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Fountain Wind Project

Visual Resources Technical Report

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Acronyms and Abbreviations

DEM	Digital Elevation Model
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
GIS	geographic information systems
I-5	Interstate 5
KOP	Key Observation Point
MW	megawatt
project	Fountain Wind Project
SR	State Route
VIA	Visual Impact Analysis

Note:

Often, agency suggestions and guidelines are provided in US units of measure (e.g., acres, feet, or miles), and in other instances, agency guidance is provided in metric (aka SI, or System International) units (e.g., meters or kilometers). To convert an otherwise readily recognized agency standard (e.g., 10 miles or 1 kilometer) to the other system may result in confusion. Accordingly, we provide measures in either system, using the original agency suggestion unchanged, and provide conversion to the other standard only when it makes sense to do so.

Glossary

These terms are included in Federal Highway Administration (FHWA) Guidelines for the Assessment of Highway Projects (FHWA 2015). Slight modifications in terminology and descriptions have been made to some terms to reflect the way the FHWA method is applied in this report.

Color	The light reflecting off an object at a particular wavelength that creates hue (green, indigo, purple, red, etc.) and value (light to dark hues).
Distance Zones	Distance zones are based on the position of the viewer in relationship to the landscape. They are measured from one static point, such as the location of a viewpoint. There are three defined distance zones: • Foreground: 0.25–0.5 mile from the viewer • Middleground: Extends from the foreground zone to 3–5 miles from the viewer • Background: Extends from the middleground zone to infinity
Form	The unified mass or shape of an object that often has an edge or outline and can be defined by surrounding space. For example, a high-rise building would have a highly regular, rectangular form whereas a hill would have an organic, mounded form.
Intactness	The integrity of visual order in the natural and human-built landscape, and the extent to which the landscape is free from visual encroachment.
Key Observation Point (KOP)	A viewpoint usually selected for use in a visual impact analysis because it is either critical or representative of the visual character of either the environment or the project. If simulations are prepared for an analysis, they are prepared for views from KOPs.
Landscape Unit	Identified area within a project area that has similar visual features and homogeneous visual character and frequently, a single viewshed. Typically, the spatial unit or organizing principle used for assessing visual impacts.
Line	Perceived when there is a change in form, color, or texture and where the eye generally follows this pathway because of the visual contrast. For example, a city's high-rises can be seen silhouetted against the blue sky as a skyline, a river can have a curvilinear line as it passes through a landscape, or a hedgerow can create a line where it is seen rising up against a flat agricultural field.
Simulations	Two- or three-dimensional depictions of the visual character of a future state. Simulations range from artistic renderings to computer animations.
Texture	The perceived coarseness of a surface that is created by the light and shadow relationship over the surface of an object. For example, a rough surface texture (e.g., a rocky mountainside) would have many facets resulting in several areas in light and shadow and, often, with distinct separations between areas of light and shadow. Conversely, a smooth surface texture (e.g., a beach) would have fewer facets, larger surface areas in light or shadow, and gradual gradations between light and shadow.

Unity	The degree to which the visual resources of the landscape join to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony or inter-compatibility between landscape elements.
Viewers	Those who occupy or will occupy a project site or lands within a project's viewshed can see the proposed project and travelers who would use it. • Neighbors: Viewers who occupy or will occupy land adjacent or visible to the proposed project. For a complex or controversial project, neighbors can be defined by land-use, including residential, retail, commercial, industrial, agricultural, recreational, and civic neighbors. • Travelers: Viewers who see the project, defined by the purpose of traveling, including commuting, hauling, touring, or exercising travelers, or by their mode of travel as motorists, bicyclists, or pedestrians.
Viewshed	The surface area visible from a location (e.g., an overlook) or sequence of locations (e.g., a roadway or trail). The area in which the project would theoretically be visible as influenced by the presence or absence of intervening topography, vegetation, and structures.
Visual Character	The description of the visible attributes of a scene or object typically using artistic terms such as form, line, color, and texture.
Visual Quality	What viewers like and dislike about visual resources that compose the visual character of a particular scene. Different viewers may evaluate specific visual resources differently based on their interests in natural harmony (harmony is considered desirable; disharmony is undesirable), cultural order (orderly is considered desirable; disorderly is undesirable), and project coherence (coherent is considered desirable; incoherent is undesirable). Neighbors and travelers may have different opinions on what they like and dislike about a scene.
Visual Resources	Components of the natural, cultural, or project environments capable of being seen. • Natural Visual Resources: The land, water, vegetation, and animals that compose the natural environment. Although natural resources may have been altered or imported by people, resources that are primarily geological or biological in origin are considered natural. A grassy pasture with rolling terrain, scattered trees, and grazing cows, for example, is considered to be composed of natural visual resources, even though it is a landscape created by people. • Cultural Visual Resources: The buildings, structures, and artifacts that compose the cultural environment. These are resources constructed by people. • Project Visual Resources: The geometrics, structures, and fixtures that compose the project environment. These are the constructed resources that were or will be placed in the environment as part of the proposed project.
Vividness	The memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern.

Executive Summary

Fountain Wind LLC, is proposing the development of the Fountain Wind Project ("project") in Shasta County, CA. The request for authorization to construct the project has been submitted to Shasta County in the application for Use Permit 16-007. This technical report evaluates potential effects on visual character and quality from development of the proposed project, which would consist of up to 72 wind turbines and associated infrastructure and facilities. It would be located on 76 assessor parcels and would have a nameplate generating capacity of up to 216 megawatts.

Stantec Consulting Services Inc. (Stantec) visual resources specialists identified areas of potential project visibility and visual sensitivity, collected photographs of views toward the project from publicly accessible locations throughout the surrounding landscape, and with advice from Shasta County identified seven viewpoints for use in the analysis of the project's potential visual effects. Visualization specialists developed simulations that placed a photo-realistic model of the project into views from Key Observation Points. Visual resources specialists then assessed the difference in visual quality between existing and proposed conditions, relying on the Federal Highway Administration Visual Impact Assessment method. This method evaluates visual quality based on concepts of natural harmony, cultural order, overall coherence, and landscape composition and vividness. Potential contrast to visual character from the proposed project was also identified and described as applicable in terms of form, line, color and texture. The evaluation in this analysis is focused on the proposed project turbines. Because the project is set entirely within forested lands that are actively managed for timber production, other proposed features—including ancillary structures and overhead transmission corridors—would be located within private parcels, set back from publicly accessible locations, and generally obscured by forest and topography in views toward the project from outside the project footprint.

The views used in the analysis represent three landscape units: Mountain Communities, Hat Creek and Pit River, and Sacramento Valley. These areas have distinct qualities in terms of topography, expansiveness of views, and land development patterns. Stantec's analysis concluded that visual quality would be reduced in views where existing turbines are not visible at present. Such views are located in the Mountain Communities landscape unit. Visual quality would also be reduced in long-distance views to the east from the Sacramento Valley, in which the project would appear across a portion of mountain slopes without much coherence. The project would contrast with existing visual character, although existing turbines are already detectable in views.

In Mountain Communities views that include existing wind turbines, the project would not substantially reduce visual quality and it would appear consistent with the visual character of existing views. Views of the project from Hat Creek and Pit River would be long-distance and elevated, in which the project would appear to expand the segment of ridgeline already occupied by wind turbines without reducing visual quality or contrasting with visual character.

1.0 INTRODUCTION

Fountain Wind LLC (Fountain Wind) is proposing the development of the Fountain Wind Project ("project") in Shasta County, CA. The project would consist of up to 72 wind turbines and associated infrastructure and facilities. It would be located on 76 assessor parcels and would have a nameplate generating capacity of up to 216 megawatts (MW). The request for authorization to construct the project has been submitted to Shasta County in the application for Use Permit 16-007.

Visual resources are elements of a natural or built environment with aesthetic value based on visual quality and character. They may be formally identified by local, state, or federal governments or recognized by other institutions and organizations. They may also be components of a natural or built environment that contribute to a memorable or distinct landscape. A visual resources technical report evaluates the potential effects on visual resources from a proposed project based on the project's physical characteristics and potential visibility, and the degree to which the project could alter existing visual quality and/or visual character.

This technical report evaluates potential effects on visual quality from development of the project. It assumes development of the project with the largest class of turbine contemplated for the project at all potential turbine locations, as specified in the following section.

2.0 PROPOSED PROJECT AND ENVIRONMENTAL SETTING

2.1 PROPOSED PROJECT

The project would include the following: turbines and other permanent features including meteorological (MET) towers, transformers, lay-down areas, access roads, underground and overhead collector lines, an operation and maintenance building, and substation components. This report evaluates potential visual effects from the proposed turbine locations in views from the surrounding area. Some of the proposed MET towers may be intermittently visible from nearby roadways. All other features will be located within the project site, away from publicly accessible viewpoints or otherwise completely to mostly obscured by intervening vegetation. Up to 72 turbines are proposed, with hub heights of up to 125 meters and rotor diameters of up to 162 meters. The maximum potential height of project turbines with rotor blades at their apex would be 206 meters.

The 206-meter–tall turbines would have individual generating capacities of up to 5.7 MW. If the 5.7 MW turbines are eventually used, only 38 would be required to be installed to achieve the project's generating capacity. All 72 turbine sites would be required if 3.0 MW turbines are used. The largest potential 3.0 MW turbine being considered has a hub height of 120 meters and rotor diameters of 138 meters, with a maximum potential height of 189 meters. The difference between these two turbine sizes would be detectable in views from 1 mile away but it would not be discernable at 3 miles away.

This report and the visual simulations evaluate a project layout of 72 turbine locations with the maximum 5.7MW turbine with a 206-meter height. This evaluation of the largest turbines at all 72 proposed locations provides the most conservative evaluation of potential visual effects.

2.2 SETTING

The project would be built on privately owned and managed lands in rural, unincorporated Shasta County, 28 miles northeast of Redding. The nearest established communities are Montgomery Creek (3 miles to the west) and Burney (7 miles to the east). The project is set within mixed conifer forest lands that are actively logged and managed. The project would be located to the west and south of the existing Hatchet Ridge Wind project, along several ridgelines and peaks. The Shasta-Trinity National Forest is to the north and west of the project and dispersed portions of the Lassen National Forest are to the south and east. Figure 1 includes an overview of the project location, along with existing landscape features and visual resources, and views referred to in this technical report (Figure 1a shows the area within a 30-mile radius of the project footprint; Figure 1b the area within a 10-mile radius).

The project is in the southern end of the Cascade Range and is within the Cascades Ecological Region, which is characterized by underlying volcanic rock strata and a physiography defined by recurring periods of glaciation (USEPA 2013). With high plateaus and valleys that trend east-west, it includes steep ridges as well as both active and dormant volcanoes and is marked by a generally mesic, temperate climate that supports productive coniferous forests. At higher elevations, subalpine meadows may occur that support unique flora and fauna.

The leasehold area is characterized by a number of buttes and peaks separated by small valleys formed by a number of tributaries in the Pit River and Cow Creek Watersheds. Elevations within the leasehold area range from about 3,000 to 6,600 feet.

3.0 METHODS

This assessment of potential effects to visual resources from the project relies on and implements selected concepts from the Federal Highway Administration (FHWA) Visual Impact Assessment (VIA) for Highway Projects method (FHWA 2015). When fully implemented, the FHWA VIA process requires four phases: 1) an Establishment Phase defines the study area and builds an understanding of the conceptual character of a proposed project; 2) the Inventory Phase examines visual quality related to the project footprint, considering the relationship between components of the affected environment and the composition of the affected population; 3) the Analysis Phase evaluates impacts on visual quality from a proposed project; and 4) the Mitigation Phase defines the mitigation and enhancement efforts to be included in project design, typically after project alternatives have been evaluated and a preferred alternative selected. This report addresses the first three phases; typical mitigation approaches for wind energy projects are briefly discussed in Section 5.4.

Section 4, Affected Environment, describes the project's study area, and Section 4.3, Visual Resources and Viewer Sensitivity, identifies affected populations, or viewers. An inventory of visual quality from representative viewpoints and potential project effects on visual quality are described in Section 5, Results and Discussion.

3.1 STUDY PROCEDURE

This section summarizes the primary steps undertaken in the production of this report.

3.1.1 Review of Project and Setting

Stantec Consulting Services Inc. (Stantec) visual resources specialists initiated the work to support this report by achieving a thorough understanding of the project components and the setting within which they are proposed to be constructed and operated. They reviewed local plans and policies, along with pertinent aerial imagery and maps. The visual resource specialists identified important visual resources, including any state or locally designated scenic roadways, designated scenic areas, or vistas, and the location of residential, recreational, or cultural sites where those with views of the proposed project are likely to have heightened sensitivity to perceived changes in the visual environment.

3.1.2 Project Study Area

A proposed project's visual study area is defined by its presumed maximum viewshed—the area within which it is likely to be visible (see following section)—and areas of presumed or known visual concern. Areas of visual concern are located within a project's viewshed; for an on-shore, utility-scale wind energy project, the viewshed is typically the area within a 10- to 20-mile radius of the project site.

For the project, visibility was projected within a 30-mile radius, with the assumption that the size of the proposed turbines, in concert with the region's topography—a mountainous project location with valley regions to both the east and west and elevated areas with direct lines of sight to the east—would result in a larger theoretical viewshed than for wind projects of comparable footprints in other areas. Public scoping comments indicated concerns about long-range views from the more highly populated Sacramento Valley to the west of the project and the elevated mountains and valleys to the east.

Within the study area, Stantec identified three landscape units—based on presumed landscape character, topography, and land uses—to inform a broad selection of preliminary viewpoints. The Mountain Communities, Hat Creek and Pit River, and Sacramento Valley landscape units are described in Section 4.4.

In this study, "project" and "project footprint" refer to the total footprint of the proposed turbines and associated structures, or the acres that will be temporarily or permanently disturbed by these structures. "Project site" refers to the approximately 4,463-acre area where project facilities could be sited. "Leasehold area" refers to the approximately 29,000-acre area comprised of all parcels to be under lease to the applicant. References to "project vicinity" are specified as necessary.

3.1.3 Viewshed Analysis

A viewshed analysis is a geographic information systems (GIS) generated map that identifies, based on the maximum height of proposed components and surrounding topography, the theoretical visibility of a proposed project. The viewshed analysis identifies the locations within the visual study area where it may be possible to view the proposed wind turbines, or any portion of proposed turbines, from eye-level (1.7-meter) vantage points. In its most basic form, a viewshed graphic's line-of-sight analysis between project components and ground elevations

throughout the surrounding terrain does not account for intervening vegetation or structures. It serves as an initial step in defining a project's maximum visibility and informs selection of preliminary viewpoints in representative areas in part by eliminating from further consideration views in areas where topography would prevent any visibility of a project.

Topographic viewshed maps were prepared using United States Geological Survey Digital Elevation Model (DEM) data, coordinates, and dimensions of all proposed turbines; an assumed viewer height of 1.7 meters; and ESRI ArcGIS® software with the Spatial Analyst extension. The viewshed analyses are based upon a 206-meter blade tip height, a 125-meter hub height (the Federal Aviation Administration [FAA] warning light height), and the location of all proposed turbines. The analyses run at blade tip height illustrate maximum potential day time visibility; modeled visibility of any portion of a turbine, including just the tip of one blade at maximum height, registers in the analysis as a visible turbine. The analyses run at the height of the FAA warning light define maximum potential nighttime visibility based on an anticipated FAA lighting plan. The resulting topographic viewshed maps define the maximum area from which any turbine or part of a turbine within the completed facility could potentially be seen within the 30-mile study area. A second set of viewshed maps showing only the area within a 10-mile zone is also included here to show areas of potential visibility at a scale not allowed by the 30-mile zone.

3.1.4 Site Photography and Selection of Key Observation Points

In December 2017, a Stantec visual resources specialist conducted a photography site visit, documenting views toward the project from publicly accessible locations throughout the surrounding area. Atmospheric conditions ranged from sunny to mostly cloudy over the multi-day site visit, typical for the region during the late fall. The site was visited again in December 2018 when conditions ranged from sunny in valley views to hazy in long-distant views and in April 2019 when there was a comparatively higher degree of clarity in long-distance views.

Visual resources specialists photographed with a high-resolution, full-frame, 35mm Digital Single-Lens-Reflex camera with a fixed 50mm lens. A 50mm focal length is widely accepted as an industry standard for approximating the field of vision of the human eye. That is, a photograph of a landscape shot with a full-frame camera with a 50mm lens generally replicates what a person would see in a single frame of view.

Stantec collected photographs of the project site from a total of 37 viewpoints. These locations included preliminary viewpoints from representative or visually sensitive areas within the project viewshed. These preliminary viewpoints were validated in the field and retained or revised based on confirmation of project footprint visibility. The visual resources specialists collected additional views to account for observed views and potentially sensitive receptors, particularly those identified during the project's public scoping phase in early 2019. All photographs serve to document project visibility and existing visual conditions within and near the project site, as viewed from publicly accessible locations; this technical report does not assess effects to private views. Each viewpoint location is documented using a hand-held global positioning system device.

From the total set of viewpoints photographed, and based on discussions with Shasta County, Stantec identified five views that represented the general ranges of viewer sensitivities, landscapes, and land uses in the project viewshed. This set included two long-distance views requested by the County, which reviewed and concurred with their use as Key Observation Points (KOPs) in the formal visual analysis. Upon review of preliminary simulations (see following section), Stantec added two more mid-range views to allow for consideration of additional views from closer proximity to the project site in the evaluation of potential effects. KOPs are included in all maps in Figures 1 and 2. In addition,

Character Views, which are not relied upon in the formal visual analysis as a KOP but rather serve to supplement discussions of existing visual character, are included throughout the description of the affected environment.

3.1.5 Preparation of Simulations

Visual simulations, in which a photo-realistic model of a project is placed into existing photographs, serve as the basis by which contrast between existing conditions and those with the project is evaluated. Using Autodesk 3ds Max™, Stantec visualization specialists built a three-dimensional model of the project based on the layout and specifications provided by ConnectGen. The model includes only the proposed turbines, the only project component visible in views selected for analysis. They then developed a simulated perspective (camera view) to match the geo-referenced location of each KOP, as well as the bearing and focal length of each photograph. Stantec obtained and used DEM data as the land base upon which existing elements in each view (e.g., buildings, vegetation, infrastructure) were modeled based on aerial imagery. Stantec placed the project model and existing elements into the DEM, then adjusted the camera and target location, focal length, and camera roll to align all modeled elements with the corresponding elements in the photograph within which the model was placed. Visual resources specialists reviewed simulations for photo-realistic quality and consistency with the project plans and layout.

This report includes simulations of long-distance views of up to 28 miles away. The human eye can, under certain atmospheric conditions, detect structures with the size, form, and color of the proposed turbines at that distance. However, standard approaches to simulation production, namely the resolution of the monitors or quality of printed images on which readers are likely to view such images, can restrict or even limit visibility of simulated features photographed from such distances. The visibility of proposed turbines in the two long-distance views evaluated here has, therefore, been exaggerated to facilitate their appearance in simulations. This was done by adjusting the resolution of the turbines to twice the default level which, when compressed into photographic format, results in a "denser," and thus more visible, simulation.

3.1.6 Assessment of Effects on Visual Resources

Relying on observations during the site photography and the resulting images of views toward the project, visual resources specialists evaluated the visual quality of existing conditions for each KOP. This process relied on the use of worksheets that focus on key concepts of the FHWA method; it assessed natural harmony, cultural order, overall coherence, and landscape composition and vividness for each view, assigning a visual quality rating ranging from "very low" to "very high" (Appendix A). This assessment was replicated for the simulated images showing the project as it would be seen from each KOP. Stantec established a visual quality rating for each view showing proposed conditions. The difference in visual quality rating for each view between existing and proposed conditions established the degree of contrast in visual quality from the project. Potential sources of contrast related to visual character–-described in terms of form, line, color, and texture—were also identified and are discussed as appropriate.

4.0 AFFECTED ENVIRONMENT

The project's affected environment includes the regulatory environment within which it would be permitted, the area within which it would likely be visible and the visual resources and landscapes it contains, and the typical viewers who would see it. Each of these is described in this section.

4.1 REGULATORY SETTING

This technical report does not evaluate project consistency with any specific local, regional, or state policies related to visual or scenic resources that would be directly applicable to the proposed project or its location. However, the Initial Study prepared for the project identified the following, which informed selection of preliminary viewpoints.

4.1.1 Shasta County

Section 6.8, Figure SH-1 of Shasta County's General Plan, designates the Hatchet Ridge Summit on State Route (SR) 299 as a "gateway or location that marks the entrance to a community of geographic area" (Shasta County 2004). Additionally, SR 299 from Bella Vista east to the Hatchet Ridge Summit gateway and SR 44 from Old Station to Millville are each considered a "corridor in which the natural environment is dominant." SR 299 from the Hatchet Ridge Summit gateway to Burney is also considered a "corridor in which natural and manmade environment contrast" (Shasta County 2004).

4.1.2 California State Scenic Highway Program

The California Scenic Highway Program was created by the Legislature in 1963 and is managed by the Landscape Architecture Division of the California Department of Transportation. Its purpose is to protect and enhance the natural scenic beauty of California highways and adjacent corridors through special conservation treatment. A highway may be designated scenic depending on how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon travelers' enjoyment of the view.

A 3.3-mile segment of SR 151 extending south from Shasta Dam is the only officially designated California State Scenic Highway in Shasta County. This roadway segment is 28 miles away from the western edge of the project footprint. Eligible State Scenic Highways include SR 89 from the Siskiyou County border to its intersection with SR 44, SR 299 west of Interstate-5 (I-5) and east of SR 89, and SR 44 from I-5 to its intersection with SR 89 (Caltrans 2017).

4.2 PROJECT VIEWSHED

Four iterations of a viewshed map were produced for use in this analysis. They are included collectively as Figure 2. Figure 2a presents a ramped viewshed analysis, based on the screening effect of topography alone for the maximum turbine height, which assumes blade tip at its apex for a 30-mile radius from the project. A "ramped" presentation indicates ranges (e.g., "heat mapping" or color coding) for 0, 1–5, 6–10, 11–20, 21–30, 31–50, and 51–72 turbines or portions of turbines potentially visible from the surrounding terrain. For example, Figure 2a indicates that the number of turbines that would theoretically be partially or fully visible based on maximum height is relatively few (areas

colored purple and blue) in valley areas within the 10 miles east of the project footprint. Beyond 10 miles away, east of SR 89 where elevations increase, theoretical visibility increases (as indicated by yellow and orange shading).

Figure 2b shows the same viewshed for each tower at hub height, where FAA lighting would be mounted. This provides a theoretical example of where aircraft warning lights would be visible throughout the surrounding landscape, without being obscured by topography.

Figure 2c shows the blade tip viewshed for just a 10-mile radius from the project footprint, and Figure 2d shows the hub height viewshed for the 10-mile radius.

4.3 VISUAL RESOURCES AND VIEWER SENSITIVITY

The visual resources near the project are primarily components of the project's geologic and natural setting. The progression in elevation and change in landscape from the broad, flat Sacramento Valley—characterized by large-scale agricultural operations and communities concentrated along the Sacramento River—to the mountainous and more sparsely populated southern Cascade Range is evident and results in the presence of limited but broadly distributed locations from which long, expansive views, or vista views, of the leasehold area are available. A portion of the designated overlooks within the mountain area, as well as informal overlooks (e.g., pull-outs along the side of mountain roads) provide for such views. Conversely, views of the ridges within the project from the nearby mountain valleys and more distant Sacramento Valley display the topography and vegetation that is emblematic of the region's visual character.

Designated visual resources within the study area and viewshed include the Fountain Fire Overlook and the eligible state scenic roadways noted above (SR 299, SR 89, and SR 44). Public lands and recreational destinations are visual resources in that they potentially provide views toward the project.

Finally, cultural features—particularly historic structures, cemeteries, and schools or other institutions—have aesthetic value in that there may be interest to conserve views from these sites. Views from such features within the leasehold area were considered and documented as appropriate.

Potential viewers include the following, based on the FHWA definitions of neighbors and travelers (FHWA 2015). The set of publicly accessible viewpoints described in the following section was identified to be representative of assumed viewer concerns.

Residential viewers: Residential neighbors live within viewing distance of the proposed project. Their visual preferences tend toward a desire to maintain the existing landscape as it is. Depending on their location, residential neighbors are often interested in cultural order and natural harmony, with less emphasis on project coherence unless it impacts their ability to appreciate the other two aspects of visual quality.

Recreational viewers: Recreational neighbors (or "recreationists") provide or participate in recreation within the project viewshed. Recreation includes organized sporting events, indoor and outdoor leisure activities, and cultural events. The visual preferences of recreational neighbors tend to be focused on and associated with their recreational activity. They tend to prefer the status quo and are leery of visual encroachments that may cause adverse effects on the setting of their activity. Depending on the type of recreation, recreational neighbors are very interested in cultural

order and natural harmony, with some emphasis on project coherence as it impacts their experience traveling to their recreational activity.

Tourists: Tourists travel on a highway, primarily for enjoyment, usually to a pre-determined destination. Tourist trips tend to be more adventuresome, cover longer distances, and take more time than commuting trips. Tourists frequently travel in groups with both a driver and passengers, and are equally interested in project coherence, cultural order, and natural harmony.

Workers: In agricultural areas, project viewers can include agricultural neighbors who are farmers of crops or herd animals and who often work in fields and pastures. Some are permanent; many are migratory but may return to the same area again and again over the years. Agricultural neighbors regard cultural order and natural harmony as critical components of the landscape. They are less interested in project coherence.

Commuters: Commuters are regular travelers of the same route. The frequency of the travel may vary, but there tend to be peaks—such as morning and evening rush hours and holidays. Commuters, like all travelers, are particularly interested in project coherence. They are also interested in cultural order and natural harmony to the extent that it contributes to wayfinding.

Residents, recreationists, and tourists are assumed to have moderately high to high sensitivity to visual change from the project, based on the context of specific views. Workers and commuters are assumed to have more moderate sensitivity to visual change.

4.4 LANDSCAPE UNITS, KEY OBSERVATION POINTS, & VISUAL CHARACTER

To frame the analysis of visual effects from the project, the viewshed is divided into landscape units. Landscape units are spatially enclosed and/or visually bounded areas with distinct landscape character and interrelated visual elements. Three general landscape units are used in this analysis: Mountain Communities, Hat Creek and Pit River, and Sacramento Valley. Publicly accessible KOPs, located within the viewshed identified in Section 4.2 and representative of the range of viewer types defined in Section 4.3 who are likely to have views toward the project, are included for each landscape unit (Table 1).

Existing visual conditions within each landscape unit are described below, supported by images of KOPs and character views. KOP and character view locations are shown in Figures 1a-b, and KOP locations are also included in the viewshed images (Figures 2a-d). Existing views from KOPs are included in Figures 3 through 9. The text in this section summarizes the visual character discussions included in the FHWA rating sheets completed for the KOPs (Appendix A).

Table 1. Landscape Units and Key Observation Points

Landscape Unit / KOP	Distance from Nearest Project Turbine (miles)	Visual Resources	Typical Viewers
Mountain Communities			
KOP 1 – Fountain Fire Overlook	0.8	Designated overlook just off of SR 299	Residents, tourists

Landscape Unit / KOP	Distance from Nearest Project Turbine (miles)	Visual Resources	Typical Viewers
KOP 2 – Montgomery Creek	3.1	Elementary School	Residents, tourists, commuters, workers
KOP 3 – Round Mountain	3.1	Hill Country Clinic / Community Center	Residents, tourists, commuters, workers
KOP 4 – SR 299 at Tamarack Road	4.5	Rural mountain landscape	Tourists, commuters, workers
KOP 5 – Burney	7.1	Main population center east of project	Residents, tourists, commuters, workers
Hat Creek and Pit River			
KOP 6 – SR 299 Pit River Overlook	18.6	Eligible State Scenic Highway	Recreationists, tourists, commuters
Sacramento Valley			
KOP 7 –Redding	27.8	Main population center west of project	Residents, tourists, commuters, workers

4.4.1 Mountain Communities

The Mountain Communities landscape unit encompasses the portion of the study area between the foothills east of Bella Vista and SR 89, east of the project. The project is entirely located within this landscape unit, which is characterized visually by its multiple local mountain peaks and general cover of mostly coniferous forest lands; mixed montane chaparral and forest scrub are present throughout the forested areas. Views from publicly accessible locations throughout the landscape unit generally contain ridgelines and slopes of varying grades with partial to complete coverage of evergreen trees, namely ponderosa pine, Douglas-fir, and white fir.

The view from KOP 1 at the Fountain Fire Overlook, a designated viewpoint commemorating the 1992 Fountain Fire that burned nearly 64,000 acres in the area, is demonstrative of homogenous vegetation in the area (Figure 3a). While there are scattered plots of federal forest in this part of Shasta County, most forest lands visible from throughout the landscape unit are privately held. There is active logging in the area. Timber facilities and associated roads and infrastructure comprise the majority of development visible to travelers on SR 299 between towns and communities. Dispersed residential uses, including clustered homes and neighborhoods, are evident. However, the majority of the population in this landscape unit is concentrated in established towns and communities mostly located along the SR 299 corridor.

Views to the east from the western slopes afford intermittent visibility of the nearby ridgelines beyond the highway and developed areas, as evidenced in the views from KOP 2 in Montgomery Creek (Figure 4a) and from KOP 3 in Round Mountain (Figure 5a). Roadside vegetation frequently obstructs views outside of the roadway corridor (see Character View 1 below). While there are similar views from the elevated valleys east of the project, such as that from KOP 4 in an open segment of SR 299 (Figure 6a), most views are more enclosed by trees and, in populated areas, structures. The view from KOP 5, in Burney, illustrates the variety of intervening elements in views toward the project from within an urbanized environment (Figure 7a). The view from SR 299 just east of SR 89, near the community of Johnson Park, further demonstrates the narrow views from the more heavily wooded portions of the study area, in which views are blocked in all directions save for down the roadway corridor (see Character View 2 below). Turbines

that are part of the currently operating Hatchet Ridge Wind project are visible in views from a number of these locations.

The collective visual character in these views is defined by the ridgeline forms visible above and beyond vivid evergreen trees, and it is further informed by the human-made elements in view: the strong linear roadways; vertical forms of utility poles and the clear-cut transmission right-of-way; existing wind turbines with their angular rotors; and the varied forms and colors of development within or just beyond the highway corridor.

Typical viewers within the Mountain Communities landscape type include tourists who may be seeking out vista views in this portion of the Cascade Range or traveling to recreational destinations beyond the study area, as well as commuters, workers, and residents within the region.

Character View 1: View along eastbound SR 299, approaching Hatchet Summit from the west. Hatchet Ridge Wind project turbines are visible to the northeast; however, most views from the highway corridor are obstructed by trees.

Character View 2: View along westbound SR 299, near the community of Johnson Park and just east of the SR 299 / SR 89 junction. Trees line the highway corridors throughout this area, which narrows or eliminates views to the west.

4.4.2 Hat Creek and Pit River

The Hat Creek and Pit River landscape unit encompasses the portion of the study area east of SR 89, where the landscape is characterized by the contrast between the Hat Creek Valley and the mountain peaks and buttes to the east and west. Hat Creek flows northward through the flatlands and is a tributary to the Pit River, which flows downhill from the east, alongside Saddle Mountain and Haney Mountain. From within the valley, which is as close as 11 miles from the project footprint, long-distance views to the west are mostly blocked by Burney Mountain and other, lower ridgelines. Character View 3, below, shows a scene typical in views from the valley floor: waterways meander through sparsely developed, intermittently wooded flatlands. Cinder cones and other geologic features are indicative of the region's volcanic origins.

Higher elevations to the east afford broader, less obstructed views to the west. In the view from KOP 6 (Figure 8a), located at an informal overlook along Haney Mountain, a few hundred feet above the valley floor and nearly 19 miles away from the project footprint, the varied topography of the region is visible. Individually detectable trees populate the landscape at all elevations and are primary vertical features. Two linear components appear to divide the view: the Pit River extends from the foreground into the middleground, below the viewpoint; further away, an electrical transmission corridor, observably cleared of vegetation, extends into the background and is visible ascending the view's mountain backdrop. Hatchet Ridge Wind project turbines are discernable along the ridgeline in the right half of the view. The view from Big Valley Point Summit shows the above features more comprehensively (see Character View 4 below), with striated mountain ridgelines and buttes serving as backdrop to the elevated and irregularly vegetated Fall River Valley. This viewpoint is more than 30 miles away from the project footprint.

Along with the travelers, residents, commuters, and workers common to the entire study area, recreationists are among typical viewers in this landscape unit. Hat Creek and Pit River are both fishing destinations. SR 89 is a

segment of the Volcanic Legacy Scenic Byway. Additionally, the Pacific Crest National Scenic Trail's route between McArthur-Burney Falls Memorial State Park and Lassen Volcanic National Park passes through Hat Creek.

Character View 3: View to the southwest from Cassel Road, east of SR 89 and Hat Creek, one of few locations that afford unobstructed views to the west. Burney Mountain is visible in the left side of the view. The project would be 12 miles away from this location. The row of trees beyond the Hat Creek sign are typical of view-obstructing vegetation along SR 89.

Character View 4: View to the southwest from Big Valley Point Summit, east of Fall River Mills. Burney Mountain, 27 miles away, is visible in the left of the view. Saddle Mountain and Haney Mountain, 13 miles away, are in the right of the view, appearing above the Fall River Valley.

4.4.3 Sacramento Valley

The lands west of the project and surrounding mountain communities descend 3,000 feet to the northern extent of the Sacramento Valley. West of Round Mountain and near the community of Bella Vista, about 17 miles from the project footprint, transitional foothills characterize the landscape. As observable in the view from Character View 5, oaks replace conifers as the predominant trees in this area. Away from the upland areas, where denser forest lands and steep grades obstruct many views from roadway corridors and populated areas, the mountains are visible in views beyond low hills. From some locations within Redding, the mountains to the east appear as a mostly uninterrupted distant skyline. Hatchet Ridge Wind project turbines are faintly visible within this backdrop (see Character View 6, below).

The view from KOP 7 represents sustained views from Redding toward the leasehold area, 28 miles to the east. This viewpoint is along a bike path near the eastbound lanes of SR 299, just under 0.5 miles east of I-5. Mostly residential neighborhoods are obscured by dense street trees and riparian vegetation visible to the north and south of the highway. Built features typical of urbanized areas and high-volume roadways—mostly vertical in form and mainly consisting of roadside signage, light poles, and electrical transmission and distribution structures—are prevalent and serve to briefly and partially block views toward the distant mountains in views from the highway. Views to the east from within urban Redding and its suburban surroundings are often blocked by structures and/or vegetation. Where attainable, visibility of these mountains serves as a visual reminder of Redding's north Sacramento Valley setting and its spatial relationship to the Cascade Range.

A broad range of viewers are present within this landscape unit. While Redding and its surroundings afford various recreational opportunities, sustained views represented by KOP 7 are primarily experienced by residents, along with workers and eastbound travelers and commuters.

Character View 5: View from eastbound SR 299, just east of Bella Vista. Rural residential uses and a patchwork pattern of open areas and mature trees are typical of the landscape east of Redding. Hatchet Ridge Wind project turbines are detectable with the eye along the distant ridgeline in the left side of the view.

Character View 5: View to the east from Hilltop Drive just east of I-5 in Redding. Burney Mountain is visible in the right of the view, 41 miles away. Hatchet Ridge Wind turbines are detectable to the naked eye along the ridgeline in the left of the view, around 36 miles away.

5.0 RESULTS AND DISCUSSION

This section describes the components of the project evaluated in this report and their potential effects to visual character and quality in each of the views just described. It summarizes the more detailed analysis in the worksheets included in Appendix A.

A project's potential effects to existing visual character in landscape units are described qualitatively in terms of identifiable contrast with regard to form, line, color, or texture, as applicable. Motion in the landscape is also considered for wind energy projects. The following discussions identify the most prominent sources of potential contrast given the project and existing visual character described in Section 4.4.

This analysis focuses on the effects from the proposed turbines. Because the project is set entirely within forested lands that are actively managed for timber production, other proposed features—including ancillary structures and overhead transmission and associated corridors—would be located within private parcels, set back from publicly accessible locations, and generally obscured by forest and topography in views toward the project from outside the project site. Most access roads would utilize existing roadways. Overhead transmission corridors would be cleared of vegetation and are generally oriented north/south, with the exception of a segment that would be located within an existing transmission right-of-way. While a newly cleared corridor may be detectable in long-distance views, most portions would be obscured by topography, forest, or be otherwise absorbed into the distant landscape and would not substantially alter existing views.

Table 2 summarizes the assessed change in visual quality for views from each KOP. Change in visual quality between existing conditions in each of the KOP views and conditions with the project as detailed in the worksheets

was made based on comparison of the existing view (the "A" view in Figures 3–9) and a view with the project simulated (the "B" view in Figures 3–9). Each figure also includes a panoramic image of existing conditions to provide greater context of current views from KOPs (the "C" image in each figure) and an image showing the field of view in the simulation (the "D" image). The "D" images are intended to help with viewer orientation relative to the site layout; they do not specify which turbines are visible in the accompanying simulations and which are obscured by topography, vegetation, and/or distance. For the two long-distance views from KOP 6 and KOP 7, an "E" figure is included. Each is an enlarged version of the simulation, provided to help readers better see proposed turbines and intended to account for distance of the views, along with photographic detection of atmospheric haze and resolution issues related to document formatting and/or quality of printed materials.

Table 2. Existing and Simulated Visual Quality by Landscape Type

Landscape Type / KOP	Visual Quality in Existing View	Visual Quality with Project Simulated
Mountain Communities		
KOP 1 – Fountain Fire Overlook	Moderately High	Moderately Low
KOP 2 – Montgomery Creek	Moderate	Moderately Low
KOP 3 – Round Mountain	Moderate	Moderately Low
KOP 4 – SR 299 at Tamarack Road	Moderate	Moderate
KOP 5 – Burney	Moderate	Moderate
Hat Creek and Pit River		
KOP 6 – SR 299 Pit River Overlook	High	High
Sacramento Valley		
KOP 7 –Redding	Moderately High	Moderate

Potential effects to nighttime views are discussed for each view. Current FAA regulations require lights on the nacelles of turbines on the perimeter of a wind energy facility and select turbines within the facility. A lighting plan has not yet been approved for the project. However, due to their height of greater than 500 feet, all turbines will need to be lit with two lights per FAA circular 70/7460-1 Marking and Lighting Wind Turbines, Section 13.6.

5.1 MOUNTAIN COMMUNITIES

5.1.1 Visual Character

In Mountain Communities views, project turbines would be visible atop ridgelines or emerging above tree lines. Where no existing turbines are visible (KOP 1, KOP 2, and KOP 3), such new features would be a source of substantial visual contrast: strong, vertical/angular forms, relatively light in color and smooth in texture would be visible where no similar features exist. The turbines would encroach upon existing skylines, which generally appear undeveloped though built features such as transmission towers do appear to extend above the ridgelines in some views (e.g., the view from KOP 2; see Figure 4). Effects to visual character would vary by proximity. In the view from KOP 1 (Figure 3b) only two project turbines would be visible, but their proximity to viewers introduce features appearing at a scale not currently represented in views. In views from KOP 2 and KOP 3 (Figures 4b and 5b) a

number of turbines would be visible across the entirety of these views. This would substantially affect the character of these views, in which even industrial appearing, predominantly linear, transmission infrastructure is mainly relegated to the foreground and middleground. When spinning, the rotor blades would further contrast with the rest of the mostly static elements in views toward areas outside of roadway corridors.

In views from KOP 4 and KOP 5, in which Hatchet Ridge Wind project turbines are visible (Figures 6b and 7b), proposed turbines would be either barely visible above a ridgeline or at some distance, an element of the view's existing visual character would appear reinforced. Project turbines would be similar in form, color, and texture to existing turbines, and they would be viewed at a similar scale. The horizontal presence of wind energy development would appear expanded in such views but additional turbines would not introduce forms or sources of motion that are not already part of the existing view's visual character.

5.1.2 Visual Quality

Under current conditions, visual quality in Mountain Communities landscape unit views range from moderate to moderately high. With the project, visual quality would range from moderately low to moderate.

5.1.2.1 KOP 1 – Fountain Fire Overlook

Existing visual quality in the view from KOP 1 is moderately high (Figure 3a). The visual quality of the same view with the project would be reduced to moderately low (Figure 3b). Two turbines would be within 1 mile of, and be prominently visible from, the Fountain Fire Overlook. Primary viewers here are tourists traveling through the area and stopping at a designated scenic overlook for a static view in the direction of the project. This KOP is also intended to represent views of nearby residents traveling along Moose Camp Road. Both tourists and residents are presumed to have moderately high to high sensitivity to visual change.

Project turbines visible from this location would appear out of scale with what is visible in the rest of the view. The turbines would extend above the viewer's perspective. This inferior viewer position to the project, in concert with its proximity, would accentuate the manner in which turbines would appear as darkened forms in afternoons when backlit by sunlight coming from the west.

The turbines in this view would detract from the natural harmony of the existing view based not so much on any removal or obfuscation of natural elements but on their dominance of all other view elements. There are no similar structures to which they would relate, and without additional turbines in view, these two do not appear as a part of any broader pattern of development, within which some sense of order might be observed. Viewers visiting the Fountain Fire Overlook, upon reading the facility's interpretive signs and looking in a direction intended to memorialize the fire, would see two large wind turbines.

Night lighting would be highly visible from this location, though vegetation would likely intervene at least partially in similar visibility throughout the surrounding area. The view from the designated overlook is presumably one intended to be observed during daylight hours. Turbine lighting would be unavoidable in any nighttime views from this location. The rural residences in the vicinity of this KOP are sources of localized night lighting, the majority of which is likely absorbed by adjacent woodlands, which do not allow for widely visible skyglow or light trespass at night. The effects of night lighting would be enhanced by the proximity of the turbines to the KOP.

5.1.2.2 KOP 2 – Montgomery Creek

Existing visual quality in the view from KOP 2 is moderate (Figure 4a), and with the project visual quality would be reduced to moderately low (Figure 4b). Project turbines would be most visible in the left side of the view, though blade tips would be detectable beyond and below the tree line in the right half of the view. They would be noticeable during operation, when rotors are spinning. All turbines visible here would be located between 3 and 5 miles away. Viewers include Montgomery Creek residents, who would have relatively static or sustained views from areas within the Montgomery Creek community, and tourists, who would view the project while traveling SR 299 en route or returning from destinations to the east. Both residents and tourists are presumed to have moderately high to high sensitivity to visual change. There are also commuters and workers passing through or based in Montgomery Creek, who are presumed to have more moderate sensitivity to visual change.

Project turbines visible from this location would appear along the view's backdrop, atop a ridgeline that contains no visible development under current conditions. Their scale would match that of the high-voltage transmission lines located atop a nearby hill and which define the skyline in the right half of the view. The turbines' placement to the east and above viewers at this location would make their backlit, darkened appearance during morning hours highly visible. In afternoon light, when front lit, they would appear lighter, as shown in Figure 4b.

As with other relatively narrow views toward the project, turbines would not appear as part of any larger pattern of development, new or existing. To that extent, the cultural order and landscape composition of the existing view would be reduced with the project. In addition to adding unique forms and a new type of land use to the view, the irregularly oriented turbines would extend the presence of built structures across the view, drawing viewer attention. The duration of views from people driving along the highway would be relatively short. Vegetation, terrain, and orientation would prevent substantial visibility of turbines from points north or south along this stretch of SR 299. The view from KOP 2 presents a comparatively narrow view toward the project. In more sustained views from outside the highway corridor, project turbines would be unique to views, as would their motion.

Six of the turbine nacelles would be visible above the ridgeline, as close as 3 miles away. Night lighting would, therefore, be highly visible from this location and light would appear where none is present currently. Vegetation may partially or completely block visibility of light from nearby parts of Montgomery Creek, but the simulated view from KOP 2 is indicative of the potential presence of night lighting in unobstructed views in the area.

5.1.2.3 KOP 3 – Round Mountain

The effects of the project in views from KOP 3 would be similar to those from KOP 2. Existing visual quality in the view from KOP 3 is moderate (Figure 5a). With the project, visual quality would be reduced to moderately low (KOP 5b). Under current conditions, a rounded and articulated ridgeline appears as an undeveloped backdrop to a narrow valley floor that contains residences, mature trees, and a series of high-voltage transmission lines uniformly oriented across the view. With the project, a number of turbines would appear atop the near ridgeline, at various distances from the viewpoint and extending to various heights based on the elevation of their location. The nearest turbines would be 3 miles away. Viewers at or near KOP 3 include local residents, who would have relatively static or sustained views from areas within the Round Mountain community, and tourists, who would view the project as they pass through the area. Both residents and tourists are presumed to have moderately high to high sensitivity to visual change. Commuters and workers, who are presumed to have more moderate sensitivity to visual change, would also

have intermittent or sustained views of the project depending on their location within or duration of time spent passing through Round Mountain.

Except for one segment of transmission line, nothing appears to extend above the ridgeline in existing views from KOP 3. This would change with construction of the project, and the skyline in the left and right portions of the view would be defined by turbines. Blades of turbines located beyond and below the mountain saddle in the center of the view would also be intermittently visible when spinning. In this view to the east, over a dozen mostly or partially visible turbines would appear backlit and dark in morning light. As seen in Figure 5b, they would appear light and visible when front lit by afternoon light.

While the project itself would appear orderly in general—seen no closer than the ridgeline but with varying heights and depths—overall coherence and composition of the view would change. What is currently a natural-appearing backdrop to a densely developed transmission corridor would, with the project, appear dedicated to energy generation. The turbines would add elements of visual interest to views from KOP 3 and in nearby Round Mountain, but their high visibility, unique forms and color, and motion when spinning would reinforce the intactness of the existing view, observable as the extent to which specific elements appear spatially discrete and the ridgeline mostly uninterrupted. Because the highway traverses the western edge of this portion of the mountain valley, and because mature vegetation is often set back from the road, views of the project here would be of short duration but not so short as to be momentary or intermittent. The attention of viewers in this portion of Round Mountain would be drawn to the project.

The nacelles of most of the turbines visible here would be visible above the ridgeline, and night lighting would be new and unobstructed in views from KOP 3. Some lighting associated with the nearby substation or other uses may be sources of night light within the mountain valley, but the project would contribute new sources of night light from an elevated, highly visible location.

5.1.2.1 KOP 4 – SR 299 at Tamarack Road

Existing visual quality in the view from KOP 4 is moderate (Figure 6a) and it would remain moderate with the project (Figure 6b). Only two turbines would be partially visible in views from KOP 4. Their blades would be intermittently visible extending above the mountain ridgeline in the center of the view. These turbines would be between 4 and 6 miles away from the viewpoint along SR 299, where likely viewers are moderate high to highly sensitive tourists and the less sensitive commuters and workers, the majority of whom would presumably view the project while passing through the area within which KOP 4 is located.

Because of their low profile, these two turbines would not be prominently visible to viewers at KOP 4, though they would be noticeable. During operation, the rotation of their blades apparently absent towers, which would not be visible from this location, could warrant additional attention. The view angle would be inferior, as they would appear at elevation. And while view duration from a straight stretch of SR 299 in an open valley would be relatively long, only portions of these two turbines would be visible here. The view's orientation to the west-southwest would result in the turbines appearing well-lit in morning light and backlit and slightly darkened in the afternoon during certain late fall, winter, and early spring.

The horizontal space of the view occupied by wind turbines would expand with the project. However, existing Hatchet Ridge Wind project turbines would remain the most visible human-made feature in the view, and the new turbines

would not detract from the natural elements visible throughout the mountain valley and hillsides. Visual quality would not be substantially altered in daytime views. At night, lighting mounted on one turbine would be partially visible beyond the tree line in the center of the view. A single source of light appearing atop a nearby ridgeline where no such light exists would draw attention; however, night lighting associated with the Hatchet Ridge turbines would be prominently visible in the right side of the view.

5.1.2.2 KOP 5 – Burney

Similar to the view from KOP 4, existing visual quality in the view from KOP 5 is moderate (Figure 7a) and would remain moderate with the project (Figure 7b). Hatchet Ridge Wind project turbines are visible in the right side of the view, just over 5 miles away. Project turbines would appear to the left of the existing turbines, between 7 and 10 miles away. Few of these turbines would be highly visible; most would appear partly obscured by foreground vegetation or intervening topography along the ridgeline, allowing for visibility of just their blades. Viewers at or near KOP 3 include local residents, who would have static or sustained views of the project from within Burney, and tourists, some of whom may be traveling through Burney, and some of whom may have stopped in town and thus have more static or sustained views. Residents and tourists are presumed to have moderately high to high sensitivity to visual change. Commuters and workers, who are presumed to have more moderate sensitivity to visual change, could also have static views of the project, depending on their location, but would also likely view the project while in motion.

The angle of view toward these turbines from within Burney results in their appearing as an extension of an existing string of turbines along Hatchet Ridge. They would be visible to varying degrees and would not, given their position relative to Hatchet Ridge Wind project turbines, appear as unique features in views. Rather, their consistency in appearance would result in a retained coherence and composition in the view. The project turbines, though larger than existing turbines, would appear at a similar scale due to their greater distance from the viewpoint. Because they would appear atop or beyond the current row of turbines on the ridgeline backdrop, the intactness of the existing view would be retained. No new structures would appear to encroach on other features in the view. The view's orientation to the west-southwest would result in the turbines appearing well-lit in morning light and backlit and slightly darkened in the afternoon during late fall, winter, and early spring.

Viewers in Burney would have intermittent views of the project, particularly those who would view the project while passing through the downtown area, where foreground buildings and trees would obstruct certain views toward areas outside of town. At night, the set of turbine lighting already visible from within Burney would appear extended across Hatchet Ridge. However, while the Hatchet Ridge Wind project turbine lighting appears as a row, given that project's layout, lighting associated with the proposed project would, based on the nacelle positions visible in Figure 7b, appear horizontally and vertically layered where visible.

5.2 HAT CREEK AND PIT RIVER

5.2.1 Visual Character

The project would be visible in very few views from the low lands along Hat Creek, but in upland views such as the Pit River overlook at KOP 6, dozens of proposed turbines would, under favorable atmospheric conditions, be discernable but not prominently visible along the ridgeline in the distant background (Figure 8b). They would be visible to the same degree that the existing Hatchet Ridge Wind project turbines are in current views, which are visible under favorable conditions as distant, bright white, vertical structures rising above the view's horizon and faintly defining the

skyline in the portion of the landscape north of the transmission right-of-way that bisects the view. Cloudy or hazy conditions result in poor long-distance visibility from the elevated portions of the landscape unit that afford direct views toward the project, obscuring existing turbines. The addition of proposed project turbines would therefore not substantially alter visual character observable in long-distance views from the east, which would remain characterized by the broad and diverse landscape visible between the viewpoint and the project footprint. New turbines would, when visible, appear to extend the horizontal space of the view occupied by wind turbines to the south with structures that would not appear to be meaningfully different in size or appearance from this distance. Spinning rotors would be detectable along an increased segment of the ridgeline, when visible. Neither the additional turbines nor the motion of their spinning rotors would alter the existing visual character in views from this landscape unit.

5.2.2 Visual Quality

Under current conditions, visual quality in Hat Creek and Pit River landscape unit views are high. With the project, visual quality would remain high.

5.2.2.1 KOP 6 – SR 299 at Pit River Overlook

Existing visual quality in the view from KOP 6 is high (Figure 8a) and it would remain high with the project (Figure 8b). About half of the project turbines would be detectable along the distant ridgeline, as close as 18 miles away. There is a direct line-of-sight between the informal overlook and the project footprint, and Hatchet Ridge Wind project turbines are visible extending atop the ridgeline in the right half of this view when atmospheric haze or seasonal clouds don't limit visibility. Proposed project turbines would appear to the left of the existing turbines and extend above the segment of the ridgeline in the center left quarter of the view. Viewers here include recreationists and tourists, who are presumed to have moderately high to high sensitivity to visual change. There are also commuters traveling this road, and they are presumed to have more moderate sensitivity to visual change. While the KOP is at a cleared pull-off area which functions as an informal overlook, the majority of viewers at this location would view the leasehold area while in motion, traveling along a relatively curved, mountainous road.

Although the project footprint is between 1,000 and 2,000 feet higher than the KOP, viewers experience a level angle of view from this distance. As with views from other KOPs in which proposed turbines would appear alongside existing ones, from here, when visible, the project would extend the portion of distant skyline occupied by wind turbines. This would generally retain and reinforce the cultural order observable in the existing view, though the footprint of the proposed project would result in new turbines appearing clustered in certain portions of the view. Such difference would be difficult to discern from this distance, and the natural setting occupying the 18 miles between the KOP and the project would remain the portion of the view most likely to draw viewer attention during most times of day. When directly backlit during later afternoon light, existing and proposed turbines would appear as a series of darkened vertical structures across the majority of the view's distant horizon.

This long-distance view, intended to represent viewers driving westbound on SR 299, has a short duration, unless viewers have stopped at the informal overlook. The mountain highway allows for moderately high speeds in this area, and the curving route requires driver attention to focus on the road. Visibility of the project footprint rather quickly disappears as eastbound drivers achieve the nearby summit and begin their descent into the Fall River Valley and westbound drivers descend out of the line-of-sight toward the leasehold area. Thus, at night, views of night lighting at the project would be visible relatively briefly to viewers at or near KOP 6. However, for the time that it would be visible, night lights associated with both projects would be cumulatively visible across the majority of the view.

5.3 SACRAMENTO VALLEY

5.3.1 Visual Character

As opposed to views from Hat Creek and Pit River, in which the horizontal space occupied by turbines would appear to expand along a distant ridgeline, in views from the Sacramento Valley, project turbines would extend such space both along and below the ridgetop. This would alter the visual character observable under favorable weather conditions in views such as that from KOP 7 (Figure 9b). With the project, and from this distance, turbines appearing similar to those currently relegated to a more distant ridgeline would be detectable throughout the west-facing slopes of the mountains east of Redding. While such features already exist and are visible in long-distance views, the project would introduce vertical forms, bright white color, and, when rotors are spinning, motion to a portion of the landscape where no such elements are currently visible. The visual character of the landscape unit's mountain backdrop would be altered.

5.3.2 Visual Quality

Under current conditions, visual quality in Sacramento Valley landscape unit is moderately high. With the project, visual quality would be reduced to moderate.

5.3.2.1 KOP 7 – Redding

The existing visual quality in the view from KOP 7 is moderately high (Figure 9a). It would be reduced to moderate with the project (Figure 9b). Nearly all of the proposed turbines would be detectable in views from Redding, 28 miles away, under favorable atmospheric conditions. Hatchet Ridge Wind project turbines, 35 miles away, are discernable in views from Redding under such conditions, and they can be seen extending in a more or less orderly fashion across the ridgetop in the left quarter of the view from KOP 7. The project would be visible between the existing turbines and the center of the view. This KOP is representative of views of residents and tourists, presumed to have moderately high to high sensitivity to visual change, and of commuters and workers, who generally have more moderate sensitivities. While the viewpoint is adjacent to a highway, from which views would be from moving vehicles, the straight segment of roadway allows for sustained views. It also serves as a proxy for static views from eastern Redding, where unobstructed by vegetation.

The distance between the viewpoint and project makes the view seem level, but with focal points along a prominent ridgeline, viewers may still get the sense of an inferior viewing angle. The presence of proposed turbines within the western slopes of the mountains, scattered with no pattern or orderly layout apparent, would give the appearance of development spilling down from the ridgeline. The additional turbines would encroach upon the skyline; they would also encroach upon the mountain slopes visible from Redding. As with the view from KOP 6, such change would be barely detectable in the distant background, though all turbines would likely be more visible during early morning light, when they would be directly backlit and thus appear as a row and clusters of darkened, vertical forms. Under such conditions, the expansion of the portion of the mountains dedicated to wind energy development would be noticeable.

Views toward the project from Redding are generally longer ones than from other locations. Residents have long duration views, and drivers at the KOP location, eastbound SR 299, would be embarking on a relatively long segment of straight road, from which the project footprint is visible. The layout of the project along the western slopes would become more apparent to viewers as they approached and/or passed through eastern portions. In particular,

nighttime lighting associated with turbines would appear substantially different with most of the proposed turbines placed on the downslope side, toward the viewer. The current, orderly presence of turbines would appear subsumed by, what would appear from this location to be, a much larger footprint of wind energy development.

5.4 POTENTIAL MITIGATION

Utility-scale wind projects appear in landscapes at a scale that does not allow for application of most mitigation strategies intended for general development projects. Their footprint is large, and their form and height make them prominent because they typically are not sited near similarly scaled structures, unless an existing wind project is nearby. As such, suggested mitigations like screening, camouflage/disguise, or developing at a low profile are not practical. Relocation and downsizing are also not practical measures for mitigating impacts from wind energy projects since such projects typically require precise locations and layouts to maximize wind resources and contracts with utilities or other off takers that have agreed to purchase the power the project will generate. Typical mitigation measures are not effective for wind energy projects and likely were not intended for developments of such scale.

Nevertheless, several measures can be considered to reduce the visual impacts of the proposed project turbines:

- Use of nonreflective paint finishes for turbine towers and blades, to the extent practicable, and subject to industry standards and requirements to comply with the FAA's lighting and marking standards.
- Limiting or minimizing the visual effects of lighting to the maximum extent practicable in compliance with FAA requirements. Project lights typically used to comply with FAA requirements will, to some extent, be shielded from ground-level views due to a constrained (3 to 5 degree) vertical beam.
- Shielding and hooding lighting fixtures, except those required by the FAA for aviation safety purposes; orienting them toward the ground so that direct rays of light do not shine onto neighboring properties or otherwise become a source of light pollution.
- Use of sensors and switches to keep proposed project facility lights off when not required.

6.0 CONCLUSIONS

Development of the Fountain Wind Project would reduce visual quality in views from the Fountain Fire Overlook, Montgomery Creek, Round Mountain—views toward the project in which Hatchet Ridge Wind Project turbines are not visible—and in long-distance views from the west. In views from Burney and SR 299 east of the project, in which existing turbines along Hatchet Ridge are visible in relatively close proximity, and in views from elevated areas further east, visual quality would not be substantially reduced.

In Mountain Community views, reduction in visual quality would be associated with instances where project turbines would appear atop currently uninterrupted ridge skylines or where they would become the view's dominant feature, either reducing the natural harmony visible in current conditions or appearing in a manner that causes the views cultural coherence or landscape composition to diminish. The project would contrast with the existing visual character in these areas, based on the introduction of comparatively large, vertical/angular forms appearing as white, smooth, sources of motion where no such feature is visible.

In Mountain Communities views within which existing turbines are visible at present, such effects would be comparatively reduced. New turbines would not alter the visual quality in any substantive way, and they would be consistent with existing visual character.

In Hat Creek and Pit River views, the addition of turbines along a ridgetop that already contains similar structures, visible in long-distance views, would not affect visual quality, and it would not contrast with existing visual character. Project turbines would appear beyond and to the side of the existing turbines in a generally orderly fashion.

Visual quality would be reduced, however, in views from Redding where project turbines would be visible in long-distance views both atop a distant ridgeline and its western slopes. This encroachment would affect the natural harmony of the view, and the dispersed project layout would be lacking in cultural order. Though visible only in the distance, the number of turbines added to the view would contrast with existing visual character.

7.0 REFERENCES

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FIGURES

APPENDICES

Appendix A KEY OBSERVATION POINTS WORKSHEETS