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1.0 INTRODUCTION

This report presents the methods and results of a biological habitat evaluation conducted by Vollmar Natural Lands Consulting, Inc. (VNLC) for the Mayacma Geothermal Project (Project). The report is prepared on behalf of Panorama Environmental, Inc., which also contributed Project documentation and guidance. The Project site is located at an existing power plant site off of High Valley Road, approximately 9.5 miles southwest of the City of Clearlake, Lake County, California (**Figure 1**). The proposed Project entails rebuilding a modern geothermal power plant—the Mayacma Geothermal Power Plant—within the development footprint of the older Bottle Rock Geothermal Power Plant. The Project includes many associated tasks, including the installation of a pipeline that will span from the new facility to a separate site northwest of the plant, where the pipeline will deliver steam to be injected into a well, sending steam and condensed water back to the underground geothermal field. The pipeline will be installed along an existing pipeline with support structures that will be used for the new pipe. The well would be installed within an area that was likewise historically leveled and paved and consists of remnant infrastructure. As part of the permitting process, the California Energy Commission requires a survey of sensitive biological resources within 1,000 feet of the Project site. The buffer area forms the project study area, amounting to a total of 122-acres.

This habitat evaluation was conducted to identify and characterize existing conditions within the study area, as well as to assess the potential for special-status species, sensitive habitats, and jurisdictional features to occur in the area. All work associated with the power plant and injection well would be within existing developed areas, and thus resulting in only noise-related impacts.

1.1 Special-status Species Potentially Affected

Based on habitat requirements and occurrence distributions, there are a total of ten special-status wildlife species with some potential to occur within the immediate proximity of the study area. These include:

- Two federally or state listed species: Northern Spotted Owl (*Strix occidentalis caurina*) and monarch butterfly (*Danaus plexippus plexippus* pop. 1); and
- Eight non-listed special-status species: foothill yellow-legged frog (FYLF) (*Rana boylii*) Northwest/North Coast clade, red-bellied newt (*Taricha rivularis*), Purple Martin (*Progne subis*), pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), hoary bat (*Lasiurus cinereus*), long-eared myotis (*Myotis evotis*), and fringed myotis (*Myotis thysanodes*).

In addition, there are 17 special-status plant taxa with potential to occur in the study area, as discussed in **Section 4.2.4**. Additional information about these and all other special-status species known from the project area is provided in **Appendix B**.

1.2 Critical Habitat

The study area is not located within any designated critical habitat. The closest critical habitat is for slender Orcutt grass (*Orcuttia tenuis*), located approximately 2.5 miles to the north, and Northern Spotted Owl, located approximately 2.8 miles to the southeast. There is no suitable habitat for slender Orcutt grass within the study area, and its presence is not further addressed in this report. Northern spotted owl is discussed in detail in **Section 4.2.1.**

Legend

- River or Stream
- Highway
- County Boundary
- Study Area*
- Water Body
- Urban Area

* 1,000-foot buffer around project site

Data Sources: Panorama Environmental, 2023
ESRI, 2023 | GAP, 1998 | DWR, 2001
USGS, various | USHUD, 2018
GIS/Cartography by: Kristen Chinn, Feb. 2023
Map File: Vicinity_576_A-P_2023-0222.mxd

FIGURE 1
Regional Vicinity Map

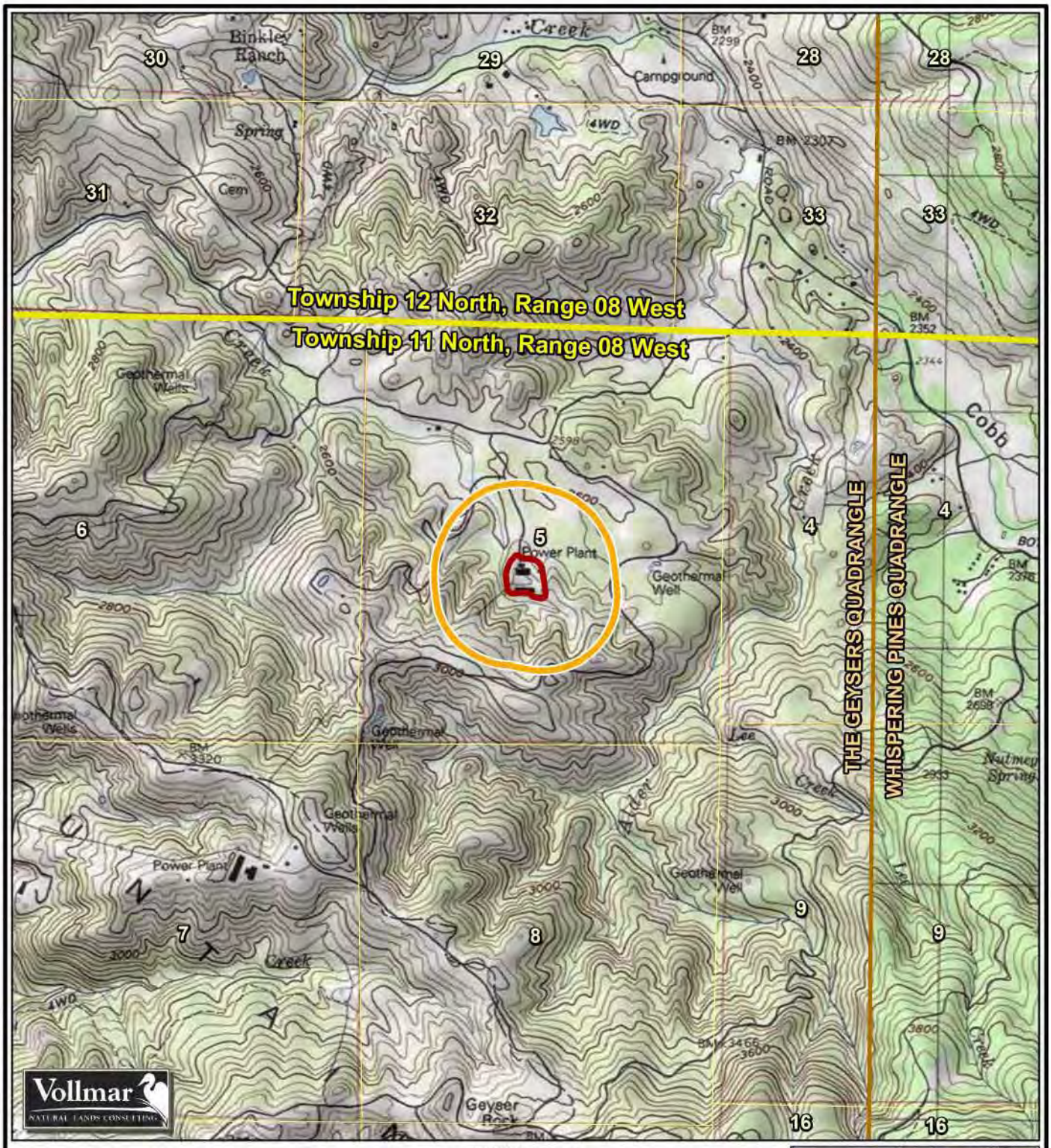
Mayacma Geothermal Project
Lake County, CA

N
W E
S

1:316,800
(1 in = 5 mi at letter layout)

0 2.5 5 10 Km

0 2.5 5 10 Mi



Legend

- Project Site (primary disturbance area)
- Study Area (project site 1,000-ft buffer)
- Quadrangle Boundary
- Township or Range Boundary
- Section Boundary*

* See map labels

Data Sources: Panorama Environmental, 2023
ESRI, 2023 | GAP, 1998 | DWR, 2001
USGS, various | USHUD, 2018
GIS/Cartography by: Kristen Chinn, Feb. 2023
Map File: DRG_576_A-P_2023-0328.mxd

FIGURE 2
USGS Topographic Map

Mayacma Geothermal Project
Lake County, CA

N W E S

1:24,000
(1 in = 2,000 ft at letter layout)

0 125 250 500 Meters

0 500 1,000 2,000 Feet

1.3 Potential Impacts to Additional Resources

The study area encompasses potentially jurisdictional aquatic habitats that are associated with Cow Creek and its tributaries, including wetland and riparian vegetation as well as unvegetated channel below the ordinary high water mark (OHWM). The wetlands appeared to be limited to small, localized portions of Cow Creek below the tops of banks and were not mapped during the field survey, as the survey was reconnaissance in nature and did not involve investigations of the three parameters required to classify and map wetlands. However, the very limited riparian habitat within the study area was mapped since this only requires identification of plant species.

2.0 PROJECT LOCATION

The study area is located off of High Valley Road, approximately one mile west of Cobb, a census-designated place in Lake County near the Sonoma County border. The closest major city is Clearlake, which is approximately 9.5 miles northeast of the study area. As indicated above, the study area consists of the Mayacma Geothermal Power Plant and a 1,000-foot buffer around it, as well as a pipeline alignment from the power plant to the well site to the northwest, which is not expected to involve direct impacts to natural habitats. It is mapped on "The Geysers" 7.5' U.S. Geological Survey (USGS) topographic quadrangle, within Section 5 of Township 11 North, Range 08 West (**Figure 2**). The project centroid is at 122.7681° west and 38.8348° north. Aside from the power plant and associated roads and other utilities, the study area encompasses a variety of mostly natural and relatively intact habitats, in the form of woodland, chaparral, coniferous forest, grassland, and stream habitats. Habitats within the study area are described in detail within **Section 4.1.4** below.

3.0 METHODS

3.1 Preliminary Review and Field Preparation

Prior to the site survey, VNLC ecologists delineated the study area and reviewed the latest version of the California Natural Diversity Database (CNDDB) to identify special-status plants and wildlife observations in the project vicinity. The study area was digitized using maps of the project site and pipeline alignment. The boundaries were included on maps and then loaded on to GPS units for navigation in the field.

The project ecologists compiled and reviewed the U.S. Fish and Wildlife Service (USFWS) Information Planning and Consultation System (IPaC) for the project area. Additionally, a nine-quad search for rare and listed plant species was conducted through the California Native Plant Society (CNPS) online "Inventory of Rare and Endangered Plants." Specifically, the search centered on The Geysers quadrangle and included all eight surrounding quadrangles. The list provides information pertaining to the special-status plants known from the region, including preferred habitat, elevation range, and blooming period. The list was used to help determine the potential for special-status plants to occur in the study area. Ecologists also reviewed site aerial imagery, the formal project description, and general regional conditions prior to the site visit. This information guided the development of field survey strategies for those special-status species with potential to occur in the study area.

3.2 Targeted Sensitive Biological Resources

Special-status animal species targeted and analyzed in this report include those listed by the USFWS or California Department of Fish and Wildlife (CDFW) as threatened or endangered, as well as those proposed for listing or that are candidates for listing as threatened or endangered. The listing of "Endangered, Rare, or Threatened" is defined in Section 15380 of the *State of California Environmental Quality Act* (*CEQA*) *Guidelines*. Section 15380(b) states that a species of animal or plant is "endangered" when its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors. A species is "rare" when either "(A) although not presently threatened with extinction, the species is existing in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or (B) the species is likely to become endangered within the foreseeable future throughout all or a portion of its range and may be considered 'threatened' as that term is used in the Federal Endangered Species Act" (ESA).

Animal species may also be designated as "Species of Special Concern" or "Fully Protected" by the CDFW. Although these species have no legal status under the California Endangered Species Act (CESA), the CDFW recommends their protection as their populations are generally declining and they could be listed as threatened or endangered (under CESA) in the future. "Fully Protected" species generally may not be harmed ("taken") or possessed at any time. The CDFW may only authorize take for necessary scientific research and may authorize live capture and relocation of "fully protected" birds to protect livestock.

Birds may be designated by the USFWS as "Birds of Conservation Concern." Although these species have no legal status under ESA, the USFWS recommends their protection as their populations are generally declining, and they could be listed as threatened or endangered (under ESA) in the future.

Special-status plants include species that are designated rare, threatened, or endangered as well as candidate species for listing by the USFWS. Special-status plants also include species considered rare or endangered under the conditions of Section 15380 of the CEQA Guidelines, such as those plant species identified by the CNPS as California Rare Plant Rank (CRPR) 1A, 1B, and 2 in the Inventory of Rare and Endangered Vascular Plants of California by the CNPS. Finally, special-status plants may include other species that are considered sensitive or of special concern due to limited distribution or lack of adequate information to permit listing or rejection for state or federal status, such as those included as CRPR 3 or 4 in the CNPS Inventory.

For the purposes of this report, 'sensitive plant communities' include those designated as such by the CDFW in the CNDDB (CDFW 2023). Plant communities ranked in the Manual of California Vegetation (MCV) were considered but not formally documented in the field due to the relatively large study area, inaccessibility of portions of the area, and reconnaissance nature of the field survey (i.e., the specific relative percent cover of dominant plants was not determined). In addition, wetland and riparian habitats, regardless of constituent plant species, are considered sensitive. Streams, impounded water bodies, and interconnecting or adjacent wetlands and drainages are subject to the jurisdiction of the United States Army Corps of Engineers (ACOE) under Section 404 of the Federal Clean Water Act (CWA). The CDFW also generally has

jurisdiction over drainages and adjacent aquatic resources, together with other aquatic features that provide an existing fish and wildlife resource pursuant to Sections 1602-1603 of the California Fish and Game Code. The CDFW asserts jurisdiction to the outer edge of vegetation (i.e., the tree dripline) associated with a riparian corridor, or to the top of the stream bank, whichever is further. The Regional Water Quality Control Board (RWQCB) also generally has jurisdiction over surface waters, including streams and wetlands. Any grading, excavation, or filling of jurisdictional drainage corridors or wetlands would require federal and/or state permits (e.g., Section 404 and/or 401 permits) and will require mitigation.

Figure 3 below shows the distribution of special-status wildlife species documented within the CNDDB in the surrounding area. These and other special-status wildlife species known from the project region are identified in **Appendix B**, along with their regulatory status, habitat requirements, and an evaluation of their potential to occur within the study area.

3.3 Field Survey

VNLC Senior Ecologist Jake Schweitzer and VNLC Wildlife Biologist Linnea Neuhaus conducted a site survey on February 10, 2023. Mr. Schweitzer and Ms. Neuhaus traversed all accessible portions of study area on foot to gain visual coverage of all habitat types present. Dominant plant species within each habitat type were recorded, along with common wildlife species, general conditions (e.g., level of disturbance), and notable habitat features. A search was conducted for sensitive habitats (e.g., riparian) and habitat potential for special-status species, such as nesting potential, burrows, and aquatic features. The search also involved looking for early-blooming special-status plants known from the vicinity of the study area, such as manzanita (*Arctostaphylos*) species. It should be noted that significant portions of the study area were inaccessible due to impenetrable shrubland habitats, and these areas were not directly investigated in the field.

A combination of GPS points and lines was recorded along the edges of drainage features, with points recorded where satellite reception was degraded (e.g., under the densest tree canopies). Riparian vegetation extended beyond the bank tops at only one localized portion of the study area. Some of the channel edges within more difficult areas to survey due to GPS reception were refined using 1x1 meter resolution USGS Light Detection and Ranging (LiDAR) data. Photographs detailing representative site conditions were also recorded throughout the site, which are presented in **Appendix A**.

red-bellied newt
Townsend's big-eared bat
Bolander's horkelia
Boggs Lake hedge-hyssop
Burke's goldfields
marsh checkerbloom
few-flowered navarretia
Lake County stonecrop
Bolander's horkelia
oval-leaved viburnum
California red-legged frog
Raiche's manzanita
Slender Orcutt Grass Critical Habitat
many-flowered navarretia
northern spotted owl
Ricksecker's water scavenger beetle
California linderiella
obscure bumble bee
slender Orcutt grass
glandular western flax
glandular western flax
purple martin
watershield
legenere
Bolander's horkelia
Boggs Lake hedge-hyssop
Hall's harmonia
many-flowered navarretia
Bolander's horkelia
California red-legged frog
two-carpellate western flax
Clear Lake pyrg
California satintail
glandular western flax
Loch Lomond button-celery
California red-legged frog
few-flowered navarretia
Loch Lomond button-celery
many-flowered navarretia
glandular western flax
pallid bat
hoary bat
Townsend's big-eared bat
fringed myotis
long-eared myotis
western red bat
Brandegee's eriastrum
three-fingered morning-glory
Geysers panicum
marsh checkerbloom
glandular western flax
marsh checkerbloom
few-flowered navarretia
marsh checkerbloom
Rincon Ridge ceanothus
Baker's navarretia
many-flowered navarretia
Colusa layia
northern spotted owl
steelhead - central California coast DPS
Mayacma Geothermal Power Plant Study Area
northern spotted owl
California red-legged frog
dimorphic snapdragon
Rincon Ridge ceanothus
Greene's narrow-leaved daisy
Colusa layia
Calistoga ceanothus
western bumble bee
Sonoma beardtongue
Lake County stonecrop
Rincon Ridge ceanothus
Geysers panicum
red-bellied newt
Geysers panicum
red-bellied newt
Northern Spotted Owl Critical Habitat
purple martin
Hoffman's bristly jewelflower
Freed's jewelflower
Geysers panicum
Freed's jewelflower
Geysers panicum
purple martin
two-carpellate western flax
purple martin
Geysers panicum
elongate copper moss
Calistoga ceanothus
red-bellied newt
Freed's jewelflower
Snow Mountain buckwheat
Rincon Ridge ceanothus
Data Sources: CNDDB, 07/2022 | GAP, 1998
USFWS, 2005 | Panorama, 2023 | VNLC, 2023
GIS/Cartography by: Jake Schweitzer, Feb. 2023
Map File: CNDDB_576_B-P_2023-0222.mxd
Vollmar NATURAL LANDS CONSULTING

Legend

- Socrates Mine Jewelflower
- Cobb Mountain Lupine
- Konocti Manzanita
- Other CNDDB Special-Status Plant (see map label)
- California Giant Salamander
- Foothill Yellow-legged Frog
- Other CNDDB Special-Status Animal (see map label)
- Steelhead Designated Critical Habitat
- Designated Critical Habitat
- County Boundary
- Study Area (~120 acres)

FIGURE 3
Regional Biological Resources

Mayacma Geothermal Project
Lake County, California

N W E S

1:63,360
(1 in = 1 mi at tabloid layout)

0 0.5 1 2 Km

0 0.5 1 2 Mi

4.0 RESULTS

4.1 Existing Conditions

The study area is located in the Mayacamas Mountains, approximately one air mile west of the Town of Cobb. Land use in the region consists primarily of agriculture in the form of vineyards, along with conserved lands and rural residential housing. There is also tourism in the region, as evidenced by the presence of outdoor recreation areas and a number of bed and breakfast establishments.

4.1.1 Climate

The climate in the region is characterized as "Mediterranean," with cool, wet winters and warm, fairly dry summers as well as high inter- and intra-annual variability in precipitation. Mean annual precipitation and temperature in the vicinity of the study area are 52.6 inches and 58.7 degrees Fahrenheit (F), respectively (PRISM 2023). More than 98 percent of annual precipitation occurs during the "wet season," which extends from October to May. Precipitation occurs primarily as rain, but snow is not uncommon on the higher peaks in the area and, according to the property manager (pers. comm.) occasionally falls within the study area.

The 2022-2023 wet season (with data available from October 2022 to January 2023 due to the date of this report) experienced higher than average precipitation and slightly lower than average temperatures for the same time period (historical range from October to January). Specifically, precipitation was 140 percent of normal (41.3 versus 29.5 inches), and mean temperatures were 99 percent of normal (51.4 versus 51.8 degrees F) (ibid). Moreover, the timing of the precipitation was highly erratic, with October and November receiving less than average precipitation, December receiving higher than average precipitation, and January receiving significantly higher than average precipitation (25.2 versus 10.1 inches of precipitation just in January).

4.1.2 Topography

As the study area is located in the Mayacamas Mountains, elevation range and topographic variations are highly variable. Elevation within the study area ranges from approximately 2,582 to 2,982 feet (787 to 909 meters) above sea level, with elevation rising generally from north to south (USGS 1997). Slope ranges from nearly flat within the power plant itself and grassland habitat in the northeast portion of the site, to over 149 percent (56 degrees) within the cismontane woodland and chaparral habitats in the west, south, and southeastern portions of the study area. Moderately steep hill slopes rise adjacent to the western and southern edges of the power plant. The average slope across the study area is notably steep, at approximately 35 percent (over 19°) (ibid).

4.1.3 Substrates

A total of four soil units are mapped within the study area, as shown on **Figure 4** below. All of the soil units feature surface textures of gravelly loam or loam, and are therefore generally well drained to somewhat excessively drained, indicating that they may be prone to erosion (USDA-NRCS 2023). The pH rating for the soils indicates that all of the rated units are moderately acidic to neutral, ranging from 5.5 to 7.3. The primary characteristics related to the soil materials and their relationship to plant growth are presented in **Table 1** below. The total percent cover of each

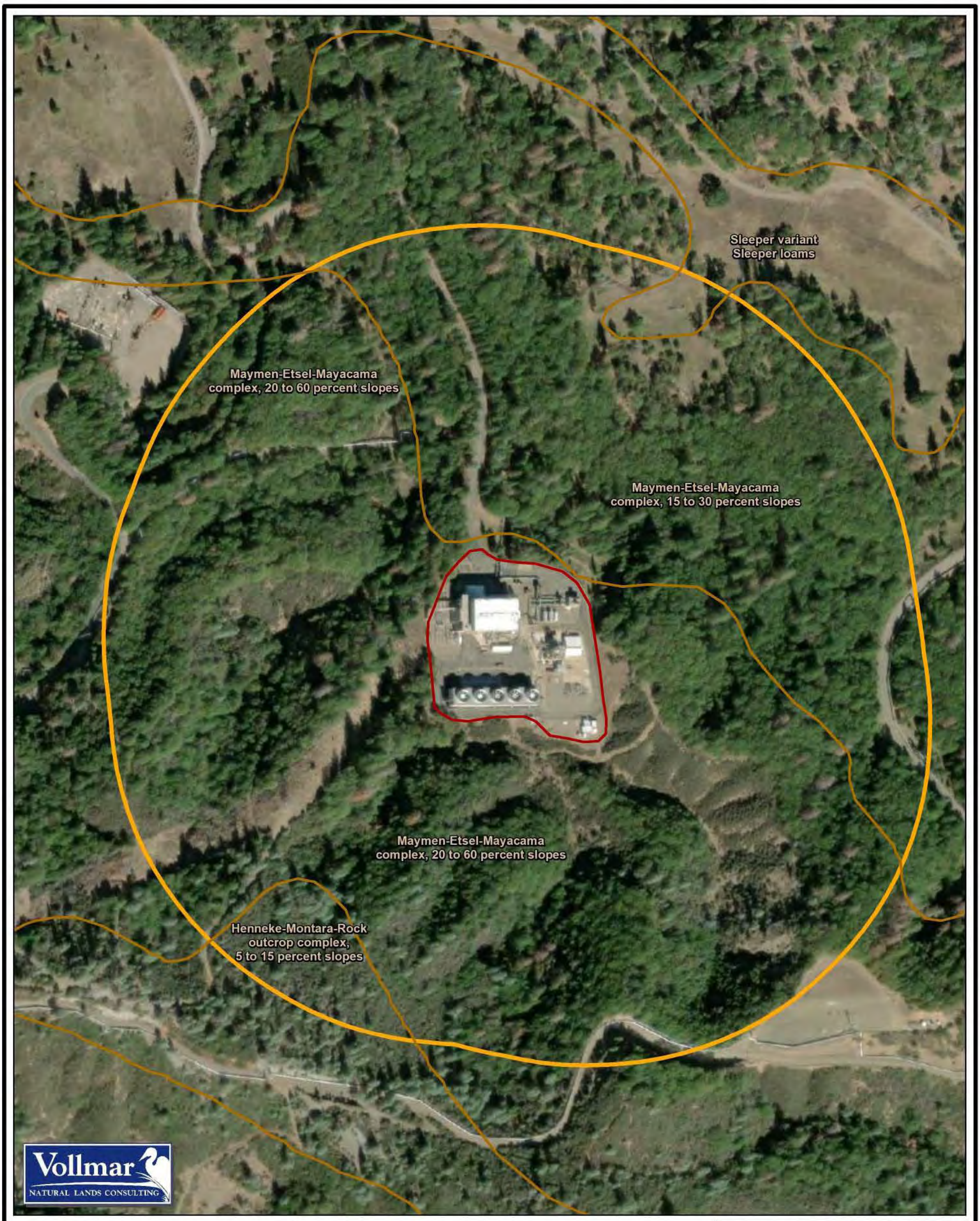


FIGURE 4
Local Site Map and Soil Units

Mayacma Geothermal Project
Lake County, California

Legend

- Road
- Project Site (primary disturbance area)
- Study Area (project site 1,000-ft buffer, 122 acres)
- Soil Unit Boundary

N
W E
S

1:3,600
(1 inch = 300 feet at tabloid layout)

0 75 150 Meters

0 150 300 600 Feet

Data Sources: VNLC, 2023 | Panorama, 2023
USDA SSURGO Data | 2022 | USGS 10m DEMs
Gap, 1998 | ESRI Aerial Imagery
GIS/Cartography by: Jake Schweitzer, March 2023
Map File: Site_576_B-P_2023-0328.mxd

unit within the study area is also provided. Note that the majority of the study area is mapped as a single soil series, namely Maymen-Etsel-Mayacama complex, which is mapped over 96.2 percent of the area. This soil type is derived from sandstone and shale rocks, which are not known to support a particularly large number of special-status plants. Similarly, the sleeper variant sleeper-loam, which is derived from sedimentary rock, is a common substrate with low to average potential to support unique flora. In contrast, the Henneke-Montara-Rock outcrop complex is derived from serpentinite, a highly unique substrate.

Serpentinite rock is an "ophiolite," which is broadly defined as a section of the earth's oceanic crust and/or the underlying upper mantle that has been uplifted and emplaced within continental crust (Alexander et al. 2007). In contrast to more strictly continental crust (i.e., rocks from much shallower depths in the earth's crust, far above the mantle), which is relatively high in silicates such as quartz and feldspar, ophiolites are composed of higher concentrations of minerals such as olivine, chromite, and pyroxene. Referred to as *mafic* (a term derived by contracting "magnesium" and "ferric'—iron), or *ultramafic* for materials with even higher concentrations of these minerals (up to 90 percent), ophiolites include sedimentary, igneous, and metamorphic rocks, but all are relatively low in minerals more associated with continental materials. Most plant taxa, having evolved on soils derived from continental materials, are adapted to minerals with higher concentrations of elements such as potassium and calcium, as well as elements such as nitrogen that are associated with the atmosphere. Far fewer plants have adapted to oceanic and mantle minerals that are high in magnesium, iron, and nickel, and relatively low in such elements as potassium and calcium (Kruckeberg 1984). Thus, soils derived from ultramafic rocks such as serpentinite generally support relatively few—often uniquely-adapted—plants. The Calflora website lists 338 of California's 2,403 special-status plants as having an affinity for serpentine substrates (2023). That amounts to 14 percent of all special-status plants, despite the rock covering less than one percent of the state.

Table 1. Characteristics of Soil Units Mapped within the Study Area

Soil Unit Name and Percent of the Study Area	Parent Material	Surface Texture*	pH*	Drainage
Henneke-Montara-Rock outcrop complex, 10 to 50 percent slopes, MLRA 15 (2.8%)	Residuum weathered from serpentinite	Gravelly loam	7.3	Well drained
Maymen-Etsel-Mayacama complex, 15 to 30 percent slopes (30.1%)	Residuum weathered from sandstone and shale	Gravelly loam	5.5	Somewhat excessively drained
Maymen-Etsel-Mayacama complex, 20 to 60 percent slopes (66.1%)	Colluvium derived from sandstone and shale	Gravelly loam	6.2	Somewhat excessively drained
Sleeper variant-Sleeper loams, 5 to 15 percent slopes (1.0%)	Residuum weathered from sedimentary rock	Loam	6.7	Well drained

Source: U.S. Department of Agriculture Natural Resources Conservation Service, SoilWeb website, 2023.
*Dominant condition. Values for surface texture, pH and organic matter correspond to the top 24 inches.

4.1.4 Habitats

The study area encompasses a notable variety of habitats, especially for a 122-acre site. There are five broadly defined natural plant communities, as classified in the system used by the CNPS for analyzing special-special plant habitat types. The diversity is largely the result of the rugged topography of the area, which provides a range of micro-habitats related to slope and aspect and,

in turn, soil characteristics (e.g., thickness). In general, herbaceous habitats such as grasslands occupy gentler slopes with thicker soils, while shrublands, typically featuring shrubs with a very high root to shoot (i.e., above ground trunk and branches) ratio, occupy the steepest slopes. Forest and woodlands cloak the intermediate hillslopes. Most of these broad habitat types consist of a variety of plant communities—for example "Chaparral" consists of at least three or four plant communities that would be classified as different alliances and associations in the MCV (CNPS 2023a), depending on the percent cover of the various shrub species. However, these are mapped as CNPS classes because the primary purpose of this report is to describe habitat types known to support special-status plants and animals, as defined in the CNPS habitat analysis system as well as most habitat analysis for special-status animals. Aside from the mapped plant communities, there are aquatic habitats in the form of a seasonal stream and ephemeral drainages. These do not support extensive or notably distinct vegetation, but do serve as habitat elements with potential to provide at least marginal habitat for special-status plants and animals. These features are described in detail in **Section 4.3.1** below.

In addition to the natural habitats, there are anthropogenic habitats, in the form of the power plant and associated cleared and leveled areas as well as a powerline corridor that is managed to prevent the growth of tall vegetation. The pipeline alignment follows an existing pipeline, which primarily runs along existing roads, but there are also localized areas of natural habitats along the alignment where heavy equipment may need temporary access. The developed power plant areas feature very low plant cover, with only a few scattered, highly adaptable herbaceous weeds, while the powerline corridor features grasses and forbs and low-growing shrubs among the stumps of cut trees. Among the most common plants along the corridor are what appear to be planted stands of native bunchgrass species, most notably California fescue (*Festuca californica*), which competes with invasive weeds and sprouts of the cut trees and shrubs. Neither of these anthropogenic habitats are likely to support sensitive biological resources, and thus are not further discussed in this section, though they are mapped on **Figure 5** below.

Cismontane Woodland

Covering 76.4 acres, Cismontane Woodland encompasses 62.7 percent of the study area. It is present on all slopes and aspects within and surrounding the study area, but is most prevalent on moderate slopes—it is sparse or absent along the steepest slopes and within extensive flatlands (**Figure 5**). The CNPS defines this habitat as follows: "Trees deciduous or evergreen, forming an open canopy. Broadleaved trees, especially oaks, dominate, although conifers may be present as canopy emergents. The understory may be open and herbaceous or closed and shrubby. This type occurs on a variety of sites in lowland California" (CNPS 2023b). The habitat as it occurs in the study area is dominated by evergreen hardwood trees, but also features some deciduous hardwoods and several conifer species. The hardwoods include canyon live oak (*Quercus chrysolepis*) along the upper slopes, black oak (*Q. kelloggii*) along the lower slopes, and California bay (*Umbellularia californica*) and Pacific madrone (*Arbutus menziesii*) in between. In general, Cismontane Woodland in the area forms a mosaic of each of these species alternating as dominant trees. Douglas fir (*Pseudotsuga menziesii*) is the most common conifer species, followed by ponderosa pine (*P. ponderosa*) and foothill pine (*Pinus sabiniana*). There are also a few sugar pines (*P. lambertiana*), a species that is uncommon in the Coast Ranges. The understory shrub and vine stratum within the Cismontane Woodland consists primarily of common manzanita (*Arctostaphylos manzanita* ssp. *manzanita*), scrub oak (*Quercus berber-*

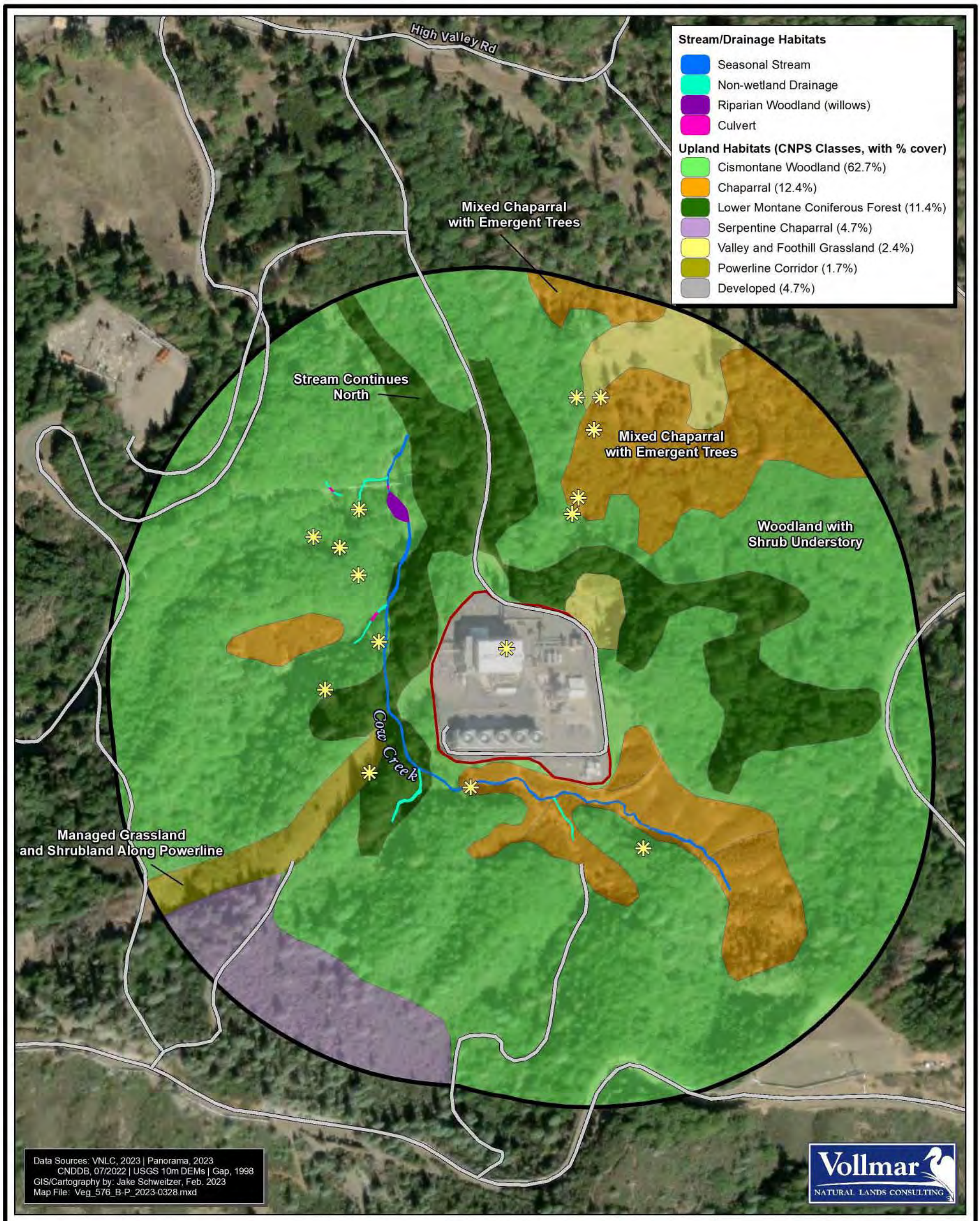


FIGURE 5
Local Biological Resources

Mayacma Geothermal Project
Lake County, California

Legend

- Bird Nest (observed 02/10/2023)*
- Road
- Project Site (~6 acres)
- Project Site 1,000-ft Buffer* (~120 ac, incl. project site)**

* All presumed to be inactive at time of survey

** Part of study area

Note: Wetland habitats are scattered along Cow Creek but are small and localized. Riparian trees occur only as scattered indiviudals except where mapped. A formal wetland delineation was not conducted in the study area.

N
W E
S

1:3,600
(1 inch = 300 feet at tabloid layout)

0 75 150 Meters

Feet
0 150 300 600

-idifolia), and birch leaf mountain mahogany (*Cercocarpus betuloides*). While all of the most common trees and shrubs are native to California and the region, the herb layer consisted of a mix of native and exotic species. The most common natives observed include California fescue, California fuchsia (*Epilobium canum*), white-flowered hawkweed (*Hieracium albiflorum*), and California milkwort (*Rhinotropis californica*), and these are interspersed with the exotic dogtail grass (*Cynosurus echinatus*), tall sock destroyer (*Torilis arvensis*), orchard grass (*Dactylis glomeratum*), and ripgut brome (*Bromus diandrus*), most of which are more common within the more open habitats.

Chaparral

Chaparral is in a distant second place among the most widespread habitat types within the study area. It occupies 20.9 acres, amounting to 17.1 percent of the study area, primarily along the steepest slopes and where soils are notably shallow and/or rocky and sterile (**Figure 5**). The CNPS (2023b) defines this habitat as follows:

"Impenetrably dense, evergreen, leathery-leaved shrubs that are active in winter, dormant in summer, and adapted to frequent fires either through resprouting or seed carry-over. There is a characteristic florula (i.e., small flora) of fire-following annuals and short-lived perennials. Mature stands may exceed 3-4 meters in height. It occurs on diverse substrates, many of which support distinctive suites of edaphic indicators. Chaparral may be successional to coniferous forest or oak woodland, as tree seedlings can sometimes be found beneath the shrub canopy."

The 22.3 acres includes areas mapped as "Serpentine Chaparral," which accounts for just under five percent of the study area (5.7 acres). As indicated above, serpentine soils are known to support a notable number of special-status plants, and so this habitat is mapped separately among the several incarnations of chaparral habitats. The serpentine area is located at the southwestern edge of the study area and extends southwestward well beyond the site. As expected, the area consists of a conspicuous diversity of shrubs and herbs that are generally absent from the rest of the study area. The most common shrub species observed include leather oak (*Quercus durata*), Jepson's ceanothus (*Ceanothus jepsonii*), and toyon (*Heteromeles arbutifolia*), while herb species consisted of coyote mint (*Monardella villosa*), wooly sunflower (*Eriophyllum lanatum*), California fescue, and soap plant (*Chlorogalum pomeridianum*). All of these are native species, and many of them are associated with serpentine soils, if not restricted to such substrates. In addition, scattered throughout the serpentine habitat are foothill pine trees, a species that is common on serpentine soils throughout much of California, but also commonly occurs on non-serpentine soils. There are relatively few tree species that commonly occur on serpentine soils.

The remaining Chaparral habitat within the study area, occurring on non-serpentine sandstone and shale soils, consist of two broad groups, including what the California Department of Forestry and Fire Protection plant community data classifies as Chamise-Redshank Chaparral and Mixed Chaparral. As its name suggests, the former is dominated by chamise (*Adenostoma fasciculatum*) and/or redshank (*A. sparsifolium*), with chamise being more dominant in northern California and redshank being more dominant in southern portions of the state. Chamise is clearly dominant within onsite Chaparral occurring along the steepest slopes and most sterile, gravelly sandstone soils, such as in the southeastern part of the study area. Associated species include buckbrush (*Ceanothus cuneatus*), scrub oak, common manzanita, and chaparral pea

(*Pickeringia montana*). No herbs were found to commonly occur in the habitat, but there may be a slightly higher cover during the spring or summer season, when annual species are more likely to be present. The Mixed Chaparral includes the same shrub species, but in more equal covers rather than a majority of chamise. Naked buckwheat (*Eriogonum nudum*) and incipient annual grasses were found growing under the shrubs in this habitat. The soils supporting this diversity were found to be less gravelly and with more organic content, enabling the more diverse mosaic of plants.

There are currently no planned project activities within the onsite Chaparral habitat, so no impacts to Chaparral plants are anticipated. However, in the event that project plans shift to include work within Chaparral, the habitat should be carefully surveyed for special-status plant

Lower Montane Coniferous Forest

This habitat covers approximately 13.9 acres (11.4%) of the study area, along two winding, somewhat linear corridors that converge north of the power plant (**Figure 5**). This habitat is defined by the CNPS as follows (2023b): "Open to dense stands of conifers found at lower and middle elevations in the mountains. Broadleaved trees may be present in the understory. Dense chaparral shrubs may also occur, especially in seral stands. The upper limit of lower montane coniferous forests more-or-less coincides with the elevation of maximum annual precipitation." This describes the onsite habitat quite accurately, as it is at "lower to middle elevation in the mountains" (i.e., roughly 2,500 to 3,000 feet in the Mayacamas), includes broadleaved trees, including most of those listed as occurring in Cismontane Woodland, and also includes stands of Chaparral shrubs. While most of the habitat is relatively shady, there are several areas where the canopy is open enough to support species that require at least modest sun exposure. The most common conifer in this habitat is Douglas fir, followed by ponderosa pine, foothill pine, and sugar pine, as well as a few California nutmeg trees (*Torreya californica*). Among all of these conifers, only the Douglas fir and ponderosa pines form substantial stands. As with all habitats other than Chaparral, common manzanita is the most prevalent shrub species, and the most common herbs seen during the February 2023 survey, included wood fern (*Dryopteris arguta*), western sword fern (*Polystichum munitum*), and bedstraw species (*Galium* spp.) within more shaded habitats, and dogtail grass and common chickweed (*Stellaria media*) within open habitats.

Valley and Foothill Grassland

Encompassing only 2.9 acres (2.4%) this is the most limited and localized natural habitat within the study area. This habitat is defined by the CNPS as follows: "Introduced, annual Mediterranean grasses and native herbs. On most sites the native bunch grass species, such as needle grass, have been largely or entirely supplanted. Stands rich in natives usually found on unusual substrates, such as serpentinite or somewhat alkaline soils." This generally applies to the onsite grasslands, though no native forb species were observed, perhaps as a result of the timeframe of the survey, in February. Two stands are present northwest of the power plant (**Figure 5**), one of which, adjacent to the power plant, appears to have been planted with orchard grass. The only other species observed in that area are dogtail grass as well as a few emergent ponderosa pines and birch leaf mountain mahogany. The northern grassland is naturally occurring and slightly more diverse, but still dominated by exotic species such as medusahead (*Elymus caput-medusae*), yellow star-thistle (*Centaurea solstitialis*), broadleaf filaree (*Erodium botrys*), and various clover species (*Trifolium* spp.). The prevalence of these weedy species is

largely the result of a lack of any management in the areas—generally some form of grazing, mowing, or burning is required to give native plant species an opportunity to thrive within California's cismontane grasslands (author's observation). The only native species observed in the Valley and Foothill Grasslands are scattered trees and shrubs, including the ponderosa pine and birch leaf mountain mahogany in the southern grassland, as well as valley oak (*Quercus lobata*), ponderosa pine, foothill pine, and black oak in the northern grassland.

4.2 Special-status Species

Based on habitat requirements, there are ten special-status animal species and 17 special-status plant taxa with some potential to occur within the study area. These include two state or federally listed animal species and eight non-listed special-status animal species, as well as multiple birds that fall under the Migratory Bird Treaty Act (MBTA). All of the special-status plants with potential to occur are CRPR taxa with no federal or state listing. **Figure 3** shows the distribution of special-status animal and plant species that are documented in the local region, and all special-status taxa are listed in **Appendix B**, along with their regulatory status, habitat requirements, and an evaluation of their potential to occur in the study area. These animal and plant taxa are described in more detail below.

4.2.1 Listed Animal Species

Northern Spotted Owl (*Strix occidentalis caurina*) – Federal Threatened, State Threatened
The Northern Spotted Owl is listed as Federal and State Threatened. The breeding range of the Northern Spotted Owl extends from Southwestern British Columbia south through California's Northern Coast Ranges to Marin County (CDFW 2016). Northern Spotted Owls usually nest in tree or snag cavities, or in the broken top of large trees. Other nesting sites include caves or crevices within cliffs. They require mature forests with large old trees, snags, multiple canopy layers and downed woody debris. Northern Spotted Owls are not migratory, though some individuals may move down-slope in the winter (Zeiner and Laudenslayer 1990). This species primarily hunts at night, but is also known to forage during the day. In California their diet primarily consists of dusky-footed woodrats, and in smaller proportions rabbits, hares, small to medium sized birds, bats, insects, and small rodents such as mice, voles, shrews, and gophers (CDFW 2016).

The main threats to the species are competition from Barred Owls (*Strix varia*) and habitat loss due to timber harvesting, land conversion, wildfires, loss of old-growth forest, marijuana cultivation, and climate change. Barred Owls displace Northern Spotted Owls by disrupting their nesting and competing with them for food and territory (USFWS 2011, CDFW 2016).

Cismontane woodland and coniferous forest habitats within the study area may provide suitable habitat for this species, and it has been documented within 4 miles. Designated critical habitat is present around Cobb Mountain, approximately 2.8 miles from the study area.

Monarch Butterfly (*Danaus plexippus plexippus* pop. 1 [overwintering population]) – Federal Candidate
Monarch butterfly is a Federal Candidate Endangered species. Adult monarch butterflies feature bright orange wings with black margins and venation. A double row of white spots runs parallel to the black border on the upside of the wing. Monarchs breed on milkweed host plants

(*Asclepias* sp.). Larvae feed exclusively on milkweed and enter pupation between 9 and 18 days old. Adult monarchs emerge after 6 to 14 days. Most adult butterflies live two to five weeks, while overwintering adults may live six to nine months. Overwintering adult monarchs migrate over 2,000 miles to overwintering sites, a journey lasting over two months. The cohort of overwintering adults breeds at the overwintering sites in early spring (February-March) and undertakes a return migration to the summer breeding grounds (USFWS 2020).

Overwintering habitat is characterized by a set of microclimatic conditions including dappled sunlight, high humidity, fresh water and an absence of freezing temperatures or high winds. Preferred trees include blue gum (*Eucalyptus globulus*), Monterey pine (*Pinus radiata*), and Monterey cypress (*Cupressus macrocarpa*) (Xerces 2016).

The western monarch population is estimated to have declined precipitously to 97% below historical abundance between the 1980s and the mid-2010s (Pelton et. al 2019). The current overwintering population of approximately 30,000 individuals may be susceptible to probable extinction due to stochastic events. Major causes of decline include loss of quality breeding and foraging habitat, insecticide application, and changes in habitat availability due to climate change (USFWS 2020).

The study area may provide spring and summer breeding and foraging habitat for western monarch; however, the study area is outside of the known overwintering range of this species.

4.2.2 Non-listed Special-status Animal Species

Foothill Yellow-legged Frog (*Rana boylii*) Northwest/North Coast Clade – Species of Special Concern

The foothill yellow-legged frog (FYLF) Northwest/North Coast Clade is listed as a CDFW Species of Special Concern. This species' aquatic habitat includes partly shaded, low gradient ephemeral and permanent streams, rivers, and adjacent moist terrestrial habitats (Hayes et al. 2016). FYLF prefer partly shaded, shallow streams and riffles with a rocky substrate that is at least cobble-sized. They occur in streams and rivers in woodland, chaparral, and forest habitats (Stebbins 2012). Breeding occurs between mid-March to early June after high water of streams subsides (Stebbins 2012).

Historically, FYLF ranged from Oregon south along the coast ranges down to the San Gabriel Mountains, and south along the foothills of the western side of the Sierra Nevada to the Tehachapi Mountains. FYLF has disappeared from up to 45 percent of its overall range in California, and 66 percent of its range in the California Sierra. The healthiest FYLF populations in California are located along the north coast and in the northern Sierra Nevada. The few remaining populations in the southern Sierra Nevada, specifically those south of I-80, are nearly extinct (Stebbins and McGinnis 2012). Frogs in this area have been largely affected by poorly timed reservoir water release, which can wash away eggs and larvae or retard their development (Kupferberg et al. 2012). Additionally, changes to flow regimes and downstream habitat alteration resulting from hydroelectric power generation and other water management projects have greatly impacted FYLF's dependence on riverine environments (ibid). FYLF are also susceptible to other environmental impacts including loss of habitat, predation by non-native

species such as American bullfrogs and crayfish, and air-borne pesticides (Davidson et al. 2002, Ashton et al. 1998).

Cow Creek within the study area provides low to moderately suitable dispersal habitat for FYLF, although breeding habitat quality is marginal within the study area. There are several documentations of the species in the watershed, including a recent documentation within 1.25 miles of the study area. The species is most likely to occur within the stream habitats in pools and sunny areas with gravel substrate.

Red-bellied Newt (*Taricha rivularis*) – Species of Special Concern
The red-bellied newt is a CDFW Species of Special Concern. Endemic to California, it is found in woodlands and redwood forests in coastal northern California. Red-bellied newts spend the dry season underground in terrestrial habitat, foraging in moist habitats under woody debris, rocks, and in animal burrows for arthropods, worms, and snails. They may migrate a mile or more to and from rapid-flowing, permanent streams during fall and winter rains where they breed and lay eggs in rocky substrate (Marangio 1988).

Cow Creek provides marginally suitable habitat, though the creek and tributaries are likely too small and seasonal for this species within the study area. However, red-bellied newts may make overland migrations or utilize the drainages in the study area to migrate through to other more suitable habitat in the vicinity. VNLC staff have documented red-bellied newts near Cobb Mountain in recent years. Due to their documented presence in the vicinity and potential for migration, red-bellied newts could be present in the study area.

Purple Martin (*Progne subis*) – Species of Special Concern
Purple Martin is a CDFW Species of Special Concern. This bird species is found in a variety of wooded, low-elevation habitats throughout California such as valley foothill and montane hardwood, valley foothill and montane hardwood-conifer, riparian, and coniferous habitats. Purple Martin inhabits open forests, woodlands, and riparian areas during the breeding season, and open habitats such as grassland, wet meadow, and fresh emergent wetland during migration (Green 1988). They commonly nest in old woodpecker cavities in tall, old, isolated trees near a body of water (Dawson 1923). Purple Martin has been eliminated from much of its previous range in California in recent decades due to loss of riparian habitat, removal of snags, and competition with other birds (Remsen 1978).

Trees and snags within the study area provide suitable nesting habitat for Purple Martin, and woodpecker cavities were documented during the field survey.

Pallid Bat (*Antrozous pallidus*) – Species of Special Concern, WBWG High Priority
Pallid bat is a CDFW Species of Special Concern, and is designated as "high" priority by the Western Bat Working Group (WBWG). Pallid bats range from southern British Columbia through the western U.S. to Mexico (Weber 2009). This species is found in low elevations throughout California in a wide variety of habitats including grasslands, shrublands, woodlands, and forests (Harris 1998d). Pallid bat is most commonly found in open dry habitats with rocky areas for roosting (Weber 2009). They roost in caves, crevices, mines, cliffs, and hollow trees. This species forages for insects and arachnids over open ground. Pallid bats mate from late October to February, with young born from April to July. Pallid bat is very sensitive to

disturbance of their roosting sites, which are important for conserving energy and juvenile growth (Harris 1998d).

Large trees and buildings within the study area may provide suitable day and night roosting habitat, and coniferous forest and cismontane woodland provide foraging habitat for pallid bat. The nearest pallid bat occurrence is documented within approximately 3.8 miles of the study area.

Townsend's Big-eared Bat (*Corynorhinus townsendii*) – Species of Special Concern, WBWG High Priority

Townsend's big-eared bat is a CDFW Species of Special Concern, and is designated as "high" priority by the WBWG. This species is found in nearly all habitats except subalpine and alpine habitats throughout California (Harris 1988e). They roost in large cavities such as caves, mines, tunnels, buildings, or other human-made structures, and sometimes large hollows of trees (Gruver and Keinath 2006). They are generally found in dry uplands, but also occur in mesic habitats such as coniferous and deciduous forest (Kunz and Martin 1982). Townsend's big-eared bat is extremely sensitive to disturbance of roosting sites (Gruver and Keinath 2006). Breeding occurs in the fall or winter seasons.

Large trees and buildings within the study area may provide suitable day and night roosting habitat, and coniferous forest and cismontane woodland provide foraging habitat for Townsend's big-eared bat. The nearest occurrence is documented within approximately 3.8 miles of the study area.

Hoary Bat (*Lasiurus cinereus*) – WBWG Medium Priority

Hoary bat is designated as "medium" priority by the WBWG. It is the most widespread North American bat, and can be found in almost all areas of California. This species winters along the coast and in southern California. They breed and roost in woodlands and forests with medium to large-sized trees with dense foliage, and can be found in foothills, deserts, mountains, lowlands, and coastal valleys during their migration. Hoary bat requires a source of water nearby, and prefers open habitats, with access to open areas for foraging and trees for cover. They mate in autumn, with young born from May through July (Harris 1998b).

Trees within the study area may provide suitable day and night roosting habitat, and coniferous forest, cismontane woodland, and grassland provide foraging habitat for hoary bat. The nearest occurrence is documented within approximately 3.8 miles of the study area.

Long-eared Myotis (*Myotis evotis*) – WBWG Medium Priority

Long-eared myotis is designated as "medium" priority by the WBWG. This species can be found throughout California, except for in the Central Valley and hot deserts, from sea level up to 9,000 feet in elevation (Harris 1988c). It is found in a variety of habitats, including shrublands, sage, chaparral, and agriculture areas, but usually seems to prefer coniferous woodlands and forests. Long-eared myotis roosts in buildings, crevices, hollow trees, caves, mines, cliff crevices, rocky outcrops, and spaces under tree bark, and sometimes under bridges (Bogan et al. 2005).

Trees within the study area may provide suitable day and night roosting habitat, and coniferous forest, cismontane woodland, and grassland provide foraging habitat for hoary bat. The nearest occurrence is documented within approximately 3.8 miles of the study area.

Fringed Myotis (*Myotis thysanodes*) – WBWG High Priority

In California, this species is widespread, occurring in most places except the Central Valley and Colorado and Mojave Deserts. Fringed myotis can be found in a wide range of habitats, most commonly pinyon-juniper, valley foothill hardwood, and hardwood-conifer habitats between 4,000 to 7,000 feet. Fringed myotis roosts in caves, mines, buildings, and crevices. The species forages in open habitats, streams, lakes, ponds, and early successional areas, requiring access to water. Fringed myotis is easily disturbed at roosting sites (Harris 1988a).

Trees within the study area may provide suitable day and night roosting habitat, and coniferous forest, cismontane woodland, and grassland provide foraging habitat for hoary bat. The nearest occurrence is documented within approximately 3.8 miles of the study area.

4.2.3 Migratory and Nesting Birds

The Migratory Bird Treaty Act (16 U.S.C. 704) and the California Fish and Game Code (Section 3503) prohibits the take of migratory birds, or disturbance to the active nests of most native birds. In addition to the special-status birds listed in **Section 4.2.1**, a number of additional migratory birds have potential to occur within the immediate vicinity of the project area. These include Allen's Hummingbird (*Selasphorus sasin*), Black-chinned Sparrow (*Spizella atrogularis*), Bullock's Oriole (*Icterus bullockii*), California thrasher (*Toxostoma redivivum*), Nuttall's Woodpecker (*Picoides nuttalli*), Oak Titmouse (*Baeolophus inornatus*), Golden Eagle (*Aquila chrysaetos*), Olive-sided Flycatcher (*Contopus cooperi*), and Wrentit (*Chamaea fasciata*).

Multiple bird species were observed within or adjacent to the study area during the field visit, including Common Raven (*Corvus corax*), Chestnut-backed Chickadee (*Poecile rufescens*), California towhee (*Melozone crissalis*), Dark-eyed Junco (*Junco hyemalis*), Steller's Jay (*Cyanocitta stelleri*), Hutton's Vireo (*Vireo huttoni*), Acorn Woodpecker (*Melanerpes formicivorus*), Anna's Hummingbird (*Calypte anna*), Oak Titmouse, Black Phoebe (*Sayornis nigricans*), Brown Creeper (*Certhia americana*), Nuttall's Woodpecker (*Dryobates nuttallii*), Gold-crowned Sparrow (*Zonotrichia atricapilla*), and Northern Flicker (*Colaptes auratus*). Bird habitat within or immediately adjacent to the study area includes woodland and forested habitat, riparian vegetation, shrublands, artificial perches (power poles, fences), and nest boxes.

4.2.4 Special-status Plants

The study area encompasses a range of natural habitats with potential to support special-status plants. As **Table 2** in **Appendix B** shows, there are 17 plant taxa known from the vicinity of the study area that occur within habitat types present in the study area, and that occur within the elevation range of the study area (2,582 to 2,984 feet). These are shaded in gray in the plant table, indicating that they are the most likely to occur. There are additional special-status plant taxa known from the nine USGS quadrangles that surround the study area and that also occur within the onsite habitat types, but these are considered less likely to occur in the study area because they either do not occur within the elevation range of the study area or are not

documented within the local vicinity—they have not been found within approximately five to ten air miles of the study area.

Chaparral

The Chaparral habitats within the study area have the highest potential to support special-status plants, because the largest number of taxa known from the region are associated with this habitat, and also because it is the least disturbed habitat within the study area. In fact, all 17 of the special-status plants with the highest potential to occur in the study area are at least occasionally, if not primarily, associated with Chaparral. Additionally, all forms of Chaparral in the study area are dominated by native plant species, and no noxious weeds or other highly competitive exotic species were noted within the habitat. Given the special properties of serpentine soils, the Serpentine Chaparral in particular has high potential to support special-status plants. Eight of the 17 special-status plants with the highest potential to occur in the study area are associated with serpentine soils as a microhabitat. Moreover, the onsite habitat is in better than average condition and supports a notable diversity of native plants.

Cismontane Woodland

Nine of the 17 special-status plants with the highest potential to occur in the study area are associated with Cismontane Woodland (**Table 2**, **Appendix B**). Given the particular species, and the fact that all of these are also associated with Chaparral (and in some cases other more open habitats, such as grasslands), it is likely that the more open, sunny woodlands are most likely to support such species. These areas support a moderate cover of exotic plants, including several invasive species, indicating that the habitat is somewhat disturbed and that there is competition from native plants. Thus, the onsite Cismontane Woodland habitats may be considered to have low-to-moderate potential to support special-status plants.

Lower Montane Coniferous Forest

Five of the 17 special-status plants with the highest potential to occur in the study area are associated with Lower Montane Coniferous Forest. As with those associated with Cismontane Woodland (see above), these plant taxa are likely to be more associated with relatively open, sunny habitats within this forest habitat, since they are also associated with more open habitats such as Chaparral and Valley and Foothill Grassland. The level of disturbance in such microhabitats is relatively low, but Lower Montane Coniferous Forest is more likely to support special-status plants where the substrate is more unique, as when the parent rock is volcanic (author's observation). Given the lack of such substrates in the study area, the likelihood of special-status plants being present is reduced and may be considered low-to-moderate.

Valley and Foothill Grassland

Only two special-status plants with the highest potential to occur in the study area are associated with Valley and Foothill Grassland, and these are primarily found on serpentine soils. Due to the lack of serpentine soils among the onsite grasslands, as well as the fact that the grasslands are dominated by exotic, mostly invasive plant species, the potential for special-status to occur in this habitat is very low.

Drainage Corridors

There are no other habitats within the study area that have potential to support special-status plants. The Cow Creek stream corridor supports very limited, localized wetland plants, including a small stand of riparian vegetation (in the form of willow trees). However, there are no seep or spring habitats outside the drainages that would support Meadow and Seep species, and the riparian vegetation is so limited—and such a generalized habitat—that it is unlikely to support special-status plants. Moreover, there are no such species that occur within these habitats that are also known to occur in the vicinity and that fall within the elevation range of the study area.

4.3 Protected Habitats

4.3.1 Wetlands or Waters of the U.S. and State of California

The primary drainage that conveys water from and through the study area is Cow Creek, which also features several small tributaries within the study area (**Figure 5**). Cow Creek is very narrow and likely seasonal, but does support plant species that indicate an extended hydroperiod, including giant chain fern (*Woodwardia fimbriata*) and scattered riparian and quasi-riparian tree species. The tree species include arroyo willow (*Salix lasiolepis*), alder (*Alnus rhombifolia*), and valley oak, though only arroyo willow forms a mappable stand. The stream's hydrology is likely augmented by a perennial spring that maintains saturated soils or subsurface flow, however, abundant water throughout the area complicated identification of springs during the time of the site survey. During the February site survey, the stream itself featured a steady flow of approximately three to eight inches of water along its length, though this was during a timeframe of recent precipitation. Portions of the stream exhibit well-defined bed and bank topography, but other portions may more aptly described as non-wetland swales. None of Cow Creek's tributaries featured clear bed and bank topography or a significant cover of wetland vegetation, despite the fact that all were flowing during the site survey—these are likely only ephemeral features. It should be noted that the site survey did not include a formal wetland delineation—it was reconnaissance in nature and did not involve detailed analysis of plant species cover or examination of soils or indicators of wetland hydrology. The purpose of the survey was to map the channel locations in order to help to develop avoidance and minimization measures, as well as to characterize the features as potential habitat for special-status species. In any case, Cow Creek flows northward into High Valley Creek, a blue line stream that flows northward into Kelsey Creek, which is the namesake stream of the regional watershed. In turn, Kelsey Creek flows northwestward, then north, eventually discharging into Clear Lake, a navigable Water that lies approximately 11.5 air miles north of the study area. Cow Creek is presumed to be jurisdictional at the state as well as the federal level, primarily along its tops of banks but also including the stand of riparian vegetation. However, the stream's ephemeral tributaries are likely jurisdictionally only under the RWQCB.

Despite the augmented hydrology, the tributaries and even the main stem provide limited habitat for special-status species, by virtue of being so narrow, shallow, and with limited habitat elements (i.e., few boulders, limited woody debris, etc.).

4.3.2 Sensitive Plant Communities

Aside from Cow Creek and its tributaries there are no sensitive habitats within the study area. Based on information compiled during the reconnaissance-level survey, none of the onsite

natural habitats would be classified as sensitive due to their species composition. All of the dominant plant species within all habitat types are relatively common in the region or otherwise common in California.

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APPENDIX A

Representative Photographs of the Study Area (February 10, 2023)

Photo 1. Cismontane Woodland
Northeastern portion of the study area. Facing southeast

Photo 2. Chaparral dominated by chamise
Southeastern portion of the study area. Facing southeast

Photo 3. Serpentine Chaparral
Southwestern portion of the study area. Facing northeast

Photo 4. Valley and Foothill Grassland surrounded by Lower Montane Coniferous Forest
Northeastern portion of the study area. Facing north

Photo 5. Valley and Foothill Grassland
Northeastern portion of the study area. Facing north

Photo 5. Cow Creek (seasonal stream) with giant chain fern
Western portion of the study area near pipeline alignment. Facing North

Photo 6. Cow Creek with rocky substrate
Southern portion of the study area. Facing west

Photo 7. Cow Creek and Riparian habitat (willows)
Northwestern portion of the study area. Facing north

Photo 8. Ephemeral tributary of Cow Creek
Northwestern portion of the study area. Facing west

Photo 9. Bottle Rock Power Plant as viewed from powerline corridor
Southwestern portion of the study area. Facing southwest

Photo 10. Existing pipeline between power plant and northwestern terminus Northwestern portion of the study area. Facing west

Photo 11. Developed area and terminus of pipeline Northwestern of the study area. Facing north

APPENDIX B

Special-Status Animal and Plant Species Documented within the Project Region

Table 1. Special-status Animal Taxa Documented in the Vicinity of the Mayacma Geothermal Project, Lake County, California. Compiled by Vollmar Natural Lands Consulting, 2023.

Species highlighted in gray have potential to occur within the study area.

Common Name *Scientific Name*	**Status**[1]	**Description of Habitat Requirements**	**Potential to Occur in Study area**
Amphibians			
California giant salamander *Dicamptodon ensatus*	SSC	Permanent and semipermanent streams, often with shelter such as rocks, logs, or stones.	**Not Expected**. Suitable habitat is not present within the study area; Cow Creek and tributaries are too small and seasonal in the study area to provide suitable habitat.
Foothill yellow-legged frog *Rana boylii*	SSC (NW/North Coast Clade)	Rocky streams in a variety of habitats.	**Potential**. Cow Creek within the study area provides low-to-moderately suitable habitat for dispersal (but not breeding). There are a few pools, sunny areas, and some gravelly substrate. The species has been documented recently in CNDDB within 1.25 miles of the study area, with several other documentations in the watershed.
California red-legged frog *Rana draytonii*	FT, SSC	Quiet pools of freshwater streams, and occasionally ponds.	**Not Expected**. Suitable habitat is not present within the study area; Cow Creek and tributaries are too small and seasonal in the study area to provide suitable habitat. Closest known documentation is 2.75 miles from study area but is a historic collection from 1945. There are no nearby CNDDB documentations since 1960.
Red-bellied newt *Taricha rivularis*	SSC	Mainly redwood forest, but also found within other conifer and hardwood woodland habitats. Spends dry season underground and migrates to rapid, permanent streams for breeding.	**Low Potential**. Marginal suitable habitat is present within the study area; Cow Creek and tributaries are small and seasonal in the study area, but this species may make overland migrations or utilize drainages to migrate through to other more suitable stream habitats in the watershed. VNLC has personally documented the species around Cobb mountain in recent years.
Birds			
Purple Martin (nesting) *Progne subis*	SSC	Breed in mountain forests or Pacific lowlands, nesting in woodpecker holes in dead snags. Forage in a variety of open habitats.	**Potential.** Suitable nesting habitat is present within the study area. Several snags were observed and at least one woodpecker cavity was documented during the field survey.

Common Name *Scientific Name*	**Status**[1]	**Description of Habitat Requirements**	**Potential to Occur in Study area**
Northern Spotted Owl *Strix occidentalis caurina*	FT, ST	Dense blocks of mature, multi-layered forests of mixed conifer, redwood, and Douglas-fir habitat.	**Low Potential**. Mixed conifer and Douglas-fir forested habitat in the study area may provide suitable habitat for this species, though it is often associated with old-growth forest habitats. The species has been documented within 4 miles of the study area.
Fish			
Delta smelt *Hypomesus transpacificus*	FT, SE	Endemic to streams, rivers, estuaries in the upper reaches of the San Francisco Bay and Sacramento-San Joaquin Delta Estuary.	**Not Expected**. Study area is outside of known range for species.
Steelhead - central California coast DPS *Oncorhynchus mykiss irideus pop. 8*	FT	Streams, rivers, lakes, estuaries, and ocean in the San Francisco Bay and North Bay.	**Not Expected**. Outside of known range of DPS.
Insects			
Monarch butterfly – California overwintering population *Danaus plexippus plexippus* pop. 1	FC	Roosts in wind-protected tree groves with nectar and water nearby. Overwinters in tall trees in large groups during migration. Forages on showy nectar source flowers. Breeds on milkweed (*Asclepias* sp.) vegetation.	**Potential**. The study area is outside of the known overwintering range (generally within 1.5 miles of the coast) of this species. However, the study area may provide suitable spring/summer breeding and foraging habitat.
Mammals			
Pallid bat *Antrozous pallidus*	SSC, WBWG:H	Forages in a variety of habitats including shrub-steppe grasslands, oak savannah grasslands, open Ponderosa pine forests, talus slopes, gravel roads, lava flows, fruit orchards, and vineyards. Day and night roosts include crevices in rocky outcrops and cliffs, caves, mines, trees, and various human structures such as bridges, barns, porches, bat boxes, and buildings.	**Potential**. Trees and buildings within the study area may provide suitable day and night roosts, and grassland, woodland, and forests provide suitable foraging habitat. No obvious roost locations were observed during the field survey, but they may still be present.
Townsend's big-eared bat *Corynorhinus townsendii*	SSC, WBWG:H	Roosts in caves, cliffs, rock ledges, and man-made structures. Found in a wide variety of habitats, except subalpine and alpine habitats.	**Potential**. Buildings and hollow trees within the study area may provide suitable day and night roosts, and grassland, woodland, and forests provide suitable foraging habitat. No obvious roost locations were observed during the field survey, but they may still be present.
Western red bat *Lasiurus frantzii*	SSC, WBWG: H	Strongly associated with riparian habitats, particularly mature stands of cottonwood/sycamore in the Central Valley and lower reaches of the large rivers that drain the Sierra Nevada.	**Not Expected**. The study area doesn't contain mature riparian habitat or large rivers or streams.

Common Name *Scientific Name*	**Status**[1]	**Description of Habitat Requirements**	**Potential to Occur in Study area**
Hoary bat *Lasiurus cinereus*	WBWG: M	Primarily deciduous and coniferous forests and woodlands, including areas altered by humans. Foraging habitat includes various open areas, including spaces over water and along riparian corridors.	**Potential**. Trees within the study area may provide suitable day and night roosts, and grassland, woodland, and forests provide suitable foraging habitat. No obvious roost locations were observed during the field survey, but they may still be present.
Long-eared myotis *Myotis evotis*	WBWG: M	Occurs in semiarid shrublands, sage, chaparral, and agricultural areas, but is usually associated with coniferous forests. Individuals roost under exfoliating tree bark, and in hollow trees, caves, mines, cliff crevices, sinkholes, and rocky outcrops on the ground. They also sometimes roost in buildings and under bridges.	**Potential**. Trees within the study area may provide suitable day and night roosts, and grassland, woodland, and forests provide suitable foraging habitat. No obvious roost locations were observed during the field survey, but they may still be present.
Fringed myotis *Myotis thysanodes*	WBWG: H	Optimal habitats are pinyon-juniper, valley foothill hardwood, and hardwood-conifer.	**Potential**. Trees within the study area may provide suitable day and night roosts, and grassland, woodland, and forests provide suitable foraging habitat. No obvious roost locations were observed during the field survey, but they may still be present.
Mollusks and Crustaceans			
Conservancy fairy shrimp *Branchinecta conservatio*	FE	Large, cool-water vernal pools with moderately turbid water.	**Not Expected**. Suitable habitat is not present within the study area.
California freshwater shrimp *Syncaris pacifica*	FE, SE	Small, perennial coastal streams at low elevation.	**Not Expected**. Study area is outside of known range of species (Marin, Napa, & Sonoma counties) and Cow Creek is likely too seasonal and high elevation to provide suitable habitat.
Reptiles			
Green sea turtle *Chelonia mydas*	FT	Open ocean, return to beaches to breed.	**Not Expected**. Suitable habitat is not present within the study area.

[1]Status: FT – Federal Threatened; FE – Federal Endangered; FC – Federal Candidate; ST – State Threatened; SE – State Endangered; SSC – CDFW Species of Special Concern; WBWG: Western Bat Working Group High ('H') or Medium ('M') Priority

Table 2. Special-status Plant Taxa Documented in the Vicinity of the Mayacma Geothermal Project, Lake County, California. Compiled by Vollmar Natural Lands Consulting, 2023.

Species highlighted in gray have the highest potential to occur within the Study Area, based on the habitat and distribution of taxon.

Scientific Name Common Name (Family)	Status[1] Federal/ State/CRPR	Habitat, Elevation, and Blooming Period[2]	Presence of Suitable Habitat within the Study Area
Amsinckia lunaris bent-flowered fiddleneck (Boraginaceae)	--/--/1B.2	Cismontane woodland, Coastal bluff scrub, Valley and foothill grassland; Microhabitat: none; 10-1,640 feet; March-June	Marginal suitable habitat is present
Antirrhinum subcordatum dimorphic snapdragon (Plantaginaceae)	--/--/4.3	Chaparral, Lower montane coniferous forest; Microhabitat: Serpentinite (sometimes); 605-2,625 feet; April-July	Suitable habitat is present
Antirrhinum virga twig-like snapdragon (Plantaginaceae)	--/--/4.3	Chaparral, Lower montane coniferous forest; Microhabitat: Openings, Rocky, Serpentinite (often); 330-6,610 feet; June-July	Suitable habitat is present but not documented in the vicinity
Arctostaphylos manzanita ssp. *elegans* Konocti manzanita (Ericaceae)	--/--/1B.3	Chaparral, Cismontane woodland, Lower montane coniferous forest; Microhabitat: Volcanic; 1,295-5,300 feet; (January) March-May (July)	Suitable habitat is present
Arctostaphylos stanfordiana ssp. *decumbens* Rincon Ridge manzanita (Ericaceae)	--/--/1B.1	Chaparral (rhyolitic), Cismontane woodland; Microhabitat: none; 245-1,215 feet; February-April (May)	Suitable is present but study area is above species elevation range
Arctostaphylos stanfordiana ssp. *raichei* Raiche's manzanita (Ericaceae)	--/--/1B.1	Chaparral, Lower montane coniferous forest (openings); Microhabitat: Rocky, Serpentinite (often); 1,475-3,395 feet; February-April	Suitable habitat is present
Asclepias solanoana serpentine milkweed (Apocynaceae)	--/--/4.2	Chaparral, Cismontane woodland, Lower montane coniferous forest; Microhabitat: Serpentinite; 755-6,105 feet; May-July (August)	Suitable habitat is present but not documented in the vicinity
Astragalus breweri Brewer's milk-vetch (Fabaceae)	--/--/4.2	Chaparral, Cismontane woodland, Meadows and seeps, Valley and foothill grassland (openings, often gravelly); Microhabitat: Serpentinite (often), Volcanic; 295-2,395 feet; April-June	Suitable is present but study area is above species elevation range
Astragalus clevelandii Cleveland's milk-vetch (Fabaceae)	--/--/4.3	Chaparral, Cismontane woodland, Riparian forest; Microhabitat: Seeps, Serpentinite; 655-4,920 feet; June-September	Suitable is present but study area is above species elevation range
Astragalus rattanii var. *jepsonianus* Jepson's milk-vetch (Fabaceae)	--/--/1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland; Microhabitat: Serpentinite (often); 970-2,295 feet; March-June	Suitable is present but study area is above species elevation range
Azolla microphylla Mexican mosquito fern (Azollaceae)	--/--/4.2	Marshes and swamps (ponds, slow water); Microhabitat: none; 100-330 feet; August	No suitable habitat is present

Scientific Name **Common Name** **(Family)**	**Status[1]** **Federal/** **State/CRPR**	**Habitat, Elevation, and Blooming Period[2]**	**Presence of Suitable Habitat within the Study Area**
Brasenia schreberi watershield (Cabombaceae)	--/--/2B.3	Marshes and swamps (freshwater); Microhabitat: none; 0-7,220 feet; June-September	No suitable habitat is present
Brodiaea leptandra narrow-anthered brodiaea (Themidaceae)	--/--/1B.2	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland; Microhabitat: Volcanic; 360-3,000 feet; May-July	Suitable habitat is present but not documented in the vicinity
Calamagrostis ophitidis serpentine reed grass (Poaceae)	--/--/4.3	Chaparral (openings, often north-facing slopes), Lower montane coniferous forest, Meadows and seeps, Valley and foothill grassland; Microhabitat: Rocky, Serpentinite; 295-3,495 feet; April-July	Suitable habitat is present but not documented in the vicinity
Calochortus uniflorus pink star-tulip (Liliaceae)	--/--/4.2	Coastal prairie, Coastal scrub, Meadows and seeps, North Coast coniferous forest; Microhabitat: none; 35-3,510 feet; April-June	No suitable habitat is present
Calycadenia micrantha small-flowered calycadenia (Asteraceae)	--/--/1B.2	Chaparral, Meadows and seeps (volcanic), Valley and foothill grassland; Microhabitat: Roadsides, Rocky, Scree, Serpentinite (sometimes), Talus, sparsely vegetated areas; 15-4,920 feet; June-September	Suitable habitat is present but not documented in the vicinity
Calyptridium quadripetalum four-petaled pussypaws (Montiaceae)	--/--/4.3	Chaparral, Lower montane coniferous forest; Microhabitat: Gravelly (sometimes), Sandy (sometimes), Serpentinite (usually); 1,035-6,695 feet; April-June	Suitable habitat is present but not documented in the vicinity
Calystegia collina ssp. *oxyphylla* Mt. Saint Helena morning-glory (Convolvulaceae)	--/--/4.2	Chaparral, Lower montane coniferous forest, Valley and foothill grassland; Microhabitat: Serpentinite; 915-3,315 feet; April-June	Suitable habitat is present but not documented in the vicinity
Calystegia collina ssp. *tridactylosa* three-fingered morning-glory (Convolvulaceae)	--/--/1B.2	Chaparral, Cismontane woodland; Microhabitat: Gravelly, Openings, Rocky, Serpentinite; 0-1,970 feet; April-June	Suitable is present but study area is above species elevation range
Camissonia lacustris grassland suncup (Onagraceae)	--/--/1B.2	Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland; Microhabitat: Granitic, Gravelly, Serpentinite; 590-4,005 feet; March-June	Suitable habitat is present but not documented in the vicinity
Carex praticola northern meadow sedge (Cyperaceae)	--/--/2B.2	Meadows and seeps (mesic); Microhabitat: none; 0-10,500 feet; May-July	No suitable habitat is present
Ceanothus confusus Rincon Ridge ceanothus (Rhamnaceae)	--/--/1B.1	Chaparral, Cismontane woodland, Closed-cone coniferous forest; Microhabitat: Serpentinite (sometimes), Volcanic (sometimes); 245-3,495 feet; February-June	Suitable habitat is present

Scientific Name **Common Name** **(Family)**	**Status[1]** **Federal/** **State/CRPR**	**Habitat, Elevation, and Blooming Period[2]**	**Presence of Suitable Habitat within the Study Area**
Ceanothus divergens Calistoga ceanothus (Rhamnaceae)	--/--/1B.2	Chaparral (rocky, serpentinite, volcanic); Microhabitat: none; 560-3,115 feet; February-April	Suitable habitat is present
Chlorogalum pomeridianum var. *minus* dwarf soaproot (Agavaceae)	--/--/1B.2	Chaparral (serpentinite); Microhabitat: none; 1,000-3,280 feet; May-August	Suitable is present but study area is above species elevation range
Clarkia gracilis ssp. *tracyi* Tracy's clarkia (Onagraceae)	--/--/4.2	Chaparral (openings, serpentinite); Microhabitat: none; 215-2,135 feet; April-July	Suitable habitat is present but not documented in the vicinity
Collomia diversifolia serpentine collomia (Polemoniaceae)	--/--/4.3	Chaparral, Cismontane woodland; Microhabitat: Gravelly (sometimes), Rocky (sometimes), Serpentinite (sometimes); 655-1,970 feet; May-June	Suitable is present but study area is above species elevation range
Cordylanthus tenuis ssp. *brunneus* serpentine bird's-beak (Orobanchaceae)	--/--/4.3	Chaparral, Cismontane woodland, Closed-cone coniferous forest; Microhabitat: Serpentinite (usually); 1,000-3,000 feet; July-August	Suitable habitat is present but not documented in the vicinity
Cordylanthus tenuis ssp. *capillaris* Pennell's bird's-beak (Orobanchaceae)	FE/CR/1B.2	Chaparral, Closed-cone coniferous forest; Microhabitat: Serpentinite; 150-1,000 feet; June-September	Suitable is present but study area is above species elevation range
Cryptantha dissita serpentine cryptantha (Boraginaceae)	--/--/1B.2	Chaparral (serpentinite); Microhabitat: none; 1,295-1,905 feet; April-June	Suitable habitat is present but not documented in the vicinity
Cypripedium montanum mountain lady's-slipper (Orchidaceae)	--/--/4.2	Broadleafed upland forest, Cismontane woodland, Lower montane coniferous forest, North Coast coniferous forest; Microhabitat: none; 605-7,300 feet; March-August	Suitable habitat is present but not documented in the vicinity
Delphinium uliginosum swamp larkspur (Ranunculaceae)	--/--/4.2	Chaparral, Valley and foothill grassland; Microhabitat: Seeps, Serpentinite; 1,115-2,000 feet; May-June	Suitable is present but study area is above species elevation range
Downingia willamettensis Cascade downingia (Campanulaceae)	--/--/2B.2	Cismontane woodland (lake margins), Valley and foothill grassland (lake margins), Vernal pools; Microhabitat: none; 50-3,640 feet; June-July (September)	Suitable habitat is present
Eriastrum brandegeeae Brandegee's eriastrum (Polemoniaceae)	--/--/1B.1	Chaparral, Cismontane woodland; Microhabitat: Sandy, Volcanic; 1,395-2,755 feet; April-August	Suitable habitat is present
Erigeron greenei Greene's narrow-leaved daisy (Asteraceae)	--/--/1B.2	Chaparral (serpentinite, volcanic); Microhabitat: none; 260-3,295 feet; May-September	Suitable habitat is present

Scientific Name **Common Name** **(Family)**	**Status[1]** **Federal/** **State/CRPR**	**Habitat, Elevation, and Blooming Period[2]**	**Presence of Suitable Habitat within the Study Area**
Eriogonum nervulosum Snow Mountain buckwheat (Polygonaceae)	--/--/1B.2	Chaparral (serpentinite); Microhabitat: none; 985-6,905 feet; June-September	Suitable habitat is present
Eryngium constancei Loch Lomond button-celery (Apiaceae)	FE/CE/1B.1	Vernal pools; Microhabitat: none; 1,510-2,805 feet; April-June	No suitable habitat is present
Erythranthe nudata bare monkeyflower (Phrymaceae)	--/--/4.3	Chaparral, Cismontane woodland; Microhabitat: Seeps, Serpentinite; 655-2,295 feet; May-June	Suitable is present but study area is above species elevation range
Erythronium helenae St. Helena fawn lily (Liliaceae)	--/--/4.2	Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland; Microhabitat: Serpentinite (sometimes), Volcanic (sometimes); 1,150-4,005 feet; March-May	Suitable habitat is present but not documented in the vicinity
Fritillaria purdyi Purdy's fritillary (Liliaceae)	--/--/4.3	Chaparral, Cismontane woodland, Lower montane coniferous forest; Microhabitat: Serpentinite (usually); 575-7,400 feet; March-June	Suitable habitat is present but not documented in the vicinity
Gratiola heterosepala Boggs Lake hedge-hyssop (Plantaginaceae)	--/CE/1B.2	Marshes and swamps (lake margins), Vernal pools; Microhabitat: Clay; 35-7,790 feet; April-August	No suitable habitat is present
Grimmia torenii Toren's grimmia (Grimmiaceae)	--/--/1B.3	Chaparral, Cismontane woodland, Lower montane coniferous forest; Microhabitat: Carbonate, Openings, Rocky, Volcanic, boulder and rock walls; 1,065-3,805 feet; no bloom period listed	Suitable is present
Harmonia hallii Hall's harmonia (Asteraceae)	--/--/1B.2	Chaparral (serpentinite); Microhabitat: none; 1,000-3,200 feet; (March) April-June	Suitable is present
Harmonia nutans nodding harmonia (Asteraceae)	--/--/4.3	Chaparral, Cismontane woodland; Microhabitat: Gravelly (sometimes), Rocky (sometimes), Volcanic; 245-3,200 feet; March-May	Suitable habitat is present but not documented in the vicinity
Hemizonia congesta ssp. *calyculata* Mendocino tarplant (Asteraceae)	--/--/4.3	Cismontane woodland, Valley and foothill grassland; Microhabitat: Serpentinite (sometimes); 740-4,595 feet; July-November	Suitable habitat is present but not documented in the vicinity
Hesperolinon adenophyllum glandular western flax (Linaceae)	--/--/1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland; Microhabitat: Serpentinite (usually); 490-4,315 feet; May-August	Suitable is present

Scientific Name **Common Name** **(Family)**	**Status[1]** **Federal/** **State/CRPR**	**Habitat, Elevation, and Blooming Period[2]**	**Presence of Suitable Habitat within the Study Area**
Hesperolinon bicarpellatum two-carpellate western flax (Linaceae)	--/--/1B.2	Chaparral (serpentinite); Microhabitat: none; 195-3,295 feet; (April) May-July	Suitable is present
Horkelia bolanderi Bolander's horkelia (Rosaceae)	--/--/1B.2	Chaparral, Lower montane coniferous forest, Meadows and seeps, Valley and foothill grassland; Microhabitat: Edges, Vernally Mesic; 1,475-3,610 feet; (May) June-August	Marginal suitable is present (not mesic)
Horkelia tenuiloba thin-lobed horkelia (Rosaceae)	--/--/1B.2	Broadleafed upland forest, Chaparral, Valley and foothill grassland; Microhabitat: Mesic, Openings, Sandy; 165-1,640 feet; May-July (August)	Suitable habitat is present but not documented in the vicinity
Imperata brevifolia California satintail (Poaceae)	--/--/2B.1	Chaparral, Coastal scrub, Meadows and seeps (often alkali), Mojavean desert scrub, Riparian scrub; Microhabitat: Mesic; 0-3,985 feet; September-May	Marginal suitable is present (not mesic)
Lasthenia burkei Burke's goldfields (Asteraceae)	FE/CE/1B.1	Meadows and seeps (mesic), Vernal pools; Microhabitat: none; 50-1,970 feet; April-June	No suitable habitat is present
Layia septentrionalis Colusa layia (Asteraceae)	--/--/1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland; Microhabitat: Sandy, Serpentinite; 330-3,595 feet; April-May	Suitable is present
Legenere limosa legenere (Campanulaceae)	--/--/1B.1	Vernal pools; Microhabitat: none; 5-2,885 feet; April-June	No suitable habitat is present
Leptosiphon aureus bristly leptosiphon (Polemoniaceae)	--/--/4.2	Chaparral, Cismontane woodland, Coastal prairie, Valley and foothill grassland; Microhabitat: none; 180-4,920 feet; April-July	Suitable habitat is present but not documented in the vicinity
Leptosiphon grandiflorus large-flowered leptosiphon (Polemoniaceae)	--/--/4.2	Cismontane woodland, Closed-cone coniferous forest, Coastal bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub, Valley and foothill grassland; Microhabitat: Sandy (usually); 15-4,005 feet; April-August	Suitable habitat is present but not documented in the vicinity
Leptosiphon jepsonii Jepson's leptosiphon (Polemoniaceae)	--/--/1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland; Microhabitat: Volcanic (usually); 330-1,640 feet; March-May	Suitable is present but study area is above species elevation range
Leptosiphon latisectus broad-lobed leptosiphon (Polemoniaceae)	--/--/4.3	Broadleafed upland forest, Cismontane woodland; Microhabitat: none; 560-4,920 feet; April-June	Suitable habitat is present but not documented in the vicinity
Limnanthes floccosa ssp. *floccosa* woolly meadowfoam (Limnanthaceae)	--/--/4.2	Chaparral, Cismontane woodland, Valley and foothill grassland, Vernal pools; Microhabitat: Vernally Mesic; 195-4,380 feet; March-May (June)	Marginal suitable habitat is present (not vernally mesic)

Scientific Name **Common Name** **(Family)**	**Status[1]** **Federal/** **State/CRPR**	**Habitat, Elevation, and Blooming Period[2]**	**Presence of Suitable Habitat within the Study Area**
Limnanthes vinculans Sebastopol meadowfoam (Limnanthaceae)	FE/CE/1B.1	Meadows and seeps, Valley and foothill grassland, Vernal pools; Microhabitat: Vernally Mesic; 50-1,000 feet; April-May	No suitable habitat is present
Lomatium repostum Napa lomatium (Apiaceae)	--/--/1B.2	Chaparral, Cismontane woodland; Microhabitat: Serpentinite; 295-3,380 feet; March-June	Suitable habitat is present but not documented in the vicinity
Lupinus sericatus Cobb Mountain lupine (Fabaceae)	--/--/1B.2	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest; Microhabitat: none; 900-5,005 feet; March-June	Suitable is present
Micropus amphibolus Mt. Diablo cottonweed (Asteraceae)	--/--/3.2	Broadleafed upland forest, Chaparral, Cismontane woodland, Valley and foothill grassland; Microhabitat: Rocky; 150-2,705 feet; March-May	Suitable habitat is present but not documented in the vicinity
Mielichhoferia elongata elongate copper moss (Mielichhoferiaceae)	--/--/4.3	Broadleafed upland forest, Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Meadows and seeps, Subalpine coniferous forest; Microhabitat: Acidic (usually), Carbonate (sometimes), Metamorphic, Roadsides (often), Vernally Mesic (usually); 0-6,430 feet; no bloom period listed	Marginal suitable habitat is present (not vernally mesic)
Monardella viridis green monardella (Lamiaceae)	--/--/4.3	Broadleafed upland forest, Chaparral, Cismontane woodland; Microhabitat: none; 330-3,315 feet; June-September	Suitable habitat is present but not documented in the vicinity
Myosurus minimus ssp. *apus* little mousetail (Ranunculaceae)	--/--/3.1	Valley and foothill grassland, Vernal pools (alkaline); Microhabitat: none; 65-2,100 feet; March-June	Marginal suitable habitat is present (disturbed grasslands, not mesic) but not documented in the vicinity
Navarretia cotulifolia cotula navarretia (Polemoniaceae)	--/--/4.2	Chaparral, Cismontane woodland, Valley and foothill grassland; Microhabitat: Adobe; 15-6,005 feet; May-June	Suitable habitat is present but not documented in the vicinity
Navarretia leucocephala ssp. *bakeri* Baker's navarretia (Polemoniaceae)	--/--/1B.1	Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Valley and foothill grassland, Vernal pools; Microhabitat: Mesic; 15-5,710 feet; April-July	Marginal suitable habitat is present (not mesic)
Navarretia leucocephala ssp. *pauciflora* few-flowered navarretia (Polemoniaceae)	FE/CT/1B.1	Vernal pools (volcanic ash); Microhabitat: none; 1,310-2,805 feet; May-June	Marginal suitable habitat is present (no volcanic ash)
Navarretia leucocephala ssp. *plieantha* many-flowered navarretia (Polemoniaceae)	FE/CE/1B.2	Vernal pools (volcanic ash); Microhabitat: none; 100-3,115 feet; May-June	No suitable habitat is present

Scientific Name **Common Name** **(Family)**	**Status[1]** **Federal/** **State/CRPR**	**Habitat, Elevation, and Blooming Period[2]**	**Presence of Suitable Habitat within the Study Area**
Orcuttia tenuis slender Orcutt grass (Poaceae)	FT/CE/1B.1	Vernal pools; Microhabitat: Gravelly (often); 115-5,775 feet; May-September (October)	No suitable habitat is present
Orobanche valida ssp. *howellii* Howell's broomrape (Orobanchaceae)	--/--/4.3	Chaparral (serpentinite, volcanic); Microhabitat: none; 590-5,710 feet; June-September	Suitable habitat is present but not documented in the vicinity
Panicum acuminatum var. *thermale* Geysers panicum (Poaceae)	--/CE/1B.2	Closed-cone coniferous forest, Riparian forest, Valley and foothill grassland; Microhabitat: Streambanks (sometimes), geothermally-altered soil; 1,000-8,105 feet; June-August	Marginal suitable habitat is present (disturbed grasslands)
Penstemon newberryi var. *sonomensis* Sonoma beardtongue (Plantaginaceae)	--/--/1B.3	Chaparral (rocky); Microhabitat: none; 2,295-4,495 feet; April-August	Suitable habitat is present
Piperia michaelii Michael's rein orchid (Orchidaceae)	--/--/4.2	Chaparral, Cismontane woodland, Closed-cone coniferous forest, Coastal bluff scrub, Coastal scrub, Lower montane coniferous forest; Microhabitat: none; 10-3,000 feet; April-August	Suitable habitat is present but not documented in the vicinity
Potamogeton zosteriformis eel-grass pondweed (Potamogetonaceae)	--/--/2B.2	Marshes and swamps (freshwater); Microhabitat: none; 0-6,105 feet; June-July	No suitable habitat is present
Sedella leiocarpa Lake County stonecrop (Crassulaceae)	FE/CE/1B.1	Cismontane woodland, Valley and foothill grassland, Vernal pools; Microhabitat: Vernally Mesic, Volcanic, vernally mesic depressions in volcanic outcrops; 1,200-2,590 feet; April-May	Marginal suitable habitat is present (not vernally mesic)
Sidalcea oregana ssp. *hydrophila* marsh checkerbloom (Malvaceae)	--/--/1B.2	Meadows and seeps, Riparian forest; Microhabitat: Mesic; 3,610-7,545 feet; (June) July-August	Marginal suitable habitat is present (not mesic)
Sidalcea oregana ssp. *valida* Kenwood Marsh checkerbloom (Malvaceae)	FE/CE/1B.1	Marshes and swamps (freshwater); Microhabitat: none; 375-490 feet; June-September	No suitable habitat is present
Streptanthus barbiger bearded jewelflower (Brassicaceae)	--/--/4.2	Chaparral (serpentinite); Microhabitat: none; 490-3,510 feet; May-July	Suitable habitat is present but not documented in the vicinity
Streptanthus brachiatus ssp. *brachiatus* Socrates Mine jewelflower (Brassicaceae)	--/--/1B.2	Chaparral, Closed-cone coniferous forest; Microhabitat: Serpentinite (usually); 1,790-3,280 feet; May-June	Suitable habitat is present

Scientific Name **Common Name** **(Family)**	**Status[1]** **Federal/** **State/CRPR**	**Habitat, Elevation, and Blooming Period[2]**	**Presence of Suitable Habitat within the Study Area**
Streptanthus brachiatus ssp. *hoffmanii* Freed's jewelflower (Brassicaceae)	--/--/1B.2	Chaparral, Cismontane woodland; Microhabitat: Serpentinite; 1,610-4,005 feet; May-July	Suitable habitat is present
Streptanthus glandulosus ssp. *hoffmanii* Hoffman's bristly jewelflower (Brassicaceae)	--/--/1B.3	Chaparral, Cismontane woodland, Valley and foothill grassland (often serpentinite); Microhabitat: Rocky; 395-1,560 feet; March-July	Suitable is present but study area is above species elevation range
Streptanthus hesperidis green jewelflower (Brassicaceae)	--/--/1B.2	Chaparral (openings), Cismontane woodland; Microhabitat: Rocky, Serpentinite; 425-2,495 feet; May-July	Suitable is present but study area is above species elevation range and species is not documented in the vicinity
Stuckenia filiformis ssp. *alpina* northern slender pondweed (Potamogetonaceae)	--/--/2B.2	Marshes and swamps (shallow freshwater); Microhabitat: none; 985-7,055 feet; May-July	No suitable habitat is present
Toxicoscordion fontanum marsh zigadenus (Melanthiaceae)	--/--/4.2	Chaparral, Cismontane woodland, Lower montane coniferous forest, Marshes and swamps, Meadows and seeps; Microhabitat: Serpentinite (often), Vernally Mesic; 50-3,280 feet; April-July	Marginal suitable habitat is present (not vernally mesic)
Trichostema ruygtii Napa bluecurls (Lamiaceae)	--/--/1B.2	Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland, Vernal pools; Microhabitat: none; 100-2,230 feet; June-October	Suitable is present but study area is above species elevation range
Viburnum ellipticum oval-leaved viburnum (Viburnaceae)	--/--/2B.3	Chaparral, Cismontane woodland, Lower montane coniferous forest; Microhabitat: none; 705-4,595 feet; May-June	Suitable habitat is present

Note: nomenclature corresponds to the CNPS (2023).

1. State or federal listing: F = Federal; C = California; E = endangered; T = threatened; R = rare
   CRPR 1A: Plants presumed extirpated in California and either rare or extinct elsewhere; CRPR List 1B = Plants rare, threatened or endangered in CA and elsewhere; CRPR 2B = Plants rare, threatened or endangered in California but more common elsewhere; CRPR 3 = More information is needed about plant; CRPR 4 = Plants of limited distribution, a watch list
   CRPR: '.1' = Seriously threatened in CA; '.2' = Fairly threatened in CA; '.3' = Not very threatened in CA
2. The elevation range within the study area is 2582 to 2,984 feet.

APPENDIX C

USFWS Information, Planning, and Consultation System (IPaC) Search Results

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Lake County, California

Local office

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS
Northern Spotted Owl Strix occidentalis caurina Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/1123	Threatened

Reptiles

NAME	STATUS
Green Sea Turtle Chelonia mydas No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6199	Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Crustaceans

NAME	STATUS
California Freshwater Shrimp Syncaris pacifica Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7903	Endangered
Conservancy Fairy Shrimp Branchinecta conservatio Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/8246	Endangered

Flowering Plants

NAME	STATUS
Burke's Goldfields Lasthenia burkei Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4338	Endangered
Few-flowered Navarretia Navarretia leucocephala ssp. pauciflora (=N. pauciflora) Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8242	Endangered
Slender Orcutt Grass Orcuttia tenuis Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/1063	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Allen's Hummingbird Selasphorus sasin This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Black-chinned Sparrow Spizella atrogularis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9447	Breeds Apr 15 to Jul 31
Bullock's Oriole Icterus bullockii This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 21 to Jul 25
California Thrasher Toxostoma redivivum This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jan 1 to Jul 31

Cassin's Finch Carpodacus cassinii — Breeds May 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9462

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Lawrence's Goldfinch Carduelis lawrencei — Breeds Mar 20 to Sep 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9464

Nuttall's Woodpecker Picoides nuttallii — Breeds Apr 1 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9410

Oak Titmouse Baeolophus inornatus — Breeds Mar 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9656

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Wrentit Chamaea fasciata — Breeds Mar 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (▪)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (▪)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

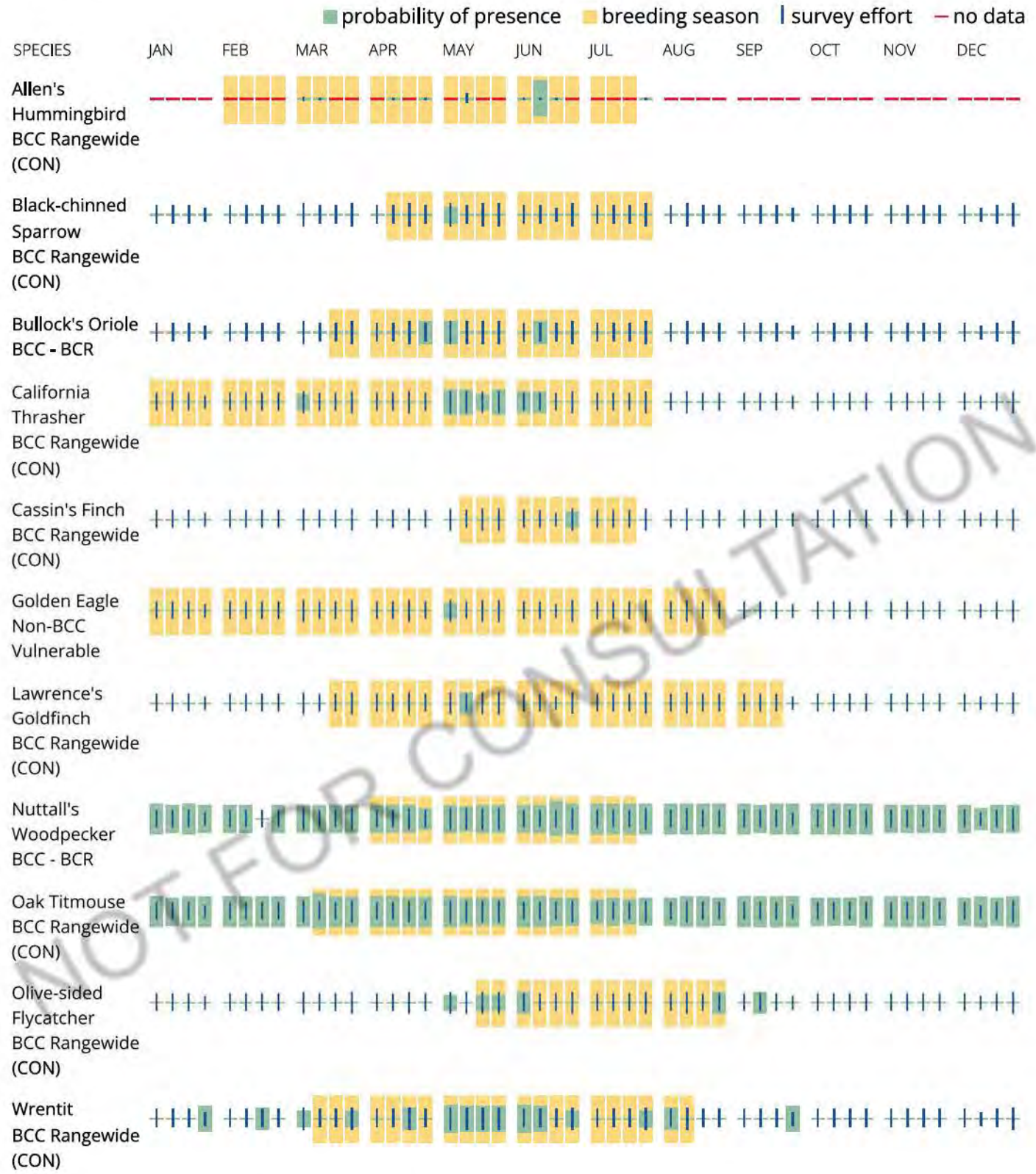
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure.

To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in

offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Mayacma Geothermal, LLC

Mayacma Geothermal Project
Supplemental Habitat Evaluation Report

November 2024

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PANORAMA
ENVIRONMENTAL, INC.

Open Mountain Energy

Mayacma Geothermal
Supplemental Habitat Evaluation Report

November 2024

Prepared for:
Mayacma Geothermal, LLC

Prepared by:
Panorama Environmental, Inc.

www.panoramaenv.com

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1 Introduction

1.1 Project Description

The Mayacma Geothermal Project (Project) is a proposed modification to the existing Battle Rock Power Plant (BRPP), a 55-megawatt (MW) geothermal turbine-generator power plant located in Lake County, California. The BRPP ceased operation in 2015 due to inadequate equipment and geothermal capacity. The geothermal resource at the site is no longer capable of efficiently supporting production of power using the existing 55-MW steam turbine generator. The modifications proposed under the Project include: installation of two organic rankine cycle binary power generation units with a net power generation capacity of 7.5 MW; installation of two power distribution center buildings; removal of an existing water cooling tower and associated equipment and replacement with two air-cooled condensers; new pipelines to connect the steam supply and non-condensable gas streams to and from the power generation units; installation of a new steam vent stack; and new electrical line and switchgear.

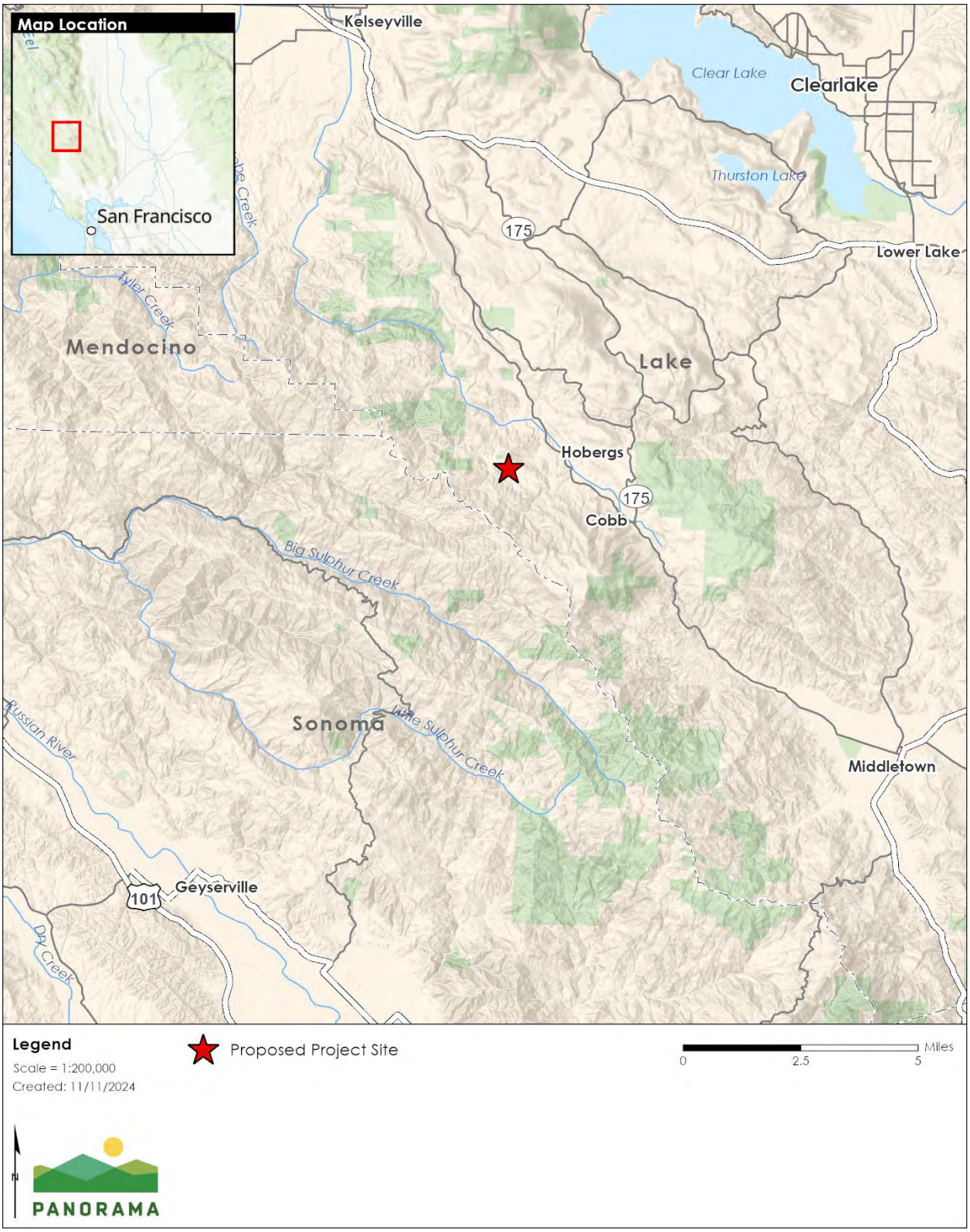
1.2 Project Location

The Project area is located off of High Valley Road, approximately 2.5 miles west of Highway 175 and Cobb, a census-designated place in Lake County (Figure 1). Clearlake is the closest major city and is approximately 10 miles northeast of the Project area. The Project area is mapped in "The Geysers" 7.5' U.S. Geological Survey topographic quadrangle within Section 5 of Township 11 North, Range 8 West.

1.3 Purpose of the Supplemental Habitat Evaluation

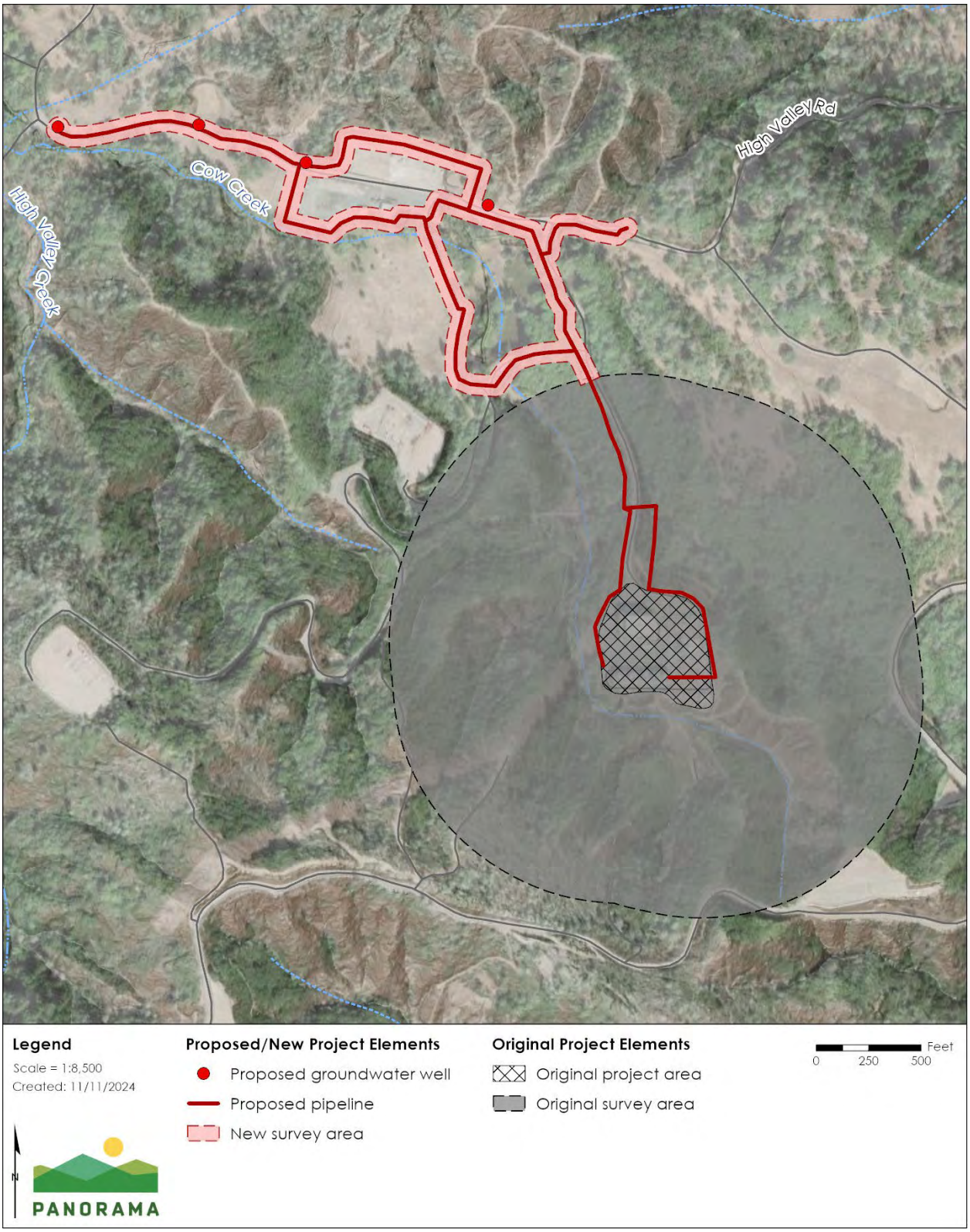
The Project as originally proposed included modifications to the BRPP within the existing development footprint of the power plant and a new pipeline that would be installed alongside an existing pipeline with associated support structures. The California Energy Commission required a survey of sensitive biological resources within 1,000 feet of the Project area. A habitat evaluation survey was completed for this original Project area in February 2023 by Vollmar Natural Lands Consulting, Inc. (Vollmar), who subsequently completed a *Biological Evaluation Report* in March 2023 (Vollmar 2023). The original Project area and the area surveyed by Vollmar may be viewed in Figure 2. Since that time, an additional 1.4 miles of pipeline and four groundwater wells were added to the Project in areas not surveyed by Vollmar (shown in Figure 2). The additional pipeline and groundwater wells would be subject to Lake County jurisdiction.

Figure 1 Project Location



Source: Mayacma Geotheraml 2024.

Figure 2 Original and New Project Elements and Survey Areas



Source: Mayacma Geothermal 2024.

Therefore, additional surveying was needed to complete the habitat evaluation for the Project. In September 2024, Panorama Environmental, Inc. (Panorama) conducted a site visit to identify and characterize the existing conditions of the new Project areas and assess the potential for special-status species, habitats, and jurisdictional features. The survey area for these new Project elements included the footprint of the Project elements plus a 50-foot buffer around the proposed pipeline (Figure 2), which brings the total survey area to 15.1 acres.

2 Methods

2.1 Desktop Review

For their *Biological Evaluation Report* (Vollmar 2023), Vollmar conducted a full desktop review to identify sensitive habitats and documented occurrences of special-status species in and around the Project area prior to conducting field work. Their review included a California Natural Diversity Database (CNDDB) search; a query of the U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) tool; a California Native Plant Society (CNPS) nine-quad search; and a review of aerial imagery, the project description, and general regional conditions. Because the location of the new Project area is adjacent to the original Project area, and because each of these database queries includes a search buffer that encompasses the new Project area, there was no need to repeat these queries for the new Project area. Any findings of sensitive habitats or special-status species in the *Biological Evaluation Report* (Vollmar 2023) apply to the new Project area.

2.2 Field Investigation

The habitat evaluation survey was a reconnaissance-level survey with the objective of identifying and mapping habitat types within the survey area and documenting any observations of special-status species. The survey area included the footprint for the new Project elements (proposed 1.4-mile pipeline route and four groundwater wells) plus a 50-foot survey buffer around these elements. A Panorama biologist conducted the habitat evaluation survey on September 13, 2024. The biologist traversed the area on foot, obtaining 100 percent coverage of the survey area. Each habitat type was delineated according to CNPS habitat classifications (CNPS 2023a; 2023b). A Bad Elf GNSS Surveyor Unit was used to obtain one-meter accuracy for the delineated habitat boundaries. The data were logged using ArcGIS Field Maps and uploaded to ArcGIS online. For any aquatic features encountered, the type of feature was documented and the boundaries of the feature within the survey area were delineated in Field Maps. A formal jurisdictional aquatic resources delineation was not conducted. Representative photographs of habitats were taken to document the habitat conditions.

The Panorama biologist looked for any special-status species that were identified from the desktop review as having potential to occur in the survey area, but protocol-level surveys for these species were not conducted. The biologist also noted whether habitat conditions would support these species (e.g., nesting or roosting habitat, burrow habitat, or aquatic habitat). Any special status species encountered during the survey were documented and georeferenced in Field Maps. The biologist also noted any observations of non-special-status wildlife species.

3 Results

3.1 Habitats

Habitats in the general area are mostly natural and relatively intact, including woodland, chaparral, grassland, and streams. The additional pipelines and groundwater wells are located primarily along existing roads or pipeline routes and within otherwise disturbed/developed areas. The proposed pipeline route and groundwater well locations occur primarily within habitats described within the *Biological Evaluation Report* completed by Vollmar (2023). However, the survey area also contained two habitats not found within the original area surveyed by Vollmar: Valley Oak Woodland and seasonal wetland. Additionally, one habitat type delineated by Vollmar was not present in the survey area: Lower Montane Coniferous Forest. All habitats delineated within the survey area are described in detail below and shown in Figure 3. Representative photos of each habitat are shown in Appendix A.

3.1.1 Upland Habitats

Cismontane Woodland

Cismontane Woodland covers 2.5 acres (16.4 percent) of the survey area and is dispersed throughout the proposed pipeline route. This habitat is defined by the CNPS (CNPS 2023a) as tree-dominated with an open canopy. Broadleaved trees, especially oaks, typically dominate, although conifers may occur within openings in the canopy. The understory can be either open and herbaceous or closed and shrub-dominated. Occurs in a variety of California lowlands. In the survey area, Cismontane Woodland habitat is dominated by evergreen hardwood trees and features some deciduous hardwoods and conifer species. Hardwood species include canyon live oak (*Quercus chrysolepis*) along upper slopes, black oak (*Q. kelloggii*) along lower slopes, and California bay (*Umbellularia californica*) and Pacific madrone (*Arbutus menziesii*) in between. Douglas fir (*Pseudotsuga menziesii*) is the most common conifer species, followed by ponderosa pine (*P. ponderosa*) and foothill pine (*Pinus sabiniana*). There are also a few sugar pines (*P. lambertiana*). The understory shrub and vine stratum consists primarily of common manzanita (*Arctostaphylos manzanita* ssp. *manzanita*), scrub oak (*Quercus berberidifolia*), and birch leaf mahogany (*Cercocarpus betuloides*). The herb layer consists of both native and non-native species. Common native species include California fescue (*Festuca californica*), California fuchsia (*Epilobium canum*), white-flowered hawkweed (*Hieracium albiflorum*), and California milkwort (*Rhinotropis californica*). Non-native species include dogtail grass (*Cynosurus echinatus*), tall sock

destroyer (*Torilis arvensis*), orchard grass (*Dactylis glomeratum*), and ripgut brome (*Bromus diandrus*).

Chaparral

Chaparral habitat covers 1.4 acres (9.2 percent) of the survey area, dispersed patchily through the proposed pipeline route. Chaparral is defined by the CNPS as impenetrably dense, evergreen, leathery-leaved shrubs that are active in winter, dormant in summer, and adapted to frequent fires (CNPS 2023a). Small flora includes fire-following annuals and short-lived perennials. Mature stands may exceed 3-4 meters in height. Chaparral habitat within the survey area consists of two broad groups, including Chamise-Redshank Chaparral and Mixed Chaparral. In the survey area, Chamise-Redshank Chaparral is dominated by chamise (*Adenostoma fasciculatum*) with redshank (*A. sparsifolium*) also present. Associated species include buckbrush (*Ceanothus cuneatus*), scrub oak, common manzanita, and chaparral pea (*Pckeringia montana*). There are no common herbs. The Mixed Chaparral includes the same shrub species, but in more equal covers rather than a majority of chamise. Naked buckwheat (*Eriogonum nudum*) and incipient annual grasses occur beneath the shrubs.

Valley and Foothill Grassland

Valley and Foothill Grassland covers 3.1 acres (20.6 percent) of the survey area, occurring within most portions of the proposed pipeline route. This habitat is defined by the CNPS as introduced Mediterranean grasses and native herbs with bunch grasses typically largely or entirely supplanted (CNPS 2023a). Valley and Foothill Grassland within the survey area is dominated by exotic grass and forb species, such as medusahead (*Elymus caput-medusae*), yellow star-thistle (*Centaurea solstitialis*), broadleaf filaree (*Erodium botrys*), and various clover species (*Trifolium* spp.). The prevalence of these weedy species may be the result of previous disturbance and/or a lack of any management in the area-generally some form of grazing, mowing, or burning required to give native plant species an ability to compete. Native species observed in this habitat are scattered trees and shrubs, including valley oak (*Quercus lobata*), ponderosa pine, foothill pine, and manzanita (*Arctostaphylos* sp.).

Valley Oak Woodland

Valley Oak Woodland covers 1.1 acres (7.2 percent) of the survey area, occurring within several portions of the pipeline route. This habitat occurs within the gently sloping valley bottom within the survey area, adjacent to the maintenance building and associated laydown/disturbed areas. This habitat is dominated by a dense overstory of valley oak (*Quercus lobata*) with an understory of grass and forb species matching those found within the valley and foothill grassland habitat. These areas are defined by stands of valley oaks with greater than 50 percent relative cover in the tree canopy. Where this habitat occurs within the survey area, valley oak was nearly 100 percent of the tree canopy.

Developed

Developed areas within the survey area are associated with High Valley Road and other roads along which the proposed pipeline is aligned. Other developed areas are associated with a

maintenance building and associated laydown yard along High Valley Road. Developed areas cover 6.8 acres (44.9 percent) of the survey area.

3.1.2 Stream/Drainage Habitats

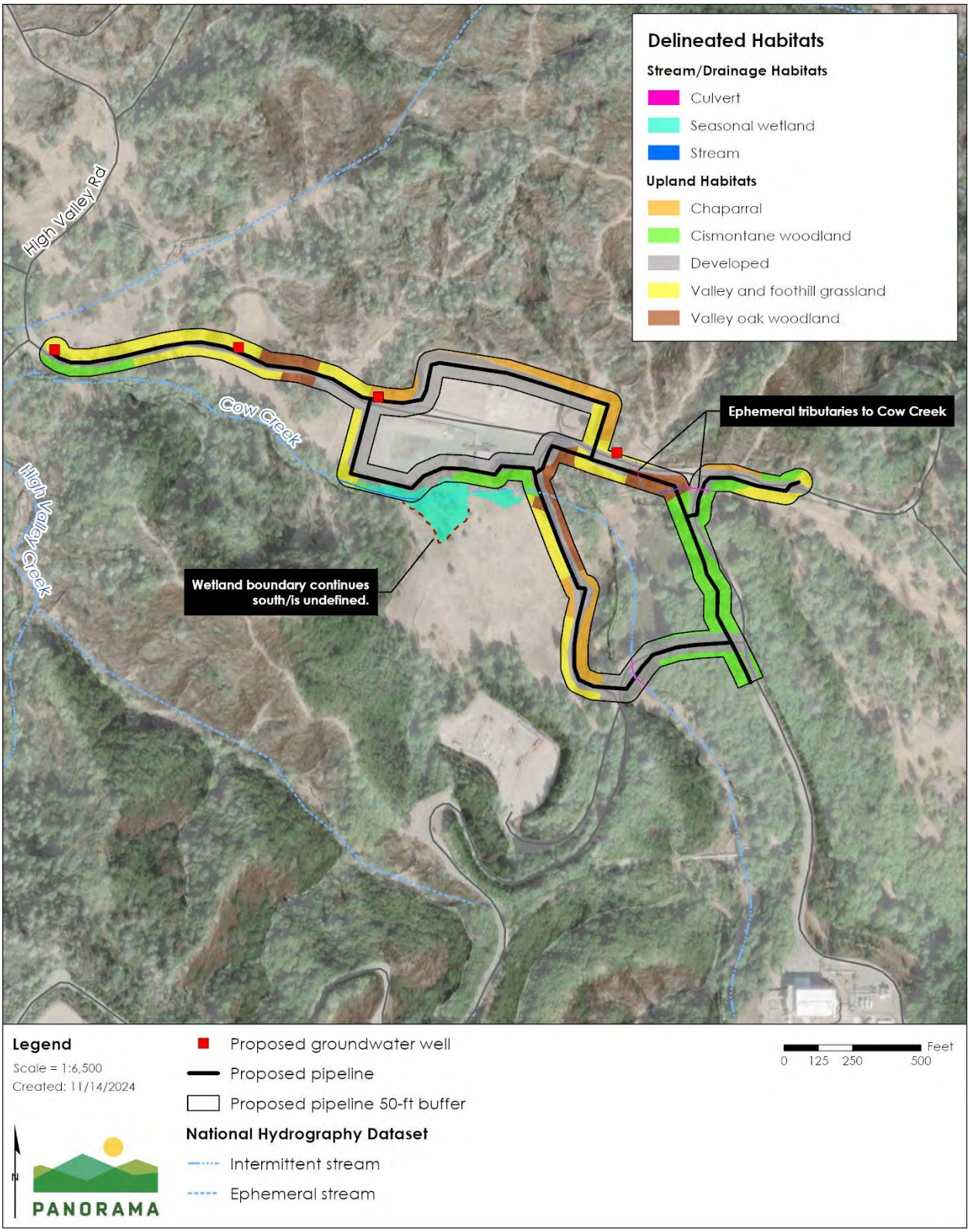
Seasonal Wetland

A potentially jurisdictional seasonal wetland occurs adjacent to Cow Creek (see above) and along the southern boundary of a maintenance building and associated laydown yard. The wetland crosses into the survey buffer along the proposed pipeline route in the south central portion of the survey area. Approximately 0.2 acre of the wetland occurs within the survey area (1.2 percent of the survey area), with additional acreage occurring outside and to the south of the survey area boundary. No wetland habitat overlaps any of the Project elements. The wetland is a flat, low-lying area that extends south (uphill) from the creek and likely receives hydrologic input from Cow Creek and seasonal seeping from the adjacent gently sloping grassy meadow to the south. This area was dry at the time of the survey, but was mapped using the boundary between hydrophytic plants observed within the wetland area and adjacent habitats (Cismontane Woodland, Valley and Foothill Grassland, and Developed areas). Hydrophytic plants observed within the wetland include primarily spike rush (*Eleocharis* sp.), Baltic rush (*Juncus balticus*) and cattails (*Typha* sp.).

Stream

Stream habitat in the survey area consists of ephemeral and intermittent streams. The survey area contains approximately 0.04 acre of stream habitat (0.3 percent of the survey area). Cow Creek is the main intermittent stream that runs within and adjacent to the both the original and new Project areas. Cow Creek flows northward through the original Project area and bends west to flow along the south side of High Valley Road and the proposed pipeline route. Cow Creek crosses the proposed pipeline route in two locations and crosses into the survey buffer in a third location. Two unnamed ephemeral tributaries to Cow Creek cross the proposed pipeline route in three locations. Because the pipeline would follow existing roads and an existing pipeline, there would be minimal to no new impact to the creek habitat as a result of the Project. At the time of the survey, the ephemeral tributaries to Cow Creek were dry and Cow Creek had no flow, but was wet in some places. Cow Creek and the portions of its unnamed tributaries mapped within the survey area can be seen in Figure 3.

Figure 3 Delineated Habitats



Source: Panorama Environmental 2024

3.2 Special-Status Species

No special-status species were documented during the survey. Non-special-status wildlife species typical of the area were observed, but because of the largely-disturbed nature of the survey area, even observations of those species were minimal. Due to the similarity of the habitat in the new survey area to the habitat in the original survey area, we assume that the same special-status species discussed in Vollmar's *Biological Evaluation Report* (2023) are relevant to this survey area. These species are summarized below. Seasonal wetland habitat is unique to the new survey area, but the proposed pipeline route and pump stations are located outside of this habitat type, so impacts to wetland-associated species are not expected.

3.2.1 Listed Wildlife Species

Northern Spotted Owl

The northern spotted owl (*Strix occidentalis caurina*) is listed as federal Threatened and State Threatened. It requires mature forests and nests in tree cavities, broken tops of large trees, caves, or cliff crevices. Cismontane Woodland habitat within the survey area may provide suitable habitat for northern spotted owl. Designated critical habitat, where individuals have been documented, is present around Cobb Mountain, approximately 4 miles from the survey area. Large trees with cavities were present in the survey area and could provide nesting habitat.

Monarch Butterfly

The monarch butterfly (*Danaus plexippus plexippus* pop. 1 [overwintering population]) is a federal candidate for listing as an Endangered species. Monarch butterfly is dependent on milkweed species (*Ascleias* spp.) for larval host plants. Overwintering adults migrate over 2,000 miles to overwintering sies, which are characterized by forests with specific microhabitat conditions, including dappled sunlight, high humidity, fresh water, and an absence of freezing temperatures or high winds. The survey area is outside of the known overwintering range, but spring and summer breeding and foraging habitat may be present in the survey area.

3.2.2 Non-Listed Special-Status Wildlife Species

Foothill Yellow-Legged Frog

The foothill yellow-legged frog (*Rana boylii*) Northwest/North Coast Clade is a California Department of Fish and Wildlife (CDFW) Species of Special Concern. It requires aquatic habitat, including partly shaded, low gradient ephemeral and permanent streams, rivers, and adjacent moist terrestrial habitats (Hayes et al. 2016). It occurs in streams and rivers in woodland, chaparral, and forest habitats (Stebbins and McGinnis 2012), often within pools and sunny areas with gravel substrate. Individuals have been documented from the watershed 1.3 miles from the survey area. Within the survey area, habitat for this species may be present within Cow Creek and its associated tributaries and wetlands. However, this species is closely associated with water and is rarely found far from the water's edge. Therefore, Cow Creek's small size and

intermittent flow regime only provides low to moderately suitable dispersal habitat and marginal breeding habitat.

Red-Bellied Newt

The red-bellied newt (*Taricha rivularis*) is a CDFW Species of Special Concern. It occupies woodlands and redwood forests in coastal northern California. Individuals have been documented near Cobb Mountain, approximately three miles from the survey area. During the dry season, it stays underground in terrestrial habitat, foraging in moist habitats under woody debris and rocks and in animal burrows. It can migrate over a mile to permanent streams during fall and winter rains to breed and lay eggs in rocky substrate (Marangio 1988). In the survey area, Cow Creek and its tributaries provide marginal habitat, but are likely too small and seasonal for breeding. In the areas of Cow Creek where the proposed pipeline route crosses, there is no suitable breeding habitat. However, there are larger pool areas downstream near the western end of the proposed pipeline route approximately 25 feet from the survey area that could potentially support breeding. Wet season surveys would be needed to determine the suitability of habitat for red-bellied newt breeding. The species may also migrate overland or through the drainages in the survey area to reach better habitat.

Purple Martin

The purple martin (*Progne subis*) is a CDFW Species of Special Concern. It is found in a variety of wooded, low-elevation habitats, including valley foothill and montane hardwood, valley foothill and montane hardwood-conifer, riparian, and coniferous. It occurs in open forests, woodlands, and riparian areas during the breeding season and open habitats, such as grassland, wet meadow, and fresh emergent wetland, during migration (Green 1988). It commonly nests in old woodpecker cavities in tall, old, isolated trees near water (Dawson 1923). Trees and snags that could provide nesting habitat for purple martin are present within the survey area.

Pallid Bat

The pallid bat (*Antrozous pallidus*) is a CDFW Species of Special Concern and designated as high priority by the Western Bat Working Group (WBWG). The pallid bat is found in low elevations throughout California in many different habitats, including grasslands, shrublands, woodlands, and forests (Harris 1988a). It is most commonly found in dry open habitats with rocky areas for roosting (Weber 2009), which occurs in caves, crevices, mines, cliffs, and hollow trees. It forages over open ground. Large trees and buildings within the survey area may provide day and night roost habitat. Areas of bare ground within the survey area may provide foraging habitat. The nearest documented occurrence of pallid bat is approximately 4 miles from the survey area. Pallid bats are sensitive to disturbance of roost sites.

Townsend's Big-Eared Bat

Townsend's big-eared bat (*Corynorhinus townsendii*) is a CDFW Species of Special Concern and designated as high priority by the WBWG. It is found in nearly all habitats except subalpine and alpine (Harris 1988b). The species roosts in large cavities, including caves, mines, tunnels, buildings, or other man-made structures. It sometimes roosts in hollows of large trees (Gruver and Keinath 2006). It is typically found in dry upland habitats, but is also found in mesic

habitats, including coniferous and deciduous forest (Kunz and Martin 1982). Within the survey area, large trees and buildings may provide day and night roost habitat and cismontane woodland may provide foraging habitat. The nearest documented occurrence is approximately four miles from the survey area. Townsend's big-eared bat is extremely sensitive to roost disturbance.

Hoary Bat

The hoary bat (*Lasiurus cinereus*) is a medium priority species according to the WBWG. It is found in almost all areas of California. It winters along the coast and in southern California and breeds and roosts in woodlands and forests with medium to large trees with dense foliage. It is found in foothills, deserts, mountains, lowlands, and coastal valleys during migration. It requires a nearby source of water and prefers open habitats with access to open areas for foraging and trees for cover. Within the survey area, there are trees suitable for day and night roosting, and cismontane woodland and grassland habitats may provide foraging habitat. The nearest documented occurrence is approximately 4 miles from the survey area.

Long-Eared Myotis

The long-eared myotis (*Myotis evotis*) is a medium priority species according to the WBWG. It occurs throughout California except for in the Central Valley and hot deserts. It occupies a variety of habitats, including shrublands, sage, chaparral, and agricultural areas, but may prefer coniferous woodlands and forests. It roosts in buildings, crevices, hollow trees, caves, mines, cliff crevices, rocky outcrops, and spaces under tree bark, and sometimes under bridges (Bogan, Valdez, and Navo 2005). Trees within the survey area may provide day and night roost habitat; cismontane woodland and grassland habitats may provide foraging habitat. The nearest occurrence is approximately 4 miles from the survey area.

Fringed Myotis

The fringed myotis (*Myotis thysanodes*) is found in most places throughout California. It occupies a variety of habitats, including pinyon-juniper, valley foothill hardwood, and hardwood-conifer. The fringed myotis roosts in caves, mines, buildings, and crevices. It forages in open habitats and aquatic habitats. It requires access to water. Trees within the survey area may provide suitable day and night roosts; cismontane woodland and grassland habitats may provide foraging habitat. The nearest documented occurrence is approximately 4 miles from the survey area.

3.2.3 Migratory and Nesting Birds

A number of birds protected by the Migratory Bird Treaty Act and the California Fish and Game Code Section 3503 are likely to occur within the survey area. Tree and shrub habitats within the survey area provide nesting habitat. Migratory bird species observed by Vollmar within the original survey area are summarized in Vollmar's *Biological Evaluation Report* (Vollmar 2023). The same species are expected to occur within the new survey area.

3.2.4 Special-Status Plant Species

Because the new survey area includes most of the habitats as the original area surveyed by Vollmar, the same 17 special-status plant species are considered to have potential to occur. These species are listed in Appendix B of Vollmar's *Biological Evaluation Report* (Vollmar 2023). These species are identified by the California Native Plant Society as having a California Rare Plant Rank of 1A, 1B, or 2, but none are federal or State listed. The survey area contains wetland habitat that was not present in the original survey area, but the proposed pipeline route would avoid this habitat type and any special-status plant species within it.

3.3 Protected Habitats

3.3.1 Wetlands or Waters of the United States and Waters of the State of California

Cow Creek (described above) flows northward into High Valley Creek, which in turn flows into Kelsey Creek, which discharges into Clear Lake, a traditionally-navigable water. The hydrologic connection to Clear Lake and the presence of bed and bank and an intermittent flow regime presumably would make Cow Creek a jurisdictional water at the state and federal level. Riparian vegetation along Cow Creek would also be under State jurisdiction.

Tributaries to Cow Creek did not have clear bed and bank or significant cover of wetland vegetation and are likely ephemeral features. These would likely be jurisdictional under the Regional Water Quality Control Board, but would not fall under federal jurisdiction.

3.3.2 Sensitive Plant Communities

There are no sensitive plant communities within the survey area.

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Appendix A: Representative Habitat Photos

Cismontane Woodland

Chaparral

Developed

Valley and Foothill Grassland

Valley Oak Woodland

Stream: Intermittent

Stream: Ephemeral

Seasonal Wetland

Appendix D – Archaeological Review – Mayacma Geothermal Project

MEMORANDUM **Basin Research Associates**

Archaeological Review – Mayacma Geothermal Project, Lake County for Proposed and Alternative Well Sites and Water Pipelines

TO:	Mr. John Casteel **Open Mountain Energy** Reno, NV 89501
RE:	Archaeological Review – Mayacma Geothermal Project, Lake County for Four Proposed Well Sites and Alternatives and Five Proposed Water Pipelines and Alternatives
FROM:	Colin I. Busby, Project Principal (510 430-8441 x101)
DATE:	October 7, 2024

INTRODUCTION

Open Mountain Energy requested this *Archaeological Review* to determine if significant cultural resources under the California Environmental Quality Act (CEQA) might be affected by the proposed project. The Mayacma Geothermal Project in Lake County has been subject to previous archaeological inventories, testing and data recovery from the 1970s to 2010 by various consultants (see Flaherty et al. 2010 for a summary) as part of the Bottle Rock (Geothermal) Power Plant (BRPP) project. A number of archaeological sites have been recorded within the facility with several subject to evaluation for inclusion on either the National Register of Historic Places (NRHP) and/or the California Register of Historical Resources (CRHR). The geothermal field, maintenance areas and power generating facilities have been in operation since the late 1970s. The well pads, maintenance facilities, power plant and internal roads and pipeline alignments have resulted in many impacts to areas within the current facility.

The BRPP was licensed by the California Energy Commission (CED) as a 55-MW geothermal turbine-generator power plant began operation in 1985 and ceased operation in 2015 due to inadequate equipment and geothermal capacity. The geothermal resource at the site is no longer capable of efficiently supporting production of power using the existing 55-MW steam turbine generator. The proposed modification to the BRPP, referred to as the Mayacma Geothermal Project, would be operated by Mayacma Geothermal LLC, under a lease from Bottle Rock Power (BRP). The proposed modifications include:

- Installation of two ORC binary power generation units with a net power generation capacity of 7.5 MW
- Installation of a sound attenuation enclosure that would house ORC units
- Installation of a low voltage electrical switchgear (480V) and control building
- Installation of medium voltage switchgear (13.8kV) inside the turbine building, 1st floor
- Installation of new pipelines to connect the steam supply to the new ORC units
- Installation of new pipelines to connect the NCG streams from the ORC units to the Stretford H_2S abatement system (Stretford system) (and optionally to catalyst reactor H_2S abatement tanks as a backup treatment system if economically beneficial).

- Installation of a new steam vent stack with associated H_2S treatment tank and pumps to be located near the ORCs
- New electrical line and switchgear to the new power generation to the existing GSU transformer
- Installation of a new condensate pipeline from the ORC units to the injection well on the Coleman Well Pad
- Disconnection of the existing steam supply pipeline at the turbine generator building inlet, steam-stacking system, and rock muffler
- Up to two (2) new groundwater supply wells and pipeline from the new groundwater supply well to the BRPP

This *Archaeological Review* was undertaken to determine if significant historic properties and/or unique archaeological resources (cultural resources) as defined by the California Environmental Quality Act (CEQA) might be affected by proposed groundwater supply well and associated pipelines to the BRPP (Energy Center) as other project components will occur within existing facilities.

CEQA (Public Resources Code 21000 et seq.) 1970, as amended requires a lead agency to determine potential impacts on both historical and archaeological cultural resources eligible for the California Register of Historical Resources (CRHR) and mitigate impacts on historically or culturally significant resources affected by a project. Under CEQA, a project is considered to have a significant effect if it would disrupt or adversely affect one or more properties of historic or cultural significance to the community (CEQA Section 21084.1 and CEQA *Guidelines*). CEQA requires a lead agency to determine if a project will have a significant effect on the environment and to assess possible impacts.

PROJECT LOCATION AND DESCRIPTION [see Figs. 1-3]

The Mayacma Geothermal Project is in Lake County at 7835 High Valley Road to the southwest of the intersection of High Valley Road (private section) and Bottle Road (County Road 515) (T 11N R 8W, Sections 5 and 6, USGS The Geysers, Calif. 1975) [Figs. 1-3].

Open Mountain Energy plans to install up to four new water wells in the vicinity of the existing Francisco Well Pad in the northern section of the facility and transfer the water via approximately 8,800 linear feet of pipelines to the BRPP Energy Facility located with the southern portion of the project site. There are four proposed well locations (Points 2, 3, 4, and 5), three suggested alternatives, and four proposed water lines (Line, Line 1, Line 2, Line 3, and a suggested water line to Alternate Well Location 1) [see Figs. 3-4].

RESEARCH PROTOCOLS

A prehistoric and historic site record and literature search was completed for a 0.25 mile area of the project site in early 2023 by the California Historical Resources Information System, Northwest Information Center, Sonoma State University, Rohnert Park (CHRIS/NWIC File No. 22-1451 dated 3/23/2023 by Murazzo). Specialized listings for cultural resources consulted include:

National Register of Historic Places (NRHP) listings in Lake County (USNPS 2024);

California History Plan (CAL/OHP 1973);

California Inventory of Historic Resources (CAL/OHP 1976);

Five Views: An Ethnic Sites Survey for California (CAL/OHP 1988);

Archaeological Determinations of Eligibility for Lake County [ADOE] (CAL/OHP 2023);

OHP [Office of Historic Preservation] Built Environment Resources Directory (BERD) for Lake County (CAL/OHP 2024a);

Listed California Historical Resources for Lake County (CAL/OHP 2024b); and,

Other relevant sources (see References Cited and Consulted).

No other agencies, departments or local historical societies were contacted regarding landmarks, potential historic sites or structures due to the nature of the proposed improvements within an existing geothermal development.

RECORDS SEARCH RESULTS

A review of the CHRIS/NWIC search completed in 2023 for a 0.25 mile radius of the project site determined that 11 archaeological reports include the project site dating from 1975 (Fredrickson 1975, 1977, 1978a-b; Fredrickson et al. 1978; Origer and Fredrickson 1979; Peri et al. 1978; Stillinger and Fredrickson 1978; Peak & Associates 1981; and, Flaherty et al. 2010). One report is an overview of Mendocino and Lake counties that partially covers the project site (see Werner 1981).

The majority of the reports appear to cover the initial permitting and subsequent studies to allow development between 1975-1981 for the geothermal project which started geothermal power generation in early 1985. Flaherty et al. (2010) completed an updated study associated with a restart and the installation of various improvements to the geothermal resource. The report provides an detailed overview of the past archaeological research and field studies and discusses the previous findings in regard to cultural resources and well as provides updated field reviews and testing in regard to recorded cultural resources..

Four recorded resources (P-17-000549/CA-LAK-608, P-17-000550/CA-LA-609H, P-17-000551/CA-LAK-610, and P-17-000815/CA-LAK-974H) are within or adjacent to the proposed wells, pipeline alignments and suggested alternatives. Four resources (P-17-002589, P-17-003985, P-17-002592 and P-17-000822/CA-LAK-989) are in the vicinity of the proposed improvements.[1]

SITE DESCRIPTIONS AND EVALUATIONS

Resources include one prehistoric lithic scatter (CA-LAK-608); a prehistoric procurement site with an associated historic trash scatter (CA-LAK-609/H); a single use prehistoric site that was mitigated in 1981 and subsequently destroyed (CA-LAK-610); and, remaining portions of a small historic complex (CA-LAK-974H) that have been impacted over the past 40 years.

1. The resources are outside of the proposed improvements (1 near Point 2 and 3 near "Line") and will not be discussed (see Flaherty et al. 2010 for a review) [see Figs. 3-4].

The two sites with a prehistoric component (CA-LAK-608 and CA-LAK 609/H) appear eligible for the NRHP/CRHR under Criterion D/4. The historic component at CA-LAK-609/H representing a single secondary disposition of trash ca. 1920-1929 does not appear eligible under any of the NRHP/CRHR. CA-LAK-610 was destroyed after data recovery mitigation in 1981. The historic component representing a single secondary disposition of trash ca. 1920-1929 at CA-LAK-609/H does not appear eligible under any of the NRHP/CRHR criteria. CA-LAK-974H, a small former historic agricultural complex, was not evaluated during past archaeological studies but impacts over the 40 years appear to have resulted in integrity issues.

CA-LAK-608 (P-17-000549) - a dense, spatially confined scatter of obsidian flakes and artifacts located on a slightly sloping hillside above High Valley Creek. The resource is a prehistorically recent archaeological deposit exhibiting a dense scattering of obsidian flakes and artifacts on the surface to approximately 20 centimeters. The primary cultural material is Mt. Konocti obsidian that occurs in more than sufficient quantity to conduct a statistically viable lithic analysis. Further, obsidian studies are possible beyond that which we have conducted. We examined lithic materials to form a preliminary assessment that it represents primarily stone tool manufacturing and repair debris. The absence of non-chipped stone material relating to subsistence activities argues against the deposit representing a seasonal or temporary campsite. In our opinion, the archaeological site represents a limited range of human behavior over a span of time representing perhaps one thousand years.

> CA-LAK-608 (P-17-000549) has yielded sufficient information to make it eligible for the NRHP under Criterion D (and likely Criterion 4 for the CRHP) (see Flaherty et al. 2010:56).

CA-LAK-609/H (P-17-000550) - site adjacent to the existing road. Single purpose prehistoric site probably focused on resource procurement due to lack of extensive chipping waste, 70 cm thick cultural deposit; possible use over last 500-2000 years based on obsidian hydration measurements. Historic component is a surface trash scatter that was incorporated into the site and represents a single episode of the secondary disposal of cultural materials from a small farm or household ca. 1920-1929.

Flaherty et al. (2010) conducted a reassessment of the resource and redefined the previous boundary:

> We were uncomfortable redefining the eastern boundary of CA-LAK-609 based on a surface assessment and we therefore conducted an Extended Phase 1 study at CA-LAK-609H consisting of 18 STPs 25 cm in diameter and 20 cm to 30 cm deep placed in a line along the archaeological site's eastern boundary just west of the existing steam pipeline.
>
> CA-LAK-609H is bisected by the existing paved road to the Bottle Rock Power Plant (Note at southern termination of current project) and the existing steam pipeline from the Franciscan Well to the plant. It appeared that that portion of CA-LAK-609 bisected by the pipeline and road was destroyed after 1981 since we observed no cultural material east of the steam pipeline. We excavated a line of 18 STPs just east of the existing steam line and found no cultural materials and when we investigated ASI-BRP-2 just east of the STPs, we found a single obsidian flake. Based on our investigation, <u>we have established a new boundary for CA-LAK- 609H, west of the</u> (existing) <u>steam pipeline</u> (Note – current map by BASIN (see Figs3-4) shows what we believe to the be the current boundary –

> west boundary is adjacent to existing dirt road leading to power plant at south end of current project site).
>
> The nearest existing project feature to CA-LAK-609 is the existing steam pipeline to the Bottle Rock Power Plant located approximately 12 m to the east. The existing road to the Bottle Rock Power Plant is east of the steam pipeline. There is no plan to enhance the road to the power plant. The possible construction of a new steam line from the Franciscan pad to the Bottle Rock Power Plant has been proposed for some time in the future. The new steam line to the Bottle Rock Power Plant, if constructed would be immediately adjacent or directly on top of the existing pipeline but regardless of placement, it would require construction of new footings.
>
> *CA-LAK-609/H* (P-17-000550) - Prehistoric component appears eligible under Criterion D/Criterion 4 for NRHP and CRHP. Historic component not evaluated but does not appear eligible under any of the NRHP/CRHR criteria.

CA-LAK-610 (P-17-000551) - single use prehistoric site with a ca. 70 cm thick cultural deposit with age estimated at 2000-500 years based on obsidian hydration. Site interpreted as resource procurement and possible hunting. Subject to data recovery as mitigation in 1981 (see Peak & Associates 1981) and subsequently destroyed by geothermal plant access road and plant berm. Site was reviewed by Flaherty et al. 2010:

> We inspected the recorded location of CA-LAK-610 several times between February and May 2010 and found no evidence for the archaeological site. We noted that the Bottle Rock Power Plant had been constructed approximately 30 m to the south and its main access road had been constructed through the eastern part CA-LAK-610. The steam pipeline connected to the north end of the plant transects through the archaeological site. Extensive evidence grading and filling within CA-LAK-610 has occurred and the archaeological site was probably destroyed ca. 1980-1981.
>
> *CA-LAK-610* (P-17-000551) – No further management required. Site was mitigated and then destroyed during subsequent facility construction.

CA-LAK-974H/P-17-000815 - Stillinger and Fredrickson (1978) found that this location, the James Coleman homestead, exhibited historical activity including a picnic area with tables and a fire pit, remains of a small wooden structure, a depression representing a possible structure (homestead?), an apple orchard with six trees, and two improved natural springs. The historic complex not formally evaluated by Stillinger and Fredrickson (1978) and it appears to have been damaged over the past 40 years.

Flaherty et al. (2010) noted:

> This archaeological site is transected north to south by a paved utility road and a modern picnic area occupies an older picnic grounds. The Bottle Rock project construction office is 40 m northwest of the recorded archaeological site boundary. There are several utility structures immediately south of the archaeological site. The steam pipeline from the Franciscan Well to the Bottle Rock Power Plant is approximately 45 m to the northwest across High Valley Creek. In our opinion, use of a portion of this archaeological site as a picnic ground will continue and given its location and topographically near level condition, it will undoubtedly continue to be used for various purposes that could damage

the small remaining intact part of the archaeological site. The only 'archaeological' part of the recorded archaeological site includes the apple trees and a possible former structure location at the far western end and this is outside of the APE but the boundary as described in 1978 extends therein.

FIELD REVIEW

Mr. Christopher Canzonieri (MA, RPA), escorted by Mr. Tyson Stoddard (Open Mountain Energy), completed a field inventory for the proposed well locations and associated water lines on August 27, 2024. There are four proposed well locations (Points 2, 3, 4, and 5), three suggested alternatives, and four proposed water lines (Line, Line 1, Line 2, Line 3, and an optional water line to suggested Alternate 1. The existing water lines are installed on the surface. The proposed water lines will parallel the existing above-ground steam lines and roads where possible.

All well (point) locations are along High Valley Road. Vegetation is seasonal grasses, Manzanita, oak, and pine trees. Overall visibility was poor to fair, with approximately 25-50% of the surface observable.

The well locations were primarily covered in short-season grasses, while the proposed pipelines passes through Manzanita, pines, and oak chaparrals with dense leaf duff and seasonal grasses. An approximate 100 x 100 foot area was surveyed around each well location. Transects were oriented north to south or east to west and spaced approximately 3 meters apart. The pipeline alignments were reviewed using a 25-foot wide right of way where possible since they were adjacent to existing pipelines and unimproved roads. Mr. Stoddard assisted in relocating the previously recorded prehistoric and historic resources.

Proposed Wells [see Figs. 3-5]

Point 2 is the westernmost well, located on the north side of the road within an open field [Fig. 6]. Surface visibility was poor to fair, with approximately 25-50% of the surface observable. Sediment is a grayish-brown clayey loam with angular rock. No cultural materials observed.

Point 3, just east of Point 2, is located on the north side of the road within an open field [Fig. 7.]. Surface visibility was poor to fair, with approximately 25-50% of the surface observable. Sediment is a grayish-brown clayey loam with angular rock. There is an earthen catch basin present to the north. No cultural materials observed..

Point 4 is located on the north side of the road along a gravel access road at the west end of the Franciscan Well Pad [Fig. 8]. The proposed well is within the gravel driveway that slopes upward from High Valley Road to the pad. No cultural materials observed.

Point 5 is west of the site boundary of P-17-000549, an obsidian lithic scatter measuring 45m^2 (see Flaherty et al. 2010) [Figs. 9-11]. Surface visibility was good, with 50% of the surface observable, consisting of short-season grasses and gravel. No cultural material observed at Point 5.

Suggested Alternate Wells [see Figs. 3-5]

Suggested Alternate 1 is located on the north side of High Valley Road, just east of the security gate into the facility. Surface visibility was good, with approximately 50% of the ground visible. Sediment is a grayish-brown clayey loam with angular rock. No cultural materials observed.

Suggested Alternate 2 is located in the northeast corner of the Wellfield Laydown area, on the south side of High Valley Road. The proposed area is covered in gravel. The south side of the proposed area has a series of large concrete blocks and cable fencing protecting the creek. No cultural material observed.

Suggested Alternate 3 is located on the southwest corner of High Valley Road and the road to the south that leads to the geothermal energy facility. Visibility was fair to good, with approximately 50-75% of the surface observable. The area has short seasonal grasses and gravels. A steam line is located immediately adjacent. No cultural materials observed.

Proposed Water Lines [see Figs. 3-5 for locations]

Line

The line extends north from the west side of the Energy Facility, paralleling the road towards High Valley Road to Suggested Alternate Well 3. The line then trends northwest along High Valley Road before turning north (near Point 5) and then west on the north side of the Franciscan Well Pad to Points 4 to 2 where it will terminate at Point 2 [see Figs 6-9, 13-16].

This alignment is adjacent to the southwest boundary of P-17-000550 and is adjacent to the western boundary of P-17-000549 at the Francisco Well Pad. The proposed water pipe alignment follows the existing steam line from the Energy Facility to High Valley Road.

No cultural materials observed adjacent to the Line, the Energy Facility access road, the east, north and western borders of the Francisco Well Pad and along the north side of High Valley Road to Points 2-4.

Line 1

Line 1 extends north from the east side of the Energy Facility, following the existing steam line and passes through P-17-000551, a previously mitigated site (see Flaherty et al. 2010. Line 1 crosses the access road to Energy Facility ties into Line. No cultural materials observed adjacent to the steam line and the road.

Line 2 and Line 3

Lines 2 and Line 3 connect to the Line leading to the Energy Facility. Line 2 has three points of connection at and near the Francisco Well Pad. Point 4 will trend south and east along the perimeter of the Wellfield Office Laydown Yard. At the southeastern corner it may be joined by a short pipeline from Suggested Alternate 2 and/or another short pipeline segment from Point 5 along the eastern boundary of the Francisco Wall Pad. At the connection, Line 2 will trend southeast to join with Line 3 [Figs. 8-9, 12, 17-19].

Line 2 passes through the recorded site boundary of P-17-000815, the historic James Coleman homestead. The field review of the proposed alignment indicates that the proposed water line will not impact any of the cultural resources within the site boundary.

Line 3 will follow an existing unimproved road to connect with Line. P-17-000550 is located to the north, and P-17-002965 is to the south. Line 3 will not impact any resources.

Line to Suggested Alternate 1Well

A short pipeline segment extends from Line just south of Suggested Alternate 3 well location to the Suggested Alternate 1 well location on the north side of High Valley Road, just east of the security gate into the facility [Figs. 13-14]. The line follows existing roads. No cultural material observed.

Field Review Findings

The field review of the proposed well location and water lines, found no cultural resources either at the well locations (100x100 foot area) or pipeline alignments (25-foot wide right of way). Many of the proposed alignments will follow existing roads and installed steam lines. They will have no impact on existing cultural resources even though Line 2 passes through P-17-00815 while Line is adjacent to P-17-000550 and P-17-000549 as is Point 5 at the Francisco Well Pad. No new cultural resources were found and documented.

FINDINGS

This document was completed to identify cultural resources that might be affected by the proposed installation of new water wells and water pipelines to supply water to an existing geothermal energy facility.

- The CHRIS/NWIC records search has 11 eleven archaeological reports on file for the project site. The reports were generally completed during the initial preparation for facility operation (1975-1981) with an updated overview completed in 2010.
- Four recorded resources are present in the current project area within or adjacent to the proposed wells, pipeline alignments and suggested alternatives. The sites include: one prehistoric lithic scatter (CA-LAK-608/P-17-000549); a prehistoric procurement site with an associated historic trash scatter (CA-LAK-609/H/P-17-000550); a single use prehistoric site (CA-LAK-610/P-17-000551) that was mitigated in 1981 and subsequently destroyed; and, remaining portions of a small historic complex (CA-LAK-974H/P-17-000815) that have been impacted over the past 40 years.
- The field inventory of the proposed water wells, suggested alternates and water pipeline alignments did not note any archaeological materials or result in the discovery of unknown cultural resources.
- No <u>listed</u> NRHP and/or CRHP resources are located within the project.
- The two sites with a prehistoric component (CA-LAK-608 and CA-LAK 609/H) have been evaluated as eligible for the NRHP/CRHR under Criterion D/4. The historic component at CA-LAK-609/H representing a single secondary disposition of trash ca.

1920-1929 does not appear eligible under any of the NRHP/CRHR. CA-LAK-610 was destroyed after data recovery mitigation in 1981. CA-LAK-974H, a small former historic agricultural complex, was not evaluated during past archaeological studies but impacts over the 40 years appear to have resulted in integrity issues.

- No other significant or potentially significant local, state or federal cultural resources/historic properties, landmarks, points of interest, etc. have been identified within the project.
- The installation of new water wells and water pipelines to supply water to an existing geothermal energy facility appears to have a low sensitivity for the discovery of prehistoric or historic archaeological resources based on the available archival data, prior construction impacts and the field inventory completed for the current project. The proposed new water wells and water pipelines

MANAGEMENT RECOMMENDATIONS

The proposed installation of new water wells and water pipelines to supply water to an existing geothermal energy facility can proceed as planned as they will not affect any historic properties or unique archaeological resources as designed.

The proposed new water wells and water pipelines, except for the section of Line 2 [see Figs. 3-4] passing through CA-LA-974H avoid the recorded cultural resources. However, the section of Line 2 section passing through CA-LAK-974H, an unevaluated historic archaeological site, will not have impact any of the qualities that could make the resource eligible for either the NRHP or CRHP under Criterion D as the data indicate that they are outside of the alignment to the west.

No subsurface testing for buried archaeological resources appears necessary based on the information from previous archaeological studies, the current negative field inventory and the proposed installation within or adjacent to existing pipelines and road alignments within the facility.

Two actions are recommended for archaeological resources protection during construction. *Worker Awareness Training* is recommended for construction personnel associated with ground disturbing construction and installation of exclusionary fencing is recommended at two locations. The following post-review protection measures are recommended.

(a) ***Plan Set Note for Cultural Resources*** - the project proponent shall note on any plans that require ground disturbing excavation that there is a potential for affecting buried cultural resources.

(b) ***Worker Awareness Training*** (WAT) - a Professional Archaeologist meeting the Standards of the Secretary of the Interior shall conduct WAT for cultural resources prior to the start of ground disturbing construction.

Training shall be required for all construction personnel participating in ground disturbing construction to alert them to the archaeological sensitivity of the project area and provide protocols to follow in the event of a discovery of archaeological materials.

The Professional Archaeologist shall develop and distribute for posting at the job site, an ALERT SHEET summarizing potential finds that could be exposed and the protocols to be followed as well as points of contact to alert in the event of a discovery.

(c) ***Exclusion Fencing*** - installation of temporary exclusion fencing is recommended along the southern and western boundary of CA-LAK-608 near Point 5 and Line at the Francisco Well Pad; and, (2) along eastern boundary of CA-LAK-609/H near the southern boundary near Line for approximately 150-200 feet where the site boundary is in the immediate vicinity of the proposed alignment.. The fencing shall be installed under the direction of a Professional Archaeologist prior to construction who shall use best professional practices and discretion to protect the known resources.

(d) ***Archaeologist On-Call*** - the project proponent shall retain a Professional Archaeologist on an "on-call" basis during ground disturbing construction for other areas of the project site to review, identify and evaluate cultural resources that may be inadvertently exposed during construction. The archaeologist shall review and evaluate any discoveries to determine if they are historical resource(s) and/or unique archaeological resources under the California Environmental Quality Act (CEQA).

(e) ***Cultural Resources Exposed During Construction*** - if the Professional Archaeologist determines that any cultural resources exposed during construction constitute a historical resource and/or unique archaeological resource under CEQA, he/she shall notify the project proponent and other appropriate parties of the evaluation and recommend mitigation measures to mitigate to a less-than significant impact in accordance with California Public Resources Code Section 15064.5. Mitigation measures may include avoidance, preservation in-place, recordation, additional archaeological testing and data recovery among other options. The completion of a formal *Archaeological Monitoring Plan* (AMP) and/or *Archaeological Treatment Plan* (ATP) that may include data recovery may be recommended by the Professional Archaeologist if significant archaeological deposits are exposed during ground disturbing construction. Development and implementation of the AMP and ATP and treatment of significant cultural resources will be determined by the project proponent in consultation with any regulatory agencies.

(f) ***Native American Ancestral Remains*** - state law shall be followed in regard to the discovery of Native American burials (Chapter 1492, Section 7050.5 to the Health and Safety Code, Sections 5097.94, 5097.98 and 5097.99 of the Public Resources Code). This shall include immediate notification of the appropriate county Coroner/Medical Examiner and the project proponent.

REFERENCES

California (State of), Department of Parks and Recreation, Office of Historic Preservation (**CAL/OHP**)

1973 The California History Plan, Volume One - Comprehensive Preservation Program. Volume Two - Inventory of Historic Features.

1976 California Inventory of Historic Resources.

1988 Five Views: An Ethnic Sites Survey for California.

2023 *Archeological Determinations of Eligibility* for Lake County. Viewed as part of CHRIS/NWIC File No. 22-1451.

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1975 An Archaeological Reconnaissance of the High Valley Creek Area, Lake County, California. MS on file, S-000146, CHRIS/NWIC, Sonoma State University Rohnert Park.

1977 An Archaeological Survey of a Union Oil Company Geothermal Leasehold near Geyser Rock, Lake and Sonoma Counties, California. MS on file, S-000631, CHRIS/NWIC, Sonoma State University Rohnert Park.

1978a Cultural Resources Portions for the Notice of Intent for the Geothermal Power Plant Site High Valley Creek, Francisco Unit Leasehold of the Geysers Region, Lake County, California. MS on file, S-001223c, CHRIS/NWIC, Sonoma State University Rohnert Park.

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1979 Archaeological Investigations at CA-LAK-609 and CA-LAK-610, High Valley, Lake County, California. MS on file, S-001515, CHRIS/NWIC, Sonoma State University Rohnert Park.

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1978 Ethnographic and Historical Survey of the Francisco Unit Leasehold High Valley Creek Lake County, California. MS on file, S-001223a, CHRIS/NWIC, Sonoma State University Rohnert Park.

Stillinger, Robert A. and David A. Fredrickson
1978 A Historic Properties Survey of the Francisco Unit Leasehold, High Valley Creek, Lake County, California. MS on file, S-001223b, CHRIS/NWIC, Sonoma State University Rohnert Park.

United States Department of the Interior, National Register of Historical Places, National Park Service **(USNPS)**
2024 NRHP [National Register of Historic Places] Spreadsheet listings = listed properties; National Historic Landmarks (NHLs), Multiple Property Cover Documents current to 8/01/2023. Web, accessed 10/03/2024.

United States Department of Interior, Geological Survey **(USGS)**
1975 The Geysers, Calif. [Quadrangle]. Topographic, 7.5 minute series.

Werner, Roger H.
1981 Archaeological Overview of Mendocino and Lake Counties. MS on file, S-002458b, CHRIS/NWIC, Sonoma State University Rohnert Park.

CHRIS/NWIC, Sonoma State University, Rohnert Park is used for material on file at the California Historical Resources Information System, Northwest Information Center, Sonoma State University, Rohnert Park.

ATTACHMENTS

FIGURES

FIGURE 1	General Project Location (ESRI World Street Map)
FIGURE 2	Project Location T11N R8W Sections 5 and 6 (USGS The Geysers, Calif. 1975)
FIGURE 3	Project Alignments and Well Locations with Cultural Resources (USGS National Map)
FIGURE 4	Aerial View of Project Alignments and Well Locations with Cultural Resources and Photo View Locations
FIGURE 5	Project with Cultural Resources - Detail View of P-17-000815/LAK-974H and P-17-000550/LAK-609/H
FIGURE 6	Point 2 – view north
FIGURE 7	Point 3 – view north
FIGURE 8	Point 4 – view east
FIGURE 9	Point 5 – view north from High Valley Road
FIGURE 10	P-17-000549 – view east with High Valley Road to right
FIGURE 11	Obsidian flakes within P-17-000549
FIGURE 12	Alternate 2 – view south from High Valley Road
FIGURE 13	Alternate 3 – view west with High Valley Road to right
FIGURE 14	Alternate 1 – view northeast from High Valley Road
FIGURE 15	Line – view north between the steam line and road
FIGURE 16	Line – view north between the steam line and road (upslope)
FIGURE 17	View north along Lines 2 and 3 (road) and existing Water Well No.1 (WW-1)
FIGURE 18	View west along Line 2, just north of the P-17-000815 site boundary
FIGURE 19	View east along Line 2 on the south side of the Wellfield Office Laydown Yard

CHRIS/NWIC SEARCH RESULTS

SEARCH	CHRIS/NWIC File No. 23-0762. Dated 12/07/2023 (No Confidential Information)

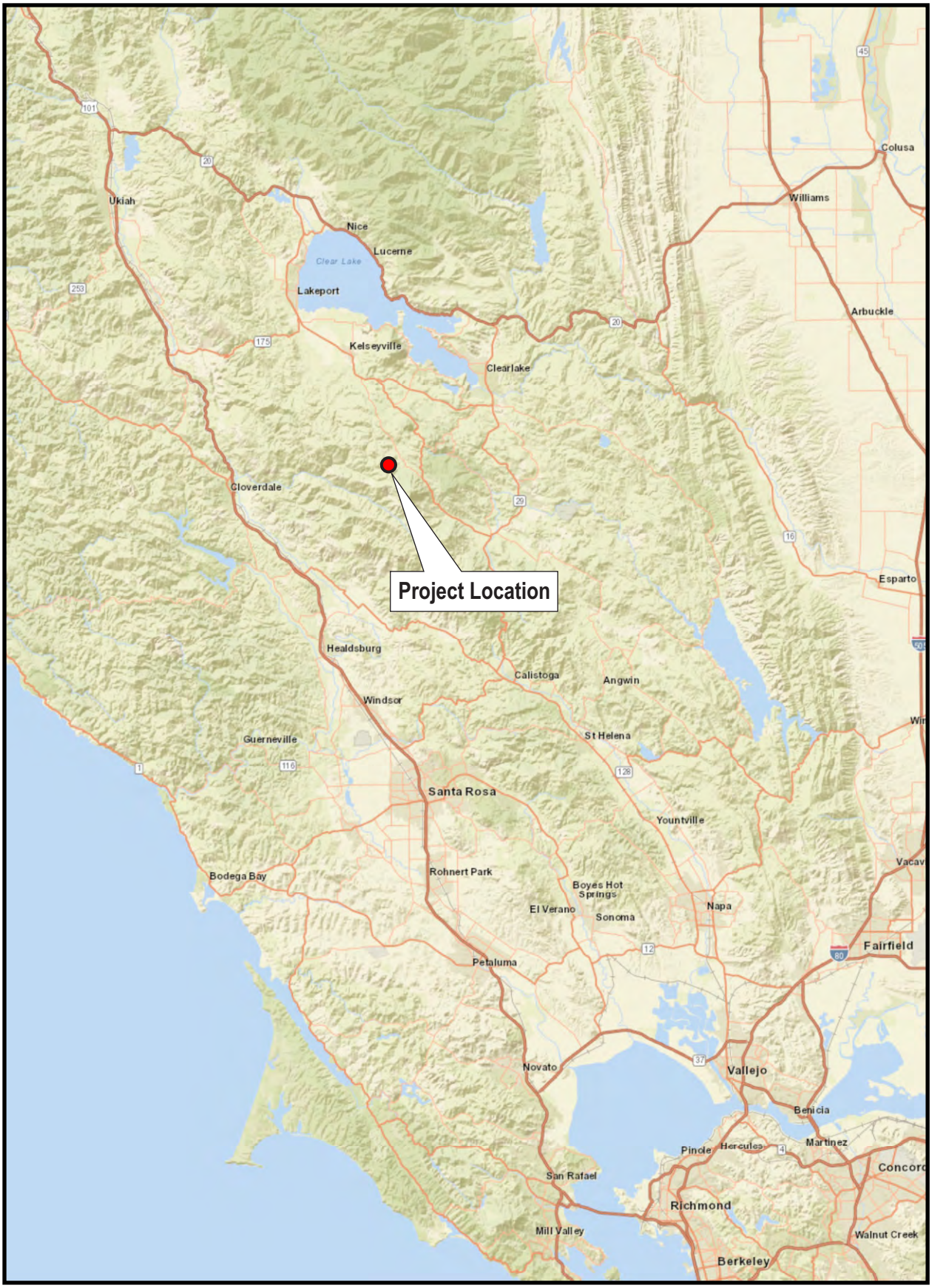

Figure 1: General Project Location (ESRI World Street Map)

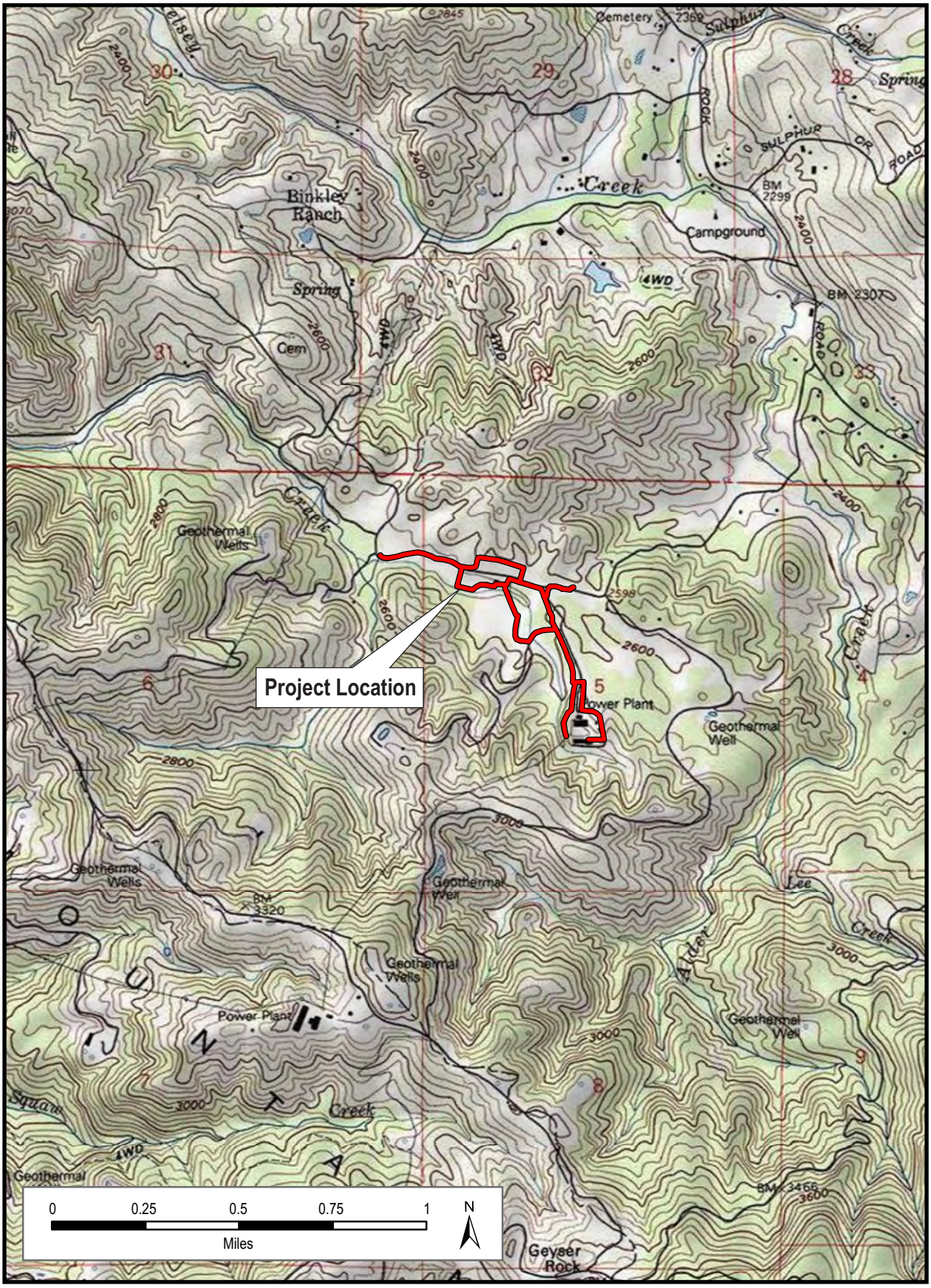

Figure 2: Project Location T11N R8W Sections 5 and 6 (USGS The Geysers, Calif. 1975)

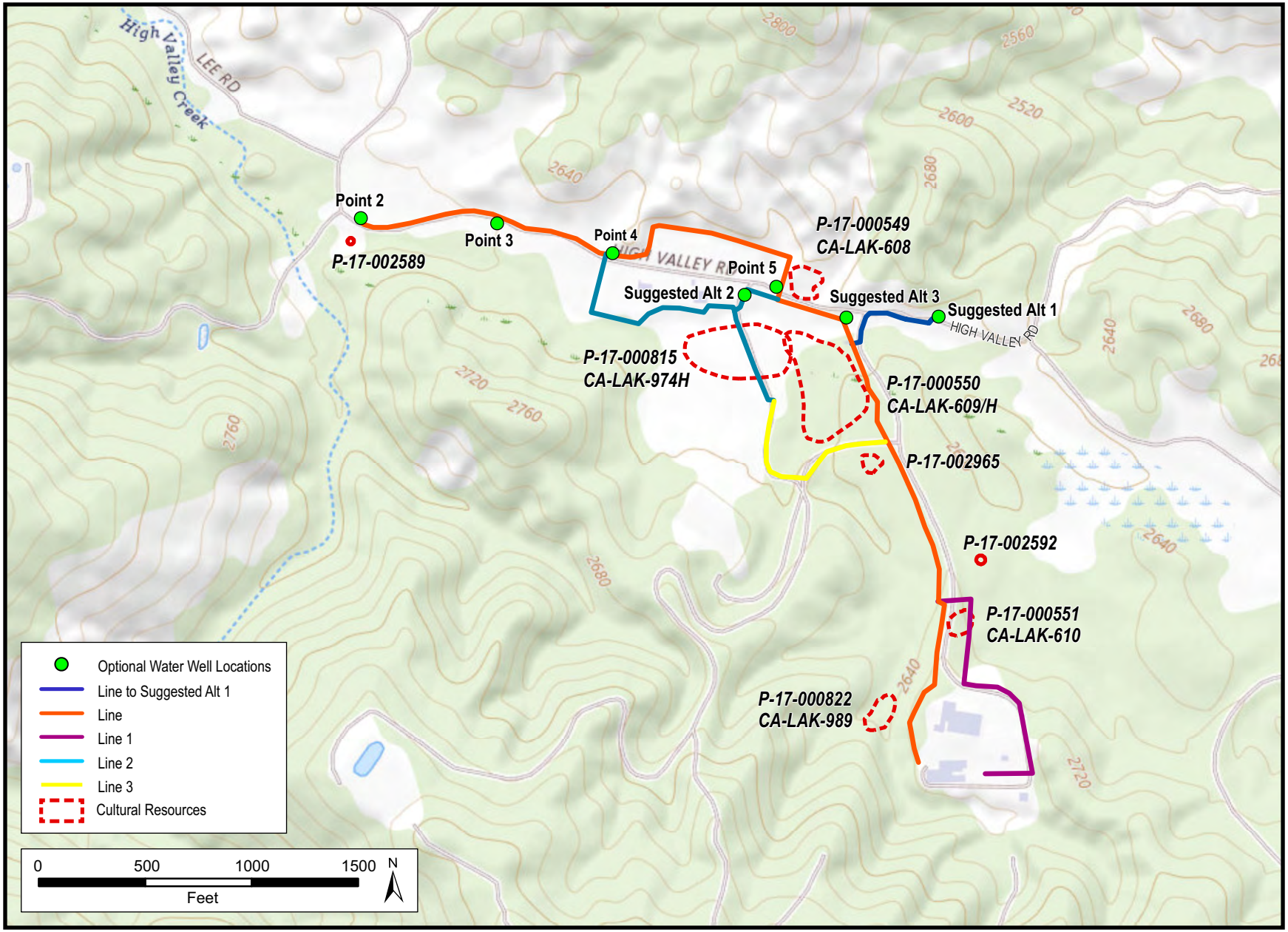

Figure 3: Project Alignments and Well Locations with Cultural Resources (USGS National Map)

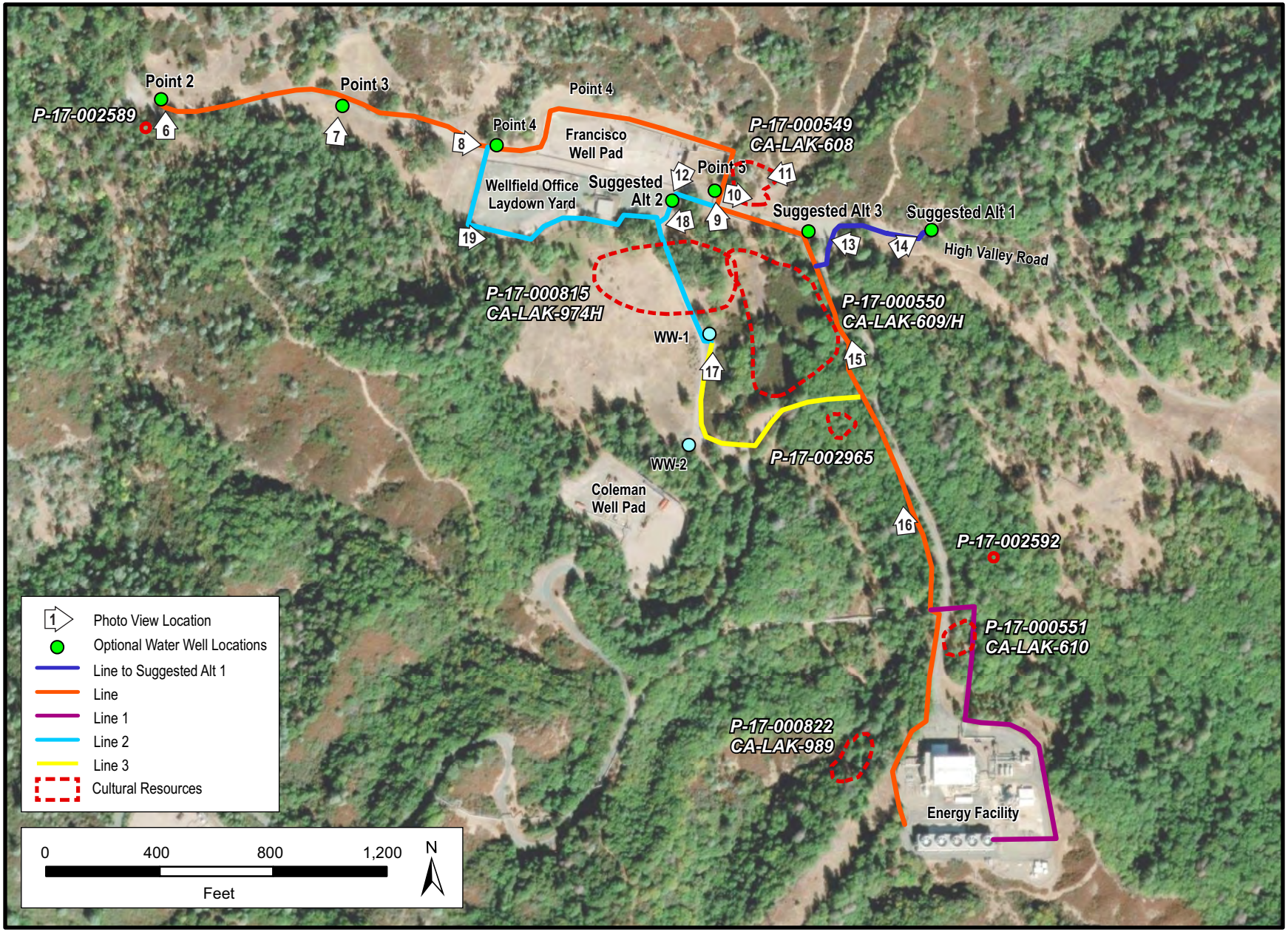

Figure 4: Aerial View of Project Alignments and Well Locations with Cultural Resources and Photo View Locations

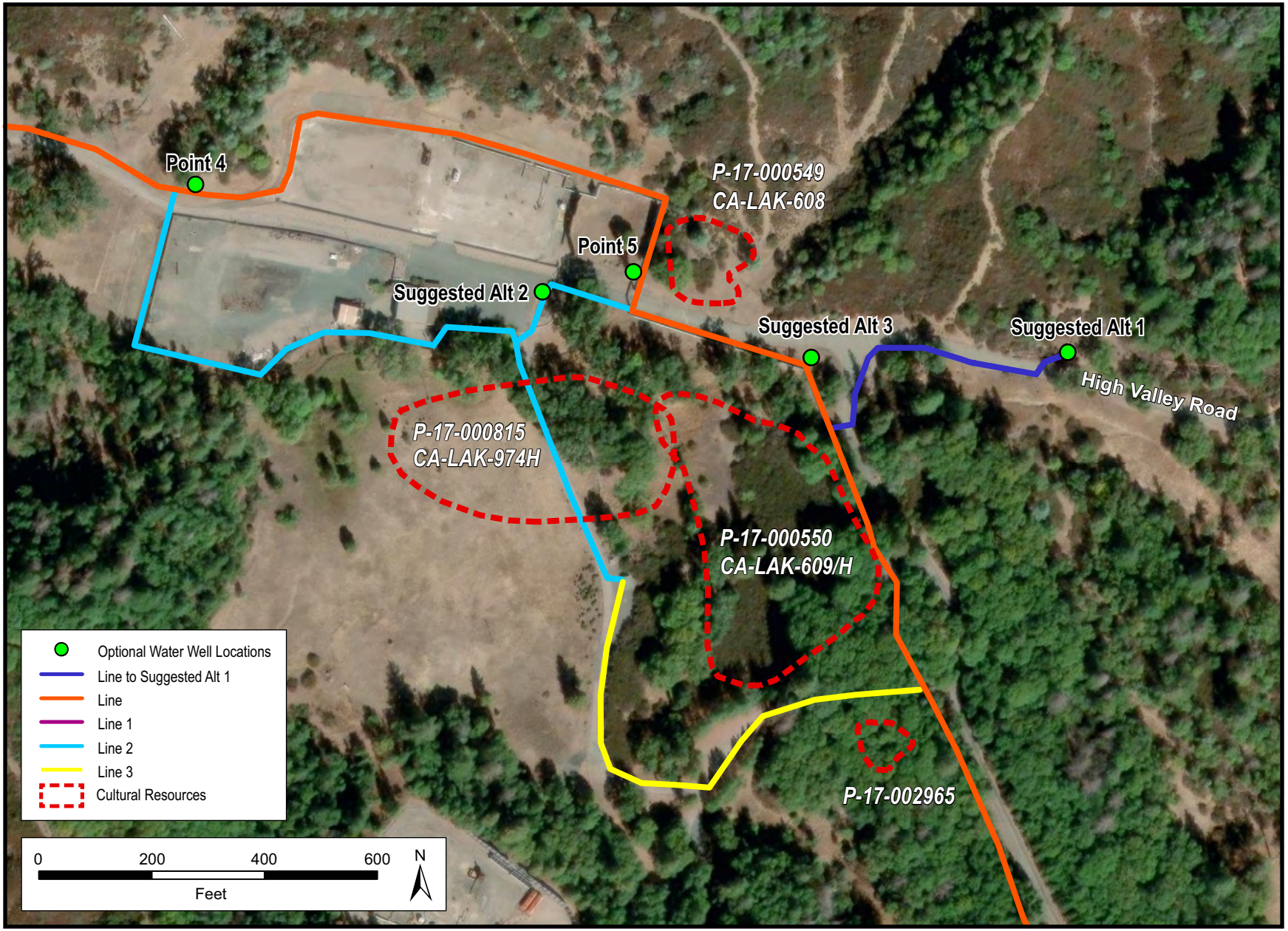

Figure 5: Project with Cultural Resources - Detail View of P-17-000815/CA-LAK-974H and P-17-000550/CA-LAK-609/H

Figure 6: Point 2 – view north

Figure 7: Point 3 – view north

Figure 8: Point 4 – view east

Figure 9: Point 5 – view north from High Valley Road

Figure 10: P-17-000549 – view east with High Valley Road to right

Figure 11: Obsidian flakes within P-17-000549

Figure 12: Alternate 2 – view south from High Valley Road

Figure 13: Alternate 3 – view west with High Valley Road to right

Figure 14: Alternate 1 – view northeast from High Valley Road

Figure 15: Line – view north between the steam line and road

Figure 16: Line – view north between the steam line and road (upslope)

Figure 17: View north along Lines 2 and 3 (road) and existing Water Well No.1 (WW-1)

Figure 18: View west along Line 2, just north of the P-17-000815 site boundary

Figure 19: View east along Line 2 on the south side of the Wellfield Office Laydown Yard

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM

ALAMEDA, COLUSA, CONTRA COSTA, DEL NORTE, HUMBOLDT, LAKE, MARIN, MENDOCINO, MONTEREY, NAPA, SAN BENITO, SAN FRANCISCO, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, SONOMA, YOLO

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3/23/2023 NWIC File No.: 22-1451

Donna M. Garaventa
Basin Research Associates
1933 Davis Street, Suite 214
San Leandro, CA 94577

Re: Mayacma Geothermal

The Northwest Information Center received your record search request for the project area referenced above, located on the The Geysers USGS 7.5' quad(s). The following reflects the results of the records search for the project area and a ¼ mile radius:

Resources within project area:	P-17-000822
Resources within ¼ mile radius:	P-17-000549; P-17-000550; P-17-000551; P-17-000815; P-17-002592; P-17-002965
Reports within project area:	S-000146; S-001223; S-038748
Reports within ¼ mile radius:	S-000042; S-000631; S-001277; S-001515; S-001881; S-002131; S-002480; S-006299; S-006302; S-047663

Resource Database Printout (list):	☒ enclosed	☐ not requested	☐ nothing listed
Resource Database Printout (details):	☒ enclosed	☐ not requested	☐ nothing listed
Resource Digital Database Records:	☐ enclosed	☒ not requested	☐ nothing listed
Report Database Printout (list):	☒ enclosed	☐ not requested	☐ nothing listed
Report Database Printout (details):	☒ enclosed	☐ not requested	☐ nothing listed
Report Digital Database Records:	☐ enclosed	☒ not requested	☐ nothing listed
Resource Record Copies:	☐ enclosed	☒ not requested	☐ nothing listed
Report Copies:	☐ enclosed	☒ not requested	☐ nothing listed
OHP Built Environment Resources Directory:	☐ enclosed	☐ not requested	☒ nothing listed
Archaeological Determinations of Eligibility:	☐ enclosed	☐ not requested	☒ nothing listed
CA Inventory of Historic Resources (1976):	☐ enclosed	☒ not requested	☐ nothing listed
Caltrans Bridge Survey:	☐ enclosed	☒ not requested	☐ nothing listed
Ethnographic Information:	☐ enclosed	☒ not requested	☐ nothing listed
Historical Literature:	☐ enclosed	☒ not requested	☐ nothing listed
Historical Maps:	☐ enclosed	☒ not requested	☐ nothing listed
Local Inventories:	☐ enclosed	☒ not requested	☐ nothing listed

GLO and/or Rancho Plat Maps:	☐ enclosed	☒ not requested	☐ nothing listed
Shipwreck Inventory:	☐ enclosed	☒ not requested	☐ nothing listed
Soil Survey Maps:	☐ enclosed	☒ not requested	☐ nothing listed

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you do not include resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at the phone number listed above.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Requests made after initial invoicing will result in the preparation of a separate invoice.

Thank you for using the California Historical Resources Information System (CHRIS).

Sincerely,

Justin Murazzo
Researcher

Appendix E – Noise Technical Data

BOTTLE ROCK GEOTHERMAL POWER PROJECT (79-AFC-4)

NOISE TECHNICAL REPORT

DECEMBER 5, 2024

Prepared by:

RCH GROUP
planning & environmental consulting

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NOISE TECHNICAL REPORT

BOTTLE ROCK GEOTHERMAL POWER PROJECT (79-AFC-4)

INTRODUCTION

The Bottle Rock Power Plant (BRRP) was certified in November 1980 and began commercial operation in February 1985 by the California Energy Commission (CEC) as a 55 megawatt (MW) geothermal turbine-generator power plant in Lake County, CA. The BRRP ceased operation in 2015 due to inadequate equipment and geothermal capacity. The amended BRPP (the "project") will be operated by Mayacma Geothermal, LLC under the terms of the lease agreement and asset purchase agreement between Bottle Rock Power, LLC and Mayacma Geothermal, LLC.

The project includes the construction and operation of a 7.5 MW binary geothermal power plant within the approximately 6-acre BRPP site, located at 7385 High Valley Road, Cobb, California. The project will include use of existing geothermal wells, steam pipelines, and access roads operated and maintained under the jurisdiction of Lake County. The project would involve installation of two organic Rankine cycle (ORC) binary power generation units, a sound attenuation enclosure that would house the ORC units, a control building, and other ancillary improvements (new pipeline segments, switchgear, electrical line, etc.).

This report provides an overview of existing noise levels measured at the project site, local noise regulatory framework, and an analysis of potential noise impacts that would result from implementation of the project. This report is prepared in a format to answer the noise issues identified in Appendix G of the CEQA Guidelines.

CHECKLIST

Would the project result in:		Significant or Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less than Significant	No Impact
a)	Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b)	Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c)	For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

SETTING

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise is defined as unwanted sound. Sound pressure level has become the most common descriptor used to characterize the "loudness" of an ambient sound level. Sound pressure level is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain. Decibels are measured using different scales, and it has been found that A-weighting of sound levels best reflects the human ear's reduced sensitivity to low frequencies, and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. All references to decibels (dB) in this report will be A-weighted unless noted otherwise.

Several time-averaged scales represent noise environments and consequences of human activities. The most commonly used noise descriptors are the equivalent A–weighted sound level over a given time period (Leq)[1]; average day–night 24-hour average sound level (Ldn)[2] with a nighttime increase of 10 dB to account for sensitivity to noise during the nighttime; and community noise equivalent level (CNEL)[3], also a 24-hour average that includes both an evening and a nighttime sensitivity weighting. **Table 1** identifies decibel levels for common sounds heard in the

[1] The Equivalent Sound Level (Leq) is a single value of a constant sound level for the same measurement period duration, which has sound energy equal to the time–varying sound energy in the measurement period.

[2] Ldn is the day–night average sound level that is equal to the 24-hour A-weighted equivalent sound level with a 10-decibel penalty applied to night between 10:00 p.m. and 7:00 a.m.

[3] CNEL is the average A-weighted noise level during a 24-hour day, obtained by addition of 5 decibels in the evening from 7:00 to 10:00 p.m., and an addition of a 10–decibel penalty in the night between 10:00 p.m. and 7:00 a.m.

environment. With regard to increases in A-weighted noise level, the following relationships occur (Caltrans, 1998a):

- Under controlled conditions in an acoustics laboratory, the trained healthy human ear is able to discern changes in sound levels of 1 dB;
- Outside of such controlled conditions, the trained ear can detect changes of 2 dB in normal environmental noise;
- It is widely accepted that the average healthy ear, however, can barely perceive noise levels changes of 3 dB;
- A change in level of 5 dB is a readily perceptible increase in noise level; and
- A 10-dB change is recognized as twice as loud as the original source.

TABLE 1. TYPICAL NOISE LEVELS

Noise Level (dB)	Outdoor Activity	Indoor Activity
90+	Gas lawn mower at 3 feet, jet flyover at 1,000 feet	Rock Band
80-90	Diesel truck at 50 feet	Loud television at 3 feet
70-80	Gas lawn mower at 100 feet, noisy urban area	Garbage disposal at 3 feet, vacuum cleaner at 10 feet
60-70	Commercial area	
40-60	Quiet urban daytime, traffic at 300 feet	Large business office, dishwasher next room
20-40	Quiet rural, suburban nighttime	Concert hall (background), library, bedroom at night
10-20		Broadcast / recording studio
0	Lowest threshold of human hearing	Lowest threshold of human hearing

SOURCE: (modified from Caltrans Technical Noise Supplement, 1998)

NOISE ATTENUATION

Stationary point sources of noise, including construction equipment, attenuate (lessen) at a rate of 6 to 7.5 dB per doubling of distance from the source, depending on ground absorption. Soft sites attenuate at 7.5 dB per doubling because they have an absorptive ground surface such as soft dirt, grass, or scattered bushes and trees. Hard sites have reflective surfaces (e.g., parking lots or smooth bodies of water) and therefore have less attenuation (6.0 dB per doubling). A street or roadway with moving vehicles (known as a “line” source), would typically attenuate at a lower rate, approximately 3 to 4.5 dB each time the distance doubles from the source, that also depends on ground absorption (Caltrans, 1998b). Physical barriers located between a noise source and the noise receptor, such as berms or sound walls, would increase the attenuation that occurs by distance alone. Noise from large construction sites would have characteristics of both “point” and “line” sources, so attenuation would probably range between 4.5 and 7.5 dB per doubling of distance.

REGULATORY CONTEXT

Federal

There are no applicable federal noise requirements.

State

Title 24, Chapter 12, Section 1207 mandates that interior noise levels attributable to exterior sources shall not exceed 45 dB, Ldn or CNEL in any habitable room. These performance standards protect persons within new buildings which house people, including hotels, motels, dormitories, apartment houses and dwellings other than single-family dwellings.

Local

Lake County

Lake County General Plan

The goal of the Lake County General Plan Noise Element is "To protect County residents from the harmful exposure of excessive noise and prevent incompatible land uses from encroaching upon existing and planned land uses". The following presents guiding and implementing policies from the Lake County General Plan Noise Element (Lake County, 2008):

> Policy N-1.2: The County shall prohibit the development of new commercial, industrial, or other noise generating land uses adjacent to existing residential uses, and other sensitive noise receptors such as schools, health care facilities, and libraries if CNEL is expected to exceed 55 dBA during daytime (7 AM to 10 PM) or 45 dBA during nighttime (10 PM to 7 AM), measured at the property line of the noise sensitive land use, unless effective mitigation measures are incorporated into the project design.
>
> Policy N-1.3: Indoor noise levels for residential uses shall not exceed 45 dBA CNEL.

Lake County Performance Standards

Lake County Chapter 21, Article 41, Section 21-41, 41.11 Noise, establishes noise performance standards to promote compatibility among various land uses. The following are relevant to the project:

Maximum sound emissions for any use shall not exceed equivalent sound pressure levels in decibels, A-Weighted Scale, for any one (1) hour as stipulated in Table 11.1 (see **Table 2)**. These maximums are applicable beyond any property lines of the property containing the noise.

TABLE 2. MAXIMUM ONE-HOUR EQUIVALENT SOUND PRESSURE LEVELS (A-WEIGHTED-DBA)

Time of Day	Receiving Property Zoning District		
	Residential*	Commercial	Industrial
7 a.m. – 10 p.m.	55	60	65
10 p.m. – 7 a.m.	45	55	60

Source: Lake County Article 41, Section 21-41, Table 11.1
Notes:
*The Residential category also includes all agricultural and resource zoning districts.

Per Section 41.11 (e): Local noise standards set forth in this Section do not apply to the following situations and sources of noise provided standard, reasonable practices are being followed:

1. Emergency equipment operated on an irregular or unscheduled basis.

2. Warning devices operated continuously for no more than five (5) minutes.

3. Bells, chimes, or carillons.

4. Non-electronically amplified sounds at sporting, amusement, and entertainment events.

5. Construction site sounds between 7:00 a.m. and 7:00 p.m.

6. Lawn and plant care machinery fitted with correctly functioning sound suppression equipment and operated between 7:00 am and 8:00 pm.

7. Aircraft when subject to federal or state regulations.

8. Agricultural equipment when operated on property zoned for agricultural activities.

Maximum sound emissions for any use shall not exceed equivalent sound pressure levels in decibels, A-Weighted Scale, for any one (1) hour as stipulated in Table 11.1 (see **Table 2)**. These maximums are applicable beyond any property lines of the property containing the noise.

Conditions of Certification

In December 2013, the CEC approved a petition amending the conditions of certification for the BRRP. The project site is subject to the approved Conditions of Certification (COCs) 16-1 through 16-3 (Noise). Modifications are shown in ~~strikethrough~~ and underline below to reflect the changes in the amended BRPP noise surveys. No additional noise COCs are necessary.

16-1. Project owner shall comply with Lake County's noise ordinance, which is 55 dBA Ld[4] and 45 dBA Ln[5] at any point beyond the property line of the source. In the event the Lake County or the project owner receives public complaints of any noise, project owner and Lake County (if

[4] Ld (or Lday) is the A-weighted, Leq over the 12-hour day period (07:00-19:00).
[5] Ln (or Lnight) is the A-weighted, Leq over the 8-hour night period (23:00 to 07:00).

requested by the complainant) agree to promptly conduct and investigation to determine the extent of the problem. Project owner shall take reasonable measures to resolve the complaints.

Protocol: Within 10 days of a request by Lake County or the CEC CPM, project owner shall conduct noise surveys at the sensitive receptors registering complaints and at the facility property line nearest the complaining receptors. Surveys shall be conducted, when possible, under circumstances similar to those when the complaints were perceived. The survey should be reported in terms of hourly Leq and hourly Lx~~z~~[6] at levels x=10, 50, and 90.

Verification: Project owner shall promptly forward to Lake County the survey results, the mitigation measures applied to resolve the problem and the results of these efforts. Lake County shall advise the CEC CPM of any continuing noncompliance conditions.

16-2. Within 90 days after the plant reaches its rated power generation capacity and construction is complete, the project owner shall conduct a noise survey at 500 feet from the generating station or at a point acceptable to ~~DWR,~~ CEC CPM~~,~~ and Lake County. The survey will cover a 24 hour period with results reported in terms of hourly Lx (x= 10, 50, and 90), hourly Leq~~Z~~ and Ldn levels.

The project owner shall prepare a report of the survey that will be used to determine the plant's conformance with county standards. In the event that county standards are being exceeded, the report shall also contain a mitigation plan and a schedule to correct the noncompliance. No additional noise surveys of off-site operational noise are required unless the public registers complaints or the noise from the project is suspected of increasing due to a change in the operation of the facility.

Verification: Within 30 days of the noise survey the project owner shall submit its report to Lake County.

16-3. Within 90 days after the start of commercial operation, the project owner shall prepare a noise survey report for the hazardous areas in the facility. The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, CCR, Article 105. The survey results will be used to determine the magnitude of employee noise exposure. If employee complaints of excessive noise arise during the life of the project, CAL/DOSH, Department of Industrial Relations shall make a compliance determination.

Verification: The project owner shall notify CAL/DOSH and the CEC CPM of the availability of the report.

[6] Lx is the percentile noise level where ‘x’ is between 0.01 and 99.9% of the time, calculated by statistical analysis and usually includes a descriptor. The most common Lx values are the L10 and L90 levels, widely used in the assessment of environmental noise levels and regulations.

Historical Noise Levels at BRPP

As discussed in the Introduction, as of 2015, the BRPP ceased operation due to inadequate equipment and geothermal capacity. Previous noise sources at the BRPP included constant operational noise from the water cooling towers, steam stacking system and rock muffler, a small facility located directly south of the office & communications building, and the Stretford facility. Noise levels measured in 2009 from these sources when the project site was operational ranged from 75-81 dB on-site (Illingworth and Rodkin, 2009). The building directly south of the office & communications building would not generate noise as part of the project (Heim, 2023). The only remaining noise-generating sources within the project site would be the Stretford facility and the water cooling towers.

In 2009, Lake County received a noise complaint from a neighboring residence, and a formal noise survey was conducted at the BRRP. This noise survey indicated that noise levels at the nearest residence were typically in the range of 45 dB and noise at the property line was in the range of 65 dB and out of compliance with COC 16-1 (CEC, 2012). The project owner identified two oxidizer blowers located on the Stretford facility as the likely source of the off-site noise and the high pitch tones (CEC, 2012). In 2010 and 2011, there were two more complaints regarding the noise emanating from the BRPP (CEC, 2012). In November 2011, a second noise survey was performed and determined that the ambient noise of the new blowers on the Stretford facility produced significantly less ambient noise compared to the old blowers and was measured at typically around 40 dB at the nearest residence and 60 dB at the nearest fence line (CEC, 2012). Although the BRPP was in compliance with the 45 dB, Leq threshold at the nearest residence, the noise levels at the BRPP property line (typically around 60 dB) were above the limit allowed in Noise COC 16-1 (CEC, 2012). Lake County indicated that if a project exceeds the County's noise standards, but the local property owners are not disturbed by it, the County does not generally take any action (CEC, 2012). Since there were no further complaints from the neighboring residence, the County considered the case resolved and did not require any further noise abatement at the BRPP (CEC, 2012). A sound wall was constructed directly north of the Stretford facility to reduce operational noise. This sound wall would be restored and would continue to be in use during project operations as a noise reduction measure.

Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others due to the amount of noise exposure, in terms of both duration and insulation from noise, and the types of activities typically involved. Residences, hospitals, schools, and nursing homes are generally more sensitive to noise than commercial and industrial land uses. Noise sensitive land uses in the Lake County Noise Element are defined to include residential areas, hospitals, convalescent homes and facilities, schools, and other similar land uses. The nearest residential structure is approximately 1,500 feet northeast of the fence line at the BRPP site, and the nearest property line is approximately 200 feet east of the BRPP site fence line.

METHODOLOGY AND EXISTING NOISE ENVIRONMENT

To quantify existing ambient noise levels, this noise study included two long-term (72-hour) and eight short-term (10-minute) noise measurements at the project site. The geothermal plant was not

operating during the noise measurements, having been shut down in 2015. Metrosonics db308 Sound Level Meters calibrated before and after the measurements were used for the long-term noise measurements. A Larson Davis SoundTrack LxT Sound Level Meter calibrated before and after the measurements was used for the short-term measurements. **Table 3** summarizes the locations and results of the noise measurements. **Figure 1** shows the noise measurement locations on a map.

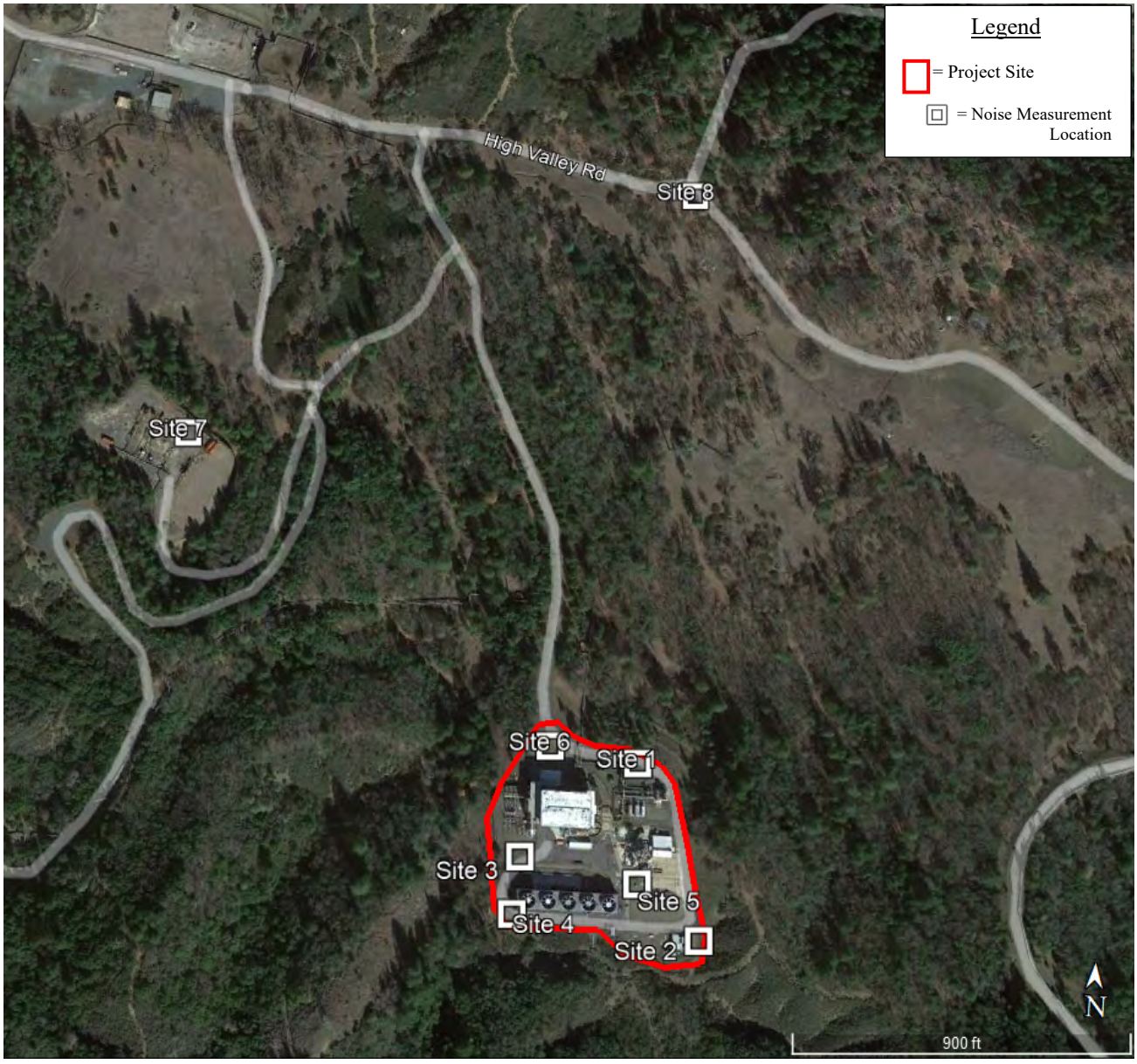
The **Noise Appendix** includes results of the long-term noise measurements shown on daily plots with hourly measurements results for Sites 1 and 2. The project site is currently vacant and generates very minimal noise. Based on observations from the short-term measurements, the main source of existing noise in the project vicinity is noise from the existing transformer and backup generator, airplanes, birds, and wind.

TABLE 3. EXISTING NOISE LEVELS

Location	Time Period	Noise Levels (dB)	Noise Sources
Site 1: Northeast area of project site, on a chain-link fence.	November 15, 12:00 a.m. Through November 17, 11:59 p.m., 2022 Tuesday – Thursday 72-hour measurement.	Hourly Leq's ranged from: 40-45 CNELs: 47, 46, 47	Unattended noise measurements do not specifically identify noise sources.
Site 1: Northeast area of project site, on a chain-link fence.	Monday November 14, 2022 10:34 a.m. to 10:44 a.m.	5-minute Leq's: 34, 37	Very quiet area. Wind 40 dB.
Site 2: Southeast area of project site, on a chain-link fence.	November 15, 12:00 a.m. Through November 17, 11:59 p.m., 2022 Tuesday – Thursday 72-hour measurement.	Hourly Leq's ranged from: 43-47 CNELs: 49, 49, 49	Unattended noise measurements do not specifically identify noise sources.
Site 2: Southeast area of project site, on a chain-link fence.	Monday November 14, 2022 10:07 a.m. to 10:17 a.m.	5-minute Leq's: 41, 40	Constant buzzing from backup generator facility 40 dB.
Site 3: East area of project site, approximately 50 feet south of existing electrical transformer.	Monday November 14, 2022 9:33 a.m. to 9:43 a.m.	5-minute Leq's: 50, 50	Constant buzzing from the transformer 50 dB. Wind 49 dB.
Site 4: Southwest area of project site, directly south of cooling towers.	Monday November 14, 2022 9:45 a.m. to 10:05 a.m.	5-minute Leq's: 37, 36, 36, 43	Very quiet area. Birds 42 dB.
Site 5: East of cooling towers.	Monday November 14, 2022 10:18 a.m. to 10:28 a.m.	5-minute Leq's: 38, 37	Very quiet area. Wind 40 dB.
Site 6: Directly south of main entrance.	Monday November 14, 2022 10:47 a.m. to 10:57 a.m.	5-minute Leq's: 44, 40	Maintenance manager truck passby 55 dB.
Site 7: Approximate center of the Coleman Pad.	Monday November 14, 2022 11:03 a.m. to 11:13 a.m.	5-minute Leq's: 37, 39	Very quiet area. Chain rattling on nearby equipment 38 dB
Site 8: Intersection of High Valley Road and Private Residential Road.	Monday November 14, 2022 11:28 a.m. to 11:38 a.m.	5-minute Leq's: 43, 33	Very quiet area. Wind 45 dB.

Source: RCH Group, 2022

FIGURE 1. NOISE MEASUREMENT LOCATIONS



RCH GROUP planning & environmental consulting

Base Map Source: Google Earth, 2022.

SIGNIFICANCE THRESHOLDS

Appendix G of the *CEQA Guidelines* states that a Project would result in a significant impact to Noise if it would:

- a) Generate a substantial temporary or permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
    - Per Lake County Code Section 41.11 (e)(5), noise from construction sites is exempt from Lake County noise standards from the hours of 7:00 a.m. to 7:00 p.m. Construction noise would be considered significant if construction occurred outside the hours of 7:00 a.m. to 7:00 p.m.
    - Per Lake County Chapter 21, Article 41, Section 21-41, 41.11, operational noise impacts would be significant if new equipment at the project site would generate noise levels at the nearest property line that would exceed the following one-hour average exterior noise levels: 55 dB from 7:00 a.m. to 10:00 p.m. and 45 dB from 10:00 p.m. to 7:00 a.m. (COC 16-1).
- b) Generate excessive groundborne vibration or groundborne noise levels; or
    - For vibration, the Federal Transit Administration (FTA) recommends a peak particle velocity (ppv) threshold of 0.5 inch per second or greater to be potentially significant since it can cause architectural damage and minor structural damage. Vibration impacts would be significant if construction or operation vibration exceeded the structural damage threshold of 0.5 ppv for structures on adjacent properties.
- c) For a project located within the vicinity of a private airstrip or an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport or public use airport, expose persons residing or working in the project area to excessive noise levels.
    - The project is not within the vicinity of a private airstrip or an airport land use plan or within two miles of a public airport, thus this impact is not addressed further.

DISCUSSION

a) Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Construction Impacts

Construction would result in a temporary increase in ambient noise levels in the vicinity of the project. Construction activities would require the use of numerous pieces of noise-generating equipment, such as excavating machinery (e.g., excavators, loaders, etc.) and other construction equipment (e.g., scrapers, dozers, compactors, trucks, etc.). The noise levels generated by construction equipment would vary greatly depending upon factors such as the type and specific

model of the equipment, the operation being performed, the condition of the equipment, and the prevailing wind direction.

The maximum noise levels for various types of construction equipment that would be used during project construction are provided in **Table 4**. Maximum noise levels generated by construction equipment used for the project would range from 74 to 85 dB, Lmax at a distance of 50 feet (see **Table 4**). **Table 5** provides typical construction activity noise levels (Leq) at 50 feet for various phases of construction.

TABLE 4. TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT (LMAX)

Construction Equipment	Noise Level (dB, Lmax at 50 feet)
Air Compressor	78
Backhoe	78
Drill Rig	85
Dozer	82
Front End Loader	79
Water Truck	80
Crane	81
Manlift	75
Welder/Torch	74
Pneumatic Tools	85
Dump Truck	76
Concrete Mixer Truck	79

NOTES:
L_{max} = maximum sound level

Source: Federal Highway Administration (FHWA) Roadway Construction Noise Model User's Guide, 2006.

TABLE 5. TYPICAL CONSTRUCTION ACTIVITIES NOISE LEVEL

Construction Equipment	Noise Level (dB, Leq at 50 feet)
Ground Clearing	84
Excavation	89
Foundations	78
Erection	85
Finishing	89

NOTES:
Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

Source: U.S. Environmental Protection Agency, Legal Compilation, 1973.

Per Lake County Code Section 41.11 (e)(5), noise from construction sites is exempt from Lake County noise standards from the hours of 7:00 a.m. to 7:00 p.m. Project construction would only occur during the hours of 7:00 a.m. to 7:00 p.m. Therefore, project construction impacts would be less than significant.

Operational Impacts

Since the Stretford facility and the water cooling towers are licensed by the CEC under 79-AFC-04 as part of the overall BRPP, they would not be considered a new source of noise at the project site once operations begin. This analysis will only analyze new changes to the project site and will consider noise impacts to be significant if project operations from new equipment would generate noise levels that exceed the Lake County noise performance standards. Because operations from the new equipment would be constant at the project site, the applicable standard exterior noise standard would be 45dB, Leq[7] for any one (1) hour at the nearest residential property line.

SoundPLAN Version 9.1 was used to model the noise generation from the proposed ORC units (BAC, 2024). The following noise inputs were assumed in SoundPLAN:

- Two new organic Rankine cycle (ORC) units capable of producing a total of 7.5 MW net of geothermal power are proposed. The ORC units would be installed within an undeveloped gravel portion of the site that is currently used for equipment storage. Each ORC unit would be approximately 120 feet long by 50 feet wide and up to 20 feet in height and fully contained within a new sound-attenuating building. The model assumes that each ORC unit would produce a constant noise level of 86 dB, Leq at 50 feet. This is the noise level produced from the binary power plant units observed at the Star Peak Geothermal site (RCH, 2022). The binary power plants at the Star Peak Geothermal site are designed for a 12.5 MW system and did not have any noise reduction features that were installed to the system (e.g., sound blankets or sound walls) when RCH recorded ambient measurements. Therefore, the representative noise level of 86 dB, Leq at 50 feet is a conservative assumption. The model assumes that the ORC units would be fully enclosed in a building with walls that have a soundproof rating of 39 Outdoor/Indoor Transmission Class (OITC) and a roof with a soundproof rating of 24 OITC.

[7] This is the maximum 1-hour average noise level. Because equipment during operations would be operating constantly, this would equate to an Lmax level at the nearest residential property line.

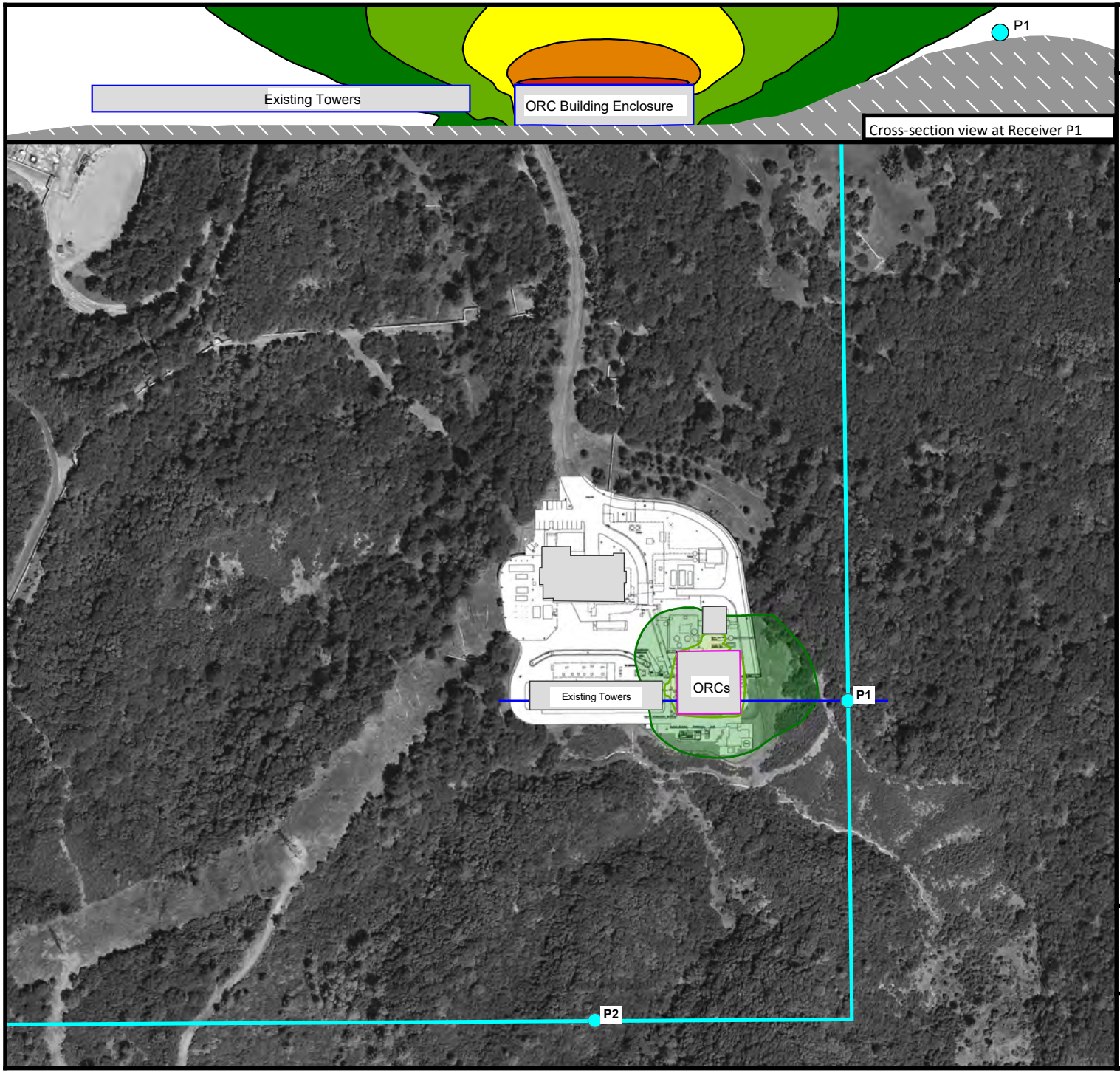


Figure 2

Amended BRPP Average Noise Contours (Leq) for Proposed Project Sources: ORCs enclosed

Legend

Contour Scale, Leq [dBA]

>=	55
50 -	55
45 -	50
40 -	45
35 -	40
30 -	35

Objects

- Receiver
- Property Line
- Proposed ORCs
- Cross Section
- Existing Building

Scale

N

0 100 200 400 feet

BOLLARD Acoustical Consultants

Figure 2 shows the predicted noise level contours from operations of the ORC units in terms of the average (Leq) noise descriptor. The noise modeling indicates that the noise levels at the nearest single-point receiver at the nearest property line (P-1) to the east would be 28.2 dB, Leq (BAC, 2024) and would be well below the Lake County exterior noise standard of 45 dB, Leq (See Figure 2). Noise levels at the nearest residence would be well below 45 dB, Leq.

As discussed in the assumptions above, the representative noise levels for the ORC units that were modeled in SoundPLAN represent a conservative operational scenario given that the noise levels that were recorded from similar equipment at the Star Peak Geothermal site are designed for a geothermal plant with approximately 67% more capacity than the project site. The binary power plant equipment at the Star Peak Geothermal site was the best available representative noise source to use in the noise modeling assumptions at the time. Therefore, the noise contours shown in **Figure 2** are considered to be a conservative operational scenario.

Note, although the SoundPLAN modeling assumed the ORC units would be fully enclosed, it is possible that the final site design could include an open portion on the west side of the ORC enclosure (i.e., 3 walls and 1 roof). This open portion of the ORC enclosure would be facing away from the eastern property line and would result in noise directed towards the water cooling towers. A final site design with an open portion on the western side of the ORC enclosure could result in slightly higher noise levels than 28.2 dB, Leq (as shown in Figure 2, which assumes that the ORC units being fully enclosed). However, any noise increase from this design would be minimal and because the representative noise levels for the ORC units are conservative, ORC noise levels would not exceed 45 dB, Leq at the nearest single-point receiver at the nearest property line (P-1).

In addition, Noise COC 16-2 requires the project owner to prepare a noise survey and report within 90 days after the project reaches its rated power generation facility. Any noncompliance with Lake County standards would require a noise mitigation plan (e.g., construction of sound walls or other noise abatement features) and a schedule to correct the noncompliance. However, because of the conservative inputs in the noise modeling, it can be assumed that new operational noise levels from the ORC's would be well below the 45 dB, Leq exterior noise standard at the nearest property line and noise from operation of the ORC's would be in compliance with Lake County noise standards at the nearest property line. Therefore, operational noise impacts would be less than significant.

b) Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Construction activities have the potential to result in varying degrees of temporary ground vibration, depending on the specific construction equipment used and operations involved. In most cases, vibration induced by typical construction equipment does not result in adverse effects on people or structures (Caltrans, 2013). Vibrational effects from typical construction activities are only a concern within 25 feet of existing structures (Caltrans 2002b). There are no off-site structures within 25 feet of the project site. The nearest residential structure is approximately 1,500 feet northeast of the fenceline at the BRPP. At this distance, vibration would be well below the 0.5 ppv threshold. Operation of the project would generate minimal vibration that would not be

perceptible to anyone outside the project site. Therefore, vibration impacts would be less than significant.

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Appendix F – Water Supply Assessment

Water Supply Assessment
Mayacma Geothermal Project
Cobb, California

Prepared for:

Open Mountain Energy
245 E. Liberty St., Suite 520
Reno, Nevada 89501

Prepared by:

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December 2024

Project No. 24-02-143

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December 6, 2024

Project No. 24-02-143

Mr. John Casteel
Open Mountain Energy
245 E. Liberty St., Suite 520
Reno, Nevada 89501

Re: **Water Supply Assessment**
Mayacma Geothermal Project, Cobb, CA

Dear Mr. Casteel:

Please find attached a Water Supply Assessment for the Mayacma Geothermal Project (formerly Bottle Rock Project) near the town of Cobb, Lake County, California. Mayacma Geothermal LLC, a wholly owned subsidiary of Open Mountain Energy (OME), recently acquired the non-operational plant and intends to install a new eight-megawatt (8 MW) power generation geothermal facility. Non-geothermal fresh water is needed for process fluid in the cooling towers and for domestic use across the site.

The Water Supply Assessment presented herein will provide further understanding of the groundwater basin and its ability to meet the project's water demand. Should you have questions regarding the work performed or results obtained, please do not hesitate to contact the undersigned at (775) 322-7969.

Sincerely,

BROADBENT & ASSOCIATES, INC.

Erielle Cushing
Project Engineer

Matt Herrick
Principal Hydrogeologist, PG, CHG, CEM

cc:

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LIST OF ACRONYMS

AFY:	acre feet per year
amsl:	above mean sea level
bls:	below land surface
Broadbent:	Broadbent & Associates, Inc.
CEC:	California Energy Commission
CEQA:	California Environmental Quality Act
CLVGWSA:	Clear Lake Volcanics Groundwater Source Area
District:	Lake County Watershed Protection District
DWR:	California Division of Water Resources
EPA:	Environmental Protection Agency
Eto:	Evapotranspiration Reference Value
ft:	feet
GMP:	Lake County Groundwater Management Plan
gpm:	gallons per minute
Mayacma	Mayacma Geothermal LLC
MCL:	maximum contaminant limit
MW:	megawatt
OME:	Open Mountain Energy
SB 610:	State Bill 610
SGMA:	Sustainable Groundwater Management Act
USGS:	United States Geological Survey
UWMP:	Urban Water Management Plan
WSA:	Water Supply Assessment
°F:	degrees Fahrenheit

Water Supply Assessment
Mayacma Geothermal Project

1.0 INTRODUCTION

Broadbent & Associates, Inc. (Broadbent) is pleased to provide this Water Supply Assessment (WSA) for the Mayacma geothermal project (formerly Bottle Rock Project) located near Cobb, Lake County, California (site). Mayacma Geothermal LLC (Mayacma), a wholly owned subsidiary of Open Mountain Energy (OME), recently acquired the non-operational Bottle Rock Project wellfield and intends to install a new eight-megawatt (8 MW) power generation plant (Plant). During past Plant operations, two shallow water supply wells provided freshwater for cooling tower process fluids and for domestic use across the site. The two wells were reported to yield a cumulative flowrate of 135 gallons per minute (gpm). The new Plant has been designed for greater efficiency, emphasizing sustainability of the geothermal resources. The Plant is expected to have an increased freshwater demand; therefore, a WSA has been prepared to better understand the capacity and sustainability of the shallow groundwater aquifer. A Site Location Map is provided as Figure 1.

Permitting to restart the Plant is ongoing with the California Energy Commission (CEC), and this WSA is a supporting document to the proponents Petition to Amend (PTA) expected to be filed in October 2024. An environmental review under the California Environmental Quality Act (CEQA) is an expected component of the CEC permitting process. In accordance with Senate Bill 610 (SB 610), the CEQA process requires preparation of a WSA to demonstrate that sufficient water supply is available to meet the needs of the proposed project.

1.1 SENATE BILL 610 REQUIREMENTS FOR GROUNDWATER SOURCES

Mayacma is working with the CEC to permit operation of the Plant. An environmental review under CEQA is an expected component of the CEC permitting process. SB 610 was implemented by the state of California in 2002 with the intent to strengthen the process by which local agencies determine the adequacy and sufficiency of current and future water supplies to meet current and future demands. SB 610 amended the California Public Resources Code to incorporate Water Code findings within the CEQA process for certain types of projects. A project requiring a WSA, as defined in SB 610, includes but is not limited to a proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet (ft) of floor area. The Mayacma geothermal project is an industrial facility that encompasses approximately 367 acres of land.

If the water supplier has previously prepared an Urban Water Management Plan (UWMP), it can determine whether the new demands are included in the UWMP. In this case, an UWMP covering the project area has not been prepared; therefore, Water Code Section 10910 requires the preparation of a WSA. To comply with SB 610 requirements, this WSA includes the following information.

- A description of the water service area including climate and population. Population information include current and projected population reflecting existing and planned future populations.
- A description and quantification of the existing and planned water sources (groundwater, surface water, and recycled water).
- A description of the water source availability during normal, single-dry, and multiple-dry water year types.

- A description of current and projected water demands among all user classes in the future public water system service area in five-year increments.
- A discussion of the total projected water supplies determined to be available to the Plant water system during normal, single-dry, and multiple-dry water years for a 20-year horizon that will meet the projected water demand associated with the proposed project, in addition to continuation of existing uses and planned future uses.

Additional WSA requirements are specified when groundwater is identified as a source. For the Plant, groundwater is planned to serve as the primary source for process water and domestic use. Due to the inclusion of groundwater as a source, the WSA must include the following additional information.

- A review of any information contained in an UWMP relevant to the identified water supply for the proposed project. Where an area does not have an UWMP, a guidance document prepared by the California Department of Water Resources (DWR) suggests that the WSA include discussion of any existing groundwater management plan and how it would affect the water supplier's use of the basin (DWR, 2003).
- A description of any groundwater basin from which the proposed project would be supplied with groundwater, including information obtained from the most current DWR bulletin that characterizes the condition of the groundwater basin (i.e., whether DWR has identified the basin as over drafted, or projected that the basin will become over drafted if present management conditions continue, and what measures are being taken to prevent over draft conditions from occurring). As suggested in the DWR guidance document relating to the implementation of SB 610, if the basin has not been (or recently been) evaluated by DWR, an evaluation of historic and recent groundwater level trends should be completed.
- A detailed description and analysis of the amount and location of groundwater pumped by the public water system for the past five years from any groundwater basin from which the proposed project will be supplied.
- A detailed description and analysis of the amount and location of groundwater that is projected to be pumped (for at least a twenty-year horizon) by the public water system from any basin from which the proposed project will be supplied.
- An analysis of the sufficiency of the groundwater that will be supplied from the basin or basins to meet the projected water demand of the proposed project.

1.2 WATER MANAGEMENT PLANS

A summary of existing Water Management Plans that are in the vicinity of the Plant and how each pertains to groundwater resources in the area is included here. There are currently no UWMPs for Lake County or the Plant area. Lake County manages groundwater resources through the Lake County Watershed Protection District (District). In 2006, the District finalized the Lake County Groundwater Management Plan (GMP) (CDM, 2006). The GMP was developed to support the long-term maintenance of high-quality groundwater resources within the 13 groundwater basins of the county. The Plant is in the Clear Lake Volcanics Groundwater Source Area. The GMP lists the following management objectives:

- Improve the understanding of groundwater hydrology and quality in Lake County
- Maintain a sustainable, high quality water supply for agricultural, environmental, and urban uses
- Minimize the long-term drawdown of groundwater levels

- Protect groundwater quality
- Minimize changes to surface water flows and quality that directly affect groundwater levels or quality
- Minimize the effect of groundwater pumping on surface water flows and quality
- Facilitate groundwater replenishment and cooperative management projects
- Prevent inelastic land surface subsidence from occurring as a result of groundwater pumping

The GMP presents data summarizing groundwater conditions in each basin or source area including hydrographs of depth to groundwater in select basins. In general, significant historical data is available for sedimentary deposits in major groundwater basins; however, very little historical information is available for the Clear Lake Volcanics groundwater source area. Stakeholders that helped prepare the GMP identified the lack of groundwater information as a major concern for the Clear Lake Volcanics groundwater source area. Because of the uncertain character of fractured rock aquifers, it is difficult to determine the amount of storage and groundwater movement within these formations. The stakeholders emphasized the need for groundwater monitoring. The GMP also included the following Best Management Objectives, developed with stakeholder input, to guide groundwater management in the Clear Lake Volcanics Groundwater Source Area:

- Prevent long-term declines in groundwater levels
- Maintain groundwater levels to assure an adequate and affordable irrigation and domestic water supply
- Develop an understanding of groundwater within the area
- Maintain a sustainable water supply now and into the future
- Increase groundwater level monitoring
- Increase groundwater quality monitoring
- Increase monitoring and understanding of groundwater levels, groundwater quality, land subsidence, and connections between these elements

The DWR (2009) established Part 2.11 of the Water Code requiring groundwater elevations be monitored seasonally in select sensitive groundwater basins identified in Bulletin 118-2003 Update (DWR, 2003a). Part 2.11 directed DWR to prioritize basins to identify the extent of groundwater monitoring. The Clear Lake Volcanic Groundwater Source Area was not listed as a select sensitive groundwater basin. However, adjacent basins to the south of Plant including Collayomi and Coyote Valley are both listed as very low priority basins. Big Valley, located north of the Plant, is listed as a medium priority basin (DWR web site, 2024).

2.0 MAYACMA PROJECT

The Plant is located on the inner coastal range of Northern California, Lake County, in portions of Sections 5 and 6, Township 11 North, Range 9 West. Located in the Mayacma Hills, the Plant encompasses three adjacent private parcels totaling approximately 367 acres and is approximately 1.25 miles southwest of the town Glenbrook and two miles southeast of Caldwell Pines Neighborhood. Cobb Mountain is located 2.5 miles to the southeast. A site location map is provided as Figure 1.

The Plant terrain includes rolling hills and ridges with elevations ranging from 2,600 ft to 3,000 ft above mean sea level (amsl). Mayacma Mountain, to the south, extends to an elevation of 4,700 ft amsl and

nearby valleys drop down to 1,200 ft amsl. The watershed is a part of the Sacramento River Basin. Surface water in the vicinity generally drains northward, eventually flowing into Clear Lake.

2.1 HISTORY

The Geysers area in Sonoma, Lake, and Mendocino counties was identified as a geothermal resource in the early 20th century. Initial exploration began in the 1950s when the potential for harnessing geothermal energy gained attention. The Bottle Rock Geothermal Power Plant was constructed with a partnership that included the DWR and private companies. The first unit of the plant began operation in 1980, making it one of the early commercial geothermal plants in the United States. Initially, the plant had a capacity of around 30 MW, utilizing steam from geothermal wells to generate electricity. In the years following its opening, the plant faced challenges, including declining steam production. These problems affected the Plant's ability to operate consistently. The Plant was officially closed in 1990 after a decade of operation (Geothermal Resources Council, 2020). While the Plant has changed ownership several times, efforts have been made to modernize the Plant. The Plant has remained in a non-operational state since 2015 due to lack of steam. OME acquired the Bottle Rock Project wellfield from Alta Rock Energy in September 2022.

2.2 CURRENT LAND USE

Lake County's population is relatively small compared to adjacent counties and other parts of California. The historic land use of the project area and the Mayacma mountains include timber and energy production, mining, agriculture, wildlife habitat, open space, dispersed recreation, and residential. The principal land uses in the immediate area are geothermal energy and mineral exploration and development. Base zoning of adjacent parcels is primarily classified as rural lands or open space districts (Lake County Assessor's Office, 2024). There are a couple smaller parcels to the east of the Plant with base zoning classified as rural residential. The Project encompasses approximately 367 acres.

2.3 CURRENT AND PROJECTED POPULATION

The Plant is presently in a Care & Maintenance phase and there are no permanent residences that live on site. Occasionally, workers are on site and primarily commute from nearby rural locations. Future planned phases include construction and Plant modernization followed by operations. It is expected that an approximate workforce of 15 would be needed during construction and Plant modernization. Routine Plant operations would require a daily workforce of four. The workforce would primarily commute from nearby rural locations including Middletown, Cobb, and the Clear Lake areas. Below Table 1 presents the estimated population for current and future phases of the Plant.

Table 1: Estimated Plant Population

Project Phase	Daily Workforce	Permanent Residence
Current – Care & Maintenance	0	0
Construction/Plant Modernization	15	0
Operations	4	0

The population of Lake County in 2022 was approximately 64,000 (US Census Bureau, 2023). According to state projections, Lake County is expected to see a slow increase in population, with estimates suggesting

growth of about 1% per year over the next decade (California Department of Finance, 2020). By 2030, the population could approach 67,000.

2.4 CLIMATE AND PRECIPITATION

The Plant area experiences a Mediterranean climate characterized by warm, dry summers and moderate wet winters with most precipitation occurring November through April (Figure 2 and 3). Higher elevations are known to be snow covered during the winter months. At the Clear Lake 4 SE Station, located approximately 12 miles northeast of the site at an elevation of 1,393 ft amsl, December's average low temperature is 31 degrees Fahrenheit (°F), and average high temperature is 55°F, while July's average high temperature is 93°F (WRCC, 2024). Average annual precipitation is 27.49 inches at the Clear Lake 4 SE Station. The Clear Lake 4 SE Station is depicted on Figure 4.

Four historic weather stations are known to have operated within three miles of the site. These weather stations better represent precipitation at the site due to their proximity and comparable elevations; however, historic temperature data is not available for these sites. Table 2 lists these historic weather stations and presents the average precipitation near the site. Each historic weather station is depicted on Figure 4.

Table 2: Average Precipitation Near Mayacma Geothermal Project

GHCN ID	Weather Station	Latitude	Longitude	Elevation (ft amsl)	Annual Mean Precipitation (inches)	Period of Record
US1CALK0010	Cobb 0.8 S, CA	38.82584°	122.72200°	2,515	69.34	09/21/2013 - 05/05/2024
USC00041882	Cobb 2 NW	38.83333°	122.75000°	2,402	53.99	07/01/1961 - 02/29/1964
USC00042015	Cordes, CA	38.85000°	122.78333°	2,612	58.35	01/02/1956 - 05/31/1961
USC00044010	Hobergs, CA	38.85000°	122.71667°	2,963	56.31	10/01/1939 - 06/30/1974
				Average:	59.50	

GHCN: Global Historical Climatology Network

2.5 EXISTING AND PLANNED WATER RESOURCES

2.5.1 Groundwater

Two shallow water supply wells are located at the Plant and historically have provided process fluid for the cooling towers and for domestic use. Total depth of the two water supply wells are 85 and 120 ft below land surface (bls). Numerous deeper geothermal wells are located on Plant property. Depths range from 8,000 to 12,000 ft bls with the shallowest screen or open hole at 6,500 ft bls. The primary source of energy production from deeper geothermal wells is steam. This assessment will focus on the non-geothermal shallow groundwater which will be used for potable and non-potable purposes. Figure 5 presents both the water supply and geothermal wells located at the Plant.

Well 1

Well 1 (occasionally referred to as Pump House 1) was completed in 1979 during initial plant construction. Well 1 was installed with a cable tool rig to a total depth of 85 ft bls. Eight-inch diameter well casing was installed with well screen set at 40 to 75 ft bls. The well screen was set in black volcanic sand and fractured blue rock which are both believed to represent the water bearing aquifer material. A tank & pump house is located to the south and immediately adjacent to Well 1.

Well 2

Well 2 (occasionally referred to as Pump House 2) was completed in 2009 to increase the water supply for the Plant. Well 2 was installed with an air rotary drilling rig to a total depth of 120 ft bls. Five-inch diameter well casing was installed with well screen set at 60 to 120 ft bls. The well screen was set in fractured sandstone which represents the water bearing aquifer material. Both wells have static water levels well above the aquifer material; therefore, the aquifer is considered confined. The two water supply wells are in the same clearing on the property and are approximately 360 ft apart. The fractured blue rock found in Well 1 may be the same geologic material as the fractured sandstone encountered in Well 2.

2024 Aquifer Testing Well 1 and Well 2

Recent aquifer testing was completed on both Well 1 and Well 2. Results are summarized in the Broadbent October 2024 *Mayacma Geothermal Aquifer Test Memorandum* and included in Appendix A. As presented in Table 3 below, the testing indicated Well 1 has a capacity of 60 gpm with the pump intake at its current location. If the pump was lowered to 70 ft bls, the well may be able to sustain 125 gpm.[1] The testing indicated Well 2 has a lesser capacity at 50 gpm.

Table 3: Plant Water Supply Well Inventory

Well Name	Purpose/Use	Screen Interval/ Depth (ft bls)	Pump Depth (ft bls)	Capacity (gpm)
Well 1	Process Cooling Fluid & Domestic Use	40-75 / 80	40	60 – 125
Well 2	Process Cooling Fluid & Domestic Use	60-120 / 120	105	50
			Total:	110 - 175

The two existing freshwater wells were previously reported to yield a cumulative capacity of 135 gpm. Based on recent aquifer tests, the two wells may be able to sustain a slightly larger yield with adjustments to pump depth in Well 1. The new Plant would benefit from a greater supply of freshwater for the process fluid and cooling towers. During the warmer summer months, the new Plant could use up to 400 gpm if available, less water will be needed during the cooler winter months. The installation of additional water supply wells would be necessary to meet the desired increase in demand.

2.5.2 Surface Water

The Plant is in the Kelsey Creek Watershed as depicted in Figure 4. The Kelsey Creek Watershed is the third largest tributary in the basin providing 16% of water to Clear Lake (County of Lakes Department of Public Works, 2010). Three creeks are within or near the Plant. High Valley Creek is an intermittent stream

[1] Based on current static water level and infinite areal extent of aquifer (i.e., no boundary conditions).

that originates at the far western extent of the Plant property and flows in a general northerly direction. Mayacmas Creek is an intermittent stream that originates to the southwest of the Plant and flows westerly. Alder Creek is a perennial stream located approximately a half a mile to the east of the Plant property and flows in a general northerly direction. High Valley Creek and Alder Creek are both tributaries to Kelsey Creek. A stream gage is present on Kelsey Creek and includes historic data from 1947 through the present (USGS, National Water Dashboard). There are no other natural surface water bodies located on the Plant parcel or on adjacent parcels in close proximity to the Plant. Figure 4 presents surface water features in the Kelsey Creek Watershed while Figure 5 presents the surface water features on and near the Plant. Surface water is not planned to be used as a resource at the Plant.

2.5.3 Recycled Water (Non-Potable)

Sustainable power generation at The Geysers is possible today due to two large-scale wastewater injection projects from Lake County and the City of Santa Rosa. Combined, approximately 20 million gallons of reclaimed water per day is provided for injection into the geothermal reservoir (Calpine Corporation, 2024). The heat in the reservoir rock converts the water into steam and supplements the production of reservoir steam for the numerous power plants in the vicinity. Current infrastructure is not in place to deliver recycled water to the Plant. Recycled water is not a planned to be used as a resource for process water at the Plant.

3.0 HYDROGEOLOGIC SETTING

3.1 GEOLOGIC SETTING

The Plant is in the north-central Coast Range geomorphic province of California and located within the Franciscan formation, a complex and diverse assemblage of rocks that formed during the Mesozoic Era (around 150 to 80 million years ago). The Franciscan Formation is characterized by a mélange structure, which is a chaotic mixture of different rock types with varying degrees of deformation. This mélange was formed by the intense tectonic activity associated with subduction, where rocks were faulted, folded, and mixed in a complex manner. Metamorphic, sedimentary, and igneous rocks make up the Franciscan formation. The power plant pad was constructed by excavating the western half of a ridge and placing the material as embankment in the intervening swale. The power plant pad is underlain by graywacke, interbedded graywacke and shale, and sheared shale. Alluvium covered the graywacke in the embankment foundation area (SWFES, 1982). There are two steeply dipping northwest trending faults that run along the north and south of the facility, these faults are believed to be a part of the San Andreas Fault System. The presence of a shallow magma chamber 4-5 miles below the surface provides the geothermal heat source for the area (Lake County Planning Department, 1989).

3.2 AQUIFER CHARACTERISTICS AND WELL YIELDS

The shallow aquifer material encountered in both existing Plant water supply wells, discussed above (Well 1 and Well 2), consists of volcanic sand and fractured sandstone. Both wells show static water levels well above the aquifer material; therefore, the aquifer is considered confined. Well 1 and Well 2 are located approximately 360 ft apart and in the same clearing. While performing aquifer testing earlier this year and pumping each well individually, changes in water levels were observed in the other well, indicating that

the two wells are likely completed in the same water bearing material. The reader is referred to the Mayacma Geothermal Aquifer Test Memorandum included in Appendix A for more details.

The hydraulic parameters calculated from the 2024 aquifer tests on the two existing Plant water supply wells are summarized below. Available data from the PTW-1 Well (RMT Inc, 2010), located ½ mile to the northwest of the Plant property is also included and depicted in Figure 5.

Table 4: Shallow Aquifer Hydraulic Parameters

Well Name	Aquifer Test Date	Average Hydraulic Conductivity (ft/day)	Average Storativity (ft/day)
Well 1	2024	68.6	$9.34X10^{-3}$
Well 2	2024	14.3	$2.06X10^{-2}$
PTW-1 Well	2009	28	Not Reported

Hydraulic conductivity is a property of porous material that describes the ease with which a fluid can move through the pore space or fractures. Storativity is the volume of water that a unit area of an aquifer releases or absorbs per unit decline or rise in the hydraulic head. The hydraulic conductivities presented in the above table are consistent with literature values for sands and fractured sedimentary and crystalline rock (Domenico and Schwartz, 1990). The values for storativity are small (less than 10^{-2}) which further implies that the aquifer is under confining conditions. The hydraulic conductivities and confining nature of the aquifer agree with the conditions and materials encountered while drilling. The hydraulic parameters presented here are representative parameters for the shallow fractured confined groundwater system at the site. A fault-controlled, fractured rock aquifer model is believed to represent the shallow aquifer system. These fault-controlled fractures allow for the storage and transmittal of water but also often result in isolated aquifer systems with limited lateral connectivity.

Sustained well yields or capacity for the two onsite water supply wells are presented in Section 2.4.1 above. The capacity for the PTW-1 Well (RMT Inc, 2010) located ½ mile to the northwest of the Plant has also been estimated. Capacities for all three wells are presented in Table 5 below and range from 50 to 125 gpm.

Table 5: Well Yields

Well Name	Screen Interval (ft bls)	Aquifer Geologic Material	Capacity (gpm)
Well 1	40-75	Volcanic Sand & Fractured Rock	60 – 125
Well 2	60-120	Fractured Sandstone	50
PTW-1	100-138	Fractured Sandstone	80

4.0 CURRENT AND HISTORIC WATER DEMANDS AND PROJECT AVAILABILITY

Provided below is a summary of available data and a description of current and historical water demands and availability.

4.1 GROUNDWATER USE AND AVAILABILITY

4.1.1 Groundwater Elevation

Pressure transducers were installed in both water supply Well 1 and Well 2 in May of this year in preparation for planned aquifer testing. Table 6 below presents change in groundwater elevations over a 6-month period of time (May through October). An overall trend in decreasing water levels was observed, with a more significant drop noted in Well 2.

Tabel 6: 2024 Change in Groundwater Elevations

Well Name	May 2024 Static DTW (ft bls)	October 2024 Static DTW (ft bls)	Change Elevation (ft bls)
Well 1	8.5	16.5	-8
Well 2	6.0	18.7	-12.7

Available historic groundwater elevation data at the Plant is limited. Although water supply Well 1 was installed in 1979 and has been intermittently operational (coincident with plant operations) over the years, historic data has not been located for the well.

Groundwater elevations in the Clear Lake Volcanics Groundwater Source Area Basin generally are high during the spring, decrease over the summer, and recover during the winter. Groundwater elevations in the Collayomi Valley Basin which is located near the town of Middletown and south of the Plant follow similar trends (CDM, 2006). In the spring, water elevations in the basin are relatively shallow, ranging from 3 to 15 ft bls. During the summer months, elevations drop further, ranging from 5 to 20 ft bls.

4.1.2 Groundwater Quality

Water quality samples were collected by OME personnel from water supply Well 1 and Well 2 in June 2024. Analysis included inorganics and uranium as a radionuclide. Results from the samples collected are summarized in the below Table 7. None of the analytes exceeded the National Primary or Secondary Drinking Water Regulations maximum contaminant level (MCL) established by the Environmental Protection Agency (EPA). A water treatment system is in place at the Plant and can be used to process water that is distributed to Plant facilities for domestic use. Laboratory analytical report and chain-of custody documentation are provided in Appendix B.

Table 7: Supply Wells Water Quality Results

Analyte	Units	Analytical Method	MCL	Well 1	Well 2
Aluminum	mg/L	EPA 200.7	0.2	0.1	<0.05
Antimony	mg/L	EPA 200.8	0.006	<0.002	<0.002
Arsenic	mg/L	EPA 200.8	0.01	<0.002	<0.002
Barium	mg/L	EPA 200.8	2	0.78	0.69
Beryllium	mg/L	EPA 200.8	0.004	<0.002	<0.002
Cadmium	mg/L	EPA 200.8	0.005	<0.002	<0.002
Chromium	mg/L	EPA 200.8	0.1	<0.002	<0.002
Chloride	mg/L	EPA 300.0	250	5	8
Copper	mg/L	EPA 200.8	1.3	<0.002	<0.002
Fluoride	mg/L	EPA 300.0	4	0.8	0.8
Iron	mg/L	EPA 200.7	0.3	0.25	0.25
Lead	mg/L	EPA 200.8	0.015	<0.002	<0.002
Manganese	mg/L	EPA 200.8	0.05	0.052	0.10
Mercury	mg/L	EPA 245.1	0.002	<0.0001	<0.0001
Nitrate	mg/L	EPA 300.0	10	<0.5	<0.5
Nitrite	mg/L	EPA 300.0	1	<0.5	<0.5
pH	su	SM 4500 H+B	6.5-8.5	8.14	8.04
Silver	mg/L	EPA 200.8	0.1	<0.002	<0.002
Selenium	mg/L	EPA 200.8	0.05	<0.01	<0.01
Sulfate	mg/L	EPA 300.0	250	5.6	6
Total Dissolved Solids	mg/L	SM 2540 C	500	220	210
Thallium	mg/L	EPA 200.8	0.002	<0.001	<0.001
Uranium	mg/L	EPA 200.8	30	<0.002	<0.002
Zinc	mg/L	EPA 200.8	5	<0.02	<0.02

mg/L = milligrams per liter
su = standard units

4.1.3 Historical Usage

Groundwater has been in use at the Plant and adjacent areas for many decades. Withdrawn volume records are not available; however, the two water supply wells were previously reported to yield a cumulative flowrate of 135 gpm. It is presumed that historic water supply usage at the Plant did not exceed the 135-gpm capacity of the two wells. Due to recent aquifer testing, the production capacities of these two wells are better understood and further described in Section 2.4.1. Additionally, results of an aquifer test analysis on a third well, located at an adjacent parcel, has been included in this report. A summary of well capacities is provided in Section 2.4.1.

As required by the Sustainable Groundwater Management Act (SGMA), California's 515 groundwater basins are prioritized into one of four categories: high, medium, low, and very low priority. Basin prioritization is based on current and projected population, degree of groundwater depletion, number of wells, irrigated acreage, volume of groundwater used, degree of reliance on groundwater, and documented adverse impacts (DWR, 2020). California's non-basin areas are defined as any area outside of a defined groundwater basin or subbasin consisting of impermeable granitic, metamorphic, volcanic,

or consolidated rocks (carbonates), with groundwater stored within fractures or other voids. The connectivity of these fractured rock systems is often limited and difficult to predict and characterize. The Plant and surrounding area are classified as a non-basin area.

4.1.4 Current Usage

As the Plant is presently non-operational, the current usage of shallow groundwater at the site has been limited to pumping from Well 1 and Well 2 during aquifer testing activities completed earlier this summer.

4.1.5 Groundwater Availability

The Plant is in a rural setting with very low population density. The California SGMA has listed the Plant and surrounding area as a non-prioritized basin (non-basin) consisting of impermeable granitic, metamorphic, volcanic, or consolidated rocks with groundwater primarily stored within fractures or other voids.

The District GMP (CDM, 2006) shows that the Plant is in the Clear Lake Volcanics Groundwater Source Area (CLVGWSA). Because of the uncertain character of fault-controlled, fractured rock aquifers, it is difficult to determine the amount of storage and groundwater movement within these formations. These fault-controlled fractures allow for the storage and transmittal of water but often result in isolated aquifer systems with limited lateral connectivity. The District stakeholders emphasized the need for groundwater monitoring in the GMP to better understand individual fault-controlled, fractured aquifer systems.

Groundwater recharge is primarily from precipitation and surface water runoff. Relative to alluvial aquifer systems, fracture systems can experience a more complex and sometimes delayed response to both recharge and drought conditions. Due to the complex structure of the CLVGWSA and the lack of groundwater monitoring data, the water budget method was selected to estimate groundwater availability for the Kelsey Creek Watershed. The water budget method is a simple equation that uses precipitation, surface water flow onto the site (run on), surface water flow off the site (runoff), and evapotranspiration to calculate the amount of water that can infiltrate back to the aquifer (Khan, et al.). The water budget method does not account for recharge that could occur from interconnected basins. The equation used to estimate water budget is the following:

$$\Delta S = P + Q_{on} - (Q_{off} + ETo) \text{ (Acre-feet per year \{AFY\})}$$

where

ΔS = change in storage
P = precipitation
Q_{on} = water flow onto the site
Q_{off} = water flow off the site
ETo = Evapotranspiration Reference Value

A positive value indicates that the aquifer is being recharged.

Evaluation Area

The site is located within the boundaries of the Kelsey Creek Watershed and was selected as the evaluation area. The Kelsey Creek watershed covers 28,493 acres and extends from the northwest side of

Cobb Mountain to Clear Lake. It is bordered by the Mayacamas Mountain Range to the south and various ridges and mountains to the north.

Groundwater recharge is observed in aquifers; however, the volcanic aquifers extend beneath multiple watersheds in Lake County. Additionally, the aquifer boundaries are not well defined, and the CLVGWSA is highly fractured with the potential for isolated and interconnected aquifers. Since the CLVGWSA likely sources water from multiple watersheds and the possibility of interconnected aquifers, evaluating the Kelsey Creek Watershed is a conservative approach and may underestimate the volume of water available to recharge the aquifers. Additionally, surface water run on can be neglected because topography prevents precipitation from adjacent watersheds from entering the watershed.

Precipitation

As described in Section 2.4, four historic weather stations within and near the Kelsey Creek Watershed were selected to estimate the average annual precipitation. These weather stations were selected due to their proximity and comparable elevation to the site. Each historic weather station is depicted on Figure 4 and the annual mean precipitation is presented in Table 2 (59.50 inches) and Table 8 (4.96 ft). As indicated on Table 8, multiplying the mean average precipitation by the area indicates that an average of 141,329 acre-feet per year (AFY) of precipitation falls in the Kelsey Creek Watershed.

Water Flow onto the Watershed

As previously described, surface water run on from streams or stormwater events in adjacent watersheds is not considered a source of groundwater recharge. Precipitation within the Kelsey Creek Watershed is considered the only source of water available for groundwater basin recharge. Additionally, this evaluation does not consider recharge that via groundwater flow from interconnected basins. This is a conservative approach and likely underestimates the volume of water available to recharge the groundwater basin.

Runoff

Runoff is precipitation that is not infiltrated into the soil. Runoff can be calculated with the rational equation which utilizes a runoff coefficient to describe the type of soil and vegetation that precipitation falls upon (Fetter, 2001). Ranges of runoff coefficients for woodlands were sourced from the State Water Resources Control Board Fact Sheet-5.1.3. Woodland coefficients, which range from 0.05-0.25, were selected because the United States Geological survey (USGS) lidar data indicates that the watershed primarily consists of Evergreen forests and shrubs (USGS, National Map Viewer). The median value (0.15) of the runoff coefficient was selected for this evaluation. As indicated on Table 8, multiplying the Kelsey Creek Watershed precipitation by the runoff coefficient indicates that approximately 21,199 AFY of precipitation are not available for groundwater recharge due to runoff.

Evapotranspiration

Evapotranspiration is the sum of soil evaporation and plant transpiration. Evapotranspiration varies from day to day due to climate, elevation, and the density of vegetation. Due to these variations, the University of California Division of Agriculture and Natural Resources developed evapotranspiration reference values (Eto) to support water budgeting. These ETo values are primarily used for agriculture planning and ETo values specific to mountainous areas, such as the Kelsey Creek Watershed, have not been developed. The value for Lake Port California (42.83 inches per year)was used due to proximity to the Kelsey Creek Watershed. The selected Eto is conservative (i.e., overestimates evapotranspiration in the watershed) because ETo values tend to decrease in regions with higher elevation (Goulden et al. 2012). The selected

ETo was not corrected for elevation. As indicated on Table 8, multiplying the Eto by the Kelsey Creek Watershed area indicates that approximately 101,723 AFY of precipitation are not available for groundwater recharge due to evapotranspiration.

Table 8: Groundwater Recharge

	Precipitation (ft/year)	A_{ws} (acres)	C	ETo (ft/year)	Total (AFY)
Precipitation (Normal Year)	4.96	28,494	---	---	141,329
Runoff	4.96	28,494	0.15	---	21,199
Evapotranspiration	---	28,494	---	3.57	101,723
Normal Year Groundwater Recharge:					**18,407**
Precipitation (Dry Year)	3.41	28,494	---	---	97,164
Runoff	3.41	28,494	0.15	---	14,575
Evapotranspiration	---	28,494	---	3.57	101,723
Dry Year Groundwater Recharge:					**-19,134**

A_{ws} = area of watershed
C = runoff coefficient
ETo = Evapotranspiration Reference Value
Precipitation - Runoff - Evapotranspiration = Groundwater Recharge

As indicated in Table 8, the average annual groundwater recharge within the Kelsey Creek Watershed is approximately 18,407 AFY during a normal year. The projected availability of groundwater is highly dependent on the storage capacity and extent of the fault-controlled fractured aquifer systems. Implementation of a groundwater monitoring plan would provide additional data that would help better define the projected groundwater availability. Because fractured aquifer systems are often isolated and have limited lateral connectivity, the risk of groundwater overdraft from the Plant affecting surrounding areas is low.

According to SB 610 guidelines, a dry year can be considered a year with a precipitation amount that is at 10 percent probability of occurrence, meaning 10 percent of the years would be drier. Of the weather stations within three-miles of the site, the Hobergs, CA historic weather station (GHCN ID USC00044010) has the longest precipitation record (10/01/1939 – 06/30/1974); therefore, this dataset was used to evaluate the precipitation that may occur during a dry year. This dataset[2] indicates that 3.41 ft of precipitation corresponds to a dry year. As presented in Table 8 and based on the assumptions from the water budget model presented above, no groundwater recharge occurs during a dry year. In practice, and depending on intensity and frequency of precipitation events, some recharge does occur in localized areas during dry periods; however, it should be considered negligible when evaluating the broader aquifer as a whole. During multiple dry years, minimal to no groundwater recharge should be expected.

5.0 PLANNED FUTURE WATER DEMANDS

Presented in this section is a summary of projected future water demands for the Plant and adjacent properties. Demands for the Plant include both potable and non-potable components. Future demands

[2] 1939 and 1974 were omitted from the evaluation because each year was missing more than two months of precipitation data. For years missing two months of data or less, the corresponding average monthly precipitation was added to the yearly total.

are based on the current plans in place to reestablish operation of the Plant. The operations water demands outlined below are projected to remain consistent over the 20-year planning horizon, as required by SB 610.

5.1 PROJECTED POTABLE WATER DEMANDS

Potable water is defined as water that is safe to drink and use for food preparation. Potable water will be needed to support the daily workforce at the Plant. As mentioned in Section 4.1.2 above, an existing water treatment system is in place at the Plant and can be used to process water that is distributed to the Plant facilities for domestic use. In the case that the treatment facility is unavailable, potable water will be imported as needed.

Construction and modernization of the Plant is expected to take 8 months, requiring an average daily workforce of 15 employees, working 5 days a week. The potable water demand over that period of time is estimated to be 0.12 AFY. The subsequent operations phase will include an average workforce of 4 employees, working 7 days per week. The annual potable water demand for operations is estimated to be 0.07 AFY. Table 9 presents the estimated potable water demand for future phases at the Plant.

Table 9: Potable Water Demands

Project Phase	Daily Workforce	Daily Water Demand (Gallons)*	Duration	Annual Water Demand (Gallons)	Annual Water Demand (AFY)
Construction/Plant Modernization	15	225	5 days/week for 8 months	39,100	0.12
Operations	4	60	7 days/week, ongoing	21,900	0.07

* = calculation assumes a consumption of 15 gallons per day per worker

5.2 PROJECTED NON-POTABLE WATER DEMANDS

Non-potable water is defined as water that is not safe for human consumption and is often used for irrigation and industrial processes. At the Plant, non-potable water will primarily be needed as process fluid for the cooling towers.

Construction and plant modernization is anticipated to take eight months with work occurring five days per week. Estimates for water demand are 460 gallons per day which equates to 0.25 AFY. As discussed in earlier portions of this assessment, the subsequent operations phase is anticipated to use up to 400 gpm for the cooling towers process fluid. The 400 gpm is based on anticipated needs during the warmer summer months, less water will be needed during the cooler winter months. Taking a conservative approach and assuming a flow rate of 400 gpm year-round, the estimated annual non-potable water demand for operations is 613 AFY. The demand for non-potable process water during operations is significantly higher than other water needs at the plant. Table 10 presents the estimated non-potable water demands for future phases at the Plant.

Table 10: Non-Potable Water Demands

Project Phase	Daily Water Demand (Gallons)	Duration (months)	Annual Water Demand (Gallons)	Annual Water Demand (AFY)
Construction/Plant Modernization	460	5 days/week for 8 months	80,000	0.25
Operations	576,000*	7 days/week	199,728,000**	613**

*=based on demand of 400 gpm
**=assumes 95% operation time with 5% downtime for facility maintenance

5.3 ADJACENT NON-PROJECT AREA WATER DEMANDS

As discussed above in Section 2.2, the principal land uses in the immediate area are geothermal energy and mineral exploration and development. Base zoning of adjacent parcels is primarily classified as rural lands or open space districts. There are a couple parcels to the east of the Plant with base zoning classified as rural residential. No data is currently available from adjacent parcels regarding water demands.

A fault-controlled, fractured rock aquifer system represents the shallow aquifer at the Plant. These fault-controlled fractures allow for the storage and transmittal of water but also often result in isolated aquifer systems with limited lateral connectivity. If shallow groundwater is being utilized as a resource on an adjacent parcel, the system may be a different aquifer not connected to the Plant aquifer.

6.0 WATER SUPPLY SUFFICIENCY

SB 610 requires that a WSA report on the adequacy of water supply to meet project demands. The water supply (potable and non-potable) for the Plant is planned to come primarily from groundwater sourced from the shallow aquifer system, and secondarily from natural steam condensate generated by the power plant process. Groundwater availability/recharge is evaluated in Section 4.1.5 while future water demands for the Plant are understood and addressed in Section 5. During a normal precipitation year, sufficient groundwater recharge is expected based on the water demands at the site. However, during dry or multiple dry years, groundwater recharge may become insufficient to fully replenish the aquifer system at the site such that the supply wells may become unable to produce groundwater at the design capacities. It is recommended that the water supply wells be continuously monitored and designed so the plant operations can decrease pumping rates from the shallow groundwater and utilize an increasing volume of Plant steam condensate on an as-needed basis (up to 100% steam condensate if necessary) during extended dry periods.

The Clear Lake Integrated Watershed Management Plan (Lake County, 2010) estimated the capacities of the major groundwater basins in the Clear Lake Watershed to be at 22 to 67% of the safe yield, therefore groundwater overdraft is not currently considered to be a problem. The major groundwater basins are defined as Big Valley, Scotts Valley, and Upper Lake Valley which primarily consist of sedimentary deposits with alluvial aquifer systems.

Lake County manages groundwater resources through the Lake County GMP (discussed in Section 1.2). Stakeholders that helped prepare the GMP identified the lack of groundwater information as a major

concern for the CLVGWSA which encompasses the Plant. The GMP emphasized the need for groundwater monitoring to better understand safe yield.

Construction is scheduled to commence in early 2025 and Plant operations to follow in early 2026. The new Plant is expected to have an operational life of 30 years. Based on recent aquifer testing, the two existing water supply wells at the Plant have a combined capacity of 110 to 175 gpm and the new Plant could use up to 400 gpm if available, but less water will be needed during the cooler winter months. The two existing wells were not originally intended for and are not sufficient to provide the full water demand desired for the new Plant. OME is planning to drill and construct several new supply wells to distribute and optimize the demand over multiple points of diversion across the property and minimize the drawdown effects while meeting the desired flow rates.

7.0 SUMMARY AND RECOMMENDATIONS

As discussed above, overdraft of groundwater from Lake County is not a concern at this time. The shallow fault-controlled fractured aquifer system is complex, and the safe yield is not fully understood; however, the average annual groundwater recharge indicates that groundwater should be available to operate the Plant without adversely impacting the aquifer(s) during normal precipitation years. However, during dry or multiple dry years, groundwater recharge may become insufficient to fully replenish the tapped aquifer system at the site to support the demand. It is recommended that the water supply system be designed to have the capacity to shift toward an increasing volume of Plant steam condensate used during extended dry periods. It is further recommended that a groundwater monitoring program be implemented that would include documentation of groundwater levels, flow rates, and totalizer readings from Plant water supply wells. The objective of the program would include ensuring that groundwater remains sustainable for the Plant and adjacent non-project areas.

Additional water supply wells are needed to meet the water usage desired for optimizing Plant operational efficiencies, and resource sustainability. Aquifer tests should be completed on new wells to understand individual well capacities and safe yields.

8.0 LIMITATIONS

The findings presented in this report are based upon observations of OME field personnel, points investigated, results of laboratory tests, and our understanding of California Regulations. Our services were performed in accordance with the generally accepted standard of practice at the time this report was written. No other warranty, expressed or implied, was made. This report has been prepared for the exclusive use of Open Mountain Energy. It is possible that variations in soil or groundwater conditions could exist beyond points explored in past investigations described herein. Also, changes in site conditions could occur in the future due to variations in rainfall, temperature, regional water usage, or other factors.

9.0 REFERENCES

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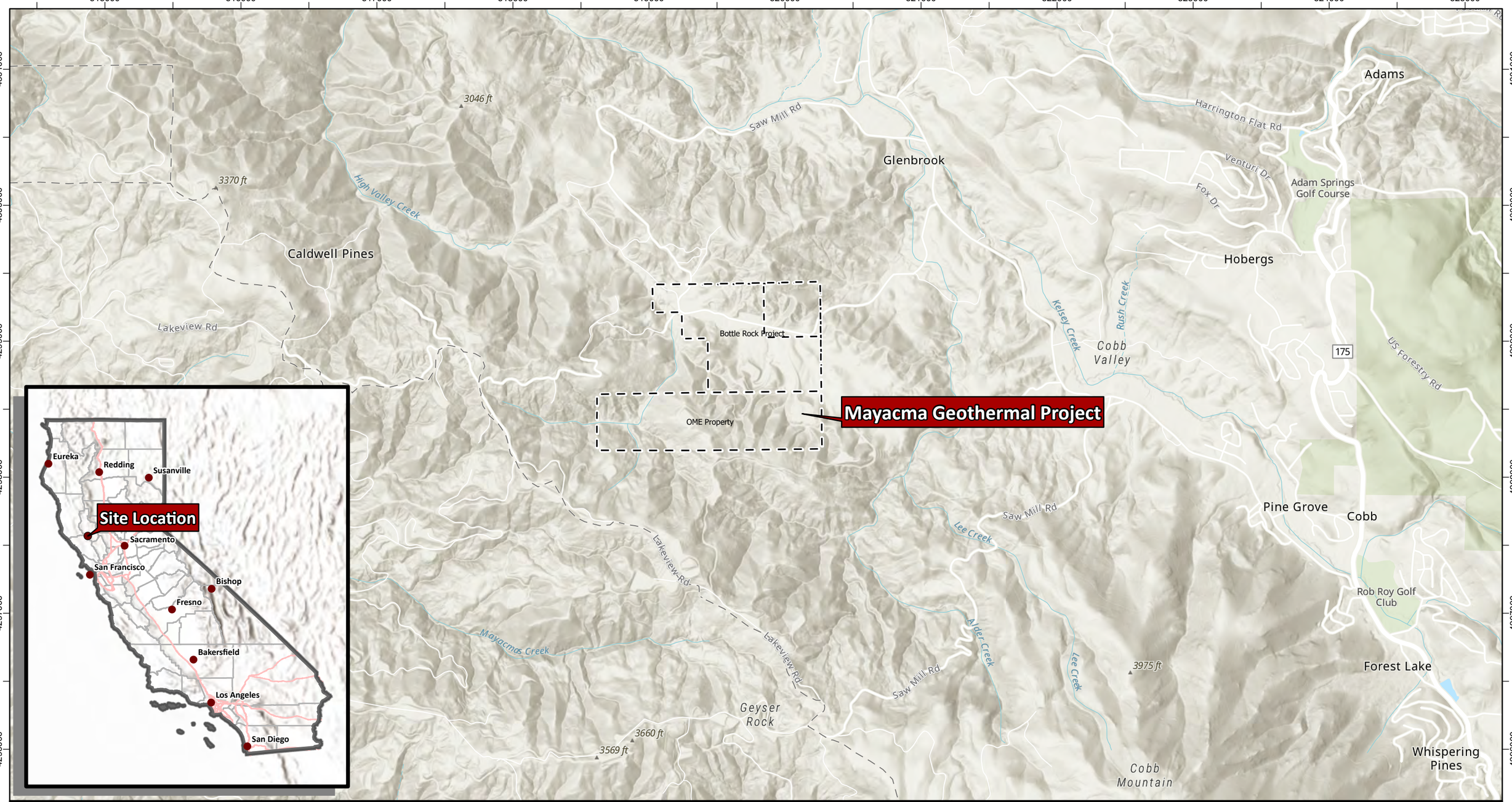
Western Regional Climate Center, Hobergs, CA Station, 2024, (https://wrcc.dri.edu/my/stations)

FIGURES



BROADBENT
5450 Louie Lane, Ste 101
Reno, NV, 89511
(775) 322-7969

Job # 24-02-143 Date: 10/10/2024

Legend:

Property Boundaries

Notes:
1. Imagery Source: California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA, Esri, USGS
2. Datum: NAD 1983 UTM Zone 10N

N

Scale: 1:27,000

0 1,000 2,000 4,000 Feet

Figure 1

Site Location Map

Water Supply Asessment Report
Mayacma Geothermal Project, Cobb, CA

Designed	
Drawn	TES
Approved	

Figure 2: Monthly Average Temperatures

Source: Western Regional Climate Center (Clearlake 4 SE Station)

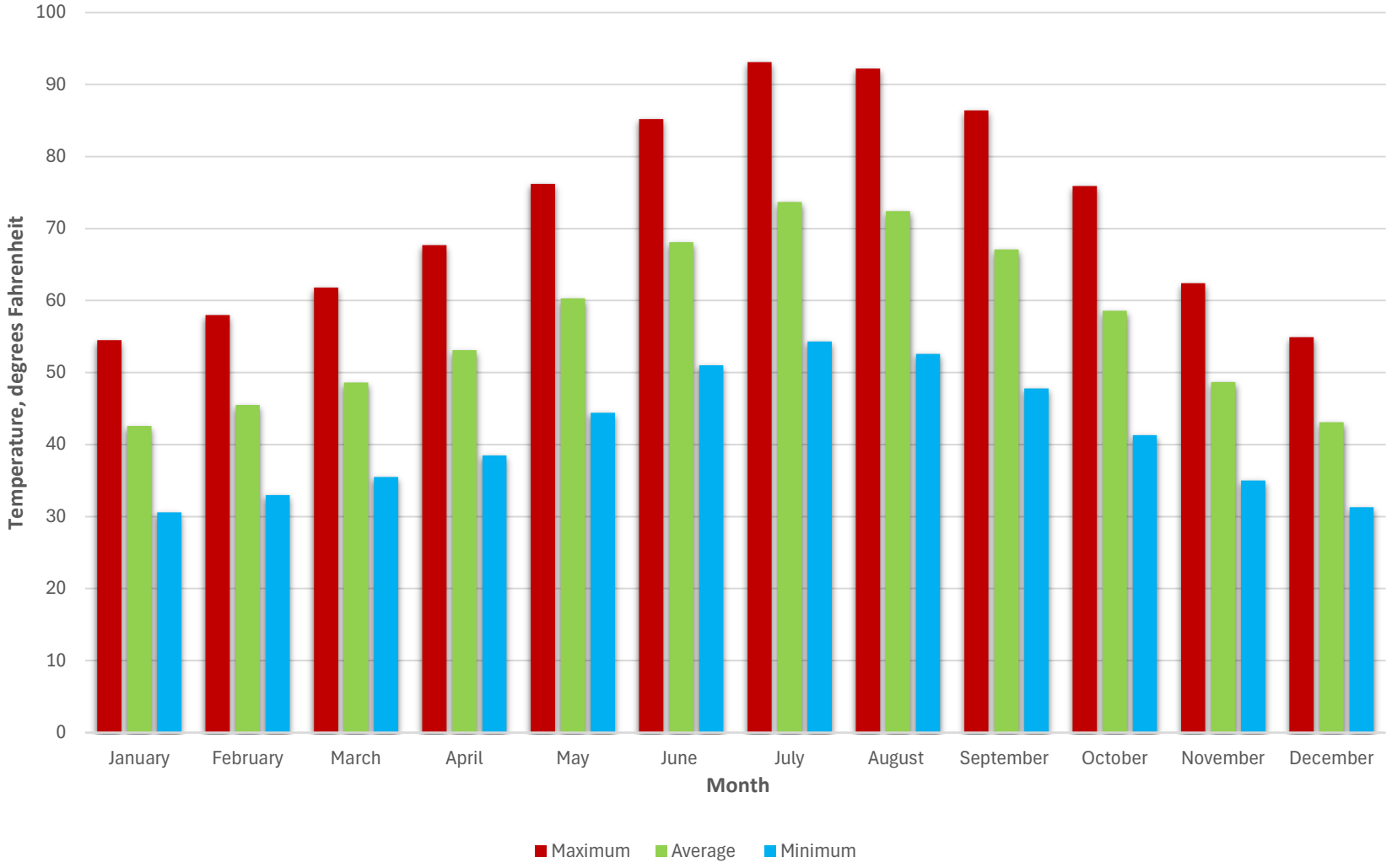
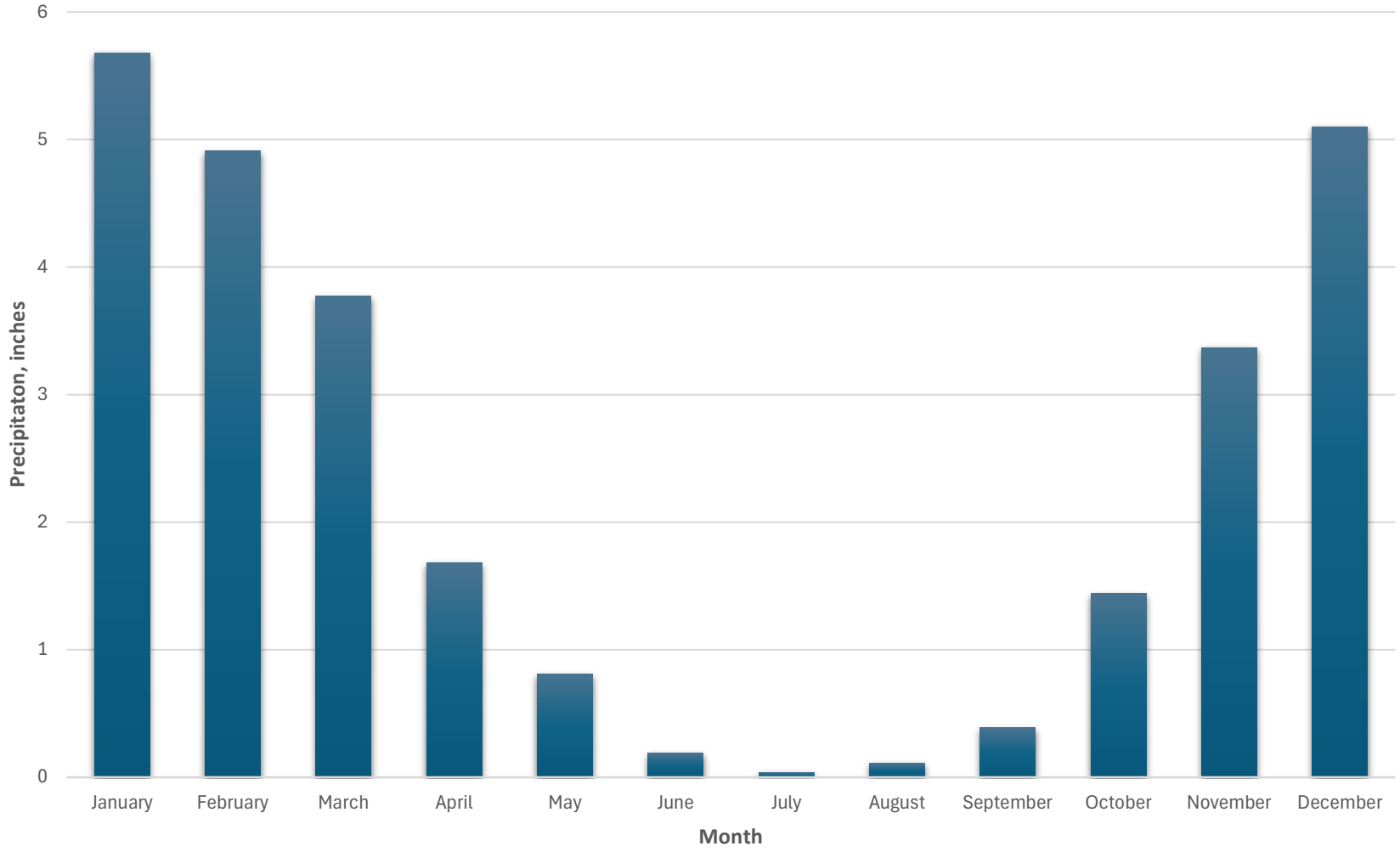
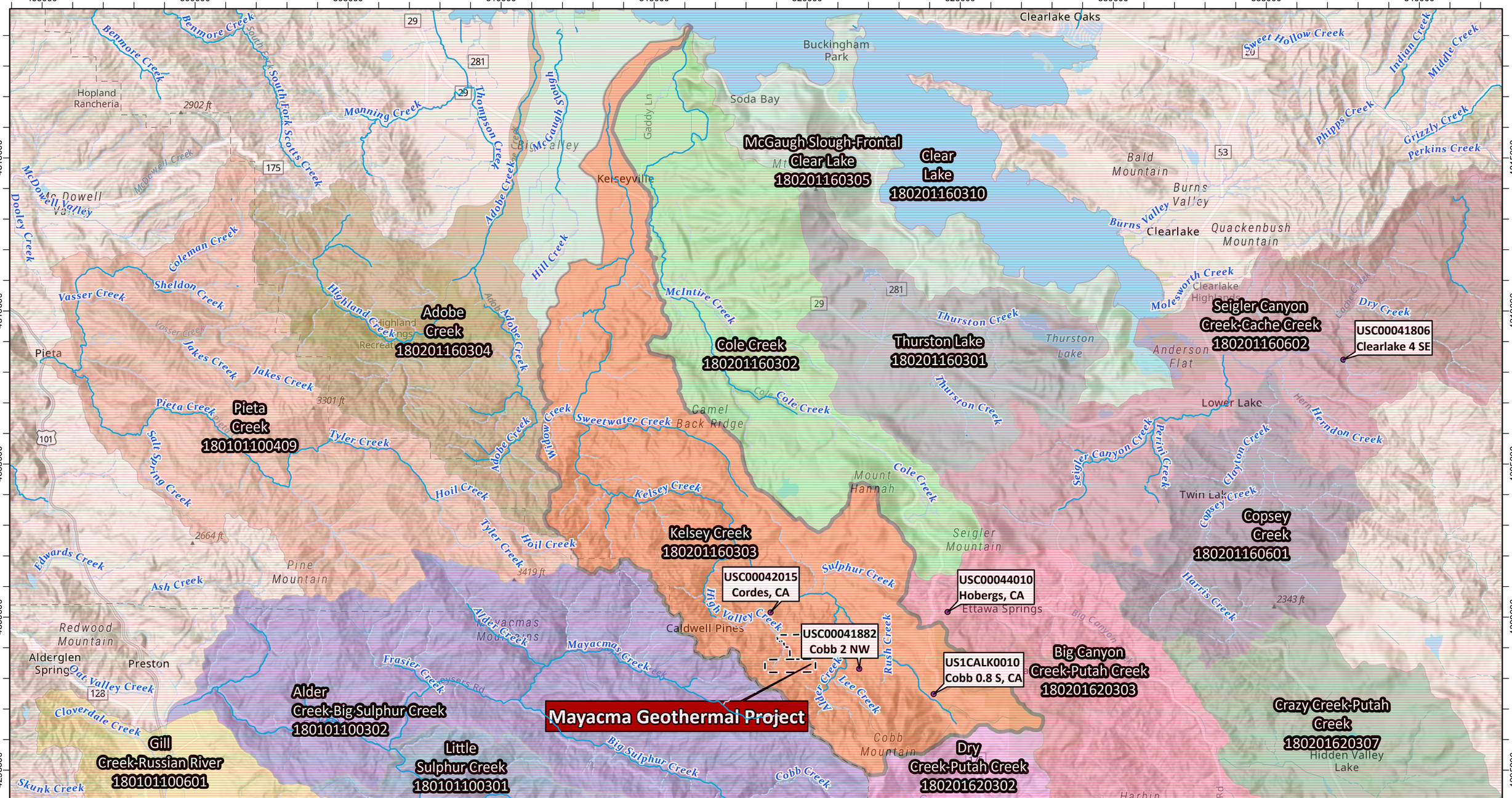


Figure 3: Monthly Average Precipitation

Source: Western Regional Climate Center (Clearlake 4 SE Station)





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Job # 24-02-143 Date: 11/21/2024

Legend:

- WeatherStations
- Property Boundaries
- Intermittent Stream
- Perennial Stream

HUC 12 Watershed

- Adobe Creek
- Alder Creek-Big Sulphur Creek
- Big Canyon Creek-Putah Creek
- Clear Lake
- Cole Creek
- Copsey Creek
- Crazy Creek-Putah Creek
- Dry Creek-Putah Creek
- Gill Creek-Russian River
- Kelsey Creek
- Little Sulphur Creek
- McGaugh Slough-Frontal Clear Lake
- Pieta Creek
- Seigler Canyon Creek-Cache Creek
- Thurston Lake

Notes:
1. Imagery Source: Esri, NASA, NGA, USGS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS
2. Datum: NAD 1983 UTM Zone 10N

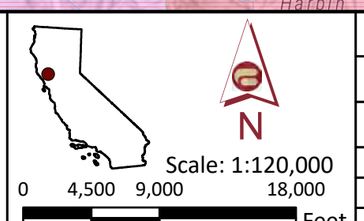

Figure 4

HUC Boundaries and Weather Stations

Water Supply Asessment Report
Mayacma Geothermal Project, Cobb, CA

Designed	
Drawn	TES
Approved	

BROADBENT
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Reno, NV, 89511
(775) 322-7969

Job # 24-02-143 Date: 11/21/2024

Legend:

- Water Supply Well
- Existing Drilled Well
- Residential Spring Well
- Pump House
- Geothermal Wells
- Spring/Seep
- Intermittent Stream
- Perennial Stream
- Property Boundaries

Notes:
1. Imagery Source: Pictometry International, Maxar
2. Datum: NAD 1983 UTM Zone 10N
3. Well Locations provided by Open Mountain Energy and compiled from RMT Inc's February 2010 *Water Resources Addendum for the Petition to Amend.*
4. Spring and stream locations compiled from USGS National Hydrography Dataset and RMT Inc's February 2010 *Water Resources Addendum for the Petition to Amend.*

N

Scale: 1:15,000

0 500 1,000 2,000 Feet

Figure 5

Wells and Surface Water Features

Water Supply Assessment Report
Mayacma Geothermal Project, Cobb, CA

Designed	
Drawn	TES
Approved	

APPENDICES

APPENDIX A MAYACMA GEOTHERMAL AQUIFER TEST MEMORANDUM

5450 Louie Lane #101, Reno, NV 89511
775-322-7969
Project # 24-02-143

MEMORANDUM

TO: Mr. John Casteel – Open Mountain Energy
FROM: Broadbent & Associates, Inc.
DATE: October 15, 2024
SUBJECT: Mayacma Geothermal Aquifer Test, Cobb, CA

INTRODUCTION

The Mayacma Geothermal Project (formerly Bottle Rock Project) is in Lake County California, in portions of Sections 5 and 6, Township 11 North, Range 9 West. The site is approximately 1.25 miles southwest of the town of Glenbrook and 2 miles southeast from the Caldwell Pines Neighborhood. The site is located in the Mayacma Hills and Cobb Mountain is located 2.5 miles southeast. Mayacma Geothermal LLC (Mayacma), a wholly owned subsidiary of Open Mountain Energy (OME), acquired the Bottle Rock Project wellfield and intends to install a new eight-megawatt (8 MW) power generation facility (facility).

During past plant operations, groundwater produced from two existing onsite wells has been utilized as process fluid in the cooling towers and for domestic use across the site. The wells are approximately 360 feet apart and historically have been reported to yield a cumulative flowrate of 135 gallons per minute (gpm). OME is currently designing an 8 MW expansion that would benefit from a greater supply of freshwater for the process fluid and cooling towers. During the warmer summer months, the new Plant could use up to 400 gpm if available, less water will be needed during the cooler winter months. Aquifer testing was completed on the two existing wells to better understand the potential yield or capacity of each well.

Broadbent supported OME personnel in development of an Aquifer Test Program to provide guidance during testing activities. OME personnel made necessary mechanical and metering adjustments to the existing infrastructure and oversaw installation of a sounding tube in both wells. OME completed the aquifer testing activities. Broadbent provided support during the planning phase of work and execution of the tests. Broadbent also analyzed the data and prepared this memo summarizing work completed.

GEOLOGY

The site is in the north-central Coast Range geomorphic province of California and located within the Franciscan formation, a complex and diverse assemblage of rocks that formed during the Mesozoic Era (around 150 to 80 million years ago). The Franciscan Formation is characterized by a mélange structure, which is a chaotic mixture of different rock types with varying degrees of deformation. This mélange was formed by the intense tectonic activity associated with subduction, where rocks were faulted, folded, and mixed in a complex manner. Metamorphic, sedimentary, and igneous rocks make up the Franciscan formation. The power plant pad was constructed by excavating the western half of a ridge and placing the material as embankment in the intervening swale. The power plant pad is underlain by graywacke, interbedded graywacke and shale, and sheared shale. Alluvium covered the graywacke in the embankment foundation area (SWFES, 1982). There are two steeply dipping northwest trending faults that run along the north and south of the facility, these faults are believed to be a part of the San Andreas Fault System. The presence of a shallow magma chamber 4-5 miles below the

surface provides the geothermal heat source for the area (Lake County Planning Department, 1989). A site vicinity map is included as Figure 1.

WATER SUPPLY WELLS

Well 1 (also referred to as Pump House 1) was completed in 1979 during initial plant construction. Well 1 was installed with a cable tool rig to a total depth of 85 feet below land surface (bls). Eight-inch diameter well casing was installed with well screen set at 40 to 75 feet bls. The well screen was set in black volcanic sand and fractured blue rock which are both believed to represent the water bearing aquifer material. A Tank house is located to the south and immediately adjacent to Well 1.

Well 2 (also referred to as Pump House 2) was completed in 2009 to increase the water supply for the Plant. Well 2 was installed with an air rotary drilling rig to a total depth of 120 feet bls. Five-inch diameter well casing was installed with well screen set at 60 to 120 feet bls. The well screen was set in fractured sandstone which represents the water bearing aquifer material. Both wells have static water levels well above the aquifer material; therefore, the aquifer is considered confined. The two water supply wells are in the same clearing on the property and are approximately 360 feet apart. The fractured blue rock found in Well 1 may be the same geologic material as the fractured sandstone encountered in Well 2. The site vicinity map attached as Figure 1 depicts the well locations. Well driller and completion reports for the two wells are attached[1].

AQUIFER TESTING

Completion of a step discharge test for both wells was planned initially to determine appropriate pumping rates for the constant discharge tests. However, existing infrastructure and valving limited the ability to control discharge in each well. As a result, only constant discharge tests were completed on both wells. Initial constant discharge tests on Well 1 and Well 2 were completed in June and July, respectively. During the initial tests, water was discharged to the field west of Well 1. However, the discharge location impacted water levels in the wells. While testing Well 2, water levels increased in Well 1 which was attributed to the discharge location of the water. The discharge water was directed to a concrete holding basin at the plant and tests were repeated on both wells in August. Constant discharge tests on Well 1 and Well 2 were initiated on August 26 and August 19, 2024, respectively. Data from these tests were used to determine representative aquifer hydraulic parameters (i.e., hydraulic conductivity and storativity).

Following aquifer tests, OME provided Broadbent with the data collected during the tests. Broadbent corrected, reduced, and evaluated the data prior to using curve fitting software to determine hydraulic parameters.

EQUIPMENT AND METHODS

The existing pumps in Well 1 and Well 2 were utilized to complete the aquifer tests. A 14 HP 3-phase submersible pump is set at 40 feet bls in Well 1. The drop pipe is three inches in diameter. A 7.5 HP 3-phase Goulds 60GS75 submersible pump is set at 105 feet bls in Well 2. The drop pipe for Well 2 is two inches in diameter. Both wells are individually plumbed to the Tank House adjacent to Well 1. Valves inside the Tank House can be used to fully isolate each well. Pump discharge rates were monitored during tests using a two-inch FloMEC discharge meter located in the Pump House and rated from 20 to 200 gpm. Pump performance was stable, and discharge rates remained relatively constant during testing.

[1]Well 1 Completion Report refers to well as "Colman" at top. Well 2 Completion Report lists Owner's well no as "Well #1".

Weeks Drilling and Pump Company completed modifications to both wells prior to testing including replacement of broken check valves and installation of a 72 foot sounding tube in Well 1 and a 100 foot sounding tube in Well 2. Water levels were measured using an electric water level tape and by means of Solinsts pressure transducers installed in both wells.

WATER MANAGEMENT

Both wells are individually plumbed to the Tank House adjacent to Well 1. Valves inside the Tank House can be used to fully isolate each well. During initial testing in June and July, water was directed out of the Tank House through sixty feet of hose laid out in the field to the west. However, the discharge location impacted water levels in the wells as evidenced by an observed water level increase in Well 1 during testing of Well 2. Using existing infrastructure, the discharge water was directed to a concrete holding basin at the plant and tests were repeated on both wells in August. During Well 2 testing, initiated on August 19, 2024, approximately 293,000 gallons of water was generated. During Well 1 testing, initiated on August 26, 2024, approximately 218,000 gallons of water was generated.

CONSTANT DISCHARGE TEST

Constant discharge aquifer tests were completed in August 2024 on Well 1 and Well 2 to determine aquifer hydraulic parameters (i.e., conductivity and storativity). Tests were conducted independently at each well, with the non-pumping well serving as an observation point during testing.

Prior to commencement of testing Well 1, static water levels were measured at 15.53 and 17.60 feet bls in Well 1 and Well 2, respectively. The test was run for approximately 40 hours at a pumping rate of 90 gpm. Water levels in both wells were monitored manually and via pressure transducers during the pumping and recovery portions of the test. As presented in Figure 2, the drawdown in the pumping well (Well 1) was relatively stable near the end of the test. As the water level approached the pump intake (approximately forty feet bls), flow rates became more unstable and water level fluctuations were observed. Water levels in the observation well (Well 2) steadily dropped during testing. The maximum drawdown in the pumping well was measured at 25.00 feet. Well 2 is approximately 360 feet from the pumping well and 1.19 feet of drawdown was observed at the end of the test.

Prior to commencement of testing Well 2, static water levels were measured at 15.80 and 14.75 feet bls in Well 2 and Well 1, respectively. The test was run for approximately 72 hours at a pumping rate of 67 gpm. Water levels in both wells were monitored manually and via pressure transducers during the pumping and recovery portions of the test. As presented in Figure 3, drawdown in the pumping well (Well 2) did not stabilize near the end of the test. Water levels in the observation well (Well 1) steadily dropped during testing and did not reach stabilization at the end of the test. The maximum drawdown in the pumping well was measured at 9.33 feet. Well 1 is approximately 360 feet from the pumping well and 0.81 feet of drawdown was observed at the end of the test.

AQUIFER TEST ANALYSIS

The Theis (1935) and Cooper and Jacob type curve analysis methods, within the graphical software package Aquifer Test Pro v. 13.0, were used to analyze the drawdown and select recovery data from the constant discharge tests. Both solutions within Aquifer Test Pro assume that the aquifer system has the following properties:

- Confined
- Flow to the well is non-steady state (i.e., water levels are changing at the time you begin the test)
- Infinite areal extent

- Homogeneous and isotropic – uniform thickness over the area influenced by the test
- Prior to pumping, the piezometric surface is horizontal over the area that will be influenced during the test
- The water removed from storage is discharged instantaneously with decline of head
- The diameters of the pumped and observation wells are small so casing storage can be neglected

Aquifer Test Analysis Reports for the two tests and two analysis methods are attached. The fit between the data and the applicable model curve is considered fair. The Theis analysis includes evaluation of both drawdown and recovery data. The Cooper & Jacob method is limited to drawdown data only. The hydraulic parameters calculated from the tests are summarized below.

Well 1 Test

	Theis	Cooper & Jacob I	Average
Average Hydraulic Conductivity (ft/day)	44.7	92.5	68.6
Average Storativity	$1.41X10^{-2}$	$4.58X10^{-3}$	$9.34X10^{-3}$

Well 2 Test

	Theis	Cooper & Jacob I	Average
Average Hydraulic Conductivity (ft/day)	9.1	19.5	14.3
Average Storativity	$2.95X10^{-2}$	$1.17X10^{-2}$	$2.06X10^{-2}$

Hydraulic conductivity is a property of porous material that describes the ease with which a fluid can move through the pore space or fractures. The storativity is the volume of water that a unit area of an aquifer releases or absorbs per unit decline or rise in the hydraulic head. The hydraulic conductivities are consistent with literature values for sands and fractured sedimentary and crystalline rock (Domenico and Schwartz, 1990). The values for storativity are small (less than 10^{-2}) which implies that the aquifer is under confining conditions. The hydraulic conductivities and confining nature of the aquifer agree with the conditions and material that were encountered while drilling. The hydraulic parameters calculated here are representative parameters for the shallow fractured confined groundwater system at the site.

WELL CAPACITITES

The well capacity is the maximum rate at which a well can consistently deliver water under specific conditions. Using the hydraulic parameters calculated from the aquifer test analysis above and current static water levels, predictive models were generated in Aquifer Test Pro to estimate the capacity of each well. Results are presented below.

WELL 1

During the constant discharge test, Well 1 was pumped at a rate of 90 gpm for approximately 40 hours. Near the end of the test, the water level approached the pump intake (approximately 40 feet bls), which resulted in unstable flow rates and fluctuations in water levels. Based on the test, the well cannot sustain 90 gpm at the current static water level and pump intake depth. It is recommended that a minimum of 10 feet of water remain above the intake during operations. The predictive model shows a well capacity at 60 gpm with the pump intake

at its current location. If the pump was lowered to 70 feet bls in the well, the predictive model shows a capacity as high as 125 gpm. [2]

WELL 2

During the constant discharge test, Well 2 was pumped at a rate of 67 gpm for approximately 72 hours. It is important to note that water levels did not stabilize during the 72 hour test. The water level continued to drop at a steady rate of approximately 0.4 inches/hour from approximately 20 hours through the end of the test. Additionally, water levels did not fully recover in the well following cessation of pumping (fell two feet short of static conditions at beginning of test). Possible explanations for these observations include: 1) the pumping rate exceeds well capacity; 2) the aquifer is heterogeneous or anisotropic; 3) there may be a no flow boundary near well; and 4) there could be issues with the well bore and/or well screen. Well 1 is eight inches in diameter and Well 2 is five inches in diameter. Smaller diameter wells are less capable of sustaining high pumping rates.

The aquifer test analysis methods do assume water levels stabilize during testing to ensure the data reflects steady-state conditions. As a result, use of the predictive model to estimate capacity of Well 2 was not completed. Based on available data, the well capacity may be less than the 67 gpm test rate. Unless additional data becomes available, it should be assumed that the well capacity is 50 gpm.

SUMMARY

Based on aquifer testing, the two existing water supply wells at the Plant have a combined capacity of 110 to 175 gpm. During the warmer summer months, the new Plant could use up to 400 gpm if available, less water will be needed during the cooler winter months. Additional water supply wells are needed to meet the water usage desired for optimizing Plant operation efficiencies, and resource sustainability. The plant property is extensive encompassing approximately 367 acres and land is available to install additional water supply wells.

LIMITATIONS

The findings presented in this memorandum are based upon observations by OME field personnel. Our services were performed in accordance with the generally accepted standard of practice at the time this report was written. No other warranty expressed or implied was made. This memorandum has been prepared for the exclusive use of OME. It is possible that variations in groundwater conditions could exist beyond points explored in this investigation. Also, changes in site conditions could occur in the future due to variations in rainfall, temperature, regional water usage, or other factors.

REFERENCES

Lake County Planning Department. May 1989. Cobb Mountain Area Plan. Lake County Board of Supervisors.

P.A Domenico and F.W. Schwartz, Copyright 1990 John Wiley & Sons, Inc., Physical and Chemical Hydrogeology.

State Water Facilities Energy Supply (SWFES). May 1982. Final Geologic Report on Bottle Rock Powerplant Initial Site Development. Prepared for State of California The Resources Agency, Department of Water Resources, Division of Design and Construction.

[2] Based on current static water level and infinite areal extent of aquifer (i.e., no boundary conditions)

ATTACHMENTS

Figure 1: Water Supply Well Locations
Figure 2: Constant Discharge Aquifer Test – Well 1
Figure 3: Constant Discharge Aquifer Test – Well 2
Aquifer Test Analysis Reports
Well Driller and Completion Reports

ATTACHMENTS

518000 518500 519000 519500 520000 520500

4299500

4299000

4298500

High Valley Rd

Francisco

Bottle Rock Project

Well 1

Tank House

Coleman

Well 2

High Valley Creek

West Coleman

OME Property

Bottle Rock Plant

BROADBENT
5450 Louie Lane, Ste 101
Reno, NV, 89511
(775) 322-7969

Job # 24-02-143 Date: 9/5/2024

Legend:

- Water Supply Well
- Injection Well
- Production Well
- Pump House
- Property Boundaries

Notes:
1. Imagery Source: Esri Community Maps Contributors, Lake County, CA, Sonoma County, California State Parks, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS, Sources: Esri, USGS, NOAA, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, Pictometry International, Maxar
2. Datum: NAD 1983 UTM Zone 10N
3. Well Locations provided by Open Mountain Energy.

N

Scale: 1:7,200

0 250 500 1,000

Feet

Figure 1

Water Supply Well Locations

Aquifer Testing
Mayacma Geothermal Project, Cobb, CA

Designed	
Drawn	TES
Approved	

Figure 2: Constant Discharge Aquifer Test - Well 1
Pumping and Recovery Data
Mayacma Geothermal Project

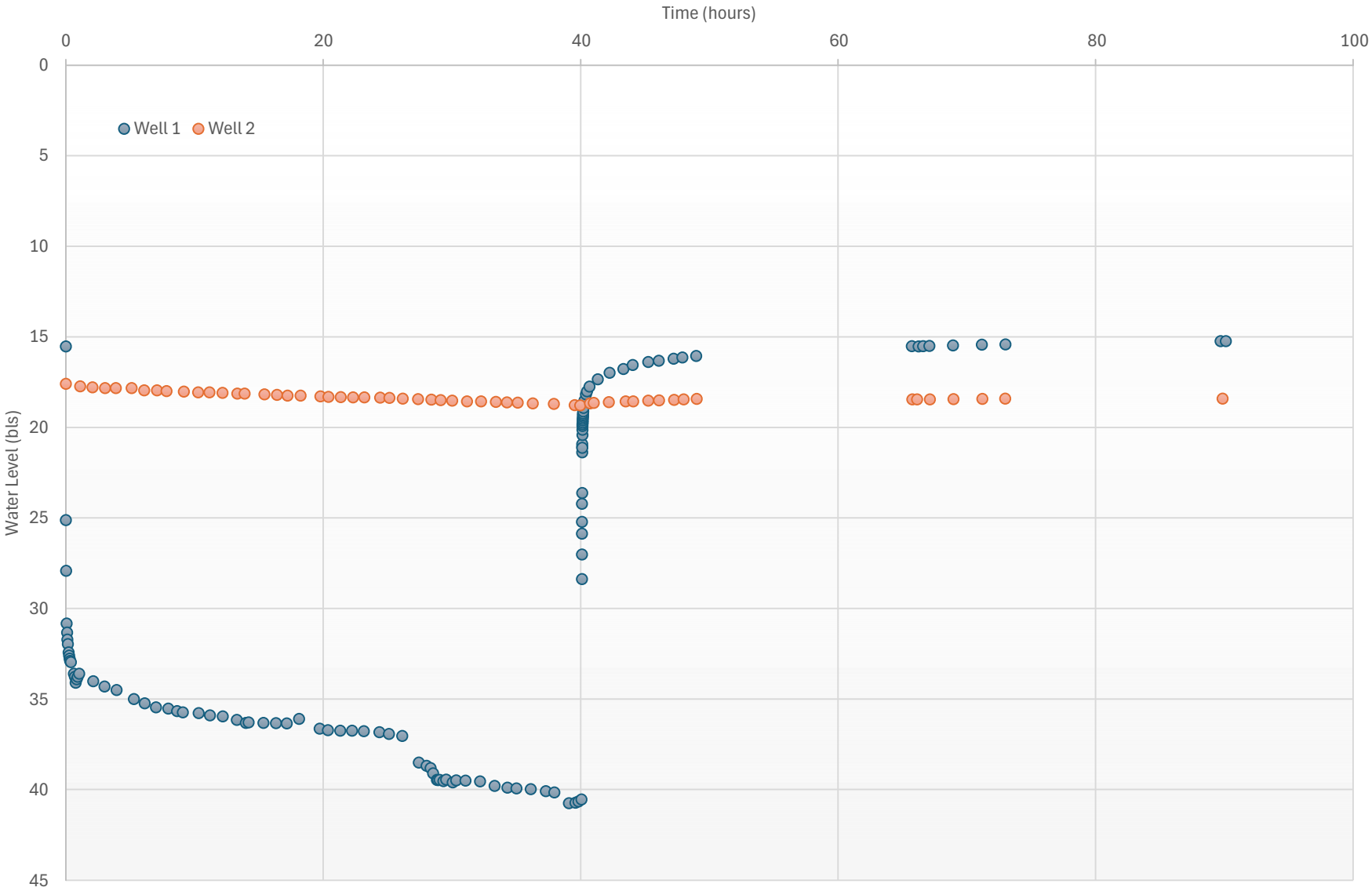
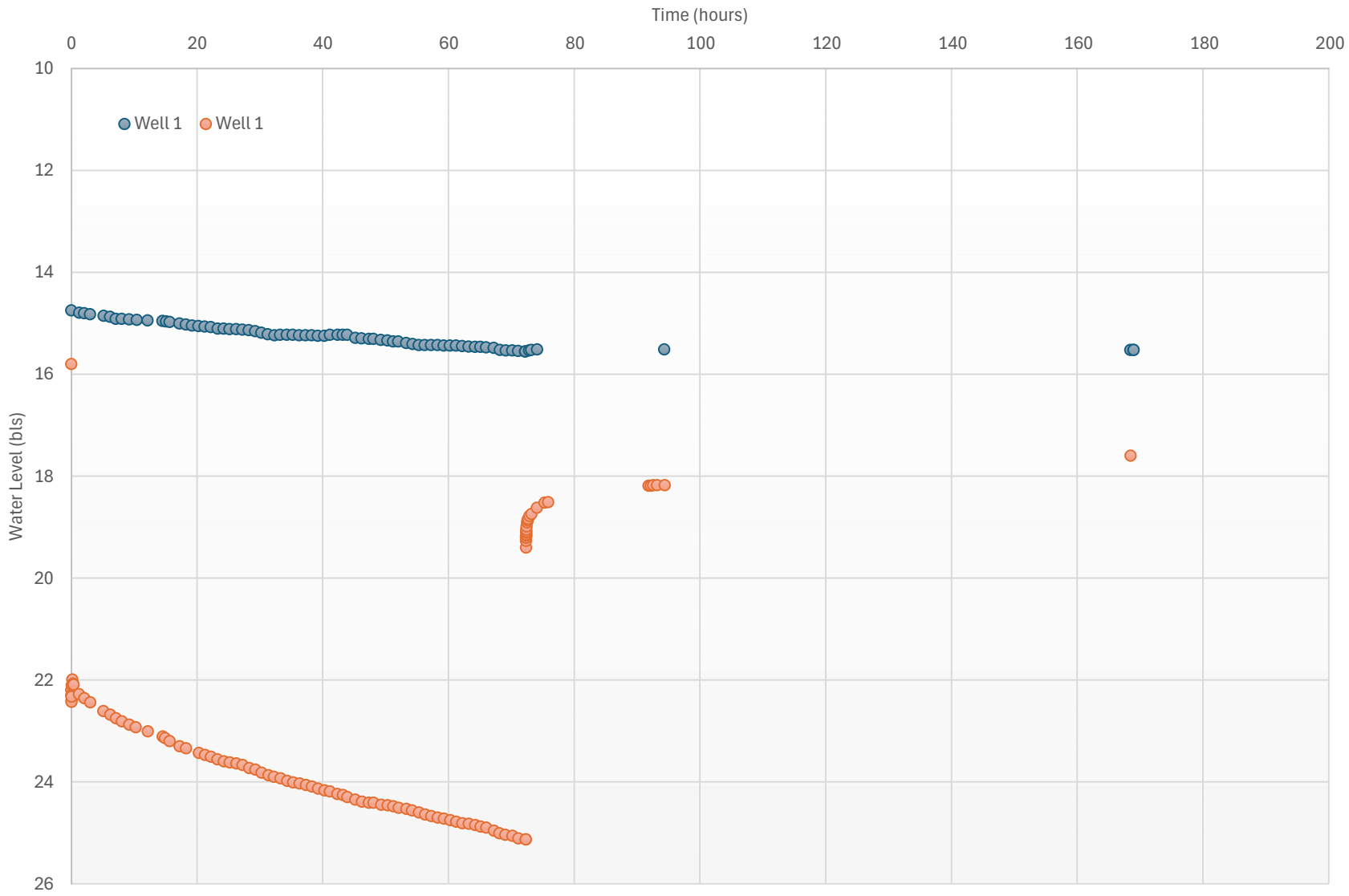
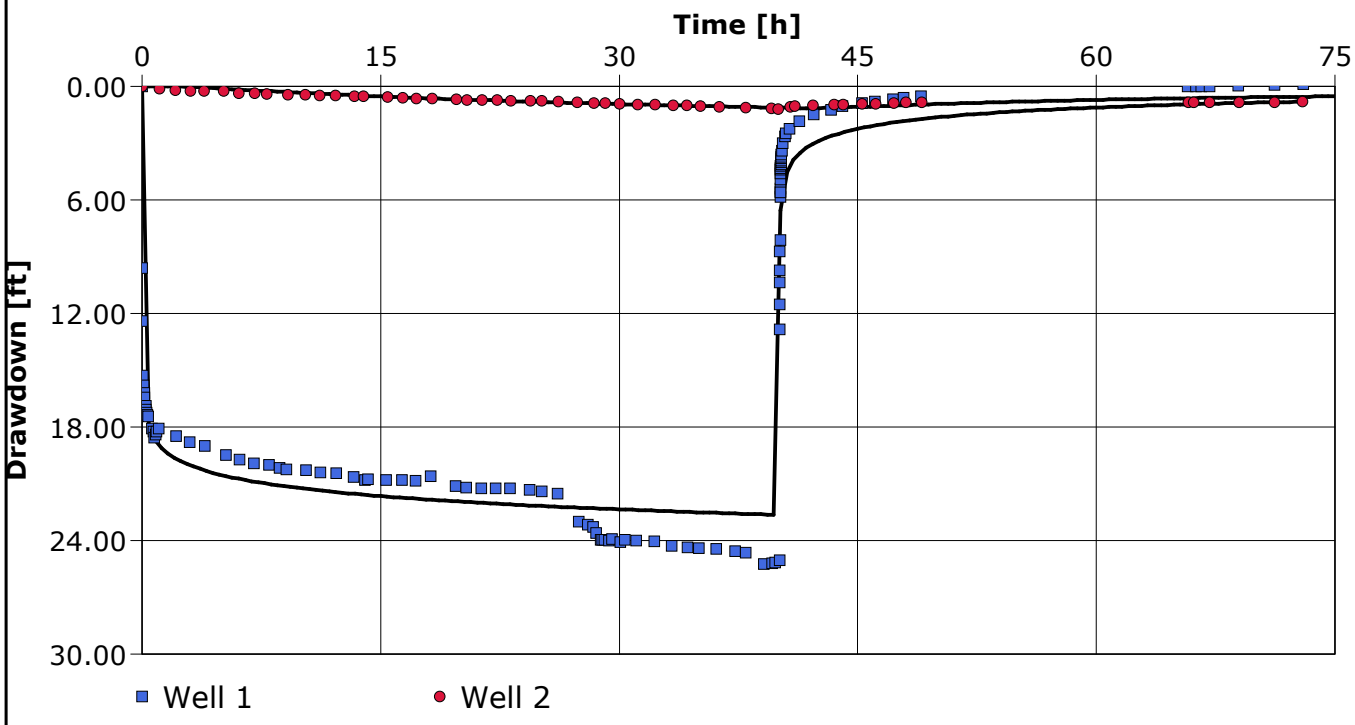


Figure 3: Constant Discharge Aquifer Test - Well 2
Pumping and Recovery Data
Mayacma Geothermal Project



	Aquifer Test Analysis Report
	Project: Mayacma Geothermal Project
	Number: 24-02-143
	Client: Open Mountain Energy

Location: Cobb, CA	Pumping Test: Well 1	Pumping Well: Well 1
Test Conducted by: Open Mountain Energy		Test Date: 8/26/2024
Analysis Performed by: Matt Herrick	Theis	Analysis Date: 9/4/2024
Aquifer Thickness: 35.00 ft	Discharge: variable, average rate 90 [U.S. gal/min]	

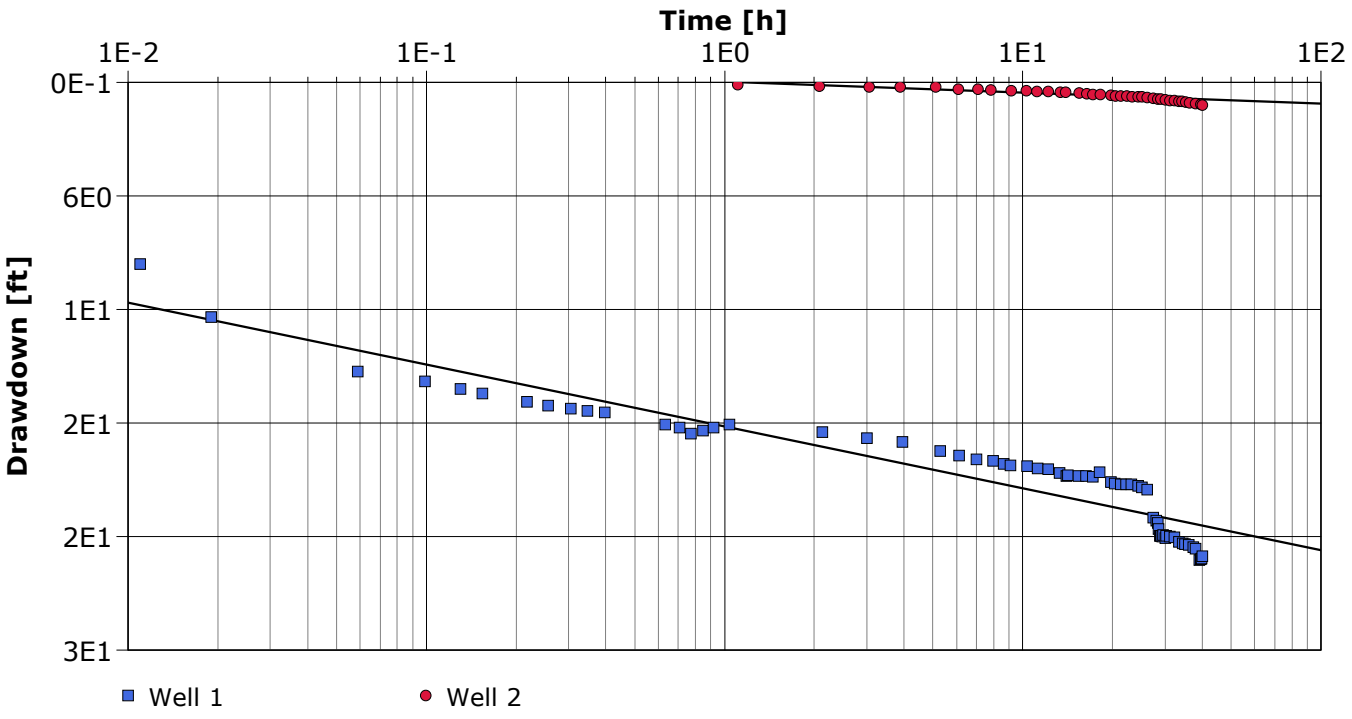


Calculation using Theis

Observation Well	Transmissivity [ft²/d]	Hydraulic Conductivity [ft/d]	Storage coefficient	Radial Distance to PW [ft]	
Well 1	1.36×10^{3}	3.89×10^{1}			
Well 2	1.77×10^{3}	5.05×10^{1}	1.41×10^{-2}	360.0	
Average	1.56×10^{3}	4.47×10^{1}			

	Aquifer Test Analysis Report
	Project: Mayacma Geothermal Project
	Number: 24-02-143
	Client: Open Mountain Energy

Location: Cobb, CA	Pumping Test: Well 1	Pumping Well: Well 1
Test Conducted by: Open Mountain Energy		Test Date: 8/26/2024
Analysis Performed by: Matt Herrick	Cooper & Jacob I	Analysis Date: 9/4/2024
Aquifer Thickness: 35.00 ft	Discharge Rate: 90 [U.S. gal/min]	



Calculation using COOPER & JACOB

Observation Well	Transmissivity [ft²/d]	Hydraulic Conductivity [ft/d]	Storage coefficient	Radial Distance to PW [ft]	
Well 1	9.69×10^{2}	2.77×10^{1}			
Well 2	5.51×10^{3}	1.57×10^{2}	4.58×10^{-3}	360.0	
Average	3.24×10^{3}	9.25×10^{1}			

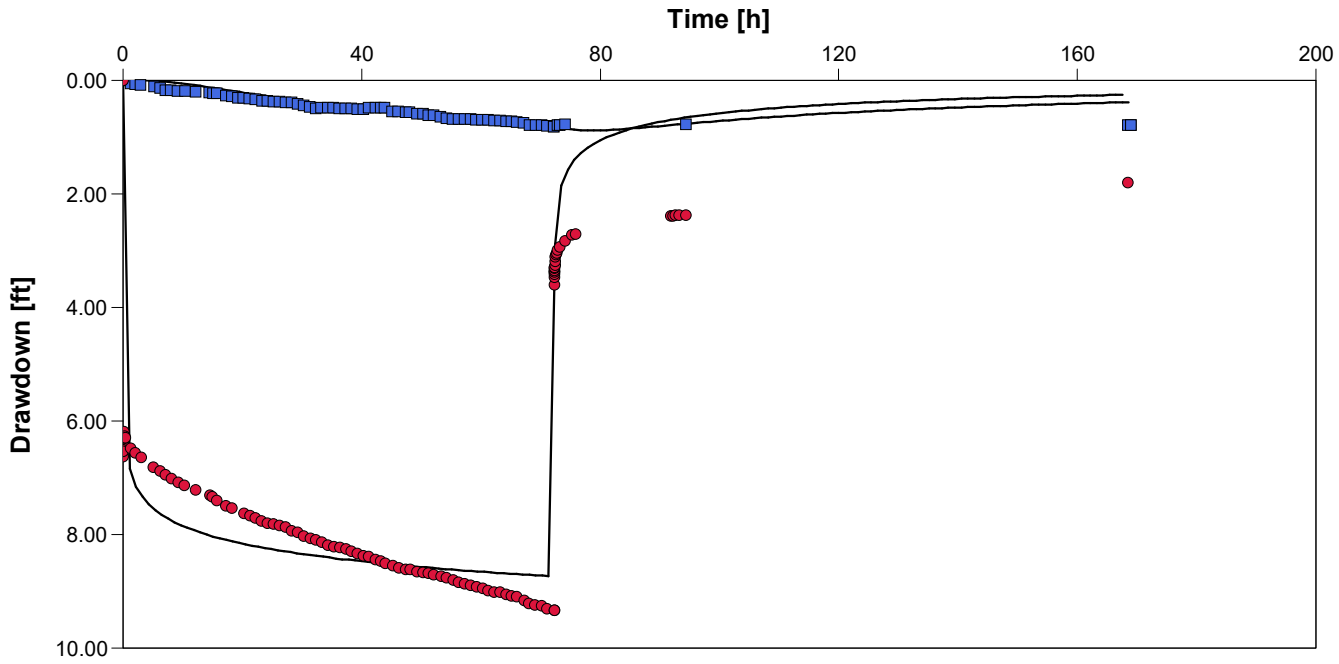
Aquifer Test Analysis Report

Project: Mayacma Geothermal Project

Number: 24-02-143

Client: Open Mountain Energy

Location: Cobb, CA	Pumping Test: Well 2	Pumping Well: Well 2
Test Conducted by: Matt Herrick		Test Date: 8/19/2024
Analysis Performed by: Matt Herrick	Theis	Analysis Date: 9/4/2024
Aquifer Thickness: 196.85 ft	Discharge: variable, average rate 67 [U.S. gal/min]	

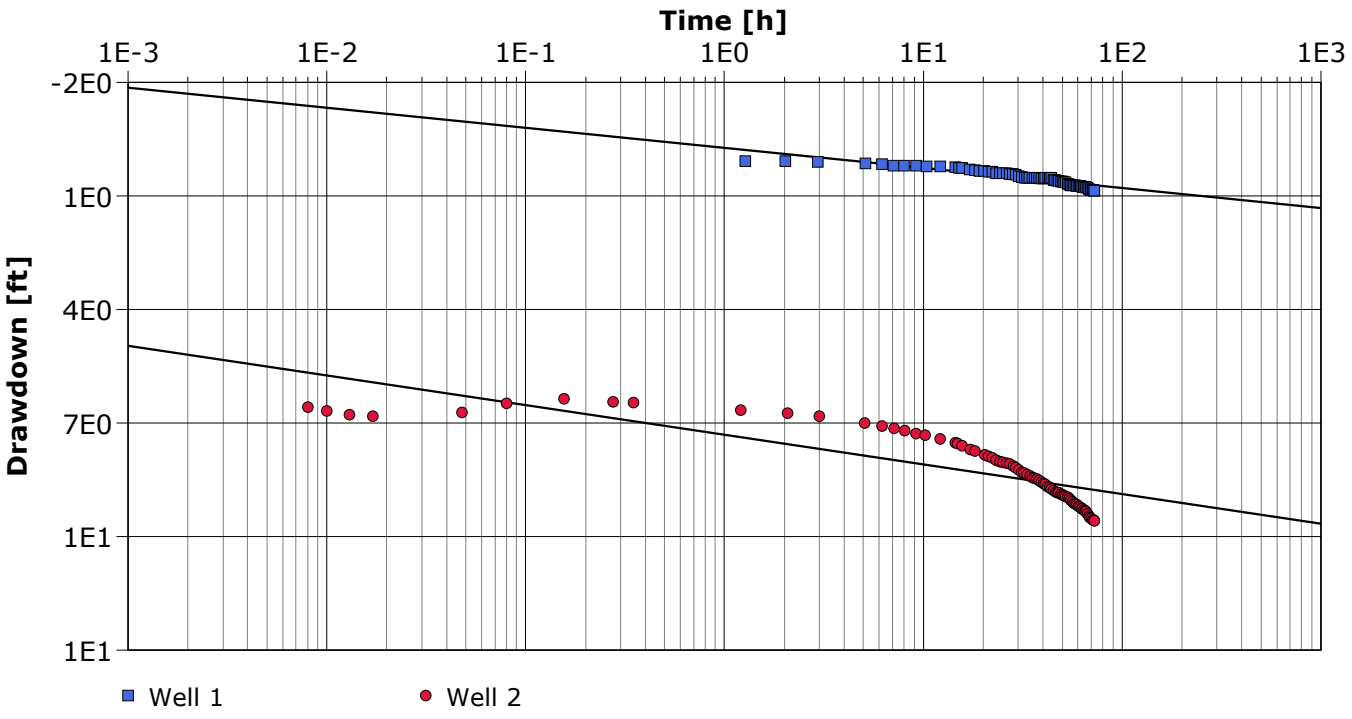


Calculation using Theis

Observation Well	Transmissivity [ft²/d]	Hydraulic Conductivity [ft/d]	Storage coefficient	Radial Distance to PW [ft]	
Well 1	1.30×10^{3}	6.60×10^{0}	2.95×10^{-2}	360.0	
Well 2	2.28×10^{3}	1.16×10^{1}			
Average	1.79×10^{3}	9.09×10^{0}			

	Aquifer Test Analysis Report
	Project: Mayacma Geothermal Project
	Number: 24-02-143
	Client: Open Mountain Energy

Location: Cobb, CA	Pumping Test: Well 2	Pumping Well: Well 2
Test Conducted by: Matt Herrick		Test Date: 8/19/2024
Analysis Performed by: Matt Herrick	Cooper & Jacob I	Analysis Date: 9/4/2024
Aquifer Thickness: 196.85 ft	Discharge Rate: 67 [U.S. gal/min]	



Calculation using COOPER & JACOB

Observation Well	Transmissivity [ft²/d]	Hydraulic Conductivity [ft/d]	Storage coefficient	Radial Distance to PW [ft]	
Well 1	4.57×10^{3}	2.32×10^{1}	1.17×10^{-2}	360.0	
Well 2	3.09×10^{3}	1.57×10^{1}			
Average	3.83×10^{3}	1.95×10^{1}			

Colman

ORIGINAL

File with DWR

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORT

~~11/80-2M~~ 11N/10W-25M
Do not fill in

No. 134481

State Well No. CONFIDENTIAL LOG Water Code Sec. 13752

Other Well No.

of Intent No.

Local Permit No. or Date

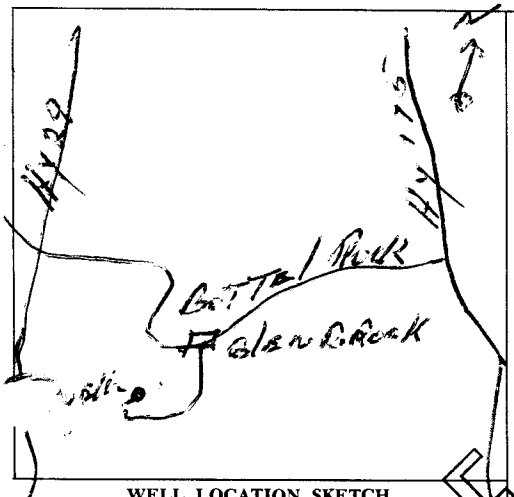
(2) LOCATION OF WELL (See instructions):

County LAKE - Owner's Well Number

Well address if different from above Glen Brook

Township Range Section

Distance from cities, roads, railroads, fences, etc. The Colman Ranch 1 mi. off of Bottel Rock Rd -



WELL LOCATION SKETCH

(3) TYPE OF WORK:

New Well [X] Deepening [ ]
Reconstruction [ ]
Reconditioning [ ]
Horizontal Well [ ]
Destruction [ ] (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:

Domestic [ ]
Irrigation [ ]
Industrial [X]
Test Well [ ]
Stock [ ]
Municipal [ ]
Other [ ]

(5) EQUIPMENT:

Rotary [ ] Reverse [ ]
Cable [X] Air [ ]
Other [ ] Bucket [ ]

(6) GRAVEL PACK:

Yes [ ] No [ ] Size

Diameter of bore

Packed from to ft.

(7) CASING INSTALLED:

Steel [X] Plastic [ ] Concrete [ ]

From ft.	To ft.	Dia. in.	Gage or Wall
+3'	80	8 5/8	.188

(8) PERFORATIONS:

Type of perforation or size of screen

From ft.	To ft.	Slot size
40	75	3/16 x 4"

(9) WELL SEAL:

Was surface sanitary seal provided? Yes [X] No [ ] If yes, to depth 20 ft.

Were strata sealed against pollution? Yes [ ] No [X] Interval ft.

Method of sealing NEAT Cement -

(10) WATER LEVELS:

Depth of first water, if known 40 ft.

Standing level after well completion Flowing Well ft.

(11) WELL TESTS:

Was well test made? Yes [X] No [ ] If yes, by whom? Dunham pump -

Type of test Pump [X] Bailer [ ] Air lift [ ]

Depth to water at start of test Flo ft. At end of test 6 ft

Yield 25 gal/min after 12 hours Water temperature

Chemical analysis made? Yes [ ] No [X] If yes, by whom?

Was electric log made? Yes [ ] No [X] If yes, attach copy to this report

(12) WELL LOG:

Total depth 85 ft. Depth of completed well 85 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	12'	Loam
12'	40	Brown Clay
40	60	Black Volcanic Sand
60	70	Fractured Blue Rock
70	85	Blue Hard Rock -

Work started 11-2 19 79 Completed 11-9 19 79

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

SIGNED (Well Driller)

NAME Eugene Lonsome -
(Person, firm, or corporation) (Typed or printed)

Address Box 65

City Lower Lake Zip 95457

License No. 421290 Date of this report 11-10-79

ORIGINAL
File with DWR

Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. e0101647

DWR USE ONLY — DO NOT FILL IN
11N/08W-05
STATE WELL NO./ STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

Owner's Well No. WELL #1
Date Work Began 11/16/2009, Ended 11/18/2009
Local Permit Agency Lake County Environmental
Permit No. WE2684 Permit Date 11/6/2009

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD AIR ROTARY FLUID N/A

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain, size, color, etc.*
0	35	Tan stiff clay
35	45	Stiff gray clay
45	60	Gray shale
60	120	Fractured sandstone

TOTAL DEPTH OF BORING 120 (Feet)
TOTAL DEPTH OF COMPLETED WELL 120 (Feet)

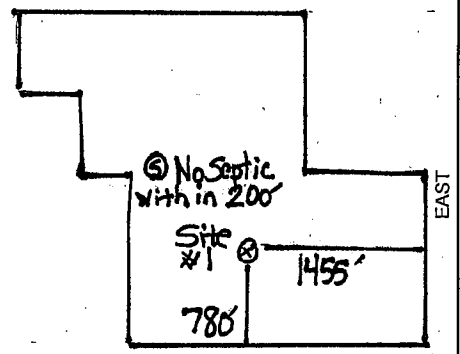
WELL OWNER

CITY STATE ZIP

WELL LOCATION

Address 7525 High Valley Road
City Cobb CA
County Lake
APN Book 013 Page 002 Parcel 03-20
Township 11N Range 8W Section 5
Latitude DEG. MIN. SEC. DEG. MIN. SEC.

LOCATION SKETCH



Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. **PLEASE BE ACCURATE & COMPLETE.**

ACTIVITY (✓)

✓ NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG"

PLANNED USES (✓)
WATER SUPPLY
___ Domestic ___ Public
___ Irrigation ✓ Industrial
MONITORING ___
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER N/A (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 56 (Ft.) & DATE MEASURED 11/18/2009
ESTIMATED YIELD * 50+ (GPM) & TEST TYPE air developed
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN 120 (Ft.)
May not be representative of a well's long-term yield.

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	20	11"								
20	120	8"								
+2	60		✓				PVC	5	SDR21	
60	120			✓			PVC	5	SDR21	.032

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	23	✓			CONCRETE
23	120			✓	3/8" GRAVEL

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analysis
___ Other
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.
NAME Weeks Drilling & Pump
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
P.O. Box 176 Sebastopol CA 95473
ADDRESS CITY STATE ZIP
Signed Melissa G Lopez 11/23/09 177681
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

DWR 188 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

APPENDIX B WATER QUALITY LABORATORY ANALYTICAL REPORT AND CHAIN-OF-CUSTODY DOCUMENTATION

SGS Silver State Analytical Laboratories
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Reno, NV 89502
(775) 857-2400
www.ssalabs.com

July 08, 2024
Workorder **24060401**

Jonh Casteel
Mayacma Geothermal LLC
245 E. Liberty St., Suite 520
Reno, NV 89501

Project: Pump House One

Dear Jonh Casteel:

It is the policy of SGS Silver State Analytical Laboratory - Reno to strictly adhere to a comprehensive Quality Assurance Plan that ensures the data presented in this report are both accurate and precise. SGS Silver State Analytical Laboratory - Reno maintains accreditation in the State of Nevada (NV-00015) and the State of California (ELAP 2990).

The data presented in this report was obtained from the analysis of samples received under a chain of custody. Unless otherwise noted below, samples were received in good condition, properly preserved and within the hold time for the requested analyses. Any anomalies associated with the analysis of the samples have been flagged in the Analytical Report with an appropriate explanation in the Definitions & Qualifiers.

Sincerely,

Carly Wood
Laboratory Director
1135 Financial Blvd
Reno, NV 89502

SGS Silver State Analytical Laboratories
1135 Financial Blvd
Reno, NV 89502
(775) 857-2400
www.ssalabs.com

Analytical Report

Workorder#: **24060401**
Date Reported: **7/8/2024**

Client: Mayacma Geothermal LLC
Project Name: Pump House One
PO #: MA-00009

Sampled By: Lucas P.

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
24060401-01	Pump House One	06/07/2024 10:26	6/7/2024

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Alkalinity, Bicarbonate (As CaCO3)	SM 2320 B	170	mg/L	2	SR	06/12/2024 10:19	
Alkalinity, Carbonate (As CaCO3)	SM 2320 B	< 2.0	mg/L	2	SR	06/12/2024 10:19	
Alkalinity, Hydroxide (As CaCO3)	SM 2320 B	< 2.0	mg/L	2	SR	06/12/2024 10:19	
Alkalinity, Total (As CaCO3)	SM 2320 B	170	mg/L	2	SR	06/12/2024 10:19	
Aluminum	EPA 200.7	0.10	mg/L	0.05	AL	06/27/2024 14:13	
Antimony	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:01	
Arsenic	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:01	
Barium	EPA 200.8	0.78	mg/L	0.01	AL	06/23/2024 23:01	
Beryllium	EPA 200.8	<0.002	mg/L	0.002	AL	06/27/2024 15:10	
Boron	EPA 200.7	0.41	mg/L	0.05	AL	06/27/2024 14:13	
Cadmium	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:01	
Calcium	EPA 200.7	35	mg/L	0.5	AL	06/27/2024 14:13	
Chloride	EPA 300.0	5.0	mg/L	0.5	SR	06/14/2024 2:45	S
Chromium	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:01	
Copper	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:01	
Fluoride	EPA 300.0	0.8	mg/L	0.1	SR	06/14/2024 2:45	
Iron	EPA 200.7	0.25	mg/L	0.05	AL	06/27/2024 14:13	
Kjeldahl, Nitrogen	SM 4500 Norg D	0.5	mg/L	0.1	DL	06/25/2024 10:22	
Lead	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:01	
Lithium	EPA 200.7	<0.1	mg/L	0.1	AL	06/27/2024 14:13	
Magnesium	EPA 200.7	10	mg/L	0.5	AL	06/27/2024 14:13	
Manganese	EPA 200.8	0.052	mg/L	0.002	AL	06/23/2024 23:01	
Mercury	EPA 245.1	< 0.0001	mg/L	0.0001	CTR	06/20/2024 13:56	
Molybdenum	EPA 200.8	<0.01	mg/L	0.01	AL	06/23/2024 23:01	
Nickel	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:01	
Nitrate as N	EPA 300.0	<0.5	mg/L	0.5	SR	06/27/2024 2:37	S
Nitrite as N	EPA 300.0	<0.5	mg/L	0.5	SR	06/27/2024 2:37	S
Nitrogen, Nitrate-Nitrite	EPA 300.0	<1.0	mg/L	1	SR	06/27/2024 2:37	S
Nitrogen, Total	Calculation	< 1.5	mg/L	1.5	CW	06/28/2024 9:44	
pH	SM 4500 H+B	8.14	pH Units		SR	06/12/2024 10:19	H
pH Temperature	SM 4500 H+B	26.0	°C		SR	06/12/2024 10:19	H
Phosphorus, Total as P	EPA 365.3	< 0.02	mg/L	0.02	CTR	06/20/2024 13:29	
Potassium	EPA 200.7	1.2	mg/L	0.5	AL	06/27/2024 14:13	
Selenium	EPA 200.8	<0.01	mg/L	0.01	AL	06/23/2024 23:01	
Silica as SiO2	EPA 200.7	32	mg/L	1	AL	07/04/2024 15:34	
Silver	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:01	
Sodium	EPA 200.7	27	mg/L	0.5	AL	06/27/2024 14:13	
Specific Conductivity	SM 2510B	360	µmhos/cm	2	SR	06/12/2024 10:19	
Sulfate	EPA 300.0	5.6	mg/L	0.2	SR	06/14/2024 2:45	
Suspended Solids	SM 2540 D	<5	mg/L	5	AE	06/14/2024 0:00	
Thallium	EPA 200.8	<0.001	mg/L	0.001	AL	06/23/2024 23:01	

Original

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Analytical Report

Workorder#: **24060401**
Date Reported: **7/8/2024**

Client: Mayacma Geothermal LLC
Project Name: Pump House One
PO #: MA-00009

Sampled By: Lucas P.

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
24060401-01	Pump House One	06/07/2024 10:26	6/7/2024

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Total Dissolved Solids	SM 2540 C	220	mg/L	10	AE	06/14/2024 0:00	
Turbidity	SM 2130 B	1.8	NTU	0.3	AE	06/07/2024 16:50	
Uranium	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:01	
Zinc	EPA 200.8	<0.02	mg/L	0.02	AL	06/23/2024 23:01	

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Analytical Report

Workorder#: **24060401**
Date Reported: **7/8/2024**

Client: Mayacma Geothermal LLC
Project Name: Pump House One
PO #: MA-00009

Sampled By: Lucas P.

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
24060401-02	Pump House Two	06/07/2024 10:00	6/7/2024

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Alkalinity, Bicarbonate (As CaCO3)	SM 2320 B	180	mg/L	2	SR	06/12/2024 10:19	
Alkalinity, Carbonate (As CaCO3)	SM 2320 B	< 2.0	mg/L	2	SR	06/12/2024 10:19	
Alkalinity, Hydroxide (As CaCO3)	SM 2320 B	< 2.0	mg/L	2	SR	06/12/2024 10:19	
Alkalinity, Total (As CaCO3)	SM 2320 B	180	mg/L	2	SR	06/12/2024 10:19	
Aluminum	EPA 200.7	<0.05	mg/L	0.05	AL	06/27/2024 14:15	
Antimony	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:03	
Arsenic	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:03	
Barium	EPA 200.8	0.69	mg/L	0.01	AL	06/23/2024 23:03	
Beryllium	EPA 200.8	<0.002	mg/L	0.002	AL	06/27/2024 15:12	
Boron	EPA 200.7	0.50	mg/L	0.05	AL	06/27/2024 14:15	
Cadmium	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:03	
Calcium	EPA 200.7	44	mg/L	0.5	AL	06/27/2024 14:15	
Chloride	EPA 300.0	8.0	mg/L	0.5	SR	06/14/2024 3:18	S
Chromium	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:03	
Copper	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:03	
Fluoride	EPA 300.0	0.8	mg/L	0.1	SR	06/14/2024 3:18	
Iron	EPA 200.7	0.25	mg/L	0.05	AL	06/27/2024 14:15	
Kjeldahl, Nitrogen	SM 4500 Norg D	0.1	mg/L	0.1	DL	06/25/2024 15:29	
Lead	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:03	
Lithium	EPA 200.7	<0.1	mg/L	0.1	AL	06/27/2024 14:15	
Magnesium	EPA 200.7	16	mg/L	0.5	AL	06/27/2024 14:15	
Manganese	EPA 200.8	0.10	mg/L	0.002	AL	06/23/2024 23:03	
Mercury	EPA 245.1	< 0.0001	mg/L	0.0001	CTR	06/20/2024 13:56	
Molybdenum	EPA 200.8	<0.01	mg/L	0.01	AL	06/23/2024 23:03	
Nickel	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:03	
Nitrate as N	EPA 300.0	<0.5	mg/L	0.5	SR	06/27/2024 17:41	S
Nitrite as N	EPA 300.0	<0.5	mg/L	0.5	SR	06/27/2024 17:41	
Nitrogen, Nitrate-Nitrite	EPA 300.0	<1.0	mg/L	1	SR	06/27/2024 17:41	
Nitrogen, Total	Calculation	< 1.1	mg/L	1.1	CW	06/28/2024 9:44	
pH	SM 4500 H+B	8.04	pH Units		SR	06/12/2024 10:19	H
pH Temperature	SM 4500 H+B	25.0	°C		SR	06/12/2024 10:19	H
Phosphorus, Total as P	EPA 365.3	0.02	mg/L	0.02	CTR	06/20/2024 13:29	
Potassium	EPA 200.7	1.9	mg/L	0.5	AL	06/27/2024 14:15	
Selenium	EPA 200.8	<0.01	mg/L	0.01	AL	06/23/2024 23:03	
Silica as SiO2	EPA 200.7	37	mg/L	1	AL	07/04/2024 15:36	
Silver	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:03	
Sodium	EPA 200.7	23	mg/L	0.5	AL	06/27/2024 14:15	
Specific Conductivity	SM 2510B	390	µmhos/cm	2	SR	06/12/2024 10:19	
Sulfate	EPA 300.0	6.0	mg/L	0.2	SR	06/14/2024 3:18	
Suspended Solids	SM 2540 D	< 5	mg/L	5	AE	06/14/2024 0:00	
Thallium	EPA 200.8	<0.001	mg/L	0.001	AL	06/23/2024 23:03	

Original

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Analytical Report

Workorder#: **24060401**
Date Reported: **7/8/2024**

Client: Mayacma Geothermal LLC
Project Name: Pump House One
PO #: MA-00009

Sampled By: Lucas P.

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID	Client Sample ID	Date/Time Sampled	Date Received
24060401-02	Pump House Two	06/07/2024 10:00	6/7/2024

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Total Dissolved Solids	SM 2540 C	210	mg/L	10	AE	06/14/2024 0:00	
Turbidity	SM 2130 B	0.3	NTU	0.3	AE	06/07/2024 16:50	
Uranium	EPA 200.8	<0.002	mg/L	0.002	AL	06/23/2024 23:03	
Zinc	EPA 200.8	<0.02	mg/L	0.02	AL	06/23/2024 23:03	

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Quality Control Report

WO#: **24060401**
7/8/2024

Analysis: Turbidity
Method: SM 2130 B **Batch ID:** **R91330**

Duplicate

RunID: 91330 SeqNo 2470997 Units: NTU
Analysis Date: 6/7/2024 4:50:05 PM Analyst: AE

Analyte	Result	Rep Limit	Rep Qual	RPD	Sample Value
Turbidity	0.308	0.300		0.0163666	0.303

Method Blank

RunID: 91330 SeqNo 2470993 Units: NTU
Analysis Date: 6/7/2024 4:50:05 PM Analyst: AE

Analyte	Result	Rep Limit	Rep Qual
Turbidity	< 0.30	0.30	B

Laboratory Control Sample (LCS)

RunID: 91330 SeqNo 2470994 Units: NTU
Analysis Date: 6/7/2024 4:50:05 PM Analyst: AE

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Turbidity	5.000	4.93	98.6								

Analysis: Anions 300.0
Method: EPA 300.0 **Batch ID:** **R91455**

Method Blank

RunID: 91455 SeqNo 2476070 Units: mg/L
Analysis Date: 6/10/2024 11:56:34 PM Analyst: SR

Analyte	Result	Rep Limit	Rep Qual
Chloride	< 0.50	0.50	
Fluoride	< 0.10	0.10	
Sulfate	< 0.20	0.20	

Laboratory Control Sample (LCS)

RunID: 91455 SeqNo 2476072 Units: mg/L
Analysis Date: 6/11/2024 1:00:52 AM Analyst: SR

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	10.00	9.3	93.3								
Fluoride	10.00	9.8	97.6								
Sulfate	10.00	9.3	92.9								

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Quality Control Report

WO#: **24060401**

7/8/2024

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060400-02A

RunID: 91455 SeqNo 2476034 Units: mg/L

Analysis Date: 6/11/2024 5:50:02 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	34.50	100.0	130	91.4								
Fluoride	0	100.0	98	98.1								
Sulfate	399.5	100.0	530	127								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060400-03A

RunID: 91455 SeqNo 2476039 Units: mg/L

Analysis Date: 6/11/2024 8:30:47 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	11.71	100.0	110	95.2								
Fluoride	0	100.0	98	97.6								
Sulfate	54.38	100.0	230	174								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24051288-31A

RunID: 91455 SeqNo 2476054 Units: mg/L

Analysis Date: 6/12/2024 4:33:01 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	18.95	100.0	110	91.5								
Fluoride	0	100.0	98	97.6								
Sulfate	107.2	100.0	200	91.0								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060255-03A

RunID: 91455 SeqNo 2476063 Units: mg/L

Analysis Date: 6/12/2024 9:22:23 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	64.04	100.0	160	93.4								
Fluoride	0	100.0	97	97.1								
Sulfate	61.79	100.0	160	94.0								

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Quality Control Report

WO#: **24060401**

7/8/2024

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060223-05A

RunID: 91455 SeqNo 2476892 Units: mg/L

Analysis Date: 6/12/2024 2:53:07 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	51.42	100.0	140	90.4								
Fluoride	0	100.0	97	97.3								
Sulfate	406.6	100.0	520	111								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060573-01A

RunID: 91455 SeqNo 2476906 Units: mg/L

Analysis Date: 6/12/2024 10:23:05 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	21.11	100.0	110	84.5								
Fluoride	0	100.0	96	95.8								
Sulfate	117.6	100.0	210	95.0								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060407-09A

RunID: 91455 SeqNo 2476917 Units: mg/L

Analysis Date: 6/13/2024 4:16:29 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	13.21	100.0	100	90.0								
Fluoride	0.7500	100.0	97	96.2								
Sulfate	378.6	100.0	490	107								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060409-07A

RunID: 91455 SeqNo 2476929 Units: mg/L

Analysis Date: 6/13/2024 10:42:02 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	16.66	100.0	110	89.0								
Fluoride	5.230	100.0	93	88.1								
Sulfate	792.3	100.0	910	113								

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Quality Control Report

WO#: **24060401**

7/8/2024

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060637-01A

RunID: 91455 SeqNo 2478816 Units: mg/L

Analysis Date: 6/13/2024 8:52:23 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	19.96	100.0	100	83.7								
Fluoride	8.900	100.0	99	90.1								
Sulfate	45.12	100.0	140	92.5								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060400-03A

RunID: 91455 SeqNo 2478826 Units: mg/L

Analysis Date: 6/14/2024 2:13:45 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	16.00	100.0	100	86.6								
Fluoride	0	100.0	96	95.8								
Sulfate	132.3	100.0	220	92.1								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060407-03A

RunID: 91455 SeqNo 2478838 Units: mg/L

Analysis Date: 6/14/2024 6:30:44 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	29.11	100.0	120	87.7								
Fluoride	5.250	100.0	96	90.3								
Sulfate	2267	100.0	2400	149								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060004-09A

RunID: 91455 SeqNo 2479792 Units: mg/L

Analysis Date: 6/14/2024 3:04:45 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	12.77	100.0	99	86.1								
Fluoride	0	100.0	96	96.4								
Sulfate	2133	100.0	2200	62.3								

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Quality Control Report

WO#: **24060401**

7/8/2024

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060672-01A

RunID: 91455 SeqNo 2479800 Units: mg/L

Analysis Date: 6/14/2024 7:21:48 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	13.07	100.0	100	88.8								
Fluoride	0	100.0	96	96.3								
Sulfate	318.0	100.0	420	101								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060063-01A

RunID: 91455 SeqNo 2479818 Units: mg/L

Analysis Date: 6/15/2024 5:00:06 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	78.96	100.0	170	93.7								
Fluoride	0	100.0	96	96.4								
Sulfate	53.35	100.0	150	92.6								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060063-02A

RunID: 91455 SeqNo 2479822 Units: mg/L

Analysis Date: 6/15/2024 7:08:39 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	25.91	100.0	28	2.41								
Fluoride	0	100.0	< 1.0	0.900								
Sulfate	36.29	100.0	40	3.25								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060004-23A

RunID: 91455 SeqNo 2479834 Units: mg/L

Analysis Date: 6/15/2024 1:34:17 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	12.71	100.0	100	87.4								
Fluoride	0	100.0	97	97.2								
Sulfate	2076	100.0	2200	141								

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Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060004-15A

RunID: 91455 SeqNo 2479846 Units: mg/L

Analysis Date: 6/15/2024 7:59:54 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Chloride	11.39	100.0	110	96.2								
Fluoride	5.710	100.0	120	117								
Sulfate	7218	100.0	7200	-27.9								

Analysis: Alkalinity

Method: SM 2320 B **Batch ID:** **R91486**

Duplicate

RunID: 91486 SeqNo 2476768 Units: mg/L

Analysis Date: 6/12/2024 10:19:22 AM Analyst: SR

Analyte	Result	Rep Limit	Rep Qual	RPD	Sample Value
Alkalinity, Bicarbonate (As CaCO3)	160	2.0		0.0543807	170
Alkalinity, Carbonate (As CaCO3)	< 2.0	2.0		0	0
Alkalinity, Hydroxide (As CaCO3)	< 2.0	2.0		0	0
Alkalinity, Total (As CaCO3)	160	2.0		0.0543807	170

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Duplicate

RunID: 91486 SeqNo 2476789 Units: mg/L

Analysis Date: 6/12/2024 10:19:22 AM Analyst: SR

Analyte	Result	Rep Limit	Rep Qual	RPD	Sample Value
Alkalinity, Bicarbonate (As CaCO3)	470	2.0		0.012959	460
Alkalinity, Carbonate (As CaCO3)	< 2.0	2.0		0	0
Alkalinity, Hydroxide (As CaCO3)	< 2.0	2.0		0	0
Alkalinity, Total (As CaCO3)	460	2.0		0.0108108	460

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Duplicate

RunID: 91486 SeqNo 2476791 Units: mg/L
Analysis Date: 6/12/2024 10:19:22 AM Analyst: SR

Analyte	Result	Rep Limit	Rep Qual	RPD	Sample Value
Alkalinity, Bicarbonate (As CaCO3)	50	2.0		0.0622568	53
Alkalinity, Carbonate (As CaCO3)	< 2.0	2.0		0	0
Alkalinity, Hydroxide (As CaCO3)	< 2.0	2.0		0	0
Alkalinity, Total (As CaCO3)	50	2.0		0.0622568	53

Laboratory Control Sample (LCS)

RunID: 91486 SeqNo 2476766 Units: mg/L
Analysis Date: 6/12/2024 10:19:22 AM Analyst: SR

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Alkalinity, Total (As CaCO3)	100.0	98	98.1	100.0	110	109	10.5	20	90	110	

Laboratory Control Sample (LCS)

RunID: 91486 SeqNo 2476787 Units: mg/L
Analysis Date: 6/12/2024 10:19:22 AM Analyst: SR

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Alkalinity, Total (As CaCO3)	100.0	110	109	100.0	110	109	10.5	20	90	110	

Analysis: Conductivity
Method: SM 2510B **Batch ID:** **R91486**

Duplicate

RunID: 91486 SeqNo 2476731 Units: µmhos/c
Analysis Date: 6/12/2024 10:19:22 AM Analyst: SR

Analyte	Result	Rep Limit	Rep Qual	RPD	Sample Value
Specific Conductivity	360	2.0		0.0083682	357

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Duplicate

RunID: 91486 SeqNo 2476738 Units: µmhos/c

Analysis Date: 6/12/2024 10:19:22 AM Analyst: SR

Analyte	Result	Rep Limit	Rep Qual	RPD	Sample Value
Specific Conductivity	4300	2.0		0.0046296	4310

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Duplicate

RunID: 91486 SeqNo 2476753 Units: µmhos/c

Analysis Date: 6/12/2024 10:19:22 AM Analyst: SR

Analyte	Result	Rep Limit	Rep Qual	RPD	Sample Value
Specific Conductivity	3700	2.0		0.0026846	3730

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WO#: **24060401**

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Duplicate

RunID: 91486 SeqNo 2476756 Units: µmhos/c

Analysis Date: 6/12/2024 10:19:22 AM Analyst: SR

Analyte	Result	Rep Limit	Rep Qual	RPD	Sample Value
Specific Conductivity	10000	2.0		0.0049188	10140

Laboratory Control Sample (LCS)

RunID: 91486 SeqNo 2476729 Units: µmhos/c

Analysis Date: 6/12/2024 10:19:22 AM Analyst: SR

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Specific Conductivity	718.0	760	105								

Analysis: pH

Method: SM 4500 H+B **Batch ID:** **R91486**

Duplicate

RunID: 91486 SeqNo 2476683 Units: pH Units

Analysis Date: 6/12/2024 10:19:22 AM Analyst: SR

Analyte	Result	Rep Limit	Rep Qual	RPD	Sample Value
pH	7.81		H	0.0413793	8.14
pH Temperature	26.0		H	0	26

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Duplicate

RunID: 91486 SeqNo 2476705 Units: pH Units

Analysis Date: 6/12/2024 10:19:22 AM Analyst: SR

Analyte	Result	Rep Limit	Rep Qual	RPD	Sample Value
pH	7.81		H	0.0063816	7.86
pH Temperature	24.0		H	0	24

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Duplicate

RunID: 91486 SeqNo 2476715 Units: pH Units
Analysis Date: 6/12/2024 10:19:22 AM Analyst: SR

Analyte	Result	Rep Limit	Rep Qual	RPD	Sample Value
pH	7.50		H	0.0171844	7.63
pH Temperature	25.0		H	0	25

Laboratory Control Sample (LCS)

RunID: 91486 SeqNo 2476677 Units: pH Units
Analysis Date: 6/12/2024 10:19:22 AM Analyst: SR

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
pH	7.020	6.94	98.9								
pH Temperature		25.0	0								

Analysis: Total Dissolved Solids
Method: SM 2540 C **Batch ID:** **R91558**

Duplicate

RunID: 91558 SeqNo 2484217 Units: mg/L
Analysis Date: 6/14/2024 Analyst: AE

Analyte	Result	Rep Limit	Rep Qual	RPD	Sample Value
Total Dissolved Solids	3500	10.0		0.0289855	3400

Method Blank

RunID: 91558 SeqNo 2484218 Units: mg/L
Analysis Date: 6/14/2024 Analyst: AE

Analyte	Result	Rep Limit	Rep Qual
Total Dissolved Solids	< 10	10	B

Laboratory Control Sample (LCS)

RunID: 91558 SeqNo 2484219 Units: mg/L
Analysis Date: 6/14/2024 Analyst: AE

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Total Dissolved Solids	500.0	500	100								

Analysis: Total Suspended Solids
Method: SM 2540 D **Batch ID:** **R91559**

Duplicate

RunID: 91559 SeqNo 2480662 Units: mg/L
Analysis Date: 6/14/2024 Analyst: AE

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Analyte	Result	Rep Limit	Rep Qual	RPD	Sample Value
Suspended Solids	< 5.00	5.00		0	0

Method Blank

RunID: 91559 SeqNo 2480663 Units: mg/L

Analysis Date: 6/14/2024 Analyst: AE

Analyte	Result	Rep Limit	Rep Qual
Suspended Solids	< 5.0	5.0	

Laboratory Control Sample (LCS)

RunID: 91559 SeqNo 2480664 Units: mg/L

Analysis Date: 6/14/2024 Analyst: AE

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Suspended Solids	200.0	213	106								

Analysis: Phosphorus, Total

Method: EPA 365.3 **Batch ID:** **R91715**

Method Blank

RunID: 91715 SeqNo 2484632 Units: mg/L

Analysis Date: 6/20/2024 1:29:00 PM Analyst: CTR

Analyte	Result	Rep Limit	Rep Qual
Phosphorus, Total as P	< 0.02	0.02	

Laboratory Control Sample (LCS)

RunID: 91715 SeqNo 2484633 Units: mg/L

Analysis Date: 6/20/2024 1:29:00 PM Analyst: CTR

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Phosphorus, Total as P	0.2500	0.255	102	0.2500	0.255	102	0	20	90	110	

Laboratory Control Sample (LCS)

RunID: 91715 SeqNo 2484634 Units: mg/L

Analysis Date: 6/20/2024 1:29:00 PM Analyst: CTR

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Phosphorus, Total as P	0.2500	0.255	102	0.2500	0.255	102	0	20	90	110	

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060401-01C

RunID: 91715 SeqNo 2484644 Units: mg/L

Analysis Date: 6/20/2024 1:29:00 PM Analyst: CTR

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Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Phosphorus, Total as P	0	0.2000	0.238	119	0.2000	0.237	119	0.421	20	80	120	

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060401-01C

RunID: 91715 SeqNo 2484645 Units: mg/L

Analysis Date: 6/20/2024 1:29:00 PM Analyst: CTR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Phosphorus, Total as P	0	0.2000	0.237	119								

Analysis: Mercury
Method: EPA 245.1 **Batch ID:** **R91720**

Method Blank

RunID: 91720 SeqNo 2484736 Units: mg/L

Analysis Date: 6/20/2024 1:56:10 PM Analyst: CTR

Analyte	Result	Rep Limit	Rep Qual
Mercury	< 0.0001	0.0001	

Laboratory Control Sample (LCS)

RunID: 91720 SeqNo 2484735 Units: mg/L

Analysis Date: 6/20/2024 1:56:10 PM Analyst: CTR

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Mercury	0.006000	0.00598	99.7								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060257-14B

RunID: 91720 SeqNo 2484739 Units: mg/L

Analysis Date: 6/20/2024 1:56:10 PM Analyst: CTR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Mercury	0	.005000	0.00477	95.4	.005000	0.00506	101	5.90	20	70	130	

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060257-14B

RunID: 91720 SeqNo 2484740 Units: mg/L

Analysis Date: 6/20/2024 1:56:10 PM Analyst: CTR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual

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Mercury	0	0.005000	0.00506	101

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060539-04B

RunID: 91720 SeqNo 2484753 Units: mg/L

Analysis Date: 6/20/2024 1:56:10 PM Analyst: CTR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Mercury	0	0.005000	0.00486	97.2	0.005000	0.00488	97.6	0.411	20	70	130	

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060539-04B

RunID: 91720 SeqNo 2484754 Units: mg/L

Analysis Date: 6/20/2024 1:56:10 PM Analyst: CTR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Mercury	0	0.005000	0.00488	97.6								

Analysis: Metals 200.8
Method: EPA 200.8 **Batch ID:** **R91779**

Method Blank

RunID: 91779 SeqNo 2487265 Units: mg/L

Analysis Date: 6/23/2024 5:29:00 PM Analyst: JF

Analyte	Result	Rep Limit	Rep Qual
Antimony	< 0.0010	0.0010	
Arsenic	< 0.0010	0.0010	
Barium	< 0.0050	0.0050	
Cadmium	< 0.0010	0.0010	
Chromium	< 0.0010	0.0010	
Copper	< 0.0010	0.0010	
Lead	< 0.0010	0.0010	
Manganese	< 0.0010	0.0010	
Molybdenum	< 0.0050	0.0050	
Nickel	< 0.0010	0.0010	
Selenium	< 0.0050	0.0050	
Silver	< 0.0010	0.0010	
Thallium	< 0.00050	0.00050	
Uranium	< 0.0010	0.0010	
Zinc	< 0.010	0.010	

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Method Blank

RunID: 91779 SeqNo 2487638 Units: mg/L

Analysis Date: 6/23/2024 9:59:00 PM Analyst: JF

Analyte	Result	Rep Limit	Rep Qual
Antimony	< 0.0020	0.0020	
Arsenic	< 0.0020	0.0020	
Barium	< 0.010	0.010	
Cadmium	< 0.0020	0.0020	
Chromium	< 0.0020	0.0020	
Copper	< 0.0020	0.0020	
Lead	< 0.0020	0.0020	
Manganese	< 0.0020	0.0020	
Molybdenum	< 0.010	0.010	
Nickel	< 0.0020	0.0020	
Selenium	< 0.010	0.010	
Silver	< 0.0020	0.0020	
Thallium	< 0.0010	0.0010	
Uranium	< 0.0020	0.0020	
Zinc	< 0.020	0.020	

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Method Blank

RunID: 91779 SeqNo 2487641 Units: mg/L
Analysis Date: 6/23/2024 10:01:00 PM Analyst: JF

Analyte	Result	Rep Limit	Rep Qual
Antimony	< 0.0020	0.0020	
Arsenic	< 0.0020	0.0020	
Barium	< 0.010	0.010	
Cadmium	< 0.0020	0.0020	
Chromium	< 0.0020	0.0020	
Copper	< 0.0020	0.0020	
Lead	< 0.0020	0.0020	
Manganese	< 0.0020	0.0020	
Molybdenum	< 0.010	0.010	
Nickel	< 0.0020	0.0020	
Selenium	< 0.010	0.010	
Silver	< 0.0020	0.0020	
Thallium	< 0.0010	0.0010	
Uranium	< 0.0020	0.0020	
Zinc	< 0.020	0.020	

Laboratory Control Sample (LCS)

RunID: 91779 SeqNo 2487263 Units: mg/L
Analysis Date: 6/23/2024 5:27:00 PM Analyst: JF

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Antimony	0.02500	0.027	108								
Arsenic	0.02500	0.027	108								
Barium	0.02500	0.027	106								
Cadmium	0.02500	0.026	104								
Chromium	0.02500	0.027	107								
Copper	0.02500	0.026	106								
Lead	0.02500	0.027	108								
Manganese	0.02500	0.027	107								
Molybdenum	0.02500	0.026	105								
Nickel	0.02500	0.026	105								
Selenium	0.1250	0.13	107								
Silver	0.02500	0.026	105								
Thallium	0.02500	0.027	109								
Uranium	0.02500	0.026	105								
Zinc	0.02500	0.027	108								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060336-02A

RunID: 91779 SeqNo 2487653 Units: mg/L
Analysis Date: 6/23/2024 10:09:00 PM Analyst: JF

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual

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Antimony	0	1.000	1.1	106
Arsenic	0	1.000	1.0	103
Barium	0	1.000	0.98	98.0
Cadmium	0	1.000	1.0	102
Chromium	0	1.000	1.1	107
Copper	0	1.000	1.1	110
Lead	0	1.000	1.0	104
Manganese	0	1.000	1.0	105
Molybdenum	0	1.000	1.1	115
Nickel	0	1.000	1.1	106
Selenium	0	5.000	5.2	104
Silver	0	1.000	1.0	103
Thallium	0	1.000	1.1	106
Uranium	0	1.000	0.94	93.5
Zinc	0	1.000	1.1	106

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060336-02A

RunID: 91779 SeqNo 2487656 Units: mg/L

Analysis Date: 6/23/2024 10:11:00 PM Analyst: JF

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Antimony	0	1.000	1.1	106								
Arsenic	0	1.000	1.0	103								
Barium	0	1.000	0.99	98.8								
Cadmium	0	1.000	1.0	101								
Chromium	0	1.000	1.1	107								
Copper	0	1.000	1.1	109								
Lead	0	1.000	1.1	105								
Manganese	0	1.000	1.0	104								
Molybdenum	0	1.000	1.1	113								
Nickel	0	1.000	1.1	107								
Selenium	0	5.000	5.3	106								
Silver	0	1.000	1.0	104								
Thallium	0	1.000	1.1	108								
Uranium	0	1.000	0.93	93.2								
Zinc	0	1.000	1.1	106								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060387-07B

RunID: 91779 SeqNo 2487697 Units: mg/L

Analysis Date: 6/23/2024 10:40:00 PM Analyst: JF

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Antimony	0	1.000	1.0	105								
Arsenic	0	1.000	1.0	99.5								
Barium	0	1.000	0.97	97.2								

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Cadmium	0	1.000	0.97	97.1
Chromium	0	1.000	1.0	104
Copper	0	1.000	1.1	107
Lead	0	1.000	1.0	104
Manganese	0	1.000	1.0	101
Molybdenum	0	1.000	1.1	107
Nickel	0	1.000	1.0	104
Selenium	0	5.000	5.4	108
Silver	0	1.000	0.91	91.0
Thallium	0	1.000	1.1	107
Uranium	0	1.000	0.94	93.6
Zinc	0	1.000	1.0	103

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060387-07B

RunID: 91779 SeqNo 2487705 Units: mg/L

Analysis Date: 6/23/2024 10:46:00 PM Analyst: JF

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Antimony	0	1.000	1.1	106								
Arsenic	0	1.000	1.0	103								
Barium	0	1.000	0.99	98.7								
Cadmium	0	1.000	0.99	98.9								
Chromium	0	1.000	1.1	107								
Copper	0	1.000	1.1	110								
Lead	0	1.000	1.0	105								
Manganese	0	1.000	1.0	104								
Molybdenum	0	1.000	1.1	111								
Nickel	0	1.000	1.1	107								
Selenium	0	5.000	5.3	106								
Silver	0	1.000	1.0	101								
Thallium	0	1.000	1.1	109								
Uranium	0	1.000	0.94	94.4								
Zinc	0	1.000	1.1	106								

Analysis: Anions 300.0
Method: EPA 300.0 **Batch ID:** **R91827**

Method Blank

RunID: 91827 SeqNo 2489425 Units: mg/L

Analysis Date: 6/10/2024 11:56:34 PM Analyst: SR

Analyte	Result	Rep Limit	Rep Qual
Nitrate as N	< 0.050	0.050	
Nitrite as N	< 0.050	0.050	
Nitrogen, Nitrate-Nitrite	< 0.10	0.10	

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Quality Control Report

WO#: **24060401**

7/8/2024

Laboratory Control Sample (LCS)

RunID: 91827 SeqNo 2489427 Units: mg/L

Analysis Date: 6/11/2024 1:00:52 AM Analyst: SR

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	10.00	9.4	93.5								
Nitrite as N	10.00	9.3	92.9								
Nitrogen, Nitrate-Nitrite	20.00	19	93.2								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060146-01A

RunID: 91827 SeqNo 2489387 Units: mg/L

Analysis Date: 6/24/2024 1:34:15 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	0	100.0	95	95.3								
Nitrite as N	0	100.0	100	99.9								
Nitrogen, Nitrate-Nitrite	0	200.0	200	97.6								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060475-04A

RunID: 91827 SeqNo 2489400 Units: mg/L

Analysis Date: 6/24/2024 8:32:00 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	0.05000	100.0	90	90.2								
Nitrite as N	0	100.0	94	93.8								
Nitrogen, Nitrate-Nitrite	0.05000	200.0	180	92.0								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060458-01A

RunID: 91827 SeqNo 2489410 Units: mg/L

Analysis Date: 6/25/2024 1:53:18 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	13.02	100.0	99	86.2								
Nitrite as N	0	100.0	92	92.0								
Nitrogen, Nitrate-Nitrite	13.02	200.0	190	89.1								

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WO#: **24060401**

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Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060539-12A

RunID: 91827 SeqNo 2490401 Units: mg/L

Analysis Date: 6/25/2024 10:27:20 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	0	100.0	89	89.2								
Nitrite as N	0	100.0	93	93.4								
Nitrogen, Nitrate-Nitrite	0	200.0	180	91.3								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060257-01A

RunID: 91827 SeqNo 2490409 Units: mg/L

Analysis Date: 6/25/2024 2:44:22 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	75.33	100.0	170	93.0								
Nitrite as N	0	100.0	92	92.0								
Nitrogen, Nitrate-Nitrite	75.33	200.0	260	92.5								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060339-10A

RunID: 91827 SeqNo 2490424 Units: mg/L

Analysis Date: 6/25/2024 10:46:17 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	7.170	100.0	94	87.0								
Nitrite as N	0	100.0	89	89.3								
Nitrogen, Nitrate-Nitrite	7.170	200.0	180	88.1								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060339-01A

RunID: 91827 SeqNo 2490436 Units: mg/L

Analysis Date: 6/26/2024 5:11:55 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	6.220	100.0	94	88.2								
Nitrite as N	0	100.0	97	96.7								
Nitrogen, Nitrate-Nitrite	6.220	200.0	190	92.4								

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Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060339-10A

RunID: 91827 SeqNo 2491250 Units: mg/L

Analysis Date: 6/26/2024 10:01:06 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	7.200	100.0	95	87.9								
Nitrite as N	0	100.0	96	96.4								
Nitrogen, Nitrate-Nitrite	7.200	200.0	190	92.2								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060223-03A

RunID: 91827 SeqNo 2491264 Units: mg/L

Analysis Date: 6/26/2024 3:54:33 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	4.660	100.0	93	88.4								
Nitrite as N	0	100.0	96	96.5								
Nitrogen, Nitrate-Nitrite	4.660	200.0	190	92.5								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060223-01A

RunID: 91827 SeqNo 2491278 Units: mg/L

Analysis Date: 6/26/2024 11:24:22 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	0	100.0	88	87.8								
Nitrite as N	0	100.0	89	89.1								
Nitrogen, Nitrate-Nitrite	0	200.0	180	88.4								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060808-01A

RunID: 91827 SeqNo 2491297 Units: mg/L

Analysis Date: 6/27/2024 8:30:25 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	0	100.0	89	89.2								
Nitrite as N	0	100.0	92	92.0								
Nitrogen, Nitrate-Nitrite	0	200.0	180	90.6								

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Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060689-01A

RunID: 91827 SeqNo 2493307 Units: mg/L

Analysis Date: 6/27/2024 1:56:04 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	0	100.0	91	90.9								
Nitrite as N	0	100.0	95	95.3								
Nitrogen, Nitrate-Nitrite	0	200.0	190	93.1								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060179-03A

RunID: 91827 SeqNo 2493319 Units: mg/L

Analysis Date: 6/27/2024 8:21:36 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	0	100.0	89	89.4								
Nitrite as N	0	100.0	91	90.7								
Nitrogen, Nitrate-Nitrite	0	200.0	180	90.1								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060832-04A

RunID: 91827 SeqNo 2493334 Units: mg/L

Analysis Date: 6/28/2024 4:23:32 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	0	100.0	91	91.0								
Nitrite as N	0	100.0	94	94.4								
Nitrogen, Nitrate-Nitrite	0	200.0	190	92.7								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060862-04A

RunID: 91827 SeqNo 2494889 Units: mg/L

Analysis Date: 6/28/2024 10:48:57 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	0	100.0	86	85.6								
Nitrite as N	0	100.0	87	87.1								
Nitrogen, Nitrate-Nitrite	0	200.0	170	86.3								

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Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060864-01A

RunID: 91827 SeqNo 2494897 Units: mg/L

Analysis Date: 6/28/2024 3:06:04 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	0	100.0	100	102								
Nitrite as N	0	100.0	75	74.7								
Nitrogen, Nitrate-Nitrite	0	200.0	180	88.6								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060179-01A

RunID: 91827 SeqNo 2497759 Units: mg/L

Analysis Date: 6/28/2024 11:40:04 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	5.320	100.0	92	87.1								
Nitrite as N	0	100.0	95	95.4								
Nitrogen, Nitrate-Nitrite	5.320	200.0	190	91.2								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060537-01A

RunID: 91827 SeqNo 2497766 Units: mg/L

Analysis Date: 6/29/2024 3:25:00 AM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	8.180	100.0	96	87.3								
Nitrite as N	0	100.0	95	95.5								
Nitrogen, Nitrate-Nitrite	8.180	200.0	190	91.4								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060985-01A

RunID: 91827 SeqNo 2497783 Units: mg/L

Analysis Date: 6/29/2024 12:31:18 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	0	100.0	92	91.6								
Nitrite as N	0	100.0	95	95.4								
Nitrogen, Nitrate-Nitrite	0	200.0	190	93.5								

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Quality Control Report

WO#: **24060401**

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Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060998-01A

RunID: 91827 SeqNo 2497792 Units: mg/L

Analysis Date: 6/29/2024 5:20:30 PM Analyst: SR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Nitrate as N	0.5000	100.0	140	137								
Nitrite as N	0	100.0	35	35.2								
Nitrogen, Nitrate-Nitrite	0.5000	200.0	170	86.1								

Analysis: Kjeldahl Nitrogen, Total (TKN)
Method: SM 4500 Norg D **Batch ID:** **R91829**

Method Blank

RunID: 91829 SeqNo 2490980 Units: mg/L

Analysis Date: 6/25/2024 10:22:00 AM Analyst: DL

Analyte	Result	Rep Limit	Rep Qual
Kjeldahl, Nitrogen	< 0.1	0.1	

Laboratory Control Sample (LCS)

RunID: 91829 SeqNo 2490981 Units: mg/L

Analysis Date: 6/25/2024 10:22:00 AM Analyst: DL

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Kjeldahl, Nitrogen	19.00	16.9	88.9								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060401-01C

RunID: 91829 SeqNo 2490983 Units: mg/L

Analysis Date: 6/25/2024 10:22:00 AM Analyst: DL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Kjeldahl, Nitrogen	0.5000	10.00	10.2	97.0	10.00	9.73	92.3	4.72	20	80	120	

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060401-01C

RunID: 91829 SeqNo 2490984 Units: mg/L

Analysis Date: 6/25/2024 10:22:00 AM Analyst: DL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Kjeldahl, Nitrogen	0.5000	10.00	9.73	92.3								

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WO#: **24060401**
7/8/2024

Analysis: Kjeldahl Nitrogen, Total (TKN)
Method: SM 4500 Norg D **Batch ID:** **R91848**

Method Blank

RunID: 91848 SeqNo 2491175 Units: mg/L
Analysis Date: 6/25/2024 3:29:00 PM Analyst: DL

Analyte	Result	Rep Limit	Rep Qual
Kjeldahl, Nitrogen	< 0.1	0.1	B

Laboratory Control Sample (LCS)

RunID: 91848 SeqNo 2491176 Units: mg/L
Analysis Date: 6/25/2024 3:29:00 PM Analyst: DL

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Kjeldahl, Nitrogen	19.00	16.4	86.3								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060179-01B
RunID: 91848 SeqNo 2491178 Units: mg/L
Analysis Date: 6/25/2024 3:29:00 PM Analyst: DL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Kjeldahl, Nitrogen	0.9000	10.00	9.54	86.4	10.00	9.07	81.7	5.05	20	80	120	

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060179-01B
RunID: 91848 SeqNo 2491179 Units: mg/L
Analysis Date: 6/25/2024 3:29:00 PM Analyst: DL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Kjeldahl, Nitrogen	0.9000	10.00	9.07	81.7								

Analysis: Metals 200.8
Method: EPA 200.8 **Batch ID:** **R91958**

Method Blank

RunID: 91958 SeqNo 2492844 Units: mg/L
Analysis Date: 6/27/2024 2:42:00 PM Analyst: AL

Analyte	Result	Rep Limit	Rep Qual
Beryllium	< 0.0010	0.0010	

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WO#: **24060401**

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Method Blank

RunID: 91958 SeqNo 2492852 Units: mg/L

Analysis Date: 6/27/2024 2:51:00 PM Analyst: AL

Analyte	Result	Rep Limit	Rep Qual
Beryllium	< 0.0010	0.0010	

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WO#: **24060401**

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Method Blank

RunID: 91958 SeqNo 2492874 Units: mg/L

Analysis Date: 6/27/2024 3:14:00 PM Analyst: AL

Analyte	Result	Rep Limit	Rep Qual
Beryllium	< 0.0020	0.0020	

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WO#: **24060401**
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Method Blank

RunID: 91958 SeqNo 2492876 Units: mg/L
Analysis Date: 6/27/2024 3:16:00 PM Analyst: AL

Analyte	Result	Rep Limit	Rep Qual
Beryllium	< 0.0020	0.0020	

Laboratory Control Sample (LCS)

RunID: 91958 SeqNo 2492850 Units: mg/L
Analysis Date: 6/27/2024 2:49:00 PM Analyst: AL

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Beryllium	0.02500	0.025	98.1								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060409-01C
RunID: 91958 SeqNo 2492885 Units: mg/L
Analysis Date: 6/27/2024 3:29:00 PM Analyst: AL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Beryllium	0.004247	1.000	1.0	101	1.000	1.0	99.6	1.67	20	70	130	

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060409-01C
RunID: 91958 SeqNo 2492891 Units: mg/L
Analysis Date: 6/27/2024 3:35:00 PM Analyst: AL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Beryllium	0.004247	1.000	1.0	99.6								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060409-07C
RunID: 91958 SeqNo 2492905 Units: mg/L
Analysis Date: 6/27/2024 3:49:00 PM Analyst: AL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Beryllium	0.004283	1.000	1.0	99.5	1.000	0.99	99.0	0.488	20	70	130	

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WO#: **24060401**

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Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060409-07C

RunID: 91958 SeqNo 2492907 Units: mg/L

Analysis Date: 6/27/2024 3:52:00 PM Analyst: AL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Beryllium	0.004283	1.000	0.99	99.0								

Analysis: Metals 6020 Solid
Method: EPA 6020 **Batch ID:** **R91958**

Method Blank

RunID: 91958 SeqNo 2494112 Units: mg/Kg

Analysis Date: 6/27/2024 2:42:00 PM Analyst: AL

Analyte	Result	Rep Limit	Rep Qual
Beryllium	< 0.0010	0.0010	

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WO#: **24060401**

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Method Blank

RunID: 91958 SeqNo 2494118 Units: mg/Kg

Analysis Date: 6/27/2024 2:51:00 PM Analyst: AL

Analyte	Result	Rep Limit	Rep Qual
Beryllium	< 0.0010	0.0010	

Laboratory Control Sample (LCS)

RunID: 91958 SeqNo 2494117 Units: mg/L

Analysis Date: 6/27/2024 2:49:00 PM Analyst: AL

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Beryllium	0.02500	0.025	98.1								

Analysis: Metals 200.7

Method: EPA 200.7 **Batch ID:** **R91982**

Method Blank

RunID: 91982 SeqNo 2493621 Units: mg/L

Analysis Date: 6/27/2024 1:15:18 PM Analyst: JF

Analyte	Result	Rep Limit	Rep Qual
Aluminum	< 0.050	0.050	
Boron	< 0.050	0.050	
Calcium	< 0.50	0.50	
Iron	< 0.050	0.050	
Lithium	< 0.10	0.10	
Magnesium	< 0.50	0.50	
Potassium	< 0.50	0.50	B
Sodium	< 0.50	0.50	

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WO#: **24060401**

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Method Blank

RunID: 91982 SeqNo 2493622 Units: mg/L

Analysis Date: 6/27/2024 1:17:27 PM Analyst: JF

Analyte	Result	Rep Limit	Rep Qual
Aluminum	< 0.050	0.050	
Boron	< 0.050	0.050	
Calcium	< 0.50	0.50	
Iron	< 0.050	0.050	
Lithium	< 0.10	0.10	
Magnesium	< 0.50	0.50	
Potassium	< 0.50	0.50	
Sodium	< 0.50	0.50	

Laboratory Control Sample (LCS)

RunID: 91982 SeqNo 2493649 Units: mg/L

Analysis Date: 6/27/2024 12:42:51 PM Analyst: JF

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Aluminum	6.000	6.0	100								
Boron	6.000	5.9	98.4								
Calcium	30.00	29	98.1								
Iron	6.000	6.0	100								
Lithium	6.000	6.0	99.9								
Magnesium	30.00	30	101								
Potassium	30.00	29	97.5								
Sodium	30.00	30	98.8								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060349-07C

RunID: 91982 SeqNo 2493626 Units: mg/L

Analysis Date: 6/27/2024 1:26:05 PM Analyst: JF

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Aluminum	0	10.00	11	109	10.00	11	109	0.218	20	70	130	
Boron	0	10.00	11	109	10.00	11	110	0.186	20	70	130	
Calcium	124.3	40.00	170	107	40.00	170	105	0.391	20	70	130	
Iron	0.02084	10.00	11	110	10.00	11	110	0.221	20	70	130	
Lithium	0	10.00	11	111	10.00	11	112	0.118	20	70	130	
Magnesium	63.22	40.00	110	108	40.00	110	107	0.298	20	70	130	
Potassium	13.13	40.00	57	109	40.00	57	109	0.0958	20	70	130	
Sodium	38.73	40.00	82	108	40.00	82	107	0.133	20	70	130	

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Quality Control Report

WO#: **24060401**

7/8/2024

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060349-07C

RunID: 91982 SeqNo 2493627 Units: mg/L

Analysis Date: 6/27/2024 1:28:14 PM Analyst: JF

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Aluminum	0	10.00	11	109								
Boron	0	10.00	11	110								
Calcium	124.3	40.00	170	105								
Iron	0.02084	10.00	11	110								
Lithium	0	10.00	11	112								
Magnesium	63.22	40.00	110	107								
Potassium	13.13	40.00	57	109								
Sodium	38.73	40.00	82	107								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060401-02B

RunID: 91982 SeqNo 2493665 Units: mg/L

Analysis Date: 6/27/2024 2:17:55 PM Analyst: JF

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Aluminum	0.01226	5.000	5.5	109	5.000	5.4	108	0.723	20	70	130	
Boron	0.4975	5.000	6.0	109	5.000	5.9	108	1.02	20	70	130	
Calcium	44.36	20.00	60	79.1	20.00	60	75.9	1.07	20	70	130	
Iron	0.2541	5.000	5.8	111	5.000	5.7	110	0.891	20	70	130	
Lithium	0.007720	5.000	5.6	113	5.000	5.7	113	0.531	20	70	130	
Magnesium	15.84	20.00	36	101	20.00	36	99.4	0.870	20	70	130	
Potassium	1.853	20.00	24	110	20.00	24	109	0.848	20	70	130	
Sodium	23.41	20.00	42	92.4	20.00	42	90.7	0.837	20	70	130	

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060401-02B

RunID: 91982 SeqNo 2493666 Units: mg/L

Analysis Date: 6/27/2024 2:20:05 PM Analyst: JF

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Aluminum	0.01226	5.000	5.4	108								
Boron	0.4975	5.000	5.9	108								
Calcium	44.36	20.00	60	75.9								
Iron	0.2541	5.000	5.7	110								
Lithium	0.007720	5.000	5.7	113								
Magnesium	15.84	20.00	36	99.4								
Potassium	1.853	20.00	24	109								
Sodium	23.41	20.00	42	90.7								

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Quality Control Report

WO#: **24060401**
7/8/2024

Analysis: Metals 200.7
Method: EPA 200.7 **Batch ID:** **R92164**

Method Blank

RunID: 92164 SeqNo 2502580 Units: mg/L
Analysis Date: 7/4/2024 2:38:14 PM Analyst: AL

Analyte	Result	Rep Limit	Rep Qual
Silica as SiO2	< 0.10	0.10	

Original

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Quality Control Report

WO#: **24060401**

7/8/2024

Method Blank

RunID: 92164 SeqNo 2502581 Units: mg/L

Analysis Date: 7/4/2024 2:40:23 PM Analyst: AL

Analyte	Result	Rep Limit	Rep Qual
Silica as SiO2	< 0.10	0.10	

Laboratory Control Sample (LCS)

RunID: 92164 SeqNo 2502576 Units: mg/L

Analysis Date: 7/4/2024 2:29:35 PM Analyst: AL

Analyte	LCS Spike Added	LCS Result	LCS % Recovery	LCSD Spike Added	LCSD Result	LCSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Silica as SiO2	6.000	6.2	103								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060218-01C

RunID: 92164 SeqNo 2502585 Units: mg/L

Analysis Date: 7/4/2024 2:49:00 PM Analyst: AL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Silica as SiO2	58.83	50.00	100	88.7	50.00	110	98.5	4.62	20	70	130	

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060218-01C

RunID: 92164 SeqNo 2502586 Units: mg/L

Analysis Date: 7/4/2024 2:51:08 PM Analyst: AL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Silica as SiO2	58.83	50.00	110	98.5								

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060387-04B

RunID: 92164 SeqNo 2502601 Units: mg/L

Analysis Date: 7/4/2024 3:23:32 PM Analyst: AL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Silica as SiO2	205.5	50.00	260	103	50.00	260	102	0.0775	20	70	130	

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Quality Control Report

WO#: **24060401**

7/8/2024

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 24060387-04B

RunID: 92164 SeqNo 2502602 Units: mg/L

Analysis Date: 7/4/2024 3:25:40 PM Analyst: AL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	Qual
Silica as SiO2	205.5	50.00	260	102								

SilverState Analytical Laboratories

Sierra Environmental Monitoring | EnviroTech | 2406040

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CHAIN-OF-CUSTODY-RECORD

Page 1 of 1

Report Results To:

Report Attention:	John Casteel
Project Number:	Mayacma Geothermal
Company:	Mayacma Geothermal LLC
Mailing Address:	245 E Liberty St. Suite 520
City, State, Zip:	Reno, NV 89501
Phone:	775-260-8351
Email / Fax:	John@OpenMountainEnergy.com

Send Invoice To:

Invoice Attention:	Nate Curtis
PO#	
Quote #	3505
Company:	Mayacma Geothermal, LLC
Mailing Address:	245 E Liberty St.Suite 520
City, State, Zip:	Reno, NV 89501
Phone:	
Email / Fax:	accounting@openmountainenergy.com

COMPLIANCE MONITORING? Yes ☐ No ☐

NEW ADDRESS? Results: ☐ Invoice: ☐

Applicable Program
SDWA ☐ CWA ☐ RCRA ☐ Mining ☐ Other _____

QC Level Report
I II III IV
NOTE: Surcharges apply to Level II, III and IV reports

Sampled by: Lucas Peters Signature: Lucas Peters

I attest to the validity and authenticity of the sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time is considered fraud and may be grounds for legal action.

ANALYSES REQUESTED

Send Results Via: Mail: ☐ Email: ☒ Fax: ☐

Send Invoice Via: Mail: ☐ Email: ☒ Fax: ☐

Standard: ☒ Standard TAT 7-10 Business Days. Note that some tests vary.

Rush
☐ Same Day: ☐ 3 Day: ☐ Other (specify): _____
☐ 1 Day: ☐ 4 Day:
☐ 2 Day: ☐ 5 Day:

Rush results will be issued after 4:00 p.m.

NOTE: A Rush Surcharge is applied for rush samples

Other Pertinent Information / Special Instructions
UIC List 2, no rads. See quote. Same for both samples.

4°

Field Measurements
On-Site pH: Chlorine:
Temperature: Other:

Date Sampled	Time Sampled	Sample Identification	SSAL - SEM Lab No.	Comp Grab	Matrix*	Preservative**	Number / Type of Containers ***	Metals*	COMMENTS:
6/7/24	10:26	Pump House One			Aq.		See quote 3505		
6/7/24	10:00	Pump House Two							

	Signature	Print Name	Company	Date	Time
Relinquished By:	Lucas Peters	Lucas Peters	Mayacma Geothermal LLC	6/7/24	4:25 pm
Received By:				6-7-24	16.25
Relinquished By:					
Received By:					
Relinquished By:					
Received By:					
Authorized By:					

Authorization is required to process samples. This obligates your organization for service fees SSAL Standard T & C's or other written agreement applies. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and costs in addition to service fees.

Samples are discarded 30 days after results are reported unless other arrangements are made and storage fees may apply.
The analytical results associated with this COC apply only to these samples as they are received by the laboratory.
The liability of the laboratory is limited to the amount paid for the report.

Matrix* DW-Drinking Water, WW-Waste Water, GW-Ground Water, SW-Surface Water, SS-Soil, S-Solid, OT-Other

Container*** P-Plastic, G-Glass, V-Voa Vial, OT-Other

Preservative** 1=H_2SO_4, 2=HNO_3, 3=HCl, 4=NaOH, 5=$Na_2S_2O_3$, 6=None, 7=Other

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QUOTATION

Quote#: 3505
Date: 4/5/2024

Company:	Mayacma Geothermal LLC	Project:	BLM Geothermal
Contact:	Accounts Payable	TAT:	15 working days
Address:	245 E. Liberty St., Suite 520	QC Level:	LEVEL I
	Reno, NV 89501	Project Manager:	Carly Wood
Phone:		Sales Rep:	
Fax:		Quote Expires:	7/4/2024
		Terms:	Invoice due in30days

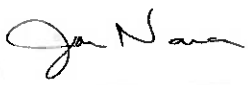
Item Description	Method	Matrix	Remarks	Qty	Net Price	Total
BLM Geothermal						
Profile 1 no WAD		Aqueous	+B, Li, Mo, SiO2, U	2	350.00	700.00
Metals Digest	EPA 200.2					
Metals 200.7	EPA 200.7					
Metals 200.8	EPA 200.8					
Mercury	EPA 245.1					
Anions 300.0	EPA 300.0					
Nitrogen, Total - Calculation Only	Calculation					
Kjeldahl Nitrogen, Total (TKN)	SM 4500 Norg D					
Total Dissolved Solids	SM 2540 C					
Alkalinity	SM 2320 B					
pH	SM 4500 H+B					
Conductivity	SM 2510B	Aqueous		2	24.00	48.00
Total Suspended Solids	SM 2540 D	Aqueous		2	23.00	46.00
Turbidity	SM 2130 B	Aqueous		2	20.00	40.00
Phosphorus, Total	EPA 365.3	Aqueous		2	35.00	70.00

Sub Total:	$904.00
Misc:	$0.00
Discount:	0.00%
Surcharge:	0.00%
TOTAL:	**$904.00**

Miscellaneous Charge Comments:

Comments:

Sincerely,



Joe Nava
Client Services Manager
Phone: (775) 857-2400
Email: Jose.Nava@sgs.com

Terms and Conditions:

- These Terms and Conditions apply to all work orders unless specifically noted otherwise.
- Free pick-up and delivery in metro areas of Las Vegas, Reno, and Elko, Nevada; Sacramento, California.
- Price includes all bottles, coolers, ice packs and preservatives.
- Pricing does not include sampling charges, if necessary, unless specifically listed.
- Hourly fees may apply if consulting work, depositions, subpoenas, or additional hourly work is incurred.
- Unless noted; pricing based on Standard Turnaround Time (7-10 business days). Rush projects subject to surcharges.
- QC reports to be SSAL Level 1+ unless otherwise noted. Additional fees apply for higher QC data packages.
- SSAL Standard Legal Terms and Conditions apply, and are incorporated, unless other written contract or PO is accepted.
- Credit application and approval, or other payment arrangement, is required prior to the release of test results.
- Liability is limited to the amount paid for services.
- Minimum invoice charge is $75.00.

Quotation reviewed and accepted by: _____ Date: _____

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Definitions & Qualifiers

WO#: **24060401**
Date: **7/8/2024**

Definitions:

LCS: Laboratory Control Sample; prepared by adding a known mass of target analytes to a specified amount of de-ionized water and prepared with the batch of samples, used to calculate Accuracy (%REC).

LCSD: LCS Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

MBLK: Method Blank; a sample of similar matrix that is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedure, and in which no target analytes
or interferences are present at concentrations that impact the analytical results for sample analyses.

MS: Matrix Spike; prepared by adding a known mass of target analytes to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available, used to calculate Accuracy (%REC)

MSD: Matrix Spike Duplicate; used to calculate both Accuracy (%REC) and Precision (%RPD)

RPD: Relative Percent Difference; comparison between sample and duplicate and/or MS and MSD.

PQL: Practical Quantitation Limit; the limit to which data is quantitated for reporting.

MDL: Method Detection Limit; the limit to which the instrument can reliably detect.

MCL: Maximum Contaminant Level; value set according to EPA guidelines.

Qualifiers:

* - Analyte exceeds Safe Drinking Water Act MCL, does not meet drinking water standards.
C - Analyte value below Safe Drinking Water Act MCL, does not meet drinking water standards.
B - Analyte found above the PQL in associated method blank.
G - Calibration blank analyte detected above PQL.
H - Sample analyzed beyond holding time for this parameter.
J - Estimated Value; Analyte found between MDL and PQL limits.
L - Sample concentration is at least 5 times greater than spike contribution. Spike recovery criteria do not apply.
R - RPD between sample and duplicate sample outside the RPD acceptance limits.
S - Batch MS and/or MSD were outside acceptance limits, batch LCS was acceptable.
W - Sample temperature when recieved was out of limit as specified by method.
Z - Batch LCS and/or LCSD were outside acceptance limits.