B O N N E V I L L E   P O W E R   A D M I N I S T R A T I O N

Whistling Ridge Energy Project

Final Environmental Impact Statement

August 2011

DOE/EIS-0419

Cooperating Agency:
State of Washington, Energy Facility Site Evaluation Council

Whistling Ridge Energy Project

Responsible Agencies: U.S. Department of Energy, Bonneville Power Administration (BPA); Washington State Energy Facility Site Evaluation Council (EFSEC).

Title: Whistling Ridge Energy Project, DOE/EIS - 0419

State Involved: Washington

Abstract: Whistling Ridge Energy LLC (Applicant) proposes to construct and operate the Whistling Ridge Energy Project, an approximately 75-megawatt (MW) wind turbine facility, about seven miles north of the City of White Salmon in Skamania County, Washington. This wind project would be located on an approximately 1,152-acre site that is currently private commercial forest land. The wind project would consist of up to 50 wind turbines that could each range in size from 1.2 to 2.5 MW, an Operations and Maintenance facility, an electrical substation, underground collector lines and systems, and other ancillary facilities. Approximately 7.9 miles of existing roads would be improved and 2.4 miles of new roads would be constructed to provide access for project construction and operation. If the Project is approved, the Applicant proposes to begin project construction in the first quarter of 2012 with the goal of having construction completed and commercial power production initiated by January 2013.

The Applicant has submitted an application to EFSEC for site certification that would allow the Applicant to construct and operate its proposed wind project. The Applicant also has requested interconnection of the project to BPA's regional transmission system at a point along BPA's existing North Bonneville-Midway 230-kilvolt (kV) transmission line that passes through the wind project site. EFSEC must decide on a recommendation to the Governor to approve or deny the issuance of the requested site certificate to the Applicant, and BPA must decide whether to allow the requested interconnection to its transmission system. Accordingly, this Final EIS addresses the proposed action of granting project approvals, as well as a No Action alternative in which EFSEC and/or BPA would not grant these approvals and the proposed wind project therefore would not be built.

The proposed project could result in temporary impacts to soils, air quality, water resources, noise levels, vegetation, wildlife, visual resources, cultural resources, and transportation during construction. During operation, impacts to noise levels, wildlife, and visual resources could occur. Additionally, mitigation measures are identified in Chapter 3 to reduce or avoid these impacts where feasible.

BPA and EFSEC released a Draft EIS in May 2010 for public review and comment. Comment letters are reprinted in Appendix H. BPA and EFSEC considered all comments received to prepare a Response to Comments Appendix (Appendix G); these appendices are included in the Final EIS (40 CFR 1503.4(c)). EFSEC expects to makes its recommendation to the Governor in fall 2011. BPA expects to issue a Record of Decision (ROD) for the proposed project in fall 2011.

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Note to Reader: This Final EIS revises and updates the information presented in the Draft EIS for the Whistling Ridge Energy Project issued in May 2010. New or revised text is shown in red underlined font and deleted text is crossed out with a solid black line (*e.g.* ~~example~~). Changes to tables, graphs, and other figures are indicated using similar editorial techniques.

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ACRONYMS AND ABBREVIATIONS

µPa	micropascals
AADT	average annual daily traffic
APE	area of potential effects
Applicant	Whistling Ridge Energy LLC
bgs	below ground surface
BMPs	best management practices
BP	before present
BPA	Bonneville Power Administration
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CPE	Columbia Plateau Ecoregion
CRL 40	Commercial Resource Land 40
CSA	Conservation Support Area
CTED	Community, Trade and Economic Development
CRGNSA	Columbia River Gorge National Scenic Area
DAHP	Department of Archeological and Historic Preservation
dB	decibels
dBA	A-weighted decibels
dBG	G-weighted decibels
DNR	Department of Natural Resources
Ecology	Washington Department of Ecology
EDNA	Environmental Designation for Noise Abatement
EFSEC	Energy Facility Site Evaluation Council
EIS	Environmental Impact Statement
EPA	US Environmental Protection Agency
FAA	Federal Aviation Administration
FCRTS	Federal Columbia River Transmission System
FHWA	Federal Highway Administration
FL 20	Forest Land 20
For/Ag-20	Resource Protection
GIS	Geographic Information System
GMA	General Management Area
Hz	Hertz
I-84	Interstate 84
ISO	International Organization for Standardization

kV	kilovolt
KVA	Key Viewing Area
kW	kilowatt
kV	kilovolt
L_{10}	noise levels equaled or exceeded 10 percent of a measured time interval
L_{50}	noise levels equaled or exceeded 50 percent of a measured time interval
L_{90}	noise levels equaled or exceeded 90 percent of a measured time interval
L_{dn}	day-night average sound level
L_{eq}	equivalent sound level
LHA	Landslide Hazard Areas
L_{max}	maximum L_{eq}
L_{min}	minimum L_{eq}
LOS	level of service
mG	milligauss
MOCA	managed owl conservation area
MP	milepost
mph	miles per hour
msl	mean sea level
MVM	million-vehicle-miles
MW	megawatt
MWh	megawatt hours
NAT	Natural
NCASI	National Council for Air and Stream Improvement
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NOC	Notice of Construction
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
NPCC	Northwest Power and Conservation Council
ODEQ	Oregon Department of Environmental Quality
OSHA	Occupational Safety and Health Administration
PCBs	polychlorinated biphenyls
PM	particulate matter
$PM_{2.5}$	particulate matter 2.5 micrometers diameter and smaller
PSD	Prevention of Significant Deterioration
PUBFh	palustrine unconsolidated bottom, semi-permanently flooded, impounded
PUD	Public Utility District

PWL	sound power level
R-10	Residential 10
RCW	Revised Code of Washington
RES-20	Rural Estates 20
ROD	Record of Decision
rpm	revolutions per minute
RPS	Renewable Portfolio Standard
RV	recreational vehicle
SCC	Skamania County Code
SCFD3	Skamania County Fire District No. 3
SDS	SDS Lumber Company
SEPA	State Environmental Policy Act
SMA	Special Management Area
SOSEA	spotted owl special emphasis area
SPCC	Spill Prevention, Control and Countermeasure
SPL	sound pressure level
SR	State Route
SWPPP	Stormwater Pollution Prevention Plan
TMP	Transportation Management Plan
Turnstone	Turnstone Environmental Consultants, Inc.
UNM	Unmapped
USC	United States Code
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
V	volts
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WNHP	Washington Natural Heritage Program
WSDOT	Washington State Department of Transportation

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1.0 SUMMARY AND PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

Whistling Ridge Energy LLC (the Applicant) proposes to construct and operate the Whistling Ridge Energy Project (the Project) approximately 7 miles north of the City of White Salmon in Skamania County, Washington (Figure 1-1). The proposed Project would be an approximately 75-megawatt (MW) wind turbine facility located within an approximately 1,152-acre Project Area on land that is currently private commercial forest land. The facility would be located on north-trending ridges that range in elevation from about 2,100 to 2,300 feet above mean sea level (msl). There is a proven wind resource at the site of the proposed Project Area. The proposed Project would consist of up to 50 wind turbines that could each range in size from 1.2 to 2.5 MW. The proposed Project also includes an Operations and Maintenance facility, an electrical collector substation, underground collector lines and systems, and other ancillary facilities.

The Applicant has submitted an application to the Washington State Energy Facility Site Evaluation Council (EFSEC) for site certification that would allow the Applicant to construct and operate the Whistling Ridge Energy Project. The Application is included as Appendix A to this EIS. As part of its responsibilities for evaluating this application, EFSEC must conduct an environmental review of the proposed energy facility under the Washington State Environmental Policy Act (SEPA). The Applicant has also requested interconnection of the proposed Project to the regional transmission system owned and operated by the Bonneville Power Administration (BPA), which is a federal agency. Interconnection of the Whistling Ridge Energy Project to the regional transmission system would require construction of a new BPA substation and related electrical equipment within the Project Area. As part of its consideration of the Applicant's interconnection request, BPA must evaluate the proposed interconnection under the National Environmental Policy Act (NEPA).

Accordingly, EFSEC and BPA have prepared this joint environmental impact statement (EIS) to be consistent with the requirements of both SEPA and NEPA. Because of the State of Washington's primary role in the siting of the proposed Project, this EIS generally follows the EIS format and content guidance contained in Washington Administrative Code (WAC) 197-11, as adopted by EFSEC through WAC 463-47. However, the EIS format and content has been modified, adjusted, and expanded where appropriate to ensure compliance with NEPA, as well.

The remainder of this chapter of the EIS describes the purpose of and need for action concerning the proposed Project, and further discusses the two agencies' approach to SEPA and NEPA compliance and decision-making for this Project. This chapter also summarizes the proposed Project and alternatives, identifies public involvement activities, and summarizes Project impacts and mitigation measures. An outline of the organization of this EIS is provided at the end of this chapter.

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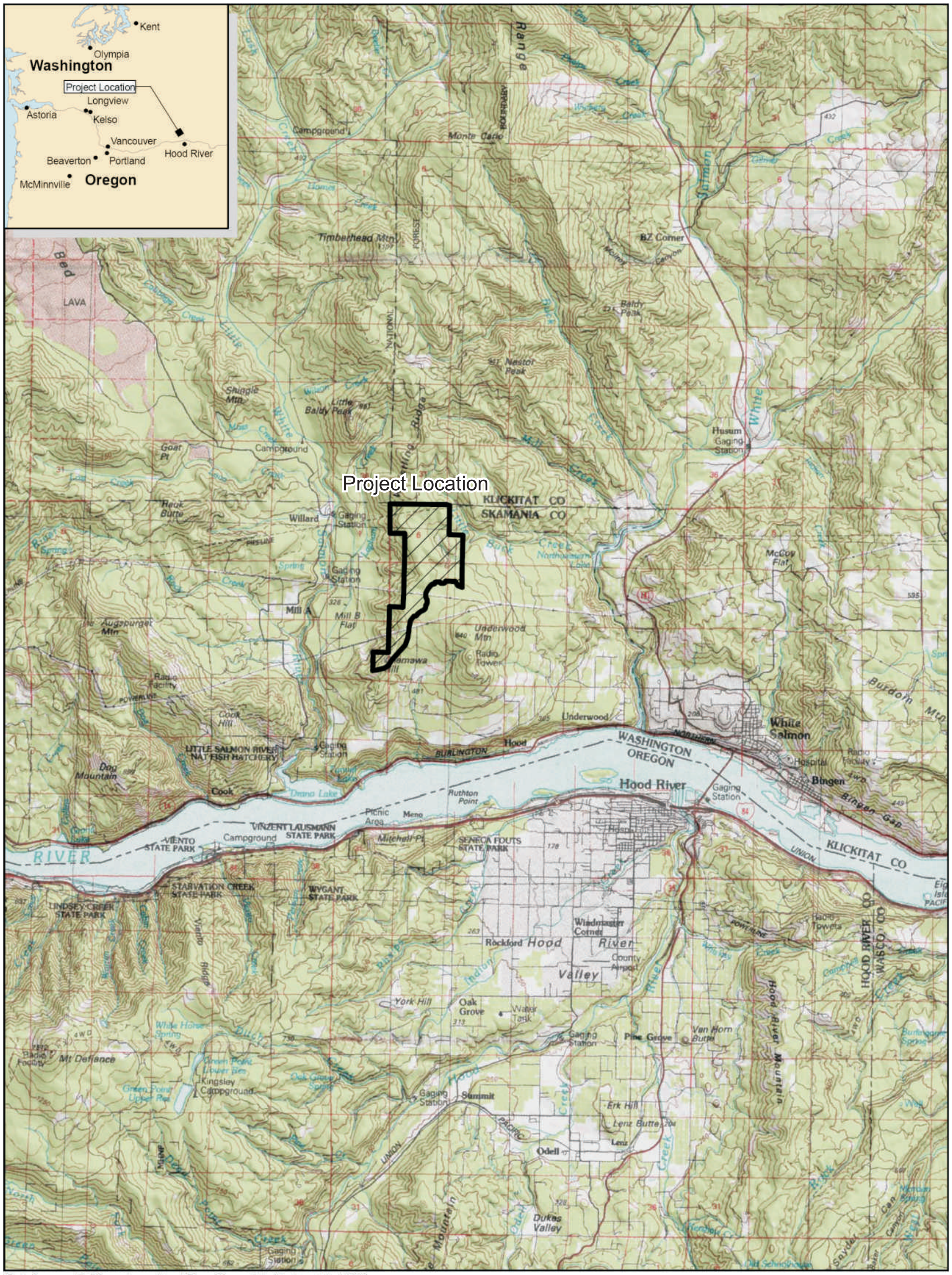

Data Source: USGS quad map, Hood River, Oregon-Washington, dated 1982.

0 1 2 3 Miles

1:100,000

Figure 1-1

Location of Proposed Whistling Ridge Energy Project

URS

Whistling Ridge Energy Project
Skamania County, Washington

1.2 PURPOSE OF AND NEED FOR ACTION

This section describes the respective need for action by EFSEC and BPA concerning the Applicant's proposed Whistling Ridge Energy Project, as well as purposes or objectives that these two agencies will consider in their respective decisions concerning the Project. This section also identifies various needs that the Applicant is responding to in proposing the Project.

1.2.1 EFSEC'S PURPOSE AND NEED FOR ACTION

On March 10, 2009, the Applicant submitted an Application for Site Certification (ASC 2009-01) to EFSEC to construct and operate the Whistling Ridge Energy Project in accordance with WAC 463-42. The Applicant chose to apply for certification of the proposed Project according to the Revised Code of Washington (RCW) 80.50.060, under which EFSEC has siting jurisdiction over energy facilities, such as the proposed Project, in the state of Washington.

EFSEC is a Washington State board comprised of a Chairman appointed by the Governor and representatives from five state agencies. The Council is augmented by representatives from the particular counties, cities, or port districts where potential projects may be located, as well as additional state agencies that can opt into the review of a new proposal. The Council is responsible for evaluating applications to ensure that all environmental and socioeconomic impacts are considered before a site is approved.

In accordance with RCW 80.50.040, EFSEC must review and act on the Application in the following ways:

- Prepare written reports to the governor which shall include: (1) A statement indicating whether the application is in compliance with the council's guidelines, (2) criteria specific to the site and transmission line routing, (3) a council recommendation as to the disposition of the application, and (4) a draft certification agreement when the council recommends approval of the application;

- Prescribe the means for monitoring of the effects arising from the construction and the operation of energy facilities to assure continued compliance with terms of certification and/or permits issued by the council;

- Integrate its site evaluation activity with activities of federal agencies having jurisdiction in such matters to avoid unnecessary duplication;

- Present state concerns and interests to other states, regional organizations, and the federal government on the location, construction, and operation of any energy facility which may affect the environment, health, or safety of the citizens of the state of Washington; and

- Issue permits in compliance with applicable provisions of the federally approved state implementation plan adopted in accordance with the Federal Clean Air Act, as now existing or hereafter amended, for the new construction, reconstruction, or enlargement or operation of energy facilities.

1.2.2 BONNEVILLE POWER ADMINISTRATION PURPOSE OF AND NEED FOR ACTION

BPA owns and operates the federal transmission system in the Pacific Northwest. This system, which is referred to as the Federal Columbia River Transmission System (FCRTS), consists of more than 15,000 circuit miles of high-voltage (115-kilovolt [kV] and above) electric transmission lines. These transmission lines are used to move most of the power from Pacific Northwest generating facilities to power users throughout the Northwest and nearby interconnected regions.

BPA has adopted an Open Access Transmission Tariff, which is generally consistent with the Federal Energy Regulatory Commission's *pro forma* open access tariff. Under BPA's tariff, BPA offers transmission interconnection to the FCRTS to all eligible customers on a first-come, first-served basis, with a decision on whether or not to make this offer subject to environmental review under NEPA. Electricity generated by the Project would be delivered to the BPA electric grid via a new transmission interconnection.

The Applicant has requested interconnection of its proposed Project to BPA's existing North Bonneville-Midway 230-kV transmission line, a portion of the FCRTS that traverses the Project Area. In response, BPA will consider the following objectives or purposes in deciding whether to grant the request:

- Maintain the electrical stability and reliability of the FCRTS;
- Continue to meet BPA's statutory and contractual obligations;
- Act consistently with BPA's environmental and social responsibilities; and
- Provide for cost and administrative efficiency.

Although BPA is considering interconnecting the Project, BPA is not considering acquiring any of the output of the proposed Project. In addition, BPA has no siting authority for the proposed Project.

1.2.3 APPLICANT-IDENTIFIED NEEDS

The Applicant's purpose in proposing the Whistling Ridge Energy Project is to help meet the future need for energy resources, while at the same time enabling the Applicant to further diversify its business through a technically and economically feasible project. This section identifies the regional needs for this proposed Project that have been identified by the Applicant, as well as the Applicant's needs that would be met by the Project.

1.2.3.1 Regional Need for New Sources of Renewable Energy

The Fifth Northwest Electric Power and Conservation Plan was issued by the Northwest Power and Conservation Council (NPCC) in May 2005. The Plan found that Northwest electricity demand was projected to grow at an average annual rate of nearly 1 percent per year, resulting in an over 5,000-MW deficit by 2025 using the medium forecast.

The Fifth Power Plan states that: *"Renewable resources are also a priority resource in the Northwest Power Act. Like conservation, their potential and cost-effectiveness are sensitive to developing technology and the cost of more traditional generating alternatives. Renewables have potential risk reduction benefits related to their ability to hedge risks of fuel price volatility and the risks of possible measures to mitigate greenhouse gas emissions."*

In September 2009, the NPCC released the Draft Sixth Northwest Power Plan (NPCC 2009), which contains projections for regional power demand. The plan notes that regional population in Idaho, Montana, Oregon, and Washington is likely to increase from 12.7 million in 2007 to 16.3 million by 2030. This 3.6 million increase in population compares to a 3.8 million increase between 1985 and 2007. The population growth will be focused on older-age categories as the baby boom generation reaches retirement age.

The cost of energy of all types is expected to be significantly higher over the next twenty years than during the 1980s and 1990s. Cost increases will be driven by increasing demand and the fact that the cost of finding and producing new energy sources is higher than for conventional supplies. Carbon emission taxes or cap-and-trade policies are likely to further raise energy costs. The NPCC predicts that wholesale electricity prices are expected to increase from about $45 per MW-hour in 2010 to $85 by 2030 (2006$).

Demand for electricity is expected to grow. The plan states that *"The Pacific Northwest consumed 19,000 average megawatts or 166 million megawatt-hours of electricity in 2007. That demand is expected to grow to 25,000 average megawatts by 2030 in the Council's medium forecast. Between 2007 and 2030, demand is expected to increase by a total of 6,500 average megawatts, growing on average by 270 average megawatts, or 1.2 percent, per year."*

According to the NPCC, much of the future demand for electricity in the region could be met through conservation. However, markets for renewable or "green" energy are still growing in the Pacific Northwest. One driver for this shift is the establishment of Renewable Portfolio Standards (RPS) at the state level, which requires that utilities obtain a percentage of their power from renewable sources. For example, in 2006, voters in Washington passed Initiative 937, which requires that by 2020 large public and private utilities must obtain 15 percent of their electricity from renewable resources, and undertake cost-effective energy conservation. In 2008, California increased its RPS goal from 20 percent to 33 percent renewable energy by 2020.

In addition to the RPS requirements, Washington law requires larger utilities in Washington to offer a voluntary "qualified alternative energy product," essentially an electricity product powered by green resources, beginning January 2012. State law defines a qualified alternative energy resource as electricity fueled by wind, solar energy, geothermal energy, landfill gas, wave or tidal action, gas produced during the treatment of wastewater, qualified hydropower, or biomass. As of 2008, 15 of the 16 utilities covered by the report had an active green power program with customers participating, and five additional utilities not covered by the law reported to the state that they were operating green power programs. Estimated sales of green power for 2008 were up 17 percent over 2007. Wind powered electricity represented 83.3 percent of green power sales (WUTC and CTED 2008).

In recent reports to the Washington State Legislature, the Washington Department of Commerce (formerly the Department of Community, Trade and Economic Development, CTED) has found that: "*…the region should begin an aggressive program to capture the large amount of cost-effective conservation that is available and to lay the groundwork for building a large amount of wind generation…*" (Washington CTED 2005).

More recently, state policy has been driven by the electorate's enactment of an RPS that requires all but the state's smallest utilities to acquire new sources of renewable energy with which to supply consumers with clean electricity. This policy, mandated by the voters, resembles similar (though more aggressive) standards in Oregon and California, and has spurred active development of potential wind energy resources within the state to serve in-state utilities.

The RPS, coupled with load growth in Washington's urban areas, has prompted investor-owned and public power utilities to seek new sources, most often developed by independent power producers, to meet their resource goals.

1.2.3.2 Need for Reliable Transmission for the Proposed Project

Power generation resources typically require interconnection with a high-voltage electrical transmission system for delivery to purchasing retail utilities. Goals and policies aimed at reducing greenhouse gas emissions are driving the need for new resources such as wind-powered projects, yet the location of such projects is constrained by the availability of high voltage transmission lines.

Transmission planning and construction can be the longest lead-time item in power plant development. While lead times for the development of new generation have become shorter, the lead time for major transmission improvements and their costs can be a major barrier to acquisition of needed and cost-effective resources. For some projects, the lead time for the development of new transmission can be as much as seven years, and the cost of the transmission can be somewhat more than half the total capital cost of a project.

In order to provide new energy resources within the next three to five years, it is critical to locate projects in areas where transmission lines currently exist. The Applicant thus needs to locate near existing high-voltage transmission, such as the FCRTS.

1.2.3.3 Business Needs of the Applicant

As stated in Section 1.1, the Applicant for the Whistling Ridge Energy Project is Whistling Ridge Energy LLC, which is a limited liability corporation operating in the State of Washington. Whistling Ridge Energy LLC has been formed by S.D.S. Co., LLC, which is an affiliated entity of SDS Lumber Company (SDS). The Applicant has owned and operated a wood products manufacturing facility in Bingen, Washington continuously since 1946. Operations include lumber and plywood manufacturing, log handling and transportation, marine transportation and construction, log chipping for the pulp and paper industry, biomass energy generation, and other land development and land use ventures in the Skamania and Klickitat County area.

When the company began in 1946, there were 26 employees in its original crew. This number grew to a high of 450 employees during the 1970s when logging and lumber production were at a peak. Production has since slowed tremendously, as the supply of timber from national forests has sharply declined due to environmental legislation. For this reason, many of the mills in

Skamania County have closed down. The Applicant was able to survive the crises and changes of the last 30 years and no longer relies on timber from national forests. While the company has scaled back operations, today they are one of the largest employers in Klickitat County, Washington, employing 325 people during their busiest production times.

The company has remained viable during changes in the market through expanding and diversifying its enterprises beginning in 1978 to include power produced in its steam-operated power plant, which creates energy from wood waste, a renewable, organic resource, and to include marine services in 1984. The proposed Whistling Ridge Energy Project is intended to provide another means of diversifying the holdings of the company to ensure a continuation of a resource-based work force in Skamania County, to create new construction and operation jobs at a time when jobs in Washington State are being lost, and to help to diversify the tax base of Skamania County.

The Applicant also seeks to provide an additional renewable resource for electric utilities in Washington. As described above and enacted in November 2006 as Initiative 937, each Washington utility serving more than 25,000 customers is required to meet specific targets for using eligible renewable resources to produce electricity. Examples of eligible renewable resources include wind energy facilities, solar panels, and geothermal plants. Each utility would have to use renewable resources to serve at least 3% of its load by 2012 through 2015; 9% of its load by 2016 through 2019, and 15% of its load by 2020.

As it has done in the past, the Applicant seeks to create new business and job opportunities through diversifying and maximizing the use of its existing holdings. A wind power project presents a new opportunity to the Applicant to provide green energy, but only if it fits with its existing business uses and its existing holdings, and is located in an area where generated electricity can be delivered to urban power markets.

1.3 SEPA/NEPA COMPLIANCE AND DECISION-MAKING

1.3.1 EIS LEAD AGENCIES

As discussed in Section 1.2.1, the Applicant has chosen to apply for site certification of the proposed Whistling Ridge Energy Project from Washington EFSEC, which has siting jurisdiction over energy facilities, such as the proposed Project, in the state of Washington. Because of its primary role as the project siting authority, EFSEC is the SEPA lead agency for this EIS.

As discussed in Section 1.2.2, the Applicant also has requested interconnection of the proposed Whistling Ridge Energy Project to the FCRTS, which is owned and operated by BPA. As a federal agency, BPA must consider the environmental consequences of its proposed actions—in this case, the proposed interconnection of the Project to the FCRTS—under NEPA prior to making a decision on whether to proceed with the proposed action. The proposed approval of the requested interconnection is the main federal proposed action related to the proposed Whistling Ridge Energy Project. BPA, therefore, is the NEPA lead agency for this EIS. While several federal agencies participated in the NEPA review for this Project, no federal agency has served as a cooperating agency (pursuant to 40 CFR § 1501.6) during the preparation of this EIS.

1.3.2 USES OF THIS EIS

This EIS will be used primarily to inform the lead agencies, the public, and other interested and affected parties about the potential environmental consequences of the proposed Whistling Ridge Energy Project, as required by SEPA and NEPA. The draft EIS was distributed to the public and other interested parties, and was used to solicit comments on the adequacy and accuracy of the environmental analysis contained in the draft EIS. Distribution of the draft EIS provided the public with information about the Project and its environmental effects, while simultaneously allowing an opportunity for meaningful public participation and comment on the draft EIS. All responses to comments received on the draft EIS are presented in Appendix G. All comment letters are presented in Appendix H.

In addition to providing the public with updated environmental information, the final EIS will be used to inform agency decisions on whether or not to issue authorizations and approvals for the proposed Project, consistent with the requirements of SEPA and NEPA. More specifically, EFSEC will use the final EIS to inform its decision on whether to recommend approval or denial of the Whistling Ridge Energy Project to the Governor of Washington. The Governor then will make a decision on whether to approve or deny the proposed Project. BPA will use the final EIS to inform its decision on whether to grant the requested interconnection of the Project to the FCRTS. BPA grants such requests by offering a final Large Generator Interconnection Agreement to a party requesting interconnection (such as the Applicant), pursuant to its tariff.

Other federal, state or local agencies also may have permitting or other approval authority for the proposed Whistling Ridge Energy Program (see Chapter 4). Those agencies may use this EIS in order to fulfill their NEPA or SEPA responsibilities.

1.3.3 INTEGRATION OF SEPA AND NEPA REQUIREMENTS

As indicated in Section 1.1, this EIS has been prepared as a joint SEPA/NEPA EIS. As such, it is intended to fulfill the format and content requirements, as well as the spirit, of both of these statutes and their implementing regulations and associated guidance documents. Preparation of a joint SEPA/NEPA EIS for a project that requires both state and federal decisions ~~approvals~~ is encouraged by both the State of Washington and the federal government.

At the state level, the Washington Department of Ecology (Ecology), the state agency charged with issuing uniform SEPA rules and guidelines for the state, has prepared the SEPA Handbook (Ecology 1998) to provide guidance on implementing SEPA requirements. Chapter 9 of the SEPA Handbook specifically recognizes that the SEPA and NEPA lead agencies for a proposed project may agree to be co-lead agencies, and encourages the preparation of a combined, or joint, SEPA/NEPA EIS in such situations to meet the requirements of both SEPA and NEPA.

At the federal level, the Council on Environmental Quality (CEQ) NEPA regulations specifically provide that state and local agencies may act with at least one federal agency as joint lead agencies for an EIS (See 40 CFR § 1501.5[b]). These regulations also specify that federal agencies shall cooperate with state and local agencies to the fullest extent possible to avoid duplication between NEPA and comparable state requirements (See 40 CFR § 1506.2[c]). Under 1506.2(c), this cooperation shall include preparation of a joint state-federal EIS where both state and federal decisions ~~approvals~~ are involved, and the state and federal lead agencies are to act as joint lead agencies for the EIS.

Much of the organization of this document is based on the SEPA EIS format and content specified in WAC 197-11-430 and 197-11-440, with adjustments made to ensure NEPA compliance as well.

1.4 DESCRIPTION OF ALTERNATIVES

Two alternatives are evaluated in this EIS: the Proposed Action (authorizing construction and operation of the proposed Whistling Ridge Energy Project and associated components, and BPA granting the proposed interconnection) and the No Action alternative (not authorizing construction and operation of the proposed Project and associated components, and BPA not granting the proposed interconnection). These alternatives are summarized below. Alternative wind energy technologies, alternative wind turbine locations, and off-site alternatives considered but eliminated from further study in this EIS also are described.

1.4.1 PROPOSED ACTION

Under the Proposed Action, the state of Washington (acting through Washington EFSEC and the Governor of Washington) would approve the Site Certificate for the proposed Whistling Ridge Energy Project, thereby authorizing the Applicant to construct and operate the Project. Upon the issuance of the Site Certificate, BPA will concurrently issue its Record of Decision (ROD) and will thereby grant interconnection access to the Applicant under its Open Access Tariff. The proposed Whistling Ridge Energy Project would be located on an approximately 1,152-acre site approximately seven miles northwest of the City of White Salmon in Skamania County, Washington (Figure 1-1). The Applicant has identified this site for the proposed Project based on many factors, including:

- The site has a proven, robust wind resource;
- The site is large enough to accommodate enough wind turbines to produce a minimum of 70 MW nameplate capacity of electricity;
- The site is owned and controlled by the Applicant;
- The site has a long history of commercial logging. ~~and associated absence of native habitat, reducing or eliminating the need to clear additional forest land~~ Native species remain; however, the native habitat has been disturbed through commercial forestry activities;
- The site is uniquely suited for its access to on-site high voltage transmission in proximity to urban power markets; and
- The site is in proximity to the mill site and business offices of the Applicant.

The proposed Project would consist of wind turbine generators and associated components, and would have a total nameplate capacity of up to 75 MW. Approximately 384 acres would be developed for the wind turbine foundations, connecting roadways, and overhead and underground transmission lines. Information about the proposed wind turbines and other project components is summarized below.

1.4.1.1 Wind Turbines

The proposed Project would consist of up to 50 wind turbine generators, each of which would likely range in size from 1.2 to 2.5 MW, for a total of up to 75 MW. Each turbine would be up to approximately 426 feet tall (262-foot hub height and 164-foot radius blades, measured from the ground to the turbine blade tip), and would be mounted on a concrete foundation. Wind turbines would be grouped in "strings," each spaced approximately 350 to 800 feet from the next (or approximately 1.5 to 2.5 times the diameter of the turbine rotor). The turbines throughout the Project would all be the same model, although height may vary in response to terrain.

Each wind turbine would consist of four main components: the turbine tower, the nacelle, the rotor hub, and the blades. Each turbine tower would be a tapered, hollow tubular structure, approximately 14 feet in diameter at the base and weighing approximately 30 tons. The towers would likely be painted a flat neutral gray or white color. Each tower would be mounted on a concrete foundation with a diameter up to approximately 60 feet. Tower foundations would be spread footing or pier-type footings. To the extent required by the Federal Aviation Administration, turbine towers would be furnished with blinking lights visible to aircraft.

The remaining three turbine components are all mounted at the top of each turbine tower. The nacelle is encased in fiberglass, and is mounted on top of the tower to house the gearbox, the generator, and the control system. The rotor hub is attached to the nacelle, and holds the blades in place. Each turbine has three laminated fiberglass blades, each approximately 129 to 164 feet long, depending on which turbine is selected. The diameter of the circle swept by the rotors would be approximately 264 to 320 feet, depending on which turbine is selected. The wind turbines would operate at wind speeds from 9 to 56 miles per hour (mph), with a rotor speed range of 10 to 20 revolutions per minute (rpm).

1.4.1.2 Electrical Collector System

The Project would include an electrical collector system to collect energy generated at approximately 575 volts (V) from each wind turbine, transform the voltage of this energy to 34.5-kV using a pad-mounted transformer, and deliver the energy via underground cables to the proposed Project substation. Each turbine's 575-V to 34.5-kV transformer would be located on a transformer pad adjacent to each tower, or enclosed in the nacelle, depending on the turbine model. From there, power would be transmitted via underground 34.5-kV electric cables. These cables would be buried by digging trenches up to 5 feet wide and approximately 3 to 4 feet deep, placing the cables in these trenches, and then filling the trenches back in with the excavated soils. In areas where collector cables from several strings of turbines follow the same alignment (for example, near the proposed substation) multiple sets of cables would be installed within each trench where possible. There would be approximately 8.5 miles of underground collector cable trenches. In areas where environmental constraints, geologic features, or cultural features necessitate, minor aboveground placement of collector cables may occur.

1.4.1.3 Project Collector Substation and Interconnection to the FCRTS

The Project also would include a project collector substation, which would further transform the energy delivered by the underground electrical collector system from 34.5-kV to 230-kV, so that it would be suitable for delivery to the FCRTS. The proposed collector substation would occupy a portion of a fenced 5-acre area at the southwest end of the Project Area, immediately adjacent to BPA's transmission line. A 50-foot cleared area would be maintained around the substation. The substation site would be a graveled, fenced area with transformer and switching equipment and an area to park utility vehicles.

Additionally, the Project would include the construction of a new BPA substation located within the Project Area which would interconnect the Project into BPA's North Bonneville-Midway 230-kV transmission line. The proposed BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there would be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work. There would be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that would be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

The interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line could cross underneath for this interconnection.

1.4.1.4 Operations and Maintenance Facility

A permanent Operations and Maintenance facility would be constructed on an approximately 5-acre area located at one of the following two locations: (1) adjacent to the proposed substation; or (2) west of the Project Area along West Pit Road. The Operations and Maintenance building would have approximately 3,000 square feet of enclosed space, including office and workshop areas, a kitchen, bathroom, shower, and a utility sink. It would be constructed of sheet metal, and would be approximately 16 feet tall (to the roof peak). A graveled parking area for employees, visitors, and equipment would be located adjacent to the building. The entire area would be fenced and have a locked gate.

1.4.1.5 Water Supply and Wastewater

During construction of the proposed Project, approximately 1.7 million gallons of water would be consumed for road compaction, dust control, wetting concrete and other construction purposes. The construction contractor would supply water used during construction. Water needed for construction would be purchased by the Applicant's construction contractor from an off-site vendor with a valid water right and transported to the site in water-tanker trucks.

The Project would not be connected to a sewer system. Sanitary wastes would be collected in portable toilets during construction. Disposal of sanitary wastes would be managed through a contract with a portable toilet vendor. The contractor would incorporate applicable state capacity requirements based on the construction worker population on the Project Area at any given time. Collected wastes would be managed and disposed of by the contracted vendor.

Project operations would not require the use of any water for cooling or any other use aside from the limited needs of the Operations and Maintenance facility. Potable water intake would be in the form of a well accommodating the Operations and Maintenance facility's needs. The Applicant would seek and obtain approval for the new well from EFSEC, in consultation with Skamania County Environmental Health Department and Ecology.

There would be no industrial wastewater stream from operation of the Project. Wastewater discharge would come from the Operations and Maintenance facility discharging to an on-site septic system. Less then 5,000 gallons per day is anticipated for kitchen and bathroom use. No wastewater would be used, discharged, or recycled for wind turbine operations.

1.4.1.6 Site Access for Construction and Operation

From State Route (SR) 14, access would be provided via county roads (Cook-Underwood Road to Willard Road) and then via a new connection to West Pit Road, an existing private logging road that connects to a network of existing logging roads on the Project Area.

Because the Project Area already has a network of logging roads, relatively few new roads would have to be constructed. Approximately 7.9 miles of existing private logging roads would be improved. In areas where there are no existing logging roads near proposed wind turbine strings, approximately 2.4 miles of new gravel access roads would be constructed. All new roadway construction would occur on private lands.

In addition to the permanent access roads described above, temporary access may be required to construct some facilities. For example, constructing the underground collector cables would require that heavy equipment be able to access trench locations where they are not directly adjacent to roads. Generally, equipment would be driven across open ground to accomplish this construction. In some locations minor grading may be required to allow safe access to construction locations (that would be determined only after final pole locations have been selected). These temporary access roads would be re-graded and re-seeded as necessary to restore vegetation after the construction phase is over.

After the Project is constructed, use of the improved and new access roads on private lands would be limited to use by the landowner and Project maintenance staff.

1.4.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the state of Washington would deny the Applicant's application for a Site Certificate for the proposed Whistling Ridge Energy Project, and/or BPA would not grant interconnection of the Project to the FCRTS. As a result, the proposed Whistling Ridge Energy Project would not be constructed or operated under the No Action Alternative. This alternative would not help utilities seeking renewable energy resources in states with RPSs, such as Washington, Oregon, and California, in achieving the renewable energy goals mandated by each state's RPS. Furthermore, this alternative would not help to meet the region's need for additional power in coming years. If the proposed Project is not constructed, it is likely that this need would be addressed by some combination of energy efficiency and conservation measures, existing power generation sources, and/or the development of other new renewable and non-renewable generation sources.

In addition, it is reasonable to expect that under the No Action Alternative, the proposed Project Area would continue to be used for logging and other timber harvest activities. This site has been in commercial forestry use for the last century, during which the site has been logged over a series of approximately 50-year logging rotations. If the proposed wind project is not approved and built, the Applicant and others would continue to use the site for commercial forestry production. Ongoing timber management activities within the Project Area under this alternative would include regular tree clearing, harvesting, replanting, and development of additional access roads as necessary.

1.4.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

The Applicant has proposed a particular type of generation facility (wind) at a specific site. The lead agencies, Washington EFSEC and BPA, must respond to the Applicant's requests for authorizations and approvals for the proposed Project at this site. While this EIS focuses on the alternatives of either granting or not granting the Applicant's requests, various ~~other~~ alternatives to the Proposed Action described in Section 1.4.1 ~~also~~ have been considered. These alternatives include alternate locations for the proposed Project, different Project sizes, alternative wind generation technologies, and different Project configurations. ~~For potential alternatives,~~ The Applicant identified a number of criteria that needed to be met in order ~~for the Applicant~~ to have a technically and economically feasible project suitable for further consideration. These criteria are as follows:

- The Project must be located in an area with a steady supply of robust wind power, and on a site on which construction could reasonably occur (no significant geotechnical constraints);
- To reduce startup costs, the Project must be located on land the Applicant owns and controls, and land that could serve a dual purpose of commercial forestry and power production;
- To allow ~~enable~~ the power to reach urban markets and eliminate the cost and time required to construct new transmission lines, the Project must be located in proximity to existing high-voltage transmission lines;
- The costs of construction must be outweighed by the potential return on investment, thereby requiring a minimum number of potential megawatts to be achieved by the Project; and
- The Project output must be at a competitive price and of adequate supply to be attractive to utilities looking to fulfill their Renewable and Alternative Energy Portfolio Standards.

The following discussion describes alternatives that were considered but eliminated from detailed study in this EIS because of technical or economic feasibility issues, not meeting the identified purpose of and need for the proposed action, or clearly greater environmental impacts:

1.4.3.1 Alternative Project Locations

The Applicant owns and manages 70,000 acres of timberland in Washington and Oregon. The Applicant manages its forestlands with the objective of producing as much high quality wood as possible, without compromising the future economic and environmental benefits of their forests. In reviewing its lands for location of a wind project, the Applicant sought:

- Areas of Applicant-owned property found to have a steady source of robust wind;
- Applicant-owned land that contained high ridges on which to place wind turbines with little impact to the continued underlying use of the land for commercial forestry;
- Land in proximity to existing high voltage transmission lines.

No other sites were identified that were under the ownership of the Applicant or as close to existing transmission infrastructure facilities as the proposed Project Area.

1.4.3.2 Larger or Smaller Generation Facility Size

During the Project planning process, the Applicant considered the feasibility of constructing and operating a larger generation facility, both in terms of more wind turbines and a larger Project Area ~~area, involving the proposed~~. Regarding more turbines, the site does contain a series of ridge lines that are conducive to locating wind turbines but at the same time are limiting as to where those turbines could be placed. In general, placement of turbines in areas substantially below the ridge lines would not effectively make use of the wind resource within the Project Area, thereby compromising the economic feasibility of the proposed Project. Accordingly, the constrained topography has necessitated a restricted generation facility ~~power plant~~ design.

Regarding a larger Project Area, the proposed Project is located on land situated between the Columbia River Gorge National Scenic Area on the south and land owned by the Washington State Department of Natural Resources (DNR) on the north. Land to the east and west was not considered, as those lands are at a lower elevation and do not include the north-trending ridge lines that exist on the proposed Project Area. While the Applicant did not consider locating turbines within the Scenic Area due to its sensitivities, consideration was given to locating turbines on the DNR lands directly north of the site. These lands have topographical characteristics similar to the proposed Project Area, and also have been logged through commercial forestry activities. However, use of these lands for Project turbines was rejected from further consideration due to comments from the public and DNR's own reluctance to consider leasing the site to the Applicant.

The Applicant also considered the feasibility of a smaller generation facility within the proposed Project Area, either by removing turbines or utilizing a smaller Project Area. However, the Project is being proposed as an "integrated whole"—in other words, as a single generation facility, not pieces of a whole, where some turbines may be eliminated. The proposed Project includes a defined energy output, based on site and design characteristics, market demand, and Applicant objectives. These objectives include providing a minimum level of generation to be attractive to utilities seeking to fulfill their RPS requirements, as well as providing a return on investment to the Applicant. In order to provide this return, the Applicant has determined that the Project must be capable of producing a minimum of 70 MW. The number of wind turbines within the Project Area already has been minimized to the extent practicable in light of the Applicant's objectives. Accordingly, if any turbines are removed from the Project design, other locations must be found to replace those turbines to maintain the minimum necessary capacity. The constrained site location and topography limits the ability to relocate turbines within the Project Area.

In sum, the Project size was selected to optimize Project energy output and economic feasibility. A smaller wind turbine facility would be unlikely to offset Project development costs. A larger project would require additional infrastructure capacity and transmission capacity.

1.4.3.3 Alternative Wind Generation Technologies

Alternative technologies for the generation of power from a wind resource were considered. Several types of wind energy conversion technologies have been developed over the past three decades and include 1) vertical axis Darrieus wind turbines, 2) two-bladed downwind wind turbines, 3) smaller three-bladed upwind wind turbines (500 to 750 kilowatt [kW]), and 4) larger 3-bladed upwind wind turbines (1 to 3 MW). The three-bladed, upwind, horizontal axis is currently the preferred technology, based on proven reliability and commercial viability.

1.4.3.4 Alternative Project Configurations

As discussed above, the proposed Project Area contains a series of ridge lines that are conducive to locating wind turbines, but at the same time are limiting as to where those turbines could be placed. This means that there are limited options for locating wind turbines within the Project Area. Alternative turbine configurations were considered, but were eliminated from further study because they either did not appropriately utilize the wind resource present within the Project Area or compromised the economic feasibility of the proposed Project.

1.4.3.5 Alternative Interconnections

Alternatives for interconnecting the proposed wind Project with the existing high voltage transmission lines that currently cross the Project Area were considered. Initially, an option of interconnecting at a point within the Project Area directly east of the currently proposed interconnection point was identified. This alternative interconnection point was located between structures 22/6 and 23/1 on the North Bonneville-Midway 230-kV transmission line. However, this option would have required the development of interconnection facilities within the Columbia River Gorge National Scenic Area because structure 22/6 is on the border of, and structure 23/1 is within, the Scenic Area. Given the high sensitivity of the Scenic Area, construction of an interconnection alternative within its boundaries was eliminated from further study in this EIS.

An alternative interconnection also was considered outside the Project Area, approximately 1.5 miles west of the currently proposed interconnection point. BPA's transmission engineers identified a potential alternative interconnection site between structures 21/4 and 22/1 on the North Bonneville-Midway 230-kV transmission line. This site is located in a relatively flat, lower-elevation area that may have easier access in the winter than the currently proposed interconnection site. However, this alternative would have required the Applicant to construct and operate a new 1.5 mile section of 230-kV transmission line from the proposed Project to this interconnection point. Development of such a new line would have required the clearing of an approximately 125-foot-wide right-of-way corridor for the line, as well as the clearing and construction of additional new transmission line access roads. The Applicant also has stated that the additional costs of constructing this new line likely would make the Project no longer economically viable. Because of the much greater potential for environmental effects as compared to merely developing the currently proposed interconnection within the already planned Project Area, as well as the significant additional cost implications, this alternative was considered but eliminated from detailed study in this EIS.

An interconnection with the other existing BPA transmission line that crosses the Project Area also was considered but rejected from further study because the line is a 115-kV line and does not have sufficient capacity to transmit the energy from the Whistling Ridge Energy Project.

1.4.3.6 Alternative Access Roads

Finally, several alternatives for accessing the proposed Project Area were investigated. There are three potential ways to access the Project Area. All are via county roads from SR 14 to Cook-Underwood Road. In addition to the proposed access route from Cook-Underwood Road, which is included as part of the Proposed Action, the Project Area could be accessed by:

- **Route 1:** Ausplund Road to a private logging road vacated by Skamania County in 1987, which crosses private property (not owned by the Applicant) that is currently used for residential, agricultural orchards, and commercial timber production and harvest.

- **Route 2:** Kollock-Knapp Road to Scoggins Road to a private logging road called the CG2930 road on County Assessor's maps, which crosses property owned by the Applicant that is currently used for commercial timber production and harvest.

The private logging road in Route 1 was made a County right-of-way in 1923. It was vacated for public use in 1987 by resolution of the Skamania Board of County Commissioners; however, the rights to use the road by abutting property owners remain. Additionally, road improvements to this route would be required for access to construct the wind energy facility and for ongoing Operations and Maintenance traffic. Impacts to a non-project landowner from these activities would occur if Route 1 were used. Therefore, Route 1 was eliminated as a construction roadway access alternative.

Route 2 would require minor roadway improvements that would not directly impact any non-project landowners. However, these roadway improvements would require construction within the Columbia River Gorge National Scenic Area. Therefore, Route 2 was eliminated as a construction roadway access alternative.

1.5 SUMMARY OF PUBLIC INVOLVEMENT, CONSULTATION, AND COORDINATION

1.5.1 PUBLIC AND AGENCY SCOPING

Both SEPA and NEPA require opportunities for public involvement and comment during the preparation of an EIS. The initial phase of public involvement is the draft EIS "scoping" phase, during which the lead agencies request public input on the scope of the draft EIS to be prepared, including the range of alternatives, potential environmental impacts, and possible mitigation measures. The lead agencies notify the public of the draft EIS scoping phase through various media (e.g., sending letters, publication notices, and internet postings), provide for a public scoping comment period, and hold public meetings to accept scoping comments. This section summarizes the public involvement and agency coordination activities that have been conducted to date for this EIS.

- **Initial EFSEC Public Notice.** On April 6, 2009, EFSEC mailed out a notice to the public concerning the Applicant's March 10, 2009 Application for Site Certification Agreement for the Whistling Ridge Energy Project. Among other things, this notice included a summary of the proposed Project, a determination that an EIS was required, and information concerning the scoping process for the joint SEPA/NEPA EIS to be prepared by EFSEC and BPA. The notice also requested that all scoping comments be submitted by May 11, 2009 and provided the date, time, and location for the initial public information and scoping meeting for the EIS.

- **BPA Scoping Letter.** On April 17, 2009, BPA mailed a letter to agencies and individuals ~~people~~ potentially interested in the proposed Whistling Ridge Energy Project that explained the proposal, BPA's role, the EIS process including scoping, and how to participate. A comment sheet was included so interested parties ~~people~~ could mail their comments to BPA. This letter also was posted on a BPA website created specifically for posting information and updates related to the EIS. BPA also provided advance notice to the State of Washington and appropriate tribes.

- **Revised EFSEC Public Notice.** On April 21, 2009, EFSEC issued a revised public notice ~~that added~~ announcing a second public information and scoping meeting for the EIS. This notice also extended the date for submitting scoping comments to May 18, 2009.

- **BPA Notice of Intent.** On April 21, 2009, BPA published a Notice of Intent (NOI) to prepare an EIS in the *Federal Register*. Like the BPA scoping letter, this NOI explained the proposal, BPA's role and proposed action related to the proposal, the EIS process including scoping, and how to participate.

- **Agency Scoping Meeting.** An agency scoping meeting was held at the Rock Creek Center in the Skamania County Fairgrounds in Stevenson, Washington during the afternoon of May 6, 2009. The meeting was attended by representatives from EFSEC, BPA, the US Forest Service (USFS), the State Attorney General's office (i.e., the Counsel for the Environment) and the general public. The primary agency comments received during the agency scoping meeting were provided by USFS.

- **First Public Information and EIS Scoping Meeting.** On May 6, 2009, EFSEC and BPA hosted an evening scoping meeting at the Rock Creek Center ~~in the Skamania County Fairgrounds~~ in Stevenson, Washington. The meeting included presentations by (1) EFSEC, explaining the process that would be followed during preparation of the EIS, (2) BPA on its role, and (3) the Applicant on the Project itself. Members of the public asked questions and were given the opportunity to provide oral and written ~~scoping~~ comments on the scope and content of the EIS.

- **Second Public Informational and EIS Scoping Meeting.** On May 7, 2009, EFSEC hosted an afternoon scoping meeting at the Underwood Community Center in the community of Underwood, Washington. Similar to the May 6 meeting, the meeting included presentations by (1) EFSEC, explaining the process that will be followed for preparation of the EIS, (2) BPA on its role, and (3) the Applicant on the Project itself. Members of the public asked questions and were given the opportunity to provide oral and written scoping comments on the EIS.

- **Mailing List.** EFSEC and BPA have developed and maintained a mailing list of interested and affected parties for the EIS. All public notices and announcements concerning the Project have been mailed to all parties on the mailing list.

- **EIS Scoping Report.** Following closure of the public scoping comment period on May 18, 2009, EFSEC and BPA jointly reviewed all of the comments received from the public, tribes, public agencies, interest groups, and other parties and developed the scope of issues to be evaluated in the EIS. An EIS Scoping Report was prepared by EFSEC, in consultation with BPA, and made publicly available on August 25, 2009.

EIS scoping comments were received both at the EIS scoping meetings and through written submittals. A total of 122 people attended the two scoping meetings, and 79 speakers provided verbal comments. By the close of the comment period, a total of 421 EIS scoping letters or e-mails had been received from public agencies, tribes, environmental organizations, interested citizens, and others. Fifty-one of these submittals were duplicate letters or cover letters/e-mails attached to supporting documentation that did not include substantive comments. A total of 1,803 individual comments from the remaining 370 submittals were identified for consideration in this EIS. The EIS Scoping Report, which is incorporated by reference, provides additional information on the EIS scoping comments that were received.

1.5.2 AGENCY CONSULTATIONS

This section summarizes federal and Washington state statutes, implementing regulations, and Executive Orders requiring consultation, review, and/or permits or approvals. A complete listing of all Environmental Consultation, Review, and Permitting Requirements is provided in Section 4.0 of this EIS.

- **Endangered Species Act.** On June 8, 2010, BPA consulted with the U.S. Fish and Wildlife Service with the determination that the proposed Project may affect but is not likely to adversely affect northern spotted owl populations or critical habitat within the Project Area. On July 19, 2010, the U.S. Fish and Wildlife Service concurred with BPA's findings under the Endangered Species Act, and provided comments on the draft EIS.

- **National Historic Preservation Act.** On August 2, 2010, BPA consulted with the Washington State Department of Archaeology and Historic Preservation (DAHP) regarding BPA's Area of Potential Effects (APE) pursuant to BPA's responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800. On August 9, 2010, BPA received concurrence for its APE from DAHP (Log No. 080910-26-BPA). BPA also initiated consultation with The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, The Confederated Tribes and Bands of the Yakama Reservation, The Cowlitz Indian Tribe, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4) on August 2, 2010. On June 2, 2011, BPA submitted a cultural resources survey report to DAHP and interested Tribes (listed above) and determined that the federal undertaking should result in no historic or cultural properties affected.

- **Adjudicative Proceedings.** EFSEC has held adjudicative proceedings for the Whistling Ridge Energy Project under Chapter 34.05 RCW, the Administrative Procedure Act and commenced the adjudicative hearing related to Application No. 2009-01 in accordance with the procedural requirements found in Chapter 463-30 WAC and Chapter 34.05 RCW. For further information including motions, orders, and filings related to EFSEC adjudicative proceedings of the Whistling Ridge Energy Project, please see *http://www.efsec.wa.gov/Whistling%20Ridge/Adjudication/wradj.shtml.*

1.5.3 APPLICANT MEETINGS AND CONSULTATION

In addition to the EIS public scoping activities, the Applicant has been actively involved in meeting and consulting with local and state agency personnel and with Tribal leaders during the preparation of studies supporting the Application. The key contacts made by the Applicant to date are summarized in this section.

1.5.3.1 Local Government

- **City of Bingen (January 2009).** Consulted with city administrator to obtain information stating that there are currently no load restrictions in place for Maple Street in the City of Bingen, Washington. Additional information was provided, stating that there is a significant increase in traffic volumes during the summer months due to recreational activities in the local area.

- **Klickitat County Public Works Department (January 2009).** Obtained the County "Resolution to Designate Haul Routes" document that could be used as a haul route agreement template for the Project by Skamania County. The document was forwarded to Skamania County for review.

- **Skamania County Planning Department.** Held three pre-application conferences between 2004 and 2008 with staff (including meetings on March 24, 2006 and August 22, 2007).

- **Skamania County Public Works Department.** Held pre-application meeting on August 22, 2007 with the County Road Engineer, and Building Inspector; meeting also attended by the Planning Department. In addition, the Skamania County Public Works Department Manager, the County Engineer, and the Maintenance Superintendent were consulted to better understand existing roadway conditions, the proposed haul route, and traffic patterns. Meetings and consultation included:

- Meeting with Skamania County Public Utility District and Embarq, the local telephone service provider on utility availability
- A determination on weight restrictions for the tracks that cross Maple Street in the City of Bingen, Washington from the Burlington Northern Santa Fe Railroad
- Obtained average daily traffic on Cook-Underwood Road at approximately milepost 12 and location of the Cook-Underwood Road and Kollock-Knapp Road intersection at approximately milepost 10 to 10.5.
- Recommendation that right of way ownership and easements be determined early on in the planning process
- Requirement that both pre and post construction roadway inspections would need to be conducted along the haul route and that one additional roadway inspection would be required at one year post construction

- **Skamania County Assessor.** Conducted phone and office discussions regarding tax benefits to Skamania County from a potential wind energy project.
- **Skamania Economic Development Council.** Held various meetings and discussions regarding economic development and wind energy.
- **Skamania Public Utility District.** Met with Commissioners and General Manager regarding Skamania Public Utility District system vulnerability to interruption by BPA and benefits to be realized by a potential wind energy project in Skamania County.
- **Underwood Fire District.** Met with Fire Commissioners to discuss a service agreement for a potential wind energy project.
- **Mill A Volunteers.** Met with members to discuss the possible formation of a Fire District and inclusion of a potential wind energy project.

1.5.3.2 State Government

- **Washington Department of Archeology and Historic Preservation**. Conducted file search for historic and cultural properties within or near the Project Area.
- **Washington Department of Fish and Wildlife (WDFW).** Meetings with WDFW included:
  - February 26, 2004 meeting with WDFW and US Fish and Wildlife Service (USFWS) staff to discuss survey methods and results of wildlife surveys completed to date, and to discuss future surveys

- November 16, 2007 meeting and site tour to discuss survey methods and results of additional wildlife surveys completed to date.
- Several information exchanges with WDFW Area Habitat Biologist to discuss Project impacts, review survey results, and discuss survey protocols.
- Several follow-up meetings with WDFW staff during June, July and August of 2009 to continue the discussion and consultation on wildlife.
- Meeting with WDFW staff on December 8, 2009 to review results of wildlife surveys.

- **Washington State Department of Natural Resources.** Held a meeting and discussions with DNR staff regarding application to lease adjoining DNR property for wind energy purposes.

- **Washington State Department of Transportation, Goldendale Office.** Discussed information relating to over-size and over-weight vehicles traveling on SR 14. They stated that the current prohibition for loads in excess of 125 feet (including the trailer and load) between mileposts 19.00 and 83.53 could be overruled for trucks traveling between the SDS facility and the junction of SR 14 and Cook-Underwood Road. The Goldendale office must be contacted prior to any over-size hauls. Pilot cars would be required and Washington State Patrol involvement may be required.

- **Washington State Department of Transportation, Southwest Region Office.** Discussed information relating to road and bridge restrictions for over-size and over-weight motor vehicles traveling on SR 14 and over-size and over-weight load permit requirements.

1.5.3.3 Federal Government

- **U.S. Army Corps of Engineers at Bonneville Dam (January 2009).** Obtained information on lockage length and width parameters as well as average daily usage numbers for the months of May through October.

- **US Fish and Wildlife Service.** Meetings with USFWS included:

  - February 26, 2004 meeting with USFWS and WDFW staff to discuss survey methods and results of wildlife surveys completed to date, and to discuss future surveys.
  - Ongoing consultation with USFWS staff to discuss survey work and results.

1.5.3.4 Tribal Government

- Letter sent to Yakama Nation Cultural Resources Department.
- Site tour and consultation with local Tribes of Yakama Nation (see Section 3.10).
- Communication with Yakama Nation Cultural Resources Program concerning consultation and survey assistance.

- Site tour and survey by representatives of the Yakama Nation Cultural Resources Program.

1.5.3.5 Railroad

- **Burlington Northern Santa Fe Railroad.** Transportation Technology Services provided rail car length, width, and weight parameters as well as transport restrictions between the Port of Longview and the SDS facility.

1.5.4 DRAFT EIS COMMENT PERIOD AND PUBLIC MEETINGS

After completion of the draft EIS, EFSEC and BPA established an initial ~~minimum~~ 45-day comment period and distributed the draft EIS ~~document~~ for public comment and review. The comment period was later extended. During the comment period, the public had the opportunity to review and submit comments on the draft EIS to EFSEC and BPA both in writing and at two public meetings. EFSEC and BPA then prepared this final EIS that considers and responds to these comments and makes any necessary corrections or revisions to the EIS text. Responses to comments are presented in Appendix G.

This section summarizes the public involvement and agency coordination activities that have been conducted since the release of the draft EIS.

- On May 25, 2010, EFSEC and BPA sent out a letter to interested parties announcing the release of the draft EIS. This letter was also posted on a BPA website created specifically for posting information and updates related to the EIS.
- On May 28, 2010, the draft EIS was filed with the U.S. Environmental Protection Agency which published a Notice of Availability of the draft EIS to the Federal Register (volume 75, number 103).
- On June 16, 2010, EFSEC and BPA hosted a public meeting at the Underwood Community Center in the community of Underwood, Washington. On June 17, 2010, EFSEC and BPA hosted a second public meeting at the Rock Creek Center in the Skamania County Fairgrounds in Stevenson, Washington. These meetings were held to accept public comments on the draft EIS.
- The initial close of comment period for the draft EIS was July 19, 2010. EFSEC and BPA extended the comment period for comments to the draft EIS to August 27, 2010.

1.6 SUMMARY OF POTENTIAL PROJECT IMPACTS AND MITIGATION MEASURES

Table 1-2 summarizes the potential impacts, design measures, and mitigation measures to be implemented by the Project. This table is organized by the various elements of the environment. For each element, the potential impacts of the alternatives are summarized. Specific design measures that would reduce or eliminate impacts to which the Applicant has committed are also listed, as are other mitigation measures that have been identified.

Table 1-1
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
Earth	Construction: • Potential erosion during grading and foundation construction. • Minor to moderate changes in topography. Operation: • Low potential for liquefaction. • Small potential for surface rupture. • Low probability for ash deposition during volcanic event. • No obvious recent mass wasting features. • No anticipated impacts from Class III Landslide Hazard Areas.	Same potential impact levels as for proposed Project with the exception that the site identified for the alternative. Operations and Maintenance facility on West Pit Road is at a lower elevation and is a more level site so erosion potential may be less.	Existing potential for erosion from logging operations would continue.	Construction: • A detailed geotechnical investigation would be performed to identify any subsurface conditions. • A Construction SWPPP would be submitted for EFSEC approval and would include measures to control erosion. • Foundations and building would be designed for Seismic Zone 2. Operation • Erosion and Sedimentation Control Plan, Environmental Protection Control Plan, and Stormwater Pollution Prevention Plan would be submitted to EFSEC for approval, and all would include BMPs to minimize erosion. • Visual inspection would be conducted following any seismic activity to look for incipient mass movement. Adverse effects on wind turbines from ash fall would be mitigated through appropriate design.
Air Quality	Construction: • Temporary exhaust emissions from construction vehicles and equipment. • Temporary odors from diesel equipment and vehicles. • Temporary dust from construction operations. Operation: • Minor dust and emissions from Operations and Maintenance vehicles. • Avoided emissions from fossil fuel power plants, including of greenhouse gasses and other pollutants.	Impact would be the same as for the construction and operation of the Operations and Maintenance facility located within the Project Area.	• Existing potential for fugitive dust and emissions would continue from logging operations. • Construction of fossil-fuel power plants to meet regional demand could impact air quality through releases of SO2, NO, CO2 and other pollutants.	Construction • All vehicles used during construction would comply with applicable Federal and state air quality regulations. • Operational measures such as limiting engine idling time and shutting down equipment when not in use. • Active dust suppression on unpaved construction access roads, parking areas and staging areas, using water-based dust suppression materials in compliance with state and local regulations. • Dust control program to minimize any potential disturbance from construction-related dust. Dust suppression would be accomplished through application of either water or a water-based, environmentally safe dust palliative such as lignin. • Traffic speeds on unpaved Project roads would be kept to 25 mph to minimize dust generation. • Carpooling among construction workers would be encouraged. • Disturbed areas would be replanted or graveled to reduce wind-blown dust. • Erosion control measures would be implemented to limit deposition of silt to roadways. • Temporary rock crushers or concrete batch plants would be required to submit a Notice of Construction to the Southwest Clean Air Agency and to comply with all permit requirements. Operation ~~• No mitigation proposed.~~ • Limit traffic speed on unpaved roads to 25 MPH to minimize dust from operation and maintenance vehicles.

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
Water	Construction • On site development would not impact ground water, surface water, public water supplies, floodplains or wetlands. • Off site, improvements to West Pit Road would potentially impact surface water. Operation • Operation of the Project would not impact ground water, surface water, public water supplies, floodplains or wetland.	Impact would be the same as for the construction and operation of the Operations and Maintenance facility located within the Project Area.	Existing patterns of ground and surface water use and impacts would continue.	Construction • Discharge of stormwater runoff from the Project would be regulated by EFSEC, based on Ecology's stormwater pollution control program. • EFSEC may require the Project to obtain coverage under the Construction Stormwater General Permit, since it would disturb more than 1 acre of land. • Final design would conform to the applicable Ecology Stormwater Management Manual in effect at the time or as instructed by EFSEC. • Unless it is instructed by EFSEC that it is not necessary to do so, the Applicant would file an NOI to obtain coverage under the Construction Stormwater General Permit and the Industrial Stormwater General Permit. • Applicant has committed to design and implement the same BMPs as required in Ecology's permits to prevent and minimize the discharge of pollutants in its stormwater runoff, and to prepare SWPPPs for the construction and operation of the Project in substantially the same form and content. • All plans would be submitted to EFSEC for approval prior to construction. Implementation of the construction BMPs would be carried out by the site work contractor, with oversight by environmental monitors. • Site-specific BMPs for temporary erosion and sedimentation control during construction would be identified on the construction plans submitted to EFSEC. See Section 3.3.3.1 for a list of proposed construction BMPs. Operation • Permanent stormwater management requires construction of appropriate stormwater hydraulic and treatment facilities, routine maintenance thereof, and prevention of chemical pollution through source control. • The constructed permanent stormwater BMPs would include: - Vegetated drainage ditches, - Culverts with stabilized inlets and outlets, - Permanent erosion and sedimentation control through site landscaping, grass, and other vegetative cover, - Runoff treatment BMPs facilities would be designed to conform to the applicable Stormwater Management Manual. • Due to the small area of impervious surface in the Project Area, no detention storage is required. • Operational BMPs would be adopted as part of the SWPPP to implement good housekeeping, preventive and corrective maintenance procedures, steps for spill prevention and emergency cleanup, employee training programs, and inspection and record

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
				keeping practices as necessary to prevent stormwater pollution. • At least annually, facility operators would receive spill response training and training in the applicable pollution control laws and regulations. • Storage of chemicals onsite would be minimal; however, the site development plan would require a SPCC Plan that would protect groundwater.
Biological Resources	Construction • Temporary impact to approximately 53.6 acres of grass/forb, brushfield/shrub, conifer-hardwood forest and conifer forest habitat. • Permanent impact to approximately 60.7 acres of grass/forb, brushfield/shrub, conifer-hardwood forest and conifer forest habitat. • Potential loss of suitable habitat, potential fatalities during clearing or grading of the construction area, and disturbance/displacement from construction activity and personnel occupying the site. • Potential mortality to birds through nest disturbance during clearing for turbine strings and new roads. Operation • ~~There would likely be some~~ The proposed Project would result in mortality to some birds and bats due to turbine collision and displacement, though not in sufficient quantities to affect population viability. • No impacts to listed species.	Impact would be the same as for the construction and operation of the Operations and Maintenance facility located within the Project Area.	• Existing pattern of habitat fragmentation from logging would continue • Other power generation facilities, including other wind projects or generation using fossil fuels, could be constructed and operated in the region to meet long-term needs for power. • ~~Potential impacts from construction of fossil fuel power plants.~~	Design Features Include: • Micrositing of turbines and associated facilities would allow any sensitive resources discovered during construction to be avoided. • Avoiding and minimizing the use of overhead collector lines which create areas where birds may congregate and perch, thus decreasing the potential for turbine collisions. • Use of tubular turbine towers, avoiding the lattice type towers which create areas where birds may congregate and perch thus decreasing the potential for turbine collisions. • Use of un-guyed meteorological towers, reducing the potential for bird collision with wires. • Minimization of turbine lighting in the Project Area, thereby reducing the potential for birds and bats to be disoriented by lights or attracted to turbines. • Installation of newer generation up-wind turbines. • As per the WDFW Wind Power Guidelines, completion of extensive pre-project assessment of wildlife, habitat and plants in the Project Area, including review of existing information and databases, habitat mapping, general avian use surveys, bat surveys, and surveys for threatened or endangered species. Construction • Use of certified "weed free" straw bales during construction to avoid introduction of noxious weeds. • All temporarily disturbed areas would be reseeded with an appropriate mix of native plant species as soon as possible after construction is completed to accelerate the revegetation of these areas and to avoid the establishment and spread of noxious weed species. • Implementation of a noxious weed control program, in coordination with the Skamania County Noxious Weed Control Board, to control the spread and prevent the introduction of noxious weed species. • In order to avoid or minimize impacts to any raptors potentially nesting in or near the Project Area, a raptor nest survey would be conducted during the breeding season, approximately April to July, prior to construction activities that would remove forest cover and/or require heavy equipment substantial enough to potentially disturb nesting activities.

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
				• Convene a Technical Advisory Committee to evaluate the mitigation and monitoring program and determine the need for further studies or mitigation measures. The Technical Advisory Committee would be composed of representatives from WDFW, USFWS, Skamania County, and the Applicant. The role of the Technical Advisory Committee would be to coordinate appropriate mitigation measures, monitor impacts to wildlife and habitat, and address issues that arise regarding wildlife impacts during construction and operation of the Project, including potential adaptive management opportunities. The post-construction monitoring plan would be developed in coordination with the Technical Advisory Committee. • For potential impacts to big game species (deer and elk), coordination with WDFW would occur if appropriate. • Prepare a SWPPP for both the construction and operation phases of the Project, and submit to EFSEC for approval. • Coordinate and consult with BPA to ensure that any potential impacts to fish are prevented, as part of the interconnection agreement. Operation • Prepare and follow a post-construction monitoring plan (developed in coordination with the Technical Advisory Committee described above). • Implement a two year minimum post-construction avian mortality study. • Prepare a SWPPP for both the construction and operation phases of the Project, and submit to EFSEC for approval.
Energy and Natural Resources	Construction Construction of the Project would require approximately: • 19,250 gallons of fuel (diesel and gasoline) for construction equipment, • 3,700 tons of steel for turbine towers, • 1,000 tons of steel for tower foundation reinforcement, • 100,000 yards of gravel (aggregate) for roads and crane pads, • 10,000 cubic yards of concrete for turbine foundations, • 1.7 million gallons of water for road compaction, dust control, wetting concrete, etc., assuming plain water is used for dust control (this amount could be reduced through the use of lignin or other dust palliative if permitted by EFSEC). Operation • Fuel for Operation and Maintenance vehicles (approximately 8,500 gallons annually). • Minor quantities of lubricating oils, greases and hydraulic fluids for the wind turbine generators (less than five 50-gallon drums).	Impact would be the same as for the construction and operation of the Operations and Maintenance facility located within the Project Area.	• Energy and water use for the Operations and Maintenance facility would not take place. • Base load demand would likely be filled through expansion of existing, or development of new, thermal generation such as gas-fired combustion turbine technology. Other wind sources could also be developed.	Adverse impacts to energy and natural resources are expected to be minimal and therefore no mitigation measures would be required.

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
	• Electricity for Project operations (less than approximately 600 kilowatt hours per wind turbine generator per month). • Water for use at the Operations and Maintenance facility and periodic maintenance of turbine blades (less than 5,000 gpd).			
Public Health and Safety ~~Environmental Health~~	Construction • Project construction could temporarily increase the risk of fire in the Project Area as a result of the operation of vehicles and power equipment, which may cause fires through contact with dried plants during dry summer weather. • Blasting may be used where solid rock is encountered during construction of turbine foundations or trenches for the underground electrical collection system. Blasting could also create a fire hazard during dry weather. • The risk of releases to the environment that would impact health would be similar to any large construction project. The primary potentially hazardous materials used during construction would be diesel fuels, lubricating oils, hydraulic fluids, and mineral oil. • Vandalism of Project facilities and theft of equipment may occur during construction. • Project construction could lead to a slight increase in the chance of traffic accidents, due to the presence of a peak of 265 construction workers traveling to the site, along with the transport of construction materials and the turbine components. This impact would last a maximum of one year, with peak impacts limited to a several-month period in the summer. • The risk of turbine structural failure during construction would be very small. Operation • Turbine fires are possible, however with the types of modern wind turbines proposed for the Project, turbine malfunctions leading to fires in the nacelle are extremely rare. • Operation of the Project would not result in the generation of regulated quantities of hazardous wastes. Since no fuel would be burned to power the wind turbine generators, there would be no spent fuel, ash, sludge or other process wastes generated. The only materials used during Project operations that present any potential for accidental spills are lubricating oils and hydraulic fluids used in the wind turbine generators and transformers. • Vandalism of Project facilities and theft of equipment during operation is similar to that expected during construction. • The risk of traffic accidents during operation would be low. • Structural failure of the turbine tower is very rare, though some instances of turbine failure have been documented in older turbine models.	The West Pit Road site would have a lower fire risk and shorter response times for emergency services since the facility would be along a county road.	• The risk of fire due to lightning strikes or human activity in the general area would continue at their present levels, as would the risk of hazardous waste release, vandalism, and traffic accidents. • The electrical energy that would otherwise be produced by the Project would need to be obtained from another generating source. The most likely alternative method for meeting the region's electricity needs would be use of a fossil fuel-powered generating facility. Such facilities have a higher risk of fire and explosion than wind energy due to their reliance on natural gas or oil rather than wind as fuel. Other wind sources could also be developed.	• Prior to construction of the Project, the Applicant would develop agreements related to emergency planning with Skamania County Department of Emergency Management. • An Emergency Plan would be prepared with components applicable to both construction and operation. The plan would include the following elements: - Fire Protection and Prevention Plan, - Personal Injury Response Plan, - Safety Plan, - SPCC Plan, - Hazardous Waste Management Plan. • All conditions affecting the safety of the Project would be reported to EFSEC, including any condition, event, or action that might compromise the safety, stability, or integrity of any facility or the ability of any equipment to function safely; or that might otherwise adversely affect life, health, or property. • The Applicant and its contractors would comply with all applicable local, state and federal safety, health, and environmental laws, ordinances, regulations, and standards. • Site security measures including fencing and outdoor lighting. Fire or Explosion The Project would use the following measures to mitigate the risk of fire or explosion: - The construction manager would be responsible for staying abreast of fire conditions in the Project Area by contacting WDNR and implementing any necessary fire precautions. - A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented by the Applicant, in coordination with the Skamania County Fire Marshall and appropriate agencies. - Both the wind turbine generators and the substation would be equipped with lightning protection systems. • A full time security plan would be implemented during Project construction to reduce the potential need for increased police services to the Project Area. • A Transportation Management Plan (TMP) that would direct and obligate the contractor to implement procedures to minimize traffic impacts would be prepared in consultation with both WSDOT and Skamania County and submitted to EFSEC for approval.

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
	• Cases of blade throw are rare and have generally been linked to improper assembly or exceedance of design limits. • The risk of impacts from ice throw is minimal. • At a distance beyond 2,500 feet, shadow flicker is considered to be imperceptible. Even if shadow flicker were a proven impact, none of the planned turbines are within 2,500 feet of existing residences. • EMF from the Project would be lower than those of many common household appliances and would have no proven health and safety impacts.			
Noise	Construction • Construction noise at the three closest residential properties is anticipated to be between 66 and 72 decibels. • The large distances between much of the Project Area and potentially affected residences, the temporary nature of construction, and the restriction of construction activities to daytime hours would serve to minimize potential noise impacts from construction activities. Based on the anticipated noise levels and the timing aspects of these impacts, construction noise impacts are expected to be low. Operation • During Project operations, nighttime noise levels are anticipated to increase from existing 34 dBA to 38 – 39 dBA at Receiver 1, from existing 35 dBA to 40 dBA at Receiver 2, and from existing 35 dBA to 41 -43 dBA at Receiver 3. Daytime noise levels are anticipated to increase from existing 38 dBA to 40 – 43 dBA. • Because predicted Project operation sound pressure levels at the nearest noise-sensitive receivers are at least 7 dBA lower than the 50 dBA L_{eq} compliance threshold, none of these above conditions is expected to result in the Project operation exceeding noise regulations. • Modern turbine designs have been modified to reduce or eliminate low frequency sound. • Recent studies performed for the Canadian Wind Energy Association have described usage of 85–90 dBG as a criterion for human perception of infrasound and, by reasonable extension, the likely threshold for infrasound complaint. The horizontal distances of the Project wind turbines to the nearest noise-sensitive receivers are at least 615 meters, which provides sufficient attenuation to offset the amount of decibels that one might add to account for the quantity of wind turbines of the Project. Thus, the expected infrasound at the nearest existing receivers (R1 and R2) would remain under an estimated value of 70 dBG, which is 15 dBG less than the previously stated criteria.	Noise impacts from construction and operating the Operations and Maintenance Facility on West Pit Road, as compared to the facility located within the Project Area would be higher due to the closer proximity to residences west of the Project Area. Noise levels are anticipated to be below state and local standards.	• Existing sound levels from the site vicinity include timber harvest activities ~~agricultural activities~~, which would continue in the future with or without the Proposed Action. No known noise impacts currently occur from these agricultural activities, and none would be anticipated to occur in the future.	Construction • Construction would generally occur only during daytime hours to reduce the potential for noise impacts. • All noise-producing Project equipment and vehicles using internal combustion engines would be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features. • Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) would be equipped with shrouds and noise control features. • All mobile or fixed noise-producing equipment used on the project that is regulated for noise output by a local, state, or federal agency, would comply with such regulation while in the course of project activity. • The use of noise-producing signals, including horns, whistles, electronic alarms, sirens, and bells, would be for safety warning purposes only. • Unless required for such safety purposes, and as allowable by applicable regulations, no construction-related public address, loudspeaker, or music system would be audible at any adjacent noise-sensitive land use. • The construction contractor would implement a noise complaint process and hotline number for the surrounding community. • The Applicant would have the responsibility and authority to receive and resolve noise complaints. Operation The noise modeling analysis indicated that the noise levels at the three closest residences (located 0.38, 0.48 and 0.8 mile away) would be 37 to 42 dBA for the 9 m/sec wind speed case, at and above which the wind turbine generators are expected to produce the most noise. The cumulative increase over ambient noise conditions would remain below applicable thresholds, and would result in no need for operation noise mitigation.

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
Land Use and Recreation	Construction • Construction-related noise and dust could temporarily affect nearby homes and businesses located along the site access route, though this impact would not be sufficient to change existing land use patterns. • Construction activities could impact some recreation users through temporary increases to traffic, and from construction-related dust and noise, such as users of the Underwood Park and Community Center located along Cook-Underwood Road. These impacts would be temporary and are expected to be minor. Operation • Operation of the Project would not cause changes to existing land uses or land use activities or development patterns. • Operation of the facility would not result in a sufficient increase in population or traffic to impact local recreational facilities. • The only potential impact of the Project to recreation resources, including users of the Columbia River Gorge National Scenic Area (CRGNSA), would be the minor to moderate impacts to the visual experience of visitors in some locations discussed in Section 3.9 Visual Resources. • The Project would not impact any Wild and Scenic Rivers.	For the Operations and Maintenance facility located at the West Pit site, earth movement and construction-related traffic would generate slightly more noise and dust along West Pit Road over anticipated levels for roadway construction without the facility. The additional noise and dust could temporarily affect nearby homes along Willard Road. Other impacts are anticipated to be similar for both alternative locations.	The existing pattern of land use would continue, including the use of the Project Area for commercial forestry and the surrounding area for commercial forestry, agriculture and rural residences	No substantial impacts to land use are anticipated, and no mitigation measures are required. The only potential impact to recreation users from operation would be the minor to moderate impact to visual resources from some viewpoints. As discussed in Section 3.9 Visual Resources, the primary mitigation measure proposed is to paint the turbines and blades a flat grey color to decrease visibility.
Visual Resources	Construction • Large earth-moving equipment, trucks, cranes, and other heavy equipment would be visible from some nearby areas. • At times, small, localized clouds of dust created by road building and other grading activities may be visible at the site. • In close-up views, the construction activities would be highly visible and would have a moderate to high visual impact. From more distant locations, the visual effects of construction would be relatively minor and would have little or no impact on the quality of views. • Construction impacts would be short-term, lasting no more than the one-year construction period. Operation • The turbines would be visible from some viewpoints, including some within the CRGNSA. The Project has the potential to create low to moderate levels of visual impact at key viewpoints. • The Project would be required to comply with Federal Aviation Administration's (FAA) aircraft safety lighting requirements for structures greater than 200 feet tall, which includes turbines and meteorological towers. The exact number of turbines that would require lighting would be specified by the FAA after it has reviewed final Project plans. These lights would be visible as	The alternative site at West Pit Road would be more visible to local traffic but would not cause a substantial visual impact.	The existing visual landscape would continue, including openings in tree cover from clear cutting and agricultural operations	Construction • No mitigation measures are proposed during construction. Operation • The turbines would be painted a non-reflective flat neutral grey or light color to minimize visual impacts. • Lights typically used to meet Federal Aviation Administration requirements would to some extent be shielded from ground level view due to a constrained (3–5 degree) vertical beam. The Federal Aviation Administration would independently review the lighting of individual turbines during the micrositing process and consult on mitigation. However, the Project must comply with the safety lighting requirement.

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
	small blinking points of red light; they would not light up the sky or the surrounding landscape.			
Historic and Cultural Resources	Construction • Potential impact to the remnants of the Haran Farmstead through ground disturbance during construction of the new Project road and turbine and transformer pads along Turbine String D. The degree of impact would depend on the final location of the road and turbines. This site has been recommended as ineligible for nomination to the National Register of Historic Places (NRHP). • Potential impacts to other, currently undiscovered cultural or historic resources. Based on the extensive inventories conducted, the likelihood of encountering additional sites is low. • Potential impact to Yakama Indian Nation Traditional Cultural Property (TCP) within the Applicant's Area of Proposed Effect (APE) from the proposed Project. Operation • Ongoing maintenance of the road along Turbine String D has the potential to cause additional impact to the Haran Farmstead site or other, currently undiscovered resources.	No historic or cultural resources are anticipated at the alternative site at West Pit Road.	The current potential for disturbance to undiscovered cultural resources from logging operations would continue.	Construction • ~~The primary mitigation method for construction impacts to the Haran Farmstead site would be to locate the new road for Turbine String D and the turbine and transformer pads a sufficient distance from the Haran Farmstead site so that impacts would not occur. However, if the Haran Farmstead is confirmed as ineligible for nomination to the NRHP, no mitigation would be required.~~ • Appropriate BMPs would be used to minimize impacts. These BMPs include preparation and use of an Inadvertent Discovery Plan, which would establish procedures to deal with unanticipated discovery of cultural resources before and during construction. The plan, among other provisions, would require immediate work stoppage and appropriate notification in the event of discovery of previously unknown cultural or historic materials. • The Yakama Indian Nation has requested the Applicant avoid placing turbines on TCP, or create buffered zones to protect relevant features. Operation • Design and location of the road, turbine and transformer locations to avoid and minimize impacts during construction would also avoid and minimize impacts resulting from regular maintenance operations. No additional mitigation would be required.
Transportation	Construction • Improvements to County and private roads between SR 14 and the Project Area would be necessary to support the long and heavy loads that would be required for the delivery of the wind energy components. The specific improvements required would depend primarily upon truck size, load size, and axle loading. • New roadway construction would be required for access to all proposed wind tower locations. In addition to approximately 7.9 miles of existing private logging roads that would require improvement, approximately 2.4 miles of new private gravel access roads would need to be built. • Temporary construction equipment such as cranes and derricks that would be used for the construction of the proposed towers could pose a hazard to aviation safety during the construction period. A "Determination of No Hazard to Air Navigation" would need to be obtained for the proposed Project Area. • Project construction would last approximately one year. During that time, there would be an increase in traffic activity in and around the Project Area due to the construction workforce, equipment deliveries, and empty trucks returning to SR 14.	Construction impacts would be the same as for the construction and operation of the Operations and Maintenance facility located within the Project Area. During operation, the alternative site at West Pit Road would have shorter travel times for Project staff.	Current transportation patterns would continue, including the current levels of service and the use of the Project Area roads for commercial timber harvest.	Construction • A TMP that would direct and obligate the contractor to implement procedures to minimize traffic impacts would be prepared in consultation with both WSDOT and Skamania County and submitted to EFSEC for approval. The TMP would include requirements for coordination of Project-related construction traffic and WSDOT planned construction projects, along with requirements for coordination of Project-related construction traffic and Skamania County, City of Bingen, and City of White Salmon summer recreational traffic. • The Applicant and its contractors would be required to comply with State and County permitting requirements for over-size and over-weight vehicles. • The Applicant would be required to notify land owners in the Project vicinity prior to construction of transportation routes that would be used for construction equipment and labor. • Approved State and/or County advanced warning construction signs would be placed prior to and during construction. • Certified flaggers would be used when necessary to direct traffic when over-size and over-weight trucks either enter or exit public roads, to minimize risk of accidents.

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
	Traffic delays could occur on Project Area roads due to the maneuvering of large vehicles carrying heavy and/or long loads. • It is expected though that at the peak of construction (a period of three to five months) during the AM peak hour, approximately 210 construction vehicles would travel through either junction of SR 14 and Cook-Underwood Road. During the PM peak hour, as many as 10 construction vehicles could travel through this junction. • During the same construction peak, an increase of as many of 275 vehicles total would be southbound on Cook-Underwood Road from the Project Area during the PM peak hour. The actual proportion of vehicles using each of these junctions is not known at this time, consequently the estimated traffic volumes are based on a worst case scenario, where all construction vehicles related to Project construction would travel through either the east or the west junction Cook-Underwood Road with SR 14. • Estimated 2011 traffic volumes, including construction vehicles, would have minimal impact on the Level of Service (LOS) at either junction of SR 14, which would maintain LOS A. For vehicles turning left or right from Cook-Underwood Road at either the west or the east junctions of Cook-Underwood Road with SR 14, delays would increase up to approximately six seconds per vehicle over estimated 2011 conditions. • The southbound approaches on Cook-Underwood Road at both the west and east junctions with SR 14 would experience degradation in LOS from A to B during the AM peak hour over estimated 2011 operations. • LOS B operations would be maintained at both the west and east junctions of Cook-Underwood Road with SR 14 during the PM peak hour with no change in LOS over year 2011. • Potential moderate impacts to travel safety could occur due to the turning movements of over-size and over-weight trucks onto and off of Cook-Underwood Road during the peak construction period of approximately three to five months. • Construction impacts to river transportation would be minimal to low. Operation • Operation of the Project would produce minimal impacts to transportation.			• Pilot cars would be used both in front of and behind all trucks transporting over-size or over-weight loads on all public roadways. • Traffic flow would not be restricted for more than 20 minutes during the construction phase. • All loads over 10 feet wide traveling on SR 14 from east of the proposed Project Area between MP 76.77 and 76.91 would require three pilot cars, two in front and one in the rear. The two front pilot cars would be required to maintain a minimum 500-foot separation. The lead pilot car in front of the load would warn oncoming traffic of the over-size load, and the pilot car immediately in front of the over-size load would be responsible for stopping all oncoming traffic. Construction of Access Roads • All sections of the access roadway system that would require improvements or new construction would be designed and built according to WSDOT and Washington State access management standards. Hazardous Materials Transport • Transport of hazardous materials would be conducted in a manner that would protect both human health and the environment and would be in accordance with applicable State, Federal and WSDOT requirements. Roadway Maintenance [During Construction] • Pre- and post-haul construction visual assessments of roadway surface conditions would be conducted identifying weak or deteriorated areas along the haul route that may require mitigation. • Following the end of construction, a mitigation design program would be developed as needed to repair all pavement sections to pre-construction conditions or better. • The Applicant would be responsible for maintaining turbine string access roads, access ways, and other roads built on site to construct and operate the proposed Project. Operation • All snow removal would be performed in a safe manner that would not degrade roadway conditions.
Public Services and Utilities	Construction • The use of construction workers from outside the immediate area could result in a minor and temporary increase in the demand for public services including police departments, providers of emergency medical services, and local fire departments.	The West Pit Road site would have a shorter response times for emergency services since the facility would be along a county road.	The current pattern of use of public services and utilities would continue.	Construction • The Applicant would provide applicable emergency response information to local agencies prior to Project construction and would review and update employee contact information annually and provide any changes to the appropriate agencies. • A full time security plan would be implemented during Project

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
	• The impact of Project construction on local schools would be at most minor and temporary, as few out-of-area construction workers are likely to be accompanied by families for this temporary construction project. • Construction-related impacts to local utilities providing telephone, electric or solid waste pickup are also expected to be minor and temporary. Most workers would not be in the area for long enough to obtain these services; those who stayed in temporary housing in the area would not remain for more than a few months. • The presence of construction vehicles on area roads would not impact the response times for emergency providers. Construction trucks would represent additional volume on area roads, but transportation LOS would remain at LOS A or B (delays of less than 15 seconds), and thus would not cause substantial delays to emergency response vehicles. Operation • Operation of the Project would create a potential positive impact to public services and utilities. The Project's assessed value could be as much as $87.5 million, and this would generate approximately $800,000 per year in tax distributions to municipal, county and other local jurisdictions. Although impacts are expected to be minimal, a portion of these funds could nevertheless be used to upgrade existing public services and utilities in Klickitat County. • The Project would have eight to nine on-site employees during operation. Given this small number, and considering the use of on-site services and emergency response plans, the Project is expected to have minimal adverse impact on local public services and utilities.			construction to reduce the potential need for increased police services to the Project Area. Provisions could include temporary fencing with a locked gate around the construction site; the use of site trailers for the temporary storage of special equipment or materials; and the use of outdoor lighting and motion-sensor lighting. • Emergency plans would be prepared to protect the public health, safety, and environment on and off the Project Area in the case of a major natural disaster or industrial accident relating to or affecting the Project. • The construction specifications would require that the contractors prepare and implement a Construction Health and Safety Program that included an emergency plan. The Construction Health and Safety Program would include the following provisions: - Construction Injury and Illness Prevention Plan, - Construction Written Safety Program, - Construction Personnel Protective Devices, - Construction Onsite Fire Suppression Prevention, - Construction Offsite Fire Suppression Support. • In the event that operations personnel were to be seriously injured and require evacuation from the Project Area, the Applicant would make arrangements with Skamania County Emergency Medical Service or Skyline Ambulance for transport. Operation • Tax revenues generated by the Project would mitigate potential impacts to public services and utilities. • The Applicant would provide all local police, fire, and emergency medical agencies with emergency response information for the Project including employee contact information, procedures for rescue operations to the nacelles, and location of rescue basket. Fire protection • The construction manager would be responsible for staying abreast of fire conditions in the Project Area by contacting DNR and implementing any necessary fire precautions. • A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented, in coordination with the Skamania County Fire Marshall and appropriate agencies. • Both the wind turbine generators and the substation would be equipped with lightning protection systems. • All onsite operations employees would be responsible for contributing to ongoing fire prevention in the Project Area through the following programs: - Operational Safety Program, - Operations Written Safety Program, - Emergency Action Plan,

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
				- Fire Prevention Plan. In addition, the Applicant would: • Provide detailed maps that show all access roads to the Project. • Provide keys to a master lock system that would enable emergency personnel to unlock gates that would otherwise limit access to the Project. • Use spark arresters on all power equipment, e.g., cutting torches and cutting tools • Inform workers in the Project Area of emergency contact phone numbers and train them in emergency response procedures • Carry fire extinguishers in all maintenance vehicles • Coordinate with DNR when the fire danger is high • Comply with equipment rules and regulations required by DNR for work conducted in wildland/forested lands Construction and Operation During both construction and operation, fire risk would be mitigated through BMPs including: • All on-site service vehicles fitted with fire extinguishers. • Fire station boxes with shovels, water tank sprayers, etc. installed at multiple locations on site along roadways during summer fire season. • Minimum of one water truck with sprayers must be present on each turbine string road with construction activities during fire season. • No gas powered vehicles allowed outside of graveled areas. • Use of high clearance vehicles on site if used off-road. • Smoking restricted to designated areas (outdoor gravel covered areas). • ~~Only~~ Blasting would be conducted by state licensed explosive specialist contractors ~~are allowed to perform this work~~ – explosives require special detonation equipment with safety lockouts. • Clear vegetation from the general footprint area surrounding the excavation zone to be blasted. • Standby water spray trucks and fire suppression equipment to be present during blasting activities. • All major construction equipment used is to be diesel powered (i.e. w/o catalytic converters). • Specially engineered lightning protection and grounding systems used at wind turbines and at substation. • Footprint areas around turbines and substation would be graveled with no vegetation. • Generators not allowed to operate on open grass areas. • All portable generators to be fitted with spark arrestors on exhaust system. • Immediate surrounding area would be wetted with water sprayer. • Fire suppression equipment to be present at location of welder/torch

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
				activity. • Electrical designs and construction specifications meet or exceed requirements of the National Electric Code and National Fire Protection Agency.
Socioeconomics	Construction • During the one-year construction period approximately 330 full-time and part-time workers would be employed at some point during construction. Some of these jobs would not last the entire construction period. The on-site construction work force would peak at approximately 265 workers over the construction period and average 143 workers over the 12 months. An estimated 65 to 75 percent of the construction labor force would likely be hired from outside the three-county area, and 25 to 35 percent would be residents of the area. • Indirect and induced value added from construction is estimated to be approximately $3.9 million. Also, Project construction would result in 71 indirect and induced jobs. • The local area contains sufficient temporary housing for out-of-area construction labor, and the Project is not expected to impact housing values, rents or new home starts. • Fiscal impacts are expected to be positive, with a total $150 M in construction expenditures, of which approximately $13.2 M would be spent in the local area. Most sales tax revenue would go to Skamania County. • Construction is not expected to impact property values or property tax revenues. Operation • Economic impacts would be positive due to increased tax revenues, employment and local expenditures. • Sales, use and other indirect business taxes to state and local governments attributable to Project operation are estimated at approximately $50,000 per year. • The proposed Project would have an estimated value of $87.5 million, which would represent an increase of 6.5 percent in assessed value in the County. At current tax rates, the increase in property tax revenue to the County would be $731,500 annually. • The Project would employ eight to nine employees; most would be hired from the local area. This work force would not impact local housing supply or prices. • Based on a review of available studies, operation of the Project is not expected to create adverse impact to property values.	Impact would be the same as for the construction and operation of the Operations and Maintenance facility located within the Project Area.	Current patterns of employment and housing would continue, including the reliance on the agricultural and timber economy for employment	Construction ~~• Socioeconomic impacts are expected to be beneficial, in the form of additional jobs, increased sales, and increased tax revenues.~~ • Construction contractors would be required to advertise positions locally and to employ local workers to the greatest extent possible. Operation • No mitigation measures would be required.

1.7 SUMMARY OF UNAVOIDABLE ADVERSE IMPACTS

Table 1-3 summarizes the potential unavoidable adverse impacts remaining after application of mitigation measures.

Table 1-2
Summary of Unavoidable Adverse Impacts

Element of the Environment	Unavoidable Adverse Impacts
Earth	The primary unavoidable impacts are the potential for landslide and erosion. Both can be mitigated through appropriate design and the application of mitigation measures.
Air Quality	The proposed Project would produce minor impacts to air quality, similar to existing logging operations. By producing electricity without generating air emissions, the Project would contribute to a beneficial impact on overall air quality.
Water	Construction and operation of the Project would only result in negligible to minor impacts to water resources because the impacts are localized and the disturbance is short-term.
Biological Resources	The Project would result in the permanent loss of approximately 60.7 ~~56~~ acres of habitat which would be converted to new Project roads, turbines and pads, substation and Operations and Maintenance facility. These impacts, while unavoidable, would take place in a landscape of managed timber lands which has for many years and will continue to be a fragmented environment with ongoing disturbance. During construction, direct mortality to birds could occur through nest disturbance. The Project would result in some ongoing mortality to birds and bats through turbine collisions. This level is not expected to be high enough to impact species viability. The Project is unlikely to cause mortality to any threatened or endangered species.
Energy and Natural Resources	The Project would have minor unavoidable adverse impacts to energy or natural resources. The overall impact of the Project to energy and natural resources would likely be positive, since it would provide the region with low-cost, clean, renewable energy, in accordance with state and national policies and priorities.
Public Health and Safety	Unavoidable adverse impacts to ~~environmental~~ public health and safety are anticipated to be minimal. Unlike thermal power plants, wind power projects pose a much smaller risk of explosion or fire potential, as there is no need to transport, store, or combust fuel to generate power. The risk of unintentional or accidental fire or explosion or discharge to the environment during both construction and operations would be minimal. The risk of accidents during construction would be no higher than for any large construction project and would be minimized through standard construction safety requirements and procedures. The risk of accidents during operation would be minimal.

Element of the Environment	Unavoidable Adverse Impacts
Noise	Construction noise is exempt so long as it occurs during daytime hours, and operation noise is predicted to be less than the nighttime threshold of 50 dBA L_{eq} per Washington State and Skamania County regulations. The analysis of noise impacts was based on specific design features of the proposed Project that were current as of the date of this EIS. These features, such as the turbine manufacturer and model selection, the layout of the turbines in the Project Area and their corresponding distances to identified closest noise-sensitive receivers, can greatly influence the analysis results. However, assuming that final turbine selections and siting locations are comparable to those features used in this analysis, no substantial adverse construction or operation noise impacts are anticipated for the Project.
Land Use	The proposed Project would not produce substantial impacts on land use or recreation. The 1,152-acre Project Area would continue to be predominantly used for commercial forestry operations. A maximum of approximately 56 acres of forestry land (under 5 percent of the Project Area) would be converted to energy facility use for the life of the Project. This conversion would not constitute a substantial change to area land use patterns given the area of the Project retained for active forestry operations, and given the acreage surrounding the Project in both private and state ownership that would be maintained in commercial forestry operations.
Visual Resources	The Project would cause some visual impact to surrounding areas where turbines were visible, including some areas inside the Columbia River Gorge National Scenic Area. The visual impact analysis showed that the anticipated level of visual impact would not be higher than low to moderate at any of the viewpoints examined.
Historic and Cultural Resources	With the use of appropriate mitigation measures, the proposed Project is not expected to produce any unavoidable impacts to historic or cultural resources.
Transportation	During construction there would be an increase in traffic in and around the Project Area due to the construction workforce, equipment deliveries, and empty trucks returning to SR 14. Traffic delays could occur on Project Area roads due to the maneuvering of large vehicles carrying heavy and/or long loads. ~~No major unavoidable adverse impacts to traffic and transportation have been identified. Construction of the Project is anticipated to have very minor impacts to LOS standards, and to have a potential very minor impact on traffic safety.~~ Operation of the Project is anticipated to have little to no impact to transportation.
Public Services and Utilities	The Project would have no unavoidable adverse impacts to public services and utilities. The small amount of additional services and utilities that would be needed would be offset by the increased tax revenue.
Socioeconomics	The proposed Project would result in beneficial impacts, primarily from employment during construction and operation. Minimal adverse impacts are expected.

1.8 CUMULATIVE IMPACTS

Cumulative impacts are the incremental impacts of a proposal when considered in the context of other past, present and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time. This section summarizes the information contained in Section 3.14.

1.8.1 PROJECTS CONSIDERED

1.8.1.1 Existing Development

The general Project vicinity is characterized by agriculture, commercial forestry, rural residential development, and a small number of commercial enterprises. The proposed Project Area is located in the state of Washington approximately two miles north of the Columbia River and directly north of the Columbia River Gorge National Scenic Area. The National Scenic Area extends along the Columbia River for about 85 miles and includes 292,500 acres in parts of three Oregon and three Washington counties. Although both the Project Area and the proposed access road are located completely outside the National Scenic Area, the proposed Project Area does extend south to its northern boundary. The Gifford Pinchot National Forest is located north of the Project Area.

On both the Washington and Oregon sides of the Columbia River, land use is predominantly commercial forestry and residential in numerous small, unincorporated communities. There is some limited agriculture located within the National Scenic Area. South of the Scenic Area, on the Oregon side, land uses include commercial forestry, agriculture, and some residential.

Portions of the Whistling Ridge Energy Project would be visible to drivers along I-84, located on the Oregon side of the Columbia River. For the purpose of assessing cumulative impacts to visual resources, views of other wind projects from I-84 were considered. From Cascade Locks, Oregon (located southwest of the Project Area on the Oregon side of the Columbia River) to the intersection with I-82 which leads north to the Tri-Cities, I-84 extends for a distance of approximately ~~127~~ 130 miles. Along this segment, there are 18 existing wind power generation projects, all located within a distance of approximately 70 miles east of the Whistling Ridge Energy Project site (to approximately Arlington, Oregon).[1] Eighteen projects could potentially be viewed by drivers travelling along I-84 within a driving time of approximately one to one-and one-half hours and were included in the analysis of cumulative impacts to visual resources described in Section 3.14.

1.8.1.2 Reasonably Foreseeable Future Development

Reasonably foreseeable future development generally includes those actions currently underway, formally proposed or planned, or highly likely to occur based on available information. Reasonably foreseeable future development projects located within approximately 20 miles of the Project Area were identified to determine if they could potentially have cumulative impacts on the environment, including water quality, soil erosion, vegetation, terrestrial wildlife species, and bird and bat species. Projects were identified through searches of the web sites of Skamania, Klickitat and Hood River Counties, Columbia River Gorge Commission, Washington State

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[1] See map at http://www.nwcouncil.org/maps/power/Default.asp.

Department of Transportation (WSDOT), Oregon Department of Transportation, EFSEC, the Oregon Department of Energy, and the Ports of Skamania County, Klickitat County, The Dalles, and Cascade Locks.

Both non-wind and wind reasonably foreseeable future projects were initially considered for inclusion in the cumulative impact analysis. Non-wind projects involved transportation improvements, communications facilities, and power line improvements. Of these projects, only the Oregon Department of Transportation bridge replacement projects, now in progress along I-84, were considered close enough to the Project Area to be included in the cumulative impact analysis. The other transportation, communication, and power line improvement projects were considered to be too far from the Whistling Ridge Project Area to result in cumulative impacts and were therefore eliminated from further analysis. Reasonably foreseeable wind projects are shown in Figure 3.14-1. Of these projects all except the Middle Mountain Project were judged to be too far away (generally more than 20 miles) from the Whistling Ridge Energy Project site to result in cumulative impacts. Nonetheless, the cumulative visual resource impact analysis does consider reasonably foreseeable wind projects within approximately the same geographic area as existing wind projects considered in that analysis. In addition, the cumulative impact analysis has been updated to reflect the discontinuation of the Middle Mountain Project. The Middle Mountain Project, originally proposed by Hood River County as a small community scale wind project of around 10 MW, would have been located on the south side of the Columbia River, approximately 17 miles south of the Whistling Ridge Energy Project. However, on May 17, 2010, the Hood River County Commission decided to discontinue efforts to develop the Middle Mountain wind project and this project therefore has been removed from the cumulative impact analysis. Therefore, the only reasonably foreseeable development projects included in the cumulative impact analysis are the Oregon Department of Transportation bridge replacement projects along I-84.

~~The remaining six projects included transportation improvements, communications facilities, and power line improvements. Of these, only the Oregon Department of Transportation bridge replacements now in progress along I-84 were considered close enough to the project area to be included in the cumulative impact analysis. The other five transportation, communication, and power line improvement projects were considered to be too far from the Whistling Ridge project site to result in cumulative impacts.~~

~~Thus, the Middle Mountain Wind Project and the I-84 Bridge Replacement Project are the only two reasonably foreseeable future projects with a potential for cumulative impacts with the Whistling Ridge Energy Project. These two projects were analyzed in addition to the visual impacts of the ten existing wind projects.~~

1.8.2 RESULTS OF CUMULATIVE IMPACTS ANALYSIS

The cumulative effects of the Proposed Action, in combination with other the past, present, and reasonably foreseeable future actions (identified above) ~~would have on the various environmental resources~~ are discussed in Section 3.14 of this EIS. Cumulative impacts from the combination of these actions could occur for each of the environmental resources. However, the contribution of the Proposed Action to these cumulative impacts would vary, with the greatest contribution occurring in cumulative impacts on visual resources as constructing and operating the Whistling Ridge Energy Project would add a view of an additional wind power project to travelers in the Gorge. In addition to the existing and reasonably foreseeable future projects east of the Project Area, long-distance travelers in either direction along I-84 could see some elements of the Whistling Ridge Project, for approximately 12.5 miles traveling west and 6.5 miles traveling east. Travelers along SR 14 would not see the Proposed Action, which would be blocked by the bluff to the north of the road. As discussed in more depth below in Section 3.14.3.10, the visual impact of the Whistling Ridge Project along I-84 would be variable, with the number of turbine strings visible changing with topography. In many places only a few turbines would be visible, and the area where the most turbines would be visible (directly across the Columbia River from White Salmon and Bingen) would also be the area where the viewer would be the farthest from the Project Area (See Figure 3.9-1). This would constitute a small cumulative impact when considered in combination with views of other wind projects located from 35 to 70 miles to the east.

The proposed action would contribute incrementally, though in a minor way, on cumulative impacts to soil erosion and water quality in the Project Area, as well as to vegetation, terrestrial wildlife species, and bird and bat species in the region. Low levels of adverse cumulative impacts have also been identified for energy and natural resources from the use of steel, concrete and vehicle fuel for construction, and for transportation (traffic safety and increased risk of accidents during construction periods of the Whistling Ridge Energy Project and the I-84 bridge replacement projects, if they should overlap). Simultaneous construction projects may create a beneficial cumulative socioeconomic impact to local communities. Finally, by introducing up to 75 MW of clean renewable energy into the regional electrical grid, the Project would positively contribute to efforts to combat the cumulative impacts of climate change, and also contribute to efforts to improve air quality in the Columbia River Gorge vicinity.

1.9 ORGANIZATION OF THIS EIS

Much of the organization of this document is based on the SEPA EIS format and content specified in WAC 197-11-430 and 197-11-440, with adjustments made to ensure NEPA compliance as well. The remainder of this EIS is organized as follows:

- **Chapter 2, Proposed Action and Alternatives.** Chapter 2 describes the Proposed Action and alternatives, including the No Action Alternative and alternatives to elements of the proposed Project t evaluated in the EIS.

- **Chapter 3, Affected Environment, Impacts, and Mitigation.** Chapter 3 describes the existing environment without construction and operation of the Whistling Ridge Energy Project for each environmental resource. The chapter also includes analyses of the environmental effects of constructing and operating the Whistling Ridge Energy Project and determines whether there is the potential for environmental impacts to occur for each environmental resource. If impacts could occur, they are evaluated to determine if they could be avoided. Mitigation measures to lessen or eliminate impacts also are listed as well as a section describing cumulative impacts for each environmental resource.

- **Chapter 4, Environmental Consultation, Review and Permitting Requirements.** This chapter describes the permits and approvals that must be obtained for the construction and operation of the Whistling Ridge Energy Project.
- **Chapter 5, Distribution List.** This chapter lists individuals and organizations that have received a copy of the Draft EIS.
- **Chapter 6, List of Preparers.** This chapter lists the individuals who contributed to the preparation of this EIS. It also includes their organization affiliation and a brief description of their professional backgrounds.
- **Chapter 7, Index.** This chapter contains an index for the EIS
- **Appendices.** The appendices provide supporting technical information to the EIS.
  - Appendix A: Application for Site Certification, as amended October 12, 2009;
  - Appendix B: Geotechnical Report;
  - Appendix C: Wildlife Reports;
  - Appendix D: Land Use Consistency Determination;
  - Appendix E: Agency Consultations
  - Appendix F: Consultant Disclosure Statements
  - Appendix G: Response to Comments
  - Appendix H: Comment Letters

1.10 REFERENCES

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2.0 PROPOSED ACTION AND ALTERNATIVES

This chapter describes the Proposed Action, the No Action Alternative, and alternatives that were considered but eliminated from detailed study. This chapter also discusses the benefits or disadvantages of reserving Project approval for a later date, and provides a summary comparison of the alternatives.

The Proposed Action involves responding to requests from the Applicant for approvals of the Whistling Ridge Energy Project. Whistling Ridge Energy LLC is a limited liability corporation operating in the State of Washington that has been formed by S.D.S. Co., LLC, which is an affiliated entity of SDS. Under the Proposed Action, the state of Washington would approve the Applicant's application for a Site Certificate for the proposed Whistling Ridge Energy Project, and BPA would grant interconnection of the proposed Project to the Federal Columbia River Transmission System (FCRTS). Under the No Action Alternative, the state of Washington would deny the Applicant's application for a Site Certificate for the proposed Project, and/or BPA would not grant interconnection of the Whistling Ridge Energy Project to the FCRTS.

2.1 PROPOSED ACTION

This section describes the wind Project that has been proposed by the Applicant. The information presented in this section is primarily based on information provided by the Applicant in the Application for Site Certification Agreement (Application 2009-01) submitted to EFSEC on March 10, 2009, and amended on October 12, 2009 (Appendix A).

2.1.1 WIND POWER IN GENERAL

Wind power is a form of renewable energy - energy that is replenished daily by the sun. As the earth is heated by the sun, air rushes to fill the low pressure areas, creating wind power. The wind is slowed dramatically by friction as it brushes the ground and vegetation, so it may not feel very windy at ground level. The kinetic power in the wind, the energy of moving air molecules, may be five times greater at the height of a 40-story building (the height of the blade tip on a utility-scale wind turbine) than the breeze on your face. Meanwhile, the wind may be accelerated by certain types of land forms, so that certain areas of the country may be very windy while other areas are relatively calm.

Wind power is converted to electricity by a wind turbine. In a typical, utility-scale wind turbine, the kinetic energy in the wind is converted to rotational motion by the rotor—typically a three-bladed assembly at the front of the wind turbine. The rotor turns a shaft that transfers the motion into the nacelle (the large housing at the top of a wind turbine tower). Inside the nacelle, the slowly rotating shaft enters a gearbox that greatly increases the rotational shaft speed. The output (high-speed) shaft is connected to a generator that converts the rotational movement into electricity at medium voltage (a few hundred volts). The electricity flows down heavy electric cables inside the tower to a transformer, which increases the voltage of the electric power to distribution-level voltage (a few thousand volts). This distribution-level voltage power flows through underground lines to a collection point where the power may be combined with other wind turbines.

In some cases, the electricity generated by these wind turbines is sent directly to nearby farms, residences and towns where it is used. In most cases, however, the distribution-level voltage power is sent to a substation where the voltage is increased to transmission-level voltage power (a few hundred thousand volts) and sent through transmission lines many miles to distant cities and factories (AWEA 2007).

2.1.2 PROJECT OVERVIEW

The proposed Whistling Ridge Energy Project would be located in south-central Washington on an approximately 1,152-acre site approximately 7 miles northwest of the City of White Salmon in Skamania County, Washington (Figure 1-1). The Project would be located on commercial forestland owned by the Applicant in an unincorporated area of Skamania County, outside of the Columbia River Gorge National Scenic Area.

The proposed Project would generate up to 75 MW of electricity. The proposed Project layout is shown in Figure 2-1. As shown in this figure, Project components would include:

- Up to 50 wind turbines ranging from 1.2 to 2.5 MW in generating capacity;
- Electrical transformers;
- 34.5-kV collector lines and systems (primarily underground);
- A Project collector substation located adjacent to BPA's proposed substation and ~~to BPA's~~ existing North Bonneville-Midway 230-kV transmission line;
- An interconnection with BPA's existing North Bonneville-Midway 230-kV transmission line;
- One Operations and Maintenance facility (to be located at one of two locations, either adjacent to the substation within the Project boundary, or along West Pit Road);
- One permanent meteorological tower; and
- Approximately 2.4 miles of newly-constructed roads and 7.9 miles of improved roads to provide access to the wind turbine locations during construction and for operations and maintenance.

As shown in Figure 2-1, the proposed wind turbines generally would be located on the forested ridges of Saddleback Mountain. The final specific locations of the wind turbines and other related and supporting facilities would be established during the final design process, taking into account micro-siting aspects determined as a result of detailed geotechnical investigations and the EFSEC Site Certification process. As shown in Table 2-1, approximately 384 acres would be developed for the wind turbine foundations, connecting roadways, and overhead and underground transmission lines.

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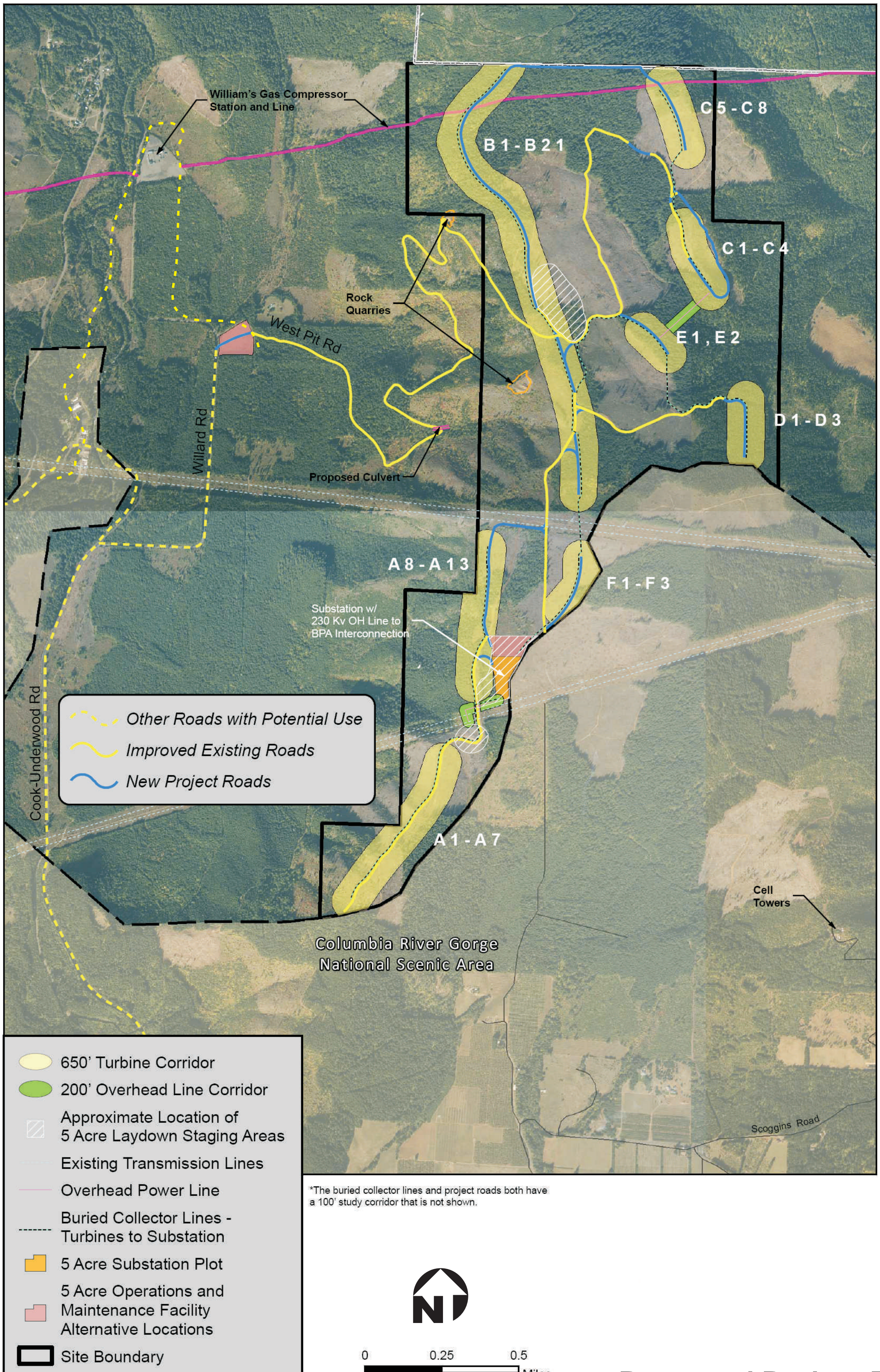


Figure 2-1
Proposed Project Elements

Source: GeoDataScape.

URS

Whistling Ridge Energy Project
Skamania County, Washington

Table 2-1
Area of Development (acres)

Project Element	Area Proposed for EFSEC Certification and Micrositing	Impacts		
		Permanent	Temporary	Total
Project Area[a]	1,152			
Area to be Developed				
Wind Facility Footprint[b]	384	NA	NA	NA
Turbine String Corridor[c]	318	25.4	36.4	61.8
Roadway Corridor within Project Area[d]	48.4	15.2	13.3	28.5
Overhead Transmission Line Corridor within Project Area[e]	6.9	3.45	0	3.45
Underground Transmission Line Corridor within Project Area[e]	8.9	0.0	2.4	2.4
Operation and Maintenance Yard & Storage Area[f]	5.0	5.0	0.0	5.0
Substation Plot & Study Area[g]	7.1	7.1	0.0	7.1
Total Area to be Developed Within Project Area	NA	56.15	52.1	108.25
Impact Area Outside of Project Area				
Roadway Corridor Outside Project Area[h] (based on 2.5 miles of improved road)	0	5.22	1.74	6.96

[a] Project Area is the area shown on Figure 2-1 bordered in black, encompassing approximately 1,152 acres in Sections 5, 6, 7, 8, and 18 of Township 3 North, Range 10 East, and in Section 13 of Township 3 North, Range 9 East.
[b] Wind Facility footprint is the total area of all corridors and development study areas in the Project boundary with overlapping areas removed, in which development potentially could take place.
[c] Total area of 650-foot corridor measured on either side of an imaginary line connecting each turbine in a string. Permanent impacts based on turbine clearance zone and permanent infrastructure in corridor but outside of clearance zone. Temporary impacts based on infrastructure in corridor but outside clearance zone.
[d] Area encompassed by a 100-foot corridor along all roads within the Project Area minus any area that overlaps with 650-foot-wide turbine corridor, based on a roadway length of 7.8 miles.
[e] Total area encompassed by a 100-foot corridor on the overhead or underground transmission lines minus any area that overlaps with roadway, overhead or turbine string corridors.
[f] Area includes the 2-acre Operations and Maintenance site plus a 50-foot area around the perimeter.
[g] Area includes the 5-acre substation site plus a 50-foot area around the perimeter.
[h] Area based on 40-foot corridor (20-foot roadway: 12-foot existing, widened to 20 feet with 10 feet on either side) from Project Area boundary to an intersect point with Willard Road, based on a length of 2.5 miles.

County and private logging roads that extend north from SR 14 provide vehicle access to the Project Area. From SR 14, access would be provided via County roads (Cook-Underwood Road to Willard Road) and then via a new connection to West Pit Road, an existing private logging road. West Pit Road connects to a network of existing private logging roads (Figure 2-1). The private logging roads are on S.D.S. Co., LLC and Broughton Lumber Company property, and provide access to most areas where Project facilities would be located.

The construction phase is anticipated to last approximately one year, during which a total of approximately 330 workers would be employed. Eight to nine permanent full- or part-time Operations and Maintenance staff would be required should the Project become operational. The Whistling Ridge Energy Project is expected to function for at least 30 years.

2.1.3 PROJECT COMPONENTS

2.1.3.1 Wind Turbines

The Project would consist of up to 50 wind turbines generators that likely would range in size from 1.2- to 2.5-MW each. Each wind turbine would consist of four main aboveground components: the turbine tower, the nacelle, the rotor hub, and the blades. Depending on which manufacturer is selected, each turbine would be approximately 221 to 262 feet tall at the turbine hub, and with the nacelle and blades mounted, the total height of each wind turbine (to the turbine blade tip) would be up to approximately 426 feet. The turbines throughout the Project would all be the same model, although height may vary in response to terrain. The towers would be tapered, hollow tubular structures, approximately 14 feet in diameter at the base and weighing approximately 30 tons each. The towers would likely be painted a flat neutral gray or white color. A controller cabinet would be located at the base inside each tower. Cables and a ladder would ascend to the nacelle to provide access for turbine maintenance. A locked door would provide access to the base of the tower.

Each tower would be mounted on a concrete foundation with a diameter up to approximately 60 feet. Tower foundations would be spread footing or pier-type footings. Some of the towers would be furnished with blinking lights visible to aircraft. The need for turbine lights and the type of lighting would be determined in consultation with the Federal Aviation Administration.

The remaining three turbine components are all mounted at the top of each turbine tower. The nacelle of each wind turbine is encased in fiberglass, and is mounted at the top of the tower to house the gearbox, the generator, and the control system. The rotor hub is attached to the nacelle, and holds the blades in place. Each turbine has three laminated fiberglass blades, each approximately 129 to 164 feet long, depending on which turbine is selected. The diameter of the circle swept by the rotors would be approximately 264 to 320 feet, depending on which turbine is selected. Together, ~~each turbine's~~ the blades, hub, and nacelle of each turbine would weigh between 95 and 150 tons, depending on the turbine size and model selected.

Wind turbines would be grouped in "strings," each spaced approximately 350 to 800 feet from the next (or approximately 1.5 to 2.5 times the diameter of the turbine rotor). The electrical output of each string would be connected to the Project substation by underground 34.5-kV collector cables, and from there would be directly interconnected with the adjacent BPA transmission system. The Project would be monitored and controlled from an Operations and Maintenance building located at one of two alternative sites, either next to the substation or adjacent to West Pit Road.

The wind turbines would operate at wind speeds from 9 to 56 mph, with a rotor speed range of 10 to 20 rpm. The turbines operate on a variable pitch principal in which the rotor blades rotate to keep them at the optimum angle to maximize output for all wind speeds. At speeds exceeding 56 mph, the blades feather on their axis and the rotor stops turning. Each turbine is equipped with a wind vane that signals wind direction changes to the turbine's electronic controller. The electronic controller operates electric motors (the yaw mechanism), which turn the nacelle and rotor so that each turbine faces into the wind.

2.1.3.2 Electrical Collector System

The Project would include an electrical collector system to collect energy generated at approximately 575 V from each wind turbine, transform the voltage of this energy to 34.5-kV using a pad-mounted transformer, and deliver the energy via underground cables to the proposed Project substation (Figure 2-1).

Each turbine's 575 V to 34.5-kV transformer would be located on a transformer pad adjacent to each tower, or enclosed in the nacelle, depending on the turbine model. From there, power would be transmitted via underground 34.5-kV electric cables. These cables would be buried by digging trenches up to 5 feet wide and approximately 3 to 4 feet deep, placing the cables in these trenches, and then filling the trenches back in with the excavated soils. In areas where collector cables from several strings of turbines follow the same alignment (for example, near the proposed substation) multiple sets of cables would be installed within each trench where possible.

There would be approximately 8.5 miles of underground collector cable trenches. In areas where environmental constraints, geologic features, or cultural features necessitate, minor aboveground placement of collector cables may occur.

2.1.3.3 Project Substation and Interconnection

The Project would also include a collector substation to connect the proposed Project to the FCRTS. This substation would further transform the energy delivered by the Project's underground electrical collector system from 34.5-kV to 230-kV so that it would be suitable for delivery to the FCRTS at the proposed BPA substation. The proposed electrical interconnection to the FCRTS would provide the Applicant with access to the wholesale electric market for sales of power from the proposed Project.

The proposed collector substation would occupy a portion of a fenced 5-acre area at the northwest end of the Project Area, immediately adjacent to BPA's North Bonneville-Midway transmission line (Figure 2-1). A 50-foot cleared area would be maintained around the substation. The substation site would be a graveled, fenced area that would include the voltage transformers, switching equipment, and other electrical equipment, as well as an area to park utility vehicles. Transformers at the substation would be non-polychlorinated biphenyl oil-filled types.

The physical interconnection of the proposed Project to the FCRTS would consist of overhead lines located between the Project collector substation and BPA's North Bonneville-Midway 230-kV transmission line. To make this interconnection, a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation would be made. This loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line could cross underneath for this interconnection.

2.1.3.4 Operations and Maintenance Facility

A permanent Operations and Maintenance facility would be constructed on an approximately 5-acre area located at one of the following two locations: (1) adjacent to the proposed substation; or (2) west of the Project Area along West Pit Road (Figure 2-1). The entire 5-acre area would be fenced and have a locked gate.

The Operations and Maintenance facility would have approximately 3,000 square feet of enclosed space, including office and workshop areas, a kitchen, bathroom, shower, and utility sink. This structure would be constructed of sheet metal, and would be approximately 16 feet tall (to the roof peak). Water for the bathroom and kitchen would come from a new on-site well and would drain into an on-site septic system (see Section 2.1.3.6). A graveled parking area for employees, visitors, and equipment would be located adjacent to the building.

2.1.3.5 Meteorological Tower

One permanent meteorological tower would be located within the Project Area. The function of the permanent meteorological tower would be to collect wind speed and direction information at hub height as well as temperature, relative humidity and barometric pressure. These values are used to provide base data to compare the function of the individual turbine wind direction and speed sensing equipment. The data collected by the tower also serves as a historical basis for measuring wind facility actual performance vs. projected performance.

The location for the permanent meteorological tower would be determined during the micro-siting process. The selected site would be based on a meteorologist’s recommendations for an on-site location that best represents the Project Area’s meteorological conditions.

The basic design for the tower would depend on the style selected. Most towers are un-guyed lattice towers at heights equal to the hub heights of the proposed wind turbines. Depending on the wind turbine selected for the Whistling Ridge Energy Project, the wind turbine would be approximately 221 to 262 feet high at the turbine hub. The meteorological towers are fairly large at the base with either three or four corners and taper in size up to hub height. Monitoring equipment would be located at the top, with the data logger and power conversion equipment located at the base.

2.1.3.6 Water Supply and Wastewater

During construction of the proposed Project, approximately 1.7 million gallons of water would be consumed for road compaction, dust control, wetting concrete and other construction purposes. The construction contractor would supply water used during construction. Water needed for construction would be purchased by the Applicant’s construction contractor from an off-site vendor with a valid water right and transported to the site in water-tanker trucks.

The Project would not be connected to a sewer system. Sanitary wastes would be collected in “portable toilets” during construction. Disposal of sanitary wastes would be managed through a contract with a portable toilet vendor. The contractor would incorporate applicable state capacity requirements based on the construction worker population in the Project Area at any given time. Collected wastes would be managed and disposed of by the contracted vendor.

Project operations would not require the use of any water for cooling or any other use aside from the limited needs of the Operations and Maintenance facility. Potable water intake would be in the form of a well accommodating the Operations and Maintenance facility's needs. Anticipated water use at this facility is expected to be less then 5,000 gallons per day for kitchen and bathroom use. The Applicant would seek and obtain approval for the new well from EFSEC, in consultation with Skamania County Environmental Health Department and Ecology.

There would be no industrial wastewater stream from operation of the Project. Wastewater discharge would come from the Operations and Maintenance facility discharging to an on-site septic system. No wastewater would be used, discharged or recycled for wind turbine operations.

2.1.3.7 Access Roads

Access to the Project Area is provided by county and private logging roads that extend north from SR 14. From SR 14, access would be provided via County roads (Cook-Underwood Road to Willard Road) and then via a new connection to West Pit Road, an existing private dirt logging road that is located entirely outside of the National Scenic Area. Approximately 2.5 miles of roadway improvements would occur on West Pit Road, which currently varies in width between 20 and 26 feet. To create a drivable surface of 25 feet with 5 feet of clearing on each side, portions of the roadway and some corners would be widened. In addition, an existing culvert that runs along a portion of this road ~~that was upgraded during the summer of 2009. This culvert~~ may need some additional lengthening if the roadway is widened over the culvert. West Pit Road would continue to be used during the Project's operational phase.

West Pit Road connects to a network of existing private logging roads on S.D.S. Co., LLC and Broughton Lumber Company property, and provides access to most areas where Project facilities would be located (Figure 2-1). Because the Project Area already has an existing network of logging roads, relatively few new roads would need to be constructed. Approximately 7.9 miles of existing private logging roads would be improved. In areas where there are no existing logging roads near proposed wind turbine strings, approximately 2.4 miles of new gravel access roads would be constructed. All new roadway construction would occur on private lands owned by S.D.S. Co., LLC and Broughton Lumber Company.

The existing logging roads to be improved were originally built to allow large trucks and logging equipment to access the Project Area for ongoing commercial logging purposes. These roads are generally 8 to 12 feet wide, although some are currently as wide as 20 feet. Improvements to allow use by Project construction vehicles generally would involve widening and providing a gravel all-weather surface. Most of the roads used to provide access to the site by construction vehicles would be widened to approximately 25 feet (width of finished road), with an additional 5 feet of shoulder on either side.

Once assembled, the construction cranes required to erect turbines and tower sections require a 35-foot-wide road (of which 25 feet needs to be graveled). Therefore, the roads that run adjacent to turbine strings and roads that connect turbine strings to one of the central staging areas would be approximately 35 feet wide (25 feet plus 5 feet of shoulder on either side). Because cranes might be needed to maintain turbines over their operational life, the 35-foot-wide roads would be kept as maintenance access roads for the expected 30-year life of the Project.

All private roadway improvements required prior to hauling, and new private roadway construction in the proposed Project Area, would be designed and constructed under the direction of a licensed engineer, in accordance with the standards for the applicable road classifications as set forth in the Skamania County Private Road Guidelines and Development Assistance Manual (Skamania County 2008), as adopted by the County Resolution in 2008. All existing county roadways requiring improvements prior to hauling would be designed and constructed in accordance with the WSDOT *Design Manual* (WSDOT 2007) and *A Policy on Geometric Design of Highways and Streets* (AASHTO 2004). A detailed geotechnical investigation of the specific locations of all Project elements would be conducted. If this investigation indicates the potential for slope instability at turbine sites or other Project facilities, such as access roads (including improvements to West Pit Road), these facilities would be redesigned or relocated to avoid this risk.

In constructing permanent access roads, a gravel surface would be installed, compacted to meet all equipment load requirements, and maintained to reduce wind erosion and dust. Existing culverts across intermittent streams would be replaced with wider or stronger culverts as necessary, and drainage improvements would be made (pursuant to a Project Erosion Control Plan and National Pollutant Discharge Elimination System [NPDES] permit), as necessary to control runoff.

In addition to the permanent access roads described above, temporary access may be required for constructing some facilities. For example, constructing the underground collector cables would require that heavy equipment be able to access trench locations where they are not directly adjacent to roads. Generally, equipment would be driven across open ground to accomplish this construction; in some locations minor grading may be required to allow safe access to construction locations (construction locations would be determined only after final tower locations have been selected). These temporary access roads would be re-graded and reseeded as necessary to restore vegetation after the construction phase is over.

After the Project is constructed, use of the improved and new access roads on private lands would be limited to the landowner and to Project maintenance staff.

2.1.4 PROJECT CONSTRUCTION

2.1.4.1 Construction Activities

Construction of the proposed Project is expected to take approximately one year, and would likely occur from early spring through late fall. Construction of the Project would involve the following tasks:

- Harvesting trees in areas that are not already cleared;
- Constructing roads and turbine crane pads;
- Constructing foundations for turbine and meteorological towers;
- Trenching for underground utilities;

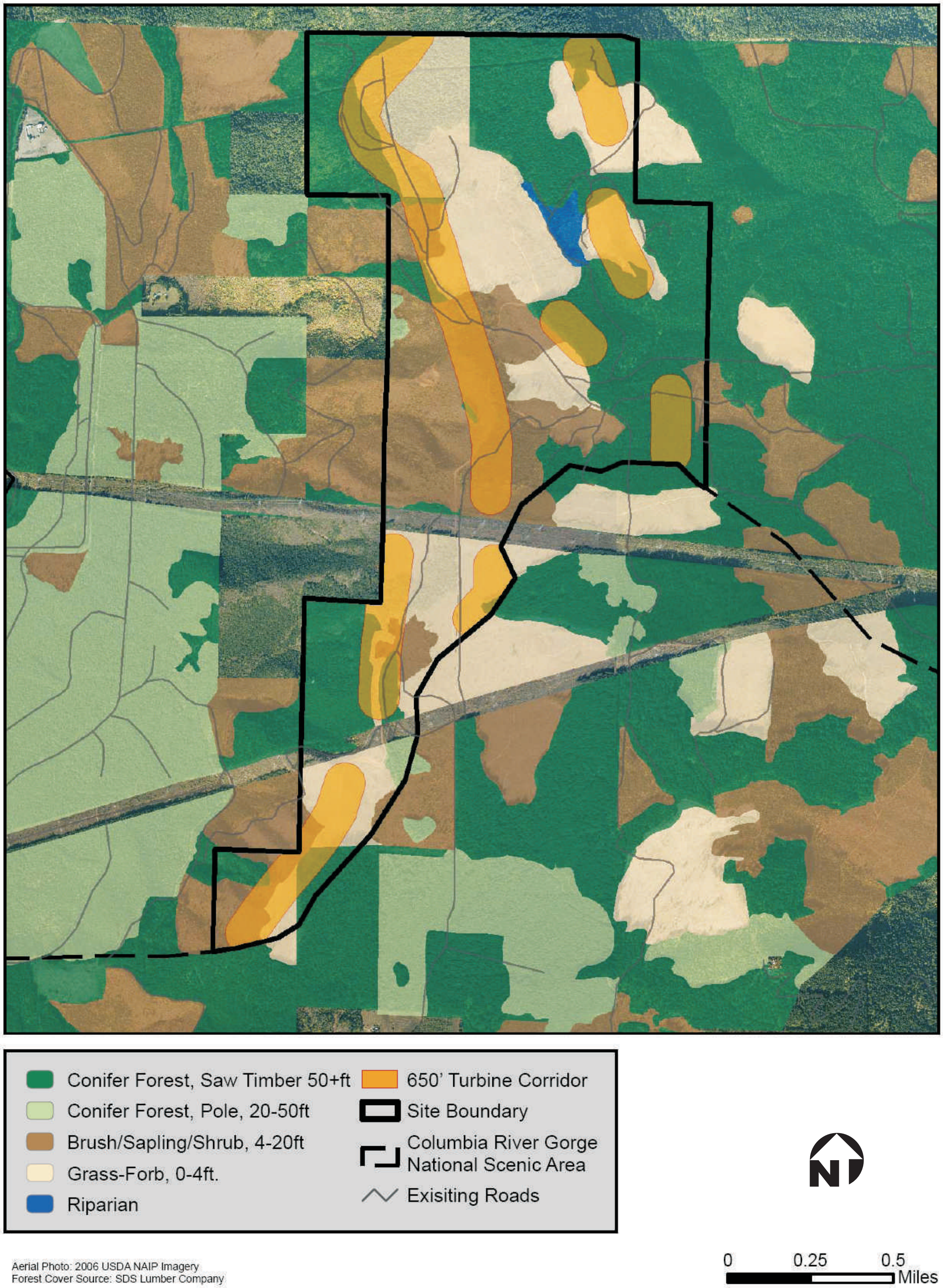
- Placing underground electrical and communications cables in trenches;
- Constructing the Project substation;
- Constructing the Operations and Maintenance building;
- Transporting tower sections to the site and assembling towers.;
- Transporting nacelle, rotor, and other turbine equipment to the site and installing the equipment on the assembled towers;
- Final testing; and
- Final road grading, final erosion control and site cleanup.

Staging and equipment lay-down areas would be used. These locations would be selected from sites that are accessible from existing roadways and are currently disturbed, or where disturbance could be minimized. Disturbances for staging and lay-down areas would be restored following construction.

In addition, the proposed transmission interconnection would be constructed between the Project substation and BPA's existing North Bonneville-Midway transmission line, which passes through the Project Area. Access for construction of the interconnection would be via existing access roads for the BPA transmission line, which are currently used for periodic inspection and maintenance of that line. The construction sequence for the transmission interconnection would include the following activities:

- **Stringing Conductors/Static Wires.** Conductor stringing involves a sequence of running pilot lines through pre-positioned pulleys located on each tower. A truck-mounted, spooled conductor would then be positioned at the beginning of the segment to be strung. Take-up spools, also truck-mounted, would be located at the end of the segment to be installed. Pilot lines would be pulled through with tension maintained and the conductors would follow and be left in position on the towers. Installation would be completed by connecting the conductors to the individual insulators and adjusting the conductor sag between towers to predetermined dimensions. In some locations, static wires also would be installed for protection of the transmission line. The static wires would be installed in a manner similar to the conductors. The conductor stringing operation would primarily involve the movement of wheeled vehicles along the access road.
- **Site Cleanup.** Following construction of the interconnection, all residual construction debris would be removed and disturbed areas would be restored as required.

After the Project has been constructed, trees on most of the site would be allowed to mature on a normal forest management schedule (according to the Applicant staff, trees in the Project Area grow about 2 feet per year on average). Figure 2-2 shows the current forest types in the Project Area.



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Source: GeoDataScape.

Figure 2-2

Current Forest Types

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Whistling Ridge Energy Project
Skamania County, Washington

The exception would be in an area immediately surrounding the turbines and the access roads to the turbines. To allow for safe access to each tower for maintenance, to eliminate the potential for trees falling against the towers during storms, and for fire protection, an area extending approximately 150 feet from the center of each tower would be managed to maintain vegetation below approximately 15 feet in height. These dimensions may be adjusted during the final micrositing[2] process to best balance the interest of maximizing electrical generation, along with maximizing replanting of all trees to ensure the best possible operation of the site for ongoing commercial forestry purposes.

2.1.4.2 Construction Schedule

Assuming that the state of Washington approves the Applicant's application for a Site Certificate, and BPA grants the Applicant's interconnection request, the Applicant would then begin construction of the proposed Whistling Ridge Energy Project. Actual construction activities, from groundbreaking to commercial operations, are expected to take approximately one year (15 months). Although actual timing of Project approvals needed to start construction are not precisely known at this time, the Applicant anticipates Project permitting with EFSEC to be completed by the fall or winter of 2011 ~~by the end of 2010 or early 2011~~, with a Record of Decision (ROD) from BPA approving the requested interconnection being issued shortly thereafter. Under this schedule, the Applicant would conduct final Project engineering, equipment procurement, and contractor selection as early as the fourth quarter of 2011 ~~2010 and the first quarter 2011~~. Project construction and pre-operational testing could begin as early as the first quarter of 2012 ~~second quarter of 2011~~ and conclude in the fourth quarter of 2012 ~~to the second quarter 2012~~. If this schedule is met, the Applicant anticipates that the Whistling Ridge Energy Project would begin commercial power production by January 2013 ~~May 2012~~.

2.1.4.3 Construction Manpower and Truck Trips

The average size of the construction workforce would be about 110 workers, with a peak of approximately 265 workers in the seventh month of the construction period. Table 2-2 shows the approximate number of on-site construction workers by activity, which would vary month by month. Table 2-3 shows the on-site construction labor by month of construction.

Truck trips to and from the Whistling Ridge Energy Project for construction-related activities would average 30 trips during the AM peak hours and 10 trips during PM peak hours. During the peak month of construction activity (approximately eight months prior to commercial operation), traffic would increase to 390 vehicles along eastbound SR 14 at the east junction with Cook-Underwood Road.

[2] "Micrositing" is process of choosing the wind turbine and their exact positions within the project area. Micrositing will occur after permit approvals are obtained and all permit conditions are known.

Table 2-2
On-Site Construction Workers by Activity

Task	Approximate On-Site Manpower
Site Certification Agreement Approved	
Engineering/Design/Specifications/Surveys	15
Order/Fabricate Wind Turbines	0
Order/Fabricate Substation Transformer	0
Road Construction	50
Foundations Construction	50
Electrical Collection System Construction	50
Substation Construction	40
Wind Turbine Assembly and Erection	75
Plant Energization and Commissioning	25
Plant Substantial Completion	0
Construction Punchlist Clean-Up	25

Table 2-3
On-Site Construction Labor by Month

Month Before Commercial Operation	Project Management and Engineers	Field Technical Staff	Skilled Labor and Equipment Operators	Unskilled Labor	Total Approximate On-Site Manpower
14	5	10	0	0	15
13	5	10	0	0	15
12	10	8	58	14	90
11	10	8	58	14	90
10	17	15	114	44	190
9	17	15	114	44	190
8	22	21	158	64	265
7	17	16	133	49	215
6	12	11	103	39	165
5	15	16	120	39	190
4	8	11	61	20	100
3	8	11	61	20	100
2	8	11	61	20	100
1	3	5	17	0	25
0	1	1	10	13	25
Cleanup	1	1	10	13	25

2.1.4.4 Construction Costs and Fiscal Considerations

The total estimated construction cost of the Whistling Ridge Energy Project would be approximately $150 million, which includes the wind turbines and associated equipment.

Construction of the proposed Project also would result in fiscal contributions within the three-county area of Skamania, Klickitat, and Hood River counties. These contributions are anticipated to be approximately $13.2 million, or just under 10 percent of the total estimated $150 million in construction costs. The $13.2 million would include supplies purchased from local suppliers, as well as increased sales tax revenues from purchases (such as food, gasoline, and lodging) made by construction workers. In addition, Skamania County would be expected to experience an increase in sales tax revenue of approximately $6,600 due to sales tax on the construction contract.

2.1.5 PROJECT OPERATION

Once operational, the Whistling Ridge Energy Project would operate 24 hours per day, seven days per week. Project operations would require eight to nine permanent full-time and/or part-time staff. Positions required for Project operation include those listed in Table 2-4.

Table 2-4
Operations and Maintenance Staff

Staff Positions	Number of Operating Personnel
Plant Site Manager	1
Operations Manager	1
Operating Technicians	4 to 5
Administrative Manager	1
Administration Assistant	1
Total	8 to 9

The annual cost of Project operation would be approximately $3.75 million. Of this annual amount, approximately $1.5 million would be for labor costs, such as wages and benefits for employees. The remaining $2.25 million in annual costs would include expenditures for materials, supplies, equipment, insurance, and contracted maintenance labor.

Operation of the proposed Project also would result in permanent fiscal contributions to the regional economy. Skamania County would be expected to experience an increase in annual property tax revenue of approximately $731,500 due to the increase in assessed value of the parcels on which the Whistling Ridge Energy Project would be constructed. This would represent an annual increase of 7.6 percent compared to the amount of property tax collected for these parcels in calendar year 2007.

2.1.6 FOREST HARVEST DURING PROJECT CONSTRUCTION AND OPERATION

The Project Area is on land managed for commercial forestry by S.D.S. Co., LLC and Broughton Lumber Company. All of the parcels on which the Project is located are managed for a continual cycle of growth, harvest, and replanting. As a longstanding commercial forestry site, no old-growth forests exist in areas where the Project is proposed. Many of the remaining stands of trees on the sections of land that would have turbines on them are near maturity and S.D.S. Co., LLC and Broughton Lumber Company have recently implemented timber harvest plans on portions of these sections. Harvests have occurred in the Project Area over time, pursuant to long-established harvesting schedules (Figure 2-3).

Harvests have typically occurred approximately every 50 years; however, the harvest periods vary depending on the market and the demand for the type of timber. As a result, some harvests have occurred as frequently as every 40 years, and some have been up to every 65 to 70 years. Additional harvests are planned, subject to requirements of a Forest Practice Application.

In areas surrounding the proposed wind turbines that have not been recently harvested, or that are not planned to be harvested before Project construction, trees would be harvested and the land would be replanted with seedlings. This clearing would allow for safe construction of the proposed Project, and would reduce the potential for tree growth to interfere with the wind resource on the site during the commercial life of the Project (that is, during the 30-year commercial life of the Project, trees that are planted at the time of construction in the cleared area would regrow at a rate that would not interfere with wind energy production).

Typically, the cleared area for the wind turbines would extend approximately 50 feet in all directions from each turbine. From a distance of approximately 50 feet to 150 feet from the base of the turbines, tree heights would be limited to a height of approximately 15 feet above the elevation of the base of the turbine. Extending from approximately 150 feet to 500 feet from the base of the turbines, there would be a restriction of approximately 50 feet in height above turbine foundation level for trees located within an area formed by a 90-degree angle centered on the prevailing wind direction and on the downwind side of the prevailing wind direction. Final locations and dimensions would be determined during the final design, micrositing and construction process (Figure 2-4).

In addition to clearing around the turbines, there would be an approximately 100-horizontal-foot limitation placed on trees along any overhead electrical cable corridors, or such standards as are determined by the Project engineers in consultation with BPA or others, as applicable. The permanently disturbed, cleared area described above would be considered a “forest conversion” under the Washington Forest Practices Act, because it is being implemented for the purpose of the Project. However, to the extent feasible for the Project, cleared areas would be reforested in accordance with typical commercial forestry management practices.

The areas where tree clearing is required would be clear-cut using crawler tractors, rubber-tired skidders, and mobile feller-bunchers, as has been done on other stands on the property. Logs would be transported by truck to SDS facilities in Bingen, Washington. Except for areas to be maintained and permanently cleared for the construction of permanent improvements and ongoing operations and maintenance access needs (which would be replanted with appropriate native grasses and low-growing shrubs), cleared areas would be replanted with trees within one year after completion of construction (tree planting is done in the spring of each year).

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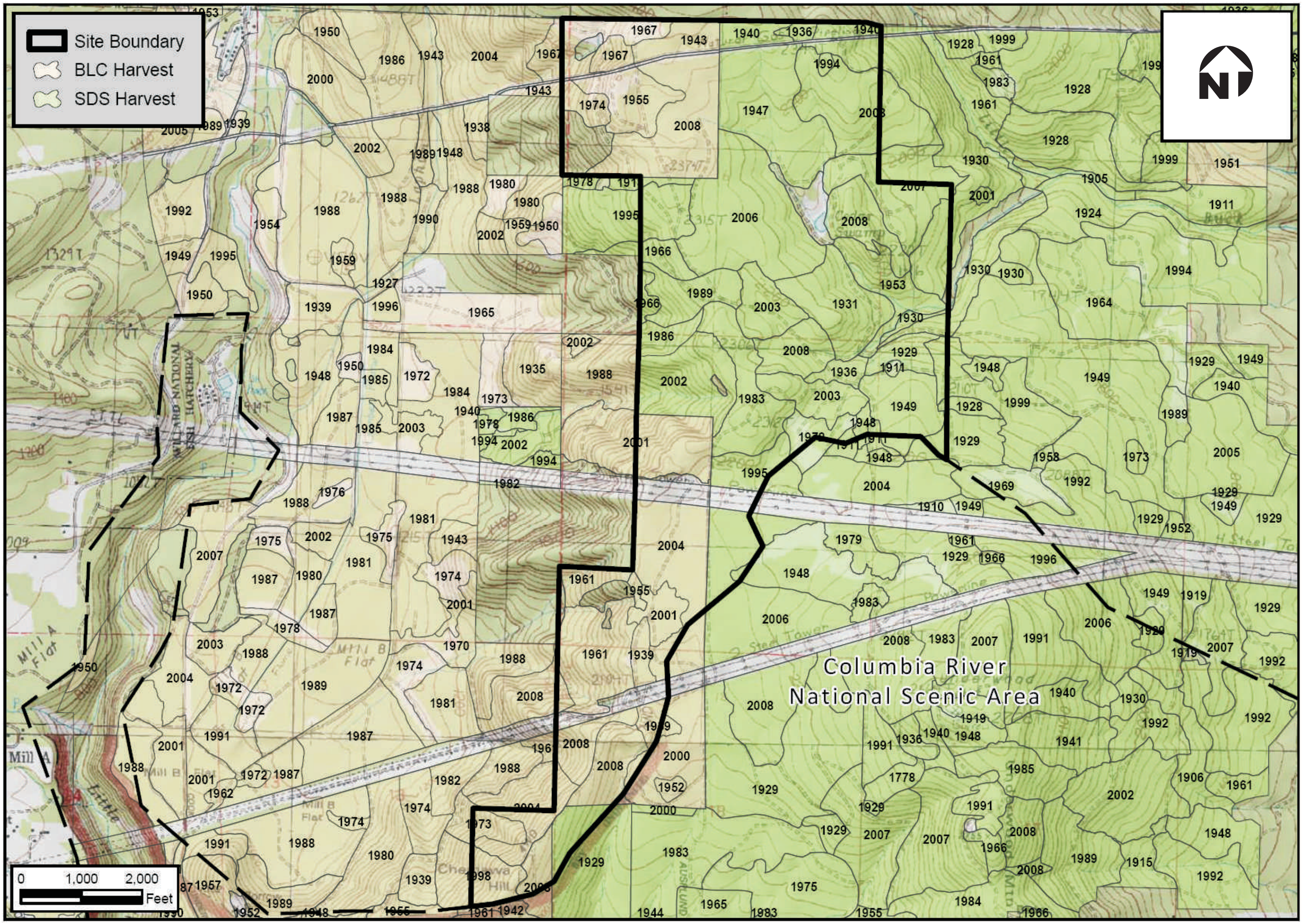

Source: SDS Lumber

Figure 2-3
Harvesting Schedule

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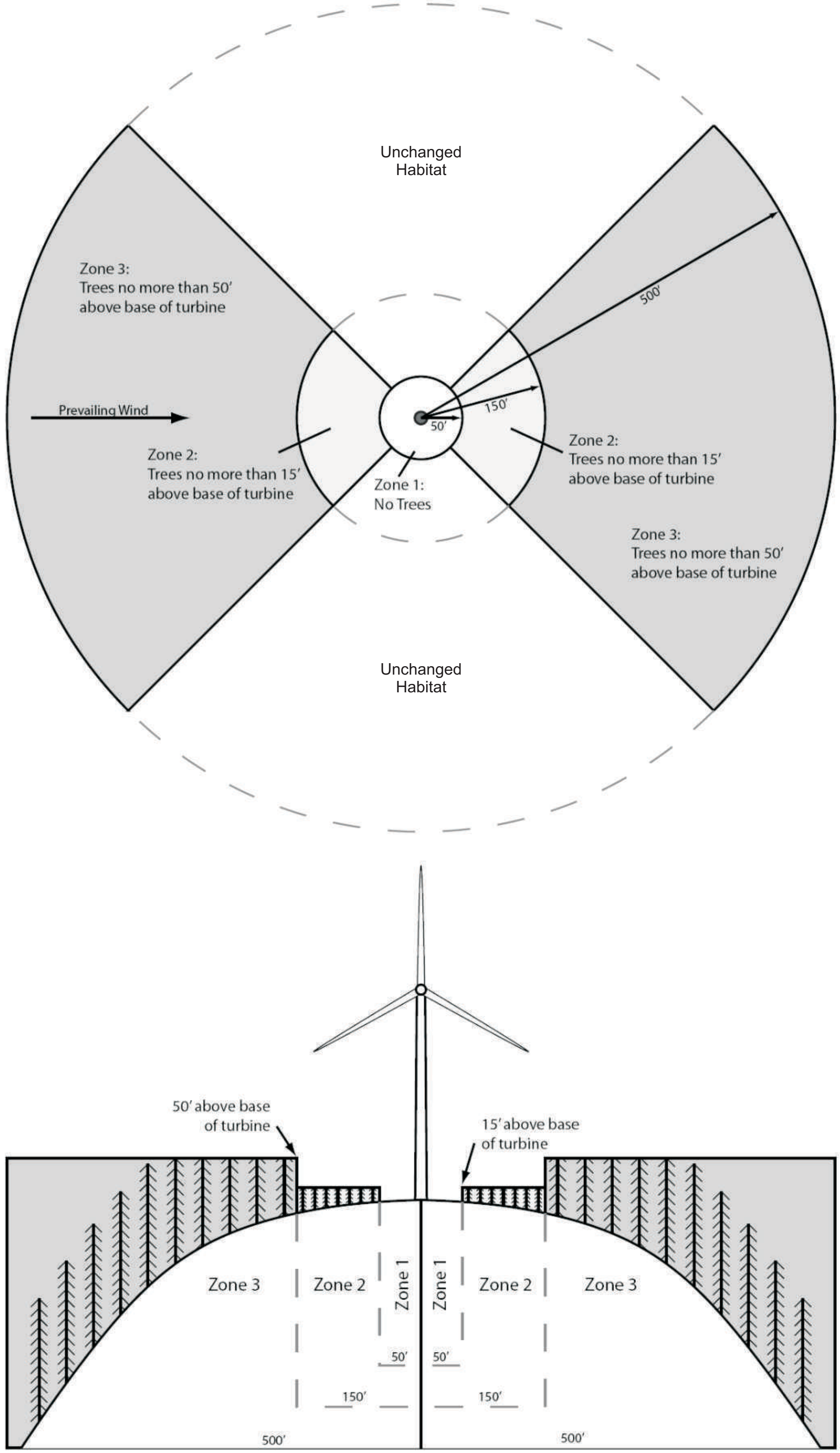
Skamania County, Washington



Source: GeoDataScape.

Figure 2-4

Turbine Timber Buffer

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Whistling Ridge Energy Project
Skamania County, Washington

2.1.7 PROJECT DECOMISSIONING

For financial evaluation and contractual purposes, the Whistling Ridge Energy Project is expected to have a useful life of at least 30 years. While some Project elements may have a typical lifespan of only about 30 years, the trend in the wind energy industry has been to "repower" older wind energy projects by upgrading equipment with more efficient turbines. It therefore is likely that the Project would be upgraded with more efficient equipment and have a useful life longer than 30 years.

However, if the Project were terminated, the necessary authorization from the appropriate regulatory agencies would be obtained to decommission the facilities. All aboveground facilities would be removed from the site, and unsalvageable material would be disposed of at authorized sites. To avoid unnecessary future ground disturbance and related environmental impacts, the turbine foundations would likely be removed to a depth of 3 to 4 feet below ground surface (bgs), and underground electrical cables would likely be abandoned in place. The soil surface would be restored as close as reasonably possible to its original condition. Reclamation procedures would be based on site-specific requirements and forest management techniques commonly employed at the time the area would be reclaimed, and would include re-grading, adding topsoil, and replanting all disturbed areas. Decommissioned roads would be reclaimed or left in place based on landowner preference, and right of way would be surrendered to the landowner.

In compliance with WAC 463-72, Site Restoration and Preservation, Whistling Ridge Energy LLC would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project were suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project that assesses potential impacts from restoration activities and would be subject to appropriate environmental review.

2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the state of Washington would deny the Applicant's application for a Site Certificate for the proposed Whistling Ridge Energy Project, and/or BPA would not grant interconnection of the Project to the FCRTS. As a result, the proposed Whistling Ridge Energy Project would not be constructed or operated under this alternative. This alternative would not help utilities seeking renewable energy resources in states with RPSs, such as ~~the state of~~ Washington, Oregon, and California, in achieving the renewable energy goals mandated by each ~~the~~ state's RPS. Furthermore, this alternative would not help to meet the region's need for additional power in coming years. If the proposed Project is not constructed, it is likely that this need would be addressed by some combination of energy efficiency and conservation measures, existing power generation sources, and/or the development of other new renewable and non-renewable generation sources.

In addition, it is reasonably expected that under the No Action Alternative, the proposed Project site would continue to be used for logging and other timber harvest activities. This site has been in commercial forestry use for the last century, during which the site has been logged over a series of approximately 50-year logging rotations. If the proposed Project is not approved and built, the Applicant and others would continue to use the site for commercial forestry production. Ongoing timber management activities within the Project Area under this alternative would include regular tree clearing, harvesting, replanting, and development of additional access roads as necessary.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

The Applicant has proposed a wind generation facility at the site discussed in Chapter 1 ~~a specific site~~. The lead agencies, Washington EFSEC and BPA, must respond to the Applicant's requests for authorizations and approvals for the proposed wind project at this site. While this EIS focuses on the alternatives of either granting or not granting the Applicant's requests, various other alternatives have been considered for the proposed Project. These alternatives include alternative locations for the proposed Project, different Project sizes, alternative wind generation technologies, and different Project configurations. For potential alternatives, the Applicant has identified a number of criteria that must be met in order for the Applicant to have a technically and economically feasible project:

- The Project must be located in an area with a steady supply of robust wind power, and on a site on which construction could reasonably occur (no significant geotechnical constraints);
- To reduce startup costs, the Project must be located on land the Applicant owns and controls, and land that can serve a dual purpose of commercial forestry and power production;
- To enable the power to reach urban markets and eliminate the cost and time required to construct new transmission lines, the Project must be located in proximity to existing high-voltage transmission lines;
- The costs of construction must be outweighed by the potential return on investment, requiring a minimum number of potential megawatts to be achieved by the Project; and
- The Project output must be at a competitive price and of adequate supply to be attractive to utilities looking to fulfill their Renewable and Alternative Energy Portfolio Standards.

The following sections describe alternatives that were considered but eliminated from detailed study in this EIS because of technical or economic feasibility issues, not meeting the identified purpose and need for proposed action, or clearly greater environmental impacts.

2.3.1 ALTERNATIVE PROJECT LOCATIONS

The Applicant owns approximately ~~and manages~~ 70,000 acres of timberland in Washington and Oregon and manages its forestlands with the objective of producing ~~as much~~ high quality wood ~~as possible~~ without compromising the future economic and environmental benefits of their forests. In reviewing its lands for a potential location of a wind project, the Applicant sought:

- Areas of Applicant-owned property found to have a steady source of robust wind;
- Applicant-owned land that contained high ridges on which to place wind turbines with little impact to the continued underlying use of the land for commercial forestry; and
- Land in proximity to existing high voltage transmission lines.

To further clarify turbine string site selection, six suitability requirements were considered. They are as follows: lands owned by the Applicant or Broughton Lumber; within three miles of BPA transmission lines; outside of CRGNSA boundary; suitable terrain; road access; and contains at least 1,000 "suitable" lands. Furthermore, "suitability" is described as follows:

- Low suitability properties: These are parcels that are within 3 miles of transmission lines, are outside the NSA boundary, have a terrain difference of between 200 and 500 feet, and have road access. These parcels are designated in yellow on the "Tract Suitability Analysis" map (see Figure G-1in Appendix G).
- Potentially suitable properties: These are parcels that are within 3 miles of transmission lines, are outside the NSA boundary, have a terrain difference of between 500 and 1,000 feet, and have road access. It should be noted that these parcels could be ruled out as being unsuitable based on other factors not assessed in this analysis, such as slope direction or parcel size. These parcels are designated in brown on the "Tract Suitability Analysis" map (see Figure G-1 in Appendix G).
- Suitable properties: These are parcels that are within 3 miles of transmission lines, are outside the NSA boundary, have a terrain difference of between 500 and 1,000 feet, and has what appear to be better road access than properties identified as "potentially suitable". These parcels are designated in dark pink on the "Tract Suitability Analysis" map (see Figure G-1 in Appendix G).
- Highly suitable properties: These are parcels that are within 3 miles of transmission lines, are outside the NSA boundary, have terrain differences between 1000 and 2000 feet above surrounding terrain and contain the highest hills/ridgelines within the study area, and have good road access. These are the best possible locations within the study area for wind facility development. Of the analyzed parcels, only 1 parcel fell into this category. These parcels are designated in blue on the "Tract Suitability Analysis" map (see Figure G-1 in Appendix G).
- The proposed Whistling Ridge Energy Project site was selected for its location within the "highly suitable properties". This site was then forwarded for further environmental analysis including wildlife surveys.

No other sites were identified that are under the ownership of the Applicant or as close to existing transmission infrastructure facilities.

2.3.2 LARGER OR SMALLER GENERATION FACILITY SIZE

During the Project planning process, the Applicant considered the feasibility of constructing and operating a larger generation facility, both in terms of more wind turbines and a larger area, involving the proposed Project Area. Regarding more turbines, the site does contain a series of ridge lines that are conducive to locating wind turbines but at the same time are limiting as to where those turbines could be placed. In general, placement of turbines in areas substantially below the ridge lines would not effectively make use of the wind resource within the Project Area, thereby compromising the economic feasibility of the proposed Project. Accordingly, the constrained topography has necessitated a restricted power plant design.

Regarding a larger area for the proposed Project, the Project Area is located between the National Scenic Area on the south and land owned by Washington DNR on the north. While the Applicant did not consider locating turbines within the National Scenic Area due to its sensitivities, consideration was given to locating turbines on the DNR lands directly north of the site. These lands have similar topographical characteristics as the proposed Project site, and also have been logged through commercial forestry activities. However, use of these lands for Project turbines was rejected from further consideration due to comments from the public and DNR's own reluctance to consider leasing the site to the Applicant.

Lands east and west of the proposed Project Area also were considered but were rejected from further evaluation because these lands were at a lower elevation and did not include the north-trending ridge lines suitable for wind turbine placement that exist on the proposed site.

The Applicant also considered the feasibility of a smaller generation facility in the proposed Project Area, either by removing turbines or utilizing a smaller Project Area. However, the Project is proposed as an "integrated whole," as a single power plant, not pieces of a whole, where some turbines may be eliminated. The Project proposes a defined output, based on site and design characteristics and market demand and Applicant objectives. These objectives include providing a minimum level of generation to be attractive to utilities seeking to fulfill their RPS requirements, as well as providing a return on investment to the Applicant. In order to provide this return, the Applicant has determined that the Project must be capable of producing a minimum of 70 MW. The number of wind turbines in the Project Area has already been minimized to the extent practicable in light of the Applicant's objectives. Accordingly, if any turbines are removed from the Project design, other locations must be found to replace those turbines to maintain the minimum necessary capacity. The constrained site location and topography limits the ability to relocate turbines within the Project Area.

In sum, the Project size was selected to optimize Project energy output and economic feasibility. A smaller wind turbine facility would be unlikely to offset Project development costs. A larger project would require additional infrastructure capacity and transmission capacity.

2.3.3 ALTERNATIVE WIND GENERATION TECHNOLOGIES

Consideration was given to alternative technologies for the generation of power from a wind resource. Several types of wind energy conversion technologies have been developed over the past three decades and include (1) vertical axis Darrieus wind turbines,(2) two-bladed downwind wind turbines, (3) smaller three-bladed upwind wind turbines (500 to 750 kW), and (4) larger 3-bladed upwind wind turbines (1 to 3 MW). The three-bladed, upwind, horizontal axis is currently the preferred technology, based on proven reliability and commercial viability.

2.3.4 ALTERNATIVE PROJECT CONFIGURATIONS

As discussed above, the proposed Project Area contains a series of ridge lines that are conducive to locating wind turbines but at the same time are limiting as to where those turbines could be placed. This means that there are limited options for locating wind turbines within the site. Alternative turbine configurations were considered, but were eliminated from further study because they either did not appropriately utilize the wind resource present at the site or compromised the economic feasibility of the proposed Project.

2.3.5 ALTERNATIVE INTERCONNECTIONS

Alternatives for interconnecting with BPA's existing high voltage transmission lines that currently cross the proposed Project Area were considered. The currently proposed location of the substation was chosen because it is a relatively clear and low-elevation area that is adjacent to the proposed site of the Operations and Maintenance facility.

Initially, an option of providing interconnection to the FCRTS at a point along the North Bonneville-Midway 230-kV transmission line within the Project Area and directly east of the currently proposed interconnection point was identified. This alternative interconnection point was located between structures 22/6 and 23/1 on the North Bonneville-Midway 230-kV transmission line. However, this option would have required the development of interconnection facilities within the National Scenic Area because structure 22/6 is on the border of, and structure 23/1 within, the Scenic Area. Given the high sensitivity of the Scenic Area, construction of an interconnection alternative within its boundaries was eliminated from further study.

An alternative interconnection also was considered off of the Project Area, approximately 1.5 miles west of the currently proposed interconnection point. BPA's transmission engineers identified a potential alternative interconnection site between structures 21/4 and 22/1 on the North Bonneville-Midway 230-kV transmission line. This site was located in a relatively flat, lower-elevation area that may have easier access in the winter than the currently proposed interconnection site. However, this alternative would have required the Applicant to construct and operate a new 1.5 mile section of 230-kV transmission line from the Project Area to this interconnection point. Development of such a new line would have required the clearing of an approximately 125-foot-wide right-of-way corridor for the line, as well as the clearing and construction of additional new transmission line access roads. This corridor would be located in steep terrain, and would require timber harvesting, new access roads, and vegetation control in areas where slopes approach 100 percent in places. In addition to potential additional impacts to plants, wildlife, cultural resources, aquatic areas, and wetlands that could be avoided by siting the Project substation within the Project Area, this alternative likely would have greater visual and geological impacts due to the new transmission line corridor's location on steep, more visible slopes.

The Applicant also has stated that the additional costs of constructing the new line associated with this alternative line likely would make the Project no longer economically viable. In additional to the substantial additional costs of constructing this additional line, timber harvesting operations on the steep terrain that exists in the potential narrow corridor for the new line under this alternative would be impossible to conduct economically adjacent to the existing BPA system unless a much larger area was harvested at the same time. Because of the much greater potential for environmental effects as compared to merely developing the currently proposed interconnection within the already planned Project Area, as well as the significant additional cost implications, this alternative was considered but eliminated from detailed study in this EIS.

Finally, an interconnection with the other existing BPA transmission line that crosses the Project Area also was considered. However, this alternative was rejected from further study because the other existing BPA line is a 115-kV transmission line that does not have sufficient capacity to transmit the energy from the Whistling Ridge Energy Project.

2.3.6 ALTERNATIVE ACCESS ROADS

During Project planning, different alternatives for accessing the proposed Project Area were assessed. There are three potential ways to access the Project Area. All are via County roads from SR 14 to Cook-Underwood Road. In addition to the proposed access route that is included as part of the Proposed Action, from Cook-Underwood Road, the Project Area could be accessed by:

- **Route 1:** Ausplund Road to a private logging road vacated by Skamania County in 1987, which crosses private property (not owned by the Applicant) that is currently used for residential, agricultural orchards, and commercial timber production and harvest.

- **Route 2:** Kollock-Knapp Road to Scoggins Road to a private logging road called the CG2930 road on County Assessor's maps, which crosses property owned by the Applicant that is currently used for commercial timber production and harvest.

The private logging road in Route 1 was made a County right of way in 1923. It was vacated for public use in 1987 by resolution of the Skamania Board of County Commissioners; however, the rights to use the road by abutting property owners remain. Additionally, road improvements to this route would be required for access to construct the wind energy facility and for ongoing operations and maintenance traffic. Impacts to a non-project landowner from these activities would occur if Route 1 were used. Therefore, Route 1 has been eliminated as a construction roadway access alternative.

Route 2 would require minor roadway improvements that would not directly impact any non-project landowners. However, these roadway improvements would require construction within the National Scenic Area. Therefore, Route 2 has been eliminated as a construction roadway access alternative.

2.4 BENEFITS AND DISADVANTAGES OF DELAYING PROJECT IMPLEMENTATION

The Washington SEPA Rules require that an EIS discuss the benefits and disadvantages of reserving for some future time the implementation of a proposal, as compared with possible approval at this time. See WAC 197-11-440(5)(c)(vii). The benefits of deferring action on the proposal would include:

- Delaying or deferring construction-related traffic, noise and dust impacts during the Project construction period.
- Delaying or deferring potential impacts related to visual resources from Project operation. These impacts would occur primarily due to the visibility of proposed Project wind turbines from various vantage points in the Project vicinity, including some viewpoints within the Columbia River Gorge National Scenic Area.
- Delaying or deferring potential increased noise levels from wind turbine operation at nearby noise-sensitive receivers.
- Delaying or deferring permanent removal of approximately 60.7 acres of vegetation and potential wildlife habitat for Project facilities.
- Delaying or deferring potential mortality to birds and bats due to turbine collision and displacement.
- Delaying or deferring use and consumption of fuels, water, and other natural resources that would be required for Project construction and operation.
- ~~Delaying or deferring construction impacts of traffic, noise and dust~~
- ~~Delaying or deferring potential operational impacts on noise, visual resources, and wildlife~~

The disadvantages of deferring action on the proposed Project would include the following:

- Delaying approval of the Whistling Ridge Energy Project would not help utilities seeking renewable energy resources in states with RPSs, such as Washington, Oregon, and California, in achieving the short-term renewable energy goals mandated by each state's RPS; however, depending on the length of the approval delay, the Project could be available for meeting the longer term goals of these RPSs. ~~The Whistling Ridge Energy Project would not help the state of Washington in achieving the renewable energy goals mandated by the state's RPS.~~
- Deferring the Whistling Ridge Energy Project would not help to meet the region's need for additional power in near-term coming years, but approval at some future time could make the Project available for longer-term power needs. Regardless, if the proposed Project is not constructed, it is likely that these needs would be addressed by some combination of energy efficiency and conservation measures, existing power generation sources, and/or the development of other new renewable and non-renewable generation sources.

- It is reasonably expected that if the proposed Project is deferred, the proposed Project Area would continue to be used for logging and other timber harvest activities so there would be continued impacts from access, timber cutting, and replanting over time. This site has been in commercial forestry use for the last century, during which the site has been logged over a series of approximately 50-year logging rotations. If the proposed Project is not approved and built, or if approval is deferred, the Applicant and others would continue to use the site for commercial forestry production. Ongoing timber management activities at the Project Area would include regular tree clearing, harvesting, replanting, and development of additional access roads as necessary.
- During the period of any delay or deferral, the Applicant would be denied the ability to create new business and job opportunities through diversifying and maximizing the use of its existing holdings.
- During the period of any delay or deferral, up to a peak of 265 new construction jobs in Skamania County would not be created.
- If Project approval is delayed, eight to nine new operation jobs in Skamania County would not be created starting in about 2012 when the Applicant hopes to begin commercial power production; however, these jobs could be created in the future if the Project is deferred but approved at some later time.
- A new revenue source to Skamania County and the state of Washington from the payment of sales and business taxes would be deferred or eliminated.

2.5 COMPARISON OF ALTERNATIVES

Under the Proposed Action, the state of Washington would approve the Applicant's application for a Site Certificate for the proposed Whistling Ridge Energy Project, and BPA would grant interconnection of the proposed Project to the FCRTS. Under the No Action Alternative, the state of Washington would deny the Applicant's application for a Site Certificate for the proposed Project, and/or BPA would not grant interconnection of the Whistling Ridge Energy Project to the FCRTS.

Table 2-5 compares BPA's Proposed Action (granting the proposed interconnection) and the No Action Alternative (not granting the proposed interconnection) to the BPA purposes identified in Chapter 1 of this EIS. Table 1-1 in Chapter 1 of this EIS summarizes the potential overall environmental impacts and mitigation for the proposed Project and interconnection, as well as alternatives including the No Action Alternative. Detailed analysis of potential impacts is contained in Chapter 3 of this EIS.

Table 2-5
Comparison of Alternatives to BPA Purposes

Purpose	BPA Proposed Action	No Action Alternative
Maintain the electrical stability and reliability of the FCRTS	The physical interconnection of the Whistling Ridge Energy Project would be designed to ensure that the electrical stability and reliability of BPA's transmission system is maintained, and contractual terms would be put in place to ensure that Project operations do not adversely affect electrical stability and reliability.	Not granting an interconnection would have no effect on the electrical stability and reliability of BPA's transmission system.
Continue to meet BPA's statutory and contractual obligations	The Proposed Action would further BPA's efforts to provide open access to its transmission system consistent with its Tariff, and would not be expected to interfere with BPA's other existing contractual obligations or compliance with any statutory requirements.	The No Action Alternative would not further BPA's efforts concerning transmission open access, and would not interfere with other existing contractual obligations or compliance with any statutory requirements.
Act consistently with BPA's environmental and social responsibilities	Through this EIS and other environmental processes, BPA is ensuring compliance with NEPA and other applicable environmental laws for its Proposed Action. Allowing interconnection of the Wind Project would increase the availability of desired renewable resources in the region through a project that has been designed to minimize or avoid environmental impacts to the extent practicable.	By not allowing the requested interconnection of the Project under the No Action Alternative, BPA would deny this renewable resource access to the energy market. Although this alternative would avoid the environmental impacts of the Project, the proposed Project Area would continue to be used for commercial forestry and environmental impacts from access, timber cutting, and replanting would be expected to continue over time.
Provide for cost and administrative efficiency	The Proposed Action would involve providing an interconnection to BPA's transmission system at a reasonable cost, and contractual arrangements would ensure efficient administration of management and operation of this interconnection.	The No Action Alternative would not have long-term interconnection cost or administration implications for BPA.

2.6 REFERENCES

American Association of State Highway and Transportation Officials (AASHTO). 2004. *A Policy on Geometric Design of Highways and Streets*. 5th Edition

American Wind Energy Association (AWEA). 2007. Wind Power Today. Available at: http://www.awea.org/pubs/factsheets/windpowertoday_2007.pdf.

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3.0 AFFECTED ENVIRONMENT, IMPACTS AND MITIGATION

This chapter describes the existing environmental resources in the vicinity of the proposed Project and the potential impacts that the Proposed Action and the No Action Alterative would have on those resources. The potential impacts described were determined through research and field observation by environmental specialists and information provided by agency and public comments. More specific information on methodology for each resource is provided as appropriate. Each resource lists the mitigation measures that would lessen impacts, and the impacts that would be unavoidable.

Toward the end of the chapter, cumulative impacts are described, followed by discussions of intentional destructive acts, relationship between short-term uses of the environment and long-term productivity, and irreversible or irretrievable commitments of resources.

3.1 EARTH

This section discusses the existing setting and potential Project impacts related to geology, soils and topography. This analysis includes potential impacts of the Proposed Action on resources, and potential impacts of geologic hazards such as earthquakes or landslides on the Project. This section includes information submitted as part of the Application for Site Certification (Appendix A) and the background data to that document (Appendix B Geotechnical Report).

3.1.1 AFFECTED ENVIRONMENT

3.1.1.1 Topography

The 1,152-acre proposed Project Area is situated on a series of north-trending ridges that range in elevation from approximately 2,100 to 2,300 feet above mean sea level (msl). The land west of the proposed Project Area drops sharply to a narrow river terrace and then to an elevation of less than 800 feet above msl in the Little White Salmon River valley. The topography northeast of the site drops gradually toward the White Salmon River or climbs gently up the northeast flank of Underwood Mountain at 2,728 feet above msl. To the south, the topography drops to a terrace of largely agricultural use and then toward the Columbia River. Figure 3.1-1 shows the site topography.

3.1.1.2 Regional Geology

The White Salmon, Washington, area is located within the Cascade Range and the Columbia Intermontane Physiographic Province. The Project Area is located just within the western boundary of the Columbia Plateau, which is located at the western edge of the Columbia Intermontane Physiographic Province. This lowland province is surrounded on all sides by mountain ranges and highlands, and covers a vast area of eastern Washington and parts of northeastern Oregon and western Idaho.

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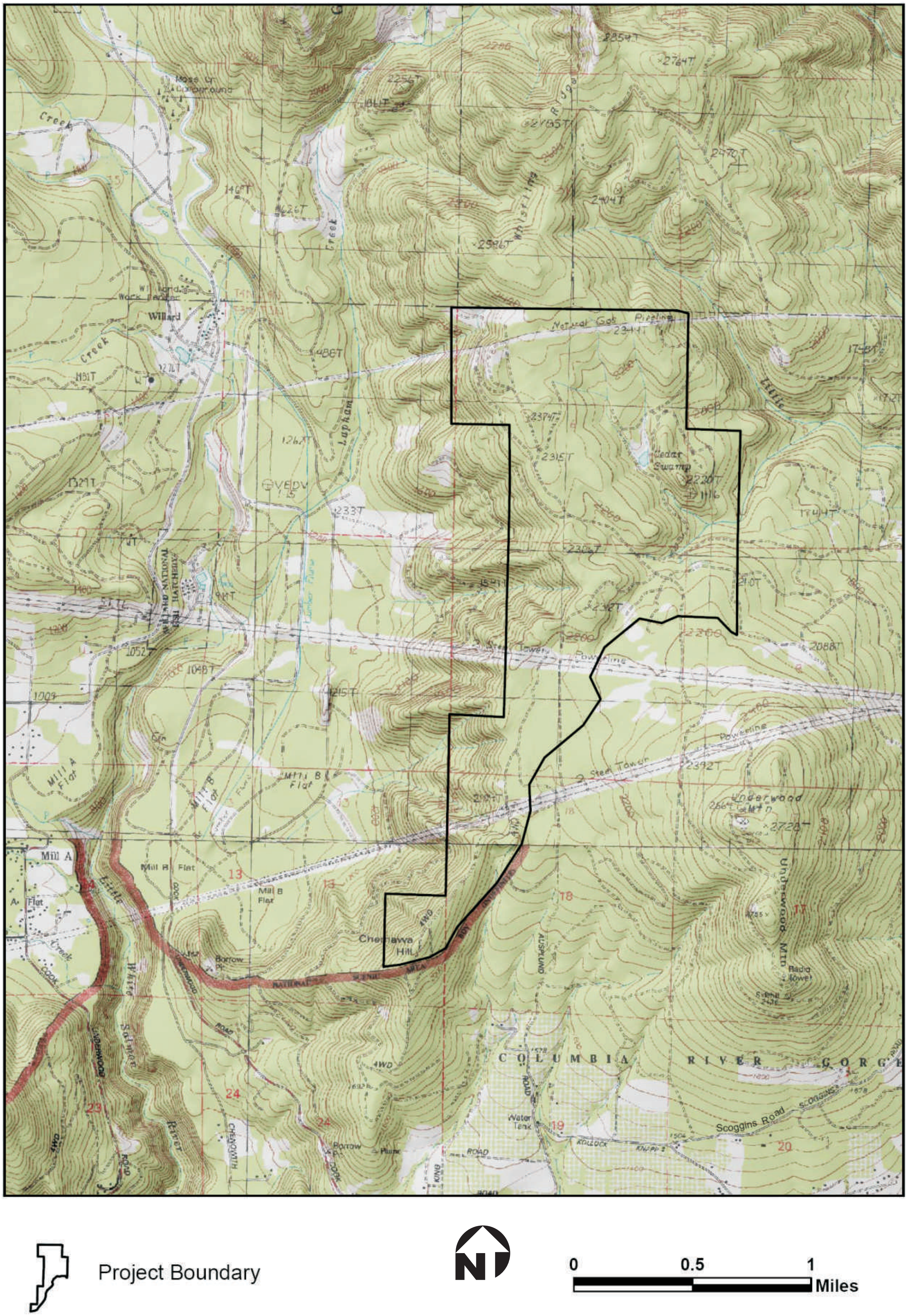

Source: GeoDataScape.

Figure 3.1-1
Site Topography

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Skamania County, Washington

The Columbia Plateau is underlain by a series of layered basalt flows extruded from vents (located mainly in southeastern Washington and northeastern Oregon) during the Miocene epoch (between 5.3 and 23.8 million years before present [BP]). Individual basalt flows ranged in thickness from a few millimeters to as much as 300 feet. Where significant time elapsed between successive flows, interflow zones developed. The interflow zones are characterized by the presence of highly weathered basalt and paleosols. These interflow zones are generally significantly weaker than the surrounding basalt and sometimes form basal failure surfaces for large landslide complexes.

Above the basalts are a variety of younger volcanic rocks and sedimentary materials that range from Pliocene (1.8 to 5.3 million years BP) to Holocene (less than 10,000 years BP). Sedimentary rocks are generally thought to underlie the basalts.

Individual geologic units in the general area are primarily Underwood Mountain Basalt., as described in Section 3.1 of the Application for Site Certification (Appendix A). Near-surface rock consists of yellow-gray volcanoclastic rocks, medium to dark gray, fine-grained to medium-grained basalt and andesite, which is fractured into angular gravels, cobbles, and boulders.

Regional geologic maps indicate the presence of Quaternary-age mass wasting landslide deposits located north of Underwood Mountain (Figure 3.1-2). These deposits are mapped as a large landslide, estimated to be approximately 1/3 square mile in area and almost a mile long. However, based on field work conducted in 2007, there is no obvious evidence to suggest the presence of a landslide as mapped on the 1:100,000 scale geologic map. If landslide deposits are present, they have been exposed long enough that most or all of the geomorphic evidence has been removed by erosion.

3.1.1.3 Local Geology and Soils

Geology

The proposed Project Area is located within the northern boundary of the Hood River Valley, which extends a few miles into southern Washington. In general, the geology of the area consists of basalt flows extruded from local vents, layered with conglomerate, tuff, tuff breccias, and other volcanoclastic deposits (Figure 3.1-2).

The bedrock underlying the proposed Project Area consists of Grande Ronde Basalt of the Columbia River Basalt Group and Quaternary basalt of Underwood Mountain—a shield volcano that lies approximately midway between the lower reaches of the Little White Salmon and White Salmon Rivers. Its southern slopes drain to the Columbia River.

In the Project Area, these basalt formations are typically overlain by silt and clay soil of varying thickness. Unconsolidated deposits are thin to absent with surface materials consisting primarily of a veneer of brown, silty topsoil that is likely derived from forest duff and wind-blown deposits. The thickness of this material varies across the site from a few inches to three feet. In several areas, bedrock and talus can be observed at the ground surface.

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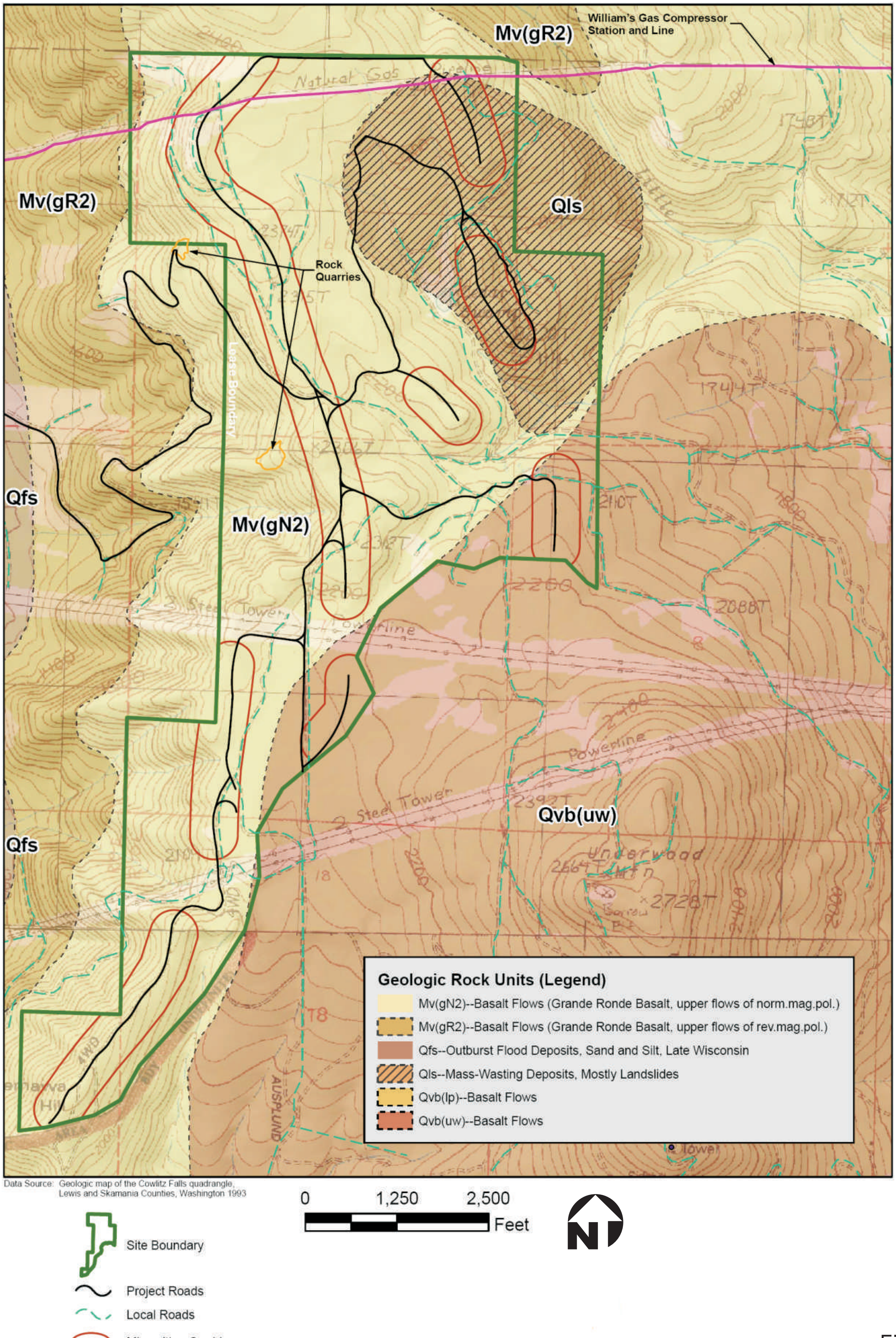

Source: Korosec, 1987.

Figure 3.1-2
Site Geology

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Whistling Ridge Energy Project
Skamania County, Washington

Soils

Soil Types. Figure 3.1-3 shows soils in the Project Area. The Natural Resources Conservation Service (NRCS) describes the soils in the Project vicinity as follows (USDA NRCS 2003):

- ***McElroy Series.*** The McElroy series consists of very deep soils (up to 5 feet) formed in colluvium and residuum from basalt with a mantle of volcanic ash that influences soils in the top 9 to 13 inches. The soils exist on the footslopes and backslopes of mountains on slopes from 5 to 90 percent at elevations from 400 to 2,600 feet in eastern Skamania County and western Klickitat County. McElroy Soils are well drained with medium to rapid runoff and moderate permeability. The series was established in 1981 following the introduction of volcanic ash from the eruption of Mt. St. Helens.

- ***Timberhead Series.*** The Timberhead series consists of very deep soils (up to 5 feet) formed in residuum and colluvium from basalt mixed with volcanic ash. The soils exist on mountain ridges between 5 and 30 percent at elevations from 2,000 to 3,600 feet in Skamania County and western Klickitat County. Timberhead Series soils are well drained with medium to rapid runoff and moderately high to high permeability.

- ***Underwood Series.*** The Underwood series consists of very deep soils (5 feet or more) formed in residuum and colluvium from basalt and andesite with a thin mantle of volcanic ash. The soils exist on benches, backslopes, and footslopes of mountains with slopes between 2 and 50 percent at elevations between 500 and 2,700 feet in southeast Skamania County and west Klickitat County. Underwood Series soils are well drained with slow to medium runoff and moderately high permeability.

- ***Undusk Series.*** The Undusk series consists of very deep soils (5 feet or more) formed in residuum and colluvium from basalt and andesite with a thin mantle of volcanic ash. The soils exist on benches, backslopes, and footslopes of mountains with slopes between 5 and 65 percent at elevations between 2,000 and 2,800 feet in southeast Skamania County and west Klickitat County. Undusk Series soils are well drained with slow to medium runoff and moderately high permeability.

Based on the current test pits and field observations, the site soil is best represented as Soil Site Class D (stiff soils). Rock with varying strength and weathering characteristics was encountered at depths ranging from 3 to 12 feet bgs.

Soil Erosion Potential. Erosion is the breakdown and transport of soils and bedrock by natural processes, including water, wind, and glaciation. The susceptibility of any material to erosion depends on chemical and physical characteristics; topography; the amount and intensity of precipitation and surface water; the intensity of wind; and the type and density of vegetative ground cover, if present.

Erosion potential was assessed for the Application for Site Certification, principally based on the erosion potential specified for surficial soils by the NRCS. These erosion factors indicate that the Underwood loam has a high potential for erosion by water and the McElroy, Timberhead, and Undusk units have a medium potential, with the remaining soil types having a low potential. Most soils found in the site vicinity are classified as having a low susceptibility to wind erosion.

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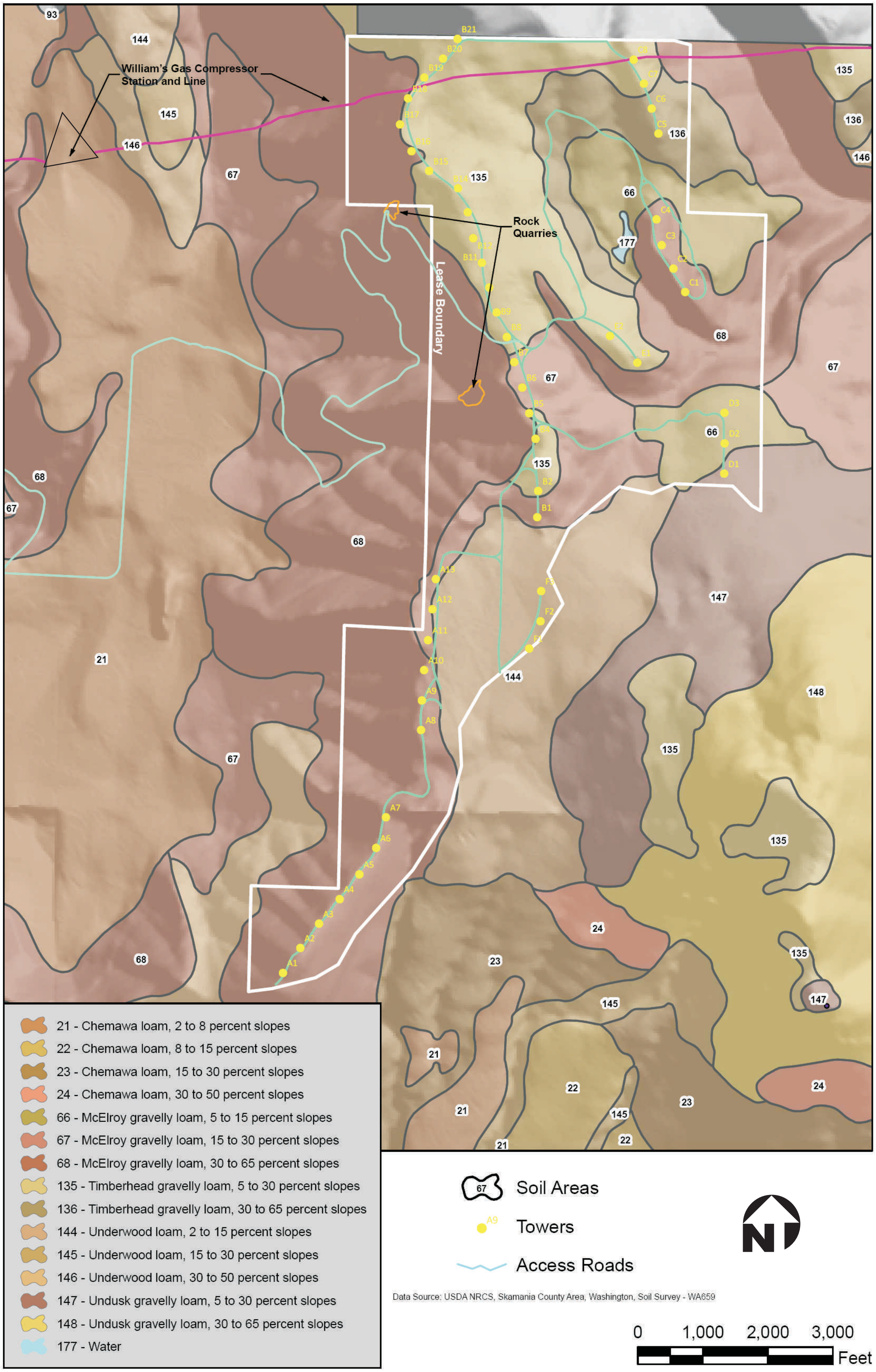

Data Source: USDA NRCS, Skamania County Area, Washington, Soil Survey - Wa659.

Figure 3.1-3

Soil Classifications

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Whistling Ridge Energy Project
Skamania County, Washington

3.1.1.4 Geologic Hazards

Earthquakes

Earthquakes are the result of sudden releases of built-up stress within the tectonic plates that make up the earth's surface. Stress accumulates where movement between plates or on faults produces friction. No faults are mapped within the footprint of the proposed Project Area. However, faults are mapped approximately 1.5 miles to the southwest and northeast. (Pezzopane 1993 and Geomatrix 1995) Many of these faults are inferred, and shown as dotted lines buried by younger surficial deposits. While the activity of the area faults is unknown, a review of aerial photography showed no indication of recent movement along the trace of the inferred faults.

There have been no surface-rupture earthquakes on any fault within northwestern Oregon or southwestern Washington in historic times, and investigations of the regional faults have been limited.

According to the updated National Seismic Hazard Maps published by the US Geological Survey (USGS) in 2008 (Petersen et al. 2008 and USGS 2009), the peak ground acceleration estimated for the area of the Whistling Ridge site is 0.18g for a 475-year return period earthquake (i.e., ground motion with a 10 percent chance of being exceeded in 50 years) and 0.40g for a 2,475-year return period earthquake (i.e., ground motion with a 2 percent chance of being exceeded in 50 years).

Large earthquakes at more distant faults could cause prolonged ground movement in the Project Area. Information on historic large earthquakes can be found in the Application for Site Certification Section 3.1 (Appendix A).

Landslides

As part of the Application for Site Certification, a preliminary landslide hazard evaluation of the Project Area was conducted by a licensed geologist pursuant to Skamania County Code (SCC) Title 21A, Chapter 21A.06 - Landslide Hazard Areas (LHAs), which are shown on Figure 3.1-4. Skamania County recognizes three classes of LHAs.

- Class I (Severe) LHAs are considered to present a severe landslide hazard and are distinguished as areas of known mappable landslide deposits that have been designated by the local legislative body.
- Class II (High) LHAs are areas with slopes between 20 and 30 percent that are underlain by soils that consist largely of silt, clay or bedrock, and all areas with slopes greater than 30 percent.
- Class III (Moderate) LHAs are areas with slopes between 20 percent and 30 percent not included in Class II.

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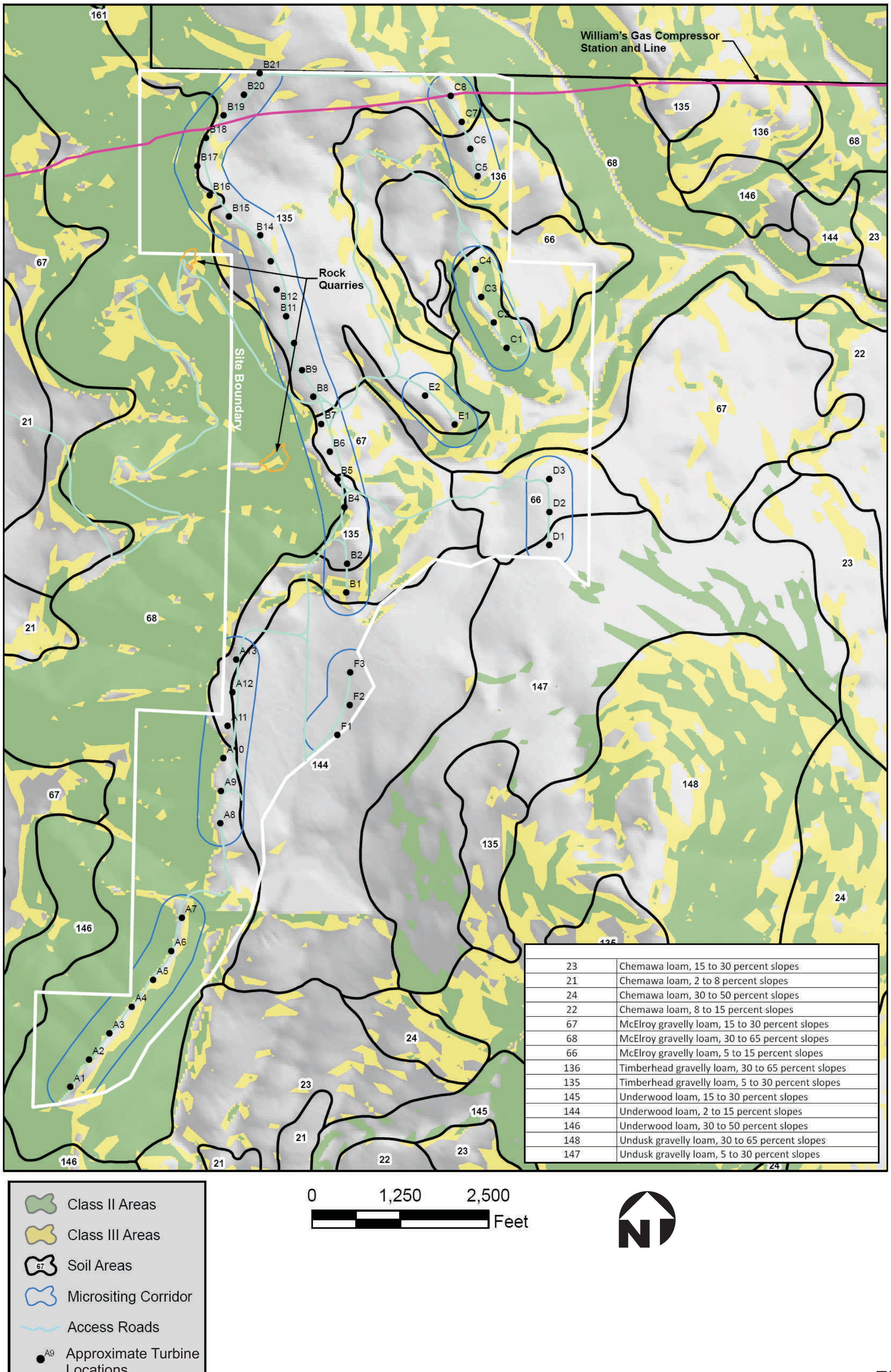

23	Chemawa loam, 15 to 30 percent slopes
21	Chemawa loam, 2 to 8 percent slopes
24	Chemawa loam, 30 to 50 percent slopes
22	Chemawa loam, 8 to 15 percent slopes
67	McElroy gravelly loam, 15 to 30 percent slopes
68	McElroy gravelly loam, 30 to 65 percent slopes
66	McElroy gravelly loam, 5 to 15 percent slopes
136	Timberhead gravelly loam, 30 to 65 percent slopes
135	Timberhead gravelly loam, 5 to 30 percent slopes
145	Underwood loam, 15 to 30 percent slopes
144	Underwood loam, 2 to 15 percent slopes
146	Underwood loam, 30 to 50 percent slopes
148	Undusk gravelly loam, 30 to 65 percent slopes
147	Undusk gravelly loam, 5 to 30 percent slopes

Figure 3.1-4

Landslide Hazard Areas

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Skamania County, Washington

The preliminary landslide hazard evaluation concluded that there do not appear to be any areas in the site that meet Skamania County's criteria for a Class I LHA. Figure 3.1-4 shows Class II LHAs in green. The Class II LHAs at the site are predominantly associated with the steep slopes west of proposed Tower Lines A and B. There are also steep slopes to the east of the seven southernmost Tower Lines A towers, and on both sides of Tower Line C. The Class II areas are generally bordered by smaller areas of Class III.

Volcanic Eruption

The Cascade Mountains of the Pacific Northwest region contain sixteen major volcanoes, which extend from Mount Garibaldi in British Columbia to Lassen Peak in California (Harris 1988). Four of the volcanoes within Washington and Oregon have experienced activity within historic time: Mount Baker, Mount Rainier, Mount Hood, and Mount St. Helens. Mount Adams is the closest volcano to the Project Area, situated approximately 30 miles due north, but is not historically active. Mount St. Helens is the closest historically active volcano to the Project Area, situated approximately 42 miles to the northwest.

3.1.2 IMPACTS

3.1.2.1 Proposed Action

Construction

Construction would involve approximately 108 acres of earth-disturbing activities (56 acres of permanent disturbance and 52 acres of temporary disturbance). Activities that would involve earth disturbance include tree harvesting in areas not already cleared; constructing roads and turbine crane pads; constructing foundations for turbine and meteorological towers; trenching for underground utilities; clearing and grading for the substation placement; and clearing and excavating for the foundation for the Operations and Maintenance facility at either of the two alternative locations. Approximately 50 percent of excavated soils are anticipated to be too large for re-use as backfill at foundations. Based on preliminary calculations and depending on the type of foundation design used, approximately 20 cubic yards of excavated soil would remain from each turbine foundation excavation.

Roadway improvements would be necessary to accommodate the heavy and long loads associated with the turbine towers. Improvements would be made to approximately 7.9 miles of existing roads, and 2.4 miles of new road would be built. Most of these improvements would be made in the Project Area, with the exception of off-site improvements to West Pit Road. For areas with steep slopes, it may be necessary to flatten and rebuild the slopes to allow access for the long loads required. Some steep sections of existing or new roads may be graded to create shallower grades, and some tight-radius turns may require localized rerouting of existing roads. West Pit Road would require permanent widening to accommodate long loads. Widening could include removal of trees and other vegetation, along with engineered cut and fill sections (cut and fill volumes would be calculated during final design). The road would not require paving, but would require an all-weather driving surface.

The primary impacts during construction would be potential for erosion, landslides, soil compaction and changes to topography.

Soils

Because some surface soils in the Project Area are moderately susceptible to erosion, there is some potential for adverse impacts on the site soil in areas of steep topography during grading and foundation construction, as shown on Figure 2.15-1, Landslide Hazard Classifications, in Section 2.15 of the Application for Site Certification (Appendix A).

Topography

Changes to the topography would include grading turbine foundations and access roads. The changes to topography would be minor to moderate depending on location.

Erosion

The potential for erosion or aggradation would be greatest during the construction process. The NRCS classifies surficial soils at the site as generally having medium erosion potential. During the dry season, soils that are disturbed and stripped of vegetative cover may be susceptible to wind erosion. The potential for erosion by wind and water would be minimized through the use of best management practices (BMPs).

Operation

Once the Project is constructed, the primary risks would be associated with earthquakes, volcanic activity, and landslides.

Earthquakes

Liquefaction. Liquefaction is a phenomenon whereby soils undergo significant loss of strength and stiffness when they are subjected to vibration or large cyclic ground motions produced by earthquakes. Saturated soils without cohesive fines (i.e., gravels, sands, and silts) are most susceptible to liquefaction. Other factors affecting the potential for liquefaction in soils are density, amplitude of loading, confining pressure, past stress history, age of soil deposit, the size, shape and gradation of particles, and the soil fabric structure. In earthquakes, liquefaction-induced ground settlement and lateral spreading have been the primary cause for extensive damage to aboveground structures, foundations, and pipelines.

Field investigation concluded that the potential for liquefaction is very low at this site. Test pits excavated at the Project Area encountered shallow bedrock covered with a combination of cohesive and cohesionless soil. No groundwater was observed in any of the test pits.

Structure failure could occur with enough ground shaking even without liquefaction. However, this hazard would be mitigated by adhering to seismic building codes.

Settlement. Field investigation concluded that settlement and lateral spread induced by a seismic event would be minimal, due to the low liquefaction potential.

Surface Rupture. Surface rupture occurs when a fault breaks to the land surface during an earthquake. Surface rupture is usually associated with moderate to large earthquakes (M_w 6.5 or greater) or rarely during smaller, very shallow events. There are no mapped faults crossing the site. Therefore, the potential for primary surface rupture in the proposed Project Area is small.

Volcanic Activity

Effects of volcanic activity are unavoidable and may include lava flows, mudflows, pyroclastic flows, and ash-fall. Volcanic flows are typically limited to the flanks of the volcano and major drainage channels extending from the volcano, which for all known volcanoes in the area are located outside the Project Area. The largest potential impact to the site from volcanic activity would be ash carried aloft that subsequently falls to the land surface. Based on prevailing wind patterns, the USGS (Wolfe and Pierson 1995) estimates that there is between a 0.02 and 0.1 percent annual probability that there would be 4 inches (10 cm) or more of ash deposited at the site from eruptions throughout the Cascade Range (Figure 2.15-2 in the Application for Site Certification). The adverse effects on wind turbines from ash fall would be mitigated through appropriate design.

Landslides

The landslide evaluation conducted for the Application for Site Certification concluded that the Project could be constructed and operated without danger to human life or the surrounding environment due to landslide hazards.

Although none of the proposed turbines are located within Class II LHAs, several of the towers along the western side of the Project Area (Tower Lines A and B) are located along ridgelines with descending slopes that are locally greater than 35 degrees (70 percent). Based on studies conducted for the Application for Site Certification, it appears that the primary concern for towers located adjacent to the Class II LHAs is the potential for headward erosion of the steep drainages by debris or earth flow processes. Erosion rates of these drainages are unknown, but no obvious recent mass wasting features were observed in the aerial photos or during the site reconnaissance. Further subsurface investigation in support of final tower foundation design would help determine if there are weak rock or soil layers that could contribute to more deep-seated failure of the ridges and provide information on the quality of the rock underlying the ridgelines.

Class III LHAs were delineated adjacent to proposed wind turbines along the southern Tower Line A and along Tower Line C. Class III LHAs are not anticipated to have any impact on the proposed facilities due to the robust nature of the proposed foundation designs.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. A detailed site restoration plan is required within ninety days from notification of Project termination. The initial site restoration plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The initial site restoration plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential changes to soils, topography, or erosion. If impacts to earth are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.1.2.2 No Action Alternative

Under the No Action Alternative, no structures would be built and there would be no road construction or improvement. Potential impacts to the site from geologic hazards would continue as under present conditions. Some potential for erosion could continue from ongoing logging activity, as mitigated by Washington State requirements and BMPs.

3.1.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential impacts of the proposed Project related to geology, soils, topography, and geologic hazards.

- Prior to Project construction, confirm subsurface soil and rock types and strength properties through a detailed geotechnical investigation of the specific locations of all wind Project elements, including wind turbines, access roads, underground trenching corridors, electrical grounding systems, and the substation and Operations and Maintenance facility locations.

- If detailed geotechnical investigations indicate potential for slope instability at Project facilities, ensure that design of these facilities included proper engineering to account for this risk or relocate the facilities on-site to avoid this risk.

- Prepare and implement a Stormwater Pollution Prevention Plan (SWPPP), Erosion and Sedimentation Control Plan, and Environmental Protection Control Plan to lessen soil erosion and improve water quality of stormwater run-off through stabilization practices, structural practices, and stormwater management. These Plans would be developed and approved by EFSEC prior to construction or modification of any roads or facilities. EFSEC may require the Applicant to obtain coverage under Ecology's Construction Stormwater General Permit because the Project would disturb more than 1 acre of land.

- Build all structures on the site in accordance with the seismic design provisions of the 2006 version of the International Building Code, and the American Society of Civil Engineers 07-05 standard. Foundations and buildings would be designed for Seismic Zone 2, and the values listed in Table 3.1-1 would be used for seismic design of the Project in accordance with Section 1613.5.3 of the 2006 International Building Code. The occupancy category of the proposed structure is assumed III as per Section 1613.5.6 of the 2006 International Building Code.

Table 3.1-1
2006 International Building Code Seismic Design Values

Parameter	Value	2006 IBC/ASCE 7-05 Reference
Soil Profile Site Class	C	Table 1613.5.2
0.2 Second Spectral Acceleration S_s	0.60 g	Figure 1613.5 (1)
1.0 Second Spectral Acceleration S_l	0.20 g	Figure 1613.5 (2)
Peak Ground Acceleration (0.4S_{Ds})	0.186 g	ASCE 7-05 equation 11.4-5
Site Coefficient F_a	1.16	Table 1613.5.3 (1)
Site Coefficient F_v	1.6	Table 1613.5.3 (2)
Seismic Design Category[a]	D	Tables 1613.5.6 (1) & (2)

ASCE – American Society of Civil Engineers
IBC – International Building Code
[a] Assumes Seismic Use Group III

- Conduct a visual inspection of Project facilities following any abnormal seismic activity. These inspections would look for signs of incipient mass movement in areas identified as potentially susceptible to such failures.

- Implement all stormwater pollution prevention activities prior to any clearing and site preparation. Measures would include installation of a stabilized construction entrance, wheel wash, silt fences, hay bales, temporary and/or permanent water conveyance systems, and installation of temporary and/or permanent retention ponds. Dust would be controlled as needed by spraying water on dry, exposed soil.

- Limit clearing, excavation and grading to those areas of the Project Area absolutely necessary for construction of the Project. Areas outside the construction limits would be marked in the field and equipment would not be allowed to enter these areas or to disturb existing vegetation.

- Inspect any installed run-off and erosion control structures at a frequency sufficient to provide adequate environmental protection. Such inspections would increase in frequency during rainfall periods.

- Store additional erosion control supplies, including sandbags and channel-lining materials, on site for emergency use.

- Divert surface runoff around and away from cut and fill slopes using pipes and/or protected channels. If the runoff is from disturbed areas, it would be directed to a sediment trap prior to discharge.

- Construct all Project roads to be gravel surfaced with a low profile. Road construction would be performed in multiple passes starting with the rough grading and leveling of the roadway areas, if necessary. Once rough grade is achieved, a fabric layer would be installed, base rock would be trucked in, spread and compacted to create a road base. A capping rock would then be spread over the road base and roll-compacted to finished grade.

- Placement of all spoils piles would be regulated by the conditions of the stormwater permits.

- Spread soil and rock that is excavated through grading across the site to the natural grade and reseed with native grasses or seeds to control erosion by water and wind.

- Crush larger cobbles into smaller rock for use as backfill or road material or dispose of materials offsite. Those materials that cannot be reused on site would be disposed of in accordance with Skamania County and Ecology regulations for clean fill materials.

3.1.4 UNAVOIDABLE ADVERSE IMPACTS

The primary unavoidable impacts are the potential for landslide and erosion. Both can be mitigated through appropriate design and the application of mitigation measures, but some erosion would nonetheless occur.

3.1.5 REFERENCES

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3.2 AIR QUALITY

This section describes the existing air quality conditions in the Project Area, the potential for impacts to air quality from the proposed Project, and mitigation measures designed to avoid or minimize those impacts.

3.2.1 AFFECTED ENVIRONMENT

Regulatory Overview

The Clean Air Act (CAA) is the primary federal statue governing air quality. The CAA establishes National Ambient Air Quality Standards for six "criteria pollutants," and local agencies may establish Ambient Air Quality Standards themselves, provided that these are at least as strict as federal standards. Local air quality is measured against these national and state standards, and areas that do not meet the standards are designated as "non-attainment" areas. Skamania County does not have any non-attainment areas for air quality[3].

New stationary sources of air emissions in nonattainment areas must undergo more rigorous permitting than equivalently sized sources in attainment areas, in an effort to bring the nonattainment area back into compliance with the air quality standards. The state of Washington has established rules through Ecology for permitting new sources in both attainment and nonattainment areas of the state, and additional requirements may be imposed by local air authorities. EFSEC issues authorizations for air emissions for sources under its jurisdiction. In general, if potential emissions from stationary sources exceed certain thresholds, approval from the appropriate permitting authority is required before beginning construction.

Under the CAA, new industrial sources of air pollution must receive an air quality permit prior to operation. The two most common permits associated with industrial activity emitting regulated air pollutants are Notice of Construction (NOC)/New Source Review approvals and Prevention of Significant Deterioration (PSD) permits. WAC Chapters 463-39 and 173-400 establish the requirements for review and issuance of NOC approvals for new sources of air emissions under EFSEC jurisdiction. PSD regulations apply to proposed new or modified "major" sources located in an attainment area that have the potential to emit criteria pollutants in excess of predetermined *de minimus* values (40 Code of Federal Regulations [CFR] Part 51). For new generation facilities, these values are 100 tons per year of criteria pollutants for 28 specific source categories, or 250 tons per year for sources not included in the 28 categories.

The Project is not required to go through these permitting processes. A NOC is not required for the proposed Project because there would be no permanent sources of regulated air emissions, and no backup generation or spinning reserves would be required as part of the proposed Project. A PSD permit would not be required; the generation of electricity with wind turbines does not produce air emissions because no fuel is being burned to produce energy.

Although construction emissions are not included in permitting of stationary sources, mobile sources (such as construction equipment and maintenance pickups) are regulated separately under the federal CAA. In addition, Washington State also regulates emissions generated by various construction activities. According to WAC 173-400-300, fugitive air emissions are emissions that "do not and which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening." These emissions include fugitive dust from unpaved roads, construction sites, and tilled land. Fugitive emissions are considered in determining the level of air permitting required only for a certain subset of sources, not including wind power

[3] See: http://www.ecy.wa.gov/programs/air/other/namaps/web_map_intro.htm.

projects. However, pursuant to WAC 173-400-040(8)(a), *"The owner or operator of a source of fugitive dust shall take reasonable precautions to prevent fugitive dust from becoming airborne and shall maintain and operate the source to minimize emissions."*

Other Washington state regulations that apply to nuisance emissions, including fugitive dust, and various equipment used during construction include the following:

- ***WAC 173-400-040(2) Fallout*** states that no person shall cause or allow the emission of particulate matter from any source to be deposited beyond the property under direct control of the owner or operator of the source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited.

- ***WAC 173-400-040(3–3a) Fugitive emissions*** states that the owner or operator of any emissions unit engaging in materials handling, construction, demolition, or other operation which is a source of fugitive emissions, if located in an attainment area and not impacting any non-attainment area, shall take reasonable precautions to prevent the release of air contaminants from the operation.

- ***WAC 173-400-040(4) Odors*** states that any person who shall cause or allow the generation of any odor from any source that may unreasonably interfere with any other property owner's use and enjoyment of his property must use recognized good practice and procedures to reduce these odors to a reasonable minimum.

- ***WAC 173-400-040(8a) Fugitive dust*** states that the owner or operator of a source of fugitive dust shall take reasonable precautions to prevent fugitive dust from becoming airborne and shall maintain and operate the source to minimize emissions.

- ***WAC 173-400-035 Portable and Temporary Sources*** states that for portable sources that locate temporarily at particular sites, such as rock crushers and batch plants, the owner(s) or operator(s) shall be allowed to operate at the temporary location providing that the owner(s) or operator(s) notifies Ecology or the local air quality authority of the intent to operate at the new location at least 30 days prior to starting the operation, and supplies sufficient information to enable Ecology or the local air quality authority to determine that the operation would comply with the emissions standards for a new source, and would not cause a violation of applicable Ambient Air Quality Standards and, if in a non-attainment area, would not interfere with scheduled attainment of ambient standards. The permission to operate shall be for a limited period of time (one year or less) and Ecology or the local air quality authority may set specific conditions for operation during that period. A temporary source shall be required to comply with all applicable emission standards.

Greenhouse Gases

Greenhouse gases are gases that trap heat in the atmosphere, and are implicated in potential global climate change. Some greenhouse gases such as carbon dioxide occur through both natural processes and human activities. Other greenhouse gases (e.g., fluorinated gases) are created and emitted solely through human activities. The most abundant greenhouse gasses are water vapor, carbon dioxide, methane, nitrous oxide, ozone and chlorofluorocarbons[4]. However, because different gasses have different heat-trapping effects, the most abundant greenhouse gasses are not necessarily the largest contributors to potential climate change.

Greenhouse gases are discussed in this section because in the United States, energy-related activities account for 75 percent of human-generated greenhouse gas emissions, mostly in the form of carbon dioxide emissions from burning fossil fuels. Half of all emissions from energy-related activities come from large stationary sources such as power plants (USEPA 2009).

Largely because of the contribution of hydropower, energy generation in the Pacific Northwest, including the Federal Columbia River Power System, produces less carbon dioxide per MW-hour than any other region in the United States. The Federal Columbia River Power System alone produces about 7,000 average MW of hydro-electricity even in a dry water year, enabling the region to sustain its relatively small carbon footprint.

Like hydropower, production of electricity from wind produces no direct emissions of greenhouse gasses or other air pollutants. The generation of wind energy also displaces generation from individual fossil-fuel-fired power plants or units, thereby reducing fuel consumption and the resulting air emissions that would have otherwise occurred.

State Regulation of Greenhouse Gasses

In Washington State, greenhouse gasses are regulated by RCW Chapter 80.80, which establishes goals for statewide reduction of greenhouse gas emissions. The statute aims to reduce overall greenhouse gas emissions to 1990 levels by 2020, and to 25 percent below 1990 levels by 2035. By 2050, the state intends to reduce overall emissions to fifty percent below 1990 levels. Goals also include fostering a clean energy economy by increasing the number of jobs in the clean energy sector to 25,000 by 2020, from just over 8,000 jobs in 2004. Ecology has proposed regulation (Chapter 173-441 WAC)[5], which would establish an inventory of greenhouse gas emission through a mandatory greenhouse reporting rule for owners or operators of:

- A fleet of on-road motor vehicles that as a fleet emit at least 2,500 metric tons of greenhouse gases annually in the state
- A source or combination of sources that emit at least 10,000 metric tons of greenhouse gases annually in the state

Since wind power projects would not emit greenhouse gasses during operations, these regulations are unlikely to apply to the Project.

Bonneville Power Administration Greenhouse Gas Initiatives

In 2008, BPA adopted new initiatives related to climate change, and included the issue in their strategic objectives and key agency performance targets. One of BPA's first steps was to prepare

[4] See: http://en.wikipedia.org/wiki/Greenhouse_gas#cite_note-kiehl197-6; accessed December 2009.

[5] See: http://www.ecy.wa.gov/laws-rules/activity/wac173441.html; accessed December 2009.

an initial climate change roadmap (BPA 2008)[6] intended as a step toward subsequent, more robust plans for managing greenhouse gas emissions. This document identifies near-term and long-term potential actions to meet agency targets and contribute to national and regional greenhouse gas reduction goals. As a first step in managing greenhouse gas emissions, BPA has collected data in 2009 to inventory BPA's greenhouse gas footprint, which were reported in 2010.

Background Air Quality

The Dalles, Oregon is the closest city with an air monitoring station. The Oregon Department of Environmental Quality (ODEQ) reports air quality data using an air quality index based on particulate matter 2.5 micrometers diameter and smaller ($PM_{2.5}$). ODEQ's 2008 report for The Dalles shows 339 days with good air quality, 25 days with moderate air quality, and no days with unhealthy air quality (ODEQ 2009).

While air quality in the Project Area is generally good, haze is a well-documented problem in the Columbia Gorge and the causes are being studied by the Southwest Clean Air Agency. In a 2008 Report, the agency found that haze was largely caused by winter stagnations that trap pollutants and fog (SWCAA 2008). In the summer, winds flow predominantly from the west, transporting emissions from the Portland metropolitan area into the Gorge. Wildfires also contribute to the haze when smoke is blown into the Gorge. There is no single source that is primarily responsible for haze; however, man-made sources are important contributors (ODEQ 2008). The most significant man-made sources contributing to haze in the Gorge include:

- Power plant emissions
- Woodstoves
- Motor vehicles
- Non-road emissions (e.g. ships, trains, trucks)
- Agricultural sources of ammonia

The Skamania Fish Hatchery, located west of the Project Area, collected climatological data in the Project Area for 1965–2005. Average temperatures ranged from a minimum of 38.2 degrees Fahrenheit to a maximum of 61.8 degrees Fahrenheit. Average precipitation was 84.06 inches, and there was an average of 9 inches of snow per year.[7]

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[6] Bonneville Power Administration, http://www.bpa.gov/corporate/pubs/Climate_Change_2008_Initial_Roadmap_final.pdf; accessed December 2009.

[7] Columbia Gorge Economic Development Association, http://www.cgeda.com/environment/quclimat.shtml.

3.2.2 IMPACTS

3.2.2.1 Proposed Action

The potential environmental consequences of the proposed Project include those from construction and operation. Impacts to air quality would not differ between the two alternative locations for the Operations and Maintenance Facility. Potential impacts include emissions, odors and dust.

Construction

Emissions

Construction of the Project would result in temporary air emissions from the following sources:

- Exhaust from the diesel construction equipment used for Project Area preparation (including logging), grading, excavation, and construction of on-site structures
- Exhaust from water trucks used to control construction dust emissions
- Exhaust from diesel trucks used to deliver equipment, concrete, fuel, and construction supplies to the construction site
- Exhaust from pickup trucks and diesel trucks used to transport workers and materials around the construction site and from vehicles used by workers to commute to the construction site
- Exhaust from diesel-powered welding machines, electric generators, air compressors, etc.
- Emissions from one or more portable rock crushers and one or more portable concrete batch plants, which would be used as necessary to supply the large amounts of gravel and concrete needed for the Project

The primary air pollutants from diesel-powered equipment would be nitrogen oxides, hydrocarbons, carbon dioxide, particulate matter (PM) and sulfur dioxide. In addition to these, the rock crusher and batch plant(s) would produce additional PM. These emissions would be similar in nature to those produced by any construction project that involves heavy equipment and transportation of materials to the Project Area. These construction emissions would be temporary and would be limited to the areas adjacent to the construction site. They would not affect a substantial number of persons or persist for an extended period of time and would not result in exceedance of any air quality standards.

Odors

Project construction would produce limited odors associated with exhaust from diesel equipment and vehicles, and painting the Operations and Maintenance facility, turbine towers, and other structures. The effect of odors would be temporary, and would be limited to the areas adjacent to the construction site and along haul routes to the batch plant(s) and rock crusher. Odors would not affect a substantial number of persons or persist for an extended period of time. An occasional small amount of diesel exhaust may be noted from trucks entering or leaving the site from public roadways.

Dust

Project construction would create fugitive dust from construction and re-construction of gravel roads, including from rock crushing and/or a concrete batch plant. Small amounts of dust would be created by construction-related traffic and additional wind-blown dust as a result of ground disturbance. The presence and impact of dust would be temporary, and would be limited to areas adjacent to the construction site and along haul routes. Dust would not affect a substantial number of persons or persist for an extended period of time. A small amount of dust may be noted from trucks entering or leaving the site from public roadways.

Operation

Emissions

Since the fuel source for the proposed Project would be wind, there would no emissions from the operation of the turbines. Project operation would not produce visible plumes, fogging, misting, icing, or impairment of visibility, or changes in ambient levels of pollutants. Emissions would occur from Operations and Maintenance vehicles. Travel on the Project access roads would produce minor exhaust emissions.

Avoided Emissions

Project operation would avoid the use of fossil fuel to meet the energy needs of the region. The Project's annual electricity production is estimated at 197,000 megawatt hours (MWh). This energy is equivalent to 114,000 barrels of crude oil or 654 million cubic feet of natural gas. Total electricity production can be used to estimate the emission displaced by a fossil-fuel alternative. Table 3.2-1 shows emission rates for carbon dioxide and sulfur dioxide for fossil-fuel-based power plants in the Northwest Power Pool, along with estimated emissions avoided from the operation of the wind power plant. This table also shows the displaced emissions from the Project as a percentage of Washington State emissions for 2004.

Table 3.2-1
Air Pollutant Emissions Displaced by the Project

Air Pollutant	Emission Rates[a] (lb/MWh)	Tons Displaced by Project[b]	Washington State Emissions 2005	Project as % of Washington Emissions
Carbon dioxide	1334[c]	131,466	16,882,540[c]	0.7
Sulfur dioxide	1.573	155	4,525	3.4

[a] Non-baseload output emission rates for Northwest Power Pool Western Electric Coordinating Council Northwest Region. A non-baseload emission factor was used to calculate the avoided emissions from the Project, based on guidance from the US Environmental Protection Agency that *"Annual non-baseload output emission rates … can be used to estimate GHG emissions reductions from reductions in electricity use. These output emission rates, called annual non-baseload emission rates, are the annual output emission rates for plants that combust fuel and have capacity factors less than 0.8. These new data values are derived from plant level data and supplement, rather than replace, the fossil fuel output emissions rates, which are sometimes used as a rough estimate to determine how much emissions could be avoided if energy efficiency and/or renewable energy displaces fossil fuel generation. These non-baseload output emission rates would somewhat improve this rough estimate by factoring out baseload generation, which is generally unaffected by measures that affect marginal generation"* (USEPA 2007).
[b] Estimated annual electricity production multiplied by emission rate, for example, for carbon dioxide (1,334) x [(75 MW) x (0.30 capacity factor) x 24 x 365]/2000 = 131,465.7 tons
[c.] 2005 value; values for 2005 were not available for the other pollutants listed.

By avoiding the need for fossil-fuel-powered plants, the Project would contribute to air quality by avoiding emissions associated with burning fossil fuels, including greenhouse gasses. Using wind power also likely would have a beneficial effect on visibility, since the same pollutants that affect visibility also affect air quality (ODEQ 2008).

Greenhouse Gas Emissions from the Project

Greenhouse gasses would be emitted during construction of the Project, as a result of burning fossil fuels in the construction equipment and vehicles. The amount of these emissions has not been quantified, but would be directly proportional to the number of workers and vehicles on the site. Some emissions of greenhouse gases would take place during the design, manufacture, transport of the wind turbines. During operation, greenhouse gas emissions would be the result of vehicles used for regular maintenance activities and would be much lower than during construction. Production of electricity itself would not release greenhouse gasses or other pollutants. ~~The American Wind Energy Association estimates that including generation from all sources, wind energy's carbon dioxide emissions are on the order of 1 percent of coal or 2 percent of natural gas per unit of electricity generated (AWEA 2009).~~

While greenhouse gas emissions from the Project would be low, several of the mitigation measures mentioned in Section 3.2.3 would reduce such emissions. These include limiting idling times of equipment and encouraging carpooling among construction workers.

Odor

Operation of the turbines would create no odors, as no combustion is involved and no odor-producing materials would be used in Project operations. Travel on the Project access roads would produce insignificant amounts of odor from exhaust. Maintenance of the substation and Operations and Maintenance building would produce occasional minor odors from painting.

Dust

Operation of the Project would result in minor increases in dust during regular maintenance of gravel access roads. Project-related increases to traffic on these gravel roads would generate small amounts of additional fugitive dust. This increased traffic would consist largely of weekly or less frequent trips to turbines in service vehicles for maintenance and repair activities.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential emissions or impacts to air quality. If impacts to air quality are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.2.2.2 No Action Alternative

Under the No Action Alternative, the Project would not be built. The Project Area would continue to be used primarily for timber harvests. If the No Action Alternative is selected, the growing electricity needs of the region would continue to be met through a combination of other renewable development and combustion of additional fossil fuels. In recent years, several of the new power plants proposed and constructed in the Pacific Northwest have been fossil-fuel-powered plants, primarily using natural gas as fuel in combined-cycle combustion turbines.

~~Fossil fuel power plants, in contrast to wind power projects, emit significant quantities of carbon dioxide, an important greenhouse gas linked to potential climate change. Natural-gas-powered plants also emit sulfur oxides and nitrogen oxides, which contribute to both ground-level air quality problems and acid rain. According to the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006* (USEPA 2008), air emissions from fossil fuel combustion for electricity production are a leading source of air pollution nationally, accounting for:~~

- ~~67 percent of sulfur dioxide emissions;~~
- ~~28 percent of nitrogen oxide emissions;~~
- ~~36 percent of carbon dioxide; and~~
- ~~3 percent of mercury.~~

3.2.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential construction-related air emissions and dust impacts:

- Ensure that all vehicles used during construction comply with applicable Federal and state air quality regulations.
- Implement operational measures, such as limiting engine idling time and shutting down equipment when not in use, to reduce air emissions.
- Implement active dust suppression on unpaved construction access roads, parking areas and staging areas, using water-based dust suppression materials in compliance with state and local regulations.
- Implement a dust control program to minimize any potential disturbance from construction-related dust. Dust suppression would be accomplished through application of either water or a water-based, environmentally safe dust palliative such as lignin. The use of a dust palliative such as lignin (a non-toxic, non-hazardous compound derived from trees) would result in the use of substantially less water for dust suppression and therefore less traffic from water trucks to the construction site. The final decision regarding dust suppression techniques would be made by the Construction Contractor in consultation with local authorities.
- Limit traffic speeds on unpaved Project roads to 25 mph to minimize dust.
- Encourage carpooling among construction workers to minimize construction-related traffic and associated emissions.
- Replant or gravel disturbed areas to reduce wind-blown dust.
- Implement erosion control measures to limit deposition of silt to roadways.

3.2.4 UNAVOIDABLE ADVERSE IMPACTS

The proposed Project would produce minor and temporary impacts to air quality during construction activities, similar to existing logging operations.

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3.3 WATER RESOURCES

This section describes the existing water resources in the Project Area, the potential for impacts to water resources from the proposed Project, and mitigation measures designed to minimize or avoid those impacts. Information in this section is taken primarily from the Application for Site Certification and the visual assessment completed for that document.

3.3.1 AFFECTED ENVIRONMENT

3.3.1.1 Surface Water

The Columbia River flows south of the Project Area and receives runoff via the White Salmon Basin from the east portion of the Project Area and via the Little White Salmon Basin from the west portion of the Project Area. Surface water resources in and near the Project Area are shown on Figure 3.3-1 and include the following:

One wetland labeled "Cedar Swamp" on Figure 3.3-1 and described in Section 3.4.

- Several drainages located within the Project Area boundaries, which are typed as seasonal, non-fish habitat streams or perennial, non-fish habitat streams (Figure 3.3-1). Some drainages extend upstream from these typed reaches, but lack defined channel features. Most of the drainages within the Project Area boundary would be classified as Class V streams under Skamania County's critical areas ordinance. Class V streams are small perennials streams or seasonal streams with short periods of spring or storm runoff (SCC 21A Appendix C). The tributary to Little Buck Creek may be classified as a Class IV stream as it nears the eastern Project Area boundary. The stream information has been updated from the information contained in the Application for Site Certification with additional data from field visits.

- One unnamed perennial stream crossed by West Pit Road, the proposed access road. This stream occurs in the Little White Salmon watershed. Flow was observed through the existing culvert under West Pit Road at the time of the July 2009 field visit. However, the surface flow and the channel disappear downstream of the culvert. There is no surface water connection to any other stream or waterbody.

3.3.1.2 Stormwater Runoff

Water runoff from the northeast portion of the Project Area drains southeast via Cedar Swamp and its tributaries to Little Buck Creek before flowing south to the White Salmon River, and ultimately to the Columbia River. Water runoff from the southwest area of the Project drains west and southwest to a flat area east of the Project, ultimately draining to the Little White Salmon River and then the Columbia River.

Project Area soils are classified as well-drained, with slow to moderate runoff, and slight to moderate hazard of water erosion. The presence of scour, sedimentation, steep slopes, ephemeral and perennial streams, and the soil classifications suggest that surface water runoff and infiltration within the Project are moderate (Haagen 1990).

3.3.1.3 Groundwater

A subsurface investigation was conducted in September 2007 to assess near-surface soil and rock characteristics (Appendix B). The investigation included twelve test pits excavated from seven to 16 feet in depth. Groundwater was not encountered in any of the test pits. However, these observations reflect groundwater levels at the time of the field investigation and actual groundwater levels may fluctuate significantly in response to seasonal effects, regional rainfall, and other factors not observed during this investigation. Regional or perched water tables may be present at a greater depth.

3.3.1.4 Floodplains

The Project Area is located on a series of north-trending ridges that range in elevation from approximately 2,100 to 2,300 feet, outside the 100-year floodplain for the White Salmon, Little White Salmon, and Columbia Rivers (FEMA 1986).

3.3.1.5 Public and Private Water Supplies

There are no public water supplies within the Project Area. Private water supplies are limited to water supply wells serving adjacent residences and agricultural operations.

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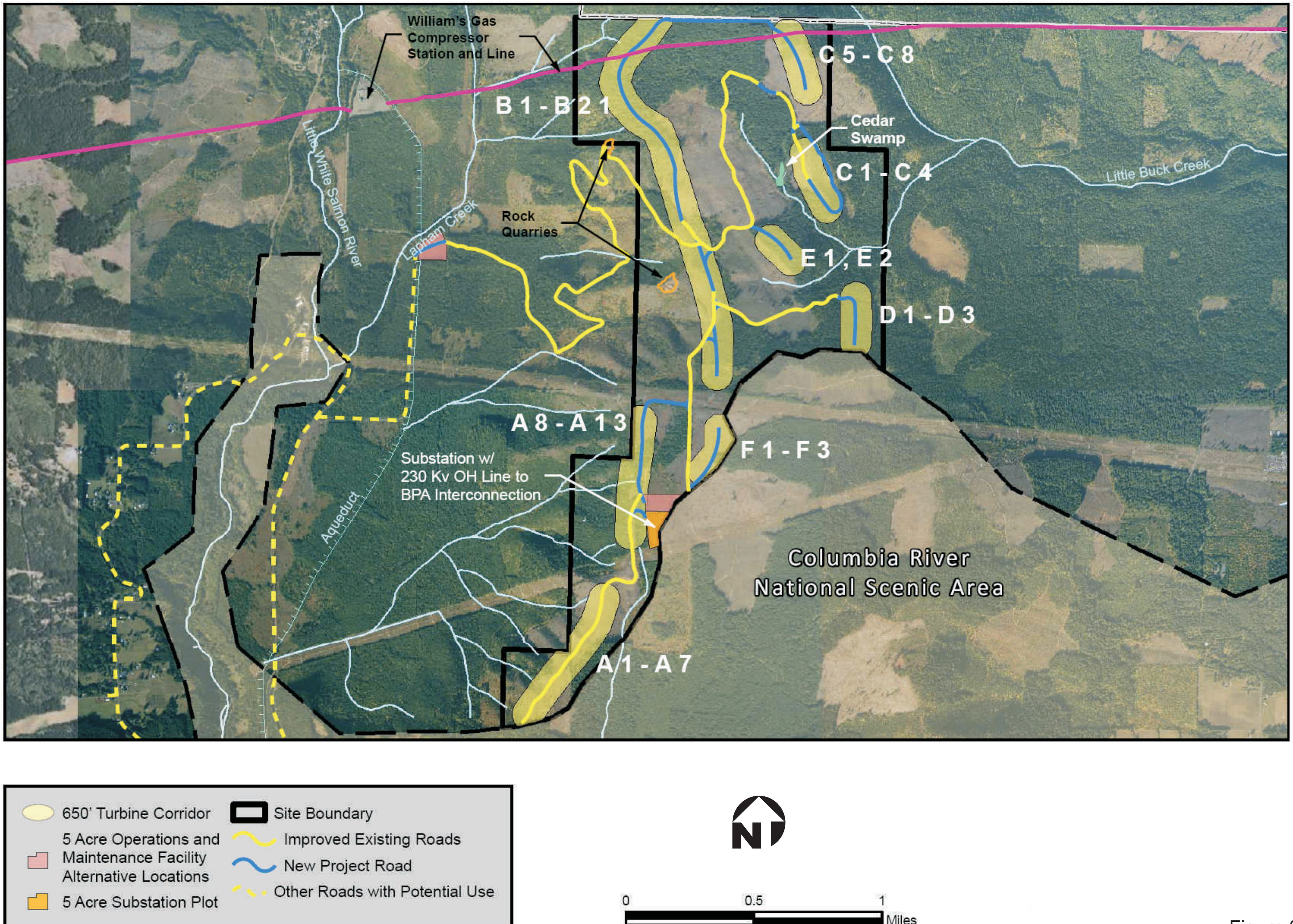

Figure 3.3-1
Waterways in the Project Vicinity

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

3.3.2 IMPACTS

3.3.2.1 Proposed Action

Construction

Surface Water

On site, Project construction would involve roadway improvements on approximately 7.9 miles of existing private, gravel logging roads, construction of approximately 2.4 miles of new gravel access roads, the Project substation, an Operations and Maintenance building at one of two alternative sites, the collector system pad, a pad for each turbine tower, and underground electric cables buried in trenches along the access roads. Temporary roadways would be built to provide additional access for heavy machinery during construction. Of these improvements, only the planned improvement to West Pit Road may directly affect water resources.

The planned improvements to West Pit Road would cross one unnamed drainage that currently flows under West Pit Road through a culvert. This drainage would be classified by Skamania County as a Class V stream. The Skamania County Code establishes buffers for Class V streams; however, expansion of existing uses is allowed within these buffers. The culvert under West Pit Road was upsized during road improvements in summer 2009. Depending on the amount of additional roadway widening that may be required, this new culvert may need to be lengthened to extend beyond the width of the improved access road. This would be determined in during final design.

Small portions of stream and stream buffer are located with the 650-foot turbine corridors used for permitting this Project. However, all streams and stream buffers would be avoided during the micrositing process.

No wetlands or other surface water bodies would be filled or otherwise affected as a result of the Project. Wetlands are discussed in further detail in Section 3.4.

Stormwater Runoff

Construction would result in approximately 108 acres of disturbed surface, of which approximately 52 acres would be restored. Use of standard construction BMPs would mitigate surface runoff and erosion from these surfaces to a minor level.

Groundwater

No impacts to groundwater are anticipated from construction. Construction water would be obtained from a supplier with valid water rights and no construction water would be withdrawn on site. Potential spills to groundwater during construction would be controlled through standard construction BMPs. A Spill Prevention, Control and Countermeasure (SPCC) Plan would be prepared.

Floodplains

The Project Area is located outside of floodplain areas. No construction impacts to floodplains would occur.

Public and Private Water Supplies

During construction, approximately 1.7 million gallons of water would be used for road construction, wetting of concrete, dust control, and other activities. Water consumed during construction would be purchased by the contractor from an off-site vendor with a valid water right and transported to the Project Area in tanker trucks. No water would be withdrawn from the Project Area during construction. There would be no water treatment requirements or methods on site. Environmentally benign dust palliatives such as lignin may be added to water used for dust suppression to improve efficiency and reduce water use.

Operation

Surface Water

No impacts to surface water are anticipated from Project operation.

Stormwater Runoff

The total Project Area is approximately 1,152 acres; however, permanently improved areas would cover approximately 56 acres, less than 5 percent of the total Project Area. Stormwater impacts from disturbed areas would be generated from this permanently improved area.

The increase in surface water runoff from this additional impervious surface is expected to be minimal. Stormwater would continue to be routed off-site via culverts and some stormwater would continue to infiltrate in the way it does currently. Based on site conditions and assuming implementation of appropriate BMPs, the net impact to absorption in the Project Area is considered negligible and there would be negligible impacts to surface water.

Approximately 22 acres would be converted from forested to non-forested habitat in the areas surrounding the turbines where re-growth of trees would be prevented. This conversion would result in minimal impacts to precipitation interception and runoff.

Groundwater

Operation of the Project would have minimal or no impacts to groundwater. The well serving the Operations and Maintenance building would use less than 5,000 gallons of water per day, and would thus be exempt from permit requirements of RCW 90.44.050 ~~RCW 90.44.040~~. The size of the aquifer is not known; however, this would be the only well in the Project Area, which is approximately 1,152 acres in size. The well would be installed by a well contractor licensed pursuant to Chapter 173-162 WAC, and in compliance with the requirements and standards of Chapter 173-160 WAC. The well would be installed consistent with Skamania County Community Development Department and Ecology requirements for new wells.

Although the amount of impervious surface would increase by approximately 52 acres with the construction of the Project, impacts to groundwater recharge during operation would be negligible.

Floodplains

The Project Area is located outside of floodplain areas. No impacts to floodplains would occur from operation of the Project.

Public and Private Water Supplies

Project operation would require water use primarily for the bathrooms, showers, and kitchen in the Operations and Maintenance building. When the Project is operational, there would be eight to nine permanent full-time and/or part-time employees on the Operations and Maintenance staff. The average total water supply needs would be less than 5,000 gallons per day.

Water supply for the Operations and Maintenance staff would be provided through a well drilled within the Project Area. All water would be discharged to a septic tank installed on site, and thus most of the water used would be returned to the aquifer. There would be no process water generated on site, and no water associated with plant operations would be discharged to surface waters.

The Project would not require the use of any water for cooling or any other industrial use, and there would be no industrial wastewater stream from the Project. The Project would require and obtain approval for the new well from EFSEC, in consultation with Skamania County Environmental Health Department and Ecology.

The Project would not require any new water rights or authorizations beyond the well for the Operations and Maintenance building.

Due to the low volume of water that would be required for operational use, no alternatives to reclaim water or other water reuse projects would be required.

Project water use is not expected to affect water levels in private wells in the vicinity of the Project. There are no public water supplies within the Project Area; therefore, no impacts are anticipated to public water supplies.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least 90 days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project’s operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential changes to surface water flow, water quality, stormwater runoff, groundwater quality, or water supply. If impacts to water resources are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.3.2.2 No Action Alternative

Under the No Action Alternative the Project would not be built, and there would be no well drilled to support the Operations and Maintenance building. No impacts to surface or ground water would occur.

3.3.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential impacts of the proposed Project related to water resources during pre-construction, construction, and operation.

- Prepare and implement a Stormwater Pollution Prevention Plan (SWPP) prior to construction of the proposed Project to lessen soil erosion and improve water quality of stormwater run-off. The SWPP would be developed to prevent movement of sediment off-site to adjacent water bodies during short term or temporary soil disturbance at construction sites. The plan addresses stabilization practices, structural practices and stormwater management (as outlined by Section 402(p) of the Federal Clean Water Act and Chapter 90.48 RCW of the State of Washington's Water Pollution Control Act).

- Identify all areas of potential chemical storage during construction, including any herbicides, and provide appropriate control measures within the SWPP.

- Control the sequence and methods of construction activities to limit erosion. Clearing, excavation, and grading would be limited to the minimum areas necessary for construction of the Project, and would not be performed far in advance of facility construction.

- Design slopes to be graded no steeper than 3 feet horizontal (H) to 1 foot vertical (V).

- Protect slopes less than 3H:1V with silt fencing as appropriate. Silt fences would be installed in locations where they would trap silt eroded from slopes during construction and prior to reestablishing vegetation. The maximum flow path to each silt fence would be approximately 100 feet. No concentrated flows greater than 1 cubic foot per second would be directed toward any fence for the 25-year storm. Silt fences would be maintained throughout the construction period and beyond, until disturbed surfaces had been stabilized with vegetation. Silt fence construction would be determined by local construction conditions during final design of the facilities.

- Design sediment control measures used during construction based on 10-year design storm specifications. Water quality measures (other than sediment removal) would be based on the 6-month, 24-hour design storm.

- Utilize sediment traps to intercept stormwater runoff and allow sediment to settle, thereby minimizing the amount of sediment flowing off site. Sediment traps would be sized for the specific disturbed area, for bare soil conditions, and typically for 75 percent sediment removal efficiency.

- Implement and emphasize erosion controls over sediment controls through non-quantitative construction activities such as:
  - Straw mulching and vegetating disturbed surfaces;
  - Retaining original vegetation wherever possible;
  - Timing grading operations to dry seasons;
  - Directing surface runoff away from denuded areas;
  - Keeping runoff velocities low through minimization of slope steepness and length; and
  - Providing and maintaining stabilized construction entrances.
- Grade control structures such as rock check dams, hay bale check dams, dikes, and swales would be used where appropriate to reduce runoff velocity, as well as to direct surface runoff around and away from cut-and-fill slopes. Swales and dikes also would be used to direct surface water on top of the filled pad toward sediment traps and away from flowing over the bank.
- Utilize the appropriate erosion control blankets designed for various weather conditions during the construction period, such as straw or jute matting or other suitable erosion control blankets, on any disturbed slopes to prevent erosion and control sediment migration.
- Use quarry spall construction entrances to reduce migration of construction dirt to public roads. Placing the construction entrances is one of the first activities required at the site, but the rock bed also must be periodically replenished as it becomes dirty or migrates into the subgrade. All construction traffic would be directed to use the construction entrances.
- Restore ground surfaces within fourteen days of the area’s final disturbance. Interim surface protection measures, such as erosion control blankets or straw matting, also may be required prior to final disturbance and restoration if warranted by the potential for erosion.
- Reduce potential for chemical pollution of surface waters during construction. Since source control is the most effective method of preventing chemical water pollution, careful control must be exercised over potentially polluting chemicals used on site during construction. Under the SPCC Plan, the general contractor would be responsible for planning, implementing, and maintaining BMPs for:
  - Neat and orderly storage of construction chemicals and spent containers in lined, bermed areas;
  - Prompt cleanup of construction phase spills; and
  - Regular disposal of construction garbage and debris.
- Train employees to utilize methods outlined by the SWPP.

- Dispose and contain garbage generated during construction properly.

- Design and incorporate BMPs into final construction plans and specifications so that operational impacts to water resources would be minor.

- Construct appropriate stormwater hydraulic and treatment facilities making sure that routine maintenance and chemical pollution prevention through source control are utilized for permanent stormwater management.

- Utilize the following constructed permanent stormwater BMPs:

  - Vegetated drainage ditches;

  - Culverts with stabilized inlets and outlets;

  - Permanent erosion and sedimentation control through site landscaping, grass, and other vegetative cover; and

  - Runoff treatment BMPs facilities would be designed to conform to the applicable Stormwater Management Manual.

- Adopt operational BMPs to implement good housekeeping, preventive and corrective maintenance procedures, steps for spill prevention and emergency cleanup, employee training programs, and inspection and record keeping practices as necessary to prevent stormwater pollution. Examples include:

  - Neat and orderly storage of chemicals under cover in the Operations and Maintenance facilities;

  - Prompt cleanup and removal of spillage;

  - Regular pickup and disposal of garbage and rubbish; and

  - Prevention of accumulations of liquid or solid chemicals on the ground or the floor.

- Train facility operators annually to in spill response and in the applicable pollution control laws and regulations.

- Train additional staff to recognize areas that may be affected by a spill and potential drainage routes.

- Train additional staff to report spills to appropriate individuals.

- Train additional staff on the appropriate material handling and storage procedures.

- Train additional staff to implement spill response procedures.

- Summarize in-house compliance inspections to be kept with the SWPP, along with any notifications of non-compliance and reports on incidents such as spills. If the SWPP has been followed but still proves inadequate to prevent stormwater pollution, Project staff would amend the SWPP and seek EFSEC concurrence with the improvements.

- Utilize BMPs to include vegetated ditches or swales which would increase infiltration to protect groundwater.

- Utilize a site development plan to protect groundwater from the on-site storage of chemicals (if any).

3.3.4 UNAVOIDABLE ADVERSE IMPACTS

Construction and operation of the Project would only result in negligible to minor impacts to water resources because the impacts are localized and the disturbance is short-term.

3.3.5 REFERENCES

Federal Emergency Management Agency (FEMA). 1986. Flood Insurance Rate Map, Skamania County, Washington; Community Panel Number 530160 075 B.

Haagen, Edward. 1990. *Soil Survey of Skamania County Area, Washington*. US Department of Agriculture, Natural Resources Conservation Service, Washington Soil Survey Program.

3.4 BIOLOGICAL RESOURCES

This section describes the existing biological resources in the Project Area, including vegetation, habitat, wetlands, special status species, fish and other wildlife. It also considers the potential for impacts to biological resources as a result of construction and operation of the Project, and mitigation measures designed to minimize those impacts. Information in this section is taken from the following background studies and reports:

- Vegetation Technical Report: Saddleback Wind Project (CH2MHill, no date) (Appendix C-1);

- Wetland Delineation Report, Saddleback Wind Energy Project (CH2MHill 2007) (Appendix C-2);

- Rare Plant Survey Report: Saddleback Wind Project (CH2MHill 2003) (Appendix C-3);

- Baseline Avian Use Surveys of the Project in Fall 2004, Summer 2006, and winter-spring 2008-2009 (West Inc. 2009a) (Appendix C-4);

- Final Report, Northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project (Turnstone 2004) (Appendix C-5);

- 2008 Final Report, Results of northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project. (Turnstone 2008) (Appendix C-6);
- 2009 Report, Results of northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project. (Turnstone 2009) (Appendix C-7);
- Bat Acoustic Studies for the Whistling Ridge Wind Resource Area in 2007 (West Inc. 2008; Appendix C-8), 2008 (West Inc. 2009b; Appendix C-9), and 2009 (West Inc. 2009c; Appendix C-10);
- Revised Report, Analysis of Cumulative Impacts on Avian, Bat and Habitat Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon (WEST 2010; Appendix C11) prepared for Klickitat County;
- Washington Natural Heritage Program (WNHP 2003a, 2003b, 2009);
- Discussions with representatives of Washington Department of Fish and Wildlife and USFWS;
- Supplemental wetland reconnaissance and special status plant surveys in May and July 2009;

3.4.1 AFFECTED ENVIRONMENT

3.4.1.1 Regional Environment

The Project Area is located in the Southern Washington Cascades Province, within the grand fir (*Abies grandis*) and Douglas-fir (*Pseudotsuga menziesii*) major vegetation zones (Franklin and Dyrness 1988). Topography in the area is characterized by generally accordant ridge crests, separated by steep, deeply dissected valleys. The prevailing climate is cool and wet. The majority of precipitation falls as snow, which may accumulate one to three meters during the winter season. The site is located on Underwood Mountain. Major drainages in the vicinity of the Project Area include the White Salmon Basin to the east and the Little White Salmon River Basins to the west, both of which drain to the Columbia River, which is located south of the Project Area.

Historically, the Project Area was dominated by grand fir and Douglas-fir. The relative abundance of each of these coniferous species was driven by elevation, aspect, underlying soil, and previous disturbance history (Franklin and Dyrness 1988). Mixed conifer and deciduous forest stands were present, typically following natural disturbance events. Deciduous forests also were present, composed mainly of alder (*Alnus rubra, A. viridis* ssp. *sinuata*), Pacific dogwood (*Cornus nuttallii*), and big-leaf maple (*Acer macrophyllum*).

For the last century, the predominant land use in the area located between Underwood Mountain and the Little White Salmon River has been commercial forest production. Lands within the Project Area are privately owned, and have been actively-managed for timber for the last century. As a result of ongoing timber harvest, forests within the Project Area are now characterized by a mosaic of stand ages; however, average stand age has declined as a result of relatively short stand rotations.

Changes in stand structure and complexity, patch size, and species distribution also have occurred. Forest management practices have resulted in a shift in species dominance to the commercially valuable Douglas-fir. ~~Changes in stand structure and complexity, patch size, and species distribution also have occurred.~~ Few large, old-growth conifers exist in the Project vicinity, and there are no late-successional stands or old forest habitats (using Washington Forest Practices habitat definition) within or adjacent to the site.[8] Canopy species within the corridor areas have been removed, and areas are managed to be devoid of shrub and tree species.

The proposed turbine corridors have been forested recently in general conformance with established timber harvest schedules, and are connected by a network of existing forest roads. Four major BPA high voltage transmission lines, located in two corridors, cross the site. Canopy species within these two corridors have been removed, and areas are managed to be devoid of shrub and tree species. The Project Area contains a network of roads ranging in width from approximately 8 to 20 feet. These roads are currently used to support logging activity and to access BPA transmission lines.

A Williams Northwest natural gas pipeline is located on the northern edge, their natural compressor station is located to the west, and cellular towers and communications facilities are located nearby. Resource mining in the area has left rock pits in places. As a result, the Project Area includes only heavily managed native habitat and is permanently committed to use by commercial forestry operations and utility infrastructure ~~no native habitat and is permanently committed to use by commercial forestry operations and utility infrastructure~~.

Initial habitat, vegetation, and special status plant surveys were conducted within the Project Area in 2003. Environmental assessments included a pre-field information review and field surveys designed to classify habitats and identify special status plants that may occur within the Project Area. Supplemental habitat, vegetation, and special status plant surveys were conducted in 2009.

3.4.1.2 Habitats

Habitat maps were created using DNR orthophotos from January 2002 and classified using the USFS Classification System (USFS 1985). Habitat maps were field-verified during the 2003 survey season. These data were entered into a GIS database and used to calculate the total acres of each habitat type that would be crossed by the proposed Project elements. The results of the habitat survey are provided in the Vegetation Technical Report (Appendix C-1).

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[8] "Adjacent" refers to defined as non- Applicant lands that were within 1.8 mile of the proposed turbine strings and/or the two known northern spotted owl management areas (Mill and Moss Creek) north of the Project Area.

Five vegetation communities and wildlife habitats were identified within the Project Area:

- Grass-forb stand (recent clearcuts);
- Brushfield/shrub stand;
- Conifer-hardwood forest;
- Conifer forest; and
- Riparian-deciduous forest.

All five of the vegetation communities are part of a mosaic of habitat that comprises a commercial forest operation, as discussed in Section 3.4.1.1. Because of these man-made conditions, which result in frequent and repeated disturbance, the quality and value of the forest is generally considered low. Native tree species are used in timber production; however, they are not allowed to become mature forests prior to harvesting. Stand structure also is considered to be low quality with limited undergrowth of a few species. Weeds are present, especially in clear cuts, which are eventually cleared for regeneration. Patch size of forests are generally small, and bisected by numerous roads, transmission lines and other facilities for logging. Timber harvest rotations are ongoing; therefore, future quality of the habitat in the Project Area is also considered low.

Grass-Forb Stand

Grass-forb stands are defined as habitats where shrubs comprise less than 40 percent crown cover and are less than 5 feet tall (USFS 1985). This stand type typically occurs when a natural or anthropogenic disturbance such as a wildfire, wind, or timber harvest results in the removal or death of the majority of large trees, or when brushfields are cleared for planting. These habitats may be devoid of vegetation, or covered by herbaceous grasses and forbs. Tree regeneration in grass-forb stands is typically less than 5 feet tall and 40 percent crown cover. Grass-forb stands within the Project Area are located primarily in recently clearcut harvest areas. Vegetation in these areas is minimal and consists predominantly of weedy herbaceous species, including bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), and dandelion (*Taraxacum officinale*). Coarse woody material, occasional slash piles, and large areas of bare ground are common in these areas.

Brushfield/Shrub Stand

Brushfields are defined as the shrub-dominated habitats (USFS 1985). These habitats typically develop following clearcut harvest, or natural disturbance that may result in removal of vegetation.

The majority of brushfields are young plantations that have been planted with Douglas-fir. The plantations typically have not reached the closed-canopy stage. Vegetation consists of remnant forest understory species, such as vine maple (*Acer circinatum*), Sitka alder, beaked hazelnut (*Corylus cornuta* var. *californica*), serviceberry (*Amelanchier alnifolia*), oceanspray (*Holodiscus discolor*), bracken fern (*Pteridium aquilinum*), sword fern (*Polystichum munitum*), and early successional species such as Himalayan blackberry (*Rubus armeniacus*), fireweed (*Epilobium angustifolium*), common yarrow (*Achillea millefolium*), pearly everlasting (*Anaphalis margaritacea*), and grasses. Large amounts of bare soil, slash and other logging debris are common.

Vegetation control has occurred in some areas as part of existing forest management practices. Control methods include herbicide application and/or mechanical control. Areas where vegetation management has occurred are visually and functionally different from areas where control has not been implemented. In areas where vegetation control has not occurred, dense vine maple thickets with occasional alder or Douglas-fir frequently occur. Patches of alder saplings, salmonberry (*Rubus spectabilis*), vine maple, red elderberry (*Sambucus racemosa*), oceanspray, lupine (*Lupinus* spp.), Oregon oxalis (*Oxalis oregana*), and grass also may be present in these areas. Small diameter coarse woody material is common.

Conifer-Hardwood Forest

Conifer-hardwood forests within the Project Area are predominantly characterized by the presence of bigleaf maple and Douglas-fir, with some red alder. The forest stand condition is characterized as a multi-layer, closed sapling-pole forest (USFS 1985). Canopy height ranges from 40 to 60 feet, and canopy closure is between 60 and 80 percent. The majority (~70 percent) of canopy cover results from the presence of Douglas-fir. The shrub layer is characterized by vine maple, salmonberry, thimbleberry (*Rubus parviflorus*), red elderberry, beaked hazelnut, and Pacific dogwood. Density of the shrub layer is variable. The herbaceous layer is characterized by sword fern, trailing blackberry (*Rubus ursinus*), oxalis, grasses, and moss. Coarse woody material is generally low to moderate. Deciduous snags are more common than conifer snags; however, short well-decayed conifer snags may be present.

Conifer Forest

Coniferous forests located within the Project Area are dominated by grand fir and Douglas-fir. Forest stand condition is primarily closed sapling-pole-sawtimber and large sawtimber. The diameter at breast height of pole-size conifers measures 8–12 inches. The diameter at breast height of sawtimber measures 12 to 23 inches. Closed sapling-pole-sawtimber stands are characterized by closed canopy, relative short live crowns, and exclusion of shrub species and many forb species. Coarse woody material in these stands is typically low, consisting mainly of remnants from historic forests. Snags are rare; however, small diameter snags become more common in the pole and sawtimber stages, as smaller individuals are out-competed.

Large sawtimber is considered to be at least 21 inches diameter at breast height. Large sawtimber stands are characterized by within-stand differentiation of canopy species, the emergence of dominant trees, and a more diverse and multilayer understory composed of shrubs and forbs. Snags and coarse woody material are generally rare; however, this may vary depending on past harvest practices, stand management, and actual stand age. The conifer forest within the Project Area is managed for commercial timber production and is replanted following harvest ~~The majority of coniferous forests within the project site is managed for commercial timber production, and is replanted following harvest.~~ Commercial timber lands are widespread throughout the vicinity of the Project Area.

Riparian Deciduous Forest

Riparian deciduous forests may develop in near-stream areas as a result of natural or anthropogenic disturbance. Riparian deciduous forest habitats are present within the Project Area in an area known as “Cedar Swamp.” Historically this area was dominated by large, old-growth western redcedar (*Thuja plicata*); however, these trees have since been harvested. Cedar Swamp is now dominated by willow (*Salix* sp.) and cottonwood (*Populus balsamifera*), with scattered occurrences of young western redcedar. Cedar Swamp is discussed further in Section 3.4.1.3.

The vegetation communities described above are common throughout the Southern Washington Cascades Province. In the proposed Project Area, these communities are maintained primarily through forest management. Because the Project is located within private commercial timber lands, existing forest management practices are expected to continue for the foreseeable future. The total acreage of each habitat type was calculated during the 2003 surveys; however, because of active forest rotation schedules, some of these areas have been harvested. Aerials photos from 2009 were used to update the habitat maps from 2003 with recent timber harvests (Figure 3.4-1). The updated acreages of each habitat type can be found in Table 3.4-1.

Grass-forb, brushfield/shrub, and conifer forest habitat types are present along West Pit Road. However, the band along the road that is within the Project bounds is too narrow to map on Figure 3.4-1.

Table 3.4-1
Habitat Types within the Project Site

Habitat Type	Area (acres)
Grass-Forb Stand	522
Brushfield/Shrub Stand	103
Conifer-Hardwood Forest	310
Conifer Forest	209
Riparian Deciduous Forest	8
Total	1,152

In addition, the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species database was searched for the area in and around the Project Area. No sensitive habitat features such as snags, talus, or Oregon white oak were identified in or within one mile of the Project Area. The Project Area is not located within any known wildlife corridor, flyway, foraging area, or migratory route.

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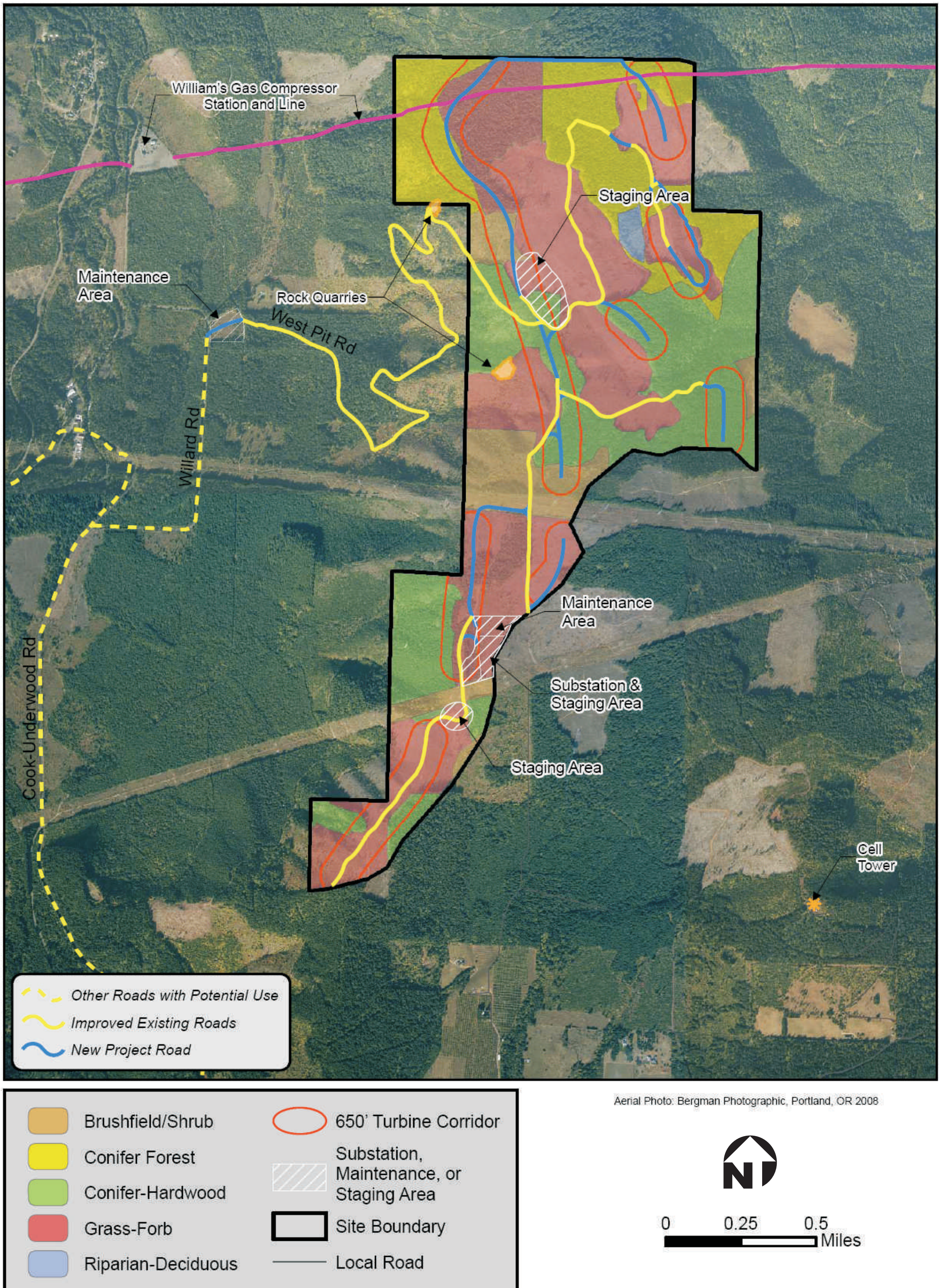

Figure 3.4-1
Habitat Types

Source: GeoDataScape.

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Skamania County, Washington

3.4.1.3 Wetlands

No wetlands or wetland indicators were identified within the Project study area (the turbine corridors and proposed access roadways). One wetland was identified outside the study area perimeter west of turbines C1-C4 (Figure 3.4-2). This wetland is labeled as "Cedar Swamp" on the USGS map and is listed as palustrine unconsolidated bottom, semi-permanently flooded, impounded (PUBFh) on the National Wetland Inventory (NWI) (Appendix C-2).

Cedar Swamp is classified as a Category II wetland according to the Washington State Wetland Rating System for Eastern Washington (Ecology 2004). The standard wetland buffer for Category II wetlands enforced by Skamania County is 100 feet. The Cedar Swamp wetland is over 150 feet from the nearest proposed turbine string or proposed road, which meets Forest Practice requirements.

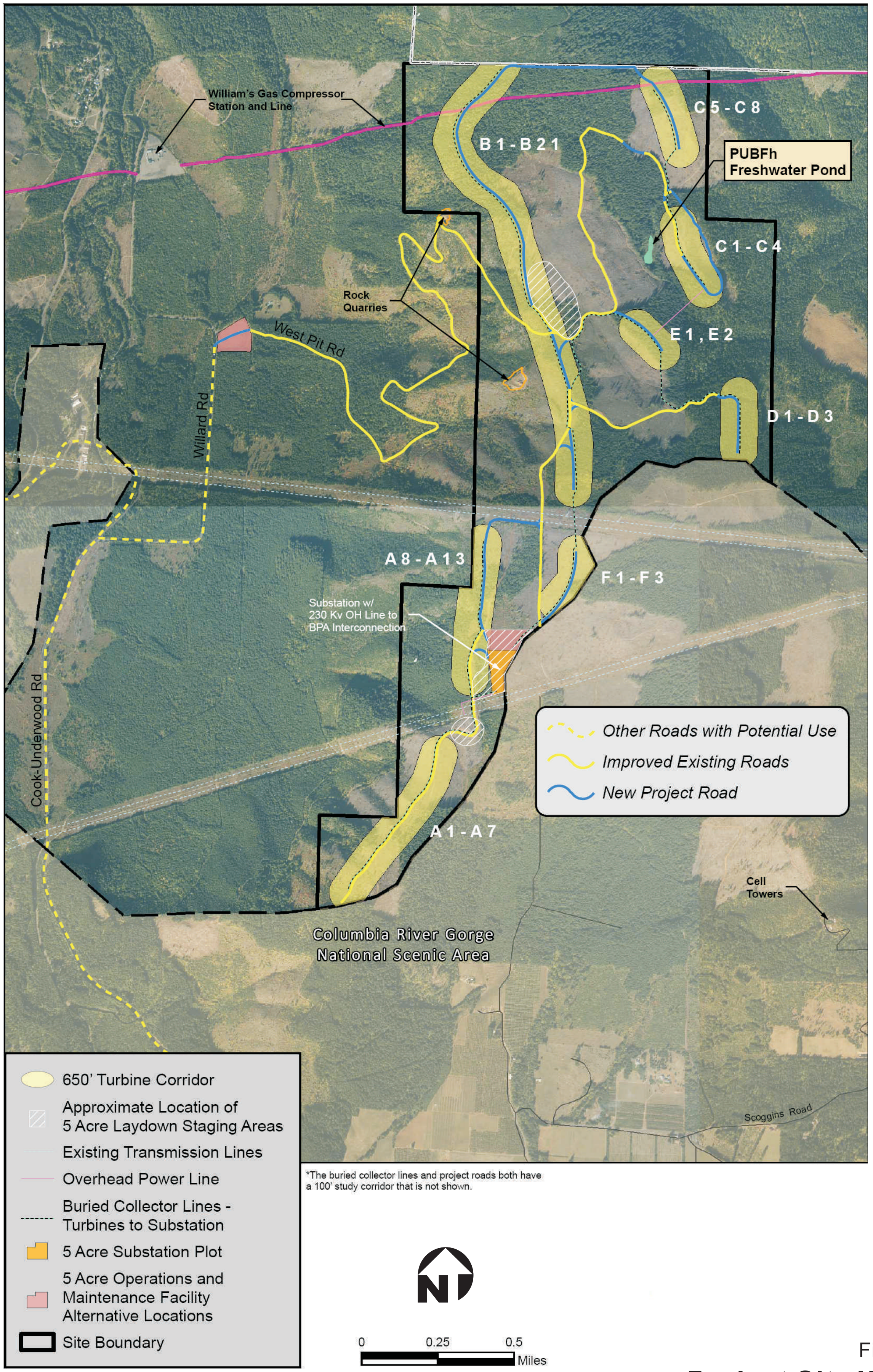
A preliminary review of the NWI was conducted for the area encompassing the construction access. Results indicate that wetlands occur along SR 14 near White Salmon, Washington (Figures 3.4-3a and 3.4-3b). The NWI does not show the presence of wetlands along any of the local secondary and forest roads proposed to be used by the Project. As the NWI is based on historic aerial photography interpretations, field investigations were conducted in May and July 2009. These investigations confirmed that wetlands do not occur along the local secondary and forest roads. See Section 3.3 for a discussion of surface water features such as streams.

3.4.1.4 Special Status Plant Species

Several sources were used to identify special-status plants that have been documented or have the potential to occur within the vicinity of the proposed Project, including:

- Listed and Proposed Endangered and Threatened Species and Critical Habitat; Candidate Species; and Species of Concern in Skamania County (USFWS 2009a);
- A Washington Natural Heritage Program (WNHP) record search of known special status plant locations in the vicinity of the Project Area (WNHP 2003a and 2009);
- *Rare Plant List for Skamania County* (WNHP 2003b and 2009).

These data indicated that no federal-listed plant species are known to occur in the vicinity of the Project Area. However, four WNHP sensitive plants occur within 2 miles of the Project Area, including branching montia (*Montia diffusa*), Suksdorf's desert parsley (*Lomatium suksdorfii*), Siskiyou false hellebore (*Veratrum insolitum*), and golden chinquapin (*Chrysolepis chrysophylla*). Two additional special status plant species are reported as historically occurring in the vicinity of the Project Area, including bolandra (*Bolandra oregana*) and white-top aster (*Sericocarpus rigidus*). Three occurrences of the Oregon white oak/Idaho fescue (*Quercus garryana/Festuca idahoensis*) vegetation community, a WNHP high-quality plant community, are documented within 2 miles of the Project Area (WNHP 2003a and 2009). These are located along the Columbia and White Salmon Rivers.



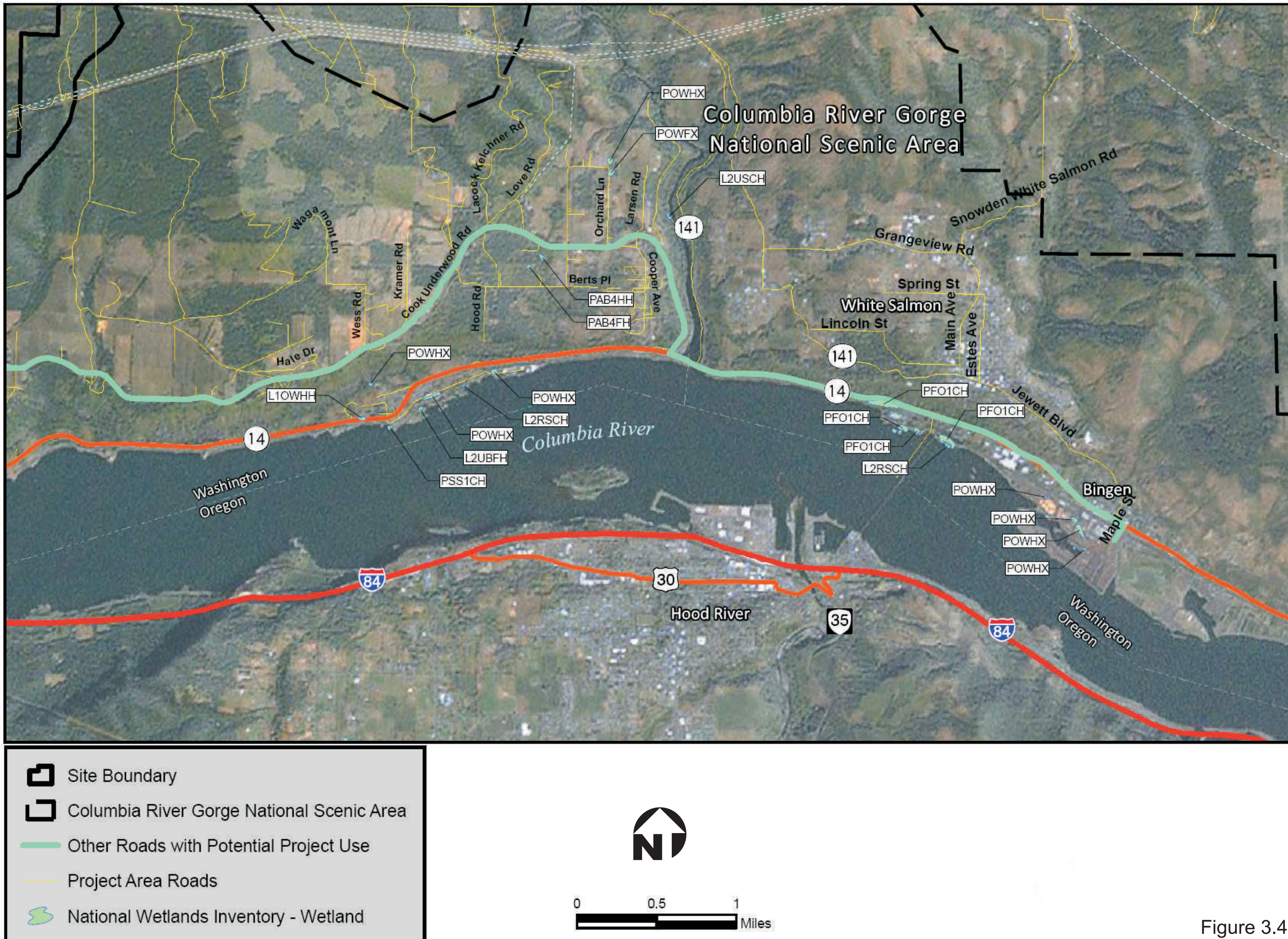
Source: GeoDataScape.

Figure 3.4-2

Project Site Wetland

URS

Whistling Ridge Energy Project
Skamania County, Washington



Job No. 33758687

Figure 3.4-3a
East Access Route NWI Wetlands

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Whistling Ridge Energy Project
Conditional Use Permit Application

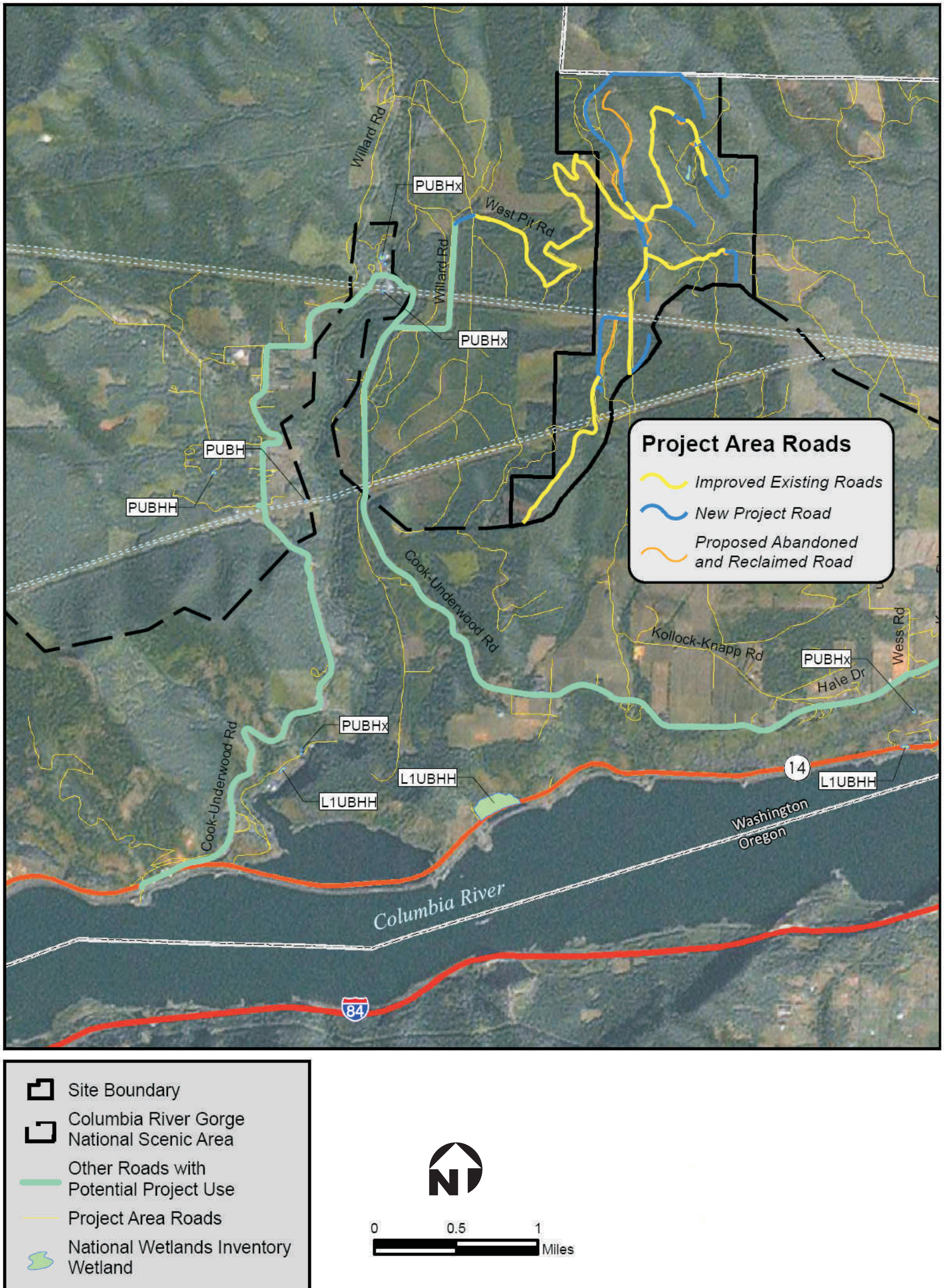

Figure 3.4-3b

West Access Route NWI Wetlands

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Whistling Ridge Energy Project
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Initial surveys were conducted in May and June 2003, and followed methods described in the US Bureau of Land Management Survey Protocols for Survey and Manage Strategy 2 Vascular Plants (Whiteaker et al. 1998). Survey dates were selected to encompass all or a portion of the blooming times of all special status plants potentially occurring in the Project Area. Surveys were conducted within a 300-foot corridor centered on proposed turbine strings and associated access roads, and a 100-foot corridor centered on existing roadways that were identified as needing improvement (Figure 3-4-4). Special status plant surveys also were conducted in proposed locations for the Operations and Maintenance facility, substation, and staging areas.

During the 2003 surveys, no special status plant species or plant communities were detected in the Project Area. A detailed account of survey methods and results, as well as a list of plant species observed during vegetation surveys, can be found in Appendix C-3.

Because turbine locations were changed from the initial alignment, field surveys conducted prior to the March 2009 Application submittal did not cover 100 percent of the proposed Project Area. Additional surveys were conducted in May and July 2009 to supplement the previous studies and included West Pit Road and underground cable routes where potential special status plant habitat could exist (Figure 3.4-4). During this survey, two WNHP Watch List species were observed within the Project Area: phantom orchid (*Cephalanthera austiniae*) and gnome plant (*Hemitomes congestum*). Watch List species are afforded no protection by any agency. Most species on the Watch List are no longer actively tracked because they were found to be more abundant than previously thought.

3.4.1.5 Special Status Wildlife Species

Seven special-status wildlife species are known to occur within the vicinity of the proposed Project: bald eagle (*Haliaeetus leucocephalus*) golden eagle (*Aquila chrysaetos*), northern goshawk (*Accipiter gentilis*), pileated woodpecker (*Dryocopus pileatus*), Vaux's swift (*Chaetura vauxi*), olive-sided flycatcher (*Contopus cooperi*) and western gray squirrel (*Sciurus griseus*). One species, the northern spotted owl (*Strix occidentalis caurina*), has been surveyed extensively within the Project Area and never detected and is therefore considered not to occur. Two additional special status species, Keen's myotis (*Myotis keenii*) and Townsend's big-eared bat (*Corynorhinus townsendii*), may occur but have not been identified in prior surveys. These species are summarized in Table 3.4-2. This section provides a detailed account of each species, their status within the Project Area, and a summary of surveys conducted within the Project Area.

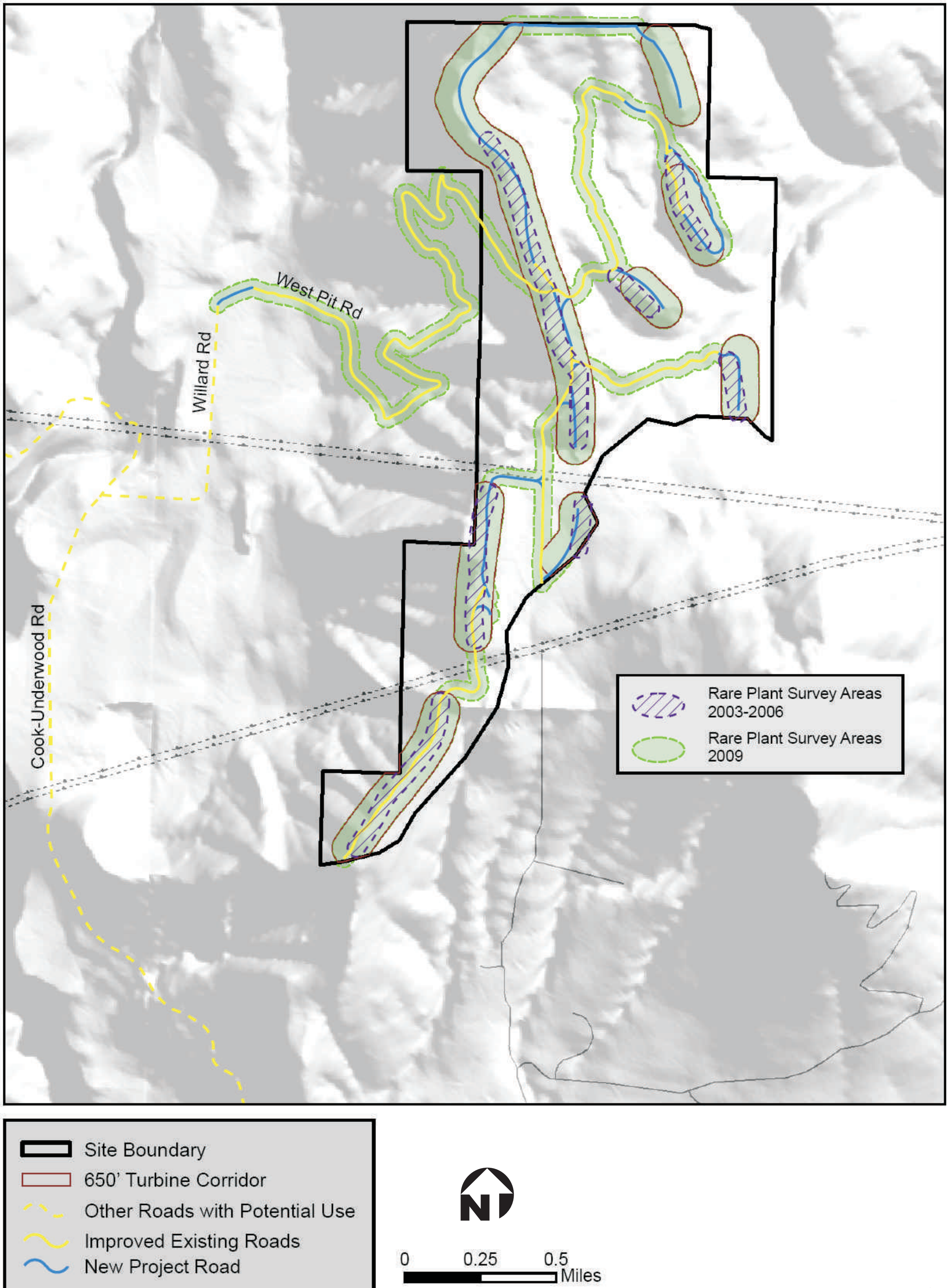

Figure 3.4-4

2003-2006, 2009 Rare Plant Survey Areas

Table 3.4-2
Federal and State Special Status Species with the Potential to Occur in the Vicinity of the Whistling Ridge Energy Project Site

Common Name	Scientific Name	Washington State Status	Federal Status	Potential to Occur
BIRDS				
Bald eagle	*Haliaeetus leucocephalus*	Sensitive	Species of Concern, Bald Eagle Protection Act	Known to Occur
Golden eagle	*Aquila chrysaetos*	Candidate	Bald Eagle Protection Act	Known to Occur
Northern goshawk	*Accipiter gentilis*	Candidate	Species of Concern	Known to Occur
Northern spotted owl	*Strix occidentalis caurina*	Endangered	Threatened	Does not Occur
Olive-sided flycatcher	*Contopus cooperi*	-	Species of Concern	Known to Occur
Pileated woodpecker	*Dryocopus pileatus*	Candidate	-	Known to Occur
Vaux's swift	*Chaetura vauxi*	Candidate	-	Known to Occur
MAMMALS				
Western gray squirrel	*Sciurus griseus*	Threatened	Species of Concern	Known to Occur
Keen's myotis	*Myotis keenii*	Candidate	-	May Occur
Townsend's big-eared bat	*Corynorhinus townsendii*	Candidate	Species of Concern	May Occur

Bald Eagle

The bald eagle is a state and federal species of concern, and also protected under the Bald Eagle Protection Act of 1940 (16 United States Code [USC] 668-668d, 54 Stat. 250) which prohibits the taking, possession and commerce of such eagles. In Washington, bald eagles are year-round residents. In addition, many bald eagles from northern areas migrate south to Washington during the winter. In Washington they occur generally in coastal waters or near large inland lakes or rivers. They are considered "fairly common" during the winter near the Project Area, but likely occur nearby year round (BirdWeb 2009). The Columbia River is approximately two miles south of the Project Area, and the White Salmon River is approximately three miles east of the Project Area. These are the two nearest likely foraging locations for bald eagles. One bald eagle was recorded in the Project Area in 2009 during surveys for northern goshawk. In addition, three bald eagles were observed during the winter of 2008–2009 during baseline avian surveys. Two were observed flying within the rotor-swept area, and one below.

Golden Eagle

The golden eagle is a Candidate under the Endangered Species Act and also protected under the Bald Eagle Protection Act of 1940 (16 USC 668-668d, 54 Stat. 250) which prohibits the taking, possession and commerce of such eagles. In Washington, golden eagles are year-round residents, primarily in the eastern part of the state. The Project Area is at the westernmost edge of their year-round distribution, where they are considered "uncommon" (BirdWeb 2009).

Golden eagles require open areas with large, rocky cliffs or large trees. They are often found in alpine parkland and mid-elevation clear-cuts, as well as shrub-steppe area and open forests. Although they soar at high altitudes, they drop down to the ground to capture prey. They prey on mid-sized mammals such as marmots, rabbits, ground squirrels, and birds.

Two golden eagles were recorded during the fall of 2004. The timing of this observation was consistent with localized or longer distance migration of this species in the fall. One was observed flying at a height within the rotor-swept area, and one was observed flying above the rotor-swept area. None were recorded during the summer of 2006 during baseline avian studies in the Project Area, which is consistent with the Project Area being outside of the species breeding distribution.

Northern Goshawk

The northern goshawk is categorized as a "species of concern" by the USFWS, and as a "listing candidate" for sensitive, threatened or endangered species by the State of Washington. Goshawks inhabit a wide variety of forest habitats, including true fir (red fir, white fir, and subalpine fir), mixed conifer, lodgepole pine, ponderosa pine, Jeffrey pine, montane riparian deciduous forest and Douglas-fir. Goshawk nest sites tend to be associated with patches of relatively large, dense forest; however, home ranges often consist of a wide range of forest age classes and conditions. Nest sites tend to be positively correlated with proximity to water or meadow habitat, forest openings, level terrain or "benches," northerly aspects and patches of larger, denser trees, although variation in habitat associations does occur (USFS 2002). Although they inhabit and hunt dense forest sites, they also hunt in open areas. They hunt on the wing, and by swooping down on ground-dwelling prey.

In Washington State, goshawks occur year-round and in some areas only during the non-breeding seasons. The Project Area is located in an area where either may occur, and the eastern slope of the Cascades is considered the most common place to find this "uncommon" species (BirdWeb 2009). This species is generally non-migratory. Some birds move to lower elevations in the winter.

Northern goshawks were recorded during avian surveys during the fall of 2004 and the summer of 2006. A total of five individuals were sighted; two during the fall and three during the summer (Figure 3.4-5). They were observed flying both within and above the rotor-swept height during surveys. Results of these surveys are detailed in Appendix C-4.

In response to the baseline data, and in order to better understand these sightings, the Applicant commenced multi-year, species- and season-specific biological surveys for Northern Goshawk. These surveys were developed based on best available survey protocols described below, and in consultation with WDFW. Northern goshawk surveys were conducted during the spring and summer seasons in 2004, 2008, and 2009, which are the time of year when goshawks would be most expected to occur. Surveys occurred on properties managed by the Applicant, Broughton Lumber and adjacent private land.

In 2004, protocol-level surveys were conducted in suitable habitat located in four core Project sections, including the provincial home range radius of 0.5 mile around the core area (see Map 7, Appendix C-5). Suitable habitat was identified using topographic maps and aerial photography.

Survey stations were establish at 0.2-mile intervals on roads and trails located in suitable habitat within 0.5 mile of a proposed wind turbine location. Potential goshawk habitat was surveyed in accordance with "Survey Methodology for Northern Goshawks in the Pacific Southwest Region" (USFS 2002). Two rounds of surveys were completed, including 185 calling stations each time. All raptor species responses detected during surveys also were recorded. No Northern Goshawks were recorded during the 2004 surveys. Detailed methodology and results for northern goshawk surveys can be found in Appendix C-5.

In 2008, the potential survey area for the northern goshawk was determined by protocol parameters outlined in the Northern Goshawk Inventory and Monitoring Technical Guide (USFS 2006), consultation with WDFW biologists, and GIS analysis. The survey area was established by placing a 150-foot buffer around the turbine string layout, and then adding an additional 2,624 foot buffer per protocol (see map in Appendix C-6). Forest stands with greatest potential to contain suitable habitat structure and composition to support northern goshawk were identified using GIS data and aerial photographs. Criteria for selecting stands included stand age greater than 25 years, and an average tree diameter at breast height of at least 12 inches. Based on these criteria, 1,100 acres was identified for surveys (Figure 3.4-5).

It was determined that the "Broadcast Acoustical Survey" methodology would be used for a two-year survey effort (2008 and 2009). Biologists completed two protocol surveys at 136 calling stations during the 2008 goshawk survey season. The first survey was conducted during the nesting period, and the second during the fledgling period. No northern goshawk responses were documented during either of the two site visits in 2008. In 2009, in addition to the two rounds of Broadcast Acoustical Surveys, two rounds of "Intensive Search" surveys were completed. These surveys were conducted where the turbine alignment extended north from prior project design. No goshawks were recorded during either type of surveys in 2009. Detailed methodology and results for 2008 can be found in Appendix C-6. The full methods and results for the 2009 surveys can be found in Appendix C-7.

Northern Spotted Owl

The Applicant conducted surveys and analysis to determine northern spotted owl occupancy. ~~The Applicant conducted surveys and analysis to confirm the absence of northern spotted owls or spotted owl activity centers in the vicinity of the proposed project.~~ Additionally, the Applicant coordinated and met with USFWS regarding its surveys and analysis for the northern spotted owl.

On April 9, 2009, the Applicant met with the USFWS to discuss the proposed Project. On May 14, 2009, the USFWS met the Applicant at the site for a site visit. On July 13, 2009 and September 14, 2009, the Applicant met with USFWS to further discuss the studies that have been performed for northern spotted owl. This section documents all the information that the Applicant obtained from its discussions with USFWS, and the surveys and analysis conducted by the Applicant.

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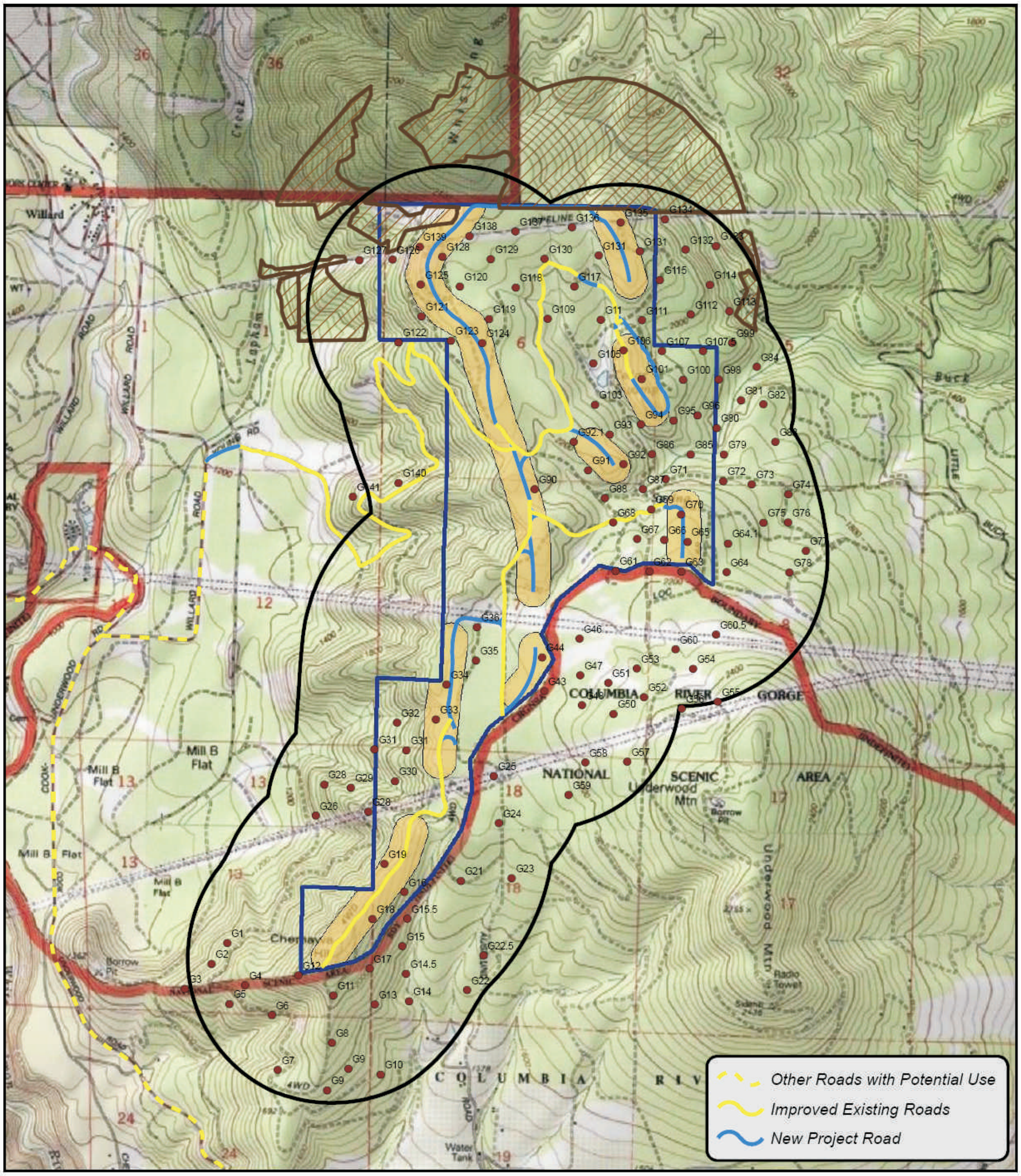

• Broadcast Acoustic Survey Points	650' Turbine Corridor
Broadcast Acoustic Potential Survey Area	Site Boundary
Intensive Search Survey Area	

N

0 0.25 0.5 Miles

Figure 3.4-5

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2008-2009 Northern Goshawk Survey Locations

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A total of 9 turbines are proposed within the 1.8 mile provincial range of two northern spotted owl activity centers. There are no proposed turbines located within the 500 acre core areas of these activity centers. Two historical meeting sites on public lands near the property have not been used in over six and eight years, respectively, and are no longer considered to be occupied by USFW endorsed protocols. However, based on federal and state law, the areas are considered occupied until decertified by WDFW or USFW. ~~As detailed below, extensive surveys indicate that neither northern spotted owls nor northern spotted owl activity centers are present in or around the proposed project area. In addition, the project would not be located within a habitat area designated as critical or identified as essential to owl recovery~~. Given the extensive survey record confirming the absence of northern spotted owls, the proposed Project would not pose a risk of taking northern spotted owls under the Endangered Species Act Section 9 and its regulations (50 CFR § 17.3).

Northern Spotted Owl Distribution and Status

The northern spotted owl is one of three spotted owl subspecies, and the only one found in Washington State. They are distributed from extreme southwestern British Columbia to northern California. In Washington State, they inhabit the Eastern and Western Cascades, Western Lowlands and Olympic Peninsula Provinces. Within these regions, northern spotted owls are associated with a variety of areas containing suitable habitat for nesting, roosting, foraging and dispersal. They prefer forest habitats characterized by multi-layered canopy and a high incidence of large trees that provide suitable structure for nesting and roosting. They have large home ranges and use large tracts of land containing late successional forests. Fragmented forest habitats may be used for dispersal and foraging. They nest in stick nests of northern goshawks, on clumps of mistletoe, in large tree cavities, on broken tops of large trees, or on large branches or cavities in bands and rock faces.

Northern spotted owls are designated as threatened under the Endangered Species Act (16 USC §§ 1531-1544), as well as under Washington State law (WAC 232-12-297). Because they are listed under the Endangered Species Act, USFWS has designated northern spotted owl critical habitat and issued a northern spotted owl recovery plan (USFWS 2008). In addition, the Endangered Species Act prohibits the "take" of northern spotted owls, which includes modifying habitat in a manner that impairs significant behavioral patterns and results in actually killing or injuring an animal (50 CFR § 17.3).

As described in detail below, the Project is not located within habitat designated as critical or identified as essential to northern spotted owl recovery. In addition, the owls prefer forest habitats characterized by multi-layered canopy, and a high incidence of large trees that provide suitable structure for nesting and roosting. No such forests are present within the Project Area. Most importantly, however, extensive surveys following USFWS protocol indicate that the Project is not sited in or near northern spotted owls or spotted owl activity centers. Two historical nesting sites on public lands near the property have not been used in over six and eight years, respectively, and are therefore no longer considered occupied site centers pursuant to USFWS protocol and state law. Based on these facts, this analysis concludes that northern spotted owls would not be "taken" by the proposed Project.

Survey History and Description

The Applicant contracted with Turnstone Environmental Consultants (Turnstone) to conduct wildlife investigations in the proposed Project Area. Surveys were conducted in 2003, 2004, 2008 and 2009, and all surveys followed the Protocol for Surveying Proposed Management Activities that May Impact Northern Spotted Owls (USFWS 1992). In addition, the National Council for Air and Stream Improvement (NCASI) surveyed historical activity centers near the Project Area each year since 1994, the last six years of which were under contract with the DNR. These surveys were conducted in support of an ongoing owl demography monitoring study and, while focused on the same activity centers, placed more emphasis on the nest cores. Table 3.4-3 summarizes the survey results.

Table 3.4-3
Whistling Ridge Energy Project Site Survey Results for Northern Spotted Owl at the Mill Creek and Moss Creek Core Areas

Year	Mill Creek Core Survey Results		Moss Creek Core Survey Results	
	Spotted Owl	Barred Owl	Spotted Owl	Barred Owl
2009	no response	male observed	no response	pair observed
2008	no response	male & female observed	no response	pair observed
2004	no response	present*	no response	present*
2003	no response	present*	no response	no response

* = Surveyor unable to determine sex of barred owl detected.

Project Area Surveys. Surveys were conducted in suitable habitat located in and adjacent to the proposed Project Area, and included two historical spotted owl activity centers, discussed in further detail below. Suitable habitat was conservatively defined as stands with 12-inch diameter at breast height and greater with a canopy cover of 60 percent or greater[9]. Suitable habitat was identified using topographic maps, aerial photography, and stand classification data from the Applicant. Figure 3.4-6 indicates the location of survey calling stations.

During the 2003–2004 survey periods, the Project Area was surveyed from March–July 2003 using the one-year survey methodology, and from March–August 2004 using the two-year survey methodology. USFWS protocol allows a six-visit survey followed by three-visit survey over two years to rule out northern spotted owls for the following two years (USFWS 1992). No northern spotted owls were detected during the 2003–2004 surveys. See Maps 1 through 5 in Appendix C-5 for 2004 survey locations.

[9] Features that support nesting and roosting typically include a moderate to high canopy closure (60 to 90 percent); a multilayered, multi-species canopy with large overstory trees (with diameter at breast height greater than 30 inches); a high incidence of large trees with various deformities (large cavities, broken tops, mistletoe infections, and other evidence of decadence); large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for spotted owls to fly (Thomas et al. 1990.)

More recent northern spotted owl surveys were conducted from May–July 2008 and May–August 2009 (Appendices C-6 and C-7). Surveys were conducted using the USFWS protocol two-year survey methodology, which requires a minimum of three visits for two consecutive years in order to determine presence or absence (USFWS 1992). Surveys were implemented in all potentially suitable habitat located within a 1.8-mile radius of the corridor. This area totaled 14,901 acres. The survey area also included the historical activity centers discussed below, which expanded the survey area by 7,222 acres. No northern spotted owls were detected in either the survey area or historical activity centers in the 2008–2009 surveys.

The Project's proposed layout was finalized in October 2008 and included additions to proposed turbine strings, removal of previously proposed turbines, and identification of areas requiring improved roadways. Changes to the Project layout resulted in lands added to the Project Area that, in some cases, were not included in wildlife surveys conducted prior to October 2008. The final turbine alignment did expand the area requiring owl surveys; however, because the survey area had included spotted owl activity centers located at the northern reach of the proposed Project Area, the area was accounted for in the 2008 and 2009 surveys.

Historical Activity Centers. Two historical northern spotted owl activity centers, Mill Creek (master site no. 0991) and Moss Creek (master site no. 1003), are located near the Project Area (Figure 3.4-6). The nest cores of both activity centers are located on public lands managed by DNR and USFS. The Mill Creek activity center is composed of contiguous but scattered northern spotted owl habitat located on private and DNR lands. This site was designated in 1992, and the last known spotted owls were a non-nesting pair seen in 2000 (Table 3.4-4 and T. Flemming, personal communication.). Since 2000, neither the surveys conducted by the Applicant nor DNR/NCASI have found northern spotted owls.

The Moss Creek activity center is composed of patchily distributed northern spotted owl habitat and a mix of rural residential lands, industrial timberland, and lands administered by DNR and USFS. This activity center was established in 1994 and the last known spotted owl was a male detected in 2002 (Table 3.4-4). Since that time, the Turnstone and DNR surveys have not resulted in any detections.

The longstanding absence of any northern spotted owls at these locations suggests that these historic site centers likely no longer qualify for special protection. As of January 1, 2009, a site center is defined under WAC as the location of status 1, 2 or 3 northern spotted owls, where status 1 means a male and female owl pair (i.e., observed in proximity to each other, a female detected on a nest, or one or both adults observed with young); status 2 means a male and female owl where pair status cannot be determined; and status 3 means either (a) "the presence or response of a single owl within the same general area on three or more occasions within a breeding season" where there is no response by an owl of the opposite sex after a complete survey, or (b) three or more responses over several years (WAC 222-16-010). Only sites documented in substantial compliance with WDFW protocols and quality control methods would be considered site centers (WAC 222-16-010).

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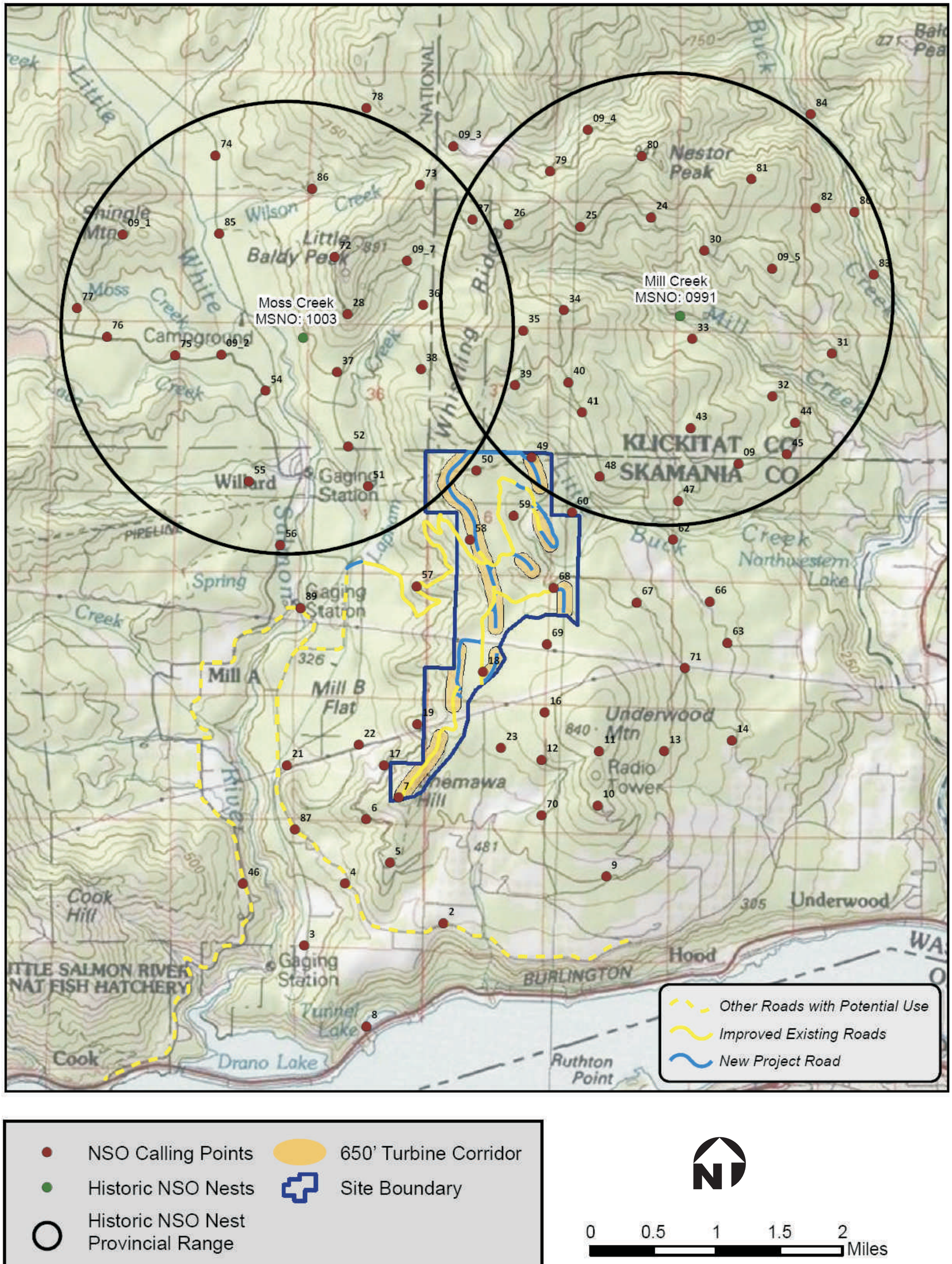

Figure 3.4-6

2008-2009 Spotted Owl Calling Points

Job No. 33758687

Table 3.4-4
DNR/NCASI Mill Creek and Moss Creek Owl Data

Year	Mill Creek (T4N R10E)		Moss Creek Campground (T4N R9E)	
	Spotted Owl	Barred Owl	Spotted Owl	Barred Owl
2008	no response	pair	no response	male
2007	no response	no response	no response	male
2006	no response	pair	no response	male
2005	no response	male	no response	pair
2004	no response	pair	no response	pair + 1 juvenile
2003	no response	no response	no response	no response
2002	no response	male	male	pair + 1 juvenile
2001	no response	-	no response	-
2000	pair	-	nest	-

Source: Washington Department of Natural Resources (T. Flemming, personal communication). 2003-2008 surveys conducted by NCASI pursuant to DNR contract; 2000-2002 survey data provided to DNR by NCASI.

No surveys—whether in substantial compliance with WDFW protocols or otherwise—have documented status 1, 2 or 3 owls on the Mill Creek or Moss Creek sites since January 1, 2009, when the new rule became effective. Furthermore, the Turnstone and DNR/NCASI surveys affirmatively documented the absence of northern spotted owl site centers at these locations. Therefore, the Mill Creek and Moss Creek locations do not meet the definition of a site center under Washington regulations. Even if they did, they should qualify for decertification under the interim decertification rules passed by the Washington Forest Practices Board[10].

Similarly, the USFWS protocol allows a historical activity center to be considered unoccupied if no owl responses are obtained after three years of surveys using protocol guidelines (USFWS 1992). These surveys do not need to be consecutive; the protocol anticipates that surveys would be conducted in one- or two-year increments (not three). In any case, however, the DNR/NCASI surveys of the Moss Creek and Mill Creek centers were conducted annually and obtained no responses over six and eight years, respectively. Based on the collective Turnstone and DNR/NCASI surveys, these centers should therefore be considered unoccupied pursuant to the USFWS protocol.

Barred Owl Concerns. During the 2003–2004 and 2008–2009 Project Area surveys described above, only barred owls were detected. In addition, the Applicant learned that the USFWS is in the process of revising its protocol for 2010 to include special guidance for conducting surveys where barred owls are detected. After the 2008 surveys, the Applicant consulted with USFWS,

[10] See Washington State Register 09-02-202 (amending WAC 222-16-080(6)(b) (re-promulgated in Washington State Register (WSRs) 09-10-012 [filed April 24, 2009], 09-18-047 [filed August 27, 2009], 10-10-133 [filed December 21, 2009], and 10-06-026 [filed February 22, 2010]) (emergency rules effective for 2009 calendar year and until June 17, 2010 when a permanent rule became effective [WSR 10-11-081, filed May 17, 2010] establishing "spotted owl conservation advisory group" to determine whether northern spotted owl site center need be maintained based on surveys demonstrating absence of the owls).

and was instructed to follow existing survey protocol (K. Berg, personal communication). The Applicant did so, but also incorporated USFWS's suggestion that biologists visit core areas during the day to look for northern spotted owls, which might not respond in the presence of barred owls. Biologists conducted three day-time site visits over the seasonal breeding window in 2009 but did not detect any northern spotted owls.

NSO Habitat Designations

Federal and state habitat designations can be useful in characterizing the importance of certain areas to spotted owl life cycles and recovery. In this case, as described in the subsections below, the Project would not be located in the areas designated as most critical to northern spotted owls or identified as essential to their recovery. The Project would be located within a state-delineated management area, but the absence of a site center means that management restrictions would not be applicable to the Project Area.

Managed Owl Conservation Area and Designated Critical Habitat Area. The USFWS released its Final Recovery Plan for the Northern Spotted Owl in 2008 (USFWS 2008), which recommends a network of habitat blocks, or managed owl conservation areas (MOCAs), on federal lands in the west-side provinces in the northern spotted owl range. MOCAs were designated to correspond to the owl's full geographic distribution. The recovery plan's strategy focuses on managing MOCAs to support self-sustaining populations of 15 to 20 spotted owl pairs, as well as spacing and managing areas between MOCAs to permit owl movement between and among MOCAs (USFWS 2008). The revised critical habitat designation, also issued in 2008, concluded that the MOCA network is "sufficient to achieve the recovery" of northern spotted owls and designated only those lands as critical (73 Federal Register page 47,328). The Project Area is not located within, adjacent to, or between federally designated MOCAs or, therefore, corresponding designated northern spotted owl critical habitat (Figure 3.4-7).

Conservation Support Area. In the final recovery plan, USFWS delineated Conservation Support Areas (CSAs) to support designated MOCAs. CSAs are areas between or adjacent to MOCAs where habitat contributions made by private, state or federal land managers "are expected to increase the likelihood that [spotted owl] recovery is achieved, shorten the time needed to achieve recovery, and/or reduce management risks…" (USFWS 2008). In Washington State alone, the USFWS delineated 2,163,453 acres as CSA habitat.

The proposed Project Area is located within the Klickitat CSA, a 425,114-acre mix of private, state and federal lands (Figure 3.4-7). The Project Area's location within a CSA does not mean that spotted owls are present in the Project Area, or that modification of the area would compromise owl recovery. As the USFWS explained in excluding CSAs from designated critical habitat, "although recognized as potentially helpful in achieving recovery plan goals, these areas were not considered essential to the conservation of the species" (73 Federal Register page 47,331). Although CSAs are not unimportant, the recovery criteria for northern spotted owl populations *"do not require the contributions of [CSAs] as an essential component of recovery"* (USFWS 2008). Moreover, to the extent CSA lands provide an important function in supporting the MOCA network, it is worth noting that the Project Area constitutes just 0.27 percent of Klickitat CSA lands and 0.053 percent of Washington CSA lands.

Spotted Owl Special Emphasis Area. In 1996, Washington State finalized a rule identifying ten spotted owl special emphasis areas (SOSEAs) to complement protections provided by the Northwest Forest Plan. The proposed Project is located in the southernmost portion of the White Salmon SOSEA which, like the Klickitat CSA, was delineated with the goal of providing demographic support (WAC 222-16-086[10]). In such areas, any suitable spotted owl habitat should be maintained (WAC 222-10-041[1]). More specifically, all suitable habitat within 0.7 mile of a site center plus 2,605 acres (approximately 40 percent) of suitable habitat within the median home range circle (a 1.8 mile radius) is assumed necessary to maintain the site center's viability (WAC 222.10.041[4]). This 40 percent suitable habitat level corresponds with USFWS research on the level of habitat necessary to avoid take and support recovery[11]. According to DNR, both the Mill Creek and Moss Creek site centers exceed 40 percent of the suitable habitat[12]. The proposed Project would not alter that fact. Therefore, the SOSEA limitations on habitat use or modifications do not restrict use of the Project Area as a wind turbine energy facility (WAC 222.10.041[4]). Forest practices within a SOSEA are therefore allowed to proceed so long as they do not affect the 40 percent suitable habitat threshold.

Habitat Conservation Plans. A review of USFWS habitat conservation plans issued in the Pacific region indicates that there is one spotted owl-related habitat conservation plan (HCP) applicable in or near the Project Area (USFWS 2009b). The HCP covers DNR managed land directly to the north of the Project site, but not the Project site itself. ~~A review of USFWS habitat conservation plans issued in the Pacific region indicates that there are no spotted owl-related habitat conservation plans applicable in or near the project area (USFWS 2009b).~~

The Applicant has sited the proposed Project to avoid habitat areas deemed critical to northern spotted owls or essential to their recovery. Surveys conducted pursuant to USFWS protocol indicate that spotted owls are not present in or near the Project, and that nearby historical sites are no longer occupied pursuant to USFWS protocol or state law. Because there are no spotted owls or activity centers present in the Project Area, no Project impacts to northern spotted owls are expected. Finally, the Project would not affect the White Salmon SOSEA's 40 percent suitable habitat level and therefore is not restricted by Washington's forest practice regulations. Given the extensive record and review, this Project does not pose a risk of taking northern spotted owls under The Endangered Species Act Section 9.

Olive-Sided Flycatcher

The Olive-Sided Flycatcher is not listed as federally or state threatened or endangered, however, it is considered a federal species of concern. The Project habitat is not very conducive for this species, and that is why only a few individuals were observed. The species does migrate and it would not be expected in the Project Area in winter or early spring. This species occurs in forest habitat and adjacent cleared areas such as burned areas or clear cuts. They perch high in treetops and catches insect prey on the wing in cleared areas. They breed in Washington State and also

[11] See 61 Federal Register 21,426, 21,428 (May 10, 1996) (proposed 4(d) rule for northern spotted owls setting 40 percent target); USFWS (2008) Appendix C at 77 (targeting 35–40 percent).

[12] Data provided by DNR which shows Mill Creek at 48 percent and Moss Creek at 55 percent (J. Herman, personal communication)

migrate through during August to areas in South America. The olive-sided flycatcher is considered a fairly common breeder in the area encompassed by the Project Area (BirdWeb 2009). There were 21 birds observed during summer 2006 avian surveys, and six recorded during the spring of 2009. All 21 observed in 2006 were within the rotor-swept area; it is not reported in 2009 how many were in the rotor-swept area. None were recorded during the fall of 2004 or the winter of 2008–2009 (Appendix C-4).

Pileated Woodpecker

The pileated woodpecker is considered a Washington State Candidate for listing. This species occurs in all forest types as long as large trees exist for nesting and foraging. Old-growth and mature forest therefore are a common association. In Washington, pileated woodpeckers occur year round but are uncommon in the vicinity of the Project Area. They are more common west of the Cascades. During avian surveys in the Project Area, six pileated woodpeckers were recorded in the fall, two during the winter, seven during the spring, and none in the summer. None occurred within the rotor-swept area (Appendix C-4).

Vaux's Swift

Vaux's swift is considered a Washington State Candidate for listing. It typically occurs in coniferous or mixed forest of mature age where snags are available for roosting and nesting. They forage for insects in flight in open sky, typically above woodlands or bodies of water. In Washington, Vaux's swift breeds widely, and the Project Area is considered within the range of common occurrence for the species. They migrate south during the fall. During fall 2004 avian surveys, 15 Vaux's swifts were recorded in three groups, 87 percent of which occurred within the rotor-swept area. Four were recorded in two groups during the summer of 2006, all of which occurred within the rotor-swept area. Eleven were recorded during the summer of 2009; the number within the rotor-swept area was not reported in this study (Appendix C-4).

Western Gray Squirrel

The western gray squirrel is listed as a "threatened" species by WDFW. In Washington, western gray squirrel distribution has been reduced to three geographically isolated populations: the "Puget Trough" population, centered in Thurston and Pierce counties, the "South Cascades" population, located in eastern Skamania County, Klickitat and Yakima Counties, and the "North Cascades" population, located in Chelan and Okanogan Counties. Western gray squirrels are arboreal species. Although they forage on the ground, this species rarely strays far from trees. They use tree canopies for cover and nesting. Western gray squirrels prefer areas where contiguous tree canopy allows arboreal travel in a minimum of a 198 feet (60 meters) radius around the nest (Ryan and Carey 1995). Western gray squirrels are diurnal species, with most activity occurring during morning hours. This species is most active during August and September, when this species is collecting and storing food for winter (Ryan and Carey 1995). The principal food source for the gray squirrel is acorns; however, conifer seeds are also eaten (Dalquest 1948). While pine nuts and acorns are considered essential foods for accumulating body fat in preparation for winter, green vegetation, seeds, nuts, fleshy fruits, and mushrooms also are consumed (WDW 1993, Carraway and Verts 1994, Ryan and Carey 1995).

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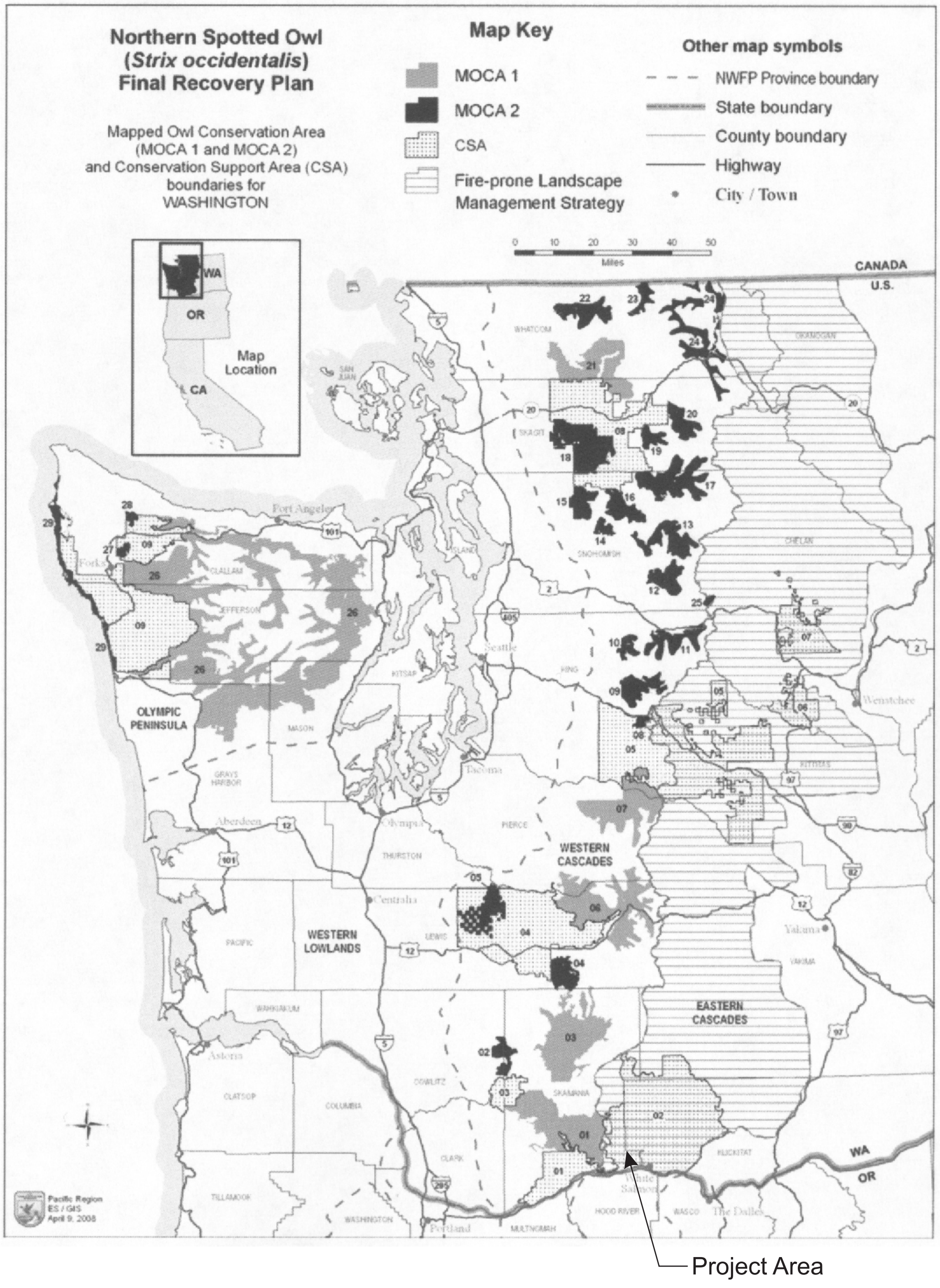

Source: 2008 Final Spotted Owl Recovery Plan (USFWS 2008).

Figure 3.4-7
Map of Spotted Owl MOCAs and CSAs

Western gray squirrel surveys were implemented by the Applicant on lands located in and adjacent to the Project Area in 2004, 2008, and 2009 (Figure 3.4-8). Surveys conducted in 2004 included a general search for western gray squirrels and nests while conducting northern goshawk station placement and surveys. Two adult western gray squirrels were identified during that effort.

An additional protocol survey was completed following methods described in Surveys for western gray squirrel nests on sites harvested under approved forest practice guidelines: analysis of nest use and operator compliance (Van der Haegen et al. 2004). No western gray squirrels were detected during protocol surveys. Detailed methodology and results for western gray squirrel surveys in 2004 can be found in Appendix C-5.

Additional western gray squirrel surveys were completed by the Applicant in 2008 and 2009. Prior to implementing field surveys, the Applicant consulted with a WDFW biologist to identify survey criteria and methodology. It was determined that gray squirrels surveys should be performed in areas where Project activities would result in the removal of potential western gray squirrel habitat or structural modification (i.e., stand thinning), and these surveys should include unaltered habitat within 400 feet of potential disturbance.

An area consisting of a 1,050-foot buffer around the proposed turbine layout to account for lands that may be affected by the Project, and also the 400-foot buffer of undisturbed lands, was identified for potential survey. This area included 1,420 acres; however, only 738 acres were identified as potentially suitable to support western gray squirrel (Figure 3.4-8). Surveys were conducted following methods described by Van der Haegen, Van Leuven, and Anderson (2004). Surveyors searched for individuals and nests, focusing mainly on gray squirrels, but also noting other species. When possible, historical use by western gray squirrels was determined. No gray squirrels or nests were detected during these surveys in 2008 or 2009. Detailed methodology and results can be found in Appendices C-6 and C-7.

Keen's Myotis

Keen's bat is considered a Washington State Candidate for listing. In Washington, this species is recorded as occurring on the Olympic Peninsula and Cascade Mountains (BCI 2009). The Project Area is likely on the very edge of the distribution range for Keen's myotis. Although little is known about this species, it is believed to rely on old-growth forests. Keen's myotis likely roosts in tree cavities and forages in dense coniferous forests. Bat surveys conducted during 2007, 2008, and 2009 (Appendices C-8, C-9, and C-10) did not have the ability to detect individual species of bats. Instead, bats are grouped into species with either "high-frequency" calls or "low-frequency" calls. Keen's myotis is considered part of the "high-frequency" group. Based on the lack of detailed information of this species life history and habitat requirements and nature of the bat surveys conducted it is difficult to conclude with certainty what the likelihood of Keen's bats occurring in the in the Project Area. However, due to the lack of old-growth or mature forest types within the Project area and the predominant commercial forestry use of the property, the likelihood of occurrence on the site is considered to be low.

Townsend's Big-Eared Bat

Townsend's big-eared bat is a federal species of concern and a Washington state candidate for listing. Its distribution spans the western US, and occurs primarily in desert scrub and pine forest regions (BCI 2009). In the spring and summer, females form maternity colonies in mines, caves or buildings. In winter they hibernate in caves and abandoned mines. These maternity and roosting locations are sensitive to disturbance. It forages after dark in upland areas. Bat surveys conducted in the Project Area during 2007, 2008, and 2009 (Appendices C-8, C-9, and C-10) did not have the ability to detect individual species of bats. Instead, bats are grouped into species with either "high-frequency" calls or "low-frequency" calls. Townsend's big-eared bat is considered part of the "low-frequency" group. Based on lack of detailed information on this species distribution and the nature of the bat surveys conducted on the site, it is difficult to conclude with certainty the likelihood of Townsend's big-eared bats occurring in the Project Area. There are no known roosting structures or maternity colonies occurring in the vicinity of the Project Area. Consequently, the likelihood of occurrence on the site is considered to be low.

3.4.1.6 Other Wildlife Species

In addition to studies of special status species, other studies of birds and bats at the Project site have been ongoing since 2004. Birds were surveyed during all seasons of the year in the fall of 2004, summer of 2006, winter 2008–2009 and spring of 2009. Results are summarized in Appendix C-4.

Bats were surveyed during the fall of 2007, summer–fall of 2008 and summer–fall of 2009. Results of those studies are presented in Appendices C-8, C-9 and C-10. The timing of these surveys is expected to capture the peak of bat use during the breeding season (summer) and migration (fall). Information on the potential for other taxonomic groups to occur in the Project Area is based on general distribution and habitat requirements for individual species.

Birds

Avian surveys were conducted in the Project Area across all seasons in multiple years. There were: 53 surveys during the fall migration period (September 11 to November 4, 2004), 45 surveys during the breeding/nesting season (May 15 to July 14, 2006), 47 surveys during winter and 116 surveys during spring (December 4, 2008 to May 29, 2009).[13]

Study protocol followed methods described by Reynolds et al. (1980). An 800-meter circular plot was centered on each observation point (Figure 3.4-9). All observations, behavior, and flight patterns of birds in and near plots were recorded. Flight patterns, such as direction of travel and flight altitude also were recorded.

[13] In its 2003 Energy Overlay Environmental Impact Statement, Klickitat County also included two survey locations at or in proximity to the Project site. These included surveys during the spring and summer 2003 seasons. See Appendix B to the Klickitat County Energy Overlay Draft Environmental Impact Statement (Kennedy/Jenks Consultants 2003).

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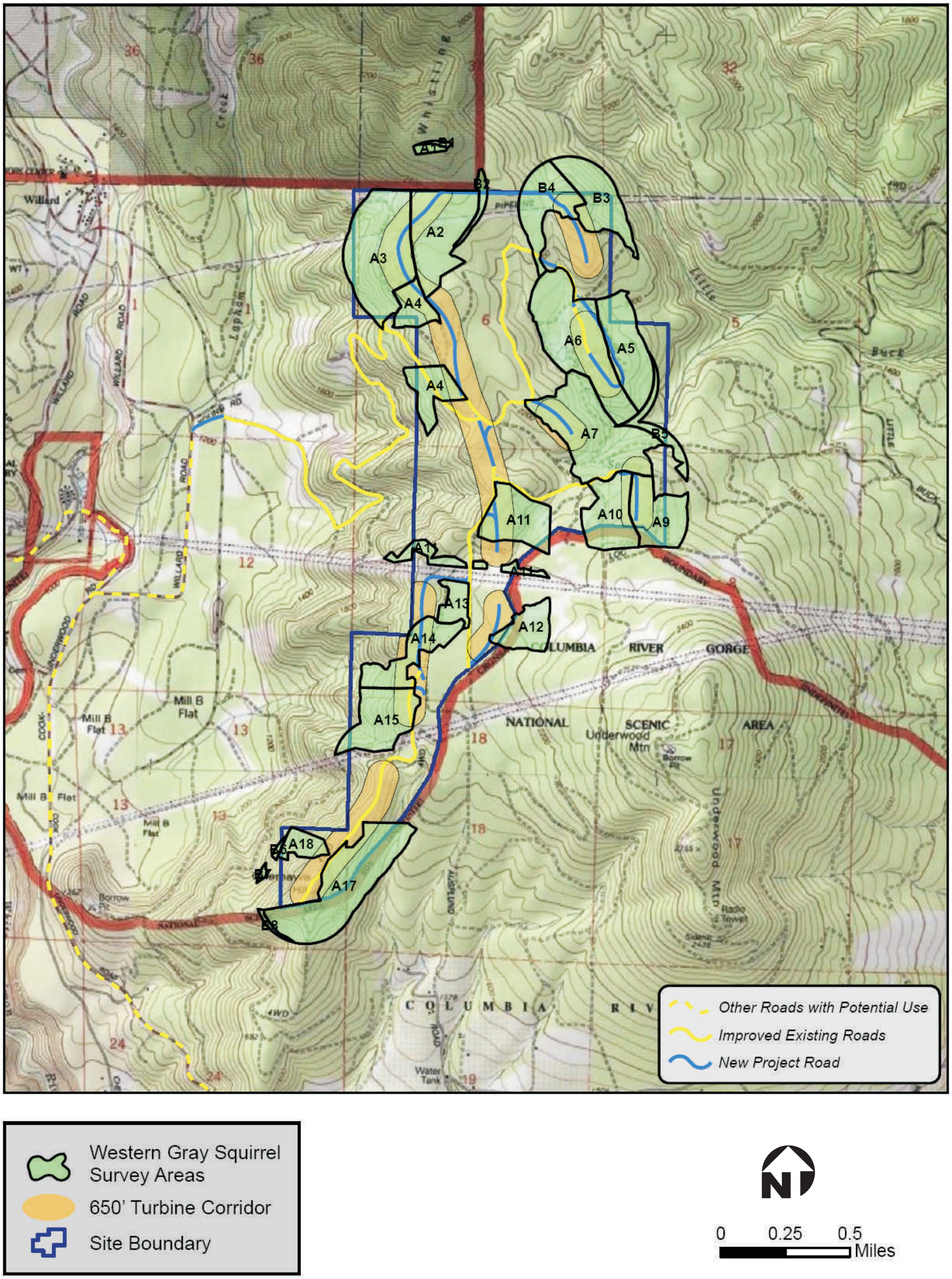

Figure 3.4-8

Western Gray Squirrel Survey Areas

Job No. 33758687

Observations of birds beyond the 800-meter radius were recorded; however, these data were analyzed separately from data collected from survey plots. The location of raptors, other large birds, or species of concern observed during counts was recorded on field map. A list of all birds recorded in the Project Area (including those during special status species surveys) is provided in Table 3.4-5. Appendix C-4 contains full results of fall 2004, summer 2006, winter 2008-09 and summer 2009 surveys.

A total of 87 species were recorded during avian surveys. Passerines (songbirds) were the most abundant avian group overall. American robin, dark-eyed junco and white-crowned sparrow were the three most frequently observed birds across all seasons. Mean overall bird use in the study area was low compared to these other wind resource areas studied; ranking 19th compared to 24 other wind resource areas (Figure 9 in Appendix C-4). Eleven species of raptors were observed: American kestrel, bald eagle, Cooper's hawk, golden eagle, northern harrier, northern goshawk, osprey, prairie falcon, red-tailed hawk, sharp-shinned hawk, and turkey vulture. Red-tailed hawk was by far the most observed raptor, followed by Cooper's hawk and sharp-shinned hawk. Mean annual raptor use was 0.28 raptors per plot per 20-minute survey, which is a standardized way to measure use in order to compare results to avian use at other sites. This annual rate is low relative to raptor use at 36 other wind-energy facilities that implemented similar protocols and had three or four season surveys. Mean raptor use in the study area was low compared to these other wind resource areas; ranking 29th compared to 36 other wind energy facilities (Figure 7 in Appendix C-4).

Fall Migration Surveys (2004)

General avian surveys identified 39 species of bird in the survey area (Figure 3.4-9). Passerines (songbirds) were the most abundant avian group, constituting 87.4 percent of observations. This group was observed with the greatest frequency (94.4 percent of surveys). Raptors were the second most abundant group observed; however, this group represented only 4.9 percent of observations. Raptors were observed during 38.5 percent of the surveys, followed by woodpeckers (22.6 percent of surveys) and doves/pigeons (9.3 percent of surveys).

The most common species at the Project Area included dark-eyed junco, American goldfinch, Steller's jay, common raven, and white-crowned sparrow. The species of birds most frequently observed during fall surveys were common raven, Steller's jay, dark-eyed junco, red-breasted nuthatch, and golden-crowned kinglet. Eight species of raptor were observed during the survey. Those with the highest use of the site were sharp-shinned hawk, Cooper's hawk, and red-tailed hawk. The highest raptor use observed at the site during 2004 surveys occurred between September 11 and October 12, 2004. These data do not indicate that any areas within the proposed site have substantially higher raptor use than others.

No federal or state listed endangered or threatened avian species were observed during the survey period. Four state candidate species were observed: golden eagle, northern goshawk, pileated woodpecker, and Vaux's swift. Two State Monitor species were observed, including four single turkey vultures and four groups totaling 27 western bluebirds. Detailed results and summary tables can be found in Appendix C-4.

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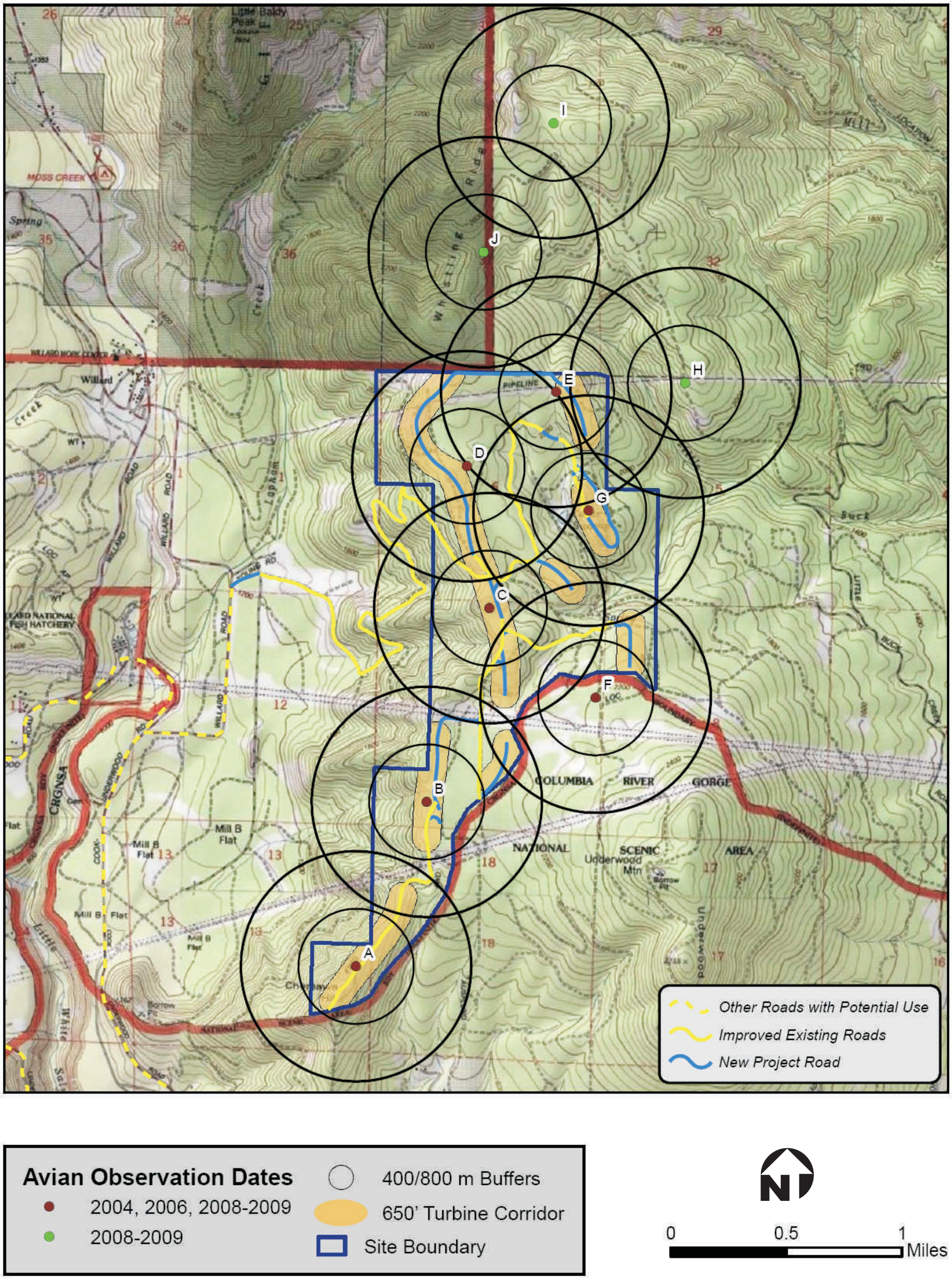

Figure 3.4-9

2004, 2006, 2008 and 2009 Bird Survey Locations

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

Table 3.4-5
Birds Observed in the Project Area Across All Seasons

Species (Common Name)	Winter	Fall	Summer	Spring
American crow				X
American goldfinch	X	X	X	X
American kestrel				X
American robin	X	X	X	X
Bald eagle	X		X	
Band-tailed pigeon		X	X	X
Barred owl			X	
Barn swallow				X
Bewick’s wren			X	
Black-capped chickadee	X	X	X	X
Black-headed grosbeak			X	X
Black-throated gray warbler			X	
Brown-headed cowbird			X	X
Bullock’s oriole				X
Canada goose				X
Cassin’s finch				X
Cassin’s vireo			X	
Cedar waxwing			X	
Chestnut-backed chickadee	X	X	X	X
Chipping sparrow			X	X
Clark’s nutcracker		X		
Common raven	X	X	X	X
Cooper’s hawk	X	X	X	X
Dark-eyed junco		X	X	X
Downy woodpecker	X		X	X
Evening grosbeak			X	X
Golden-crowned kinglet	X	X	X	X
Golden-crowed sparrow		X		
Golden eagle		X		
Gray jay				X
Hairy woodpecker		X	X	X
Hammond’s flycatcher			X	X
Hermit thrush			X	X
Hermit warbler				X
House wren			X	X
Lazuli bunting			X	X
Lincoln’s sparrow		X		
Macgillivray’s warbler			X	X
Mountain chickadee		X		X
Mourning dove		X		
Nashville warbler			X	X
Northern flicker	X	X	X	X
Northern harrier		X		X

Species (Common Name)	Winter	Fall	Summer	Spring
Northern goshawk		X	X	
Northern rough-winged swallow			X	
Northern saw-whet owl				
Olive-sided flycatcher			X	X
Orange-crowned warbler			X	X
Osprey			X	
Pileated woodpecker	X	X		X
Pine siskin			X	X
Prairie falcon		X		
Purple finch		X	X	X
Red crossbill		X	X	X
Red-breasted nuthatch	X	X	X	X
Red-breasted sapsucker				X
Red-tailed hawk	X	X	X	
Red-winged blackbird				X
Ruby-crowned kinglet		X	X	X
Rufous hummingbird			X	X
Ruffed grouse		X	X	
Say's phoebe				X
Sharp-shinned hawk		X	X	X
Snowy owl				X
Song sparrow	X	X		X
Sooty grouse				X
Spotted towhee		X	X	X
Steller's jay	X	X	X	X
Swainson's thrush			X	
Townsend's solitaire			X	X
Townsend's warbler			X	
Tree swallow		X		X
Turkey vulture		X	X	X
Varied thrush		X		X
Vaux's swift		X	X	X
Violet-green swallow			X	X
Warbling vireo			X	X
Western bluebird		X	X	X
Western tanager		X	X	X
Western wood-peewee			X	X
White-breasted nuthatch				X
White-crowned sparrow		X	X	X
Wild turkey				X
Willow flycatcher			X	
Wilson's warbler			X	X
Yellow-rumped warbler		X	X	X
Yellow warbler			X	

Summer Surveys (2006)

Fifty-five species of birds were observed during summer breeding and nesting surveys in 2006 (Figure 3.4-9). Passerines were the most abundant group (88.5 percent), followed by raptors and woodpeckers (3.3 percent each), and doves/pigeons (3.2 percent). The most frequently observed groups were passerines (100 percent of surveys), woodpeckers (35.6 percent of surveys), and raptors (31.1 percent of surveys). Species with the highest use of the Project Area included white-crowned sparrow, red crossbill, western tanager, spotted towhee, and MacGillivray's warbler. The most frequently observed species included white-crowned sparrow (77.8 percent of the surveys), western tanager (75.6 percent of surveys), spotted towhee (64.4 percent of surveys), MacGillivray's warbler (48.9 percent), and dark-eyed junco (48.9 percent). Three species of raptors were observed, including red-tailed hawk, northern goshawk, and sharp-shinned hawk. Raptor use in the fall was only slightly higher than during the summer breeding season. The data do not indicate that any portions of the Project Area have substantially higher raptor use than other areas. For all bird species combined, use of the Project Area by avian species was slightly higher during the summer breeding season than during the fall migration period. Detailed results and summary tables can be found in Appendix C-4.

Winter/Spring Surveys (2008-2009)

Fifteen species of birds were observed during winter surveys in 2008–2009, and 65 species during the spring of 2009. In winter, observations were dominated by common raven, American robin, and unidentified finches. The number of species and number of individuals observed in the spring were the highest across all seasons. Similar to other seasons, passerines were the most abundant group, followed by woodpeckers and then raptors. Individual species with the highest use included American robin, dark-eyed junco and yellow-rumped warbler. The data do not indicate that any portions of the Project Area have substantially higher raptor use than other areas. Detailed results and summary tables can be found in Appendix C-4.

The WDFW Priority Habitats and Species database was searched for known occurrences of raptor nests. The only recorded nest was for an osprey, more than one mile east of the Project Area.

Bats

Bat acoustic studies were conducted for the Project in 2007, 2008 and 2009. Detailed information on these investigations can be found in Appendices C-8 (2007), C-9 (2008) and C-10 (2009).

Bat acoustic studies conducted from 2007 through 2009 were implemented at various locations in the Project Area. The goal of the studies were to: (1) characterize the local bat population in a variety of habitats, (2) identify areas of high usage by bats, and (3) characterize the frequency of bat usage of areas representative of where turbine strings would be located. Studies were done across several seasons to estimate annual variation during breeding and periods of migration.

For all studies, passive Anabat® II echolocation detectors coupled with Zero Crossing Analysis Interface Modules (ZCAIM; Titly Electronics Pty Ltd., NSW, Australia) were used in all survey years. Anabat detectors record bat echolocation calls using a broadband microphone. Bat species are generally grouped into those that emit low frequency (<35 kHz) or high frequency (≥

35 kHz) calls. The units of activity equaled the number of bat passes, and were used to calculate the number of bat passes per detector night (Hayes 1997). The data thus indicate the level of bat activity rather than absolute abundance.

In 2007, detectors were placed at two locations from August 20 through October 21 (Figure 1 in Appendix C-8). The 2007 studies were intended to provide a general census of bat activity in recently reforested or young forest areas. This type of habitat is similar to what would be found in the areas within 150 feet of the proposed turbines, on the two sides of the turbines. The northernmost detector was located just outside the proposed turbine corridor. This detector was initially placed at ground level; however, it was raised to a height of 130 feet (40 meters) on September 7. The southernmost detector was located outside the Project Area; however, it was placed in habitat believed to be representative of that found in the Project Area. The southernmost detector was placed at ground level, and remained at that location for the duration of the study.

Due to equipment failures in 2007, both Anabat detectors were only operable for 24 percent of the sampling period, amounting to 45 detector-nights. Bat activity was similar between north and south ground level Anabat units (mean = 11.67 ± 2.0 and 9.6 ± 4.1, respectively). Bat activity recorded after the northern Anabat detector was elevated was much lower (mean = 2.47 ± 1.1) than that recorded at ground level. A list of bat species with potential to occur in the Project Area based on range maps, divided between high-frequency and low-frequency species, can be found in Table 3.4-6.

Table 3.4-6 (Revised to Add Call Frequency)
Bat Species Likely to Occur in the Project Area, Based on Range-Maps

Species	Status	High Frequency (>35 kHz)	Low Frequency (<35 kHz)
California bat		X	
Big Brown bat			X
Fringed myotis	FCo, SM	X	
Hoary bat			X
Keen's bat	SC	X	
Little brown bat		X	
Long-legged bat	FCo, SM	X	
Pallid bat	SM		X
Silver-haired bat			X
Townsend's big-eared bat	FCo, SM		X
Western long-eared bat		X	
Western pipistrelle	SM		
Western red bat		X	
Western small-footed bat		X	
Yuma myotis		X	

Status Codes:
FCo – Federal Species of Concern
SC – State Candidate
SM – State Monitor
Source: Western Ecosystems Technology, Inc., Final Report, Bat Acoustic Studies for the Saddleback Wind Energy Project, Skamania County, Washington, February 14, 2008)
(no information on call frequency was provided for Western pipistrelle)

The bat acoustic survey effort was increased to four locations during the 2008 survey period, and the survey period covered July 3 to October 7, 2008. This period corresponded with summer breeding and fall bat migration. Four survey locations were used, all on the ground (Figure 1 in Appendix C-9). Two were located in clear cuts (SB1 and SB4), one immediately adjacent to a wetland (SB2) and one in a road corridor (SB3). Sampling at the wetland was intended to characterize bat occurrence a location known to have a high level of usage, because wetlands are frequently used as foraging and drinking habitat for bats. Similarly, sampling in the road corridor was intended to capture the highest levels of use within the Project Area, because road corridors are frequently used by bats to travel between roosting and foraging locations. The two clear cut sites were most representative of the types of habitat where turbines would be located for the proposed Project. However, because all detectors were located on the ground, sampling did not entirely capture the potential bat use of the rotor-swept area.

Table 3.4-7 summarizes bat activity at all survey locations. During the 2007 and 2008 surveys, the two clear cut sites (SB1 and SB4) had an average of 14.30 and 73.76 bat passes per night, respectively. The wetland (SB2) and road corridor (SB3), recorded much higher levels of use, at 178.03 and 327.25 bat passes per night, respectively. Seasonal activity patterns were similar for the two clear cut survey locations, with the highest bat activity occurring during the months of July and August. Bat activity in the wetland area was highest during the month of July. In comparison to 2007, bat numbers were on average higher because in 2007 this peak use period was not captured during the sampling period (in 2007 sampling did not begin until August 20).

Table 3.4-7
Average Bat Detections Per Night During Three Survey Years

Year	Location	Habitat	Ground or Elevated	Average per Detector Night
2007	North	Young forest	G	11.67
	North	Young forest	E	2.47
	South	Young forest	G	9.60
2008	SB1	Clear cut	G	14.30
	SB2	Wetland	G	178.03
	SB3	Road corridor	G	327.25
	SB4	Clear cut	G	73.76
2009	WR1	Clear cut	G	17.28
	WR2	Clear cut	E	10.59
	WR3	Young forest	G	11.04
	WR4	Young forest	E	1.53
	WR5	Clear cut	G	6.43
	WR6	Clear cut	E	1.64

In 2009, the bat survey efforts were further refined to focus specifically on the types of locations where turbines would be sited. Three locations were selected (Figure 3.4-10), two in clear cuts and one in a recently reforested area (young forest). In addition, each sampling location had a pair of Anabat detectors; one on the ground and one elevated on a meteorological tower. The elevated detectors were intended capture bat use in what would likely be the rotor-swept area, which is where potential bat-turbine collisions would occur. The ground level detectors were intended to provide some comparison to prior year studies, most of which were done at ground level. The numbers of bat detections in 2009 are summarized in Table 3.4-7.

In general, elevated detectors recorded fewer bats than their ground level counterparts, indicating that bat occurrence within the rotor-swept area is lower than those at lower flight elevations. For all years (2007–2009), elevated bat detections were the lowest numbers recorded, between 1.53 and 10.50 bat passes per night. All bat detections in 2009 were collected by Anabat equipment installed in locations most representative of potential turbine locations. The detections were notably lower than some of the other records in 2008 taken from equipment placed in areas of known high bat use.

Amphibians and Reptiles

Amphibians and reptiles likely to occur within the Project Area are those species that can tolerate disturbance associated with managed timber activities and drier-than-average conditions for at least part of their life cycle. This includes such common species as Long-toed salamander (*Ambystoma macrodactylum*), Rough-skinned newt (*Taricha granulose*), Ensatina (*Ensatina eschscholtzii*), Pacific treefrog (*Pseudacris (=Hyla) regilla*), and northwestern garter snake (*Thamnophis ordinoides*). Breeding may occur within the intermittent drainages located in the northeast corner of the site, within cedar swamp, or substantial roadside drainage ditches. These species may stray further from water sources during heavy rains or during winter conditions.

Mammals

Several large mammals have the potential to occur within the Project Area. Known priority wildlife habitats, including mule deer and black-tailed deer (*Odocoileus hemionus)* winter range, are present east of Underwood Mountain, extending to lands to the north/northeast. Winter range for Columbia black-tailed deer is present in lands west of Underwood Mountain, and extends north and south from the Project Area. Elk (*Cervus elaphus*) winter range is present throughout the Project Area. Other species likely to occur throughout the region include cougar (*Puma concolor*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), and black bear (*Ursus americanus*). Douglas squirrels (*Tamiasciurus douglasii*) were recorded during surveys for the western gray squirrel.

Fish

No fish have been documented within the Project Area. The Project is on a ridgeline between Underwood Mountain and the White Salmon River, approximately 3 miles north of the Columbia River. The ridgeline is oriented in a north-south direction. The Columbia River receives runoff via the White Salmon drainage area east of the site and via the Little White Salmon River west of the site. The White Salmon River contains evolutionarily significant units and designated critical habitat for three species listed as threatened under the Endangered Species Act: (1) Lower Columbia River Chinook, (2) Middle Columbia River Steelhead, and (3) Columbia River Chum (Figure 3.4-11).

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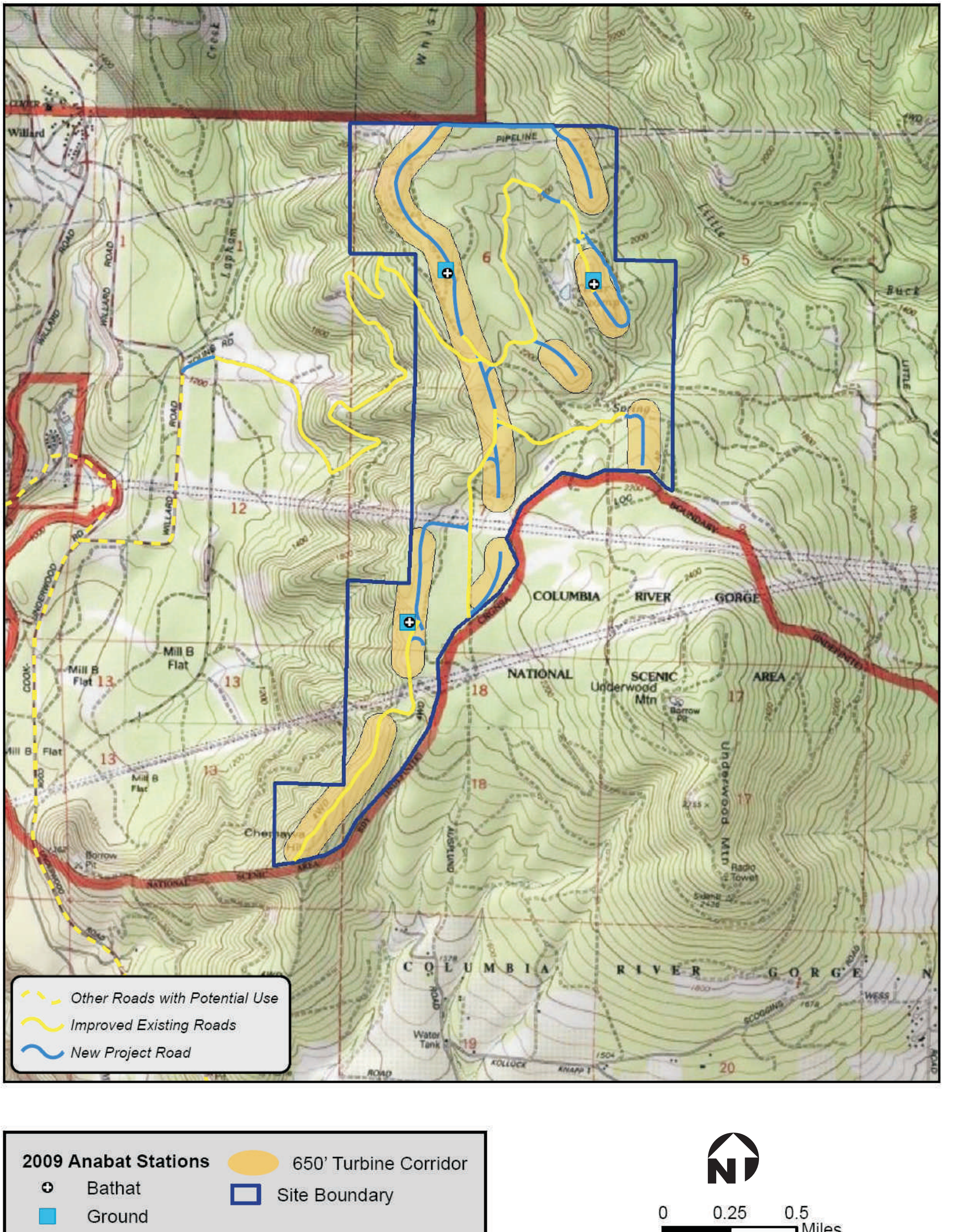
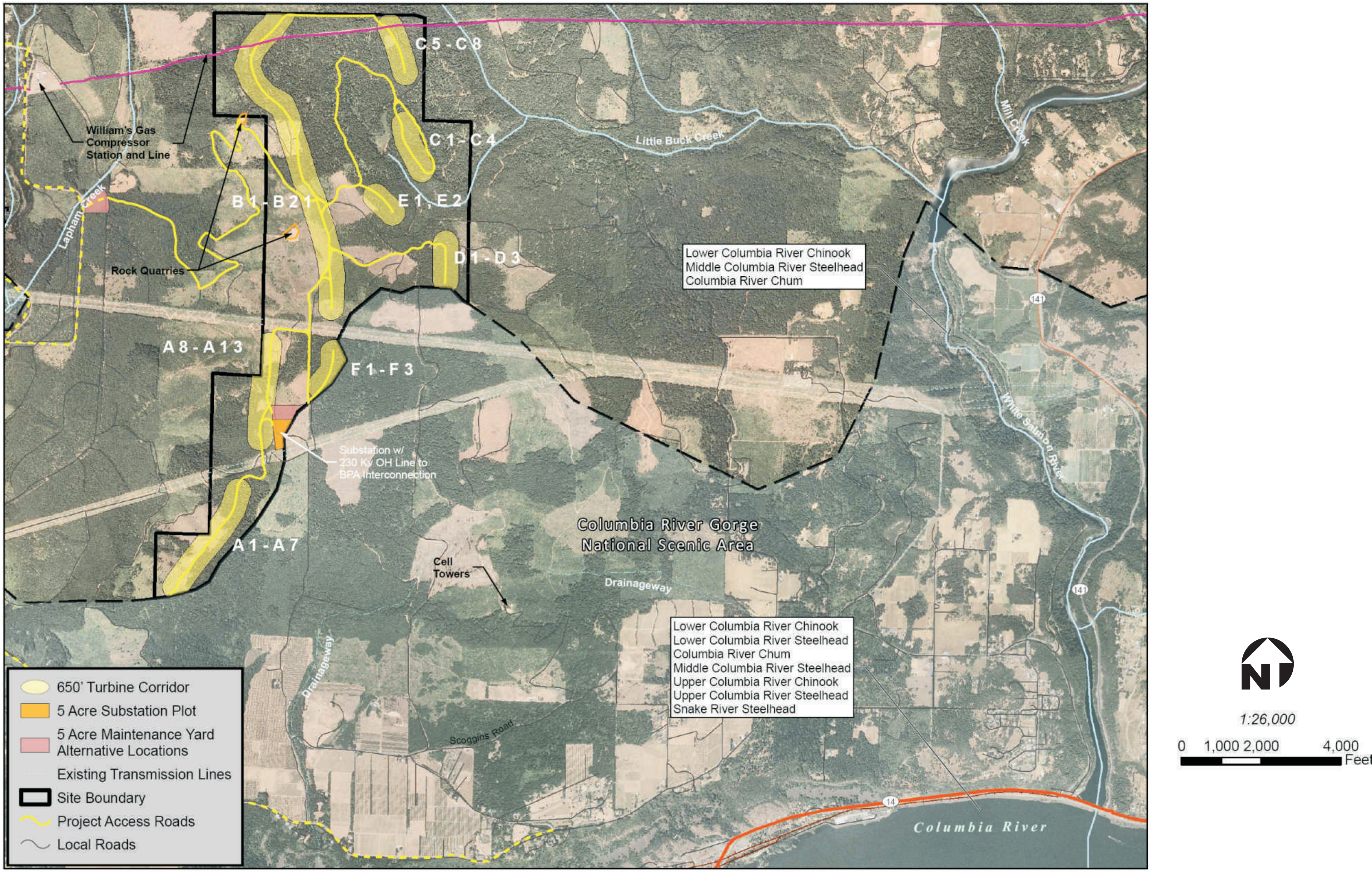


Figure 3.4-10
2009 Bat Survey Locations

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application



Job No. 33758687

Figure 3.4-11

Designated Critical Fish Habitat

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

A tributary to Little Buck Creek is located in the northeast portion of the Project Area. This tributary is typed as a non-fish-bearing stream. No special status fish species are present in Little Buck Creek. However, Buck Creeks drains into Northwestern Lake, which in turn drains into the White Salmon River.

West Pit Road crosses an unnamed drainage. This stream had observed flow through the existing culvert under West Pit Road at the time of the July 2009 field visit. However, the surface flow and the channel disappear downstream of the culvert. There is no surface water connection to Lapham Creek or the Little White Salmon River. Fish are not present in this stream.

3.4.1.7 Noxious Weeds

The Project Area contains several noxious weed species, which are nonnative, invasive plants. The weed species observed during field visits to date are listed in Table 3.4-8.

The Washington Noxious Weed Control Board identifies lists of noxious weed species that require control, eradication, or monitoring. Class A noxious weeds are nonnative species with a limited distribution within a state and require eradication to reduce the potential of becoming more widespread.

Table 3.4-8
Noxious Weed Observations

Scientific Name	Common Name	Status
Centaurea stoebe	Spotted knapweed	Class B - Designate
Cirsium arvense	Canada thistle	Class C - Designate
Cirsium vulgare	Bull thistle	Class C
Cytisus scoparius	Scot's broom	Class B - Designate
Daucus carota	Queen Anne's lace	Class B
Hypericum perforatum	Common St. John's-wort	Class C
Leucanthemum vulgare	Ox-eye daisy	Class B
Linaria dalmatica	Dalmatian toadflax	Class B - Designate
Rubus armeniacus	Himalayan blackberry	Class C
Senecio vulgaris	Common groundsel	Class C

Class B noxious weeds are regionally abundant, but may have limited distribution in some counties. In Washington, in regions where a Class B noxious weed is unrecorded or of limited distribution, prevention of seed production is required. In these areas the weed is a "Class B designate." However, in regions where a Class B species is already abundant or widespread, control is a local option. In these areas the weed is a "Class B non-designate."

Class C noxious weeds are already widely established, but placement on the state list allows counties to enforce local control if desired. Skamania County has designated a few Class C weeds. Within the Project boundary, only Canada thistle (*Cirsium arvense*) is a designated Class C weed.

3.4.2 IMPACTS

This section identifies the potential impacts to biological resources as the result of both construction and operation of the proposed Project.

3.4.2.1 Proposed Action

Skamania County Critical Areas Ordinance Regulation

The Skamania County Critical Areas Ordinance recognizes the following as critical areas: watershed protection areas (including wetlands, streams, creeks, rivers, ponds and lakes); critical aquifer recharge areas; fish and wildlife habitat; frequently flooded areas; and geologically hazardous areas (including landslide hazards, erosion hazards and volcanic hazards). All critical areas have a required no-touch buffer setback based on the classification of the critical area, as set forth in Skamania County Critical Areas Ordinance Title 21A. All buffers are undisturbed buffers and must be free of any logging, road building, or other development activities including, but not limited to, vegetation removal, grading, filling, mowing, or placement of structures. The Project would not affect any critical areas or buffers.

Construction

Habitat Types

Construction and operation of the Project would require the removal of vegetation in some areas to accommodate roadway construction and improvement, turbine siting, staging, and construction. The impacts of Project construction would not differ substantially from customary forestry activities on the site. Each turbine footing and foundation would measure approximately 3,100 square feet. Vegetation surrounding each turbine would be managed according to the following specifications:

- A circular area extending 50 feet from each turbine tower base would be harvested and graveled;
- From 50 feet to 150 feet from the base of the turbine towers, tree heights would be limited to 15 feet above the elevation of the base of the turbine; and
- From 150 feet to 500 feet from the base of the turbine towers, tree height would be limited to 50 feet above the turbine base within an area formed by a 90 degree arc centered on the ordinary downwind direction (Figure 2-4 in Chapter 2).

The A and F turbine strings and parts of the B and C turbine strings would be accessed by existing roads. Modifications to these roads are anticipated in order to support the long and heavy loads required for delivery of the wind turbine systems. An estimated 5.1 miles of roads within the Project Area would require improvements as a result of the proposed Project. The majority of new roads would be constructed to access parts of the B and C turbine strings, and all of the D and E turbine strings. Access to these turbines would require 2.4 miles of new roadway. All roads used to access turbines would be maintained throughout the life of the Project.

All vegetation clearing would be completed using crawler tractors, rubber-tired skidders, mobile feller-bunchers, or cable yarding equipment. This equipment is typically used in timber harvest, and is currently used to harvest other stands located on the Applicant's property. Logs would be transported by truck to Applicant facilities in Bingen, Washington. Except for permanently cleared areas, cleared areas would be replanted with trees within one year following completion of construction (typically the following spring). Areas where trees are permanently removed would be replanted with appropriate native grasses and low-growing shrubs. Because trees would be cleared for the purpose of the Project, cleared areas would be considered "forest conversion" under the Washington Forest Practices Act. However, cleared areas would still be reforested in accordance with typical commercial forestry management practices when feasible. ~~Permanent and temporary~~ Temporary and Permanent impacts to habitat types within the Project Area can be found in Tables 3.4-9 and 3.4-10.

West Pit Road was widened in the summer of 2009. Additional road improvements would be required during the construction phase of the Project. However, the loss and modifications of habitat types from these modifications are anticipated to be minor. ~~Tables 3.4-9 and 3.4-10 show the temporary and permanent impacts of the Project to the habitat types found on the site and along the portion of West Pit Road that would be improved.~~

Table 3.4-9
Temporary Impacts from Project Elements to Habitat Types (acres)

Habitat Type	Turbine Corridor[a]	Road Corridor[b]	Transmission Line Corridor[c]	Operations and Maintenance Area	Substation Area	Roadway Corridor Outside Project Area[d]	Total
Grass-Forb Stand	15.12	6.57	0.68	0	0	0.23	22.60
Brushfield/Shrub Stand	2.31	1.61	0.61	0	0	0.66	5.19
Conifer-Hardwood Forest	11.56	2.05	1.08	0	0	0.40	15.09
Conifer Forest	7.40	3.07	0.02	0	0	0.23	10.72
Riparian Deciduous Forest	0	0	0	0	0	0	0
Total	36.39	13.30	2.39	0	0	1.52	53.60

[a] Total temporary impact area of proposed development within the 650-foot corridor measured on either side of an imaginary line connecting each turbine string.
[b] The temporary impact area of proposed roadway modifications within the Project Area encompassed by a 100-foot corridor along all roads. Does not include overlap of transmission corridor or turbine corridor.
[c] The temporary impact area of proposed development within the area encompassed by a 100-foot corridor along all Project transmission lines. Does not include overlap of road corridor or turbine corridor.
[d] The area of temporary impact is based on the assumption that 5 feet on both sides of the roadway would be restored after construction of permanent roadway modifications.

Table 3.4-10
Permanent Impacts from Project Elements to Habitat Types (acres)

Habitat Type	Turbine Corridor[a]	Road Corridor[b]	Transmission Line Corridor[c]	Operations and Maintenance Area	Substation Area	Roadway Corridor Outside Project Area[d]	Total
Grass-Forb Stand	10.47	7.17	0.36	5.0	7.10	0.68	30.78
Brushfield/Shrub Stand	1.31	1.98	1.14	0	0	1.97	6.40
Conifer-Hardwood Forest	8.67	1.82	1.95	0	0	1.20	13.64
Conifer Forest	4.94	4.23	0	0	0	0.70	9.87
Riparian Deciduous Forest	0	0	0	0	0	0	0
TOTAL	25.39	15.20	3.45	5.00	7.10	4.55	60.69

[a] Total permanent impact area of proposed development within the 650-foot corridor measured on either side of an imaginary line connecting each turbine string.
[b] The permanent impact area of proposed roadway modifications within the Project Area encompassed by a 100-foot corridor along all roads. Does not include overlap of transmission corridor or turbine corridor. Also excludes existing roadway.
[c] The permanent impact area of proposed development within the area encompassed by a 100-foot corridor along all Project transmission lines. Does not include overlap of road corridor or turbine corridor.
[d] The permanent impact area is based on the assumption that the existing roadway is 20 feet wide, the new roadway would be 25 feet wide, and that an additional 5 feet on each side of the roadway would be permanently cleared.

Wetlands

No wetlands or wetland buffers are located within the Project footprint. Therefore, no wetlands or buffers are expected to be affected by construction of the Project.

A review of the National Wetland Inventory indicates that wetlands may occur along SR 14 but not along County or private roads proposed for the Project's construction access and turbine delivery routes. No improvements to SR 14 are anticipated to be required, and therefore no wetland-related impacts would occur. Roadway improvements to the County or private logging roads are not expected to affect wetlands. This information was confirmed through field investigations performed in May and July 2009.

See Section 3.3 for a discussion of impacts to other surface water features such as streams.

Special Status Plant Species

No federal- or Washington State-listed plant species have been documented at the site during multiple field surveys. Therefore, no project-related impacts are anticipated from construction of the proposed Project. Two plant species on the WNHP Watch List, gnome plant and phantom orchid, were observed within areas that may be cleared for construction of the Project. Both species are growing in areas that have been previously clearcut and were able to re-establish. In addition, there are no regulatory requirements to protect these species.

Special Status Wildlife Species

Potential construction related impacts to bald eagle, golden eagle, northern goshawk, northern spotted owl, olive-sided flycatcher, pileated woodpecker, Vaux's swift, western gray squirrel, Keen's myotis, and Townsend's big-eared bat are discussed in this section.

Bald Eagle. Four bald eagles were recorded in the Project Area. The Project Area is over two miles away from the nearest known bald eagle foraging habitat, which is the Columbia or White Salmon Rivers. Therefore bald eagle use of the Project Area is considered infrequent and sporadic. The removal of coniferous forest as a result of Project construction that far away from suitable foraging habitat would not impact bald eagles. No breeding habitat would be affected.

Golden Eagle. Golden eagles have been recorded in the Project Area; however they are considered an uncommon visitor to this region of Washington State. They are known to forage in mid-elevation clear cut habitat. The permanent removal of 21.31 acres of grass-forb stand or shrub habitat for construction of turbine strings and transmission line corridors would decrease the amount of foraging habitat available to golden eagles within the Project Area. Any golden eagles potentially using the Project Area for foraging would likely be temporarily deterred from using the site by construction vehicle and personnel activity.

Northern Goshawk. Northern goshawks were recorded in the Project Area. Although they were recorded during the summer, no evidence of nest or breeding individuals was observed during multiple years of surveys. A breeding goshawk may have a wide area of home range spanning multiple age classes of forest. They also may forage in open areas. Construction of the proposed Project would result in the permanent loss of 21.86 acres of managed coniferous or mixed deciduous-coniferous forest. This would represent a loss of habitat generally suitable for goshawks, though unlikely to support breeding pairs. Goshawks also forage in open area, where they swoop to the ground to capture prey. Approximately 17.13 acres of grass-forb habitat would be permanently lost during construction of the Project.

Northern Spotted Owl. The Applicant has sited its proposed Project to avoid habitat areas deemed critical to the northern spotted owl or essential to its recovery. Surveys conducted pursuant to the USFWS protocol indicate that spotted owls are not present in or near the Project, and that nearby historical sites are no longer occupied pursuant to USFWS Protocol and state law. Because there are no northern spotted owls or activity centers present in the Project area, no Project construction impacts are expected. Finally, the Project would not impact the White Salmon SOSEA's 40 percent suitable habitat level and therefore is not restricted by Washington's forest practice regulations. Given the extensive record and review, this Project does not pose a risk of taking northern spotted owls under Endangered Species Act Section 9.

Olive-sided Flycatcher, Pileated Woodpecker, and Vaux's Swift. These three avian species are all passerines with known occurrence within the Project Area. All three use coniferous forest for nesting. Construction of the proposed Project would result in loss of 21.86 acres of forest habitat. Construction during the breeding season would likely result in disturbance of any individuals occurring in the vicinity, thereby temporarily reducing the use of further areas of habitat. Vaux's swift and olive-sided flycatchers forage on the wing over cleared areas, so it is likely that no additional habitat loss would occur for these species as the result of conversion of forested area to clearing (grass-forb stand).

Western Gray Squirrel. The construction of the proposed Project would result in the permanent removal of 21.86 acres of managed coniferous or mixed deciduous-coniferous forest. The gray squirrel prefers habitat where contiguous tree canopy allows arboreal travel in a minimum of a 198-foot (60-meter) radius around the nest (Ryan and Carey 1995). Current forest management practices on forest within the proposed Project Area has created habitat not generally suitable for this species, due to fragmentation of mature forest stands. Contiguous forest habitat located in the Project Area would not develop in the future. The Project Area also contains very few oak trees, and those that were observed were of small stature (less than 20 feet tall), stunted, and growing in openings on exposed rocky slopes in shallow soils. Acorn crops from oak trees are an important food source for western gray squirrels, and the lack of this primary food source may deter use of the Project Area by gray squirrels. Because habitat for this species is considered rare or of moderate/poor quality in the Project Area, impacts to western gray squirrel due to loss of coniferous forest habitat are expected to be negligible.

Keen's Myotis and Townsend's Big-Eared Bat. The special status bat species may occur in the Project Area, based on their documented distribution. Surveys for bats were not able to identify all bats to species level. Both species may utilize mature or old-growth forested habitats within the Project Area, if suitable nest sites were available. Permanent loss of 21.86 acres of forest habitat and 21.31 acres of shrub/grass/forb habitat may result in a small reduction of suitable habitat for these species. No known roosting or breeding locations would be impacted.

Other Wildlife Species

In general, wildlife in the Project Area could be affected by the construction of the Project through the loss of suitable habitat, potential fatalities during clearing or grading of the construction area, and disturbance/displacement from construction activity and personnel occupying the site. Fragmentation of the remaining habitat also could occur, although current land management practices result in an existing source of ongoing fragmentation on the site. Therefore, permanent vegetation removal and temporary construction disturbance are the primary impacts as a result of the proposed Project.

Birds. Direct mortality to birds and/or bird nests could occur during the initial clearing or grading of the construction areas. Additional disturbance could occur indirectly to birds or bird nests occurring adjacent to construction areas. This may occur if a nest or a primary foraging area is nearby. In areas where temporary disturbance would occur, it is anticipated that birds would generally reoccupy restored habitats with time. Some habitat would be permanently converted from one type (forest) to another (clear cut or grass-forb). This would result in a temporary disturbance, likely followed by recolonization of the area by a different suite of birds.

Bats. Impact to bats as a result of construction would be minimal unless known nesting or roosting sites were removed. Disturbance or displacements to bats as a result of construction activities would be minimal because bats are primarily active during the night, when construction would not occur.

Amphibians/Reptiles. No wetlands or other surface water bodies are proposed to be filled as a result of the Project. Therefore, no amphibian breeding habitat would be directly impacted. Amphibians and reptiles would potentially experience direct loss of non-breeding habitat and further fragmentation of the remaining habitats.

Mammals. No direct mortality of large mammals is anticipated as a result of construction because these species are able to relocate away from heavy equipment used in clearing and grading. Some avoidance of the area due to disturbance would likely occur on a temporary basis. Permanent removal of vegetation would result in the loss of some habitat for these species. The conversion of one habitat type to another would likely not reduce the amount of area available to the more commonly-occurring species, which utilize multiple habitat types during their life cycle.

Fish. No impacts are anticipated from construction of the Project. No perennial streams or fish are located within the construction areas within the Project boundaries. In addition, the construction would occur when the ephemeral drainages that cross the access roads are dry. This would eliminate any potential impacts from sediment. The unnamed drainage on West Pit Road may be temporary impacted if this segment of the road needs to be widened. However, no fish are present in this stream.

Noxious Weeds

While no Class A weeds have been observed in the Project Area, several Class B and C weeds are present. Noxious weeds can threaten the general ecological health and diversity of native ecosystems. Noxious weed infestations are the second leading cause of wildlife habitat degradation.

Because many weeds are adapted to disturbed conditions and can establish immediately after construction, constructing the Project could foster the spread of noxious weeds throughout the Project Area. Noxious weeds would be managed within the Project Area. By implementing BMPs, weeds are not anticipated to spread further as a result of the development of the Project.

Operation

Habitats

Table 3.4-10 shows the permanent impacts of the Project to the habitat types found on the site. Operation of the Project would result in the permanent removal of 60.69 acres of habitat. ~~Operation of the project would result in no further impacts to habitats on the project site.~~

Wetlands

No wetlands or wetland buffers are located within the Project operation area. Therefore, no wetlands or buffers are expected to be impacted by operation of the Project.

Special Status Plant Species

No impacts to special status plant species are anticipated from the operation of the Project.

Special Status Wildlife Species

In order to determine which species (including special status species) are most at risk for turbine fatalities, a relative index to collision risk (***R***) was calculated for bird species observed in the survey area using the following formula:

$$R = A*Pf*Pt$$

Where A = mean use for species $\boldsymbol{i}$ averaged across all surveys, $\boldsymbol{Pf}$ = proportion of all observations of species $\boldsymbol{i}$ where activity was recorded as flying (an index to the approximate percentage of time species $\boldsymbol{i}$ spends flying during the daylight period), and $\boldsymbol{Pt}$ = proportion of all flight height observations of species $\boldsymbol{i}$ within the rotor-swept height. This is a relative index, which only illustrates which species may be the most susceptible to turbine fatalities. For the Project, the exposure index ranges from 0.29 on the high end (red crossbill) to 0 for many species (indicating that they were recorded on the site but not flying within the rotor swept area. If a species was recorded on the site, but never flying at all, then the exposure index would not be applicable. Exposure indices for all species across all years of survey can be found in Appendix C-4.

This index does not account for differences in behavior other than flight characteristics (i.e., flight height and proportion of time spent flying). In this impacts section, point count data were used to establish diurnal indices of avian use, and how these indices compare to other wind resource areas in the United States.

Bald Eagle. Bald eagles, although now fairly common in Washington State, are likely uncommon visitors to the Project Area. They are unlikely to nest or forage within the Project Area because there is no suitable habitat. An exposure index of 0.02 was calculated for the bald eagle (Appendix C-4). The potential for ongoing occurrence of bald eagle in the Project Area is very low. The potential for bald eagle fatalities as a result of turbine strike is also considered to be extremely low.

Golden Eagle. Two golden eagles were recorded in the Project Area during the fall of 2004. One occurred within the rotor-swept area and one was above. The golden eagle's exposure index at Whistling Ridge is reported to be less than 0.01 (Appendix C-4). Therefore, golden eagles are considered to be at relatively low risk for collision with turbines at this site.

Golden eagles typically soar at a height within the rotor-swept area of most modern turbines, and swoop to the ground to capture prey. Golden eagles have recently experienced their first mortality at a wind turbine site in Washington State (Durbin 2009). Numerous golden eagles have been killed at the Altamont wind turbine project in California, indicating that this species is susceptible to turbine collision. Golden eagles have experienced mortality greater than would be anticipated based on their level of occurrence at Altamont Pass (Appendix C-4).

The creation of cleared areas re-vegetated with low growing herbaceous species around turbines may increase the risk of golden eagles entering the rotor-swept area if they forage for prey located beneath turbines. However, given their rare occurrence in the Project Area, the potential for golden eagles to experience a turbine collision is extremely low.

Northern Goshawk. Extensive surveys over four years recorded no goshawks in the Project Area, indicating that if they do occur, it would be extremely rare. Based on these years of species specific surveys using multiple methodologies, they were recorded more than would be expected during baseline surveys in 2004 and 2006. Based on those records, the exposure index for northern goshawk at the Project Area is reported to be 0.02. This includes the occurrence of five individuals, four of which were flying within the rotor swept area. Similar to the golden eagle, this species may be at risk of increased foraging activity in open areas around turbines because they hunt for prey that occurs on the ground in cleared areas. However, given their rare occurrence in the Project Area, the potential for turbine related fatalities for this species is extremely low.

Northern Spotted Owl. The Applicant has sited its proposed Project to avoid habitat areas deemed critical to the northern spotted owl or essential to its recovery. Surveys conducted pursuant to the USFWS protocol indicate that spotted owls are not present in or near the Project, and that nearby historical sites are no longer occupied pursuant to USFWS Protocol and state law. Because there are no northern spotted owls or activity centers present in the Project Area, no Project construction impacts are expected. Finally, the Project would not impact the White Salmon SOSEA's 40 percent suitable habitat level and therefore is not restricted by Washington's forest practice regulations. Given the extensive record and review, this Project does not pose a risk of taking northern spotted owls under Endangered Species Act Section 9.

Western Gray Squirrel. No impacts to western gray squirrels are anticipated from operation of the proposed Project.

Olive-sided Flycatcher, Pileated Woodpecker, and Vaux's Swift. These three species are encompassed in the bird discussion under "Other Wildlife."

Keen's Myotis and Townsend's Big-Eared Myotis. These two bat species are encompassed in the bat discussion under "Other Wildlife."

Other Wildlife Species

Birds. Potential operation-related impacts to avian species include turbine collision and displacement. Based on the exposure index derived from abundance and flight behavior, the species most likely to collide with wind turbines located at the Project are red crossbills (R = 0.29), American robin (R = 0.14), common raven (R = 0.23), and western bluebird (R = 0.11). The full list of species and their exposure index can be found in Appendix C-4. In addition, the revised report "Analysis of Cumulative Impacts on Avian, Bat and Habitat Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon" (West 2010) prepared for Klickitat County can be found in Appendix C11 of this FEIS. For an updated cumulative impacts analysis that takes into consideration wind energy development within forested habitats of western WA, please refer to Section 3.14.3.5.

The highest index for any raptor was 0.05 for red-tailed hawk, indicating a risk approximately six times lower than for the red crossbill. A regression analysis using data collected from the Whistling Ridge site and 13 other new-generation wind turbine projects found a significant correlation between raptor use and raptor mortality. Based on this analysis and surveys in the Project Area, the estimated a raptor/vulture fatality rate is zero per MW/year, which is an extremely low estimate compared to many wind projects (Appendix C-4). The Applicant's consultants have generally reported a range of mortality for predictions, as was done in the baseline report for the proposed Project, where the 90 percent prediction interval around the estimate was 0 to 0.25 raptor fatalities/MW/year. Further, data collected from the Project Area indicate that the area is not within a major migratory pathway, at least during fall migration.

Vaux's swifts, western bluebirds (a State Monitor species), and olive-sided flycatchers were commonly observed flying at rotor-swept heights, and some turbine-related mortality may occur for these species over the life of the Project. One prairie falcon and multiple turkey vultures (both State Monitor species) were observed at rotor-swept heights. Turkey vultures are known to have very low susceptibility to turbine collisions (Orloff and Flannery 1992). Pileated woodpeckers were recorded on the site, but not flying. Osprey (a State Monitor species) was recorded during northern goshawk surveys, which was separate from the baseline avian studies and therefore not included in the exposure index calculations.

~~These collisions would likely be rare, and~~ It is unlikely that the Project would have any negative impacts on population levels on and near the Project Area. According to the National Academy of Sciences (2008), there is no evidence that "measurable demographic changes to bird populations in the United States" is occurring from fatalities at wind developments. Higher numbers of Vaux's swifts and western bluebirds were recorded during fall migration, whereas olive-sided flycatcher appears to primarily use the Project Area for breeding.

Waterfowl, waterbirds, and shorebirds were not observed using lands within the Project Area during this study, and mortality involving this group is expected to be rare. Based on abundance, passerines are expected to make up the largest proportion of fatalities at the Project. Post-construction mortality data collected at other wind projects in Washington and Oregon indicate that less correlation between pre-construction surveys and turbine-related mortality is observed in non-raptor species. The lack of correlation may be because most fatalities are among nocturnal migrants that are not accounted for during surveys.

The avian use information for the Project Area is based on detections of birds seen and/or heard calling. Because songbirds are less vocal during fall, this information may be skewed toward summer use. Similarly, the level of night migration for species associated with the Project Area is also not known. Risk analyses presented above provide some insight into which species are most vulnerable to turbine collision; however, estimates are based on abundance, proportion of daily activity budget spent flying, and flight height of each species. Observations were made during daylight hours, and do not take into consideration flight behavior or abundance of nocturnal migrants. Further, the analysis does not account for varying ability among species to detect and avoid turbines, habitat selection, or other factors that may influence exposure to turbine collision. As a result, actual risk may be lower or higher than indicated by these estimates (Orloff and Flannery 1992).

Bats. It is likely that some bat mortality would occur during operation; however, mortality estimates are difficult due to our lack of understanding of why bats collide with wind turbines (Kunz et al. 2007, Baerwald et al. 2008). Several factors may aid in the assessment of potential impacts to bats, including site-specific habitat and topography, species composition, and activity patterns. The following impact assessment was completed by examining site-specific habitat features and bat acoustic data collected to date. Additional insight from investigations conducted at other wind projects is presented where relevant. The revised report "Analysis of Cumulative Impacts on Avian, Bat and Habitat Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon" (West 2010) prepared for Klickitat County, is included as Appendix C-11 of this EIS. For an updated cumulative impacts analysis that takes into consideration wind energy development within forested habitats of western Washington, please refer to Section 3.14.3.5.

The number of bat detections varied greatly between the three survey years. This is based on variation in habitat surveyed and the height of detector placement. Overall, the majority of detected species were low-frequency species, such as big brown and silver-haired bats. Hoary bats made up 8.2 percent of all passes by low-frequency species. Based on studies from other wind energy projects in the Pacific Northwest, turbine fatalities would be most expected from hoary bats and silver haired bats. Big brown bats are relatively uncommon at wind turbine fatalities. At elevated stations meant to reflect the rotor-swept area, low-frequency bats were again recorded in much higher numbers than high-frequency species. This likely reflects migration flight heights and foraging preferences.

The timing of peak bat activity on the proposed Project Area (portions of July and August) does not coincide with when the highest levels of bat mortality have been documented at other wind projects in the US. Fatality studies have shown a peak in mortality in August and September and generally lower mortality earlier in the summer (Johnson 2005, Arnett et al. 2008). While the survey effort varies among the different studies, the studies that combine Anabat surveys and fatality surveys show a general association between the timing of increased bat call rates and timing of mortality, with both call rates and mortality peaking during the fall (Kunz et al. 2007). The highest use of the Project Area occurred in July and August, prior to the time that most bat mortality occurs at wind resource areas in the Pacific Northwest as well as throughout the US.

High bat activity in July and August is likely due to use of the Project Area by local bats during the reproductive season, when pups are being weaned and foraging rates are high. Activity beyond mid-August likely represents movement of migrating bats through the area. Activity by hoary bats also was substantially higher in July, and dropped off significantly beginning in early August. After August 31, activity for all bats was very low relative to earlier dates, indicating that most bats had left the area for winter hibernacula or warmer climates. These data indicate higher use of the Project Area by resident populations of bats, rather than by migrants passing through the area. Further, high bat activity levels during the breeding season, as seen in the Project Area, do not equate to high bat fatality rates. Low mortality has been documented during the breeding season at several wind projects, even when relatively large bat populations were present in the area (Fiedler 2004, Gruver 2002, Howe et al. 2002, Johnson et al. 2004, Schmidt et al. 2003).

Finally, no known large bat colonies are present near the proposed Project. The nearest know hibernaculum is located near the town of Trout Lake, nearly 20 miles north of the proposed Project (B. Weiler, personal communication). <u>No significant peaks in bat activity, suggesting high migration activity, were noted during the August-September time frame that bats migrate.</u> ~~The project site does not contain topographic features, such as canyons, that may funnel migrating bats toward corridors where turbines would be placed.~~ No turbines would be constructed near wetlands or ponds, and cleared areas surrounding turbine strings would closely mimic clearcuts or young reforested areas, where to date, recorded bat activity levels in the Project Area were the lowest.

Some bat fatalities are anticipated as a result of the operation of the proposed Project. Variable levels of recorded use by bats across years, habitats and recording height above ground indicate that the extent of impacts is difficult to predict at this time.

Amphibians/Reptiles. No impacts are anticipated to amphibians or reptiles as a result of Project operation.

Mammals. Because data on impacts to big game as a result of wind project operation is limited, it is difficult to predict the impact of the proposed Project on wildlife using priority habitats on the proposed Project Area. Additional coordination with WDFW is ongoing, and would continue to address this resource.

Fish. No impacts are anticipated to fish as a result of Project operation.

Noxious Weeds

The spread of noxious weeds is not anticipated to occur as a result of Project operation with BMPs in place.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least 90 days prior to the beginning of site preparation. A detailed site restoration plan is required within 90 days of Project termination. The initial site restoration plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The initial site restoration plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential changes to wetlands, vegetation, wildlife habitat, and noxious weeds. If impacts to biological resources are anticipated as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.4.2.2 No Action Alternative

Under the No Action Alternative the Project would not be built. Timber harvest would still occur within the proposed Project boundary, which would continue to affect habitats and potentially increase the spread of weeds. However, there would be no increased avian or bat fatalities from turbine operations.

Other power generation facilities could be constructed and operated in the region to meet long-term needs for power, including other wind projects or generation using fossil fuels. Fossil fuel combustion would affect vegetation, wetlands, wildlife, and threatened and endangered species, including impacts related to carbon dioxide emissions. The significance of such impacts would depend on the site-specific locations and design of such facilities.

3.4.3 MITIGATION MEASURES

- The following mitigation measures are identified to avoid, minimize, and compensate for potential impacts to biological resources during construction and operation to the extent feasible.

- Avoid and minimize the use of overhead collector lines, which create areas where birds may congregate and perch, thus decreasing the potential for turbine collisions.

- Use of tubular turbine towers, avoiding the lattice type towers which creates areas where birds may congregate and perch, thus decreasing the potential for turbine collisions.

- Use of un-guyed meteorological towers, reducing the potential for bird collision with wires.

- Minimize the use of turbine lighting in the Project Area, thereby reducing the potential for birds and bats to be disoriented by lights or attracted to turbines.

- Install newer generation up-wind turbines.

- Utilize certified "weed free" straw bales during construction to avoid introduction of noxious weeds.

- Re-seed all temporarily disturbed areas with an appropriate mix of native plant species as soon as possible after construction is completed to accelerate the re-vegetation of these areas and to avoid the establishment and spread of noxious weed species.

- Implement a noxious weed control program, in coordination with the Skamania County Noxious Weed Control Board, to control the spread and prevent the introduction of noxious weed species.

- Conduct raptor nest surveys prior to construction during the breeding season (approximately April to July) in order to avoid or minimize impacts to any raptors potentially nesting in or near the Project Area. Construction activities requiring the surveys would include those that would remove forested areas and/or require the use of heavy equipment substantial enough to potentially disturb nesting activities.

- Implement a two year minimum post-construction avian mortality study.

- Convene a Technical Advisory Committee to evaluate the mitigation and monitoring program and determine the need for further studies or mitigation measures. The Technical Advisory Committee would be composed of representatives from WDFW, USFWS, Skamania County, and the Applicant. The role of the Technical Advisory Committee would be to coordinate appropriate mitigation measures, monitor impacts to wildlife and habitat, and address issues that arise regarding wildlife impacts during construction and operation of the Project, including potential adaptive management opportunities. The post-construction monitoring plan would be developed in coordination with the Technical Advisory Committee.

- Coordinate with WDFW for potential impacts to big game species (deer and elk), if appropriate.
- Prepare a SWPP for both the construction and operation phases of the project and submit to EFSEC for approval.

3.4.4 UNAVOIDABLE ADVERSE IMPACTS

The proposed Project would result in permanent loss, temporary disturbance and fragmentation of existing habitat for a number of wildlife species. These impacts, while unavoidable, would take place in landscape of managed timber lands which has for many years and would continue to be a fragmented environment with ongoing disturbance. There are no impacts to wetlands, and any particularly sensitive areas would be avoided during micrositing of the turbines.

No population impacts are expected to birds through turbine collisions. Adequate information is not known on bat population sizes to determine whether population response would be anticipated.

~~The proposed project would cause mortality to birds and bats through turbine collisions. However, the level of mortality is not anticipated to be sufficient to negatively affect the population viability of any single species.~~

It appears unlikely that the Project would cause any mortality to a threatened or endangered species. Extensive surveys for northern spotted owl and northern goshawk have been conducted throughout the Project Area and both species are considered either completely absent or extremely rare. Golden eagles were recorded during surveys in 2004, but not in more recent surveys. Bald eagles were recorded in the winter of 2008 and summer of 2009. The potential for ongoing occurrence of either golden or bald eagles is considered extremely rare.

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3.5 ENERGY AND NATURAL RESOURCES

This section describes potential impacts to energy resources.

3.5.1 AFFECTED ENVIRONMENT

3.5.1.1 Region

Regional Demand

In September 2009, the Northwest Power and Conservation Council released the Draft Sixth Northwest Power Plan (NWPCC 2009), which contains projections for regional power demand[14]. The plan notes that regional population is likely to increase from 12.7 million in 2007 to 16.3 million by 2030. Demand for electricity is expected to grow, in part as a result of this population growth. The Draft Sixth Northwest Power Plan states:

> *The Pacific Northwest consumed 19,000 average megawatts or 166 million megawatt-hours of electricity in 2007. That demand is expected to grow to 25,000 average megawatts by 2030 in the Council's medium forecast. Between 2007 and 2030, demand is expected to increase by a total of 6,500 average megawatts, growing on average by 270 average megawatts, or 1.2 percent, per year.*

The cost of energy of all types is expected to be significantly higher over the next twenty years than during the 1980s and 1990s. Cost increases would be driven by increasing demand and the fact that the cost of finding and producing new energy sources is higher than for existing supplies. Carbon emission taxes or cap-and-trade policies are likely to further raise energy costs. The Northwest Power and Conservation Council predicts that wholesale electricity prices are expected to increase from about $45 per megawatt-hour in 2010 to $85 by 2030 (2006$).

[14] The Northwest Power and Conservation Council released their Sixth Northwest Power Plan in February 2010. The FEIS continues to reflect the information in the Draft Sixth Northwest Power Plan. For the final version of the Power Plan, see the Northwest Power and Conservation Council's website at http://www.nwcouncil.org/energy/powerplant/6/default.htm.

Pacific Northwest Markets for Renewable Energy Resources

According to the Northwest Power and Conservation Council, much of the future demand for electricity in the region could be met through conservation. However, markets for renewable or "green" energy are still growing in the Pacific Northwest, and the Project can help to meet this growing demand. One driver for this shift is the establishment of RPS at the state level, which requires that utilities obtain a percentage of their power from renewable sources. For example, in 2006, voters in the Washington passed Initiative 937, which requires that by 2020 large public and private utilities must obtain 15 percent of their electricity from renewable resources, and undertake cost-effective energy conservation. In 2008, California increased its RPS goal from 20 percent to 33 percent renewable energy by 2020.

In addition to the RPS requirements, Washington law requires larger utilities in Washington to offer a voluntary "qualified alternative energy product," essentially an electricity product powered by green resources, beginning in January 2012 (RCW 19.29A.090). State law defines a qualified alternative energy resource as electricity fueled by wind, solar energy, geothermal energy, landfill gas, wave or tidal action, gas produced during the treatment of wastewater, qualified hydropower, or biomass. As of 2008, 15 of the 16 utilities covered by the report had an active green power program with customers participating, and five additional utilities not covered by the law reported to the state that they were operating green power programs. Estimated sales of green power for 2008 were up 17 percent over 2007. Wind powered electricity represented 83.3 percent of green power sales (WUTC 2008).

Bonneville Power Administration Transmission System

BPA owns and operates 15,000 miles of power lines that carry power from the dams and other power plants to utility customers throughout the Pacific Northwest. The BPA service area includes Oregon, Washington, Idaho, Western Montana, and small portions of Wyoming, Nevada, Utah, California, and Eastern Montana.

Electric power plants require an interconnection with a high-voltage electrical transmission system for delivery to purchasing retail utilities. BPA owns and operates the FCRTS, which comprises more than three-fourths of the high-voltage transmission grid in the Pacific Northwest, and extra regional transmission facilities. BPA considers and grants interconnection requests to the FCRTS in accordance with its Open Access Transmission Tariff. Current and proposed wind project interconnections to BPA transmission facilities in the vicinity of the Project Area are shown in Figure 3.14-1. Under BPA's tariff, BPA offers transmission interconnections to the FCRTS to all eligible customers on a first-come, first-served basis, with a decision on whether or not to make this offer subject to environmental review under NEPA.

3.5.1.2 Project Area

The Project would be located north of the Columbia River. The Columbia River corridor is an area of good wind energy potential that currently supports several successful wind power projects. The Columbia River Gorge provides a low-elevation connection between continental air masses in the interior of the Columbia Basin east of the Cascade Range and the maritime air of the Pacific Coast. Especially strong pressure gradients develop along the Cascades and force the air to flow rapidly eastward or westward through the Gorge.

Electric service for the Project Area is provided by Skamania County Public Utility District #1, which obtains electricity from the Federal Columbia River Power System (FCRPS), the series of hydroelectric projects along the Columbia River, through BPA. Backup power is obtained from Condit Dam, which is scheduled to be decommissioned in 2010. In July 2009 the Public Utility District sought intervener status with EFSEC to argue in favor of the Project, based on the ability of the Project to provide backup power to the Public Utility District once Condit Dam is removed (EFSEC 2009). There is currently no utility service of any kind at the proposed Project Area.

The proposed Project Area is already heavily used by energy and other utilities. Two BPA high-voltage transmission lines cross the Project Area, a natural gas pipeline runs near the north border of the Project Area, and there are two communications towers within one mile of the Project Area.

3.5.2 IMPACTS

3.5.2.1 Proposed Action

Construction

The Project would consume limited amounts of energy and natural resources, primarily during construction. The electrical substation would be built immediately adjacent to the BPA lines, reducing the need to build new long-distance high-voltage transmission lines.

Estimated types and quantities of energy and natural resources consumed during construction are as follows:

- 19,250 gallons of fuel (diesel and gasoline) for construction equipment
- 3,700 tons of steel for turbine towers
- 1,000 tons of steel for tower foundation reinforcement
- 100,000 yards of gravel (aggregate) for roads and crane pads
- 10,000 cubic yards of concrete for turbine foundations
- 1.7 million gallons of water for road compaction, dust control, wetting concrete, etc., assuming plain water is used for dust control (this amount could be reduced through the use of lignin or other dust palliative if permitted by EFSEC)

The source of fuel for construction equipment and vehicles would be licensed fuel distributors or gas stations. Petroleum products, including vehicle and equipment gasoline and diesel fuels, and machinery lubricants are available and would be purchased from numerous commercial outlets in the Project vicinity. Water for construction would be obtained from a local source with valid water rights, as described in Section 3.3 Water Resources. Concrete would be purchased from existing suppliers located near the Project Area. Electricity for construction equipment would be provided from portable generators.

Bulk materials such as aggregate gravel and sand, in addition to soils, would be supplied locally from existing quarries. Other building materials, equipment, and other operational commodities would be purchased from equipment and material suppliers. The largest resource use would be steel and concrete. Diesel fuel and electricity also would be consumed during construction. The amounts of all of these resources would be small compared to existing supplies, and none are expected to affect availability or market supply.

Nonrenewable resources in the Project vicinity are primarily gravel extracted from local sources and used locally. Primary consumption of these resources is related to construction projects (sand, gravel, and other mineral resources as used in steel, aluminum, concrete, and other building products). Several gravel pits and quarries are located near the Project Area. These would be adequate to supply the needs of the Project.

Renewable resources are materials that can be regenerated, such as wood, other fibers, wind, and sunlight. The primary renewable resources in the Project Area are timber and wind. The Project Area, including the Project Area, has been used for the renewable production of forest products for many years. The addition of the Project would diversify this renewable resource-based business by using a second, compatible renewable resource, the wind energy of the site. The Project would shift approximately 56 acres of commercial forest land to non-forest uses for the Project Area roads and the turbine corridors. In the context of the 1,152-acre site and the large areas of surrounding area in private and Washington State timber management, this reduction would not affect the availability of timber as a renewable resource.

Operation

Operation of the Project would consume limited amounts of energy and nonrenewable natural resources. During operations, electrical energy from Skamania County Public Utility District #1 would be consumed on a limited basis during times when the wind generated on site is insufficient to power warning lights required by the Federal Aviation Administration and security lights. Some electricity would be used at the Operations and Maintenance and substation facilities. In addition, turbines require electrical energy to run lubrication pumps and cooling systems, electrical monitoring systems, and position motors when wind speeds are below generation levels.

- Types and quantities of energy and natural resources consumed during operations are as follows:
- Fuel for operations and maintenance vehicles (approximately 8,500 gallons annually)
- Minor quantities of lubricating oils, greases and hydraulic fluids for the wind turbine generators
- Electricity for Project operations (less than approximately 600 kilowatt hours per wind turbine generator per month)
- Water for use at the Operations and Maintenance facility and periodic maintenance of turbine blades (less than 5,000 gallons per day)

Electricity for Project operations would mostly be generated by the approximately 75 MW of electricity created by the Project itself. Wind facilities have a very high "energy payback" (ratio of energy produced compared to energy expended in construction and operation), and wind's energy payback time is one of the shortest of any electrical generation technology. It takes approximately three to eight months, depending on the wind speed at the site, for a wind facility to produce the total amount of energy used to construct the equipment and build the Project (AWEA 2007). The Applicant expects this to be true for the Project as well.

During periods when the wind turbines are not generating power, electricity would be purchased from the Skamania County Public Utility District #1.

The impact of this proposed Project to the regional electric demands can best be seen by a recent Northwest Power and Conservation Council evaluation of projected electrical demand in the region. The NPCC found that a medium forecast predicts a demand of about 5,300 MW by 2025 with a range of about minus 2,500 MW to a high of about plus 7,000 MW. The medium forecast represents a growth of about 1 percent per year. Given the regional energy needs and the unique convergence of gas pipelines, wind energy, and transmission lines in Klickitat County, it is reasonable to estimate that the County could produce a portion of the projected increased energy demand. Currently, the regional power resources come from the following energy technologies:

- Hydroelectric, 55 %
- Coal fired thermal, 19 %
- Nuclear power, 5 %
- Imports, 8 %
- Gas fired combustion turbines, 3 %
- Non-Utility generation, 6 %
- Miscellaneous, including wind power, 4 %

The Klickitat County Energy Overlay Zone Final EIS[15], released by the Klickitat County Planning Department, also recently evaluated the projected energy demand in Klickitat County, Washington, the county immediately adjacent to Skamania County. The Klickitat County Planning Department found that the technologies that are currently being used within Klickitat County include hydroelectric, gas fired combustion turbines, biomass fired turbines, and wind energy. These energy technologies are expected to continue to be developed in the County (through the year 2024) and include:

- Seven 250 MW or five 350 MW natural gas thermal projects;

[15] See: http://www.klickitatcounty.org/default.asp

- Two 50 MW biomass projects;
- Four wind power projects with total generating capacity of 1,000 MW; and
- Solar projects are anticipated to be small in size and number.

The proposed Project, although in a small way, would help meet the Project demand outlined by the NPCC as mentioned above through its wind power generation. Additionally, the proposed Project would be consistent with the types of projects that have been outlined within the Klickitat County Energy Overlay Zone Final EIS.

Studies of the projected impact of this proposed Project to the FCRTS have found that the North Bonneville-Midway 230-kV line interconnection provides sufficient capacity for the proposed 70 MW request. From the proposed BPA substation interconnection, the power flow would be directed 80% towards North Bonneville and 20% towards Midway. The contingency analysis for this interconnection request indicates that no overloads are anticipated to occur, and this proposed Project would not be expected to affect the operation of BPA's transmission system.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least 90 days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential uses of energy and natural resources. If impacts to energy or natural resources are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.5.2.2 No Action Alternative

Under the No Action Alternative, the proposed Project would not be built. The energy and water use for the Operations and Maintenance building would not take place. It is likely that the region's power needs would be met through energy efficiency and conservation measures, existing power generation, or the development of new power generation. However, projections of the region's power needs are discussed further in the Northwest Power and Conservation Council's Sixth Northwest Power Plan.[16] Base load demand would likely be filled through expansion of existing, or development of new thermal generation such as gas-fired combustion turbine technology. Other wind sources also could be developed. Such development could

[16] See: http://www.nwcouncil.org/energy/powerplan/6/default.htm.

occur at appropriate locations throughout Washington State. The impacts on energy and natural resources would depend on the type, location, and size of the facility proposed.

3.5.3 MITIGATION MEASURES

Adverse impacts to energy and natural resources are identified to be minimal and therefore no mitigation measures would be required.

3.5.4 UNAVOIDABLE ADVERSE IMPACTS

The Project would have minor unavoidable adverse impacts to energy and natural resources. The overall impact of the Project to energy and natural resources would be positive, since it would provide the region with low-cost, clean, renewable energy, in accordance with state and national policies and priorities.

3.5.5 REFERENCES

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3.6 PUBLIC HEALTH AND SAFETY

This section describes existing health and safety hazards at the Project Area and identifies potential health and safety risks from Project construction and operation. Risks discussed include fire or explosion, release of hazardous materials, vandalism, traffic accidents, turbine structural failure, ice throw, electric and magnetic fields, and shadow-flicker. Mitigation measures are identified for potential impacts.

3.6.1 AFFECTED ENVIRONMENT

3.6.1.1 Existing Health and Safety Risks

Existing health and safety hazards at the Project Area include those associated with the current commercial forestry operations on the site. Commercial forestry operations include some risks of fire and explosion from equipment operation, especially during dry summer months. Commercial forestry entails a small risk of leaks or spills of fuel, oil, or hydraulic fluid. There is also a small health and safety hazard related to logging trucks currently traveling to and from the site. During the dry summer months, there is some risk of fire from lightning.

Resources for responding to risks to ~~environmental~~ public health and safety include fire prevention, law enforcement, and emergency medical response.

3.6.1.2 Fire Prevention

The Project Area is currently used for commercial forestry and there are no structures on the site.

Two city fire departments (North Bonneville and Stevenson) and seven Skamania County fire districts provide fire protection to Skamania County residents. DNR also provides fire suppression services to forested areas in Skamania County, and would be the first responder to a fire emergency at the Project Area (J. Weeks, personal communication). Skamania County Fire District No. 3 (SCFD3) (also known as Underwood Fire District) provides fire protection and emergency response to a 20-square mile service area immediately south of the Project Area (D, Cox, personal communication). Although the Project Area is not formally within SCFD3's service area (T. Skinner, personal communication), SCFD3 would likely respond to a fire at the Project Area, along with and in coordination with DNR (R. Hovey, personal communication). The Mill A Fire Department is also near the Project Area, and has a staff that includes less than six volunteer firefighters and no paid personnel (J. Carlson, personal communication).

The Project Area is located in DNR's West Klickitat Area. The DNR work center closest to the Project Area is the Husum work center, which is staffed by one fire manager officer and one assistant fire manager (J. Weeks, personal communication). Other staff and equipment at the Husum work center includes six firefighters and two Type 6 wildfire engines (Fullerton and Helgerson 2008). The DNR response time to the Project Area would vary depending on the location of the engines and the type of fire emergency at the Project Area, but would range from 45 minutes to one hour (R. Hovey and J. Weeks, personal communications). The engines are usually assigned to work projects in the field.

SCFD3 is located in the unincorporated community of Underwood and is staffed by 17 volunteer firefighters. The SCFD3 service area is 20 square miles. Equipment at SCFD3 includes one each of the following: Type 1 engine, Type 2 engine, Type 3 engine, Type 7 engine, Type 2 tender, and Type 3 tender (Fullerton and Helgerson 2008). The Washington State Ratings Bureau rating for SCFD3 at the Project Area is "Unprotected – 10," because the site is not located within the SCFD3 boundaries (T. Skinner, personal communication).

The Project Area is located outside of the Columbia River Gorge National Scenic Area. If an incident at or near the site, i.e., a wildland fire, threatens the area, the Columbia River Gorge

National Scenic Area fire agency could respond. The fire agency is equipped with three Type 6 wildfire engines, one fire prevention module, two command vehicles, two cooperative engines (with the DNR), and one cooperative engine (with the Oregon Department of Forestry). The Columbia River Gorge National Scenic Area fire agency has nine employees and is staffed seven days per week, July through September (Fullerton and Helgerson 2008).

Skamania and Klickitat Counties have jointly prepared a Community Wildfire Protection Plan through a Title III grant from the Secure Rural Schools and Self Determination Act (Klickitat and Skamania Counties 2006). This is a plan developed by a community in an area at risk from wildfire, with the goal of reducing the risk of catastrophic wildfire within the region. .

Table 3.6-1 lists the fire departments that serve the site and surrounding area, along with the departments' staff and equipment. These fire districts have mutual aid agreements with each other (J. Carlson, personal communication).

3.6.1.3 Law Enforcement

The Skamania County Sheriff's Office provides law enforcement services in the Project vicinity. Sheriff's Office headquarters are located in Stevenson, approximately 15 miles southwest of the Project Area. The response time from Sheriff's Office headquarters to the Project Area is approximately 20 minutes.

The Washington State Patrol patrols SR 14 south of the site. Roads extending north of SR 14 are county roads, and are patrolled by the Sheriff's Office. Table 3.6-2 provides information on the police departments serving the site area, including service area and number of officers.

3.6.1.4 Emergency Medical Services

Two ambulance companies provide emergency response services for the Project Area: Skamania County Emergency Medical Service and Skyline Ambulance. Skamania County Emergency Medical Services is the functioning entity of Skamania County Hospital District No. 1, which provides ambulance service to the residents of Skamania County. Skyline Ambulance is based at Skyline Hospital in White Salmon, and is equipped with three ambulance vehicles. Table 3.6-3 lists characteristics of the first response ambulance service providers for the Project Area.

Table 3.6-1
Fire Departments in the Whistling Ridge Energy Project Vicinity

Fire Department	Paid Full-Time Personnel	Volunteer Personnel	Equipment	Protection Class[a]
Skamania County Fire District No. 3	0	17	1 – Type 1 engine 1 – Type 2 engine 1 – Type 3 engine 1 – Type 7 engine 1 – Type 2 tender 1 – Type 3 tender	10
Mill A Fire Department	0	<6	(c)	
Washington Department of Natural Resources	6	NA[b]	2 – Type 6 wildfire engines	-
Columbia River Gorge National Scenic Area Fire Agency	9	NA[b]	3 – Type 6 wildfire engines 1 – fire prevention module 2 – command vehicles 2 – cooperative engines (with DNR) 1 – cooperative engine (with Oregon Department of Forestry).	-

Sources: Fullerton and Helgerson (2008), Washington State Patrol (personal communication), MSRC (2008), J. Carlson (personal communication).
[a] T. Skinner (personal communication): As rated by the Washington Surveying and Rating Bureau. The Bureau rates the level of fire protection provided by fire departments against four main elements: available water supply; logistical characteristics and makeup of the district fire department; available communications systems; and fire control and safety measures taken and ordinances in effect in the particular fire district. Ratings are used to evaluate fire protection availability for insurance purposes. Ratings range from 1 to 10, with class 1 representing the highest level of fire protection and class 10 the lowest level. Ratings were not available for the DNR or the Columbia River Gorge National Scenic Area Fire Agency.
[b] Not available.

Table 3.6-2
Police Department Staffing Levels in the Whistling Ridge Energy Project Vicinity

Department	2008 Population of Service Area	Number of Commissioned Officers	Ratio of Officers to 1,000 Population
Skamania County Sheriff's Office	10,700	23	2.1[a]
Washington State Patrol District 5 Goldendale Detachment	30,800[b]	9	0.3
Washington State Patrol Vancouver District 5	608,600[c]	60	0.01
Average for Washington State	6,489,490	10,541	1.6[d]

[a] D. Cox (personal communication), WASPC (2008), Washington State Patrol (personal communication).
[b] Includes population of Klickitat and Skamania Counties.
[c] Includes population of Clark, Cowlitz, Lewis, and Skamania Counties.
[d] WASPC (2008), statistics are for 2007.

Table 3.6-3
Ambulance Service Providers in the Whistling Ridge Energy Project Vicinity

Name	Ownership	Level of Care
Skyline Ambulance	Public	Advanced Life Support
Skamania County Emergency Medical Services	Public	Advanced Life Support

Sources: Skyline Hospital (2008), Skamania County EMS (2008).

The two hospitals closest to the Project Area are Skyline Hospital in White Salmon (7 miles southeast of the Project) and Providence Hood River Memorial Hospital, directly across the Columbia River from White Salmon in the City of Hood River (8 miles southeast of the Project). Skyline Hospital is a 32-bed acute care hospital with a Trauma Level IV designation, serving western Klickitat County and eastern Skamania County. Services at Skyline Hospital include acute care, obstetrics, surgery, cardiopulmonary care, radiology and laboratory services, physical therapy, a pharmacy, and emergency services. Skyline Hospital owns and operates a three-vehicle ambulance service (Skyline Hospital 2008).

Providence Hood River Memorial Hospital is a 25-bed facility that provides cardio conditioning, counseling, diabetes treatment, a dialysis center, emergency services, obstetrics, radiology, laboratory services, nutrition, occupational medicine, a sleep center, and surgery[17].

3.6.2 IMPACTS

3.6.2.1 Proposed Action

Potential impacts to ~~environmental~~ public health may occur during construction or operation.

Construction

Construction impacts include the typical risks to health associated with the construction of an industrial facility, including fire or explosion, release of hazardous materials, vandalism, and accidents.

Fire or Explosion

The only structures proposed on the site are the turbine towers, associated transformers and substation, and the Operations and Maintenance facility. Project construction could temporarily increase the risk of fire at the Project Area and in the broader Project Area, as a result of the operation of vehicles and power equipment, which may cause fires through contact with dried plants during dry summer weather. Blasting may be used where solid rock is encountered during construction of turbine foundations or trenches for the underground electrical collection system. Blasting could create a fire hazard during dry weather.

As the landowner and a long-term commercial forestry business, the Applicant has maintained the ability to respond to fires on their forest land with dozers and water trucks, and would

[17] See: http://www.providence.org/hoodriver/

continue to do so. Fire response by the Applicant would be supplemented by DNR, which provides fire protection on forest lands. DNR has resources in the area and responds to all wildland fires. DNR would likely respond to a structure fire in the woods, as would Underwood Fire District #3 and Mill A Volunteers. SCFD3 is the nearest local fire district. Eric Ziegler, District Chief, submitted a letter to EFSEC during the EIS scoping period stating that SCFD3 can provide service coverage to the Project Area to respond to fires without any reduction in service to their constituency. Mill A Volunteers is not a recognized fire district with a tax base but a volunteer fire company. Mill A Volunteers has joint responder agreements with Underwood Fire District and the DNR.

There are two locations being considered for the Operations and Maintenance facility site, one site next to the substation and the other at the bottom of West Pit Road. The West Pit Road site would have a lower fire risk and shorter response times for emergency services, since the facility would be along a county road.

Releases of Hazardous Materials

The risk of releases to the environment that would affect health would be similar to any large construction project. The primary potentially hazardous materials used during construction would be diesel fuel for construction equipment, lubricating oils and hydraulic fluids for the turbines, and mineral oil for the transformer at each turbine and the substation. Approximately 19,250 gallons of diesel fuel would be used during construction. Most trucks would fuel up off-site; some fuel would be transported to the site.

Each turbine would contain a small amount of hydraulic fluid, and would have a pad-mounted transformer containing approximately 500 gallons of mineral oil for cooling. The BPA substation would have either one or two transformers, each containing up to 12,000 gallons of mineral oil. These transformers would be filled during construction.

Should contaminated media be unexpectedly encountered during construction of the Project, work would be stopped, and an environmental specialist would be called in to characterize the nature and extent of the contamination and to determine how the work may safely be completed. Work would proceed only after measures approved by the WDOE and identified in the Hazardous Waste Management Plan are put in place to prevent the spread of contaminated materials and protect the health and safety of workers.

Vandalism

During construction, the presence of out-of-area workers could create a negligible increase the risk of vandalism in the community. Vandalism of Project facilities and theft of equipment during construction also is a potential area of concern. Security provisions could include temporary fencing with a locked gate around the construction site; the use of site trailers for the temporary storage of special equipment or materials; and the use of outdoor lighting and motion-sensor lighting. Access to the Project Area would be controlled, and site visitors including vendors, equipment personnel, maintenance contractors, material suppliers, and all other third parties would require permission for access from authorized Project staff prior to entrance. These measures would help to reduce the potential for vandalism and other incidents at the Project Area that would require a response by local law enforcement agencies. The Applicant may contract for on-site security to supplement coverage by the Skamania County Sheriff.

Traffic Accidents

Project construction could lead to a slight increase in the chance of traffic accidents, due to the presence of a peak of 265 construction workers traveling to the site, along with the transport of construction materials and the turbine components. This impact would last a maximum of one year, with peak impacts limited to a several-month period in the summer. This risk would be minimal and similar to any construction project involving the use of heavy equipment and large structural components on the roadways. The Skamania County Sheriff or the Washington State Patrol would respond to traffic accidents. Medical response would be provided by the local ambulance services (Skamania County Emergency Medical Service and Skyline Ambulance) and the two local hospitals (Skyline Hospital in White Salmon and Providence Hood River Memorial Hospital in Hood River), which have capacity for additional patients.

Turbine Structural Failure

The risk of turbine structural failure during construction would be very small, and would be due primarily to problems in the assembly process, should a failure occur. The turbine supplier would be required to document and provide the quality assurance/quality control procedures used during manufacturing and assembly to minimize or eliminate the risk of failure.

Ice Throw

Ice storms, both mild and occasionally severe, may occur in the Project Area. During periods of ice build-up, the exposed parts of the turbine may be coated with ice. When a stationary blade accumulates ice followed by an increase in temperature, the ice on the blade can thaw. If the blades are stationary, the ice would fall near the turbine base, but once the blades begin to rotate, ice fragments may be thrown. Ice throw would not be a risk during construction because the turbines would not be operating.

Shadow Flicker

Shadow flicker caused by wind turbines is defined as alternating changes in light intensity as the moving blade casts shadows on the ground and objects, including windows at residences. Some health concerns have been raised about the effects of shadow flicker. Shadow flicker can only occur if the location of the turbine is close to a receptor that is in a position where the blades interfere with very low-angle sunlight. Shadow flicker would not be a risk during construction because the turbines would not be operational.

Electromagnetic Fields

Electrical transmission lines, distribution lines, and substations create electromagnetic fields. Electromagnetic fields also exist in nature and around all types of electrical devices and appliances. They are produced by the presence of differences in electrical potential (voltage) and the movement of charges because of the potential (current). This movement produces magnetic fields. The electrical and magnetic fields around electrical appliances and utility facilities are extremely low frequency. They have a significantly lower frequency (60 cycles per second, or Hz), than radio broadcast waves (0.5 to 100 million cycles per second) or electromagnetic energy from sunshine (1,000 trillion cycles per second). Electrical and magnetic fields would not be generated prior to completion of the Project other than by electrical generators used for temporary site power.

Operation

Potential health and safety concerns from operation of a wind energy facility include ongoing risks of fire or explosion, releases to the environment, vandalism or traffic accidents, along with concerns regarding turbine structural failure, tower failure, blade throw ice throw from the turbine blades, shadow flicker from the moving blades, and electrical and magnetic fields.

Fire or Explosion

Wild fires in the Project Area are relatively rare, and fire conditions are monitored continually by the DNR. During Project operation, fire protection would continue to be provided by the Applicant, DNR, Underwood Fire District, and Mill A Volunteers. Potential for fire would be lower once construction is completed, and would relate primarily to lightning and vehicle use during the dry summer months. These risks would be mitigated through appropriate operational practices. DNR has stated that resources for fire protection and suppression services are adequate to serve the Project during construction and operation (J. Weeks, personal communication).

Turbine fires are possible; however, with the types of modern wind turbines proposed for the Project, turbine malfunctions leading to fires in the nacelle are extremely rare. The turbine control system detects overheating in turbine machinery, and internal fires would be detected by these sensors, causing the machine to shut down immediately and send an alarm signal to the central supervisory control and data acquisition system, which would notify operators of the alarm by cell phone or pager.

Releases to the Environment

Operation of the Project would not result in the generation of regulated quantities of hazardous wastes. Since no fuel would be burned to power the wind turbine generators, there would be no spent fuel, ash, sludge or other process wastes generated. The only materials used during Project operations that present any potential for accidental spills are lubricating oils and hydraulic fluids used in the wind turbine generators and transformers.

- ***Turbine Fluids.*** The fluids within the turbines are checked by staff periodically and must be replenished or replaced on an infrequent basis (generally less than once per year and sometimes only once every five years). When replacing these fluids, the industry standard practice is for staff to climb up to the nacelle and remove the fluids in small (typically five-gallon) containers and lower them to the ground using a small maintenance crane built into the nacelle itself. The containers would then be transferred to a pickup truck for transport to the Operations and Maintenance facility for temporary storage (typically less than one month) before being picked up by a licensed transporter for recycling. Replacement fluids are added in the same method, only in reverse.

- ***Replacement Fluids.*** Small quantities of replacement fluids, typically no more than a few 50-gallon drums of lubricating oil and hydraulic oil, may be stored at the Operations and Maintenance facility for replenishing and replacing spent fluids. These fluids would be stored in appropriate containers. All operations staff would be trained in appropriate handling and spill prevention techniques to avoid any accidental spills. Because only small quantities of fluids are transported, added, or removed at any one time and are stored for short periods of time, the potential for an accidental spill during routine maintenance is extremely limited.

- ***Pad Mounted Transformers.*** Each wind turbine generator has a pad mounted transformer located at its base. These transformers contain mineral oil, which acts as a coolant. Each pad mounted transformer contains up to 500 gallons of mineral oil. The transformer is designed to meet stringent electrical industry standards, including containment tank welds and corrosion protection specifications. Regular maintenance is performed on the transformers, including checking the condition of the coolant.

- ***Substation Transformer(s)***. The BPA substation would be equipped with either one or two transformers. Each substation transformer would contain up to 12,000 gallons of mineral oil for cooling. These transformers are designed to meet stringent electrical industry standards, including containment tank welds and corrosion protection specifications. The substation transformers are equipped with an oil level sensor that detects any sudden drop in the oil levels and send an alarm message to the central supervisory control and data acquisition system. Finally, the substation transformers are supported by a concrete vault to ensure that any accidental fluid leak does not result in any discharge to the environment.

It is anticipated that an Operation SPCC Plan would be submitted and approved by EFSEC prior to operation.

Vandalism

Vandalism of Project facilities and theft of equipment during operation is similar to that expected during construction. As with the construction period, the Project design would include site security measures including fencing and outdoor lighting, and the Applicant may contract for on-site security to supplement coverage by the Skamania County Sheriff.

Traffic Accidents

The risk of traffic accidents during operation would be low. The Project would employ between eight and nine operations staff; this number would not generate sufficient additional traffic to increase accident rates. Traffic accident response would continue to be provided by the Skamania County Sheriff and Washington State Patrol, with support by local ambulance services and hospitals as needed.

Tower Failure

Structural failure of the turbine tower is very rare, though some instances of turbine failure have been documented in older turbine models. A review performed for the Kittitas Valley Wind Project EIS located five reported instances of tower failure worldwide. There are at least 55,000 wind turbines installed world-wide (EFSEC 2007). One insurance company representative whose company insured over 12,000 turbines reported that he was not aware of any instances of the failure of tubular turbine towers (EFSEC 2007).

Tower failure can be attributed to improper design, manufacturing defects, extreme weather events, or the wrong application of technology. Reasons for tower collapse can vary depending on conditions and tower type, but may include blade strikes, very strong winds, and improper maintenance. While structural failure is more damaging than blade failure, the consequences and risks to human health are far lower since risks are confined to within a relatively short distance from the turbine (Caithness 2006). There is only one recorded death from a tower collapse, which occurred in Sherman County, Oregon (a construction worker who died during the testing phase and not during operation). A six-month investigation found that the operating company *"failed to properly instruct and supervise workers in the safe operation of tools and equipment. It also found that company procedures for working under potentially dangerous conditions fell short of OSHA [Occupational Safety and Health regulations]"* (Hill 2008). The investigation did not find any structural problems with the tower itself.

Blade Throw

Cases of blade throw are rare and have generally been linked to improper assembly or exceedance of design limits (AWEA 2008). In those rare instances where towers or blades have failed, the failure typically results in components crumpling or falling straight down to the ground, although in a small number of cases blades or parts of blades have been thrown from the nacelle. There is limited data available on how far blade components would be thrown since blade throw is extremely rare. In testimony for the Kittitas Valley Wind Project, a representative from Vestas Wind Systems in Denmark stated that there are approximately 10,000 Vestas turbines installed and operating worldwide. There has been only one noted occurrence of blade throw, with a Vestas V39-500kW turbine in Denmark in 1992 where a blade was thrown 50 to 75 meters (approximately 165 to 245 feet) (EFSEC 2007). Based on this information, the Applicant determined that using a minimum of turbine tip height to define the minimum safety setback distance is sufficient to protect against blade throw.

For the Project, members of the public would not have access to the Project Area, and signs would be used to discourage unauthorized access. The tip height of the turbines would be approximately 426 feet. The property boundaries of the Project Area would be greater than 426 feet in distance to the nearest turbine in all but a few isolated cases. Exact distances from the turbines to the property boundary would depend on the final design and placement of the turbines; however, it is possible that the nearest turbine would be within this distance of the Project boundary for small parts of turbine strings A and B (on the west of side of the Project Area), F and D (on the south side) and B and C (on the north side). However, most of this area is under control of the Applicant or in large-scale agriculture, and there are no residences within this buffer area:

- On the west side of the Project Area, there are six properties, of which only two are owned by a person or entity other than the Applicant. These two are owned by the State and managed by DNR. All these neighboring properties are managed as commercial forest land with no residential structures.

- On the south side, there are five adjacent off-project properties, located within the Scenic Area. Of these five properties, only one, totaling 29 acres, is owned by someone other than the Applicant. The 29-acre parcel is primarily managed as forest and orchard lands, with 1 acre used for residential purposes. The owner has received approval from Skamania County to relocate their existing home to within 50 feet of their north property line. This new location would bring the residence to within 2,000 feet of the closest proposed turbine corridor. Except for this parcel, all adjacent lands to the south are in commercial timber production.

- On the north side, the land is owned by the State and managed for commercial timber harvest by the DNR.

The wind turbines for the Project would be equipped with sophisticated computer control systems to monitor variables such as wind speed and direction, air and machine temperatures, electrical voltages, currents, vibrations, blade pitch and yaw angles, etc. Each turbine would be connected to a central data control system. The system would allow for remote control and monitoring of individual turbines and the wind plant as a whole from both the central host computer or from a remote computer.

All turbines are designed with several levels of built-in safety and comply with the codes set forth by Occupational Safety and Health Administration and American National Standards Institute standards. The turbines would be equipped with two fully independent braking systems that could stop the rotor either acting together or independently. The braking system is designed to bring the rotor to a halt under all foreseeable conditions. The system would include aerodynamic braking by the rotor blades and by a separate hydraulic disc brake system. Both braking systems would operate independently such that if there is a fault with one system, the other could still bring the turbine to a halt. Remote restarting of the turbine would not be possible following an emergency stop. The turbine would be inspected in-person and the stop-fault reset manually to re-activate automatic operation. The turbines also would be equipped with a parking brake used to "park" the rotor while maintenance routines or stationary rotor inspections are performed.

Ice Throw

As noted above, during periods of ice build-up, the exposed parts of the turbine may be coated with ice. When a stationary blade accumulates ice followed by an increase in temperature, the ice on the blade can thaw. If the blades are stationary, the ice would fall near the turbine base, but once the blades begin to rotate, ice fragments may be thrown. The risk of impacts from ice throw is minimal. Most modern turbines include sensors that would shut down the turbine when ice build-up is detected. A 1998 study reported that there had been no injury from ice thrown from wind turbines (Morgan et al. 1998). A 2009 study reported one human injury due to ice-throw, although the specifics of the incident were not provided (Caithness 2009). As stated above, there are at least 55,000 wind turbines in operation world-wide.

Reported data on ice throws at other projects indicate that ice fragments were found on the ground from 50 to 328 feet from turbines (<33 to 197 feet blade diameter) and were in the range of 0.2 to 2.2 pounds in mass (Morgan et al. 1998, EFSEC 2007). When more than a few meters from the turbine, the risk of ice landing at a specific location was found to reduce quite quickly with the distance of the location from the turbine. It was also found that ice falls predominantly downwind of the rotor plane. Seifert et al. (2003) conducted risk analyses on ice throw primarily in Europe. The general conclusion was that wind turbines would not cause ice throw risks as they are normally set back from residences and roadways and that the hypothetical risk of being struck by ice is small. However, the actual throwing distance of the ice fragments would vary based on many variables not included in this calculation, including rotor azimuth, rotor speed, local radius, ice fragment size and weight, and the wind speed.

Thus, a buffer based on tip height (approximately 426 feet) would provide adequate protection from ice throw. As discussed in the Blade Throw section above, the Project Area boundaries are usually farther than this distance from the nearest turbine, and where this is not the case the surrounding area is either under the control of the Applicant, managed for commercial timber harvest by Washington State, or managed for large-scale agriculture. The nearest residence is approximately 2,000 feet from the nearest proposed turbine string.

Shadow Flicker

Shadow flicker is the alternating change in light intensity when moving turbine blades cast shadows on the ground and objects, such as windows in residences. Shadow flicker is not caused by viewing the sun through rotating wind turbines blades or moving through the shadows of a wind energy facility, or sunlight reflected from turbine blades. Shadow flicker occurs when a turbine is located near a receptor (e.g., residence) with an unobstructed line of sight to the turbine, the sun is behind and perpendicular to the turning turbine blades and the receptor is located close enough to the turbine to be in its shadow.

The existence and intensity of shadow flicker are affected by a number of factors including:

- The strength of the sun as affected by cloud cover.
- The line of sight of the observer relative to the sun and the turbine. This is related to the sun's height in the sky, which varies with latitude and longitude, time of day, and time of year
- The distance between the observer and the turbine, which affects the distinctness of the shadows.
- The presence of obstructions such as buildings or vegetation.
- The orientation of the turbine depending on wind conditions. When the turbine is facing the sun, shadow flicker is greater behind the turbine; when the turbine is rotating in line with the sun, there is much less flicker (Committee for Renewable Energy 2008).

Potential shadow flicker from wind turbines can only occur when (1) the sun is very low in the sky; (2) a receptor is very close to the turbine; (3) the receptor is oriented toward a turbine; (4) the receptor has an unobstructed line of sight; and (5) the weather conditions include bright sun. When all these factors exist, they may produce a pulsating shadow which may or may not be perceptible. Shadow flicker frequency is related to the rotor speed and number of blades on the rotor, which can be translated into a "blade pass frequency" measured in alternations per second, or hertz (Hz). Although in some instances the flickering of light can induce epileptic seizures in people who are photosensitive (about 3- 5 percent of the 1 percent of Americans who are epileptic are photosensitive), shadow flicker from wind turbines is too slow to induce epileptic seizures. Whether light flicker would provoke a reaction depends on its frequency, light intensity, visual area, image pattern, and color (Epilepsy Foundation 2009). Flicker frequency due to a turbine is on the order of the rotor frequency, i.e., 0.6–1.0 Hz (NRC/NAS 2007). The flicker frequency that provokes seizures in photosensitive individuals is 5–30 Hz, well above the maximum of approximately 1 Hz for wind turbines. There is no scientific data or peer-reviewed studies that suggest a link between epileptic seizures and rotor blade alternatives.

Analyses conducted at other wind energy facilities approved by EFSEC (Kittitas Valley Wind Power Project and the Wild Horse Wind Power Project) examined the potential effects of shadow flicker for residents near the proposed projects and recommended certain measures for minimizing these effects. EFSEC found that as the distance between the wind turbine generators and residences increases, the perception of shadow flicker decreases or attenuates. At a distance beyond 2,500 feet, shadow flicker is considered to be imperceptible. Even if shadow flicker were a proven impact (as the Council found in the Kittitas Valley Wind Power Project case), none of the planned turbines are within 2,500 feet of existing residences (Figure 3.7-1 Noise Level Contours in Section 3.7 shows the locations of the closest residences.). If shadow flicker were found to occur, operational controls could be implemented to completely eliminate this perceived impact. For instance, turbine speed or orientation could be controlled during specific periods.

Electromagnetic Fields

The Project would include 34.5-kV collector lines and systems, primarily located underground. There would be a new collector substation located adjacent to BPA's existing North Bonneville to Midway 230-kV transmission line and a new interconnection from the proposed BPA substation to the 230-kV transmission line.

Electrical transmission lines, distribution lines, and substations create electromagnetic fields, which also exists in nature and around all types of electrical devices and appliances. As shown in Table 3.6-4, much of typical daily exposure to electromagnetic fields from human-made sources is a result of using electric home appliances. Electromagnetic field strength is expressed with a unit of measure called a milligauss (mG), and is measured using a special monitoring device. The strength of electromagnetic fields falls rapidly as one moves away from the source.

Table 3.6-4
Electromagnetic Field Readings for Common Equipment

Source	Readings (mG)
Video Display Terminals (VDTs)(distance 6 inches)	14 mG
Portable Heaters (distance 6 inches)	100 mG
Vacuum Cleaner[a] (distance 6 inches)	300 mG
Can Opener[a] (distance 6 inches)	600 mG
Hair Dryer[a] (distance 6 inches)	300 mG
Distribution Line 37.5-kV[b] (distance 100 feet)	<1-2 mG
Transmission Line 115-kV[a] (distance 100 feet)	1.7 mG
Transmission Line 230-kV[a] (distance 100 feet)	7.1 mG

[a] National Institute of Environmental Health Sciences (2002). , EMF: Questions and Answers, 2002.
[b] Gauger, J.R. (1985), Silva et al. (1988)

Electromagnetic fields from the Project would be lower than those of many common household appliances and would not have health and safety impacts. Electromagnetic field readings for items commonly found in homes compared to electrical transmission lines are shown on Table 3.6-4.

Given the low strength of electromagnetic fields from the Project and the distance to the nearest residences and the Operations and Maintenance facility, the Project would have no impacts from electromagnetic fields.

Other Potential Impacts

Other potential adverse impacts to ~~environmental~~ public health during operation could occur from the following:

- ***Weather.*** Weather emergency includes hail, high winds, thunderstorms, extreme cold weather, and any other naturally occurring weather situation that may endanger equipment, or require adjustments to the normal operations of the facility. Risks to personnel at the Project would be minimized through preparation of and implementation of an Emergency Plan that includes planning for weather contingencies.

- ***Geological***. This type of emergency deals with seismic activity and related geological phenomena. As discussed in Section 3.1 Earth, the likelihood of earthquake at the site is very low.

- ***Security.*** This type of emergency includes bomb threats, civil unrest, sabotage, or any other man made threats to the facility or personnel. The risk of a security emergency in this location and to this type of facility is considered very low.

- ***Lighting.*** The FAA, requires structures over 200 feet be equipped with red or white flashing lights mounted on the nacelle of a wind turbine to avoid aircraft collisions during the day and night.

Project Decommissioning

The health and safety risks associated with decommissioning would be similar to those during the construction process. In compliance with WAC 463-72 Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major public health ~~environmental health~~ issues presently anticipated. If impacts to public health ~~environmental health~~ are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures would be proposed as part of the plan.

3.6.2.2 No Action Alternative

Under the No Action Alternative, the proposed Project would not be built. The risk of fire due to lightning strikes or human activity in the general area would continue at their present levels, as would the risk of hazardous waste release, vandalism, and traffic accidents. The electrical energy that would otherwise be produced by the Project would need to be obtained from another generating source.

3.6.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential impacts to public health and safety to the extent feasible.

- Prepare Emergency Plans for the Project containing the following components:
  - ***Fire Protection and Prevention Plan.*** A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented, in coordination with the Skamania County Fire Marshall and appropriate agencies. As part of the plan, the construction manager would be responsible for staying abreast of fire conditions in the Project Area by contacting DNR and implementing any necessary fire precautions.
  - ***Personal Injury Response Plan.*** Procedures would be developed for construction, operation and maintenance of the Project to describe procedures to be followed in the event of a personal injury, including who is to be alerted, contacting 911, how to alert others in the immediate vicinity, remaining with the employee, and administering first aid until medical assistance arrives.
  - ***Safety Plan.*** Prior to the commencement of any construction work, the construction contractor would be required to prepare a Safety Plan that would apply to all contractor and subcontractor personnel working at the site. The plan would be designed to ensure compliance with all laws, ordinances, regulations, and standards concerning health and safety. The contractor would assign a safety manager with the authority to issue a "stop work" notice when health and safety issues arise.
  - ***SPCC Plan.*** While storage of chemicals on site would be minimal, the Project could require an SPCC Plan that would protect groundwater. The SPCC Plan would apply to both construction and operation if hazardous materials were stored on site in quantities sufficient to trigger the plan requirement.
  - ***Hazardous Waste Management Plan.*** Hazardous materials to be used or stored on site would be limited to small quantities of materials used for maintenance (cleaning and painting), lubrication of equipment, and possibly fuel. During construction, the construction contractor would be required to prepare a Hazardous Waste Management Plan that complies with state and federal hazardous waste management laws for handling, storage, and disposal. A similar plan would be prepared and implemented for operation.
- Report conditions affecting the safety of the Project to EFSEC, including any condition, event, or action that might compromise the safety, stability, or integrity of any facility or the ability of any equipment to function safely; or that might otherwise adversely affect life, health, or property.

- Develop agreements related to emergency planning with Skamania County Department of Emergency Management prior to Project construction. This agreement would be provided to EFSEC and attached to the Emergency Plan prior to implementation.

- Comply with all applicable local, state, and federal safety, health, and environmental laws, ordinances, regulations, and standards. Some of the main laws, ordinances, regulations and standards that would be reflected in the design, construction, and operation of the Project are as follows:

    - Occupational Safety And Health Act of 1970 (29 USC 651, et seq.) and 29 CFR 1910, Occupational Safety and Health Standards;
    - Uniform Fire Code;
    - Americans with Disabilities Act;
    - Uniform Fire Code Standards;
    - Uniform Building Code;
    - National Fire Protection Association design standards for the requirements of fire protection systems;
    - National Institute For Occupational Safety And Health requirements that safety equipment carry markings, numbers, or certificates of approval for stated standards;
    - American Society of Mechanical Engineers plant design standards.

- American National Standards Institute plant design standards:

    - National Electric Safety Code;
    - American Concrete Institute Standards;
    - American Institute of Steel Construction Standards;
    - National Electric Code.

- Utilize the following measures to mitigate the risk of fire or explosion:

    - The construction manager would be responsible for staying abreast of fire conditions in the Project Area by contacting DNR and implementing any necessary fire precautions;
    - A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented by the Applicant, in coordination with the Skamania County Fire Marshall and appropriate agencies;
    - Both the wind turbine generators and the substation would be equipped with lightning protection systems.

Table 3.6-5 lists sources of potential fire and explosion along with measures to mitigate the risk of either occurring.

- Require that all on-site operations employees would be responsible for contributing to ongoing fire prevention in the Project Area through the following programs:
    - Operational Safety Program;
    - Operations Written Safety Program;
    - Emergency Action Plan;
    - Fire Prevention Plan.
- Develop on-site emergency plans would be prepared for the Project in case of a major natural disaster or accident relating to or affecting the Project. The plans would describe the emergency response procedures to be implemented during various emergency situations that may affect the Project or surrounding community or environment. In addition to the above measures, the Applicant would:
    - Provide detailed maps that show all access roads to the Project;
    - Provide keys to a master lock system that would enable emergency personnel to unlock gates that would otherwise limit access to the Project;
    - Use spark arresters on all power equipment, e.g., cutting torches and cutting tools;
    - Inform workers at the Project Area of emergency contact phone numbers and train them in emergency response procedures;
    - Carry fire extinguishers in all maintenance vehicles;
    - Coordinate with DNR when the fire danger is high;
    - Comply with equipment rules and regulations required by DNR for work conducted in wildland/forested lands.

Table 3.6-5
Fire and Explosion Risk Mitigation

Construction or Operation	Potential Fire or Explosion Source	Mitigation Measures
Construction and Operation	General Fire Protection	• All on-site service vehicles fitted with fire extinguishers. • Fire station boxes with shovels, water tank sprayers, etc. installed at multiple locations on site along roadways during summer fire season. • Minimum of one water truck with sprayers must be present on each turbine string road with construction activities during fire season.
Construction and Operation	Dry vegetation in contact with hot exhaust catalytic converters under vehicles	• No gas powered vehicles allowed outside of graveled areas. • Mainly diesel vehicles (i.e. w/o catalytic converters) used on site. • Use of high clearance vehicles on site if used off-road.
Construction and Operation	Smoking	• Restricted to designated areas (outdoor gravel covered areas).
Construction and Operation	Explosives used during excavation	• Only state-licensed explosive specialist contractors are allowed to perform this work—explosives require special detonation equipment with safety lockouts. • Clear vegetation from the general footprint area surrounding the excavation zone to be blasted. • Standby water spray trucks and fire suppression equipment to be present during blasting activities.
Construction and Operation	Electrical fires	• Use generally high clearance vehicles on site. • No gas powered vehicles allowed outside of graveled areas. • All major construction equipment used is to be diesel powered (i.e., without catalytic converters).
Construction and Operation	Lightning	• Specially engineered lightning protection and grounding systems used at wind turbines and at substation. • Footprint areas around turbines and substation are graveled with no vegetation.
Construction	Portable generators – hot exhaust	• Generators not allowed to operate on open grass areas. • All portable generators to be fitted with spark arrestors on exhaust system.
Construction	Torches or field welding equipment	• Immediate surrounding area would be wetted with water sprayer. • Fire suppression equipment to be present at location of welder/torch activity.
Construction and Operation	Electrical arcing	• Electrical designs and construction specifications meet or exceed requirements of the National Electric Code and National Fire Protection Agency.

- Prepare in advance to reduce the potential for traffic accidents. Mitigation for lowering the risk potential of traffic accidents includes:
  - A Transportation Management Plan (TMP) that would direct and obligate the contractor to implement procedures to minimize traffic impacts would be prepared in consultation with both WSDOT and Skamania County and submitted to EFSEC for approval. The TMP would include requirements for coordination of project-related construction traffic and WSDOT planned construction projects, along with requirements for coordination of project-related construction traffic and Skamania County, City of Bingen, and City of White Salmon summer recreational traffic.
  - The Applicant and its contractors would be required to comply with State and County permitting requirements for over-size and over-weight vehicles.
  - The Applicant would be required to notify land owners in the Project vicinity prior to construction of transportation routes that would be used for construction equipment and labor.
  - Approved State and/or County advanced warning construction signs would be placed prior to and during construction.
  - Certified flaggers would be used when necessary to direct traffic when over-size and over-weight trucks either enter or exit public roads, to minimize risk of accidents.
  - Pilot cars would be used both in front of and behind all trucks transporting over-size or over-weight loads on all public roadways.
  - Traffic flow would not be restricted for more than 20 minutes during the construction phase.
  - All loads over 10 feet wide traveling on SR 14 from east of the proposed Project Area between MP 76.77 and 76.91 would require three pilot cars, two in front and one in the rear. The two front pilot cars would be required to maintain a minimum 500-foot separation. The lead pilot car in front of the load would warn oncoming traffic of the over-size load, and the pilot car immediately in front of the over-size load would be responsible to stop all oncoming traffic.

3.6.4 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts to public health ~~environmental health~~ are anticipated to be minimal.

Because there would be no need to transport, store, or combust fuel to generate power, the risk of unintentional or accidental fire or explosion or discharge to the environment during both construction and operations would be minimal. The risk of accident during construction would be no higher than for any large construction Project and would be minimized through standard construction safety requirements and procedures. The risk of accident during operation would be minimal.

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3.7 NOISE

This section describes the existing noise levels in the vicinity of the Project and the potential noise impacts from construction and operation of the proposed Project.

3.7.1 AFFECTED ENVIRONMENT

3.7.1.1 Analysis of Environmental Noise

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day and the type of activity during which the noise occurs, and the sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the pitch of the sound and is measured in Hz, while intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above approximately 110 dB begin to be felt inside the human ear as discomfort and eventually pain at 120 dB and higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 1 to 2 dB. A 3 to 5 dB change is readily perceived. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or if minus 10 dB, halving) of the sound's loudness.

Due to the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically; however, some simple rules are useful in dealing with sound levels. First, if the intensity of a sound is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example: 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

Sound level is usually expressed by reference to a known standard. This report refers to sound pressure level (SPL). In expressing sound pressure on a logarithmic scale, the sound pressure is compared to a reference value of 20 micropascals (μPa). SPL depends not only on the acoustic power of the source, but also on the distance from the source and on the acoustic characteristics of the space surrounding the source, the receiver, and the path between them. A sound power level, on the other hand, is analogous to the wattage of a light bulb: it describes a source's rate of emitted acoustical energy and is not distance dependent. Using the same light analogy, SPL would be the brightness or intensity of light that can be measured at a specific distance from a source. To clarify the distinction between sound power level and SPL, the latter should always be specified with a location or distance from the noise source.

The distance value associated with SPL is an important metric, as the decrease in measurable sound level due to increasing distance from any single sound source normally follows the inverse square law. In other words, SPL changes in inverse proportion to the square of the distance from the sound source. As a general rule, at distances greater than 50 feet from a noise generator such as a wind turbine, SPL drops at a rate of 6 dB with each doubling of distance. Additionally, some sound energy is absorbed in the medium (e.g., air) through which it travels as a function of temperature, humidity, and the frequency of the sound. This attenuation can be up to 2 dB over 1,000 feet. The overall sound propagation drop-off rate would vary based on other conditions such as natural terrain and intervening obstructions.

Sound frequency (Hz) is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number of times per second. When the drum skin vibrates 100 times per second it generates a sound pressure wave that is oscillating at 100 Hz, and this pressure oscillation is perceived—by way of the inner ear organs and their connection to the brain—as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the best human ear.

Sound from a tuning fork contains a single frequency (a pure tone), but most sounds one hears in the environment do not consist of a single frequency but rather a broad band of frequencies differing in sound level. The method commonly used to quantify environmental sounds consists of evaluating frequencies of sound according to a weighting system that reflects that human hearing sensitivity: less sensitive at low frequencies and extremely high frequencies than at the mid-range (e.g., speech) frequencies. This is called "A-weighting," and the measured decibel level adjusted by the A-weighting constants is called the A-weighted sound level (dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve of adjustment constants across the audible spectrum.

C-weighting is another type of filter, with adjustments that help expose low-frequency sound sources that the ear does not detect well, such as compressors, pumps, and diesel engines. For the same measured sound, it is not uncommon for corresponding dBC and dBA levels to vary. As an example, the difference between dBC and dBA levels within an office building may be 20 dB (i.e., 40 dBA and 60 dBC). These wind turbines are not a source of substantial low-frequency noise. Because low frequency sound is less audible to human hearing, C-weighting is often used to assess potential annoyance from rattling due to low frequency noise that may excite vibration in structures.

Although the dBA may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable. A single descriptor called the equivalent sound level (L_{eq}) may be used to describe sound that is changing in level. L_{eq} is the energy-mean dBA during a measured time interval. It is the "equivalent" constant sound level that would have to be produced by a given source to equal the acoustic energy contained in the fluctuating sound level measured. In addition to the energy-average level, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum L_{eq} (L_{max}) and minimum L_{eq} (L_{min}) indicators that represent the root-mean-square maximum and minimum noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the acoustic floor for that location.

To describe the time-varying character of environmental noise, the statistical noise descriptors L_{10}, L_{50}, and L_{90} are commonly used. They are the noise levels equaled or exceeded 10 percent, 50 percent, and 90 percent of the measured time interval, respectively. Sound levels associated with L_{10} typically describe transient or short-term events. For the L_{50} descriptor, half of the sounds during the measurement interval are softer than L_{50} and half are louder. Levels associated with L_{90} often describe background noise conditions and/or sound sources that exhibit continuous, "steady-state" characteristics.

Finally, another sound descriptor known as the day-night average sound level (Ldn) represents the average sound level for a 24-hour day and is calculated by adding a 10 dB penalty only to sound levels during the night period (10:00 PM to 7:00 AM). The L_{dn} is typically used to define acceptable land use compatibility with respect to noise. Because of the night-time penalty associated with the L_{dn} descriptor, the L_{eq} for a continuously operating sound source during a 24-hour period would be numerically less than the day-night level. Thus, and by way of example, for a power plant operating continuously for periods of 24 hours, the L_{eq} would be 6 dB lower than the L_{dn} value.

Table 3.7-1 provides sound levels of typical noise sources and environments to provide a frame of reference.

Aside from industrial and other settings where workers may be exposed to very high noise levels and the risk of hearing loss, environmental noise effects are typically limited to subjective impacts (e.g., annoyance, nuisance, dissatisfaction) and activity interference (i.e., impacts to sleep, speech, and learning). Despite attempts by prominent acousticians to satisfactorily quantify the association between measurable sound levels and corresponding reactions of annoyance and dissatisfaction, there is no way to measure the subjective impacts of noise. Further, the aforementioned variability of individual human sensitivity and/or tolerance to noise defies creation of a common standard.

3.7.1.2 Regulatory Overview

Washington State and Skamania County Noise Limits

WAC 463-62-030 states that energy facilities shall meet the noise standards established in Chapter 70.107 RCW, also known, in short, as the “Noise Control Act of 1974”, as implemented in the requirements of WAC 173-60. SCC Title 8 Chapter 22: Noise Regulations identifies limits and exceptions specific to noise in Skamania County. SCC 8.22 was adopted pursuant to, and is consistent with, WAC 173-60. Environmental designations for noise abatement (EDNA) are established in SCC Section 8.22.080 and WAC 173-60-030. These rules establish maximum permissible environmental noise levels and are based on the EDNA, which is defined as an area or zone (environment) within which maximum permissible noise levels are established. There are three EDNA classes:

- ***Class A.*** Lands where people reside and sleep (such as residential);
- ***Class B.*** Lands requiring protection against noise interference with speech (such as commercial/recreational);
- ***Class C.*** Lands where economic activities are of such a nature that higher noise levels are anticipated (such as industrial/agricultural).

The noise limits that a new source can impose for each land use classification are presented in Table 3.7-2.

Table 3.7-1
Common Noise Levels and Subjective Human Responses

Noise Source (at a given distance)	A-Weighted Sound Pressure Level in Decibels	Noise Environment	Human Judgment of Noise Loudness (relative to a reference SPL of 70 decibels)
Military jet take-off with after-burner (50 feet), civil-defense siren (100 feet)	140, 130	Aircraft Carrier Flight Deck	
Commercial jet take-off (200 feet)	120	Thunderclap	Threshold of Pain 32 Times as Loud
Pile driver (50 feet)	110	Rock Music Concert	Average Human Ear Discomfort 16 Times as Loud
Ambulance siren (100 feet), newspaper press (5 feet), power lawn mower (3 feet)	100		Very Loud 8 Times as Loud
Motorcycle (25 feet), propeller plane flyover (1,000 feet), diesel truck, 40 miles per hour (50 feet)	90	Boiler Room Printing Press Plant	OSHA threshold for 8-Hour Exposure 4 Times as Loud
Garbage disposal (3 feet)	80		2 Times as Loud
Passenger car, 65 miles per hour (25 feet), vacuum cleaner (10 feet)	70	Data Processing Center, Department Store	Reference Loudness Moderately Loud
Normal conversation (5 feet), air-conditioning unit (100 feet)	60	Private Business Office, Restaurant	1/2 as Loud
Light traffic (100 feet)	50	Lower Limit of Daytime Urban Ambient Sound	1/4 as Loud
Bird calls (distant)	40	Quiet Urban Nighttime	1/8 as Loud
Soft whisper (5 feet)	30	Recording Studio, Library	Very Quiet 1/16 as Loud
	20	Whistling, Rustling Leaves	Just Audible 1/32 as Loud
	10	Breathing	Barely Audible 1/64 as Loud
	0		Threshold of Hearing 1/128 as Loud

Source: URS internal information and Table N-2136.2 on p. 18 of the Technical Noise Supplement (Caltrans 1998).

Table 3.7-2
Washington Maximum Permissible Sound Levels
(Leq(1) in dBA)

EDNA of Noise Source	EDNA of Receiving Property		
	Class A[a] (Residential)	Class B (Commercial)	Class C (Agricultural, Industrial)
Class A	55/45	57	60
Class B	57/47	60	65
Class C	60/50	65	70

[a]Sound limits shall be reduced by 10 dBA between the hours of 10 PM and 7 AM at Class A EDNAs
Source: WAC Chapter 173-60. Standard applies at property line of receiving property.

The Project is sited on land zoned as Forest Land 20 (FL 20) and Unmapped (UNM) zones. Approximately 0.9 mile west of the Project Area, the alternative Operations and Maintenance facility site would be located in the R-5 zone. Both the Project Area and the alternative Operations and Maintenance facility site are used for commercial timber harvest. Based on current zoning and land use, a reasonable interpretation would classify the Project Area as a noise source having an environmental designation of Class C EDNA, and the alternative Operations and Maintenance site as having an environmental designation of Class A EDNA. With respect to the receiving land uses, this noise analysis has identified some receiver locations being within agriculturally zoned lands that could normally be classified as Class C EDNA. Since the WAC does not specifically address the situation of an occupied residential structure located on an agricultural parcel, one might assess the residence as Class A EDNA and the outlying property line as Class C EDNA. EFSEC has accepted such an interpretation for other wind energy projects such as Wild Horse and Kittitas Valley, the latter of which had approval upheld by the Washington Supreme Court. While other interpretations may be feasible, Table 3.7-3 illustrates the Class A (Residential) receiver noise level limitations for noise generated from a Class C (Commercial) EDNA (SCC 8.88.090, 100) source, including adjustments based on the duration of noise exposure time.

Table 3.7-3
Class A EDNA Receiver Noise Limits
(dBA)

Equivalent Noise Level Exposure Time (Time / Statistic)	Daytime (7 AM – 10 PM)	Nighttime (10 PM – 7 AM)
1 hour / L_{eq}	60	50
15 minutes / L_{25}	65	55
5 minutes / $L_{16.7}$	70	60
1.5 minutes / $L_{2.5}$	75	65

Levels shown are at the property line of the receiving property and indicative of a source that is located in a Class C EDNA

Notwithstanding the above and per 173-60-050 WAC, there are exemptions to the limits for certain noise-producing activities or source types as follows:

- Construction noise (including blasting) between the hours of 7 AM and 10 PM;
- Motor vehicles when regulated by 173-62 WAC ("Motor Vehicle Noise Performance Standards" for vehicles operated on public highways);
- Motor vehicles operated off public highways, except when such noise affects residential receivers; and
- Noise from electrical substations (WAC 173-60-050[2][a]).

Despite these exemptions, 173-60-50(6) WAC states, *"Nothing in these exemptions is intended to preclude the Department from requiring installation of the best available noise abatement technology consistent with economic feasibility."*

US Environmental Protection Agency and Occupational Safety and Health Administration

While the US Environmental Protection Agency (EPA) has no regulations governing environmental noise, the EPA has conducted extensive studies to identify the effects of certain sound levels on public health and welfare. An EPA document (USEPA 1974) identifies sound levels *"requisite to protect the public health and welfare with an adequate margin of safety."* The EPA specifies a day-night sound level (L_{dn}) of 55 dBA for outdoor areas, where quiet is a basis for use. The L_{dn} is similar to the 24-hour L_{eq} except that a 10-decibel penalty is added to sound levels between 10 PM and 7 AM to account for sleep interference. For a potentially continuous source of noise such as operation of the Project, the 55 dBA L_{dn} effectively translates to a 49 dBA hourly L_{eq}, which is generally consistent with the 50 dBA $L_{eq(1)}$ required by Skamania County and the State of Washington. However, this EPA finding is guidance, not regulation.

The EPA's 49–50 dBA $L_{eq(1)}$ sound level is far less than what is usually associated with hearing loss. The federal Occupational Safety and Health Administration (OSHA) has developed noise standards designed to address worker health and safety risks associated with noise exposure and the potential for noise-induced hearing loss. The action level under these OSHA standards is an 8-hour time-weighted average of 85 dBA. Exposure to sound in excess of this standard requires the employer to initiate a hearing conservation program to evaluate the exposure, its duration, possible engineering controls to reduce noise and the provision of hearing protection to employees. The decibel levels covered by the state standards in WAC 173-60-110 are well below OSHA hearing impact standards.

Low Frequency Noise

Low frequency sound typically ranges from 100 Hz to 20 Hz, the latter of which is the generally understood limit audible to the human ear. WAC 173-60-110 uses the A-weighting scale because it is a standard that characterizes sound frequencies that are more sensitive to the human ear. Local jurisdictions within the State of Washington that have a C-weighted scale standard do not apply it to wind turbines. There is no Washington State standard associated with the C-weighted scale for low-frequency noise because the C-weighted scale is primarily used as an indicator of low frequency induced noise vibrations.

3.7.1.3 Affected Environment

Noise Receivers

Although Figure 3.7-1 shows that there are many potential noise-sensitive receivers surrounding the Project vicinity, the three receivers closest to the Project wind turbine tower locations are the two closest residences, which are approximately 0.48 mile (2,560 feet) southeast of Tower A1 (R1 on Figure 3.7-1) and 0.8 mile (4,265 feet) southwest of Tower B16 (R2 on Figure 3.7-1). A potential future residence (R3 on Figure 3.7-1) is approximately 0.38 mile (2,000 feet) from Tower A1.

Existing Sound Levels

While some reference materials such as the Federal Transit Administration's *Transit Noise and Vibration Impact Assessment Guide* (FTA 2006) offer techniques to make a coarse estimate of existing noise levels for an area based on parameters such as population density, the reality is that at residences in or near any project proposed for development, there is no such single and consistent background noise level. The background noise level can vary at a given location or across different locations on a Project Area due to factors such as changing climate conditions and the presence of contributing noise sources (including flows of water associated with creeks or canals, agricultural equipment operations, irrigation pumps and equipment, livestock, road, rail and air traffic, wildlife such as birds or insects, dogs, and routine human activities). Hence, a field survey that includes documentation of observed or perceived noise events and monitoring of ambient sound at different times of day at different locations helps to accurately depict actual conditions that influence pre-project ambient sound level. These conditions and their influence on ambient sound level offer clues as to how the increase in noise level resulting from the operation of any project, including those that emit a constant level, would likely vary with location and time of day.

To help establish representative baseline ambient sound levels for the Project vicinity and characterize the existing noise environment in the areas occupied by the receivers shown in Figure 3.7-1, a set of long and short-term sound level measurements were conducted from January 20 to 22, 2009. The locations of the short-term and long-term measurement sites were selected to approximate the existing ambient sound in the vicinity of Ausplund Road (and hence, Receiver 1). Likewise, the location of ST2 was chosen to generally represent the ambient sound level for the Mill A community and its surroundings west of the Project, on which Receiver 2 is located.

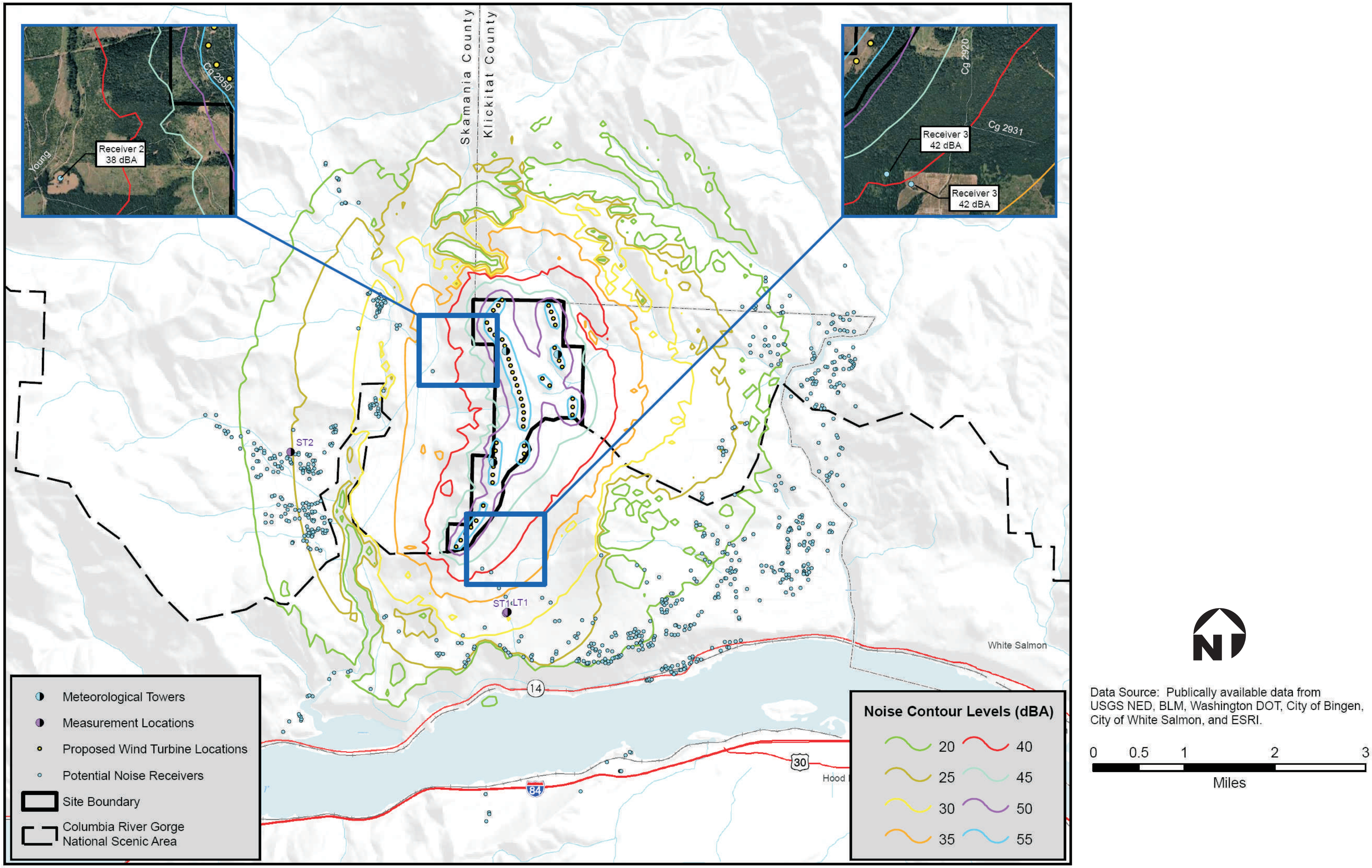


Figure 3.7-1
Noise Level Contours

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

The measurement locations included a position near the intersection of Ausplund Road and Kollack-Knapp Road (ST1), and a position near the intersection of Jessup Road and Manzanola Road (ST2). For purposes of the impact analysis described in this document, these measurement locations are considered reasonably representative for each general area, and more specifically R1 and R2, respectively, on the basis of similar expected ambient sound sources, despite the dissimilarity of locations. For instance, the ambient sound environment measured at ST1 likely contains the same typically identifiable sound components (e.g., distant bird song, dog barks, roadway traffic) and a generally unidentifiable "background" that one might measure at the precise geographic location of R1.

A Bruel+Kjaer 2250 (SN: 2653963) ANSI Type-1 real-time sound analyzer, fitted with a standard microphone windscreen and mounted on a five-foot tall tripod, was used for the short-term measurements. The instrument was field calibrated before and after each measurement period with an acoustic calibrator. All sound level measurements were performed in accordance with International Organization for Standardization guidelines (ISO 1996a, b, and c). Weather conditions during the survey period were seasonably cold with overcast skies, but there was no precipitation during the measurement periods. The air temperature varied from 30 to 44 degrees Fahrenheit, with 33 to 53 percent relative humidity. Measured ground wind speeds in the vicinity of the measurement positions were low, with averages ranging from 0 to 1 mph, and directed toward the north for all measurements. Detailed weather conditions for individual noise measurements and a summary of the short-term measurement data are included in Table 3.7-4.

A long-term measurement (LT1) was conducted at a position near the corner of Ausplund Road and Kollock-Knapp Road using a Larson Davis 720 (SN: 0436) ANSI Type 2 Integrating sound level meter. With only the windscreen-covered microphone exposed to the outdoor environment, the sound level meter was placed in a locked, weather-resistant case and secured to a nearby tree. The long-term measurement consisted of consecutive 15 or 30 minute averages conducted over an uninterrupted 24-hour period. The instrument was field calibrated before and after the measurement period with an acoustic calibrator (CAL 200 s/n: 5789). Data from the long-term measurement is presented in Table 3.7-5.

Field observations associated with the short and long-term measurements are as follows:

ST1. This measurement location was at the corner of Ausplund Road and Kollock-Knapp Road. There are several residential receivers located in this general area. The first short-term measurement at this location was conducted between 11:52 AM and 12:12 PM on January 21, 2009. The first measurement noise sources included distant aircraft, distant roadway traffic, dogs barking in the distance, and birds vocalizing. The second short-term measurement was conducted between 6:00 PM and 6:20 PM on January 21, 2009. The second measurement noise sources included distant aircraft, distant roadway traffic, and dogs barking in the distance. The third short-term measurement at this location was conducted between 11:32 PM and 11:52 PM on January 21, 2009. Noise sources during the third measurement included distant roadway traffic and dogs barking in the distance. The first measurement L_{eq} one-minute interval values ranged from 34 to 59 dBA, the second measurement 1-minute L_{eq} values ranged from 27 to 66 dBA, and the third measurement 1-minute L_{eq} values ranged from 25 to 49 dBA. L_{eq} for the entire duration of each of these three measurement periods appears in Table 3.7-4.

ST2. This measurement location was in front of the John Schwab Memorial Tennis Courts on the corner of Jessup Road and Manzanola Road. The sound level meter was approximately 15 feet from Jessup Road. The first short-term measurement at this location was conducted between 12:48 PM and 1:08 PM on January 21, 2009. The first measurement noise sources included distant aircraft, distant roadway traffic, children playing in the distance, and birds vocalizing. The second short-term measurement was conducted between 6:36 PM and 6:56 PM on January 21, 2009. The noise sources for the second short-term measurement included distant aircraft and distant roadway traffic. The third short-term measurement was conducted between 12:08 AM and 12:28 AM on January 22, 2009. Noise sources present during the third short-term measurement included distant roadway traffic. The first measurement L_{eq} one-minute values ranged from 35 to 52 dBA, the second measurement 1-minute L_{eq} values ranged from 34 to 54 dBA, and the third measurement 1-minute L_{eq} values ranged from 31 to 39 dBA. L_{eq} for the entire duration of each of these three measurement periods appears in Table 3.7-4.

Table 3.7-4
Short-Term Noise Measurement Data Summary

Measurement Location		Measured Sound Data									
ID	Description	Time	L_{eq}, dBA	L_{10}	L_{50}	L_{90}	L_{eq}, dBA without Cars	Temp (F)	%RH	Wind Speed (mph)	Wind Direction
ST 1	Corner of Ausplund Road and Kollock-Knapp Road	11:52 - 12:12	46	39	35	34	38	35	53	1	North
		18:00 - 18:20	49	36	31	28	32	32	35	1	North
		23:32 - 23:52	35	32	28	26	30	30	34	0	-
ST 2	Just north of the John Schwab Memorial Tennis Courts	12:48 - 13:08	41	40	36	35	37	44	40	1	North
		18:36 - 18:56	44	40	36	35	36	32	34	1	North
		00:08 - 00:28	35	36	35	34	35	30	34	0	-

Measurements conducted on January 21 and 22, 2009

Table 3.7-5
Long-Term Noise Measurement Data Summary

Site ID	Measurement Location	Measurement Period			24-hr Measurement Results (dBA)			
		Start Date	Start Time	Duration (hh:mm)	L_{eq}	L_{10}	L_{50}	L_{90}
LT1	Corner of Ausplund Road and Kollock-Knapp Road	01/21/09	11:40 am	24:00	46	41	39	38

LT1. This measurement location was at the corner of Ausplund Road and Kollock-Knapp Road, on the north side of the roadway. The sound level meter was placed in a locked, weather-resistant case and secured to a tree near the side of the road. The windscreen-covered microphone, connected to the meter by cable, was attached to the tree trunk at approximately 3 to 4 feet above the ground. Concurrent with these short and long-term ambient sound measurements, Applicant meteorological stations 320, 321, and 323 collected data on wind speed, direction, and temperature at various elevations above grade. Average reported wind velocities from the station NRG Type 40 anemometers were quite low, and while apparently consistent with the low average wind velocities measured on the ground at the sound measurement positions, were considered potentially compromised by icy conditions due to the low recorded temperatures and high moisture content of the air.

Table 3.7-4 shows the considerable decibel differences between the L_{eq} measurements and the adjusted values when intervals containing documented automotive pass-by events were removed from the short-term measurement data sets (i.e., “without cars”). This change is unsurprising due to the proximity of the real-time sound analyzer to the roadway at ST1 and ST2. Upon removing these intervals, the remaining collected data more accurately depicts the background or a measurement position that is considerably distant from passing road traffic.

Table 3.7-6 presents the arithmetic average L_{eq} of ST1 and LT1.

Table 3.7-6
Average Ambient for ST1/LT1 Measurement Area

	Daytime (L_{eq}, dBA)	Evening (L_{eq}, dBA)	Nighttime (L_{eq}, dBA)
Average L_{eq} without cars	(39+38)/2 = 38	(39+32)/2 = 35	(38+30)/2 = 34
Average L_{eq} with cars	(44+46)/2 = 45	(42+49)/2 = 45	(38+35)/2 = 36

3.7.2 IMPACTS

3.7.2.1 Methodology

Construction

Project construction would take place over a period of 12 months between the hours of 7:00 AM and 7:00 PM Monday through Friday. During construction activities, a varying number of construction equipment and personnel would occupy the Project Area, which would result in varying levels of construction noise. The Project would use conventional construction techniques and equipment, including excavators, bulldozers, heavy trucks (e.g., water truck, dump truck), and similar heavy construction equipment. Specialized construction equipment for logging, foundation building and other tasks using special equipment (e.g., heavy duty cranes) may be needed.

Conventional construction activities would result in a short-term temporary increase in the ambient noise level resulting from the operation of construction equipment. The increase in noise level would be experienced primarily close to the noise source. The magnitude of the noise effects would depend on the type of construction activity, noise level generated by construction equipment, duration of the construction phase(s), and the distance between the noise source and receiver.

Construction noise impacts associated with the Project were assessed with spreadsheet-based noise calculations. User inputs include:

- Distance from source—the distance between the edge of the construction site and the considered receiver.
- Duty cycle—the portion of an hour, in aggregate, that a piece of equipment is energized (stationary or mobile) and creating noise.
- Quantity—the number of equipment pieces or noise-producing events over a specific time period (e.g., equipment utilization per month).
- Hours—the number of daytime hours (up to 12) that represent a typical daily work shift.

These inputs allow sound propagation prediction using the following formula:

$$L_{eq} = \text{Source SPL} + 10 * \log_{10} (\text{Duty Cycle}) + 10 * \log_{10} (\text{Quantity}) +$$

$$10 * \log_{10} (\text{Hours}/12) - 20 * \log_{10} (\text{Distance from Source / Reference Distance})$$

where source SPL and reference distance describe the typical noise, associated with a single piece of equipment, measured at a pre-defined distance. For instance, a chainsaw may have a source SPL of 78 dBA measured at a distance of 50 feet from its operator. Values for source SPL and reference distance have either been reproduced from available manufacturers' data or calculated from industry-accepted formulas linking sound generation to the rated engine horsepower of the equipment. Note that for purposes of model conservatism, air and ground absorption effects are not included.

Operation

Once the Project is commissioned and operating normally, the new ambient sound level that can be perceived would be a logarithmic sum of background and Project noise. For a wind project, and aside from non-dominant sources such as electrical substations, operation noise level varies with wind speed at the turbines. When available winds are relatively calm, the turbines emit very little noise compared to what occurs when stronger wind conditions have turbines operating at their highest power generation and, concurrently, highest noise levels. Thus, a wind project's noise level at a particular receptor is primarily determined by the wind speed occurring at the turbine and the distance to the closest turbines.

The Cadna/A® Noise Prediction Model (Version 3.71.125) was used to estimate the project-generated sound pressure levels at the property lines and noise-sensitive receivers. Cadna/A® is a Windows® based software program that predicts and assesses noise levels near industrial noise sources based on International Organization for Standardization (ISO) 9613-2 standards for noise propagation calculations. Routinely used by acoustical professionals to develop sound level predictions from a variety of complex industrial sources, including wind turbines, the model uses these industry-accepted propagation algorithms and accepts sound power levels (in dB re: 1 picowatt) for the nine standard octave bands ranging from 31.5 Hz to 8,000 Hz, as typically provided by the equipment manufacturer and other sources. A comparison of overall reference sound power level (Lw, dBA) for a variety of different manufactures and models, with the power capacity being the primary differentiator is presented in Table 3.7-7. The calculations account for classical sound wave divergence, plus attenuation factors resulting from air absorption, basic ground effects, and barrier/shielding. Intervening natural and man-made topographical barrier effects were considered as appropriate, including those from structures such as major buildings, tanks, and large equipment.

Table 3.7-8 summarizes octave band sound power level inputs from each type of pre-defined noise source. Given that the exact turbine model to be used for the Project has not yet been determined at the time of this report, conservative but realistic and representative values for the type of equipment being considered for this Project have been used. For example, the model currently uses data from an industry leading 1.8 MW 50/60 Hz wind turbine, at wind speeds of about six meters per second and nine meters per second at 33 feet (10 meters), in accordance with the protocol established in International Electrotechnical Commission Standard 61400-11:2002[16]. The decibel values shown for the two wind turbine generator wind speeds in Table 3.7-8 at each octave band center frequency include a +2 dB margin, which produces an A-

[16] As noted, the modeling is based using conservative and representative values for the type of equipment being considered. The noise model currently uses data from an industry leading 1.8 MW 50/60 Hz wind turbine. The project may use larger wind turbines, up to 2.5 MW, and these could have a different noise profile. However, total project noise would be limited by the 75 MW EFSEC certification. If 1.8 MW turbines were selected, the project could use up to 42 turbines, however if 2.5 MW turbines were selected, only 30 turbines could be built, and overall project noise could be lower.

weighted overall level that represents the top end of a range associated with the manufacturer's warranty values.

Table 3.7-7
Commercial Wind Turbine Sound Reference Data

Manufacturers and Model Nos.	Rating (MW)	dBA	Remarks	References
Enercon E112	4.5	107	at 50 ft (15 m)	(1) Alberts (2006)
Enercon E70	2.0	102	at 50 ft (15 m)	
Vestas V80	1.8	98	lower range	
		109	upper range	
Typical Utility Turbines	unspecified	90	lower range	(2) Rogers (2006)
		105	upper range	
Repower MM92	2.0	105	Lw (weighted)	(3) Illingworth & Rodkin
General Electric 1.5 SLE	1.5	104	Lw (weighted)	
Various Utility Turbines	3.0	109	Lw (weighted)	(4) confidential
	3.0	107	Lw (weighted)	
	1.8	105	Lw (weighted)	
	2.0	108	Lw (weighted)	
Typical	2.4	106		

Sources: (1, 2) Cardno ENTRIX; (3, 4) URS
Notes:
Typical Rating is arithmetic average; Typical dBA is logarithmic average
Noise proximate to a wind turbine comprises gearbox, generator, yaw drive, cooling fans, and related systems inside the nacelle in addition to aerodynamic noise from the rotor blades

Table 3.7-8
Noise Model Sound Level Parameters

Project Component	Type of Source	Sound Power Level in dB at Octave Band Center Frequency (Hz)									Unweighted (linear)	A-Weighted	Acoustic Height (feet)
		31.5	63	125	250	500	1,000	2,000	4,000	8,000			
Wind Turbine at 6m/s wind speed	Point	82.7	88.7	95.3	99.7	101.9	100.7	97.4	88.9	82	106.8	104.7	262
Wind Turbine at 9m/s wind speed	Point	84.9	90.9	97.3	101	103.3	102.6	99.5	91.6	84.4	108.4	106.4	262
Turbine Transformers	Point	60	66	68	63	63	57	52	47	40	72	63	7
Sub Station component	Point	80	86	88	83	83	77	72	67	60	92	83	13

Source: URS internal information and Thomas Mills, personal communication

The Project layout configuration (i.e., the arrangement of wind turbine generators and ancillary equipment on the site) was imported into Cadna/A® from Project files provided by the client. The Cadna/A model consequently predicts hourly sound levels, which would be equal at all times of the day in this case. The formula used to derive the overall SPL (in dBA) from sound power level (PWL) is as follows:

$$SPL = PWL - 20 \, Log\,(r) - 10.9 + C$$

where r is in meters and C is a dimensionless absorption constant (Harris 1998).

At each studied receptor, the model calculates the acoustical contribution from each input source, which in this exercise using Cadna/A includes all expected wind turbines associated with the Project at locations depicted in Figure 3.7-1. When Project micrositing occurs and final turbine layout and turbine model are arrived at, additional noise modeling can be performed to re-predict operation noise level and re-evaluate anticipated project compliance with the standards discussed in this EIS.

3.7.2.2 Proposed Action

General Construction Noise

Table 3.7-9 shows the predicted construction noise levels experienced at the closest residences to the Project. As per 173-60-050 WAC, construction noise between the hours of 7:00 AM and 10:00 PM are exempt from the receiver noise limit guidelines. Consequently, the calculated values at the three closest receivers comply with the applicable noise standard.

Table 3.7-9
Predicted Construction Noise Levels at Receivers Closest to Project

ID	Description (distance/direction)	EDNA Classification	Construction Sound Level Limit (dBA)	Maximum Project Construction Sound Level (dBA)	Complies with Standard
Receiver 1	Residence 0.48 mile (2560') SE of Tower A1	Class A	Exempt	70	Yes
Receiver 2	Residence 0.8 mile (4265') SW of Tower B16	Class A	Exempt	66	Yes
Receiver 3	Residence 0.38 mile (2000') SE of Tower A1	Class A	Exempt	72	Yes

If it is determined to be necessary, blasting would occur during the turbine foundation portion of the construction schedule and only during daytime hours. Blasting noise could possibly be audible at a considerable distance from the construction site and noticeable at residences near the Project Area. Sound levels from blasting at a receiver would not be extreme, however, and the occurrence would be low in frequency, intermittent, and confined to a period of one to two months. The WAC 173.60.050 exemption for temporary construction noise includes noise from blasting activity, from the aforestated state noise limits between the hours of 7 AM and 10 PM.

The large distances between much of the Project Area and potentially affected residences, the temporary nature of construction, and the restriction of construction activities to daytime hours would serve to minimize potential noise impacts from construction activities. Based on the anticipated noise levels and the timing aspects of these impacts, construction noise impacts are expected to be low.

If Project construction occurred in phases, the effect on the level of noise impacts would be to extend the total duration of temporary disturbance from Project construction, but to reduce the intensity or magnitude of impacts for any individual phase. Construction noise impacts would still be temporary, localized, and low in magnitude, and overall Project impacts during construction would remain low in a phased-construction scenario.

General Operation Noise

The predicted operational noise levels at the three closest residences to the Project are supplied in Tables 3.7-10 and 3.7-11. This analysis evaluates the existing noise levels at the closest receptors, and evaluates increases in dBA at these locations. The Washington noise regulations do not require this information; however, the Applicant supplied this information to fully inform EFSEC during the Application for Site Certificate process. Table 3.7-12 shows the results of a refined predictive noise analyses using the same Cadna/A modeling program as used for the draft EIS, but applying or adding new parameters.

Table 3.7-10
Nighttime Operational Noise Impact Assessment

Receiver ID	EDNA Class	Sound Level Limit (dBA)	Existing (dBA)	Project (dBA)	Overall (dBA)	Increase (dBA)	Complies with Regulation
6 m/sec at 10m height							
1	Class A	50	34	36	38	4	Yes
2	Class A	50	35	38	40	5	Yes
3	Class A	50	35	40	41	6	Yes
9 m/sec at 10m height							
1	Class A	50	34	37	39	5	Yes
2	Class A	50	35	39	40	5	Yes
3	Class A	50	35	42	43	8	Yes

Figure 3.7-1 depicts these three residential receivers (for the 9 m/s wind speed, 10°C temperature and 70% relative humidity operation case) in two detail maps as part of a larger aerial plan on which predicted noise contours and other known receiver locations have been superimposed. The operation of the Project would comply with all applicable noise regulations.

Table 3.7-11
Daytime Operational Noise Impact Assessment

Receiver ID	EDNA Class	Sound Level Limit (dBA)	Existing (dBA)	Project (dBA)	Overall (dBA)	Increase (dBA)	Complies with Regulation
6 m/sec at 10m height							
1	Class A	60	38	36	40	2	Yes
2	Class A	60	38	38	41	3	Yes
3	Class A	60	38	40	42	4	Yes
9 m/sec at 10m height							
1	Class A	60	38	37	41	3	Yes
2	Class A	60	38	39	41	3	Yes
3	Class A	60	38	42	43	5	Yes

Table 3.7-12
Refined Noise Analysis

Key DEIS Scenario Parameter	Scenario A	Scenario B	Scenario C	Scenario D	Original Results
Wind Turbines Operating	All ON	All ON	A1-A7 OFF	All ON	All ON
Wind Speed (meters per second)	12	12	12	12	12
Wind Speed (miles per hour)	27	27	27	27	27
Wind Direction	West	West	West	West	West
Temperature (°C)	0	0	10	10	10
Temperature (°F)	32	32	50	50	50
Relative Humidity (percent)	10	90	70	70	70
Cadna/A Modeling Results (Project only)					
Residence 1 (SPL, dBA)	36.6	43.3	28.4	44.3	39.4
Residence 2 (SPL, dBA)	19.3	28.1	29.2	29.4	38.2
Residence 3 (SPL, dBA)	40.2	45.5	24.9	46.3	41.6
Difference Between Original and Refined Results (Project only)					
Residence 1 (SPL, dBA)	-2.8	3.9	-11.0	4.9	n/a
Residence 2 (SPL, dBA)	-18.9	-10.1	-9.0	-8.8	n/a
Residence 3 (SPL, dBA)	-1.4	3.9	-16.7	4.7	n/a

Source: URS

Under certain conditions, there is the potential for one or more of the following phenomena to occur that may temporarily cause a variance in the predicted sound levels:

- In the Cadna/A prediction model, all studied wind turbine generators were assumed to operate at the same speed. In reality, very slight differences in operating rotor speeds due to non-uniformities in the passing wind profile can result in intermittent constructive and destructive interference—or what one might call "beats," that can have a perceptible frequency as current research suggests (van den Berg 2006).

- The atmosphere can either be "stable" or "unstable," which in summary are descriptors for how layers of air mass interact. The latter of these two is usually associated with cold air near the ground that is not well coupled to higher air masses. This effect can explain why high wind speeds at wind turbine generator hub height can be substantially greater than those near ground level (van den Berg 2006).

- The relative humidity and ambient temperature have a substantial effect on the attenuation of outdoor sound at high frequencies and long distances through air absorption. Relative humidity and temperature effects can produce a variance of approximately +/- 2 dBA.

- The uncertainty range for the PWL of each wind turbine generator is +/- 2 dBA.

- Due to the very low ground wind speeds recorded during the short-term measurements, actual ambient noise levels at any receiver in the Project vicinity may be higher as a result of noise generated by turbulence from wind streaming through vegetative ground cover (i.e., trees and grasses). Further, since wind-generated noise tends to rise at a rate of 2.5 dBA per 1 m/s increase in wind speed, and generally turbine aerodynamic noise rises at a rate of only 1 dBA per 1 m/s increase in wind speed, high wind speeds near the ground may cause background sound (i.e., not Project operation) to dominate the perceptible and even measurable ambient sound environment (BLM 2005).

Because predicted Project operation sound pressure levels at the nearest noise-sensitive receivers are at least 7 dBA lower than the 50 dBA L_{eq} compliance threshold, none of these above conditions is expected to result in the Project operation exceeding noise regulations.

Low Frequency Sound

Low frequency noise produced by a wind turbine generator can include tonal components produced by the generator and gearbox within the nacelle downstream of the rotor hub, atop the tower mast. The source sound power levels in Table 3.7-8 already include these noise contributors. Modern wind turbine design typically includes sound attenuation features in the nacelle to help reduce the magnitude of these electro-mechanical noise components to the aggregate, so that the spectrum of sound levels at the octave band center frequencies shown in Table 3.7-8 largely describes the aerodynamic effects of the rotor blades interacting with the passing wind profile. Even though there are no relevant regulations and standards related to dBC, the turbine sound power level manufacturer ratings show that C-weighted levels are within

2 dB of A-weighted levels. Therefore, low frequency noise is not anticipated to be an issue for this Project.

In earlier generations of wind turbine design, the practice of using downwind rotors allowed turbulence from the tower mast to disrupt favorable aerodynamic conditions for the passing blades, causing considerable low frequency noise. This practice has been abandoned by the contemporary upwind rotor design of virtually all wind turbine generators built in the past five years, including the models contemplated for this Project.

The noise produced by air interaction with the rotor blades tends to be broadband noise, but is amplitude-modulated as the upstream blades pass the tower, resulting in what some call a characteristic "swoosh." The blade passage frequency of this "swoosh" is only a temporal modulation of sound and should not be confused with low frequency sounds. Research studies of low-frequency noise emissions from wind turbines have determined that low frequency noise is a function of the wind itself, and that the "swoosh" of the turbines is actually in the readily audible range of frequencies (500 to 1 kiloHertz) (Leventhall 2006). Virtually any sound can be time-modulated without changing its pitch. Thus, low frequency modulation of audible sound does not imply the presence of actual low frequency sound or infrasound, which is discussed in the following subsection.

Table 3.7-13 shows differences in dBA and dBC predicted at the three representative receivers R1, R2, and R3 rather than at the source (the wind turbines). Information regarding potential impacts from exposure to low frequency noise is inconclusive. Scientific articles suggest that low frequency noise does not pose a health risk (Leventhall 2006). There may, however, be some correlation between an individual receptor's psychological sensitivity to the noise source (like or dislike for the noise source) and complaints regarding discomfort from that noise source. These are sometimes associated with complaints regarding sleep disturbance. Figure 3.7-2 illustrates the thresholds of human hearing at low frequencies. Because sensitivity to noise can be influenced by such psychological factors and can subjectively be deemed significant by an affected individual, regardless of measurable frequency or amplitude level, it is difficult to quantify these impacts or to impose mitigation. However, modern turbine designs have been modified to reduce or eliminate low frequency sound.[17]

[17] See, for instance, http://www.bwea.com/ref/lowfrequencynoise.html.

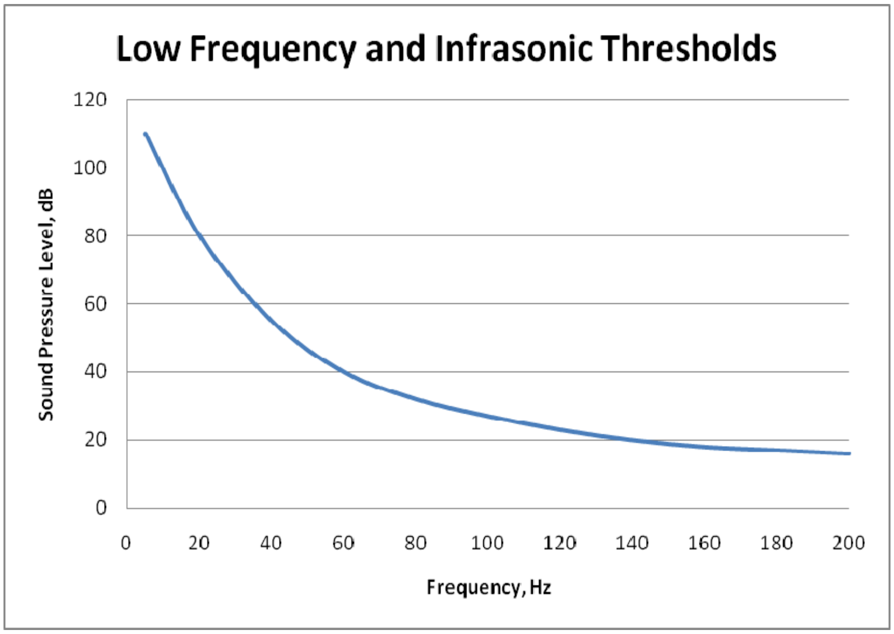
Table 3.7-13
Results of Comparison of dBC vs. dBA Levels

Key DEIS Scenario Parameter	Scenario A	Scenario B	Scenario C	Scenario D	Original Results
Wind Turbines Operating	All ON	All ON	A1-A7 OFF	All ON	All ON
Wind Speed (meters per second)	12	12	12	12	12
Wind Speed (miles per hour)	27	27	27	27	27
Wind Direction	West	West	West	West	West
Temperature (°C)	0	0	10	10	10
Temperature (°F)	32	32	50	50	50
Relative Humidity (percent)	10	90	70	70	70
Cadna/A Modeling Results (Project only)					
Residence 1 (SPL, dBA)	36.6	43.3	28.4	44.3	39.4
Residence 2 (SPL, dBA)	19.3	28.1	29.2	29.4	38.2
Residence 3 (SPL, dBA)	40.2	45.5	24.9	46.3	41.6
Cadna/A Modeling Results (Project only)					
Residence 1 (SPL, dBC)	41.4	45.9	33.0	46.6	42.0
Residence 2 (SPL, dBC)	32.3	35.2	35.3	35.5	41.5
Residence 3 (SPL, dBC)	43.7	47.6	30.3	48.2	43.8
Difference Between dBC and dBA Results (Project only)					
Residence 1 (SPL, dBC minus dBA)	4.8	2.6	4.6	2.3	2.6
Residence 2 (SPL, dBC minus dBA)	13.0	7.1	6.1	6.1	3.3
Residence 3 (SPL, dBC minus dBA)	3.5	2.1	5.4	1.9	2.2

Source: URS

Figure 3.7-2
Low Frequency and Infrasonic Normal Hearing Thresholds

Figure 1, Leventhall 2006	
Frequency, Hz	SPL, dB
5	110
20	80
40	55
60	40
80	32
100	27
120	23
140	20
160	18
180	17
200	16



Source: Leventhall, Geoff. 2006. Infrasound from Wind Turbines - Fact, Fiction or Deception. Canadian Acoustics, Volume 34, Number 2.

Infrasound

The term infrasound describes sound with frequencies of 20 Hz or less that are generally considered below the threshold of human hearing. Such sound, if sufficiently high in magnitude, can still be perceived or even heard as induced by vibration. Natural sources of infrasound include waves, thunder, wind, and even certain species of wildlife.

A review of wind turbine noise measurement studies conducted by Jakobsen (2005) concluded that operation of contemporary wind turbine generators featuring rotors “upwind” of tubular tower masts generated infrasound in the range of 70 G-weighted decibels (dBG) at a distance of one hundred meters. (The G-weighting scale, like the oft-used A-weighting scale for audible sound spectra, is a filter applied to low-frequency sound as described in ISO 7196:1995E.) Jakobsen also notes that this infrasound, usually associated with aerodynamic effects of blade passage past the tower mast, tends to ignore atmospheric sound absorption and ground attenuating effects due its very large wavelength. Hence, one could reasonably expect infrasound to attenuate only with increasing propagation distance.

Recent studies performed for the Canadian Wind Energy Association have described usage of 85–90 dBG as a criterion for human perception of infrasound and, by reasonable extension, the likely threshold for infrasound complaint (HGC Engineering 2006).

The horizontal distances of the Project wind turbines to the nearest noise-sensitive receivers are at least 615 meters, which provides sufficient attenuation to offset the amount of decibels that one might add to account for the quantity of wind turbines of the Project. Thus, the expected infrasound at the nearest existing receivers (i.e., R1 and R2) would remain under an estimated value of 70 dBG, which is 15 dBG less than the previously stated criteria. This estimated Project aggregate wind turbine generator infrasound level also is far below what NASA studies determined (125 dB, linear) as a threshold for potential health impacts (HGC Engineering 2006).

Project Decommissioning

In compliance with WAC 463-72 Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. A detailed site restoration plan is required within ninety days of Project decommissioning. The initial site restoration plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The initial site restoration plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major noise issues presently anticipated, including noise impacts from construction activities related to removal of the wind generation equipment and site restoration. If impacts to noise are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.7.2.3 No Action Alternative

Under the No Action Alternative, the proposed Project would not be constructed. Existing sound levels would be expected to remain largely the same. Although the generally quiet ambient noise levels in the Project Area would continue, occasionally elevated noise levels in the immediate Project vicinity would be expected from ongoing timber harvest activities at the Project Area.

3.7.3 MITIGATION

The following mitigation measures are identified to avoid, minimize, and compensate for potential noise-related impacts during construction and operation of the proposed Project to the extent feasible.

- Equip all noise-producing Project equipment and vehicles using internal combustion engines with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) would be equipped with shrouds and noise control features that are readily available for that type of equipment.

- Regulate all mobile or fixed noise-producing equipment used on the Project for noise output governed by local, state, or federal agency regulations, to comply with such regulations while in the course of Project activity.

- Designate that the use of noise-producing signals, including horns, whistles, electronic alarms, sirens, and bells, would be for safety warning purposes only. Unless required for such safety purposes, and as allowable by applicable regulations, no construction-related public address, loudspeaker, or music system would be audible at any adjacent noise-sensitive land use.

- Implement a noise complaint process and hotline number for the surrounding community. The Applicant would have the responsibility and authority to receive and resolve noise complaints.

3.7.4 UNAVOIDABLE ADVERSE IMPACTS

Construction noise is exempt so long as it occurs during daytime hours, and operation noise is predicted to be less than the nighttime threshold of 50 dBA L_{eq} per Washington State and Skamania County regulations.

The analysis of noise impacts presented here was based on specific design features of the proposed Project that were current as of the date of this Draft EIS. These features, such as the turbine manufacturer and model selection, the layout of the turbines in the Project Area and their corresponding distances to identified closest noise-sensitive receivers, can greatly influence the analysis results. However, assuming that final turbine selections and siting locations are comparable to those features used in this analysis, no substantial adverse construction or operation noise impacts are anticipated for the Project.

3.7.5 REFERENCES

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3.8 LAND USE AND RECREATION

This section describes the existing land uses and recreation areas at the Project Area and in surrounding areas, and identifies potentially applicable land use policies and zoning ordinances. This section also discusses potential Project impacts on land use and recreation, as well as the consistency of the proposed Project with local land use plans and zoning ordinances.

3.8.1 AFFECTED ENVIRONMENT

3.8.1.1 Existing Land Use

Project Area

The Project Area is located in an unincorporated portion of southeastern Skamania County, Washington, about two miles north of the Columbia River (see Figure 1-1). The primary use at the Project Area is commercial forestry. The site has been used for this purpose for the last century. During this time, the owners and operators have logged the property over a series of approximately 50-year logging rotations. Ongoing tree farming activities include regular clearing, replanting, and harvesting.

Portions of the Project Area are also used for utility corridors. A natural gas pipeline, owned and operated by Williams Gas, runs from east to west across the Project Area near the north boundary of the site. Two existing transmission line corridors also cross the Project. These approximately 250-foot wide corridors, which generally run in an east-to-west direction, are owned and maintained by BPA. Each corridor is occupied by a high-voltage transmission line and its associated support towers and access roads. The corridors are routinely maintained to remove all tall growing vegetation, as well as any adjacent “danger trees” (i.e., those trees with the potential to fall into the existing lines) in order to avoid interference with these lines.

Surrounding Areas

Land use in the Project vicinity is predominately commercial forestry with other typical rural uses and both incorporated and unincorporated communities dispersed throughout (see Figure 3.8-1). The incorporated cities of White Salmon and Bingen, Washington are located adjacent to each other approximately 7 miles southeast of the Project Area, along the north side of the Columbia River. Directly south and across the Columbia River from Bingen is the City of Hood River, in Hood River County, Oregon. The city of Stevenson, the Skamania County seat, is located approximately 15 miles southwest of the Project Area along the Columbia River. These incorporated cities have mixed urban uses typical of small communities.

In the more immediate vicinity of the Project Area, the unincorporated community of Willard is located approximately 2.25 miles northwest of the Project Area, and the unincorporated community of Mill A is located approximately 1.5 miles west of the site. Other residential uses in the immediate vicinity of the Project Area are generally rural, low- to medium-density single-family homes between 30 and 50 years old. There are approximately 400 residences and businesses within three miles of the Project Area (see Figure 3.8-2). A new homesite location has been approved approximately 2,000 feet (0.38 mile) from the south property line of the Project Area.

Commercial forestry areas and the Gifford Pinchot National Forest are generally located to the north of the Project Area. East of the Little White Salmon River, lands are currently being used for commercial timber production under ownership by S.D.S. Co., LLC, Broughton Lumber Company, and Washington State. The Washington State lands are managed by DNR for commercial harvest to support the State’s schools.

To the south of the Project Area is the Columbia River Gorge National Scenic Area (see Figure 3.8-3). The Scenic Area extends along the Columbia River for about 85 miles and includes 292,500 acres in parts of three Oregon and three Washington counties. In addition to forested areas, land uses within the Scenic Area near the Project Area on the Washington side of the Columbia River include limited agriculture, mostly pear and apple orchards recently augmented with some wine grape vineyards. On the Oregon side of the Columbia River, land use within the Scenic Area is predominantly commercial timber production and residential. Further south of the Scenic Area in Oregon, land uses include commercial forestry, agriculture (primarily pears, apples, and cherries), and some residential.

SR 14 and the Burlington Northern Santa Fe Railway are located between the Project Area and the Columbia River, within the Scenic Area. I-84 is located on the Oregon side of the Columbia River, within the Scenic Area.

3.8.1.2 Recreation

The primary recreation activities within Skamania County are camping, hiking and fishing. Major recreation locations include the Gifford Pinchot National Forest; the Mount St. Helens National Volcanic Monument; the Lewis and Clark Trail Highway, which follows the Columbia River through Skamania County; and the Columbia River Gorge National Scenic Area south of the Project Area. Informal recreational activities such as hunting, hiking, and mountain biking also take place on private land, subject to landowner approval. There are no formally designated recreational areas within the Project Area; however, the Applicant would allow informal recreational use of their land with approval.

Summer recreational activities include water sports such as fishing, swimming, boating, river rafting, kayaking, water skiing, and wind surfing; as well as camping, biking, hiking, horseback riding, hunting, picnicking, and other outdoor sports. Some of these activities continue into the winter, weather permitting. Sightseeing is a popular year-round activity in the Columbia River Gorge. Recreational facilities within approximately 25miles of the Project Area are shown in Figure 3.8-3 and listed in Table 3.8-1.

The closest recreational facility is the Underwood Park and Community Center, located near Underwood just off of Cook-Underwood Road, approximately 1.5 miles east of the Project Area. The community center has a large gymnasium, stage, kitchen, and meeting room; while the park has soccer fields, a pavilion, and a playground. Recreational facilities or activities available closest to the Project Area include hiking and horseback riding along Buck Creek Trail, Husum Hills Golf Course, BZ Corners Boat Launch, Underwood Park/Community Center, and Drano Lake Boat Ramp.

There are no Skamania County recreation facilities within five miles of the proposed Project. However, two national trails, the Lewis and Clark National Historical Trail and the Oregon National Historic Trail, are located within 5 miles of the Project Area. These trails roughly follow SR 14 and I-84, respectively. Also within 5 miles of the site, the White Salmon River is designated as a Wild and Scenic River, and within 25 miles, the Klickitat River is also so designated.

There are no new parks or recreation facilities planned within a 5-mile radius of the site, either as part of the Skamania County Parks and Recreation Master Plan or the Columbia River Gorge National Scenic Area Management Plan. No federal recreation regulations apply to the site, nor are there federal or state plans for recreation facilities on or near the site.

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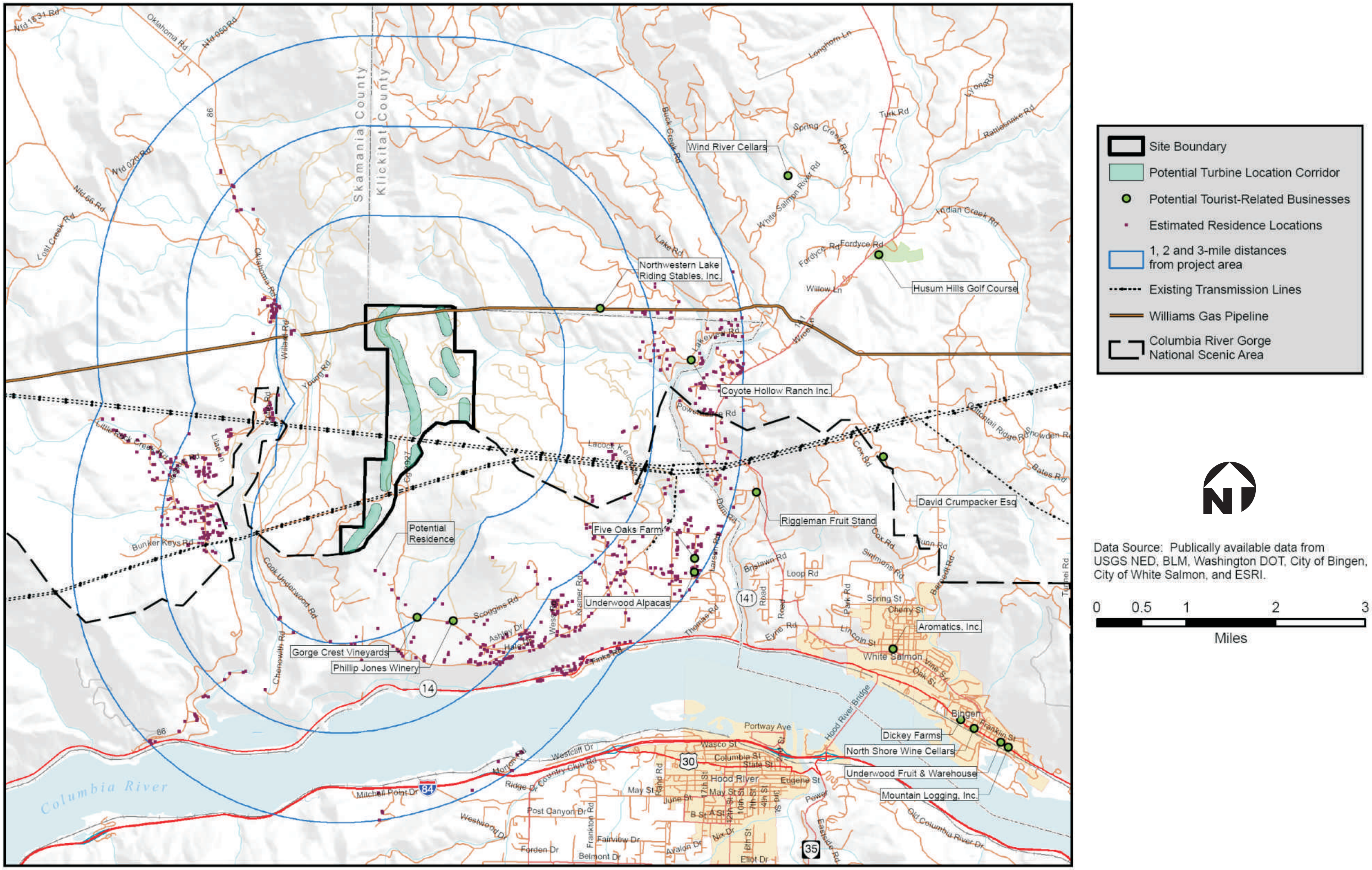

Figure 3.8-1

Residences within Three Miles of the Project Site

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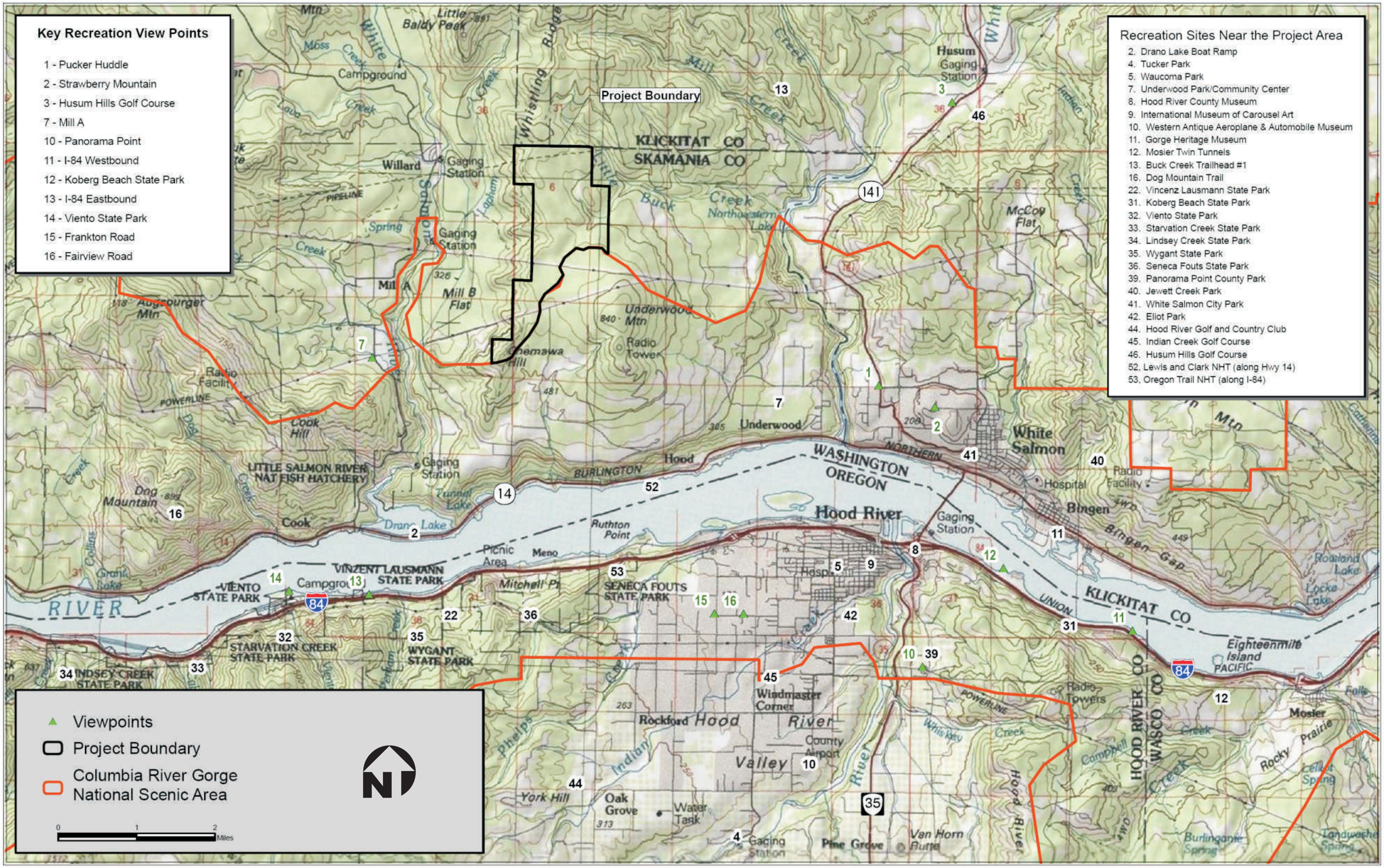

Figure 3.8-2
Recreation Facilities within Five Miles of the Project Site

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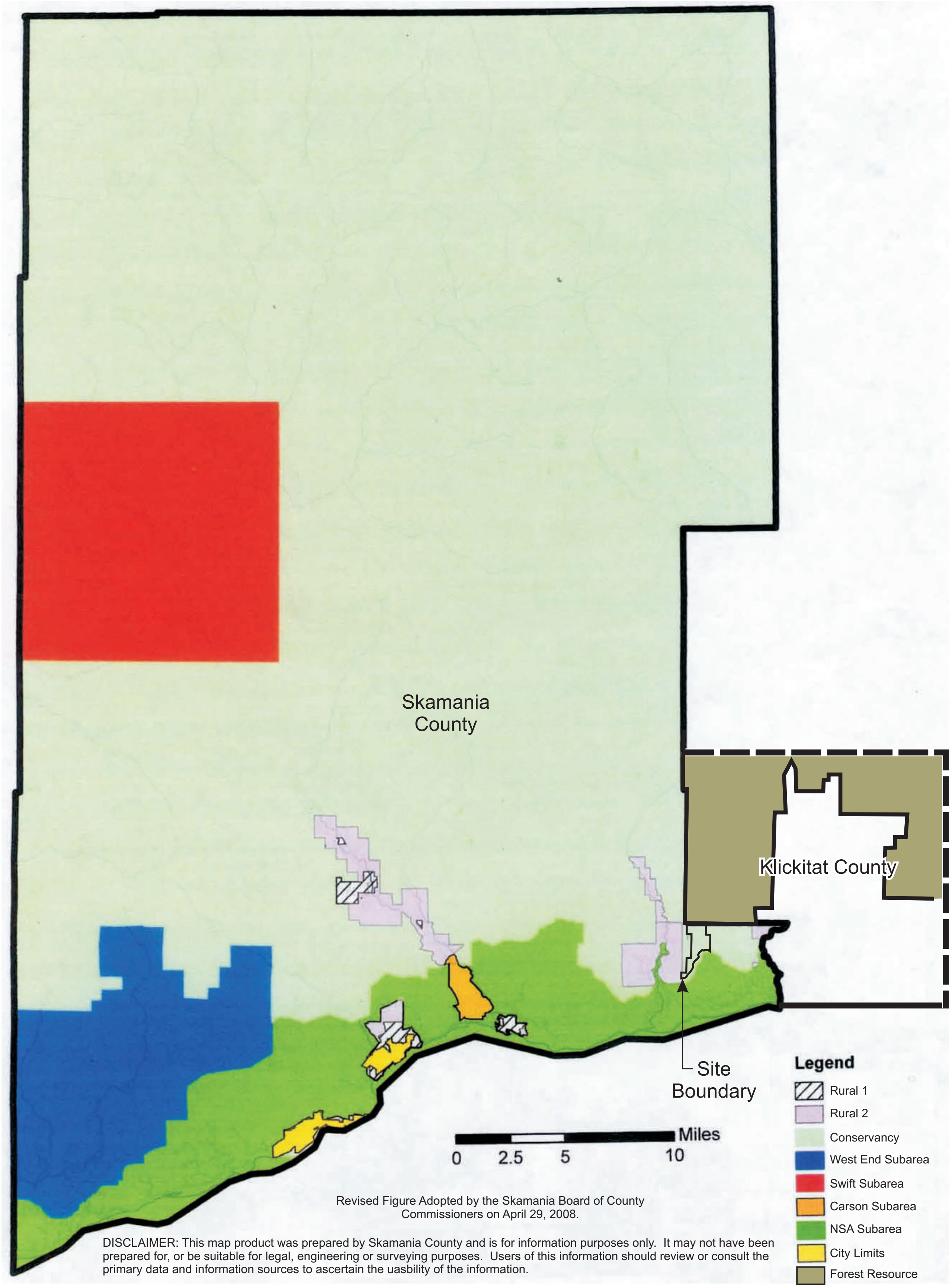

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Source: Skamania County.

Figure 3.8-3

Skamania and Klickitat Counties Comprehensive Plan Designations

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Skamania County, Washington

3.8.2 APPLICABLE LAND USE REGULATIONS

Skamania County has two independent sets of land use regulations. The first is a stand-alone zoning code (SCC Title 22) that regulates uses and development within the General Management Area (GMA) and Special Management Area (SMA) of the Columbia River Gorge National Scenic Area). The Scenic Area Code is based on the Management Plan for the Scenic Area, which is overseen by the USFS and Columbia River Gorge Commission, as directed by the National Scenic Area Act.

The remainder of unincorporated Skamania County, as well as those portions of the Scenic Area classified as Urban Areas (such as White Salmon, Bingen, and Hood River), is governed by the Skamania County Comprehensive Plan, zoning regulations in SCC Title 21, and Titles 20, Shorelines, and 21A, Critical Areas.

Because the Project Area is located outside of the National Scenic Area, land use at the site is regulated by the Skamania County Comprehensive Plan and SCC Titles 21, 20, and 21A. In addition, although the Project Area is immediately adjacent to the National Scenic Area, the National Scenic Area Act expressly provides that land use regulations developed for the National Scenic Area do not apply to adjacent area. Section 544O(a)(10) of the Act states:

> *Nothing in Sections 544 to 544p of this title shall establish protective perimeters or buffer zones around the scenic area or each special management area. The fact that activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas*.

16 USC §544O(a)(10). The remainder of this section therefore focuses on describing potentially applicable provisions of the Skamania County Comprehensive Plan and SCC Titles 21, 20, and 21A. For additional information of the provisions of the National Scenic Area Act, see Section 4.11 of this EIS.

Table 3.8-1
Public Park and Recreation Facilities within 25 Miles

National Scenic Areas and Trails	Klickitat County Parks
Columbia River Gorge National Scenic Area	Klickitat County Park
Lewis and Clark National Historic Trail	Hood River County Parks
Oregon Trail National Historic Trail	Tucker Park
Washington State Parks	Panorama Point County Park
Columbia Hills State Park	Tollbridge County Park
Doug's Beach State Park	City of White Salmon
Oregon State Parks/Campgrounds/Trails	Jewett Creek Park
Lindsey Creek State Park	White Salmon City Park
Starvation Creek State Park	City of Hood River
Viento State Park	Eliot Park
Wygant State Park	Waucoma Park
Seneca Fouts State Park	Golf Courses
Koberg Beach State Park	Husum Hills Golf Course
Memaloose State Park	Indian Creek Golf Course
Mayer State Park	Hood River Golf and Country Club
Lang Forest State Park	Carson Hot Springs Golf Course and Resort
Wyeth Campground	Skamania Lodge Golf Course
Historic Columbia River Highway State Trail - Twin Tunnels Segment (Mosier Twin Tunnels)	The Dalles Country Club
USFS Wilderness Area / Parks / Trails/Boat Launches	Northwest Aluminum Golf Club
BZ Corners Boat Launch	Museums and Sightseeing
Mark O. Hatfield Wilderness	Hood River County Museum
Balfour-Klickitat Park	Western Antique Aeroplane & Automobile Museum
Dog Mountain Trail	International Museum of Carousel Art
Herman Creek Trail	Gorge Heritage Museum
Washington State Department of Natural Resources	Columbia River Gorge Interpretive Center
Buck Creek Trail	Bonneville Lock and Dam Visitor Complex
Skamania County Parks/Campgrounds/Launches	Columbia Gorge Discovery Center
Home Valley Campground	Wasco County Historical Museum
Underwood Park/Underwood Community Center	Fort Dalles Museum
Big Cedars County Park	Sternwheeler Cruises
Wind River Boat Ramp	
Drano Lake Boat Launch	
Skamania County Fairgrounds	
Rock Creek Community Center	

3.8.2.1 Skamania County Comprehensive Land Use Plan

On July 10, 2007, Skamania County adopted its current Comprehensive Plan, which includes three Subarea Plans. The Project Area is not located in one of these subareas. There are three land use designations outside of the specific subarea plans: Rural I, Rural II, and Conservancy (see Figure 3.8-4). The Project Area is designated as Conservancy. The Comprehensive Plan identifies zoning that is consistent with the Conservancy designation, including: Residential 10 (R-10), Rural Estates 20 (RES-20), Resource Protection (FOR/AG 10 and 20), Commercial Resource Land 40 (CRL 40), Natural (NAT), and Unmapped Classification (UNM).

The alternative location of the Operations and Maintenance facility is in the Rural II designation of the Comprehensive Plan. Most residential zoning classifications are consistent with the Rural II designation, as are the FOR/AG 10 and 20, NAT, and UNM zoning classifications.

The overall Comprehensive Plan vision statement is:

> *Skamania County is strongly committed to protecting our rural character and natural resource based industries while allowing for planned future development that is balanced with the protection of critical resources and ecologically sensitive areas, while preserving the community's high quality of life.*

Natural resources-based industry is further encouraged in the Comprehensive Plan's description of the intent of the Conservancy designation:

> *The Conservancy land use area is intended to provide for the conservation and management of existing natural resources in order to achieve a sustained yield of these resources, and to conserve wildlife resources and habitats. Much of the Conservancy land use area is characterized by rugged terrain, steep in slope, and unsuitable for development of any kind. Logging, timber management, agricultural and mineral extraction are main use activities that take place in this area. Recreational activities of an informal nature such as fishing, hunting, and hiking occur in this area, although formal recreational developments may occur from time to time. Conservancy areas are intended to conserve and manage existing natural resources in order to maintain a sustained resource yield and/or utilization.*

Among the uses identified as appropriate in the Conservancy designation are: public facilities, utilities, utility substations, forest management (including temporary logging and mining camps), and surface mining (by conditional use).

The Rural II designation is described in the Comprehensive Plan as follows:

> *"The Rural II land use area is intended to provide for rural living without significant encroachment upon lands used for agriculture and timber. This land use area is the middle developmental range level suggested by this plan. The lower density will help to protect agricultural and timber lands from dense residential type development, and should maintain the rural character of this designation."*

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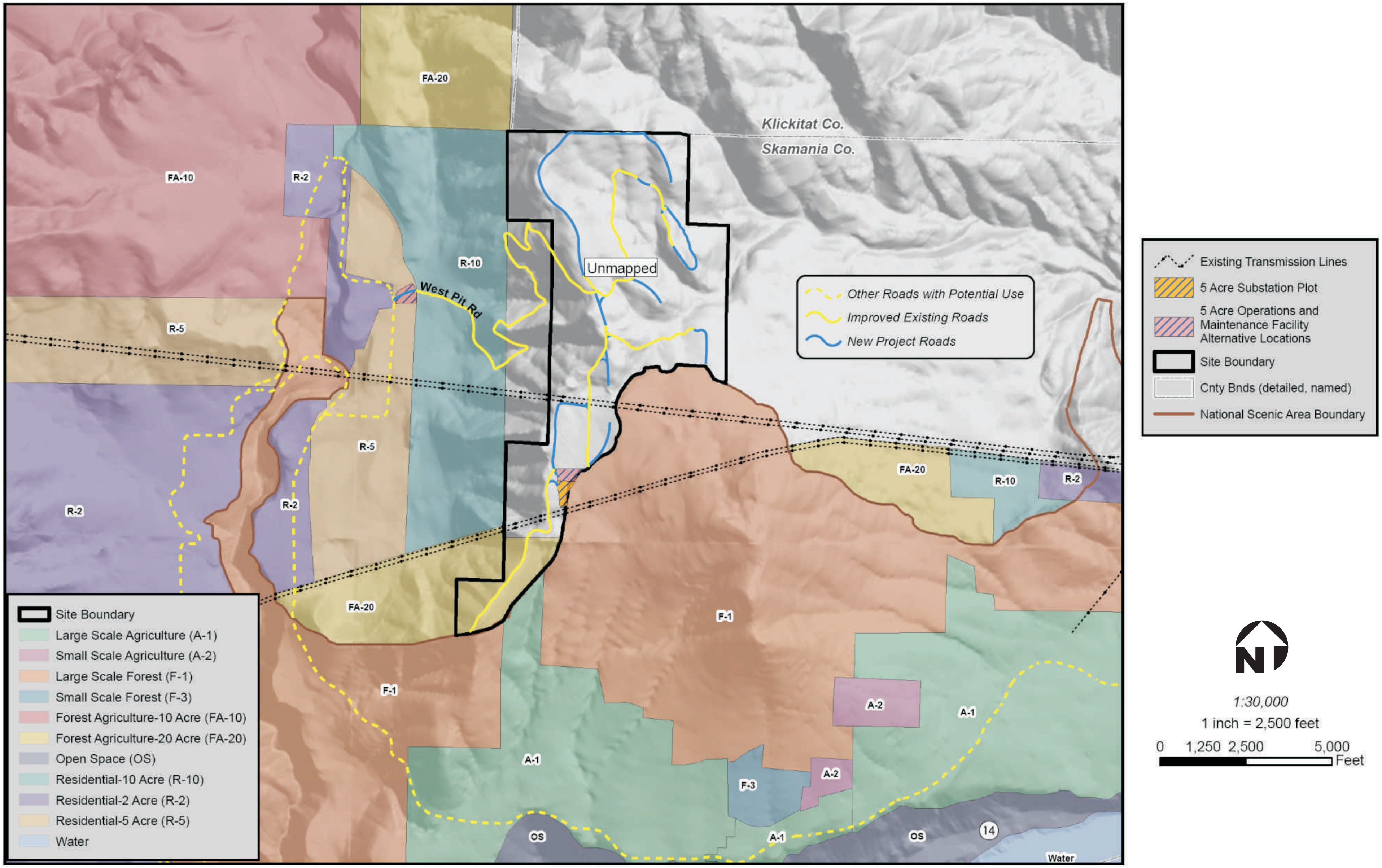

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Figure 3.8-4
Skamania County Zoning

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Among the non-residential uses identified in the Comprehensive Plan as appropriate in the Rural II designation are public facilities, utilities, utility substations, telecommunication facilities, hospitals, meeting halls, agriculture, forest management including temporary logging and mining camps, and surface mining.

The following identifies potentially applicable goals and policies in the Comprehensive Plan.

> *Goal LU.1: To integrate long-range considerations (comprehensive planning) into the determinations of short-term action (individual development applications).*
>
> > *Policy LU.1.2: The plan is created on the premise that the land use areas designated are each best suited for the uses proposed therein. However, it is not the intention of this plan to foreclose on future opportunities that may be made possible by technical innovations, new ideas and changing attitudes. Therefore, other uses that are similar to the uses listed here should be allowable uses, review uses or conditional uses, only if the use is specifically listed in the official controls of Skamania County for that particular land use designation.*
>
> *Goal LU.2: To provide for orderly future physical development of Skamania County.*
>
> > *Policy LU.2.4: Encourage new commercial enterprises to locate within or near existing commercial areas to avoid further scattering and to better serve the public.*
>
> *Goal LU.3: To coordinate public and private interests in land development.*
>
> > *Policy LU.3.3: Encourage industry that would have minimal adverse environmental or aesthetic effects.*
>
> *Goal LU.4: To promote interagency cooperation and effective planning and scheduling of improvements and activities so as to avoid conflicts, duplication and waste.*
>
> > *Policy LU.4.3: Land use patterns, which minimize the cost of providing adequate levels of public services and infrastructure, should be encouraged.*
>
> *Goal LU.5: To promote improvements which make our communities more livable, healthy, safe and efficient.*
>
> > *Policy LU.5.5: Promote compatibility of industry with the surrounding area or community by fostering good quality site planning, landscaping, architectural design, and a high level of environmental standards.*

Policy LU.5.6: Encourage commercial development that is convenient, safe and pleasant to the general public by: requiring that new establishments provide off-street parking adequate for its needs. Encourage pooled or joint use parking areas for adjacent developments may be utilized; Regulate access points for vehicular traffic for commercial areas to prevent unsafe conditions; the design of commercial sites, buildings, and signs should be compatible with surrounding areas; and, landscaping may be required as a buffer when commercial use adjoins residential or farm property.

Goal E.1: To ensure the proper management of the natural environment to protect critical areas and conserve land, air, water, and energy resources.

Goal T.1: Transportation – Encourage an efficient multi-modal transportation network that is based on regional priorities and coordinated with county and city comprehensive plans.

Goal T.2: Continue the priority of increasing safety of the Skamania County rural 2-lane road system. The majority of the Public Works Department's future efforts will be to reduce the accident rate with Skamania County.

Goal T.3: Public Facilities and Services – Ensure that those public facilities and services necessary to support development should be adequate to serve the development at the time the development is available for occupancy and use without decreasing current service levels below locally established minimum standards.

Goal AHP.1: Identify and encourage the preservation of lands, sites, and structures that have historical or archaeological significance.

Goal AHP.2: Increase recognition of historic, archaeological, and cultural resources.

Goal AHP.3: Protect historic, archaeological and cultural resources through a comprehensive planning approach.

3.8.2.2 Skamania County Zoning Ordinance SCC Title 21

Title 21 of the Skamania County Zoning Ordinance is the county zoning that applies to the Project Area. Although extensive updates of SCC Title 21 have been proposed for adoption, the last-adopted version is still in effect ~~because the proposed updates are currently under appeal by local interest groups~~.

Under SCC Title 21, the Project Area is located primarily in the UNM zone, with the southern tip of the Project Area in the FOR/AG 20 zone (see Figure 3.8-5). Both of these zoning classifications are consistent with the Comprehensive Plan's Conservancy designation for this area. None of the Project Area is designated as farmland.

Approximately 7,152 acres of the 1,152-acre Project Area are located in the UNM zone. UNM zones are those areas of the county where no formal adoption of any zoning map has taken place. The Skamania County Code provides:

> *In the UNM zone all uses which have not been declared a nuisance by statute, resolution, ordinance or court of jurisdiction are allowable. The standards, provisions, and conditions of this title [SCC Title 21] shall not apply to unmapped areas.*

SCC 21.64.020. Nuisances established by the Board of County Commissioners by resolution and ordinance are identified in SCC 8.30.010; this provision of the County Code does not identify wind energy facilities as a nuisance. In addition, neither the RCW nor the WAC designate wind energy facilities as a nuisance.

In July 2007, the County adopted a moratorium on unincorporated UNM-zoned lands outside the Swift Subarea. The moratorium does not prohibit all development in UNM lands. Rather, it restricts three types of land uses: (1) issuance of building permits on lands created by deed since January 2006 that are 20 acres or larger; (2) land divisions (short plat and subdivision); and (3) acceptance of SEPA checklists in support of converting land to non-forestry uses.

The remainder (approximately 400 acres) of the Project Area is located within the FOR/AG 20 zoning classification (see Figure 3.8-5). Pursuant to SCC 21.56.010[A]), the purpose of this zone is:

> *To provide land for present and future commercial farm and forest operations in areas that have been and are currently suitable for such operations, and to prevent conflicts between forestry and farm practices and nonresource production uses by not allowing inappropriate development of land within this zone classification.*

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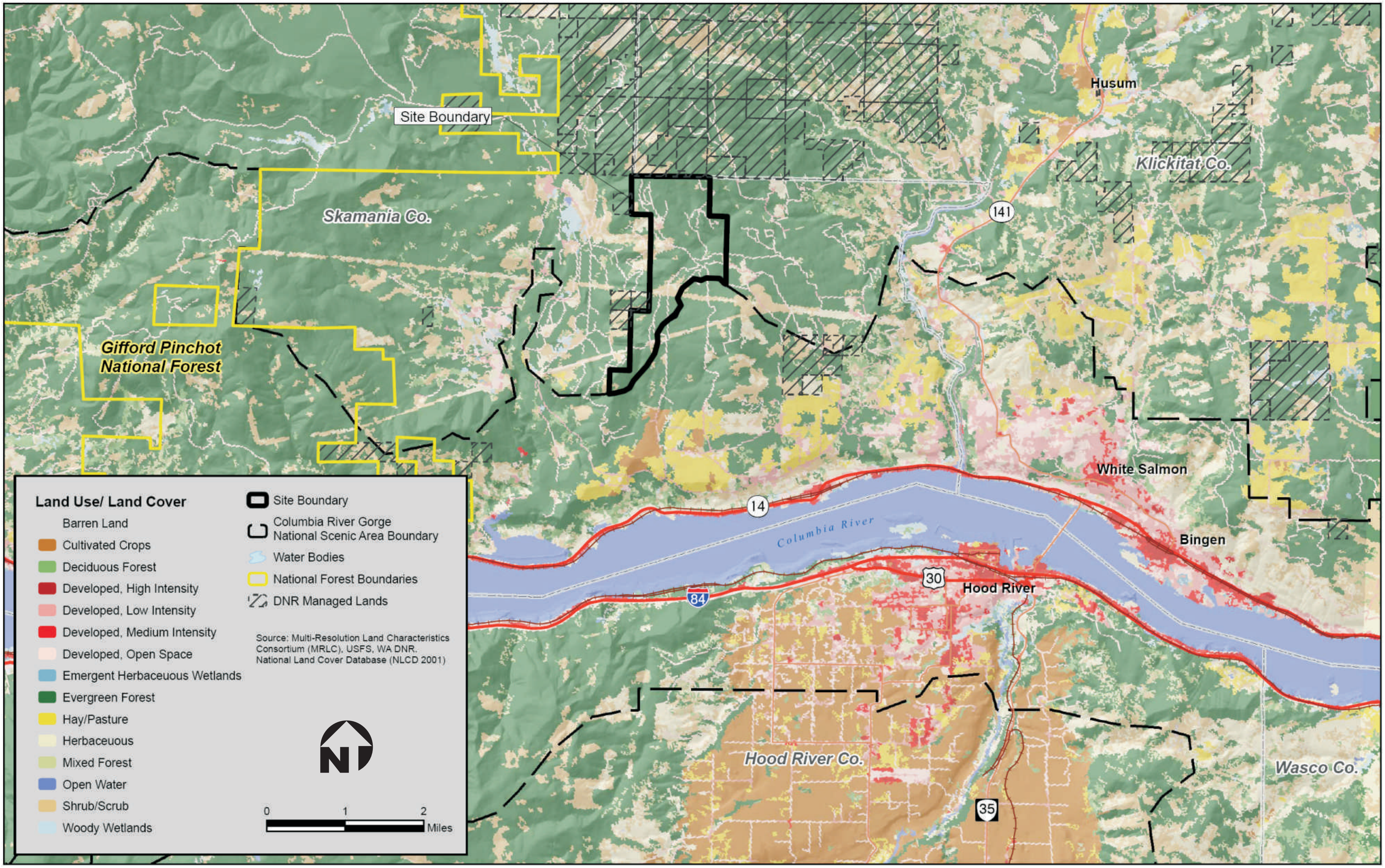

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Figure 3.8-5
Land Use within Five Miles of the Site

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Uses allowed outright in the FOR/AG 20 zone include the following:

A. *Forestry practices and associated management activities of any forest crop in accordance with Washington Forest Practices Act of 1974 including timber, Christmas trees, nursery stock, and surface mining.*

B. *Commercial and domestic agriculture.*

C. *Orchards and vineyards.*

D. *Horticulture.*

E. *Cottage occupation (in accordance with Chapter 21.70).*

F. *Light home industry (in accordance with Chapter 21.70).*

G. *Management of unique biological areas.*

H. *Management and propagation of fish and wildlife.*

I. *Water resources management facilities.*

J. *Storage of explosives, fuels and chemicals.*

K. *Accessory uses normally associated with an allowable use.*

L. *Public and private conservation areas or structures for retention of water, soil, open space, forest, or wildlife resources.*

M. *Log sorting and storage areas, scaling stations, temporary crew quarters, forest industry storage and maintenance facilities.*

N. *Family day care home (in accordance with Section 21.86.020).*

O. *Residential care facilities (in accordance with Chapter 21.85).*

P. *Farm labor housing.*

Q. *Accessory equipment structures.*

R. *Attached communication facilities not located on BPA towers (in accordance with Section 21.70.160).*

Uses allowed by Conditional Use Permit in the FOR/AG 20 zone include:

A. *Individual single-family residences not provided in conjunction with forest or farm management, including residential and resource related development may be permitted conditionally, provided they meet (…additional listed conditions).*

B. *Recreational facilities.*

C. *Semi-public facilities and utilities.*

D. *Sawmills, shake and shingle mills, chippers, pole and log yards.*

E. *Geothermal energy facilities.*

F. *Aircraft landing fields.*

G. Cluster developments.

H. Child mini-day care center (in accordance with Section 21.86.030).

I. Child day care center (in accordance with Section 21.86.040.

The alternative Operations and Maintenance facility site is located approximately 0.9 mile west of the Project Area in the R-5 zoning classification (see Figure 3.8-5). This zoning classification is consistent with the Comprehensive Plan's Rural II designation for this area. Pursuant to SCC 21.36.010, the purpose of the R-5 zone is:

> *To provide a transition zone of medium to low density residential development which will maintain a rural character of the area in the Rural II Land Use Area of the County Comprehensive Plan A.*

Uses allowed outright in the R-5 zone include the following:

A. Single-family dwellings

B. Commercial and Domestic agriculture

C. Forestry

D. Public facilities and utilities

E. Cottage occupation (In accordance with Chapter 21.70)

F. Light home industry (In accordance with Chapter 21.70)

G. Residential care facilities (In accordance with Chapter 21.85)

H. Family day care home (In accordance with Chapter 21.86.020)

I. Safe home

J. Accessory equipment structures

K. Attached communication facilities located on BPA towers. (in accordance with Section 21.70.160)

Uses allowed by Conditional Use Permit in the R-5 zone include:

A. Surface mining

B. Recreational facilities

C. Professional services

D. Geothermal energy facilities

E. Public displays

F. Cluster developments

G. Semi-public facilities

H. Small and Large-Scale Recreational Vehicle Parks.

I. Child day center (In accordance with Chapter 21.86.040)

3.8.2.3 Skamania County Code, Title 20, Shorelines

Because the Project Area is not located near or on any shorelines of State, County or other significance, there are no applicable provisions of this county code.

3.8.2.4 Skamania County Code, Title 21A, Critical Areas

The Washington State Growth Management Act, RCW 36.70A.060, requires counties to identify and regulate critical areas.[18] Critical areas include:

- Fish and wildlife habitat conservation areas
- Frequently flooded areas
- Geologically hazardous areas
- Ponds and lakes
- Streams, creeks, and rivers

In Skamania County, critical areas regulations are found in SCC Title 21A. The Project Area is not located within any critical recharge areas, frequently flooded areas, ponds and lakes, or rivers. Portions of the Project Area are located near geologically hazardous areas due to steep slopes classified as Class II and III LHAs. There are wetlands, fish and wildlife habitat areas, streams, and creeks on the site.

3.8.3 IMPACTS

Adverse impacts to land use can are defined two ways:

- ***Changes to existing land use activities and development patterns.*** The Project could cause adverse impacts if it were to preclude the continuance of existing land uses or cause major changes to the existing patterns of land use activities or development.
- ***Inconsistency of a proposed project with existing land use regulations.*** The Project could cause adverse impacts if it was found to be inconsistent with the Skamania County Comprehensive Plan, Zoning Code, or Critical Areas regulations.

[18] See: http://www.commerce.wa.gov/_CTED/documents/ID_892_Publications.pdf

3.8.3.1 Proposed Action

Changes to Existing Land Use Patterns and Recreation

Project Construction

During construction, earth movement and construction-related traffic would generate noise and dust that could temporarily affect nearby homes and businesses located along the site access route (described in Section 3.11, Transportation). Cook-Underwood Road would be the primary access route for construction materials and workers. However, construction impacts would not be sufficient to cause changes to existing land use patterns.

Land clearing for the construction of the alternative Operations and Maintenance facility site would occur concurrently with roadway improvements to West Pit Road. The additional earth movement and construction-related traffic would generate slightly more noise and dust in that area along West Pit Road over anticipated levels for roadway construction without the facility. The additional noise and dust could temporarily affect nearby homes along Willard Road. Construction impacts would not be sufficient to cause changes to existing land use patterns.

Construction would not directly affect local recreational facilities beyond the potential for construction workers to use local recreational facilities during the one year construction period. Existing limits on the length of stay in public camping areas would minimize any potential impacts on park users from construction workers staying in parks, and a majority of the construction workers are expected to be within daily commuting distance of the site. Additionally, workers who did stay at local parks would most likely do so on weekdays and would thus not be there on the days with the highest levels of use.

Construction activities could affect some recreation users such as users of the Underwood Park and Community Center located along Cook-Underwood Road, through temporary increases to traffic, and from construction-related dust and noise. These impacts would be temporary and are expected to be minor.

Construction of the Operations and Maintenance facility at the West Pit Road location would not impact local recreational facilities. Existing limits on the length of stay in public camping areas would minimize any potential impacts on park users from construction workers staying in parks, and a majority of the construction workers are expected to be within daily commuting distance of the site. Additionally, workers who did stay at local parks would most likely do so on weekdays and would thus not be there on the days with the highest levels of use.

Construction of the Operations and Maintenance facility at the West Pit Road could affect some recreation users through temporary increases to traffic, and from construction-related dust and noise. Impacts would be primarily limited to recreational users traveling on Cook-Underwood Road. This impact would not be noticeably different from the construction of the on-site location. Construction impacts would be temporary and are expected to be minor.

Project Operation

Project operation also would not cause changes to existing land uses or land use activities or development patterns. The surrounding land uses are predominantly commercial forestry, agriculture and residential, and these uses would not be directly negatively affected by the Project (Figure 3.8-5). The majority of the Project Area itself would remain in commercial forest production, with a maximum of approximately 56 acres of land (under 5 percent) converted to non-forestry uses related to new and widened roads, the turbine strings, the Operations and Maintenance facility, and the substation. At decommissioning, all of these facilities would be removed and the area returned to commercial forest.

Project operation would not force any changes in forestry operations or activities on the rest of the Project Area or on surrounding properties. The Project would not generate sufficient amounts of noise, traffic, visual changes, energy use, air emissions or water use to cause changes to these existing land use patterns.

Concern was expressed during scoping that the visibility of the turbines would cause a negative impact on agricultural tourism, specifically visits to area wineries. Wind power and winery tourism already co-exist in the Columbia River area. For example, four wind power facilities are located between Walla Walla and Kennewick (Canyon, Stateline, Vansycle, and Combine Hills). This area is home to a thriving wine industry with over 60 wineries. Section 3.9 Visual Resources discusses visual impacts.

Project operation would not result in a sufficient increase in population or traffic to impact local recreational facilities. The only potential impact to recreation users would be the minor to moderate visual impacts discussed in Section 3.9 Visual Resources.

Operation of the alternative Operations and Maintenance facility would not change existing land use patterns. The surrounding land uses are predominantly commercial forestry, agriculture and residential, with the nearest home approximately 0.25 mile away. The site is adjacent to West Pit Road, which would be used for access to the Project Area during both construction and operation. Use of the alternative site for the Operations and Maintenance facility would generate noise, traffic, new lighting, energy use, air emissions, and water use, but not at levels sufficient to cause changes to the existing surrounding land uses. The Operations and Maintenance facility thus would be compatible with surrounding land use and would not hinder the development of permitted land uses on neighboring properties.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential changes to land use, recreation or recreational access. If impacts to land use or recreation are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

Consistency with Applicable Land Use Regulations

~~Overall, the proposed project would be consistent with applicable land use regulations.~~ The Project would not involve subdividing any land parcels nor applying for changes to zoning or Comprehensive Plan designations. In a letter to EFSEC dated May 4, 2009, Skamania County found that the proposed Project is consistent with the Skamania County Comprehensive Plan, SCC Title 21 Zoning Code, SCC 21A Critical Areas, Title 24 Clearing and Grading, and resource maps. On December 22, 2009, the Skamania County Board of County Commissioners passed Resolution 2009-54, resolving that the revised project, including the use of the alternative location of the Operations and Maintenance facility and the use of the West Pit Road as an access route, is consistent with Skamania County Land Use Plans and applicable zoning ordinances (see Appendix D Land Use Consistency Determination). When a county certifies consistency with its local land use plans and ordinances, pursuant to WAC 463-26-090, the plan states that *"such certificates will be regarded as prima facie proof of consistency and compliance with such land use plans and zoning ordinances absent contrary demonstration by anyone present at the hearing."*

The following further evaluates the consistency of the proposed Project with applicable land use regulations.

Skamania County Comprehensive Land Use Plan

The Project would be consistent with the Comprehensive Plan vision and the Conservancy designation in that it would conserve and manage existing natural forest and wind resources to maintain a sustained yield and utilization of both. Within the Conservancy designation, public facilities, utilities, and utility substations are allowed. Wind energy facilities are consistent with the Conservancy designation because they are utilities. The Project would provide an alternative source of electrical energy generation that is not reliant on either fossil fuels or hydropower, while allowing forest management activities to continue around the turbine corridors. In addition, the staff report attached to Skamania County Resolution 2009-54 documents the County's determination that the proposed Project would be a semi-public facility under SCC Title 21 (see Appendix D). Semi-public facilities are defined in SCC 21.08.010 as *"facilities intended for public use which may be owned and operated by a private entity."* The Project thus would be a utility consistent with the Conservancy designation's appropriate uses.

The alternative location for the Operations and Maintenance facility on West Pit Road would include an approximately 3,000-square-foot building, located on a 5-acre parcel in an area designated as Rural II in the Comprehensive Plan. The facility would be similar in size to a larger single family home. The Project would be a utility that is consistent with the Rural II designation and would not conflict with any of the goals or policies expressed in the Comprehensive Plan.

Skamania County Zoning Ordinances

The portion of the proposed Project that would be located in the UNM zoning classification would be considered consistent with this zoning. There is no conflict from siting wind energy facilities in the UNM zone, and these facilities have not been identified as a nuisance by statute, resolution, ordinance, or court order. Concerning the County's moratorium on unincorporated UNM-zoned lands, the Project is not sited on lands created by deed since January 2006 and does not involve any land division. Because of Washington EFSEC's preemptive role in permitting wind energy facilities, including acting as Lead Agency for associated SEPA review, the County's moratorium on acceptance of SEPA checklists for forest practices conversions does not affect the Project.

Turbine Corridor A1–A7, with approximately seven turbines, would be located in the small portion at the southern tip of the Project Area that is within the FOR/AG 20 zone. If the proposed Project were being permitted through Skamania County rather than through Washington EFSEC, it is probable that a Conditional Use Permit from the County would be required for siting these turbines. Since Washington EFSEC is the permitting authority in this case, no such permit is required. Nonetheless, this portion of the proposed Project would be consistent with the purpose and intent of the FOR/AG 20 zone in which it would be located, and while not an outright allowed use, this Project is considered to be semi-public facility that would be a conditional use in this zone. As discussed above, the Project also would provide renewable energy generation while allowing forest management activities to continue around the turbine corridors. The portion of the proposed Project that would be located in the FOR/AG 20 zone thus would be considered consistent with this zoning.

The proposed alternative Operations and Maintenance facility located along West Pit Road would be within an area zoned R-5. Like turbine Corridor A1–A7, if the County was the permitting authority for the alternative Operations and Maintenance facility, a Conditional Use Permit likely would be required. However, Washington EFSEC is the permitting authority and no such permit is required. Nonetheless, the alternative Operations and Maintenance facility would be consistent with the purpose and intent of the zone in which it would be located. The Operations and Maintenance building would be located on a 5-acre site, and, at 3,000 square feet, would be similar in size to a larger single-family residence. The building would meet all applicable setback requirements, and would not pose a hazard to the health, safety or welfare of the surrounding community. Traffic associated with the facility would be similar to traffic from staff currently involved in ongoing timber management in the area. A well and on-site septic system would be installed to provide potable water for the Operations and Maintenance building. The anticipated demand for fire and police services would be low, and similar to other commercial operations in the Project vicinity. Development of the facility would not hinder or discourage development or continuation of timber management activities on nearby properties, or of residential properties in the area. Finally, the facility would not conflict with the goals and policies expressed in the current version of the County's Comprehensive Plan. Accordingly, location of the alternative Operations and Maintenance facility in the R-5 zone would be considered consistent with this zoning.

The proposed Project also would be consistent with the critical areas regulations found in SCC Title 21A. The Project Area is not located within any critical recharge areas, frequently flooded areas, ponds and lakes, or rivers. Portions of the Project Area are located near geologically hazardous areas due to steep slopes classified as Class II and III LHAs. There are wetlands, fish and wildlife habitat areas, streams, and creeks on the site. The Project has been designed to minimize impacts to these areas, as discussed in Section 3.8.4, Mitigation Measures, and primarily in Section 3.3 Water and 3.4 Biological Resources.

Improvements to West Pit Road to widen it in places also would be consistent with SCC Title 21A. The use of the West Pit Road would not create safety concerns. While no new construction would occur within wetlands, streams, or their buffers, West Pit Road crosses one unnamed drainage in the Lapham Creek watershed. In July 2009, the drainage had observed flow through the existing culvert under West Pit Road, but the surface flow and the channel disappeared downstream of the culvert. The drainage is classified as a Class V stream under SCC 21A.04.020(B),Appendix C. Buffers are established for Class V streams, within which expansion of existing uses is allowed. As long as the proposed expansion or widening is 100 percent or less than the existing footprint, no development review is required under SCC 21A.05 and SCC 21A.06 in fish and wildlife protection areas or geologically hazardous areas. The road improvements in these regulated fish and wildlife protection areas do not exceed the allowed expansion threshold. For a full discussion of fish, wildlife, their habitats, and Project impacts to these, please see Section 3.4 of the Application for Site Certification.

Columbia River Gorge National Scenic Area Management Plan

While the proposed Project would be located entirely outside of the Columbia River Gorge National Scenic Area, concerns have been raised regarding the compatibility of the Project with the objectives and policies of the National Scenic Area Management Plan. The following identifies key objectives and policies, along with a discussion of Project consistency with each of these objectives and policies.

- ***Protection of Resources.*** The Project would not decrease any resources within the Scenic Area. Neither the site nor its access roads are within the Scenic Area, and no recreation resources would be lost.

- ***Scenic Appreciation and Scenic Travel Corridors.*** The Project would have minor to moderate impacts on visual quality as viewed from travel corridors inside the Scenic Area. See Section 3.9 Visual Resources.

- ***Resource Based Recreation.*** No resource-based recreation resources are within or in proximity to the Project Area. The only potential impact to recreation in the Scenic Area would be incidental recreational use by construction workers during the construction period. Such use is expected to be minimal.

- ***River Access and Protection of Treaty Rights.*** This Project is on private lands outside of the Scenic Area and would have no effect on river access or treaty rights.

- ***Interpretation/Education.*** An opportunity to provide alternative energy interpretation and education could be included in this Project and further the goals of the Scenic Area.

- ***Trails and Pathways.*** The Project would not directly affect any trails or pathways in the Scenic Area. There may be some distant views of wind turbines from trails; the impact is expected to be "low to moderate." See Section 3.9 Visual Resources.

- ***Transportation.*** Portions of SR 14 and portions of Cook-Underwood Road that are within the Scenic Area would be used to access the Project. Increased traffic would cause a temporary and limited impact to recreational travelers during the construction period.

- ***Coordination.*** The Project Area and access roads are located outside of the Scenic Area. No coordination is required.

3.8.3.2 No Action Alternative

Under the No Action Alternative, the Project would not be built. The site would continue to be used for commercial forestry and timber harvest would continue on a regular rotating schedule. Accordingly, existing land uses at the Project Area would remain unchanged. In addition, the informal recreation activities at the Project Area would remain largely the same, and no effect on recreational uses in surrounding areas would occur. The current level of consistency with land use plans and regulations also would continue to exist under this alternative.

3.8.4 MITIGATION MEASURES

No substantial impacts to land use are identified and no mitigation measures are required. The only potential impact to recreation users from operation would be the minor to moderate impact to visual resources from some viewpoints. Mitigation for this potential impact is identified in Section 3.9, Visual Resources.

3.8.5 UNAVOIDABLE ADVERSE IMPACTS

The 1,152-acre Project Area would continue to be predominantly used for commercial forestry operations. A maximum of approximately 56 acres of forestry land (under 5 percent of the Project Area) would be converted to energy facility use for the life of the Project. This conversion would not constitute a substantial change to area land use patterns given the area of the Project retained for active forestry operations, and given the acreage surrounding the Project in both private and state ownership that would be maintained in commercial forestry operations.

3.9 VISUAL RESOURCES

This section describes potential impacts to visual resources. It assesses the potential for visual impacts using accepted methods of evaluating visual landscape quality and predicts the type and degree of effects the Project would likely have on those attributes. This section also identifies mitigation measures designed to minimize those impacts.

3.9.1 METHODOLOGY

This section summarizes the visual impact assessment performed for the Application for Site Certification Agreement. The visual assessment used the Scenery Management System defined in *Landscape Aesthetics, A Handbook for Scenery Management* (USFS 1995) and *Visual Impact Assessment for Highway Projects* (FHWA 1988). The study was also designed to respond to the provisions of WAC 463-42-362, Built Environment–Land and Shoreline Use, which specifies the analysis of aesthetic and light and glare issues as part of the EFSEC process.

The Federal Highway Administration (FHWA) methodology is widely used for visual assessment of private lands such as the Project area, where visual quality objectives have not been established. A visual quality objective is a resource management objective established by a district manager or contained in a plan that reflects the desired level of visual quality based on the physical characteristics and social concern for the area. Five categories of visual quality objectives commonly used are preservation, retention, partial retention, modification, and maximum modification.

The FHWA methodology has been used to evaluate other recent wind power projects, including the Desert Claim project[19], Lower Snake River (FHWA and BLM) and the Kittitas Valley project (FHWA and USFS methodologies)[20]. The FHWA method is also used where linear features of the Project such as roads or turbine strings move into differing landscapes and visual corridors with differing view groups.

Three methodologies are commonly used to analyze visual impacts in federal and state EISs: the FHWA and USFS methodologies used for this Project, and the Visual Resource Management system used by the BLM[21]. The BLM methodology is generally used where projects are proposed on or in proximity to BLM lands and visual resource objectives for specific planning areas are already established. Under the BLM methodology a contrast rating can be completed and compared to the established BLM visual classifications. In order to use the BLM process for projects on private lands where no visual resource objectives have been established, it would be necessary to complete a full visual management inventory to delineate all lands in question and then classify each delineated area using the BLM classifications. The FHWA process provides for establishing existing visual quality objectives at a smaller scale or project level.

The BLM analysis would then determine whether and how the project features meet the objectives of the classification using the Visual Resource Management process for contrast rating. The FHWA process also follows this process, but is more conducive to a project of this scale and complexity. Full-scale Visual Resource Management delineation and classification are more appropriate for land management planning on a large scale and for providing visual objectives for public lands with multiple management objectives and uses.

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[19] See: http://www.efsec.wa.gov/Desert%20Claim/FEIS/3.10Aesthetics.pdf

[20] See: http://www.efsec.wa.gov/Desert%20Claim/FEIS/3.10Aesthetics.pdf

[21] See: http://www.blm.gov/nstc/VRM

While the FHWA process does not rely on pre-existing visual quality objectives, it does incorporate elements of the Scenery Management System, which is part of both the USFS and BLM methodologies establishing existing visual quality and process for determining visual contrast. The FHWA process incorporates Scenery Management System and Visual Resource Management components, including landscape features, ecological conditions, cultural settings, and social needs to establish the existing visual conditions and the effects of a project on the visual environment.

The methodology used is appropriate since it provides a clear understanding of how the proposed Project would affect the visual landscape as seen from the key viewing areas. This methodology portrays the differing viewer groups and their sensitivity to visual change, defines distance zones (foreground, middle ground and unseen areas) and evaluates the contrast between pre- and post-project conditions as seen from the different viewpoints, by different viewer groups, and from different distances.

This analysis of visual effects was based on field observations and review of wind energy facilities' visual effects, public perception, design measures to reduce visual impacts, and local planning documents. Project maps, drawings, technical data, and computer-generated viewshed maps were used to determine areas where the Project would be visible, and visual simulations were generated (described in Section 3.9.1.3) to illustrate the change from the existing conditions if the Project is implemented. The analysis included systematic documentation of the visual setting, evaluation of visual changes associated with the Project, and measures designed to mitigate these visual effects. Mitigation measures include restoration or enhancement activities in areas that would be disturbed during construction.

3.9.1.1 Scenic Quality Assessment

Scenic quality ratings were developed based on observations in the field, photographs of the affected area, methods for assessing visual quality, and research on public perceptions of the environment and scenic quality ratings of landscape scenes. The final assessment of scenic quality was made based on professional judgment that took a broad spectrum of factors into consideration, including:

- Natural features, including topography, watercourses, rock outcrops, and vegetation
- The positive and negative effects of human alterations and built structures on visual quality
- Visual composition, including an assessment of the vividness, intactness, and unity of patterns in the landscape, defined as:
    - Vividness refers to the memorability of the visual impression received by the viewer from contrasting landscape elements as they combine to form a striking and distinctive visual pattern;

- Intactness is the integrity of visual order in the natural and human landscape, and the extent to which the landscape is free from visual encroachment;
- Unity is the degree to which the visual resources of the landscape join together to form a coherent and harmonious visual pattern.

Each viewpoint was assigned a final rating based on the rating scale shown in Table 3.9-1. This rating scale incorporates the landscape assessment concepts developed in the USFS and FWHA methodologies.

Table 3.9-1
Landscape Scenic Quality Scale

Visual Quality Rating	Explanation
Outstanding 6	A rating reserved for landscapes with exceptionally high visual quality. These landscapes are significant nationally or regionally. They usually contain exceptional natural or cultural features that contribute to this rating. They are what we think of as "picture postcard" landscapes. People are attracted to these landscapes to view them.
High 5	Landscapes that have high quality scenic value. This may be due to cultural or natural features contained in the landscape or to the arrangement of spaces contained in the landscape that causes the landscape to be visually interesting or a particularly comfortable place for people. These landscapes have high levels of vividness, unity, and intactness.
Moderately High 4	Landscapes that have above average scenic value but are not of high scenic value. The scenic value of these landscapes may be due to human or natural features contained within the landscape, to the arrangement of spaces in the landscape, or to the two-dimensional attributes of the landscape. Levels of vividness, unity, and intactness are moderate to high.
Moderate 3	Landscapes that are common or typical landscapes with average scenic value. They usually lack significant human or natural features. Their scenic value primarily results from the arrangement of spaces contained in the landscape and the two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are average.
Moderately Low 2	Landscapes that have below average scenic value but not low scenic value. They may contain visually discordant human alterations, but these features do not dominate the landscape. They often lack spaces that people perceive as inviting and provide little interest in terms of two-dimensional visual attributes of the landscape.
Low 1	Landscapes that have below average scenic value. They may contain visually discordant human alterations, and often provide little interest in terms of two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are below average.

Source: Buhyoff et al. (1994), FHWA (1988), and USFS (1995)

3.9.1.2 Visual Sensitivity Assessment

The analysis also assessed visual sensitivity, which involves predicting the general impact on the quality of views from a given viewpoint. A combination of three factors determines how sensitive a landscape scene is:

- The number and type of viewers
- The viewing conditions
- The quality of the view

Residential areas with unobstructed views of a regionally important and memorable scene would be very sensitive to objects or structures that would impede views. A view from a seldom-traveled rural road where motorists have only distant, oblique views of wind turbines in an unremarkable setting would likely qualify as an area of low sensitivity.

The principal types of viewers in the Project Area who have predictably high levels of sensitivity to visual impacts include:

- Resident viewers;
- Roadway viewers (drivers and passengers); and
- Recreating viewers such as hikers, water recreationists, and mountain bikers.

This analysis defines three levels of visual sensitivity:

- ***Low.*** Viewer types representing low visual sensitivity include agricultural and industrial/warehouse workers. Compared with other viewer types, the number of viewers is generally considered small and the duration of view is short. Low levels of sensitivity are assigned to areas 5 miles or more from the closest turbine, where a wind power project would be a distant and a relatively minor element in the overall landscape.
- ***Moderate.*** Viewer types representing moderate visual sensitivity consist of highway and local travelers. The number of viewers varies depending on location; however, on average they tend to be moderately large, based on overall densities of surrounding areas and highway commuters. Viewer awareness and sensitivity are also considered moderate because destination travelers often have a focused orientation. Moderate levels of sensitivity were assigned to areas where turbines would be visible from 0.5 mile to 5 miles within the primary view of residences and roadways. The primary view refers to the central area that the eye can see clearly without moving and is surrounded by the peripheral vision. In distinguishing between moderate and low levels of sensitivity in the 0.5-mile to 5-mile zone, contextual factors were also considered, including the viewing conditions in the immediate foreground of the view.
- ***High.*** Residential, recreational, and viewers congregating in public gathering places (churches, schools, trails, designated scenic viewpoints, etc.) are considered to have comparatively high visual sensitivity. The visual setting may in part contribute to the enjoyment of the experience. Views may be of long duration and high frequency. High levels of sensitivity are generally assigned in those cases where turbines would be potentially visible within 0.5 mile or less from residential properties, heavily traveled roadways, or heavily used recreational facilities. The principal types of viewers in the Project Area who have predictably high levels of sensitivity to visual impacts include residential viewers, roadway viewers (drivers and passengers) and recreating viewers such as hikers, water recreationists, and mountain bikers.

These criteria were used to establish the sensitivity levels of each view using a systematic approach based on the distance of the Project from the viewpoint, the number of turbines or percentage of the Project Area that could be viewed from this viewpoint, and the dominant viewer types for each view. Through this analysis, an overall sensitivity rating was established for each existing landscape view.

3.9.1.3 Preparation of Visual Simulations

Visual simulations were developed using photographs taken with a 35 mm digital SLR camera. Various focal lengths from 40 to 70 mm were used with the intent to capture the maximum pixels and resolution for the simulation. Visual Nature Studio, a widely-used three-dimensional Geographic Information System (GIS) software, manufactured by 3D Nature, LLC, was used to model the turbine locations on terrain built from USGS digital elevation model data. The photo locations were camera-matched in the software to render the turbines from the same viewpoint as the photographs taken on the ground. The resulting rendered turbine images were then photo-composited into the photographs to create the simulations. Existing topographic and site data provided the basis for developing the initial digital model.

In preparing the visual simulations, the turbine model used was the 2.5-MW Clipper Liberty model C93, which was considered a likely model to be selected based on information provided by the Applicant. This model has an overall height to nacelle of 80 m (262 feet) and blade diameter of 93 m (305 feet), and a blade length of 45.2 m (153 feet). The overall height to the tip of a stationary, vertical blade is 126.5 m (415 feet). The actual turbine size has not been determined, but potential turbines are estimated to have a height to nacelle of 262 feet and blade length between 129 and 164 feet.

Simulations were prepared assuming a conservative scenario of 50 turbines. This approach to creating simulations most likely overstates the visual impacts. This is because the Applicant has applied for EFSEC certification for a maximum of 75 MW. If 2.5 MW turbines were to be used, only 30 turbines could be built, and overall visual impact would be less. If lower-power turbines were used, the turbines would be smaller and thus less visible. Further, in evaluating impacts, the turbine is considered visible if any part of a vertical turbine blade is visible. In practice, turbines with only a part of the blade visible would not be seen when the blade is moving or is stationary but not vertical.

Atmospheric haze varies by location, season, time of day, and weather patterns. In creating photo composite visual simulations, the aim is to match the haze level on the rendered turbines to the observable haze present in the photograph. This is done by comparing the haze effects on the photographed terrain near the turbines to the rendered haze effects on the rendered terrain. This is then translated into a worst-case (lower than expected) haze visibility setting for the turbine renders. The result is that the turbines would be slightly more visible in the final composites than they would actually be if an observer were standing on the ground viewing them from the exact place, date, and time that the photos were taken.

The sky depicted in some of the visual simulations includes clouds, simulating the cloudy conditions that are common at the site.

Site plans and specifications for the proposed wind turbines were used to create three-dimensional digital models of the planned turbine placements. These models were combined with the digital terrain model to produce a complete computer model of the wind facility. For each viewpoint, a render camera was placed in the Visual Nature Studio software. The aspect ratio of each render was then matched to the corresponding photograph and the rendered terrain was visually matched to the photographed terrain to confirm scale. Finally the resulting turbine images were matched in perspective, scale, and aspect ratio, are photo-composited into the original digital photo base using Adobe Photoshop. This process produces accurate portrayals of how the given turbine models and placements would look on the given terrain and from the specified viewpoints after construction. Seasonal conditions including weather, air quality, vegetation (foreground and background) and color impact the quality of the compositions. These compositions are a representative example of the area without subjectivity.

Simulations were not developed for nighttime conditions. Night simulations are inherently inaccurate, since they do not show the periodic flashing of the air warning lights, which is the impact most often mentioned. Night simulations are not typically performed as part of the analysis of wind power projects, and have not been requested by EFSEC. The potential impact of air warning lights is discussed in Section 3.9.3.1.

3.9.2 AFFECTED ENVIRONMENT

Each landscape has a specific quality that gives a geographic area its visual and cultural image, and consists of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. The character of an existing landscape may range from a predominantly natural landscape to landscapes that are heavily culturally influenced. The existing scenic quality of an existing landscape includes the natural scenic attributes of the landscape in combination with the existing land use patterns. The list of attributes includes naturally evolving, natural appearing, pastoral, agricultural, or even urban landscapes and generally are at the broadscape or landscape level of the analysis, but can be analyzed for each specific viewpoint at a project level.

The sensitivity of a landscape or view of that landscape is based on the scenic integrity of the landscape and the types of viewers. A landscape that has a high degree of integrity is a landscape that has a sense of wholeness, intactness, or being complete. Its scenic quality is near-perfect, with no evident discordant elements or deviations from the existing character, making it highly sensitive to most changes and to the perceptions of the viewer types.

The existing visual resources are the natural and built features open to view in the Project landscape. The combination of land, water, and vegetation patterns represent the natural landscape features that define an area’s visual character, while built features such as buildings, roads, and other structures reflect human or cultural modifications to the landscape. These natural and built landscape features or visual resources contribute to the public’s experience and appreciation of the environment. This section describes the broad scale regional and local landscape settings that were used to establish appropriate viewpoints from which the Project would be visible.

3.9.2.1 Regional Landscape Setting

The Project is set in two distinct landscapes. One landscape is the areas were the turbines would be sited along ridges located on the northern plateau of the Columbia River Gorge on Underwood Mountain (Figure 1-1). The other landscape is the Columbia River Gorge National Scenic Area, which is outside the Project but within the viewshed looking into the Project Area. The Project Area is completely outside the Scenic Area, and therefore is not subject to the Columbia River Gorge Scenic Area Management Plan or related regulatory requirements. No improvements to Project Area roadways would take place in the Scenic Area.

The Scenic Area extends 85 miles along the Columbia River, and includes portions of three Oregon and three Washington counties. Formed by ancient volcanoes and sculpted by floods, the Columbia River Gorge carves a corridor through the Cascade Mountains in Oregon and Washington as the river journeys to the Pacific Ocean.

The National Scenic Area Act designated 292,500 acres on both sides of the Columbia River for special protection from the outskirts of Portland-Vancouver in the west to the semi-arid regions of Wasco and Klickitat counties in the east. The Scenic Area is categorized as SMAs, GMAs, and Urban Areas:

- SMAs contain the most sensitive resources. They total 114,600 acres and are managed by USFS.
- GMAs total 149,400 acres and include a mixture of historic land uses such as farming, logging, and cattle grazing. The Columbia River itself is currently designated as a GMA as well. Development on GMA lands is administered by the Gorge Counties and the Gorge Commission.
- Thirteen Urban Areas in the Gorge are exempt from any Scenic Area regulations: Cascade Locks, Hood River, Mosier, and The Dalles in Oregon, and North Bonneville, Stevenson, Carson, Home Valley, White Salmon, Bingen, Lyle, Dallesport, and Wishram in Washington. The Act's second purpose is to protect and support the economy of the Gorge by encouraging growth in existing Urban Areas and by allowing future economic development in a manner that is consistent with protection and enhancement of resources.

The Project Area is outside of the Scenic Area Management Plan and no visual quality objectives or management designations have been established for the area. Areas south of the Project within the Scenic Area are designated as Urban or GMA. The views from the Gorge into the Project Area were examined through viewpoint selection. This area of the Gorge, closest to the Project, is considered to have a high visual quality with a moderate sensitivity based on the vividly memorable, and although the area is not free of visual encroachment, the visual resources join together with a moderate degree of unity.

3.9.2.2 Local Landscape Setting

The Project Area is on land managed for commercial forestry by the Applicant. All of the parcels on which the Project is located are managed for a continual cycle of growth, harvest, and replanting. As a longstanding commercial forestry site, no old-growth forests exist in areas where the Project is proposed. Many of the stands of trees on the sections of land that would have turbines on them are recently harvested and reforested. The Applicant implemented timber harvest plans on approximately 50 acres during 2003. Additional harvests covering approximately 100 acres are planned as part of the ongoing commercial forestry operations (Figure 2-3).

In areas surrounding the proposed wind turbines that have not been recently harvested or that are not planned to be harvested before Project construction, trees would be harvested and most of the land would be replanted with seedlings. This clearing would allow for safe construction, and would reduce the potential for tree growth to interfere with the wind resource on the site during the commercial life of the Project. Low vegetation would be maintained in some areas to provide safe areas around the turbines (Figure 2-4).

No visual quality objectives have been established in the Project Area beyond the harvest size and configuration requirements of the Washington Forest Practices Act. These cleared areas are considered a “forest conversion” under the Forest Practices Act and have no established visual quality objectives. These openings, to the extent feasible, would be reforested in accordance with typical commercial forestry management practices.

S.D.S. Co., LLC and Broughton Lumber Company own this commercial property in Skamania County, Washington. The Project and the West Pit Road used for Project access are not located inside the Scenic Area. In relationship to the visual quality of the area, there are views from the Scenic Area into the Project Area. The viewpoints and viewer types in relation to the roadway improvements within the Scenic Area have been considered in this analysis for consistency with the Scenic Area guidance and conformance.

SR 14 in this area is a recognized scenic roadway. Typically, this designation means that a scenic corridor management plan would be prepared to provide policy-level guidance in the local adoption of comprehensive plan policies, zoning, and other land use regulation. There is no scenic corridor management plan for SR 14 and, therefore, no regulatory control of aesthetic impacts within the corridor. However, the scenic roadway designation carries an additional level of care and scrutiny in the review of potential aesthetic impacts based on recognition, but not regulation.

The local landscape visual appearance is of moderate visual quality with a moderate level of sensitivity. The levels of vividness (memorability), intactness (freedom from visual encroachment), and unity are average within the broader landscape. The immediate area of the Project Area is currently characterized by several types of visual disturbance. These include:

- BPA power transmission lines running east-west through the south and center portions of the Project Area;
- Williams gas pipeline running through the north portion of the Project Area, and compressor station just to the northwest of the Project Area;
- Two rock quarries west of the Project Area;

- Cell towers south of the Project Area in the Scenic Area;
- Forest openings from clear-cutting throughout and surrounding the Project Area; and
- Land clearing for agriculture especially south and east of the Project Area.

3.9.2.3 Viewpoints

To analyze the Project's effects on visual resources, viewpoints were selected to characterize the aesthetic character of the Project Area and the differing landscapes in or near the Project. Most of the viewpoints are at publicly accessible locations which would have the largest number of viewers. Within the Columbia River Gorge National Scenic Area, Key Viewing Areas (KVAs) have been established as *"those portions of important public roads, parks, or other vantage points with the scenic area from which the public views scenic area landscapes."* (SCC 22.04.010). Viewpoints included KVAs from which the Project could be seen, other viewpoints within the Scenic Area, and viewpoints outside the Scenic Area.

Figure 3.9-1 illustrates (with colored shading) how many of the turbines would be visible. No turbines are visible from several of the KVAs. For example, SR 14 is a KVA; however, the section of SR 14 nearest the Project Area has steep hills to the north, which block views of the Project Area. KVAs with no turbines visible were not selected as viewpoints for visual simulations and were not further analyzed.

Individual viewpoints were chosen based on the following criteria:

- Viewpoints that are most representative of the different roads, population areas, and recreation areas where views of the wind turbines would occur;
- Locations that are most accessible to the public; and
- Locations with the largest number of viewers (including residences).

Figure 3.9-1 shows the locations of these viewpoints and the number of turbines visible from each viewpoint. Views were not modeled from every residence from which the Project would be visible; however, residences and representative businesses between one and three miles from the Project Area are shown on Figure 3.9-2.

Each viewpoint was assessed for its scenic quality and viewer sensitivity. Scenic quality was determined by evaluating each viewpoint using the six levels of landscape scenic quality defined in Table 3.9-1 (Outstanding, High, Moderately High, Moderate, Moderately Low and Low). Viewer sensitivity for each viewpoint was determined by evaluating each viewpoint using the three levels of viewer sensitivity explained in Section 3.9.1.2 (Low, Moderate, and High). A rating was then applied to provide an overall average for the area. This process established the existing conditions for each of the individual viewpoints, from which impact of the Project on these parameters could be measured.

During scoping, a request was received that a visual simulation be prepared to depict views from Dog Mountain, a popular local hiking area and a Scenic Area KVA. To address this request, photo were taken from potential viewpoints located on the northeast and south side of the mountain. The photographs were used to assess views of the proposed Project, and to identify potential impacts to visual resources from those locations. It was determined that views of the Project Area were blocked by Cook Hill at all potential viewpoints located both on and off the trail. The Project would be visible from Cook Hill; however, there is no known recreational use in this area. Because the Project Area is not visible from Dog Mountain, scenic quality and viewer sensitivity were not rated, and no visual simulation was prepared to further assess potential impacts to visual resources.

This section describes the existing views from representative viewpoints. The viewpoint numbering below matches the numbering used in the Application for Site Certification. Additional viewpoints, which were excluded from this EIS as duplicative, can be found in the Application for Site Certification (Appendix A). Simulated photos depicting the existing view with proposed turbines are included in Section 3.9.3.

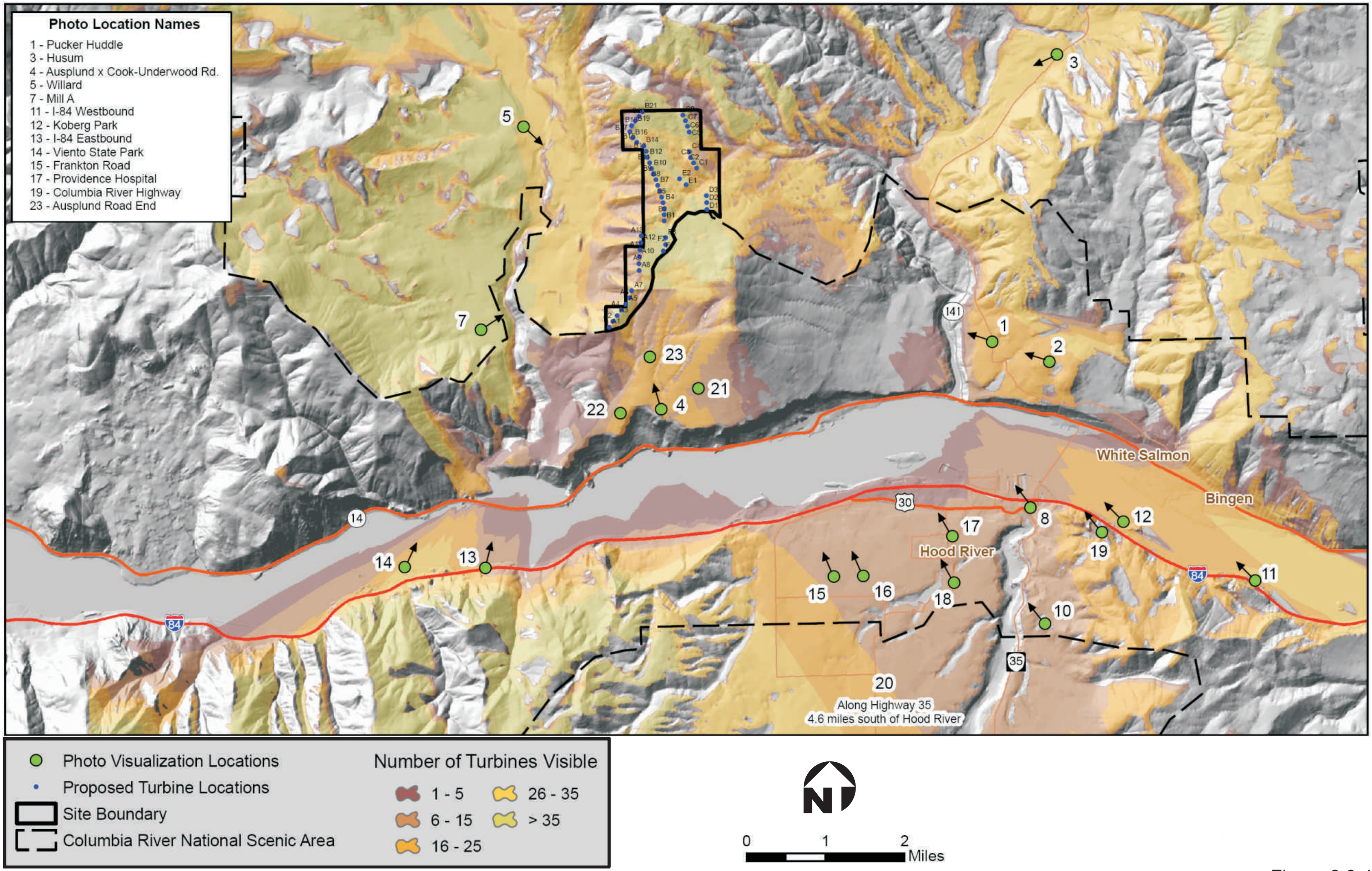
Viewpoint 1: Pucker Huddle (Within Scenic Area)

Scenic Quality. Viewpoint 1 is taken from SR 141, which is approximately 4 miles from the Project and is a small connector providing access to the Indian Heaven Wilderness in the Gifford Pinchot National Forest. This highway also allows access to several rural communities, including White Salmon, Husum, and Pucker Huddle. Most areas are unincorporated and several of the residences are recreational in nature with some year-round residences. As discussed in the review of the regional and local landscapes, no public roads pass through or are immediately adjacent to the Project.

Viewpoint 1 is a wide panoramic view of Underwood Mountain from SR 141 adjacent to the Pucker Huddle area. The view encompasses the east side of the Project Area and the ridged lines of forest management areas are visible in the middle ground of the viewshed. Natural openings are prevalent from this viewpoint, with several natural appearing features of openings and vegetation that provide an interesting view. The BPA transmission lines bisecting the Project Area on the north and south ends can be seen from this viewpoint. The quality of the views from this viewpoint along SR 141 was rated as moderate, reflecting the fact that the visible landscape is relatively common in the region and has average scenic value. The ridge line along Underwood Mountain, which is in the area of the Project, provides a degree of topographic interest when viewed with the other natural appearing features. The landscape visual scenic quality from this viewpoint is moderate.

Viewer Sensitivity. Traffic volumes along SR 141 are minimal and used for local traffic and recreational traffic in the summer months. Considering the distance of the Project from this viewpoint (less than 5 miles), the minimal use of the highway, and the portion of the Project that is visible from the viewpoint, the level of view sensitivity is considered low. This is based on the duration of the view from SR 141, the low level of residential viewers from this viewpoint, and the scenic quality rating.

33758687_169.cdr



Job No. 33758687

Figure 3.9-1
Locations of Simulation Viewpoints

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

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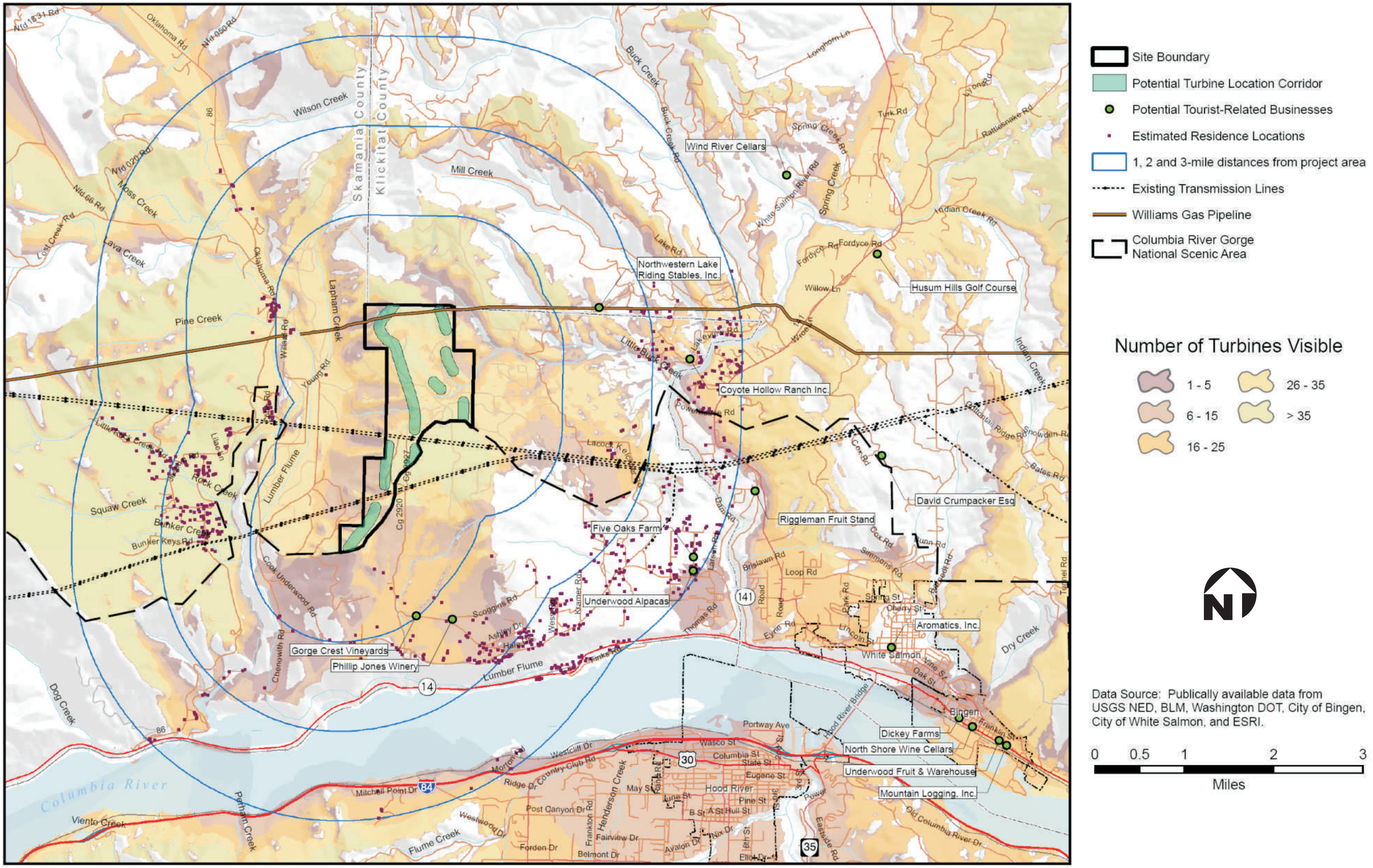

Figure 3.9-2
Residences with Visible Turbines

URS

Whistling Ridge Energy Project
Skamania County, Washington

Viewpoint 3: Husum

Scenic Quality. This viewpoint captures the view from SR 141 northeast of the Project Area. This viewpoint would be the first view of the Project from travelers moving south into the Project Area. The viewpoint encompasses the northern portion of the Project from the highway, which is the closest viewing area from that vantage point. The foreground of the viewpoint is pastoral with a middle ground view of the hillsides and a background view of Underwood Mountain and the Project Area. The view is natural appearing with moderate to high levels of vividness, unity, and intactness in the foreground, middle ground, and background of the photo. The quality of the view from this viewpoint was rated moderately high because of the above-average quality and the unity of the man-made and natural features on the landscape.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (greater than 5 miles), the duration of the view (roadway travelers), the portion of the Project that is visible from the viewpoint, the viewer types (minimal residential/recreational), and the scenic quality rating, the level of visual sensitivity is considered moderate.

Viewpoint 4: Ausplund Road and Cook-Underwood Road (Scenic Area KVA)

Scenic Quality. This viewpoint captures the view from the Ausplund Road and Cook-Underwood Road where they meet and provide residential, agricultural, and forest management access to the area. These roads are connector and feeder roads that can be accessed from SR 14. This area is elevated from the Columbia River Gorge National Scenic Area but is within its boundaries. The area has a mix of uses including agriculture, forest management, and some recreation. The foreground from the roadway is an agricultural setting with middle and background views of forest vegetation and forest management areas. The view is natural appearing with moderate levels of vividness, unity, and intactness. The quality of the view from this viewpoint was rated moderate because of the average or typical views of this type in the Project Area.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (0.5 to 5 miles), the viewer types (roadway travelers), the portion of the Project that is visible from the viewpoint, the viewer types (residential/roadway), and the scenic quality rating, the level of visual sensitivity is considered moderate.

Viewpoint 5: Willard

Scenic Quality. This viewpoint captures the view from the small residential community of Willard. This area is accessible by a County road from SR 14 and used by residential and private forest management users. The view looks southeast into the Project Area and provides a panorama of the longest string of turbines. The foreground is a mixture of mixed conifer second growth stands and the middle ground is of mixed timber harvest openings and a transmission corridor. The background view is similar and the mixture of vertical and horizon lines and formations detracts from the overall vividness and unity of the view. The intactness of the views is moderated by the changes in line and form. The quality of the view from this viewpoint was rated moderately low to moderate.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (0.5 to 5 miles), the duration of the view (foreground screening), the portion of the Project that is visible from the viewpoint, the viewer types (minimal residential), and the scenic quality rating, the level of sensitivity is considered moderate.

Viewpoint 7: Mill A

Scenic Quality. This viewpoint captures the view from the old mill property west of the Project Area. This area is accessible from Willard Road and has a mixture of uses. The view looks northeast into the southern end of the A turbine string. The foreground view is obstructed by the vertical lines of transmission towers. The middle ground view is of transmission corridors and extensive timber harvest openings. Many of the residential views are partially screened from the valley floor. There is a visual discord with the man-made alterations. The vividness, unity, and intactness appear uninviting and of moderate to low visual quality. The scenic quality rating for this viewpoint is moderately low.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (0.5 to 5 miles), the duration of the view (foreground screening), the portion of the Project that is visible from the viewpoint, the viewer types (minimal residential), and the scenic quality rating, the level of sensitivity is considered moderate.

Viewpoint 11: I-84 Westbound (Scenic Area KVA)

Scenic Quality. This viewpoint captures the view from I-84 traveling westbound towards the Project Area from the east. I-84 travels along the Columbia River Gorge National Scenic Area and views along this portion of the highway are generally directed towards the river and the distant scenery. Beyond the foreground view of the highway and other corresponding structures the view is generally intact with average or above vividness, unity, and intactness. Viewers traveling along this corridor have multiple line-of-sight transitions, and this is considered to be average within those views. The scenic quality rating for this viewpoint was rated moderate.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (8–10 miles), the portion of the Project that is visible from the viewpoint, the viewer types (roadway), and the scenic quality rating, the level of sensitivity was rated moderate.

Viewpoint 12: Koberg Park (Within Scenic Area)

Scenic Quality. This viewpoint captures the view across the Columbia River from Koberg Park. The foreground view of the river is a complete composition indicative of the area and the middle and backgrounds have a high level of vividness, unity, and intactness. The railway line that bisects the view in the middle ground tends to blend into the scenery without distraction. This view is considered to be above average for the types of views that are throughout the Scenic Area. The scenic quality rating for this viewpoint was rated moderately high.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (8–10 miles), the portion of the Project that is visible from the viewpoint, the viewer types (recreational), and the scenic quality rating, the level of sensitivity was rated moderate.

Viewpoint 13: I-84 Eastbound (Scenic Area KVA)

Scenic Quality. This viewpoint captures the view from I-84 traveling eastbound towards the Project Area from the west. I-84 travels along the Scenic Area and views along this portion of the highway are generally directed towards the river and the distant scenery. Beyond the foreground view of transmission structures the view is generally intact with average or above-average vividness, unity, and intactness. Viewers traveling along this corridor have multiple line of sight transitions and this view is considered to be above average within the context of those multiple views. The scenic quality rating for this viewpoint was rated moderately high.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (3 to 5 miles), the portion of the Project that is visible from the viewpoint, the viewer types (roadway travelers with fleeting views), and the scenic quality rating, the level of sensitivity was rated as moderately low.

Viewpoint 14: Viento State Park (Within Scenic Area)

Scenic Quality. This viewpoint captures the view from Viento State Park, a popular recreation and rest area along the Columbia River. Landscape features are diverse and intact and the contrasts of the features have a high level of unity. This view is the open waters of the Columbia River in the foreground with rock features and vegetation in the middle ground and a background of mountains that provides an overall pleasing composition that is inviting to the viewer. This view is one of the less common views along the Gorge and has an above average scenic value. The scenic quality rating for this viewpoint was rated moderately high to high.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (greater than 5 miles), the portion of the Project that is visible from the viewpoint, the viewer types (recreational), and the scenic quality rating, the level of sensitivity was rated as moderate to high.

Viewpoint 15: Frankton Road (Within Scenic Area)

Scenic Quality. This viewpoint represents the view from the higher-elevation residential areas west of Hood River. The view looks across the Columbia River into the Project Area. Frankton Road is a local access road and traffic is considered low. Residences in this area have views both north and south. Many of the views are screened to the north and take advantage of the view south into Oregon. The view has residential development in the foreground, which is common along this roadway. The middle ground is vegetation, some agriculture, and some forest management. The background is the ridge along the Project Area. These types of views are relatively common and of average scenic value when compared to the broader area. Vividness, unity, and intactness are moderate to high levels. The scenic quality rating for these viewpoints is moderate.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (greater than 5 miles), the portion of the Project that is visible from the viewpoint, the viewer types (residential), and the scenic quality rating, the level of sensitivity was rated as moderate.

Viewpoint 17: Providence Hospital Hood River (Within Scenic Area)

Scenic Quality. This viewpoint represents the north view of the Project from the City of Hood River. The foreground is an urban setting with a middle ground of vegetation that screens the background to some degree, providing a diverse composition of features. The view has a somewhat vivid appeal based mostly on the man-made features; however, the unity and intactness are below average and are visually discordant. This detracts from the background view. Viewers would generally be more focused on the business of the urban environment. The scenic quality of these viewpoints was rated moderately low.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (more than 5 miles), the portion of the Project that is visible from the viewpoint, the viewer types (urban/residential), and the scenic quality rating, the level of sensitivity was rated as low.

Viewpoint 19: Columbia River Highway (Within Scenic Area)

Scenic Quality. This viewpoint represents the view of the roadway traveler on the Columbia River Highway (Highway 30) southeast of the Project Area. This view has a higher scenic quality and is more representative of the high-quality views within the Columbia Gorge area. The foreground, middle ground, and background all have an above average arrangement of spaces in the landscape. The view appears intact and has a unity with the road and even the transmission line that is visible in the middle ground. The landscape provides diversity but not to the extent of clutter. This view is rated moderately high for scenic quality.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (greater than 5 miles), the portion of the Project that is visible from the viewpoint, the viewer types (roadway travelers/sightseers), and the scenic quality rating, the level of sensitivity was rated as moderate.

Viewpoint 23: Ausplund Road End (Within Scenic Area)

Scenic Quality. This viewpoint represents the view from local area roadways at specific intersections where local area travelers might converge. These roads are old logging roads that have been upgraded to meet the local residential use. However, they are still used for logging and would be used in the construction portion of this Project. This would include upgrading and in some instances widening the roads, which can affect visual quality. This view is from the end of the Ausplund Road~~which would be used to access the area for construction and maintenance~~. Very few viewers beyond those associated with the Project would see this viewshed. Without the vehicles in the foreground, the scenic quality rating assigned to this view is moderate.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (less than 1 mile), the portion of the Project that is visible from the viewpoint, the viewer types (local area workers and residence), and the scenic quality rating, the level of sensitivity was rated as low to moderate.

3.9.3 IMPACTS

Visual impacts are a primary consideration for wind power projects. The alteration of the landscape by the introduction of wind turbines, and the visual impacts of wind turbines on the landscape is a complex issue, and factors other than the attributes described above play a major role in the observer's reaction or perception of the visual impacts or change.

Wind turbines are relatively large, and being available to the wind requires the turbines to be in a location that is open and highly visible. Viewers' reaction to the visual impacts of wind turbines on the landscape is a complex issue, and is influenced by the generally positive perception of wind as a renewable energy alternative. However, many supporters of renewable energy projects express a desire that the projects be placed elsewhere. This message was voiced by several people in the public scoping meetings for this Draft EIS. Studies have shown that some negative opinions change once the wind projects are constructed and in operation.

3.9.3.1 Proposed Action

The appearance of the Project is determined by the Project facilities that may be seen by the public during operation of the Project. Project facilities include turbines, a meteorological tower, the BPA substation, the Operations and Maintenance facility (at one of two alternative locations) and roads. The substation, Operations and Maintenance facility, and Project Area roads would be difficult to see from outside of the Project Area, and would be typical of development in this rural area dominated by forest management and large-scale agriculture. The meterological tower is slender and would have no moving parts, and would not be as noticeable as a wind turbine. Consequently, the visual impact assessment focused on the potential impact of the turbines. This section describes Project facilities and their visibility from outside the Project Area.

The Project facilities are:

- ***Turbines.*** The turbines would be the most visible Project facilities. Commercial-scale turbines are similar in appearance and are composed of a tower, a nacelle, and turbine blades attached to a rotor. The tower would appear to be a steel pole, tapered from base to hub, with a base diameter of approximately 14 feet. At the top of and perpendicular to the tower, the nacelle would appear to be an elongated metal boxlike structure. Three aerodynamically shaped blades connected to a nose cone attach to the front of the nacelle. Depending on the turbine model chosen, each turbine would be up to approximately 426 feet tall (262-foot hub height and 164-foot radius blades, measured from the ground to the turbine blade tip), and would be mounted on a concrete foundation. Wind turbines would be grouped in "strings," with each turbine spaced approximately 350 to 800 feet from the next (or approximately 1.5 to 2.5 times the diameter of the turbine rotor). Typically, wind turbines are painted white to comply with FAA daytime lighting requirements. A gravel buffer and crane pad would be maintained at each turbine site, and would not be visible from outside the Project Area.

  The tall turbines would introduce vertical lines into the viewshed. Blades would be visible when stationary and moving at low speeds, but would not be visible when moving more quickly. The visibility of the turbines would be affected by the angle of the sun and climate conditions. At low sun angles (morning and evening) sunlight would reflect off a greater surface of the turbine and result in greater visibility. Conversely, when the sun is directly overhead, a relatively small surface of the turbine would reflect. On cloudy days, visibility of the light-colored turbines would be less since the turbines would blend with the background. Available data indicates that on average, there are 145 sunny days per year in Skamania County, Washington, that is, 39.7 percent of days are sunny.22 Therefore, the majority of the time some clouds are present. The turbines would therefore blend with the background the majority of the year.

- ***Electrical System.*** The electrical system would primarily be underground, and would connect the turbines to the BPA substation. The substation would occupy a portion of a fenced 5-acre area at the southwest end of the Project Area, immediately adjacent to the BPA 230-kV transmission line. A 50-foot cleared area would be maintained around substation. The substation would difficult to see from outside the Project Area.

- ***Operations and Maintenance Facility.*** The Operations and Maintenance facility would be a 3,000 square foot metal building approximately 16 feet tall, with a gravel parking lot and surrounding fence and gated entrance. The facility would be built at one of two alternative locations, either in the Project Area or to the west of the site on West Pit Road. In either location the visual impact of the facility would be minimal, and similar to small utility or agricultural facilities in the area.

- ***Roads.*** The Project would require 7.9 miles of new permanent gravel roads, and 2.4 miles of improved existing roads. New permanent and improved roads would be visually similar to existing secondary and gravel roads in the Project Area and most would be difficult to see from outside of the Project Area.

- ***Meteorological Tower.*** The Project would include one meteorological tower, approximately 221 to 262 feet tall. The tower height would be the same as the hub height for the selected wind turbine. Because meteorological towers are slender and do not have large components like turbine blades, the meteorological tower would be difficult to see from outside the Project Area.

The primary visual concern is the potential impacts of the proposed installation of up to 50 wind turbines on existing views and the overall aesthetic character of the Project Area. The specific turbine type and manufacturer have not been selected; however, it is likely that the turbines would be in the 1.2- to 2.5-MW range, and would measure approximately 426 feet in height (262-foot hub height and 164-foot radius blades). Each turbine would have three rotor blades made of laminated fiberglass. The diameter of the circle swept by each blade would be from 264 to 320 feet, depending on which turbine was selected. Turbine “strings” would include rows of from three to 21 turbines placed at approximately 350 to 500 foot intervals.

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[22] See: http://www.bestplaces.net/County/Skamania-Washington.aspx#.

For many viewers, the location of the Project would minimize visual impacts. Location effects include the limiting effect of topography, tree cover, the relatively long distance to surrounding residences, and the orientation of the Project vis-à-vis viewers. Figure 3.9-2 shows the number of turbines visible from residences and a selection of local businesses. The figure does not attempt to show all businesses in the Project Area; the businesses added are for general reference. The figure shows that the Project would not be visible from many of the residences to the southeast of the Project, and would be most visible to residences to the west, in and around Mill A. This figure may overstate the visibility of the Project somewhat, for two reasons:

- Turbines are judged to be visible if any part of the turbine blades would be visible. In practice, if only the tip of a blade is visible then viewers would not see it when it is not vertical or when the blade is moving.
- The visual simulation is based on topography alone, and does not take into account the masking effect of trees.

However, public input and comments during EIS scoping indicated that for some viewers, the presence of the wind turbines represents a negative impact because it alters the appearance of the rural landscape over a large area. The flashing of aviation warning lights on the tops of turbines at night would similarly be considered a negative impact.

The visual impact assessment was based on evaluating the changes to the existing visual resources that would result from construction and operation of the Project. These changes were assessed, in part, by evaluating the “after” views provided by the computer-generated visual simulations and comparing them to the existing visual environment. Consideration was given to the following factors in determining the extent and implications of the visual changes:

- Changes in the affected visual environment’s composition, character, and valued qualities
- The affected visual environment’s context, including distance
- The extent to which the affected environment contains places or features that have been designated in plans and policies for protection or special consideration
- The number of viewers, their activities, and the extent to which these activities relate to the aesthetic qualities affected by the changes
- The distance factor was considered in the sensitivity rating for establishment of baseline and therefore becomes a factor in the impact assessment

Levels of impact were classified as high, moderate, and low:

- ***High.*** High levels of impact were assigned when turbines would be highly visible in areas with a high number of sensitive viewers, and would greatly alter levels of vividness, unity, and intactness, decreasing the level of visual quality. This is the largest number of viewers from that key viewpoint. The assessment accounts for the number of viewers and would add that into the discussion.

- ***Moderate.*** Moderate levels of impacts were assigned in situations when turbines would be visible in areas with moderate levels of visual sensitivity and viewers, where the presence of the turbines would moderately alter levels of landscape vividness, unity, and intactness.

- ***Low.*** Low levels of visual impact were found in situations when the Project would have relatively small effects on overall landscape level attributes, where existing levels of landscape aesthetic quality are low, or where there are low levels of visual sensitivity and a low number of viewers.

While only three levels of impact (High, Moderate, and Low) were used to describe the visual impacts of the Project on each viewpoint, it should be noted that each of these impact levels is based on the consideration of six levels of landscape visual quality (Outstanding, High, Moderately High, Moderate, Moderately Low and Low) and three levels of visual sensitivity (Low, Moderate and High) when determining the final anticipated level of visual impact. This approach, a result of the combined use of the FHWA/USFS methodology provides a credible explanation of how the proposed Project would affect each viewpoint by describing the contrast between pre- and post-project conditions as seen from the different viewpoints, by different viewer groups, and from different distances.

Construction

During construction, large earth-moving equipment, trucks, cranes, and other heavy equipment would be visible from some nearby areas. At times, small, localized clouds of dust created by road building and other grading activities may be visible at the site. Because of construction-related grading activities, areas of exposed soil and fresh gravel that contrast with the colors of the surrounding undisturbed landscape would be visible.

In close-up views the changes associated with the construction activities would be highly visible and would have a moderate to high visual impact. Close-up views would include those seen by travelers on the segment of the local roads that pass around the Project Area and those seen from the closest residences. From more distant locations, the visual effects of construction would be relatively minor and would have little or no impact on the quality of views.

Construction impacts would be short-term, lasting no more than the one-year construction period.

Operation

During Project operation, the turbines would be visible from some viewpoints. The potential level of visual impacts from key and representative Project viewpoints is summarized in Table 3.9-2 and shown on Figures 3.9-3 through 3.9-15. Additional viewpoints are analyzed in Section 4.2-3 of the Application for Site Certification (Appendix A). A more detailed description for each viewpoint follows the summary table and figures. The visual impact analysis showed that the Project has the potential to create low to moderate levels of visual impact at key viewpoints.

Table 3.9-2
Summary of Existing Scenic Quality Assessment and Project Visual Impacts

Viewpoint	Within or Outside of Scenic Area[a]	Distance from Nearest Turbine (miles)	Existing Scenic Quality		Anticipated Level of Visual impact
			Visual Quality	Viewer Sensitivity	
Viewpoint 1: State Highway 141/Pucker Huddle (Figure 3.9-3)	SA	3.99	Low	Moderate	Low to Moderate
Viewpoint 3: Husum, Highway 141 north (Figure 3.9-4)	--	4.76	Moderate to Moderately High	Moderate	Moderate
Viewpoint 4: Ausplund Road, Cook-Underwood Road (Figure 3.9-5)	KVA	1.23	Moderate	Moderate	Moderate
Viewpoint 5: Willard (Figure 3.9-6)	--	1.35	Moderately Low to Moderate	Moderate	Moderate
Viewpoint 7: Mill A (Figure 3.9-7)	--	1.62	Moderately Low	Moderate	Low to Moderate
Viewpoint 11: I-84 Westbound (Figure 3.9-8)	KVA	8.39	Moderate	Moderate	Moderate to Low
Viewpoint 12: Koberg Park (Figure 3.9-9)	SA	6.60	Moderately High	Moderate	Moderate
Viewpoint 13: I-84 Eastbound (Figure 3.9-10)	KVA	3.43	Moderately High	Moderately Low	Moderate to Low
Viewpoint 14: Viento State Park (Figure 3.9-11)	SA	3.99	Moderately High to High	Moderate to High	Moderate ~~to High~~
Viewpoint 15: Frankton Road (Figure 3.9-12)	SA	4.51	Moderate	Moderate	Moderate
Viewpoint 17: Providence Hospital (Figure 3.9-13)	SA	5.07	Moderately Low	Low	Low
Viewpoint 19: Columbia River Highway (Figure 3.9-14)	SA	6.46	Moderately High	Moderate	Low
Viewpoint 23: Ausplund Road End (Figure 3.9-15)	SA	0.64	Moderate	Moderate	Moderate

[a] -- += not in Scenic Area; SA = within Scenic Area; KVA = Key Viewing Area within Scenic Area.

Photomontage and Wireline

Viewpoint Location

45°44'21" N 121°30'44" W
Bearing: 301 °
Field of View: 38.5°
6.41 km to the nearest turbine
Elevation: 201 meters

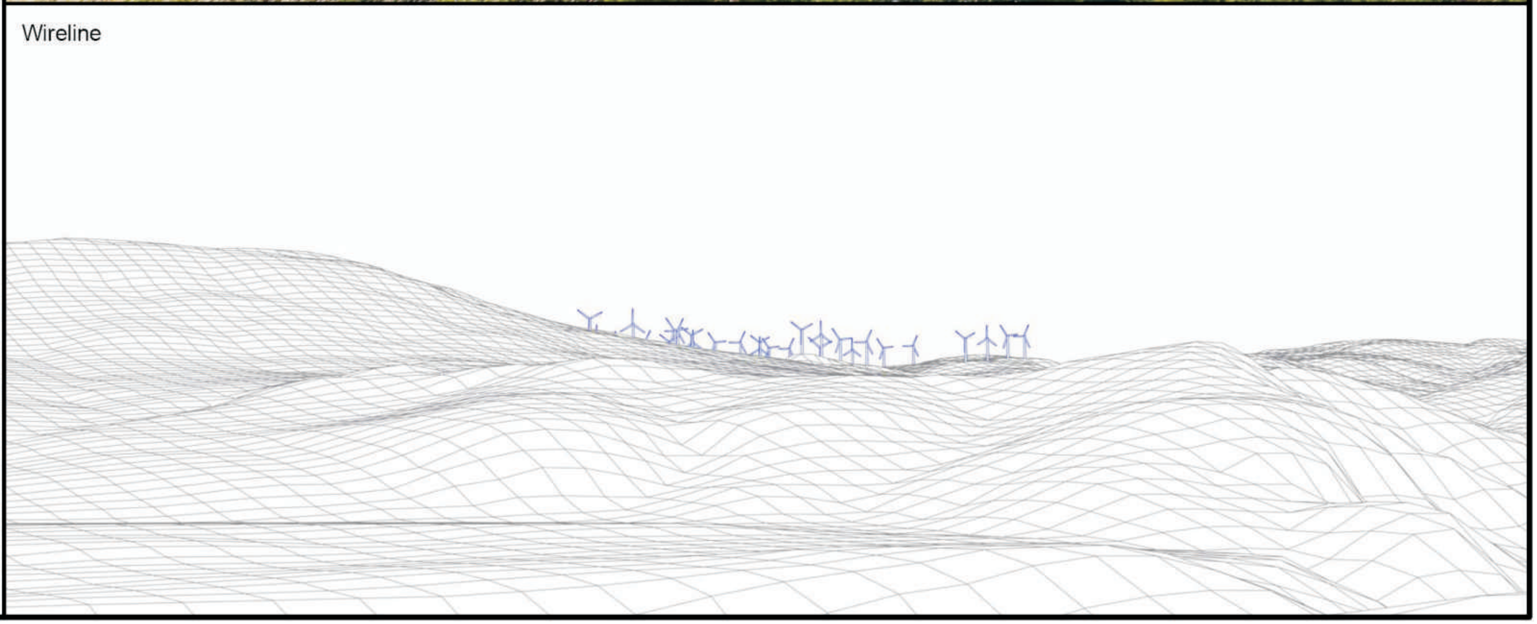
Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 22
Number of tips visible: 59

Photomontage

Wireline



Source: GeoDataScape.

Figure 3.9-3

Viewpoint 1 - Pucker Huddle

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

Viewpoint Location

45°47'30" N 121°29'38" W
Bearing: 250 °
Field of View: 35°
7.66 km to the nearest turbine
Elevation: 152 meters

Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 30
Number of tips visible: 87

Photomontage

Wireline

Source: GeoDataScape.

Figure 3.9-4
Viewpoint 3 - Husum

URS

Whistling Ridge Energy Project
Skamania County, Washington

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Photomontage and Wireline

Viewpoint Location

45°43'40" N 121°35'56" W
Bearing: 331°
Field of View: 50°
1.99 km to the nearest turbine
Elevation: 411 meters

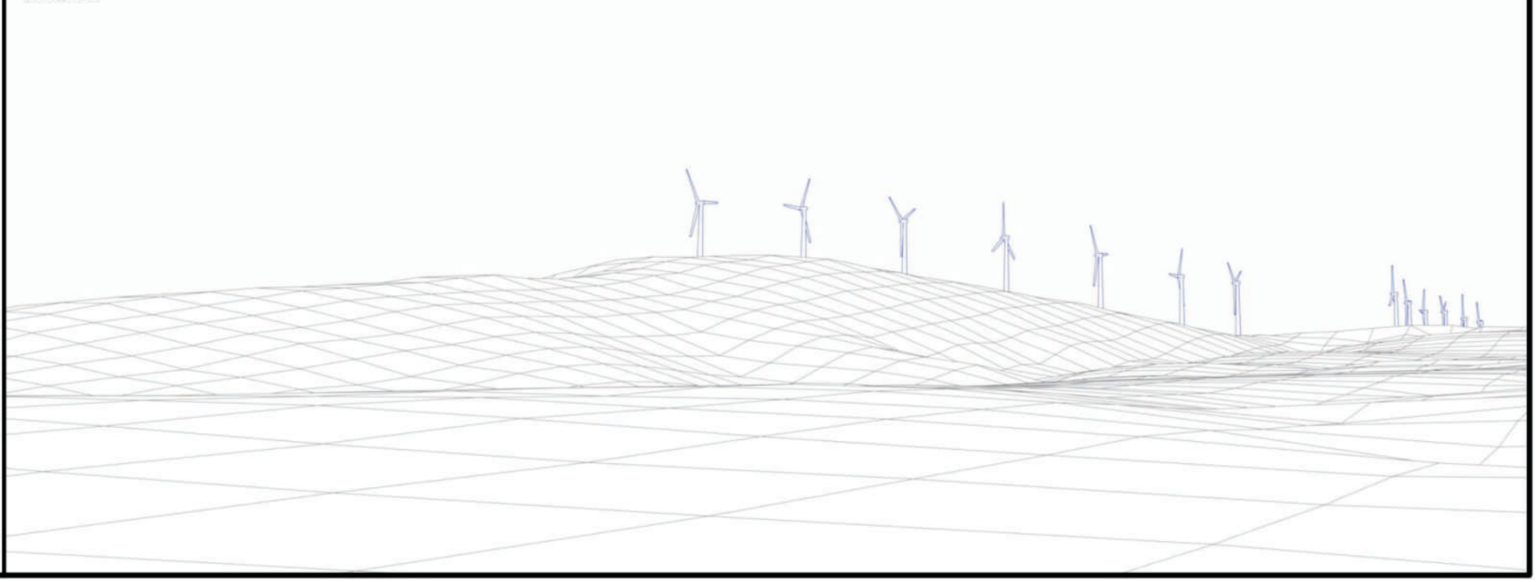
Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 7
Number of tips visible: 21

Photomontage

Wireline



Source: GeoDataScape.

Figure 3.9-5

Viewpoint 4 - Ausplund Road and Cook-Underwood Road

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

Viewpoint Location

45°46'48" N 121°38'02" W
Bearing: 124°
Field of View: 74°
1.67 km to the nearest turbine
Elevation: 408 meters

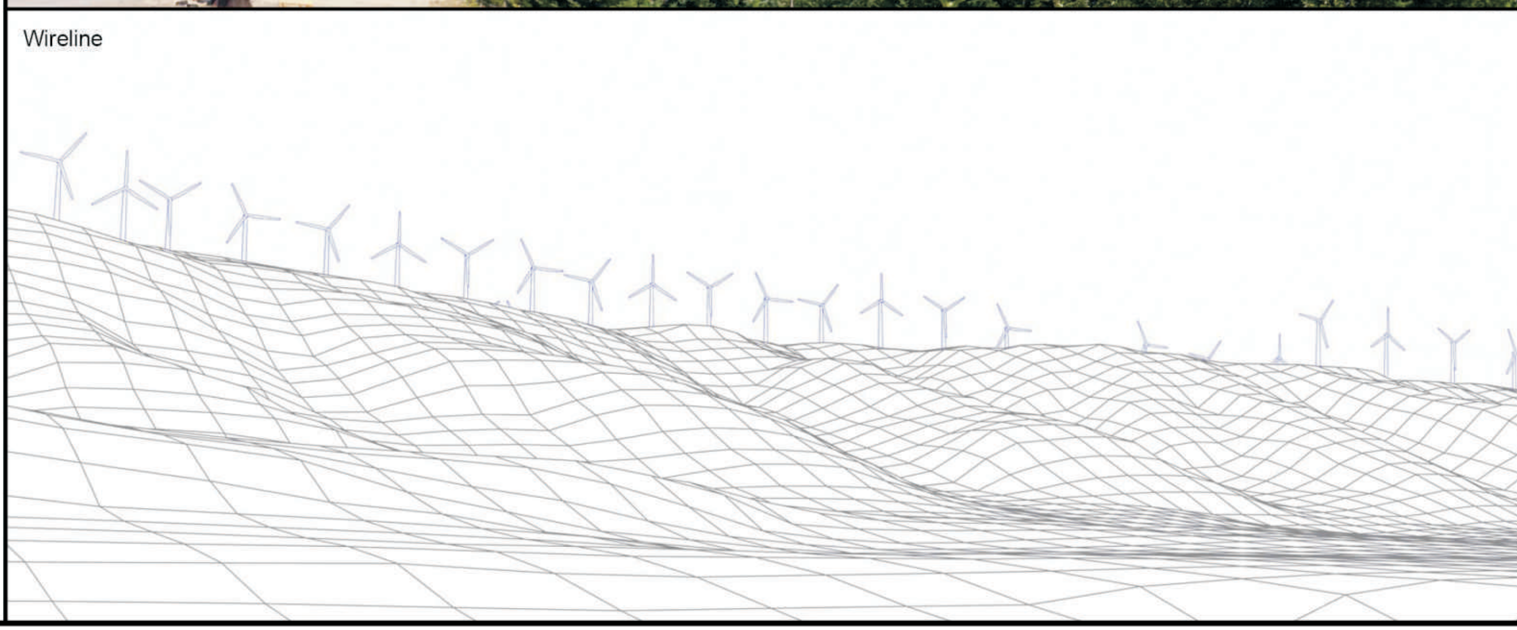
Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 19
Number of tips visible: 57

Photomontage

Wireline



Source: GeoDataScape.

Figure 3.9-6

Viewpoint 5 - Willard

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

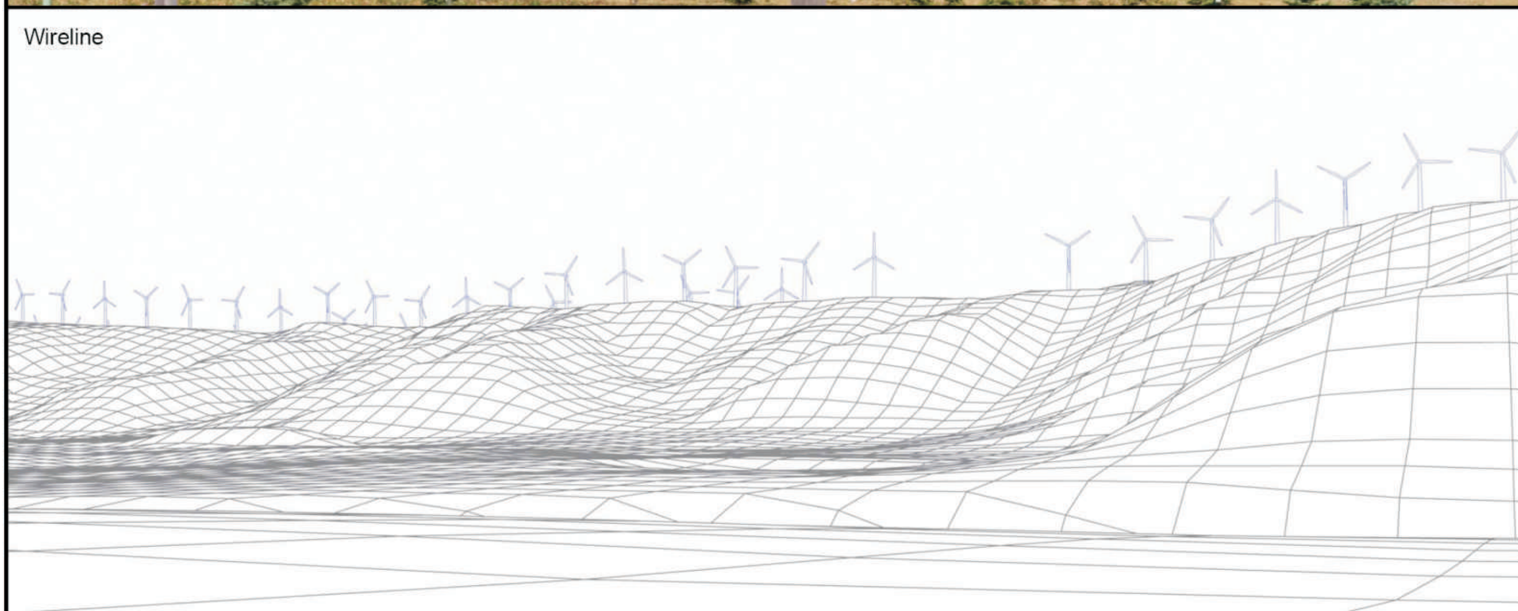
Viewpoint Location

45°44'35" N 121°38'45" W
Bearing: 65°
Field of View: 57°
2.61 km to the nearest turbine
Elevation: 287 meters

Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 30
Number of tips visible: 85



Source: GeoDataScape.

Figure 3.9-7

Viewpoint 7 - Mill A

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

Viewpoint Location

45°41'40" N 121°26'40" W
Bearing: 307 °
Field of View: 21°
14 km to the nearest turbine
Elevation: 31 meters

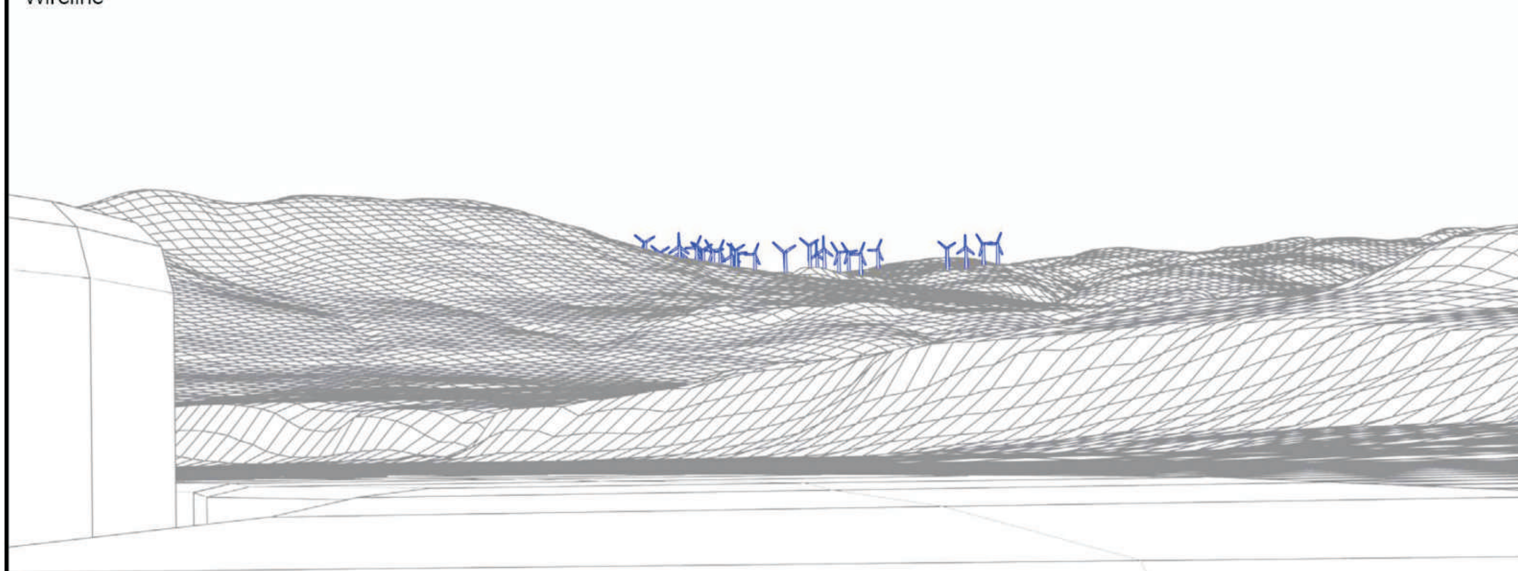
Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 25
Number of tips visible: 70

Photomontage

Wireline



Source: GeoDataScape.

Figure 3.9-8
Viewpoint 11 - I-84 Westbound

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

Viewpoint Location

45°42'20" N 121°28'43" W
Bearing: 315°
Field of View: 30°
11 km to the nearest turbine
Elevation: 25 meters

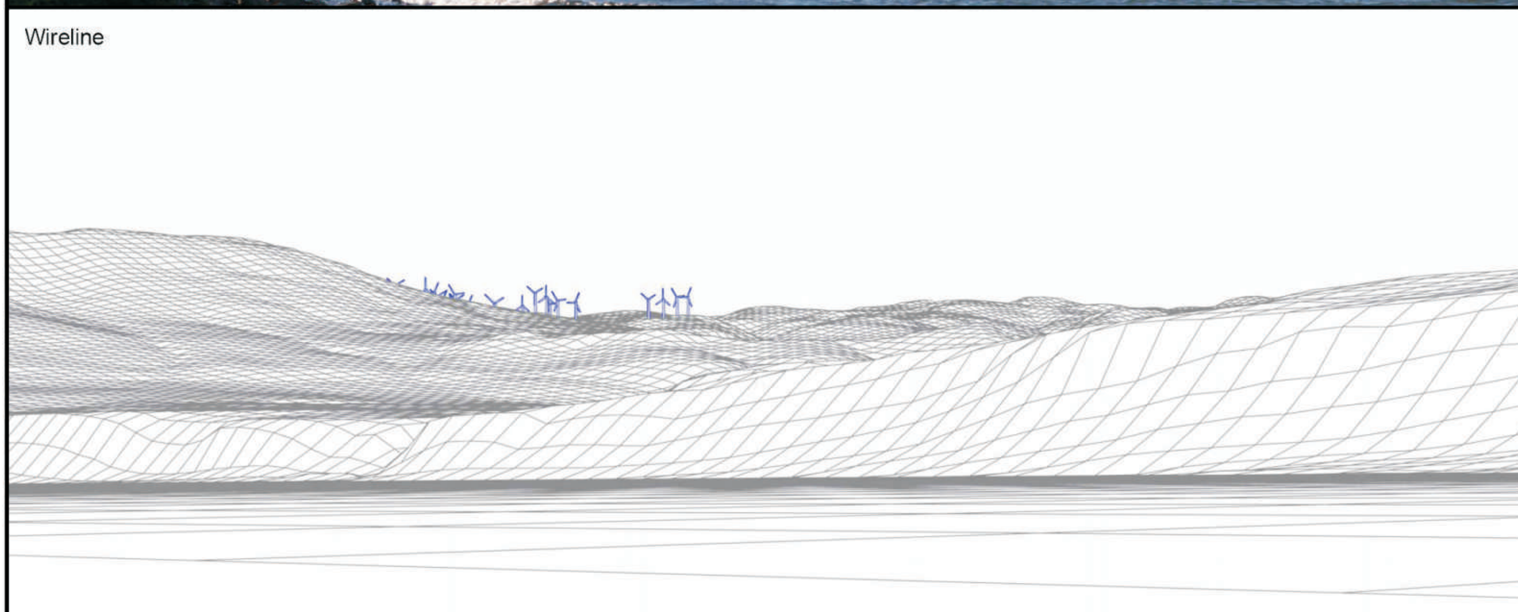
Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 15
Number of tips visible: 39

Photomontage

Wireline



Source: GeoDataScape.

Figure 3.9-9

Viewpoint 12 - Koberg Beach State Park

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

Viewpoint Location

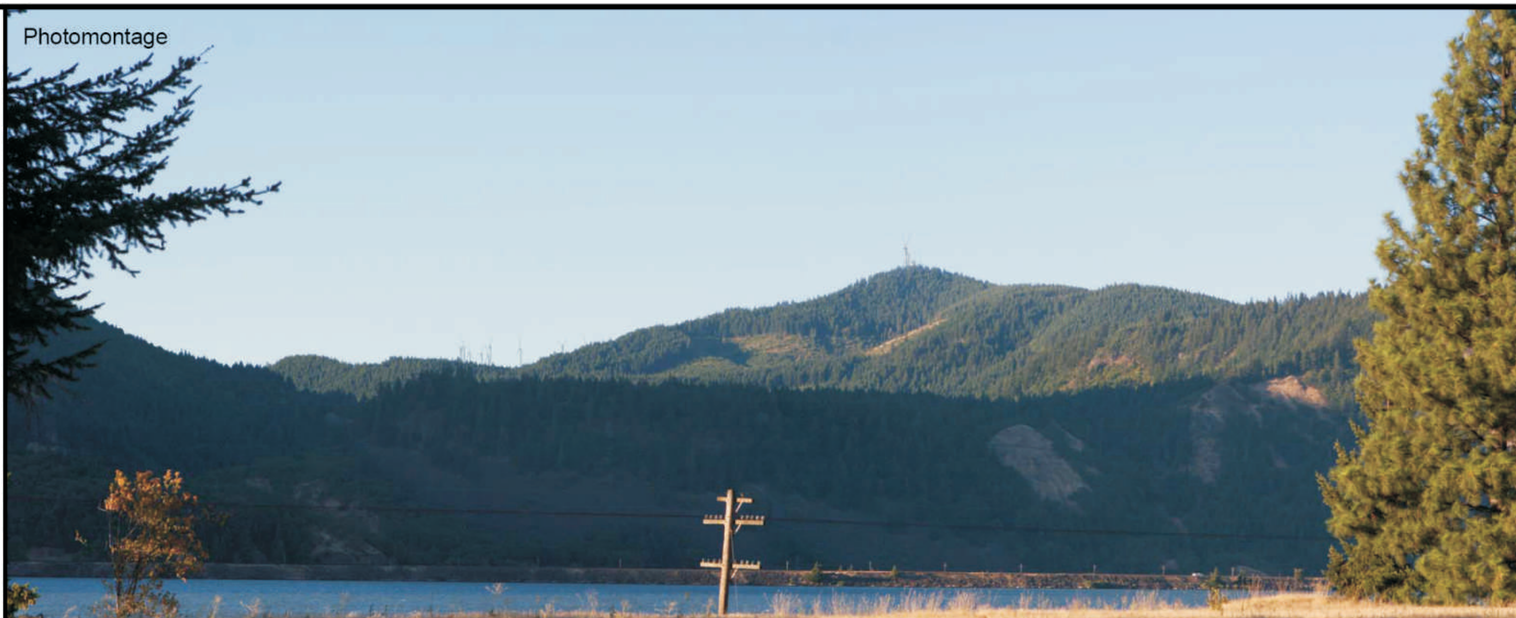
45°41'55" N 121°39'04" W
Bearing: 28 °
Field of View: 33.5°
5.52 km to the nearest turbine
Elevation: 44 meters

Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 12
Number of tips visible: 35

Photomontage



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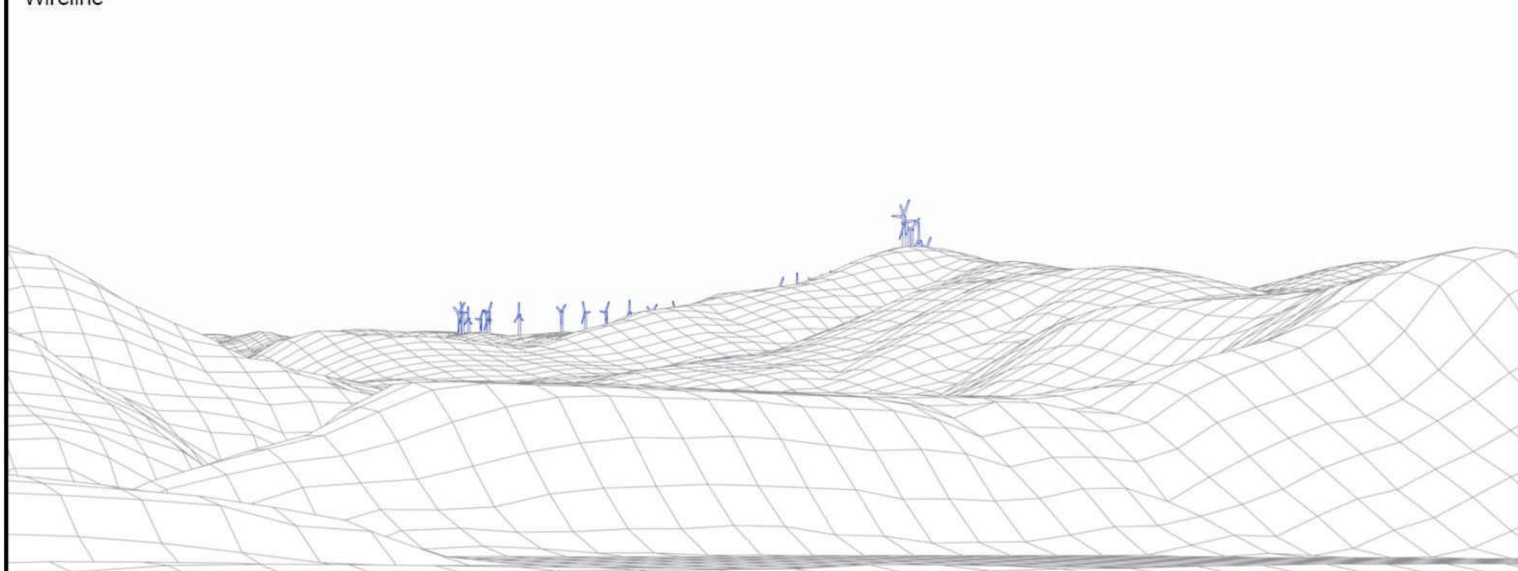


Source: GeoDataScape.

Figure 3.9-10

Viewpoint 13 - I-84 Eastbound

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

Viewpoint Location

45°41'59" N 121°40'01" W
Bearing: 36°
Field of View: 49°
6.43 km to the nearest turbine
Elevation: 30 meters

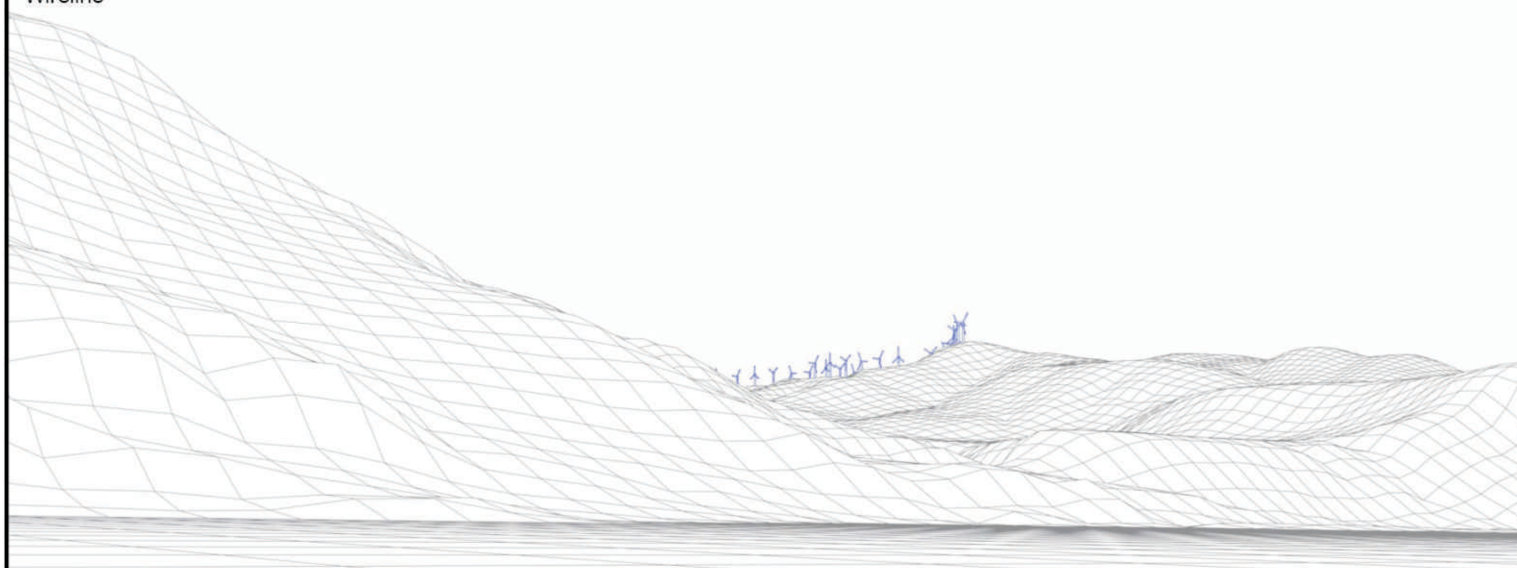
Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 18
Number of tips visible: 46

Photomontage

Wireline



Source: GeoDataScape.

Figure 3.9-11

Viewpoint 14 - Viento State Park

Photomontage and Wireline

Viewpoint Location

45°41'48" N 121°33'17" W
Bearing: 331°
Field of View: 55°
7.25 km to the nearest turbine
Elevation: 191 meters

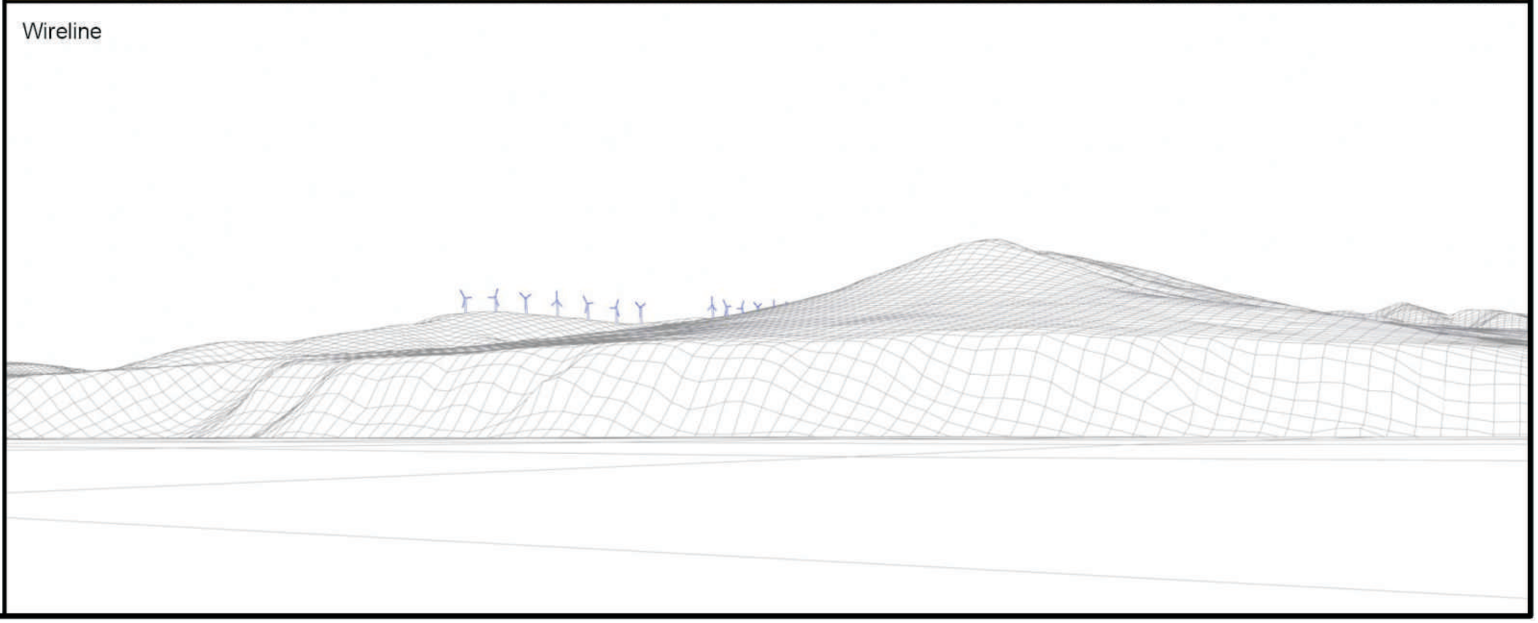
Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 10
Number of tips visible: 29

Photomontage

Wireline



Source: GeoDataScape.

Figure 3.9-12

Viewpoint 15 - Frankton Road

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

Viewpoint Location

45°42'13" N 121°31'25" W
Bearing: 332°
Field of View: 59°
8.17 km to the nearest turbine
Elevation: 143 meters

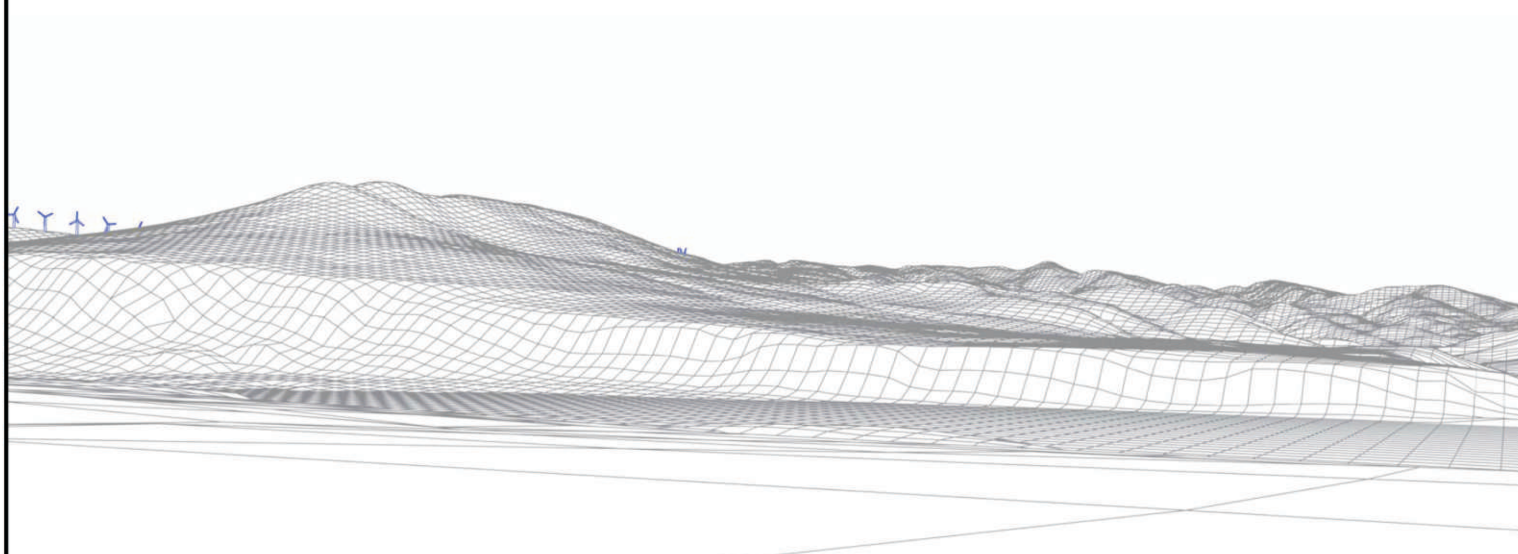
Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 4
Number of tips visible: 11

Photomontage

Wireline



Source: GeoDataScape.

Figure 3.9-13
Viewpoint 17 - Providence Hospital

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_137.cdr

Photomontage and Wireline

Viewpoint Location

45°42'14" N 121°29'04" W
Bearing: 317°
Field of View: 63°
10.75 km to the nearest turbine
Elevation: 146 meters

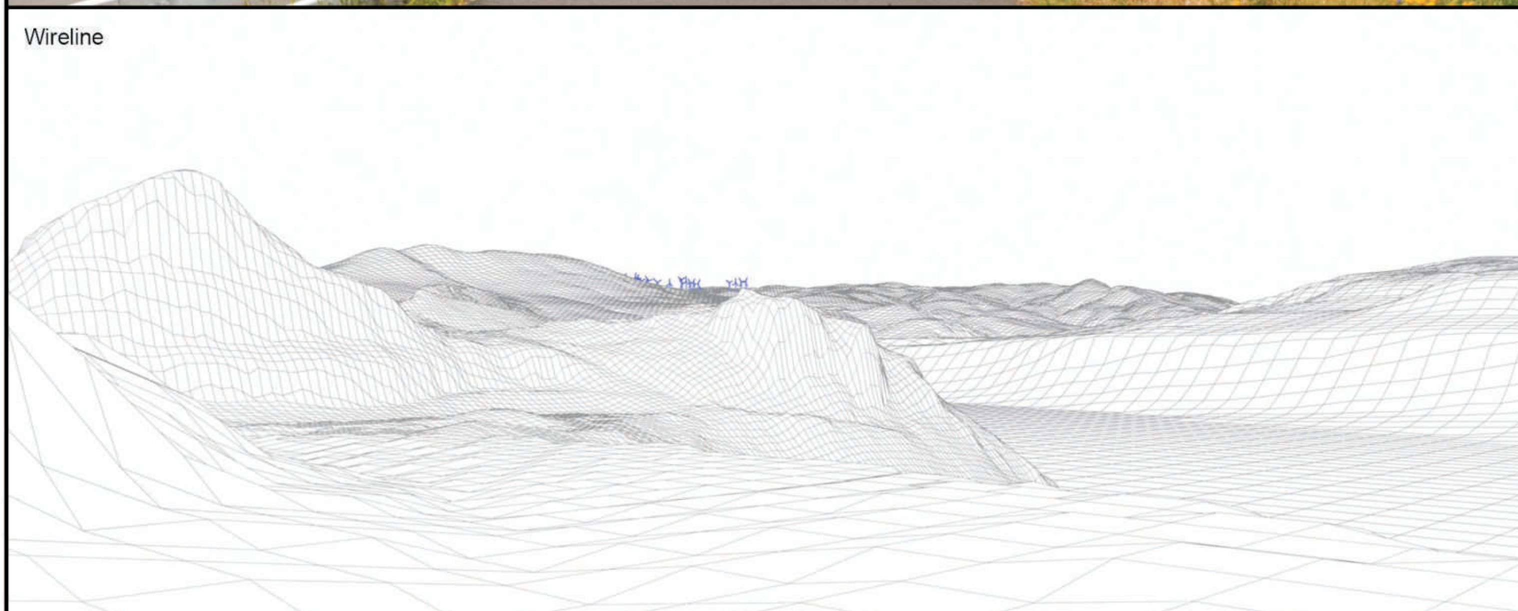
Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 11
Number of tips visible: 39

Photomontage

Wireline



Source: GeoDataScape.

Figure 3.9-14

Viewpoint 19 - Columbia River Highway

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

Viewpoint Location

45°44'15" N 121°36'07" W
Bearing: 345 °
Field of View: 58°
1.02 km to the nearest turbine
Elevation: 482 meters

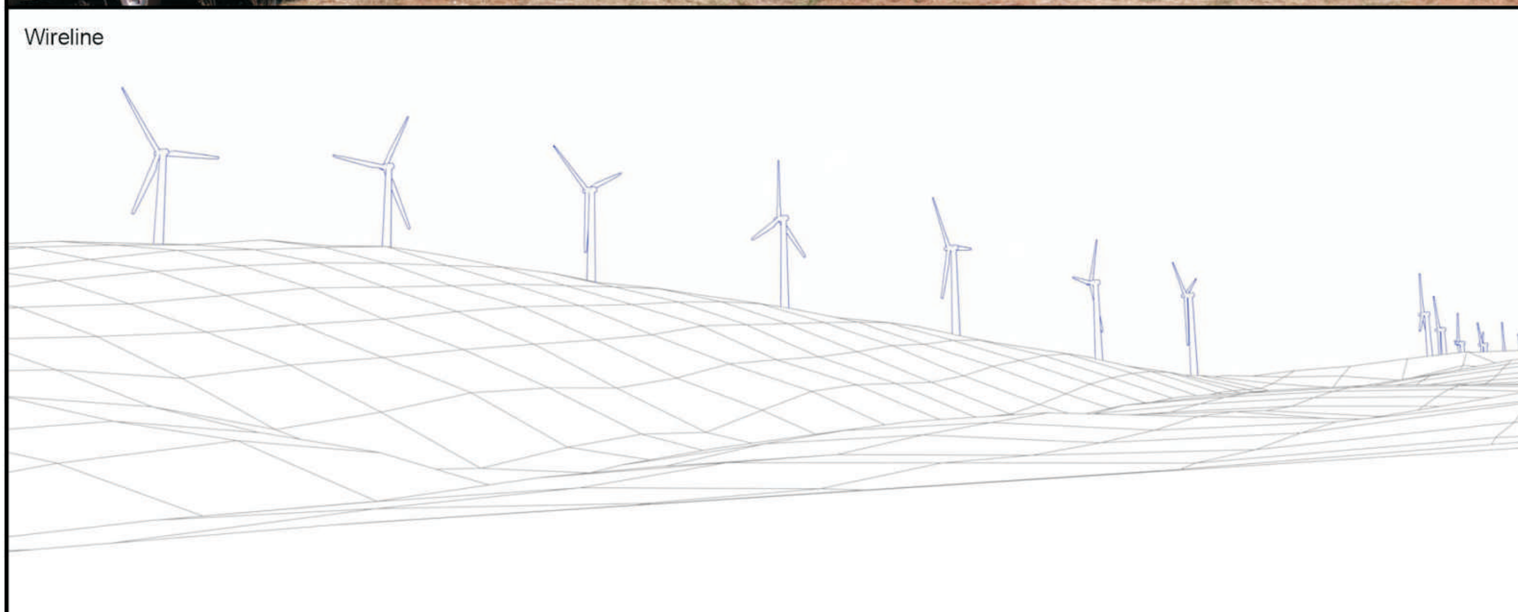
Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 8
Number of tips visible: 21

Photomontage

Wireline



Source: GeoDataScape.

Figure 3.9-15

Viewpoint 23 - Ausplund Road End

URS

Whistling Ridge Energy Project
Skamania County, Washington

Viewpoint 1: Pucker Huddle (Figure 3.9-3)

From Viewpoint 1, approximately 25 turbines would be visible on the ridge tops at distances of approximately 4 miles to the nearest turbines. At the distance depicted in the photo, the visual clutter of more turbines has more impact than the considerable scale of the larger turbines. The composition would be silhouetted against the sky, increasing their visual impact. However, the distance and the line of sight from the residential areas would minimize the contrast. The presence of the turbines would reduce the scene's degree of intactness by introducing a large number of highly visible engineered vertical elements.

The potential visual impact from Viewpoint 1 would range from low to moderate.

Viewpoint 3: Husum (Figure 3.9-4)

From Viewpoint 3, approximately 27 turbines would be visible on the ridge tips at a distance of approximately 4.75 miles to the nearest turbines. Figure 3.9-4 illustrates the simulated views from SR 141 traveling south into the Project Area. Travelers moving along this highway are generally using the road to access recreation areas or for leisurely drives. Residential viewers would be screened to some degree from the view based on vegetation, landscaping, and the line of sight from the valley floor. Introduction of these vertical structures in the background of this view would decrease the intactness of the landscape, based on the numbers of turbines that would be visible. The composition of the view would be altered with the introduction of these engineered structures and would be apparent on the horizon to the travelers and residence in the area.

Due to the low levels of viewers, duration of the views, and viewer awareness, the visual impact from Viewpoint 3 is considered moderate.

Viewpoint 4: Ausplund Road and Cook-Underwood Road (Figure 3.9-5)

From Viewpoint 4, approximately 14 turbines would be visible looking northwest from the roadway, at a distance of approximately 1.23 miles to the nearest turbines. Figure 3.9-5 illustrates the simulated view from the roadway at the intersections of Ausplund and Cook-Underwood Roads. Because of the position of this viewpoint (direct line of sight) and its distance from the turbines, the turbines apparent scale would be visible and apparent. The presence of the turbines would likely have a moderate effect on the vividness of the existing view and a moderate impact on the overall sense of unity and intactness by the roadway and residential viewers.

The potential visual impact from Viewpoint 4 would be moderate.

Viewpoint 5: Willard (Figure 3.9-6)

From Viewpoint 5, approximately 24 turbines in turbine strings A and B would be visible from screened views from residences in the area of Willard. Figure 3.9-6 shows the simulated view from Viewpoint 5 in the northern portion of the Project looking southeast. These turbines would be located in the ridge tops, with the nearest turbines approximately 1.35 miles away. Because the turbines would be seen against the sky at medium range and screened in many residential views, they would still be visible in the background. This would reduce the visual unity and intactness minimally when compared to the existing components in the landscape. The wind turbines would be arrayed uniformly along the ridgeline and would create a moderate change in the setting's existing low to moderate visual quality.

The potential visual impact from Viewpoint 5 would be moderate.

Viewpoint 7: Mill A (Figure 3.9-7)

From Viewpoint 7, approximately 35 turbines in strings A and B would be visible in the foreground, middle ground, and background of this view. The nearest turbines would be located approximately 1.62 miles away. Figure 3.9-7 shows the simulated view. The turbines would be seen against the sky. The presence of the long line of turbines may create a slight increase in the vividness of this view. The unity of the view would be decreased further by the long turbine line and the intactness of the view would be moderately compromised compared to the existing view.

The potential visual impact from Viewpoint 7 is considered to be low to moderate.

Viewpoint 11: I-84 Westbound (Figure 3.9-8)

From Viewpoint 11, approximately 19 turbines would be visible in the distance background to roadway travelers looking west into the Project Area from I-84. The nearest turbines would be 8.39 miles away. Figure 3.9-8 shows the simulated view. Although the turbines would be visible to travelers on the far horizon, their presence is not expected to decrease the existing quality of this view, because of their relatively small size at this viewing distance. The visible turbines would have a minimal effect on this view's vividness, unity, and intactness.

The potential visual impact from Viewpoint 11 was rated as moderate to low.

Viewpoint 12: Koberg Park (Figure 3.9-9)

From Viewpoint 12, approximately 17 turbines would be visible in the distant background to recreational users of the park and river. The nearest turbines would be approximately 6.60 miles away. The view looks west into the Project Area. Figure 3.9-9 shows the simulated view. Although the turbines would be visible to the viewers on the far horizon it is not expected to decrease the existing quality of this view to a great degree, because of their relatively small size at this viewing distance. The visible turbines would have a minimal effect on this view's vividness, unity, and intactness.

The potential visual impact from Viewpoint 12 was considered to be moderate.

Viewpoint 13: I-84 Eastbound (Figure 3.9-10)

From Viewpoint 13, approximately eight turbines would be visible in the background to travelers on the roadway looking west into the Project Area from I-84. The nearest turbines would be approximately 3.43 miles away. Figure 3.9-10 shows the simulated view. This view for travelers would be of short duration. Although the turbines would be visible to travelers on the horizon it is not expected to decrease the existing quality of this view because of the number of turbines visible and the partial screening from the middle ground ridgeline. The visible turbines would have a minimal effect on this view's vividness, unity, and intactness for these reasons.

The potential visual impact from Viewpoint 13 was rated as moderate to low.

Viewpoint 14: Viento State Park (Figure 3.9-11)

From Viewpoint 14, approximately 20 turbines in the background would be visible to the recreational users of the area. The nearest turbines would be just under four miles away. Figure 3.9-11 shows the simulated view. Although the water-related recreational activities would have the line of sight more related to the water and river banks, the recreational users moving through this area would be affected by this contrast in the view. The vividness of the scenic quality may be positively or negatively affected, depending on the user perception of turbines in the background. The unity and intactness of the existing view would be moderately compromised and the visible turbines would have a moderate effect on the view's scenic quality compared to existing conditions, due to the distance from the park and activities in the foreground and middle ground.

The potential visual impact for Viewpoint 14 was considered to be moderate.

Viewpoint 15: Frankton Road (Figure 3.9-12)

From Viewpoint 15, approximately 10 turbines can be seen, with the nearest turbines approximately 4.51 miles away. Figure 3.9-12 shows the simulated view. At this distance, the contrast would have a minor effect on the overall visual impact. Consequently, because the prominence of the turbines in the view would be low, the turbines would have a minor effect on the vividness, unity, and intactness from this viewpoint.

The potential visual impact from this viewpoint would be moderate.

Viewpoint 17: Province Hospital Hood River (Figure 3.9-13)

From Viewpoint 17, only two turbines can be seen, and they are diminished by the distance (just over five miles). Figure 3.9-13 shows the simulated view. At this distance, viewers would have to scan the horizon to find the turbines. Consequently, minor effect or negligible effects to the scenic quality is expected.

The potential visual impact from this viewpoint would be low.

Viewpoint 19: Columbia River Highway (Figure 3.9-14)

From Viewpoint 19, approximately nine turbines are visible in the distant background. The nearest turbines would be approximately 6.46 miles away. Figure 3.9-14 shows the simulated view. Although the turbines would be visible in the background the viewer would have to have a focused orientation to see them in the landscape. The amount of turbines and the limited prominence based on the distance is expected to have a minimal effect on the scenic quality from this viewpoint.

The potential visual impact from this viewpoint would be low.

Viewpoint 23: Ausplund Road End (Figure 3.9-15)

From Viewpoint 23, approximately eight turbines can be seen. The nearest turbine would be approximately 0.64 mile away. Figure 3.9-15 shows the simulated view. This area would be within one mile of the Project and the turbines would be highly visible at the end of this road. However, very minimal use of these roads beyond workers associated with forest management reduces the viewer types. Regardless, the impacts of the turbines on the landscape would affect the scenic quality of the view.

The potential visual impact from this viewpoint would be moderate.

Viewpoint 24: Dog Mountain

Because the Project Area cannot be seen from the Dog Mountain trail (either during the day or at night), no simulated view was prepared. There would be no impact.

Night Lighting

The Project would be required to comply with the Federal Aviation Administration aircraft safety lighting requirements for structures greater than 200 feet tall, which includes turbines and meteorological towers. The exact number of turbines that would require lighting would be specified by the Federal Aviation Administration after final Project plan review; however, current guidance requires that warning lights be mounted on the first and last turbines of each string, and from those end turbines, lights should then be positioned such that the next lit turbine is no more than 1/2 mile, or 2640 feet, from the last lit turbine. The lights would be synchronized to flash together to illuminate the full extent of the Project Area (Patterson 2005). These lights would be visible as small blinking points of red light; they would not light up the sky or the surrounding landscape. Aside from any required aircraft warning lights, the turbines would not be illuminated at night. There would be one meteorological tower located within the Project Area. Its location would be selected during the micro-siting process. Depending on its proximity to turbine towers, it may or may not require aircraft safety lighting.

The Draft EIS for the Nine Canyon Wind Project contains a generic illustration of night lights and can be found online at http://www.efsec.wa.gov/wildhorse/deis/figures/40%20Fig%203.10-9%20and%2010.pdf.

Columbia River Gorge National Scenic Area

During scoping, some commenters expressed concern that Project operation would impact the Scenic Area adversely since turbines would be visible from some Key Viewing Areas inside the Scenic Area. Analysis of KVAs and viewpoints within the Scenic Area were sought and analyzed. The presence of the Project would cause low to moderate visual impact to viewpoints within the Scenic Area,

Congress has determined that the National Scenic Act is not to be used to regulate activities outside of the Scenic Area boundary. The Act states that *“(a) Nothing in this Act shall ... (10) Establish protective perimeters or buffer zones around the scenic area or each special management area. The fact that activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management area.”* ~~*no protective perimeters or buffer zones shall be established around the scenic area or each special management area. Activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard*~~

~~*from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas*~~ (16 USC § 544O(a)(10). This federal policy and Congressional mandate discourage projecting National Scenic Act policies, regulations and directives beyond the boundary of the Scenic Area.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. A detailed site restoration plan is required within ninety days of Project decommissioning. The initial site restoration plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The initial site restoration plan would include or parallel a decommissioning plan for the Project. Visual and aesthetic impact from decommissioning would be similar to those expected during the construction phase.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major visual resource issues presently anticipated. If impacts to visual resources are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures would be proposed as part of the plan.

3.9.3.2 No Action Alternative

Under the No Action Alternative, turbines would not be built. Existing visual conditions would continue unchanged, and would be influenced primarily by ongoing timber harvest until and unless a different applicant proposed to develop the wind energy potential of the area. In the event the failure to construct this Project results in continuation and expansion of fossil fuel energy generation sources, it is foreseeable that air quality, including haze conditions, would continue to be a negative impact to the air quality and scenic resources of the of the Columbia River Gorge National Scenic Area.

3.9.4 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential visual resource impacts during construction and operation of the proposed Project to the extent feasible.

- Ensure that a non-reflective flat neutral gray or light color is the choice of color for the turbines so that visual impacts would be minimized. The primary mitigation measure available for visual impacts is the choice of color for the turbines. Although a brown turbine color would reduce visual contrast in views where the turbines are seen against the landscape, it would also accentuate the visibility of the turbines where they would be seen against the sky. In addition, the brown color would have a greater contrast when snow is on the ground. Because the turbines are most frequently seen against the sky, particularly in close-range views where visual concerns are the greatest, a non-reflective flat neutral gray or light color would be ideal.

- Comply with Federal Aviation Administration requirements for safety lighting. Lights typically used to meet Federal Aviation Administration requirements would to some extent be shielded from ground level view due to a constrained (3–5 degree) vertical beam. The Federal Aviation Administration would independently review the lighting of individual turbines during the micrositing process and consult on mitigation. However, the Project must comply with the safety lighting requirement.

3.9.5 UNAVOIDABLE ADVERSE IMPACTS

The Project would cause some visual impact to surrounding areas where turbines were visible, including some areas inside the Columbia River Gorge National Scenic Area. However, the visual impact analysis showed that the anticipated level of visual impact would not be higher than low to moderate at any of the viewpoints examined.

3.9.6 REFERENCES

Buhyoff, G.J., P.A. Miller, J.W. Roach, D. Zhou, and L.G. Fuller. 1994. An AI Methodology for Landscape Visual Assessments. *AI Applications* 8, no. 1: 1-13.

European Wind Energy Association (EWEA). 2003. Focus On Public Opinion: A Summary of Opinion Surveys on Wind Power. Accessed at: http://www.ewea.org/fileadmin/ewea_documents/documents/publications/WD/WD22vi_public.pdf.

Federal Highway Administration (FHWA). 1988. *Visual Impact Assessment for Highway Projects*.

Patterson, James W. 2005. Development of Obstruction Lighting Standards for Wind Turbine Farms. FAA Technical Note DOT/FAA/AR-TN05/50. November.

US Forest Service (USFS). 1995. *Landscape Aesthetics, A Handbook for Scenery Management*.

3.10 HISTORICAL AND CULTURAL RESOURCES

This section describes existing historical and cultural resources in the Project vicinity and identifies potential impacts to these resources from construction and operation of the proposed Project. Cultural resources include buildings, sites, structures, and objects, each of which may have historical, architectural, archaeological, cultural, or scientific importance. Artifacts, records, and material remains associated with these properties, and traditional cultural properties, which can include archaeological, traditional procurement, and religious sites and landscapes, are types of cultural resources.

The primary source of information for this section is the Cultural Resources Inventory Report prepared in support of the Application for Site Certification by URS (2009), as supplemented by fieldwork done by URS in December 2009 (URS 2010). The Cultural Resources Inventory Report was designed to identify, evaluate, and record pre-contact and historic cultural resources.

URS did so in accordance with Chapter 36 CFR §800 of the National Historic Preservation Act (NHPA) which is the regulatory requirement for the BPA Project Area as noted in Section 1.2.2. BPA's Project Area would be limited to the location of its proposed substation at the point of interconnection. The survey also was designed to fulfill the Applicant's SEPA requirements for their portion of the Project, the wind facility itself). The survey objectives include identifying archaeological resources and historic properties that might be considered eligible for the National Register of Historic Places (NRHP) located within the area of potential effects (APE) for the proposed Project for both BPA's interconnection and the Applicant's wind facility.

3.10.1 REGULATORY SETTING

3.10.1.1 Laws and Regulations

Several federal and state laws protect cultural resources, including NEPA and SEPA, which require that impacts of federal and state actions on cultural resources be identified and assessed in environmental documents, as well as the National Historic Preservation Act (NHPA), which establishes a national policy of historical preservation and requires that the effects of Federal actions (such as BPA's interconnection with the Project) on significant cultural resources be determined. Collectively, these regulations and guidelines establish a comprehensive program for the identification, evaluation, and treatment of cultural resources.

To be eligible for the National Register of Historic Places (NRHP), properties must be at least 50 years old (unless they have special significance) and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. They also must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet at least one of four criteria:

- ***Criterion A:*** be associated with important historical events or trends;
- ***Criterion B:*** be associated with important people;
- ***Criterion C:*** have important characteristics of style, type, or have artistic value;
- ***Criterion D:*** have yielded or have potential to yield important information.

If a resource is determined eligible for the NRHP, then Section 106 of the NHPA (80 Stat. 915; 16 USC 470) and its implementing regulations (36 CFR 800) require that effects of the proposed federal project to that resource be assessed. If a property eligible for the NRHP would be adversely affected by the proposed federal action, the federal agency must evaluate alternatives or modifications to the proposed action that would avoid, minimize or mitigate adverse effects.

3.10.1.2 Area of Potential Effect

The NHPA requires that the Area of Potential Effect (APE) for the Project Area be determined. As a federal law, the NHPA requires federal agencies to evaluate the impact of all federally-funded or permitted projects on historic properties (buildings, archaeological sites, etc.) through the Section 106 review process. This process applies only to BPA's portion of the Project (the interconnection). However, the DEIS included an APE for the entire Project Area. Figure 3.10-1 has been updated to show the BPA's APE and the Applicant's APE. For BPA, the APE is the proposed substation site--a 5 acre plot and several steel lattice and wood pole structures located towards the southern end of the Applicant's Project Area. As part of the Section 106 review process, the Washington Department of Archaeology and Historic Preservation (DAHP) concurred with BPA's definition of BPA's proposed APE on August 9, 2010 (see Appendix E).

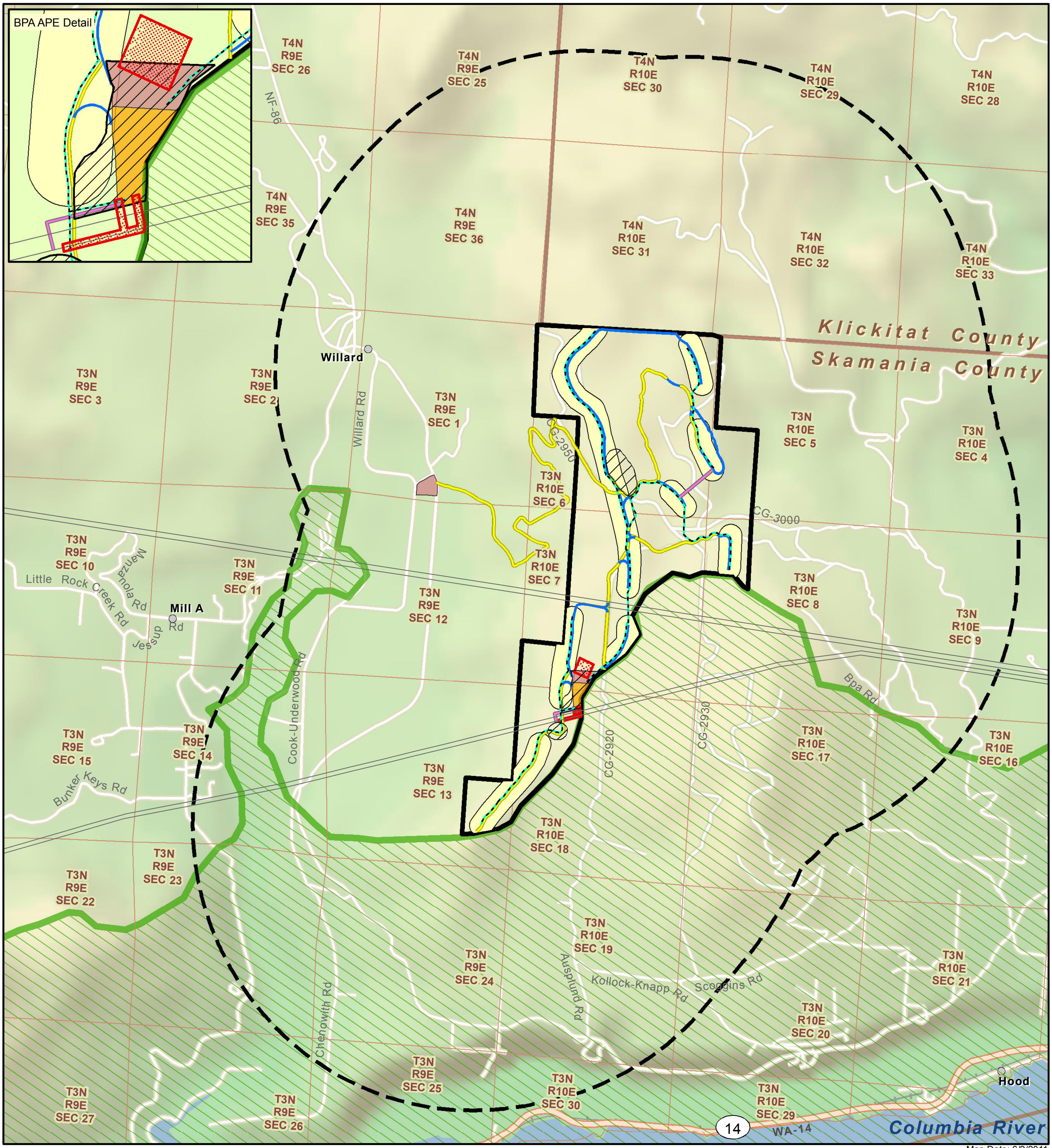
The proposed Project has the potential to affect cultural resources and as such an APE was identified (the Applicant's APE). The APE for direct effects to cultural resources is considered to be the footprint for potential ground-disturbing activities that are anticipated to occur during construction and long-term maintenance of the Project. For the Project, ground disturbance could take place in the turbine string corridors, road corridors inside the Project Area, the West Pit Road outside the Project Area, overhead and underground transmission corridors inside the site Project Area, the Operation and Maintenance facility (two alternative sites), and ~~the substation and~~ lay-down areas. These activities have a total footprint of approximately 379 ~~384~~ acres (Figure 3.10-1) and constitute the APE for the Applicant's direct effects to cultural resources. The Applicant's indirect APE is the area outside of the Project boundary where the Project may have, for instance, a visual impact on significant cultural resources. DAHP concurred with EFSEC's definition of the APE for the Applicant on February 1, 2010 (see Appendix E).

3.10.2 AFFECTED ENVIRONMENT

3.10.2.1 Cultural Context

Pre-Contact Background

The archaeological record of the Columbia Plateau documents the prehistory of a region that is distinguished by local adaptations to a unique set of resources and its inland maritime environment (Chatters and Pokotylo 1998). Archaeological research near the site has focused principally within the Columbia River corridor, and models for the Portland Basin of the Northwest Coast culture area (Pettigrew 1981), the Columbia Plateau culture area (e.g., Galm et al. 1981), and the White Salmon and Klickitat rivers specifically (Masten and Galm 1989) can be applied. An overview of archaeological research within the Columbia River Gorge has been summarized by Beckham et al. (1988). Recently, Griffin and Churchill (2001) synthesized the multiple cultural chronologies that have been posited for the region; the following discussion is based on their synthesis.



Map Date: 6/2/2011

Map Features

- BPA APE
- Applicant's APE (Indirect Effects)
- Approximate Location of 5 Acre Laydown Staging Areas
- 5 Acre Substation Plot
- 5 Acre Operations and Maintenance Facility Alternative Locations
- 650' Turbine Corridor
- Site Boundary
- PLSS Sections
- Columbia River Gorge National Senic Area
- BPA Transmission Lines
- Improved Existing Roads
- New Project Roads
- Overhead Power Line
- Buried Collector Lines - Turbines to Substation

Feet
0 1,000 2,000 4,000

N

Figure 3.10.1

Area of Potential Effects

BONNEVILLE POWER ADMINISTRATION

Whistling Ridge Energy Project
Skamania County, Washington

The Early period dates from 11,000 to 4,500 years BP, though recent studies at Paisley Caves in Oregon suggest an even earlier date of regional occupation at least by about 14,300 BP (Jenkins 2009). A mobile lifestyle focused on intensive riverine resources with periodic use of uplands is inferred. Subsistence shifted from reliance on large game to an increase in the importance of fish, root, and vegetable resources by the end of the period. Permanent structures are not found in association with the earliest sites, but semi-subterranean house settlements appeared along major rivers at the latter stage, reflecting an increase in sedentism. Sites dating to this period have mostly been found around The Dalles at the eastern end of the Columbia River Gorge (Griffin and Churchill 2001).

The Middle period occurred from approximately 4,500 BP to 250 years BP and is characterized by increased occurrences of semi-subterranean houses and the appearance of food storage facilities, indicative of further sedentism and decreased mobility. Concurrently, there was intensification of use of fish, roots, and vegetable resources during the first half of the period, with hunting of secondary importance. The pattern of winter sedentism was apparently established during this period. There are more archaeological sites, including villages, fishing camps, and hunting camps that date to this period and that are found in the area between the Cascade Mountain Range and the town of Lyle, as well as The Dalles area (Griffin and Churchill 2001).

The Late period, dating from 250 to 100 years BP, is defined by the appearance of the horse on the Columbia River Plateau (circa 1730s), which increased the mobility and resource acquisition patterns of local groups. The period is also marked by the introduction of trade goods and the devastating effects of introduced diseases on the local populations, as well as the arrival of Euro-Americans. There is an increase in the quantity and distribution of sites dating to this period, with most being located along the confluences of major rivers and the Columbia River, though several sites are found on sandy terraces as well as within the islands. A large number of historic villages were noted by Lewis and Clark between Beacon Rock and The Dalles during their 1805–1806 travels (Griffin and Churchill 2001).

Along the lower White Salmon River, Middle and Late period projectile point styles are common. Recorded site types in this area include housepit villages, temporary camps, petroglyph sites, and cemetery sites (Griffin and Churchill 2001).

Ethnographic and Ethnohistoric Background

The proposed Project Area is located near the boundary between two ethnographic culture areas of the Pacific Northwest, the Northwest Coast, and the Columbia Plateau.. Local groups living in the Columbia River Gorge at the time of historic contact are known from the languages they spoke as the Upper Chinookans and the Echeesh-Keens (Sahaptins)[23] (Beckham et al. 1988; Griffin and Churchill 2001). In the general area of the Project, the Columbia River Gorge was

[23] Griffin and Churchill (2001) note that the Yakama Nation prefers the use of “Echeesh-Keen” over the term “Sahaptin.”

used by the Eastern Chinookan-speaking Wishram, White Salmon, and Cascades people, as well as the Echeesh-Keen-speaking Yakama and Klickitat (Griffin and Churchill 2001).

The Upper Chinookans occupied the Gorge from the vicinity of the mouths of the Sandy and Washougal rivers east to the Deschutes River. Various Echeesh-Keen speaking groups lived to the east, including the Tenino, Klickitat, Yakama, and Umatilla. The Yakama primarily occupied territory north of the Tenino, while the Klickitat occupied inland regions to the northwest, extending to the Columbia River in the vicinity of the Klickitat River, along with Wishram peoples (Beckham et al. 1988, French and French 1998). Of these groups, the Project Area falls within territory that would have probably been used most intensively by the White Salmon, who comprised several small bands residing primarily in an area extending from about ten miles below The Dalles to the White Salmon River area, especially at the mouth of this river, although they lived away from the river as well (Ruby and Brown 1992).

During the nineteenth century, White Salmon usage most notably overlapped with the Klickitat, the Echeesh-Keen-speaking group primarily occupying the upper drainages of the Klickitat and White Salmon rivers. Several villages were found at the mouth of the White Salmon River, including at least one that was shared with the Klickitat (French and French 1998, Ruby and Brown 1992, Spier and Sapir 1930). White Salmon winter villages were found upriver along the White Salmon near the contemporary communities of Husum and BZ Corner, and along Rattlesnake Creek to the north (Griffin and Churchill 2001). Use of *Namnit* (45SA22), an important ethnohistoric period fishing village at the mouth of the White Salmon River, continues into the present.

Less information appears to be available in the historic record regarding traditional use of the Little White Salmon River west of the White Salmon River. Another important village site was situated at the mouth of the Little White Salmon River: *Skatxlmmax,* or ‘eating place,’ and *sqtdalpt*, or ‘it keeps tearing out’, both refer to the village located at modern-day Cook along the Columbia River (French and French 1998). Salmon came to spawn here, and in winter whitefish could be taken from the spawning pools (Nielsen 1959). A trail from Drano Lake traversed the east side of the river into the upper valley. Two main huckleberry fields, including Big Huckleberry Mountain on the south side of the lava beds and Little Huckleberry Mountain towards the headwaters of the Little White Salmon River, were frequented. Bark was peeled from many cedar trees along this trail for use in basket making. The racetrack near Red Mountain was the location of a big annual social event held in conjunction with the berry picking and drying (Nielsen 1959).

The Upper Chinookan and Echeesh-Keen peoples followed a similar seasonal pattern of subsistence activities, except that the former relied more heavily on fish than the latter (Griffin and Churchill 2001). In winter, limited hunting and fishing took place but subsistence was based on stored foods. With the arrival of the spring Chinook salmon, people would gather roots in the nearby hillsides. After the snow packs melted away, movement into the uplands occurred since fishing sites were usually inundated. Dried roots would then be hauled to the winter villages for storage in semi-subterranean cellars. Important spring gathering areas included Camas and Panakanic prairies, Deadhorse Meadow, and the Snowden area. Following the spring root gathering, people returned to the fishing areas along the major rivers to fish for blueback and

Chinook salmon, and women would gather golden currant, gooseberry, dogwood, service berry, and choke cherry from the river and nearby uplands. A type of tobacco was planted and harvested by Chinookans (French and French 1998). In late summer and early fall, huckleberries were picked in the uplands near Mt. Adams, and hunting for deer and elk occurred. Toward late fall, the winter villages would be reoccupied. The White Salmon River was a focal area for tule salmon harvested in the fall that attracted many families to the region (Griffin and Churchill 2001, Norton et al. 1983, Schuster 1998, Winthrop and Meninick 1996). The fishing village at the mouth of the White Salmon River also functioned as a minor trading center (Griffin 2001).

In sum, the ethnographic and ethnohistoric context indicates that the Project Area is situated along a high-elevation ridgeline about two to three miles from two ethnographic riverine village sites, and within approximately one mile of the Little Salmon River valley, which would have formed a natural travel corridor providing access from the Columbia River to upland regions to the north, such as the popular berry picking grounds in the Mount Adams country. No specific reference to the promontories that are in or near the Project Area, now known as Chemawa Hill or Underwood Mountain, were encountered in the reviewed literature, but proximity to known village sites suggests these high places and the adjacent ridgelines composing the Project Area could have been visited occasionally for non-residential, transient uses such as for spiritual activities, burials, or resource acquisition activities related to hunting, cedar peeling, plant gathering, and berry picking.

Historic Background

The first white pioneers to settle the section of the Columbia River between the Cascades and the confluence of the Snake River were reportedly the Joslyn family, who arrived at the White Salmon flats in 1852 and attempted to purchase their lands from the local Klickitats, in addition to filing a Donation Land Claim (McCoy 1987). Increased settlement by whites led to the creation of reservations throughout the region during the 1850s. Fourteen tribes and bands were signatories to the Yakama Treaty of June 9, 1855, when the Yakama ceded around 11 million acres to the US Government, while retaining rights for hunting, fishing, and gathering at traditional locations, and agreed to the establishment of the 1.3 million-acre Yakama Reservation. The White Salmon Reservation was temporarily established at the mouth of the White Salmon River at the Joslyn claim in 1856 for around 800 Native peoples who were not active in the Yakima War of 1855–1856, during which time a coalition of interior tribes led by Kamiakin fought against the US Army and local settlers. At the end of the war two years later, the White Salmon Reservation was closed and residents were removed to the Yakama Reservation. Some avoided relocation and claimed lands their families had traditionally used, including around Northwestern Lake and along the area's minor drainages such as Buck Creek. Although a few took up farming, most continued to practice traditional subsistence activities at traditional places such as the Underwood In Lieu Site (Griffin and Churchill 2001).

The Underwood town site, located about six miles southeast of the Project Area and along the Columbia River, was among the earliest of the pioneer settlements in this portion of the Columbia River Gorge. Amos Underwood was a contemporary of the Joslyns who arrived in the region in 1852 and married Chief Chenowith's daughter, Ellen. In 1861, Amos and Ellen Underwood built a log house at the site of the present town bearing their name, as well as a dock and pier to accommodate sternwheelers. Amos' brother Edward Underwood also settled here and his house reportedly served as an Indian gathering place, especially in the fall during the salmon runs on the White Salmon River (Thun 1959). The Underwood brothers platted a town site in 1904, in anticipation of growth related to the construction of the Spokane, Portland, & Seattle Railway beginning the following year (McCoy 2003).

The upper drainage of the Little White Salmon River Valley, including the location of the proposed alternate site for the Operations and Maintenance facility along Willard Road, was not homesteaded until the 1880s and 1890s, when the more desirable lower-elevation lands had already been taken (Thun 1959). There were a reported 35 homesteads from Cooks to the present day Oklahoma park at the head of the river (Nielsen 1959). A review of late-nineteenth century General Land Office maps (BLM 2009a) dated 1876 does not depict any settlement or other features of historic interest in or near the Project Area.

The history of the White Salmon and Little White Salmon region has a long association with the logging industry. Initially, the Menominee Lumber Company cut the easily-accessible timber into logs that could be floated down the White Salmon River.. Oxen and horses were used to drag the timber, which traveled across several constructed rollaway dams before reaching the Columbia River, where they were rafted for towing to the Hood River mill (McCoy 1987). Wind River Lumber Company succeeded Menominee, using their dams along the White Salmon as they removed virgin timber from the Buck Creek, Mill Creek and Underwood Mountain areas (McCoy 1987). It was at this time that the upland forests of the Project Area were probably first harvested.

As of 1896, there were seven sawmills operating in Skamania County, the most notable of these being the Oregon Lumber Company's along the Little White Salmon River (Price 1896). After the logging of Underwood Mountain was complete, the Oregon Lumber Company established the Mill A sawmill and headquarters along the west side of the Little White Salmon River, and another sawmill at Chenowith Flat on the east side of the Little White Salmon River at what was known as Mill B (less than one mile to the south of the proposed Maintenance Yard Alternative Location at Willard Road) (Attwell 1975, McCoy 1987). There were flumes on both sides of the river that carried the lumber to the Columbia (Atwell 1975). When the supply of timber became more difficult to access, the company closed the mill in 1907, and moved it to Oregon (McCoy 1987, Nielsen 1959, Thun 1959).

Broughton Lumber Company was established around 1916 by Harold Broughton and D.M. Stevenson, who operated a mill at Willard along the Little White Salmon River. Using water diverted from the Little White Salmon River,, Broughton Lumber Company transported the timber via a flume connecting the mill at Willard to the Columbia River, and then rafted the logs across the river to Oregon for railroad transport. The flume originally consisted of a 4.5-mile long segment from Willard to Drano Lake, and was constructed by the Drano Flume Company around 1913. In 1923, Broughton purchased the Drano Flume Company and expanded their operation by building an additional 4.5 miles of flume from Drano Lake eastward along the Columbia River to a new resaw and planing mill located along the railroad near Underwood (McCoy 1987, Thomas 2007). Following its completion, boards could travel the nine -mile long flume to the planning mill in less than an hour.

From 1923 to about 1940, Broughton Lumber Company constructed and operated a railroad for transport of logs to the primary mill. Two steam engines were used and a maximum of nine miles of track that were laid to haul timber from the woods to the mill at Willard,, but the tracks had no permanent location, as they were moved and re-laid as necessary. The Broughton Lumber Company operation closed in 1986, and portions of the flume from Willard to the Columbia River were dismantled by the company shortly thereafter (Thomas 2007).

The logging activity that cleared extensive areas on Underwood Mountain in the early-twentieth century opened up these lands for orchard use at the same time. Settlement occurred quickly as a result of the "Apple Boom," the period between 1905 and 1920 when vast orchards were planted along the White Salmon Valley, on Underwood Mountain, and elsewhere throughout the region. In 1908, the completion of the railway across the north shore of the Columbia River contributed to this influx of residents. White Salmon emerged as a main trading center by 1910, and fruit packing plants were established along the railway (McCoy 1987 and 2003).

Land patents were filed relatively late, from 1905 to 1910, for the high elevation ridgelines that characterize most of the Project Area (BLM 2009b). The correlation of the land patent dates with the regional orchard boom and railroad completion date in the Project Area is suggestive of prospective claims either for orchards or as investments for lumber resources. It has not been determined how many of the early-twentieth century claimants actually resided on their parcels. A 1929 USGS Hood River topographic quadrangle depicts the presence of one residential structure, an access road, and a trail within the Project Area.

Orchard growers at Underwood initially attempted to irrigate their crops with water pumped from the White Salmon River, but when the pump house was washed away by a flood, they attempted to take water out of Little Buck Creek using a gravity flume until the flume burned. Irrigation was not restored, and some orchard growers and farmers lost their land by foreclosure due to inability to pay taxes. A hard freeze in 1919 killed many apple trees, and several growers switched to winter pear crops (Thun 1959). Commercial orchards generally failed in the White Salmon Valley due to dry land and lack of organized irrigation, severe winters, and a short growing season at higher elevations. Many orchards were simply abandoned and reclaimed by second-growth timber (McCoy 1987 and 2003).

Improvements in transportation along the north shore of the Columbia River occurred after the 1919 opening of the North Bank Highway, especially when the five tunnels west of Underwood were completed in 1937. The Hood River to White Salmon Bridge was opened in 1924 (McCoy 2003), further connecting the economies of the two towns.

3.10.2.2 Cultural Resources Overview

Tribal Consultation and Traditional Cultural Resources

Based on the archival review, no specific traditional cultural properties or sacred sites are documented within the Project Area. Given that this information is culturally sensitive, however, the reviewed records are not likely to contain specific references to traditional or sacred sites that could occur within the Project Area and tribal consultation is required to address their potential presence (Parker 1993). ~~BPA will conduct the government-to-government tribal consultation for this project as per Section 106 of the NHPA.~~

To incorporate tribal involvement at an early stage in the process, the Applicant initiated contact with the Confederated Tribes and Bands of the Yakama Nation. The Applicant invited the participation of both the Yakama Nation Cultural Resources Department and two local resident tribal members to assist with the identification of potential sensitive, traditional, and/or sacred resources.

Through the Yakama Nation's Cultural Resources Program (CRP), the Applicant requested participation of tribal members for the archaeological field inventory, sponsored a field trip to the Project Area, and solicited ~~has attempted to solicit~~ concerns with regard to potential cultural resources of importance to the tribe. The Applicant contacted the Yakama Nation Cultural Resources Department to review their confidential data sources and to report any potential areas of sensitivity, as appropriate, so that these areas can be avoided and protected early in the planning process. A field investigation by Yakama Nation cultural resources specialists occurred in December 2009. During this investigation, members of the Yakama Nation determined that there is a Traditional Cultural Property (TCP) within the Applicant's APE. Due to the sensitive nature of the TCP, specific information regarding the type of TCP has not been included within this EIS. However, sacred sites such as these are important to the Yakama people of today and of the future. The Yakama Nation expressed opposition to construction of wind turbines within this area and recommended that the proposed Project be redesigned to avoid placing turbines on Chemawa Hill, or if full avoidance was not possible, then buffered zones should be established to protected the relevant features. In addition, the Yakama Nation also recommended avoidance of the Haran Farmstead. ~~The Yakama Nation's findings, currently in preparation, will supplement the information contained in this EIS.~~

Separate from Yakama Nation ~~Cultural Resources Department~~, the Applicant invited the participation of two local residents, also members of the Yakama Nation, who have long-standing ties to the area. Chief Wilbur Slockish of the Klickitat Tribe and Chief Johnny Jackson of the Cascades Tribe met with URS archaeologists prior to the November 2009 field inventory and jointly toured the Project Area. Both individuals stated that based on their knowledge of this area, the Project Area was not specifically used by their ancestors or contemporary Indians. Neither individual identified any traditional cultural properties or other sensitive or sacred sites within the Project Area.

BPA initiated consultation with the DAHP, The Confederated Tribes of the Umatilla Indian Reservation, The Cowlitz Indian Tribe, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission pursuant to 36 CRF 800.4(a)(4). On May 27, 2010, the Yakama Nation provided is cultural resources review and consultation report. On September 10th, 2010, BPA received a letter from the Yakama Nation stating that they did not agree with BPA's interconnection APE and believed that it should include the Applicant's APE as well. A BPA archaeologist spoke with a Yakama Nation archaeologist on March 31st,m 2011 regarding the APE. The Yakama Nation archaeologist noted that the Project application is undergoing an adjudicative review through EFSEC. On May

2, 2011, BPA representatives and Yakama Nation representatives met to discuss the Tribes' request for an expanded APE. It was discussed that BPA has no jurisdiction over siting of wind development facilities, a matter left to Washington EFSEC, and that BPA's APE and Section 106 review was limited to the proposed interconnection.

The Yakama Nation participated in part of the adjudicative process as an intervener. The Yakima Nation formerly withdrew its adjudicative testimony before the adjudicative hearing began. The Applicant is committed to continue working with the Yakama Nation throughout the life of the Project. This includes adjusting the number of proposed towers to be located on Chemawa Hill.

~~The Yakama Nation and EFSEC went to adjudication due to issues regarding the cultural resources, including the the TCP located within the Applicant's APE. An agreement was reached between the Yakama Nation and EFSEC. In addition, in part in response to the Yakama Nation's concerns, the Applicant reduced the number of towers located on Chemawa Hill. The Applicant also agreed to continue consultation with tribally-designated representatives as specific construction and siting occurs on Chemawa Hill and make adjustments where practicable to do so to address culturally sensitive areas.~~

Previously-Recorded Cultural Resources in the Project Vicinity

The DAHP maintains a state-wide database of previously-recorded cultural resource sites, historic register properties, and completed inventories. The locations of the cultural resource sites (e.g., archaeological sites) are managed as restricted access information. The locations of historic register properties (e.g., buildings and structures listed on the state or national register) are non-restricted information.

The DAHP database does not have any record of previous inventories within the Project Area including both the Applicant's and BPA's APEs. Prior inventory coverage in the general vicinity depicts a few small, scattered inventories in upland areas near Underwood Mountain, mostly related to development review projects in the Columbia River Gorge National Scenic Area. A limited linear inventory for a proposed timber sale occurred adjacent to and north of the Applicant's APE and did not identify any resources (Stilson 2005). In general, few inventories have been completed in the vicinity; those that have been completed are limited in scope and do not allow for comparisons or predictions to be made about the types of resources that could be found in the Project Area. Intensive inventory coverage has only occurred along the White Salmon River drainage several miles to the east of the Project Area, where numerous pre-contact and historic period sites have been identified.

One cultural resource was previously-recorded within the Project Area, consisting of the Broughton Lumber Company flume (45GP596). The flume formerly paralleled Willard Road at the western boundary of the alternative location for the Maintenance and Operations facility. The flume was dismantled and removed from this area following the 1986 closure of the mill along the Columbia River. Although sections of the historic flume are still present elsewhere, none remain in the Project Area. This site therefore reflects a former alignment rather than extant physical remains.

Within a one-mile radius of the Project Area are two additional sites: a mortar and peeled cedar found about 0.5 mile west of the Maintenance Yard at Willard, and an early-twentieth century debris scatter associated with an old homesite, found about one mile north of the APE within a similar forested, upland setting. No historic register properties (e.g., buildings and structures) are found within the Project Area or within 1.5 miles of the Project Area based on the DAHP database.

In general, the density of cultural resources is greatest along the White Salmon River to the east, with scattered resources also found along the north shore of the Columbia River. Most archaeological research in the area has focused on riverine sites found along the Columbia River, and, more recently, along the lower White Salmon River. Fewer non-riverine archaeological sites have been documented in the general area, with several archaeological sites, mostly historic period, found in the Underwood Heights vicinity, several miles from the Project Area. It is unclear whether the higher site density documented along the White Salmon River is reflective of more intensive survey coverage, more intensive use of this area, or both, as compared to the Little White Salmon River. However, it appears unlikely that the higher elevation Project Area would have the same density of sites as the riverine areas along the Columbia and White Salmon rivers.

3.10.2.3 Project Area Inventory

A preliminary cultural resources inventory of the Project Area was conducted in 2003, based on the Project design at that time (Ballentyne 2003). Because the proposed Project Area was subsequently revised and expanded, a new survey was completed in 2009 (URS 2010). A wider survey corridor of 650 feet for the turbine strings necessarily overlapped the 2003 inventory's 300-foot wide survey corridor. Much of the Project Area was therefore inventoried on two separate occasions, six years apart. The two survey areas are shown on Figure 3.10-2.

The 2009 URS inventory of the Project Area consisted of a pedestrian survey of the 384-acre APE where direct impacts to cultural resources could occur both within the Applicant's APE and BPA's APE. Prior to the field inventory, oral interviews were conducted with the landowner and local tribal informants, and historic maps and historic and modern aerial photos were reviewed to identify potential resources within the Project Area.

Field Methods

An intensive pedestrian survey of the APE was conducted for this Project in November 2009 for the cumulative 384-acre combined APE. Transects were spaced no greater than 100 feet (30 meters); most were at 65-foot (20-meter) intervals or less. Survey methods depended on the Project component being surveyed and the steepness of the slopes, as well as the presence of any hazards such as burning slash piles. Slopes greater than 30 percent were usually not inventoried. In several areas, survey coverage extended beyond the combined APE, depending on the topography. Ground visibility at the time of the inventory was variable; areas that had been most recently harvested provided excellent visibility, while forested areas were found to have dense accumulations of duff, slash, and dense vegetation that obscured the ground surface. Soil exposures provided by animal burrows, cut banks, roadways, and root casts were inspected closely.

Promontories associated with the proposed turbine strings were examined for potential rock cairns, rings, walls, or other alignments that could indicate sensitivity. Large old-growth stumps were examined for evidence of scarification, and large boulders were examined for evidence of petroglyphs, pictographs, or processing activities. The inventory was especially vigilant in looking for historic features such as residences, camps, roads, railroad alignments, flumes, or other evidence of historic logging and homesteading activities.

Limited subsurface probing was conducted for this Project at the location of an historic period archaeological resource, referred to as the Haran Farmstead, recorded at the time of the 2009 field inventory. This resource is located within one of the turbine strings, and is characterized by several rock features and a small artifact scatter related to an abandoned early-twentieth century residence and fruit orchard. The subsurface probing investigation employed close-interval systematic, as well as intuitive, sampling methods. Shovel probes were placed at close intervals around each of the recorded rock features to determine whether any associated archaeological deposits could be identified. Wider-spaced, systematic (20 to 30-meter interval) probes were placed within the lower-probability former orchard fields and within expansive areas found between several the rock features, where no surface artifacts were observed, to determine the presence or absence of buried resources.

A total of 52 shovel probes were excavated. The probes measured 30-cm in diameter and were generally excavated at 5 to 30-meter intervals to an average depth of 50 cm. Sediment was passed through alternating screen mesh sizes, both 1/4-inch and 1/8-inch mesh sizes were utilized. All artifacts were replaced within the excavated probe after documentation; none were collected.

Prior to subsurface probing, a metal detector was used to aid in the identification of metal artifacts obscured by the layer of duff that is present across much of the site due to its forested setting. The metal detector was used intensively around each of the recorded rock features. Systematic transects of 10 to 30 meters were walked in lower probability areas such as the former orchard field. Shovel scrapes, or simple removal of snow and duff to expose the ground surface soil, were utilized as an additional method to improve surface visibility. Shovel scrapes were placed at 30-meter intervals within the former orchard lands, where probability is considered low, in order to provide additional validity to the surface reconnaissance.

Beyond the Haran Farmstead, no additional exploratory probing was conducted elsewhere in the Project Area. The majority of the potentially higher sensitivity landforms such as the ridgelines and promontories either had excellent ground surface visibility due to recent timber harvesting activities, and/or had exposed basalt rock with little potential for subsurface soils. Much of the Project Area is characterized by steep topography where exploratory subsurface testing is neither warranted nor practicable. Although Little Buck Creek crosses the Project Area within a proposed Overhead Transmission Line corridor, this area was found to be a small stream crossing surrounded by steep terrain with no areas likely to contain potential cultural resources.

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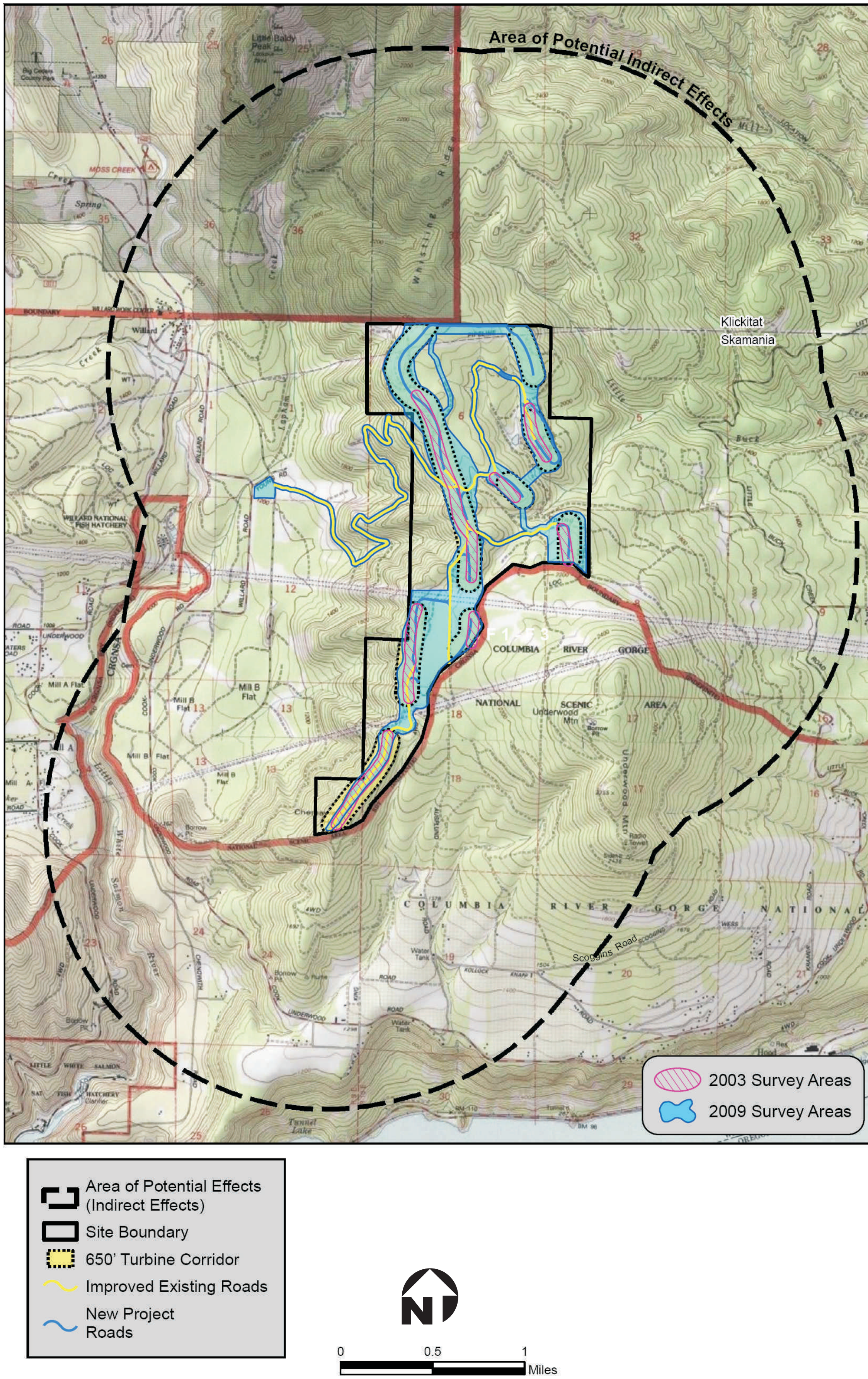

Figure 3.10-2

Cultural Resources Survey Locations

Inventory Results

The 2003 draft survey report, which was never finalized or submitted for agency review, preliminarily noted two separate resources, including an historic rock wall feature and a small, disturbed historic artifact scatter of glass, ceramics, and tin cans within a roadway (Ballentyne 2003). As part of the 2009 inventory, one historic period archaeological site, the Haran Farmstead, was identified within one of the turbine string corridors, and incorporates the rock wall feature identified in 2003. The historic artifact scatter previously documented in 2003 was not relocated during the 2009 inventory, and appeared to have been buried or obliterated by later road improvements in this same area (URS 2010).

The Haran Farmstead, documented in 2009, consists of several rock features and a sparse historic artifact scatter associated with a former rural homesite related to James A. Haran, who had a small plum orchard here around the 1920s. A total of nine archaeological features were recorded, including two rock walls[24] (probable property or field clearing boundaries), two structural rock foundations (probable residence and milking parlor), and several rock features of indeterminate function but possibly remnants of appurtenances such as privy, pump house or food storage structures. One small concentration of fewer than 20 historic artifacts, including aqua and colorless glass fragments, galvanized metal water pipes, crockery and porcelain fragments, and tin cans, also was observed. Approximately 100 to 150 artifacts, mostly metal fragments and tin cans, were found scattered across the site during a pedestrian survey supplemented by use of a metal detector.

In December 2009, URS archaeologists conducted exploratory subsurface sampling across the site to define the site boundaries and to determine the presence or absence of associated buried deposits. About 20 artifacts were encountered during the subsurface probing investigation, limited to wire nails, a water pipe, several small colorless glass fragments, and metal can or non-diagnostic metal fragments.

The NRHP eligibility of the Haran Farmstead is addressed in the Cultural Resources Inventory Report. Each of the four criteria of eligibility is applied, and aspects of integrity are addressed. The Haran Farmstead is recommended as ineligible for the NRHP, due primarily to insufficient association and altered key aspects of integrity, which limit its potential to be considered under Criterion A (association with important events), Criterion B (association with important people), and Criterion C (having important characteristics of style). For Criterion D (information potential), the results of the inventory and exploratory subsurface probing indicate there is inadequate data potential to warrant eligibility. ~~URS's recommendation for ineligibility is pending agency review and concurrence.~~

Summary

One historic period cultural resource was identified within the combined APE: the Haran Farmstead archaeological site located with the Applicant's APE, which consists of rock features

[24] The Haran Farmstead as recorded in 2009 incorporates the rock wall observed during the 2003 inventory. The other resource identified during the 2003 inventory, a small concentration of historic artifacts found within an existing access road, was not located in 2009.

and a sparse artifact scatter related to a circa 1920s orchard and residence. Systematic subsurface probes were placed within this site and did not identify significant, buried deposits. The site was recommended as ineligible for the NRHP.

Additional historic farmsteads or other sites within the Project Area are not indicated by the results of archival research, which included review of historic maps and aerial photos. Field inventory confirmed that no aboveground resources, such as buildings, railroads, or flumes, are found in the Project Area.

A preliminary review of the ethnographic and ethnohistoric literature did not document this area as having any specific association for traditional resources, though uplands such as these could have been used at least transiently, for example, for plant resource gathering or spiritual purposes. The Applicant solicited participation of the Confederated Tribes and Bands of the Yakama Nation in order to identify any potentially sensitive resources or traditional cultural properties in the Project Area. Two local tribal members with long-standing ties to the area toured the Project Area and did not identify any cultural resources or concerns. The 2003 and 2009 inventories did not observe any pre-contact Native American site types, such as lithic scatters, petroglyphs, or peeled cedars during the inventory.

Only one water source was observed during the field inventory: the outlet of Little Buck Creek, downstream of the earthen dam that was constructed in 1947 to create the "Cedar Swamp" fire pond (located outside the APE). This small watercourse is surrounded by steep terrain and is not likely to have significant, associated archaeological resources.

Promontories associated with the proposed turbine string, especially Chemawa Hill and others with panoramic views of the surrounding area, were inspected closely for potential rock cairns, rings, walls, or other alignments that could indicate sensitivity. No such features were observed. It appears that even if such resources had been present, the historic and modern logging practices would have obscured this type of resource.

A cultural resource review was also conducted by the Yakama Nation's Cultural Resources Program which identified culturally-sensitive areas, including Chemawa Hill. Chemawa Hill is located within the Applicant's APE, and the Applicant is currently proposing to place turbines at this location. Due to the sensitive nature of the site, specific information regarding the TCP will not be included in this EIS, but the area has been identified by the Yakama Nation as sacred. The Applicant has agreed to reduce the number of turbines located on Chemawa Hill and would continue to collaborate with the Yakama Nation on siting modifications where practicable.

Although the Project Area was logged at least 100 years ago, no features such as camps, historic roads, railroad features, or other evidence clearly related to the historic use of the area was observed. Large old-growth stumps are occasionally encountered, but most are in an advanced state of decay and springboard notches were not observed. No evidence for historic road alignments was observed during the inventory; existing roadways are mechanically-graded, usually rocked and graveled, modern-use alignments that lack historic distinction. As no old-growth forest remains in this area, potential sensitivity for scarified, peeled trees is not indicated.

Much of the current combined APE examined in the Cultural Resources Inventory Report conducted in 2009 was surveyed in 2003. This overlapping of inventory coverage, nearly six years apart, at different times of the year, and with the surrounding forest in different stages of harvest, provides additional support for a general absence of cultural resources to be found in the APE.

3.10.3 IMPACTS

3.10.3.1 Proposed Action

Construction

The proposed Project has the potential to affect one historic period archaeological site, the Haran Farmstead, through ground disturbance during construction of the new Project road and turbine and transformer pads. ~~The degree of impact would depend on the final location of the road and turbines.~~ The Cultural Resources Inventory Report, however, recommended this site as ineligible for the NRHP; and there were no archaeological resources identified within the BPA APE.

Construction also would have the potential to impact other, currently undiscovered cultural or historic resources. Based on the extensive inventories conducted, the likelihood of encountering additional sites is low.

There have been no cultural resources identified within the BPA APE. Within the Applicant's APE, one TCP was identified by the Yakama Nation in relation to Chemawa Hill. The Applicant has agreed to continue to work with the Yakama Nation throughout the proposed Project and will also site fewer turbines on top of Chemawa Hill.

~~Effects on traditional cultural properties or other sensitive or sacred resources that might be of concern cannot be determined until consultation with the tribes is concluded. This consultation is not expected to be completed until after the Draft EIS is issued.~~

Operation

The ongoing maintenance of the access road or emergency procedures such as fire suppression activities have the potential to cause additional impact to the Haran Farmstead or other, currently undiscovered resources.

Project Decommissioning

Project decommissioning could have impacts similar to those during initial construction, including ground disturbance from turbine, transformer and pad removal. As with construction, the degree of impact would depend on the final location of the road and turbines~~, and on the determination of NRHP eligibility for the Haran Farmstead~~.

3.10.3.2 No Action Alternative

Under the No Action Alternative, the Project would not be built and no impacts to historic or cultural resources would take place.

3.10.4 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential cultural resource impacts during construction and operation of the proposed Project to the extent feasible.

- ~~Implement avoidance and data recovery if the Haran Farmstead (a historic period cultural resource recorded within the APE) is determined to be eligible for nomination to the NRHP. The Haran Farmstead archaeological site, which consists of rock features and a sparse artifact scatter related to a circa 1920s orchard and residence. If the Haran Farmstead is determined to be eligible for nomination to the NRHP, then avoidance and mitigation measures such as data recovery would be considered to achieve a finding of no adverse effect for the project. Though none have been identified to date within the project area, properties considered as significant for reasons other than research potential, such as traditional cultural properties, may require mitigation measures other than data recovery that would be determined in consultation with the Tribe and agencies.~~

- Utilize BMPs to minimize impacts to any additional cultural or historic resources that may be encountered during construction of the proposed Project. These BMPs include preparation and use of an Inadvertent Discovery Plan, which would establish procedures to deal with unanticipated discovery of cultural resources before and during construction. The plan, among other provisions, would require immediate work stoppage and appropriate notification in the event of discovery of previously unknown cultural materials. The plan also would specify protocols for the treatment of human remains that fulfill the requirements of the Native American Graves Protection and Repatriation Act in the event that human remains and/or funerary items are encountered during construction or operation of the Project.

- Design the locations of road, turbine, and transformer to avoid and minimize impacts during construction regular maintenance operations. Although Chemawa Hill was identified as a TCP within the Applicant's APE, the Applicant has worked with the Yakama Nation to site fewer towers on Chemawa Hill and are committed to working with the Yakama Nation during the proposed Project.

3.10.5 UNAVOIDABLE ADVERSE IMPACTS

With the use of appropriate mitigation measures, the proposed Project is not expected to produce any unavoidable impacts to historic or cultural resources.

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3.11 TRANSPORTATION

This section discusses the existing network of roadways and rail, river, and air transportation in the Project vicinity, as well as the potential impact of the proposed Project on transportation.

3.11.1 AFFECTED ENVIRONMENT

3.11.1.1 Roadway Transportation

Existing Roadways

In the Columbia River Gorge, the two major roadways extending generally from east to west along the Columbia River are State Route (SR) 14 on the Washington side of the Columbia River and Interstate 84 on the Oregon side of the Columbia River. Other major roadways, such as State Routes 141 and 142 in Washington and State Routes 35 and 197 in Oregon, intersect these two highways generally in the vicinity of cities and communities located in the Gorge.

SR 14 between Interstate 5 in the Vancouver, Washington area and the Project Area is generally very narrow with 12-foot lanes and 2- to 4-foot paved shoulders. It also has many hills, and curves with tight corners in several places. East of the Project Area on SR 14, there is one low and very narrow tunnel east of the town of Lyle, Washington, and also a very narrow bridge east of The Dalles at approximately milepost (MP) 86. Between Cook-Underwood Road and SR 97 (Goldendale), SR 14 is generally narrow with 12-foot lanes and 2- to 4-foot paved shoulders. It also has some tight low-recommended-speed corners and a number of hills. Between SR 97 and the junction with SR 395/I-82, SR 14 is generally narrow with 12-foot lanes and 2- to 4-foot paved shoulders.

Existing access to the Project Area is provided by various county roads that extend northward from SR 14, along with existing private logging roads (see Figures 3.11-1 and 3.11-2). Key roads in the immediate Project vicinity include:

- ***Cook-Underwood Road.*** Cook-Underwood Road has two 12-foot lanes and paved shoulders that are 1 foot or less in width. In general, the side slope begins at the fog line. This road is under the jurisdiction of Skamania County and generally is in good condition. There are currently no over-size or over-weight load restrictions in force. The Skamania County Comprehensive Plan lists Cook-Underwood Road as Federal Functional Classification “Major Rural Collector.”

- ***Willard Road.*** Willard Road has two 12-foot lanes and paved shoulders that are 1 foot or less in width. This road is under the jurisdiction of Skamania County and generally is in good condition. There are currently no over-size or over-weight load restrictions in force. The Skamania County Comprehensive Plan lists Willard Road as Federal Functional Classification "Rural Local Access."

- ***West Pit Road.*** West Pit Road is a private logging road that connects to a network of existing private logging roads located on S.D.S. Co., LLC and Broughton Lumber Company property. West Pit Road varies in width from 20 to 26 feet. It is a dirt road covered in light pit run. This road has portions that generally are in poor condition; however, during summer 2009, various roadway improvements were made and segments of the road were widened for logging purposes.

Existing Traffic Volumes

Average annual daily traffic (AADT) values for SR 14 are shown in Table 3.11-1. Peak hour directional volumes were developed based on typical rural highway traffic patterns and proximity of business centers. Typical rural highway traffic patterns conservatively assume AM peak hour volumes to be approximately 7 percent of the total daily volumes, and PM peak hour volumes to be approximately 10 percent of the total daily volumes, with a directional split of 70/30. PM peak hour volumes are traditionally considered to by the highest during a given day. Since no current traffic data is available for Cook-Underwood Road at either the west or east junctions with SR 14, existing traffic volumes are based on typical patterns for small rural towns. Estimated 2009, 2011, and 2012 peak hour traffic volumes at the west and the east junctions of Cook-Underwood Road with SR 14 are presented in Table 3.11-2. Traffic volumes for 2011 and 2012 were based on an expected average weighted growth rate of approximately one percent per year.

Table 3.11-1
Annual Daily Traffic at West and East Junctions of SR 14 and Cook-Underwood Road

Location	Average Annual Daily Traffic (all vehicles)	
	2008	2009 (est)[a]
SR 14 – west junction w Cook-Underwood Road	3,000	3,100
SR 14 east junction w Cook-Underwood Road	3,300	3,400

Source: WSDOT (2008)
[a] A growth rate was developed for the Project vicinity using historic data from annual traffic reports between 1996 and 2008. During several years between 1996 and 2008, there was no recorded historical growth in this area. Using this data, an average weighted growth rate of approximately 1 percent per year was determined.

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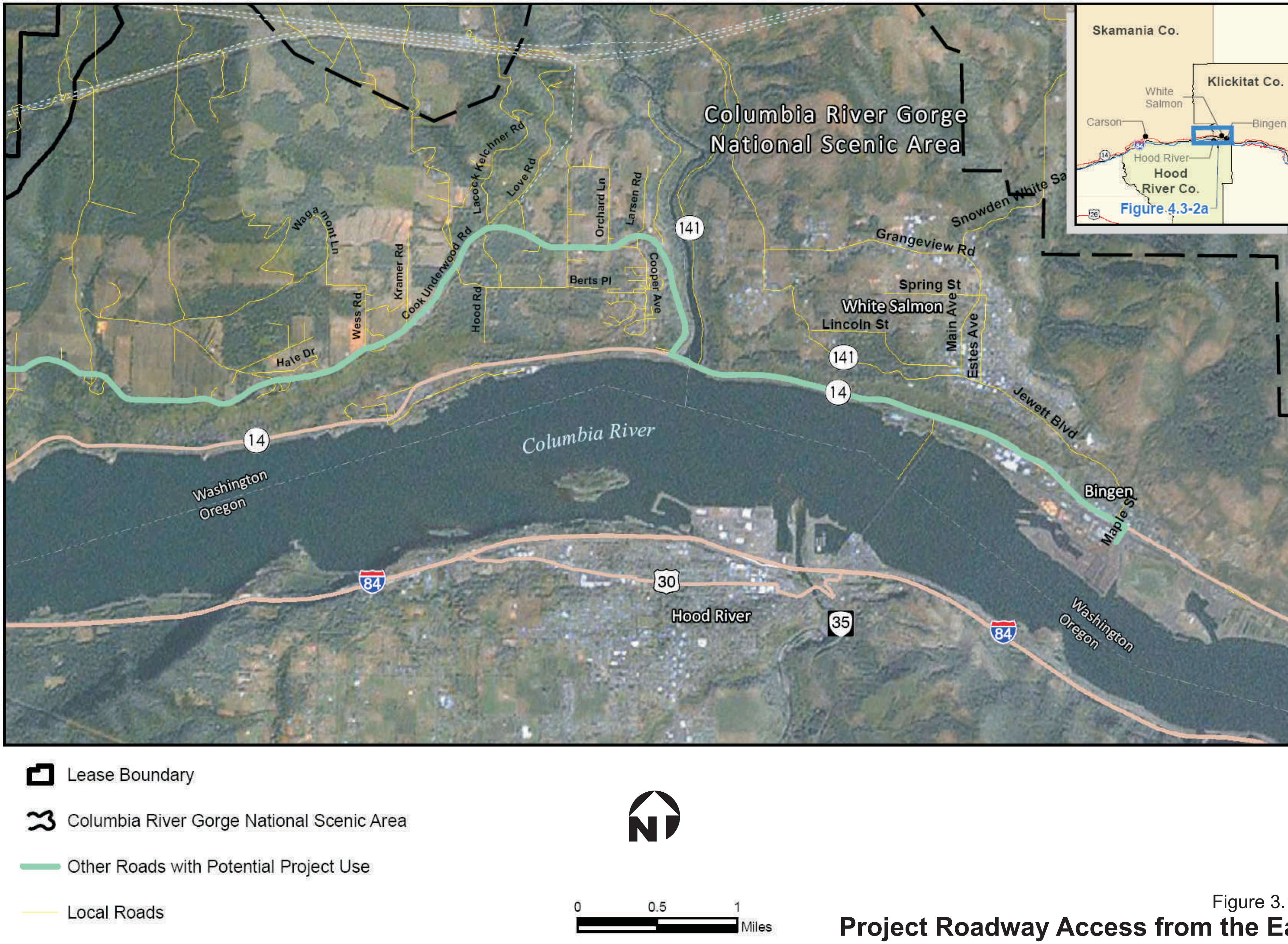

Figure 3.11-1
Project Roadway Access from the East

URS

Whistling Ridge Energy Project
Skamania County, Washington

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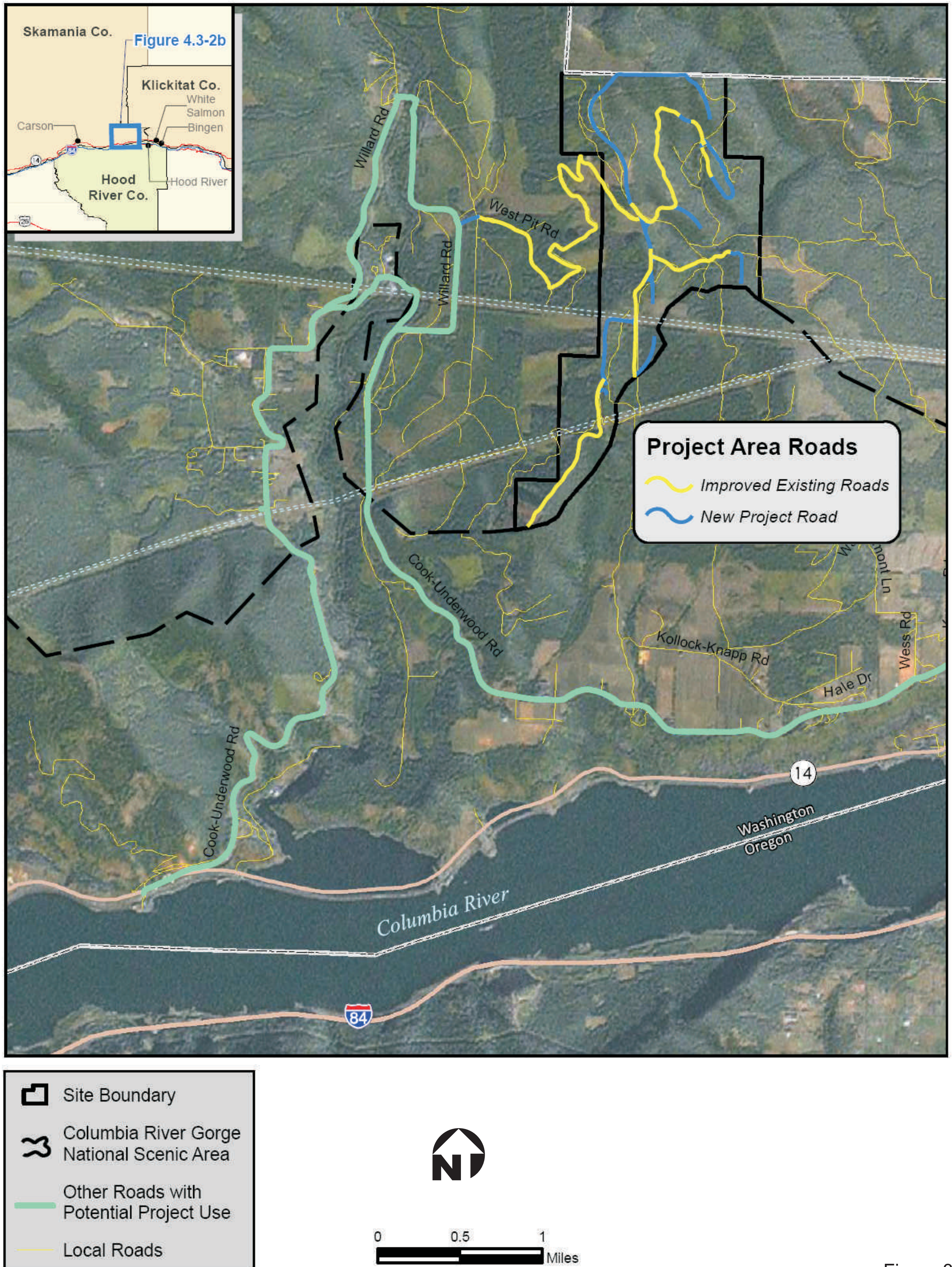

Figure 3.11-2

Project Roadway Access from the West

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Table 3.11-2
Estimated 2009, 2011, and 2012 Peak Hour Traffic Volumes at West and East Junctions of SR 14 and Cook-Underwood Road

Location	West Junction of Cook-Underwood Road with SR 14		East Junction of Cook-Underwood Road with SR 14	
	2009		2009	
	AM Peak	PM Peak	AM Peak	PM Peak
Eastbound SR 14	160	90	170	100
Westbound SR 14	70	220	70	240
Southbound Cook-Underwood Road	10	10	10	10
	2011		2011	
	AM Peak	PM Peak	AM Peak	PM Peak
Eastbound SR 14	160	100	180	110
Westbound SR 14	70	230	80	260
Southbound Cook-Underwood Road	10	10	10	10
	2012		2012	
	AM Peak	PM Peak	AM Peak	PM Peak
Eastbound SR 14	170	100	180	110
Westbound SR 14	70	240	80	260
Southbound Cook-Underwood Road	10	10	10	10

AM Peak Hour is 7:00 AM to 8:00 AM
PM Peak Hour if 4:00 PM to 5:00 PM

Existing Level of Service

Level of service (LOS) is an estimate of operational performance based on delay to motor vehicles. The *Highway Capacity Manual* (TRB 2000), which is generally used when determining LOS, defines LOS using a letter scale from A to F. LOS A is defined as minimal or no delay to vehicles and LOS F is defined as extreme delays to vehicles. LOS C or better is typically considered acceptable for rural intersections and is the LOS threshold of acceptable traffic flow for Skamania County. Table 3.11-3 presents the LOS delay criteria for two-way-stop-control intersections.

Table 3.11-3
Level of Service Criteria for Two-Way-Stop-Control Intersections

Level of Service	Expected Traffic Delay
A	< 10 seconds
B	> 10 - 15 seconds
C	> 15 - 25 seconds
D	> 25 - 35 seconds
E	> 35 - 50 seconds
F	> 50 seconds

Source: TRB (2000)

Existing LOS was estimated for SR 14 and Cook-Underwood Road, using estimated 2009 traffic volumes and the software package Highway Capacity Software Plus, which uses algorithms based on the *Highway Capacity Manual* (TRB 2000). Based on this analysis, the longest delays occur at Cook-Underwood Road during the PM peak hour; however, these delays are relatively short (see Table 3.11-4). Up to approximately 10 seconds of delay is experienced by some vehicles at the west junction of Cook-Underwood Road with SR 14 during the PM peak hour. Slightly more than 10 seconds of delay is experienced by some vehicles at the east junction of Cook-Underwood Road with SR 14 during the PM peak hour. These delays translate to LOS A conditions at the west junction and LOS B at the east junction. Delays during the AM peak hour at Cook-Underwood Road and during both peak hours at SR 14 are all less than 10 seconds, which translates to LOS A.

Table 3.11-4
2009 Level of Service Summary at West and East Junctions of
SR 14 and Cook-Underwood Road

Roadway and Turning Movement	Peak Hour	West Junction		East Junction	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SR 14 Eastbound Left Turn	AM	7.6	A	7.6	A
	PM	7.9	A	8.0	A
Cook-Underwood Road Southbound Left/Right Turn	AM	9.4	A	9.4	A
	PM	10.0	A	10.2	B

Delay = Average per vehicle

Existing Traffic Safety

Traffic safety was analyzed along SR 14 between the towns of Stevenson and Bingen for 2006 to 2008. Collision Data Summaries were obtained from WSDOT. SR 14 is functionally classified as a rural collector roadway. SR 14 between Stevenson and Bingen is located within the Southwest Region of the state of Washington. During this three-year period, a total of 158 collisions occurred between the west city limits of Stevenson at MP 43.91, and the east city limits of Bingen at MP 66.88.

Between 2006 and 2008, a total of 17 collisions occurred within the Stevenson city limits, and another 17 occurred within the Bingen city limits. Only one collision occurred at the west junction of Cook-Underwood Road and SR 14 (MP 56.28), and three collisions occurred at the east junction of Cook-Underwood Road and SR 14 (MP 63.32). Four collisions occurred at the intersection of Maple Street and SR 14 within the city of Bingen (MP 66.47). The majority of collisions occurred within Skamania County between MP 44.66 and MP 63.48. Several collisions also occurred within Klickitat County between MP 63.48 and MP 64.71, and within the White Salmon city limits between MP 64.71 and MP 65.50.

The number of collisions that occur along a given roadway is generally expressed in terms of a rate, where collision occurrence is indexed to the number of vehicles traveling on a particular length of the given roadway. The collision rate is based on the number of collisions per million-vehicle-miles (MVM) traveled. Table 3.11-5 shows collision rates for each year as well as multi-year rates for the three year period for SR 14 between Stevenson and Bingen, in addition to collision rates for the city of Bingen.

The multi-year collision rate along SR 14 between Stevenson and Bingen is 1.43 collisions per MVM. The 2007 average collision rate for all Washington state rural collector roadways was 1.65 collisions per MVM and for 2008, 1.63 collisions per MVM. The average collision rate for all Washington rural collector roadways within the Southwest Region during 2007 was 1.72 collisions per MVM, and during 2008, 1.87 collisions per MVM. The multi-year collision rate on SR 14 between Stevenson and Bingen is lower than both the 2007 and 2008 average Washington State and Southwest Region collision rates.

Table 3.11-5
Collision Numbers and Rates for Years 2006 through 2008

Location	Number of Collisions	MP Range	Segment Length (miles)	AADT (veh/day)	Collision Rate (Collisions/MVM)
2006 Data					
Stevenson to Bingen	48	43.91 to 66.88	22.97	4,500	1.27
Bingen City Limits	5	66.50 to 66.88	1.38	7,600	1.31
2007 Data					
Stevenson to Bingen	61	43.91 to 66.88	22.97	4,400	1.65
Bingen City Limits	4	66.50 to 66.88	1.38	6,700	1.19
2008 Data					
Stevenson to Bingen	49	43.91 to 66.88	22.97	4,200	1.39
Bingen City Limits	8	66.50 to 66.88	1.38	6,300	2.52
Multi-Year Data					
Stevenson to Bingen	158	43.91 to 66.88	22.97	4,400	1.43
Bingen City Limits	17	66.50 to 66.88	1.38	6,900	1.63

AADT – average annual daily traffic
MVM million-vehicle-miles

The multi-year collision rate for the city of Bingen is 1.63 collisions per MVM. The multi-year collision rate for the city of Bingen is equal to or close to both the 2007 and 2008 Washington State collision rates and is lower than both the 2007 and 2008 average Southwest Region collision rates. No average collision rate data is available for year 2006.

Transportation Plans and Programmed Transportation Improvements

Skamania County. The Transportation Element of the Comprehensive Plan represents the County's policy plan for the next 20 years and specifically considers the location and condition of the existing traffic circulation system, the projected transportation needs, and plans to address future transportation needs while maintaining established LOS standards. This plan is implemented through the Six-Year Transportation Improvement Program and Annual Construction Program. The most recent Six Year Transportation Improvement Program was approved in April 2009, and lists one improvement to Cook-Underwood Road: a resurfacing project between MP 0 and MP 3. This improvement is listed for years 4–6 of the program, or between 2012 and 2014.

Washington State Department of Transportation Statewide Transportation Improvement Program. This is a list of funded transportation improvement projects. The Transportation Improvement Program for 2009–2012 presents a list of regionally significant projects for the upcoming three years (WSDOT 2009a). A search of the project database for Clark, Skamania and Klickitat Counties showed no projects scheduled for any of the roads in the immediate Project vicinity. The only planned transportation improvement project near the Project Area is resurfacing 1.0 mile of Wind River Road.

WSDOT also is planning to improve SR 14 between Camas and Washougal, east of Vancouver. The project would widen SR 14 from two lanes to four lanes from the end of the West Camas Slough Bridge to Union Street (SR 500). Included in the project would be construction of a new bridge parallel to the existing bridge on the east end of Lady Island, and construction of a split-diamond interchange at Union Street and 2nd Street. ~~The project is planned to go to bid in 2010, and construction is scheduled to be completed in 2012 (WSDOT 2009b).~~

Skamania County and Klickitat County Regional Transportation Plans. These Regional Transportation Plans were developed by the Southwest Washington Regional Transportation Council, in coordination with other jurisdictions and WSDOT (SWRTC 2009a and 2009b). Regional transportation plans are intended to develop regional solutions to transportation needs. Both plans emphasize maintenance and preservation as priorities. Improvements are recommended to address identified deficiencies. Recommended improvements in these plans include several projects to upgrade portions of SR 14. However, funding is not provided through this planning process and these projects are not currently included in the Statewide Transportation Improvement Program.

3.11.1.2 Rail Transportation

The Burlington Northern Santa Fe Railway operates a rail mainline that runs parallel to SR 14 to the south of the Project Area. This line is a major link that ties the important industrial areas of Vancouver, BC; Portland, Oregon; and Seattle/Tacoma, Washington to the north-central states of the United States and eastern railroads via Chicago. In the Project vicinity, the Applicant currently has two rail spurs from the Burlington Northern Santa Fe mainline to an existing Applicant facility located along the Columbia River in Bingen, Washington. One spur terminates near Maple Street and is approximately 800 feet long. The second spur terminates at a plywood facility in the area and is approximately 2,000 feet long.

3.11.1.3 River Transportation

River transportation in the Project vicinity includes barge and boat shipping transport on the Columbia River, which is located about two miles south of the Project Area and runs predominantly east to west towards the Pacific Ocean. The Columbia River is a major throughway used for transporting commodities such as grain, wheat, and lumber down river from the interior Pacific Northwest to ports such as the Ports of Longview and Vancouver for shipping to various U.S. and international destinations. The Columbia River also is used to ship goods upriver to destinations in the interior Pacific Northwest. Although there are many hydroelectric dams and associated lockage facilities along the Columbia River, the only such facility between the Pacific Ocean and the Project Area is Bonneville Dam, at about river mile 146 on the Columbia River.

Barges moving upriver from the Ports of Longview or Vancouver are transported to the Bonneville Dam using tug boats. The barges and tugs bypass the Bonneville Dam via the lockage facility at the Dam. The Bonneville lockage facility accommodates commercial, government, and recreational vessels. The heaviest lockage traffic on average occurs during the month of August. Vessel traffic is typically heaviest on Thursdays, Fridays, Saturdays, and Sundays. River vessels then continue upriver past the applicant facility in Bingen. At this Applicant facility, there is a dock and crane suitable for unloading heavy materials and other equipment.

3.11.1.4 Air Transportation

Air transportation in the regional area includes the Portland International Airport approximately 60 miles southwest of the proposed Project Area, and several other smaller public and private local airports within a 10-mile radius.

3.11.2 IMPACTS

To determine potential transportation impacts, the Skamania County Public Works Department Manager, the County Engineer, and the Maintenance Superintendent were consulted. Potential impacts to potential Project access routes were considered, and levels of service were estimated for the construction and operation periods. Impacts were considered high if they would result in a decrease in LOS to below the Skamania County standard of LOS C at a given intersection after mitigation. Impacts would be moderate if the Project would result in a modest change to traffic volumes, patterns, or LOS. Impacts would be low if the Project would result in no noticeable change to traffic volumes, patterns, or LOS. Potential impacts to rail, river, and air transportation also were evaluated to determine whether there would be significant increases in uses or interference with their operations.

3.11.2.1 Proposed Action

Construction

Impacts to Project Vicinity Roadways

During Project construction, various types of construction vehicles would access the Project Area. Most Project construction vehicles would be expected to travel to the general Project vicinity via SR 14 since it is the most convenient major highway leading to the area. From SR 14, the construction access route would follow Cook-Underwood Road to Willard Road, and then use a short segment of newly-constructed roadway to access West Pit Road (see Figure 3.11-2). From West Pit Road, construction vehicles would use a network of existing, improved, and new private logging roads at the site to access areas where Project facilities would be built (see Figure 3.11-3).

Project construction would last for approximately one year, and would involve transport of large wind energy components, such as the tower sections, the nacelle and turbines, and blades, to the Project Area during a two to three month period. All wind energy components initially would be delivered from their manufacturing points to one of two ports in Washington state – either the Port of Longview or the Port of Vancouver. From these Ports, the Project components would be transported to the Project Area. Potential methods for transporting these materials to the Project Area include:

- Using specialized trucks that would use existing State, County, City, and private roadways to deliver the components directly to the Project Area;
- By train via the existing Burlington Northern Santa Fe rail lines that run parallel to SR 14 to deliver the components to an existing Applicant facility in Bingen, Washington, and then using specialized trucks to deliver these components to the Project Area; and
- By barge and tug boat up the Columbia River and through the lockage facility at the Bonneville Dam to the Applicant's existing facility in Bingen and then via specialized trucks to the Project Area.

Potential impacts associated with specialized trucks are discussed in this subsection of the analysis; the rail and river transport options are discussed later in this section. The specialized trucks used for transporting wind energy components could have loads as high as 17.5 feet tall measured from the ground to the highest point of the load, as wide as 14.5 feet, and/or as long as 150 feet. While most of these trucks would not exceed the WSDOT legal load limit, some trucks could have a gross vehicle weight in excess of 105,500 pounds. Trucks with loads in excess of the legal load limit could degrade the condition of the existing roadways along the proposed haul route, and may require additional axles in order to distribute the weight of the load. Permits would be required for all oversized and overweight vehicles.

Most specialized trucks delivering components directly from either of the Ports to the Project Area would be expected to use SR 14 to the west junction of Cook-Underwood Road with SR 14 at MP 56.28 (see Figure 3.11-2). These trucks would encounter restrictions on SR 14 that are summarized in Table 3.11-6, and could require additional traffic control measures. However, SR

14 would not require improvements to accommodate the trucks the transport of wind energy components.

Due to the road constraints discussed in Section 3.11.1.1 and identified in Table 3.11-6, the use of specialized trucks on SR 14 may not be physically possible for some extremely large or wide loads. An alternate route would be for trucks to use I-84 through Oregon to the Boardman junction, then along SR 730 to the junction of I-82 with SR 395, across the Columbia River back into Washington State and then to SR 14. Trucks traveling on SR 14 in this direction, between the junction of I-82/SR 395 and Cook-Underwood Road, would be constrained by one very narrow tunnel with a height restriction of 13 feet 3 inches measured vertically from the edge of the roadway. There also are several additional Columbia River crossings west of the I-82/SR 395 crossing, but each has weight restrictions that would prohibit the transport of wind energy components. These crossings include the Bridge of the Gods, the Hood River Bridge, SR 197, and SR 97.

Table 3.11-6
Road and Bridge Restrictions for Oversize Motor Vehicles on SR 14
(all restrictions apply in both directions)

Milepost	Height[a]	Width	Length
18.89 to 34.68 (west of Project)	Loads over 10' wide require 1 front and 1 rear pilot cars		
19 to 56 (west of Project)		Loads over 14' wide require 2 front and 1 rear pilot cars	
19 to 83.53 (west and east of Project)			Loads over 125' – trailer/load length prohibited
56.28 to 63.25 (west of Project)	All over-height (14') loads must contact WSDOT Goldendale Office Detour via Cook-Underwood Road must be approved by Skamania County	No loads over 12' wide allowed Loads between 8.5 and 10' wide require 2 front and 1 rear pilot cars	
65 to 65 Hood River Bridge Crossing (east of Project)		No over-width loads allowed	
76.77 to 76.91 (east of Project)	All over-height (14') loads must contact WSDOT Goldendale Office	Loads over 10' wide require 2 front and 1 rear pilot cars	

[a] Heights are measured from the ground to the highest point on the load.

For wind energy components transported either by rail or barge as discussed below, these components would be delivered from either of the Ports to the existing Applicant facility in Bingen, Washington, and then loaded onto specialized trucks at this facility. The trucks would then transport the components to the Project Area. The route for these trucks would include approximately 0.25 mile of Maple Street in Bingen, Washington. Maple Street was recently constructed and is in good condition. Maple Street has two 12-foot lanes, a wide concrete sidewalk on the east side, and a paved shoulder on the west side. There are currently no oversize or overweight restrictions for this road.

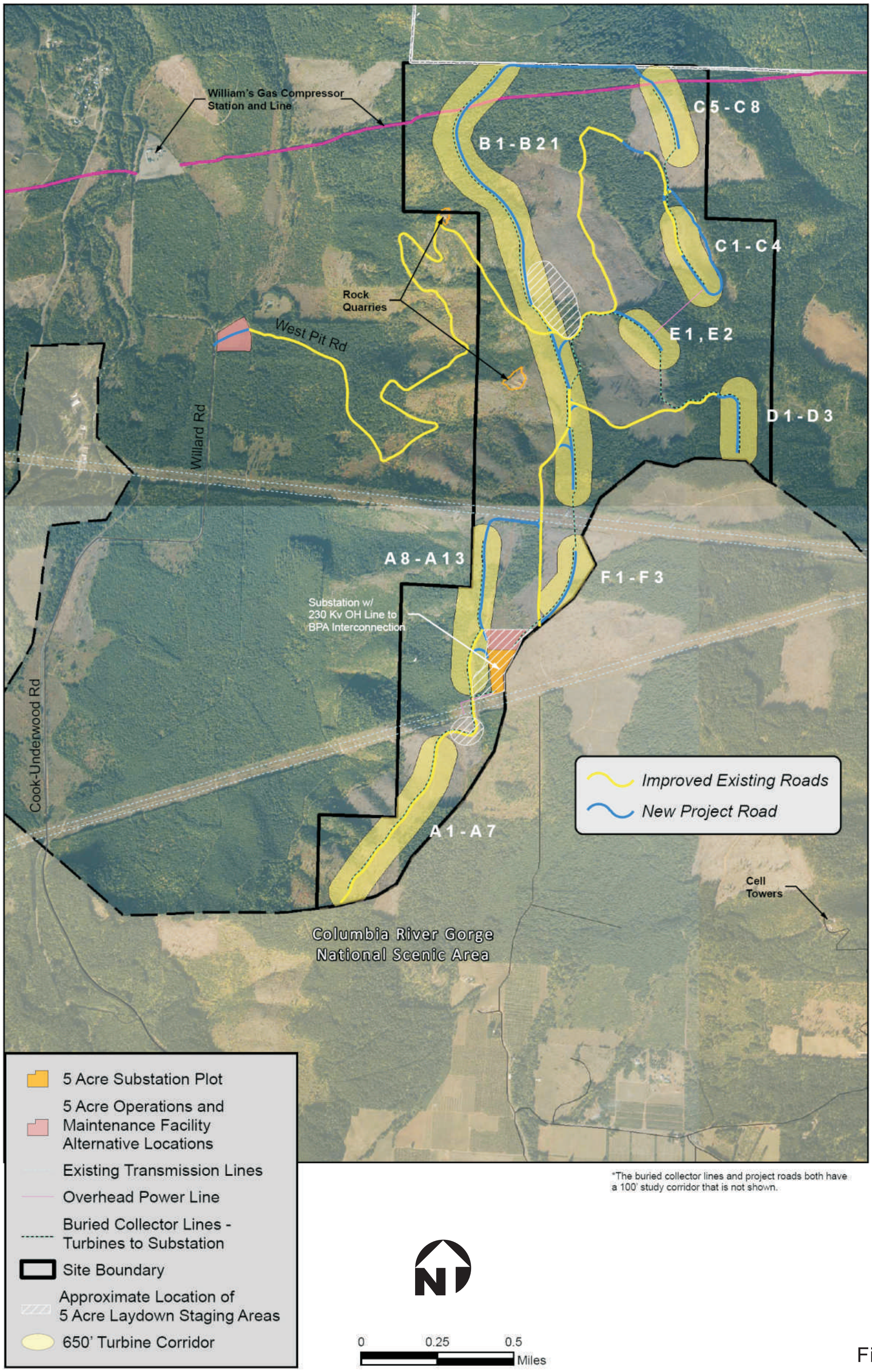

Figure 3.11-3

Project Site Roadway Network

Source: GeoDataScape.

URS

Whistling Ridge Energy Project
Skamania County, Washington

Specialized trucks leaving the Applicant's facility would then follow SR 14 to the east junction of SR 14 and Cook-Underwood Road at MP 63.32. This portion of SR 14 has a restriction on loads over 125 feet in length. Special provisions and/or permitting may be required to transport the turbine blades (the longest components) to the junction of SR 14 and Cook-Underwood Road at MP 63.32 from the junction of SR 197 (MP 83.50).

Improvements to County and private roads between SR 14 and the Project Area would be necessary to support the long and heavy loads that would be required for the delivery of the wind energy components. These improvements would include widening and rebuilding sections of the existing roadway network, as well as placing asphalt on some roads that would be used for hauling equipment and Project components to the Project Area. All existing county roadways requiring improvements prior to hauling would be designed and constructed in accordance with the WSDOT *Design Manual* (WSDOT 2007) and *A Policy on Geometric Design of Highways and Streets* (AASHTO 2004).

Cook-Underwood Road contains a bridge that crosses the Little White Salmon River near its northernmost point at approximate MP 5.5. Specialized trucks would be required to meet Skamania County provisions for oversized and overweight loads. Cook-Underwood Road would require no improvements to accommodate the transport of wind energy components. However, specialized trucks transporting wind energy blades, the longest single wind energy component, eastbound on SR 14 onto Cook-Underwood Road at MP 56.28 or westbound onto Cook-Underwood Road at MP 63.32 would require a 135-foot inside turning radius, and a 20-foot allowance for "tip swing."

In addition, temporary widening of the intersection of Cook-Underwood Road and Willard Road would be required to accommodate the required truck turning radii for westbound trucks transporting wind energy blades to the Project Area. Widening could include removal of some trees and vegetation, and engineered fill sections and embankment cut sections. The engineered fill and embankment cut sections would not require paving, but would require an all-weather driving surface. The exact amount of right of way or easement that might be required from adjacent property owners would depend on the turbines chosen, and would be determined during final design. Following construction, the area would be re-vegetated. No other improvements would be required along Willard Road to accommodate the transport of wind energy components

A new direct connection across property owned by the Applicant would be required between Willard Road and West Pit Road for transport of larger Project components to the Project Area. The intersection of Willard Road and West Pit Road would be designed to accommodate the required truck turning radii. In addition, West Pit Road would require additional permanent widening to accommodate transport of wind energy components to the Project Area. West Pit Road would be improved to provide a minimum drivable section width of 25 feet (width of finished road), with an additional 5 feet of shoulder on either side, with allowance for side slope and drainage. The one existing culvert, which was upgraded during the summer of 2009, may need some additional lengthening if the roadway is widened over the culvert. Widening could include removal of trees and vegetation, and engineered fill sections and embankment cut sections. The engineered fill and embankment cut sections would not require paving, but would require an all-weather driving surface.

Roadway Construction in the Project Area

To provide access to all of the proposed wind tower locations, approximately 7.9 miles of existing roads would be improved and about 2.4 miles of new private access roads would be constructed at the Project Area (see Figure 3.11-3). All roadway improvements and new construction at the proposed Project Area would be designed and constructed in accordance with the standards for the applicable road classifications as set forth in the Skamania County Private Road Guidelines and Development Assistance Manual, as adopted by the County Resolution in 2008.

New gravel roadways would extend toward and run along the turbine strings. Roads extending towards the turbine strings would be designed for a minimum drivable section width of 25 feet with allowance for side slope and drainage. Roads running along or between the turbine strings would be designed for a minimum drivable section width of 25 feet with an additional 5-foot section on both sides to accommodate drainage and clearance for the Project crane that would be on site to assemble the tower sections, the nacelles, and blades. All newly constructed roads would be constructed with an all-weather driving surface.

During construction, parking would be located at the construction staging area and along the proposed Project Area access roads. Parking along turbine string roads would be primarily for those employees working on foundations, electrical infrastructure, and turbines. Vehicles would park in areas that would be already temporarily or permanently disturbed from other construction activities. No additional ground disturbance would occur solely for construction parking requirements.

Impacts to Traffic Volumes and LOS

During Project construction, there would be an increase in traffic activity in and around the Project Area due to the construction workforce, equipment deliveries, and empty trucks returning to SR 14. Traffic delays could occur on Project Area roads due to the maneuvering of large vehicles carrying heavy and/or long loads. In addition, it is expected that approximately 265 personnel would be on site at the same time while multiple construction disciplines conduct work concurrently. Between 65 and 75 percent of the construction labor force would most likely be hired from the cities of Portland and Vancouver; of these, most are expected to commute daily to and from the Project Area. The remaining 25 to 35 percent of the work force would most likely be residents of Skamania, Klickitat, and Hood River counties.

Traffic volumes during construction were estimated for the west and east junctions of Cook-Underwood Road with SR 14. The estimated traffic volumes assume that all construction vehicles related to Project construction would travel through either the east or the west junction Cook-Underwood Road with SR 14; if other routes were used, the actual impacts to these junctions would be less.

Table 3.11-7 compares estimated traffic volumes without the proposed Project to estimated traffic volumes with the proposed Project during the peak construction period. As shown in this table, it is expected that at the peak of construction (a period of three to five months) during the AM peak hour, approximately 210 construction vehicles would travel through either junction of SR 14 and Cook-Underwood Road. During the PM peak hour, approximately 10 construction vehicles would be expected to travel through this same junction. Also during this construction peak, an increase of up to 275 vehicles total would be southbound on Cook-Underwood Road from the Project Area during the PM peak hour.

Table 3.11-7
Estimated 2011 Traffic Volumes
During Peak Construction Period

Location	West Junction of Cook-Underwood Road with SR 14				East Junction of Cook-Underwood Road with SR 14			
	2011 Without Project		2011 With Project		2011 Without Project		2011 With Project	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Eastbound SR 14	160	100	370	105	180	110	390	115
Westbound SR 14	70	230	160	240	80	260	170	270
Southbound Cook-Underwood Road	10	10	20	285	10	10	20	285

AM Peak Hour is 7:00 AM to 8:00 AM
PM Peak Hour if 4:00 PM to 5:00 PM

Peak-hour LOS analyses were completed for both the west and east junctions of SR 14 and Cook-Underwood Road using estimated 2011 traffic volumes, including non-project traffic and traffic related to construction. The analysis assumed that 65 to 75 percent of construction traffic trips would travel to and from west of the Project Area on SR 14, and 25 to 35 percent of construction traffic trips would travel to and from east of the Project Area on SR 14. Many of these trips would occur outside of the peak periods, depending on their origin location and start time. Analyses results are presented in Table 3.11-8.

Table 3.11-8
Level of Service During Construction

Location	Peak Hour	Estimated 2009 LOS		Estimated 2011 LOS			
				Without Project		With Project	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
West Junction of Cook-Underwood Road							
SR 14 Eastbound Left Turn	AM	7.6	A	7.6	A	8.4	A
	PM	7.9	A	8.0	A	8.0	A
Cook-Underwood Road Southbound Left/Right Turn	AM	9.4	A	9.4	A	14.7	B
	PM	10.0	A	10.1	B	14.1	B
East Junction of Cook-Underwood Road							
SR 14 Eastbound Left Turn	AM	7.6	A	7.6	A	8.4	A
	PM	8.0	A	8.0	A	8.1	A
Cook-Underwood Road Southbound Left/Right Turn	AM	9.4	A	9.5	A	15.1	B
	PM	10.2	B	10.3	B	14.7	B

Delay = Average per vehicle

Based on this analysis, estimated 2011 traffic volumes, including construction vehicles, would have minimal impact on the LOS at either junction of SR 14, which would maintain LOS A. For vehicles turning left or right from Cook-Underwood Road at either the west or the east junctions of Cook-Underwood Road with SR 14, delays would increase up to approximately six seconds per vehicle over estimated 2011 conditions. The southbound approach on Cook-Underwood Road at the west junction with SR 14 would experience degradation in LOS from A to B during the AM hour over estimated 2011 operations. The southbound approach on Cook-Underwood Road at the east junction with SR 14 would experience degradation in LOS from A to B during the AM peak hour over estimated 2011 operations. LOS B operations would be maintained at both the west and east junctions of Cook-Underwood Road with SR 14 during the PM peak hour with no change in LOS over year 2011.

Traffic Hazards

Traffic hazards associated with construction projects generally relate to accidents. Construction of the Project would require that many construction vehicles, including trucks with oversized and overweight loads, share the existing roadway network with the general public. As a result, some accidents could occur that would be directly attributable to construction traffic. This increase is expected to be temporary and minimal. Prior to Project construction, coordination would be required between the owner, contractor, the Cities of Bingen and White Salmon, Skamania County, and WSDOT to ensure the highest level of safety possible for both the traveling public and the construction vehicles. This coordination would be particularly important during the summer months when the cities of Bingen and White Salmon experience an increase in traffic volume from recreational activities in the surrounding area.

SR 14 in the vicinity of the proposed Project Area is a two-lane undivided rural highway with limited access. Access points in the proposed Project vicinity do not include roadway channelization for turning movements. PM peak traffic volumes at both the east and west intersections of SR 14 with Cook-Underwood Road would increase from an estimated 10 vehicles without the Project to an estimated 285 vehicles with the Project (see Table 3.11-7). While traffic delay would increase by approximately four seconds (see Table 3.11-8), LOS at both intersections in the PM peak would remain at LOS B. Construction worker traffic (workers travelling to and from the job site) is anticipated to have minor effects on traffic safety. Potential moderate impacts to travel safety could occur due to the turning movements of oversized and overweight trucks onto and off of Cook-Underwood Road during the peak construction period.

Impacts to Railroad Transportation

Some wind energy components also may be transported from either the Port of Longview or Port of Vancouver by rail to the existing Applicant facility in Bingen, Washington. Wind energy components on rail cars can be up to 14.5 feet in width, up to approximately 15 feet in height, and as long as 150 feet. The wind energy components likely would be transported on standard or heavy-duty 89-foot long flat rail cars. These components would be off-loaded at the Applicant's facility to a staging location to be determined and loaded onto specialized trucks for transport to the Project Area.

Although the Burlington Northern Santa Fe rail line between Vancouver, Washington and the Applicant's facility could accommodate most wind energy components, this rail line may not be able to accommodate loads with widths in excess of 14 feet. This may preclude transport by rail of the wide bottom sections of the wind turbine towers; however, the nacelles, turbines, blades, and upper sections of the wind turbine towers still could be transported by rail. Because rail transport would only be used for components that could safely be transported by rail and would be accomplished within existing railroad schedules, impacts to rail transportation are expected to be minimal to low.

Impacts to River Transportation

Potential impacts to river transportation would occur only if wind energy components were transported by barge from either the Port of Longview or Port of Vancouver to the Applicant's facility in Bingen, Washington. The wind energy components would be transported from the Ports upriver to the Bonneville Dam using by barges and tugboats. The barges and tugboats would bypass the Bonneville Dam via the lockage facility, and continue upriver to the existing Applicant's facility in Bingen, Washington. The wind energy components would be off-loaded at the Applicant's facility to a staging location to be determined and loaded onto specialized trucks for transport to the proposed Project Area.

There would be no oversized or overweight restrictions using barges at either of the Ports, on the Columbia River, or at the lockage facility at the Bonneville Dam. Coordination with the Bonneville Dam Project Office would be required to determine optimal times for lockage use. Because there would be no interference with river operations and shipping of Project materials would be accomplished within existing lockage schedules, construction impacts to river transportation are expected to be minimal to low.

Impacts to Air Transportation

Temporary construction equipment such as cranes and derricks that would be used for the construction of the proposed towers could pose a hazard to aviation safety during the construction period, depending on their height. A "Determination of No Hazard to Air Navigation" likely would need to be obtained for certain taller wind energy components, such as the wind turbines, that would be constructed at the Project Area. It is not expected that local or regional airports would be used for transporting construction equipment or material, and no air transportation impacts would be anticipated.

Operation

Project operation would generate small volumes of additional traffic associated with workers commuting to the Project and occasional service delivery trips. Project operation workers would generate approximately 30 daily trips, with service delivery trips ranging from zero to usually no more than four daily trips. Although the Project would operate 24 hours a day, seven days a week, using an automated system, the operations crew would typically work eight-hour days Monday through Friday. The distribution of operational traffic trips is expected to be the same as for construction trips.

Impacts to Project Vicinity Roadways

Vehicles trips generated during Project operation would consist primarily of employees commuting to and from the site in their personal vehicles. The number of additional trips, and the types of vehicles used, are not expected to exceed State or County roadway legal load limits. These vehicles would not contribute to roadway degradation.

Impacts to Traffic Volumes and LOS

Peak-hour traffic volumes were estimated for operations at both the west and east junctions of SR 14 and Cook-Underwood Road. These estimates include 2012 baseline traffic volumes and the project-generated traffic volumes. Like the analysis of traffic volumes during construction, the estimated traffic volumes assume that all vehicles during Project operation would travel through either the east or the west junction Cook-Underwood Road with SR 14; if other routes were used, the actual impacts to these junctions would be less. Table 3.11-9 compares estimated traffic volumes without the proposed Project to estimated traffic volumes with the proposed Project during full operation of the Project.

Table 3.11-9
Estimated 2012 Traffic Volumes During Operation at Junctions of Cook-Underwood Road and SR 14

Location	West Junction of Cook-Underwood Road with SR 14				East Junction of Cook-Underwood Road with SR 14			
	2012 Without Project		2012 With Project		2012 Without Project		2012 With Project	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Eastbound SR 14	170	100	180	100	180	110	190	110
Westbound SR 14	70	240	75	240	80	260	85	260
Southbound Cook-Underwood Road	10	10	10	25	10	10	10	25

AM Peak Hour is 7:00 AM to 8:00 AM
PM Peak Hour if 4:00 PM to 5:00 PM

Peak-hour LOS analyses were completed for both the west and east junctions of SR 14 and Cook-Underwood Road, based on the estimated 2012 traffic volumes. The results indicate that operations would have a minimal impact on the LOS for either the west or the east junctions of Cook-Underwood Road with SR 14. Delays would increase slightly—less than one second per vehicle—for vehicles turning left or right from Cook-Underwood Road at either the west or the east junctions of Cook-Underwood Road with SR 14 over estimated 2012 operations. LOS A and B operations would be maintained during the AM and PM peak hours at both the west and east junctions of Cook-Underwood Road with SR 14 with no change in LOS over year 2012. Analyses results are presented in Table 3.11-10.

Table 3.11-10
Level of Service During Operation

Location	Peak Hour	Estimated 2009 LOS		Estimated 2012 LOS			
				Without Project		With Project	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
West Junction of Cook-Underwood Road							
SR 14 Eastbound Left Turn	AM	7.6	A	7.6	A	7.6	A
	PM	7.9	A	8.0	A	8.0	A
Cook-Underwood Road Southbound Left/Right Turn	AM	9.4	A	9.4	A	9.7	A
	PM	10.0	A	10.2	B	10.4	B
East Junction of Cook-Underwood Road							
SR 14 Eastbound Left Turn	AM	7.6	A	7.6	A	7.6	A
	PM	8.0	A	8.0	A	8.0	A
Cook-Underwood Road Southbound Left/Right Turn	AM	9.4	A	9.5	A	9.8	A
	PM	10.2	B	10.3	B	10.6	B

Delay = Average per vehicle

During operations, employees would park at the Operations and Maintenance facility parking lot. There would be approximately 10 vehicles each day, including employee and delivery vehicles. A maximum of approximately 20 vehicles are expected to be parked in the Operations and Maintenance facility parking lot at any one time. A visitor kiosk is also planned at the Operations and Maintenance facility that would provide tourists with a safe place to view and learn about wind turbines. The parking lot would be sized to accommodate these uses.

Traffic Hazards

Because of the low volumes and infrequent trips, Project operation is not expected to increase traffic hazards or accident occurrences.

Impacts to Railroad and River Transportation

Once construction is complete and the Project is operational, it is expected that there would not be any use of railroad or river transportation for the proposed Project. Because there thus would be no interference with railroad or river operations, there would be no expected impacts to railroad and river transportation during Project operation.

Impacts to Air Transportation

The proposed wind turbines would not be expected to conflict with arriving or departing aircraft from either the public or private airports within the Project vicinity. All towers would meet Federal Aviation Administration regulations regarding lighting. A “Determination of No Hazard to Air Navigation” would be obtained for the proposed Project. The Federal Aviation Administration would need to be notified of any alterations to the wind turbine towers that could affect air space.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major transportation issues presently anticipated, including impacts to traffic volumes and LOS standards. If impacts to transportation are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.11.2.2 No Action Alternative

Under the No Action Alternative, the Project would not be constructed and therefore no additional auto or truck trips would be added due to the Project. No impacts upon any type of transportation (road, rail, air, or river) would occur.

3.11.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, reduce, or compensate for potential Project impacts to transportation.

- Prepare and implement a Transportation Management Plan to direct and obligate the contractor to implement procedures to minimize traffic impacts in consultation with both WSDOT and Skamania County. The plan should be submitted to EFSEC for approval and include requirements for coordination of project-related construction traffic and WSDOT planned construction projects, along with requirements for coordination of project-related construction traffic and Skamania County, City of Bingen, and City of White Salmon summer recreational traffic.

- Comply with State and County permitting requirements for over-size and over-weight vehicles.

- Notify land owners in the Project vicinity prior to construction of transportation routes that would be used for construction equipment and labor.

- Place approved State and/or County advanced warning construction signs prior to and during construction.

- Use certified flaggers when necessary to direct traffic when over-size and over-weight trucks either enter or exit public roads, to minimize risk of accidents.

- Avoid restricting traffic flow for more than 20 minutes during the construction phase.

- Use pilot cars both in front of and behind all trucks transporting over-size or over-weight loads on all public roadways. For all loads over 10 feet wide traveling on SR 14 from east of the proposed Project Area between MP 76.77 and MP 76.91, use three pilot cars, two in front and one in the rear. The two front pilot cars would be required to maintain a minimum 500 feet of separation. The lead pilot car would warn oncoming traffic of the over-size load, and the pilot car immediately in front of the over-size load would be responsible for stopping all oncoming traffic.

- Design and build all access road improvements or new construction according to WSDOT and Washington State access management standards.

- Conduct pre- and post-haul construction visual assessments of roadway surface conditions to identify weak or deteriorated areas along the haul route that may require repair as a result of project-related traffic. Following the end of construction, repair all pavement sections affected by project-related traffic as needed to pre-construction conditions or better.

- Perform all snow removal from Project access roads in a safe manner that does not degrade roadway conditions.

3.11.4 UNAVOIDABLE ADVERSE IMPACTS

No major unavoidable adverse impacts to traffic and transportation have been identified. Construction of the Project is anticipated to have very minor impacts to LOS standards, and to have a potential very minor impact on traffic safety. Operation of the Project is anticipated to have little to no impact to transportation.

3.11.5 REFERENCES

American Association of State Highway and Transportation Officials (AASHTO). 2004. *A Policy on Geometric Design of Highways and Streets*.

Transportation Research Board (TRB). 2000. *Highway Capacity Manual*.

Southwest Washington Regional Transportation Council (SWRTC). 2009a. *Skamania County Regional Transportation Plan*. May. Accessed October 2009 at: http://www.rtc.wa.gov/reports/mtp/Rtp2009Skamania.pdf.

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3.12 PUBLIC SERVICES AND UTILITIES

This section describes impacts to public services and utilities. The Project Area is served by a variety of public services and utilities. Public services discussed include fire protection, law enforcement, emergency medical services and schools. Utilities discussed include telephone, electric, sewer, water and solid waste disposal.

3.12.1 AFFECTED ENVIRONMENT

3.12.1.1 Public Services

Fire Protection

As discussed in Section 3.6.1.2, Public Health and Safety, fire protection services are provided by two city fire departments (North Bonneville and Stevenson) and seven Skamania County fire districts provide fire protection to Skamania County residents. DNR also provides fire suppression services to forested areas in Skamania County, and would be the first responder to a fire emergency at the Project Area (J. Weeks, personal communication).

Law Enforcement

As discussed in Section 3.6.1.3, Public Health and Safety, the Skamania County Sheriff's Office would provide law enforcement services to the Project. Sheriff's Office headquarters are located in Stevenson, approximately 15 miles southwest of the Project Area. The response time from Sheriff's Office headquarters to the Project Area is approximately 20 minutes.

Additionally, the Washington State Patrol patrols SR 14, which is south of the site. Construction and equipment delivery vehicles would travel on SR 14. Roads extending north of SR 14 are county roads, and are patrolled by the Sheriff's Office.

Emergency Medical Services

As discussed in Section 3.6.1.4, Public Health and Safety, two ambulance companies would respond to an emergency in the Project Area: Skamania County Emergency Medical Service and Skyline Ambulance. Skamania County Emergency Medical Services is the functioning entity of Skamania County Hospital District No. 1, which provides ambulance service to the residents of Skamania County. Skyline Ambulance is based at Skyline Hospital in White Salmon, and is equipped with three ambulance vehicles.

The two hospitals closest to the Project are Skyline Hospital in White Salmon (7 miles southeast of the Project) and Providence Hood River Memorial Hospital in the City of Hood River (8 miles southeast of the Project).

Schools

The public school closest to the Project Area is the Mill A School, which is approximately 2 miles southwest of the site. The next closest public schools are in the community of Carson, approximately 10 miles west of the site. School buses may drive through neighborhoods near the Project Area, including Willard and Mill A, which are located approximately 2.25 and 1.5 miles respectively from the site.

Mill A School District No. 31 provides public educational services to the population in the district (ESD 2008). Mill A School currently enrolls 81 students in grades K through 8 in the southeastern corner of Skamania County adjacent to the Project Area. High school students living within the boundaries of the Mill A School District attend Stevenson High School in the Stevenson-Carson School District No. 303, which borders Mill A School District No. 31 on the west. Table 3.12-4 shows that over the last few years, enrollment in these five districts has not changed more than five percentage points, on average.

Table 3.12-1
Enrollment Trends
in the Whistling Ridge Energy Project Vicinity

	Mill A School District	Mount Pleasant School District	Skamania School District	Stevenson-Carson School District	Washougal School District
Fall 2004	79	65	64	1,049	2,870
Fall 2005	76	63	72	1,069	3,015
Fall 2006	66	56	70	1,058	3,057
Fall 2007	69	56	68	1,020	3,054
Annual Average Rate of Growth, 2004-2007	-4.4%	-4.8%	2.0%	-0.9%	2.1%

Source: Washington State OSPI (2008).

There are no higher education facilities near the Project Area. The higher education facilities closest to the site are located in Vancouver, Washington.

3.12.1.2 Utilities

The site area is served by the following utilities:

- Telephone: Embarq;
- Electric: Skamania County Public Utility District (PUD);
- Sewer: Individual septic systems;

- Water: Individual wells;
- Solid Waste Pickup: Skamania County.

Embarq provides telephone service to the area surrounding the site (D. Cox, personal communication). The Skamania County Public Utility District (PUD) is a customer-owned utility that provides electricity service to Skamania County. The PUD's primary source of power is obtained from BPA, which markets power generated by the federal hydroelectric facilities along the Columbia River. The PUD's backup power source is the Condit Dam. The PUD has expressed interest in using the Project as a source of backup power when the Condit Dam is removed.

The homes and businesses in Mill A and Willard do not have sewer service or water service, and are served by individual wells and septic systems.

Skamania County provides solid waste pick-up service to residences and businesses in the County, including those near the Project Area (Skamania County PUD office staff, personal communication). The majority of solid waste from Skamania County is delivered to the Roosevelt Regional Landfill in Klickitat County (WSSWIC 2009). The landfill began operations in 1990, and as of 2000 had in excess of 140 million tons of remaining permitted capacity. The landfill site contains more than 2,000 acres in which additional capacity could likely be permitted (Klickitat County 2000).

3.12.2 IMPACTS

3.12.2.1 Proposed Action

The potential impacts of the proposed Project on public services and utilities include those from construction and operation.

Construction

The use of construction workers from outside the immediate area could result in a minor and temporary increase in the demand for public services including police departments, providers of emergency medical services, and local fire departments.

The impact of Project construction on local schools would be at most minor and temporary, as few out-of-area construction workers are likely to be accompanied by families for this temporary construction project.

Construction-related impacts to local utilities providing telephone, electric or solid waste pickup are also expected to be minor and temporary. Most workers would not be in the area for long enough to obtain these services; those who stayed in temporary housing in the area would not remain for more than a few months.

The presence of construction vehicles on area roads would not impact the response times for emergency providers. Construction trucks would represent additional volume on area roads, but transportation LOS would remain at LOS A or B (delays of less than 15 seconds), and thus would not cause substantial delays to emergency response vehicles. Construction activities themselves would take place entirely within land managed for commercial forestry by the Applicant, and would not impact local emergency providers.

Fire Protection

The Project Area is generally forest land. The only structures proposed on the forest lands are the towers, associated transformers and substation, and the Operations and Maintenance facility. Project construction could temporarily increase the risk of fire at the Project Area and in the broader Project Area. As the landowner, the Applicant has the ability to respond to fires on their forest land with dozers and water trucks.

Fire response on forest lands is provided by DNR. They have resources in the area and respond to all wildland fires. DNR would likely respond to a structure fire in the woods, as would Underwood Fire District and Mill A Volunteers. Mill A Volunteers is not a recognized fire district with a tax base but a volunteer fire company; the group has joint responder agreements with Underwood and DNR.

Underwood Fire District is the nearest local fire district and has submitted a comment (scoping comment #108) to EFSEC regarding their ability to respond to fires and provide services. The Underwood fire chief commented:

> *"The area designated for the energy project is outside our district; DNR is the official service provider for these areas. The Project may have a generally positive impact on the ability of our department and DNR to offer fire protection services to the area because new roads, extensions, and improved existing roads will provide better access for all first responders. If necessary, Fire District 3 can provide service coverage to the Project area without any reduction in service capacity to our constituency. We do not have a contract to provide service to the area. The project does not present any challenges or requirements for which we are not already prepared to respond."*

There are two potential locations for the Operations and Maintenance facility site, one on-site next to the substation and the alternative site along West Pit Road near the intersection with Willard Road. The alternative site would have a shorter emergency response time than the on-site option.

Law Enforcement

Construction activities associated with the Project would increase traffic volume on roadways surrounding the Project Area, as a result of both commuting construction workers and the transportation of materials. This increased volume would likely occur in mid-summer to fall when vacationers use the roadways. It is possible that the number of accidents and calls for service along major roadways (e.g., SR 14 and I-84) would increase for approximately six months, after which most of the on-site work would be done.

The demand for traffic enforcement activities would peak when construction employment peaks at approximately 265 employees for approximately one month. Out-of-area workers are not expected to move their families into the Project Area because each construction phase requiring workers with specialized skills would be completed within three and one-half months or less. They would likely either commute (from the Portland-Vancouver area) or stay in temporary housing for the period of time needed to complete their tasks. As described in Section 4.4 Socioeconomics of the Application for Site Certification, this analysis assumes that as many as 40 non-local workers could be employed at the Project Area during the peak construction month (this includes potential out-of-state workers) and would likely stay in temporary housing.

There likely would be additional calls for response during the construction phase, primarily because of increased traffic and accident potential. However, because the construction period is short (approximately one year), the increased service calls are not anticipated to be sufficient in number to require additional law enforcement staff resources in the Project Area. See Section 3.11, Transportation, for further discussion of traffic safety hazards.

Emergency Medical Services

During Project construction, the local demand for emergency medical services could increase slightly due to construction accidents that could occur at the Project Area or Project vicinity. Project construction workers would be exposed to hazards caused by equipment failure, natural disaster, or human mistake that would require the services of local emergency response units to provide initial treatment and transportation to a local medical facility and the services of emergency rooms in the receiving facility. The specific level of demand for emergency medical service response is unknown.

With adequate safety measures in place, and considering the size of the construction workforce (which would temporarily reach a peak of 265 workers for one month) it is expected that Project construction would generate few serious injury accidents requiring emergency medical services response. The two local hospitals (Skyline Hospital in White Salmon and Providence Hood River Memorial Hospital in Hood River) have capacity for additional patients and there are ambulances available to service the Project Area.

It is expected that an average of 31 and a peak of 40 construction workers would temporarily migrate to the local labor market from either outside the immediate tri-county area of Skamania, Klickitat and Hood River region or from out of state. However, because the duration of their stay in the Project Area would be short (approximately four months), it is unlikely that these temporary workers would create a noticeable increase in demand for emergency medical services during Project construction.

Schools

An average of 21 (40 at peak) specialized non-local construction workers from out of the area would work on the Project. However, the anticipated maximum duration of employment for each craft is three to three and one-half months, and few workers are anticipated to move their families to the area. Further, much of the construction would take place during the summer months when school is not in session. Consequently, construction is expected to cause little to no additional enrollment. The Mill A and White Salmon School Districts have the capacity to handle any influx. The White Salmon Valley School District commented during scoping:

> *"Economically this project has the potential to benefit the community and the school district by adding revenues without creating additional demands for services or impacts on the school system."*

Construction traffic is not expected to lower transportation LOS below LOS A or B (delay less than 15 seconds), and consequently there would be little or no impact on school busses in the area.

Utilities

Water Supply. During the approximately one-year construction period, approximately 1.7 million gallons of water would be consumed for road compaction, dust control, wetting concrete, and other construction purposes. The construction contractor would supply water used during construction. Water would be delivered to the Project Area via water trucks and obtained from a local source with a valid water right. This impact would be negligible considering the temporary nature of the impact and the availability of adequate water supplies.

Wastewater. No impacts to community wastewater disposal systems are anticipated because the Project would not be connected to a sewer system during construction. Sanitary wastes would be collected in portable toilets during construction. Disposal of sanitary wastes would be managed through a contract with a portable toilet vendor. The contractor would incorporate applicable state capacity requirements based on the construction worker population in the Project Area at any given time. Collected wastes would be managed and disposed of by the contracted vendor.

Solid Waste. During construction, the primary wastes generated would be solid construction debris such as scrap metal, cable, wire, wood pallets, plastic packaging materials and cardboard. The total volume of construction wastes is expected to be less than ten tons. This waste would be accumulated on site in drop boxes until hauled away to a licensed transfer station or landfill by either the construction contractor or the Skamania County Solid Waste Division.

The majority of solid waste from Skamania County is delivered to the Roosevelt Regional Landfill in Klickitat County (WSSWIC 2009). The landfill began operations in 1990, and as of 2000 had in excess of 140 million tons of remaining permitted capacity. The landfill site contains more than 2,000 acres, in which additional capacity could likely be permitted (Klickitat County 2000).

Operation

Project operation would create a potential positive impact on public services and utilities. The Project's assessed value could be as much as $87.5 million, and this would generate approximately $731,500 per year in property tax revenue and $50,000 in sales tax revenue. Assuming that an annual tax revenue of $731,500 would be distributed in the same manner as current property tax distributions, funds receiving the most revenue would be the State School Fund ($185,281), School District 405 Maintenance and Operations ($149,461), the County Road fund ($115,035), and the Current Expense fund ($111,086). The sales tax revenue would be split between Washington State (approximately $46,000) and Washington Counties, primarily Skamania and Klickitat Counties ($4,000). Section 3.13.2 Impacts provides additional information on revenue. Although impacts are expected to be minimal, a portion of these funds could nevertheless be used to upgrade existing public services and utilities in Klickitat County.

The Project would have eight to nine on-site employees during operation. Given this small number, and considering the use of on-site services and emergency response plans, the Project is expected to have minimal adverse impact on local public services and utilities.

Fire Protection

Fire protection would continue to be provided by the Applicant, DNR, Underwood Fire District and Mill A Volunteers. Potential for fire during operations would be lower than during the construction period, and the remaining fire risk could be mitigated through appropriate operational practices. DNR has stated that resources for fire protection and suppression services are adequate to serve the Project during construction and operation (J. Weeks, personal communication).

Wildfires in the Project Area are relatively rare, and DNR continually monitors fire conditions.

Turbine fires are possible; however, with the types of modern wind turbines proposed for the Project, turbine malfunctions leading to fires in the nacelle are extremely rare. The turbine control system detects overheating in turbine machinery, and internal fires would be detected by these sensors, causing the machine to shut down immediately and send an alarm signal to the central supervisory control and data acquisition system, which would notify operators of the alarm by cell phone or pager.

Law Enforcement

The Sheriff's Office resources are generally adequate to serve the Project during construction and operation, given that on-site security is provided by a separate party (D. Cox, personal communication). The Applicant would likely contract locally for private security.

Emergency Services

The Project would not result in a decrease in response times for area service providers during operation. The Project's eight to nine permanent employees would not represent a substantial increase in traffic volumes on area roads that would impact emergency response, nor would Project facilities result in additional traffic controls.

Schools

The addition of eight to nine employees, even if all were from outside the local area and had families, would represent a minimal impact to local schools, especially since they would likely live in more than one school district.

Utilities

Upon completion, the Project and either of the proposed sites for the Operations and Maintenance Facility would be served by the following utility systems:

- ***Telephone.*** Embarq and Sprint. Both providers have adequate capacity to serve the site.

- ***Electric service.*** Skamania County PUD/BPA connection. Electricity would be used at the Operations and Maintenance building. The PUD has adequate capacity to serve the site. The impact would be the same at either alternative location for the facility; however, the alternative site at West Pit Road would be closer to existing PUD lines. No new BPA infrastructure would be needed for the electrical transmission interconnection system beyond the proposed interconnection and substation.

- ***Drinking water.*** Estimated water use during operation would be less than 5,000 gallons per day, primarily for showers, kitchen, and bathroom for Operations and Maintenance staff. Since the staff would work eight-hour shifts Monday through Friday, total water use is likely to be equivalent or less than a single-family home. Water would be supplied by an on-site well. A well using less than 5,000 gallons of water a day would be exempt from permit requirements in RCW 90.44.040. The well would be installed by a well contractor licensed pursuant to Chapter 173-162 WAC, and in compliance with the requirements and standards of Chapter 173-160 WAC. The well would be installed consistent with Skamania County Community Development Department and Ecology requirements for the new wells.

- ***Wastewater.*** Sewer service would be provided through an on-site septic system. The Operations and Maintenance facility would use less than 5,000 gallons per day of water, and since sewer flows are determined by indoor water use, total sewer flow is also likely to be equivalent or less than a single-family home. There is adequate space on either the Project Area or the alternative Operations and Maintenance site for construction of a septic field of sufficient size to serve this demand. The septic system would be built by a septic tank installer licensed by Skamania County, in accordance with all requirements of the Washington Department of Health and the Skamania County Community Development Department Environmental Health Division.

- ***Non-hazardous waste.*** Solid waste pickup would be provided by Skamania County through Allied Waste, which has one of three garbage collection franchises for the County. The Roosevelt Regional Land Fill has adequate space for any routine non-hazardous waste from the Project.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential impacts on public services and utilities. If impacts to public services or utilities are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.12.2.2 No Action Alternative

Under the No Action Alternative the proposed Project would not be built. There would be no impacts to public services and utilities.

3.12.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, reduce, or compensate for potential Project impacts to public services and utilities during construction or operation of the proposed Project.

- Mitigate potential impacts to public services and utilities by using tax revenues generated by the Project.

- Provide all local police, fire, and emergency medical agencies with emergency response information for the Project, including employee contact information, procedures for rescue operations to the nacelles, and location of rescue basket. The Applicant would provide applicable emergency response information to local agencies prior to Project construction and would review and update employee contact information annually and provide any changes to the appropriate agencies.

- Utilize fire precautions for staying abreast of fire conditions in the Project Area by contacting DNR. A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented, in coordination with the Skamania County Fire Marshall and appropriate agencies. Both the wind turbine generators and the substation would be equipped with lightning protection systems. As seen in Table 3.6-5, Public Health and Safety, sources for potential fire and explosion along with measures to mitigate the risk of either occurring, are outlined.

- Maintain the use of a full-time security plan during Project construction to reduce the potential need for increased police services to the Project Area. These law enforcement mitigation measures are outlined in Section 3.6.3, Public Health and Safety.

- Prepare emergency plans to protect the public health, safety, and environment on and off the Project Area in the case of a major natural disaster or industrial accident relating to or affecting the Project. The construction specifications would require that the contractors prepare and implement a Construction Health and Safety Program that included an emergency plan. The Construction Health and Safety Program would include the following provisions:

- Construction Injury and Illness Prevention Plan;
- Construction Written Safety Program;
- Construction Personnel Protective Devices;
- Construction On-Site Fire Suppression Prevention; and
- Construction Off-Site Fire Suppression Support.

- Install the well supplying the Operations and Maintenance facility, at either of the two sites under consideration, by a well contractor licensed pursuant to Chapter 173-162 WAC, and in compliance with the requirements and standards of Chapter 173-160 WAC. The well would be installed consistent with Skamania County Community Development Department and Ecology requirements for the new wells.
- Coordinate and comply with the Skamania County Community Development Department Environmental Health Division, and would comply with all County and State septic tank and subsurface disposal field design, installation, and maintenance requirements

3.12.4 UNAVOIDABLE ADVERSE IMPACTS

The Project would have no unavoidable adverse impacts to public services and utilities. The small amount of additional services and utilities that would be needed would be offset by the increased tax revenue.

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3.13 SOCIOECONOMICS

This section describes the potential impact of the proposed Project on local socioeconomic resources. For the purpose of this analysis, the region is defined as the tri-county area that includes Skamania and Klickitat Counties in Washington State and Hood River County in Oregon State. The Project Area is defined as the area within approximately three miles of the Project Area.

3.13.1 AFFECTED ENVIRONMENT

3.13.1.1 Demographics

Region

Table 3.13-1 shows the April 1, 2009 population for Skamania and Klickitat Counties, and the July 1, 2008 population for Hood River, Oregon. A greater percentage of all three counties live outside of incorporated areas. The incorporated cities closest to the Project Area are White Salmon, Washington, with 2,200 residents, and Hood River, Oregon, with 6,865 residents. The metropolitan area closest to the Project Area is the Portland-Vancouver-Beaverton metropolitan area, with a population of 2.2 million people. Table 3.13-1 also shows the population distribution for the region and the surrounding communities.

Minority residents represent 23 percent of the White Salmon population and 31 percent of the Hood River population. The minority population is primarily Hispanic/Latino. The tri-county area including Skamania, Klickitat, and Hood River Counties is predominantly white, non-Hispanic. Hood River County has the highest minority percentage (31 percent) of population, followed by Klickitat County (16 percent) and Skamania County (11 percent). The State of Washington population includes 24 percent minority residents. Oregon's population includes 20 percent minority.

In 2000, 17 percent of the population of White Salmon and Hood River were living below the poverty[25] level. This same measure was 13 percent for Skamania County, 17 percent for Klickitat County, and 14 percent for Hood River County the same year. These percentages are higher than statewide averages for Washington and Oregon.

Skamania County's population is expected to grow from 10,800 in 2009 to 11,720 in 2015, an annual average growth rate of 1.4 percent. Klickitat County's population is expected to grow from 20,200 in 2009 to 23,049 in 2015, an annual average growth rate of 2.2 percent. The growth rates for both Skamania County and Washington State are expected to slow by 0.3–0.4 percentage points during 2015 to 2025. The population growth rate for Klickitat County is expected to slow from 2.2 to 1.1 percent for 2015 to 2025. Skamania County is expected to have 12,915 residents by 2025 and Klickitat County is expected to have 25,831 residents by 2025. Hood River County is expected to grow 1.3 percent annually on average, during 2009–2015 and 2015–2025.

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[25]The Census Bureau uses a set of income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every individual in it is considered in poverty. The official poverty thresholds do not vary geographically, but are updated annually for inflation. The poverty threshold in 2000 for a family of four with two related children under age 18 was $17,463 (US Census 2009).

Table 3.13-1
Population Distribution in the Project Vicinity

Jurisdiction	Population, April 1, 2000	Population, 2009
Skamania County	9,872	10,800
Unincorporated	8,079	8,465
Incorporated	1,793	2,335
North Bonneville	593	880
Stevenson	1,200	1,455
Klickitat County	19,161	20,200
Unincorporated	12,536	13,550
Incorporated	6,625	6,650
Bingen	672	685
Goldendale	3,760	3,745
White Salmon	2,193	2,200
Hood River County (Oregon)	20,411	21,725
Unincorporated	13,465	13,745
Incorporated	6,946	7,980
Cascade Locks	1,115	1,055
Hood River	5,831	6,925
Washington State	5,894,143	6,668,200
Unincorporated	2,374,593	2,552,500
Incorporated	3,519,550	4,115,700
Oregon State	3,421,399	3,823,465
Unincorporated	1,141,038	1,158,198
Incorporated	2,280,361	2,665,267

Notes: 2000 estimates are April 1 estimates; 2009 estimates are April 1 for Washington State and counties, and July 1 for Oregon state and Hood River County.
Sources: WOFM (2009), PSUPRC (2009).

Project Area

In 2008 the three census block groups within 3 miles of the Project Area had 3,347 residents. Approximately 12 percent were minority. Twelve ~~Nine~~ percent lived below the poverty level in 2008 ~~2000~~; higher ~~fewer~~ than for the region generally.

Minority and Low-Income Populations

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states that each federal agency shall identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low income populations. The Order further stipulates that the agencies conduct their programs and activities in a manner that does not have the effect of excluding persons from participation in, denying persons the benefits of, or subjecting persons to discrimination because of their race, color, or national origin.

As stated above, the 2009 Census indicated that Skamania County had a minority population that consisted primarily of Hispanic/Latino persons which accounted for only 6 percent of the total population in that county. Additionally, of the total population make-up for Skamania County, 12 percent were living below the poverty level as indicated by the 2008 Census.

3.13.1.2 Housing

Region

In 2008 there were 5,409 housing units in Skamania County, 9,985 housing units in Klickitat County and 3,050 housing units in Hood River County. Occupancy rates in 2008 were 83 percent in Skamania County, 89 percent in Klickitat County and 90 percent in Hood River County, representing 909 vacant units in Skamania County, 1,078 vacant units in Klickitat County and 892 vacant units in Hood River County. In 2000, median gross rents were 13 percent lower in Skamania County and 25 percent lower in Klickitat County than for Washington as a whole. Median gross rent in Hood River County was 13 percent lower than in Oregon as a whole in 2000.

Project Area

The existing residences closest to the Project Area are approximately 0.48 mile and 0.8 mile from the proposed turbine locations. A new homesite location has been applied for, which would be located approximately 2,000 feet (0.38 mile) from the site's south property line. It is unknown if the applicant for this permit has secured all approvals or has proceeded with construction plans. One of two alternative Operations and Maintenance facility sites is located approximately 0.9 mile west of the Project Area on West Pit Road. The nearest residence to this potential site is approximately 0.25 mile away. The other alternative Operations and Maintenance facility site is located in the Project Area adjacent to and north of the substation, farther from residential areas.

The unincorporated community of Willard is located approximately 2.25 miles northwest of the Project Area. The unincorporated community of Mill A also is located near the Project Area, approximately 1.5 miles west of the site. The homes near the Project Area are in a rural setting, primarily single family and between 30 and 50 years old.

Temporary Housing

Over 1,000 hotel rooms and 39 recreational vehicle (RV) or tent campsites exist within 25 miles of the Project Area (Table 3.13-2). Assuming an average occupancy rates of 70 percent, a minimum of 325 hotels rooms or RV/tent campsites are available at any one time.

Table 3.13-2
Temporary Lodging Units

Type of Lodging	Units within 25 Miles of Project Area
Hotel or Motel	1,043
RV Camping	21
Tent Camping	16
Cabin or RV	2
Total Units	1,082
Units Available Assuming 70% Occupancy	325

Source: Woodall (2008), TravelWashington (2008).

3.13.1.3 Employment

Region

In Skamania County, there were approximately 3,254 jobs in 2007 (BEA 2009), representing a gain of 138 jobs over 2006 levels. The principal sources of employment in Skamania County were local government, accommodation and food services, federal government, and manufacturing (Golubcow 2006a and 2006b). "Place of work earnings" (wages, salaries and proprietors' earnings) accounted for only one-quarter of total personal income in the county, with income from property (dividends, interest and rent) and transfer payments (mainly Social Security) making up the balance. The annual unemployment rate in Skamania County was 6.6 percent in 2007 and 8.4 percent in 2008, higher than for Washington State (4.5 percent in 2007 and 5.5 percent in 2008).

In Klickitat County, there were approximately 9,839 jobs in 2007 (BEA 2009). Of these jobs, SDS and Broughton Lumber Company employ a work force of up to 325 employees during their busiest production times, which is equivalent to three percent of total jobs in Klickitat County.[26] The principal sources of employment were local government, retail trade, and professional and technical services. Place of work earnings accounted for about 46 percent of total personal income in the county, with income from property and transfer payments making up the balance. The unemployment rate in 2007 was 6.7 percent, and in 2008 was 8.2 percent. These unemployment rates were higher than for Washington State as a whole.

There were 15,787 jobs in Hood River County in 2007 (BEA 2009), representing the highest employment of the three counties in the region. Place of work earnings accounted for 59 percent of total personal income in the county, with income from property and transfer payments making up the balance. The principal sources of employment were manufacturing, health care and social assistance, local government, and retail trade. The unemployment rate in Hood River County was 4.6 percent in 2007. In comparison, the annual unemployment rate for Oregon as a whole was 5.1 percent in 2000 and 5.2 percent in 2007.

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[26] Located in Bingen, SDS jobs are reported as part of Klickitat County statistics even though logging operations occur in both Skamania and Klickitat Counties.

Table 3.13-3 shows unemployment rates in the region for 2000, 2007 and 2008. Hood River County has the lowest unemployment rate of the three counties in the region. The most recent available annual unemployment rate in Hood River County (2007) is roughly two percentage points lower than the same measures for Klickitat and Skamania Counties and 0.6 percentage point lower than for Oregon as a whole.

Table 3.13-3
Unemployment Trends

Geographic Area	Unemployed					
	2000 Annual		2007 Annual		Annual 2008 (Washington areas) and December 2008 (Oregon Areas[a]	
	No.	Percent	No.	Percent	No.	Percent
Skamania County	290	6.0	340	6.6	450	8.4
Klickitat County	700	7.5	650	6.7	820	8.2
Hood River County	757	6.6	592	4.6	712	5.7
Washington State	151,340	5.0	154,720	4.5	192,000	5.5
Oregon State	93,196	5.1	100,517	5.2	158,369	8.0

Sources: WESD (2008), OED (2009).
[a] The most recent annual statistics for Washington are for 2008 and are shown in this column. The most recent annual statistics for Oregon are for 2007. This column shows (for the Oregon areas) the most recent unemployment rate available for both Oregon and Hood River County, which is the December 2008 monthly unemployment rate.

The annual rates, however, do not show the impact of the economic recession, which began to be felt at the end of 2008. These effects can be partially seen by comparing monthly unemployment rates between 2008 and 2009 (through August, the latest month available) which are shown in Table 3.13-4. Table 3.13-4 shows that in August 2009, Skamania County's unemployment rate was 3.1 percentage points higher than for the same month in 2008. The comparable figures are 2.9 percentage points for Klickitat County and 3.3 percent for Hood River County.

Project Area

The Project Area is used for long-term timber production. Although the number of jobs in the project area is unknown, approximately 400 homes or businesses exist within three miles of the Project Area, and approximately one-third of these homes or businesses are located in Willard.

~~*Minority and Low-Income Populations*~~

~~Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states that each federal agency shall identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low income populations. The Order further stipulates that the agencies conduct their programs and activities in a manner that does not have the effect of excluding persons from participation in, denying persons the benefits of, or subjecting persons to discrimination because of their race, color, or national origin.~~

~~As stated above, the 2000 Census indicated that Skamania County had a minority population that consisted primarily of Hispanic/Latino persons which accounted for only 11 percent of the total~~

~~population in that county. Additionally, of the total population make-up for Skamania County, 13 percent were living below the poverty level as indicated by the 2000 Census.~~

Table 3.13-4
Monthly Unemployment Rates, 2008 and 2009

Month	Skamania County		Klickitat County		Hood River County	
	2008	2009	2008	2009	2008	2009
January	8.9	14.5	9.2	12.7	5.5	8.5
February	9.5	14.2	8.9	12.3	5.2	8.9
March	8.5	15.1	7.0	12.9	5.0	9.6
April	7.8	14.2	7.3	12.1	4.6	9.6
May	7.1	11.9	7.2	9.9	5.1	10.6
June	7.8	12.0	6.5	10.3	5.6	9.2
July	7.4	11.7	7.2	8.2	5.4	7.9
August	8.3	11.4	6.2	9.1	6.2	9.5
September	6.2	N/A	5.4	N/A	4.7	N/A
October	7.0	N/A	5.9	N/A	4.2	N/A
November	9.0	N/A	7.3	N/A	5.4	N/A
December	11.7	N/A	9.6	N/A	6.3	N/A

Source: BLS (2009).

3.13.1.4 Public Finance and Fiscal Conditions

Due to the location of the proposed Project within Skamania County and Washington State, these two jurisdictions would be the primary beneficiaries of tax revenues related to Project construction and operation. Washington State and Skamania County collect several types of taxes:

- ***Payroll taxes.*** Washington State collects payroll taxes for workers' industrial insurance, unemployment compensation, and other purposes. While Counties do not directly benefit from payroll taxes, these revenues have a direct beneficial impact to Skamania County residents.

- ***Business and occupation taxes.*** Business and occupation taxes, which are paid on the gross receipts of business activities, are the second-largest revenue source for Washington State. Skamania County does not levy a business tax, so although it does not benefit directly from Business and occupation taxes paid by businesses within Skamania County, the state as a whole would benefit.

- ***Retail sales and use tax.*** In Washington State, the first 0.5 percent of retail sales tax goes to the local county.

- ***Property tax.*** Skamania County collects property taxes for taxing districts within the County. The Project Area is within Taxing District 109, for which the total assessment rate is $8.026839/$1,000 assessed value. This revenue is split between the County, Washington State, and the local taxing district.

In 2008, Skamania County started with a beginning fund balance of $25.6 million, and accrued revenues of $13.7 million that year. The largest revenue fund categories were intergovernmental revenues (43 percent), general property taxes (21 percent) and charges and fees for services (10 percent). Expenditures in 2008 were $19.4 million. The largest expenditure categories were law and justice services (26 percent), general government (20 percent), transportation (19 percent) and natural resource (10 percent) (Table 3.13-5).

Dollars in each of the revenue and expenditure categories are distributed among the General Fund, Special Revenue Fund, Debt Service Fund, Capital Project Fund and Enterprise Fund. Approximately 54 percent of all revenue dollars are in the General Fund, and 39 percent of the revenue dollars are in the Special Revenue Fund. Most of the expenditure dollars were in the General Fund (57 percent) and the Special Revenue Fund (37 percent).

The Project Area is within Taxing District 109, for which the total millage rate[27] is $8.026839/$1,000 assessed value. The millage rate is broken down in Table 3.13-6.

Table 3.13-5
Skamania County Revenues and Expenditures, 2008

Category	Amount
General Property Taxes	2,814,374
Sales & Use Taxes	362,938
Other Local Taxes	614,543
Licenses & Permits	182,553
Charges & Fees for Services	1,331,765
Interest & Investment Earnings	1,228,335
Fines & Forfeits	478,440
Rents, Insurance Premium, Internal Contributions, Miscellaneous	840,764
Intergovernmental Revenues	5,855,309
Total Revenues	13,709,021
Beginning Fund Balance	25,623,475
Law & Justice Services	5,081,012
Fire & Emergency Services	764,603
Health & Human Services	1,649,067
Transportation	3,612,827
Natural Resources	1,858,521
General Government	3,933,882
Utilities	744,672
Capital	1,744,959
Debt Service-Interest	25,000
Total Expenditures	19,414,543

Source: WSA (2009).

[27] The millage rate is the amount per $1,000 of property assessed value that is used to calculate taxes on property.

Table 3.13-6
Breakdown of Taxing District No. 109 Millage Rate

Category	Amount
Current Expense	1.218965
Mental Health	0.012500
Developmental	0.012500
Veteran's Relief	0.011250
County Road	1.262288
Hospital and EMS District	0.643625
State Treasurer (State School Fund)	2.033112
Cemetery District	0.074757
Library District	0.338660
Excess Levy: School District 405 (Klickitat County), Maintenance and Operations	1.640058
Excess Levy: School District 405 (Klickitat County), Capital Projects	0.163270
Excess Levy: School District 405 (Klickitat County), Bond	0.281641
Public Utility District	0.334213
Total	8.026839

Source: L. Moore (personal communication).

3.13.2 IMPACTS

3.13.2.1 Proposed Action

Impacts of the proposed Project are divided between construction and operation.

Construction

Business and Economic Impacts

Design and construction of the proposed Project is expected to begin in 2011. Operation is expected to commence by 2012. During the estimated one-year construction period (excluding engineering, design, specifications, and survey), approximately 330 full-time and part-time workers would be employed at some point during construction. Some of these jobs would not last the entire construction period. The on-site construction work force would peak at approximately 265 workers over the construction period and average 143 workers over the 12 months (Table 3.13-7).

An estimated 65 to 75 percent of the construction labor force would likely be hired from outside the tri-county area, and 25 to 35 percent would be residents of the tri-county area including Skamania, Klickitat, and Hood River counties (A. Barkley, personal communication).[28] (This estimate is based on the relative size of the labor force in the tri-county area compared to larger labor forces in metropolitan areas that are farther away.) This would translate to 66 to 93 (peak)

[28]This information, along with estimated average and peak workforce size and number of full-time and part-time jobs related directly to project construction, are project-specific estimates provided by the Applicant.

and 36 to 50 (average) workers from the tri-county area and 172 to 199 (peak) and 93 to 107 (average) workers from outside the tri-county area, primarily the Portland-Vancouver metropolitan area. At peak, the construction workforce would represent 32 to 45 percent of the estimate size of the construction workforce in Skamania County in 2007 (BEA 2009).

Table 3.13-7
Estimated Quarterly Construction Personnel

Month Before Commercial Operation	Estimated Number of Construction Personnel On Site
14	15
13	15
12	90
11	90
10	190
9	190
8	265
7	215
6	165
5	190
4	100
3	100
2	100
1	25
0	25
Cleanup	25
Average (months 1 – 12)	143
Peak (months 1 – 12)	265

Source: A. Barkley (personal communication)

The total cost of construction is $150 million. Total payroll costs, including fringe benefits and other labor overhead costs, are projected to be approximately $18 million, of which approximately $4.5 million (25 percent) is expected to be earned in the tri-county area (A. Barkley, personal communication), based on the assumption by the Applicant that approximately one-quarter of the construction workforce would already live in the tri-county area.

Non-labor costs are estimated to be $132 million. Construction materials, services and equipment leasing associated with construction are projected to total approximately $13.2 million (10 percent of total non-labor costs) (A. Barkley, personal communication). The Applicant estimates that most of this spending would take place in the tri-county area.

Spending by suppliers, local Project workers and households would benefit the retail trade and services sector, as well as other sectors of the local economy. To estimate the value of these indirect and induced impacts, assumptions specific to Project construction were provided by the proposed Project owner (A. Barkley, personal communication), and were used as inputs to the IMPLAN regional input/output model. These assumptions are as follows and were also mentioned above:

- Local non-labor construction expenditures would be approximately $13.2 million;
- Labor income earned by local residents would be approximately $4.5 million;
- Approximately one-quarter of the workforce (36 workers, taken as a percentage of the average workforce size of 143 workers) would be current residents of the local area.

Based on these assumptions and using IMPLAN modeling software, indirect and induced value added from construction is estimated to be approximately $3.9 million.[29] Project construction would result in 71 indirect and induced jobs (Table 3.13-8). Total direct, indirect and induced value added would be an estimated $8.5 million. Total employment (direct, indirect and induced) would be an estimated 107 full-time and part-time jobs. These effects would continue throughout the construction period.

Table 3.13-8
Employment Impacts of Construction

Sector	Number of Direct Jobs	Number of Indirect Jobs	Number of Induced Jobs	Total Number of Jobs
Agriculture, Forestry, Fish & Hunting	0	1	0	2
Mining	0	0	0	0
Utilities	0	0	0	0
Construction	35	1	0	36
Manufacturing	0	35	11	46
Wholesale Trade	0	0	0	0
Transportation & Warehousing	0	0	6	6
Retail trade	0	1	2	3
Information	0	5	5	10
Finance & insurance	0	1	2	3
Real estate & rental	0	1	0	1
Total[a]	35	45	26	107

Source: IMPLAN (2008).
North American Industry Classification System categories that are 0 are not shown.
[a] Totals may not add due to rounding.

Economic effects would occur beyond the tri-county area in the form of jobs, income and spending. These effects would occur due to spending (attributable to Project construction) that would occur outside the tri-county area. Although these effects were not quantified as part of this analysis, 65 percent to 75 percent of the construction workforce would live in areas outside the tri-county area; therefore, spending would likely increase in the areas where these employees reside. Also, non-labor construction procurements that occur in areas outside the tri-county area (estimated to be approximately $119 million) would result in economic benefits. Areas that benefit could include the metropolitan area closest to the proposed Project (Portland-Vancouver) as well as other areas in the Northwest and the nation as a whole.

[29] Value added is the difference between the proposed project's total output and the cost of the proposed project's inputs. For the construction industry in the tri-county area, value added is comprised primarily of employee compensation (IMPLAN 2008). Value added is a measure of the contribution to output in the tri-county area made by project construction.

Population and Housing Impacts

Up to an estimated 15 percent of the construction workforce would be specialized craftsmen originating outside of Washington and Oregon (A. Barkley, personal communication). These workers would likely have relatively short assignments, and few would be expected to bring their families to the area. The remaining 85 percent of non-local workers would likely come from the Portland-Vancouver area. Assuming as a worst-case scenario that one-third of the workers from the Portland-Vancouver metropolitan area would stay in temporary lodging near the Project Area Monday through Friday, and the specialized, temporary staff also would require lodging, the population that would require housing in the tri-county area is expected to range from 75 workers to 85 workers during peak construction. These construction workers would be expected to seek temporary accommodation in the general vicinity of the Project Area, and to use motels, trailers, campers, and other forms of transient housing. Given that 325 of the approximately 1,082 hotel rooms or RV campsites within 25 miles of the Project Area would be available at any one time, the out-of-area workers would not cause a substantial impact to the availability of transient accommodation in the Project vicinity. The construction phase of the proposed Project is not expected to affect median housing values, median gross rents, or new housing construction.

Fiscal Impacts

Overall fiscal impacts of Project construction are expected to be positive, based primarily on increased employment and spending in the local economy.

Sales Tax Revenue. The total cost of construction is estimated to be approximately $150 million. Non-local procurements would include wind power generation equipment purchased from various domestic and foreign suppliers. Depending on legislation currently under consideration in the state legislature, state sales and use tax may be levied only on procurements that are not directly related to electricity generation. Should the state sales tax exemption for wind power be extended, capital equipment such as turbines, transformers, transmission cables, and substation equipment would not be taxable.

Local procurements are estimated to be 10 percent of total procurements ($13.2 million) (A. Barkley, personal communication). An estimated 90 percent of local procurements would be directly related to electricity generation, and would not be subject to sales tax should the state sales tax exemption for wind power be extended. Taxable sales due to Project construction is therefore estimated to be approximately $1.32 million, resulting in $92,400 in sales and use tax revenue using the sales tax rate (7.0 percent) for the Project Area, which is located in unincorporated Skamania County.

Most of the sales tax revenue due to Project construction would accrue to Skamania County because the Project Area is located in Skamania County. However, if taxable construction supplies are purchased in another Washington State county (Klickitat County, for example), and not shipped to the Project Area, the county in which the purchase occurred would receive the county portion of the sales tax revenue on that purchase. Of the total estimated $92,400 in sales tax revenue, Washington State would receive $85,800 and Skamania County (or the counties where materials or supplies are purchased and not shipped to the site) would receive $6,600.

If a portion of taxable construction materials or supplies are purchased in Hood River County, the owner must pay use tax to Washington State, in which case the tax would go to Washington State (6.5 percent) and Skamania County (0.5 percent). Sales tax revenue would not accrue to Hood River County. Klickitat County could receive a portion of the sales tax revenue, but as stated above, the majority of the county portion is expected to go to Skamania County.

In addition to the $92,400, the proposed Project would result in modest increases in sales tax revenues due to local purchases by construction workers.

Property Values and Property Tax Revenue. Construction activities are not likely to adversely affect property values in residential and commercial areas near the Project Area because the construction period would be relatively short. Construction of the proposed Project would not affect property tax revenues.

County Expenditures. Construction of the proposed Project would require that many construction vehicles, including trucks with over-size and over-weight loads, share the existing roadway network with the general public. Skamania County could experience a small increase in traffic-related costs due to the need for permitting and control measures related to these vehicles, particularly for the over-size loads. Some accidents could occur that would be directly attributable to construction traffic, but any increase is expected to be minimal.

The County could experience minor to negligible increases in the cost of public services such as fire suppression, law enforcement, governmental services, parks and recreation, and hospital costs during construction due to the additional traffic and the temporary population. These are not expected to be significant in the context of the County as a whole.

Operation

Business and Economic Impacts

Operation of the proposed Project would result in a positive economic impact to Skamania County, the tri-county area, and the State of Washington due to increased tax revenues, employment, and local expenditures.

Project operation would require eight to nine full-time or part-time Operations and Maintenance employees. Approximately 75 percent of employees (7 employees) would originate from the tri-county area (A. Barkley, personal communication). An additional temporary workforce with appropriate skills would be utilized during major maintenance or other non-routine operational work. Efforts would be made to hire local individuals to staff the proposed Project as much as practicable.

The estimated gross payroll, including fringe benefits and other payroll overhead for the operational workforce would be $1.5 million, or an average annual labor cost of $167,000 to $188,000 per employee. Subtracting approximately 25 percent to estimate benefits and overhead, the implicit wage would be within 10 percentage points of the 2007 standard industrial wage for construction workers in Skamania County (IMPLAN 2009).

In addition to the direct employees, Project operation would result in indirect and induced employment, for an estimated total of 11 ~~12~~ permanent jobs resulting from the proposed Project (Table 3.13-9).

Table 3.13-9
Employment Impacts of Operation

Sector	Number of Jobs			
	Direct	Indirect	Induced	Total
Ag, Forestry, Fish & Hunting	0	0	0	0
Mining	0	0	0	0
Utilities	7	0	0	7
Construction	0	0	0	0
Manufacturing	0	0	2	2
Wholesale Trade	0	0	0	0
Transportation & Warehousing	0	0	1	1
Retail trade	0	0	0	0
Information	0	0	1	1
Finance & insurance	0	0	0	0
Real estate & rental	0	0	0	0
Total[a]	7	1	4	11

Source: IMPLAN (2009).
North American Industry Classification System categories that are 0 are not shown.
[a] Totals may not add due to rounding

Using IMPLAN regional economic modeling software for the power generation and supply industry in Skamania, Klickitat, and Hood River Counties, a wind power facility employing nine full-time workers would have a gross annual operating cost valued at approximately $3.75 million. This would include direct purchases from suppliers (including fuels, maintenance supplies and services, retail goods and professional services).

An alternative methodology for calculating job impacts is used by the Renewable Energy Policy Project, which estimates that every megawatt of installed wind capacity creates about 4.8 job-years of employment, including both direct and indirect jobs (REPP 2009). Using this methodology, the proposed Project, which would produce approximately 75 MW of electricity, would result in 360 job-years or 12 jobs per year for the 30 year life of the proposed Project.

As stated in Chapter 1, the purpose of the Project is to help meet the future need for energy resources while at the same time enabling SDS to further diversify its business through a technically and economically feasible project. When SDS started in 1946, there were 26 employees in its original crew. This number grew to a high of 450 employees during the 1970s when logging and lumber production were at a peak. Production has since slowed tremendously, as the supply of timber from national forests has sharply declined due to environmental legislation. For this reason, many of the mills in Skamania County have closed down. SDS was able to survive the crises and changes of the last 30 years and no longer relies on timber from national forests. SDS has scaled back operations, yet today SDS is one of the largest employers in Klickitat County, employing 325 people during busiest production times.

SDS has remained viable during changes in the market through expanding and diversifying its enterprises to include marine in 1984 and power produced in its steam-operated power plant, which creates energy from wood waste, a renewable, organic resource. The the Project is intended to provide another means of diversifying the holdings of SDS to ensure a continuation of a resource-based work force in Skamania County, and to create new construction and operation jobs at a time when jobs in Washington State are being lost. As shown in Table 3.13-9, the proposed Project would create twelve new full-time jobs in Skamania County,

Population and Housing Effects

Of the nine permanent employees for the proposed Project, seven are assumed to originate from the tri-county area, and two would be assumed to migrate to the area from other locations. Assuming an average household size of 2.6 persons, the population in the area could increase by approximately five people, and two households. At the most recent average housing vacancy rate available for Skamania County (16.8 percent), more than 900 housing units would be available in Skamania County alone. Thus operation of the proposed Project would not impact housing availability or cost.

The proposed Project would not displace any minority or low-income populations. The proposed Project would be constructed on private land currently used for forest production, and no residents would be displaced.

Fiscal Impacts

Property Values. Local communities near proposed wind turbine locations have expressed concern that constructing wind turbines would detract from views, which would in turn decrease their property values. A number of studies have been performed to determine the impact of wind power projects on property values. These include the following:

- The Lawrence Berkeley National Laboratory prepared *The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis* in December 2009 (Hoen et al. 2009). Researchers collected data on almost 7,500 sales of single-family homes within 10 miles of 24 existing wind facilities in nine different US states. None of the models uncovered conclusive evidence of the existence of any widespread property value effects that might be present in communities surrounding wind energy facilities. Neither the view of the wind facilities nor the distance of homes to those facilities was found to have any consistent, measurable, and significant effect on the selling prices of those homes (Hoen et al. 2009).

- In 2006, ECONorthwest prepared *Economic Impacts of the Kittitas Valley Wind Project* (the Kittitas Study) for the Economic Development Group of Kittitas County, Washington. This report involved a survey of tax assessors in counties (other than Kittitas County) with wind projects to determine the potential effects of wind facilities on property values. The Kittitas Study also conducted a review of the available academic literature for additional information on property value effects. The finding was that views of wind turbines would not negatively impact property values (ECONorthwest 2006).

- The Renewable Energy Policy Project prepared *The Effect of Wind Development on Local Properties* (REPP 2003). For this study, the project compiled a database that included every wind development that came on-line after 1998 with 10 MW installed capacity or greater. For all projects for which sufficient data was available, REPP conducted a statistical analysis to determine how property values changed over time in the viewshed and in the comparable community. The statistical analysis provided no evidence that wind development has harmed property values within the viewshed (REPP 2003).

- Responses to comments published as part of the 2009 Desert Claim Wind Power Project Final Supplemental Environmental Impact Statement state *"the Final EIS referenced a 2003 report published by Kittitas County that summarized the existing literature on the effect of wind power projects on property values."* The response states that the study, which was prepared by Huckell/Weinman Associates, concluded that wind power facilities have not diminished the value of surrounding properties (EFSEC 2009).

- A literature review to assess the question of whether wind turbines in rural communities have the potential to affect residential property values was completed as part of the Lower Snake River Wind Energy Project Draft EIS (Ecology & Environment 2009). The Draft EIS reported that in 2008 Hoen and Wiser found (1) no statistical evidence that homes near wind facilities are stigmatized by those facilities, (2) no statistical evidence that homes with a view of wind turbines have different values than homes without such views, and (3) no statistical evidence that homes within 0.25, 0.5 and 1 mile of the turbines sell for different values than those located further away. In 2006, while assessing the impacts of a 20 turbine, 30 MW wind facility's visibility on residential property values in Madison County, New York, Hoen found no statistically significant relationship between either proximity to or visibility of the wind facility and the sale price of homes (Ecology & Environment 2009, Hoen 2006).

In summary, the results of these studies and literature reviews are that no statistical evidence exists that wind development has a harmful effect on property values within the viewshed. Therefore, property value impacts are not expected as a result of the proposed Project.

Sales Tax Revenues. Sales, use and other indirect business taxes to state and local governments attributable to Project operation are estimated at approximately $50,000 per year. This estimate is the sum of the estimated sales and use tax revenue from (1) the procurement of supplies and materials for the purpose of Project operations, and (2) new employee spending in the area. The sales tax revenue would be split between Washington State (approximately $46,000) and Washington counties, primarily Skamania and Klickitat counties ($4,000).

The portion of non-labor annual operating cost that is not directly related to electricity production (10 percent of $2.3 million, or approximately $230,000) would be taxable (A.

Barkley, personal communication). Applying the Skamania County sales and use tax rate (7.0 percent) to this amount results in an estimated $15,800 in tax revenue.

New employee spending is estimating by taking the total labor income (direct, indirect and induced) from the IMPLAN operations model (approximately $977,000 per year) and assuming that 70 percent of this amount is disposable income and 70 percent of disposable income is spent in local Washington counties. Based on these assumptions, related sales and use tax revenue would be approximately $34,000.

With the proposed Project, the Project Area would continue to be managed as commercial forest, excluding the area containing the turbine strings and roads. The Project Area covers 1,152 acres. Table 1-1 shows that the maximum area developed for the wind turbine foundations, connecting roadways and transmission lines would be 384 acres (approximately 33 percent of the 1,152-acre site). As specific locations are determined for turbines and other Project components, the 384-acre area would be reduced. The areas that would experience permanent impacts and temporary construction impacts of the proposed Project total approximately 108 acres (approximately nine percent of the 1,152-acre site). The 56-acre area that would be removed from timber production for the life of the proposed Project is approximately five percent of the total Project Area. The opportunity cost of taking this land out of timber production would include tax revenues for Skamania County and Washington State, and would be countered by the sales tax revenues resulting from wind energy sales.

Property Tax Revenue. The proposed Project would have an estimated value of $87.5 million, which would represent an increase of 6.5 percent in assessed value in the County. Using the average 2008 property tax rate for Skamania County of $8.36/$1,000 assessed value (WDOR 2009), the increase in property tax revenue to the County would be $731,500. This would represent an annual revenue increase of 2.9 ~~7.66~~ percent compared to the $2.8 ~~9.66~~ million in property tax collected in calendar year 2008 ~~2007~~. Although Washington State limits property tax increases to one percent of the previous year's levy, new construction does not apply, and would be added on after the one percent is added, using the previous year's property tax rate (V. Torres, personal communication). The increase in property tax revenue would begin one year after construction is complete, and continue for the life of the proposed Project. However, to the extent the wind turbines depreciate over time, the assessed value of the turbines and therefore the property tax revenue also would decrease.

Additional property tax revenue would be distributed to a variety of County departments. Assuming that annual tax revenues of $731,500 would be distributed in the same manner as current property tax distributions, funds receiving the most revenue would be the State School Fund ($185,281), School District 405 Maintenance and Operations ($149,461), the County Road fund ($115,035), and the Current Expense fund ($111,086). A portion of the State School Fund would be returned to Skamania County for Skamania County schools.

Property tax revenues would be higher to the extent that increased wages and economic activity in the County resulted in higher valued properties.

A different methodology was used by the National Wind Coordinating Committee, which estimates an increase of $10 to $14 in property taxes for each $1,000 investment (NWCC 2009).

Using this approach, the $17.7 million dollars spent locally (labor and non-labor cost) would result in approximately $177,000 to $250,000 in additional property taxes. This estimate is lower than the forecast given above; however, the NWCC estimate is based on industry averages, while the first estimate is based on project-specific data.

County Services. The addition of five residents would cause a negligible increase in demand for and cost of public services. These would also be outweighed by the substantial economic benefits of the proposed Project to the County.

Minority and Low-Income Populations. Environmental justice addresses whether the Proposed Action would disproportionately impact disadvantaged populations such as low-income and minority residents. The population in the study area (Skamania and Klickitat Counties, Washington; and Hood River County, Oregon) is predominantly white (non-Hispanic/Latino) and a review of data from the 2000 Census did not identify any specific geographic concentrations of minority groups. The Proposed Action would not be expected to disproportionately affect any low-income populations, based on per capita income information at the Census Tract level. Therefore, there would be no disproportionately high or adverse effects to minority or low income groups.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. A detailed site restoration plan is required within ninety days of Project decommissioning. The initial site restoration plan would address site restoration that would occur at the conclusion of the proposed Project's operating life (estimated to be 30 years), and restoration in the event the proposed Project is suspended or terminated during construction or before it has completed its useful operating life. The initial site restoration plan would include or parallel a decommissioning plan for the proposed Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major socioeconomic issues presently anticipated, including potential impacts to population, housing and employment. If socioeconomic impacts are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.13.2.2 No Action Alternative

Under the No Action Alternative, the proposed Project would not be built. Socioeconomic conditions in the area would continue in their present condition.

3.13.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, reduce, or compensate for potential Project impacts to any socioeconomic factors during construction or operation of the proposed Project.

- Impact to the local economy and social structure of the proposed Project is expected to be beneficial, in the form of additional jobs, increased sales, and increased tax revenues. Temporary increases in population during construction are likely to be minor in view of the availability of housing, transient accommodations, and other public services in the region.

- Ensure that the applicant uses the local labor pool to the greatest extent possible; construction contractors would be required to advertise positions locally and to employ local workers to the greatest extent possible.

3.13.4 UNAVOIDABLE ADVERSE IMPACTS

The proposed Project would result in beneficial impacts, primarily from employment during construction and operation. Minimal adverse impacts are expected.

3.13.5 REFERENCES

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3.14 CUMULATIVE IMPACT ANALYSIS

"Cumulative impacts" are the impacts on the environment which result from the incremental impact of an action, such as this Proposed Action, when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 C.F.R. 1508.7).

This section describes existing development in the vicinity of the proposed Project, as well as current and reasonably foreseeable future development planned for the area, and analyzes and describes potential cumulative impacts. The past, present, and reasonably foreseeable future actions provide the context to assess the cumulative impacts of these actions in combination with the Proposed Action.

3.14.1 EXISTING DEVELOPMENT

The nature and extent of existing development in the vicinity of the proposed Project (i.e., generally within approximately 20 miles of the Project Area) is largely described earlier in this chapter in the sections for each environmental resource. This section first summarizes existing cumulative development that has occurred in the vicinity of the proposed Project. This section then discusses existing wind projects that are considered in the analysis of potential cumulative visual impacts to travelers and others along the I-84 corridor.

3.14.1.1 Surrounding Land Uses

The general Project vicinity is characterized by agriculture, commercial forestry, rural residential development, and a small number of commercial enterprises.

The proposed Project Area is located approximately two miles north of the Columbia River and directly north of the Columbia River Gorge National Scenic Area. The National Scenic Area extends along the Columbia River for about 85 miles and includes 292,500 acres in parts of three Oregon and three Washington counties. Although both the Project Area and the proposed access road are located completely outside the Scenic Area, the proposed Project Area does extend south to the northern boundary of the Scenic Area. The Gifford Pinchot National Forest is located north of the Project Area.

On the Washington side of the Columbia River, land use is predominantly commercial forestry and residential in numerous small, unincorporated communities. There are approximately 400 residences and businesses within three miles of the Project Area (Figure 3.8-1). There is some limited agriculture, mostly pear and apple orchards recently augmented with some wine grape vineyards, located within the Columbia River Gorge National Scenic Area. On the Oregon side of the Columbia River, land use within the Scenic Area is predominantly commercial timber production and residential. South of the Scenic Area, land uses include commercial forestry, agriculture, and some residential. The primary Oregon orchard crops are pears, apples, and cherries.

3.14.1.2 Existing Wind Projects

Portions of the Project would be visible to drivers along I-84, which is located on the Oregon side of the Columbia River. For the purpose of assessing cumulative impacts to visual resources, views of other wind projects from I-84 were considered even if they are located farther than 20 miles from the Project Area. I-84 extends for a distance of approximately 130 ~~127~~ miles from Cascade Locks, Oregon (southwest of the Project Area on the Oregon side of the Columbia River) to the intersection with I-82, which leads north to the Tri-Cities. The draft EIS identified ten existing wind projects along this segment, all located within a distance of approximately 70 miles east of the Project Area (to approximately Arlington, Oregon).[30] Following publication of the draft EIS, eight additional wind projects were identified within a distance of approximately 70 miles east of the Whistling Ridge Energy Project Area. These projects have been added to the analysis in the FEIS. These 18 projects could potentially be viewed by drivers along I-84 within a driving time of approximately one to one-and one-half hours and were included in the analysis of cumulative impacts to Visual Resources described further in Section 3.14.3.10. ~~These ten projects could potentially be viewed by drivers along I-84 within a driving time of approximately one to 1.5 hours.~~

From Arlington, I-84 continues on in an easterly and the southeasterly direction, terminating at Pendleton, Oregon. There are no existing wind energy projects in this area. Farther east, there are wind energy generation projects southeast of the Tri-Cities, and west and southwest of Walla Walla (in both Washington and Oregon), more than 80 additional miles east-northeast. These were considered too remote for this analysis.

All of the 18 ~~ten~~ existing wind energy projects considered in the cumulative visual resource impact analysis are located east of the Columbia River Gorge National Scenic Area as shown in

[30] See map at http://www.nwcouncil.org/maps/power/Default.asp.

Figure 3.14-1. Nine ~~Four~~ are located north of the Columbia River in Washington, and nine ~~six~~ are located south of the river in Oregon. In contrast to the steep terrain and forested vegetation of the Project Area, the 18 ~~ten~~ operating wind projects located to the east are on lands with rolling hills, open vistas, and little or no vegetation. The projects that were considered include:

- Windy Point (Tuolumne), 137 MW wind project west of Maryhill, Washington;
- Windy Flats – Dooley, 113 MW wind project west of Maryhill, Washington;
- Linden Ranch, 50 MW wind project near Goldendale, Washington;
- Goodnoe Hills, 94 MW wind project north of the Columbia River between Goldendale and Roosevelt, Washington;
- White Creek, 205 MW wind project near Roosevelt, Washington;
- Harvest Wind, 99 MW wind project near Roosevelt, Washington;
- Juniper Canyon I, 150 MW wind project in Klickitat County, Washington;
- Big Horn, 199 MW wind project in Klickitat County, Washington;
- Big Horn II, 50 MW wind project in Klickitat County, Washington;
- Patu, 10 MW wind project near Wasco, Oregon;
- Biglow Canyon (I, II, III and Phase II), 600 ~~125~~ MW wind project in Sherman County, Oregon;
- Klondike (I, II, III ~~IIIA~~), 499 MW wind project in Sherman County, Oregon;
- Hay Canyon, 101 MW wind project in Sherman County, Oregon;
- ~~Goodnoe Hills, 94 MW wind project north of the Columbia River between Goldendale and Roosevelt, Washington;~~
- ~~Big Horn, 199 MW wind project in Klickitat County, Washington;~~
- Star Point, 99 MW wind project in Sherman County, Oregon;
- ~~White Creek, 205 MW wind project near Roosevelt, Washington;~~
- Wheat Field, 97 MW wind project near Arlington, Oregon;
- Rattlesnake Road, 103 MW wind project near Arlington, Oregon;
- ~~Wheat Field, 97 MW wind project near Arlington, Oregon;~~

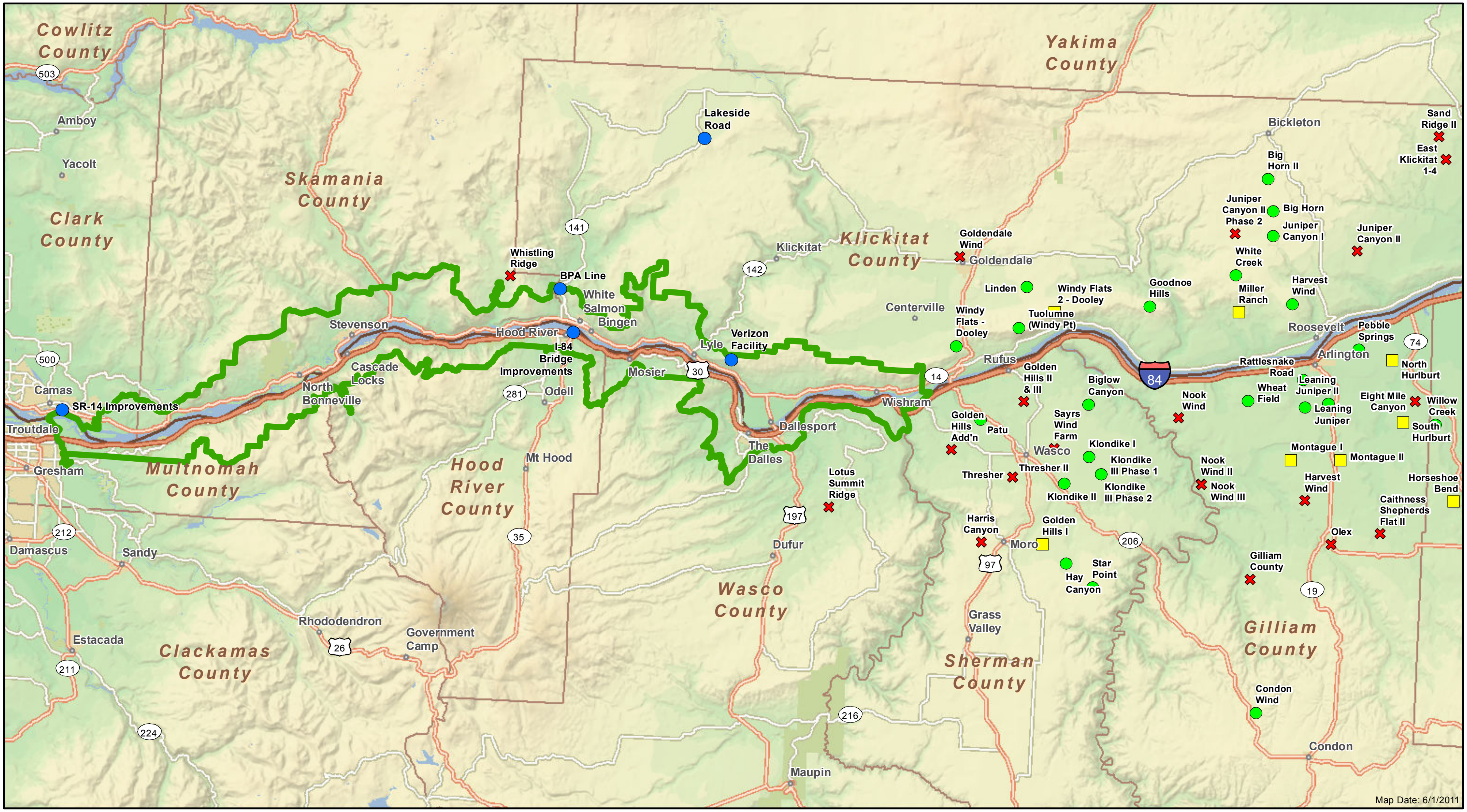
- Leaning Juniper I, 150 MW wind project near Arlington, Oregon;
- Leaning Juniper II, 200 MW wind project near Arlington, Oregon;

3.14.2 REASONABLY FORESEEABLE FUTURE DEVELOPMENT

Reasonably foreseeable future development generally includes those actions currently underway, formally proposed or planned, or highly likely to occur based on available information. Reasonably foreseeable future development projects located within approximately 20 miles of the Project Area were identified to determine if they could potentially have cumulative impacts on the environment, including water quality, soil erosion, vegetation, terrestrial wildlife species, and bird and bat species. The 20 mile radius was considered a reasonable geographic area within which to consider potential cumulative impacts, particularly construction-related impacts such as surface disturbance, vegetation removal, emissions, runoff, noise, and traffic. To assess potential cumulative visual impacts to drivers along the I-84 corridor, reasonably foreseeable future wind projects located within approximately 70 miles of the Whistling Ridge Project Area were also added to the analysis.

Various sources, including searches in the fall of 2009 of the web sites of the surrounding Skamania, Klickitat and Hood River Counties, Columbia River Gorge Commission, WSDOT, Oregon Department of Transportation, EFSEC, the Oregon Department of Energy, and the Ports of Skamania County, Klickitat County, The Dalles, and Cascade Locks, were made to obtain information about any current and potential future development in the Project vicinity. Reasonably foreseeable development that may occur in the vicinity of the Proposed Action could include both other wind projects and roadway projects. (See Figure 3.14-1 for the general locations of this potential development.)

Both non-wind and wind reasonably foreseeable future projects were initially considered for inclusion in the cumulative impact analysis. Non-wind projects involved transportation improvements, communications facilities, and power line improvements. Of these projects, only the Oregon Department of Transportation bridge replacement projects, now in progress along I-84, were considered close enough to the Project Area to be included in the cumulative impact analysis. The other transportation, communication, and power line improvement projects were considered to be too far from the Whistling Ridge Project Area to result in cumulative impacts and were therefore eliminated from further analysis. Reasonably foreseeable wind projects are shown in Figure 3.14-1. Of these wind projects, all except the Middle Mountain project were judged not likely visible from I-84. Nonetheless, the cumulative visual resource impact analysis does consider reasonably foreseeable wind projects with approximately the same geographic area as existing wind projects considered in that analysis. In addition, the cumulative impact analysis has been updated to reflect the discontinuation of the Middle Mountain project. The Middle Mountain project, originally proposed by Hood River County as a small community scale wind project of around 10 MW, would have been located on the south side of the Columbia River, approximately seventeen miles south of the Whistling Ridge Energy Project. However, on May 17, 2010, the Hood River County Commission decided to discontinue efforts to develop the Middle Mountain wind project and this project therefore has been removed from the cumulative impact analysis.



Map Features

- Existing Wind Generation
- Wind Project Under Construction
- Proposed Wind Generation
- Other Proposed Projects
- Columbia River Gorge National Scenic Area Boundary

Miles 0 5 10 20

Figure 3.14-1

Existing and Proposed Development

Whistling Ridge Energy Project
Skamania County, Washington

~~In addition to the potential for cumulative visual impacts, two proposed projects in the project vicinity were identified as having a potential for other cumulative impacts with the Project.~~

~~***Middle Mountain Wind Project.*** Hood River County is proposing this 9-MW project, which would be located approximately 10 miles south of Hood River31. Six wind turbines are proposed in a single line on Middle Mountain. The project would be located approximately 15 miles south of the Project. The County has completed visual simulations, and a project informational meeting is scheduled for January 12, 2010. The County plans to continue its feasibility analysis in the coming months. Studies of impacts to biological resources have not been conducted.~~

A description of the Oregon Department of Transportation bridge replacement projects along I-84 are presented below:

I-84 Bridge Replacements. Oregon Department of Transportation is repairing or replacing 21 bridges on I-84 through the Columbia River Gorge with new bridges. Several of these projects are located near Hood River and these improvements are grouped as follows:

- *I-84 Cascade Locks to Hood River.* The bridges in this bundle span the junction of the Hood and Columbia rivers. Construction began in July 2008 and was completed in fall 2010[32].
- *I-84 Exit 64 (Hood River).* This bundle includes replacing the overpass bridge on Interstate 84 at exit 64 in Hood River and improving the interchange and Button Bridge Road beneath the overpass. Design work started in fall 2008 and would be completed by fall 2009. Construction is scheduled from early 2010 to late 2011[33].
- *I-84 Hood River to The Dalles.* These five bridges are located at the east end of the Columbia River Gorge. Construction on the Mosier Creek bridge replacement began in August 2008 and would be completed in fall 2010[34]. Design work on the remaining bridges is complete and construction is scheduled from spring 2009 until early 2012. Repairs to the I-84 bridges at Hostetler Way in The Dalles and over Rock Creek in Mosier were completed in summer 2007.

[31] See: http://www.co.hood-river.or.us/vertical/Sites/%7B4BB5BFDA-3709-449E-9B16-B62A0A0DD6E4%7D/uploads/%7B909769CE-99F0-47B5-9CAF-77015BF9D737%7D.PDF, and http://www.co.hood-river.or.us/index.asp?Type=B_BASIC&SEC={2AE779FB-D681-4AA8-8835-B50BBAA8252D}.

[32] See: http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/CascadeLocksto2ndStreetHoodRiver.pdf.

[33] See: http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/B224_PIP_90109_ODOT.pdf.

[34] See: http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/CascadeLocksto2ndStreetHoodRiver.pdf.

3.14.3 CUMULATIVE IMPACTS

The following subsections describe the cumulative effects that the Proposed Action, in combination with the past, present, and reasonably foreseeable future actions identified above, would have on the various environmental resources discussed in this EIS. Cumulative impacts from the combination of these actions could occur for each of the environmental resources. However, the contribution of the Proposed Action to these cumulative impacts would vary, with the greatest contribution occurring in cumulative impacts on visual resources as constructing and operating the Project would add a view of an additional wind power project to travelers in the Gorge. In addition to the existing projects east of the Project Area, long-distance travelers in either direction along I-84 could see some elements of the Project, for approximately 12.5 miles traveling west and 6.5 miles traveling east. Travelers along SR 14 would not see the Proposed Action, which would be blocked by the bluff to the north of the road. As discussed in more depth below in Section 3.14.3.10, the visual impact of the Project along I-84 would be variable, with the number of turbine strings visible changing with topography. In many places only a few turbines would be visible, and the area where the most turbines would be visible (directly across the Columbia River from White Salmon and Bingen) would also be the area where the viewer would be the farthest from the Project Area (Figure 3.9-1). This would constitute a small cumulative impact when considered in combination with views of other wind projects located from 35 to 70 miles to the east.

Low levels of adverse cumulative impacts have been identified for energy and natural resources from the use of steel, concrete and vehicle fuel for construction, and for transportation (traffic safety and increased risk of accidents during construction periods of the Project and the I-84 bridge replacement projects, if they should overlap). Simultaneous construction projects may create a beneficial cumulative socioeconomic impact to local communities. Finally, by introducing up to 75 MW of clean renewable energy into the regional electrical grid, the Project would positively contribute to efforts to combat the cumulative impacts of climate change, and also contribute to efforts to improve air quality in the Columbia River Gorge vicinity.

All potential cumulative impacts are discussed below.

3.14.3.1 Earth

Past and present commercial logging of the site and surrounding area, agriculture, and construction of rural residences have resulted in cumulative impacts to geology and soils, primarily through increased erosion and soil disturbance and compaction. As the reasonably foreseeable future actions are developed, these actions likely would contribute to cumulative impacts. Reasonably foreseeable use of the Project Area for both the proposed the Project and for a continuation of commercial forestry could increase the potential for soil erosion, and contribute to these cumulative impacts for the life of the Project.

3.14.3.2 Air Quality

While past and present development and activities have resulted in some deterioration of air quality in the Project vicinity, the cumulative effect of these activities on air quality has been fairly negligible. Overall, the air quality in the region is considered good, as evidenced by

Oregon Department of Environmental Quality (ODEQ) reports on air quality for The Dalles, Oregon, the closest city with an air monitoring station. ODEQ reports air quality data using an air quality index based on particulate matter 2.5 micrometers diameter and smaller ($PM_{2.5}$). ODEQ's 2008 report for The Dalles shows 339 days with good air quality, 25 days with moderate air quality, and no days with unhealthy air quality (ODEQ 2009).

While air quality in the Project Area is generally good, haze is a well-documented problem in the Columbia Gorge and the causes are being studied by the Southwest Clean Air Agency. In a 2008 Report, the agency found that haze was largely caused by winter stagnations that trap pollutants and fog (SWCAA 2008). In the summer, winds flow predominantly from the west, transporting emissions from the Portland metropolitan area into the Gorge. Wildfires also contribute to the haze when smoke is blown into the Gorge. There is no single source that is primarily responsible for haze; however, man-made sources are important contributors (ODEQ 2008). The most significant man-made sources contributing to haze in the Gorge include: power plant emissions; woodstoves; motor vehicles; non-road emissions (e.g. ships, trains, trucks); and agricultural sources of ammonia.

Construction of reasonably foreseeable future actions would be expected to generate dust and emissions during construction activities that could cumulatively contribute to air quality degradation. Construction of the terrestrial portions of the Proposed Action also would generate dust and emissions that likely would incrementally contribute, though slightly and only for a short time, to cumulative air quality impacts in the general Project vicinity.

Climate Change. Past and present actions in the Project vicinity, the region and across the globe have contributed to climate change and global warming. The past and present actions include, without limitation, the post-settlement conversion of native landscapes to residential, commercial and forestry uses, the introduction of carbon dioxide and other greenhouse gases from fossil fuel emission sources, particularly from automobiles and fossil fuel electrical generation sources, and in general, post-industrial manufacturing processes and land uses. Locally, residential, agricultural and commercial development is expected to continue a trend that permanently removes forests and replaces them with land uses that contribute to climate change.

"Climate change" refers to changes in the Earth's global climate, including the rise in average surface temperature known as global warming. At this time, while there is nearly complete scientific consensus concerning the anthropogenic causes of global climate change, and also consensus on its deleterious impacts on the natural and human environment, there is uncertainty regarding the specific, localized effects of projected global warming upon regional temperature, precipitation and ocean conditions. The Federal Environmental Protection Agency (EPA) recently acknowledged that due to its impacts on climate change and related human health effects, carbon dioxide is considered an air quality pollutant requiring a regulatory response.[35]

[35] In December, 2009, Environmental Protection Agency (EPA) Administrator Lisa Jackson announced that the agency had finalized its finding that greenhouse gases, including carbon dioxide, pose a threat to human health and welfare. The ruling allows the EPA to begin regulating greenhouse-gas emissions from power plants, factories and major industrial polluters, although the precise details of that regulation

The effects of global warming on the overall hydrology of the Columbia River Basin are difficult to separate from the natural variability resulting from cycles such as El Niño and the Pacific Decadal Oscillation. Further, forecasted changes to water supply or runoff volumes for the key Columbia River Basin drainages are more susceptible to shorter climatic cycles, such as El Niño and the Pacific Decadal Oscillation, than longer-term trends attributable to global warming. The variability seen in the Columbia River Basin over the last 80 years is greater than the variability experienced in the last 10–15 years. Therefore, even though the precise effects of global warming on the Columbia River Basin cannot be accurately determined at this time, estimated changes are within historic variations.

According to the US Global Change Research Program[36], the predicted future climate change effects to the Pacific Northwest (PNW) are as follows:

> *The climate model results selected for use in the National Assessment study (Hadley and Canadian) show regional warming continuing[37] at an increased rate in the next century, in both summer and winter. Average warming over the region is projected to reach about +3°F by the 2020s and +5°F by the 2050s - well outside the natural range of climate in the 20th century. Annual precipitation changes projected through 2050 over the region range from a small decrease (-7%) to a slightly larger increase (+13%). The projected changes in precipitation, unlike the projected temperature changes, are within the range of year-to-year variability that has been experienced over the past 100 years in the PNW. The models suggest small changes in yearly average precipitation, but the seasonal trends are larger: nearly all the climate models show wetter winters and some show drier summers in the future.*
>
> *After 2050, the projected trend to a warmer, wetter regional climate continues with substantially more warming likely to occur in winter than in summer. By the 2090s,*

---

have yet to be worked out. "The threat is real," said Jackson. "If we don't act to reduce greenhouse-gas emissions, the planet we will leave to the future will be very different than the one we know today."

[36] See: US Global Change Research Program (http://www.usgcrp.gov/usgcrp/nacc/education/pnw/pnw-edu-2.htm)

[37] A Note about General Circulation Models - This paper's discussion about possible futures and their implications was taken from different sources based on a variety of general circulation models (GCMs) but is particularly based on the results of the Hadley Centre and Canadian Centre model simulations used by the National Assessment process. GCMs are tools used by scientists to construct plausible estimates of potential changes in climate. It is generally agreed that these models provide reasonable estimates of changes at the global and latitudinal scale.

However, for a variety of reasons, significant differences can exist on a regional scale between model outputs. Among these reasons are limits in the computational resources needed to resolve regional-scale topography and surface features. Because GCMs are coarse and do not accurately represent changes at the regional scale, caution should be used in interpreting the details of outputs from these models. However, until climate models that can resolve regional scales are available, these models offer the best "what if" scenarios available for consideration of vulnerabilities to climate change. The discussion describes plausible futures given our current understanding; however, these projections should not be considered definitive predictions of changes and effects.

projected average summer temperatures rise by +7.3°F to 8.3°F, while winter temperatures rise +8.5°F to 10.6°F. Projected precipitation increases over the region range from 0 to 50% depending on the model. Warmer temperatures, though, mean less winter precipitation will fall as snow and therefore there will be less snowpack for later melting and use.

These projected changes are associated with large-scale shifts in atmospheric circulation over the Pacific, especially in winter, which resemble the changes that occur during the strongest El Niño events. As a result, winters are warmer and wetter -- both in total precipitation and in the amount of rainfall in heavy storms -- because warmer temperatures increase the quantity of water vapor.

Warming since 1900 in the Pacific Northwest ranges from 0 to 4°F. By 2100, both models project warming near 5°F west of the Cascades, with much larger warming further east in the Canadian model.

Precipitation has increased over most of the Pacific Northwest since 1900. Both climate models project continued precipitation increases, with the largest increases in the southern part of the region.

Although precise forecasting of the future effects of global warming on the Columbia River Basin may not be possible at this time, it is possible to consider how the development of the Project would affect emissions of greenhouse gases such as carbon dioxide. Reasonably foreseeable future actions, including continued use of fossil-fuel-burning automobiles, industrial processes, and electrical power generation are likely to continue, with cumulative impacts to air quality and acceleration of climate change through the continuing introduction of greenhouse gas emissions into the atmosphere. Power generated from wind displaces power generated by carbon dioxide emitting sources. In addition to wind energy generation being a non-emitting source, wind energy also is integrated into the hydropower system to reduce reliance on other thermal energy sources (i.e., coal, natural gas, or nuclear). Because the current mix of power sources in the Northwest relies heavily on thermal sources, electricity sourced from the wholesale market would likely have a significant greenhouse gas component, with attendant deleterious cumulative impacts. Integrating power generated by wind turbines into the hydropower system reduces reliance on other energy alternatives and avoids the need to procure 75 MW of electric power with a significant greenhouse gas component. Consequently, the Proposed Action would have a positive cumulative impact on efforts to combat air quality deterioration and climate change.

3.14.3.3 Water Resources

Creeks and Streams

Past and present development and activities have cumulatively caused various adverse impacts to creeks and streams in the general Project vicinity. Portions of some of these water bodies have been channelized or filled. Others have been affected by pollutants from stormwater runoff, wastewater discharges, and other sources. Reasonably foreseeable future actions, including continued commercial forestry practices and the additional development of rural residences could also contribute to these cumulative impacts.

Roadway construction and maintenance in the Project Area and vicinity could increase stormwater runoff, and increase sedimentation and turbidity if construction equipment crosses drainage ways. The Proposed Action would incrementally contribute to adverse cumulative impacts to creeks and streams in the general Project vicinity. In particular, the Proposed Action would potentially add to cumulative impacts to Little Buck Creek on the east side of the Project and possibly to Lapham Creek near the proposed site of the Operations and Maintenance Facility during Project construction from construction site stormwater runoff that would result in temporarily increased sedimentation and turbidity. The Proposed Action and other cumulative projects also would have a longer-term adverse cumulative impact to these creeks through the addition of increased impervious areas, which would increase the amount of stormwater runoff to these creeks, however the increase in impervious surfaces for the Proposed Action are expected to be minimal and largely limited to the wind turbine foundations and the Operations and Maintenance building. Lapham Creek drains into the Little White Salmon River, which drains into the Columbia River. Implementation of stormwater detention and other stormwater management practices for the Proposed Action would serve to minimize and possibly avoid Project contributions to these cumulative impacts, including contributions to cumulative impacts to other water bodies in the area, such as the Columbia River.

Groundwater Resources

Cumulative impacts to groundwater from past and present development and activities in the general Project vicinity have included groundwater withdrawals for wells. The reasonably foreseeable future actions would cumulatively affect groundwater for additional wells, including the proposed groundwater use of up to 5,000 gallons per day for the Operations and Maintenance Facility. The Proposed Action could contribute to the cumulative effect of potential groundwater contamination; however the potential for spills or contamination would be no larger than existing commercial forestry or agricultural operations.

3.14.3.4 Vegetation and Wetlands

Vegetation and Habitat

Past and present land development, timber harvest, and agricultural uses have resulted in a cumulatively significant change in the composition of vegetation and habitat types in the Project vicinity. In general, land development and agricultural uses have resulted in conversion of forested areas to non-forested areas, and timber harvests have resulted in a mosaic of forest ages, with average stand age declining over time from relatively short stand rotations. Changes in stand structure and complexity, patch size, and species distribution also have occurred. Few large, old-growth conifers or late-successional stands exist in the general Project vicinity. Accordingly, past and present uses have resulted in cumulative habitat conversion and an ongoing pattern of habitat fragmentation. Reasonably foreseeable future actions, such as ongoing land development and timber harvests, would continue this trend.

Project construction would take place in the context of the existing use of the Project vicinity generally for commercial forestry, which includes regular cycles of clearcutting and reforestation. Nonetheless, by removing trees and other vegetation in the wind Project area for the life of the Project, development of the Proposed Action would contribute incrementally, though in a relatively minor way, to these cumulative impacts.

Special-Status Plant Species

Plant species listed as threatened or endangered and other special-status plant species have been cumulatively affected by past and present development and activities through habitat loss and direct effects to individual species. This trend would likely continue as future development occurs in areas where these species are present. However, the Proposed Action would not contribute to this adverse cumulative impact because, as described in Section 3.4.1.4, the Proposed Action would not affect any threatened or endangered or other special-status plant species.

Wetlands

Incremental losses and degradation of wetlands over time have cumulatively depleted wetland resources in the United States. In the Project vicinity, wetlands likely were previously impacted by construction of a variety of activities, including development of roads and railroads, agricultural activities, and past timber harvests. Reasonably foreseeable future actions may also affect wetlands in the Project vicinity, but it is expected that these future projects would be required to avoid, minimize, and compensate for any potential impacts to wetlands from filling or other activities as part of Project Section 404 permitting requirements. Regardless, because construction and operation of the proposed Project would not impact wetlands, implementation of the Proposed Action would not contribute to cumulative impacts to wetlands.

Noxious Weeds

Past and present activities in the Project vicinity have led to a cumulatively significant spread of noxious weeds in the vicinity, and noxious weed spread could continue with reasonably foreseeable future actions. Although mitigation measures have been identified to minimize the spread of noxious weeds by the Proposed Action, it is likely that noxious weed impacts would nonetheless still occur under the Proposed Action. The Proposed Action thus would contribute incrementally, though in a relatively minor way, to this cumulative impact.

3.14.3.5 Habitat and Wildlife

Terrestrial Wildlife Species

Past and present development and other activities have had a cumulative adverse impact on terrestrial wildlife species and their habitat in the general Project vicinity. The clearing and conversion of land for home sites, utility infrastructure, and other uses since approximately the 19th century has resulted in the cumulative loss of wildlife habitat. Wildlife habitat also has been cumulatively modified through activities such as logging and other silvicultural activities, which have altered and fragmented habitat. This habitat loss and modification has resulted in the displacement of wildlife species. While these changes to existing habitat have been cumulatively detrimental to some species of wildlife, some changes that have resulted in conversion from one habitat type to another (as opposed to conversion to human uses) have been cumulatively beneficial to other wildlife species. Wildlife species also have been directly affected by hunting and trapping activities, as well as incidental harm and killing from other human activities in the area. Reasonably foreseeable future actions involving highway improvements, residential, commercial, agricultural and other development and logging would be expected to incrementally add to these cumulative impacts.

The Proposed Action would impact terrestrial wildlife habitat through permanent improvement of approximately 56 acres now in grass/forb, field/shrub, managed coniferous or mixed deciduous-coniferous forest from within the Project Area (See Table 1-3 and Section 3.3). Some terrestrial wildlife species may also be disturbed by Project construction activities or avoid the Project Area temporarily during construction. The Proposed Action thus would contribute incrementally, though in a relatively minor way, to the cumulative impact on terrestrial wildlife species and their habitat.

Bird and Bat Species

Past and present development and other activities have had a cumulative adverse impact on wildlife species, including birds and bats, with permanent alteration and loss of their habitat in the general Project vicinity. The clearing and conversion of land for home sites, utility infrastructure, and other uses since approximately the 19th century has resulted in the cumulative loss of habitat for birds and bats. Habitat for birds and bats has also been cumulatively modified through activities such as logging and other silvicultural activities, which have altered and fragmented habitat. This habitat loss and modification has resulted in the displacement and mortality of these wildlife species. Further, as discussed below, past and present residential and other development has a continuing impact on these species, through building, window, transmission line and telecommunication facility strikes, vehicular strikes, and the predation of these species by domestic cats. Reasonably foreseeable future actions, including non-wind energy generation uses, are expected to have a continuing negative impact on these species.

As documented elsewhere in this DEIS in Section 3.4 Biology, the Proposed Action would impact bird and bat species. Because of the variability in species, habitat, and flight patterns on a regional basis, it is difficult to assess potential cumulative impacts of “full build-out” development of wind power on birds and bats over a large geographic area. However, the National Academy of Sciences National Research Council estimated the best and worse case fatality estimates for birds and bats based on a regional “full-build” scenario in 2020 for the Mid-Atlantic Highlands (NRC 2007). This study is considered the most thorough, objective and “best available science” on the topic of cumulative impacts from wind energy projects, and made use of a real world example (although from a different region of the country from Whistling Ridge). This study concluded that it is unlikely that the predicted level of fatalities would result in measurable impacts to migratory populations of most species, although for rare and local populations, the cumulative impacts when combined with all other man-made sources of mortality could affect population viability.

The reference in this study to “all other man-made sources of mortality” in the National Research Council study highlights one of the numerous caveats and difficulties inherent to such a study: collisions with turbines are only one element of man-made cumulative effects on bird and bat populations in a given region. Examples of other man-made impacts include collisions with buildings, transmission lines and vehicles, habitat loss, and predation by domestic cats. Erickson et. al. (2005) concluded that these sources of mortality are likely much larger than the potential impacts of wind power development. Other uncertainties included:

- While estimation of bird fatalities caused by wind energy projects is possible, data on bat fatalities is currently sparse, and typically is not species-specific.
- Estimates of turbine fatalities from past projects, especially those from the 1980s through the 1990s, are based on a variety of methodologies and do not include corrections for observer bias and potential removal of carcasses by scavengers.
- Factors such as the turbine height and design, rotor velocity, number and dispersion of turbines, location of turbines in the landscape, and operational schedule of turbines may influence fatalities. Turbine technology is continually changing and it cannot be predicted what technology will be available in the future.

A similar cumulative impact study on avian and bats was performed by WEST, Inc. for the Klickitat County Planning Department in 2008 and updated in 2010 (WEST, Inc. 2010 ~~2008~~). WEST's 2008 study reviewed 17 wind-energy facilities totaling 2,464 MW that were in operation in the CPE of Eastern Washington and Oregon, and an additional 30 potential wind-energy facilities that were planned or being constructed within the CPE as of mid-2008. At the time of their 2008 study, WEST found that there was approximately 6,665 MW of existing or proposed wind-energy facilities in the CPE. For the purpose of their analysis, WEST assumed that 6,700 MW of wind power would be present in the CPE. However, past experience indicates that not all permitted projects are built, so these figures likely overestimate what would actually be constructed. Klickitat County added this study to the Klickitat County energy Overlay Zone Environmental Impact Statement originally issued in September 2004. The 2010 study is included in this EIS as Appendix C-11.[38]

Like the National Research Council study, for the purpose of their cumulative analysis, WEST assumed that for cumulative impacts to occur, there must be a potential for a long-term reduction in the size of a population of birds or bats.

WEST's general approach to the cumulative effects analysis was to summarize results of fatality monitoring studies at operational wind-energy facilities within the CPE, and then use those results to estimate impacts for all constructed and proposed wind-energy facilities within the same ecoregion. At the time of the WEST study, most wind energy development in northern Oregon and southern Washington had been within an area historically characterized by open, arid shrub-steppe and grassland-steppe habitats. WEST found that the current predominant land use of the CPE is dryland agriculture and rangeland, with low precipitation (6 to 12 inches per year). Habitat and land use throughout the entire CPE are similar.

[38] A similar, but somewhat more limited cumulative impact study was prepared for the Shepherd's Flat Wind Energy Facility in 2007. (Included in this EIS as Appendix C-12)

WEST's cumulative effects analysis relies heavily on data from 12 ~~11~~ wind-energy facilities in the CPE where fatality monitoring has occurred. Most of the operating facilities have had or would have some sort of avian and bat post-construction casualty monitoring associated with them, and post-construction fatality monitoring data are available from 12 ~~11~~ operational wind energy facilities in the CPE. For each of the individual study areas from which fatality results are available, the predominant land use was a mosaic of agriculture (mainly dryland wheat farming) and grassland or shrub-steppe rangeland used for livestock grazing.

West estimated the population losses for birds (excluding raptors), raptors, upland game birds, waterfowl, waterbirds, and shorebirds, passerines, sensitive bird species, and bats. Their study estimated 67.1 ~~69.5~~ percent of losses would be to passerines, of which horned lark fatalities made up nearly half. Fatalities to other avian and bat populations were estimated to be substantially less. None of the estimated fatalities were anticipated to cause a significant loss in population, and no cumulative impacts were anticipated.

In comparison to the CPE, the site proposed for the Project is in a different ecoregion, (the Eastern Cascades ecoregion,) which to date has not experienced any wind energy development. In addition, the Project Area is more mountainous, receives more precipitation (an average of 84.06 inches per year as measured at the Skamania fish Hatchery), and is more forested than the CPE. Due to the difference in habitat types between the Project Area and the CPE, the results of the direct impact analysis for the Project cannot be directly applied to the results of WEST's cumulative effects analysis for the CPE. However, WEST's cumulative effects analysis is relevant in considering the added impacts of the Proposed Action to the overall cumulative biological impacts of all wind energy projects in the region.

As described in Section 3.4 Biological Resources, operation of the Project would result in unavoidable mortality to birds and bats through turbine collisions, but there likely would not be enough mortality to negatively affect the population viability of any single species.

The Eastern Cascades Ecoregion likely contains bird and bat populations that are separate from those populations in the CPE due to the significant differences in habitat. The potential for cumulative impacts to birds and bats associated with wind energy development in the Eastern Cascades, and indeed throughout the coniferous forested portions of all of western Washington and Oregon, is extremely small. No existing wind energy developments occur in the Eastern Cascades. With the exception of the Grayland project in Pacific County, a very small 4-turbine wind energy facility, there are no other existing wind energy facilities in forested habitats of western Washington or Oregon. To date, only three additional projects have been proposed in this entire area, including the Middle Mountain Project in Hood River County, Oregon, the Coyote Crest project in Pacific and Lewis Counties, Washington, and the Radar Ridge project in Pacific County, Washington. The only other project proposed in the Eastern Cascades, Middle Mountain, is no longer being pursued by Hood River County, as the County Commission decided to cease efforts to pursue this community scale project of around 10 MW at its meeting on May 17, 2010 (*see http://www.co.hood-river.or.us*).

The one existing project (Grayland) and remaining two projects (Coyote Crest, Radar Ridge) are all in extreme western Washington within another ecoregion, the Northwest Coast Ecoregion. It is not certain that Coyote Crest and Radar Ridge would both be constructed. As with populations in the CPE, wind energy development in the Northwest Coast ecoregion would have little effect on separate bird and bat populations in the Eastern Cascades Ecoregion. In addition, based on preconstruction avian and bat studies conducted at these projects, both raptor and all bird use is generally lower than within the CPE (Table 3.14-1), indicating the potential for avian impacts is likely lower in forested ecoregions than within the CPE. Bat use is more varied, ranging from quite low to relatively high (Table 3.14-2). Again, however, based on the very few wind energy projects proposed in this region, these projects, taken together, would likely have a very small cumulative impact on birds and bat populations.

~~Operation of the Middle Mountain wind project also would presumably cause some mortality to birds and bats. Raptors, including bald eagles, golden eagles, northern goshawks and others could travel the 12 air miles between the two wind projects, and the two projects would be considered part of the same regional population of raptors.~~ The Proposed Action thus would contribute incrementally, though in a relatively minor way, to the cumulative impact on bird and bat species in the region.

Finally, the evaluation of cumulative impacts for wind energy generation facilities should be considered in the context of other mortality threats to these species, which have been estimated in recent research as many times larger than those from wind energy generation (Erickson et al. 2005; 2008). Moreover, the cumulative impacts analysis for wind energy generation facilities does not account for potential mortality to birds and bats caused by climate change, and the beneficial biological impact of renewable energy in avoiding these impacts. For example, one study from 2009 estimated that, based on performance in the United States and Europe, wind facilities and nuclear power stations are responsible each for between 0.3 and 0.4 bird fatalities per gigawatt-hour (GWh) of electricity while fossil-fueled power stations are responsible for about 5.2 fatalities per GWh (Sovacool 2009).

Table 3.14-1
Avian and Raptor Use of Proposed Wind Energy Facilities in Managed Coniferous Forest Habitats of Western Washington Compared to the Columbia Plateau Ecoregion

Proposed Project	County	Mean All Bird Use	Mean Raptor Use	Reference
Coyote Crest	Pacific and Lewis	11.74a	0.15	Tetra Tech 2009
Radar Ridge	Pacific	3.14	0.14	WEST and Turnstone 2009
Grayland	Pacific	2.10	0.18	McGraw et al. 2008
Whistling Ridge	Skamania	9.32	0.28	Johnson et al. 2009a
Columbia Plateau Ecoregion		12.0 a	0.52	Johnson and Erickson 2010

[a] For these studies birds were recorded out to 800 m and therefore avian use values for all birds are not directly comparable to the other studies, which recorded small birds out to 100 m. All raptor use values were derived from recording birds out to 800 m.

Table 3.14-2
Bat acoustic activity indexes for proposed wind energy facilities in managed coniferous forest habitats of western Washington

Proposed Project	County	Mean Bat Activity	Detector Locations	Reference
Coyote Crest	Pacific and Lewis	1.3	Ground and met towers	Hein et al. 2010
Radar Ridge	Pacific	3.25-6.89	Ground and met towers	Erickson et al. 2009
Grayland	Pacific	219.8	Ground	McGraw et al. 2008
Whistling Ridge	Skamania	7.9–148.3	Ground and met towers	Johnson et al. 2009b

Fish Species

Past and present development and other activities have had an adverse impact on fish species, including the alteration and loss of their habitat in the general Project vicinity. Negative impacts to fish and other aquatic resources from past and present, as well as reasonably foreseeable future development in the region include the alteration of streams and rivers by the introduction of hydroelectric generation dams, loss of riparian habitat, increased sediment loading, increased stream temperatures, pollution from herbicide and insecticide use, changes in peak and low stream flows, fragmentation of fish habitat, decreases in streambank stability, altered nutrient supply, and stormwater runoff from roads and bridges. The proposed work on the I-84 bridges may cause temporary increases in impacts from construction activities. These impacts are anticipated to continue into the foreseeable future.

Typically, wind energy generation projects in the region tend to be located in upland areas and generally well away from fish habitat, which is also true of the proposed Project. Therefore, wind energy projects in the region in general, and the proposed Project in particular, would not contribute to direct cumulative impacts to fish species.

Potential indirect cumulative impacts to fish species can occur through a somewhat complex relationship among wind projects interconnected to BPA transmission system, Columbia River hydro operations, and operation of this hydroelectric generation system to meet Clean Water Act (CWA) and ESA requirements for listed fish species. There are currently over 3,500 ~~2,000~~ MW of wind energy connected to the transmission grid within BPA's Balancing Area, and several thousand more MW of wind power are expected to be developed and connected to the grid in the next few years.[39] The majority of these projects are concentrated in the geographic area east of the Columbia River Gorge, and the overall amount of wind power on BPA's transmission system largely depends on wind velocities in this particular area. Accordingly, the amount of wind power on BPA's system can fluctuate widely and relatively quickly, depending on whether wind

[39] BPA. *Factsheet: How BPA Supports Wind Power in the Pacific Northwest.* DOE/BP-4002. March 2009, as updated by Wind Generation Capacity in the BPA Balancing Authority Area, available at http://transmission.bpa.gov/business/operations/Wind/WIND_InstalledCapacity_Plot.pdf (last visited May 2011).

speeds in this area are low (meaning very little wind power is being generated in this area) or high (meaning wind projects in this area are generating close to or at full capacity).

Within BPA's Balancing Area, there must be a match between generation and loads at all times. BPA has historically reserved capability in the hydroelectric system to provide balancing services for wind power output swings when needed. However, the increasingly large proportional share of wind power on BPA's system and the natural fluctuation of this power have combined to result in large, unscheduled swings in wind generation of up to several hundred megawatts within a single hour that cannot be handled by reserved capability alone. In such situations, BPA must immediately decrease generation in the BPA Balancing Area to maintain the constant balance of generation and load needed to keep the system stable. Using the hydroelectric system to decrease generation in these situations is often not available because: (1) reservoir space at the hydro projects is being maintained for required flood protection (meaning that additional water cannot be stored); and/or (2) additional water cannot be spilled, rather than run through turbines, at the hydro projects due to CWA limits on the level of total dissolved gases in the river and potential impacts on ESA-listed fish species from higher levels of total dissolved gases.

For these reasons, BPA has been working with wind project developers and operators for the past few years to develop measures for temporarily reducing sources of wind generation within the BPA Balancing Area when necessary. As part of a comprehensive review of wind project interconnections and their effects that was conducted in winter 2008, BPA established transmission operation protocols under which BPA's dispatch system automatically instructs wind project operators to reduce their generation to specified levels if necessary for reliability and ESA or CWA compliance. BPA has issued Dispatcher Standing Order (DSO) 216 to document these protocols, and is continuing to refine and clarify this DSO as more is learned about wind project operations relative to BPA's transmission system (visit http://www.transmission.bpa.gov/wind/op_controls/default.cfm for more information). More recently, BPA has adopted an interim Environmental Redispatch policy, under which BPA would temporarily limit the energy output of regional generators, including wind generation, only as a last resort to avoid harm to salmon and steelhead and assure reliable energy delivery during unusually high seasonal river flows (see *BPA's Interim Environmental Redispatch and Negative Pricing Policies, Administrator's Final Record of Decision*, May 2011, available at *http://www.bpa.gov/corporate/pubs/RODS/2011/ERandNegativePricing_FinalROD_web.pdf*).

During an Environmental Redispatch, utilities and consumers who purchase wind power or other energy would continue to receive the full energy deliveries associated with their transmission schedules, but the energy would originate from the FCRPS instead of other resources. These measures ensure that wind power on BPA's transmission system does not cumulatively impact Columbia River hydro operations necessary for listed fish species.

The proposed Project would be subject to DSO 216 and BPA's interim Environmental Redispatch policy, which would avoid any contribution from the proposed Project to indirect cumulative impacts to fish species. In addition, because the proposed Project is located at the west end of the Columbia River Gorge rather than the east end (i.e., approximately 60 miles to the west of the Columbia Plateau wind generation vicinity), wind patterns in the Project vicinity can vary significantly at any given point in time from those in the area where the majority of existing and proposed wind projects are located. This difference adds diversity in wind energy production and further reduces the potential for any contribution of the proposed Project to indirect cumulative impacts to fish species during periods of time when generation needs to be decreased to maintain transmission system stability. The added diversity should assist BPA in implementing regulation requirements on the hydro system. Overall, the proposed Project would not be expected to contribute, either directly or indirectly, to cumulative impacts to fish species.

3.14.3.6 Energy and Natural Resources

Past and present land development, timber harvest, and agricultural uses have resulted in a cumulative use of energy and depletion of energy resources in the Project vicinity. The Project would have a positive effect on energy, in that it would produce more energy than that used to build and operate the facility. The Project would consume a limited amount of natural resources for construction, including steel, concrete, and fuel for machinery. The amount of these resources used would be insignificant compared to available supply. ~~The Middle Mountain wind project would be similar in the balance between consumption of energy and generation of renewable energy to the Project although both the energy payback and the amount of resources consumed would be smaller, since the Middle Mountain project would have only six turbines, and is anticipated at 9 MW to be approximately 12 percent of the size of the Project.~~ The I-84 bridge improvements would consume steel, concrete and fuel. The combined consumption of these natural resources is small compared to available supply. The Proposed Action thus would contribute incrementally, though in a relatively minor way, to the cumulative impact on use of natural resources in the region.

3.14.3.7 Public Health and Safety

Past development of high voltage transmission lines across the Project Area has created a low level of EMF exposure. The Project would include 34.5-kV collector lines and systems, primarily located underground. There would be a new substation located adjacent to BPA's existing North Bonneville to Midway 230-kV transmission line, and a new interconnection from the substation to the 230-kV transmission line. Adding additional overhead and underground cables would cumulatively increase the overall level of EMF exposure. The electric and magnetic fields generated by the collector lines and underground systems under the Proposed Action, which are described in Section 3.6, Public ~~Environmental~~ Health and Safety, would contribute to the cumulative levels of EMF in the Project vicinity, though only slightly because of cable shielding and undergrounding, the minor nature of these Project elements, and the distance to existing residences.

During construction of the Project, there would be a slight increase in risk of traffic or worker accidents during the construction period. This impact would take place in the background of existing land use patterns based on commercial forestry, agriculture, and residential development. ~~Effects of construction of the Middle Mountain wind project and I-84 bridge replacements would most likely be similar, though the impact of the Middle Mountain project would be smaller, given the smaller size of the project.~~ Given the anticipated low number of incidents and the available capacity of the local emergency responders and hospitals to respond to those incidents, the cumulative impact would be relatively minor, and would be reduced once construction is completed.

3.14.3.8 Noise

Past and present development activities have introduced noise sources to the vicinity, including residential construction and development, commercial forestry operations, motor vehicles, machinery and domestic livestock and pets. Implementation of the cumulative actions identified in Sections 3.14.1 and 3.14.2 would be expected to generate various levels of noise through the Project vicinity, as would the Proposed Action. Depending on the proximity and timing of these actions, there could be cumulative noise impacts if actions are undertaken simultaneously and in relative close relation to each other. For most of the cumulative actions, it is expected that they would not result in cumulative noise impacts due to temporal or spatial separation. However, given the expected timing of the I-84 bridge improvement projects in the vicinity of the proposed Project, it is possible, however not expected, that receptors in the area could be exposed to cumulative noise impacts during the construction of these roadway projects in combination with the Proposed Action.

Operation of the Proposed Action would result in elevated noise levels from the movement of the turbines, maintenance activities, and operation related traffic. The operation noise levels would vary with the speed of the turbines. While the noise levels are not predicted to exceed regulated noise levels, the Proposed Action would contribute in minor ways to cumulative increases in noise levels in the Project vicinity. These contributions would be lessened through the application of mitigation measures described in Section 3.7 Noise.

3.14.3.9 Land Use and Recreation

The cumulative past, present and reasonably foreseeable actions identified in Sections 3.14.1 and 3.14.2 have resulted in changes to land use and would be expected to continue the incremental growth of developed land uses in the Project vicinity. The Proposed Action would be consistent with existing land use planning and zoning designations for Project facilities, and would not result in any inconsistencies with existing or planned adjacent land uses. The Proposed Action also would have little or no effect on existing land use patterns~~. The land use impact of the Middle Mountain wind project has not been studied but is unlikely to be inconsistent with local land use codes, to cause changes to local land use patterns, or to create cumulative impacts.~~

The Project would have little to no impact on recreation resources~~, and this is most likely the case for the Middle Mountain wind project as well~~. The I-84 bridge replacements may have a beneficial impact to recreation users, as roadway improvements may improve access to recreational resources in the area. Given the abundant recreational resources in the area and the low level of impacts, the Proposed Action's contribution to cumulative impacts to recreation would be minor.

3.14.3.10 Visual Resources

While parts of the Gifford Pinchot National Forest near the Project Area remain undeveloped, past and present development activities have changed the visual landscape in the immediate

Project vicinity by introducing manmade features and altering natural forms. These uses include residential, commercial and agricultural development, the construction of highways, bridges and roads, electrical transmission towers and hydroelectric dams, and telecommunication facilities. Ongoing human activities in the vicinity also contribute to continuing cumulative visual impacts, primarily views of clear-cutting and agricultural openings in natural vegetation patterns. Except for private timber operations, private development activity in the Project vicinity would be subject to the visual impact limitations placed on private development by the CRGNSA. Future private development would either be required to not be visually evident or be visually subordinate. Reasonably foreseeable future actions would be expected to continue current trends, as the past and present patterns of land use are expected to continue.

During construction, the Project would contribute to cumulative visual impacts through visible construction activities, although some viewers interested in viewing Project construction may consider the Project's contribution to be a positive impact. After construction is complete, the presence of the proposed wind turbines would contribute to cumulative visual impacts on nearby residents and motorists passing by on county roads, SR 14 and I-84.

~~The visual impacts of the Project would not be higher than low to moderate at any of the viewpoints examined. In considering the two specific reasonably foreseeable future projects, Hood River County estimated that the proposed Middle Mountain project would be visible as far away as 9.32 miles from that project[40]. The two projects are approximately 12 air miles apart, and there may therefore be a few locations where both projects would be visible, though these would be background views at the limit of visibility.~~ The visual impact of the I-84 bridge improvements would be limited to the period of construction. Oregon Department of Transportation states that *"New bridge designs will complement the aesthetic appeal of the Gorge and reflect the allure of the adjacent Historic Columbia River Highway."* Thus, these new bridges may result in a positive impact to visual resources[41]. Therefore, the visual impacts of the Project would not be higher than low to moderate at any of the viewpoints examined.

Past and present development of wind energy projects has also taken place at other locations in the Columbia River Gorge. The visual effect of these projects on the regional landscape and the experience of viewers is also a consideration, since long-distance drivers passing through the Gorge would recall seeing wind energy development in the Columbia Gorge. To assess this impact, the visibility of ten existing wind projects east of the Project Area were modeled in the draft EIS for cumulative impacts using the following assumptions:

- Visibility was modeled to 20 miles. This distance is considered very conservative and was chosen to accommodate recreation users with binoculars.
- Visibility was modeled using bare-earth surfaces without vegetation. In reality, many views would be blocked by trees, particularly in the Project vicinity.

~~[40] See: http://www.co.hood-river.or.us/vertical/Sites/%7B4BB5BFDA-3709-449E-9B16-B62A0A0DD6E4%7D/uploads/%7B909769CE-99F0-47B5-9CAF-77015BF9D737%7D.PDF~~.

[41] See: http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/.

- Visibility was modeled from single points representing the approximate location of each project taken from the Northwest Power and Conservation Council's on-line Northwest Power Generation Map[42].

- This visibility analysis documents visibility of even single elements of wind energy facilities, such as distant and fleeting views of wind energy nacelles and/or turbine blade tips, and does not differentiate these sightings from a more prominent view of entire turbines or generation facilities.

- The visibility analysis also does not account for the overall visual or aesthetic context of landscapes that are not in a pristine condition, most particularly the presence of existing electrical transmission lines which dominate the viewscape in many areas analyzed.

~~Overall, these assumptions almost certainly represent a significant overstatement of the visibility of these facilities, and their cumulative impacts to the landscape.~~

Following publication of the draft EIS, eight additional wind projects were identified within a distance of approximately 70 miles east of the Whistling Ridge Energy Project Area. These projects have been added to the visual quality analysis but have not been modeled for the EIS. In addition, reasonably foreseeable future wind projects have been added to the analysis. Nevertheless, the visual impacts of the additional existing and reasonably foreseeable wind projects would be similar to the impacts of the 10 projects originally modeled in the draft EIS. Thus, for a motorist driving east on I-84, the first of the wind energy projects would become visible near Wishram, approximately 35 miles to the east of the Project Area. From this point eastward, wind projects are potentially visible (using the assumptions stated) for approximately 52 of the following 64 miles (Figure 3.14-2).

Construction of the Project would add some additional views of wind turbines in addition to the past, present, and reasonably foreseeable wind power development projects and existing electrical transmission facilities. Travelers on I-84 through the Gorge would be able to see the Project for a time while traveling near Hood River. Travelers along I-84 could each see at least some part or elements of the Project, for approximately 12.5 miles traveling west and 6.5 miles traveling east[43]. At normal highway speeds this would result in an additional visual impact for between 7 and 12 minutes. Travelers along SR 14 would not see the Proposed Action, which would be blocked by the bluff to the north of the road.

The visual impact of the Project along I-84 would be variable, with the number of turbine strings and turbine equipment elements visible changing with topography. In many places only a few turbines would be visible, and the area where the most turbines would be visible (directly across

[42] See: http://www.nwcouncil.org/maps/power/Default.asp

[43] The project area is within view for approximately 17 miles, however in each direction the curvature of the road and the location of the project mean that the project would be behind drivers and passengers for some of that distance.

the Columbia River from White Salmon and Bingen) would also be the area where the viewer would be the farthest from the Project Area (See Figure 3.9-1).

The maximum impact of the Project along I-84 can be pictured by referring to Figures 3.9-10 (Viewpoint 13) or 3.9-8 (Viewpoint 11), which show viewpoints located on I-84. From Viewpoint 11, for instance, a traveler proceeding west would see a maximum of 25 turbine hubs and 70 blade tips, all at a distance of 14 kilometers (8.9 miles), or far background distance. From Viewpoint 13, a traveler proceeding east would see a maximum of 12 turbine hubs and 25 blade tips, at a distance of around 5.5 kilometers (3.4 miles) or middle-ground distance. As discussed in Section 3.9, however, these numbers overstate the visual impact, for the following reasons:

- The number of hubs and blade tips visible is calculated using bare-earth surface models. In reality, views of many turbines would be blocked by trees.
- All turbine blades would not be visible when the blades are rotating.
- Atmospheric haze, when present, would reduce the visibility of the turbines, especially at background distances.

For westbound travelers, the Project would be the last wind power project visible, and for eastbound travelers it would be the first. Building the Project would therefore add a small cumulative visual impact for long-distance travelers.

A similar cumulative impact could occur, probably on a more consistent basis, for residents of and frequent visitors to the local area. While residents of White Salmon, for example, might not see turbines from Whistling Ridge ~~and Middle Mountain~~ on a daily basis, they would likely experience repetitive views of wind turbines (or portions of wind turbines) through their local travels over a period of weeks, months or years. The “significance” of these perceptions would be individual in nature and inherently subjective, and is considered in the context of an altered landscape that includes hydroelectric generation facilities, transmission towers and lines, roads, bridges, highways and other land uses. Consequently, some local residents and frequent visitors might perceive what they individually consider to be a substantial change to the overall character of the local landscape. Although the geographical and topographical setting of the Project (including north-south trending ridge lines) limits its regional visibility, such a response would be more likely with the development of multiple wind projects.

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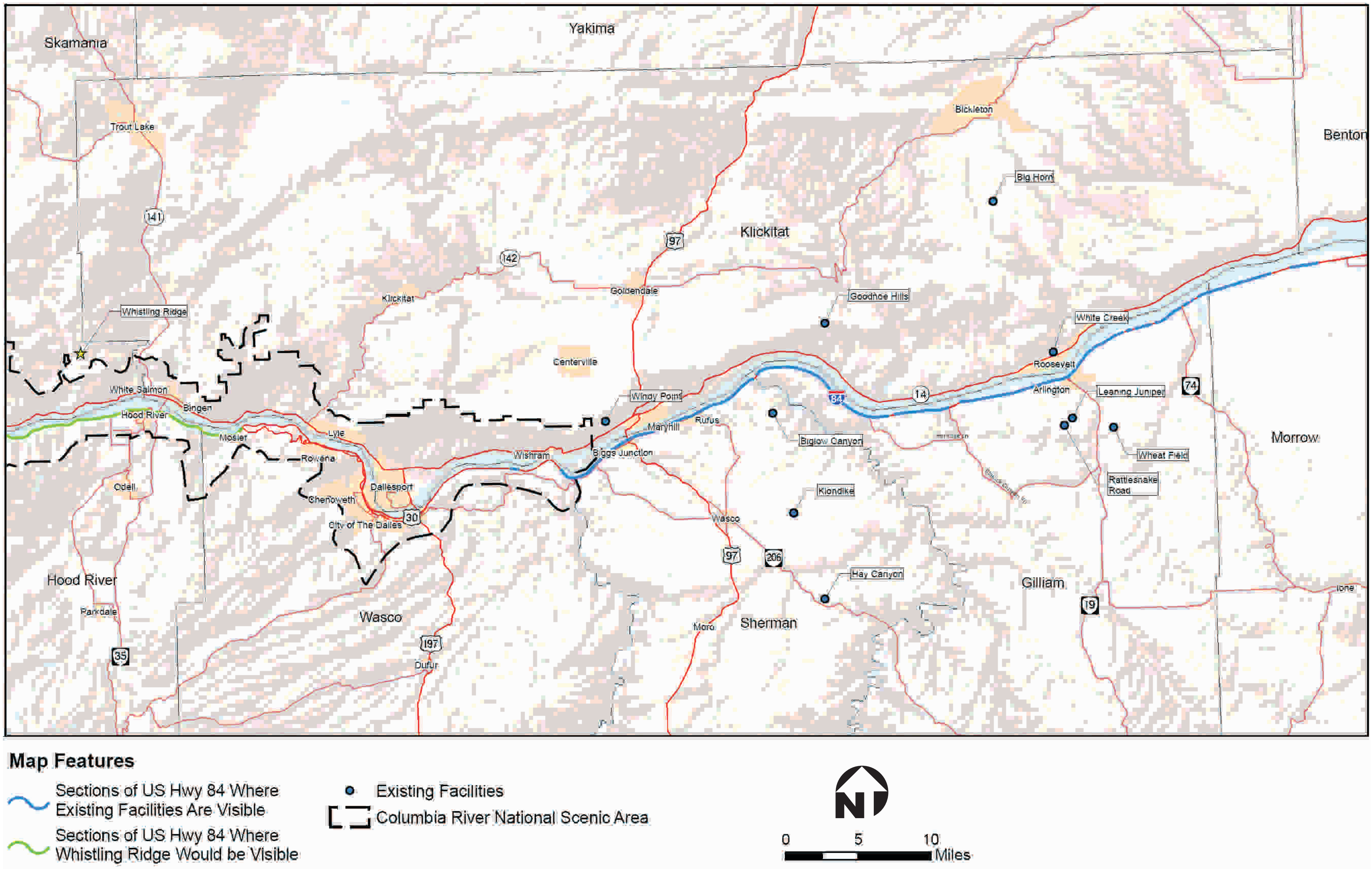

Figure 3.14-2
Existing Wind Projects Visibility from I-84

Job No. 33758687

URS

Whistling Ridge Energy Project
Skamania County, Washington

3.14.3.11 Historical and Cultural Resources

Cultural and historic resources in the Project vicinity have been and are being affected because of past, present, and current development and activities. These cumulative impacts include the redevelopment of land used for pioneer settlements, such as the Underwood town site north of the Project Area, and natural degradation of wooden flumes that were used in the late 1800s and early 1900s to transport logs to the Columbia River. Although the Proposed Action would not affect any known upland archaeological or historic resources, there is the potential for the Proposed Action to impact previously undiscovered cultural resources or artifacts. Mitigation measures are identified in Section 3.10, Historic and Cultural Resources, to lessen or avoid the potential for this impact. However, if the Proposed Action does impact previously undiscovered cultural resources or artifacts, it would contribute incrementally to the adverse cumulative impact to cultural resources in the area.

3.14.3.12 Transportation

The cumulative actions identified in Sections 3.14.1 and 3.14.2 have resulted in increases in traffic and would be expected to continue the incremental growth of traffic in the Project vicinity. The Proposed Action would contribute to cumulative traffic levels in the Project vicinity, but generally only during the construction phase of the Proposed Action. Construction of the Project is scheduled for a one-year period beginning in 2011. Construction of the I-84 bridges would take place in 2009, 2010 and 2011[44], with the majority of construction taking place in 2010. There could be some potential cumulative traffic congestion for travelers along I-84 during periods when both construction projects were active. However, workers traveling to the Whistling Ridge site could use SR 14 as an alternative route.

3.14.3.13 Public Services and Utilities

Past and present development and activities have resulted in an incremental increase in demand for public services and utilities. The Proposed Action would not be expected to adversely affect the overall capacity or ability to serve of any utility in the area, and thus would not contribute to cumulative impacts to utilities. By providing a potential backup or alternative power source for the Skamania County Public Utility District (PUD), the Proposed Action may contribute to a positive impact on utilities.

Construction of the Project, and the use of construction workers from outside the immediate area, could result in a minor and temporary increase in the demand for public services including police departments, providers of emergency medical services, and local fire departments, and would contribute to a cumulative increase in demand when added to the construction of ~~the Middle Mountain wind project and~~ I-84 bridge improvement projects. The temporary increased demand

[44] See:
http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/May2009GorgewideNewsletter.pdf, especially the construction schedule snapshot on page 2.

for services during the construction period caused by the average of 143 workers (265 during the peak month) would be substantially reduced during operation for the permanent workforce of nine full-time workers.

3.14.3.14 Socioeconomics

During construction, the Proposed Action would contribute incrementally to a positive cumulative impact on the economy of the local community by providing additional employment and increased need for goods and services. While the Proposed Action and other cumulative actions would increase the number of construction workers in the Project vicinity, there appears to be sufficient vacant rental dwellings and available temporary housing, hotel/motel, camping, and RV units in the general Project vicinity to accommodate the potentially overlapping construction schedules of the Proposed Action and some of the possibly concurrent cumulative actions such as the construction of the ~~Middle Mountain wind project and the~~ I-84 bridge improvement project.

During operation, the Proposed Action would employ nine full-time workers. The operational workforce would have a minor cumulative effect on population, employment, and housing in the Project vicinity. The fiscal impact of the Project would be highly positive, as the Project's assessed value of up to $87.5 million would generate approximately $800,000 per year in tax distributions to municipal, county, and other local jurisdictions. Operation of the Proposed Action would be expected to have a major contribution to cumulative financial benefits to Klickitat and Skamania counties.

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3.15 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

The Proposed Action under consideration does not pose short-term impacts that would significantly alter the long-term productivity of the affected environment. The turbines and associated facilities would take less than 5 percent of the arable land in the 1,152-acre study area out of production, and the remainder of the land could still be used for commercial forestry. After decommissioning of the Project, all of the land could revert to its previous uses. Little change in the long-term environmental productivity of the land would have been caused.

3.16 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible commitments of resources occur when a non-renewable resource such as minerals or petroleum-based fuels is used for the construction or operation of a Proposed Action. An irretrievable commitment of resources occurs when a federal agency gives up all rights or protections for a particular resource that it has ownership of or jurisdiction over, whether it be land, trees, water, animal or plant species, or some other resource.

The Proposed Action would include the use of steel, gravel, wood, and other non-renewable material to construct the wind turbines, access roads, electrical power line, operations and maintenance facilities, and substations. Materials would come from outside sources or from local borrow pits. Petroleum-based fuels for vehicles and equipment would also be required. Development of the proposed action would result in the irretrievable commitment of a small amount of commercial forestry land. These commitments are irretrievable rather than irreversible because the Project could be decommissioned in the future and previous land uses restored. In addition, many materials used to construct and operate the Project could be recycled upon decommissioning.

3.17 INTENTIONAL DESTRUCTIVE ACTS

BPA, like other utilities and government agencies, experiences incidents of criminal activity such as vandalism, theft and burglary. Some of these incidents cause significant operational and financial impacts to the agency. Between 2007 and 2009, BPA experienced approximately 128 incidents of burglary, theft and vandalism. These incidents cost the agency approximately $1,624,110. The BPA Security and Emergency Response Office works closely with Federal Law Enforcement Agencies and, local and state police to ensure all incidents are appropriately reported, investigated and prosecuted. This effort has resulted in the return of BPA property and in court ordered restitution to be paid by the convicted parties.

Issues concerning international terrorist activity, domestic terrorism and sabotage remain a significant concern for BPA and other critical infrastructure operators. BPA maintains close liaison with Federal Law Enforcement Agencies, Department of Homeland Security, and Local jurisdictions to ensure effective communication of information and intelligence.

The impacts from vandalism and theft, though expensive, do not generally cause a disruption of service to the area. Stealing equipment from electrical substations, however, can be extremely dangerous. In fact, nationwide, many would-be thieves have been electrocuted while attempting to steal equipment from energized facilities. On Oct. 11, 2006, a man in La Center, Washington, was electrocuted while apparently attempting to steal copper from an electrical substation.

Federal and other utilities use physical deterrents such as fencing, cameras, and warning signs to help prevent theft, vandalism and unauthorized access to facilities. In addition, through its Crime Witness Program, BPA offers up to $25,000 for information that leads to the arrest and conviction of individuals committing crimes against BPA facilities. Anyone having such information can call BPA's Crime Witness Hotline at (800) 437-2744. The line is confidential, and rewards are issued in such a way that the caller's identity remains confidential.

Acts of sabotage or terrorism on electrical facilities in the Pacific Northwest are rare, though some have occurred. These acts generally focused on attempts to destroy large transmission line steel towers. For example, in 1999, a large transmission line steel tower in Bend, Oregon was toppled.

Depending on the size and voltage of the line, destroying towers or other equipment could cause electrical service to be disrupted to utility customers and end users. The effects of these acts would be as varied as those from the occasional sudden storm, accident or blackout and would depend on the particular configuration of the transmission system in the area. While in some situations these acts would have no noticeable effect on electrical service, in other situations, service could be disrupted in the local area, or if the damaged equipment was part of the main transmission system, a much larger area could be left without power.

When a loss of electricity occurs, all services provided by electrical energy cease. Illumination is lost. Lighting used by residential, commercial, industrial and municipal customers for safe movement and security is affected. Residential consumers lose heat. Electricity for cooking and refrigeration is also lost, so residential, commercial, and industrial customers cannot prepare or preserve food and perishables. Residential, commercial, and industrial customers experience comfort/safety and temperature impacts, increases in smoke and pollen, and changes in humidity, due to loss of ventilation. Mechanical drives stop, causing impacts as elevators, food preparation machines, and appliances for cleaning, hygiene, and grooming are unavailable to residential customers. Commercial and industrial customers also lose service for elevators, food preparation, cleaning, office equipment, heavy equipment, and fuel pumps.

In addition, roadways experience gridlock where traffic signals fail to operate. Mass transit that depends on electricity, such as light rail systems, can be impacted. Sewage transportation and treatment can be disrupted.

A special problem is the loss of industrial continuous process heat. Electricity loss also affects alarm systems, communication systems, cash registers, and equipment for fire and police departments. Loss of power to hospitals and people on life-support systems can be life-threatening.

Overhead transmission conductors and the structures that carry them are mostly on unfenced utility rights-of-way. The conductors use the air as insulation. The structures and tension between conductors make sure they are high enough above ground to meet safety standards. Structures are constructed on footings in the ground and are difficult to dislodge.

While the likelihood for sabotage or terrorist acts on the Proposed Action or alternatives is difficult to predict given the characteristics of the Project, it is unlikely that such acts would occur. If such an act did occur, it could have a significant impact on the transmission system or electrical service because the North Bonneville-Midway 230-kV transmission line is an integral part of BPA's transmission system; however, any impacts from sabotage or terrorist acts likely could be quickly isolated. The Department of Energy, public and private utilities, and energy resource developers include the security measures mentioned above and others to help prevent such acts and to respond quickly if human or natural disasters occur.

3.18 ADVERSE EFFECTS THAT CANNOT BE AVOIDED

Implementation of the Proposed Action would result in some adverse impacts that cannot fully be avoided even with implementation of mitigation measures. However, most of these impacts would occur during the construction phase of the Proposed Action and thus would be temporary. For the proposed wind Project, the unavoidable adverse impacts include:

- Short-term earth-disturbing activities of 108 acres during construction (56 acres of permanent disturbance and 52 acres of temporary disturbance). These impacts, while unavoidable, would take place in landscape of managed timber lands which has for many years and would continue to be a fragmented environment with ongoing disturbance. During construction, direct mortality to birds could occur through nest disturbance.

- Short-term potential for landslide and erosion during construction and operations.
- Short-term impacts to air quality similar to that of existing logging operations during construction.
- Short-term and localized impacts to water resources during construction and operation of the Project.
- Short-term and minimal risk of unintentional or accidental fire or explosion or discharge to the environment during both construction and operations.
- Short-term and minimal delays in traffic in some areas during construction.
- Short-term and minimal risk of accident during construction.
- Short-term accidental fire, release of hazardous materials, or injury could occur during construction, operation, or decommissioning of the Project.
- Short-term noise impacts during construction is exempt so long as it occurs during daytime hours, and operation noise is predicted to be less than the nighttime threshold of 50 dBA L_{eq} per Washington State and Skamania County regulations.
- Long-term visual impact to surrounding areas where turbines were visible, including some areas inside the Columbia River Gorge National Scenic Area.
- Long-term mortality to birds and bats through turbine collisions.
- Long-term yet minor unavoidable adverse impacts to energy or natural resources through the consumption of fossil fuels for construction and maintenance of the Proposed Action.
- Long-term socioeconomic impacts are considered to be beneficial as the Project would provide employment during construction and operation. Additionally, increased tax revenues would offset the impacts to public services and utilities.
- Permanent loss, temporary disturbance and fragmentation of existing habitat for a number of wildlife species.

Under the No Action Alternative, although many of the potential impacts of the Proposed Action would not occur, the existing Project Area would continue to be utilized for commercial forestry operations. Additionally, BPA's North Bonneville-Midway 230-kV and the Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines would continue to remain in place and would be subject to impacts related to the need for ongoing repairs and maintenance of these existing transmission lines.

4.0 ENVIRONMENTAL CONSULTATION, REVIEW, AND PERMITTING REQUIREMENTS

This chapter addresses federal and Washington state statutes, implementing regulations, and Executive Orders requiring consultation, review, and/or permits or approvals, and discusses the applicability of these requirements to the proposed Project. This EIS is being sent to Tribes, federal agencies, and state and local governments as part of the consultation process for this Project.

Permits and approvals required for the Project construction and operation are listed in Table 4-1 and discussed in more detail in this chapter. Permits and approvals listed in Table 4-1 fall into seven categories: Site Certification Agreement (EFSEC), environmental (NEPA and SEPA), air-related permits, land use approvals, approvals related to the transmission interconnection, consultation, and other required permits. Agencies requiring permits or approvals include EFSEC, Skamania County, BPA, USFWS, National Marine Fisheries Services, Ecology, the Federal Aviation Administration, WSDOT, and WDFW.

4.1 NATIONAL AND STATE ENVIRONMENTAL POLICY ACT

This Draft EIS was prepared jointly by EFSEC and BPA to fulfill the requirements of both Washington's SEPA (43.21C RCW) and NEPA (42 USC 4321 et seq.). Both of these statutes require state and federal agencies, respectively, that are proposing to take action to assess, consider, and disclose the potential impacts of their proposed actions on the environment. Furthermore, the implementing regulations for both SEPA and NEPA both encourage coordination on combined state and federal actions. WAC 463-47-150 states that "[w]hen [EFSEC] is considering an action which also involves federal actions; it shall attempt to coordinate the two governmental processes so that only one environmental impact statement need be prepared for that proposal." In addition, 40 CFR 1506.2 encourages the preparation of joint state and federal environmental impact statements to aid in elimination of duplication with state and local procedures. EFSEC and BPA will consider the Project's potential environmental consequences and comments from agencies, Tribes, and the public when making decisions regarding the proposed Project.

4.2 ENDANGERED SPECIES ACT

The Endangered Species Act of 1973 (16 USC 1536) as amended in 1988, establishes a national program to conserve threatened and endangered species of fish, wildlife and plants, and to preserve the ecosystems on which they depend. The Act is administered by USFWS for wildlife and freshwater species, and by National Oceanic and Atmospheric Administration (NOAA) Fisheries for marine and anadromous species. It defines procedures for listing species, designating critical habitat for listed species, and preparing recovery plans and specifies prohibited actions and exceptions.

Table 4-1
Summary of Whistling Ridge Energy Project Permits and Approvals

Type of Permit/Approval	Permit or Requirement	Lead Agency	Comments
Site Certification Agreement	Site Certification Agreement	EFSEC	• Application filed March 10, 2009. • Amended Application filed October 12, 2009.
Environmental	SEPA Compliance/EIS	EFSEC	• Determination of Significance issued April 6, 2009.
Air-related permits	Temporary air permit for concrete batch plant	EFSEC/Ecology/Southwest Clean Air Agency	• EFSEC will coordinate with Southwest Clean Air Agency and Ecology as appropriate.
	Temporary air permit for rock crushing for roadways	EFSEC/Ecology/Southwest Clean Air Agency	• EFSEC will coordinate with Southwest Clean Air Agency and Ecology as appropriate.
Land use approvals	Certificate of Land Use Compliance	Skamania County	• In a letter to EFSEC dated May 4, 2009, Karen Witherspoon, Skamania County Community Development Department Director, found that the proposed Project is consistent with Skamania County Code Title 21 Zoning Code, 21A Critical Areas, Title 24 Clearing and Grading, the Comprehensive Plan, and resource maps.
Approvals related to the transmission interconnection	Transmission Interconnection Agreement Record of Decision NEPA Compliance/EIS	BPA	• NEPA compliance via joint EFSEC/BPA EIS.
Consultation	Endangered Species Act Concurrence	USFWS/NOAA Fisheries	• Concurrence that the proposed action “may affect, but is not likely to adversely affect” ~~no impact on~~ listed species. ~~• Bald Eagle and Golden Eagle Protection Act~~
	Native American Consultation Traditional Cultural Properties Survey	BPA	• Yakama Indian Nation has prepared a Traditional Cultural Properties Report.
	Aviation Obstruction Zone	Federal Aviation Administration	• Concurrence that Project is not an obstacle to aviation.

Type of Permit/Approval	Permit or Requirement	Lead Agency	Comments
Other required permits	Construction Storm Water Discharge Permit	EFSEC/Ecology	• For construction activity that disturbs one acre or more and may result in a discharge of stormwater to surface waters of the state.
	Building Permits	EFSEC/Skamania County	• Construction of permanent buildings or additions to existing facilities.
	Clearing and Grading Permit	EFSEC/Skamania County	• For vegetation removal and earthwork associated with construction activities.
	Water Availability Verification Evaluation and Group B Public Water System Approval	EFSEC/Skamania County	• Developing new sources of potable water.
	On-site Septic System Site Evaluation and Design Review	EFSEC/Skamania Community Development	• Construction of a septic system for sanitary waste.
	Forest Practices Application	Washington Department of Natural Resources	• For harvesting timber and other activities related to timber harvest operations.
	Approval for Over Height and Over Length Loads on State Highways	WSDOT	• For hauling of turbine equipment.
	Industrial Water Well Approval	EFSEC/Ecology	• Notification of Intent to Construct a Water Well (less than 5,000 gallons per day).
	Electrical Construction Permit	Department of Labor and Industries	• For interior and exterior electrical wiring and power supply connections.
	Road Approach Permit	Skamania County Department of Public Works	• Allows a property owner the authority to access a county road.
	Haul Route Agreement / Right – of-Way Use Permit	Skamania County Department of Public Works	• Use of County roads by oversized or overweight vehicles.
	Negotiated Private Road Agreements	Skamania County Department of Public Works	• To use private roads for temporary or permanent access.

BPA = Bonneville Power Administration
Ecology = Washington State Department of Ecology
EFSEC = Energy Facility Site Evaluation Council
EIS = environmental impact statement
NEPA = National Environmental Policy Act
NOAA = National Oceanic and Atmospheric Administration
SEPA = State Environmental Policy Act
USFWS = US Fish and Wildlife Service
WSDOT = Washington State Department of Transportation

Section 7 of the Endangered Species Act requires federal agencies to ensure that the actions they authorize, fund, and carry out do not jeopardize endangered or threatened species or their critical habitats. A federal agency is required to consult with USFWS and/or NOAA Fisheries if it is proposing an action that may affect listed species or their designated critical habitat. If listed species or designated critical habitat are present and could be affected by the Proposed Action, Section 7 requires that the federal agency prepare a biological assessment to analyze the potential effects of the action on listed species and critical habitat and make an effect determination for each species. BPA prepared and submitted a Biological Assessment (dated June 8, 2010) to USFWS for informal consultation as provided in Appendix E. The Project has received a concurrence letter from USFWS (July 19, 2010) that the Project "may affect, but is not likely to adversely affect" northern spotted owls, and through concurrence from the USFWS has complied with Section 9 of the ESA as also provided in Appendix E. ~~As described in Section 3.4 Biological Resources, no listed species or critical habitat are anticipated to be affected by the project.~~

4.3 FISH AND WILDLIFE CONSERVATION ACT AND FISH AND WILDLIFE COORDINATION ACT

The Fish and Wildlife Conservation Act of 1980 (16 USC 2901 et seq.) encourages federal agencies to conserve and promote conservation of non-game fish and wildlife species and their habitats. In addition, the Fish and Wildlife Coordination Act (16 USC 661 et seq.) requires federal agencies undertaking projects affecting water resources to consult with USFWS and the state agency responsible for fish and wildlife resources.

As described in Section 4.2, BPA is in the process of consulting with USFWS concerning fish and wildlife resources that could be affected by the proposed Project. In addition, BPA has consulted with WDFW and has incorporated recommendations to avoid and minimize potential impacts to fish and wildlife resources. Mitigation designed to avoid and minimize impacts to fish and wildlife and their habitat is identified in Section 3.4 Biological Resources.

4.4 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

NOAA Fisheries is responsible for ensuring compliance with the Magnuson-Stevens Fishery Conservation and Management Act of 1976. In the exclusive economic zone, except as provided in Section 102, the US claims, and will exercise, sovereign rights and exclusive fishery management authority over all fish and all continental shelf fishery resources. Beyond the exclusive economic zone, the US claims and will exercise exclusive fishery management authority over all anadromous species throughout the migratory range of each such species, except when in a foreign nation's waters, and all continental shelf fishery resources.

Public Law 104-297, the Sustainable Fisheries Act of 1996, amended the Magnuson-Stevens Act to establish requirements for essential fish habitat descriptions in federal fishery management plans, and to require federal agencies to consult with NOAA Fisheries on activities that may adversely affect essential fish habitat, which can include all streams, lakes, ponds, wetlands, and other viable water bodies and most of the habitat historically accessible to salmon. Activities above impassible barriers are subject to consultation provisions of the Magnuson-Stevens Act.

No species administered under the amended Magnuson-Stevens Act occur in the vicinity of the proposed Project.

4.5 MIGRATORY BIRD TREATY ACT

The Migratory Bird Treaty Act implements various treaties and conventions between the US and other countries, including Canada, Japan, Mexico, and the former Soviet Union, for the protection of migratory birds (16 USC 703-712, July 3, 1918, as amended 1936, 1960, 1968, 1969, 1974, 1978, 1986, and 1989). Under this Act, taking, killing, or possessing migratory birds or the eggs or nests is unlawful. Most species of birds are classified as migratory under the Act, except for upland and nonnative birds such as pheasant, chukar, gray partridge, house sparrow, European starling, and rock dove.

Potential impacts to migratory birds as a result of the proposed Project are discussed in the Section 3.4 Biological Resources. Although the proposed Project would not be expected to result in a take or killing of migratory bird species within the meaning of the Act, impacts to migratory birds could occur through temporary disturbance both during construction and operation of the Project ~~impacts to migratory birds could occur through temporary disturbance during construction.~~ BPA would ensure appropriate mitigating measures are employed to minimize and avoid impacts to migratory birds.

4.6 EXECUTIVE ORDER 13186, RESPONSIBILITIES OF FEDERAL AGENCIES TO PROTECT MIGRATORY BIRDS

Executive Order 13186 was issued on January 17, 2001. It directs each federal agency that is taking actions that may negatively impact migratory bird populations to work with the USFWS to develop an agreement to conserve those birds. The protocols developed by this consultation are intended to guide future agency regulatory actions and policy decisions; renewal of permits, contracts, or other agreements; and the creation of or revisions to land management plans. This order also requires that the environmental analysis process include effects of federal actions on migratory birds. On August 3, 2006, the USFWS and the US Department of Energy signed a Memorandum of Understanding to complement the Executive Order. BPA, as part of the Department of Energy, will work cooperatively in accordance with the protocols of the Memorandum of Understanding.

4.7 BALD AND GOLDEN EAGLE PROTECTION ACT

The Bald Eagle Protection Act of 1940 prohibits the taking or possessing of and commerce in bald and golden eagles, with limited exceptions (16 USC 668–668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978). The Act only covers intentional acts or acts in “wanton disregard” of the safety of bald or golden eagles.

Potential occurrence of bald eagles in the Project vicinity and potential impacts from the proposed Project are discussed in Section 3.4 Biological Resources. Mitigation measures to avoid and minimize impacts to bald eagle also are identified. The Project would not involve intentional acts or acts in wanton disregard of bald or golden eagles. Any accidental injuries or deaths would be subject to Federal law. ~~Because the project would not involve intentional acts or~~

~~acts in wanton disregard of bald or golden eagles, this project is not considered to be subject to compliance with the Act.~~

4.8 HERITAGE CONSERVATION ACTS

Because of the recognized importance of cultural and historic resources, several laws have been passed to protect and provide appropriate treatment for these resources. In addition, American Indian Tribes are afforded special rights under certain laws and treaties. Laws and orders related to cultural and historic resources include:

- Antiquities Act of 1906 (16 USC 431–433)
- Historic Sites Act of 1935 (16 USC 461–467)
- National Historic Preservation Act (NHPA) of 1966 (16 USC 470 et seq.), as amended, inclusive of Section 106
- Archaeological Data Preservation Act of 1974 (16 USC 469 a-c)
- Archaeological Resources Protection Act of 1979 (16 USC 470 et seq.), as amended
- Native American Graves Protection and Repatriation Act (25 USC 3001 et seq.)
- American Indian Religions Freedom Act of 1978 (PL 95-341, 92 Stat. 469, 42 USC 1996, 1996a)
- Executive Order 13007 Indian Sacred Sites
- Interior Secretarial Order 3175 of 1993

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. Historic properties are properties that are included in the Natural Register of Historic Places (NRHP) or that meet the criteria for the Natural Register. If a federal agency plans to undertake a type of activity that could affect historic properties, it must consult with the appropriate State and/or Tribal Historic Preservation Officers to assess adverse effects on identified historic properties. BPA fully respects tribal law and recognizes tribal governments as sovereigns. BPA consults affected tribes about potential cultural and/or other tribal impacts prior to taking project and program actions. As a federal agency, BPA is responsible for conducting NHPA review and Section 106 compliance activities during NEPA environmental review processes. As necessary, BPA's Tribal Policy of 1996 further commits the agency to policy level government-to-government consultation upon request of tribal policy makers and elected officials to better understand the technical and legal issues necessary to make informed decisions. ~~BPA's 1996 government-to-government agreement with 13 federally-recognized Native American Tribes of the Columbia River basin provides guidance for the Section 106 consultation process with the Tribes.~~

The NHPA amendments specify that properties of traditional religious and cultural importance to a Native American Tribe (also known as Traditional Cultural Properties) may be determined to be eligible for inclusion on the NRHP. In carrying out its responsibilities under Section 106, a federal agency is required to consult with any Native American Tribe that attaches religious or cultural significance to any such properties.

The Native American Graves Protection and Repatriation Act requires consultation with appropriate Native American Tribal authorities prior to excavation when human remains or cultural items (including funerary objects, sacred objects, and cultural patrimony) on federal lands or for projects that receive federal funding are found. The Act recognizes Native American ownership interests in some human remains and cultural items found on federal lands and makes illegal the sale or purchase of Native American human remains, whether or not they derive from federal or Indian land. Repatriation, on request, to the culturally affiliated tribe is required for human remains.

Executive Order 13007 addresses “Indian sacred sites” on federal and tribal land. “Sacred site” means any specific, discrete, narrowly delineated location on federal land that is identified by a Tribe, or a Tribal individual determined to be any appropriately authoritative representative of a Native American religion. The site is sacred by virtue of its established religious significance to, or ceremonial use by, a Native American religion, provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site. This order calls on agencies to do what they can to avoid physical damage to such sites, accommodate access to and ceremonial use of Tribal sacred sites, facilitate consultation with appropriate Native American Tribes and religious leaders, and expedite resolution of disputes relating to agency action on federal lands.

The American Indian Religious Freedom Act protects and preserves to American Indians their inherent right of freedom to believe, express, and exercise traditional religions. BPA has identified the Yakama Indian Nation as having general concerns about the management of certain areas along the Columbia River Gorge, including the Project vicinity. These concerns include, but are not limited to, access to sites, use and possession of sacred objects, and the freedom to practice sacred worship ceremonies.

In addition to these various laws and directives, the federal government has general trust responsibilities to tribes under a government-to-government relationship to ensure that their reserved treaty rights are protected. Ongoing consultation with the Yakama Indian Nation ensures that their rights are protected.

BPA has consulted with the DAHP as well as with The Confederated Tribes of the Umatilla Indian Reservation, The Cowlitz Indian Tribe, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission pursuant to 36 CFR 800.4(a)(4) under Section 106 of NHPA. These correspondences are provided in Appendix E. ~~for the federal undertaking with the Yakama Indian Nation, the Washington State Historic Preservation Officer, and any other interested parties.~~ This consultation process did not identify any effects to historic properties ~~if any, and will provide for resolution of any impacts with the consulting parties~~.

Throughout the EIS process, the Applicant has worked to involve and consult with Yakama Nation, including the Chiefs of the Cascade and Klickitat Tribes. Representatives from both tribes participated in site trips conducted in 2009 to provide advice and perspective in developing project alternatives. Initially, the Yakama Indian Nation did not agree with the definition of BPA's APE. However, the Yakama Nation and BPA have reached an agreement concerning the APE and the Tribe will continue to work with the Applicant when the final micrositing process occurs.

If, during construction, previously unidentified cultural resources that would be adversely affected by the proposed Project are found, the Applicant would be required to follow all required procedures set forth in the NHPA, Native American Graves Protection and Repatriation Act, Archaeological Resources Protection Act, and the American Indian Religious Freedom Act.

4.9 ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states that each federal agency shall identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low income populations. Minority populations are considered members of the following groups: American Indian or Alaska Native, Asian or Pacific Islander, Black not of Hispanic Origin, or Hispanic if the minority population of the affected area exceeds 50 percent, or is meaningfully greater than the minority population in the Project Area. The Order further stipulates that the agencies conduct their programs and activities in a manner that does not exclude persons from participating in or deny persons the benefits of those programs and activities, and that does not subject persons to discrimination because of their race, color, or national origin.

The proposed Project has been evaluated for disproportionately high environmental effects on minority and low-income populations (see Section 3.13, Socioeconomics). The Project would not result in disproportionately high and adverse effects to minority or low income groups.

BPA has considered all input from persons or groups regardless of race, income status, or other social and economic characteristics. Potentially affected minority populations include American Indian tribes with an interest in the federal lands that could be affected. BPA, with EFSEC as a participant, is consulting with Yakama Indian Nation regarding the potential impacts of the Proposed Action. For more information on these consultations, see Section 4.8, Heritage Conservation, as well as Section 3.10, Historical/Cultural Resources.

4.10 STATE, AREA-WIDE, AND LOCAL PLAN AND PROGRAM CONSISTENCY

4.10.1 ENERGY FACILITY SITE EVALUATION COUNCIL

Chapter 80.50 RCW are the laws which the Energy Facility Site Evaluation Council must follow in siting and regulating major energy facilities. WAC Title 463 provides the regulations by which the EFSEC functions under state and federal law. Chapters 80.70 and 80.80 RCW also apply to some energy facilities under EFSEC jurisdiction. For more information on the consistency of the proposed Project with Skamania County land use regulations, see Section 3.8, Land Use and Recreation.

Chapter 80.50 RCW (Energy Facilities–Site Locations) and Title 463 WAC specify that during the siting of energy facilities such as the Project, EFSEC will specify the conditions of construction and operation. This provision operates to supersede all state and local land use permitting related to energy facility sites that are under EFSEC's jurisdiction. However, a determination of consistency with local land use regulation is required. In the event that a proposed Project is determined to be inconsistent with local land use regulations, the applicant may request that the Project be regulated at the state level by EFSEC, rather than by the local jurisdiction. Because Skamania County has found the Project to be consistent with its Comprehensive Plan and Zoning Ordinance, the Applicant does not anticipate requesting this type of preemption for this Project. However, if EFSEC were to determine that, notwithstanding the County's determination, the Project is inconsistent with any element of local land use plans or ordinances, EFSEC retains preemption authority to resolve such inconsistency.

4.10.2 SKAMANIA COUNTY

Skamania County has provided EFSEC with a letter and Resolution 2009-54 stating that the proposed Project would comply with the land use policies and zoning regulations for the vicinity of the proposed Project. (Appendix D)

4.11 COLUMBIA RIVER GORGE NATIONAL SCENIC AREA ACT

The Columbia River Gorge National Scenic Area Act (16 U.S.C. 544-544p) established the Columbia River Gorge National Scenic Area (CRGNSA) to: (1) protect and provide for the enhancement of the scenic, cultural, recreational, and natural resources of the Gorge; and (2) protect and support the economy of the Columbia River Gorge area by encouraging growth to occur in existing urban areas and by allowing future economic development. The Act also authorized creation of the Columbia River Gorge Commission, a bi-state regional planning agency that was created by an inter-state Compact between the states of Washington and Oregon.

The Gorge Commission, the U.S. Forest Service, and the six counties with land in the CRGNSA all work together to implement the provisions of the Act. The Gorge Commission has several responsibilities under the Act, including planning for the CRGNSA, implementation of the CRGNSA Management Plan, and monitoring and hearing appeals of land-use decisions. The local counties and the Gorge Commission are responsible for drafting and enforcing land-use ordinances to implement the Management Plan. The Forest Service administers recreation facilities, assists in resource protection programs, provides technical assistance, and manages National Forest lands within the CRGNSA.

The 292,500 acre CRGNSA extends along the Columbia River from approximately the confluence of the Columbia and Sandy rivers on the west to just past the village of Wishram, Washington on the east. The proposed WREP Project Area is located outside of, but immediately adjacent to, the northern boundary of the CRGNSA near White Salmon, Washington (see Figure 1-1). The Scenic Area comprises three land use classifications: GMAs, SMAs, and Urban Areas. SMAs, which contain the most sensitive resources, are managed by USFS. GMAs include a mixture of historic land uses such as farming, logging, residential, and cattle grazing. Development on GMA lands is administered by five of the six Gorge Counties and the Columbia River Gorge Commission. Both SMAs and GMAs are subject to local Scenic Area codes deemed consistent with the Scenic Area Management Plan by the Columbia River Gorge Commission and the US Secretary of Agriculture prior to adoption. In Skamania County, Scenic Area development regulations are codified in SCC Title 22.13. Urban Areas (including Cascade Locks, Hood River, Mosier, and The Dalles in Oregon, and North Bonneville, Stevenson, Carson, Home Valley, White Salmon, Bingen, Lyle, Dallesport, and Wishram in Washington) are exempt from Title 22 Scenic Area regulations.

Although the proposed Project thus is in close proximity to the CRGNSA, the CRGNSA Act expressly states that:

> *Nothing in [this Act] shall . . . establish protective perimeters or buffer zones around the scenic area or each special management area. The fact that activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas*.

See (16 USC § 544O(a)(10). Accordingly, because the proposed Project is located outside of the CRGNSA, the provisions of the CRGNSA Act do not apply to the proposed Project.

4.12 FARMLAND PROTECTION POLICY ACT

The Farmland Protection Policy Act (7 USC 4201 et seq.) directs federal agencies to identify and quantify adverse impacts of federal programs on farmlands. The Act's purpose is to minimize the number of federal programs that contribute to the unnecessary and irreversible conversion of agricultural land to non-agricultural uses.

The location and extent of prime and other important farmlands is designated by the Natural Resource Conservation Service and can be found in their soil survey information. Prime farmland refers to land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oil seed crops. None of the lands within the Project Area boundary are considered to be prime farmland, and the access road also does not cross or affect other farmlands.

4.13 RECREATION RESOURCES

BPA used the Wild and Scenic River inventory of listed and proposed rivers (16 USC Sec. 1273 [b]) qualifying for Wild, Scenic, or Recreation River status to evaluate recreational resources and impacts. The Project Area area does not contain and will not cross any listed segments. Impacts to the visual quality in the vicinity of the Columbia River Gorge National Scenic Area are discussed in Section 3.9, Visual Resources.

The Northwest Power Planning Council's Protected Area Amendments to the Pacific Northwest Electric Power Planning Council Designation Act of 1980 are not applicable to the Project.

No National Recreation or National Scenic Trails identified in the National Trail System (16 USC Sec. 1242–1245) lie within the Project Area. Two national trails, the Lewis and Clark

National Historical Trail and the Oregon National Historic Trail, are located within 5 miles of the Project Area. These trails roughly follow SR 14 and I-84, respectively. Within 5 miles of the site, the White Salmon River is designated as a Wild and Scenic River, and within 25 miles, the Klickitat River is also so designated.

4.14 CLEAN WATER ACT

The Clean Water Act (933 USC § 1251 et seq.) regulates discharges into waters of the United States:

- ***Section 401.*** A federal permit to conduct an activity that causes discharges into navigable waters is issued only after the affected state certifies that existing water quality standards would not be violated if the permit were issued. No discharges to navigable waters are proposed as part of the Project.

- ***Section 402.*** This section authorizes storm water discharges under NPDES. The State of Washington was delegated the NPDES program under the Clean Water Act in 1974, and has adopted its own NPDES program. The Applicant would file an NOI to obtain coverage under the Washington general permit and would prepare a SWPPP. The SWPPP will address stabilization practices, structural practices, stormwater management, and other controls (see Section 3.1 Geology and Section 3.2 Water Resources).

- ***Section 404.*** Authorization from the US Army Corps of Engineers under Section 404 is required when there is a discharge of dredge or fill material into waters of the US, including wetlands. As discussed in Section 3.4 Biological Resources, the proposed Project would not cause any impact to wetland areas.

4.15 FLOODPLAIN / WETLANDS ASSESSMENT

The U.S. Department of Energy mandates that impacts to floodplains and wetlands be assessed and that alternatives for protecting these resources be evaluated in accordance with Compliance with Floodplain/Wetlands Environmental Review Requirements (10 CFR 1022.12), and Federal Executive Orders 11988 and 11990.

Section 3.4 Biological Resources evaluates Project impacts on floodplains and wetlands. The Project Area is not within a floodplain as determined from Flood Insurance Rate Maps published by the Federal Emergency Management Agency. Wetlands occur within the Project Area boundary but would not be affected by the construction and operation of the Project. This evaluation serves as the notice of floodplain/wetlands involvement for this Project.

4.16 COASTAL ZONE MANAGEMENT ACT

As an agency of the federal government, BPA follows the guidelines of the Coastal Zone Management Act of 1972 (16 USC Sections 1451–1464) and would ensure that projects would be, to the maximum extent practicable, consistent with the enforceable policies of the state management programs. The proposed Project is not in the coastal zone, nor would it directly affect the coastal zone.

4.17 THE SAFE DRINKING WATER ACT

The Safe Drinking Water Act (42 USC Section 200f et seq.) protects the quality of public drinking water and its source. BPA would comply with state and local public drinking water regulations. The proposed Project would not affect any sole source aquifers or other critical aquifers, or adversely affect any surface water supplies.

4.18 CLEAN AIR ACT

The Clean Air Act, as revised in 1990 (PL 101-542 [42 USC 7401]), requires the EPA and individual states to carry out a wide range of regulatory programs intended to assure attainment of the National Ambient Air Quality Standards.

The proposed the Project lies entirely in Skamania County, Washington. As discussed in Section 3.2 Air, the county is an attainment area within the National Ambient Air Quality Standards for all criteria pollutants. Impacts to air quality would be limited primarily to the construction period and would be minor, and would conform to state and federal CAA regulations. See Section 3.2 Air Quality for a complete analysis and discussion of this issue.

4.19 GLOBAL CLIMATE CHANGE

Global climate change is an increase in the average temperature of the Earth's surface. Since the late 1800s, data shows that the global average temperature has increased about 0.7 to 1.4 degrees F (0.4 to 0.8 degrees C), and some projections estimate that the average temperature will rise an additional 2.5 to 10.4 degrees F (1.4 to 5.8 degrees C) by 2100 (NASA 2009). A majority of scientists who study climate have concluded that human activities are responsible for most of this warming primarily through emission of certain gases that enhance Earth's natural greenhouse effect. Gases that absorb infrared radiation and prevent heat loss to space are called greenhouse gases. These gases include water vapor, carbon dioxide, methane, nitrous oxide, nitrogen oxides, non-methane volatile organic compounds, and stratospheric ozone-depleting substances such as chlorofluorocarbons.

The clearing of large areas of vegetation from the Earth's surface is also believed to contribute to global climate change because trees and other plants remove carbon dioxide from the air during photosynthesis, the process they use to produce food. Removal of vegetation contributes to the buildup of carbon dioxide by reducing the rate at which the gas is removed from the atmosphere and by the decomposition of dead vegetation.

Operation of the proposed Project would not generate emissions of gases (such as carbon dioxide) that contribute to global climate change, other than small amounts of emissions from vehicles used for site access and maintenance activities.

About 26 acres of tall-growing conifer vegetation would be cleared for the Proposed Action. The removal of this vegetation would result in a net reduction in the collectors of carbon in the Project Area. However, because the amount of clearing would be extremely small, and because low-growing vegetation would regrow in cleared areas, the proposed Project's contribution to global climate change would be negligible to nonexistent.

4.20 POLLUTION CONTROL ACTS

Several pollution control acts potentially apply to the proposed Project, depending on the exact quantities and types of hazardous materials that may be stored on site. Regulations would be enforced by EFSEC, and development of a Hazardous Materials Management Plan in accordance with the Uniform Fire Code may be required by local fire districts.

The Resource Conservation and Recovery Act, as amended, is designed to provide a program for managing and controlling hazardous waste by imposing requirements on generators and transporters of this waste, and on owners and operators of treatment, storage, and disposal facilities. Each treatment, storage, and disposal facility owner or operator is required to have a permit issued by EPA or the state. Typical construction and maintenance activities in BPA's experience have generated small amounts of these hazardous wastes: solvents, pesticides, paint products, motor and lubricating oils, and cleaners. Small amounts of hazardous wastes may be generated by the Project. These materials would be disposed of according to state law and the Resource Conservation and Recovery Act.

The proposed Project would not generate large amounts of solid waste.

The Toxic Substances Control Act is intended to protect human health and the environment from toxic chemicals. Section 6 of the Act regulates the use, storage, and disposal of polychlorinated biphenyls (PCBs). BPA adopted guidelines to ensure that PCBs are not introduced into the environment. Equipment used for this Project will not contain PCBs. Any equipment removed that may have PCBs will be handled according to the disposal provisions of the Toxic Substances Control Act.

The SPCC Act is intended to prevent discharge of oil into navigable waters of the US or adjoining shorelines, as opposed to response and cleanup after a spill occurs. Facilities subject to the Act must prepare and implement an SPCC Plan to prevent any discharge of oil into or upon navigable waters or adjoining shorelines. Because the proposed Project does not include the storage of large amounts of oil, the Project is not subject to this Act. However, EFSEC may likely require the preparation of an SPCC Plan for the Project.

The Federal Insecticide, Fungicide and Rodenticide Act registers and regulates pesticides. BPA uses herbicides (a kind of pesticide) only in a limited fashion and under controlled circumstances. Herbicides are used on transmission line rights of way and in substation yards to control vegetation, including noxious weeds. When BPA uses herbicides, the date, dose, and chemical used are recorded and reported to state government officials. Herbicide containers are disposed of according to Resource Conservation and Recovery Act standards.

If a hazardous material, toxic substance, or petroleum product is discovered, and may pose an immediate threat to human health or the environment, BPA requires that the contractor notify the Contracting Officer's Technical Representative immediately. Other conditions such as large dump sites, drums of unknown substances, suspicious odors, stained soil, etc., also must be reported immediately to the Technical Representative, who will coordinate with the appropriate personnel within BPA. In addition, the contractor will not be allowed to disturb such conditions until the Contracting Officer's Technical Representative has given the notice to proceed.

4.21 NOISE CONTROL ACT

The Federal Noise Control Act of 1972 (42 USC 4901) requires that federal entities, such as BPA, comply with state and local noise requirements. The EPA has established a guideline of 55 dBA for the annual average L_{dn} in outdoor areas. In computing this value, a 10 dB correction (penalty) is added to night-time noise between the hours of 10 PM and 7 AM.

WAC 463-62-030 states that energy facilities shall meet the noise standards established in Chapter 70.107 RCW, also known as the Noise Control Act of 1974, as implemented in the requirements of WAC 173-60. SCC Title 8 Chapter 22: Noise Regulations identifies limits and exceptions specific to noise in Skamania County. SCC 8.22 was adopted pursuant to, and is consistent with, WAC 173-60. Depending on the classification of receiving properties, the noise limits range from 50 dBA to 70 dBA.

Traffic on public roads, aircraft, and railroad traffic are exempt from the applicable environmental noise limits. Construction activities also are exempt from the noise regulations during daytime hours.

The Project would operate at or below existing state noise limits. The facilities would be designed to meet the limits for the worst case, that is, at night, at the edge of the right-of-way, a limit of 50 dBA. See Section 3.7 Noise for detailed analysis of this issue.

4.22 NOTICE TO THE FEDERAL AVIATION ADMINISTRATION

The Federal Aviation Administration requires a Project Proponent to submit its designs for approval if a proposed structure is taller than 200 feet from the ground, if a conductor is 200 feet above the ground, or the structures are within the approach path of an airport. Final locations, structures, and structure heights would be required to be submitted to the Federal Aviation Administration for the Project because the proposed turbine heights are over the 200-foot level.

4.23 FEDERAL COMMUNICATIONS COMMISSION

Federal Communications Commission regulations require that transmission lines be operated so that radio and television reception would not be seriously degraded or repeatedly interrupted. Further, the regulations require that the operators of these devices mitigate such interference. No interference with radio, television, or other reception is expected as a result of the proposed Project (Section 3.6 Public Health and Safety). If any such interference were to occur, BPA would comply with the Federal Communications Commission requirements relating to radio and television interference from the proposed Project.

5.0 DISTRIBUTION LIST

5.1 FEDERAL AGENCIES

USDOC NOAA
National Marine Fisheries Service
Administration
525 N.E. Oregon St., Suite 500
Portland, Oregon 97232-2778

USDOC NOAA
National Marine Fisheries Service
510 Desmond Drive S.E., Suite 103
Lacey, Washington 98503-1291

USDOC NOAA
Northwest Power Planning Council
851 S.W. 6th Ave., Suite 1100
Portland, OR 97204-1348

U.S. Department of the Interior
Fish & Wildlife Service
P.O. Box 848
Ephrata, WA 98823-0848

U.S. Department of the Interior
Fish & Wildlife Service
911 N.E. 11th Avenue
Portland, OR 97232-4181

U.S. Department of the Interior
Fish and Wildlife Service
Hanford Reach National Monument/
Saddle Mountain National Wildlife Refuge
3250 Port of Benton Blvd.
Richland, WA 99352-1670

U.S. Department of the Interior
Fish and Wildlife Service
Arid Lands Wildlife Refuge
3250 Port of Benton Blvd.
Richland, WA 99352-1670

U.S. Department of the Interior
Bureau of Land Management
Spokane District Office
1103 N. Fancher Road
Spokane, WA 99212-1275

U.S. Department of the Interior
Bureau of Indian Affairs
Yakima Agency Land Operations P11
Environmental Coordinator
P.O. Box 632
Toppenish, Washington 98948-0632

U.S. Department of the Interior
Bureau of Reclamation
1917 Marsh Road
Yakima, WA 98901-2058

U.S. Army Corps of Engineers
P.O. Box 3755
Seattle, Washington 98124-3755

U.S. Department of Energy
Office of NEPA Compliance
1000 Independence Ave. S.W.
Washington, D.C. 20585-0001

U.S. Department of Energy
Richland Operations Office
825 Jadwin Ave.
Richland, WA 99352-3589

U.S. Department of Transportation
Federal Aviation Administration
2200 W. Washington Ave.
Yakima, WA 98903-1249

U.S. Environmental Protection Agency
1200 Pennsylvania Ave. N.W.
Washington, DC 20004-2403

U.S. Environmental Protection Agency
Region 10
1200 6th Ave.
Seattle, Washington 98101-3123

Dan Wiley, Chief of Resources Stewardship
Lewis and Clark National Historic Trail
National Park Service
601 Riverfront Drive
Omaha, NE, 68102

Lee Kreutzer
National Trails System
National Park Service
324 S. State, Suite 200
Salt Lake City, UT, 84111

5.2 TRIBAL GOVERNMENTS

Confederated Tribes and Bands of
The Yakama Nation
Ms. Lavina Washines, Vice Chair
P.O. Box 151
Toppenish, WA 98948

Confederated Tribes and Bands of
The Yakama Nation
Mr. Johnny Jackson, Cascade Chief
P.O. Box 190
Underwood, WA 98651

Confederated Tribes and Bands of
The Yakama Nation
Wildlife Resource Management
P.O. Box 151
Toppenish, WA 98948

Confederated Tribes and Bands of
The Yakama Nation
Mr. Wilbur Slockish, Chief
P.O. Box 782
The Dalles, OR 97058

Confederated Tribes and Bands
Of the Yakama Nation
Mr. Harry Smiskin, Chairman
Tribal Council
P.O. Box 151
Toppenish, WA 98948

Confederated Tribes of the Umatilla
Indian Reservation
Mr. Elwood Patawa, Chairman
46411 Timine Way
Pendleton, OR 97801

Confederated Tribes of the Umatilla
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Ms. Teara Ferman
CRPP
46411 Timine Way
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Confederated Tribes of the Umatilla
Indian Reservation
Mr. Shawn Steinmetz
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46411 Timine Way
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Confederated Tribes of the Umatilla
Indian Reservation
Ms. Catherine Dickson
CRPP Principal Investigator
46411 Timine Way
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Confederated Tribes of the Umatilla
Indian Reservation
Ms. Carey Miller
CRPP
46411 Timine Way
Pendleton, OR 97801

Nez Perce Tribe
Mr. Samuel Penney, Chairman
P.O. Box 365
Lapwai, ID 83540

Nez Perce Tribe
Ms. Vera Sonneck
P.O. Box 365
Lapwai, ID 83540

Nez Perce Tribe
Mr. Josiah
P.O. Box 365
Lapwai, ID 83540

Confederated Tribes of the Warm Springs Reservation of Oregon
Mr. Ronald Suppah, Chairman
P.O. Box C
Warm Springs, OR 97761

Ms. Sally Bird, Cultural Resources Manager
Warm Springs GeoVisions
P.O. Box 460
Warm Springs, OR 97761

Confederated Tribes of the Warm Springs Reservation of Oregon
Mr. Robert Brunoe, THPO
P.O. Box C
Warm Springs, OR 97761

Cowlitz Indian Tribe
Mr. William Iyall, Chairman
P.O. Box 2547
Longview, WA 98632

Cowlitz Indian Tribe
Mr. David Burlingame
P.O. Box 2547
Longview, WA 98632

Cowlitz Indian Tribe
Mr. John Barnett
P.O. Box 2547
Longview, WA 98632

5.3 PUBLIC OFFICIALS

State of Washington
Office of the Governor
Honorable Christine Gregoire, Governor
P.O. Box 40002
Olympia, WA 98504-0002

State of Washington
State Senate District 15
Honorable Jim Honeyford, Senator
P.O. Box 40415
Olympia, WA 98504-0415

State of Washington
House of Representatives
House District 15
Honorable Bruce Chandler, Representative
P.O. Box 40600
Olympia, WA 98504-0600

State of Washington
House of Representatives
House District 15
Honorable David Taylor, Representative
P.O. Box 40600
Olympia, WA 98504-0600

U.S. Senate
Honorable Patty Murray, Senator
Jackson Federal Bldg., Suite 2988
915 2nd Ave.
Seattle, WA 98174-1009

U.S. Senate
Honorable Maria Cantwell, Senator
915 2nd Ave., Suite 3206
Seattle, WA 98174-1011

U.S. House of Representatives
House District 3
Honorable Brian Baird, Representative
120 Union Avenue, Suite 105
Olympia, WA 98501

U.S. House of Representatives
House District 4
Honorable Richard Hastings, Representative
302 E. Chestnut Ave.
Yakima, WA 98901-2718

5.4 STATE AGENCIES

State of Washington
Office of Archaeology and Historic Preservation
420 Golf Club Road
Olympia, WA 98504-8343

State of Washington
Department of Ecology
SEPA Review Section
P.O. Box 47703
Olympia, WA 98504-7703

State of Washington Department of Ecology
15 West Yakima Avenue, Suite 200
Yakima, Washington 98902-3452

State of Washington
Department of Natural Resources
SEPA Center
P.O. Box 47015
Olympia, WA 98504-7015

State of Washington
Department of Fish and Wildlife
Anne Friez, Regional Habitat Program Manager
WDFW, Region 5
2108 Grand Blvd.
Vancouver, WA 98661

State of Washington
Department of Natural Resources
Washington Natural Heritage Program
P.O. Box 47016
111 Washington St. S.E.
Olympia, WA 98504-7016

State of Washington
Department of Transportation
1231 Scale House Rd
PO Box 125
Goldendale, WA 98620

State of Washington
Department of Transportation
Southwest Region
P.O. Box 1709
Vancouver, Washington 98682

5.5 LOCAL GOVERNMENTS AND UTILITIES

Skamania County Commissioner
Jim "JR" Richardson
PO Box 790
Stevenson, WA 98648

Skamania County Commissioner
Paul Pearce
PO Box 790
Stevenson, WA 98648

Skamania County Commissioner
Bob Anderson
PO Box 790
Stevenson, WA 98648

Skamania County Community Development Department
Karen Witherspoon, Director
PO Box 790
Stevenson, WA 98648

Skamania County Community Development Department
Mark Mazeski, Senior Planner
PO Box 790
Stevenson, WA 98648

Skamania County Public Works Department
Larry Douglass, Director
PO Box 790
Stevenson, WA 98648

Skamania County Noxious Weed Program
Todd Murray
PO Box 790
Stevenson, WA 98648

Southwest Clean Air Agency
11815 NE 99th Street
Suite 1294
Vancouver, WA 98682

Skamania County Public Utility District #1
1492 Wind River Highway
Carson, Washington 98610

5.6 LIBRARIES AND EDUCATIONAL INSTITUTIONS

Fort Vancouver Regional Library
120 NW Vancouver Avenue
P.O. Box 818
Stevenson, Washington 98648

White Salmon Community Library
5 Town & Country Square
White Salmon, Washington 98672

Cascade Locks Branch Library
140 SE Wa-Na-Pa Street
Cascade Locks, Oregon 97014

Hood River County Library
502 State Street
Hood River, Oregon 97031

State of Washington
Joel M. Pritchard Library MS 42460
415 15th St. S.W.
Olympia, WA 98504-0001

Yakima Valley Regional Library
Reference Coordinator
102 N. 3rd Street
Yakima, Washington 98901-2705

Washington State University
2710 University Drive
Richland, WA 99352-1671

Bonneville Power Administration Library
905 NE 11th Avenue, NHTL-1
Portland, Oregon 97232

5.7 MEDIA

Yakima Herald Republic
City Editor
P.O. Box 9668
Yakima, WA 98909-0668

KNDO TV
News Director
1608 S. 24th Ave.
Yakima, WA 98902-5719

KIMA TV
2801 Terrace Heights Dr.
Yakima, WA 98901-1455

KAPP TV
Applevalley Broadcasting Avenue 77
P.O. Box 10208
Yakima, WA 98909-1208

The Oregonian
803 State St, Hood River, OR 97031
(541) 386-3944

Hood River News
419 State St, Hood River, OR 97031
(541) 386-1234

Goldendale Sentinel
117 W Main St, Goldendale, WA 98620
(509) 773-3777

Skamania County Pioneer
P.O. 219
Stevenson, WA 98648

5.8 UTILITIES

Northwest Pipeline Company

5.9 INTERESTED GROUPS

Columbia Gorge Audubon Society

Friends of the Columbia Gorge

Gifford Pinchot Task Force

Kittitas Audubon

Northwestern Lake Development Homeowners' Association

Renewable Northwest Project

Save our Scenic Area (SOSA)

Salem Audubon Society

Seattle Audubon

Skamania County Agri-Tourism Association

Vancouver Audubon Society

5.10 INTERESTED INDIVIDUALS

Sally Newell

Gretchen Starke

Mary Repar

Robert Graham

Carol Taylor

Dawn Stover

Tom Rousseau

Rick Aramburu

Gary Kahn

Jessica Walz

Sallie Jones

Nathan Baker

Peter Cornelison

Ron Reynier

Rick Till

Keith Brown and Teresa Robbins

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6.0 LIST OF PREPARERS

The Whistling Ridge Energy Project EIS was prepared by the Washington Energy Facility Site Evaluation Council (EFSEC) and Bonneville Power Administration (BPA), with the assistance of URS Corporation (URS), a consulting firm, West Inc., Northwest Wildlife Consultants, GeoDataScape, and Carroz Consulting. In addition, ENTRIX Consulting was retained by Washington EFSEC to provide an independent, third-party review of the EIS for SEPA and NEPA compliance. The following lists those individuals who participated in the preparation of this EIS. Consultant disclosure statements required under NEPA (*see* 40 CFR 1506.5(c) and 10 CFR 1021.310) are included in Appendix F of this EIS.

6.1 WASHINGTON EFSEC

Al Wright, EFSEC Manager. Mr. Wright has over 40 years experience in the energy and environmental fields. Mr. Wright has been Managing Director of EFSEC since 2010 and is responsible for all facets of EFSEC activities. Before joining EFSEC Mr. Wright was consultant to NW Utilities on hydro-electric operations and power sales contracts. Mr. Wright has also served as Executive Director of the Pacific Northwest Utilities Conference Committee, a NW association of public and private electric utilities. He also served a director of the Oregon Water Resources Board and as the Regional Coordinator for the Mid-Columbia Public Utilities Districts. Mr. Wright holds a Civil Engineering degree from University of California at Berkeley and has completed graduate studies in Watershed Management from Humboldt State College.

Stephen Posner, EFSEC Compliance Manager. Mr. Posner has over 25 years experience working in various environmental regulatory programs. As EFSEC's Compliance Manager for the last 3 years, Mr. Posner is responsible for managing environmental compliance activities for facilities under EFSEC's jurisdiction. Mr. Posner also coordinates and participates in the review of applications for site certification. Prior to working at EFSEC, Mr. Posner worked for the California Environmental Protection Agency as a hazardous waste/solid waste compliance inspector. Education: Bachelor's Degree in Biological Sciences.

Jim La Spina, EFSEC Compliance Specialist. Jim has been a state environmental regulator for almost 14 years. He wrote NPDES Permits for Ecology for 11 years and joined EFSEC in September 2007 as an Energy Facility Siting Specialist. Jim is responsible for coordinating the review of a project proponent's Application for Site Certification. After the governor approves a proposed project, Jim verifies the Certificate Holder's compliance with requirements in the Site Certification Agreement. Education: Master's in Environmental Studies.

6.2 BPA

Andrew M. Montaño, EIS Project Manager, Environmental Protection Specialist. Mr. Montaño has nearly 20 years experience within the environmental field. His primary background was in water quality-related research while working as an Aquatic Biologist with his former agency, the Bureau of Reclamation. Additionally, he has also specialized in toxicology and hazardous wastes site management, nuisance species control, and some fisheries-related activities. His NEPA experience includes projects that proposed modified flow regimes on regulated rivers in the western United States as well his recent experience with transmission-related projects. Education: MS in Environmental Science and Engineering; BS in General Studies (biology emphasis)

Amy Freel, Electrical Engineer. Mrs. Freel has 19 years of experience working at BPA of which she has been an electrical engineer for 14 years. She worked as a Substation Designer for 10 years, a Customer Service Engineer for 1 year, and as a Project Manager for the last 3 years. In her role as an electrical engineer, she designed and managed the installation of high voltage projects from the planning stage through the commissioning stage. Projects include new and up grades to substations and transmission lines 500kV and below. Education: BS, Electrical Engineering

Hub Adams, Attorney. Mr. Adams has 20 years of experience preparing environmental documents for compliance with NEPA, state "little NEPA" laws, and other environmental laws. As BPA's NEPA attorney, he is responsible for ensuring NEPA compliance for BPA's activities and assisting in the preparation of EISs and other NEPA documents. Prior to BPA, he worked as an environmental consultant managing and preparing joint NEPA/state EISs, other environmental documents, and project permitting processes for a variety of proposed projects, including complex energy, mining, and transportation projects. He is a member of the American Planning Association (APA) and the American Institute of Certified Planners (AICP). Education: JD, Certificate in Environmental and Natural Resources Law; BA, Urban and Regional Planning.

6.3 CONSULTANTS

6.3.1 URS CORPORATION

Katy Chaney, Project Manager. Ms. Chaney has over 27 years of experience. As vice president and manager of URS's Pacific Northwest environmental services, her management responsibilities include environmental impact statements, permitting efforts, and planning and siting studies. Education: BA, Political Science.

Dale Bennett, JD, Senior Planner. Mr. Bennett has 20 years of experience managing large and small planning, land use, regulatory, and remote sensing projects.

Mark DuLaney, Senior Graphics Illustrator. Mr. DuLaney has over 30 years of experience in graphic illustration and design. He has experience using Corel Draw and Corel Photo Paint, PageMaker, and Power Point. Education: Air Force 223X1 course in Technical Illustration and drawing classes at The New School of Visual Concepts.

David Every, PhD, Senior Ecologist. Dr. Every has over 30 years of experience as an environmental consultant on wetland and terrestrial ecological issues throughout the United States. Education: PhD, Botany; MS, Botany; BS, Zoology.

Mike Kelly, Senior Archaeologist. Mr. Kelly has 27 years of experience in cultural resource management and has been responsible for directing numerous archaeological investigations throughout the Pacific Northwest, California, and the Great Basin. Education: MA, Anthropology; BA, Anthropology.

Louise Kling, Ecologist and Environmental Planner. Ms. Kling has over 15 years of experience in fisheries and wildlife research, with an emphasis on disturbance ecology. She is well versed in survey methods used to quantify a variety of taxa, including terrestrial and aquatic habitat. She has implemented and managed projects for public agency, university, and private sector clients. Her analytical skills include a wide range of multivariate statistical methods and spatial analysis using GIS. For the past three years, she has focused on visual resource assessment and ecological design, land use evaluation, and environmental justice in support of the NEPA process. Her experience in visual resources assessment includes BLM, USFS, FHWA, and US Army Corps of Engineers methodologies and management of georeferenced photosimulation production. Her expertise has been applied to energy facilities siting, energy transmission, pipeline and transportation projects. In addition, she currently serves as a visual resources technical advisor to the Columbia River Gorge Vital Signs Indicator Project.

Sarah McDaniel, RPA, Staff Archeologist. Ms. McDaniel provides technical support for URS Corporation's cultural resources program in the Pacific Northwest Region and California. Responsibilities include archaeological site identification, recordation, and evaluation; historic resource documentation; and preparation of summary reports for compliance with federal and state regulations. Ms. McDaniel has six years of experience in cultural resources management and archaeological investigations.

Dan Meier, Engineering Geologist. Mr. Meier is a Certified Engineering Geologist located in Portland, Oregon. He has over 17 years of professional geologic experience in the western United States. His specialties include on-site geologic mapping, subsurface exploration, as-constructed geologic mapping, construction inspection, interpretation of field data, and preparation of maps and reports. He is experienced in seismic hazard evaluations, landslide evaluations, engineering geology and construction management and inspection.

Dautis Pearson, Environmental Planner. Mr. Pearson is a Senior Planner, NEPA, Endangered Species Act, and Federal/State agency and private compliance specialist. He has 23 years of experience in land management planning; interdisciplinary and interagency team leading and facilitation, and NEPA/SEPA environmental preparation. Dautis' experience with all federal agencies' NEPA and Endangered Species Act process provides great insight into various agency directions for collaboration and streamlining. He has 12 years of experience with USFS as a Land Use Planning Specialist and has supported or managed several energy and transmission related or linear projects. Education: BS, Biology; Riparian and Fire Ecology; Forestry; Silviculture.

Mark Storm, Senior Noise Control Engineer. Mr. Storm has over 18 years of experience managing tasks for environmental noise regulation review, field surveys, acoustical impact assessment, mitigation planning and compliance evaluation for various energy project types such as solar-to-thermal, wind turbine, biomass and natural gas. He is INCE board certified.

Jeff Walker, Botanist and Wetland Biologist. Mr. Walker has over 10 years of experience as a botanist. He has conducted vascular and nonvascular plant surveys, performed monitoring of rare plant populations, and conducted wetland delineations and evaluations. Education: BS, Botany and Environmental Studies.

6.3.2 WEST, INC

Kimberly Bay. Ms. Bay has 9 years of experience working primarily on the coordination of the data and reports for wind-energy projects. This task includes data and database management, data quality assurance/quality control, data analysis, and finally compiling the results for the reports. She has experience with most statistical computer packages including SAS, R, SPLUS, and SPSS, the database application ACCESS, and the GIS application ARCVIEW.

Greg Johnson. Mr. Johnson has over 22 years of consulting experience in wildlife and ecological studies. He is a Certified Wildlife Biologist through The Wildlife Society, a Professional Wetland Scientist through the Society of Wetland Scientists, and a certified Senior Ecologist through the Ecological Society of America. His specialty areas include wildlife research with an emphasis on contaminants and wind power development; endangered species; wetland delineation, mitigation, and functional value assessment; and vegetation sampling. He has supervised 17 field studies to assess effects on terrestrial and aquatic wildlife of pesticides and other contaminants throughout the US. Over the last 14 years, he has studied wildlife-windpower interactions at proposed or existing wind energy facilities in 16 US states and Alberta, Canada, and is currently Project Manager for the first large-scale greater sage-grouse telemetry study to evaluate impacts of wind energy development on this species.

Tamara Enz, Research Biologist. Tamara Enz is a project manager and biologist for WEST. After becoming fluent in Japanese, Tamara learned the more challenging language of botanical terms, earning a Master's of Science in plant biology at the University of Massachusetts, Amherst. Working throughout New England, Puerto Rico, and Montana, Tamara conducted community and wetland delineations and habitat suitability studies, coordinated rare plant searches, and participated in numerous research projects ranging from genetics studies to weed control. She has also done extensive bird work, including breeding and migratory bird surveys and point counts, banding, and call playback response surveys in New England, Alaska, Montana, and Canada. Her mammalian experience includes an ice based bowhead whale census in Barrow, Alaska, lynx tracking surveys in Wyoming, and general track surveys in Maine.

Jeffrey Gruver, Research Biologist. Jeff Gruver joined WEST in 2007. Jeff has been involved in bat research since 1996, and has studied bat ecology in the Pacific Northwest, the Rocky Mountains, and the Badlands of southern Alberta. He earned a B.S. in Economics (1993) from Penn State University and an M.S. in Zoology and Physiology from the University of Wyoming (2002). Jeff's M.S. research examined the assemblage of bats near a wind power facility in southern Wyoming in relation to documented bat fatalities at the facility. His PhD research focused on the how physiological constraints influence ecological responses of bats in northern arid climates. Jeff has authored or co-authored scientific publications on topics ranging from species conservation assessments to factors influencing bat fatality risks at wind energy installations.

6.3.3 NORTHWEST WILDLIFE CONSULTANTS, INC

Scott Downes, Bob Gritski, and Karen Kronner. Northwest Wildlife Consultants, Inc. is an environmental consulting firm based in eastern Oregon and Washington. They specialize in wind energy studies and bird, reptile, amphibian and mammal surveys. They are partnering with the WDFW and Oregon Department of Fish and Wildlife on ferruginous hawk telemetry studies in the Columbia Basin.

6.3.4 GEODATASCAPE, INC

Chris Watson. Mr. Watson, owner of GeoDataScape, has over ten years of experience in providing GIS and visual simulation experience for a variety of projects. He has worked as a field geologist. Education: MS and BS, Geology.

6.3.5 TURNSTONE ENVIRONMENTAL

Jeff Reams, Wildlife Biologist. Mr. Reams is also a partner with Turnstone Environmental Consultants, Inc. for 14 years. He is the senior wildlife biologist and oversees the northern spotted owl, northern goshawk and western gray squirrel surveys. Education: BS Oregon State University

Devin Sahl, Wildlife Biologist. Mr. Sahl has been employed by Turnstone Environmental Consultants Inc. for past 8 years. He served as a wildlife biologist and as the field coordinator on the Whistling Ridge project. He was involved with the northern spotted owl, northern goshawk and the western gray squirrel survey efforts associated with the project.

6.3.6 CARROZ CONSULTING

Katie Carroz, Socioeconomist. Ms. Carroz has 10 years of environmental analysis experience specializing in economic, socioeconomic, environmental justice, demographic, and fiscal analyses, and EIS preparation and coordination. Education: MA, Economics with an emphasis on natural resources; BA, Economics with minor in environmental studies.

6.3.7 CARDNO ENTRIX, INC

Jeremy Pratt, Project Manager. Jeremy Pratt leads the ENTRIX Western Division Environmental Management, Permitting and Compliance practice. Jeremy has more than 30 years' experience preparing environmental documents for compliance with NEPA, and throughout his career he has focused on managing large-scale, controversial projects to resolve long-standing resource conflicts in complex regulatory environments. Jeremy works with project applicants and local stakeholders concerned with the development, use, protection or environmental management of their sites, communities, or resources. He works easily in both the technical and policy areas to evaluate the environmental effects of proposed actions, programs, or projects; achieve permits and assure regulatory compliance; or develop management plans. Education: BS Interdisciplinary Studies, Evergreen State College; MS Environmental and Energy Sciences, Washington State University.

Jan Aarts, Deputy Project Manager. Mr. Aarts has over 25 years of experience preparing technically sound and legally defensible environmental documents for a wide variety of energy-related projects in the Pacific Northwest. Projects have included wind energy projects, geothermal exploration projects, hydroelectric projects, natural gas pipelines, and high-voltage transmission lines. Mr. Aarts has prepared the full range of NEPA environmental documents, including Notices of Intent, Documented Categorical Exclusions, Environmental Assessments, Environmental Impact Statements, Findings of No Significant Impact, and Records of Decision. He has also prepared the full range of State Environmental Policy Act (SEPA) environmental documents, including Environmental Checklists and Environmental Impact Statements. His technical expertise includes the subjects of land use, regulatory compliance, recreation, socio-economics, community impacts, environmental justice, public services, utilities, and cumulative impacts. He is also experienced at managing the work of other technical experts conducting cultural resource investigations, air and noise studies, hazardous waste investigations, fish and wildlife studies, biological assessments, wetland delineations, stream studies, and mitigation plans.

Chelsea Ayala, Air Quality Specialist. Ms. Ayala has over 17 years of regulatory agency, analytical laboratory, and environmental consulting experience. She has served as project manager, deputy project manager, senior reviewer, technical writer, and technical lead for environmental projects throughout California and the United States. Her areas of expertise include air quality, noise, and climate change for a variety of projects, including oil and gas pipelines, electric transmission lines, and water projects. She has experience preparing environmental documentation for Projects involving NEPA and state environmental policy laws and has managed multiple projects for electric transmission lines and prepared environmental analyses for multiple oil and gas projects. Education: BA Environmental Studies, California State University.

Eliza Ghitis, Geomorphologist. Eliza Ghitis has a background in coastal, estuarine and fluvial geomorphology, specializing in the ways physical systems interact with ecology. She has managed numerous salmon habitat restoration projects through all phases of design, permitting, implementation, and post-construction monitoring and maintenance. She has conducted ecological and geomorphic studies, including study design, data collection, data analysis and compilation of reports, and preparation of numerous NEPA environmental documents and NEPA technical supporting documents. She is trained in environmental hazard assessment and mitigation, including slope stability, water quality, and relative sea level rise. Education: MS Environmental Geomorphology, Oxford University; BS Earth and Space Sciences, University of Washington.

Dave Harvey, Historian. Mr. Harvey has over 30 years of experience in historic preservation, cultural resources management, architectural history, and historic research in the Pacific Northwest, California, Alaska, and Montana, and has assisted federal and state agencies, local governments and utilities, and private architectural and engineering firms in carrying out their cultural resources obligations under sections 106 and 110 of the National Historic Preservation Act (NHPA) and NEPA (EA/EIS). Mr. Harvey has worked closely with federal land management agencies, such as the U. S. Forest Service, National Park Service, Bureau of Reclamation, Bureau of Land Management, and U. S. Army Corps of Engineers throughout the Pacific Northwest and Alaska, where he conducted determination of National Register eligibility studies, Historic American Building Survey/Historic American Engineering Record (HABS/HAER) documentations, assessments of agricultural/early settlement landscapes, and historic land use studies. Education: MA History/Historic Preservation, Western Washington University; BA History and Government, Fairleigh Dickinson University.

Melissa Klungle, Environmental Scientist. Ms. Klungle has ten years of experience in environmental science consulting specializing in terrestrial and aquatic biology, and environmental policy. Ms. Klungle has experience preparing federal and state environmental documentation for energy projects. Education: BS Fisheries and Wildlife Management, Michigan State University.

Gretchen Lebednik, Biologist. Ms. Lebednik has managed numerous restoration, monitoring, and permitting projects. Ms. Lebednik has served as principal biologist or principal botanist in the preparation and review of Biological Assessments/Evaluations, FERC documents, NEPA/CEQA documents, California Energy Commission applications, and mitigation plans for projects in a variety of habitats in California and the Pacific Northwest. She has extensive training and field experience in plant ecology and taxonomy on the Pacific Coast and has performed numerous field investigations in freshwater seasonal wetland, vernal pool, riparian, estuarine, alkali meadow, coastal dune, desert, grassland, foothill woodland, and montane communities in California. Ms. Lebednik has served as principal biologist or principal botanist in the preparation and review of Biological Assessments/Evaluations, FERC documents, NEPA/CEQA documents, California Energy Commission applications, and mitigation plans for projects in a variety of habitats in California and the Pacific Northwest. Education: MS Botany, University of Washington, BA Environmental Biology, University of California.

Darcey Miller, Environmental Biologist. Ms. Miller has twelve years of experience in environmental science consulting, specializing in wetland biology, wildlife habitat, and environmental permitting and policy. She has designed and monitored restoration and mitigation projects, led field efforts for delineations and biological assessments, and coordinated with agencies at all levels to assist clients in obtaining environmental permits. Ms. Miller has experience preparing and editing federal and state environmental documentation for linear and other energy projects. She is a Professional Wetland Scientist and a member of the Society of Wetland Scientists. Education: BS, Environmental Science, additional major in English, University of Mary Washington.

Kirk Ranzetta, Cultural Resource Specialist. Dr. Ranzetta has over fourteen years of private, public, and non-profit sector work experience in cultural resource management, historic preservation, and environmental permitting including NEPA and state environmental policy laws. He has extensive experience in the Pacific Northwest, Midwest, and Mid-Atlantic regions managing, technically reviewing, and completing cultural resource surveys for compliance with Section 106 of the NHPA and NEPA (EA/EIS). He has also served as a technical editor, drafted text, and conducted fieldwork for cultural resource reports and other NHPA and NEPA related-documents. Prior to working at ENTRIX, Dr. Ranzetta served as the Review and Compliance Coordinator for the Oregon SHPO where he consulted with federal agencies on hundreds of projects, evaluated cultural resource reports for technical sufficiency, assisted agencies in the negotiation and preparation of MOAs, and worked to streamline project reviews. This experience included working closely with cultural resources staff from the Oregon DOT, Oregon Energy Siting Council, USFS, FERC, BPA, USFWS, BIA and BLM in Oregon. These reviews were conducted in compliance with Section 106 of the NHPA, Section 4(f), NEPA, HABS/HAER requirements, ORS 358.653, and OAR Chapter 345. Education: PhD Urban Affairs and Public Policy, University of Delaware; MA Urban Affairs and Public Policy, University of Delaware; BA Historic Preservation, University of Mary Washington.

Ryan Shatt, Geologist. Mr. Shatt has over twelve years of experience as a geologist. His expertise includes Remedial Investigations, Human Health Risk Assessments, and Remedial Action. He conducts and manages environmental field investigations including supervision of subsurface drilling operations, monitoring well installation, lithologic identification, soil classification and interpretation, rock coring, borehole geophysics, and sampling of soil and ground water. He also assesses soil and ground water analytical data to evaluate compliance with applicable regulations, conducts pump test analysis and groundwater flow evaluations, performs Phase I ESAs, prepares NEPA environmental documents and manages projects. He has experience as contributing author for soil, geology, and water resources sections for numerous EIS and EA reports. Education: BA Geosciences, Penn State University.

Sandra Slayton, Environmental Scientist. Ms. Slayton has nine years of experience in environmental science consulting specializing in watershed planning, GIS, water quality, floodplain management, and environmental policy. Ms. Slayton has experience preparing federal and state environmental documentation for linear and other energy projects. She has been involved in numerous watershed planning projects including work related to water quality analysis, habitat conservation and enhancement, and hydrologic and hydraulics studies. She is a member of the American Water Resources Association. Education: MA, Ecology, University of North Carolina at Chapel Hill; BA, Environmental Science, University of Virginia.

Rachel Tamigniaux, Project Coordinator. Ms. Tamigniaux is an environmental social scientist with experience in the public, private, and non-profit sectors. She has assisted in the writing, editing and preparation of environmental documents for a wide variety of projects, including wind facilities, oil pipelines, river dredging, and hydroelectric projects. She has experience in the development of National Environmental Policy Act (NEPA) and Washington State Environmental Policy Act (SEPA) environmental documents, specifically Environmental Impact Statements (EISs), as well as experience with Section 106 processes and the development of related documents including Programmatic Agreements (PAs) and various monitoring plans. She has in-depth experience in the public comment management process, particularly for large projects. Ms. Tamigniaux has written planning guidance for environmental conferences for the U.S. Environmental Protection Agency as well as environmental policy and sustainability guidance documents for local non-profits. She is also a contributing author for the websites www.thechicecologist.com; www.theclimatecommunity.com; www.hohm.microsoft.com; and www.tag.microsoft.com. Education: MSc Environmental Social Science, University of Kent, Canterbury; BA Environmental Studies, University of Washington.

Lucy Zuccotti, Archaeologist. Ms. Zuccotti has over 12 years of technical and professional experience as an Archaeologist and Osteologist. Her background includes directing multiple field investigations in Western Washington and conducting background investigations in preparation for fieldwork. She has extensive experience writing reports summarizing research and field results in compliance with federal and state laws and regulations including NEPA and SEPA. Ms. Zuccotti has worked directly with and for Native American governments to mitigate impacts on tribal areas of interest. She is considered an expert in identification and analysis of human remains. Education: MA Anthropology, University of Arkansas; BA Anthropology, Hampshire College.

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