Testimony of Tom Priestly

Exhibit 34-14 (TP-14) to the Testimony of Tom Priestly

REPORT OF TOM PRIESTLEY

My name is Thomas Priestley and my business address is 155 Grand Avenue, Suite 1000, Oakland, California, 94612. I am employed by CH2M HILL, a 14,500-person, employee-owned firm that provides engineering, construction, operations, communications, security, environmental, and related services to public and private clients across the U.S. and elsewhere in the world. I am a Senior Environmental Planner who specializes in evaluating the aesthetic effects of proposed projects, and I have oversight over the project aesthetic analysis work that takes place in CH2M Hill's Western Region. A copy of my resume is attached.

For the Kittitas Valley Wind Power Project, I conducted site surveys and analyzed the environmental effects of the project as they relate to aesthetics and to light and glare issues. I participated in the project's environmental impact statement (EIS) process and provided expert testimony. In that capacity, I provided technical assessments and developed recommendations to minimize project impacts based on application of accepted analytical techniques, discussed more fully below.

Recently, Horizon Wind Energy (formerly Zilkha Renewable Energy) redesigned the project layout to respond to comments on project visual aspects, aesthetics, and lighting raised by the Kittitas County Commissioners, County staff, adjacent landowners, and the general public. The project as originally proposed would have entailed installation of up to 150 turbines. Under the layout currently proposed, the number of turbines has been significantly reduced – the project now calls for the installation of 64 to 80 turbines - the precise number will depend upon the specifications of the wind generation equipment that is finally selected. With the reduction in the total number of turbines, it has been possible to eliminate turbines located in the areas about which the greatest levels of public concern about aesthetic impacts had been expressed.

To assess the aesthetic effects of the revised project layout, I conducted a systematic evaluation that applied the same methodology I employed in preparing the original analysis of the project's visual impacts that was included in the Application for Site Certification and later incorporated into the DEIS issued by EFSEC. This evaluation is documented in a technical memorandum (*Analysis of the Visual Resources Impacts of the Revised Kittitas Valley Wind Power Project*, Thomas Priestley, PhD, November 7, 2005). As was the case with the aesthetic analysis I prepared for the original visual analysis, the analysis methodology I used was based on the widely accepted analysis approaches developed by Federal land management agencies and the US Department of Transportation.

Specifically, photographs of views from representative viewpoints were evaluated, using existing views paired with computer-generated simulations that accurately depict the appearance of the proposed project. The simulations of the revised, 64 turbine layout depicted turbines at the upper end of the size range for which the Applicant is seeking approval. The turbines depicted had a hub height of 263 feet, a rotor diameter of 295 feet, and a height to blade tip of 410 feet.

The redesigned project layout now being proposed eliminates turbines in areas where the greatest public concerns about visual effects had been expressed. For example, a string of six turbines has been eliminated from the area located to the northeast of turbine H1, along upper Elk Springs Road, a private road not maintained by the County. Because of their proximity to the enclave of residences located on the forested slopes of Section 35, these turbines were eliminated to reduce the project's potential for having impacts on views from the dwellings in this area. In string F which is located on the ridge across from the rural residences along Bettas Road, the number of turbines has been reduced from 13 to 6, eliminating the 5 turbines that had formerly been located north of turbine A1, and allowing the remaining turbines to be more widely spaced. A turbine formerly located to the north of turbine A1, and a string of 3 turbines formerly located to the east of string A have also been eliminated to reduce visual impacts on residences to the north. Along Highway 97, a string of 9 turbines formerly located north of turbine G1 has been eliminated to preserve the existing visual character and quality of the highway corridor as it transitions into the more scenic region to the north of the Project area. The technical memorandum contains the visual simulations of these changes.

With respect to lighting, the only lighting that will be associated with the turbines will be the aviation safety lighting required by the Federal Aviation Administration (FAA). Horizon has committed significant resources to working with the FAA to reduce the amount of lighting it requires. That effort has led to a dramatic reduction in the number of red, night warning lights that must be installed, and the elimination of white daytime warning lights. The lighting plan for the project now being proposed reflects the revised FAA standards, which will substantially reduce the project's potential light impacts. The only other lighting required by the project will be lighting at two specific locations: the operations and maintenance facility and the project substation. The impacts of this lighting will be minimized by restricting the amount and levels of lighting to the minimum needed to meet operational and safety requirements, providing timers and switches so that lighting will be turned on only at times when it is required, and careful placement of lights and use of cutoff fixtures to eliminate skyglow and light trespass in the surrounding area.

The bottom line of my analysis is that from most of the viewpoints evaluated in the original project EIS, the project's aesthetic impacts will be moderately to substantially reduced. For example in Analysis View 2, which is the view looking northbound on Highway 97 at the crest of the ridge, all 9 turbines that would have been visible at close range in this view under the original project have been eliminated, completely eliminating any project impact on this view. In Analysis View 3, which is the view looking south along Highway 97 from the intersection with the northern end of Bettas Road, the number of turbines visible has been reduced from 10 to 3, reducing the level of project aesthetic impact from moderate to low. In Analysis View 1, which is the view looking northbound on Highway 97 from the intersection with Eburg Ranches Road, the number of turbines visible would be reduced from 40 to 30, but the level of impact will remain low to moderate. In Analysis View 4, which is the view from a residence in

Section 35 at the upper end of Elk Springs Road, the number of turbines visible has been reduced from 40 to 15, and all turbines are now located 1.5 miles and further in distance from the residences in this area. . In Analysis View 11, the view from Forest Road 35 on the slopes of Table Mountain northeast of the project site, the number of turbines visible at distances ranging from 3.2 to 5.4 miles from this viewpoint has been reduced from 146 to 60. Although the numbers of turbines visible in Analysis Views 4 and 11 will be substantially reduced and the degree of impact will be attenuated, the level of impact to these views remains moderate to high. In the case of Analysis View 4, it is important to note that of the 32 or so residential and recreational properties in Section 35, because of the topography and forest cover, only a few have views out toward the project area that are as open as those seen in Analysis View 4. As a consequence, the numbers of properties in this area whose views will be directly affected to a substantial degree by the project will be very small. In the case of Analysis View 11, this view would be seen only by occupants of the moderate number of vehicles that use this segment of Forest Service Road 35. Because of the steep slopes and absence of pullouts along this portion of the road, the lands in the area from which Analysis View 11 can be seen are not a recreational destination. In the plateau areas to the north where the recreation takes place, views to southwest toward the project site are generally screened by trees, so the project's visibility to recreational users would be very limited.

In summary, the new project layout and the reduced numbers of turbines substantially reduce the project's level of visual impact. In addition, all of the mitigation measures that had been built into the design of the project as it had been originally proposed have been retained. These measures, which include things like minimizing the surface disturbance required for construction of the project, undergrounding most of the project's electric collection lines, and using earth tone colors for the small cabinets containing pad mounted equipment at the base of each turbine tower will continue to assure that the details of the project's design will be handled in a way that will minimize or eliminate their potential to create visual impacts.

Analysis of the Visual Resources Impacts of the Revised Kittitas Valley Wind Power Project

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Horizon Energy

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CH2M HILL

COPIES: Mike Pappalardo/CVO

DATE: November 7, 2005

PROJECT NUMBER: 335601

Purpose and Scope of the Analysis

As described in the revised Application submitted to Kittitas County on September 30, 2005, Sagebrush Power Partners, LLC seeks to develop a wind farm with a capacity of up to 246 megawatts (MW) on an approximately 6,000 acre site located on lands extending approximately one mile on either side of Highway 97 in the area approximately 12 miles north of Ellensburg. The project will entail the installation of anywhere from 64 to 80 turbines - the precise number will depend upon the specifications of the wind generation equipment that is finally selected.

The current project design represents a scaling back of the project that had originally been proposed and submitted to the Washington Energy Facility Site Evaluation Council (EFSEC) for licensing in January, 2003. The project as originally proposed would have entailed the installation of up to 150 turbines. The intent in developing the project layout now being proposed was to eliminate turbines located in areas where the greatest concerns had been expressed about the original project's potential visual effects. The locations of the turbines proposed in the original project and those that are being proposed now can be seen in Figure Vis-7. As review of this figure indicates, a string of six turbines has been eliminated from the area located to the northeast of turbine H1, along upper Elk Springs Road. Because of their proximity to the enclave of residences located on the forested slopes of Section 35, these turbines were eliminated to reduce the project's potential for having impacts on views from the dwellings in this area. In string F which is located on the ridge across from the rural residences that line Bettas Road, the number of turbines has been reduced from 13 to 6, eliminating the 5 turbines that had formerly been located north of turbine A1, and allowing the remaining turbines to be more widely spaced. A turbine formerly located to the north of turbine A1, and a string of 3 turbines formerly located to the east of string A have also been eliminated to reduce visual impacts on residences to the north. Along Highway 97, a string of 9 turbines formerly located north of turbine G1 has been eliminated to preserve the existing visual character and quality of the highway corridor as it transitions into the more scenic region to the north.

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This technical memo provides a focused analysis of the visual resources impacts of the revised project. It builds on and revises the analyses of the project's aesthetics light, and glare impacts included in the Visual Resources analysis in the Draft EIS issued by EFSEC in December, 2003. The focus of this analysis is on the project's effects on views along US 97, and other views on which the previous analyses found the project to have the potential to create moderate to high levels of visual impact.

The boundaries of the lands included in the project site, the locations of the proposed turbines, and the locations of the viewpoints that have been selected for analysis are indicated on Figure Vis-1.

Analysis Approach

The procedure followed in evaluating the impacts of the revised project on these views is the same as the procedure followed in preparing the evaluation of the aesthetic impacts of the project originally proposed in 2003. As was the case in the analysis prepared as a part of the EFSEC application, for each of the viewpoints used as the basis for analysis, an assessment was made of the existing level of scenic quality and visual sensitivity. Then, for each view, a photograph depicting the view as it now exists was paired with a simulation of the same view as it would appear with the proposed project in place (Figures Vis 2 – Vis 6). Review of these image pairs provided a basis for identifying the project's degree of visibility from each of the viewpoints and for assessing the implications of the visual changes that the project would bring about.

The assessment of the existing scenic quality of the views evaluated 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 ratings assigned to each view fit within the rating scale summarized in Table Vis-1. Development of this scale builds 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.

[1] Vividness, unity, and intactness are dimensions of landscape quality that are taken into account by the system for landscape evaluation and visual impact assessment developed by Federal Highway Administration and now in widespread use for evaluation of project visual impacts (U.S. Department of Transportation Federal Highway Administration. 1988. Visual Impact Assessment for Highway Projects). Vividness is defined as the memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern. Intactness is defined as the integrity of the visual order in the natural and man-built landscape, and the extent to which the landscape is free from visual encroachment. Unity is defined as the degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern, and the term refers to the compositional harmony or degree of inter-compatibility between landscape elements.

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Table Vis.-1. Landscape Scenic Quality Scale

Rating	Explanation
Outstanding Visual Quality	A rating reserved for landscapes with exceptionally high visual quality. These landscapes are significant nationally or regionally. They usually contain exceptional natural or cultural features that contribute to this rating. They are what we think of as "picture post card" landscapes. People are attracted to these landscapes to view them.
High Visual Quality	Landscapes that have high quality scenic value. This may be due to cultural or natural features contained in the landscape or to the arrangement of spaces contained in the landscape that causes the landscape to be visually interesting or a particularly comfortable place for people. These landscapes have high levels of vividness, unity, and intactness.
Moderately High Visual Quality	Landscapes which have above average scenic value but are not of high scenic value. The scenic value of these landscapes may be due to man-made or natural features contained within the landscape, to the arrangement of spaces, in the landscape or to the two-dimensional attributes of the landscape. Levels of vividness, unity, and intactness are moderate to high.
Moderate Visual Quality	Landscapes, that are common or typical landscapes which have average scenic value. They usually lack significant man-made or natural features. Their scenic value is primarily a result of the arrangement of spaces contained in the landscape and the two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are average
Moderately Low Visual Quality	Landscapes that have below average scenic value but not low scenic value. They may contain visually discordant man-made alterations, but the landscape is not dominated by these features. They often lack spaces that people will perceive as inviting and provide little interest in terms of two-dimensional visual attributes of the landscape.
Low Visual Quality	Landscapes that have below average scenic value. They may contain visually discordant man-made alterations, and often provide little interest in terms of two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are below average.

Note: Rating scale based on Buhyoff et al., 1994; U.S. DOT Federal Highway Administration, 1988, and United States Department of Agriculture Forest Service. 1995.

The analysis of viewers, viewing conditions, and viewer sensitivity in each viewing area was structured to consider residential viewers, roadway viewers, and, to the extent to which they are present, recreational viewers. To summarize the insights developed through the analysis of viewer sensitivity, overall levels of visual sensitivity at the various viewpoints were identified as being High, Moderate, or Low. In 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 a wind farm would be a distant and relatively minor element in the overall landscape, a low level of sensitivity was assigned.

The computer-generated simulations used to evaluate the project's aesthetic impacts were developed 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.

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The Wind Pro software used these data 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 Analysis 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 visual simulations prepared to serve as a basis for this analysis reflect the site layout depicted on Figures Vis-1 and Vis-7, which include a total of 64 turbines. These turbines are assumed to have a hub height of 80 meters (263 feet), a rotor diameter of 90 meters (295 feet) and a height to the tip of the blade of 125 meters (410 feet).

In evaluating the "after" views provided by the computer-generated visual simulations and comparing them to the existing visual environment, consideration was given to the following factors in determining the extent and implications of the visual changes:

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

Short-Term Construction Period Impact

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

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nearby areas. At some times, small, localized clouds of dust created by road-building and other grading activities may be visible at the site. Because of the construction-related grading activities, areas of exposed soil and fresh gravel which contrast with the colors of the surrounding undisturbed landscape will be visible. In close-at-hand views, particularly those seem 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. From more distant viewing locations, the visual effects will be relatively minor and will have little or no impact on the quality of views. It is important to note that because Project 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 the crane pads adjacent to each tower and any other non-road surface areas disturbed during construction will be replanted to recreate the appearance of their original vegetative cover.

Long-Term Impacts During the Project Operation Phase

The analysis conducted by EFSEC of the project that was originally proposed and which included a larger number of turbines looked at the project's potential aesthetic effects on a total of eleven viewpoints. From four of these viewpoints, the analysis presented in EFSEC's December 2003 Draft EIS found that the project's aesthetic impacts would be low. These viewpoints were:

- Viewpoint 7 - Iron Horse/John Wayne Trail at Taneum Road,
- Viewpoint 8 - Thorp
- Viewpoint 9 - I-90 at Springwood Ranch
- Viewpoint 10 - Lower Green Canyon Road,

From one viewpoint, Viewpoint 1 – US 97 at Eburg Ranches Road looking north, the level of visual impact was found to be low to moderate.

From three viewpoints, the EFSEC analysis found a moderate level of visual impacts. These viewpoints were:

- Viewpoint 3 – US 97 at the northern end of Bettas Road, looking south
- Viewpoint 5 – Bettas Road
- Viewpoint 6 – SR 10 corridor between Morrison Canyon and Swauk Creek.

From three viewpoints, a moderate to high level of visual impacts was found These viewpoints were:

- Viewpoint 2 – US 97 north of the gravel pit, looking north
- Viewpoint 4 –view from a residence in Section 35
- Viewpoint 11 – National Forest Lands/view from Forest Service Road 35 looking southwest

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It is assumed that because the project that is currently being proposed entails a smaller number of turbines than the project that was evaluated in 2003, that this project's impacts on the views from Viewpoints 7 (Iron Horse/John Wayne Trail at Taneum Road), 8 (Thorp), 9 (I-90 at Springwood Ranch), and 10 (Lower Green Canyon Road) will also be low.

It is also assumed that because a substantial number of the turbines that had been included in the original project layout have been eliminated, the impacts on Viewpoints 5 (Bettas Road) and 6 (SR 10 corridor between Morrison Canyon and Swauk Creek) will not exceed the moderate level of impact that the original project was found to have.

The analysis presented here of the aesthetic impacts of the project that is currently proposed focuses on the three viewpoints where the EFSEC analysis of the project proposed in 2003 found moderate to high impacts: Viewpoints 2 (Highway 97 north of gravel pit, looking north), 4 (view toward southwest from a residence in Section 35), and 11 (Forest Service Road 35). It also evaluates the project's effects on two views where lower levels of visual impact were found, but which are of special interest because of their location along US 97: Viewpoints 1 (US 97 at Eburg Ranches Road, looking north) and 3 (US 97 at the northern end of Bettas Road, looking south). The Project's aesthetic impacts during the operational period are presented in Table Vis-2. As the analysis presented in this table indicates, the revised project now being evaluated would have:

- no visual impact on the view from Viewpoint 2 (US 97 north of the gravel pit, looking north)
- a low level of impact on the view from Viewpoint 3 (US 97 at the northern end of Bettas Road, looking south)
- a low to moderate level of impact on the view from Viewpoint 1 (US 97 at Eburg Ranches Road looking north), and
- a moderate to high level of impact on the views from Viewpoints 4 (view from a residence in Section 35) and 11 (view from Forest Service Road 35 looking southwest).

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Table Vis 2

Analysis of Impacts to Visual Resources During Project Operation

Analysis Views	Existing Level of Visual Quality	Level of Visual Sensitivity	Assessment of Visual Change	Potential Level of Visual Impact
Highway 97 Corridor				
Analysis View 1 (Figures Vis-2a and Vis-2b) Highway 97 at Eburg Ranches Road looking north	Moderately Low	Moderate	Approximately 30 turbines will be visible to one degree or another on the ridge tops in the center of the view at distances of 0.8 to 3 or more miles. The turbines will be sited behind the transmission towers, and in many cases, they will, appear to be either generally similar in scale to these structures. In some cases, they will appear to be slightly larger. Some of the turbines will be visually absorbed by the landscape backdrop, but the rest will be silhouetted against the sky to some degree, which will increase their visual salience. The presence of the turbines will increase the vividness of this view by adding visually striking features. At the same time, the project will reduce the scene's degree of intactness to some extent by introducing a large number of highly visible engineered vertical elements. However, because the pattern that the turbines will form will be consistent with the pattern created by the existing transmission towers, they will not substantially change the scene's degree of visual unity. Overall, the presence of the project will create a low to moderate level of change to the existing character and quality of this view.	Low to Moderate
Analysis View 2 (Figure Vis-3[2]) US 97 north of gravel pit looking north	Moderate	High	Under the version of the project that was submitted to EFSEC in 2003, 9 turbines would have been prominently visible along the ridgeline on the east side of US 97 in this view, creating a moderate to high level of visual impact. Under the project as it is now proposed, those 9 turbines have been eliminated, and as a consequence, the project will no longer have any visual impact on this view.	No Impact

[2] Because under the current project design, no turbines will be visible in this view, only the existing view is presented

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Analysis View 3 (Figures 6a and 6b) Highway 97 at northern end of Bettas Road looking south	Moderate	High	3 turbines will be visible in the ridgetop area along the east side of the road. These turbines will be located at distances ranging from approximately 0.9 to 1.2 miles from this viewpoint. These turbines will be seen against the sky at in the mid-distance, and will create a moderate reduction in the visual unity of the view and will alter the view's character to some degree Because of the limited numbers of turbines visible in this view and because the turbines have an attractive design and will be arrayed in an orderly and uncluttered way their presence will not necessarily create a substantial change the in the setting's existing moderate level of visual quality.	Low
Ridgelands East of Highway 97				
Analysis View 4 (Figures 8a and 8b) View looking south from residence in Section 35 at upper end of Elk Springs Road	High	Moderate	In the project as originally proposed, a total of approximately 40 turbines would have been visible from this viewpoint. As review of Figure 8b indicates, under the project that is currently being proposed, the number of turbines visible would be reduced to approximately 15. These turbines would be visible at distances ranging from 1.5 to 4.0 miles. 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 to some extent.	Moderate to High
Wenatchee National Forest Lands				
Analysis View 11 (Figures 6a and 6b) View looking southwest from Forest Service Road 35	Moderately High to High	Moderate to High	Although the level of traffic on this road is not high, the views from this road have a moderate to high level of sensitivity because this road provides access to recreational areas at higher elevations on Table Mountain. From this viewpoint, over 60 turbines will be visible in the valley below at distances ranging from 3.2 to 5.4 miles. Because of the elevated viewing position, these turbines will be backdropped against the 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	Moderate to High

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			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.	

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Light and Glare

To respond to the Federal Aviation Administration's (FAA) aircraft safety lighting requirements, the Project will be marked according to guidelines established by the FAA. FAA guidelines for lighting of wind turbines call for lights that flash 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. Previously, the FAA has required warning lights to be mounted on the first and last turbines of each string, and every 1000 to 1400 feet on the turbines in between. Under recently released guidelines, the number of turbines requiring night lighting has been reduced. In addition, the revised guidelines do not require daytime warning lighting if the turbines are painted a light color, as is proposed for this project. Figure Vis-7 is a site layout map indicating the turbines that are likely to be marked with night warning lights in response to the FAA's requirements. The exact number of turbines that will require lighting will be specified by the FAA after it has reviewed final Project plans. Aside from any required aircraft warning lights, the turbines will not be illuminated at night.

Based on experience at the nearby Wild Horse Wind Power Project, the number of nighttime aviation warning lights that will be required is likely to be consistent with the number indicated on Figure Vis-7. This number represents a substantial reduction in the number of nighttime warning lights that it had been anticipated would be required for the project as originally proposed. Because the nighttime aircraft safety lights will be limited in number, red, and highly directional, their potential to create skyglow or backscatter will be minimal. The flashing red lights 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 flood lights and other outdoor lights at the residential properties located in the vicinity of the Project site, and headlights on the surrounding highways. The flashing red lights will be most noticeable in the areas within a mile or so to the Project, and could be perceived as having an adverse effect on views from residential properties in these areas.

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 would be put into place to restrict this lighting to the minimum required and to attenuate its effects. High illumination areas not occupied on a regular basis will be provided with switches or motion detectors to light these areas only when occupied. At times when lights are turned on, the lighting will not be highly visible offsite and will not produce offsite glare effects because lighting will be restricted by specification of non-glare fixtures, and placement of lights to direct illumination into only those areas where it is needed. The naturalistic plantings of indigenous trees and shrubs to be installed in the areas around these facilities will further reduce the visibility of their night lighting.

Mitigation Measures

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

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- The current Project layout substantially reduces the number of turbines, and eliminates turbines from areas where concerns had been expressed about the aesthetic effects of the Project as originally proposed.
- During the construction period, areas being graded will be watered down frequently 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 finish to minimize contrast with the sky backdrop.. Because the turbines are most frequently seen against the sky, particularly in close range views where visual concerns are the greatest, the neutral finish is the best 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[3]
- 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 nighttime aviation warning lighting required by the FAA. It will be kept to the minimum required intensity to meet FAA standards. This lighting will conform to the FAA's new standards for marking of wind turbines that will entail lighting far fewer turbines than previously required, and having all the lights be synchronized. No daytime lighting is anticipated, according to the FAA's new turbine lighting Advisory Circular.
- Nearly all of the Project's electrical collection system will be located underground, eliminating visual impacts.
- On the short segments 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 reflectivity), and non reflective and non-refractive insulators will be used. One segment of 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. The roads

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

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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 substation 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, 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 fence surrounding the substation will have a dulled, darkened finish to reduce its 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.

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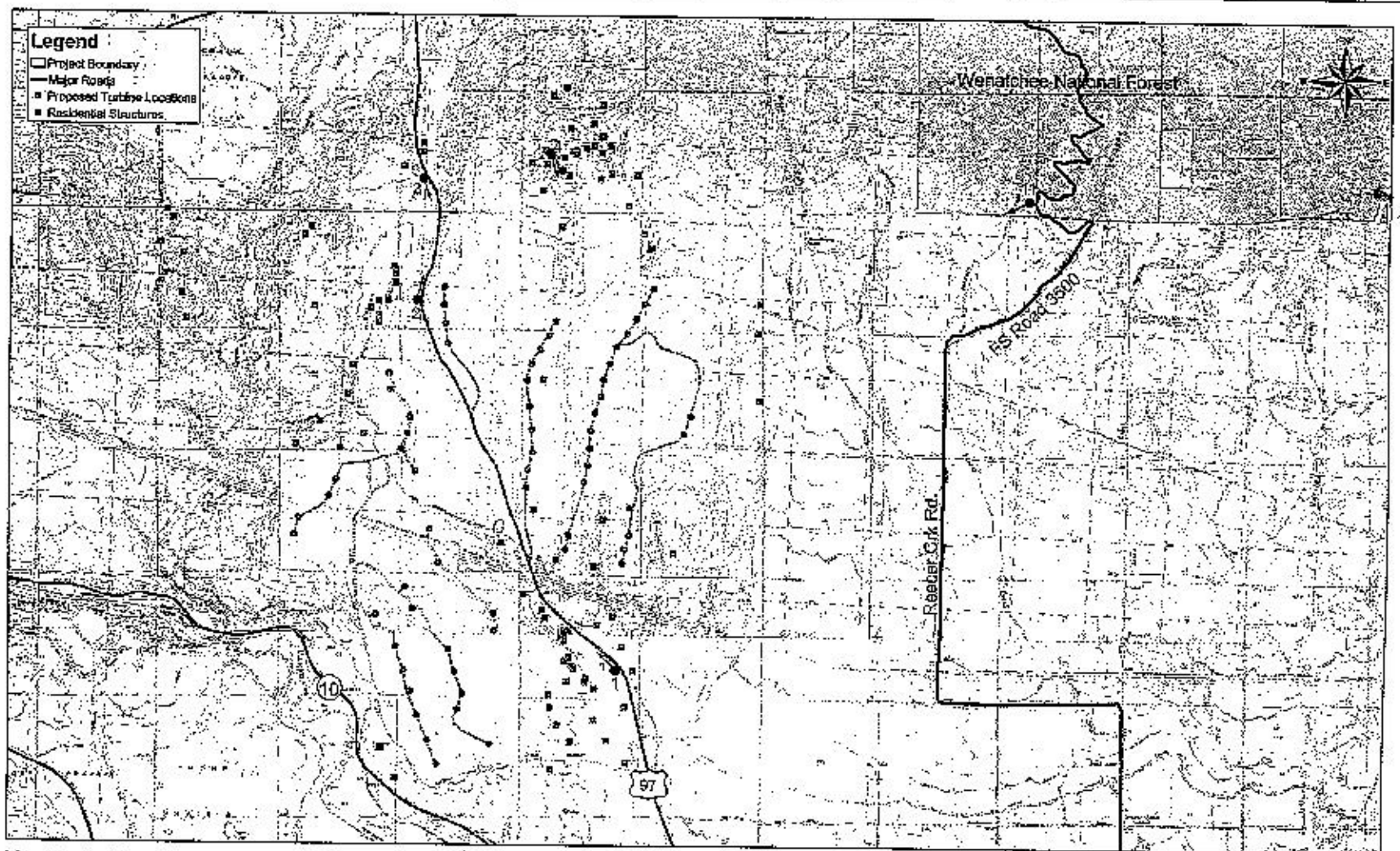

Map Created November 21, 2005

LEGEND:

1 Analysis Viewpoints

FIGURE VIS - 1: LOCATIONS OF ANALYSIS VIEWPOINTS

KITTITAS VALLEY WIND ENERGY PROJECT

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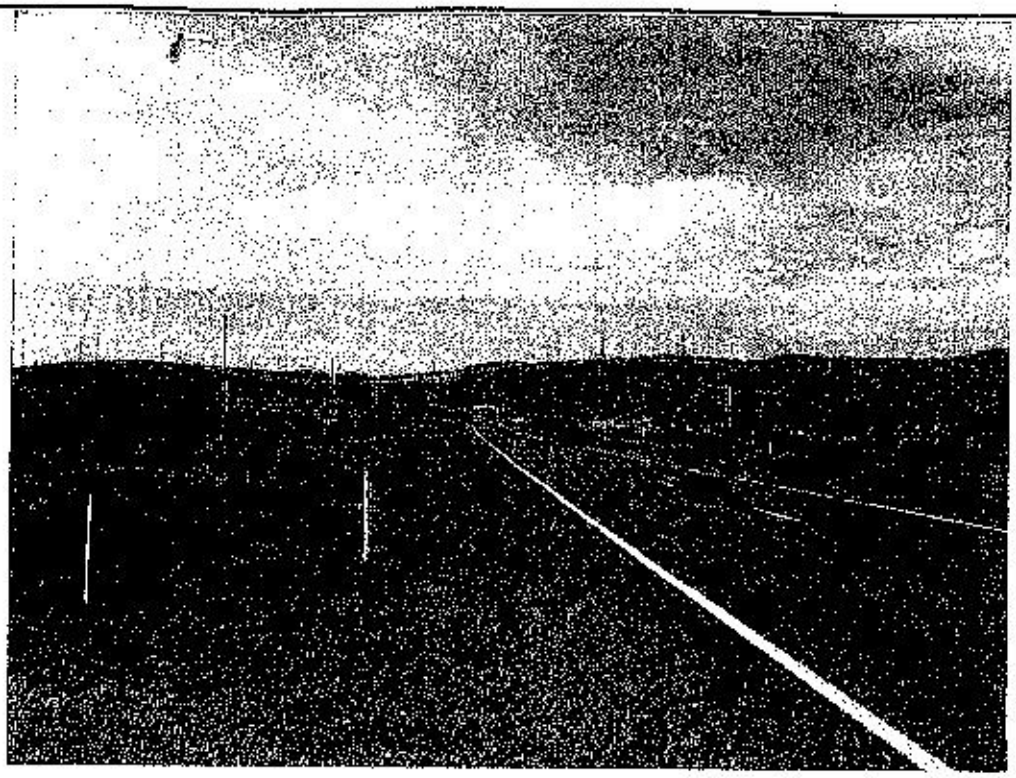

Figure Vis 2a - Analysis View 1: Existing view from Highway 97 at Eburg Ranches Road looking north

Figure Vis 2b - Analysis View 1: Simulated view toward project seen from Highway 97 at Eburg Ranches Road looking north

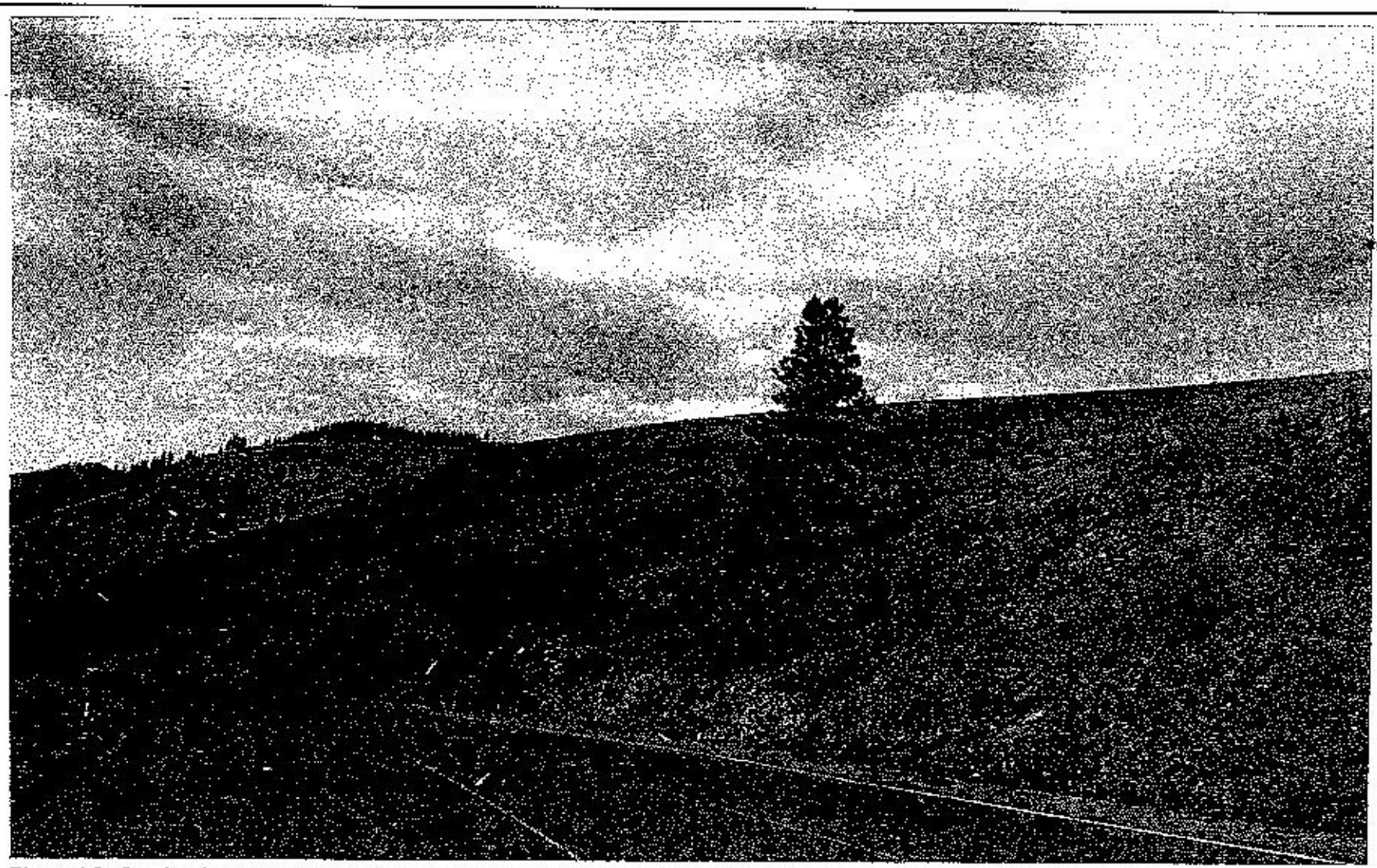

Figure Vis 3 - Analysis View 2: Existing view from Highway 97 north of gravel pit looking north. With the revisions to the project, no turbines will be visible in this view.

KITTITAS VALLEY WIND ENERGY PROJECT

Figure Vis 4a - Analysis View 3: Existing view looking south from Highway 97 at intersection with northern end of Bettas Road

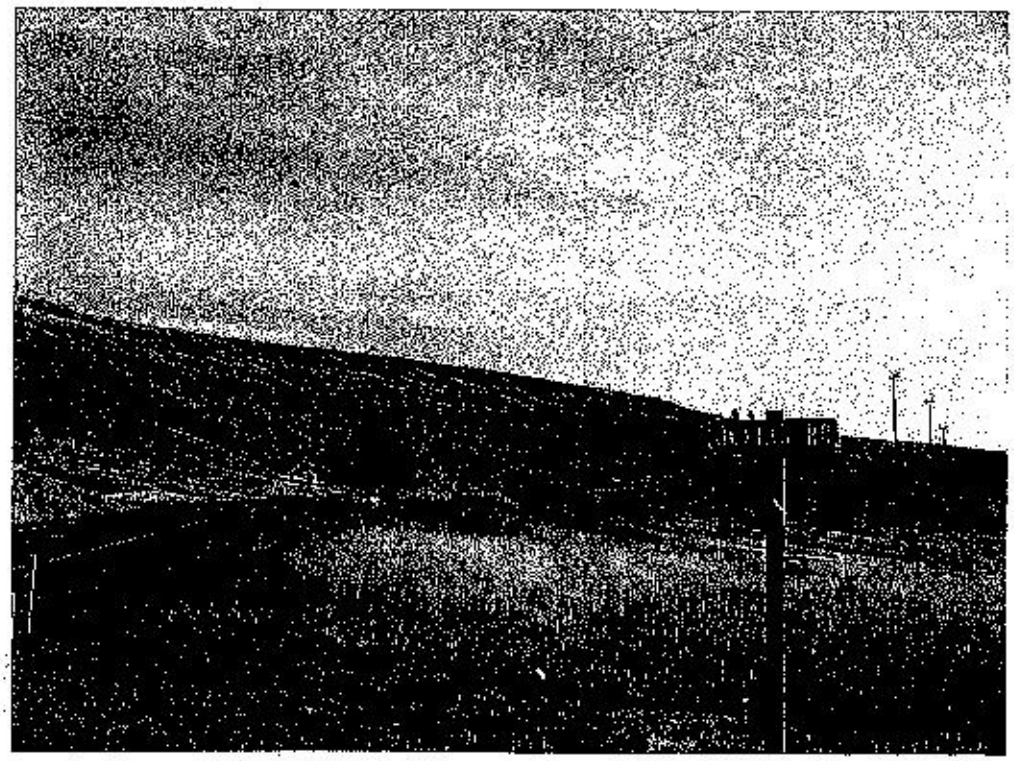

Figure Vis 4b - Analysis View 3: Simulated view looking south from Highway 97 at intersection with northern end of Bettas Road

Figure Vis 5a - Analysis View 4: Existing view looking south from residence in Section 35 at upper end of Elk Springs Road

Figure Vis 5b - Analysis View 4: Simulated view looking south from residence in Section 35 at upper end of Elk Springs Road

Figure Vis 6a - Analysis View 11: Existing view toward project from Forest Road 36

Figure Vis 6b - Analysis View 11: Simulated view toward project from Forest Road 35

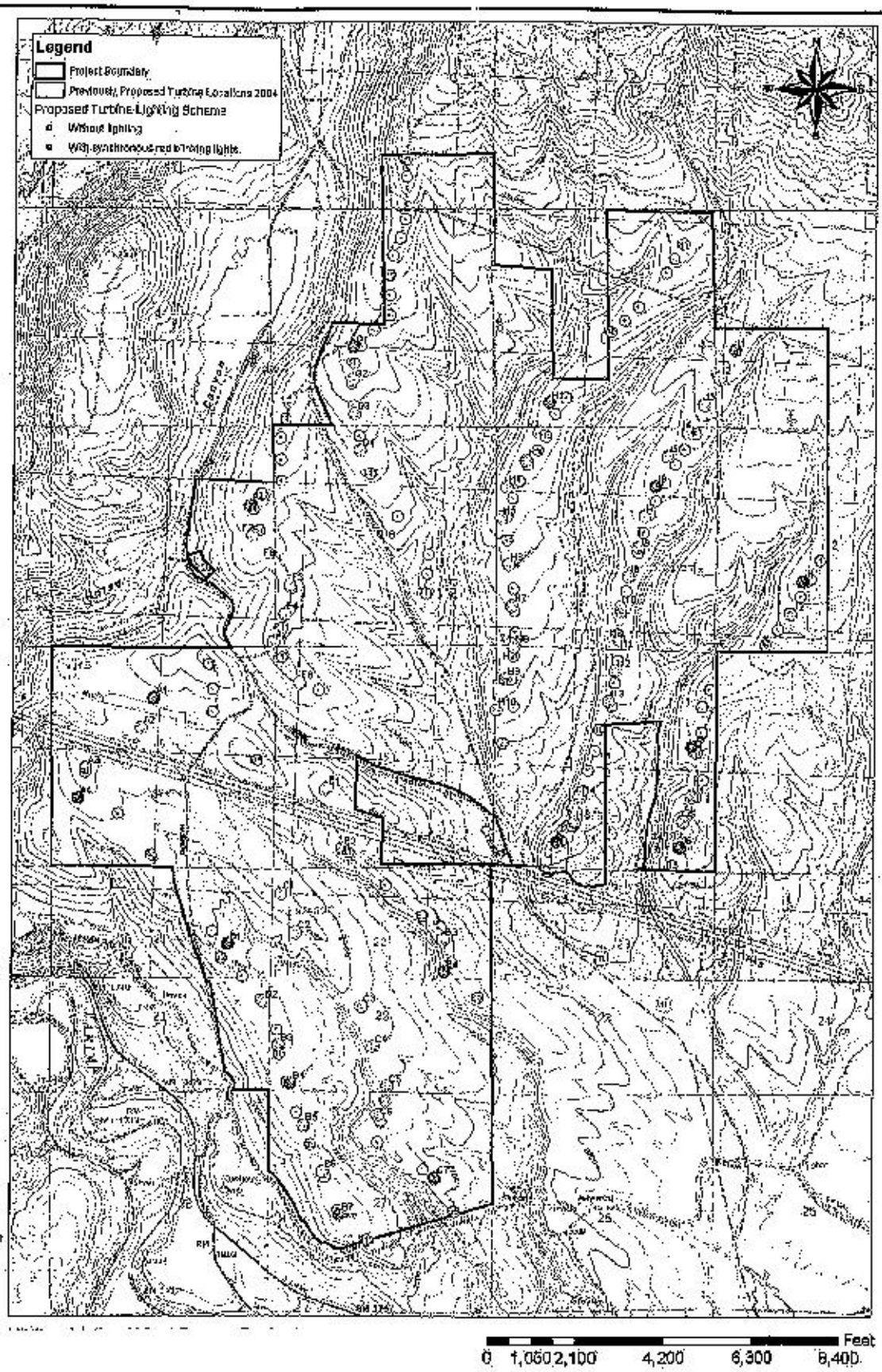

FIGURE VIS-7
PROPOSED FAA LIGHTING SCHEME
KITTITAS VALLEY WIND ENERGY PROJECT

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