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Water Supply Report

Fountain Wind Energy Project

March 15, 2024

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Acronyms and Abbreviations

af	acre-feet
afy	acre-feet per year
Applicant	Fountain Wind LLC
CAL FIRE	California Department of Forestry and Fire Protection
CASGEM	California Statewide Groundwater Elevation Monitoring
CEC	California Energy Commission
CEQA	California Environmental Quality Act
DWR	California Department of Water Resources
ft bgs	feet below ground surface
Fountain Wind	Fountain Wind, LLC
gpm	gallons per minute
GSP	Groundwater Sustainability Plan
MW	megawatt(s)
O&M	operations and maintenance
Project	Fountain Wind Energy Project
SGMA	Sustainable Groundwater Management Act of 2014
SR	State Route
Stantec	Stantec Consulting Services Inc.

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) completed water supply planning for the Fountain Wind Project (Project) for the California Energy Commission (CEC), the California Environmental Quality Act (CEQA) Lead Agency for the Project. The Project comprises approximately 2,855 acres of actively managed timberland in unincorporated Shasta County, California, six miles west of the unincorporated town of Burney and about 35 miles northeast of Redding (Figure 1).

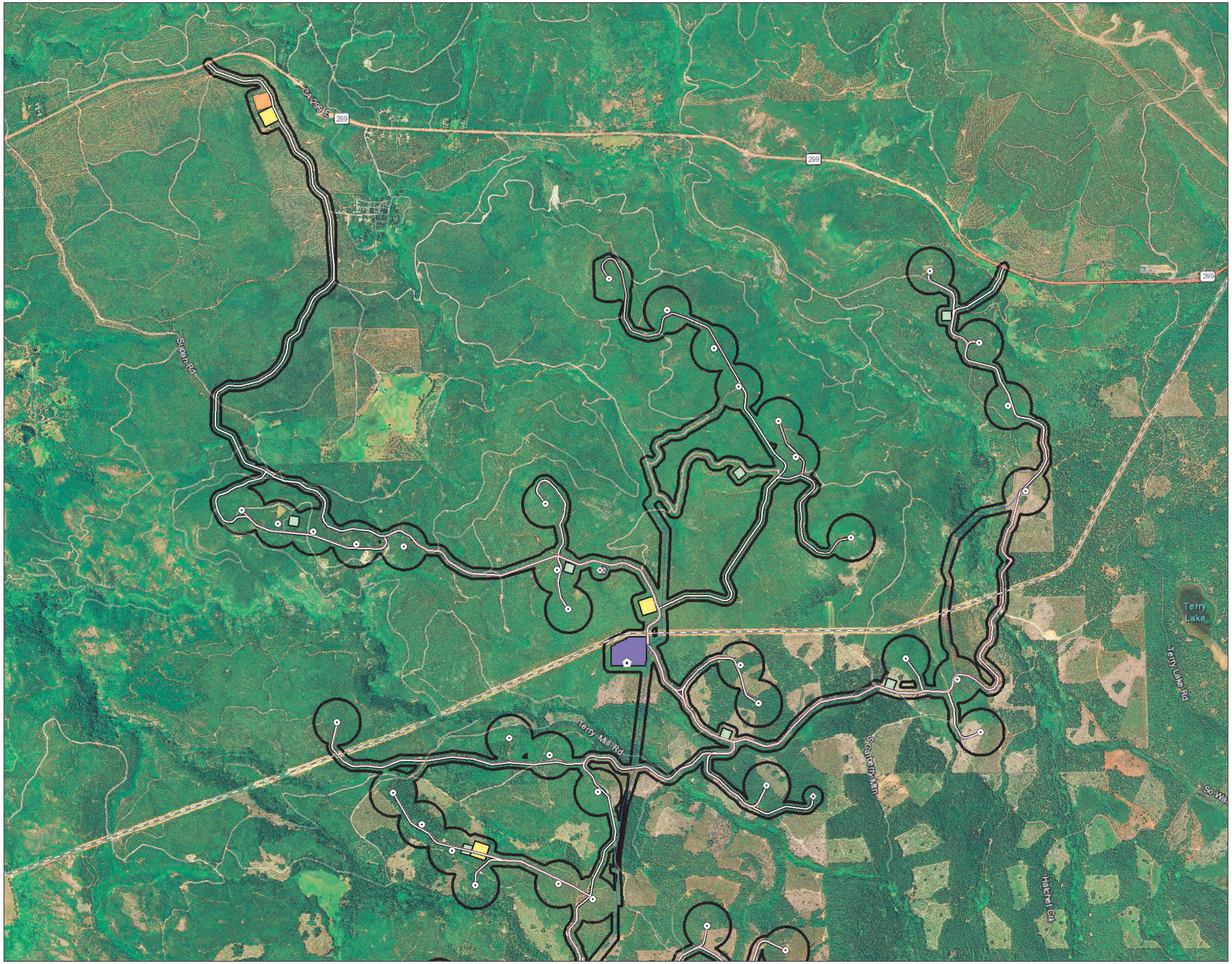
During construction, water would be imported by truck from public or private wells within one of the five Redding-Area Groundwater Subbasins or from the Burney Creek Valley Groundwater Basin. Most of the water to be used by the Project will be during a two-year period for construction of wind turbines, collector lines, and related facilities; dust suppression; soil backfill compaction; and concrete manufacture. Water would also be imported to fill and maintain tanks on site for fire protection. Construction water demand is estimated to be 310 acre-feet (af) over 28 months, or 260 acre-feet per year (afy) in year one and 50 afy in year two.

During the operational phase of the project, water would be drawn from a new, onsite well at the operations and maintenance (O&M) facility or imported by truck from a public or private well within one of the Redding-Area Subbasins or from the Burney Creek Valley Groundwater Basin. Water would be used by up to 10 full-time onsite employees and onsite fire flow water storage. Water demand during operations would be approximately 5.6[1] afy over 35 years for a total of 196 af.

As the CEQA lead agency, the CEC is tasked with analyzing whether the project would substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin or conflict with or obstruct implementation of a sustainable groundwater management plan. The CEC must also determine whether there are sufficient groundwater supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years. Stantec conducted this analysis to determine the potential for project-related groundwater withdrawal to have a significant environmental impact.

Overall, project-related water use would minimally increase local annual groundwater withdrawal during a brief two-year construction window and during the project's 35-year operational lifetime. As discussed below, this additional project-related withdrawal is a negligible increase in overall annual groundwater extraction for any of the potential source basins during construction or operation. As a result, water use by the project would not decrease groundwater supplies or interfere with groundwater recharge such that the project may impede sustainable groundwater management of any of the potential source basins. In addition, there are sufficient water supplies available to serve the project and reasonably foreseeable future development during normal dry and multiple dry years during construction and operations.

[1] 5,000 gallons per day, or equivalent to a pumping rate of about 11 gpm for eight hours per day



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Legend

- Turbine Location
- Met Tower Location
- Microwave Tower Location
- Storage Shed Location
- Overhead Collection
- Underground Collection
- Access Road
- Batch Plant
- O&M Facility
- Staging Area
- Substation/Switchyard Site
- Project Site Boundary
- PG&E Transmission Line

N

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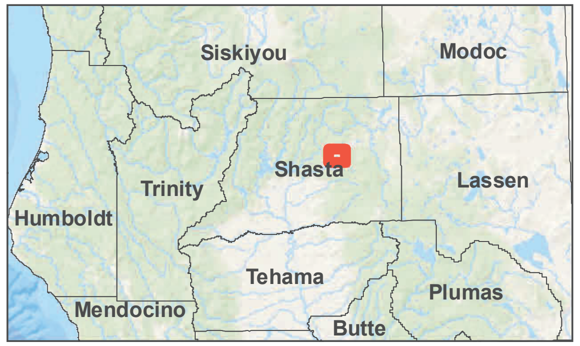
Notes
1. Coordinate System: NAD 1983 UTM Zone 10N
2. Data Sources: Shasta County GIS Division
3. Background: 2020 NAIP Orthoimagery



Project Location
Shasta County
California

Prepared by GC on 2023-07-05
TR Review by ES on 2023-07-05
IR Review by CB on 2023-07-05

Client/Project 203723159
Fountain Wind LLC
Fountain Wind Project

Figure No.
1

Title
Project Overview
Map 1 of 2

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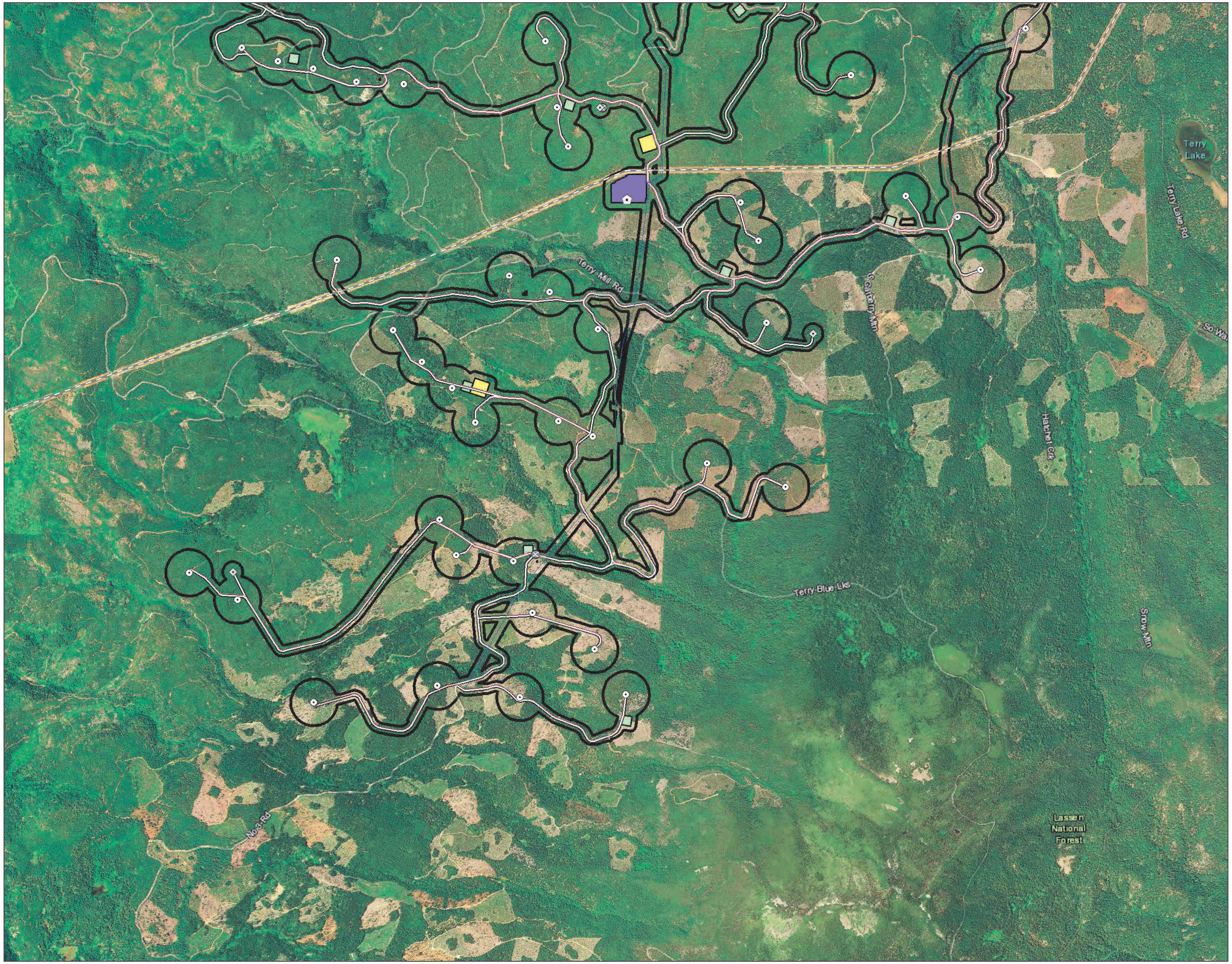

Stantec

Legend

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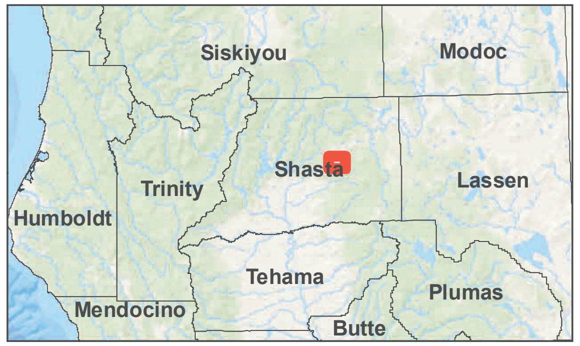

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Prepared by GC on 2023-07-05
TR Review by ES on 2023-07-05
IR Review by CB on 2023-07-05

Client/Project 203723159
Fountain Wind LLC
Fountain Wind Project

Figure No.
1

Title
Project Overview
Map 2 of 2

2.0 PROJECT DESCRIPTION

The Fountain Wind Energy Project (Project) is a wind energy generation development proposed by Fountain Wind LLC (Applicant) in unincorporated Shasta County. The proposed Project is located approximately one mile west of the existing Hatchet Ridge Wind Project, six miles west of Burney, 35 miles northeast of Redding, and immediately south of State Route (SR) 299. The Project would be located entirely on private property, managed for timber production and harvesting, where public access is currently restricted.

The Applicant is applying for site certification and Project approval under the CEC's "opt-in" provisions pursuant to Public Resources Code §25545 et seq. These opt-in provisions grant the CEC exclusive permitting authority (with some limited exceptions) over qualifying non-thermal energy production "facilities," including a "terrestrial wind electrical generating powerplant with a generating capacity of 50 megawatts or more and any facilities appurtenant thereto." The project qualifies as a "facility" under Public Resources Code §25545(a)(1) because it is a terrestrial wind electrical generating powerplant with a generating capacity of more than 50 megawatts (MW).

The primary project components are:

- Up to 48 wind turbines with a nameplate generating capacity of up to 7.2 MW each (for a total nameplate capacity of up to 205 MW).
- Underground and overhead collection lines.
- Access roads, temporary construction laydown areas, an operation and maintenance facility, permanent meteorological evaluation towers, storage sheds, and up to three temporary concrete batch plants.
- A substation and switchyard to interconnect to the existing Pacific Gas and Electric Company 230 kilovolt line and a relay microwave tower or overhead fiber optic communication circuits.

Project construction is expected to last 24 to 28 months and require up to approximately 200 workers at peak construction. Project operations would require up to 10 full-time employees, depending on the final turbine technology selected. Routine maintenance activities are expected to include checking torque on tower bolts and anchors; checking for signs of stress on the turbines or leakage of lubricants, hydraulic fluids, or other hazardous materials; inspecting the grounding cables, wire ropes and clips, and surge arrestors; cleaning; and repainting. Water storage tanks will be installed to provide water for fire suppression. The life of the project is assumed to be 35 years.

The Project Area includes 37 parcels in which the project components will be sited. The Project Site Boundary encompasses approximately 2,855 acres within the Project Area and includes where all infrastructure would be sited and where potential temporary and permanent disturbance activities may occur, including associated construction and maintenance corridors. The Project Site also includes a substation and switchyard to interconnect to the existing Pacific Gas and Electric Company 230 kilovolt line and a relay microwave tower or overhead fiber optic communication circuits. The Project Site is located in the southern Cascade Ranges south of State Route 299.

For construction purposes, the project proposes to truck in non-potable groundwater pumped from one of five subbasins within the Redding Groundwater Basin:

1. Anderson Subbasin
2. Bowman Subbasin
3. Enterprise Subbasin
4. Milville Subbasin
5. South Battle Creek Subbasin

Non-potable construction water could also be trucked in from the Burney Creek Valley Groundwater Basin. Water for operations is proposed to be pumped from the Project Site groundwater area or pumped from one of the above-listed basins and trucked to the site.

As described further below, these groundwater basins range from "medium" to "very low priority" basins based on the state's basin prioritization process, meaning that they are not currently in overdraft condition and are not anticipated to be in overdraft condition with or without the project.

3.0 REGULATORY SETTING

3.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT

This document is a planning document that supports a CEQA analysis and identifies project water supply needs, identifies potential water supply sources, and analyzes the capacity of those sources to meet the project needs as well as reasonably foreseeable future development.

3.2 SUSTAINABLE GROUNDWATER MANAGEMENT ACT

The Sustainable Groundwater Management Act (SGMA) of 2014 requires local agencies in California to form groundwater sustainability agencies and develop and implement groundwater sustainability plans (GSPs) for certain groundwater basins to avoid undesirable results and mitigate overdraft. Groundwater sustainability agencies use basin prioritization to classify California's 515 groundwater basins into one of four categories high-, medium-, low-, or very low-priority.

Basin prioritization is a technical process which uses best available information and is based on eight components that are identified in the California Water Code Section 10933(b). These components include population, projected population growth, number of public supply wells, total number of wells, number of irrigated acres, groundwater use vs. supply, impacts (i.e., declines in groundwater levels, saline intrusion, groundwater-extraction-induced subsidence), habitat and streamflow, and other regional and statewide information. Each component is given a score, with scores over 14 points indicating higher priority. Each basin's priority determines which provisions of California Statewide Groundwater Elevation Monitoring (CASGEM) and SGMA apply.

Groundwater basins that have historically been subject to heavy pumping for irrigation or drinking water for large populations are at the greatest risk of overdraft (DWR 2024a). For example, the San Joaquin Valley – Kings Subbasin has a priority score of 40 and is considered to be in critical overdraft due to its large number of irrigated acres and large and growing population. Conversely, most of the Redding Area Subbasins and the Burney Creek Valley Basin are considered very low priority basins that are not at risk of overdraft because they host small populations with little irrigation withdrawal (DWR 2024b). Basins and aquifers that do not meet the threshold for prioritization under CASGEM and SGMA are not monitored and do not have associated groundwater sustainability plans. As a result, there is typically much less data on these basins, which is mostly limited to yield statistics from existing wells.

4.0 HYDROGEOLOGIC SETTING

There are 515 designated groundwater basins and subbasins in California. (DWR 2024a). Groundwater is stored in subsurface spaces called aquifers. Aquifers are the collective saturated area within the pore spaces of unconsolidated to moderately consolidated sand, silt, clay, and gravel (called alluvial aquifers). Fractured rock aquifers occur where water occurs within interconnected fractures in consolidated or crystalline rock (e.g., granite) and along more permeable horizons between otherwise impermeable layers (e.g., layered volcanic deposits). In alluvial aquifers, well yields can exceed several thousand gallons per minute (gpm). In fractured rock aquifers, well yields are typically much lower, less than a few tens of gallons per minute. Most groundwater basins are comprised of alluvial aquifers. In some cases, volcanic rock aquifers are known to provide significant yields to wells due to a combination of high fracture density, cavities that serve as conduits for groundwater flow, and a reliable source of recharge. The Burney Creek Valley Groundwater Basin is underlain by this type of aquifer.

4.1 SACRAMENTO RIVER HYDROLOGIC REGION

4.1.1 Geography and Climate

The Sacramento Valley is in the northern portion of California's Central Valley between Redding at the northern end at the base of the Klamath Mountains and the Sacramento–San Joaquin Delta on the south. The Sacramento Valley has a Mediterranean-type climate characterized by hot, dry summers and cool, wet winters. The average annual rainfall in Redding and Red Bluff are 35 and 24 inches, respectively, with about 90% of the precipitation falling from October through April. Typical precipitation from May through September is less than one inch. The Sacramento River, California's largest river, begins its course in the headwaters near Mount Shasta and meanders south through the Sacramento Valley. (Harkness 2022).

Numerous perennial and ephemeral streams flow from the mountain ranges surrounding the Sacramento Valley, across the valley floor, and into the Sacramento River. Streams originating on the western side of the Sacramento Valley are mostly ephemeral and most streams flowing from the eastern side are perennial. Some of the notable streams flowing from the western side of the valley in the northern part of the Sacramento Valley are Cottonwood Creek, Reeds Creek, Elder Creek, and Thomes Creek. Notable creeks flowing from the eastern side of the valley are Cow Creek, Battle Creek, Antelope Creek, Mill Creek, and Deer Creek. (DWR 2014).

4.1.2 Geology and Lithology

The Sacramento Valley basin contains marine and non-marine sediments up to eight kilometers thick (DWR 2014). A relatively thin layer of primarily mid- to late Pliocene to Holocene continental sediments contains the fresh groundwater used for drinking water. These freshwater-bearing sediments are derived from the surrounding mountain ranges and constitute a mix of marine, continental, and volcanic sediments. Marine sediments are derived from the Coast Ranges, whereas the continental and volcanic sediments are derived from the Cascade Range. These aquifers overlie saline-water-saturated marine sediments that were deposited during the Mesozoic and early Cenozoic eras (Pierce 1983 in DWR 2014). The depth to the base of freshwater (groundwater with a total dissolved solids concentration <3,000 milligrams per liter) in the Sacramento Valley generally occurs at less than 750 meters below land surface (DWR 2014; Hegenberger and Donnelly 2015).

Although the groundwater basins are divided north and south, aquifer lithology is primarily divided east and west by the Sacramento River. Groundwater is in the heterogeneous gravel and sand layers of the Tehama and Tuscan Formations and in the shallower alluvial layers (DWR 2014). The general pattern of groundwater flow is from the northern end of the Sacramento Valley toward the Sacramento–San Joaquin Delta and from the margins of the valley toward the Sacramento River (DWR 2014).

The Pliocene Tuscan Formation is the primary water-bearing unit in the eastern part of the northern Sacramento Valley. It is an important sedimentary unit composed of volcaniclastic sediments deposited from the Cascade Range that yields relatively large quantities of water to wells in the Sacramento Valley and Redding Groundwater Basins (DWR 2014). The Tuscan Formation crops out to the northeast of Red Bluff and then dips into the subsurface southwestward, where it intermingles with the Tehama Formation.

The Pliocene Tehama Formation crops out along the western margin of the Sacramento Valley and Redding Groundwater Basins and dips eastward beneath the Quaternary alluvium deposits in the center of the Sacramento Valley, where it intermingles with the Tuscan Formation (DWR 2014). The Tehama Formation is derived from the Coast Ranges to the west and is composed of unconsolidated to moderately consolidated coarse- and fine-grained sediments with thin lenses of gravel and sand (DWR 2014). The average thickness of the Tehama Formation is approximately 600 meters, and the lower part of the Tehama Formation contains saline groundwater (DWR 2014). The younger Quaternary alluvium deposits overlie the Tehama Formation along the Sacramento River and other minor creeks. These alluvial deposits are primarily composed of sands and gravels derived from the Coast Ranges. Overall, the Tehama Formation and the overlying Quaternary alluvial deposits produce variable amounts of water to wells (DWR 2014).

4.2 REDDING GROUNDWATER BASIN

The Redding Groundwater Basin covers approximately 510 square miles (1,550 square kilometers) and includes five subbasins: Enterprise, Millville, Anderson, South Battle Creek, and Bowman (Table 1). Three mountain ranges border the Redding Groundwater Basin—the southernmost extension of the Cascade Range along the eastern edge, the northern Coast Ranges, a series of folded and faulted parallel ridges and valleys trending to the west, and the Klamath Mountains to the north. (DWR 2003).

Recharge to the Redding Groundwater Basin is from subsurface inflow, infiltration of precipitation and applied irrigation water, and percolation from streams and creeks. Groundwater movement is generally from the periphery of the basin towards the Sacramento River and then southward, where at the Red Bluff Arch, the water in the sedimentary rocks of Tertiary and Quaternary age is probably discharging into the Sacramento River. (DWR 1984).

The storage capacity for the entire Redding Groundwater Basin is estimated to be 5.5 million af for 200 feet of saturated thickness over an area of approximately 510 square miles (Pierce 1983 in DWR 2014). Specific yield data for each subbasin is not available to be able to estimate storage capacity at the subbasin level. (DWR 2024b). None of the basins discussed in this report are experiencing groundwater level declines, saline intrusion, or groundwater-extraction-induced subsidence (DWR 2024b). Table 1 outlines characteristics of the Redding-Area Subbasins.

4.2.1 Anderson Subbasin – Medium Priority

The Anderson Subbasin comprises the portion of the Redding Groundwater Basin bounded on the west and northwest by bedrock of the Klamath Mountains, on the east by the Sacramento River, and on the south by Cottonwood Creek. Annual precipitation ranges from 27 to 41 inches, increasing to the north and west. The Anderson Subbasin aquifer system is comprised of continental deposits of late Tertiary to Quaternary age. The Quaternary deposits include Holocene alluvium and Pleistocene Modesto and Riverbank formations. The Tertiary deposits include Pliocene Tehama and Tuscan formations. Helly and Harwood (1985 in DWR 2014) report that the Tehama Formation interfingers with the Tuscan Formation in the region between Interstate Highway 5 and the Sacramento River north of the city of Red Bluff. Recharge to the principal formation is mostly by infiltration of streamflows at the margins of the subbasin. Infiltration of applied water and streamflows, and direct infiltration of precipitation are the main sources of recharge into the alluvium (Pierce 1983 in DWR 2014).

The population within the Anderson Subbasin is 53,123 people with a projected growth of 12% by 2030. With 65 public supply wells, 2,763 total wells, just over 8,000 irrigated acres, and a low reliance on groundwater (33% of supply), the Anderson Subbasin is one of two Redding Area medium-priority subbasins. An estimated 16,435 af of groundwater are withdrawn each year in this subbasin. (DWR 2024b). DWR approved the Anderson Subbasin Groundwater Sustainability Plan (GSP) (DWR 2022a) on

Table 1. Characteristics of Redding-Area Groundwater Subbasins

Source Name	Basin Number	County	Size (acres)	SGMA Basin Priority	Priority Score	Critically Overdrafted	Population (number of people) / Projected Growth (between 2020 and 2030)	Average Well Yield [gpm] and Depth (ft)
Redding Area – Anderson	5-006.03	Shasta	98,500	Medium	17	No	53,123 12%	Irrigation (0-1800 ft): 46-302 Domestic (11-805 ft): 140
Redding Area – Bowman	5-006.01	Tehama	85,330	Very Low	0	No	7,937 49%	Irrigation (65-2000): 312-589 Domestic (60-700 ft): 527
Redding Area – Enterprise	5-006.04	Shasta	60,900	Medium	18	No	69,106 25%	Irrigation (30-700 ft): 180-266 Domestic (18-713 ft): 139
Redding Area - Millville	5-006.05	Shasta	65,616	Very Low	0	No	2,513 40%	Irrigation (8-700 ft): 254-265 Domestic (40-650 ft): 156
Redding Area – South Battle Creek	5-006.06	Tehama	32,300	Very Low	0	No	52 52%	Irrigation (170-270 ft): 227 Domestic (80-884 ft): 189

Source: DWR 2024b

Abbreviations:

SGMA – Sustainable Groundwater Management Act

gpm – gallons per minute

ft – foot

January 18, 2024, based on, among other things, its determination that the Subbasin is stable, is not currently in a state of long-term overdraft, and projections of future extractions are likely to stay within current and historical ranges.

4.2.2 Bowman Subbasin – Very Low Priority

The Bowman Subbasin comprises the portion of the Redding Groundwater Basin bounded on the west by the Coast Ranges; on the north by Salt, Dry, and Cottonwood Creeks; on the east by the Sacramento River, and on the south by the Red Bluff Arch. The Red Bluff Arch is defined as the hydrologic divide between the drainages of Cottonwood Creek and Hooker Creek to the north and the drainages of Blue Tent Creek, Dibble Creek, and Reeds Creek to the south. The South Fork of Cottonwood Creek drains the western half of the subbasin and Hooker Creek drains the central portion. The eastern extents of the subbasin have many small drainages tributary to the Sacramento River. Annual precipitation ranges from 23 to 27 inches. (DWR 2014).

The Bowman Subbasin aquifer system consists of continental deposits of late Tertiary to Quaternary age. The Quaternary deposits include Holocene alluvium and Pleistocene Modesto and Riverbank formations. The Tertiary deposits include Pliocene Tehama and Tuscan formations. The Red Bluff Arch is an anticlinal structure that forms the hydrogeologic boundary between the Redding and Sacramento Valley groundwater basins. Recharge to the principal aquifer is mostly by infiltration of streamflows at the margins of the subbasin. Infiltration of applied water and streamflows, and direct infiltration of precipitation are the main sources of recharge into the alluvium (Pierce 1983 in DWR 2014).

The population within the Bowman Subbasin is 7,937 people with a projected growth of 49% by 2030. With 12 public supply wells, 1,819 total wells, just over 3,000 irrigated acres, and a moderate reliance on groundwater (51% of supply), the Bowman Subbasin is considered to be a very low priority subbasin. An estimated 7,681 af of groundwater are withdrawn each year in this subbasin. (DWR 2024b). Because this subbasin is considered very low priority, it does not require a GSP. However, the Tehama County Flood Control and Water Conservation District Groundwater Sustainability Agency (GSA) submitted a GSP to DWR, which is currently under review.

4.2.3 Enterprise Subbasin – Medium Priority

The Enterprise Subbasin comprises the portion of the Redding Groundwater Basin bounded on the west and southwest by the Sacramento River, on the north by the Klamath Mountains, and on the east by Little Cow Creek and Cow Creek. Annual precipitation within the basin ranges from 29 to 41 inches, increasing to the north. The Enterprise Subbasin aquifer system is comprised of continental deposits of late Tertiary to Quaternary age. The Quaternary deposits include Holocene Stream Channel Deposits and terrace deposits of the Modesto and Riverbank formations. The Tertiary deposits are the Pleistocene Tehama Formation and the Tuscan Formation. Recharge to the principal aquifer formation is mostly by infiltration of streamflows. Infiltration of applied water and streamflows, and direct infiltration of precipitation are the main sources of recharge into the alluvium (Pierce 1983 in DWR 2014).

The population within the Enterprise Subbasin is 69,106 people with a projected growth of 25% by 2030. With 35 public supply wells, 2,281 total wells, just under 3,000 irrigated acres, and a low-to-moderate reliance on groundwater (38% of supply), the Enterprise Subbasin is the second of the Redding Area's medium-priority subbasins. An estimated 712,142 af of groundwater are withdrawn each year in this subbasin. (DWR 2024b).

DWR approved the Enterprise Subbasin Groundwater Sustainability Plan (GSP) (DWR 2022b) on January 18, 2024, based on, among other things, its determination that the Subbasin is stable, is not currently in a state of long-term overdraft, and projections of future extractions are likely to stay within current and historical ranges.

4.2.4 Millville Subbasin – Very Low Priority

The Millville Subbasin comprises the portion of the Redding Groundwater Basin bounded on the west by Cow Creek, Little Cow Creek, and the Sacramento River; on the north by the Klamath Mountains; on the east by the Cascade Range; and on the south by Battle Creek. Annual precipitation ranges from 27 to 31 inches, increasing to the north. The Millville Subbasin aquifer system is comprised of continental deposits of late Tertiary to Quaternary age. The Quaternary deposits include Holocene alluvium and Pleistocene Modesto and Riverbank formations. The Tertiary deposits include the Pliocene Tehama Formation along the Sacramento River and the Tuscan Formation. The Tuscan Formation is the primary water-bearing unit in the subbasin. Recharge to the principal aquifer is mostly by infiltration of stream flows. Infiltration of applied water and stream flows and direct infiltration of precipitation are the main sources of recharge into the alluvium (Pierce 1983 in DWR 2014).

The population within the Millville Subbasin is 2,513 people with a projected growth of 40% by 2030. With four public supply wells, 780 total wells, just over 1,000 irrigated acres, and a moderate reliance on groundwater (52% of supply), the Millville Subbasin is considered to be a very low priority subbasin. An estimated 2,870 af of groundwater are withdrawn each year in this subbasin. (DWR 2024b). Because this subbasin is considered very low priority, it does not require a GSP.

4.2.5 South Battle Creek Subbasin – Very Low Priority

The South Battle Creek Subbasin comprises the portion of the Redding Groundwater Basin bounded to the west by the Sacramento River, to the north by Battle Creek, to the east by the Cascade Range, and to the south by the drainage divide along the north rim of Paynes Creek. Annual precipitation within the subbasin ranges from 25 to 29 inches, increasing to the east. The South Battle Creek aquifer system is comprised of continental deposits of late Tertiary to Quaternary age. The Quaternary deposits include younger alluvium and the Pleistocene Modesto Formation. The Tertiary deposits include the Tuscan Formation and possibly the Tehama Formation along the Sacramento River. The Tuscan Formation is the primary water-bearing unit in the subbasin. Helly and Harwood (1985) report that the Tehama Formation interfingers with the Tuscan Formation in the region between Interstate Highway 5 and the Sacramento River north of the city of Red Bluff. The Tehama Formation may extend beyond the Sacramento River within the subbasin boundary; however, the deposit is not included here as a water-bearing formation. (DWR 2014).

The Inks Creek fold system, a northeast to southwest trending anticlinal structure, is part of the hydrogeologic divide between the Redding Groundwater Basin and the Sacramento Valley Groundwater Basin. Recharge to the principal aquifer is mostly by infiltration of streamflows at the basin margins and from Inks Creek at the center of the basin. Infiltration of applied water, streamflows, and precipitation are the main sources of recharge into the alluvium (Pierce 1983; DWR 2014).

The population within the South Battle Creek Subbasin is 52 people with a projected growth of 52% by 2030. With no public supply wells, 30 total wells, just over 1,500 irrigated acres, and a low reliance on groundwater (30% of supply), the South Battle Creek Subbasin is considered to be a very low priority subbasin. An estimated 1,517 af of groundwater are withdrawn each year in this subbasin. (DWR 2024b). Because this subbasin is considered very low priority, it does not require a GSP.

4.3 BURNEY-AREA GROUNDWATER

4.3.1 Burney Creek Valley Groundwater Basin – Very Low Priority

The Burney Creek Valley Groundwater Basin is not a Redding-Area Subbasin and is located 54 miles northeast of Redding surrounding the town of Burney. This groundwater basin consists of Quaternary lake deposits bounded to the west by north trending faults. The basin is bounded on all sides by Pleistocene basalt (Gay 1958 in DWR 2014). Burney Creek drains the valley to the north. Annual precipitation is approximately 27 inches. Hydrogeologic information pertaining to water-bearing formations, groundwater level trends, and groundwater storage is not available. (DWR 2014). Table 2 outlines characteristics of the Burney Creek Valley Groundwater Basin.

Table 2. Characteristics of the Burney Creek Valley Groundwater Basin

Source Name	Basin Number	County	Size (acres)	SGMA Basin Priority	Priority Score	Critically Overdrafted	Projected Population Growth (by 2030)	Average Well Yield [gpm] and Depth (ft)
Burney Creek Valley	5-48	Shasta	2,340	Very Low	0	No	1,466 0%	Domestic (55-395 ft): 205 Municipal/Irrigation (181-408 ft): 295

Source: DWR 2024b
Abbreviations:
SGMA – Sustainable Groundwater Management Act
gpm – gallons per minute
ft – foot

The population within the Burney Creek Valley Groundwater Basin is 1,466 people with a projected growth of 0% by 2030. With no public supply wells, 16 total wells, no irrigation, and a high reliance on groundwater (100% of supply), the Burney Creek Valley Groundwater Basin is considered to be a very low priority subbasin. An estimated 643 af of groundwater are withdrawn each year in this subbasin. (DWR 2024b). Because this groundwater basin is considered very low priority, it does not require a GSP.

4.3.2 Project Site Groundwater Area – No Designated Priority

The Project site groundwater area underlies the Project Site and would serve as the water source for a new well at the O&M facility. Because this aquifer does not meet the threshold for prioritization under CASGEM and SGMA, it is not monitored and does not have an associated groundwater sustainability plan. Very little data exists about this aquifer, and data available are limited to yield statistics from private wells.

Lithologic logs of domestic wells within two miles of the proposed O&M facility on the Project Site indicate the geology of this aquifer consists of highly variable layers and mixtures of lava, cinders, ash, gravel, sand, silt, and clay to a depth of at least 220 feet below ground surface (ft bgs) (DWR, 2024b). Some of the mixed layers of gravel, silt, and clay may constitute volcanic mudflow deposits or lahars. In addition, some deposits contain clay from the chemical weathering of certain minerals in lava flows and ash layers or lava and ash fragments in lahars. Groundwater in the underlying volcanic deposits is primarily contained within fractures and in layers of basalt lava and pyroclastic deposits, and is largely formed from infiltration of rainwater, snowmelt, and surface water. (DWR 1984; DWR 1964; DWR 1968).

5.0 WATER DEMAND

5.1 CONSTRUCTION

Most of the water used during construction will be for dust suppression, soil backfill compaction, and concrete manufacture during construction of wind turbines, collector lines, and related facilities. Water would also be used to fill and maintain tanks located within the Project Site for the purposes of fire suppression. An estimated 310 af of non-potable water will be required for construction-related activities for 24 to 28 months. Table 3 outlines categories of water use during construction. Water for use during the two-year construction period would be trucked in from one or more existing, public or private wells drawing from one of the five Redding-Area Subbasins or the Burney Creek Valley Groundwater Basin.

Table 3. Water Use Categories During Construction

Category	Gallons	Acre-Feet
Compaction Total Water	51,898,980	159
Dust Control Total Water	42,240,000	130
Vegetation Establishment Total Water	5,480,000	17
Concrete Batching	1,505,600	5
Storage for Fire Suppression	51,000	0
Total Water	**101,175,579**	**310.4**

Source: ConnectGen 2024

5.2 OPERATIONS

Water for the operations phase of the project would be supplied by a new well at the O&M facility, which would draw from the Project Site groundwater area, or via groundwater trucked from an existing public or private well within one of the five Redding Area Subbasins or the Burney Creek Valley Groundwater Basin.

Estimated annual water demand for the operations phase of the project is up to 5.6 afy (approximately 5,000 gallons per day) for each of the Project's 35 years of operation. This annual water demand is equivalent to that of approximately 19 single-family residences, which have an average water demand of one afy per 3.4 households in California (Water Education Foundation, 2018). Water used during operations would consist of potable and non-potable water demands. Potable water would be used by up to 10 full-time onsite employees (30 gallons per capita per day, or 0.4 afy). The restroom and other potable water facilities at the O&M building will be designed to conserve water (e.g. low flush toilets, low flow sinks). Potable water would be stored in a tank at the O&M facility. Non-potable water demands would include water for onsite fire flow water storage. Water flow at the O&M facility will meet fire flow requirements in accordance with Shasta County Building Code and California Fire Code.[2, 3]

6.0 METHODS

CEQA requires the disclosure of the potential environmental impacts a proposed project may have on, among other topics, water quality and hydrology. Two criteria pertain to water supply. Specifically, Appendix G Criteria asks a lead agency to consider whether a project would result in a significant impact to hydrology or water quality through substantially decreasing groundwater supplies or interfering substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin. Appendix G also recommends that a lead agency analyze if there are sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years. To estimate the potential impacts of project construction and operations on groundwater supply against these two criteria, Stantec investigated the project's potential effects on the eight parameters in the California Water Code that are used to designate a basin's priority. These parameters were used because actions which substantially affect any of these eight parameters have the potential to affect groundwater supply now or in the future or interfere with recharge such that they may impede sustainable groundwater management of the basin.

The eight parameters outlined in the California Water Code include population, projected population growth, number of public supply wells, total number of wells, number of irrigated acres, groundwater use vs. supply impacts (i.e., declines in groundwater levels, saline intrusion, groundwater-extraction-induced

[2] Shasta County Code of Ordinances Title 16 Buildings and Construction, Chapter 16.04.130 Fire Standards and Equipment (Ordinance No. 2019-06 [2019])
[3] 2019 California Fire Code (California Code of Regulations Title 24 Part 9)

subsidence), and habitat and streamflow. The potential for the O&M facility well to impact adjacent surface waters is discussed in a separate submittal (TN 254379 docketed February 8, 2024).

7.0 DISCUSSION

The discussion below outlines the potential impacts of groundwater pumping to supply water to the project during construction (via trucking from any of the five Redding-Area Subbasins or the Burney Creek Valley Groundwater Basin) and operations (via a new well at the O&M facility or trucking from any of the five Redding-Area Subbasins or Burney Creek Valley Groundwater Basin).

Of the eight basin priority parameters, the project would have no effect on five: population, population growth, number of public supply wells, total number of wells, and number of irrigated acres. The project would not induce population growth or contribute directly to an increase in population because incoming construction workers would reside in the region only temporarily during construction, and the operations phase would require only up to 10 full-time onsite employees. The project would introduce no new public facilities, housing, irrigated farmland, or public services which might induce population growth in the region, and would only add one, new, private supply well, which is not a significant increase in supply wells for any of the focal groundwater basins or subbasins.

Of the three groundwater use vs. supply impacts, the project would have no effect on two: seawater intrusion and groundwater-extraction-induced land subsidence. None of the focal basins are at risk for seawater intrusion because they are not located near or adjacent to sources of seawater. Land subsidence has been reported in the Anderson, Bowman and Enterprise subbasins[4] but values are relatively small when margin of error is considered, and do not necessarily indicate that inelastic (non-recoverable) land subsidence is occurring. In addition, subsidence values naturally fluctuate from year to year in response to seasonal groundwater level changes due to pumping and recharge.

7.1 POTENTIAL IMPACTS OF CONSTRUCTION WATER DEMAND

7.1.1 Groundwater Supply and Recharge

Temporary water use by project-related construction activities would not substantially affect groundwater use or increased rate of groundwater level decline. Construction water will be trucked from any of the five Redding-Area Subbasins or the Burney Creek Valley Groundwater Basin. Construction water demand equates to an increase in extraction equal to the annual withdrawal of a single new well with a yield of 96 gpm. With yields of most wells within the six focal basins averaging a much higher rate (up to 589 gpm),

[4] Between 2008 and 2017 by DWR (2018) using satellite-based Interferometric Synthetic Aperture Radar (InSAR) as indicated: Anderson Subbasin – up to 0.132 ft (1.584 inches); Bowman Subbasin – up to 0129 ft (1.548 inches); and Enterprise Subbasin – up to 0.092 ft (1.104 inches).

this two-year, temporary increase in water use is within the daily capacity of the majority of existing wells and comprises a negligible to low increase in overall annual groundwater extraction within any of the potential source basins. In addition, the recharge rate in these groundwater basins is stable and the additional pumping is not anticipated to cause any perceptible drawdown on basin supplies.

Groundwater use during project construction would not lead to increased groundwater level decline. Groundwater level decline is a negative effect of groundwater overdraft, the risk of which is closely tracked by DWR. Groundwater basins at highest risk of overdraft (e.g., many basins supporting heavy agricultural irrigation in California's Central Valley) were required under the SGMA to prepare a GSP. None of the basins that are the focus of water supply for the project are in or at risk of overdraft within the period during which construction would take place, as evidenced by their very low to medium priority designations (Table 1). As a result, none of these basins are at imminent risk of increased groundwater level decline with or without the project. The temporary addition of 310 afy of demand would therefore not lead to a significant increase in the risk of groundwater level decline. As a result, temporary water use by project-related construction activities will not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of any of the potential source basins.

7.1.2 Sufficiency of Groundwater Supply for Project and Future Development

Construction-related water demand is not anticipated to impact the sufficiency of groundwater supply for the project or foreseeable future development. This is because the existing groundwater supply in the Redding-Area Subbasins and Burney Creek Valley Groundwater Basin is adequate to supply temporary project demand and projected development that may occur within the two-year construction period, even within the highest-priority basins.

For example, while historical pumping in the Anderson Subbasin totaled 20,000 afy, the GSP considered a much higher pump rate of 89,000 afy as the "sustainable yield." In approving the GSP, DWR noted that "the estimated sustainable yield (89,000 afy) is far greater than that of the average annual groundwater pumping estimated during the historical period (20,000 afy) or what is reasonably expected in the projected period (22,000 afy), and that groundwater conditions across the Subbasin appear to be generally stable under current (and projected) pumping rates. … While Department staff have concerns with the proposed estimated sustainable yield for the Subbasin, staff conclude that this should not preclude Plan approval at this time; an increase in groundwater pumping of this magnitude appears highly unrealistic to occur in the near future and, therefore, seems unlikely to undermine the GSA's ability to implement its Plan. Department staff conclude that the historical, current, and projected water budgets included in the Plan substantially comply with the requirements outlined in the GSP Regulations." (DWR 2022a). Accordingly, while the GSP's sustainable yield may be lower than that proposed, it is likely much higher than historical and projected pump rates, indicating that the Project's construction demands would easily fall within the subbasin's sustainable yield. Similar conclusions are made in the Enterprise

Subbasin GSP (DWR 2022b), further indicating that Project construction water demands fall within the sustainable yield.

Furthermore, Stantec produced a supply-and-demand analysis for the three Redding-Area Subbasins with data available to support such an analysis, namely Anderson, Enterprise, and Bowman. Stantec compared the inflow and outflow presented in the three basins' GSPs to estimate average annual groundwater budgets for each basin. Estimates of projected growth (percent increase in population)(Table 1) were taken from the Groundwater Bulletin for each basin. These three subbasins possess SGMA basin priorities of medium, medium, and very low, respectively, which encompass the priorities of the remaining three potential source basins (Milville, South Battle Creek, and Burney Creek Valley). The Anderson, Enterprise, and Bowman Subbasins also possess a wide range of characteristics such as population, projected growth, and groundwater demand, making them effective proxies for the remaining three basins. Table 4 summarizes the projected average annual groundwater budgets for the Anderson, Bowman, and Enterprise subbasins plus the two-year construction water demand.

Table 4. Projected Average Annual Groundwater Budgets for the Anderson, Bowman and Enterprise Subbasins with Project Construction Water Demand

Groundwater Budget Component	Anderson Subbasin[1] (afy)	Bowman Subbasin[2] (afy)	Enterprise Subbasin[1] (afy)
Inflow	489,000	100,000	332,000
Outflow	489,000	99,000	331,000
Total Balance	**0**	**1,000**	**1,000**
Project Construction Water Demand (Year 1)	260	260	260
Revised Groundwater Budget Balance (Year 1)[3]	**-260**	**740**	**740**
Project Construction Water Demand (Year 2)	50	50	50
Revised Groundwater Budget Balance (Year 2)[3]	**-50**	**950**	**950**

Source: EAGSA 2022a, 2022b; Tehama County Flood Control and Water Conservation District 2022

afy – acre-feet per year

1 Projected average annual water demand for Anderson and Enterprise subbasins is for the period Water Years 2019-2071.

2 Projected average annual water demand for Bowman Subbasin is for the period Water Years 2022-2072 with future land use and 2070 climate change assumptions.

3 Construction water demand is estimated at 310 af over two years (up to 28 months) with 260 af water demand in Year 1 and 50 af water demand in Year 2.

The average annual projected groundwater budget for the Anderson Subbasin is zero, meaning that inflow equals outflow. With the addition of 260 af of construction water demand in year one and 50 af of demand in year two, the groundwater budget for year one is -260 af and -50 for year two. This apparent deficit is well within the margin of error (20%) built into water budget calculations and does not mean that construction water demand will disrupt a balanced water supply. Water budgets continuously change based on fluctuations in supply and demand, and a negative budget simply means that, for this year, demand is expected to exceed supply. This negative budget is common in dry years, and in wet years the budget would be net positive, as is the case for the Enterprise and Bowman Subbasins.

Further, this analysis is based on the conservative assumption that short term demands for construction water for projected or anticipated projects in the Redding region are not already included in the outflow budget for the Anderson Subbasin of 489,000 (or the outflow budgets of other subbasins provided above). However, it is likely that the subbasins' water budgets through 2071 already account for such demand and, therefore, that the Project's 310 af falls within the anticipated outflow for each subbasin. For example, the approved Anderson Subbasin GSP's water budget accounts for "purveyor pumping projected based on future population growth." The GSP also concludes that "water supplies are projected to meet future water demands." Similar conclusions are included the Bowman and Enterprise GSPs.

Therefore, taking into consideration margin of error, the temporary nature of construction water demand, and the sustainable yield estimates for the Anderson, Bowman, and Enterprise Subbasins, construction water demand would not have a significant effect on the sustainability of groundwater resources used during construction or for foreseeable future development.

7.2 POTENTIAL IMPACTS OF OPERATIONAL WATER DEMAND

7.2.1 Groundwater Supply and Recharge

7.2.1.1 New Well at O&M Facility

Water use during operations could come from a new well drilled at the O&M facility which would be drawing from groundwater within the Project Site groundwater area, which is not a groundwater basin and is therefore not subject to prioritization according to the eight parameters described in the California Water Code. Owing to the lack of monitoring data for this groundwater supply, Stantec qualitatively estimated potential impacts of operational water use by comparing estimated annual operational water use to current annual demand from existing wells within two miles of the proposed O&M well (Table 5). All nine wells were drilled for domestic use. Initial well yields vary between 6 and 60 gpm, with an average of 22.3 gpm. Initial depth to groundwater ranges between 10 and 177 ft bgs.

The two primary sources of groundwater demand within two miles of the O&M facility are two small, public water systems (Table 5). The first is a single well at the Caltrans Hillcrest Safety Roadside Rest Area (Water System No. CA4500283), located 1.96 miles west of the O&M facility. This facility serves approximately 2,500 users per year. The well completion report noted that its initial estimated yield was 29 gpm, but it is uncertain whether the well is still operating (SWRCB 2024a).

Table 5. Well Completion and Testing Data for Wells Located within Two Miles of the O&M Facility

State Well No.[1]	DWR No.	Well ID	Well Completion Date	Use[2]	Well Log (Y/N)	Total Drilled Depth (ft bgs)	Well Depth (ft bgs)	Well Diameter (in)	Screened/Perforated Interval Measured from Land Surface		Initial Estimated Yield (gpm)	Initial Specific Capacity (gpm/ft)	Static Water Level (ft bgs)	Notes
									Top (ft)	Bottom (ft)				
Within 1 mile of the O&M Facility														
35N/01E-27	1080524	NA	8/1/2007	D	Y	220	200	6(140')/ 4 (200')	NA	NA	25	NA	177	Airlift test
35N/01E-27	e0206441	2	3/19/2014	D	Y	107	64	6-5/8	NA	NA	15	NA	10	
35N/01E-27	e0206442	2	3/20/2014	D	Y	100	100	4.5	80	100	12	NA	10	
Within two miles of the O&M Facility														
35N/01E-21	128506	NA	5/16/1974	D	Y	126	126	8	28	44	30	NA	20	Airlift test (CAL FIRE Hillcrest Forest Fire Station No. 74), may be in Section 29
35N/01E-27	16785	NA	8/3/1977	D	Y	126	55	6	NA	NA	6	NA	45	Airlift test
35N/01E-27M	117284	Well #3	9/13/1983	D	Y	202	87	6-5/8	NA	NA	12	0.3	33	Airlift test; open bottom (Moose Camp)
35N/01E-29	4420	NA	1/6/1967	D	Y	150	150	8	58	70	60	2.6	21	Pump test
35N/01E-29M	414564	WW-2	8/3/1992	P	Y	175	175	6	155	170	29	0.6	99.54	Pump test (Caltrans Hillcrest Safety Roadside Rest Area)
35N/01E-29M	431371	NA	7/26/1991	P	N	NA	144	8-1/8	58	101	12	NA	69.4	Perforate well, airlift test (Caltrans Hillcrest Safety Roadside Rest Area)

Source: SWRCB Division of Drinking Water 2024a, b

Notes:
[1] Well completion reports obtained from DWR Well Completion Report Map Application (accessed 5/28/2020).
All wells are located in Township 1 North (N), Range 1 East (E), Mount Diablo Base & Meridian
[2] Well uses: D = domestic water supply, I = irrigation well, P = public water supply 35N/01E-27
Average Yield (Q) = 17.3 gpm for wells (3) located within 1 mile of the O&M facility. Average Q = 22.3 gpm for wells (9) located within two miles of the O&M facility (includes wells within 1 mile).

Abbreviations:
ft bgs – feet below ground surface
DWR – California Department of Water Resources
Caltrans – California Department of Transportation
ft – feet
gpm – gallons per minute
ID – identification
in – inch
NA – not applicable

The second is the residential and resort community of Moose Camp (Water System No.CA4500017), which has two wells, Well 2 and Well 3, located 1.05 miles south-southeast of the O&M facility (Moose Camp 2007). The initial estimated yield at Well 3 was 12 gpm. No well completion report or yield information was available for Well 2. These two wells serve four permanent residents year-round and as many as 165 people through 51 service connections between May 1 and October 31 (SWRCB 2024b).

The estimated annual non-Project groundwater demand within two miles of the proposed O&M facility well is presented below in Table 6.

Table 6. Estimated Annual Non-Project Groundwater Demand Within Two Miles of the Proposed O&M Well

Site	Use Type	Population / Area Served (people)	Estimated Total Annual Water Use (afy)
Moose Camp	Continuous occupancy	129	32.4
CAL FIRE Forest Fire Station No. 75[1]	Continuous occupancy	4	1.0
Caltrans - Hillcrest Safety Roadside Rest Area	Transient occupancy	2,500	0.1
Unaccounted For Private Residential (11 est.) and Commercial (1 est.) Wells[2]	Continuous occupancy	36	3.5
		Total	**37.0**

Source: SWRCB 2024a, b; DWR 2020

1 Not designated as a public water system on SWRCB Safe Drinking Water Information System Drinking Water Watch website.

2 Based on Google Earth imagery and estimated water use of one acre-foot per year per 3.4 households.

As shown in Table 6, the estimated annual non-Project groundwater use within two miles of the proposed O&M well is 37.0 afy.

Assuming the worst-case scenario of 5.6 afy of groundwater use during the operational phase of the project, the new well at the O&M facility would be increasing groundwater consumption within the local aquifer by 15% annually, equating to an increase in demand similar to that drawn by 1.6 households (Water Education Foundation 2018). In addition, the proposed O&M well's estimated minimum pumping rate of 11 gpm would fall within the lower range of the yields documented for wells within two miles (6 to 60 gpm). For comparison, the new well at the O&M facility would satisfy a demand for water that is approximately 17% of the demand for water from the local well with the highest demand (Moose Camp). As such, the groundwater demand generated by the operations phase of the project and sourced from a new, onsite well is not anticipated to substantially decrease groundwater supplies.

The project would not substantially interfere with the rate at which precipitation or surface features infiltrate into the subsurface to contribute to groundwater recharge. The project construction would add new, impervious surfaces, primarily comprising turbine foundations, paved roads, substation and switching station foundations, and O&M building foundation. However, these are small areas (the largest being the O&M facility foundation of 7,000 square feet) surrounded by acres of permeable ground. In addition, no impermeable surfaces are proposed to be located within or directly impact surface waters. As a result, the project would have a negligible effect on precipitation infiltration or groundwater recharge rate related to precipitation and infiltration. Therefore, the operations phase of the project would not substantially interfere with groundwater recharge.

7.2.1.2 Trucking Water from Redding-Area Basins or Burney Creek Valley Groundwater Basin

Water for operations could be trucked from any of the five Redding-Area Subbasins or from the Burney Creek Valley Groundwater Basin. Operational water use would not have a substantial effect on groundwater use or rate of groundwater level decline in any basin. To support this conclusion, Stantec produced a supply-and-demand analysis for the Anderson, Enterprise, and Bowman Subbasins (subbasins with available data, including adopted GSPs, that can facilitate meaningful analysis and comparisons). As outlined in Section 7.1.2, these subbasins serve as effective proxies for the remaining two Redding-Area Subbasins and the Burney Creek Groundwater Basin. Table 7 summarizes the projected average annual groundwater budgets for the Anderson, Bowman and Enterprise Subbasins with the annual operational water demand of 5.6 af.

Table 7. Projected Average Annual Groundwater Budgets for the Anderson, Bowman and Enterprise Subbasins with Project Operational Water Demand

Groundwater Budget Component	Anderson Subbasin[1] (afy)	Bowman Subbasin[2] (afy)	Enterprise Subbasin[1] (afy)
Inflow	489,000	100,000	332,000
Outflow	489,000	99,000	331,000
Total Balance	**0**	**1,000**	**1,000**
Project Annual Operational Water Demand	5.6	5.6	5.6
Revised Annual Groundwater Budget Balance (Year 1)[3]	**-5.6**	**994.4**	**994.4**

Source: EAGSA 2022a, 2022b; Tehama County Flood Control and Water Conservation District 2022
afy – acre-feet per year
1 Projected average annual water demand for Anderson and Enterprise subbasins is for the period Water Years 2019-2071.
2 Projected average annual water demand for Bowman Subbasin is for the period Water Years 2022-2072 with future land use and 2070 climate change assumptions.
3 Operational water demand is estimated to be 5.6 af per year for 35 years.

Because the Bowman and Enterprise subbasins each have an average annual projected groundwater budget of 1,000 af, the addition of operational water demand results in a groundwater budget of 994.4 af for each year of operations. Because inflow equals outflow in the Anderson subbasin, the projected annual groundwater budget including operational water demand would be -5.6 af. As outlined in Section 7.1.2, this apparent deficit does not mean that operational water demand will disrupt a balanced water supply each year, only that demand is expected to exceed supply during dry years. Additionally, as discussed above, this analysis is based on the conservative assumption that demands for operational water are not already included in the outflow budget for the Anderson Subbasin of 489,000 (or the other subbasins provided above). However, it is likely that the subbasins' water budgets through 2071 already account for such demand and, therefore, that the Project's 5.6 acre feet of demand falls within the anticipated outflow for each subbasin.

Furthermore, even if water is sourced from the Burney Creek Valley Groundwater Basin, the basin with the least supply, annual demand increase for operations would be less than 1% of current demand. As such, the groundwater demand generated by the operations phase of the project would not substantially decrease groundwater supplies, interfere substantially with groundwater recharge, or adversely impact sustainable groundwater management in any of the Redding-Area Subbasins or the Burney Creek Valley Groundwater Basin.

Groundwater use during project operations is not anticipated to lead to increased groundwater level decline in the project site groundwater area. Data on existing wells within two miles of the proposed O&M well show widely variable depths and depths to groundwater. The nine wells within two miles of the proposed O&M well draw from groundwater within fractures in the volcanic rocks or erosional surfaces that are underlain by impermeable rocks that cause groundwater to accumulate. These groundwater pockets are not interconnected such that pumping of one well impacts nearby wells. As a result, the well at the O&M facility would not be drawing from a defined groundwater body or aquifer which supplies all wells in the region, but instead would be drawing from groundwater which accumulates in relative isolation beneath the Project Site. This conclusion can be drawn based on the variability in initial groundwater levels and pumping rates reported in the Well Completion Reports for the nine existing wells (Table 10). Therefore, existing evidence indicates that a new well at the O&M facility would be drawing from its own, relatively isolated groundwater source and pumping would not lead to increased groundwater level decline in the Project Site groundwater area.

7.2.2 Sufficiency of Groundwater Supply for Project and Future Development

7.2.2.1 New Well at O&M Facility

Studies by DWR (1968 and 1984) provide limited information regarding groundwater conditions near the Project Site, and there are no DWR or USGS groundwater studies that discuss the Project Site specifically. As a result, wells located within two miles of the proposed O&M well were used as proxies to better understand the likely characteristics of a well at the O&M facility. Data on lithology, water levels, and pumping rates presented in Well Completion Reports for these existing wells (Table 10) were used to better understand subsurface hydrogeologic conditions in the vicinity of the proposed O&M well.

As discussed above under Section 7.2.1.2, variability in well yields suggests that bedrock fractures are the primary source of groundwater in the project site groundwater area, and that these fractures are not interconnected such that the pumping of one well impacts nearby wells. As a result, the sustainability and longevity of a well drawing from these groundwater pockets depends upon the number, size, interconnectedness, and water-bearing characteristics of the fractures encountered during drilling, and not the supply or demand of a regional aquifer or groundwater basin. Data from the existing nine wells can be used as a proxy in providing information on the potential sustainability and longevity of the well at the O&M facility. For example, as shown in Table 11, a number of wells within two miles of the O&M facility have been in operation for over 30 years (Well WW-2 [29 gpm for 30 years] and Well #3 [12 gpm for 40 years]).

Assuming the lithologic and subsurface hydrogeologic conditions are similar within two miles of the O&M facility, it is reasonable to conclude that the groundwater supplied by a well drilled at the O&M facility would be sustainable at a minimum pumping rate of 11 gpm over the 35-year operational life of the project. In addition, because the well at the O&M facility and any future wells in the area will be drawing from their own, isolated groundwater pockets, the sustainability and longevity of wells within this region are based more upon hydrogeologic and lithologic subsurface conditions and less upon demand. Therefore, should there be an increase in development in this region in the future, the number of preexisting wells will not affect the sustainability or longevity of new wells, since each draws from its own, isolated source. As a result, the construction of a new well at the O&M facility will not affect the sustainability of groundwater supplies for the project during operations or for future development in the project area.

7.2.2.2 Trucking Water from Redding-Area Basins or Burney Creek Valley Groundwater Basin

Operational water demand is not anticipated to impact the sufficiency of groundwater supply for the project or foreseeable future development. This is because the existing groundwater supply in the Redding-Area Subbasins and Burney Creek Valley Groundwater Basin is adequate and the incremental increase in water demand for operations will not substantially affect existing groundwater supplies in any of the focal basins. Table 8 summarizes the projected average annual groundwater budgets for the Anderson, Bowman, and Enterprise Subbasins with the annual operational water demand of 5.6 af.

Table 8. Projected Average Annual Groundwater Budgets for the Anderson, Bowman and Enterprise Subbasins with Project Operational Water Demand

Groundwater Budget Component	Anderson Subbasin[1]	Bowman Subbasin[2]	Enterprise Subbasin[1]
Inflow	489,000	100,000	332,000
Outflow	489,000	99,000	331,000
Total Balance	**0**	**1,000**	**1,000**
Project Annual Operational Water Demand	5.6	5.6	5.6
Revised Annual Groundwater Budget Balance (Year 1)[3]	**-5.6**	**994.4**	**994.4**

Source: EAGSA 2022a, 2022b; Tehama County Flood Control and Water Conservation District 2022

Note: Units in acre-feet per year (afy).

1 Projected average annual water demand for Bowman Subbasin is for the period Water Years 2022-2072 (Tehama County Flood Control and Water Conservation District, 2022) with future land use and 2070 climate change assumptions.

2 Operational water demand is estimated to be 5.6 af per year for 35 years.

According to Table 8, operational water demand will lead to a 0.001% increase in demand for the Anderson Subbasin and a 0.005% increase in demand for the Bowman and Enterprise Subbasins. This equates to an additional annual demand equal to 1.6 households. The U.S. Census reports that the average single-family household in Shasta County contains 2.5 people (U.S. Census Bureau 2022). Using this assumption, this analysis can rely on data on population projections for these three subbasins outlined in Table 1 to generally determine projected water demand over the 35-year operational life of the project. According to Table 1, the increase in population within these three subbasins during the operational life of the project is projected to be between approximately 13,000 people (Bowman Subbasin) and 57,000 people (Enterprise Subbasin). Therefore, the project's operational water demand will contribute to between 0.03% and 0.007% of the increase in demand projected for these three subbasins over the operational life of the project. Because this increase would be de minimis, operational water demand is not anticipated to impact the sufficiency of groundwater supply for the project or foreseeable future development.

8.0 CONCLUSION

Construction of the Fountain Wind Project would use water during construction and operational phases. During construction, approximately 310 afy of water would be used for dust suppression, soil backfill compaction, concrete manufacture, and emergency fire suppression. Water would be trucked in from one of the five Redding-Area Subbasins or the Burney Creek Valley Groundwater Basin. During operations, approximately 5.6 afy would be used for the 35-year project lifespan for potable water demands for onsite employees and non-potable water for fire flow water storage. Water used during operations would come from a new, onsite well located at the O&M Facility or be trucked from an existing well within one of the Redding-Area Subbasins or Burney Creek Valley Groundwater Basin.

8.1 POTENTIAL IMPACTS OF CONSTRUCTION WATER DEMAND

None of the basins that are the focus of water supply for the project are in or at risk of overdraft within the period during which construction would take place, as evidenced by their very low to medium priority designations. As a result, none of these basins are at imminent risk of increased groundwater level decline with or without the project. The temporary addition of 310 afy of demand would therefore not lead to a significant increase in the risk of groundwater level decline. Therefore, temporary water use by project-related construction activities will not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of any of the potential source basins.

Construction-related water demand is not anticipated to impact the sufficiency of groundwater supply for the project or foreseeable future development because the existing groundwater supply in the focal basins is adequate to supply temporary project demand and projected development that may occur within the two-year construction period. Taking into consideration results of a supply-and-demand analysis and groundwater budget, the temporary nature of construction water demand, and the sustainable yield estimates for the Enterprise and Anderson Subbasins, construction water demand would not have a significant effect on the sustainability of groundwater resources used during construction or for foreseeable future development.

8.1 POTENTIAL IMPACTS OF OPERATIONAL WATER DEMAND

Assuming the worst-case scenario of 5.6 afy of groundwater use during the operations phase of the project, the new well at the O&M facility would be increasing groundwater consumption within the local aquifer by 15% annually, or an increase equal to 1.6 additional households. The O&M well’s minimum pumping rate of 11 gpm would fall well within the yields of existing wells within two miles of the new well. As a result, the operational groundwater demand sourced from a new, onsite well is not anticipated to substantially decrease groundwater supplies. In addition, because project construction would not add large areas of new, impermeable surfaces, the Project will have a negligible effect on precipitation infiltration and groundwater recharge rate related to precipitation and infiltration. As a result, the operations phase of the project would not substantially interfere with groundwater recharge.

Should operational water supply be trucked in from existing wells in one of the Redding-Area Subbasins or Burney Creek Valley Groundwater Basin, the annual demand increase would be less than 1% of current demand in any of the focal basins. As such, the groundwater demand generated by the operations phase of the project would not substantially decrease groundwater supplies, interfere substantially with groundwater recharge, or adversely impact sustainable groundwater management in any of the Redding-Area Subbasins or the Burney Creek Valley Groundwater Basin.

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