to local authorities, the local fire district, ODF and BLM. As determined through the Fire Management Strategy, some fire-fighting equipment would be located at the substation site, maintenance yard, and in vehicles. Fire deterrents within the wind energy facility would include service and access roads, which may serve as firebreaks, and regular clearing of vegetation from areas around transformers, riser poles, and buildings.
- Smoking and burning would not be permitted on the project site.
- West Butte Wind would ensure that catalytic converters are installed on all gasoline-powered equipment.
- Employees or contractors responsible for blasting activities may place temporary signs in the work area as appropriate to designate a “No Cell Phone Use Area” to avoid potential premature unintentional blasting.

Appendix C

Sensitive Species List

West Butte Wind Project

BLM - Prineville District Sensitive Species List

Scientific Name	Common Name	Status[1]	Documented or Suspected within Prineville District[2]
TE & P[3]			
Lynx canadensis	Canada lynx	FT	S
Oncorhynchus mykiss	Steelhead	FT	D
Salvelinus confluentus	Bull trout	FT	D
Vertebrates			
Agelaius tricolor	Tricolored blackbird	OR-SEN	D
Ammodramus savannarum	Grasshopper sparrow	OR-SEN	S
Bartramia longicauda	Upland sandpiper	SEN	S
Bucephala albeola	Bufflehead	OR-SEN	D
Centrocercus urophasianus	Greater sage-grouse	SEN	D
Coccyzus americanus	Yellow-billed cuckoo	SEN	S
Coturnicops noveboracensis	Yellow rail	OR-SEN	D
Cygnus buccinator	Trumpeter swan	OR-SEN	D
Cypseloides niger	Black swift	OR-SEN	S
Dolichonyx oryzivorus	Bobolink	SEN	S
Falco peregrinus anatum	American peregrine falcon	SEN	D
Haliaeetus leucocephalus	Bald eagle	SEN	D
Melanerpes lewis	Lewis' woodpecker	OR-SEN	D
Pelecanus erythrorhynchos	American white pelican	SEN	S
Picoides albolarvatus	White-headed woodpecker	SEN	D
Seiurus noveboracensis	Northern waterthrush	OR-SEN	S
Dicamptodon copei	Cope's giant salamander	SEN	D
Rana luteiventris	Columbia spotted frog	OR-SEN	D
Rana pretiosa	Oregon spotted frog	SEN	D
Antrozous pallidus	Pallid bat	SEN	D
Brachylagus idahoensis	Pygmy rabbit	SEN	D
Corynorhinus townsendii	Townsend's big-eared bat	SEN	D
Euderma maculatum	Spotted bat	SEN	D
Gulo gulo luteus	California wolverine	SEN	S
Martes pennanti	Fisher	SEN	S
Myotis thysanodes	Fringed myotis	OR-SEN	S
Spermophilus washingtoni	Washington ground squirrel	SEN	D

Scientific Name	Common Name	Status[1]	Documented or Suspected within Prineville District[2]
Oncorhynchus clarki lewisi	Westslope cutthroat trout	SEN	D
Oncorhynchus mykiss	Inland redband trout (all stocks)	SEN	D
Invertebrates			
Juga hemphilli dallesensis	Dalles juga	OR-SEN	D
Juga hemphilli hemphilli	Barren juga	SEN	S
Juga hemphilli maupinensis	Purple-lipped juga	OR-SEN	D
Monadenia fidelis ssp. Nov.	Deschutes sideband	OR-SEN	D
Oreohelix variabilis sp. Nov.	Deschutes mountainsnail	OR-SEN	D
Boloria bellona	Meadow fritillary	SEN	S
Boloria selene	Silver-bordered fritillary	OR-SEN	S
Vascular Plants			
Achnatherum hendersoni	Henderson's ricegrass	OR-SEN	D
Achnatherum wallowaensis	Wallowa ricegrass	OR-SEN	S
Arabis sparsiflora var. Atrorubens	Sickle-pod rockcress	OR-SEN	S
Artemisia arbuscula ssp. Longicaulis	Lahontan sagebrush	OR-SEN	S
Astragalus collinus var. Laurentii	Laurence's milk-vetch	OR-SEN	S
Astragalus diaphanus var. Diurnus	South fork john day milk-vetch	OR-SEN	D
Astragalus peckii	Peck's milk-vetch	OR-SEN	D
Astragalus tegetarioides	Bastard kentrophyta	OR-SEN	S
Astragalus tyghensis	Tygh valley milk-vetch	OR-SEN	D
Botrychium ascendens	Upward-lobed moonwort	SEN	S
Botrychium crenulatum	Crenulate moonwort	SEN	S
Botrychium minganense (*)	Gray moonwort	OR-SEN	S
Botrychium montanum	Mountain grape-fern	OR-SEN	S
Botrychium pumicola	Pumice grape-fern	OR-SEN	D
Callitriche marginata	Winged water-starwort	OR-SEN	S
Calochortus longebarbatus var. Peckii	Peck's mariposa-lily	OR-SEN	D
Calyptridium roseum	Rosy pussypaws	SEN	S
Camissonia pygmaea	Dwarf evening-primrose	SEN	D
Carex capitata	Capitate sedge	OR-SEN/ WA-STR	S
Carex diandra	Lesser panicled sedge	OR-SEN	S

Scientific Name	Common Name	Status[1]	Documented or Suspected within Prineville District[2]
Carex idahoa	Idaho sedge	OR-SEN	S
Carex retrorsa	Retrorse sedge	OR-SEN	S
Castilleja chlorotica	Green-tinged paintbrush	OR-SEN	D
Castilleja thompsonii	Thompson's paintbrush	OR-SEN	S
Cymopterus nivalis	Snowline spring-parsley	OR-SEN	S
Cypripedium fasciculatum (*)	Clustered lady's slipper	SEN	S
Delphinium nuttallii	Nutall's larkspur	OR-SEN	S
Elatine brachysperma	Short seeded waterwort	OR-SEN	S
Eleocharis bolanderi	Bolander's spikerush	OR-SEN	S
Eriogonum cusickii	Cusick's buckwheat	OR-SEN	S
Heliotropium curassavicum	Salt heliotrope	OR-SEN	S
Lomatium ochocense	Ochoco lomatium	OR-SEN	D
Lomatium ravenii	Raven's lomatium	OR-SEN	S
Lomatium suksdorfii	Suksdorf's desert parsley	SEN	D
Lomatium watsonii	Watson's desert parsley	OR-SEN	D
Luina serpentina	Colonial luina	OR-SEN	D
Mimulus evanescens	Disappearing monkeyflower	OR-SEN	S
Navarretia leucocephala ssp. Leucocephala	White-flowered navarretia	OR-SEN	S
Penstemon deustus var. Variabilis	Variable hot-rock penstemon	WA-SEN/ OR-STR	S
Penstemon peckii	Peck's penstemon	OR-SEN	S
Phacelia minutissima	Dwarf phacelia	SEN	S
Pilularia americana	American pillwort	SEN	D
Ranunculus triternatus	Dalles mt. buttercup	SEN	D
Rorippa columbiae	Columbia cress	SEN	S
Rotala ramosior	Lowland toothcup	SEN	S
Talinum spinescens	Spinescent fameflower	OR-SEN	D
Thelypodium eucosmum	Arrow-leaf thelypody	OR-SEN	D
Utricularia minor	Lesser bladderwort	OR-SEN/ WA-STR	S
Non-Vascular Plants			
Tortula mucronifolia	Moss	OR-SEN	S
Dermatocarpon meiophyllizum (*)	Lichen	SEN	S
Texosporium sancti-jacobi	Lichen	SEN	D

Scientific Name	Common Name	Status[1]	Documented or Suspected within Prineville District[2]
Fungi			
None			

[1] *FT: Federally Threatened*
SEN – Sensitive in OR and WA
OR-SEN – Sensitive in OR only
WA-SEN – Sensitive in WA only
OR-STR – Strategic in OR only;
WA-STR – Strategic in WA only
[2] *D - Documented; S – Suspected*
[3] *Federal Status: Threatened, Endangered & Proposed*
** Survey and Manage species that will remain Sensitive in OR and/or WA even though the criteria would place them in the Strategic category or off the list.*

Appendix D
Soils Tables

Table D-1. Soils in the West Butte Wind Power Project Area

Soil Mapping Unit[1]	Map Unit	Acres In Project Area	NRCS Soil Characteristics			
			Land Capability (non irrigated)[2]	Depth (inches) to restrictive feature	Drainage Class	Wind Erodibility Group[3]
Houstake ashy sandy loam, dry, 0 to 3 percent slopes	029	992.19	6s	N/A[4]	Well drained	2
Ayres very cobbly loam, 8 to 20 percent slopes	067	82.42	7s	10 to 20	Well drained	7
Ayres very cobbly loam, dry, 0 to 8 percent slopes	075	1149.37	7s	10 to 20	Well drained	7
Erakatak-Ateron complex, 12 to 30 percent south slopes	085	2262.46	N/A	20 to 40	Well drained	N/A
Erakatak-Ateron complex, 40 to 70 percent south slopes	095	319.86	6e	20 to 40	Well drained	4
Redcliff-Rock outcrop complex, 30 to 65 percent south slopes	103Em	133.98	6e	20 to 40	Well drained	7
Tub-Prill-Elderflat complex, 12 to 30 percent north slopes	113	133.98	4e	40 to 60	Well drained	6
Tristan-Meadowridge-Era complex, bouldery, 2 to 40 percent south slopes	115	160.29	7s	40 to 60	Well drained	8
Era ashy sandy loam, 0 to 3 percent slopes	121	72.97	6s	N/A[4]	Well drained	2
Stookmoor-Beden complex, 1 to 20 percent slopes	135Cm	80.53	N/A	20 to 40	Somewhat excessively drained	N/A
Stookmoor-Westbutte complex, 25 to 50 percent north slopes	137Em	48.11	N/A	20 to 40	Somewhat excessively drained	N/A

Soil Mapping Unit[1]	Map Unit	Acres In Project Area	NRCS Soil Characteristics			
			Land Capability (non irrigated)[2]	Depth (inches) to restrictive feature	Drainage Class	Wind Erodibility Group[3]
Ayresbutte-Ayres complex, 3 to 8 percent slopes	147	383.03	6s	20 to 40	Well drained	4
Ginserly-Hatrock complex, 12 to 30 percent north slopes	156	1988.93	4e	40 to 60	Well drained	5
Ginserly cobbly ashy loam, 30 to 65 percent north slopes	157	395.20	6e	40 to 60	Well drained	5
Tuscor-Anatone complex, 12 to 30 percent south slopes	159	221.52	4e	40 to 60	Well drained	8
Anatone-Merlin-Polkbutte complex, 15 to 60 percent north slopes	165	1.08	N/A	10 to 20	Well drained	N/A
Ginserly-Hatrock complex, bouldery, 12 to 40 percent south slopes	180	148.20	N/A	40 to 60	Well drained	N/A
Ginserly-Hatrock complex, bouldery, 12 to 40 percent north slopes	181	3029.42	N/A	40 to 60	Well drained	N/A
Ayres cobbly loam, moist, 3 to 8 percent slopes	204	5267.22	7s	10 to 20	Well drained	7
Ayres very cobbly loam, moist, 8 to 20 percent slopes	205	549.75	7s	10 to 20	Well drained	7
Ayresbutte-Ayres complex, moist, 3 to 8 percent slopes	207	3226.27	N/A	20 to 40	Well drained	N/A
Anatone-Tuscor complex, 30 to 65 percent south slopes	259	378.32	7s	10 to 20	Well drained	8

Soil Mapping Unit[1]	Map Unit	Acres In Project Area	NRCS Soil Characteristics			
			Land Capability (non irrigated)[2]	Depth (inches) to restrictive feature	Drainage Class	Wind Erodibility Group[3]
Choptie-Westbutte complex, 5 to 30 percent slopes	25Cm	99.79	N/A	10 to 20	Well drained	N/A
Anatone-Bocker complex, 2 to 20 percent slopes	272	882.64	7s	10 to 20	Well drained	8
Powellbutte-Luckycreek complex, 0 to 10 percent slopes	276	34.23	N/A	20 to 40	Well drained	N/A
Observation-Cadlebutte complex, 0 to 15 percent slopes	277	0.37	N/A	20 to 40	Well drained	N/A
Homehollow complex, 0 to 8 percent slopes	278	944.50	6e	20 to 40	Well drained	2
Ginserly-Hatrock complex, bouldery, 0 to 12 percent slopes	282	956.23	N/A	40 to 60	Well drained	N/A
Meld gravelly ashy loam, 0 to 15 percent slopes	285	1658.19	N/A	20 to 40	Well drained	N/A
Polkbutte ashy loamy sand, 5 to 70 percent north slopes	286	112.39	N/A	N/A[4]	N/A	N/A
Hatrock-Ginserly complex, 30 to 60 percent north slopes	292	23.31	6e	N/A[4]	Well drained	3
Observation-Bonnieview-Ateron complex, 0 to 50 percent slopes	B451	161.31	6e	20 to 40	Well drained	7
Hankins-Merlin complex, 0 to 35 percent slopes	B500	83.51	N/A	40 to 60	Well drained	N/A

Soil Mapping Unit[1]	Map Unit	Acres In Project Area	NRCS Soil Characteristics			
			Land Capability (non irrigated)[2]	Depth (inches) to restrictive feature	Drainage Class	Wind Erodibility Group[3]
Polkbutte-Anatone high precipitation, complex, 5 to 35 percent slopes	X310	47.02	N/A	N/A[4]	N/A	N/A
Ateron-Merlin, rubbly complex, 5 to 20 percent slopes	X810	79.52	7s	12 to 20	Well drained	8
Redcliff-Rock outcrop complex, 5 to 30 percent slopes	102D	1063.45	6e	20 to 40	Well drained	7
Redcliff-Rock outcrop complex, 30 to 65 percent south slopes	103E	2940.41	6e	20 to 40	Well drained	7
Stookmoor loamy sand, 1 to 3 percent slopes	132A	1869.49	6e	20 to 40	Somewhat excessively drained	2
Stookmoor gravelly loamy sand, 20 to 50 percent north slopes	134D	190.70	6e	20 to 40	Somewhat excessively drained	3
Stookmoor-Beden complex, 1 to 20 percent slopes	135C	7547.78	6e	20 to 40	Somewhat excessively drained	2
Stookmoor-Westbutte complex, 25 to 50 percent north slopes	137E	1191.42	6e	20 to 40	Somewhat excessively drained	3
Swalesilver loam, 0 to 1 percent slopes	149A	2.05	6w	N/A[4]	Somewhat poorly drained	4
Blayden loamy sand, 0 to 3 percent slopes	17A	457.12	6s	12 to 20	Well drained	2
Borobey sandy loam, 0 to 5 percent slopes	19A	2996.02	6e	N/A[4]	Somewhat excessively drained	3
Choptie-Westbutte complex, 5 to 20 percent slopes	25C	648.77	6e	10 to 20	Well drained	5

Soil Mapping Unit[1]	Map Unit	Acres In Project Area	NRCS Soil Characteristics			
			Land Capability (non irrigated)[2]	Depth (inches) to restrictive feature	Drainage Class	Wind Erodibility Group[3]
Gardone sand, hummocky, 3 to 15 percent slopes	53C	11.01	6e	N/A[4]	Excessively drained	1
Ninemile-Dester complex, 1 to 8 percent slopes	93B	525.89	6e	10 to 20	Well drained	3
Total		**45552.22**				

1 This table only displays the major soils in each map unit and describes characteristics based on the first soil type listed in the complex name. Others may exist.

2 Land capability values of 3 through 8 with an "e" subclass indicates main limitation as risk of erosion unless close-grown plan cover is maintained.

3 Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

4 N/A indicates data was not available through Soil Data Mart for OR654 (Prineville Area) and OR620 (Upper Deschutes River Area, Oregon, Parts of Deschutes, Jefferson, and Klamath Counties) (NRCS 2010a), or the USDA-NRCS Soil Survey Division Official Soil Series Descriptions (NRCS 2010b).

Table D-2. Alternative 1 Temporary and Permanent Soil Disturbances

Soil Mapping Unit	Map Unit	Temporary Disturbance BLM Land	Temporary Disturbance Private Land	Total Temporary Disturbance	Permanent Disturbance BLM Land	Permanent Disturbance Private land	Total Permanent Disturbance
Anatone-Bocker complex, 2 to 20 percent slopes	272	0	35.7	35.7	0	10.7	10.7
Anatone-Tuscor complex, 30 to 65 percent south slopes	259	0	0.8	0.8	0	0	0
Ateron-Merlin, rubbly complex, 5 to 20 percent slopes	X810	0	2.8	2.8	0	1.2	1.2
Borobey sandy loam, 0 to 5 percent slopes	19A	2.4	10.8	13	1.93	5.41	7.24
Choptie-Westbutte complex, 5 to 20 percent slopes	25C	0	0.8	0.8	0	0.8	0.8
Choptie-Westbutte complex, 5 to 30 percent slopes	25Cm	0	4.9	4.9	0	1	1
Erakatak-Ateron complex, 12 to 30 percent south slopes	85	0	11.7	11.7	0	5.1	5.1
Erakatak-Ateron complex, 40 to 70 percent south slopes	95	0	2.2	2.2	0	0.3	0.3
Gardone sand, hummocky, 3 to 15 percent slopes	53C	0	0.8	0.8	0	0.4	0.4
Ginserly cobbly ashy loam, 30 to 65 percent north slopes	157	0	0.9	0.9	0	0.81	0.81
Ginserly-Hatrock complex, 12 to 30 percent north slopes	156	0	1.3	1.3	0	1.3	1.3
Ginserly-Hatrock complex, bouldery, 12 to 40 percent north slopes	181	0	13.9	13.9	0	5.1	5.1

Soil Mapping Unit	Map Unit	Temporary Disturbance BLM Land	Temporary Disturbance Private Land	Total Temporary Disturbance	Permanent Disturbance BLM Land	Permanent Disturbance Private land	Total Permanent Disturbance
Ginserly-Hatrock complex, bouldery, 12 to 40 percent south slopes	180	0	7.1	7.1	0	3	3
Ginserly-Hatrock complex, bouldery, 0 to 12 percent slopes	282	0	57.6	57.6	0	14.4	14.4
Polkbutte ashy loamy sand, 5 to 70 percent north slopes	286	0	1.7	1.7	0	1.5	1.5
Redcliff-Rock outcrop complex, 30 to 65 percent south slopes	103E	3.3	7.7	11	2.64	2.11	4.75
Redcliff-Rock outcrop complex, 30 to 65 percent south slopes	103Em	7.5	9.5	17	1.72	2.91	4.63
Redcliff-Rock outcrop complex, 5 to 30 percent slopes	102D	0.4	3.3	3.6	0.4	1.5	1.8
Stookmoor loamy sand, 1 to 3 percent slopes	132A	5.6	4.5	10.1	4.56	0	4.56
Stookmoor-Beden complex, 1 to 20 percent slopes	135C	0.5	15.7	16.2	0.41	7.6	8.01
Stookmoor-Beden complex, 1 to 20 percent slopes	135Cm	0	9.6	9.6	0	4.51	4.51
Stookmoor-Westbutte complex, 25 to 50 percent north slopes	137E	0	0.8	0.8	0	0.4	0.4
Total		**19.7**	**204.2**	**223.5**	**11.7**	**70.1**	**81.5**

Table D-1. Alternative 2 Temporary and Permanent Soil Disturbances

Soil Mapping Unit	Map Unit	Temporary Disturbance BLM Land	Temporary Disturbance Private Land	Total Temporary Disturbance	Permanent Disturbance BLM Land	Permanent Disturbance Private land	Total Permanent Disturbance
Anatone-Bocker complex, 2 to 20 percent slopes	272	0.0	35.7	35.7	0.0	10.6	9.7
Anatone-Tuscor complex, 30 to 65 percent south slopes	259	0.0	1.1	1.1	0.0	0.2	0.19
Ateron-Merlin, rubbly complex, 5 to 20 percent slopes	X810	0.0	2.7	2.7	0.0	1.2	1.1
Ayres cobbly loam, moist, 3 to 8 percent slopes	204	0.0	5.7	5.7	0.0	4.6	4.6
Ayres very cobbly loam, moist, 8 to 20 percent slopes	205	0.0	0.4	0.4	0.0	0.3	0.3
Ayresbutte-Ayres complex, 3 to 8 percent slopes	147	0.3	0.0	0.3	0.3	0.0	0.3
Ayresbutte-Ayres complex, moist, 3 to 8 percent slopes	207	1.1	7.1	8.2	0.9	5.8	6.6
Borobey sandy loam, 0 to 5 percent slopes	19A	0.9	7.6	8.5	0.03	2.01	2.04
Choptie-Westbutte complex, 5 to 20 percent slopes	25C	0.0	0.8	0.8	0.0	0.8	0.8
Choptie-Westbutte complex, 5 to 30 percent slopes	25Cm	0.0	4.9	4.9	0.0	1.1	0.9
Erakatak-Ateron complex, 12 to 30 percent south slopes	085	0.0	14.4	14.4	0.0	6.6	6.4
Erakatak-Ateron complex, 40 to 70 percent south slopes	095	0.0	4.3	4.3	0.0	1.4	1.3

Soil Mapping Unit	Map Unit	Temporary Disturbance BLM Land	Temporary Disturbance Private Land	Total Temporary Disturbance	Permanent Disturbance BLM Land	Permanent Disturbance Private land	Total Permanent Disturbance
Gardone sand, hummocky, 3 to 15 percent slopes	53C	0.0	0.4	0.4	0.0	0.0	0.0
Ginserly cobbly ashy loam, 30 to 65 percent north slopes	157	0.0	1.0	1.0	0.0	0.8	0.8
Ginserly-Hatrock complex, 12 to 30 percent north slopes	156	0.0	7.6	7.6	0.0	4.7	4.7
Ginserly-Hatrock complex, bouldery, 0 to 12 percent slopes	282	0.0	57.7	57.7	0.0	14.4	13.0
Ginserly-Hatrock complex, bouldery, 12 to 40 percent north slopes	181	0.0	13.9	13.9	0.0	5.0	4.8
Ginserly-Hatrock complex, bouldery, 12 to 40 percent south slopes	180	0.0	7.1	7.1	0.0	3.1	2.9
Houstake ashy sandy loam, dry, 0 to 3 percent slopes	29	2.1	0.0	2.1	1.7	0.0	1.7
Meld gravelly ashy loam, 0 to 15 percent slopes	285	0.0	10.0	10.0	0.0	6.3	6.3
Polkbutte ashy loamy sand, 5 to 70 percent north slopes	286	0.0	1.8	1.8	0.0	1.5	1.5
Powellbutte-Luckycreek complex, 0 to 10 percent slopes	276	0.0	2.3	2.3	0.0	1.2	1.2
Redcliff-Rock outcrop complex, 30 to 65 percent south slopes	103E	1.4	7.1	8.5	0.04	1.3	1.4
Redcliff-Rock outcrop complex, 30 to 65 percent south slopes	103Em	0.8	9.6	10.4	0.02	2.9	2.8
Redcliff-Rock outcrop complex, 5 to 30 percent slopes	102D	0.1	1.8	1.9	0.0	0.0	0.00

Soil Mapping Unit	Map Unit	Temporary Disturbance BLM Land	Temporary Disturbance Private Land	Total Temporary Disturbance	Permanent Disturbance BLM Land	Permanent Disturbance Private land	Total Permanent Disturbance
Stookmoor loamy sand, 1 to 3 percent slopes	132A	2.3	4.5	6.8	0.06	0.0	0.06
Stookmoor-Beden complex, 1 to 20 percent slopes	135C	0.2	7.3	7.5	0.01	3.4	3.4
Stookmoor-Beden complex, 1 to 20 percent slopes	135Cm	0.0	10.6	10.6	0.0	1.53	1.46
Stookmoor-Westbutte complex, 25 to 50 percent north slopes	137E	0.0	0.4	0.4	0.0	0.0	0.0
Tristan-Meadowridge-Era complex, bouldery, 2 to 40 percent south slopes	115	0.0	0.66	0.66	0.0	0.54	0.54
Total		**9.2**	**228.5**	**237.6**	**3.0**	**81.2**	**80.7**