BEFORE THE STATE OF WASHINGTON

ENERGY FACILITY SITE EVAUATION COUNCIL

In the Matter of Application No. 2003-01: SAGEBRUSH POWER PARTNERS, LLC; KITTITAS VALLEY WIND POWER PROJECT	EXHIBIT 34 (TP-T)

APPLICANT'S PREFILED DIRECT TESTIMONY
WITNESS #15: THOMAS PRIESTLEY

Q Please state your name and business address.

A My name is Thomas Priestley and my business address is 155 Grand Ave. Suite 1000, Oakland, CA 94612.

Q What is your present occupation, profession; and what are your duties and responsibilities?

A I am employed by CH2M Hill. CH2M Hill provides environmental consulting services to organizations such Zilkha Renewable Energy. I assist those organizations in analyzing environmental impacts of projects such as the Kittitas Valley Wind Power Project. I am a Senior Environmental Planner for CH2M Hill. My duties regarding this were to assess the aesthetic and light and glare impacts of the proposed project, develop recommendations to

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

minimize visual impacts and to assist in the preparation of the Application for Site Certification for this Project.

Q Would you please identify what has been marked for identification as Exhibit 34-1 (TP-1).

A Exhibit 34-1 (TP-1) is a résumé of my educational background and employment experience.

Q Are you sponsoring any portions of the "Application for Site Certification" and "Clarification Information Provided to EFSEC Independent Consultant for EIS Preparation", for the Kittitas Valley Wind Power Project?

A Yes. I am sponsoring the following sections for which I was primarily responsible for the analysis and development:

Section 5.1.4 Aesthetics/Light and Glare

Clarification Information Section 5.1.4.3.10 Interstate 90

Clarification Information Section 5.1.4 Aesthetics

Clarification Information Attachment 11 Visual Simulation of Project Substation and O&M Facility

Q What exhibits that are part of the Application that you are sponsoring?

A I am sponsoring the following exhibits to the Application:

Exhibit 22-1 Potential Project Visual Impact in the Region

Exhibit 22-2 Visual Simulation Photo and Viewpoint Locations

Exhibit 22-3 Visual Simulation Technical Terms

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

Exhibit 22-4 Visual Simulation Photos

Q Are there any other similar exhibits that are not part of the Application that you would like to introduce into evidence with this testimony?

A Yes. Subsequent to the filing of the Application EFSEC requested additional visual simulations which were prepared under my direction and used for the preparation of the DEIS.

Q Did EFSEC request an additional simulation portraying the lower and upper end scenarios regarding numbers and sizes of WTG's?

A Yes. These are attached as Exhibit 34-2 (TP-2) (DEIS Figure 3.9-14 Viewpoint 1: Simulated View Lower End Scenario) and Exhibit 34-3 (TP-3) (DEIS Figure 3.9-16 Viewpoint 1: Simulated View Upper End Scenario). These two exhibits illustrate the appearance of smaller and largest turbine scenarios as seen from Viewpoint 1, US 97 at Ellensburg Ranches Road, looking north

Q Did EFSEC request an additional visual simulation of the view from Forest Route 35 in the Wenatchee National Forest?

A Yes. This visual simulation is attached as Exhibit 34-4 (TP-4) (DEIS Figure 3.9-13 Viewpoint 11: Existing Conditions), which shows the existing view. Exhibit 34-5 (TP-5) (DEIS Figure 3.9-28 Viewpoint 11: Simulated View) portrays a simulation of that view with the WTG's in place.

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

Q Did EFSEC request additional simulations illustrating the cumulative impact of the Kittitas Valley, Desert Claim and Wild Horse wind power projects?

A Yes. Exhibit 34-6 (TP-6) (Figure 3.14-1 – Cumulative Study Area for Kittitas Valley, Desert Claim, and Wild Horse Wind Power Projects) is a map prepared under my direction using a USGS topographic map as a base that shows the locations of the Kittitas Valley, Desert Claim, and Wild Horse wind power projects, the distances between them, and their relationship to nearby communities and major highways. Exhibit 34-7 (TP 7) (DEIS Figure 3.14-2 – Photograph Locations for Cumulative Analysis) is a map prepared under my direction, also using a USGS topographic map as a base, that indicates the locations of the Kittitas Valley and Desert Claim wind power projects and locations of the viewpoints where photos were taken for use in the analysis of cumulative project effects. Exhibit 34-8 (TP-8) (DEIS Figure 3.14-3 Viewpoint 1: Existing Conditions) shows the existing view from a viewpoint located along Reecer Creek Road at a point just slightly west of Kittitas County Fire District Station No. 2. Exhibit 34-9 (TP-9) (DEIS Figure 3.14-4 Viewpoint 1: Simulated Conditions Kittitas Valley Wind Power Project) portrays a simulation of the view shown in Exhibit 34-8 (TP-8) with the WTG's from the Kittitas Valley Wind Power Project in place. Exhibit 34-10 (TP-10) (DEIS Figure 3.14-5 Viewpoint 1: Simulated Conditions Desert Claim Wind Power Project) portrays a simulation of the view as shown in Exhibit 34-8 with the WTG's from the Desert Claim Wind Power Project in place. I should note that on the versions of these two simulations that appeared in the DEIS, the titles had been reversed, and that on Exhibits 34-9 and 34-10, this error has been corrected. Exhibit 34-11 (TP-11) (DEIS Figure 3.14-6 Viewpoint 1: Simulated Condition Cumulative Scenario) portrays the view shown in Exhibit 34-8 with WTG's from both the Kittitas Valley and the Desert Claim wind power projects in

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

place. Exhibit 34-12 (TP-12) (DEIS Figure 3.14-7 Viewpoint 2: Existing Conditions) shows the existing view from a viewpoint on Forest Service Road 3500at a point just outside of the National Forest boundary where the view opens up sufficiently to allow substantial portions of the Kittitas Valley and Desert Claim wind power projects to be seen. Exhibit 34-13 (TP-13) (DEIS Figure 3.14-8 Viewpoint 2: Simulated Conditions Cumulative Scenario) portrays the view shown in Exhibit 34-12 (TP-12), with the WTG's from the Kittitas Valley and Desert Claim wind power projects in place.

Q Do the visual simulations in the Application and the exhibits attached hereto accurately portray what they purport to represent?

A Yes.

Q Are you familiar with these sections of the Application and Exhibits?

A Yes

Q Did you prepare these sections and exhibits, or, if not, did you direct and/or supervise their preparation?

A Yes.

Q Is the information in these sections and exhibits within your area of authority and /or expertise?

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
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TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

A Yes

Q Are the contents of these sections and exhibits of the Application either based upon your own knowledge, or upon evidence, such as studies and reports as a reasonably prudent persons in your field and expertise are accustomed to rely in the conduct of their affairs?

A Yes.

Q To the best of your knowledge, are the contents of these sections and exhibits of the Application true?

A Yes.

Q Do you incorporate the facts and content of these sections and exhibits as part of your testimony?

A Yes.

Q Are you able to answer questions under cross examination regarding these sections and exhibits?

A Yes

Q Do you sponsor the admission into evidence of these sections and exhibits of the Application?

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

A Yes

Q Are there any modifications or corrections to be made to those portions of the Application that you are sponsoring?

A No

Q Would you please summarize and briefly describe your evaluation of the visual impacts resulting from the construction an operation of the project.

A

Introduction and Analysis Approach:

In environmental planning and analysis, visual or aesthetic resources are generally thought of as being the natural and developed features of the environment that are seen and enjoyed by the public. Visual resource or aesthetic impacts are usually defined in terms of a project's physical characteristics and potential visibility, and the extent to which the project's presence would change the perceived visual character and quality of the environment in which it is located. The provisions of the Washington Administrative Code pertaining to applications to EFSEC require that the applicant "…shall describe any scenic resources which may be affected by the facility…" (WAC 463-42-342 (3)) and "…shall describe the aesthetic impact of the proposed energy facility and associated facilities and any alteration of surrounding terrain." (WAC 463-42-363 (4)).

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

To respond to EFSEC's requirements in this area, I drew on a set of well-developed and accepted analytic procedures and tools for conducting the necessary analyses. To a large degree, these procedures and tools were developed under the aegis of Federal agencies such as the Bureau of Land Management, the US Forest Service, and the Federal Highway Administration in response to the requirements of the National Environmental Policy Act of 1969. NEPA, as this legislation is known, mandates the "…Federal Government to use all practicable means…[to]…assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings…" (NEPA sec. 101 (b)) and directs Federal agencies to "…utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and decision making which may have an impact on man's environment" (NEPA sec. 102(a)). To fulfill these requirements, a number of Federal agencies devoted considerable time and resources to conducting research and developing methods that would provide a sound basis for assessing the environment's aesthetic qualities and evaluating how those qualities would be affected by proposed changes brought about by land management decisions and development projects.

The methods developed by these agencies share many common elements, and the basic principles of the methods have been widely adopted in the environmental planning profession as the basis for identifying landscape visual resource qualities and assessing the effects of proposed changes on them. What these methods do is provide a systematic process for identifying the area potentially affected by a proposed project or action, inventorying its aesthetic qualities and sensitivities, documenting the visibility and character of the proposed changes, and assessing how and the extent to which those changes would affect the character and quality of the existing visual setting. The way in

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

which I applied these methods to evaluate the aesthetic effects of the Kittitas Valley Wind Power Project is described briefly below.

One of the first steps in the process was to define the project viewshed, that is, the area from which the project's facilities would be potentially visible. To do so, I directed my colleagues at Wind Engineers to use the "Zones of Visual Influence" (ZVI) feature of the WindPro software system, a sophisticated program developed to assist in the planning, design, and environmental assessment of wind energy projects (EMD 2002). To identify the areas from which the turbines are potentially visible, the ZVI module makes use of a digital height model generated from digital height contour lines. The module calculates lines of sight between each point on the land surface and the tops of each of the proposed turbines, and notes whether there is an unobstructed view toward the turbine based solely on terrain. The products of this analysis were a map (Exhibit 22-1) that indicated the potential visibility of the proposed turbines in the larger region, and a second map (Exhibit 22-2) that focused on the areas closest to the project site and provided a more detailed indication of the extent to which the turbines might be visible in the surrounding area. Because these analyses were run using topographic data only, and did take into account the screening of views provided by vegetation and buildings, the patterns of project visibility displayed on these two exhibits represent the maximum potential visibility of the turbines and thus may overstate the extent to which the turbines will actually be visible.

For the area within the Project's potential viewshed, I conducted research that included review of local planning documents, topographic maps, and aerial photos, and made field visits that included photo documentation of existing conditions. Based on this research,

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

the Project area was divided up into a number of viewing areas – areas which offer similar kinds of views toward the project site and/or within which there would likely be similar concerns about landscape issues. Within most of these viewing areas, I selected Simulation Viewpoints (SVs) as locations for taking photos that could be used for the development of simulated views of the Project that could form the basis for visualizing the Project's potential visual effects. The simulation viewpoints were established to capture views that are typical of the conditions that exist in each of the viewing areas. The emphasis was placed on views from publicly accessible locations that would be likely to be seen by the largest numbers of people. A total of 16 simulation viewpoints were documented as a part of the process of preparing the initial EFSEC application, and later, in response to requests for further information by EFSEC, 4 additional simulation viewpoints were documented, including a view toward the Project substation and operation and maintenance (O&M) facility, a view from National Forest lands (Exhibit 34-4 (TP-4) and Exhibit 34-5 (TP-5), which are attached to this testimony), and a view from a hillside area and another from a valley area in which both the proposed Kittitas Valley project and the proposed enXco Desert Claim project would be visible (Exhibit 34-7 (TP-7) through Exhibit 34-13 (TP-13), which are attached to this testimony). This resulted in analysis of conditions at a total of 20 viewpoints and preparation of over 20 simulations of the Project's appearance. This is a level of analysis and simulation work that far exceeds the level of visual analysis conducted for power generation projects that have come before EFSEC for review in the past.

For each of the viewpoints used for analysis and the preparation of simulation images, I documented existing viewing conditions and made an assessment of the view's existing

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

scenic quality. 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, water courses, rock outcrops, and natural vegetation;
- The positive and negative effects of man-made alterations and built structures on visual quality; and
- Visual composition, including an assessment of the vividness, intactness, and unity of patterns in the landscape.[1]

The final ratings assigned to each view fit within the rating scale summarized in Table 5.1.4-1 in the EFSEC Application. This scale is based on a scale developed for use with an artificial intelligence system for evaluation of landscape visual quality (Buhyoff et al., 1994), and incorporates landscape assessment concepts applied by the U.S. Forest Service and the U.S. Department of Transportation. The scale defines six classes of scenic quality, ranging from "Outstanding Scenic Quality" (landscapes with exceptionally high scenic quality that are significant nationally or regionally) at one end of the spectrum, to "Low Visual Quality" (landscapes that are below average in scenic value, which may contain visually discordant alterations) at the other end.

In addition to assessing the existing quality of each view, I also documented the sensitivity of each view in terms of the numbers of viewers and their sensitivity. Residential viewers, roadway viewers, and recreational viewers were assumed to be the most potentially sensitive to the project's visual effects. Overall levels of visual sensitivity at each of the viewpoints were identified as being High, Moderate, or Low. In

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

general, high levels of sensitivity were assigned in situations where turbines would be potentially visible within 0.5 mile or less from residential properties, heavily traveled roadways, or heavily used recreational facilities. Moderate levels of sensitivity were assigned to areas where turbines would be potentially visible within 0.5 to 5 miles within the primary view cone of residences and roadways. In distinguishing between moderate and low levels of sensitivity in the 0.5 to 5 mile zone, account was also taken of contextual factors, including the viewing conditions in the immediate foreground of the view. In areas lying 5 miles or more from the closest turbine, where turbines would be distant and relatively minor elements in the overall landscape, a low level of sensitivity was assigned. The distance thresholds applied in defining the varying levels of potential sensitivity derive from the landscape visual analysis systems developed by the US Forest Service and other agencies, which divide the landscape up into distance zones that are related to the degree to which landscape details are detectable to the viewer. The foreground distance zone is defined as the area within ¼ to ½ mile from the viewer, where the maximum discernment of detail is possible. The middle ground is defined as the area from ¼ to 3 to 5 miles from the viewer, where there is visual simplification of vegetative surfaces into textures, overall shapes and patterns, and there is linkage between foreground and background parts of the landscape. The background is defined as the landscape zone 3 to 5 miles and further from the viewer in which little color or texture is apparent, colors blur into values of blue or gray, and individual visual impacts become least apparent (USDA Forest Service 1973, pp. 56-57).

To provide a basis for the assessment of the project-related visual changes, for each viewpoint, the photo of the existing view was used as the basis for preparation of a

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[1] These terms are defined in the Technical Terms section at the end of Chapter 5 in the Project's EFSEC Application.

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

simulation of the view as it would appear with the development of the project. These "before" and "after" images were then compared to provide an understanding of how, and the degree to which, the presence of the project would change the view. The computer-generated simulations were the result of an objective analytical and computer modeling process and are accurate within the constraints of the available site and Project data. The simulations were created using the Photomontage module of the WindPro software program (a widely accepted and applied program used for planning and assessing wind generation projects). Existing topographic and site data provided the basis for developing an initial digital model. The Applicant provided site plans and digital data for the proposed wind turbines. These were used to create three-dimensional (3-D) digital models of these facilities. These models were combined with the digital site model to produce a complete computer model of the wind farm. For each viewpoint, viewer location was digitized from topographic maps, using 5 feet as the assumed eye level. The WindPro program overlaid computer "wire frame" perspective plots on the photographs of the views from the Simulation Viewpoints to verify scale and viewpoint location. Digital visual simulation images were produced as a next step based on computer renderings of the 3-D model combined with high-resolution digital base photographs. The final "hardcopy" visual simulation images that were provided in the Applicant's EFSEC application were produced from the digital image files using a color printer.

In comparing the "before" and "after" views from each viewpoint, consideration was given to the following factors in determining the extent and implications of the visual changes:

- The specific changes in the affected visual environment's composition, character, and any specially valued qualities;

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

- The affected visual environment’s context;
- The extent to which the affected environment contains places or features that have been designated in plans and policies for protection or special consideration; and
- The relative numbers of viewers, their activities, and the extent to which these activities are related to the aesthetic qualities affected by the expected changes. Particular consideration was given to effects on views identified as having high or moderate levels of visual sensitivity.

Levels of impact were classified as high, moderate, and low. In general, high levels of aesthetic impacts were assigned in situations in which turbines would be highly visible in areas with sensitive viewers, and would alter levels of landscape vividness, unity, and intactness to the extent that there would be a substantial decrease in the existing level of visual quality. Moderate levels of aesthetic impact were assigned in situations in which turbines would be visible in areas with high levels of visual sensitivity in which the presence of the turbines would alter levels of landscape vividness, unity and intactness to the extent that there would be a moderate change in existing visual quality. Moderate levels of visual impact were also found in situations in which the presence of turbines in the view would lead to more substantial changes in visual quality, but where levels of visual sensitivity were moderate to low. Low levels of visual impact were found in situations where the Project would have relatively small effects on overall levels of landscape vividness, unity, and intactness and/or where existing levels of landscape aesthetic quality are low or where there are low levels of visual sensitivity.

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

Description of the Existing Visual Setting:

The lands on which the project is sited extend across a roughly 3.4 by 5.5 mile area along the northern edge of the Kittitas Valley, approximately 11 miles to the north and west of the City of Ellensburg. These ridge lands slope southward toward the valley from Table Mountain, a 6,359 foot high peak that is part of the Wenatchee Range to the north. The ridges on which the Project is located range in elevation from 2,160 to 3,445 feet above mean sea level, and lie in the area defined by Swauk Creek on the west and Green Canyon on the east. The tops of the ridges have a gentle southward slope, and the ridge area is dissected by a number of deep, narrow, steep-sided canyons.

The Project area has an open, windswept appearance. Most of the ridgetops on which the Project facilities would be located consist of dry, rocky grasslands used for grazing. To a large degree, trees and shrubs are limited to the areas along the streams in the canyons. The exception is in the higher elevation areas at the Project's northern fringes, where there are clusters of ponderosa pines and other conifers that form the southern edge of the forests that lie upslope to the north.

The Project area is roughly bisected by Highway 97, a north-south route of regional importance. The most visually prominent built features in the Project area in addition to Highway 97 are the sets of large electric transmission lines in the Bonneville Power Administration (BPA) and Puget Sound Energy (PSE) transmission corridors that cross the Project area in an east-west direction. Although many portions of the Project area are uninhabited, there are clusters of rural residences on large parcels in several areas, most notably along the Highway 97 corridor just south of the Project

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

site, in portions of the ridge area east of Highway 97, and along Bettas Road. Under the Kittitas County Comprehensive Plan (Kittitas County, 2001) and Zoning Ordinance, the lands in the Project area have been designated as Agriculture-20 and Forest and Range land use areas. The Comprehensive Plan does not acknowledge any special scenic or visual resource values in the Project area, and does not include policies that are specifically oriented to protection of Project area scenic qualities.

Although the County's Comprehensive Plan is silent on the question of scenic values in the Project area and vicinity, the corridor along Highway 10, which runs along the southern edge of the Project area, has gained some recognition as having scenic values. For example, the American Automobile Association map of Washington indicates that the segment of Highway 10 between Cle Elum and Ellensburg is an "AAA Designated Scenic Byway" and local tourist literature promotes Route 10 as a scenic alternative to I-90. In the 1990's, Kittitas County received a grant that enabled it to prepare a plan for a scenic route that would include this segment of Highway 10, along with segments of Highways 970 and 903, which follow the segments of the Yakima and the Cle Elum Rivers between Ellensburg and Salmon La Sac. A planning report for this corridor, titled The Swift Water Corridor Vision (Kittitas County, 1997) was prepared. This report documents the corridor's scenic values and identifies opportunities for undertaking road improvement measures and development of roadway amenities and interpretive installations. As the vision statement takes pains to point out, "This Vision is ***not*** intended to be a plan that creates additional management policies, regulations, or restriction on private property, beyond those that already exist under federal, state, regional, and local plans and regulations. ***This Vision is not a mandate; it is a recommendation.***" Although the Swiftwater Vision

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

was completed and published in 1997, it has not been formally adopted by the County.

In addition, in April, 2003, the Washington legislature approved SB 5937, which designated Highway 97 as a State Scenic Byway. Highway 97's new State Scenic Byway status establishes eligibility to apply for National Scenic Byway funding and to receive technical support from the Federal and State Scenic Byway programs, creates opportunities to stimulate tourism, and provides for a process to plan for tourism impacts on the corridor. Scenic Byway status does not impose new legal restrictions on lands along the road corridors, and the Washington Department of Transportation does not use Scenic Byway status as a basis for commenting on the EIS aesthetic analyses prepared for projects along Scenic Byway corridors.

Within the area from which the project's features are potentially visible, thirteen viewing areas were defined. Eleven of these areas are identified on Tables 5.1.4-2 and 5.1.4-3 in the EFSEC Application. The two additional landscape areas are the United States Forest Service lands along Forest Road 35 in the area to the north of the northern terminus of Reecer Creek Road, and the area along Reecer Creek Road in the upper valley in proximity to the Desert Claim windpower project site. The visual conditions in these thirteen areas are represented by views from a total of 20 viewpoints. The visual quality of the views from these 20 viewpoints ranges from moderately low to high. The views with the highest levels of visual quality are those from I-90 (Simulation Viewpoint 14) and from Reed Park in Ellensburg (Simulation Viewpoint 16) in which the peaks of the Stuart Range are an important feature on the distant horizon, the view from Section 35 at the upper end of Elk Springs Road in the

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

ridge lands east of Highway 97 (Simulation View 5) which provides panoramic views toward the south, and the views from the National Forest lands along Forest Road 35 which provide panoramic views across the valley.

Description of the Project's Appearance:

The Project will include up to 151 turbines, which will be arranged in 10 strings located along ridgelines on the Project site. The turbines will be mounted on tubular steel towers that will be approximately 18 feet in diameter at the base and will rise to a hub height of 203 to 265 feet. Each tower will support a nacelle that houses a drive train, gearbox, generator, and other generating equipment. The nacelles will be approximately 30 feet long, 11 feet wide and 12 feet high and will be completely sheathed in an aerodynamically shaped fiberglass or metal shell. The rotors will be attached to the front of the nacelles, which are mounted on the tops of the towers. The rotors will have three blades, and will have a diameter of 197 feet to 295 feet. Although not required for functionality, each rotor will have an aerodynamic appearing nose cone to improve its appearance. These dimensions represent the range of sizes of the various turbine models being considered for this Project. The Applicant is considering several turbine models from different vendors. The final decision regarding turbine and tower dimensions is driven largely by Project economics such as turbine pricing and the performance of specific turbines under different wind conditions. Given the relatively low wind shear at the Project site, it is not anticipated that taller towers will be necessary. The primary difference among the turbine models being considered is the rotor diameter, which range from 197 feet to 295 feet. Most of the visual simulations presented in the EFSEC Application are based on a turbine with a hub height of 210 feet and a rotor diameter of 203 feet,

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

which are representative of the dimensions of the turbines that are being considered for the Project. For two of the simulation views, simulations were provided of the turbines with dimensions at the high end of the dimension range (Exhibit 22-3, Figures Vis 4c and Vis 6c) to permit the appearance of the slightly larger turbines to be compared with that of the slightly smaller turbines that have been simulated.

The surfaces of the turbine towers, rotors, and nacelles will be neutral gray in color and will be given a finish that has a low level of reflectivity.

The power generated by the turbines will be delivered to the Project substation by means of a largely underground electric collection system. Small, pad-mounted transformers located at the base of each turbine tower will convert the electricity produced by the turbine to a transmission voltage of 34.5 kV and will connect to the underground collection lines. Each of the transformers will be housed in a metal-sided case that is approximately 8 feet wide, 8 feet long, and 8 feet high. The transformer housings will be painted in earth tone colors using paint with a low-reflectivity finish. An approximately 1.2 mile long segment of the collection system connecting the eastern and western portions of the Project will be above ground due to the large amount of power flowing through this portion of the collection system. This line would run from near the northern end of Hayward Road (String D) to near the junction of Bettas Road and Highway 97 (substation). This portion of the system would be carried on single wood poles with dual cross arms that are 40 to 50 feet tall. The overhead portion of the transmission system will utilize non-specular conductors and insulators that are non-reflective and non-refractive.

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

The network of roads that will provide access to each of the turbines will consist of both existing and new roads which will have a standard width of 24 feet and a compacted gravel surface. In areas with steeper slopes, cutting and filling will be required to keep grades below 15%.

The proposed operations and maintenance (O&M) facility is planned for an approximately 2-acre site located in the flat area along the north side of the southern end of Bettas Road in the area just west of its intersection with Highway 97. This area is visible in EFSEC Application Exhibit 22-3, Photo 6 on Figure 3c. To construct this facility, the existing shrub-steppe vegetation on the site will be removed and the site will be graded and fenced. The primary structure in the O&M facility will be a main building that is approximately 50 feet wide, 100 feet long, and 35 feet high. This building will house offices, spare parts storage, and a shop area. This building will be steel framed and will have steel siding that will be painted with low reflectivity paints in earth-tone colors that blend well with the surrounding landscape. The outdoor areas devoted to parking and vehicle turning will be paved with asphalt in areas that are heavily used and with gravel in less frequently used areas. Naturalistic groupings of indigenous trees and shrubs will be established in the area surrounding the O&M facility to provide partial screening and to integrate it into the landscape setting.

Two sites have been proposed as locations for Project substations. One of the sites would be located adjacent to the proposed O&M facility along the north side of the southern end of Bettas Road just west of its intersection with Highway 97, and would tie into the adjacent PSE 230-kV Rocky Reach to White River transmission line. The other site is located approximately 800 feet southwest of this site, on the sloped area

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

south of Bettas Road and immediately north of the BPA transmission corridor. It is possible that either or both of these sites would be developed. In either case, the substation would occupy an area of 2 to 3 acres that would need to be cleared and graded. Because of the sloped terrain, considerable grading would be required to accommodate a substation on the site adjacent to the BPA corridor. The primary elements of a substation on either site would include a small control building, large transformers, bus work, steel support structures, structures housing switchgear, a transmission take-off tower, lightning suppression structures, outdoor lighting, and a perimeter chain link fence. The tallest structures would be the transmission take-off structures, which would be on the order of 60 feet high. The bus work and steel support structures would be in the range of 40 to 45 feet high. The transformers, switchgear structures, and control building would be no more than 12 to 15 feet in height. Although the substation control buildings would be painted an earth-tone color using low-reflectivity paints, the substation equipment would have a standard low reflectivity neutral gray finish. Attachment 11 submitted with the of the Clarification Information is a visual simulation that depicts the appearance of the O&M facility and the substation adjacent to the PSE transmission line as they would appear in a view from northbound Highway 97.

To respond to the Federal Aviation Administration's aircraft safety lighting requirements, the Project will be marked with lights that flash white during the day (at 20,000 candela) and red (at 2,000 candela) at night. These lights are designed to concentrate the beam in the horizontal plane, thus minimizing light diffusion down toward the ground and up toward the sky. The exact number of turbines that will require lighting will be specified by the FAA after it has reviewed final Project plans;

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

however, typically, the Northwest Regional Office of the FAA has required that warning lights be mounted on the first and last turbines of each string, and every 1000 to 1400 feet on the turbines in between. The FAA is now in the process of reviewing its safety lighting standards for wind energy facilities, and is in the process of developing revised requirements. The research that the FAA has undertaken as a part of this review suggests that the revised requirements are likely to go in the direction of requiring fewer lights that could be located further apart. Zilkha Renewable Energy is participating in a test of a new FAA approach to turbine aviation warning lighting at its Blue Canyon wind farm in Oklahoma. At this installation, of the 45 turbines, 14 have medium intensity red strobes mounted on them. These lights are controlled by a central computer, and are synchronized so that they all flash simultaneously. These lights are used only at nighttime, and there are no flashing white lights for daytime use. Aside from the aircraft warning lights, the turbines will not be illuminated at night.

At the O&M facility, outdoor night lighting will be required for safety and security. This lighting will be restricted to the levels required to meet safety and security needs. Sensors and switches will be used to keep lights turned off when not required. All lights will be hooded and directed to minimize backscatter and illumination of areas outside the O&M site. The lighting, paving and landscaping mitigation measures proposed for the O&M facility would be applied to the substation(s) as well.

Project construction is expected to take place over a period of up to 12 months. During that time, a staging area will be set up at the site of the proposed O&M facility

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

along Bettas Road just west of Highway 97 that will be used for temporary storage of turbine components, equipment, and vehicles. Grading will be required to create access roads and 30 by 60-foot flat, gravel-covered areas at the base of each tower site that will accommodate the cranes required to erect the turbines.

Project Impacts:

During the construction period, large earth moving equipment, trucks, cranes, and other heavy equipment will be highly evident features in views toward the Project site from nearby areas. At some times, small, localized clouds of dust created by road-building and other grading activities may be visible at the site. My analysis and the analysis presented in EFSEC's DEIS come to similar conclusions about the project's construction period impacts. Because of the construction-related grading activities, areas of exposed soil and fresh gravel that contrasts with the colors of the surrounding undisturbed landscape will be visible. Both the EFSEC DEIS and I conclude that in close-at-hand views, particularly those seen by travelers on the segment of Highway 97 that passes through the Project site, and those seen from the closest residences, the visual changes associated with the construction activities will be highly visible and will have a moderate to high level of visual impact. EFSEC and I also agree that in more distant viewing locations, the visual effects will be relatively minor and will have little or no impact on the quality of views. Because the construction activities will take place over a period of only 12 months, the construction impacts will be relatively short in duration. After construction, is complete, all construction-related debris will be removed from the site and any other non-road surface areas disturbed during construction will be reseeded to recreate the appearance of their original vegetative cover.

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

The Project's aesthetic impacts during the operational period are summarized in the EFSEC Application in Table 5.1.4-2, and presented in more detail in Table 5.1.4-3. From 10 of the 20 viewpoints used for analysis, the visual impacts of the project will be low. In most of these 10 areas, the impacts are low because the turbines are seen in the distance, where they tend to have a relatively low level of visual contrast with their surroundings, which reduces their noticeability and limits their apparent effect on landscape vividness, unity, and intactness.

From 7 of the 21 viewpoints, the project's effects will be moderately low to moderate. In these areas, the turbines will be visible, but their degree of visual contrast with their settings, will in many cases be relatively low and in some situations will appear to be in scale with existing transmission towers.

The Project has the potential to create Moderately High to High levels of visual impact at 4 locations. At Simulation Viewpoint 2 along Highway 97, 9 turbines will be visible on top of the ridge in close proximity to this heavily traveled roadway, and will be seen silhouetted against the sky, altering the character and quality of this view which has a high level of sensitivity because it is seen in the foreground by a large number of motorists on Highway 97. However, some viewers are likely to find that because the turbines have an attractive design and are sited along the ridgeline in an orderly and uncluttered way, that their presence will not necessarily create a change the in the setting's existing moderate level of visual quality. It is likely that the effects of the Project on views of northbound travelers along this area of the highway will be a little less than suggested by the simulation image (EFSEC Application for site Certification Figure Vis 5b) because the photograph on which the

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

simulation is based was taken from the west side of the road, where the ridge top area is more visible. On the east side of the road where northbound travelers would be located, views toward the ridgetop and the turbines would be constrained to some degree by the proximity of the slope to the side of the road.

In the view from the rural residential area along Sagebrush Road (Simulation View 4) a total of more than 70 turbines will be visible to the east and north at distances ranging from 0.9 to over 4 miles. Although most of the turbines will be seen against hills in the backdrop, which will reduce their visual salience to some degree, a number of the closer turbines and many of the turbines to the north will be seen silhouetted against the sky, which will increase their noticeablity. The high visibility of the many of the turbines and the large numbers of turbines involved will reduce the visual intactness and unity of this view, which is sensitive because of the presence of residential viewers.

From Simulation Viewpoint 5 in Section 35 in the ridgelands east of Highway 97, a total of approximately 40 turbines will be visible. Three strings of turbines will be visible in the middleground, and an additional two strings will be visible in the far middleground. Because of the elevated viewing position, these turbines will be seen against the backdrop of the ridgetop's ground surface. The contrast between the light color of the turbines and the darker color of the ground will create a moderate level of visual contrast, increasing the visibility of the turbines. Because of the elevated position of this viewpoint and its distance from the turbines, the turbines' apparent scale will be consistent with that of other features in the setting. The presence of the turbines will have little effect on the vividness of this view, but will reduce its overall sense of unity and intactness. The level of impact is considered to

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

Moderately High to High because these visual changes will be visible to some degree from up to 5 of the residences in Section 35.

One of the views along Forest Road 35 in the National Forest lands north of the northern terminus of Reecer Creek Road, the Project's impacts will be moderately high because large numbers of turbines will be visible in the middleground of this view (Exhibit 34-5 (TP-5). The impact will be moderated to some degree by the fact that the turbines will be seen against the ground plane, which will reduce their degree of contrast and noticeability.

The analysis of visual resource impacts in EFSEC's Draft EIS evaluated the Project's aesthetic impacts on 13 of the 20 viewpoints I used as the basis for my analysis (11 views of the Kittitas Valley project by itself, and 2 views that also included portions of the enXco Desert Claim project that provided a basis for consideration of cumulative impacts). For each of the 11 viewpoints of the Kittitas Valley project alone, EFSEC's DEIS analysis reached essentially the same conclusions that I did about the Project's degree of impact on the views. Where I part company with the DEIS analysis is with the conclusions it presents in Section 3.9.6, Significant Unavoidable Adverse Impacts. In this section, the DEIS states that "For many viewers, the presence of the wind turbines represents a **significant unavoidable adverse impact** because it **significantly alters the appearance of the rural landscape over a large area of the Kittitas Valley.**" (emphasis added). This conclusion has a highly speculative character and is not acceptable because it does not link back to the specifics of the preceding analysis. This sentence and the one that follows it both use the term "significant". The use of this term has not been explained or given an operational definition

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

Based on experience at the Stateline and Nine Canyon Wind projects in Washington, it appears that the white flashing lights that may be required to be mounted on the turbines and would flash during daylight hours as currently required by the FAA for daytime aircraft safety will be visible, but not particularly intrusive to viewers in the areas surrounding the Project and are thus unlikely to create a moderate or high level of visual impact. The flashing red lights (2,000 candela) that the FAA requires be operated at nighttime will introduce a new element into the Project area's nighttime environment. At present, the Project site and surrounding area are relatively dark at night. The major sources of light in the area are floodlights and other outdoor lights at the residential properties located in the vicinity of the Project area, and headlights on the surrounding highways. Both my analysis and the analysis presented in EFSEC's Draft EIS concur that the flashing red lights will be most noticeable in the areas within a mile or so of the Project, and may be perceived as having an adverse effect on views from residential properties in these areas. I note that in the section of the Draft EIS on page 3.9-50, titled 'Additional Recommended Mitigation Measures', there is a reference to concerns expressed by commentors about "lost sleep" caused by the proposed turbine lighting. My assessment is that this discussion must be expanded to note that it is highly unlikely that the project's nighttime navigation lights would cause sleep disturbance. The nighttime lights will be red and will flash at an intensity of 2,000 candela (vs. 20,000 candela for the white lights that could be required to flash during the daytime). The navigational lights are designed to concentrate the beam in the horizontal plane, thus minimizing the diffusion of light down toward the ground and up toward the sky. Experience at existing wind power sites in the Northwest indicates that although the flashing red navigation warning

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

lights have become visible elements in the night sky, they have not created a detectable increase in ambient light conditions at off-site locations.

The Project's O&M facility and substation(s) will create sources of light in areas where there are no nighttime sources of light other than the headlights of vehicles on adjacent roadways. However, the impacts of the lighting associated with these facilities will not be substantial. As indicated previously, some night lighting will be required for operational safety and security, but mitigation measures will be put into place to restrict this lighting to the minimum required and to attenuate its effects.

Mitigation Measures:

Mitigation measures that have been made an integral part of the Project's design include:

- During the construction period, active dust suppression will be implemented to minimize the creation of dust clouds;
- When construction is complete, areas disturbed during the construction process will be restored to natural appearing conditions;
- The wind turbine towers, nacelles, and rotors used will be uniform and will conform to the highest standards of industrial design to present a trim, uncluttered, aesthetically attractive appearance;
- The turbines will have neutral gray finish to minimize contrast with the sky backdrop. Comparison of simulations of towers with a neutral gray finish with simulations of towers with an earth-tone brown finish (Simulation Views 2 and 14) indicate that although the earth tone finish reduces visual contrast in views in which the turbines are seen against a landscape backdrop, it accentuates the visibility of the turbines in views in

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

which they are seen against the sky. Because the turbines are most frequently seen against the sky, particularly in close range views where visual concerns are the greatest, the gray finish is the better choice for minimizing Project aesthetic impacts;

- A low-reflectivity finish will be used for all surfaces of the turbines to minimize the reflections that can call attention to structures in a landscape setting;
- Because of the prevailing wind conditions and the high level of reliability of the equipment being used, the rotors will be turning approximately 80-85% of the time, minimizing the amount of time that turbines will appear to be non-operational, a condition that the public often finds to be unattractive[2];
- The small cabinets containing pad-mounted equipment that will be located at the base of each turbine will have an earth-tone finish to help them blend into the surrounding ground plane;
- The only exterior lighting on the turbines will be the aviation warning lighting required by the FAA. It will be kept to the minimum required intensity to meet FAA standards. It is anticipated that the FAA will soon be issuing new standards for marking of wind turbines that will entail lighting far fewer turbines in a large wind farm than is now required, and having all the lights be synchronized. These potential regulatory changes are being closely monitored, and if, as is likely, they are made before Project construction begins, the aviation safety marking lighting will be redesigned to meet these standards;
- Nearly all of the Project's electrical collection system will be located underground, eliminating visual impacts;
- On the 1.2 mile segment of the electrical collection system that will be above ground, simple wooden poles, non-specular conductors (i.e. conductors that have a low level of

[2] This finding is supported by research by Thayer and Freeman (1987), among others.

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

reflectivity), and non-reflective and non-refractive insulators will be used. This line parallels two existing sets of overhead high voltage transmission lines and a paved road;

- To the extent feasible, existing road alignments will be used to provide access to the turbines, minimizing the amount of additional surface disturbance required. Access road widths will be restricted to 20 feet. The roads will have a gravel surface and will have grades of no more than 15%, minimizing erosion and its visual effects;
- The O&M facility building will have a low-reflectivity earth-tone finish to maximize its visual integration into the surrounding landscape;
- The colors of the asphalt and gravel used for circulation and parking areas at the O&M facility will be selected to minimize contrast with the site's soil colors;
- Outdoor night lighting at the O&M facility and the substations will be kept to the minimum required for safety and security, sensors and switches will be used to keep lighting turned off when not required, and all lights will be hooded and directed to minimize backscatter and off-site light trespass;
- At the substation(s), all equipment will have a low reflectivity neutral gray finish to minimize visual salience;
- All insulators in the substations and on takeoff towers will be non-reflective and non-refractive;
- The control buildings located at each substation would have a low-reflectivity earth-tone finish;
- The chain link fences surrounding the substations will have a dulled, darkened finish to reduce their contrast with the surroundings;
- In the areas surrounding the O&M facility and substations, naturalistic groupings of indigenous trees and shrubs will be established to provide partial screening and to visually integrate the facilities into their landscape settings.

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

The Draft EIS recommends a number of additional mitigation measures (Draft EIS, pages 3.9-50 and 3.9-51). Some of these measures are feasible and have a reasonable relationship to the Project's potential impacts. Others, however, are not feasible and/or do not bear a reasonable relationship to the Project's likely impacts. The additional suggested mitigation measures that I do not support are briefly noted here:

- The DEIS notes that during EIS scoping, the suggestion was made that the County impose scenic setbacks from Highway 97. The DEIS does not directly recommend that such setbacks be established, but indicates that "Kittitas County would make decisions regarding scenic setbacks in the project area." (DEIS, p.3.9-50) My assessment is that the results of the analyses that I have conducted for the Highway 97 corridor and those presented in the DEIS do not establish a clear rationale for modification of the project in this area through establishment of scenic setbacks. It is true that along the portion of Highway 97 north of the intersection with northern end of Bettas Road, landscape values are relatively high. However, along the portions of the Highway 97 corridor south of this area, where the turbine strings would be located, the level of existing visual quality is moderate at most. This area lies largely outside of the timber zone, and there are a number of highly visible landscape modifications, including the extensive slope cuts required to accommodate the highway, the gravel pit and gravel storage area at the point the highway crosses over the ridge, and the PSE and BPA transmission line corridors in the area south of the intersection with the southern end of Bettas Road. In addition, as I note in my analysis in the EFSEC Application, the simulated view we provide of the project's appearance along Highway 97 overstates the project's visibility because it is taken from the west side of the road. For northbound travelers, views toward the ridgetop to the east

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

where the closest turbines would be located would be constrained to some degree by the proximity of the slope to the side of the road.

- The suggestion that measures be taken to "mitigate for light pollution at residences that do not have window coverings and methods to shield or somehow create a visual barrier between tower lights and nearby residences." should be dropped. Experience at existing wind power sites in the Northwest indicates that although the flashing red navigation warning lights have become visible elements in the night sky, they have not created a detectable increase in ambient light conditions at off-site locations.

- The recommendation that trees be planted to screen uphill views toward turbines located within a one mile distance must be rejected. The Applicant has already explored this tree planting option and has found that it would not be feasible. One constraint is that the Applicant does not own or have leases on the land in the foreground zones of heavily traveled roads from which there would be uphill views of turbines. There is no certainty that the Applicant would be able to obtain permission from landowners for tree planting in these areas. Any trees planted in these areas would require irrigation to become established, and no developed water sources are available in these areas to provide the irrigation water that would be needed. It should be noted that the Applicant has made a commitment to plant scattered groupings of native trees in the area around the substation and O&M facility to provide partial screening of these installations. Tree planting in this area is feasible because the Applicant will have control over the land where

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

the planting will take place and because the trees can be irrigated using water from the well that will be developed at the O&M facility.

- The visual resources analysis does not include findings that justify the recommendation that the turbine foundations should not extend above the existing grade. The impacts EFSEC's Consultant identifies in its analysis have been related to the overall height and form of the turbines, and not to their relationship to the ground plane. Review of the simulations presented in the Visual Resources Analysis suggests that given the distance of the turbines from the areas from which they would be viewed, and the angle of view, the details of the relationship of the turbine bases to the ground plane would not be visually important. In addition, it is my understanding that there are technical problems that make this measure infeasible in this area.

- No analysis is presented that justifies the recommendation that transformers and control panels be accommodated within the bases of the turbine towers. The transformers that have been proposed as a part of the Project will be approximately 8 feet wide, 8 feet long, and 8 feet high, and the transformer housings will be painted earth tone colors to permit integration into the surrounding landscape. Given the small size of the transformers, the use of non-contrasting colors for their exteriors, and their distance from the areas from which the project will be viewed, their role in contributing to any visual impacts that the project might create will be very minor. It is also my understanding that that there are technical issues that would make this measure infeasible.

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

- No analysis is presented that justifies the recommendation that the Applicant acquire conservation easements on lands in the foreground of important views toward the turbines. The assertion that "This approach would conserve natural areas so that the visual contrast between the wind turbine and the land maintains its order and purity." is not backed up with an explanation of what this statement really means. In addition, no evidence is presented that that the aesthetic principle that it seems to suggest is valid, or that implementation of this measure would attenuate the project's visual effects in a meaningful way.

Cumulative Impacts:

Exhibit 34-6 (TP-6) identifies the locations of the Kittitas Valley, Desert Claim, and Wild Horse wind power projects. As this figure indicates, the Kittitas Valley and Desert Claim projects are relatively close to each other, with a separation of just 1.6 miles at their closest point. The Wild Horse project, however, is relatively far from both of these projects. The Wild Horse site lies 14 miles east of the Desert Claim project site and 21 miles east of the Kittitas Valley project site.

I took a careful look at areas in and around both the Kittitas Valley and Desert Claim projects to identify the extent to which there are viewpoints from which both projects can be seen in foreground to middleground views. Because of the topographic conditions, there are virtually no areas where the Kittitas Valley project can be seen in the foreground and the Desert Claim project in the middleground or background. However, there are a number of locations in the upper Kittitas Valley in and in proximity to the Desert Claim project where the Desert Claim project can be seen in the foreground to middleground and the Kittitas Valley project can be seen in the middleground to background. Exhibit 34-8 (TP-8) through Exhibit 34-13 (TP-13)

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

provide a representative example of the combined effects of both projects on views from these areas. The locations of these viewpoints are indicated on Exhibit 34-7 (TP-7) (a copy of which is appended). One of these viewpoints (Viewpoint 1 on Exhibit 34-7 (TP-7)) is located along Reecer Creek Road at a point just west of the Kittitas County Fire District Station No.2. My assessment, which is consistent with that of the DEIS, is that the effect of seeing the Kittitas Valley project in the middleground to background zones of the view with the Desert Claim project in the near middleground would not substantially increase the effect that the Desert Claim project alone would have on the visual character and quality of the view. The other viewpoint (Viewpoint 2 on the Exhibit 34-7 (TP-7)) is located on upper Reecer Creek Road, just outside of the boundary of the Wenatchee National Forest, where the view expands sufficiently to allow substantial portions of both the Kittitas Valley and Desert Claim project sites to be seen. As review of Exhibit 34-13 (TP-13) indicates, from this vantage point, turbines that are a part of the Desert Claim project will be visible in the foreground and middleground of the view, and turbines that are part of the Kittitas Valley project will be visible in the background. My assessment is that because the Kittitas Valley project will be located in the view's background zone where the turbines will tend to fade into the landscape, they would not substantially increase the effect that the Desert Claim project alone would have on the visual character and quality of the view. My assessment of this project's cumulative impacts as experienced from this viewpoint differs from that of the analysis presented in the DEIS. The DEIS analysis erroneously characterizes the Desert Claim turbines as being in the background zone of the view (page 3.14-19), when they would clearly be in the foreground and middleground where they would be visually dominant elements of the view. Given the dominance of the Desert Claim turbines in the nearer view, the presence of the Kittitas Valley turbines in the background , three miles and further in the

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

distance, would result in relatively little increase in the overall visual effect created by the Desert Claim project.

Because the Wild Horse project is located so far from the other two projects and in an entirely different portion of the landscape, it has limited potential to be seen in the same view as the other two wind power projects. It is conceivable that there are some locations at the western edges of, or within the Kittitas Valley and Desert Claim wind power project sites from which there may be an unobstructed line of sight toward Whiskey Dick Mountain and the Wild Horse project site. However, because of the large distances involved (21 miles from the Kittitas Valley project and 14 miles from the Desert Claim project), the Wild Horse turbines would be barely, if at all, detectable and would have essentially no effect on the view.

Conclusion:

The Kittitas Valley Wind Power Project will add a number of tall, highly visible new elements to the project area landscape. However, from most locations in the area where there are appreciable numbers of viewers, the presence of the Project will not create a serious reduction in the overall quality of the views that people experience. In addition, there are a few specific places where residences and heavily traveled roadways are located in close proximity to the turbines where the project will be of more visual concern. To reduce the Project's visual effects in these areas, the Applicant has incorporated siting and design measures that relate the Project to the landscape setting and minimize adverse visual effects.

DARREL L. PEEPLES
ATTORNEY AT LW
325 WASHINGTON ST. NE #440
OLYMPIA, WA 98506
TEL. (360) 943-9528 FAX (360) 943-1611
dpeeples@ix.netcom.com

EXHIBIT 34-1 (TP-1)

Thomas J. Priestley
Senior Environmental Planner

Education

PhD, Environmental Planning, University of California, Berkeley
MLA, Environmental Planning, University of California, Berkeley
MCP, City Planning, University of California, Berkeley
BUP, Urban Planning, University of Illinois

Distinguishing Qualifications

Broad training in planning, natural resources, and applied social science.

Over 20 years of professional experience as an educator, researcher, and professional urban/environmental planner.

Skilled in developing work programs and budgets, assembling and managing interdisciplinary project teams, providing quality control, and integrating study findings into appropriate documentation.

Visual assessment specialist with involvement in over 50 visual assessment efforts.

Experienced in the preparation of California Environmental Quality Act (CEQA)- and National Environmental Policy Act (NEPA)-required documents.

Broad knowledge of methods used for siting electric generation, transmission, and substation facilities and mitigating their land use and aesthetic effects.

Skilled in scoping aesthetic and urban design issues and in developing and implementing the appropriate analyses.

Relevant Experience

Dr. Priestley has more than 20 years of professional experience in urban and environmental planning and project assessment. He is known nationwide for his expertise in evaluating aesthetic, land use, property value, and public acceptance issues related to electric energy projects. His experience includes projecting community land use development trends to determine facility needs and optimal location; assessing land use and visual effects of proposed electric facilities; and conducting studies of public perceptions of project visual effects. Through his project experience and his research conducted for utility clients, Dr. Priestley has developed a broad knowledge of methods used for siting electric generation, transmission, and substation facilities and mitigating their land use, aesthetic, and other environmental effects. As editor or co-author, he has made major contributions to Edison Electric Institute publications related to understanding and evaluating the environmental effects of electric facilities.

In addition to his electricity facility experience, Dr. Priestley is skilled in scoping aesthetic and urban design issues related to other kinds of projects and in developing and implementing the analyses appropriate to address them as part of project assessments. He has worked on numerous transportation-related projects, including conducting research for the Center for the Study of Urban Transport, France's national institute for research on environmental issues associated with urban rail and highway facilities. Dr. Priestley has developed special expertise in evaluation of aesthetic issues associated with hydro projects, particularly those located at waterfall sites. In addition, he has specialized experience in the analysis of the aesthetic effects of wind power facilities.

Dr. Priestley has prepared environmental assessment documents in response to the requirements of the NEPA, CEQA, the US Forest Service Visual Management System, the Federal Energy Regulatory Commission, and the California Energy and Public Utilities Commissions. As the senior professional in the visual resources practice in CH2M HILL's Western Region, he has oversight of visual resource analysis activities in the western states, with an emphasis on issue scoping, study design, mobilization of appropriate staff and technologies, and senior review of final products.

Representative Projects

Wind Generation Facilities

Kittitas Valley Wind Power Project, Kittitas County, WA. Conducted visual impact studies and prepared the visual impact assessment report for a proposed wind power project entailing installation of 116 1.5 to 2.3 MW turbines on exposed ridge lands in proximity to highways and rural residences.

Altamont Pass Wind Resource Area Repowering, Alameda and Contra Costa Counties, CA. Evaluated the potential visual effects of a program to replace existing wind turbines in the Altamont Pass area with a smaller number of larger, more efficient units. Prepared written analysis for inclusion in the counties' environmental assessment under CEQA.

Thermal Generation Facilities

Power Plant Fatal Flaw Analyses, Various California Locations. Conducted initial scoping of visual issues of candidates sites for the development of combined cycle power plants. Identified visual resource constraints on the use of the site for a power plant and recommended siting and design measures to reduce visual impacts.

Central Valley Energy Center, Fresno County, CA. Prepared the visual resources analysis for the Application for Certification (AFC) for a 1,060 MW natural gas-fired combined cycle power plant and associated 230 kV transmission line proposed for development in an agricultural area at the edge of the City of San Joaquin.

Inland Empire Energy Center, Riverside County, CA. Prepared the AFC visual resources analysis for a 670 MW natural gas-fired combined cycle power plant, associated gas compressor station, and 500 kV transmission line proposed for development in an urban fringe area located east of the City of Perris.

East Altamont Energy Center, Alameda County, CA. Prepared the AFC visual resources analysis for an 1,100 MW natural gas-fired power plant and associated 230 kV transmission line proposed for development in an agricultural area near Byron in the northern San

Joaquin Valley. Prepared written testimony and testified as an expert witness on visual resources during hearings before the California Energy Commission (CEC).

Russell City Energy Center, Alameda County, CA. Assisted with decision-making for the architectural design of a 600 MW natural gas-fired combined-cycle power plant proposed for a highly visible location at the western gateway to the City of Hayward. Prepared the AFC visual resources analysis for the power plant and an associated 230 kV transmission line. Prepared supplemental analysis of the visual impacts of relocation of a cluster of tall radio towers to a new location to accommodate development of the power plant. Prepared written testimony and testified as an expert witness on visual resources during hearings before the CEC.

Los Esteros Critical Energy Facility, Santa Clara County, CA. Prepared the AFC visual resources analysis for an 195 MW natural gas-fired simple-cycle peaking power plant proposed for development adjacent to a proposed server farm in the Alviso District of the City of San Jose. Prepared written testimony and testified as an expert witness on visual resources during hearings before the CEC.

Woodland Generation Station 2, Stanislaus County, CA. This project involved an 80 MW peaking unit for which the Modesto Irrigation District filed a Small Power Plant Exemption (SPPE) with the CEC. In its initial evaluation, CEC contended that the project's steam plumes would create significant visual impacts, the mitigation of which would require substantial modifications of the project's operations. Prepared special analyses of the setting, and of the visibility and visual role of the steam plume within that setting, to provide a basis for reassessment of CEC's conclusions. Provided expert testimony. As a result of the applicant's contestation of staff's findings, plume-related mitigation requirements were dropped.

Gilroy Energy Center Phase I and Phase II Projects, Santa Clara County, CA. Prepared the visual resources analysis for the 21-day and 4-month permit applications for a set of six LM 6,000 natural gas-fired simple-cycle peaking power generation units proposed for installation adjacent to the Gilroy Foods processing plant and the Gilroy Cogeneration Plant on the eastern edge of the City of Gilroy.

Rio Linda Power Plant, Sacramento County, CA. Prepared the AFC visual resources analysis for a 600 MW natural gas-fired power plant and associated 230 kV transmission line proposed for development in an urban fringe area near Rio Linda in the Sacramento metropolitan area.

Metcalf Energy Center, Santa Clara County, CA. Responsible for all aspects of the visual resources analysis for a 600 MW natural gas-fired power plant and associated 230 kV transmission line proposed for development at the southern edge of the City of San Jose. Assisted in review of architectural and landscape treatments, prepared visual resources analysis for the AFC, reviewed and critiqued relevant sections of the CEC's Preliminary Staff Analysis (PSA) and Final Staff Analysis (FSA), and evaluated the visual issues associated with CEC-proposed alternative sites. Testified during hearings before the CEC as an expert witness on visual resources.

Los Medanos Energy Center, Contra Costa County, CA. Provided post-licensing assistance to the client related to visual resource issues associated with this 500 MW combined cycle power plant located in the city of Pittsburg. Assisted the applicant with selection of color treatment for project facilities and with securing of CEC. Consulted on the development of a landscape plan to mitigate the visual effects of a relocated underground transmission line and assisted in securing CEC approval of the mitigation plan.

Elk Hills Power Project, Kern County, CA. Scoped the visual issues and prepared the AFC visual resources analysis for a 500 MW natural gas-fired power plant and associated 230 kV transmission line proposed for development in the former Elk Hills Naval Reserve. Reviewed and critiqued relevant sections of the CEC's PSA and FSA. Testified during hearings before the CEC as an expert witness on visual resources.

Newark Energy Center, Alameda County, CA. Prepared visual resources analyses for a 600 MW natural gas-fired power plant and associated 230 kV transmission line proposed for development in the city of Newark.

Delta Energy Center, Contra Costa County, CA. Scoped the visual issues and prepared the AFC visual resources analysis for an 880 MW natural gas-fired power plant and associated 230 kV transmission line proposed for a site in the city of Pittsburg. Reviewed and critiqued relevant sections of the CEC's PSA and FSA. Prepared written testimony and testified as an expert witness on visual resources during hearings before the CEC. Provided post-licensing assistance to the client for the selection of color treatment for project facilities and to secure CEC approval.

Sutter Power Project, Sutter County, CA. Developed special analyses of land use and visual resource issues associated with this 500 MW natural gas-fired generating facility and associated 230 kV transmission line proposed for a site in an agricultural area within the Sacramento Valley. Testified during hearings before the CEC as an expert witness on land use and visual resources.

Glenwood Springs Cogeneration Plant and Transmission Line, CO. Analyzed the aesthetic impacts of a proposed 25 MW cogeneration/desalinization plant. Assisted with the alignment selection for the transmission line associated with the plant, and evaluated the line's visual effects.

Bay Area Resource Recovery Facility and Transmission Line, San Mateo County, CA. As a consultant to the CEC, analyzed the aesthetic impacts of a cogeneration plant and transmission line proposed for development on a site adjacent to San Francisco Bay.

Kangley-Echo Lake Transmission Line, King and Kittitas Counties, WA. Scoped the visual issues and designed and implemented an analysis plan to assess the potential aesthetic impacts of a proposed 500 kV transmission line on four alternative routes, with a total length of approximately 120 miles through forest, recreation, scenic corridor, and rural and suburban residential areas. Supervised the preparation of photo simulations and the preparation of Geographical Information System (GIS) analyses. Prepared the technical report documenting the analysis.

Jefferson-Martin Transmission Project Proponent's Environmental Assessment, San Mateo County, CA. Senior reviewer and consultant for an analysis of the aesthetic issues associated with the proposed replacement of a 14.7-mile segment of an existing kV transmission line with a 230 kV line on larger towers. The transmission line's location in an open space area prized for its scenic qualities and in proximity to affluent residential areas made the visual issues a sensitive and critical dimension of this project, requiring an intensive degree of analysis.

Tri-Valley Transmission Upgrade Project Proponent's Environmental Assessment, Alameda County, CA. Analyzed aesthetic issues associated with a system of new 230 kV lines and substations being proposed by Pacific Gas and Electric Company (PG&E) to upgrade service to the Livermore/Pleasanton/San Ramon area. Scoped issues and made an evaluation of a large set of candidate routes to aid selection of a smaller set of preferred routes. Conducted detailed visual analyses of the preferred routes, wrote the draft of the visual analysis report, and proposed mitigation measures in preparation for filing of a permit application with the California Public Utilities Commission (CPUC).

Valley-Auld Transmission Line Proponent's Environmental Assessment, Riverside County, CA. Scoped visual issues associated with a proposed 12-mile, 115 kV Southern California Edison transmission line, conducted visual analyses, prepared the visual analysis report, and proposed mitigation measures to reduce project's visual effects to less than significant levels in preparation for filing of a permit application with the CPUC.

Swan Lake/Lake Tyee Transmission Project, Tongass National Forest, AK. Prepared visual section of the Environmental Impact Statement (EIS) for a 60-mile transmission line and associated access roads proposed by Ketchikan Public Utilities for Forest Service lands in Alaska's southeast peninsula. Coordinated with Forest Service planning and visual resource management specialists; reviewed Forest Service Visual Resource Management analyses and policies for the project area; analyzed existing landscape conditions; evaluated the aesthetic effects of similar facilities that already exist in the region; provided advice about siting of the route alternatives; analyzed the visual effects of the alternatives; and developed mitigation strategies.

Geothermal Public Powerline, Lake and Colusa Counties, CA. Consultant to the CEC for evaluation of the aesthetic impacts of a transmission line proposed to link the Geysers geothermal area and the Central Valley. Inventoried landscape conditions and reviewed the project proponent's visual impact assessments. Developed independent evaluations of the project's effects on landscape quality in developed communities, in resort areas, along scenic highway corridors, and in other sensitive areas; proposed mitigation measures.

Colusa County Transmission Line Element, Colusa County, CA. Consultant to a team that developed an element for the Colusa County General Plan to guide the siting and design of new electric transmission lines. Summarized the literature on transmission line effects and on siting and design options for impact mitigation; developed an analysis framework; provided technical review of all final products; and prepared the chapter on aesthetic issues. The aesthetic work included survey and evaluation of the county's current landscape conditions and sensitivities, and development of siting and design guidelines.

International Electric Transmission Perception Project. Project Manager for a multi-year research program sponsored by Hydro-Québec, Electricité de France, BC Hydro, the Bonneville Power Administration and Southern California Edison. Managed a team of planners and social scientists conducting research aimed at development and application of standardized methods for surveying the public's perceptions of the impacts of high-voltage transmission lines. Identified transmission line siting issues and information needs; summarized and evaluated existing research findings; participated in development of a conceptual framework for understanding the public's perceptions; and contributed to the development of a master plan and design for preparation and testing of standardized survey instruments.

Development of a New Method for Considering Aesthetic Issues in Transmission Line Siting, Québec, Canada. For Hydro-Québec, provided conceptual review and research assistance for its efforts to evaluate and revise approaches to treatment of transmission line aesthetic issues in project planning, siting, and design.

Environmentally Sensitive Design of Transmission and Substation Equipment. For Hydro-Québec and Electricité de France, developed an inventory and assessment of the experience of US utilities in developing new transmission and substation equipment designs to reduce aesthetic and other environmental impacts. Activities included literature review, survey of utility engineers and planners, interviews with utility personnel, and documentation and synthesis of findings.

Review of New Design for 500 kV Towers, British Columbia, Canada. Aesthetics specialist on a panel of experts convened by BC Hydro to review a new design for 500 kV transmission towers.

Design Solutions for Mitigation of Substation Impacts. For Hydro-Québec, documented the experience of utilities in the US, Canada, France, and Japan during the development of design solutions for urban substations to aid their integration into their settings. In addition, documented measures used by US utilities to respond to environmental issues associated with modifications of existing substations.

Study of Transmission Line Effects on Property Values, Solano County, CA. Consultant and major contributor to the design and implementation of a research project sponsored by Southern California Edison that used hedonic modeling to evaluate the property value effects of transmission lines in a cross-section of suburban residential neighborhoods.

Review of the Literature on Transmission Line Effects on Property Values. Major contributor to development of an Edison Electric Institute-sponsored bibliography and critical review of post-1975 studies on the relationship between transmission lines and the value of residential property.

Guide to Conducting Research on Transmission Line Property Value and Aesthetic Effects. Co-author of an Edison Electric Institute guidebook for utility staff on the design and implementation of research on the effects of electric transmission lines on perceptions and property values in residential neighborhoods. Co-authored and assisted in the production of an accompanying videotape.

Study of Public Perceptions of a Transmission Line in a Residential Neighborhood, Vallejo, CA. Designed and conducted a survey of resident perceptions of a newly upgraded 115/230 kV transmission line in a neighborhood of single-family homes. Conducted advanced analysis and interpretation of the findings. Published the results as a research report and journal article.

Transmission Line Undergrounding and Under River Crossings. For Hydro Québec, conducted a set of case studies documenting and analyzing controversies over the siting of electric transmission lines in which demands were made for placing lines underground or under water.

Transmission Line Effects on Land Use Development. For the Edison Electric Institute, identified and evaluated transmission line siting cases in which concerns about line impacts on future development were a major concern. Reviewed the literature on transmission line impacts on land use development and proposed a program for further research.

Transmission Line Land Use and Aesthetic Issues. For PG&E, analyzed land use and aesthetic issues associated with transmission lines and prepared policy papers for submission to the CPUC.

Hydroelectric and Water Resources Projects

Red Bluff Diversion Dam, Tehama County, CA. Developed the analysis plan for and directed the assessment of the aesthetic changes associated with a set of alternatives being considered for changes in management of the Red Bluff Diversion Dam to enhance passage for anadromous fish. Changes being considered included construction of a massive pumping facility, new fish ladders, and a dam bypass and elimination of an aesthetically and recreationally important lake created by the dam either entirely, or for all but two or four months of the year. The analysis, which included preparation of simulations, was summarized in an aesthetics chapter prepared to meet the requirements of both the NEPA and CEQA.

Oroville Facilities Hydroelectric Project, Oroville, CA. As part of an Applicant Prepared Relicensing (APR) process, responsible for preparation of initial project documents. Developed outlines and work plans; coordinated with the Department of Water Resources and environmental specialists for each of the issue areas; assembled drafts; edited text; designed final reports; and supervised report production. Responsible for analysis of the visual resource issues associated with the project's reservoir, forebay, afterbay, canals, dam structures, power houses, and fish ladder facility.
Technical advisor to the Land Use, Land Management, and Aesthetics Work Groups, requiring participation in sessions involving agency staff, representatives of Indian Tribes and Non-Governmental Organizations, and members of the general public.

Willamette Falls Hydroelectric Project, Oregon City and West Linn, OR. As part of the APR process, prepared analyses of visual resources issues that include evaluations of the appearance of the falls under varying flow conditions, as well as assessments of the relationship of project structures to the project's landscape setting.

Aesthetic and Site Enhancement Studies, Shoshone Falls Hydroelectric Project, ID. Consultant to Idaho Power on the effects of proposed relicensing of the Shoshone Falls hydroelectric project on the aesthetic qualities of the falls and adjacent park. Provided direction for development of the analysis approach for assessing the effects of changes in flows over the falls on the falls' appearance and public expectations. Evaluated the project in light of local government and land management agency plans and policies, designed and implemented special perception studies, and worked with an advisory committee of representatives of local governments and state agencies. Based on this process, recommended mitigation and enhancement measures. Assisted in preparing a visual analysis report for incorporation into the Exhibit E submitted to Federal Energy Regulatory Commission (FERC).

FERC Exhibit E, Snoqualmie Falls Hydroelectric Project, WA. Analysis of the aesthetic implications of a proposal by Puget Sound Power and Light to increase the capacity of its generating plant at Snoqualmie Falls. Assessed impacts of structural changes and changes to flows over the falls. Developed and applied a methodology for evaluating the effects flow changes would have on the falls' appearance. Prepared the aesthetics section of Exhibit E of the relicense application. Developed the script for a video regarding the aesthetics issues submitted to the FERC.

Ramsey-French Meadow Hydro Project, FERC Initial Scoping, Stanislaus National Forest, CA. Scoped visual issues associated with a hydroelectric project proposed by the Northern California Power Authority for the North Fork of the Stanislaus River. Responsible for coordination with Forest Service landscape personnel, review of Forest Service and county plans, field evaluation of landscape conditions, preparation of the visual effects section of the FERC-mandated Initial Scoping document, and preparation of a plan for the assessment of aesthetic issues.

Environmental Evaluation of Proposed Modifications to Existing Hydroelectric Facilities. On behalf of Hydro-Québec, documented FERC procedures and guidelines for environmental assessment of proposed changes to existing hydroelectric projects. Documented hydro upgrade-related activities undertaken by the US Bureau of Reclamation and the US Army Corps of Engineers. Collected procedures, guidelines, and examples of project environmental assessments and post-construction monitoring studies prepared by or for these agencies.

Visual Assessment/Mitigation Recommendations for the San Joaquin Reservoir, Newport Beach, CA. Evaluated visual impacts of proposed alternative reservoir cover and water treatment plant options for a Metropolitan Water District water supply facility located in an affluent residential area. Developed a proposal for design mitigation measures that led to project acceptance by residents of the neighborhood overlooking the reservoir.

Remediation and Landfill Projects

Relocation of KFAX Radio Towers at the Old West Winton Landfill, Alameda County, CA. Analyzed the aesthetic implications of relocating a set of four 228-foot-high radio transmission towers on a closed landfill site adjacent to a major public open space area. The analysis included development of visual simulations and an investigation of options for establishment of screening landscaping on top of the landfill's cap.

Penn Mine Remediation Project, Calveras County, CA. Evaluated the visual impacts of a mine waste remediation project in the watershed of the East Bay Municipal Utility District's Camanche Reservoir. Assessed the visual implications of the removal of mine spoils, landfilling of the spoils, regrading of slopes, and revegetation of affected lands. The focus was on impacts of these changes on the views experienced by recreational users on the adjacent reservoir.

Environmental Assessments for Transportation Projects

Bay Area Rapid Transit (BART) Warm Springs Extension, Fremont, CA. Analyzed the aesthetic impacts of a proposed 7.8-mile extension of the BART heavy-rail system from the

City of Fremont to Santa Clara County. Prepared the aesthetics section of the CEQA-mandated Environmental Impact Report (EIR).

Santa Clara County T2010 Transportation Plan, San Jose, CA. Evaluated the aesthetic issues associated with the highway, rail, and light rail projects proposed by the Santa Clara County T2010 Transportation Plan and prepared the aesthetics section of the CEQA-mandated EIS.

Urban Freeway Design Research, France and US. Conducted research comparing American and French approaches to planning and design of urban freeways to optimize their integration into the urban environment. Research included literature review, interviews with highway engineers and landscape architects in the US and France, review of plans and environmental assessments, and site visits to exemplary projects.

Chevilly-Larue Roadway Design Evaluation Study, France. Member of a study team that evaluated the effects of urban design measures intended to improve traffic safety and aesthetics that were installed on a heavily-traveled road through the center of a suburban community. Developed a research strategy and questionnaire for documenting resident perceptions before and after the installation of the measures.

Land Use, Natural Resource, and Urban Design Studies

Growth and Development Studies, Northern and Central California. At PG&E, designed, scheduled, and managed studies evaluating growth trends and forecasting future population and land use in urban and rural areas throughout Northern and Central California to provide a basis for planning and siting future electric facilities. Supervised work that included coordination with local planning agencies; data gathering and evaluation; analysis of economic, demographic, environmental, infrastructure, and policy data; development of growth projections; and reporting of findings.

East Anderson Receiving Station Growth Impact Study, Phoenix, AZ. For the Salt River Project, analyzed the land use development implications of a large electric receiving station proposed for a developing area on the edge of Phoenix. Directed collection, mapping, and analysis of demographic, economic, land use, infrastructure, planning, and policy data, and generation of projections of future land use patterns under project and no-project scenarios.

Plum Creek Land Exchange EIS, Mount Baker/Snoqualmie, Wenatchee, and Gifford Pinchot National Forests, WA. Analysis of land status and use, aesthetic, recreation, unroaded area, and wild and scenic river issues associated with the proposed exchange of over 100,000 acres of forest land between the Plum Creek Timber Company and the National Forest system. Assessed public and agency concerns; developed an analysis strategy; used Forest Service GIS data as the basis for map and statistical analyses; collected and made use of supplemental data generated through field work, interviews, and review of published sources; and prepared analyses and summary text for the EIS.

Plum Creek Road Access EIS, Wenatchee National Forest, WA. Analysis of aesthetic, recreation, unroaded area, and wild and scenic river issues associated with the proposed development of over 40 road segments over Forest Service lands to provide access to future timber harvest areas on adjacent Plum Creek Timber Company parcels. Assessed public and agency concerns; developed an analysis strategy; used Forest Service GIS data as the basis for map and statistical analysis; collected and made use of supplemental data generated through field work, interviews, and review of published sources, and prepared analyses and summary text for the project EIS.

Oakland Army Base Disposal and Reuse EIS, Oakland, CA. Analyzed the land use, demographic, aesthetic, odor, and environmental justice issues associated with six different reuse options being considered for the 422-acre Oakland Army Base. Drafted the text for the EIS sections related to these issues. In addition, developed a cumulative effects analysis and summary text that that considered all project environmental issues for each of the reuse options.

Environmental Assessment of Proposed Development Projects, Northern California. For a variety of municipal planning departments, evaluated the aesthetic and urban design issues associated with proposed development projects and prepared the aesthetics sections of the EIRs prepared under CEQA. The projects included a shopping and parking complex located in one of California's most historic town centers, a major suburban hotel complex, a 580-acre residential subdivision, and a set of four downtown parking garages.

Centrage Urban Development Project, Sacramento, CA. For Lennane Properties, developed and applied a methodology for assessing the potential scale and privacy effects of a proposed cluster of high-rise buildings on adjacent single-family residential areas.

Using Land Use Controls to Improve Air and Water Quality, Sonoma County, CA. Contributed to an EPA-sponsored study evaluating links between land use development and air and water quality. Identified and summarized the findings of the relevant literature, developed links with the planning agencies in the study area, and evaluated of the local land use planning and regulatory system to identify its potential role in influencing development to improve air and water quality.

Bay Area Open Space Plan, San Francisco Bay Area, CA. Contributed to the revision of the Association of Bay Area Governments' Bay Area Open Space Plan, evaluating open space as a component of visual quality.

University Teaching

Department of City and Regional Planning, University of California, Berkeley. Lecturer Taught CP 214, "Urban and Regional Physical Infrastructure," a graduate-level course providing a survey of the major infrastructure systems, their characteristics and impacts, and their relationships to the planning of cities and regions.

Department of Urban and Regional Planning, California State Polytechnic University, Pomona. Assistant Professor. Designed and taught undergraduate courses in urban design, and natural factors in planning. Taught studio sections of courses in graphic communication and design and in subdivision design. Conducted activity sections of the introduction to cities and planning course.

Ecole Nationale des Ponts et Chaussées. Paris, France. Visiting Lecturer. Taught "The Urban Environment," a lecture course in English for engineers and planners on environmental quality issues and their treatment in project planning and design.

Departments of Landscape Architecture and City Planning, University of California, Berkeley. Instructor. Co-taught "The Urban Environment" a graduate level course reviewing methods for treating environmental quality issues in the planning and design process. Assisted in teaching "Social Factors in Landscape Design."

Professional Affiliations

American Institute of Certified Planners
American Planning Association
American Society o f Landscape Architects
International Association for Impact Assessment

Selected Professional Reports, Publications and Conference Papers

Public Perception of Electric Facilities, an Advanced Workshop, Washington, DC March 17, 18, 19, 1996: Workshop Summary (editor). Published by the Edison Electric Institute, Washington, DC, 1997.

Perception of Transmission Lines: Summary of Surveys and Framework for Further Research (with Kenneth Craik, Mary Deming, and Selma Monsky). International Electric Transmission Perception Project. Published by Edison Electric Institute, Washington, DC, 1996.

"Environmental Perception, Cognition, and Behavior: Public Responses to Electric Transmission Lines" (with Gary Evans, Ph.D.). Journal of Environmental Psychology 16, 65-74, March, 1996.

L' integration dans l'environnement des ouvrages de transport d'energie electrique. (in collaboration with Aménatech). Prepared for Hydro-Quebec and Electricite de France. 1996.

Environmental Design Issues Associated with Older Substations. (with Aménatech). Report prepared for Hydro-Québec, Vice-présidence Environnement, October, 1995.

"The Public and Electric Facility Siting" (with Daniel Cohen). Article published in Environmental Planning Quarterly, Spring, 1995.

Substations in the Urban Context: Design Issues and Examples. Report prepared for Hydro-Québec, Vice-présidence Environnement, 1994.

"Colusa County Transmission Line Element" Paper given at Edison Electric Institute National Land Management Workshop, Duluth, Minnesota, August 1992 and submitted for inclusion in the workshop proceedings.

Perceived Effects of Electric Transmission Facilities: A Review of Survey-Based Studies. Prepared for the Siting and Environmental Planning Task Force of the Edison Electric Institute. 1992.

The Effects of Overhead Transmission Lines on Property Values: A Review and Analysis of the Literature. (with Cynthia Kroll, Ph.D.) Prepared for the Siting and Environmental Planning Task Force of the Edison Electric Institute. 1992.

A Statistical Analysis of Transmission Line Impacts on Residential Property Values in Six Neighborhoods. (with Patrice Ignelzi) Prepared for the Southern California Edison Company. May, 1991.

Perceptions of a Transmission Line in a Residential Neighborhood: Results of a Case Study in Vallejo, California. (With Gary Evans, Ph.D.) Prepared for the Southern California Edison Company. November, 1990.

Undergrounding of Electric Transmission Lines: A Review of Recent Cases in the United States. Prepared for Vice-présidence Environnement, Hydro Québec. July, 1990.

A Guide to Assessing Transmission Line Impacts in Residential Communities. (with Patrice Ignelzi). Washington, DC, Edison Electric Institute, 1990.

Transmission Line Impacts: Studying Perceptions and Property Values. (videotape, contributing author of script). Washington, DC, Edison Electric Institute, 1990.

"Perceptions of Transmission Lines in Residential Neighborhoods: Results of a California Case Study." Edison Electric Institute Workshop on Transmission Lines in Residential Neighborhoods: Issues in Siting and Environmental Planning, Portland, Oregon, October, 1989.

Aesthetic Quality Issues and Their Treatment in Electric Transmission Line Planning - Towards a New Paradigm. Ph.D. Dissertation, Department of Landscape Architecture, University of California, Berkeley, September, 1988.

"Study of the Effects of An Electric Transmission Line on Perceived Neighborhood Quality." IAPS 10, Delft, Holland, July, 1988.

"The Environment Behavior Perspective and Assessment of Landscape Aesthetics - Powerline Siting and Analysis in North America." in Environment and Human Action, Proceedings, 8th International Conference of the IAPS, West Berlin, July 25-29, 1984. Berlin: Hochscule der Kunst, pp. 51-53. 1984.

"Donald Appleyard's Contribution to Street Livability Research." Proceedings, Fifth Annual Pedestrian Conference. Boulder, CO: Transportation Division, City of Boulder, 1984, pp. 19-27.

Chinatown Urban Design Study. (with Peter Bosselmann, et al.) Berkeley Environmental Simulation Laboratory, 1984.

Sun, Wind, and Comfort: A Study of Open Spaces and Sidewalks in Four Downtown Areas. (With Peter Bosselmann, Edward Arens, *et. al.*) Berkeley, CA: Institute of Urban and Regional Development, 1984.

Aesthetic Considerations and Electric Utilities: An Introductory Guide to the Literature. Palo Alto, CA: Electric Power Research Institute, February, 1984.

"The Field of Visual Analysis and Resource Management: A Bibliographic Analysis and Perspective" Landscape Journal. Spring, 1983, pp. 52-59.

Transmission Lines and Land Use Development: Final Report. Prepared for the Community and Regional Planning Task Force of the Edison Electric Institute, 1983.

EXHIBIT 34-2 (TP-2)
Figure 3.9-14 Viewpoint 1: Simulated View Lower End Scenario (90m RD)

EXHIBIT 34-3 (TP-3)

Figure 3.9-16 Viewpoint 1: Simulated View Upper End Scenario (60m RD)

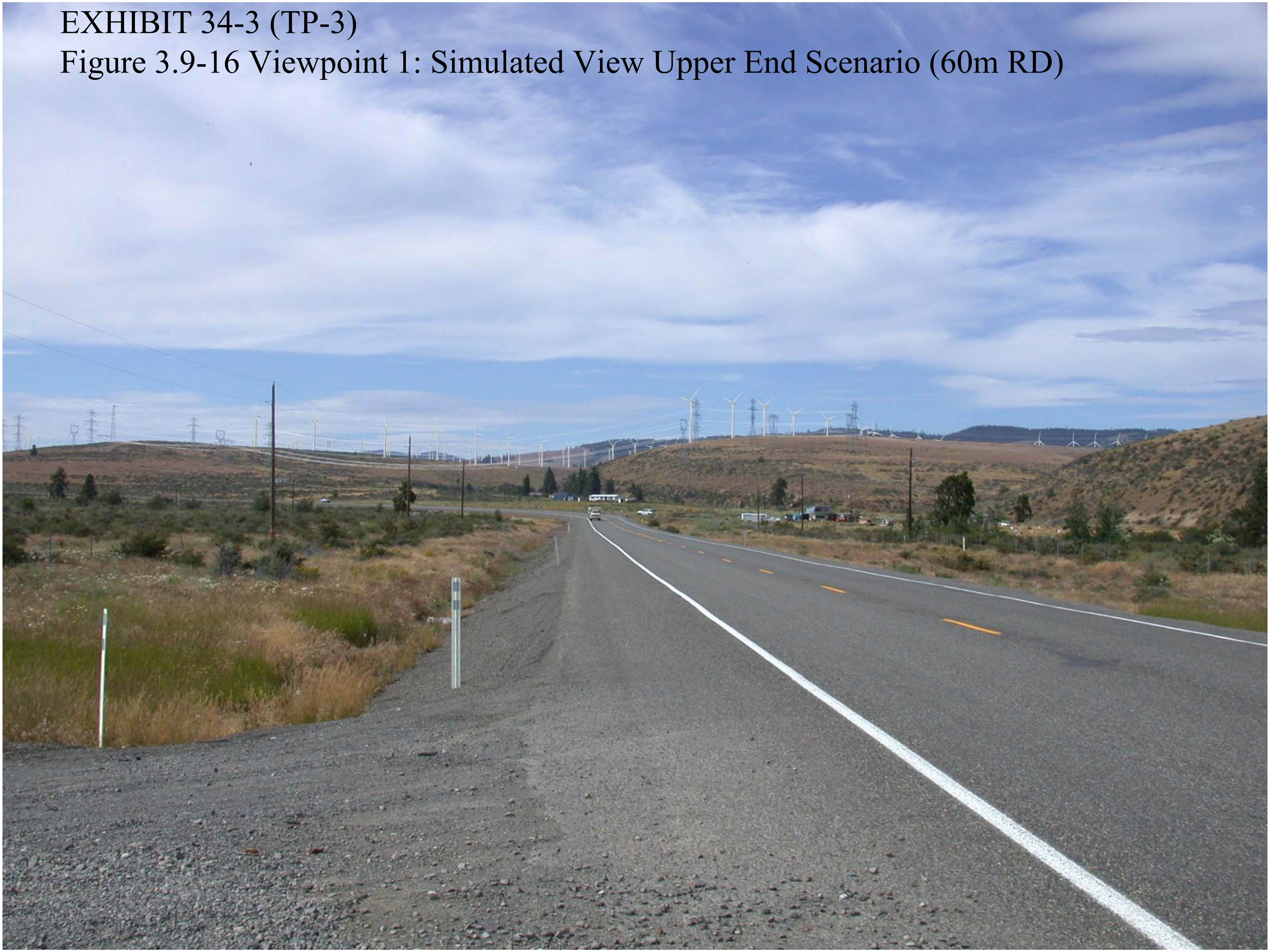
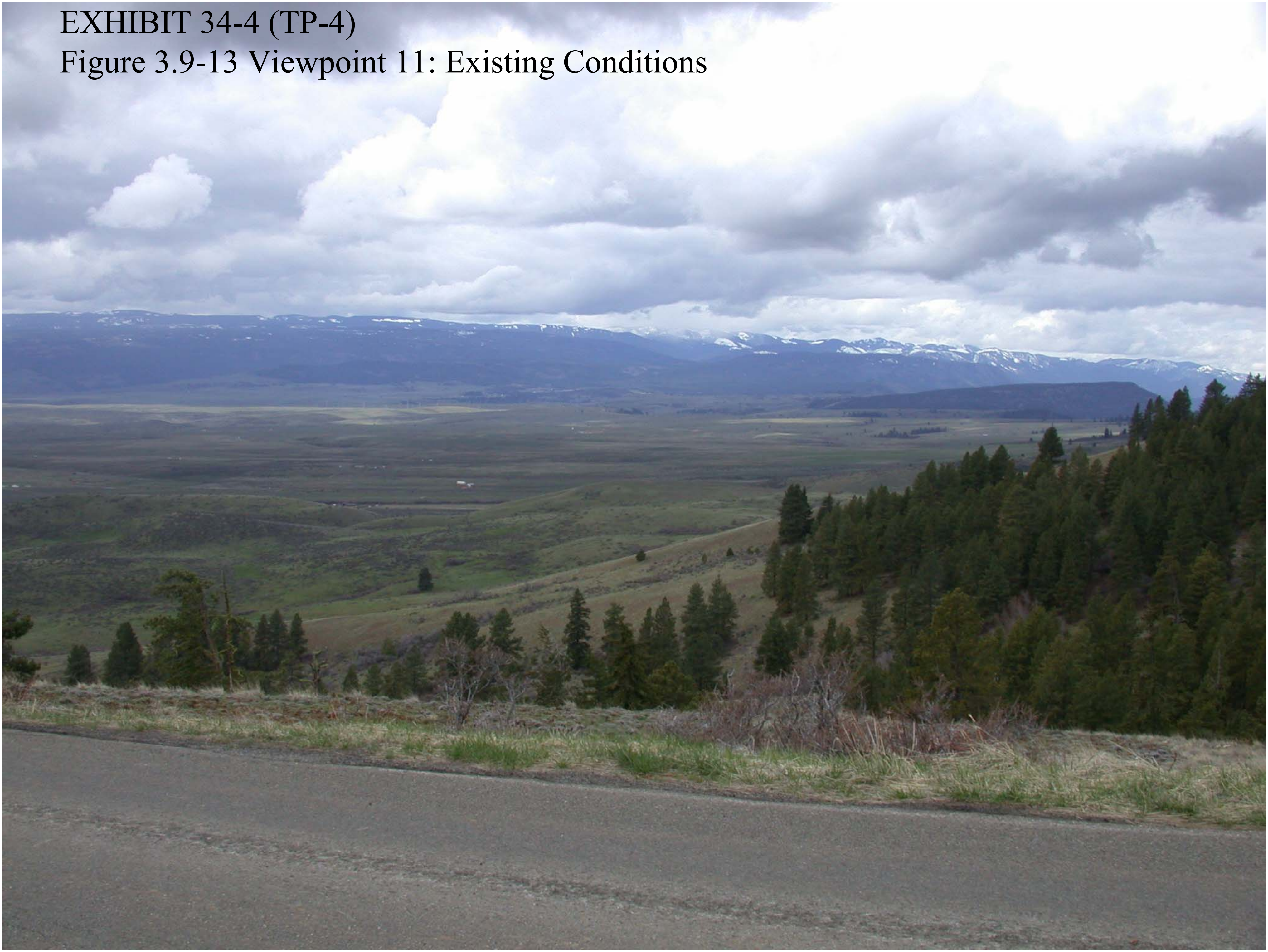


EXHIBIT 34-4 (TP-4)
Figure 3.9-13 Viewpoint 11: Existing Conditions



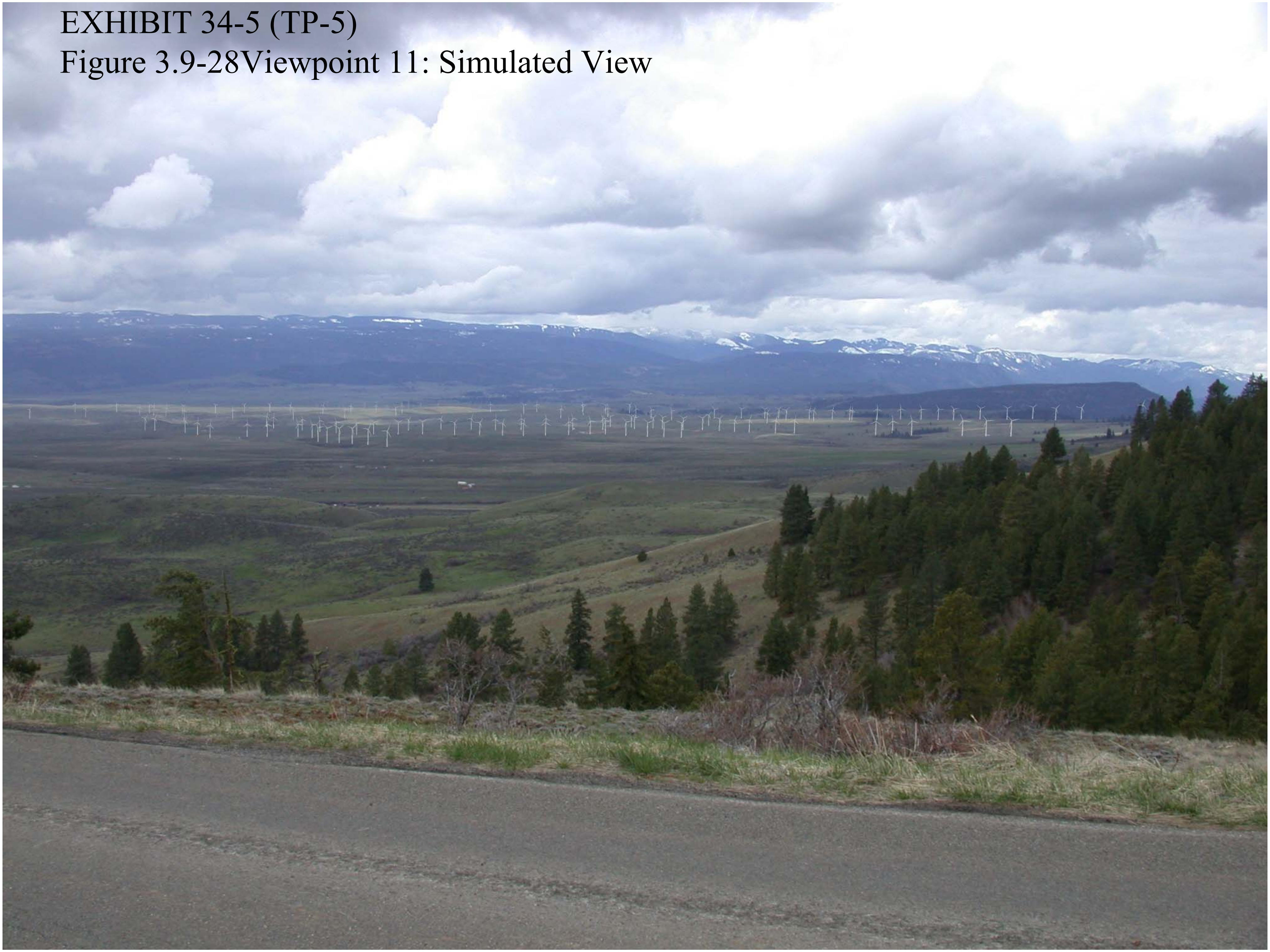


EXHIBIT 34-5 (TP-5)
Figure 3.9-28Viewpoint 11: Simulated View

EXHIBIT 34-6 (TP-6)

Figure 3.14-1 Cumulative Study Area for Kittitas Valley, Desert Claim and Wild Horse Wind Power Projects

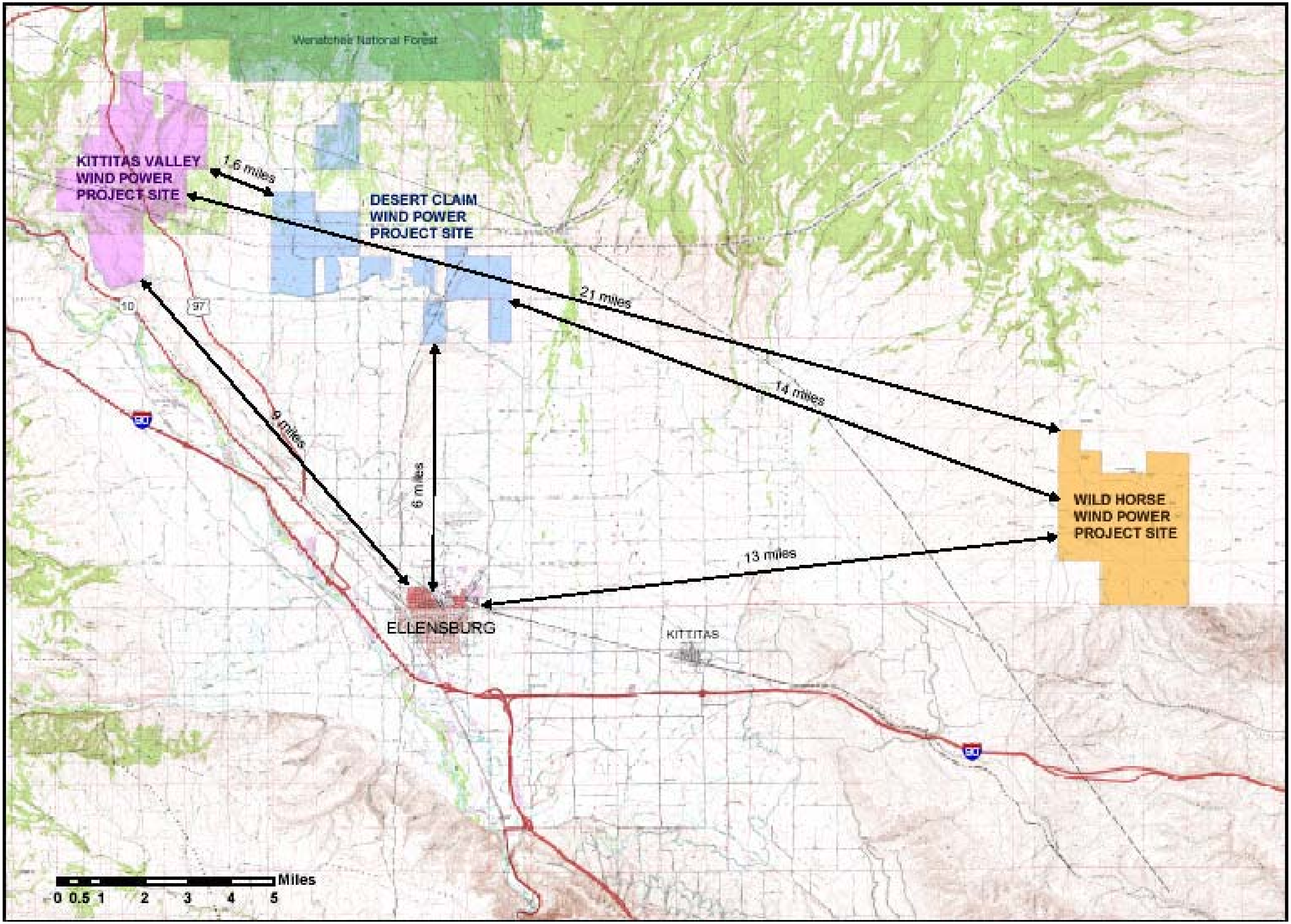


EXHIBIT 34-7 (TP-7)

Figure 3.14-2 – Photograph Locations for Cumulative Analysis

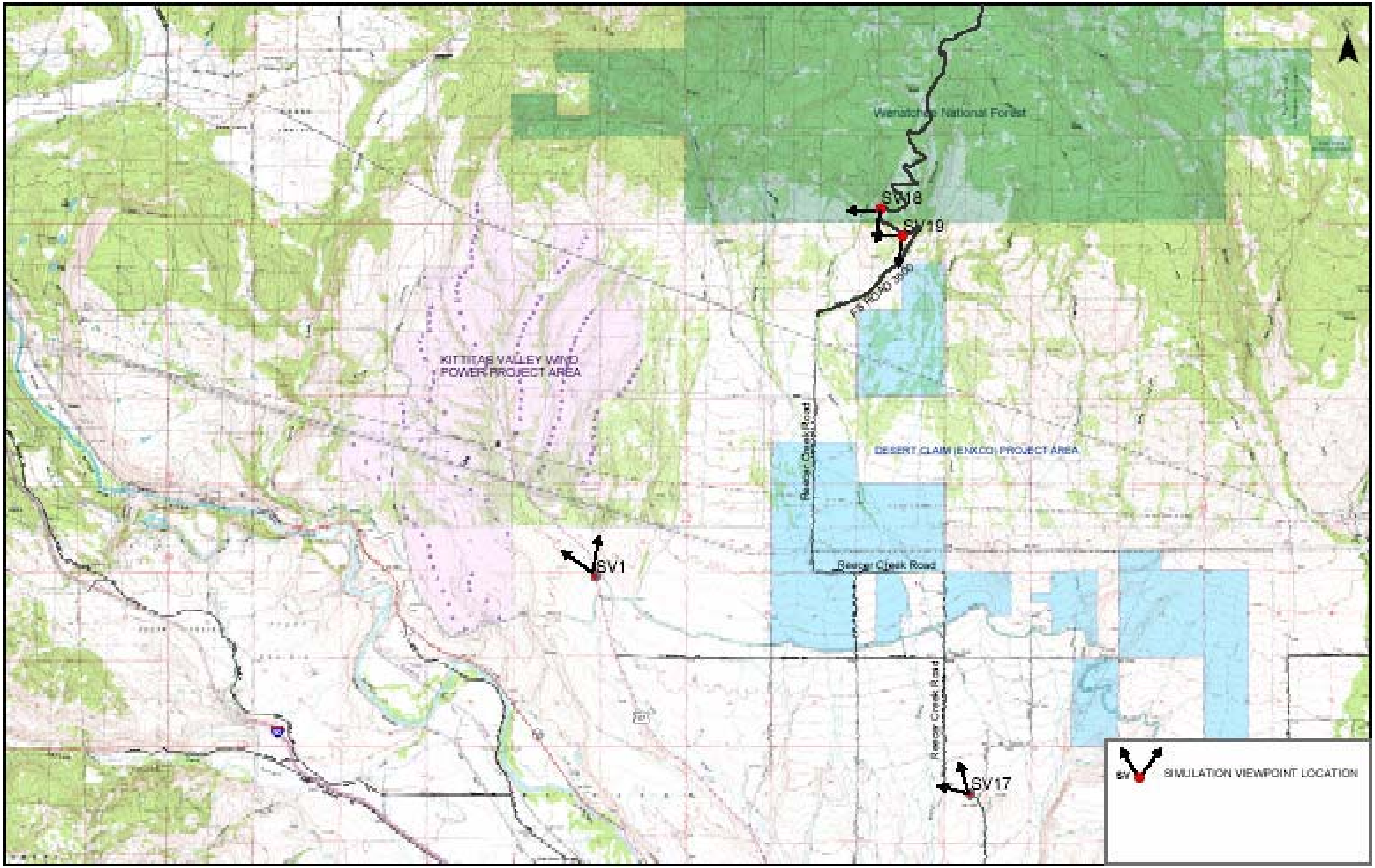


EXHIBIT 34-8 (TP-8)

Figure 3.14-3 Viewpoint 1: Existing Conditions

EXHIBIT 34-9 (TP-9)
Figure 3.14-4 Viewpoint 1: Simulated Conditions Kittitas Valley Wind Power Project

EXHIBIT 34-10 (TP-10)
Figure 3.14-5 Viewpoint 1: Simulated Conditions Desert Claim Wind Power Project

EXHIBIT 34-11 (TP-11)

Figure 3.14-6 Viewpoint 1: Simulated Conditions Cumulative Scenario

EXHIBIT 34-11 (TP-11)

Figure 3.14-6 Viewpoint 1: Simulated Conditions Cumulative Scenario

EXHIBIT 34-12 (TP12)

Figure 3.14-7 Viewpoint 2: Existing Conditions

EXHIBIT 34-13 (TP-13)

Figure 3.14-8 Viewpoint 2: Simulated Conditions Cumulative Scenario