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November 15, 2024

Via Email and e-filing Docket 23-OPT-01

Leonidas Payne
Project Manager
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Re: Docket 23-OPT-01: County of Shasta AB 205 Review and Comments on Fountain Wind Project (Wildfire Impacts and Safety, Economic Benefits, Alternatives Analysis, Visual Simulations, Aquatic Survey, & Rare Plant Survey and Native Vegetation Community)

Dear Mr. Payne:

In accordance with the County of Shasta's ("County") obligation under Assembly Bill ("AB") 205 and Public Resources Code section 25519(f), the County hereby submits the following comments on the Fountain Wind Project ("Project") application. The County provides comment on various matters submitted as part of the Project application and applicant data request responses and other documents that have been submitted to the California Energy Commission ("Commission") by Fountain Wind, LLC. The County's comments include additional analysis on wildfire impacts and fire safety, the adverse economic impacts of wildfire damage and associated fire insurance increases, CEQA alternatives analysis, public convenience and necessity alternatives analysis, project visual simulations, aquatic survey, and rare plant survey and native vegetation community. These comments are submitted within the scope of the

County's cost reimbursement budgets, dated August 15 and November 14, 2023, and approved by Commission staff on November 29, 2023.[1]

Below are the County's comments followed by individual summaries of expert review of the application.

I. Additional Wildfire Impacts and Fire Safety Review (Exhibit A)

The County's continuing review of the application and responses to data requests on wildfire impacts shows aerial firefighting impacts that cannot be mitigated as well as mitigation cited in the proceeding record that is not validated. The Project could create a "no-fly" zone that would prevent aerial firefighting efforts in fire created and spreading after a certain time period. In addition, the application's current wildfire analysis is inadequate with an overemphasis on the effectiveness of fuel breaks and other mitigation, and thus, a full impact assessment cannot be reasonably completed. Expert findings include:

1. The Reax Engineering analysis provides additional modeling analysis and focuses on quantifying the effects of reduced air tanker access in the project area.
2. The wildfire analysis shows fire spread over 6-hour and 24-hour time periods.
3. In a 24-hour time period, the wildfire analysis shows a restricted ("no fly") flight zone over the project area due to surrounding structures.
4. The application documentation asserting that current Project mitigation will decrease wildfire risk is overemphasized and a full impact assessment of wildfire risk cannot be reasonably completed.

II. Adverse Economic Impact of Wildfire Damage and Associated Fire Insurance Increases in Shasta County (Exhibit B)

The County's review of whether there is an overall net positive economic benefit to the Project shows substantial wildfire costs attributable to direct damages and property-related costs, associated costs and penalties due to negligence and legal liability, and impacts to local and regional economics due to higher insurance premiums and loss of coverage. The County asserts that such costs and cost factors must be accounted for in any overall net positive economic benefit analysis under Public Resources Code section 25545.9 and related feasibility analyses under CEQA. In other words, the costs below are an "offset" against positive economic benefits that must be evaluated and quantified. Based on the County's review of the applicant's "gross" economic analysis against wildfire costs, the County believes that an overall "net" positive

[1] The County submits these comments as "the local government having land use and related jurisdiction in the areas of the proposed [Project] site and related facility,"[1] as contemplated by AB 205, and as the local agency that has discretionary authority over the Project and previously denied a use permit for it in 2021. The County submits these comments on Application areas within the scope of its subject matter expertise to provide further information to the Commission to assist with its review of the Application. The County has conducted an extensive analysis of the subjects summarized herein. In addition to its own internal review, the County has retained experts in the area of biological resources, which team is well-versed in the Project and the proposed site and related area.

economic benefit cannot be demonstrated. To date, the applicant has not yet submitted a net analysis, thus, this item is incomplete.

1. Wildfire Costs and Damages
    a. The property costs associated with direct fire damage in Shasta County is extensive with approximately $87,392,000 due to the Zogg, Dixie, Salt and other wildfires.
    b. Damages caused by wildfires in the surrounding counties are extensive with approximately $194,800,000 in direct damages in Lassen, Tehama, Butte, Plumas, Trinity and Siskiyou Counties.
    c. PG&E costs and penalties for its culpability in various Shasta County and regional wildfires have totaled approximately $500,000,000, although this amount does not reflect economic damages.
    d. Economic costs also include replacement of lost or damaged structures, time delay, the discouragement of future investment, damage to wildland ecosystems, environmental recovery, and a decrease in tourism.
2. Wildfire impacts on the cost of fire insurance
    a. Shasta County is one of the highest risk areas of the state and nation for wildfires.
    b. Marginal increases in wildfire risk have not been priced into the Fountain Wind Project, including fire insurance premiums.
    c. Small increases in premiums of 1% or 5% can have significant impact on economic activity and across all economic sectors.
    d. Increase fire insurance premiums slow real estate markets, which compound reduced growth and costs over time.
    e. The overall result is that money effectively "leaves" the local economy.

III. Alternatives Analysis (Exhibit C)

The County's review of the project alternatives under CEQA shows that there are more environmentally, technically, and economically feasible alternatives at the project site and within Shasta County and the surrounding counties. Furthermore, the alternatives specifically meet Shasta County General Plan objectives, such as wildfire safety. Based on the energy resources and wildfire safety components of the Shasta County General Plan, the Fountain Wind Project appears to be inconsistent with the County's General Plan objectives. Therefore, there is strong evidence that more feasible alternatives exist.

1. CEQA requires the Commission to identify feasible alternatives or mitigation measures available that would substantially lessen the significant environmental effects of the project.
2. The County assumes that the Commission's environmental review will cite similar project objectives as to the objectives that were referenced by the County in the Fountain Wind Project Draft Environmental Impact Report for Use Permit No. UP 16-007 (SCH No. 2019012029) (Shasta County, 2020), and that such project objectives are not narrowly conceived.

3. The Shasta County General Plan encourages increased utilization of renewable and alternative energy resources through the development of biomass, waste-to-energy, and cogeneration, which have the added benefits of local job creation and economic benefits, energy efficiency, and improving forest and tree vigor and wildland fire safety.
4. The County's General Plan contains a number of both planned and operational projects with approximately 150 MW of cogeneration, biomass, and waste-to-energy resources and 700 MW of battery energy storage that meet and are consistent with General Plan requirements and have both environmental and operational advantages that meet regional needs and statewide RPS and GHG reduction goals.
5. The alternative site location for the Project in Tehama County proffered by the applicant was not adequately studied in the application nor the data request responses. The environmental concerns and other infeasibility of the alternative location was dismissed without any analysis.
6. There are a considerable number of spatial and temporal considerations associated with the various project alternatives and alternative site locations that begin to demonstrate the environmental and technical feasibility and superiority of those alternatives that have less environmental impact and would achieve greater state and regional policy goals for renewable energy, GHG reduction, and reliability.

IV. Visual Simulations (Exhibit D)

The County's review of the application's visual simulations and other viewshed analysis shows that the key observation points are limited and do not include key stakeholder perspectives like the Pit River Tribe and the impacts to tribal cultural resources. A review of other large wind energy project environmental documentation demonstrates that the application analysis is inadequate and inconsistent with the visual simulation analysis of similar projects, such as those proposed in Humboldt County.

1. The Key Observation Points docketed in the record are limited in scope and omit potential views of the Project from other locations within the viewshed.
2. Key stakeholder perspectives are omitted and potential visual impacts to the cultural landscapes must be analyzed and coordinated with stakeholders, including, and most importantly, the Pit River Tribe. Analysis of the impacts on cultural landscapes and coordination with stakeholders is commonplace with other large wind energy projects, such as the previously proposed 155 MW, 160 wind turbine project along the Monument and Bear River Ridges in Humboldt County (*i.e.*, Humboldt Wind Energy Project)[2] and

[2] The Humboldt Wind Energy Project proposed on Bear River Ridge had significant impact to tribal cultural resources of the Wiyot tribe, similar to the Fountain Wind Project, whereby the environmental analysis contained substantial visual simulations incorporating such impacts and coordination from the Wiyot tribe and other stakeholders. The complete EIR is found here: https://ceqanet.opr.ca.gov/2018072076/2. *See also* https://files.ceqanet.opr.ca.gov/213230-2/attachment/QVZKPHTPjUr7vgwzS2XZL9ot6QtCY6hvaGPHuIX9mKTOq3R1h74Nq6SnHAiY2Y1LOBj_pvpHrt6u29MQ0 https://www.yournec.org/terra-gen-wind-project/ (Aesthetics: Visual Resources Technical Report); https://www.wiyot.us/CivicAlerts.aspx?AID=22&ARC=27 (Wiyot opposition to the project); https://www.northcoastjournal.com/NewsBlog/archives/2019/12/17/why-the-supes-denied-terra-gens-wind-project-despite-a-series-of-11th-hour-concessions-from-the-company (Overview of the County's denial of the project).

the ongoing California Offshore Wind Energy Call Areas.[3] Here, the applicant did not consult with Shasta County stakeholders or conduct visual simulations examining the impacts on the Pit River Tribe or other cultural landscape impact analysis.

3. Current photo-simulations fail to show Project visibility under different daily and seasonal conditions and do not contain or under-represent a typical worst-case visibility scenario. Basic data is missing, such as solar azimuth and altitude.
4. There is a significant omission of nighttime simulations and blade motion analysis.
5. Project renderings have poor spatial accuracy and quality.
6. Key project features are omitted.

V. Peer Review of the Aquatic Survey Resources Report (Exhibit E)

The County's review of the application shows that there are a number of data and missing information issues regarding riparian habitat and resource agency review guidelines.

1. The report must be revised to evaluate and document the presence and extent of riffle and pool complexes.
2. The report does not map any occurrences of riparian habitat upslope of U.S. Army Corps of Engineers jurisdiction and does not quantify the extent of California Department of Fish & Wildlife ("CDFW")authority as required by its regulations.
3. The report contains a significant data gap as to how much riparian habitat is present in the Project area and how much vital riparian habitat will be eliminated as a result of the Project.
4. There are approximately 30 other additional errors in the report.

VI. Review of Rare Plant Surveys and Natural Vegetation Community Mapping (Exhibit F)

1. 2023 surveys were conducted as spot checks and there have been no re-surveys of what the applicant addressed in 2019 and 2021.
2. There are significant issues with botanical survey maps due to a lack of topography, landscaping features, scale, text, data, description, and other missing details.
3. Records searches focused on Shasta County are invalid and questionable.
4. Rare plant survey methods do not comply with CDFW standards.
5. There is a lack of information of whether sensitive natural communities are present at the Project site.
6. Invasive plant species mapping is incomplete and there is no indication of what areas were surveyed.
7. Numerous other information is incomplete.

[3] The Bureau of Ocean Energy Management (BOEM) has conducted extensive visual simulations for the proposed California Wind Energy Offshore Call Areas in Humboldt, Morro Bay, and Diablo Canyon in specific response to stakeholder interest in visual impacts, particularly from the Native American tribal stakeholders. https://www.boem.gov/renewable-energy/state-activities/california-visual-simulation.

The County intends to supplement the above comments and expert review as further analysis becomes available. We welcome having meetings with Commission staff to review these comments in detail, answer any questions, or provide the underlying data and analysis.

Thank you for your consideration of these comments.

Sincerely,

Alan B. Cox
Senior Deputy County Counsel

ABC/cga

Attachments

Exhibit A

Additional Wildfire Impacts and Fire Safety Review

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15 November 2024

Adam Fieseler, Assistant Director
Shasta County Department of Resource Management
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Subject: Fountain Wind Project – Discussion of fire behavior modeling results (Letter #2)

Dear Mr. Fieseler,

We are providing an update on our analyses of potential fire behavior impacts associated with the proposed Fountain Wind Project. In our previous report that was delivered on August 29, 2024, and in a summarized letter, dated September 19, 2024, we discussed the findings from our review of existing project documentation related to wildfire risk. We also outlined the additional fire modeling analysis that we were in the process of conducting, which focuses on quantifying the effects of reduced air tanker access in the project area with the implementation of the 48 wind turbines. This effort described is now completed. The results from our fire modeling analysis and additional relevant discussion are provided herein.

Quantifying Effects of Reduced Air Tanker Access

We conducted a fire spread analysis for severe fire weather conditions and ignitions which occur in or near the Fountain Wind Project footprint. Fire perimeters are presented at discrete intervals vs. time from ignition out to 6 hours and 24 hours. The simulation results are used to evaluate the potential severity of a fire at the earliest time after fire detection that very large air tankers (VLAT's) would likely be above the fire line dropping retardant. As shown in Figure 1, the scenarios assume a boundary around the area of the proposed wind turbines, and that ignitions would occur near the upwind side of this area. This boundary is also assumed to encompass a possible restricted flight zone in the 24-hour fire spread scenario.

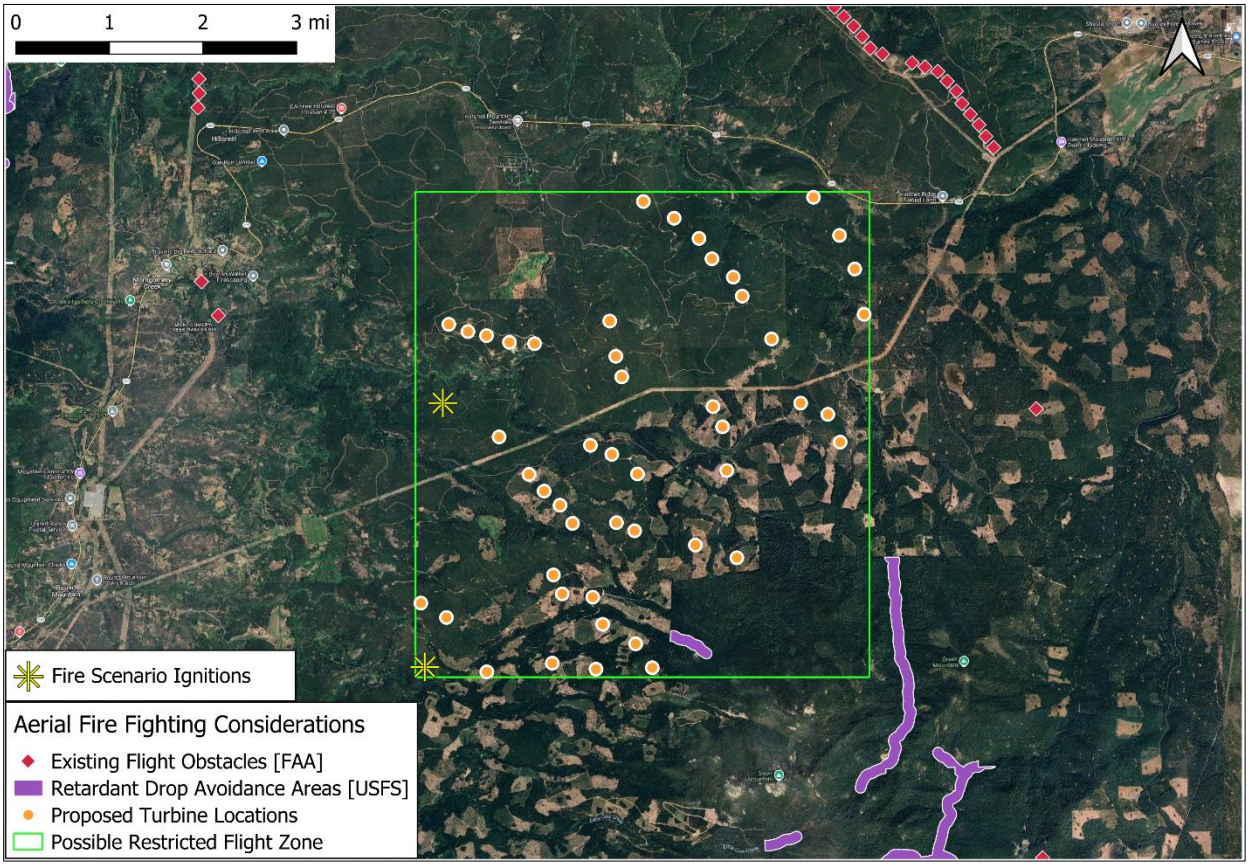

Figure 1. The green boundary surrounds the Fountain Wind Project turbine locations (orange dots), which encompasses a possible flight restriction zone for VLAT's. The yellow stars are the ignition locations for each of the fire spread scenarios. Purple polygons are aerial retardant drop avoidance areas per the USDA/USFS, and the red diamonds are existing flight obstacles per the FAA. The red diamonds to the northeast of the project area represent wind turbines that are part of the Hatchet Ridge Project.

1. Methods and tools

FlamMap [1] is a fire analysis software used to simulate potential fire behavior characteristics using geospatial inputs for weather, fuel, and topography to approximate real-world conditions. To evaluate various fire spread scenarios, we selected the Minimum Travel Time (MTT) module included within the FlamMap software. MTT is a two-dimensional model that predicts fire progression under constant weather and fuel moisture conditions, enabling analysis of the effects of spatial patterns in fuels and topography [2]. It calculates the fire arrival time across the landscape by searching for the set of pathways with minimum fire spread times from point, line, or polygon ignitions. The MTT algorithm includes heading, flanking, and backing fire spread calculations.

a. Scenario description

Two scenarios are modeled in which fire spreads under historical severe environmental conditions from different ignitions placed upwind of the proposed project site. The intent is to provide plausible spatiotemporal estimates of fire arrival times that can illustrate potential outcomes of fire events originating near the project site. The scenarios incorporate representative conditions of wind and weather that were reported during the 1992 Fountain Fire [7,9]. Due to climate change, the annual number of days with similar extreme temperatures and periods of drought are projected to become more frequent and severe. These

conditions, along with other factors, are expected to exacerbate fire danger in the region [3], thus, it is reasonable and prudent to evaluate fire behavior scenarios that consider extreme fire weather.

Each scenario simulates fire spread over two time periods: 6 hours and 24 hours. In the 6-hour scenario, it is assumed that there are no flight restrictions in the area, allowing VLAT to contribute to the initial attack efforts. The 24-hour scenario represents a larger fire and assumes the presence of flight restrictions, preventing early VLAT suppression. Visualizing fire spread at later times can help assess the fire perimeter once it has moved beyond the restricted flight zone. This scenario would likely represent a larger and more challenging fire to control due to the absence of early VLAT suppression following ignition.

b. Model inputs

Model inputs for topography and vegetative fuels were taken from the federal LANDFIRE [4] program. Fuels inputs were modified to reflect the project conditions, including fuel removal and reduction for the proposed access roadways, shaded fuelbreaks, and cleared buffer zones around the turbines. Weather, wind, and fuel moisture inputs were calculated with FireFamily+ [5] using composite historical data measurements from the Whitmore and Oak Mountain Remote Automated Weather Stations (RAWS). The fuel moisture values that are input to the model represent severely dry conditions that would be expected under a period of prolonged drought.

The wind speed input is set to a domain average value of 15 mph, chosen as a balance between extreme sustained wind conditions and more moderate, frequently experienced gusting speeds. Wind speed and wind direction inputs are spatially resolved using WindNinja [6] to capture the effects of local topography on the wind field, resulting in simulated wind speeds ranging from 3 mph to 56 mph across the landscape. Two different domain-average wind directions were modeled for the scenarios: one with the predominant westward wind in the project area, and the other with a southwesterly wind, reflecting conditions observed during the Fountain Fire in August 1992. Each scenario features a distinct ignition location aligned with its wind conditions: one ignition point is set in the mid-project area, upwind of the predominant westward winds, while the other is located in the southwest project area, upwind of the southwesterly winds.

2. Limitations and assumptions

There are limitations in applying fire models for simulating fire spread due to uncertainty associated with the underlying models that drive fire behavior. Several of the complex physical processes involved in wildfire spread are not well understood, including ember generation and transport, fire whirls, and other extreme behavior. There is also a loss of accuracy in results when modeling fire spread for more than a few hours. This is due to constantly changing weather and winds conditions, which are not recursively fed into the model to reflect ambient conditions as a fire evolves. These limitations are addressed, to an extent feasible, by applying conservative environmental conditions as discussed above. Aerial fire suppression efforts are also not explicitly modeled; this is a limitation of fire modeling capabilities. However, the 6-hour scenario evaluated in this study assumes that initial attack operations with VLAT's are possible without flight restrictions, and the results intend to be illustrative of the fire size at the time of containment. The 24-hour results assume no suppression at all, which would not be true in reality, yet the purpose of the study is to visualize the potential impact of reduced air tanker access.

3. Simulation results and discussion

The MTT model provides fire arrival times indicating the time at which a fire reaches locations across the landscape following assumed ignition at the start of the simulation time. Figure 2 shows the results for fire arrival time from the scenario where a location is placed to the west side of the project area under westerly wind conditions. The fire area grows to 660 acres in 6 hours (left image) and to 9,300 acres in 24 hours (right image). Figure 3 shows the results from the scenario where the location is to the southwest of the project considering a southwesterly wind. In 6 hours, the fire area in Figure 3 grows to 275 acres (left image), and in 24-hours, the fire area is 7,485 acres (right image). In both scenarios, the fire arrival time results after a 6-hour period assume no flight restrictions, whereas fire arrival time after a 24-hour period

assume that the green boundary incorporates a restricted flight zone. In the latter case, the fire grows larger and becomes more difficult to control.

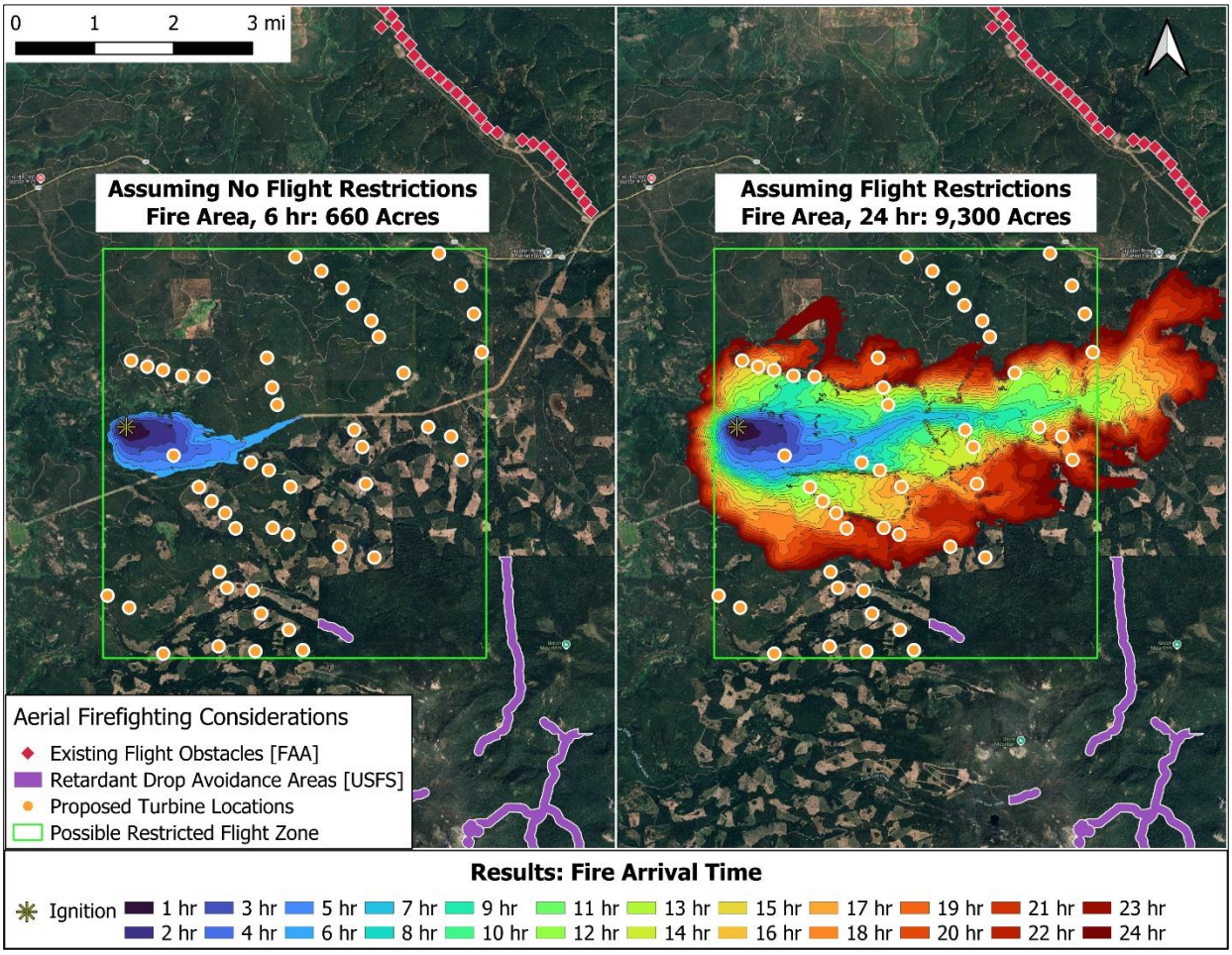

Figure 2. Results show fire arrival time after ignition up to 6 hours (left) and 24 hours (right) from the modeling scenario where ignition (yellow star) is placed to the west of the Fountain Wind Project area (green rectangle). A westerly wind is assumed in this scenario. The results on the left side assume no flight restrictions in the area, whereas results on the right side assume the green boundary is a flight restriction zone. The orange dots represent the proposed wind turbine locations, and the red diamonds are existing flight obstacles per the FAA. The purple polygons represent aerial avoidance drop areas per the USDA/USFS.

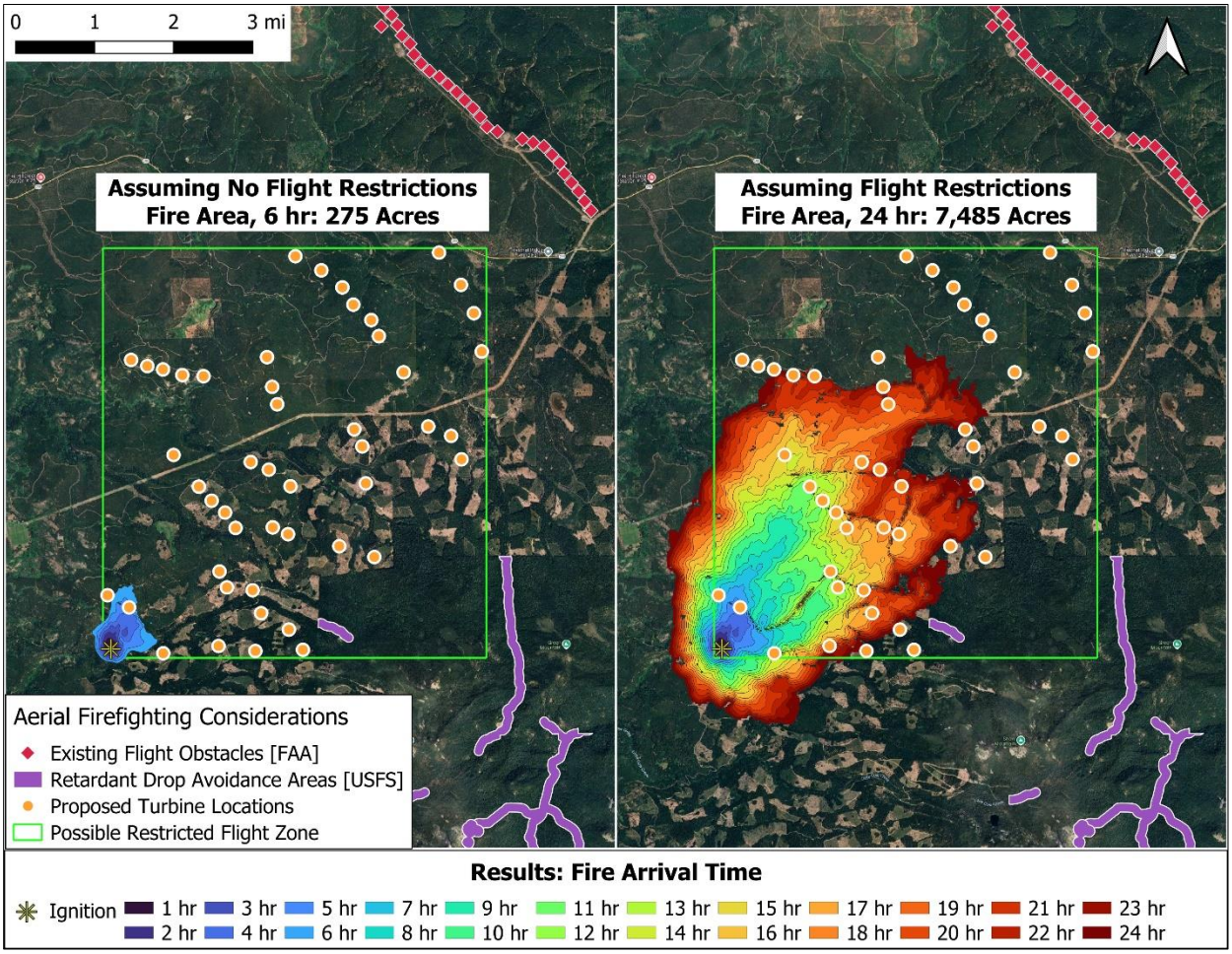

Figure 3. Results show fire arrival time after ignition up to 6 hours (left) and 24 hours (right) from the modeling scenario where ignition (yellow star) is placed to the west of the Fountain Wind Project area (green rectangle). A southwesterly wind is assumed in this scenario. The results on the left side assume no flight restrictions in the area, whereas results on the right side assume the green boundary is a flight restriction zone. The orange dots represent the proposed wind turbine locations, and the red diamonds are existing flight obstacles per the FAA. The purple polygons represent aerial avoidance drop areas per the USDA/USFS.

Discussion on Fuelbreak Effectiveness

Supporting documents for the Fountain Wind Project assert that wildfire risk will decrease once the project is complete, relative to current conditions. This claim is largely based on the assumption that vegetation removal and fuels reduction associated with the project (i.e., from newly constructed roadways, shaded fuelbreak implementation, and fuel clearance zones around the turbines) will effectively contribute to wildfire risk mitigation. While fuelbreaks are intended to alter the behavior of a fire entering the treated area, their ability to limit potential fire intensity relies on fuelbreak construction standards, the behavior of the approaching wildland fire, and the level of suppression [10].

A significant challenge to fuelbreak effectiveness is "spotting," a behavior common in severe wildfires, where embers lofted ahead of the main fire front create new ignitions. Spotting has allowed fires to "jump" roadways and fuelbreaks in multiple California wildfires, notably including the 2024 Park Fire [8] and the 1992 Fountain Fire [9].

The fuelbreaks created by the Fountain Wind Project are also intended to improve firefighter access for indirect suppression efforts, which is cited as another factor in the project's overall reduction in wildfire risk. However, ground suppression effectiveness often relies on aerial retardant applications, which can more easily reach surface fuels in fuelbreaks [10]. The presence of wind turbines may restrict or prevent effective aerial retardant drops along proposed fuelbreaks. Consequently, the existing fire risk documentation has overemphasized the effectiveness of fuelbreaks as a means to reduce fire risk. Therefore, a full impact assessment of wildfire risk cannot be reasonably completed based on the analysis provided.

Sincerely,

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Fire Protection Engineer
Reax Engineering Inc.

David Rich, PhD
Principal
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References

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Exhibit B

Adverse Economic Impact of Wildfire Damage and Associated Fire Insurance Increases in Shasta County

Beacon Economics

October, 2024

Fountain Wind Project:

Adverse Economic Impact of Wildfire Damage and Associated Fire Insurance Increases in Shasta County

Wildland development in wildfire-prone areas inherently carries risk. A wind farm development, as proposed in the Fountain Wind project, increases wildland fire risk in two primary ways. First, by the potential ignition of turbines or other electrical infrastructure linking the turbines to the grid. Second, by restricting the ability of firefighting responses, particularly the initial airborne attack, which may lead to difficulties in early containment of wildland fires. These fires may then grow larger and more destructive. This second effect occurs both in fires caused directly by turbine infrastructure ignition, and those not caused directly by the project but near it. These risks have costs associated with them. The following document explores two of these costs – those associated with direct damages from wildfire, and those related to increases in residential fire insurance.

First, the property costs associated with the direct damage of a potential fire can be extensive: according to estimates from the California Department of Forestry and Fire Protection[1], Shasta County experienced the following damages from wildfires:

- $4.7 million in 2019,
- over $50 million in 2020 (Zogg Fire),
- $31 million in 2021 (Dixie and Salt Fires),

[1] Cal Fire Redbooks for each year, Table 18, retrieved from https://www.fire.ca.gov/our-impact/statistics.

- $1.2 million in 2022,
- and $492,000 in 2023.

Thus, there is not a question of *if* wildfire will damage Shasta's economy each year, but rather how much. Even in relatively quiet years, the damages to a small economy like Shasta are significant.

Nearby counties[2] have also experienced millions of dollars' worth of damages over those five years:

- $2.2 million in Lassen County,
- $6.7 million in Tehama County,
- $9.2 million in Butte County, following several billions of damages after the destructive 2018 Camp Fire,
- $32 million in Plumas County,
- $67.8 million in Trinity County,
- and $76.9 million in Siskiyou County.

Another form of the valuation of damages caused by fires are settlements or penalties imposed upon the responsible party, often PG&E. In recent years, PG&E settled with the California Public Utilities Commission for $45 million for its involvement in the 2021 Dixie Fire[3] and $150 million for its involvement in the 2020 Zogg Fire[4], as well as settling for $50 million with the Shasta County District Attorney regarding the Zogg Fire[5] and $252 million with Butte County for its involvement in the 2018 Camp Fire[6]. This means PG&E settled about $500 million if damages in the Shasta County region in just the last several years. These penalties and settlements do not encompass the entirety of economic damage caused by their respective fires, but illustrate the high costs of culpability for fires.

Beyond just the direct costs of the fire, replacement of lost or damaged structures is delayed, often for years at a time. This time delay would reduce economic activity in a region. For example, residential structure damage may lead to residents to move temporarily out of the county, which reduces the impact of their spending on local firms. For example, by 2022, only a quarter of destroyed Shasta County homes lost during the 2018 Carr Fire had been rebuilt[7], demonstrating that this time delay can be significant. Damage to commercial structures can similarly put

[2] Ibid.
[3] https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-approves-45-million-penalty-in-settlement-with-pge-for-dixie-fire-2024
[4] https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M509/K173/509173901.PDF
[5] https://investor.pgecorp.com/news-events/press-releases/press-release-details/2023/PGE-and-Shasta-County-District-Attorney-Reach-Settlement-to-Further-Enhance-Wildfire-Safety/default.aspx?print=1
[6] https://www.buttecounty.net/DocumentCenter/View/1550/Pacific-Gas-and-Electric-Settlement-Policy-PDF
[7] https://lci.ca.gov/docs/20220817-Shasta_County_Case_Study.pdf

a pause on firms' economic activities, or in some cases stop it altogether. Time delay thus often extends the economic impact of a wildfire beyond a single-year period. High-profile fires and high-risk areas may also discourage future investment in local economies, compounding the negative economic effect further. Finally, the intrinsic value of wildland ecosystems, which would be damaged or even destroyed in a wildfire, should also be considered, as should the costs of any environmental recovery effort, and the resulting decrease in local tourism.

Secondly, risk of wildfire is an intrinsic component of the cost of fire insurance. Shasta County is already one of the highest-risk areas of the state and indeed the country for wildfires. The marginal increase in wildfire risk stemming from the development of the Fountain Wind project has yet to be priced in, meaning that fire insurance premiums are likely to increase throughout the county and particularly near the proposed development site. Even a small increase in premiums – a 1% or 5% hike – can have a significant impact on economic activity. As insurance premiums are paid primarily by households, increases in the premium results in a reduction of disposable income households can spend in other sectors of the economy. The money spent on insurance premiums is effectively taken out of the local economy, as insurers do not spend that revenue locally.

Modelling an increase in aggregate spending on fire insurance, across policy types – based on state Department of Insurance premium, policy count, and exposure data[8] – can inform an understanding of the potential economic impact. By utilizing IMPLAN, a sophisticated, location-aware input-output (IO) analysis modelling software that is an industry standard for economic impact analysis, we are able to understand not only the gross economic impact of an increase in insurance premiums (modelled as a reduction in post-tax income), but also further determine the impacts to specific industries and fiscal and tax implications thereof. IMPLAN is able to model the "ripple effect" of money as it is spent throughout the economy – for example, household spending on groceries is a direct effect, but also provides employment and income for store workers, who then further spend that money on their own purchases. Note that this is not a forecast of what the increase in premiums will be – rather it is a model of what economic impacts to Shasta County may results from an example of a premium rise. The actual increase in premiums is determined with proprietary methods. The economic impact may be significantly larger, given that fire premiums have frequently risen at exorbitant rates. For example, Allstate was recently approved to raise home insurance premiums by an average of 34.1% statewide by the California Department of Insurance, with many households seeing a doubling or more of their premiums in especially fire-devastated areas[9]. An increase in

[8] Retrieved from https://www.insurance.ca.gov/0400-news/0200-studies-reports/0250-homeowners-study/#A
[9] https://www.washingtonpost.com/climate-environment/2024/08/29/california-insurance-wildfires-allstate/

response to wildland development such as the Fountain Wind project can compound these increases, and a fire caused or worsened by Fountain Wind would drive costs even further.

Table 1: Premium Increase Annual Economic Impact on Shasta County Economy

Premium Increase	Total Economic Impact	Direct Economic Impact	Indirect and Induced Impact	County and Sub-County Fiscal Impact	State and Federal Fiscal Impact
1%	$1,235 K	$816.4 K	$418.7 K	$17.7 K	$97.8 K
5%	$6.4 M	$4.31 M	$2.09 M	$88.3 K	$489.0 K

Source: IMPLAN. Analysis by Beacon Economics.

Table 1 above demonstrates that even a marginal increase in premiums can have significant economic effects. IMPLAN assumes that households will cover the increased cost of insurance by both reducing spending and savings, but only the former is then modelled to have an impact on the broader economy. A significant portion of household spending is in industries such as healthcare or housing services, although a spending reduction impacts most industries providing consumer goods and services. Some of the reduction in spending is experienced only outside of the county, which implies the actual economic impact is larger. Another contributing factor to the size of the economic impact is that this modelling applies only to *residential* property fire insurance and excludes any increase to commercial property insurance. Reductions in spending by firms typically has a greater economic impact as business-to-business transactions tend to have larger "ripple" or multiplier effects.

Table 2: 10 most impacted economic sectors in Shasta from a 5% increase in residential fire insurance increase

Display Description	Impact Output	Percentage of Total Industry Output
Owner-occupied dwellings	($434,000)	-0.04%
Hospitals	($290,000)	-0.05%
Offices of physicians	($124,000)	-0.04%
Limited-service restaurants	($118,000)	-0.04%
Retail	($106,000)	-0.03%
Real estate agents, property managers, etc.	($96,000)	-0.02%
Tenant-occupied housing	($84,000)	-0.04%
Full-service restaurants	($78,000)	-0.04%
Other local government enterprises	($71,000)	-0.02%
Insurance carriers, except direct life	($66,000)	-0.03%

*Annual change in 2024 dollar values

A further concern is the loss of private market insurance. When risks rise beyond a certain level, it becomes unprofitable for insurance providers to offer any sort of insurance for homeowners and renters. As insurers forgo offering coverage in an area, residents can lose all insurance. While California does mandate an insurer of last resort (the California FAIR Plan insurance), it is meant as a stopgap measure until private market insurance can be found. FAIR Plan insurance is more limited in its coverage while commanding higher premiums compared to what private market insurance would have offered. Thus, if the risk within Shasta County rises even further because of the Fountain Wind development on wildland, it may cause a decrease in private market coverage, forcing more households onto FAIR Plan insurance. This switchover would be both economically damaging – as even more money flows out of the county to pay for insurance – and leave residents more exposed in the case of a fire.

In addition to the adverse economic impacts detailed above, the increase in fire insurance will undoubtedly slow the growth of the real estate market. Research shows that rural areas have higher price elasticities in California than more urban areas, meaning increases in costs have a greater effect on their prices and construction.[10] A reduced growth rate will compound overtime significantly lowering this key sector overtime.

[10] Wang, Y., & Zhang, Y. (2023). Study on Factors Influencing the Prices of Houses in California Based on Factor Analysis Method. Highlights in Science, Engineering and Technology, 72, 719-726. https://doi.org/10.54097/bynj1947

In conclusion, the impacts of any wildland development in a highly fire-prone area present a risk of significant economic damage. Economic impacts are manifested through both actual damage in the case of a fire and through increased costs associated with risk, priced in as increases in the cost of insurance. The economic impact of fire damage is self-evident, as destruction of structures and the suspension of economic activity can present enormous costs to an economy such as that of Shasta County. Further, by increasing the premiums paid for fire insurance, money that can otherwise be spent in the local economy are now spent on insurance. This money effectively "leaves" the local economy, rather than rippling through local businesses and households. There must be a consideration of these impacts in any true net impact analysis of a potential wildland development project in a high fire risk area.

Exhibit C

Alternatives Analysis

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MEMORANDUM

To: Adam Fieseler, Assistant Director
Shasta County Department of Resource Management

From: Bruce R. Grove Jr., Regional Principal

Date: November 13, 2024

Subject: Conceptual Evaluation of Potential Energy Alternatives – Fountain Wind Energy Project

Introduction

At the request of the Shasta County Department of Resource Management (County), SHN Consulting Engineers and Geologists (SHN) has provided the following conceptual assessment of potential energy alternatives to the proposed Fountain Wind Energy Project (proposed project). The purpose of this preliminary evaluation is to highlight the feasibility and associated environmental benefits of two commercial energy alternatives; Cogeneration and Battery Energy Storage Systems (BESS). Included as part of this evaluation is the need to address an Alternative Location in conjunction with alternatives analysis. As described below, these viable alternatives warrant full and careful consideration as a critical element of the California Energy Commission's (CEC) application review and subsequent environmental determination pursuant to the California Environmental Quality Act (CEQA).

Project Description

The proposed project is a wind energy generation development proposed by Fountain Wind LLC (applicant) in unincorporated Shasta County. The proposed project is located approximately 1 mile west of the existing Hatchet Ridge Wind Project, 6 miles west of Burney, 35 miles northeast of Redding, and immediately north and south of State Route 299. The proposed project would be located entirely on private property, managed for timber production and harvesting, where public access is currently restricted. The project area includes thirty-seven parcels in which the project components will be sited and encompasses approximately 16,108 acres. The proposed project site boundary encompasses approximately 2,855 acres within the overall project area.

The proposed project entails the construction and operation of up to 48 wind turbines. Associated development would include construction of underground and overhead collection lines, access roads, maintenance facilities, evaluation towers, batch plants, substations, and a relay microwave tower.

CEQA Requirements

A fundamental mandate of CEQA is that "public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of the project" (PRC Sections 21002, 21081). One of the purposes of an EIR is to identify alternatives to a proposed project and evaluate the comparative merits of feasible alternatives (State CEQA Guidelines Section 15126.6(d)). By examining a range of

alternatives, the lead agency can demonstrate that it has taken a "hard look" at the project objectives to select alternatives that allow for meaningful comparison.

CEQA and subsequent case law generally defines the level of detail required to make an environmental document legally adequate and defensible. In the absence of the necessary level of detail within a project application, it is the responsibility of the lead agency, in this case the California Energy Commission, to request additional information from the applicant or conduct additional analysis in order to operate within the professional *Standard of Care* required to prepare a legally defensible document. Specifically, Section 15151 of the State CEQA Guidelines provides the following standards from which adequacy of a CEQA document is judged:

> *An EIR should be prepared with sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible.*

Additionally, CEQA mandates that environmental analyses and determinations must be accompanied by factual support. Accordingly, Section 15384 of the State CEQA Guidelines states:

> *(a) "Substantial evidence" means enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached. Whether a fair argument can be made that the project may have a significant effect on the environment is to be determined by examining the whole record before the lead agency. Argument, speculation, unsubstantiated opinion or narrative, evidence which is clearly erroneous or inaccurate, or evidence of social or economic impacts which do not contribute to or are not caused by physical impacts on the environment does not constitute substantial evidence.*
>
> *(b) Substantial evidence shall include facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts.*

Alternatives

The EIR must describe a range of reasonable alternatives and must briefly describe the rationale for alternative selection based upon the requirements described below (see State CEQA Guidelines Section 15126.6). This discussion must also identify alternatives seriously considered (including proposals by the public or other agencies) but rejected as infeasible including the rationale for rejection. Factors that may be used to eliminate an alternative from detailed discussion include failure to meet basic project objectives, infeasibility, inability to avoid significant environmental impacts (see State CEQA Guidelines Section 15126.6(c)).

- The discussion shall focus on alternatives that are capable of avoiding or substantially lessening any significant effects of the project, even if the alternatives may impede to some degree the attainment of project objectives or may be more costly (State CEQA Guidelines Section 15126.6(b)). This applies even if the project effects can be mitigated through the imposition of mitigation measures alone. *It is important to note that defining the project objectives narrowly in an attempt to severely limit the scope of potential alternatives is not permissible* (language added/emphasized).

- Alternatives that do not reduce at least one of the significant effects of the proposed project must not be included in the EIR.

- The discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives or would be more costly.

- Criteria that can be taken into consideration in determining the feasibility of various alternatives include site suitability; economic viability; availability of infrastructure; General Plan consistency; other plans or regulatory limitations; jurisdictional boundaries (depending on project scale); and whether the project proponent can reasonably acquire, control, or otherwise have access to the alternative site. (see State CEQA Guidelines Section 15126. 6(f)(1)).

- If any alternatives are considered infeasible due to the above criteria, the EIR must provide factual support for this conclusion. If an alternative is rejected because of financial infeasibility, then evidence of the infeasibility must be included in the record. The rationale must be based on fact, not speculation or opinion.

- The range of alternatives cannot be limited by the fact that the project applicant has made substantial investments, agreements, or contracts in the proposed project before obtaining approval by the decision-making body.

- An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.

An EIR must include a clearly written statement of objectives that will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision-makers in preparing findings. For the purpose of this evaluation, we assume that the CEC's Draft EIR will cite similar project objectives to those previously referenced in the Fountain Wind Project Draft Environmental Impact Report for Use Permit No. UP 16-007 (SCH No. 2019012029) (Shasta County, 2020):

1. Develop, construct, and operate a commercial wind energy generation facility capable of generating up to 216 MW of wind energy.
2. Interconnect to the Northern California electrical grid (NP15).
3. Locate the project in close proximity to an existing transmission line with sufficient capacity to reduce impacts and costs associated with building new transmission infrastructure.
4. Assist California in meeting the renewable energy generation targets set in Senate Bill (SB) 100.
5. Create temporary and permanent jobs in Shasta County and contribute to the County's tax base.
6. Obtain entitlements to construct and operate a commercially financeable wind energy project.
7. Support landowners through diversification of revenue streams.
8. Offset approximately 128,000 metric tons of carbon dioxide emissions generated by fossil fuels.
9. Provide emissions-free energy for approximately 100,000 households.

It is important to recognize that project objectives that are narrowly conceived in an attempt to mirror the proposed project itself are considered prejudicial in nature as it precludes the selection of any other alternative than the proposed project, preventing informed decision-making and public participation.

Alternative Renewable Energy Sources

As previously described above, the range of potential alternatives to the proposed project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects (see State CEQA Guidelines Section 15126.6). The CEC, as lead agency, is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. Based on guidance promulgated in Section 15126.6 of the State CEQA Guidelines, it can be reasonably concluded that the following project alternatives are both reasonable and feasible while meeting most of the *assumed* basic objectives of the proposed project. These alternatives and their comparative merits meet CEQA's criteria for full consideration by the CEC.

Cogeneration

Objective E-2 of the Shasta County General Plan encourages increased utilization of renewable energy resources by encouraging development of biomass, waste-to-energy, and cogeneration sources. Additionally, General Plan policies E-d and E-f prioritize energy projects and programs that provide jobs and other economic benefits within the County for County residents and direct that integrated waste management goals that are designed to promote energy efficiency shall be encouraged and promoted while General Plan policies T-f and T-g state that the County should encourage and promote the utilization of wood waste produced in the County and biomass thinning programs in timbered areas with extensive rural residential development for purposes of improving both tree vigor and wildland fire safety.

The County is uniquely situated in an area of northern California that will continue to experience interest from biomass/cogeneration developers given the region's vast agricultural and forestry resources. Multiple biomass generators in Shasta County use cogeneration technology, including three facilities in Anderson and two in Burney. Located just outside of Anderson, the 75-acre Shasta-Sustainable Resource Management, LLC facility represents the County's largest operational cogeneration facility providing dependable, environmentally safe disposal of wood waste and forest residue from Shasta County and surrounding areas, while generating clean, renewable electricity that is sold to PG&E (up to 55 MW). With 53 employees, Shasta-Resource Management, LLC processes approximately 2,500 tons of wood fuel per day and has the generating capacity of 58,000 kilowatts, the equivalent of supplying the electrical needs of 85,000 California homes.

Bioenergy facilities are among various public and private energy producing facilities that fall within the definition of public utilities in the Shasta County Zoning Plan. Public utilities are allowed in all zones districts with approval of a use permit. As noted above and explained in General Plan Section 6.4, Energy (Shasta County, 2004), the County encourages the development of cogeneration sources and efforts have been made to expand the amount of cogeneration capacity available in the region through the following approvals:

- Bar Over Heart – 5 MW (under construction)
- Burney Forest Products – 31 MW (operational)
- Shasta Renewable Resources, LLC – 6 MW (operational)
- Shasta Sustainable Resource Management – 55 MW (operational)

- Sierra Pacific Industries, Anderson – 30 MW (operational)
- Sierra Pacific Industries, Burney – 20 MW (operational)
- TLT Enterprises, LLC – 3 MW (under construction)

Potential sites that provide close proximity to existing transmission lines with sufficient capacity to support commercial cogeneration development exist within the vicinity of the proposed project. These include but are not limited to the area surrounding PG&E's Round Mountain Substation and lands adjacent to the existing transmission 230 kV corridor along Fern Road northwest of Whitmore. Both of these general locations would allow for close interconnection to the Northern California electric grid.

The availability of regional transmission facilities, coupled with the County's historic trend towards cogeneration development further supports the feasibility and ultimate consideration of commercial cogeneration as an alternative to the proposed project.

Battery Energy Storage Systems (BESS)

Battery storage is used to reduce greenhouse gas emissions associated with gas-fired power generation facilities by storing energy during off-peak hours (lower energy usage/demand times) and dispatching this energy on an as-needed basis during peak demand hours. This technology reduces the amount of fossil fuels consumed during peak hours and maximizes usage of energy from renewable sources such as wind and solar facilities that may not be able to produce energy during times of peak demand. A BESS alternative would increase local electricity peak power storage supply, thereby supporting the stability of the local electrical grid.

California has been among the fastest adopters of energy storage in the world, partly due to its prolific adoption of solar energy in past decades. The State now has a policy in place (SB100) to source 100% percent of retail electricity by 2045 from renewable sources. A BESS alternatives supports PG&E's compliance with new regulatory and policy measures, such as AB 2514, which mandates that utilities procure over 1.3GW of behind-the-meter storage by the early 2020s and adds energy storage into utilities' long-term Integrated Resource Planning (IRP). Going forward, the State may need to continue building nearly 2,000 MW storage per year on average to meet 2045 clean energy goals.

New State energy policies are ensuring that net metering policies are on their way out and increasing application of time-of-use rates, resulting in the increase peak demands. Generating, then storing power for use at peak demand times (when power becomes expensive) is more financially viable than injecting the power into the grid for diminishing returns. BESS facilities achieve these goals by creating aggregated virtual power plants (VPP) through inter-connection of several BESSs, which pools the capabilities of several such systems and offers more economic, reliable services. Energy storage can also reduce renewable curtailments by charging to mitigate oversupply conditions.

The Crossroads Battery Energy Storage Project, recently proposed near PG&E's Round Mountain Substation, would provide a 300 MW BESS facility on approximately 20 acres within Shasta County. Although this application is in early entitlement, it offers confirmation that BESS constitutes a reasonable and feasible energy alternative in Shasta County, achieving energy benefits beyond that of the proposed project.[1]

[1] In addition to the Crossroads BESS Project, two additional battery storage facilities are proposed in Shasta County that are noted as "complete" by CAISO. These projects include the 200 MW Anderson River BESS near PG&E's Cottonwood 230 kV facility and the 179.5 MW Meadow Ridge 2 BESS with a point of connection at PG&E's PIT #1-Cottonwood 230 kV and Round Mountain – Cottonwood #3 transmission facilities. The anticipated commercial operation dates are December 1, 2025 and February 28, 2026, respectively.

The following energy objectives and operational advantages can be achieved under a BESS alternative:

- Operational support and more secure electrical power system for PG&E's distribution and transmission system.
- Provides local capacity reserves and energy security benefits for Shasta County.
- Ready supply of dispatchable energy reserve, PG&E can reduce its reliance on gas-generation peaking power plants to serve peak load demands or possible loss of transmission capacity.
- Assist the State in achieving the Renewable Portfolio Standard (RPS) and greenhouse gas emission reduction objectives.
- Increased resiliency and ability to supply power during black-outs and major outages.
- BESS can be located within immediate proximity to existing transmission and substation facilities.
- Emergency preparedness as a focused mitigation strategy with the objective of setting the stage for fast and efficient real-time mitigation of harm to people, communities, and environment. The BESS alternative offers far more effective and direct emergency response planning for diverse types of incidents.

Similar to the commercial cogeneration alternative discussed above, the availability of accessible regional transmission facilities, combined with reasonably foreseeable BESS development in the County, provides evidence of BESS's feasibility for consideration as an alternative to the proposed project.

Alternative Location

The CEC has rightly requested the applicant to identify a feasible alternative location for the development of a large wind energy system (outside of unincorporated Shasta County) that meets the basic project objectives (see Data Request ALT2-01, Docket Number: 23-OPT-01, TN# 251462, dated August 2, 2023). In response to TN# 251462, the applicant submitted information related to one potential offsite alternative. The merits of this alternative, as described below, obligates the CEC to fully consider its comparative qualities to that of the proposed project.

The alternative location would relocate the proposed project to 13,125 acres of private land in unincorporated Tehama County. An alternative location in unincorporated Tehama County can be reasonably selected based on the presence of a suitable, nearly contiguous tract of land that would accommodate up to 48 wind turbines and 205 MW of renewable energy that does not currently have wind power projects or applications for wind power projects.

As provided in Data Request ALT2-01 (see Docket Number: 23-OPT-01, TN# 251462), the alternative location is suitable as the site can accommodate a project similar in scope to that of the proposed project including the following: 48 wind turbines; generation of 205 MW of renewable energy; a 4.25-mile gen-tie line; and connection to an existing 230 kV PG&E transmission system. Transmission upgrades would include a new interconnection switchyard as well as other network upgrades as identified by the Grid Operator (CAISO) through an interconnection request and associated study work. A similar number of new access roads and ground disturbance would be required for this alternative location as the proposed project.

As reflected in Docket 23-OPT-01, TN# 251462, this alternative location "*would meet most of the project's objectives but would not be as desirable because the development at the alternative site would likely require additional accommodation of environmental constraints compared to the proposed project site*." We concur with the ability of this alternative to substantially meet most of the project objectives;

however, this conclusionary statement is prejudicial in its intent, lacking sufficient evidence as the environmental implications have not been thoroughly vetted by the applicant or CEC. Essentially, the standard of review has not been achieved. While the CEC has considerable discretion as to the methodology and analysis it employs to analyze a potentially significant impact of a project and its alternatives, an EIR must reasonably describe the nature and magnitude of the impact (i.e., include a meaningful explanation of why an impact is significant or not). If the alternative location is ultimately determined infeasible or environmentally inferior, the CEC's rational must be documented based on substantial evidence pursuant to State CEQA Guidelines Section 15384.

The alternative location has few or no residential structures in the immediate vicinity and is otherwise compatible with wind power development given its proximity to available transmission. The threat of wildfire would be significantly reduced by relocating the project outside the heavily forested area of eastern Shasta County with significant wildfire history. Finally, the alternative location would reduce the significant and unavoidable impacts of the project related to Aesthetics (project and cumulative), Air Quality (cumulative), Biological Resources (project and cumulative), and Cultural and Tribal Cultural Resources (project and cumulative) (see Fountain Wind Project Draft Environmental Impact Report for Use Permit No. UP 16-007 (SCH No. 2019012029)).

Based on the above, the impacts of the alternative location can be reasonably ascertained by the applicant or CEC. Without speculation, the CEC can reasonably concluded that the alternative location is both reasonable and feasible while meeting most of the *assumed* basic objectives of the proposed project. This alternative warrants full consideration in the CEC's forthcoming EIR.

Impact Minimization

Both commercial energy alternatives and the alternative location minimizes many of the severe consequences of the proposed project as site development and operational aspects are significantly reduced when compared to a 2,855 acre, 48 wind turbine development. The following environmental benefits associated with the above recommended alternatives are provided for CEC's consideration:

Spatial Context[2]

- Reduced overall project area.
- 510 acres of localized permanent impacts would be significantly reduced.
- 548 acres of temporary impacts associated with staging areas, multiple site access and maintenance roads, fuel breaks, and 39 miles of underground collectors would be fully avoided.
- Ridgeline development and associated visual impacts, including shadow-flicker effects, are essentially eliminated.
- Impacts to avian and migratory bird species are significantly reduced, if not eliminated.
- Maximized avoidance of known archaeological resources.
- Unmitigable impacts to culturally affiliated tribes would be reduced or eliminated.
- Reduced impacts on domestic groundwater wells as a result of blasting and/or settlement.
- Small scale need for temporary and permanent stormwater controls.
- Necessary improvements along State Route 299 to facilitate turbine and blade delivery would be eliminated.

[2] Spatial boundaries include the location and extent of potential effects likely to occur. This encompasses the project footprint and is the anticipated area of physical disturbance associated with the construction, operation, and decommissioning of the project.

- Market evolution and technological advancement offers both enhanced efficiencies and sustained non-fossil fuel energy options at a smaller, environmentally sound scale for an extended horizon which maximizes the ability to achieve the State's carbon reduction goals.
- As technology naturally evolves, storage or efficiency upgrades could be managed on land that has historically been used for power generation and take advantage of existing infrastructure and not create impacts to undisturbed areas of Shasta County.

Temporal Context[3]

- Future decommissioning activities and resultant environmental impacts would be significantly reduced.
- Emergency access and response to local residents during delivery of project components would be significantly reduced.
- Threat of wildfire ignition or impairment to regional fire suppression capabilities is significantly reduced.
- Aerial fire suppression capabilities within this heavily forested region of eastern Shasta County would continue to be unimpeded.
- The need for new or expanded fire facilities and equipment would be significantly reduced or eliminated.
- Localized and effective emergency response planning can be achieved.
- Enhanced regional wildfire mitigation opportunities through increased biomass waste reduction.
- Landfill disposal of low value wood leads to a variety of adverse environmental impacts, including leachates that threaten groundwater quality, delayed stabilization of landfills, and emission of odors, volatile organic compounds (VOCs), and greenhouse gases (methane).
- Cumulative visual degradation, including views from the valley floor, associated with wind turbine development is reduced.
- Cumulative impact reduction related to air quality, biological, and water quality associated with the effects of wildfire risk and wildfire suppression activities.

Documentation and References

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[3] Temporal boundaries consider the when and for how long project effects are likely to occur associated with the project's construction, operation, and decommissioning phases over relevant time periods. Temporal boundaries are also used to assess residual effects and are also considered applicable for the assessment of cumulative effects.

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Exhibit D

Visual Simulations

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MEMORANDUM

To: Adam Fieseler, Assistant Director
Shasta County Department of Resource Management

From: Bruce R. Grove Jr., Regional Principal
Ethan Lawton, Tribal Cultural Liaison

Date: November 13, 2024

Subject: Evaluation of Docketed Visual Simulations – Fountain Wind Energy Project

Introduction

At the request of the Shasta County Department of Resource Management (County), SHN Consulting Engineers and Geologists (SHN) has provided a preliminary evaluation of visual simulations docketed by the California Energy Commission (CEC) for the Fountain Wind Energy Project (proposed project). The purpose of this preliminary evaluation is to provide general comments on the adequacy of the updated photosimulations as provided in the *Visual Resources Technical Report Addendum*, dated July 26, 2023 (herein referenced as the VIA Addendum) in presenting accurate visual representations of anticipated project impacts. The following docketed items serve as the basis of this review:

- Docket Number: 23-OPT-01, TN# 250567, fwp_visual_resources_addendum_pt1, June 9, 2023 (CEC, 2023a).
- Docket Number: 23-OPT-01, TN# 250566, fwp_visual_resources_addendum_pt2, June 9, 2023 (CEC, 2023b).
- Docket Number: 23-OPT-01, TN# 253663, National Park Service Comments – Night Sky Impacts to two nearby National Park Sites and Communities, December 18, 2023 (CEC, 2023c).
- Docket Number: 23-OPT-01, TN# 249950-2, CEC data Response Memo – Visual Resources, May 2, 2023 (CEC, 2023d).
- Docket Number: 23-OPT-01, TN# 251199, FtnWind_VisResTechReportAddendum_07262023_no_sims, July 27, 2023 (CEC, 2023e).

Project Description

The proposed project is a wind energy generation development proposed by Fountain Wind LLC (applicant) in unincorporated Shasta County. The proposed project is located approximately 1 mile west of the existing Hatchet Ridge Wind Project, 6 miles west of Burney, 35 miles northeast of Redding, and immediately north and south of State Route 299. The proposed project would be located entirely on private property, managed for timber production and harvesting, where public access is currently restricted. The project area includes thirty-seven parcels in which the project components will be sited and encompasses approximately 16,108 acres. The proposed project site boundary encompasses approximately 2,855 acres within the overall project area.

The proposed project entails the construction and operation of up to 48 wind turbines. Associated development would include construction of underground and overhead collection lines, access roads, maintenance facilities, evaluation towers, batch plants, substations, and a relay microwave tower.

CEQA Requirements

The California Environmental Quality Act (CEQA) applies to "discretionary projects proposed to be approved or carried out by public agencies." (Pub. Res. Code Section 21080(a)). The term "project" refers to the whole of an action and to the underlying activity being approved (State CEQA Guidelines Section 15378(a),(c)–(d)). This definition ensures that the action reviewed under CEQA is the development or other activities that will result from the approval. A "project" has two essential elements. First, it is an activity that may cause a direct (or reasonably foreseeable indirect) physical environmental change. Second, it is an activity directly undertaken by a public agency, an activity supported in whole or in part by a public agency, or an activity involving the issuance by a public agency of some form of entitlement, permit, or other authorization. (Cal. Pub. Res. Code Section 21065). CEQA requires the CEC to evaluate and disclose the environmental impacts of the proposed Fountain Wind Energy Project and to reduce those impacts to the extent feasible.

Evaluation

The degree to which a project or activity affects the visual quality of a landscape depends on the visual contrast created between a project and the existing landscape. The contrast can be measured by comparing the project features with the major features in the existing landscape. The basic design elements of scale, form, line, color, and texture are used to make this comparison and to describe the visual contrast created by the project.

Utility-scale wind facilities and the individual wind turbine generators associated with this project are exceptionally large structures incorporating visually reflective surfaces and non-natural geometry that contrasts strongly with the natural landscape. Given the scale of this proposal and its geographic location within a forested setting of eastern Shasta County, the preliminary review of the above docketed items is approached based on the following assessment principals:

- Are the selected views important and representative of all stakeholders?
- Do the photosimulations illustrate the maximum visual contrast that could reasonably be expected on a regular basis?
- Are all project elements depicted in the right locations, at the right scale, and in correct visual perspective?
- Do the photosimulations reflect high-quality images of the proposed project?

Key Observation Points

The most recent Key Observation Points (KOPs) were docketed by the CEC on July 27, 2023 (see Docket Number: 23-OPT-01, TN# 251199). The KOPs have been slightly adjusted and modified to those evaluated as part of the County's prior CEQA review and include the following:

- KOP 2 – Montgomery Creek view to east-southeast (previous KOP). View updated with current project layout.
- KOP 3a – Round Mountain view to east (previous KOP 3). View updated with current project layout.
- KOP 3b – Round Mountain view to east-southeast (new KOP). View of additional turbines outside of the frame of view from KOP 3a.

- KOP 4a – Hatchet Mountain Pass view to west-southwest (new KOP). View from eastbound State Route 299 of project turbines. This view replaces the previous KOP 4.
- KOP 4b – Hatchet Mountain Pass view to southwest (new KOP). View from eastbound shoulder of State Route 299, approximating westbound traveler's view of project's eastern access road.
- KOP 5a – Central Burney view to west-southwest (previous KOP 5). View updated with current project layout.
- KOP 5b – Northern Burney view to southwest (new KOP). View from rural residential portion of Burney (Black Ranch Road) with no obstructions.
- KOP 6 – Pit River Overlook view to west. Elevated view of project from State Route 299 from eastbound shoulder of highway, approximating westbound traveler's view.
- KOP 7 – Redding view to east-northeast. View from a point adjacent to the State Route 299 shoulder, approximating eastbound traveler's view of the project.

Narrow KOP Selection

Photosimulations developed for specified viewpoints can only depict the views from those exact locations, and thus, they omit potential views of the project from all other locations within the viewshed. The current revised KOP views represent only a small part of the total area from which the project would be visible. We believe these views are limited in scope, limiting the CEC's ability to render an informed decision based on the range of anticipated project impacts (see Docket Number: 23-OPT-01, TN# 250566). In collaboration with County staff, the following KOP locations within the viewshed area should be considered by the CEC:

- Recommended KOPs 1 and 2 – These views were chosen to demonstrate the anticipated visual impacts of the proposed project combined with the cumulative impact of the Hatchet Ridge Wind Project in relation to the Round Mountain Substation and PG&E's 230 kV transmission facility.

- Recommended KOPs 3, 4 and 5 – Views 3, 4 and 5 were chosen for their clear view of the project site where travelers along State Route 299 can enjoy the scenic view of the natural landscape. Compared to the applicant's KOP 1, these photo locations also represent wider unobstructed views of the project site where visual impacts would be more frequently viewed for a longer duration along State Route 299.

The recommended KOPs images were collected between 9:17 a.m. and 10:24 a.m. on November 6, 2024 and do not account for variations in daytime hours or weather conditions. Future photosimulations of these view locations must account for variable lighting and seasonal settings as noted below under the *Visual Contrast* subheading.

Omission of Key Stakeholder Perspectives

The Pit River Tribal members who call this scared land home are connected with the land, since time immemorial. The landscape, although outside of recent Reservation boundaries, has traditionally been part of the Tribal Ancestral Territory and is considered a Tribal Cultural Resource (TCR). The Cultural Landscape is not simply a set of physical features but is a sacred memory and experience for the Tribe. Visual views of, and from, these Cultural Landscapes are an integral part in sacred activities and the on-going cultural practices of the Pit River Tribe and its members.

Similar projects such as Terra-Gen's proposal for forty-seven 600-foot turbines on ecologically sensitive Monument and Bear River Ridges analyzed potential impacts to Cultural Landscapes. In addition, the Humboldt County Offshore Wind Project (on-going/in process) includes an analysis of potential impacts to Tribal Cultural Landscapes by the National Oceanic and Atmospheric Administration and by the Udall Foundation's John S. McCain III National Center for Environmental Conflict Resolution. An analysis of potential visual impacts to the Cultural Landscapes must be analyzed and included in the VIA Addendum.

Visual Contrast

The visual environment changes constantly as the sun's position changes in the course of the day and as clouds pass overhead. The photosimulations, as presented, fail to show the project's visibility under different lighting conditions which can vary by season, time of day, sun direction and angle above the horizon, atmospheric factors, including the presence of absence of clouds and the level of haze. Photos were taken during spring (April and May) and winter (December) of 2023 generally between 9:30 a.m. and 3:18 p.m., reflecting a limited visual experience during daylight hours. The base KOP images also offer limited landscape representations of the winter season (October through March) with photosimulations neglecting any depiction of snow conditions on the landscape. Accumulated snow represents a significant realistic local landscape theme that is experienced for long durations during a typical winter season.

Based on the above factors, the photosimulations presented do not represent a typical worst-case visibility scenario (i.e., a scenario which simulated conditions result in the greatest visual contrast from the project.) A key factor contributing to contrast between the turbines and their visual backdrop is the relationship of the sun angle and the viewing angle (i.e., whether the turbines are frontlit with respect to the viewer, backlit, sidelit, or unlit (shaded)). *Evaluating Photosimulations for Visual Impact Assessment*, prepared for the National Park Service, provides an example for a typical worst-case windfarm scenario that is viewed from the west. This example states that considering lighting and weather conditions, the typical worst-case scenario would be early to mid-morning on a clear day with good visibility. In this case, the wind turbines would be backlit (silhouetted) by the rising sun, and the shadowed side of the turbines facing the view would contrast strongly with the bright backdrop (Sullivan, Meyer, Palmer, 2021).

Utilizing the above scenario as a guide, several simulated KOPs referenced analyzed in the VIA Addendum underrepresent the likely worse-case visual implications of the proposed project. Given the time of day and direction represented in KOP 2 (photo taken looking east at 2:18 p.m.), KOP 3a (photo taken looking east at 3:18 p.m.), and KOP 3b (photo taken looking east at 3:18 p.m.), the simulated turbines appear under illuminated and do not accurately reflect the anticipated worse-case contrast at these locations. While the VIA Addendum states that the wind turbines represented in these KOP would "*appear backlit and dark in morning light*," the CEC is not afforded visual examples of how the backlit effect impacts the overall contrast for the viewer.

Furthermore, the VIA Addendum lacks basic data that would otherwise 1) inform the reviewer of base assumptions employed to develop the photosimulations and 2) confirm the accuracy in depicting the direction and length of visible turbine shadows upon the existing landscape. This includes the solar azimuth and altitude (direction of the sun on the horizon and its height above the horizon).

Creating multiple photosimulations that illustrate changes in lighting throughout the course of the day, including seasonal changes, can allow for a more representative assessment of these time-related effects. Absent consideration of varying lighting conditions and seasonality, the visual

simulations are one dimensional, lacking sufficient evidence to render a logical and informed impact conclusion by the CEC. To provide a comprehensive analysis and to fully disclose the visual impacts of the proposed project, additional multi-faceted photosimulations are warranted.

Omission of Nighttime Simulations

When facilities, such as wind turbines, require lighting sufficient to cause impacts at night, the effects of illumination must be depicted in photosimulations. Federal Aviation Administration (FAA) guidelines for marking and lighting wind energy facilities require warning beacons that flash red at night (FAA, 2007). All marker beacons within a wind farm are also required to flash simultaneously (approximately 24 times/minute); however, only the perimeter turbines of a wind farm need such markings, provided that there is no unlighted gap greater than 0.5 miles. The marking beacons will be visible from all KOP locations, among others, on most clear nights. From the viewer's perspective, the sight of a large number of closely and regularly spaced synchronized flashing red lights would significantly contrast against a black or near black backdrop of the night sky.

It is noted that only daytime simulations were generated with corresponding narrative observations provided in the VIA Addendum (see Docket Number: 23-OPT-01, TN# 251199). This omission is further compounded by the proximity of the project to Lassen Volcanic National Park and Whiskeytown National Recreation area, both within the potential maximum viewshed of the proposed project (CEC, 2023c). As highlighted by agency representatives, "*the largest threat to dark night skies is artificial lighting from nearby development and flashing red lights at the Hatchet Ridge Wind Project that have caused some impacts to the night sky viewing experienced at both areas*" (CEC, 2023c). This statement further supports the need for a nighttime cumulative analysis focused on the introduction of a new utility-scale wind energy development adjacent to the Hatchet Ridge Wind Project.

We recognize that there is an inherit limitation with photosimulations to effectively illustrate the flashing of turbine warning beacons; however, absent "still" or "static" nighttime simulations showing relative illumination of warning beacons underemphasizes the dynamic nature of the visual experience associated with the proposed wind facility. Again, this represents a glaring omission of the altered nighttime environment that viewers will experience living and driving through the project area during low light and nighttime conditions. The VIA Addendum must be revised to reflect a nighttime illumination assessment, including the maximum distance at which the red warning beacons are visible at night.

Blade Motion

The motion of the turbine blades is an especially important part of the visual experience of wind energy projects and is not a common type of "natural" movement. The inability to depict motion as part of the visual impact assessment results in lowered perceptions of visual contrast associated with the proposed project. In reality, visible blade motion is a primary contributing factor to turbine visibility, becoming a more important visible element at shorter viewing distances. This limitation should be explicitly noted in the VIA Addendum while expanding the discussion of motion effects for each KOP.

Spatial Accuracy and Quality

Renderings have limited and predetermined horizontal and vertical field of view showing what is only in the picture frame. As a result, the visual context provided by the larger landscape that would otherwise be visible in the "real" or proximate landscape, is lost. The VIA Addendum presents existing

and simulated images for each KOP, along with a panoramic view of each. The panoramic views provide a broader landscape context with focused simulations.

KOP 2, 3a, 3b, 5a, and 5b appear too small in size and of low digital resolution to see key details of the turbines. A more accurate and adjusted view of KOP 3a would capture a larger landscape frame, including landscape elements reflected on the left side of the panoramic view. Additionally, the KOP 3a, KOP 3b, and KOP 5b simulations are based on images taken a distance from the State Route 299 mainline. These KOPs depict far away views resulting in project and landscape elements appearing too small and lacking realistic detail presenting the reviewer with an unrealistic and distorted visual perspective of the project and its visual impacts at these locations.

Omission of Key Project Features

Photosimulations submitted in Docket Number: 23-OPT-01, TN# 251199, omit a dedicated KOP that evaluates the impacts associated with the proposed O&M Building. Additionally, and as noted in the VIA Addendum, proposed meteorological towers constructed onsite would be up to 394 feet high and painted in aviation-safe orange and white. Although no meteorological towers appear in the photosimulations, a new, potentially focused simulation should be prepared from State Route 299 to illustrate at least one meteorological tower in relation to the wind turbines. Absent a specific photosimulation of the O&M building and at least one meteorological tower, the VIA Addendum should expressly state the rationale for not modeling these important project elements.

Documentation and References

CEC (California Energy Commission). 2023a. Docket Number: 23-OPT-01, TN# 250567. *fwp_visual_resources_addendum_pt1*. June 9, 2023.

CEC. 2023b. Docket Number: 23-OPT-01, TN# 250566. *fwp_visual_resources_addendum_pt2*. June 9, 2023.

CEC. 2023c. Docket Number: 23-OPT-01, TN# 253663. *National Park Service Comments – Night Sky Impacts to two nearby National Park Sites and Communities*. December 18, 2023.

CEC. 2023d. Docket Number: 23-OPT-01, TN# 249950-2. *CEC data Response Memo – Visual Resources*. May 2, 2023.

CEC. 2023e. Docket Number: 23-OPT-01, TN# 251199. *FtnWind_VisResTechReportAddendum_07262023_no_sims*. July 27, 2023.

DOI (United States Department of the Interior). 2013. *Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands*. First Edition. April 2013.

OPR (Office of Planning and Research). 2024. *California Environmental Quality Act (CEQA) Statute(Public Resources Code 21000-21189) and Guidelines (California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387)*. January 1, 2024.

FAA (U.S. Department of Transportation, Federal Aviation Administration). 2007. *Advisory Circular AC 70/7460-1K, Obstruction Marking and Lighting*. February 1, 2007.

Shasta (Shasta County). 2020. *Fountain Wind Project Draft Environmental Impact Report for Use Permit No. UP 16-007 (SCH No. 2019012029).* July 2020.

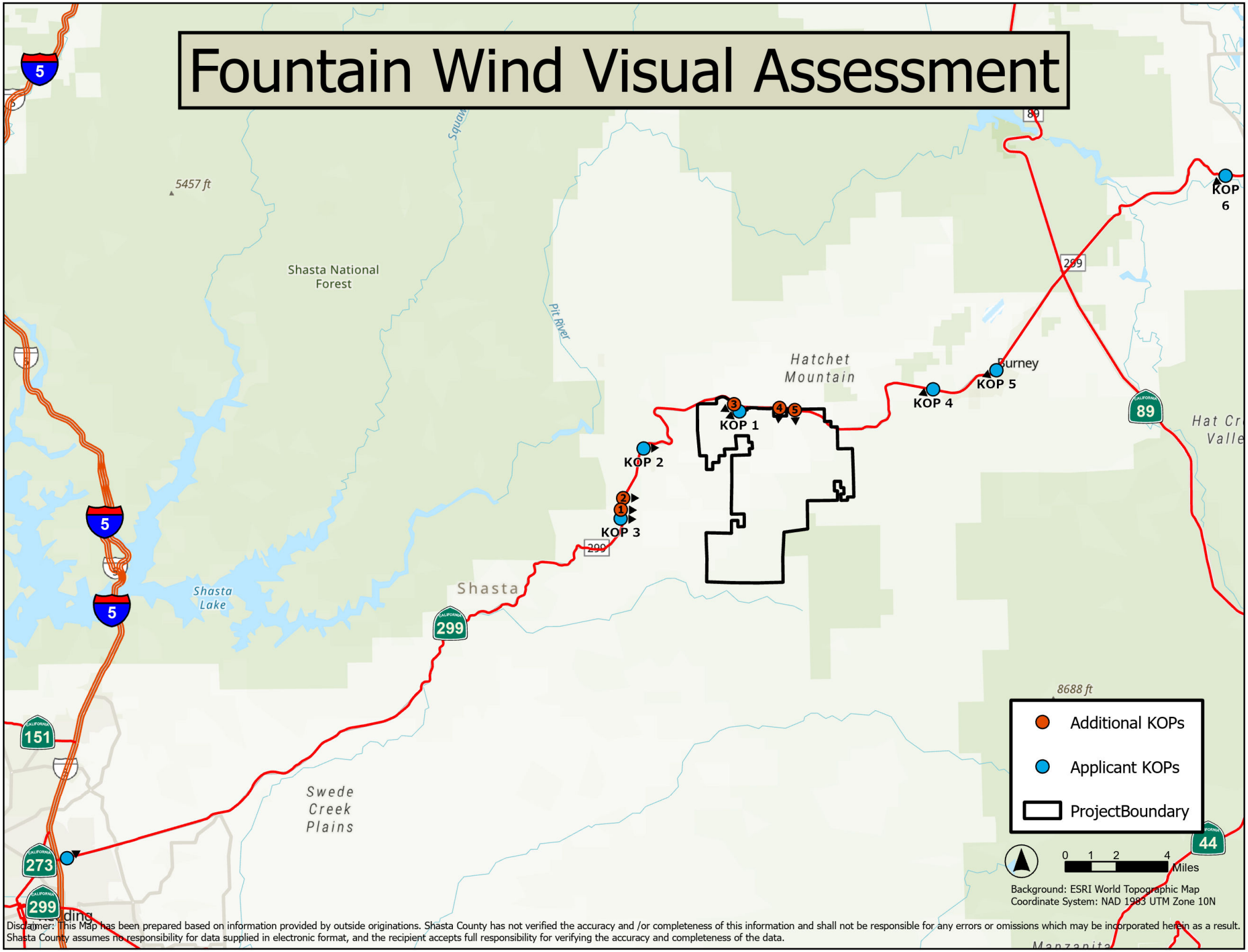
Sullivan, R., et al. U.S. Department of the Interior, Bureau of Land Management. *Wind Turbine Visibility and Visual Impact Threshold Distances in Western Landscapes.*

Sullivan, R., M. Meyer and J. Palmer. 2021. *Evaluating Photosimulations for Visual Impact Assessment*. Natural Resources Stewardship and Science, Air Resources Division, National Park Service, Lakewood, Colorado.

Attachments

Fountain Wind Visual Impacts Figure (Applicant KOPs/Additional KOPs)

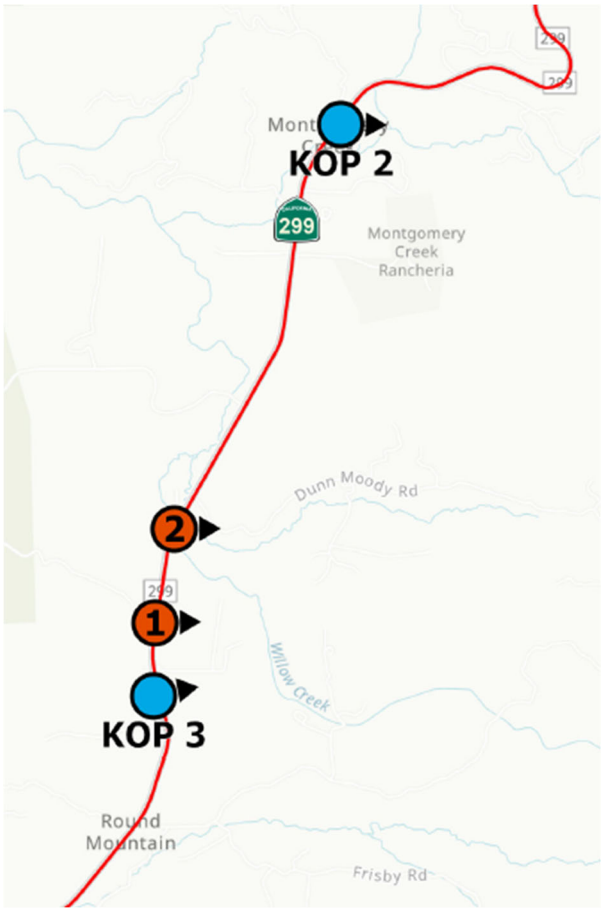
Fountain Wind Visual Assessment



Additional KOP 1

Photo Taken 11/06/2024 at 10:24 AM

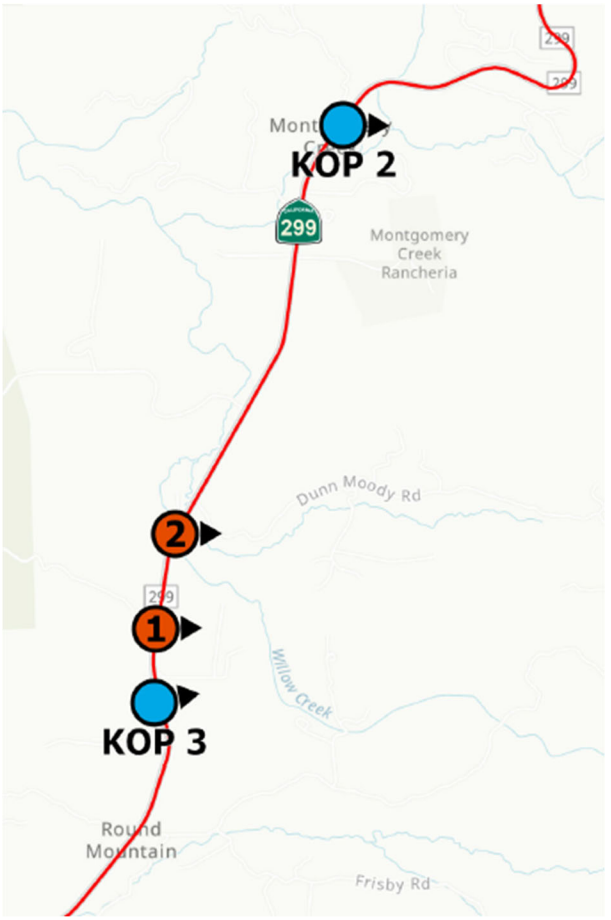
Facing Fountain Wind Project Area



Additional KOP 2

Photo Taken 11/06/2024 at 10:21 AM

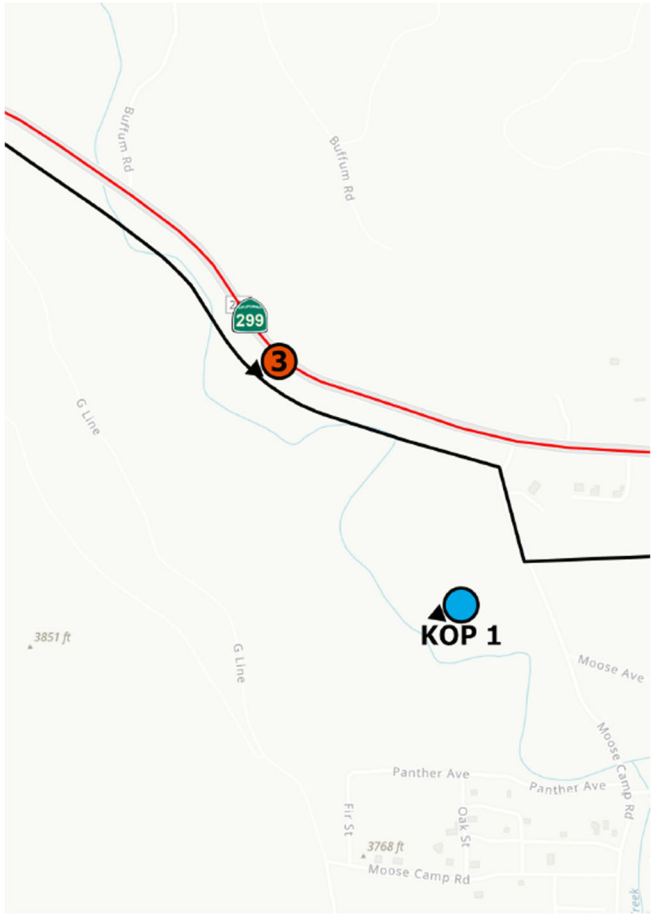
Facing Fountain Wind Project Area



Additional KOP 3

Photo Taken 11/06/2024 at 9:17 AM

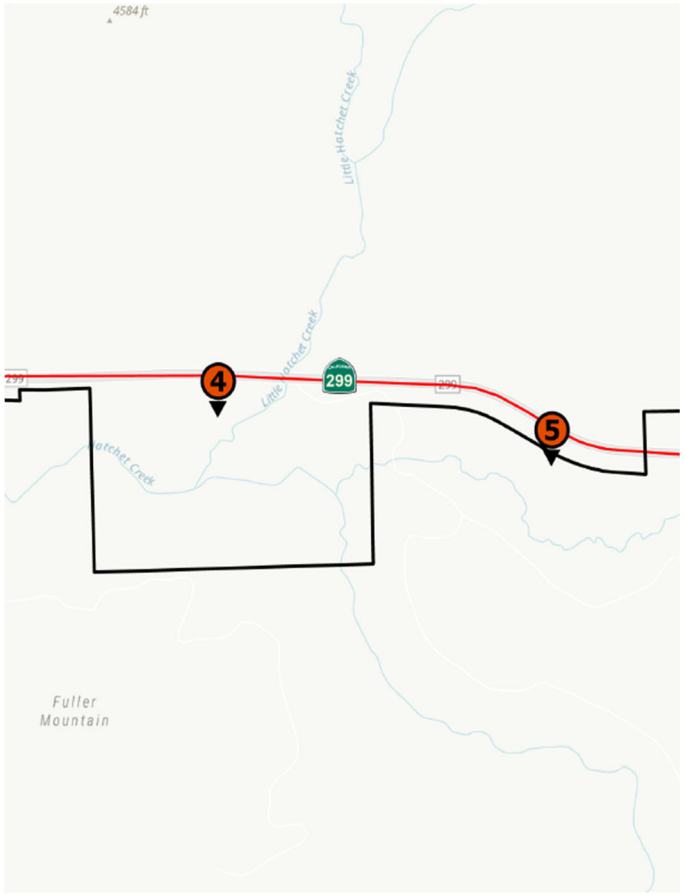
Facing Fountain Wind Project Area

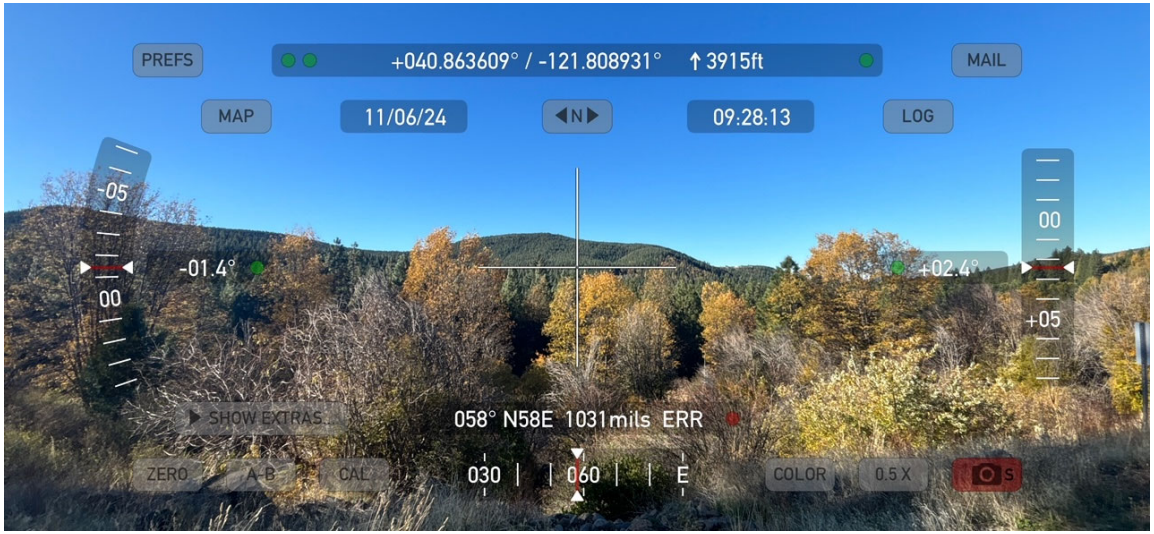


Additional KOP 4

Photo Taken 11/06/2024 at 9:25 AM

Facing Fountain Wind Project Area





Additional KOP 5

Photo Taken 11/06/2024 at 9:28 AM

Facing Fountain Wind Project Area

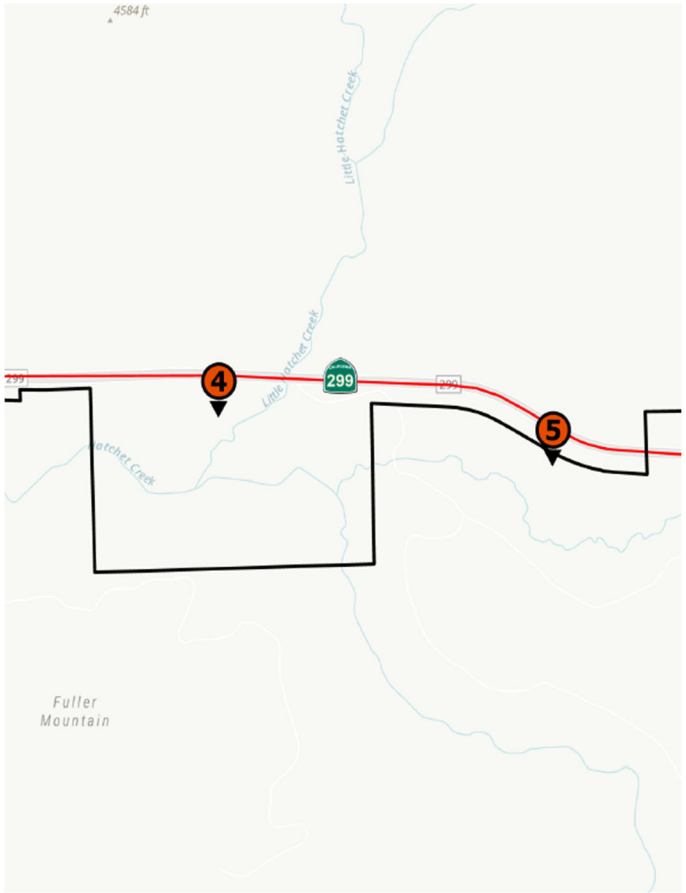


Exhibit E

Peer Review of the Aquatic Survey Resources Report

ENPLAN

374-011
November 4, 2024

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Redding, CA 96002

Adam Fieseler, Assistant Director
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SUBJECT: Fountain Wind Energy Project: Peer Review of the Aquatic Survey Resources Report and Associated Documentation

In response to your request, ENPLAN has completed a peer review of the aquatic resource delineation and associated documentation submitted to the California Energy Commission (CEC) in support of the Fountain Wind Energy Project. The project entails the construction and operation of up to 48 wind turbines. Associated development would include construction of underground and overhead collection lines, access roads, maintenance facilities, evaluation towers, batch plants, substations, and a relay microwave tower. The project area is generally located between the communities of Montgomery Creek and Burney, about 30 miles northeast of Redding, and immediately north and south of State Route 299.

This peer review was completed by Donald Burk. Don has a Master of Science degree in botany and nearly 30 years of experience conducting aquatic resource delineations. He is familiar with pertinent agency regulations regarding Waters of the State and United States.

Primary documents reviewed for this assessment are listed below:

> Stantec Consulting Services, Inc. December 23, 2019. Fountain Wind Energy Project Aquatic Resources Survey Report. (TN 248329-4 and 248307-2).
> *No figures were provided with this report. We assume that the data is consistent with the January 29, 2024, map cited below*.
>
> fwp aquatic feature jurisdictionality fig 1. January 29, 2024. Project Components and Potential Impacts to Waters (TN 254345).

For the purposes of this peer review, we have used various U.S. Army Corps of Engineers regulations, guidance, and technical standards as the standard against which the current study should be judged, including those listed below.

> Environmental Laboratory. (1987). "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1 (on-line edition), U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region (Version 2.0).

Minimum Standards for Acceptance of Aquatic Resources Delineation Reports. January 2016.

Updated Map and Drawing Standards for the South Pacific Division Regulatory Program. February 10, 2016.

Overall, the study appears to be based on thorough, professional field studies, and the work is well-documented and clearly presented. However, we do find two major omissions in the study, one based on the work itself and the other based on the broader needs of the project. These significant flaws are discussed below, and a number of technical and minor errors are also noted.

Riffle/Pool Complexes

The 1987 Manual identifies six types of "special aquatic sites." Four of these are not expected to occur in the project study area (sanctuaries and refuges, mudflats, vegetated shallows, and coral reefs). The other two (wetlands and riffle/pool complexes) have a high potential to be present. The Fountain Wind Energy Project Aquatic Resources Survey Report addresses the presence of wetlands but is completely silent regarding riffle and pool complexes.

The 2021 Nationwide Permit Definitions provide the following information: "Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course [sic] substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools."

The development of riffle-pool-run complexes is part of a natural hydrologic process. Although not described in the Nationwide Permit Definitions, runs consist of deep, fast-moving water with a uniform flow. They are found below pools and extend to the next riffle section.

Page 4 of the subject report documents the presence of riverine habitat dominated by riffles and runs. The presence of steep terrain is documented on page 3. Pages 11 and 12 note that 109 perennial stream segments are present in the study area. These stream segments total 30,495 feet in length and vary from 2 to 90 feet in width. We fully expect that riffle and pool complexes are present, if not common, in the delineated streams; however, these special aquatic sites are not identified in the Fountain Wind Energy Project Aquatic Resources Survey Report.

The Aquatic Resources Survey Report must be revised to evaluate and document the presence and extent of riffle/pool complexes. As documented in the February 10, 2016, Updated Map and Drawing Standards for the South Pacific Division Regulatory Program (Standard 5.d), the delineation map must:

"*Clearly show location and extent of all areas within the survey area potentially meeting the criteria for waters of the U.S., including special aquatic sites (e.g., wetlands, sanctuaries and refuges, mudflats, vegetated shallows, and **riffle and pool complexes**), and/or navigable waters. Each type of boundary (for example, ordinary high water mark, mean high water, wetlands or other special aquatic sites, and high tide line) must be clearly annotated and/or symbolized to ensure they are differentiable on the map."* [Emphasis added].

Once the location and extent of riffle/pool complexes has been identified and mapped, the anticipated impacts of the proposed project on this special aquatic type must be quantified. The extent of impacts on riffle/pool complexes may affect applicability of various Nationwide Permits as well as mitigation requirements for the project.

Non-Wetland Riparian Habitats
Under Section 1600 of the California Fish and Game Code, California Department of Fish and Wildlife has permit authority over the bed, channel, and bank of any river, stream, or lake in the state. The "bank" is generally accepted as the land that confines the flow, along with the riparian vegetation that is supported by the waterbody. For streams, CDFW permit authority can in some cases encompass the entire 100-year floodplain.

Under USACE procedures, the limit of federal jurisdiction over streams is defined as the land encompassed in the ordinary high-water mark; where riparian vegetation is adjacent to the stream, the extent of federal jurisdiction is confined to areas meeting the three-parameter test. Because riparian plant species may be deep-rooted, in many cases they extend upslope of the limits of federal jurisdiction. For this reason, CDFW permit authority may encompass a broader stream cross-section than that regulated by the USACE.

CDFW encourages wetland professionals to map and quantify the extent of CDFW permit authority where it exceeds the extent of USACE jurisdiction. The Fountain Wind Energy Project Aquatic Resources Survey Report does not map any occurrences of riparian habitat upslope of USACE jurisdiction. However, review of aerial photographs strongly suggests that the riparian corridor is much broader than the USACE jurisdictional lands in many locations. This is confirmed through some of the data forms provided in the report, e.g., Data Point 63 (and probably 054-up) document the presence of 60% riparian cover adjacent to a stream and riparian wetland, and identifies this as non-wetland habitat – but it would clearly be subject to CDFW permit authority.

In addition to the Aquatic Resources Survey Report, riparian vegetation is addressed in the Fountain Wind Project Rare Plant Surveys and Natural Vegetation Community Mapping (West, Inc., 2018, 2019). However, the latter provides only a broad-brush approach and assumes that "any future modifications to habitat along streams (e.g., riparian areas) due to added road work will incorporate riparian protections consistent with other ongoing management activities (i.e., timber harvesting) in the region."

The approaches utilized for the two studies result in a significant data gap. There is no opportunity for the reviewing public to determine how much non-wetland riparian habitat is present in the study area and how much of this vital riparian habitat will be eliminated as a result of project implementation. Additional field study is needed to map the full extent of

riparian habitat and, subsequently, the impacts of the proposed project on this sensitive habitat type must be quantified, and appropriate mitigation measures must be disclosed.

Additional Errors

- Section 1, paragraph 4: The survey area is described as including "a 200-foot buffer around proposed project facilities." The definition of "facilities" contradicts that used in Paragraph 1 of the same section.
- Section 2, paragraph 1: The location of Buckhorn station needs to be provided.
- Section 2, paragraph 1: "annual average high" should be "average annual high."
- Section 2, paragraph 1: A citation is needed for the growing-season period stated in the report. Given that the study area elevation ranges from 3,550 feet to 6,300 feet in elevation, a single growing-season reference is inadequate.
- Section 2.2, paragraph 4: This section describes vegetation communities including a lodgepole pine, fresh emergent wetland, and riverine. While not necessarily an error, this conflicts with the West reports, which do not describe these vegetation communities (or anything even similar) in the study area. Reconciliation of the vegetation descriptions in two technical studies is needed (starting with a cross-walk).
- Section 3.2: Field study date ranges should be consistent with those provided in Section 1, and the more detailed of the descriptions should be used.
- Section 3.2.2, Line 1: "non-wetland features" should be "non-wetland aquatic features."
- Section 3.2.2, paragraph 2: "average depth" is unclear. Is this average thalweg depth of average cross-sectional depth?
- Section 5.0, paragraph 2: Current regulations defining Waters of the US should be used. Waters of the State should also be defined and addressed.
- Data Point 3, Vegetation: 50% is not 35.
- Data Point 13, Vegetation: 20% is not 13.2, *Mentha* is not a dominant.
- Data Point 21, Other Waters: indicators and feature designations are not provided.
- Data Point 35: Summary of Findings is incorrectly marked.
- Data Point 36: Summary of Findings is incorrectly marked. Four species are incorrectly identified at dominants. Dominance test is incorrect, prevalence index must be calculated.
- Data Point 37: Summary of Findings is incorrectly marked.
- Data Point 38: Summary of Findings is incorrectly marked. For soils, F6 Dark Redox Surface is not applicable -- F6 must have value of 3 or less, chroma of 1 or less, and 2% or more concretions or value 3 or less, chroma 2 or less and 5% or more concentrations.
- Data Point 47: Summary of Findings is incorrectly marked.
- Data Point 51: Prevalence Index is incorrect, FAC cover is 5%.
- Data Point 54: Soil appears to be hydric per F3 Depleted Matrix.
- Data Point 56: Summary of Findings is incorrectly marked.
- Data Point 58: Summary of Findings is incorrectly marked. "Hydrophytic Vegetation Present?" is incorrectly marked. Soil Remarks incorrectly states that no indicators were observed. Hydrology field observations conflict with Remarks.

- Data Point 60: Must calculate Prevalence Index since soils and hydrology are positive. Vegetation summary box marking conflicts with Remarks and Summary of Findings.
- Data Point 62, Soils: Histic Epipedon does not apply. A histic epipedon must be underlain by a mineral soil with a chroma of 2 or less. Organic layer is usually 8 inches or greater in depth.
- Data Point 65: Summary of Findings is incorrectly marked. "Other Waters" evaluation is positive, but feature is identified as an upland. Hydric Soil is incorrectly marked.
- Data Point 66: Summary of Findings is incorrectly marked.
- Data Point 67: Soil is marked as naturally problematic, but this is not explained in Remarks.
- Data point 052 up: *Bromus carinatus* is not a dominant. Dominance test and Prevalence Index are incorrect.
- Data Point 053 up: Prevalence Index is incorrect.

Please contact me if you have any questions regarding our results.

Sincerely,

Donald Burk
Environmental Services Manager

c: Ryan Baron, Best Best &Krieger

Exhibit F

Review of the Rare Plant Surveys and Natural Vegetation Community Mapping

ENPLAN

374-011
November 1, 2024

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SUBJECT: Fountain Wind Energy Project: Peer Review of the Rare Plant Surveys and Natural Vegetation Community Mapping

In response to your request, ENPLAN has completed a peer review of the botanical studies and associated documentation submitted to the California Energy Commission (CEC) in support of the Fountain Wind Energy Project. The project entails the construction and operation of up to 48 wind turbines. Associated development would include construction of underground and overhead collection lines, access roads, maintenance facilities, evaluation towers, batch plants, substations, and a relay microwave tower. The project area is generally located between the communities of Montgomery Creek and Burney, about 30 miles northeast of Redding, and immediately north and south of State Route 299.

This peer review was completed by Donald Burk. Don has a Master of Science degree in botany and over 40 years of botanical field experience in Shasta County. He is familiar with the rare plants and natural communities of the area, as well as with pertinent agency regulations regarding rare plants and natural communities.

Primary documents reviewed for this assessment are listed below:

> Flaig, K., Q. Hays, and J. Thompson. 2018. Rare Plant Surveys and Natural Vegetation Community Mapping, Fountain Wind Project, Shasta County, California. Prepared for Pacific Wind Development LLC, Portland, OR. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon. October 17, 2018.
>
> Flaig, K., A. Chatfield, and J. Thompson. 2019. Rare Plant Surveys and Natural Vegetation Community Mapping, Fountain Wind Project, Shasta County, California. Prepared for ConnectGen Operating LLC, Houston, Texas. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon. December 20, 2019.
>
> Thompson, J., K. Lawrence, and A. Chatfield. 2021. Rare Plant Surveys, Fountain Wind Project, Shasta County, California. Prepared for CG Fountain Wind LLC, Houston, Texas. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon. October 19, 2021.

Thompson, J., Fields, J., and Flaig, K. 2023. 2023 Rare Plant Spot-Check Surveys, Fountain Wind Project, Shasta County, California. Prepared for CG Fountain Wind LLC, Houston, Texas. Prepared by Western EcoSystems Technology, Inc. (WEST), Corvallis, Oregon. September 28, 2023.

West, Inc. January 10, 2019. Technical Memorandum from Andrea Chatfield and Kurt Flaig, WEST, Inc., to Kristen Goland, Pacific Wind Development LLC. RE: Request for Clarifications on 2018 Rare Plant Survey and Natural Vegetation Community Mapping Report for the Fountain Wind Project.

West, Inc. June 9, 2023. Memorandum from Joel Thompson, WEST, Inc., to John Kuba, ConnectGen LLC. Subject: Rare Plant Spot Check Surveys for the Fountain Wind Project.

Stantec Consulting Services, Inc. December 23, 2019. Fountain Wind Energy Project Aquatic Resources Survey Report.

The rare plant surveys conducted by WEST were completed over the course of four field seasons. The 2018 survey addressed the then-proposed development footprint; revisions to the study area were addressed in 2019 and 2021. The 2023 survey consisted of spot checks of work completed in prior years. It should be noted that with the exception of the 2023 spot checks, no attempt was made to re-survey areas that were previously addressed, i.e., with the exception of the spot checks, each portion of the study area was surveyed only during one season.

The four survey reports are very similar in format and content with respect to rare plants. Therefore, comments made with respect to one report typically apply to all four reports. For the purposes of this peer review, we have used the *2018 CDFW Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (*Protocols*) as the standard against which the current study should be judged. The *Protocols* have been adopted by CDFW, and are designed to help applicants "meet California Environmental Quality Act (CEQA) requirements for adequate disclosure of potential impacts to plants and sensitive natural communities." Further, the *Protocols* are referenced in the Methods sections of the WEST reports. The field surveys and reports completed by WEST fall far short of the accepted standards, as documented below.

SURVEY AREA

- Per the *Protocols*, botanical survey reports must provide a description of the proposed project.
    - No description is provided other than this is a "wind project."

- Per the *Protocols*, botanical survey reports must provide a detailed map of the project area that identifies topographic and landscape features.
    - The maps in the reports are nearly useless. No topographic map is provided. No landscape features are identified – no roads, streams, rivers, mountains, communities, etc. There is no information allowing one to know where in

Shasta County the project is located. The scale of the maps is insufficient to allow the reader to understand the extent of the field survey.
    - The study location is described in the report text only in very ambiguous terms ("central Shasta County"). Township/Range/Section and quad sheet name(s) should be provided, or coordinates should be given. Distances to nearest communities or similar setting information should be provided.

- Per the *Protocols*, botanical survey reports must provide a vegetation map of the project area using *Survey of California Vegetation Classification and Mapping Standards* at a thematic and spatial scale that allows the display of all sensitive natural communities.
    - A vegetation map is provided, but the scale renders it nearly useless. Additional comments regarding the vegetation mapping are provided below.

- Per the *Protocols*, botanical survey reports must include a soils map.
    - No soils map is provided, and the text description of soils is limited to one sentence.

- Per the *Protocols*, botanical survey reports must include a written description of the biological setting, including all natural communities; geological and hydrological characteristics; and land use or management history.
    - While the reports do provide a very brief overview of some of the needed information, they are missing basic data such as the acreage of the study area, the elevation range of the study area, and a general description of topography (i.e., steep vs. gently rolling) and aspect of the study area (north-facing vs. south-facing). Given the influence of the Fountain Fire, the acreage and percentage of the study area that was burned should be provided; a map showing burn extent and burn intensity within the study area would also be highly informative.

- Per the *Protocols*, botanical surveys should be comprehensive over the entire project area, including areas that will be directly or indirectly impacted by the project.
    - The WEST reports do not adequately identify the project area or the survey area. Locations of the survey corridors are depicted on a map at a scale that does not allow identification of the actual survey areas. Widths of the survey corridors are not provided. Spacing of survey transects within these corridors is not provided. The reports state that buffers were surveyed around all areas that may be subject to ground disturbance, but the width of the buffers is not provided and cannot be discerned on the map.

- Even if the survey area was defined as needed, because the proposed project is not described, there is no way to determine if adequate buffers were surveyed as needed to address potential indirect impacts.

- Figure 1 of the 2023 report shows "current disturbance corridors" and "previous survey corridors." Close examination of this (low-quality) map shows a half-dozen

current disturbance corridors outside the previous survey coverage areas. These areas were not addressed in the 2023 spot checks, so they apparently remain without any botanical survey coverage. Additional field survey is warranted.

METHODS – RARE PLANT SURVEYS

- The *Protocols* provide a definition of special-status plant species. The WEST reports do not define this term, but (as evidenced in their records search results) use a narrower definition that excludes many special-status plants from consideration. As discussed on page 3 of the *Protocols*, special status plants may include plants tracked by the California Natural Diversity Data Base (CNDDB) as California Rare Plant Rank (CRPR) 3 and CRPR 4. As documented in the WEST reports and in the January 10, 2019, memo prepared by WEST, for the purpose of the Fountain Wind project, "target" species were limited to state and federally listed species and species with a CRPR of 1B or 2B.
    - As noted in the *Protocols*, CRPR 3 and 4 plants may warrant consideration under CEQA Guidelines §15380 with respect to both direct impacts and cumulative impacts. Because CRPR 3 and 4 species were intentionally excluded from the "targeted" rare plant survey, the public has no basis to determine if these species are present and if potential impacts to these species may be significant. Likewise, the public has no opportunity to evaluate cumulative impacts to these species or to request mitigation for the loss of such species.

- As stated on page 4 of the *Protocols*, "Botanical field surveys should be floristic in nature, meaning that every plant taxon that occurs in the project area is identified to the taxonomic level necessary to determine rarity and listing status. "Focused surveys" that are limited to habitats known to support special status plants or that are restricted to lists of likely potential special status plants are not considered floristic in nature and are not adequate to identify all plants in a project area to the level necessary to determine if they are special status plants." [emphasis added]. This is reinforced on page 5 of the *Protocols*, which states: "Botanical field surveys and subsequent reporting should be comprehensive and floristic in nature and not restricted to or focused only on a list."
    - The surveys completed by WEST were focused, not floristic. As discussed on page 2 of WEST's 2018 report, the study consisted of "focused surveys to determine presence or absence of target species…".
    - The absence of floristic surveys means that the surveyors could easily have overlooked unexpected occurrences of special status species, such as range extensions – and range extensions are not uncommon. Likewise, the surveyors would have overlooked previously undescribed species (which are very likely to be rare as defined in the State CEQA Guidelines); while not as common as range extensions, new species continue to be found in Shasta County (see below), particularly in remote areas such as the Fountain Wind project vicinity. The focused surveys conducted by WEST fall short of the accepted standards presented in the *Protocols* and are not adequate to support CEQA review.

- The 2018 records search identified 51 “target species” (with 36 listed as being possibly present). For the 2019 surveys, 69 species were targeted (with 47 listed as possibly present). Although 18 new “target species” were identified (11 listed as “Potentially Present”), the surveyors did not return to the 2018 study area to survey for these additional species. The reports state that the surveyors reviewed species descriptions, photographs, and habitat requirements of the target species prior to the surveys – the 2018 review obviously did not extend to the full list of target species developed in 2019.
    - Because a floristic study (as required in the *Protocols*) was not conducted, there is no basis to determine if these additional “target species” are actually present in the 2018 study area. The 2018 survey crew would not have been familiar with the future additions to the target species list, which increases the likelihood that they would have been overlooked. Therefore, the 2018 survey was insufficient to meet WEST’s stated (non-protocol) “target species” survey approach.

- Paragraph 1 of this section states that CNDDB provides “an inventory of …rare plant communities,…” This is misleading. The Natural Communities mapping program was halted in the mid-1990’s and no new occurrences have been added since then. Identification of rare plant communities in the CNDDB is far from complete.

- Paragraph 1 of this section states that the CNPS records search was focused on Shasta County.
    - This is not further explained and appears to be a vast overstatement. Current CNPS records for Shasta County identify 105 species with a CRPR of 1A, 1B, 2A, or 2B, yet the total number of “target plants” identified by WEST in 2019 is only 67. Either the report text needs to be revised to state the actual search parameters or a number of additional species need to be added to the “target species” list.

- The validity of the records searches is questionable. The initial records search was completed in January 2017. It was thus over a year out-of-date when the initial field survey was conducted. The CNPS Inventory was updated by WEST in May 2019, prior to conducting the 2019 survey. However, as documented in the report references, the CNDDB records search was apparently not updated. The 2021 WEST report relies on the 2017 records search (as documented in the report references section), which was four years old at the time of the field work. The 2023 report states that the list of target species developed for the 2021 surveys served as the basis for the 2023 spot checks. Although the 2023 reference sections cites 2021 data, the same 2021 data is not cited in the 2021 report. We do not know if the surveyors relied on six-year-old data or two-year-old data. While the *Protocols* do not explicitly define how recent the records search must be, most botanists would update the records search prior to conducting field work each season; use of a six-year-old records search does not meet professional standards.

- The records searches did not include review of U.S. Fish and Wildlife Service records of species that may potentially be affected by a project at the specified site location.

- The discussion of rare plant survey methods utilized by WEST does not comply with the CDFW standards.
    - Page 5 of the *Protocols* states: "Botanical field surveys should be comprehensive over the entire project area, including areas that will be directly or indirectly impacted by the project. Adjoining properties should also be surveyed where direct or indirect project effects could occur, such as those from fuel modification, herbicide application, invasive species, and altered hydrology."
        - The WEST surveys were limited to specific project corridors and activity nodes and did not address the entire project area. As noted above, even the areas that were surveyed are not adequately described.

    - Page 6 of the *Protocols* states that known reference sites should be visited to allow the surveyors to determine if the special-status species are identifiable at the time of the survey, and to obtain a visual image of the special-status plants, associated habitat, and associated natural communities.
        - Reference sites are not mentioned in the 2018, 2019, or 2021 WEST reports. The 2023 report states that given the number of special-status species that could be present, visitation of known reference populations was not feasible/practicable. This is a lame excuse. Given that surveys were conducted in years with vastly different precipitation levels, at a minimum, some reference populations should have been checked. For example, during drought years, known populations of special-status wetland species should have been visited; in years with high snowfall, populations of late-blooming species such as Cascade grass-of-Parnassus should have been checked to determine their phenology.

    - Page 9 of the *Protocols* states that botanical survey reports must include the names and qualifications of the botanical field surveyors.
        - Field surveyors are named in three of the four reports, but resumes are provided for only four of the five individuals who (apparently) participated in the field surveys.

    - Page 9 of the *Protocols* requires that the dates of the botanical field surveys be provided, indicating the botanical field surveyors that surveyed each area on each survey date.
        - Although a date range is provided for the survey periods, no additional information is given. Because the botanical survey dates are mixed

with the weed mapping and habitat mapping, we don't even know on which days the botanical survey work was actually conducted.

- Page 9 of the *Protocols* requires that the total person-hours spent during the botanical survey be identified.
  - No information on the extent of the survey effort is provided. The report should separately identify total-person hours spent on the rare plant survey, the natural community mapping, and the invasive plant species mapping as these are three distinctly different work areas. Survey hours exclude travel time, plant identification time, break time, and other hours not focused on the survey field-coverage effort.

METHODS – NATURAL VEGETATION COMMUNITIES

- As discussed on page 4 of the *Protocols*, CDFW's *List of California Terrestrial Natural Communities* provides the best available natural communities information and indicates which natural communities are considered sensitive. The list is routinely updated, most recently on June 1, 2023.
  - The 2018 survey report states that vegetation was mapped in accordance with the 1986 Holland classification system or the 2008 [actually 2009] *A Manual of California Vegetation*. The 2019 report utilized the 2009 *A Manual of California Vegetation*. The classification system in the 2009 *Manual* is compatible with the CDFW *List of California Terrestrial Natural Communities;* the Holland system is not compatible with the others. Review of the 2018 report shows that it relies heavily, if not exclusively, on the Holland system. The 2018 report concludes that no sensitive natural communities are present. The 2019 report takes the natural community descriptions in the 2018 report and shoehorns them into the *Manual of California Vegetation*/CDFW *California Terrestrial Natural Communities* system – and now concludes that sensitive natural communities are present.
    - Knowledge of California's natural communities has increased substantially over the past decades, particularly with respect to sensitive natural communities. Because outdated standards were used to document natural communities, there is a high potential that communities currently described as sensitive may have been overlooked. The CDFW *List of California Terrestrial Natural Communities* states the status of each described community. By utilizing old systems with different natural community nomenclature, there is no direct nomenclatural link to identify whether a community is sensitive or not. Some of the old nomenclature may be "cross-walked" to the new nomenclature, but that is not always the case. The use of old natural community descriptors severely limits the ability of the public to determine if sensitive plant communities are actually present in the study area.
  - The 2018 and 2019 reports identify natural communities to the "Alliance" level, which is a relatively generic description. Each Alliance can contain

multiple "Associations" that are more precisely defined natural communities. Although some Alliances can be designated as sensitive, sensitive natural communities are more typically described at the "Association" level. A non-sensitive Alliance may contain sensitive Associations. For example, the 2019 report identifies the presence of the *Pinus ponderosa* Forest Alliance and correctly states that the Alliance is not sensitive. However, 28 of the 45 currently described Associations falling under the *Pinus ponderosa* Forest Alliance are identified as sensitive. Because of the gross level of natural community classification/mapping used by WEST, the public has no information as to whether sensitive natural communities (Associations) are actually present.

- The *Protocols* state that detailed mapping of sensitive natural communities should be provided (1:24,000 or larger, which is the same as 1" = 2,000'). The mapping in the reports is nowhere near this detailed; the 2018 map is near 1" = 9,600' and the 2019 mapped is even more zoomed out at 1" = 11,115'.

METHODS – INVASIVE PLANT SPECIES

- The Methods section of the WEST report states that mapping of invasive plant species was mainly restricted to existing road corridors; off-road areas were not mapped because they are unlikely to support invasive plants, and clear-cuts were not mapped because they are known to contain a high concentration of weedy species. However, the mapping does not identify these areas, so it is impossible to distinguish an area that was not surveyed from an area that was surveyed but does not support weeds.

- The methods section states that all weeds identified by CAL-IPC with a rating of "High," "Moderate," and "Limited" were mapped. However, the plant list includes several plants that meet these criteria but were not mapped, including *Hypochaeris* sp. (Limited or Moderate), *Plantago lanceolata* (Limited), *Bromus tectorum* (High), *Poa pratensis* (Limited), and *Elymus caput-medusae* (High; shown in the 2019 map but not the 2018 map even though it is on the 2018 list of plant species encountered).

RESULTS AND DISCUSSION – RARE PLANT SURVEYS

- As discussed above, the 2018 list of "targeted" rare plant species excluded a number of species later identified as potentially being present. The 2018 survey area was never fully resurveyed for the additional species (other than for some spot-checks in 2023). Therefore, the results of the 2018 survey must be discounted and the affected footprint and appropriate buffers need to be re-surveyed.

- *Castilleja lassenensis* is not included in the 2017 CNDDB records search but appears in the subsequent records searches. WEST states that the species is "Unlikely" to occur in the study area because it is restricted to the flanks of Lassen and granite substrates in the Sierras. We disagree with both the habitat description and the potential-for-occurrence assessment. With respect to habitat, the species does not occur on granitic substrates in the Sierra; it is restricted to volcanic

substrates in the southern Cascade Range. *Castilleja lassenensis* was resurrected as a valid species in 2015 and little work has been conducted to document the range of the species. Most of the work to date has been in Lassen Park; however, we are aware of a number of populations in the Caribou Wilderness and other locations that have not yet been formally documented (and it should be noted that all previously reported *C. lemmonii* populations in the southern Cascades may actually be *C. lassenensis*). Additionally, existing records show that *Castilleja lassenensis* has been reported from the Burney and Burney Mountain West quadrangles, and that the species may occur at elevations as low as 4,800 feet. The potential for occurrence should be revised to "Possible."

  - Because this rare species was not on the "target" list in 2018, additional field survey is needed.

- *Trifolium siskiyouense* (CRPR 1B.1) is not included in the 2017 CNDDB records search but appears in the subsequent records searches. WEST states that this wet-montane-meadow inhabitant is "Unlikely" to occur in the study area because the nearest occurrence is on "volcanic plateau approximately 30 miles south of Project." This is incorrect. *Trifolium siskiyouense* has been reported from "Montgomery Creek," which is about three miles west of the project footprint. The specific location is unknown, but could easily be within the study area. Other reported populations are to the north of the project, not to the south. The potential for occurrence should be revised to "Possible."
  - Because this rare species was not on the "target" list in 2018, additional field survey is needed.

- Broad-nerved hump moss (CRPR 2B.2), three-ranked hump-moss (CRPR 4.2), Pacific fuzzwort (CRPR 4.3), and slender silver-moss (CRPR 4.2) are included in the CDFW *Special Vascular Plants, Bryophytes, and Lichens List* (2024), and are identified by WEST as being "Possible" in the study area. None of the resumes provided in the WEST reports indicate that the surveyors have any experience in bryophyte identification, and no bryophytes are included in the list of observed species. Absent any information to the contrary, it appears that a bryophyte survey was not conducted. A survey of the entire project area by qualified bryophyte specialists is needed.

- The Siskiyou jellyskin lichen (*Scytinium siskiyouense*; CRPR 1B.1) is included in the CDFW *Special Vascular Plants, Bryophytes, and Lichens List* (2024). However, this rare species is not mentioned in any of the rare plant survey reports and the WEST survey crews were not trained in its detection. A survey of the entire project area by qualified lichen specialists is needed.

- The reports identify a number of plants only to the genus level. However, at least 11 of these genera may include special-status species (CRPR 1-4). In Shasta County alone, Calflora identifies one rare *Allium*, two rare *Lomatiums*, four rare *Erigerons*, one rare *Solidago*, one rare *Cryptantha*, five rare *Carexes*, five rare *Silenes*, two rare *Phacelias*, nine rare *Eriogonums*, one rare *Castilleja*, and three rare *Penstemons.* Because the surveyors did not identify taxa in these genera to the species level, the

public has no way of knowing if any of these 34 Shasta County rare plant species are present in the Fountain Wind survey area.

- A new species of onion (*Allium incomptum*) was discovered in Shasta County in 2015, with the description published in 2022. CDFW designated this species as CRPR 1B.3 in April 2023. The newly described rare onion occurs less than 15 miles from the Fountain Wind survey area. Because the surveyors did not update their records search prior to the 2023 surveys, they were apparently unaware of the potential for the onion to occur in the study area. WEST's 2018 list of plant species encountered includes *Allium parvum* (which has a similar appearance to *Allium incomptum*) and one unidentified species of onion. The 2019 report lists *Allium parvum* and at least two unknown species of onions. The 2021 and 2023 reports drop *Allium parvum* and list only two or more species of unknown onions.
    - WEST apparently observed three or more species of onions in the study area and identified only one of them to species level. The public has no way of knowing if the recently described rare onion, *Allium incomptum*, occurs in the study area.

- The WEST reports state that the range of survey dates included the blooming times of all "target" rare plant species, but this may not be correct. The 2018 survey was conducted between May 21 to May 29 and July 30 to August 3, the 2019 survey was conducted between May 29 to June 3 and July 30 to August 2, and the 2021 survey was conducted on May 24 and 25 and July 27 and 28. The 2023 survey was conducted on unspecified dates in June and August.
    - Red Bluff dwarf rush is identified as blooming in March, April, and May; given drought conditions in some of the survey years, there is no basis to determine if it would have been identifiable during the stated survey periods. Had the surveyors checked reference population as recommended in the *Protocols*, the validity of the survey dates could have been assessed/defended.
    - Silky cryptantha is identified as blooming in April and May; given drought conditions in some of the survey years, there is no basis to determine if the species would have been identifiable during the stated survey periods. Had the surveyors checked reference population as recommended in the *Protocols*, the validity of the survey dates could have been assessed/defended.
    - Three-ranked hump moss is shown as being identifiable in July; very little field survey work occurred in July. There is no basis to determine if the species would have been identifiable during the stated survey periods. Had the surveyors checked reference population as recommended in the *Protocols*, the validity of the survey dates could have been assessed/defended.
    - Rattlesnake fern is shown as being identifiable only in June; very little field survey work occurred in June. Additional documentation is needed to support a conclusion that the field survey would have detected rattlesnake fern if present in the study area. We believe that the fern is detectable over a much

broader date range, but this would need to be supported in the WEST reports.
    - Cascade grass-of-Parnassus is identified as blooming in August and September. Survey coverage barely extended into August in 2018 and 2019 and terminated in July in 2021; given high snowfall in some of the survey years, there is no basis to determine if the species would have been identifiable during the stated survey periods. Had the surveyors checked reference population as recommended in the *Protocols*, the validity of the survey dates could have been assessed/defended.
    - Because no dates are provided for the 2023 surveys, the potential for surveys to allow identification of rare species cannot be assessed.

- The 2018 report concludes that no rare plant species were encountered. This is contradicted by the plant list included in the report, which lists *Carex comosa* as being observed. Also, the plant community descriptions in the 2018 report identify *Carex comosa* as a common species in the Wet Montane Meadow habitat. *Carex comosa* is a CRPR 1B.2 species, and its potential for occurrence was identified in the pre-field research as "Possible," with a known occurrence six miles to the north. *Carex comosa* is deleted from the subsequent plants lists and plant community descriptions; no explanation is given as to why. A thorough explanation is necessary.

- The 2018 report also lists another rare plant, *Calystegia atriplicifolia* ssp. *buttensis,* as being present. Upon questioning by an outside reviewer, WEST prepared a Technical Memorandum in 2019 removing the plant from the list of species observed, noting that it was just outside the project footprint and is a CRPR 4.2 species that is not one of their "focal species."
    - As discussed above, CRPR 3 and 4 species should be considered in CEQA documents. Further, even if the plants were just outside the study area footprint, indirect and cumulative impacts to the species should be addressed in accordance with the *Protocols*.
    - The *Protocols* state that CNDDB data forms should be submitted for observations of CRPR 3 and 4 plants. No data forms were submitted as part of the WEST study.

- We are perplexed as to why WEST reports the presence of *Convolvulus* sp. on all of their plants lists. There are only four *Convolvulus* species reported in California: two rarely encountered horticultural escapees, one rare native that occurs only south of the Bay Area, and the extremely common weedy *C. arvensis*. We expect that all of the WEST botanists would be very familiar with *C. arvensis*, so the most likely explanation is that *Convolvulus* is used in its out-of-date conscription that included what is now *Calystegia*. This raises the question as to whether the rare *Calystegia atriplicifolia* ssp. *buttensis* was observed throughout the project site but was not reported. A thorough explanation is necessary.

- Woolly meadowfoam (*Limnanthes floccosa* ssp*. floccosa*; CRPR 4.2) is known to occur within a 10-mile radius of the project site and is included in the CDFW *Special Vascular Plants, Bryophytes, and Lichens List* (2024). However, this species is not mentioned in any of the rare plant survey reports, its blooming period typically ends prior to the dates at which the WEST surveys began, and the species is very unlikely to have been detected by the WEST survey crews. Surveys in April or early May are warranted.

- The CNDDB and WEST reports identify the survey period for *Limnanthes flocossa* ssp. *bellingeriana* (CRPR 1B.2) as extending from "April-June." We believe this is an overstatement. Based on review of California Consortium of Herbaria records, only one collection of this taxon has been made later than May 20 (by legendary botanists Taylor and Clifton). This species is very unlikely to have been detected by the WEST survey crews. Surveys in mid-April or early May are warranted.

- The 2019, 2021, and 2023 WEST reports claim to contain a comprehensive list of all plant species encountered during the current and prior surveys. This is not true. The 2018 report lists 219 species. The 2019 report adds 13 new species and drops two of those previously listed (*Carex comosa* and *Erythranthe guttatus*). The 2021 report lists only 125 species (of which four are newly added). The 2023 report lists 133 species (four newly added). A comprehensive list of plants identified by WEST should contain about 239 species – and this is a significant under-reporting of the number of species actually present.

- The WEST reports (2019, 2021, and 2023) state that plant species were identified to the highest taxonomic level possible using *The Jepson Manual: Vascular Plants of California, Second Edition* (Baldwin et al. 2012).
    - This statement is incorrect. The WEST plant lists use numerous out-of-date names for plant species. This undermines one's confidence in the quality of the reports and also highlights the age of the reports – the bulk of the work was completed five to six years ago and was not substantially updated during the 2023 spot checks; the old nomenclature persists in the 2023 report.

- We find that the "comprehensive" plant list prepared by WEST is far from complete. This may be because the WEST survey was "focused" and not floristic as is required under the *Protocols*. To help assess the adequacy of the WEST reports, we reviewed the plant list prepared for the project by the wetland delineators (Stantec, 2019). Stantec identified 179 plant species in the study area; 95 of these species are not on the WEST list.
    - The Stantec team included botanists based in northern California and with expensive experience in northern California. The nomenclature in the Stantec report conforms to standards current at the date of the report. Based on surveyor qualifications and report presentation, the Stantec report is of higher quality than the WEST report, and the Stantec plant list appears to be more reliable than the WEST list.

  - The Stantec list was not intended to be comprehensive and focused on aquatic resources; the fact that Stantec identified 95 species not observed by WEST undermines one's confidence in the WEST reports.
  - The Stantec plant list includes one rare plant species (*Sidalcea gigantea*, CRPR 4.3) that was not observed by WEST and is not on WEST's list of "target species." As discussed in the *Protocols*, plants of this status may warrant consideration under CEQA. Evaluation of indirect and cumulative impacts to the species should be addressed.
  - The Stantec report identifies the presence of western blueberry (*Vaccinium uliginosum*). The WEST reports list the closely related Shasta huckleberry (*Vaccinium shastense*) as a "target" species that has a "Possible" presence in the study area. The WEST report does not identify the presence of any *Vaccinium* in the study area, which further undermines one's confidence in the WEST reports.
  - The 2019 WEST report identifies 1,036 acres of *Acer glabrum* Provisional Shrub Alliance within the evaluation area, of which 31 acres are within the development corridors. The Stantec report identifies 28.6 acres of a montane riparian community dominated by shrubs including vine maple, *Acer circinatum*. Rocky Mountain maple, *Acer glabrum*, is not identified as being present. We find it highly disconcerting that WEST reported *Acer glabrum* in 2018 and 2019, but the more reliable (in our opinion) Stantec report does not identify any *Acer glabrum*. This concern is heightened by the fact that the 2021 and 2023 WEST reports list only *Acer circinatum*, not *Acer glabrum*. In 2023, WEST botanists re-visited 11 montane riparian habitats but did not identify *Acer glabrum* as being present – even though it was said to be the dominant species in 2019. We have to suspect that the WEST botanists mis-identified a dominant wetland plant in 2018 and 2019 and relied on this misidentification to describe a sensitive natural community.

- The scale and quality of the project mapping is insufficient to allow one to determine if all disturbance areas and sufficient buffers were surveyed.

- Three State-listed species are identified in the 2018 WEST report (Appendix A). However, the subsequent reports eliminate the column in the table identifying State status (the table name is changed to exclude State-listed species, but the Appendix cover sheets continue to indicate that State-listed species are identified). The basis for excluding State-listed species needs to be justified if the table is to remain in its most recent iteration.

- The list of "target species" (Appendix A) incorrectly identifies Mingan moonwort as a CRPR 2B.2 species and northern clarkia as a CRPR 1B.3 species.

- The WEST plant lists contain minor errors. Phacelia is spelled incorrectly (common name). *Veronica anagallis-aquatica* is a non-native species. *Rumex salicifolius* is a native species.

RESULTS AND DISCUSSION – NATURAL VEGETATION COMMUNITIES

- The 2018 vegetation community map is based on the Holland system. In 2019, the same map unit boundaries were used, but were renamed in accordance with CDFW standards. This created some problematic results.
    - The 2018 report distinguishes Mixed Montane Riparian Forest from Mixed Montane Riparian Scrub habitat, primarily based on a conifer forest overstory in the former. The 2019 report shoehorns these distinctly different habitats into a single shrub alliance: "*Acer glabrum* Provisional Shrubland Alliance". It is unclear how a tree-dominated habitat can now be considered as a shrubland.
    - As discussed above, it is doubtful that an *Acer glabrum*-dominated riparian scrub community is actually present on the site.
    - Lands described in 2018 as "Mixed Conifer Forest – Burned" are reclassified in 2019 as "Ponderosa Pine Forest Alliance." However, lands described in 2018 as "Mixed Conifer Forest – Unburned" were converted to "White fir – Douglas fir Forest Alliance" in 2019. A defensible explanation is needed to show how mixed conifer forest can be converted to both Ponderosa Pine Forest (dominated by a single species) and White Fir – Douglas Fir Forest. Is mixed conifer forest the pre-fire condition and ponderosa pine forest plantation the post-fire condition?
    - White fir is described as a minor component of the Mixed Conifer Forest – Unburned in 2018, but is a dominant species when reclassified as White Fir -- Douglas Fir Forest in 2019. We see no defensible explanation for this significant change.
    - *Carex utriculata* (=*C. rostrata*) was identified as one of 13 common species in the Wet Montane Meadow community in 2018, but is considered as the sole dominant species when the habitat was re-characterized as "Beaked Sedge Meadow" in 2019. Given the species identified in 2018, the habitat could readily have been re-characterized as "Bluejoint Reed Grass Meadow," "Beaked Sedge and Blister Sedge Meadow," or "*Carex utriculata* fen." The latter three communities are identified as Sensitive Natural Communities by CDFW, while the selected Beaked Sedge Meadow is not listed as a Sensitive Natural Community. A defensible explanation for this re-characterization is needed.
    - The 2018 Wet Montane Meadow description states that several shallow "bogs" are included within the larger meadow community. California "bogs" are more accurately described as fens. Many fens are considered as Sensitive Natural Communities by CDFW or are pending addition to this list (e.g., star sedge fen, shore sedge fen, woodland sedge fen, short-beaked sedge fen, California pitcher plant fen, western false asphodel – California bog asphodel fen, *Carex vesicaria* fen, *Carex utriculata* fen, *Carex capitata* fen).
        - All mention of "bogs" is removed in the 2019 WEST report, which is inappropriate. The fens need to be adequately described and documented so that it can be determined if they are a sensitive natural community (which is highly likely the case).

- The vegetation community maps contain multiple minor errors. In 2018, ELCA is listed as a dominant weed, but the species code is omitted from the legend. The legend uses the codes "CYED" and "RUAC" but the map designations are "CYEC" and "RVAC." The 2019 map legend provides a code for *Holcus lanatus*, but the species is not shown on the map nor is it included in the WEST plant list (but is included in the Results and Discussion Section). The 2019 legend lists "RUAC" twice and uses the code "ELCM" while both "ELCM" and "ELCA" are used on the map.

- As documented on pages 10 and 11 of the *Protocols*, botanical survey reports must include an assessment of potential project impacts on sensitive natural communities.
    - Although the 2019 report identifies the presence of 31 acres of a sensitive natural community in the development footprint, no assessment of the loss of community is provided, and the report provides no recommendations to avoid, minimize, or mitigate impacts to the sensitive natural community.
    - Project implementation will result in the conversion of an undisclosed acreage of natural habitat to a developed/industrial use. The permanent loss with respect to each habitat type present in the study area must be quantified and evaluated, and avoidance, minimization, and mitigation measures must be provided as appropriate.

- Page 8 of the *Protocols* states that if a sensitive natural community is found in a project area, the surveyors shall document it with a Combined Vegetation Rapid Assessment and Releve Field Form and submit the form to VegCAMP.
    - No field forms are included in the 2019 report and there is no evidence that the required forms were submitted to VegCAMP.

- Under "Results" for Natural and Sensitive Vegetation Communities, the 2018/2019 reports state that "riparian communities" cross the development corridors in many areas and that they are "largely" at existing road crossings or in areas where future roads may be constructed.
    - Generally speaking, riparian habitats are widely recognized as having high ecological values and are generally considered to be sensitive habitats. The 2018/2019 botanical reports provide no indication as to the types of riparian communities present in the study area – is this term restricted to the purported *Acer glabrum* Provisional Shrub Alliance, a sensitive natural community, or does it include the purported *Carex utriculata* Herbaceous Alliance, a non-sensitive community?
    - The acreages of each community type in the study area need to be identified, particularly for sensitive communities and riparian communities. Likewise, the potential effects to these communities must be evaluated and avoidance, minimization, and mitigation measures need to be provided, as discussed on pages 10 and 11 of the *Protocols*. The short discussion in the 2019 WEST report concludes that "It is assumed that any future modifications to habitat

along streams (e.g., riparian areas) due to added road work will incorporate riparian protections consistent with other ongoing management activities (i.e., timber harvest) in the region." The evaluations and conclusions in the WEST reports fall far short of the botanical survey report standards as well as CEQA standards.

- We are aware that a separate aquatic resources delineation report was prepared, which identifies and maps certain riparian corridors. However, not all riparian habitats qualify as wetlands, so one cannot necessarily rely on the wetland delineation as the basis for evaluating riparian habitat impacts.

- Both the 2018 and 2019 WEST reports identify the presence of black oak woodland in several areas of the project site. The Oak Woodland Conservation Act (SB 1334) was adopted by the State legislature in 2004 and various requirements were incorporated into the California Environmental Quality Act (CEQA) and the State CEQA Guidelines. Essentially, if a county determines that a project will result in a significant effect to oak woodlands, the county shall require one or more oak woodland mitigation alternatives to offset the significant effect associated with the conversion of oak woodlands.
    - Maps in the WEST reports are inadequate to allow the locations of the oak woodlands to be ascertained, and no information is presented regarding the significance of the oak woodlands or possible impacts to the oak woodlands. Additional study is needed to appropriately characterize the on-site oak woodlands, assess the extent and significance of potential impacts to the oak woodlands, and develop appropriate avoidance, minimization, and mitigation measures.

RESULTS AND DISCUSSION – INVASIVE PLANT SPECIES

- The WEST reports suggest that a considerable effort was devoted to identification and mapping of noxious weed occurrences, which is laudable. However, the Results section does not address the potential spread of weeds into or out of the project area. The need to actively manage invasive species is recognized in the report, but the significance of the impact is not evaluated and no mitigation measures are provided.
    - It is inappropriate to dismiss the effects of the project as "minimal….relative to the influence of ongoing commercial timber operations." The actual extent of impacts must be identified and addressed regardless of surrounding land uses.
    - The reports suggest that new roads and facility sites have a high potential to support noxious weeds, but do not quantify the acreage of relatively weed-free habitat that may be converted to weed-infested habitat.
    - The potential for new weed species to be imported to the area as a result of project construction and operation is not addressed.
    - The introduction and spread of invasive plant species has a high potential to adversely affect natural communities in the area, potentially including

sensitive natural communities. As discussed on pages 10 and 11 of the *Protocols,* recommended avoidance, minimization, and mitigation measures to help offset the impacts of the proposed project must be presented in the report.

Please contact me if you have any questions regarding our results.

Sincerely,

Donald Burk
Environmental Services Manager

c: Ryan Baron, Best Best &Krieger