



MEMORANDUM

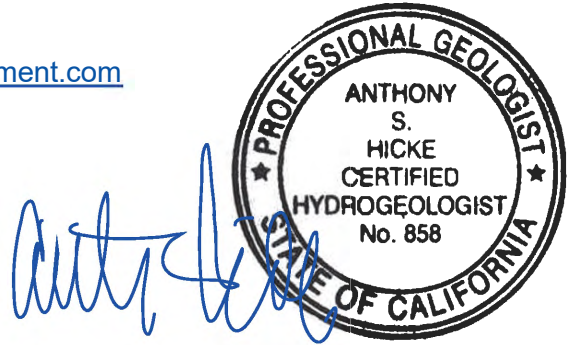
January 17, 2024

Job No. 584-NPA05

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c/o Josh Clark  
Sent via email: [josh@clarkvineyardmanagement.com](mailto:josh@clarkvineyardmanagement.com)

Cc: Mr. Michael Muelrath, P.E.  
Applied Civil Engineering Inc. (ACE)  
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From: Anthony Hicke and Edward Linden  
Richard C. Slade & Associates LLC (RCS)



Re: Results of Napa County Tier 1 and Tier 3 Water Availability Analyses  
For a Proposed New Vineyard Development Project and Proposed New Irrigation Well at  
1510 Diamond Mountain Road (APN 020-400-013)  
Calistoga, CA

**Introduction**

This Memorandum presents the key findings, conclusions, and preliminary recommendations regarding a Water Availability Analysis (WAA) by RCS for a proposed new vineyard development project located at 1510 Diamond Mountain Road (the subject property) in Calistoga, California. RCS understands the proposed project is to develop 1.9 acres of new vineyard on the subject property. To augment the onsite water supply of the property, drilling and construction of a new onsite well is also proposed. This document was prepared on behalf of the property owner, 1510 Acquisition LLC, to provide hydrogeologic analyses pertaining to the proposed new vineyard development project and the proposed new well (also referred to as the “Future Well” herein) in conformance with the Napa County WAA Guidelines (2015) and recent updates to those Guidelines by Napa County (2022a & 2023a). A summary of the WAA Tiers and their applicability to the proposed developments is as follows:

- A “Tier 1” WAA (“Groundwater Use for Napa County”) consists of calculating an estimate of the annual groundwater recharge that occurs at the subject property and comparing that estimate to the estimated future groundwater extractions at the property. A Tier 1 WAA is applicable to the subject property for the proposed vineyard development and proposed Future Well (Napa County, 2023a).
- No active offsite wells are known to exist within 500 feet of the proposed Future Well (the proposed project well), and no springs used for water supply purposes are known to exist within 1,500 feet of the proposed Future Well. Therefore, a “Tier 2” WAA (“Well & Spring Interference”) is not required for the proposed project or the project well (the proposed Future Well) per County requirements (Napa County, 2015 & 2023a).
- A “Tier 3” WAA (“Groundwater / Surface Water Interaction”) is required for County-issuance of a drilling permit for the proposed Future Well and for County-approval of the proposed vineyard development project, because the proposed Future Well (the project



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well) is proposed to be located within 1,500 feet of a County-defined “Significant Stream” (PBES & LSCE, 2023a & 2023b), and it will supply water to the proposed new vineyards and existing onsite vineyards.

This Memorandum includes discussion of the proposed new onsite well, the Future Well, which has not yet been constructed. The Future Well will provide irrigation water supply to the proposed new vineyard area once both the well and new vineyard areas are permitted and completed. Pumpage from the Future Well will also replace the portion of water supply to the subject property that is currently provided by an offsite well. This document has been prepared by RCS to satisfy the WAA requirements for both the vineyard development project and the new well (Future Well) drilling permit application.

### **Site Conditions and Project Description**

The subject property consists of a single parcel identified by County Assessor’s Parcel Number (APN) 020-400-013 that is located in the Calistoga area of Napa County, in the hills along the southwestern margin of the Napa Valley; the area of this parcel as reported in the September 6, 2023, version of the County’s GIS parcel layer is 35.81 acres (Napa County, 2023b). Figure 1, “Regional Map,” depicts the approximate boundary of the property in relation to: the County’s Significant Streams (PBES & LSCE, 2023a) and Significant Streams 1,500-foot buffer areas (PBES & LSCE, 2023b); the local groundwater basin (DWR, 2021); and the local subwatersheds described by LSCE & MBK (2013). The entire property is within a 1,500-foot buffer area around Diamond Creek, a County-designated Significant Stream, but the property is located outside of the nearby local groundwater basin, known as the Napa Valley Subbasin of the Napa-Sonoma Valley Groundwater Basin (DWR, 2021). According to the LSCE & MBK (2013) subwatershed data the subject property is located entirely within the Napa River Watershed at St. Helena. Note that the Napa River Watershed at St. Helena is wholly within (i.e., is a subwatershed of) the larger Napa River Watershed near Napa; this spatial relationship is shown on the map on the right side of Figure 1.

Figure 2, “Property Map”, and Figure 3, “Geologic Map”, show several of the same data that are shown on Figure 1, but add several additional data that include, depending on the Figure, some or all of the following: the locations of the existing onsite wells; the proposed location for the new onsite irrigation-supply well (the Future Well); the approximate locations of several offsite water sources that are either known to exist or may possibly exist; the owner-reported locations of onsite and nearby septic system components; and Tier 2 WAA setback distances (500 feet and 1,500 feet) around the proposed location for the Future Well.

The locations of the known and possible offsite wells and springs were approximated by RCS based on records retrieved from the County’s Electronic Document Retrieval website (PBES, 2023), on internal RCS records, and on data collected during a site visit to the property by an RCS geologist. The records retrieved from Napa County consisted of various types of documents including State Well Completion Reports (WCRs, also known as “driller’s logs”) and drilling permits for wells that may have been drilled in the area, along with evidence of a spring greater than 1,500 feet southwest of the subject property that is outside the view of Figure 2, but visible on Figure 3. The locations of known and possible offsite wells and the spring shown on Figures 2 and 3 should not be considered an exhaustive representation of all nearby wells and springs; others may also exist in the area. Note that the proposed location of the Future Well, which is proposed to serve the new vineyard, is greater than 500 feet from known and possible offsite



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wells that might exist and are not slated for destruction<sup>1</sup> (see Figures 2 & 3), and greater than 1,500 feet from the location of a possible offsite spring located southwest of the property (see Figure 3).

From communications with and review of data provided by the project engineer (Mr. Michael Muelrath of Applied Civil Engineering), vineyard management personnel (Mr. Joshua Clark of Clark Vineyard Management, Mr. Garrett Buckland of Premiere Viticulture, and Mr. Nigel Kinsman of Kinsman Wine Consulting), and from a May 18, 2023, field reconnaissance visit by an RCS geologist to the subject property, the following key items were noted and/or observed (refer to Figure 2):

- Most of the subject property overlies the south-facing slope of a small canyon, with a minor portion of the property situated on the opposite side of the canyon, straddling Diamond Creek. The property has reportedly been developed with 12.68 acres of vineyards, a winery, a residence with a pool, and a 0.5-acre fruit and olive orchard; no other significant water-using onsite developments are known to exist.
- Two water-supply wells exist at the subject property: the Old Well and the New Well. The existing New Well is in active use, but the existing Old Well is not actively pumped. However, the Old Well could possibly be put into use in the future, if necessary (e.g., as an emergency backup supply well). The existing onsite water demands that are not currently met by the existing New Well are met by pumpage from an offsite well on a neighboring property.
- The applicant intends to develop 1.9 acres of new vineyard on the subject property as part of a Timber Conversion Exemption. Once development of the new vineyard areas is complete, the future total area of onsite vineyards will be approximately 14.58 acres.
- In addition to the proposed new vineyard development, the applicant also proposes to drill and construct a new water supply well on the subject property, referred to herein as the “Future Well”. The Future Well is proposed to provide irrigation water to the proposed new vineyard development, and also to supplant all water supply currently provided to the subject property by the offsite well. Hence, following successful construction, development, and testing of the Future Well, it is proposed that the subject property will completely cease to receive water from the current offsite source.
- Development on offsite areas surrounding the subject property consists of vineyards, at least one winery, residences, and forested areas.
- During the May 2023 site visit, the RCS geologist traveled along roads in the immediate vicinity of the subject property in an attempt to identify possible nearby, offsite wells. RCS refers to such work as a “windshield survey.” During this survey, the RCS geologist attempted to identify possible offsite well locations by observing typical well-house enclosures, pressure tanks, storage tanks, power lines, or by making direct observations of wellheads.

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<sup>1</sup> According to the property owner, the two wells located just north of the northern boundary of the subject property that are located within 500 ft of the proposed location of the Future Well (see Figure 2) are no longer active and will be destroyed in the near future.



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### Local Geologic Conditions

Figure 3, “Geologic Map,” depicts the types, lateral extents, and boundaries between the various earth materials mapped at ground surface in the region by others; this map was adapted from work by the California Geological Survey (Delattre & Gutierrez, 2013). The earth materials mapped at ground surface at and proximal to the subject property include the following, from geologically youngest to oldest:

#### Sedimentary deposits (map symbols Qhc, Qha, Qhf, Qa, Qf, Qls, Qodf, and QTq)

These deposits consist of various terrestrial sediments that have been deposited since the Pliocene geological epoch (since ~5.3 million years ago [mya]). The depositional environments of these sediments have been various terrestrial settings that included stream channels, alluvial fans, lakes, and sloped areas (debris flows and landslides<sup>2</sup>); they are generally comprised by unconsolidated to poorly consolidated layers and lenses of sand, gravel, silt, and clay, with some larger clasts.

Delattre & Gutierrez (2013) show undifferentiated alluvial deposits (Qa) and old debris flow deposits (Qodf) at ground surface in the lower-elevation areas of the subject property, proximal to Diamond Creek. The actual thickness (depth below ground surface) of these deposits, and that of any possible underlying sediments, is not known. The driller’s descriptions of the earth materials that were reportedly encountered in the boreholes for the two existing onsite wells differ significantly (discussed further below), despite these wells being located roughly 100 feet apart from each other and not apparently being separated by any mapped geologic structures. However, based on RCS’s experience in the region and RCS’s interpretations of the driller’s descriptions of earth materials listed on the WCRs for the onsite wells, these sediments might extend to a depth on the order of perhaps 30 to 130 feet below ground surface property.

#### Sonoma Volcanics (map symbols Tstp and Tsrc)

The earth materials belonging to the Sonoma Volcanics are Pliocene geologic-aged (deposited or emplaced ~5.3 to 2.6 million years ago) per Delattre & Gutierrez (2013), and these materials are known to include many varied types of volcanic materials. Exposed at ground surface and mapped by others within the boundary of the subject property is the Rhyolite of Calistoga (Tsrc), a geologic unit assigned to the Sonoma Volcanics. The other unit of the Sonoma Volcanics within the visible extent of Figure 3, the Tuff of Petrified Forest (Tstp), is not present within the boundary of the subject property. However, Tstp could possibly exist at some depth beneath the subject property.

Earth materials belonging to the Sonoma Volcanics tend to produce more groundwater where they are hard and highly fractured, where they are deeply weathered, or where the individual grains (clasts) are relatively large and the pore spaces between the grains are uncemented and well connected (in sedimentary and deeply weathered materials). Where such zones occur, these earth materials are considered the main water-bearing units in the region. In contrast, volcanic ash flows and deeply weathered volcanic tuffs tend to be fine-grained, clay-rich, and often have limited permeability; these fine-grained materials

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<sup>2</sup> Note that it was not a part of our Scope of Hydrogeologic Services for this project to study, investigate, analyze, determine, or opine on the potential activity of any type of mass movement including, but not limited to, landslides and debris flows, and/or on the potential impact that any type of mass movement might have on any structures, wells, or other existing or future developments.



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tend to only yield groundwater to wells at limited flow rates.

The maximum thickness of the Sonoma Volcanics beneath the subject property cannot be determined from data reported on the WCRs for the onsite wells, but the driller's descriptions of the earth materials encountered in the borehole of the deeper well, the existing New Well, suggest a possible minimum thickness of at least 300 feet. More specifically, the driller's descriptions suggest that from a depth of 130 feet, or perhaps even shallower, the earth materials of the Sonoma Volcanics are present, and that they extended to the bottom of the 430-foot-deep borehole. The Sonoma Volcanics may also extend below the 430-foot bottom-depth of the borehole of the New Well.

### Geologically Ancient Rocks (not within view of Figure 3)

At great depth below the ground surface of the subject property, underlying the Sonoma Volcanics, geologically ancient (at least several tens of millions of years old) rocks that comprise the regional bedrock are known to be present. These rocks belong to complex assemblages of earth materials known as the Great Valley Sequence and the Franciscan Complex. These regional bedrock materials are generally considered to be non-water bearing, but they are not expected to play a direct role in the availability of groundwater at the subject property based on driller's descriptions of earth materials encountered in the boreholes of the existing New Well and several nearby offsite wells.

### Geologic Structure

Within the view of Figure 3, two unnamed faults<sup>3</sup> are shown in the vicinity of the subject property (Delattre & Gutierrez, 2013). These faults are not mapped within the boundary of the subject property, with the nearest of these faults (to the north) passing roughly 1,700 feet from the nearest edge of the parcel. Because these faults are not close to the subject property, they are not anticipated to have a significant influence on the availability of groundwater at the subject property. Another data source for fault locations was also reviewed (USGS, 2020a), but no faults are shown to exist within the view of Figure 3 in that publication. It is not known if any of the geologic structures (faults, folds, etc.) that are reported to exist, or that may exist, in the vicinity of the subject property have any influence on groundwater flow (e.g., act as groundwater flow barriers).

Several measurements by others of the orientations of sedimentary bedding and volcanic flow rocks are shown within the view of Figure 3. A consistent pattern does not appear to be present in the orientations shown thereon, with variable bedding orientations and dip angles. Lastly, no structural folds are present in the geologic mapping by others that is shown on Figure 3 (Delattre & Gutierrez, 2013).

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<sup>3</sup> Our hydrogeologic work herein does not include any efforts to define or determine local seismicity; to define or determine the potential activity of any faults in the region; or to define or determine the potential for onsite fault rupture.





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### Local Hydrogeologic Conditions

The earth materials described above can generally be separated into two basic categories, based on their relative capacity to store and transmit groundwater to wells. These two general categories are:

#### Potentially Water-Bearing Materials

The Sonoma Volcanics, including some of the sedimentary deposits thereof, are considered by RCS to be the principal water-bearing materials beneath the subject property and its immediate environs, and to a lesser extent, the recent sedimentary deposits that in some places overlie the Sonoma Volcanics. As described above, based on the work of Delattre & Gutierrez (2013), the geologic unit belonging to the Sonoma Volcanics beneath the subject property is the Rhyolite of Calistoga, whereas the overlying, geologically younger sedimentary materials, where present, are undifferentiated alluvial deposits and old debris flow deposits that consist primarily of unconsolidated to poorly consolidated gravel, sand, silt, and clay, with some larger clasts derived from the Sonoma Volcanics. These interpretations are based primarily on RCS's interpretation of the driller's descriptions of earth materials on the WCR for the existing New Well, the WCRs for several nearby offsite wells, and review of the descriptions of and map patterns of the earth materials mapped in the vicinity of the subject property in Delattre & Gutierrez (2013).

In hard volcanic materials like the Rhyolite of Calistoga, the occurrence and movement of groundwater tends to be controlled by the frequency, openness, and interconnectedness of the randomly occurring network of subsurface fractures that often exists in these rocks. Tuff and ash flow deposits like the Tuff of Petrified Forest can exist as relatively hard, competent deposits (described as "welded"), or as softer, more friable deposits. Softer ash flows and deeply weathered volcanic tuffs tend to be fine-grained, clay-rich, and often have limited permeability; thus, these fine-grained ashy and tuffaceous materials are typically only capable of yielding groundwater to wells at limited flow rates. In the overlying sedimentary deposits (i.e., Qa and Qodf), where present, the occurrence and movement of groundwater tends to be controlled by the intergranular porosity of the materials; the size and angularity of the individual grains; the degree of consolidation and cementation; and potentially numerous other factors.

From our long-term experience with these materials, and based on our numerous water well construction projects in Napa County, pumping capacities of wells that draw groundwater from these materials can range widely, from rates as low as a few gallons per minute (gpm) to rates in excess of several hundred gpm.

#### Potentially Nonwater-Bearing Rocks

This category includes the geologically ancient regional basement rocks, known to be present below the Sonoma Volcanics in the vicinity of the subject property. These diverse and geologically old rocks are well-cemented, well-lithified, and tend to exhibit very low permeability. Occasionally, localized conditions can allow for small volumes of groundwater to exist in these bedrock materials where they are sufficiently fractured, or where they are relatively more coarse-grained. However, even in areas with potentially favorable conditions, well yields are often no more than a few gpm in these bedrock materials, and the water quality can be marginal to poor in terms of various naturally occurring groundwater constituents.



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### Local Groundwater Basin

Groundwater basin boundaries in California have been defined and designated by the State Department of Water Resources (DWR) in their Bulletin 118, “California’s Groundwater”, and were used to define groundwater basin boundaries for the purposes of Groundwater Sustainability Plan (GSP) preparation (LSCE, 2022). Figures 1 and 2 show the boundary of the local groundwater basin (the Napa Valley Subbasin of the Napa-Sonoma Valley Groundwater Basin) defined in DWR Bulletin 118 (2021), relative to the boundary of the subject property. As shown on those Figures, the entire subject property lies outside of the local groundwater basin.

### Key Construction and Testing Data for Existing Onsite Wells

Two wells exist on the subject property at the approximate locations shown on Figures 2 and 3; these wells are known as the “Old Well” and the “New Well”. RCS was able to obtain a DWR Well Completion Report (WCR, or “driller’s log”) and a County permit for each of these wells from Napa County records (PBES, 2023); these documents are included in the Appendix to this report. Table 1, “Summary of Available Well Construction and Pumping Data,” provides a tabulation of key well construction and yield data that are available for the two onsite wells.

### Onsite Well Construction Data

The data on Table 1 include the following details on the construction of the onsite wells, as derived from the documents included in the Appendix to this report:

- Construction dates are 2008 and 1983.
- Well casing depths are 430 feet and 89 feet.
- Both wells were constructed with plastic casing, likely of polyvinyl chloride (PVC) composition, with casing diameters of 6 and 8 inches.
- The sanitary seal depth in the New Well is 54 feet, but the exact depth of the sanitary seal in the Old Well is not clear, falling somewhere in the range of 20 to 26 feet.

### Summary of Key “Test” Data for Onsite Wells

The WCRs for the onsite wells provide the depth to the original post-construction static water level (SWL) in each well, along with the original “test” rates (as shown on Table 1). These data include:

- The initial SWL depth in the New Well following completion of well construction was reportedly 5 feet below the wellhead reference point (ft brp), but the reference point height above ground surface was not reported.
- The initial SWL depth in the Old Well following completion of well construction was reportedly 11 ft brp, but as with WCR for the New Well, the measurement reference point was not defined.
- The reported “test” rate<sup>4</sup> for initial post-construction airlifting operations in the existing New Well was estimated by the well driller to be 90 gpm at the end of well construction. The duration of that airlift “test” was reportedly 4 hours.

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<sup>4</sup> As a rule of thumb, RCS geologists estimate that normal operational pumping rates for a new well equipped with a permanent pump are typically on the order of only about one-half or less of the airlifting rate reported on a driller’s log. RCS regards “test” rates derived via bailer methods with even greater uncertainty.



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- The reported “test” rate for initial post-construction bailing operations in the Old Well was estimated by the well driller to be 50 gpm at the end of well construction, and the reported duration of the “test” was 30 minutes.

### Summary of Onsite Water Level Data Collected by RCS Geologist During Site Visit

During the May 18, 2023, site visit, the RCS groundwater geologist successfully collected static water level (SWL) measurements in the two onsite wells. The water level data collected by the RCS geologist was as follows:

- New Well SWL: 1.3 feet above ground surface (ft ags). This measurement was made after the RCS geologist closed an overflow valve attached to the wellhead. Before closing the overflow valve (roughly 10 inches above ground surface), the well was observed to be a flowing artesian well.
- Old Well SWL: 12.2 feet below ground surface (ft bgs)

### Pumping Capacity of Existing Onsite Wells

Instantaneous flow rate data and volumetric flow totalizer data are not available for either of the onsite wells. However, pump data from a pumping contractor provided to RCS by Mr. Clark for the New Well shows the installed pump as a Goulds model 65GS100. According to product literature for this pump model, it is rated for flow rates of up to 80 gpm.

According to vineyard management personnel, the New Well met all onsite demands prior to acquisition of the subject property by the current owner, around the year 2017. Onsite demands (i.e., vineyard, orchard, residence, and winery) are reportedly unchanged since then, but management chose to provide the majority of the subject property’s water supply from an offsite well following the 2017 property acquisition through the year 2023. At present, the New Well reportedly meets the onsite demands of the winery, the residence, and the orchard, in addition to the demands of up to approximately 15% (~2 acres) of the existing vineyard acreage (12.68 acres).

### Proposed Construction for Onsite Future Well

The proposed location of the onsite Future Well is shown on Figures 2 and 3. Key construction details of the Future Well are proposed to be as follows:

- Well casing depth of approximately 620 ft bgs
- Sanitary seal length of at least 300 ft, beginning at ground surface
- Casing perforations interspersed between the depths of 340 ft bgs and 600 ft bgs; the specific layout of perforations between those depths to be determined based on borehole geology and static water level observed during drilling operations.





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### Water Demands

#### Existing Water Demands

Existing onsite water demands consist of irrigation of 12.68 acres of vineyard, residential demands, winery demands, and irrigation of 0.5 acres of fruit and olive orchard. No other water demands were reported to exist at the property. According to Mr. Buckland, total onsite irrigation volume for the 2023 irrigation season, inclusive of heat suppression, was as follows:

- a. Irrigation of 0.5 acres of fruit and olive trees: 0.18 acre feet (AF)<sup>5</sup>
- b. Irrigation and heat suppression for 12.68 acres of vineyard: 8.81 AF

Based on these 2023 irrigation demands, the unit irrigation rate for onsite vineyards is 0.69 acre feet per year per acre (AFY/acre), and the unit irrigation rate for the fruit and olive orchard is 0.36 AFY/acre.

No records of water use were available for the other onsite demands, so existing water use for these demands has been estimated in coordination with the project engineer and vineyard management personnel, based on standard assumptions in the County's 2015 WAA Guidance Document, as follows:

- c. Residence with pool and minor to moderate landscaping = 0.85 AFY
- d. 25,000 gallons per year (gpy) Winery<sup>6</sup> = 1.39 AFY
  - i. Process Water @ 2.15 AFY/100,000 gallons = 0.54 AFY
  - ii. Landscaping @ 0.5 AFY/100,000 gallons = 0.13 AFY
  - iii. 4 Employees @ 15 gallons/shift<sup>7</sup> = 0.69 AFY
  - iv. 1,040 Annual Tasting Visitors @ 3 gallons/visitor = 0.01 AFY
  - v. 440 Annual Marketing/Event Visitors @ 15 gallons/visitor = 0.02 AFY

Based on the reported and estimated totals presented above, current total onsite water demands can be estimated as follows:

$$a. + b. + c. + d. = 0.18 + 8.81 + 0.85 + 1.39 = 11.23 \text{ AFY}$$

These onsite water demands are currently met by contributions from the existing New Well and an offsite water well. According to vineyard management personnel, the existing New Well currently meets the demands of the fruit and olive trees, the residence, the winery, and up to 15% of the onsite vineyards. The current demand met by the New Well can therefore be estimated as follows:

$$a. + 15\%*b. + c. + d. = 0.18 + 15\%*8.81 + 0.85 + 1.39 = 3.74 \text{ AFY}$$

All remaining demands (85% of vineyard irrigation, or 7.49 AFY) are currently met by the offsite well.

<sup>5</sup> one acre-foot = 325,851 gallons

<sup>6</sup> Based on winery permit on file with County and the County's 2015 WAA Guidance Document

<sup>7</sup> Assumed 250 annual shifts per employee.



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### Proposed Water Demands

Following development of the proposed new vineyard and successful construction and testing of the proposed Future Well, onsite water demands will consist of all existing onsite water demands, and will also include the additional demands of the proposed new onsite vineyard, as follows:

- e. Existing Demand for All Current Onsite Uses = 11.23 AFY
- f. Total Demand for Proposed New 1.9-Acre Vineyard = 1.31 AFY
  - ii. Unit vineyard irrigation rate = 0.69 AFY/acre<sup>8</sup>
  - iii. Includes heat suppression
  - iv. Passive measures (that do not require groundwater) will be used to help manage frost, as necessary
  - v. New vineyard irrigation demand = 1.9 acres x 0.69 AFY/acre = 1.31 AFY

According to Mr. Buckland, during years with below average rainfall, vineyard management practices (such as adjustments to vineyard canopy levels) will be employed to maintain a consistent vineyard water demand and not require an increase in groundwater production during drought years. Mr. Buckland also expects vineyard water use to decrease over time from the 2023 uses as the vineyards mature based on the root stock planted in the vineyards, and other planting/vineyard management decisions.

The existing onsite demands that are currently met by the New Well, approximately 3.74 AFY, will continue to be met by the New Well. Thus, water use from the New Well will not increase as a part of the proposed project – a “no-net-increase” condition. All other existing demands (85% of vineyard demands) and proposed future demands (all new vineyard demands) are proposed to be met by the Future Well. All use of the offsite water well to meet onsite demands is proposed to cease following successful construction and testing of the proposed Future Well.

Based on the information presented above, total proposed onsite water demand will be 12.54 AFY, calculated as:

$$e. + f. = 11.23 \text{ AFY} + 1.31 \text{ AFY} = 12.54 \text{ AFY}$$

In summary, the onsite water demands of the subject property will increase by 1.31 AFY, from the estimated existing demand of 11.23 AFY, to the total proposed demands of 12.54 AFY. Onsite groundwater extractions from the existing New Well will not increase relative to current estimates (3.74 AFY), which are significantly lower than historic pre-2017 uses of this well. Overall onsite groundwater extractions will increase by 8.80 AFY relative to current estimates, from 3.74 AFY to 12.54 AFY, and these increased extractions will be derived entirely from the proposed Future Well.

### Proposed Pumping Rates for Onsite Wells

To estimate the pumping rates that would be required from the proposed Future Well to meet the demands that it is proposed to supply (8.80 AFY total, to supply 85% of existing vineyard and 100% of proposed new vineyard), the following assumptions and calculations were made:

- Groundwater pumping would occur on a 50% operational basis during the irrigation season; that is 12 hours per day (720 minutes per day) and 7 days per week.

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<sup>8</sup> Unit vineyard irrigation rate for onsite vineyards for 2023, as reported by vineyard managers.



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- The irrigation season would be 20 weeks long.

Therefore, the pumping rate required from the Future Well to meet the 8.80 AFY of demands that it is proposed to supply would be 29 gpm, calculated as follows:

$$\text{Required Pumping Rate from Future Well} = 8.80 \text{ AFY} \times \frac{325,851 \text{ gallons}}{\text{AF}} \times \frac{\text{year}}{20 \text{ weeks}} \times \frac{\text{week}}{7 \text{ days}} \times \frac{\text{day}}{720 \text{ minutes}} = 29 \text{ gpm}$$

As described above, the property owner is applying for a new well permit with the County for drilling and construction of the Future Well. Once constructed, this well would meet 85% of the demands of the existing vineyard, and 100% of the proposed demands of the new vineyard. Based on the airlift rates reported on the WCRs for several nearby wells, and on RCS's experience with a nearby offsite well that is comparable in construction to the proposed construction of the Future Well, a successful Future Well is likely to be capable of supporting an operational pumping rate of 29 gpm.

According to Mr. Buckland, the duration of the 2023 irrigation season was 27 weeks. For comparison, if the same assumptions presented above were extended to a 27-week irrigation season, the required pumping rate would fall to approximately 21 gpm. However, consideration of the shorter 20-week irrigation season, and therefore a higher required pumping rate, results in an analysis that is more conservative than if a longer irrigation season had been used for these calculations.

The remaining onsite demands of 3.74 AFY, which are currently met by the existing New Well, will continue to be met by the New Well in the future. As discussed previously, prior to the 2017 acquisition of the subject property by the current owner, the New Well supported all onsite water demands. Furthermore, the pre-2017 demands were reportedly comparable to current demands. Therefore, the New Well is expected to easily meet its current and future demands.

### **WAA Tier 1: "Groundwater Use for Napa County"**

Napa County promulgated additional guidelines<sup>9</sup> for WAA preparation with respect to groundwater recharge calculations in response to the Governor's Executive Order N-7-22 (Napa County, 2022a & 2023a) and the drought in the State at that time. For projects that require a WAA and are located outside of the Napa Valley Subbasin of the Napa-Sonoma Valley Groundwater Basin (DWR, 2021), the County requires a calculation of parcel-specific groundwater recharge to determine allowable groundwater usage. Napa County also requires that parcel-specific groundwater recharge estimates used in WAAs for projects outside of the Napa Valley Subbasin consider "average rainfall" to be the average annual rainfall that has occurred in the last 10 water years, such as defined in the County's 10-year average precipitation dataset (PBES & LSCE, 2022).

#### **Parcel-Specific Precipitation**

Spatial analysis of the County's 10-year average rainfall data set (PBES & LSCE, 2022) determined that the area-weighted average rainfall for the 10-water-year period of 2012 to 2021 at the subject property is 32.58 inches (2.7 ft). Multiplying this rainfall average by the 35.81-acre assessed area of the subject property, then dividing by a factor of 12 (inches to feet conversion), results in a total of 97.2 AFY. This value is the average volume of rainfall that the subject property

<sup>9</sup> A "prolonged drought analysis" is no longer required for WAA preparation due to the required use of the 10-year annual rainfall average or the unit groundwater use of 0.3 AFY/ac (Napa County, 2022b).



## MEMORANDUM

receives each water year, per the County's current 10-year (Water Years 2012 to 2021) average methodology. However, it does not consider the deep percolation rate (groundwater recharge rate) at the subject property.

### Parcel-Specific Groundwater Recharge

Groundwater recharge on a long-term average annual basis at the subject property can be estimated as a percentage of average rainfall that falls on the property and subsequently undergoes deep percolation, ultimately entering the local aquifer system beneath the property. The actual percentage of rainfall that undergoes deep percolation is a function of numerous local and regional conditions, including ground surface slopes; soil types; ground cover; evapotranspiration; and the frequency, intensity, and duration of rainfall, among other possible factors.

Estimates of groundwater recharge as a percentage of rainfall were presented for several watersheds that are tributary to the Napa River in LSCE & MBK (2013). A local subset of those same watershed boundaries is depicted on Figure 1 of this Memorandum. The local subwatershed that contains the entire subject property is referred to by LSCE & MBK (2013) as the "Napa River Watershed at St. Helena". As noted above, the entire Napa River Watershed at St. Helena is contained within the Napa River Watershed near Napa. On Table 8-10 of LSCE & MBK (2013), referred to thereon as "Recharge (% of Precip.)", the deep percolation rate for the Napa River Watershed near Napa is 17%, whereas the deep percolation rate for the Napa River Watershed at St. Helena is 14%. To present a more conservative analysis for the purposes of this Tier 1 WAA, the lower deep percolation rate of 14% for the Napa River Watershed at St. Helena was selected.

Multiplication of the 14% groundwater recharge rate in LSCE & MBK (2013) with the average volume of rainfall that the subject property receives each water year (97.2 AFY) results in a parcel-specific average groundwater recharge rate of 13.61 AFY by the County's current 10-year precipitation average methodology. However, this calculation still does not directly consider the possible effect of the ground surface slope on the potential for deep percolation at the property.

### Effect of Slope on Groundwater Recharge Potential

Any estimate of the percentage of rainfall that enters an aquifer system via deep percolation that relies on estimates of rainfall, evapotranspiration, and surface water outflow over an entire watershed, such as the estimates provided by LSCE & MBK (2013), inherently includes the effects of ground surface slope. To provide a more site-specific estimate of the potential effects of ground slope on groundwater recharge at the subject property, a ground surface slope analysis is provided below.

Many basic geologic references assume that recharge potential is reduced on steeper slopes because steeper slopes tend to increase surface water runoff rates and less time is therefore available for rainfall to percolate (infiltrate) into the ground before running off as surface flow. Page 56 of LSCE & MBK (2013) asserts that deep percolation recharge from rainfall is "significantly reduced" for land areas with slopes angles (inclinations)  $>30^{\circ}$ . On page 11 of LSCE & MBK (2013), an assessment of slope angles  $>30^{\circ}$  is also mentioned, and this was attributed to a prior LSCE report, namely "LSCE 2011" therein; that document is likely to be the reference listed as "2011a" on page 134 of LSCE & MBK (2013). LSCE (2011) states on page 29 that "areas in which the slope of the land surface exceeds 30 degrees, beyond which recharge potential is significantly reduced." No other references or data are presented in any of the above-



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referenced documents to quantify the qualitative description of “significantly reduced”. Because the various factors that affect groundwater recharge are likely interrelated (Yeh et al., 2009), assigning a value to define the amount that recharge is diminished as a function of slope is extremely difficult. No references were reviewed by RCS that quantify the possible reduction of deep percolation that might occur as a function of ground surface slope angle.

The watershed-wide estimates of the deep percolation rate of rainfall for the entire Napa River Watershed at St. Helena were based on water balance calculations that included rainfall throughout the entire watershed (LSCE & MBK, 2013). As discussed above, those watershed-scale calculations inherently include all slopes within the watershed, including slopes  $>30^\circ$ . Therefore, to provide a more conservative and site-specific estimate of groundwater recharge for the subject property, it is assumed that deep percolation at the subject property does not occur on areas with slopes of  $>30^\circ$ , and that rainfall that occurs on the areas of  $>30^\circ$  slopes would leave the property through some other hydrologic process (e.g., surface runoff, evapotranspiration, etc.).

Spatial analysis of a U.S. Geological Survey (USGS) digital elevation model (2020c) determined that the entire ground surface is sloped at  $\leq 30^\circ$ , and thus, no reduction of recharge volume is necessary for the subject property.

In accordance with current Napa County guidelines (2015 & 2023a) and based on the conservative analyses presented above, average annual groundwater recharge at the subject property, and thus allowable groundwater extractions from the subject property, would be 13.61 AFY. This estimate of groundwater recharge and allowable groundwater extractions is higher than the 12.54 AFY of onsite groundwater extractions proposed to meet the future demands of the subject property. Because total proposed onsite groundwater extractions (12.54 AFY) do not exceed the estimated average annual groundwater recharge at the property (13.61 AFY), the Tier 1 WAA conditions are satisfied for the proposed new vineyard development, the proposed new Future Well, and for the existing uses of groundwater uses that would continue into the future at the subject property.

### **Tier 2 WAA – Review of Possible “Well & Spring Interference”**

RCS reviewed publicly available records for evidence of offsite wells (PBES, 2023) and springs (PBES, 2023; USGS, 2023) near the subject property. This review did not result in discovery of any known or possible active offsite wells or offsite springs that are used for water supply purposes within 500 feet or 1,500 feet of the proposed location of the Future Well, respectively. Two inactive wells located just north of the property boundary do exist within 500 feet the proposed location of the Future Well, but those two wells will reportedly be destroyed soon, according to a representative of that offsite property, Mr. Aaron Harkin. An offsite well likely exists within 500 feet of the existing New Well, but groundwater extractions from the existing New Well and the current uses of those extractions will not change as a part of the proposed new vineyard project, representing a “no-net-increase” condition. Therefore, the Tier 2 WAA requirements for the proposed vineyard development project and the proposed Future Well are presumptively met, and a Tier 2 WAA is not required to gain County approval of either the proposed development or the proposed drilling permit for the Future Well (Napa County, 2015 & 2023a).

### **Tier 3 WAA – Review of Possible “Groundwater/Surface Water Interaction”**

Napa County has published information defining which rivers, streams, and creeks within the County are considered “significant” for the purposes of Tier 3 WAA review. These “Significant





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Streams” are defined in GIS data available from a County GIS data source, where they are referred to as “Significant Streams” and “Significant Streams\_1500ft\_Buffer” (PBES & LSCE, 2023a & b). According to the County’s updates to WAA requirements (Napa County, 2023a), a Tier 3 WAA is required if a project well is located within 1,500 feet of a Significant Stream and if groundwater use from that well will increase.

Figures 1 and 2 show the spatial relationship between the subject property and the nearby Significant Stream 1,500-foot buffer areas. Figure 2 also shows that the entire subject property, including the project well (the proposed Future Well), is within a Significant Stream 1,500-foot buffer area. Submission of this Tier 3 WAA is required for County-approval of the proposed vineyard development project, and for County-approval of a drilling permit for the proposed Future Well (Napa County, 2015 & 2023a), which is the project well that will supply the proposed vineyard project.

The Significant Stream 1,500-foot buffer area that encompasses the subject property appears to have been generated around Diamond Creek, which passes through the southern portion of the property, flowing from west to east when adequate water is present in the creek for flow to occur. Diamond Creek emanates from the hills and mountains west of the Napa Valley floor, generally flowing in a northeasterly direction, and ultimately drains into the Napa River (see Figure 1). Measured along a straight horizontal line, the mouth of Diamond Creek (where it flows into the Napa River) is 0.80 miles northeast of the creek’s intersection with the eastern boundary of the subject property. The approximate flow-distance (i.e., along the Significant Stream) between these same points is 1.17 miles.

### Creek Flow Characteristics

RCS is not aware of any quantitative historic surface water flow data for Diamond Creek. According to Figure 6-123b of LSCE (2022) and the National Hydrography Dataset (USGS, 2023), Diamond Creek is classified as an intermittent stream near the subject property. Therefore, surface flow in Diamond Creek in the vicinity of the subject property is intermittent, and RCS recognizes that such flows would generally not occur during the summer and fall months, when regional precipitation tends to be minimal.

Through review of imagery available from the Google Maps “Street View” dataset (Alphabet, 2023), RCS was able to recover limited observations of historic surface water flows at several points along Diamond Creek, prior to its confluence with the Napa River. Because there are several observation points sufficiently close to roads on which historic Street View imagery has been captured, these images can be reviewed for several distinct locations along Diamond Creek (see Creek Observation Points on Figure 1). The locations most distant from the subject property, Creek Observation Points A and B, are very close to each other on St. Helena Hwy, where Diamond Creek passes under the roadway. Observations made at Point A were based on imagery captured looking towards the northeast (downstream, away from the subject property), whereas observations made at Point B were based on imagery captured with a southwestern-looking orientation (upstream, towards the subject property). Point C, the third Observation Point, is roughly 1,160 feet downstream of the location where Diamond Creek exits the subject property. The fourth Observation Point, Point D is within the boundary of the subject property; however, only a single date of observation was available at this Point. Points A and B were included in this analysis because, despite being inside the local groundwater basin and considerably farther downstream from the subject property than Points C and D, they were found to have more than twice as many imagery times available for review as were available at Points C and D.



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Table 2, below, presents a summary of the qualitative creek conditions determined by RCS via review of those available Street View images. As shown on Table 2, most of the Street View imagery reviewed showed Diamond Creek as being dry. An additional observation of creek flow condition was made during a visit to the subject property on May 18, 2023, at which time an RCS groundwater geologist observed water flowing in Diamond Creek, near the western boundary of the property and the existing onsite wells, and relatively close to Observation Point D.

**Table 2 – Summary of “Street View” Imagery Review**

Street View Imagery Date	Finding at Observation Point			
	Point A	Point B	Point C	Point D
Feb-2023	water present	water present	--	--
Oct-2022	dry	dry	--	--
Jun-2021	dry	--	--	--
Apr-2021	--	dry	--	--
Apr-2019	water present	water present	water present	--
Nov-2018	dry	--	--	--
Dec-2016	dry	dry	--	--
May-2016	--	dry	--	--
Apr-2016	dry	dry	water present	--
Jul-2015	--	dry	dry	--
Mar-2015	dry	--	--	--
Apr-2014	dry	--	--	--
Apr-2013	--	dry	--	--
Jun-2011	--	dry	water present	water present
May-2011	dry	--	--	--
Nov-2007	inadequate resolution	inadequate resolution	likely dry	--

-- = imagery not available at Observation Point

The Street View imagery observations show that water was not observed in Diamond Creek between the months of July and December, whereas water was occasionally observed in the creek between the months of February and June (no images captured in January were available for review). Furthermore, because water is only occasionally present in the available observations described herein, the evidence presented herein demonstrate that Diamond Creek is an intermittent stream in the vicinity of the subject property.

Review of aerial imagery reveals that Diamond Creek is likely dammed upstream of the subject property; it is possible that the timing of water releases from that dam, if any, impart a strong influence on the surface flows in Diamond Creek in the vicinity of the subject property. The presence of this upstream dam makes determination of natural streamflow conditions difficult, based on available data. However, as stated above, Diamond Creek is intermittent in the vicinity of the subject property and is apparently dry for a significant portion of the year. In the immediate vicinity of the subject property, the presence of flow in Diamond Creek is likely controlled by direct precipitation, surface water runoff, and upstream dam releases (if any), but not groundwater.



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### Napa Valley Subbasin Groundwater Sustainability Plan

In Section 6, “Groundwater and Surface Water Conditions”, of the Napa Valley Subbasin Groundwater Sustainability Plan (LSCE, 2022), a discussion of the hydraulic connection of groundwater and creeks within the County is presented, as simulated by computer modeling. Figure 6-123b therein shows the “average annual hydraulic connection” of creeks (LSCE, 2022). On that Figure, Diamond Creek is shown as “intermittent”, and without any “simulated average annual hydraulic connectivity” along the length of the stream in the vicinity of the subject property. The nearest portion of Diamond Creek on Figure 6-123b with any “simulated average annual hydraulic connectivity” is greater than 0.5 miles downstream of the subject property, where Diamond Creek enters the local groundwater basin. Thus, based on Figure 6-123b of LSCE (2022), surface water in Diamond Creek, when present, is not hydraulically connected to underlying groundwater.

### Timing of Groundwater Use

Based on the discussion above, Diamond Creek is dry for most of the year, particularly in the summer and fall. This period generally coincides with the expected timing of future irrigation for existing vineyards, existing olive and fruit trees, and proposed vineyards, which according to Mr. Buckland, occurred over a 27-week period in 2023, from late April to early November. Irrigation demands comprise the bulk of groundwater demands of the subject property, and all the groundwater extractions from the Future Well are proposed to be used for the purposes of vineyard irrigation. According to the Mr. Buckland, nearly half of agricultural irrigation occurred in July and August, and roughly 85% of this irrigation occurred between May and September. The vast majority of the proposed 12.54 AFY of groundwater extractions from the subject property are projected to occur during the irrigation season, during months when Diamond Creek has historically tended to be dry. Even if some sort of theoretical hydraulic connection did exist between the intermittent flows in Diamond Creek and the groundwater accessible to the proposed Future Well, the majority of natural surface water flows in the creek would likely occur in the spring, and possibly winter, when groundwater extractions from the proposed Future Well would be minimal.

### Hydrogeology

Figure 3 shows the horizontal alignment of a geologic cross section created by RCS for the purposes of this Tier 3 WAA; the alignment was selected such that it intersects the proposed Future Well (the project well) and the most proximal portion of Diamond Creek found in the Significant Streams dataset. The geologic cross section is shown on Figure 4, “Cross Section A-A”. This illustration is a scaled schematic that depicts the interpreted geologic conditions beneath the section alignment, the proposed construction details for the Future Well, and the construction of nearby historically constructed wells along the section alignment. Figure 4 is annotated with the surface features intersected by the cross section, including the location of Diamond Creek found in the Significant Streams dataset, the topographic low in which Diamond Creek actually flows, and the subject property boundary lines. Also shown on the cross section are available water level depth measurements for the wells shown thereon. The data and interpretations presented on Figure 4 were derived from WCRs of onsite and nearby wells; from Delattre & Gutierrez (2013); and from RCS’s work in the area on other parcels.

The available water level measurements in the existing onsite wells (New Well and Old Well) were derived from the respective WCRs for these wells and from the May 2023 RCS visit to the subject



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property. The two post-construction water levels reported on the WCRs for these wells and the May 2023 measurement by the RCS geologist in the Old Well were all relatively shallow, but below ground surface. Conversely, the RCS geologist found the New Well to be in a condition of artesian flow (above ground surface) at the time of the May 2023 site visit, with the water in the well casing rising to a static height of 1.3 feet above ground surface (ft ags) when the overflow was contained within the casing.

When a well is producing artesian flow, an upward flow potential from the earth materials the well is perforated against exists, along with at least partially confining conditions at some depth below ground surface. Based on the close proximity of the New Well and the Old Well, the vertical separation between the perforated casing interval depths reported for these wells in excess of 30 feet (see Figure 4), and in the absence of known horizontal flow barriers between these wells, it can be reasoned that if upward flow were occurring from some portion of aquifer accessible to the New Well (i.e., within the perforated casing interval of the well), that flow would need to pass through the same sediments that the Old Well is perforated against before it could reach the bed of Diamond Creek. If an upward flow like that were occurring, the water level in the Old Well would be expected to approach the elevation of the local ground surface, or at the very least, the elevation of the bed of Diamond Creek. The May 2023 measurements in these wells do not support this scenario. Instead, the water level in the shallower Old Well was lower in elevation than both the bed of Diamond Creek and the water level in the much deeper existing New Well.

The May 2023 water level data and reported well construction details discussed above support the existence of a confining region near the interpreted interface between the top of the Sonoma Volcanics and the base of the of overlying sediments. This apparent confining region is interpreted to impede the vertical flow of groundwater from the Sonoma Volcanics into the overlying sediments in the vicinity of Diamond Creek. Groundwater beneath this apparent confining region is accessible to the New Well, and perhaps to similarly perforated wells beneath the entire subject property, but a significant hydraulic connection between this groundwater and the intermittently present surface water in Diamond Creek does not exist. It is this same confined region of the Sonoma Volcanics aquifer system from which the proposed Future Well would extract groundwater.

Post-construction water levels in the two nearby offsite wells shown on Figure 4, which are near the proposed location of the Future Well, were far deeper below ground surface than those that have been measured in the New Well and the Old Well, at 270 ft bgs (WCR #345290) and 210 ft bgs (WCR #345291). However, the elevations of these water levels are somewhat comparable to the elevations to the available water levels in the existing onsite wells.

Groundwater pumped from the Future Well, constructed as proposed (i.e., 300-ft sanitary seal length, on the order of 340 ft bgs depth to topmost casing perforations), would be extracted exclusively from the Sonoma Volcanics. As proposed, the elevation of the uppermost casing perforations of the Future Well would be similar to that of the uppermost casing perforations of the existing New Well, and comparable to the elevation of the interpreted confining region discussed above, between the sedimentary deposits in which Diamond Creek is bedded and the Sonoma Volcanics beneath those sediments. Furthermore, as proposed, the elevation of the topmost casing perforations of the Future Well would be more than 110 ft lower than the bed of Diamond Creek along Cross Section A-A'. RCS anticipates that the depth to groundwater in the proposed Future Well may be roughly similar to the water levels reported for those two nearby offsite wells, perhaps on the order of 200 to 300 ft bgs.



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In summary, a significant hydraulic connection between Diamond Creek and the groundwater accessible to the proposed Future Well (or the existing New Well) does not exist, based on the water level and well construction data discussed herein. As shown on the Figure F-2 “Decision Tree” in the 2015 Napa County WAA Guidance Document, and described in the Guidance Document text, the “Groundwater/Surface Water Evaluation is complete” because the project well (the proposed Future Well) is not hydraulically connected to surface water(s).

### **Key Conclusions and Recommendations**

1. The proposed project consists of developing 1.9 acres of new vineyards on the subject property, and drilling of a new agricultural supply well to meet the proposed water demands of the proposed new vineyards. The resultant future total vineyard area on the property will be approximately 14.58 acres.
2. According to vineyard management personnel, current onsite water demands total approximately 11.23 AFY and are met by the existing New Well and an offsite well; these demands consist of domestic, winery, orchard irrigation, and vineyard irrigation. The volumes of the existing demands will continue unchanged following development of the new vineyard areas and successful drilling and construction of the proposed Future Well. The portion of existing demands that are reportedly met by the existing New Well (3.74 AFY) will not change in the future. However, all onsite demands that are currently met by that offsite well will be met by the proposed Future Well (the project well), thereby ceasing reliance on offsite water sources. The Old Well will remain available as an emergency backup supply to the New Well.
3. Total water demand for the vineyard development project (i.e., vineyard irrigation and vineyard heat protection) has been estimated to be 1.31 AFY. The 1.31 AFY of irrigation demand for the new vineyard will be met by groundwater pumped from the proposed Future Well.
4. Total onsite water demands following completion of the proposed vineyard development project will be 12.54 AFY.
5. The estimated parcel-specific average annual groundwater recharge at the subject property is 13.61 AFY. This conservatively estimated average annual recharge volume is greater than the total future groundwater demand proposed for the property, of 12.54 AFY. Therefore, because proposed demand does not exceed parcel-specific groundwater recharge, the proposed project and proposed new well are compliant with Napa County’s Tier 1 WAA requirements (Napa County, 2015 & 2023a).
6. The proposed Future Well will only need to operate at a pumping rate of 29 gpm to meet the estimated groundwater demands that it will provide. Based on the results of confidential work performed by RCS on a similarly constructed offsite well near the proposed location of the Future Well, and on airlift data on WCRs for nearby offsite wells, the proposed Future Well is likely to be capable of providing an operational pumping rate of at least 29 gpm once it is successfully constructed and tested.
7. A Tier 2 WAA is not necessary for either the proposed vineyard project or the proposed construction of the Future Well (the project well), because:
  - a. The proposed project well will be located greater than 500 feet from the known and possible locations of offsite wells (except those that are either destroyed or will soon be destroyed, according to a representative of the owner of those wells).
  - b. The proposed project well will be located greater than 1,500 feet from the locations of known and possible offsite springs used for water supply purposes and owned by others.





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8. Constructed as proposed herein, the Future Well would have no hydraulic connection to Diamond Creek. This lack of hydraulic connection is demonstrated by the following:
  - a. The Napa Valley Groundwater Sustainability Plan depicts the section of Diamond Creek near the subject property without any “simulated average annual hydraulic connectivity” (LSCE, 2022).
  - b. In the immediate vicinity of the subject property, available observations suggest that the intermittent presence of surface water in Diamond Creek is probably controlled by direct precipitation, surface runoff, and possibly upstream dam releases; but it is not controlled by groundwater that is accessible to wells perforated primarily in the rocks of the Sonoma Volcanics.
  - c. During the May 2023 site visit by an RCS groundwater geologist, the water level in the relatively shallow Old Well was observed to be lower in elevation than the artesian above-ground-surface water level in the much deeper existing New Well. This observation, when considered in conjunction with the reported construction depths of these adjacent wells, supports the interpreted existence of a confining region between the shallower sediments accessible to the Old Well, in which Diamond Creek is bedded, and the deeper earth materials accessible to the existing New Well (primarily the Sonoma Volcanics).
  - d. The casing perforations proposed for the Future Well would be lower in elevation than the interpreted bottom depth of the sedimentary materials in the vicinity of the subject property, illustrated along Cross Section A-A’ in Figure 4. The perforations of the Future well would also be more than 110 feet lower in elevation than the bed of the nearest portion of Diamond Creek.
  - e. As proposed, the Future Well would be constructed into and extract groundwater exclusively from the rocks of the Sonoma Volcanics, from subsurface elevations comparable to the perforations of the existing New Well. With this construction, the Future Well would not be in direct hydraulic communication with Diamond Creek, because it has been demonstrated that a significant hydraulic connection does not exist between the sediments in which Diamond Creek is bedded and groundwater that will be accessible to the proposed Future Well.
9. According to the Napa County 2015 WAA Guidance Document, the Tier 3 analysis has been satisfied because a lack of hydraulic connection between the Significant Stream (Diamond Creek) and the proposed Future Well (the Project Well) has been demonstrated.
10. RCS recommends initiation of groundwater monitoring at the subject property, in all existing and future onsite wells. This should include the frequent, ongoing monitoring of static and pumping water levels in all onsite wells, and the monitoring of instantaneous flow rates and cumulative pumped volumes from the active onsite pumping wells.



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### Closure/Disclaimer

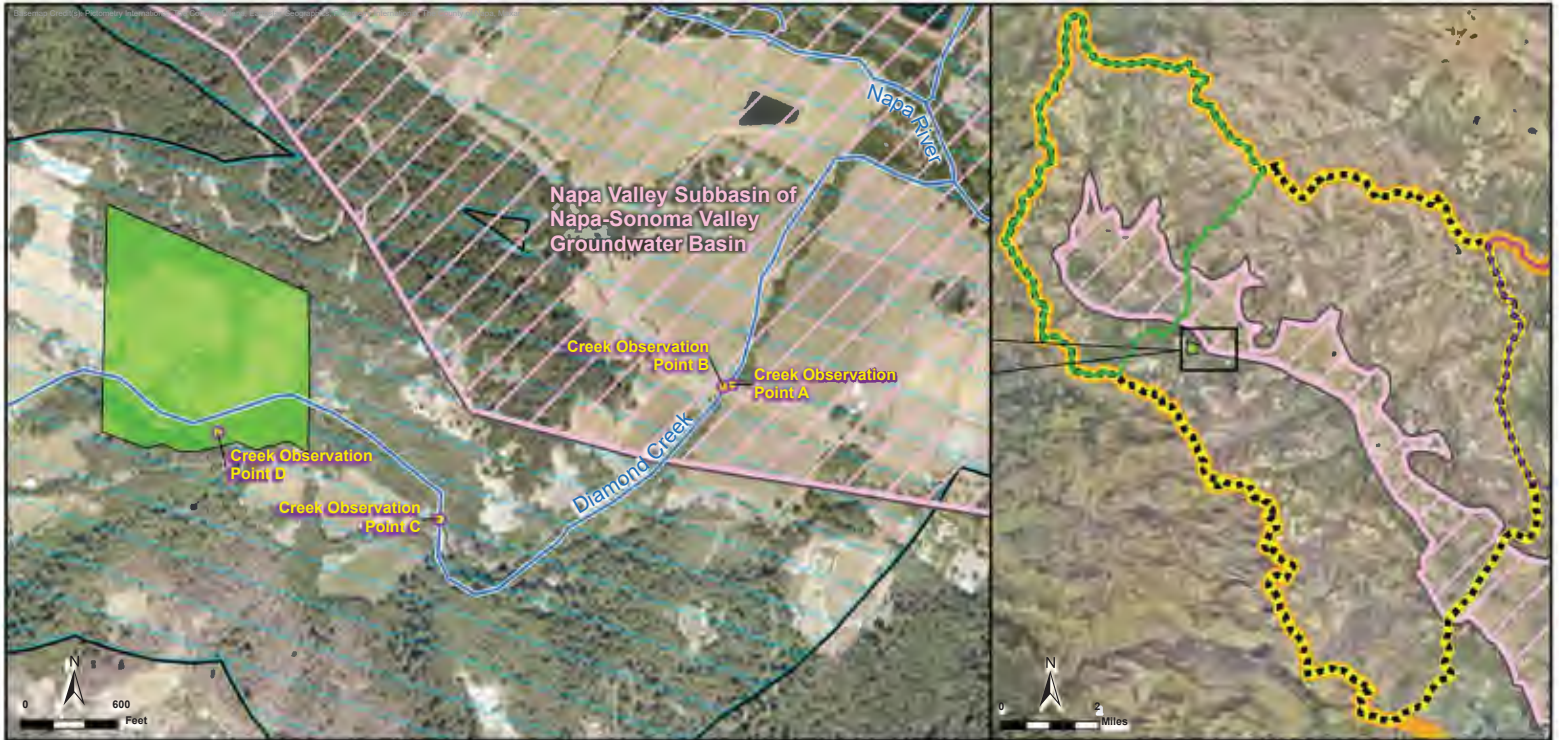
This Memorandum regarding RCS's WAA for a proposed vineyard development project and drilling permit for a proposed new well at the 1510 Diamond Mountain Road property, in the Calistoga area of Napa County, CA, has been prepared for 1510 Acquisition, LLC and applies only to the evaluation of the subject property for the requirements discussed herein. This WAA has been prepared in accordance with the care and skill generally exercised by reputable professionals, under similar circumstances, and in this or similar localities. No other warranty, either express or implied, is made to the conclusions or professional advice presented herein.













## MEMORANDUM

### References

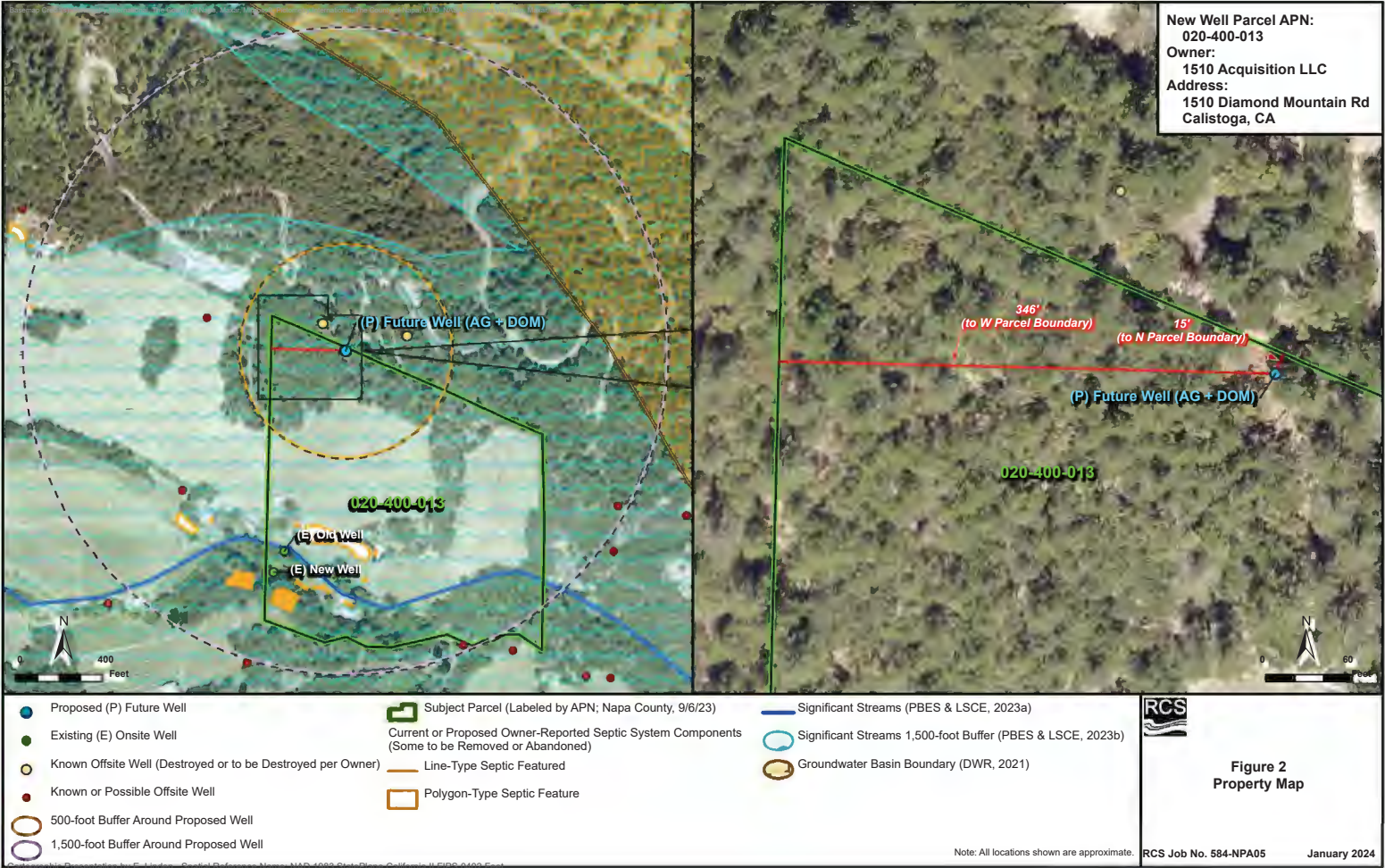
- Alphabet Inc., 2023. Google Maps Website. Street View imagery accessed in 2023 at:  
<https://www.google.com/maps>
- DWR, 2021 (California Department of Water Resources). *Bulletin 118 California Groundwater Basins*. Version 6.2. Published December 6, 2021.
- Delattre, M.P. & Gutierrez, C.I., 2013. *Preliminary Geologic Map of the Calistoga 7.5' Quadrangle, Napa and Sonoma Counties, California: A Digital Database*. Scale 1:24,000. California Geological Survey website:  
<https://www.conservation.ca.gov/cgs/rgm/preliminary>
- LSCE, 2011 (Luhdorff & Scalmanini Consulting Engineers). *Napa County Groundwater Conditions and Groundwater Monitoring Recommendations*. Prepared for Napa County Department of Public Works. February 2011.
- , 2022. *Napa Valley Subbasin Groundwater Sustainability Plan*. January 2022.
- LSCE & MBK, 2013 (LSCE & MBK Engineers). *Updated Hydrogeologic Conceptualization and Characterization of Conditions*. Prepared for Napa County. January 2013.
- PBES, 2023 (Napa County Planning, Building & Environmental Services). *Electronic Document Retrieval | Napa County, CA*. Accessed in 2023. <https://services.countyofnapa.org/OBPBESPAV/Search/PBESDocs/index.html>
- PBES & LSCE, 2022. *MeanPrecip\_WY\_2012\_2021\_PRISM*. Feature Layer by PBES.Admin. Credits:  
<https://prism.oregonstate.edu/recent/> (data modified by LSCE and Napa Co. PBES). Updated 10/20/2022. Accessed 12/14/2022.  
<https://napacounty.maps.arcgis.com/home/item.html?id=985a11dfb2ab45518254354036c93aa2>
- , 2023a. *Significant\_Streams*. Feature Layer by PBES.Admin. Updated 5/17/2023.  
<https://www.arcgis.com/home/item.html?id=3e3a0f5a59f147e1ae99723f8420f096>
- , 2023b. *Significant\_Streams\_1500ft\_Buffer*. Feature Layer by PBES.Admin. Updated 5/17/2023.  
<https://www.arcgis.com/home/item.html?id=8f3927797b6f490c89a8b07778dfed6f>
- Napa County, 2015. *Water Availability Analysis (WAA) - Guidance Document*. Prepared for Napa County Board of Supervisors, Adopted May 12, 2015.
- , 2022a. *FAQ – Napa County Well Permit Standards (including response to Governor’s Executive Order N-7-22), July 15, 2022*. Accessed 12/3/2022 at:  
<https://www.countyofnapa.org/DocumentCenter/View/25906/Well-Permit-Standards-FAQs---15-July-2022>
- , 2022b. *WAA & Napa County Practices*. Stakeholder Outreach Meeting, held virtually, November 28, 2022.
- , 2023a. *Napa County Well Permit Standards and WAA Requirements - January 6, 2023*.  
<https://www.countyofnapa.org/DocumentCenter/View/25905/Well-Permit-Standards-and-WAA-Requirements--January-6-2023?bidId=>
- , 2023b. *Parcels\_public*. Last updated September 6, 2023.  
[https://gis.napa.ca.gov/data/boundaries/parcels\\_public.zip](https://gis.napa.ca.gov/data/boundaries/parcels_public.zip)
- USGS, 2020a (U.S. Geological Survey). *Quaternary Fault and Fold Database of the United States*. Last updated September 2, 2020. <https://www.sciencebase.gov/catalog/item/589097b1e4b072a7ac0cae23>
- , 2020b. *USGS one meter x53y427 CA NoCAL Wildfires B5b 2018*. Digital Elevation Model (DEM) raster digital data. 3D Elevation Program (3DEP). Published 3/18/2020.
- , 2020c. *USGS 1/3 arc-second n39w123 1 x 1 degree*. Digital Elevation Model (DEM) raster digital data. 3D Elevation Program (3DEP). Published 3/17/2020.
- , 2023. *USGS National Hydrography Dataset Best Resolution (NHD) - California*. FileGDB format. Published 5/5/2023. U.S. Geological Survey, National Geospatial Program.
- Yeh, et al., 2009 (Yeh H.F., Lee C.H., Hsu K.C., Chang P.H.). *GIS for the assessment of the groundwater recharge potential zone*. *Environ Geol* 58:185–195.



<b>LEGEND</b>		  <b>Figure 1</b> <b>Regional Map</b>
<ul style="list-style-type: none"> <li> Significant Streams (Napa County, 5/17/23)</li> <li> Significant Streams 1,500-foot Buffer (Napa County, 5/17/23)</li> <li> Groundwater Basin Boundary (DWR, 2021)</li> <li> Subject Parcel (APN 020-400-013; Napa County, 9/6/23)</li> <li> Creek Observation Point</li> </ul>	<ul style="list-style-type: none"> <li><b>Watersheds in LSCE &amp; MBK (2013)</b></li> <li> Conn Creek Watershed</li> <li> Napa River Watershed at Calistoga</li> <li> Napa River Watershed at St. Helena</li> <li> Napa River Watershed near Napa</li> </ul>	

Cartographic Presentation by E. Lindon. Spatial Reference Name: NAD 1983 StatePlane California II FIPS 4162 Feet.





New Well Parcel APN:  
 020-400-013  
 Owner:  
 1510 Acquisition LLC  
 Address:  
 1510 Diamond Mountain Rd  
 Calistoga, CA

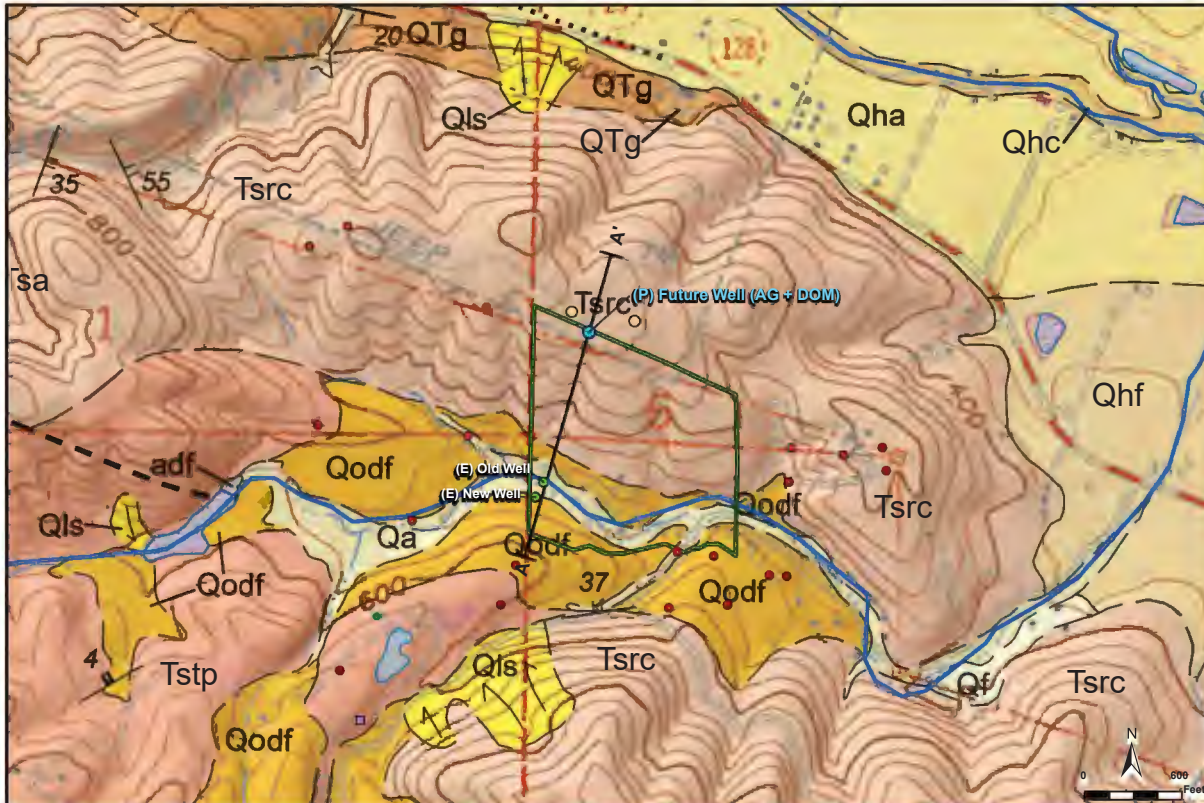
- Proposed (P) Future Well
- Existing (E) Onsite Well
- Known Offsite Well (Destroyed or to be Destroyed per Owner)
- Known or Possible Offsite Well
- 500-foot Buffer Around Proposed Well
- 1,500-foot Buffer Around Proposed Well
- Subject Parcel (Labeled by APN; Napa County, 9/6/23)
- Current or Proposed Owner-Reported Septic System Components (Some to be Removed or Abandoned)
- Line-Type Septic Feature
- Polygon-Type Septic Feature
- Significant Streams (PBES & LSCE, 2023a)
- Significant Streams 1,500-foot Buffer (PBES & LSCE, 2023b)
- Groundwater Basin Boundary (DWR, 2021)

**RCS**

**Figure 2  
Property Map**

Note: All locations shown are approximate. RCS Job No. 584-NPA05 January 2024





### GEOLOGIC LEGEND

#### Sedimentary Deposits

- Qhc** Stream channel deposits (modern to latest Holocene)
- Qha** Alluvial deposits, undifferentiated (Holocene)
- Qhf** Alluvial fan deposits (Holocene)
- Qa** Alluvial deposits, undifferentiated (Holocene to latest Pleistocene)
- Qf** Alluvial fan deposits (Holocene to latest Pleistocene)
- Qls** Landslide deposits (historical to Pleistocene)
- Qodf** Old debris flow deposits (Pleistocene)
- QTg** Unnamed fluvial and lacustrine deposits (early Pleistocene to Pliocene)

#### Sonoma Volcanics

- Tstp** Tuff of Petrified Forest (Pliocene)
- Tsrc** Rhyolite of Cellistoga (Pliocene)

--- Contact between map units  
 Solid where accurately located, dashed where approximately located, short dash where inferred, dotted where concealed, quartered where uncertain.

--- Fault  
 Solid where accurately located, dashed where approximately located, short dash where inferred, dotted where concealed, quartered where uncertain. Bell and bar on downthrown block. Arrow and number indicate direction and angle of dip of fault plane.

↘ Strike and dip of inclined beds.

↘ Strike and dip of volcanic flow.

↻ Landslide  
 Arrows indicate principal direction of movement.

Geologic map adapted from: Delatte, M.P. & Gutierrez, C.I., 2013. Preliminary Geologic Map of the Calistoga 7.5' Quadrangle, Napa and Sonoma Counties, California: A Digital Database. Scale 1:24,000. California Geological Survey website: <https://www.conservation.ca.gov/cgs/gm/preliminary>

### LEGEND

- Subject Parcel (APN 020-400-013; Napa County, 9/6/23)
- Proposed (P) Future Well
- Existing (E) Onsite Well
- Known Offsite Well (Destroyed or to be Destroyed per Owner)
- Alignment of Cross Section (see Figure 4)

#### Known or Possible Offsite Water Sources

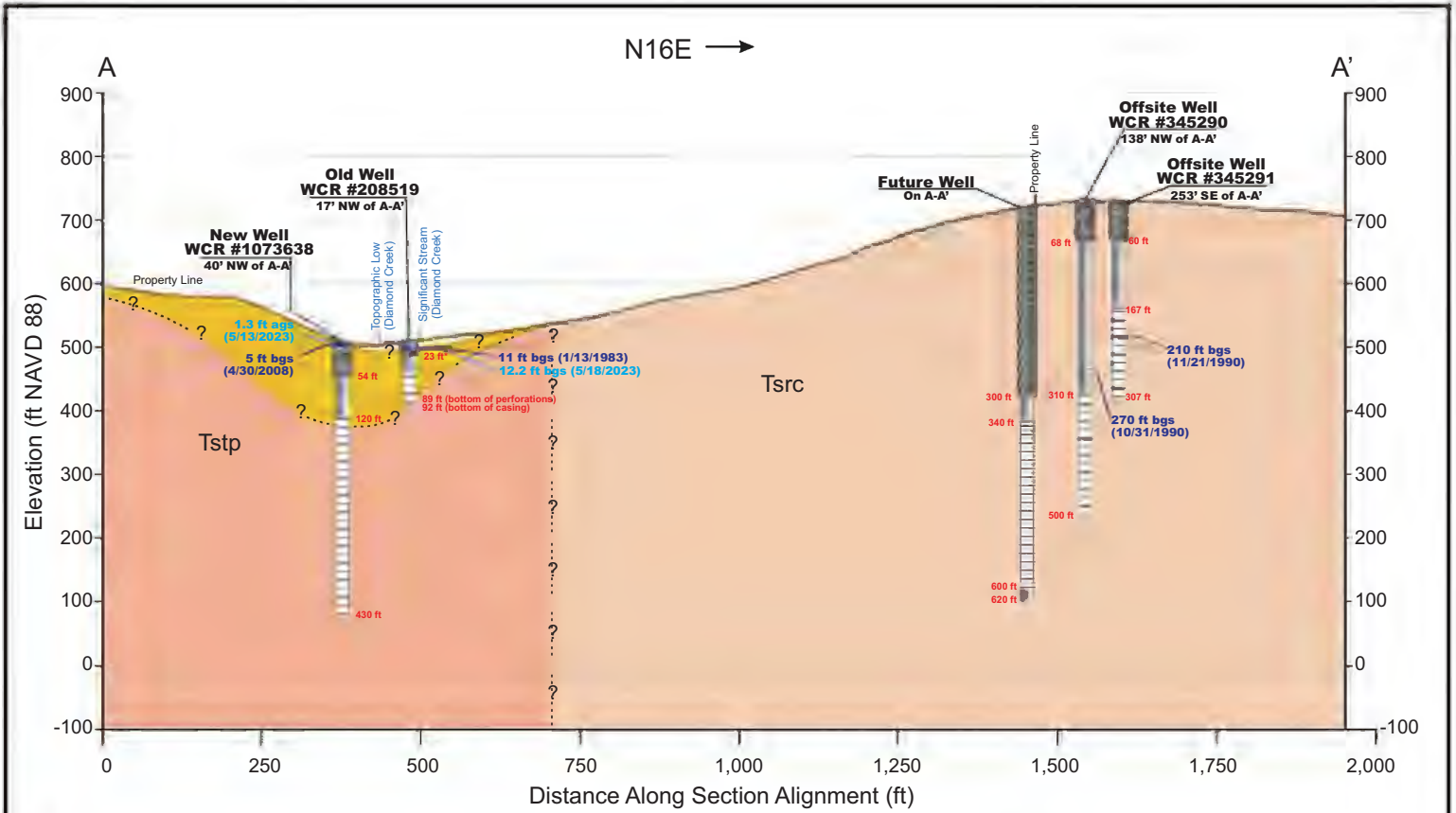
- Offsite Spring
- Offsite Well
- Offsite Well - Probably Destroyed, Disused, or at Different Location
- Significant Streams (PBES & LSCE, 2023a)

Note: All locations shown are approximate.

**RCS**

**Figure 3**  
Geologic Map

RCS Job No. 584-NPA05      January 2024



1:1 Scale (Vertical = Horizontal)  
Horizontal alignment of Section shown on Figure 3.

Cross section based on Delattre & Gutierrez (2013)  
Elevation profile derived from USGS DEM (2020b)  
\*: Seal depth of Old Well depicted as 23 feet due to uncertainty of data sources.

### ft = Well Construction Depth Below Ground Surface in Feet  
(as Reported on WCR for Completed Wells; Proposed for Future Well)

### ft bgs = Depth to Water in Feet Below Ground Surface  
(Measured After Well Construction, as Reported on WCR)

### ft bgs/ags = RCS 5/18/2023 Site Visit Depth to Water Measurement  
(feet below/above ground surface)

= Sanitary Seal    = Perforated Casing

= Blank Casing

<b>Qa</b>	Alluvial deposits, undifferentiated
<b>Qodf</b>	Old debris flow deposits
<b>Tsrc</b>	Rhyolite of Calistoga (Sonoma Volcanics)
<b>Tstp</b>	Tuff of Petrified Forest (Sonoma Volcanics)



**Figure 4**  
**Cross Section A-A'**

Job No. 584-NPA05

January 2024

**Table 1  
Summary of Well Construction and Testing Data  
1510 Diamond Mountain Road  
New Vineyard Development Project**

**WELL CONSTRUCTION DETAILS**

Well Designation	Well Log No.	County Permit Nos.	Date Drilled	Method of Drilling	Pilot Hole Depth (ft bgs)	Casing Depth (ft bgs)	Casing Type	Casing Diameter (in)	Borehole Diameter (in) and Depth Interval (ft bgs)	Sanitary Seal Depth (ft bgs)	Perforation Intervals (ft bgs)	Type and Size (in) of Perforations	Gravel Pack Interval (ft) and Size
New Well	1073638	E08-00141	April 23-30, 2008	Mud Rotary	430	430	Plastic (PVC?)	6	12-in to 54 ft 9-in to 430 ft	54	120-430	0.032-in Slots	54-430 Well Pack
Old Well	208519	11450 / 12-7-82	January 3-13, 1983	Cable Tool	92	89	Plastic (PVC?)	8	'10" plus'	20 or 23 or 26*	49-89	0.040-in Slots	20-89 '3/8 minus'

**POST-CONSTRUCTION YIELD DATA**

Well Designation	Well Log No.	Date & Type of Yield Data	Duration of "Test" (hrs)	Estimated Flow Rate (gpm)	Static Water Level (ft brp)
New Well	1073638	April 30, 2008 Airlift	4	90	5
Old Well	208519	January 1983 Bailer	0.5	50	11

Notes: n/a = not applicable  
 \* = Permit shows 26' and WCR shows 23', even though gravel starts at 20'.  
 DWR = California Department of Water Resources  
 ft bgs = feet below ground surface  
 in = inches  
 hrs = hours  
 gpm = gallons per minute

Water Availability Analysis for  
 1510 Diamond Mountain Road  
 New Vineyard Development Project  
 RCS Job No. 584-NPA05  
 January 2024



**MEMORANDUM**

**APPENDIX**

STATE WELL COMPLETION REPORTS  
FOR  
ONSITE WELLS  
AT  
1510 DIAMOND MOUNTAIN ROAD PROPERTY  
&  
SELECTED NEARBY OFFSITE WELLS  
OWNED BY OTHERS







FEE 10.00 DATE 12-7-82  
 RECEIPT NO. 11458 BY EW

# Old Well County Permit (p1/2)

A.P. NO. 20-400-13

NAPA COUNTY HEALTH DEPARTMENT  
 DIVISION OF ENVIRONMENTAL HEALTH

## APPLICATION & PERMIT TO CONSTRUCT A WATER WELL

NAME BILL RODDIS (Owner) ADDRESS 1510 DIAMOND MT. ROAD (Job Location)

NAME GUERNEVILLE WATER SYSTEM SERVICE CO. (Well Driller) ADDRESS 12022 MAYS CANYON DATE 7 DEC 82  
GUERNEVILLE 95446

TYPE OF WORK  
 NEW WELL  RECONDITIONING \_\_\_\_\_ DEEPENING \_\_\_\_\_  
 TYPE I PERMIT  DESTROY \_\_\_\_\_ OTHER \_\_\_\_\_  
 TYPE II PERMIT \_\_\_\_\_

PROPOSED USE  
 DOMESTIC \_\_\_\_\_ IRRIGATION  INDUSTRIAL \_\_\_\_\_ MUNICIPAL \_\_\_\_\_  
 TEST WELL \_\_\_\_\_ OTHER \_\_\_\_\_ HOT WATER \_\_\_\_\_

Sewage Disposal on site (existing or proposed) Public \_\_\_\_\_ Individual  Private \_\_\_\_\_  
 Distance from well to any part of nearest sewage disposal system 150 feet.  
 (Sketch of site to accompany application) County road setback 184 feet from centerline.

TYPE OF EQUIPMENT TO BE USED: Rotary \_\_\_\_\_ Cable  Hand Dug \_\_\_\_\_ Other \_\_\_\_\_

**WORKER'S COMPENSATION COVERAGE:** (Check one of the following)  
 A certificate of current Worker's Compensation Insurance coverage is presently on file with this office.  
 A certificate of current Worker's Compensation Insurance is being filed with this application.  
 I certify that in the performance of the work for which this permit is issued I shall not employ any person in any manner so as to become subject to the Worker's Compensation laws in California.

Richard P. Fogess Jr.  
 Signature of Applicant

7 December 1982  
 Date

### FOR OFFICE USE ONLY

	Date	By	Remarks
Pre-Inspection			
Class II Approval			
Permit Issued	<u>12/7/82</u>	<u>Bil</u>	
Const. Inspection	<u>1/13/83</u>	<u>mwp</u>	<u>SEAL TO 26'</u>
Final Inspection			
Final Approval			

Remarks: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DOON-SALL, WILLIAM A.  
AND MARIAN R.

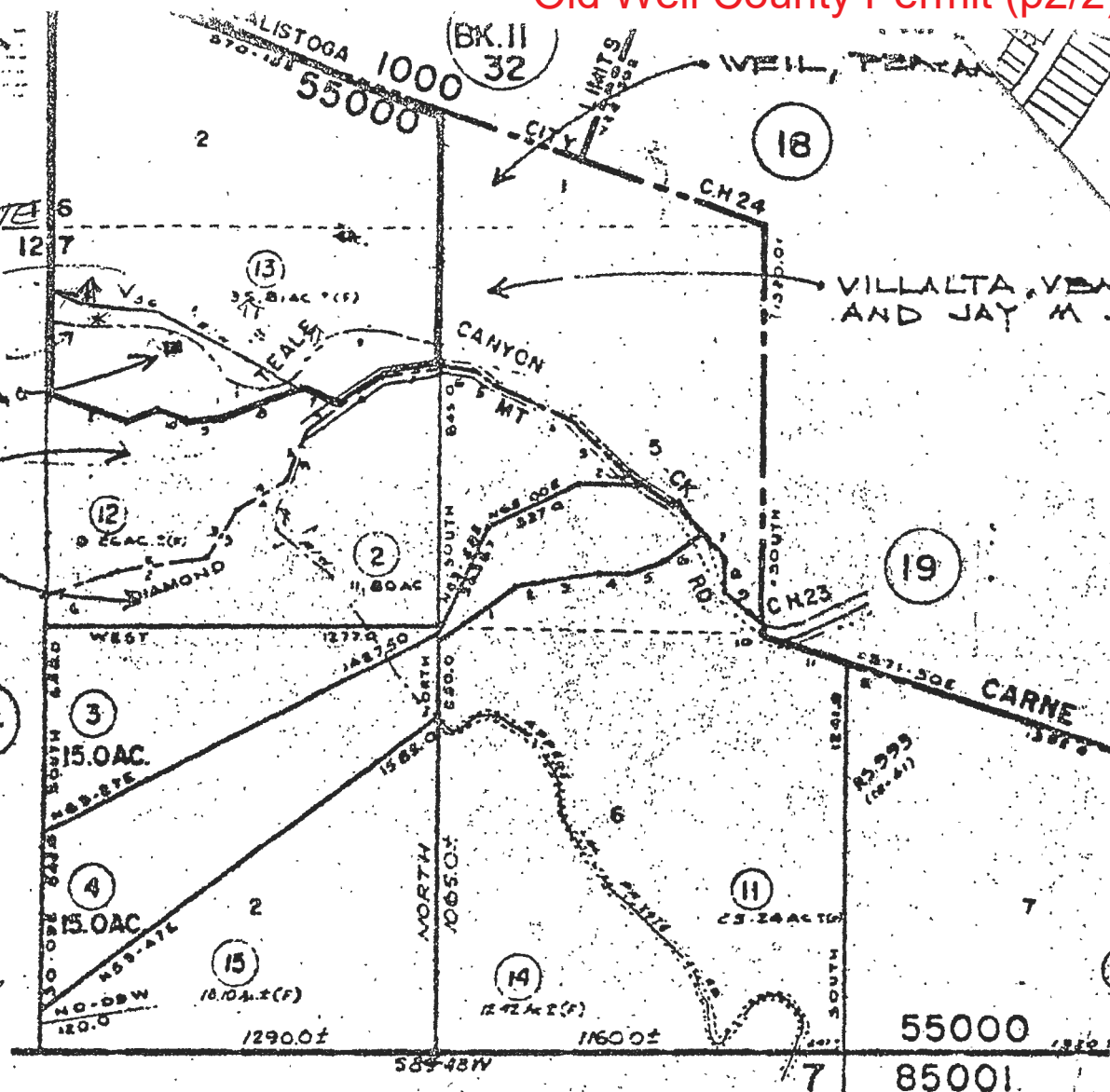
150' DISTANCE  
BETWEEN WELL SITE  
AND CANYON

DRAINAGE COURSE  
PROJECT AREA

DRONSTEIN, AL

RUGO, RICHARD A  
AND MARY A.

AP# 20-400-13  
1510 DIAMOND MT.  
CALISTOGA



PCL. NO. 3		
1	S 68-15E	208.0
2	N 27-30W	36.0
3	N 45-00W	264.0
4	N 66-5W	264.0
5	N 54-00W	97.0
6	N 62-30W	118.0
PCL. NO. 8		
1	N 34-00E	300.0
2	N 75-45E	36.0
3	N 90-00E	150.0
4	S 89-30E	56.0
5	N 70-30E	128.0
6	N 54-15E	158.0
7	S 42-00E	58.0
8	S 7-30E	150.0
9	S 48-00E	143.0
10	SOUTH	37.0
11	S 71-30E	280.0

PCL. NO. 2		
1	N 68-47-52E	244.28
2	N 66-30-06E	321.55
3	N 68-06-32E	135.46
4	N 65-30-34E	174.83
5	N 27-37-08E	166.28
6	N 54-16-10E	301.31
7	N 81-11E	180.36
PCL. NO. 12		
1	N 68-13-02E	244.28
2	N 66-30-06E	321.55
3	N 63-35-42E	135.46
4	N 65-01-46E	174.83
5	N 27-08-10E	166.28
6	N 53-46-20E	125.03
7	N 65-13-40W	140.0
8	S 73-51-20W	250.0
9	N 87-68-40W	150.0
10	N 57-13-40W	37.0
11	S 90-06-20W	123.20
12	N 66-45-10W	3.50E

NOTE: This Map Was Prepared For Assessment Purposes Only, No Liability Is Assumed For The Accuracy Of The Data Delineated

DWR USE ONLY — DO NOT FILL IN

STATE WELL NO. / STATION NO. 1073638

LATITUDE \_\_\_\_\_ LONGITUDE \_\_\_\_\_

APN/TRS/OTHER \_\_\_\_\_

Page 1 of 1

Owner's Well No. \_\_\_\_\_

Date Work Began 04/23/2008, Ended 04/30/2008

Local Permit Agency Napa County Permit Date \_\_\_\_\_

Permit No. 1073638 GEOLOGIC LOG

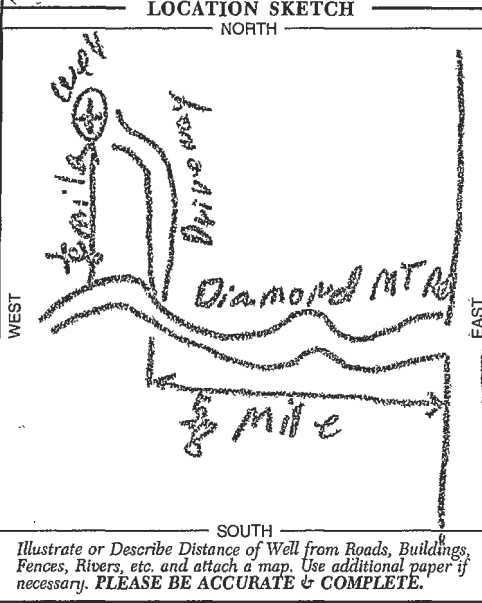
ORIENTATION (∠)		DEPTH FROM SURFACE	DESCRIPTION
<input type="checkbox"/> VERTICAL	<input type="checkbox"/> HORIZONTAL	Ft. to Ft.	Describe material, grain size, color, etc.
<input type="checkbox"/>	<input type="checkbox"/>	0 to 20	Yellow Clay
<input type="checkbox"/>	<input type="checkbox"/>	20 to 37	Gravel
<input type="checkbox"/>	<input type="checkbox"/>	37 to 120	Gray Clay & Gravel
<input type="checkbox"/>	<input type="checkbox"/>	120 to 130	gravel
<input type="checkbox"/>	<input type="checkbox"/>	130 to 205	Yellow Clay
<input type="checkbox"/>	<input type="checkbox"/>	205 to 260	Yellow & Pink Fractured Rock
<input type="checkbox"/>	<input type="checkbox"/>	260 to 300	Gray Fractured Rock
<input type="checkbox"/>	<input type="checkbox"/>	300 to 340	White & Pink Fractured Rock
<input type="checkbox"/>	<input type="checkbox"/>	340 to 410	Pink & Yellow Rock
<input type="checkbox"/>	<input type="checkbox"/>	410 to 430	Pink Rock & Pink Clay

WELL OWNER

Name \_\_\_\_\_  
Mailing Address \_\_\_\_\_  
City \_\_\_\_\_

WELL LOCATION

Address 1510 Diamond Mountain Road  
City Calistoga  
County Napa Page \_\_\_\_\_ Parcel \_\_\_\_\_  
Township 020 Range 400 Section 013-000  
Lat \_\_\_\_\_ N Long \_\_\_\_\_ W



ACTIVITY (∠)

NEW WELL

MODIFICATION/REPAIR

Deepen

Other (Specify) \_\_\_\_\_

DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

USES (∠)

WATER SUPPLY

Domestic  Public

Irrigation  Industrial

MONITORING \_\_\_\_\_

TEST WELL \_\_\_\_\_

CATHODIC PROTECTION \_\_\_\_\_

HEAT EXCHANGE \_\_\_\_\_

DIRECT PUSH \_\_\_\_\_

INJECTION \_\_\_\_\_

VAPOR EXTRACTION \_\_\_\_\_

SPARGING \_\_\_\_\_

REMEDICATION \_\_\_\_\_

OTHER (SPECIFY) \_\_\_\_\_

RECEIVED

JUN 03 2008

DEPT OF ENVIRONMENTAL MANAGEMENT

TOTAL DEPTH OF BORING 430 (Feet)

TOTAL DEPTH OF COMPLETED WELL 430 (Feet)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 11 1/2 (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL 5 (Ft.) & DATE MEASURED 4-30-08

ESTIMATED YIELD 500 (GPM) & TEST TYPE 4 Hrs. Pump

TEST LENGTH 4 (Hrs.) TOTAL DRAWDOWN 5 1/2 (Ft.) 500 GPM at Davof test

\* May not be representative of a well's long-term yield.

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)				
		TYPE (∠)	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0 to 54	12	W	Plastic	6	F 480	
54 to 120	9	W	"	"	"	
120 to 430	9	W	"	"	"	.032

DEPTH FROM SURFACE	ANNULAR MATERIAL			
	CE-MENT (∠)	BEN-TONITE (∠)	FILL (∠)	FILTER PACK (TYPE/SIZE)
0 to 54				1/2" Clay
54 to 430				1/2" Pack

ATTACHMENTS (∠)

Geologic Log

Well Construction Diagram

Geophysical Log(s)

Soil/Water Chemical Analyses

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 William Hall Completion  
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 5110 State Highway 128 Napa, CA 94558  
CITY STATE ZIP

Signed Joseph Phiri DATE SIGNED 5-2-08  
C-57 LICENSED WATER WELL CONTRACTOR C-57 LICENSE NUMBER

# New Well County Permit (p1/4)



STEVEN LEDERER  
Director of Environmental Management

## COUNTY of NAPA

ENVIRONMENTAL MANAGEMENT  
1195 Third Street, Suite 101, Napa CA 94559  
Phone: 707/253-4471 Fax: 707/253-4545  
www.co.napa.ca.us

### WELL PERMIT

**Application Type:** EM Permits-Water Wells-Class I

**Permit Number:** E08-00141

**Applied Date:** 04/02/2008

**Parcel Number:** 020-400-013-000

**Issued Date:** 04/02/2008

**Permit Expires On:** 4/2/2010

**Situs Address:** 1510 DIAMOND MOUNTAIN ROAD CALISTOGA

**Owner:** VONSTRASSER RUDY AND RITATR

**Phone:**

**Address:** 1510 DIAMOND MTN RD, CALISTOGA, CA, 94515-9634

**Applicant:** Pulliam Well Exploration

**Phone:**

**Business Name:**

**Project Type:** EM Permits-Water Wells-Class I

#### Proposed Use:

**Use:** Private

**Name of Public Water System:**

**Well To Service This Parcel Only?:** Yes

#### Water Supply:

**All Setbacks Required By Code?:**

**Hazmat Site Within 1500 feet?:** No

**Ground Water Permit Required?:** No

**Hazmat Site Number and Name:**

**Emergency Exemption Granted?:**

**Well Located in Flood Zone?:** No

**Reason For Emergency Exemption:**

#### Specifications:

**Casing Diameter (inches):** 8

**Method of Seal Placement:** tremie pump

**Boring Diameter (inches):** 14

**Material:** cement

**Annular Seal (inches):** 3

**Minimum Seal Depth (feet):** 50

#### TO PERMITEE:

Any work performed or operations conducted under the auspices of this permit constitutes acceptance of all conditions, inspections and comments contained in the this permit, and the incorporation of all requirements as set forth in the permit application.

Staff Signature:

Date: 4/2/08





# New Well County Permit (p2/4)

COUNTY of NAPA

STEVEN LEDERER  
Director of Environmental Management

ENVIRONMENTAL MANAGEMENT  
1195 Third Street, Suite 101, Napa CA 94559  
Phone: 707/253-4471 Fax: 707/253-4545  
www.co.napa.ca.us

## CONDITIONS/INSPECTIONS/COMMENTS

**Application Type:** Class I

**Permit Number:** E08-00141

**Applied Date:** 04/02/2008

**Parcel Number:** 020-400-013-000

**Issued Date:** 04/02/2008

**Owner:** VONSTRASSER RUDY AND RITA TR

**Applicant:** Pulliam Well Exploration

### Conditions:

<u>Description</u>	<u>Comment</u>
HIST	*** SB813 TRANSFER CREATED ON: 031799
EM-11	The applicant shall comply with the Department of Public Works "Conditions of Approval-National Pollution Discharge Elimination System Requirements", a copy of which was provided at the time of permit issuance. Failure to comply with the NPDES requirements will result in a stop-work order.
EM-2 ✓	A copy of the State of California Well Completion Report must be submitted within 60 days of well completion. 6/03/08

**Inspections:**                      **Inspected By:**                      **Date:**

<u>Description</u>		
Construction Inspection	ZP	4/29/08
Environmental Management Final	ZP ✓	7/10/08

### Comments:

<u>Date</u>	<u>Comment</u>
	Call 253-4135 at least 24 hours in advance during normal business hours to schedule inspection requests. Inspections are taken on a first-come-first-served basis so if you need a specific date and time be sure to call well in advance
04/02/2008	Environmental Management's inspection must be obtained prior to covering any portion of the system.
	Well permits are issued only to licensed well drillers. A copy of the well driller's license (C-57) must be on file with DEM.
	If a claim is to be submitted for a refund, per County Code, a 25% processing fee will be retained. Such claims must be made within one year of the date on the receipt.

# New Well County Permit (p3/4)



STEVEN LEDERER  
Director of Environmental Management

COUNTY of NAPA

ENVIRONMENTAL MANAGEMENT  
1195 Third Street, Suite 101, Napa CA 94559  
Phone: 707/253-4471 Fax: 707/253-4545  
www.co.napa.ca.us

## APPLICATION THIS IS NOT A PERMIT

**Application Type:** EM Permits-Water Wells-Class I

**Permit Number:** E08-00141

**Parcel Number:** 020-400-013-000

**Situs Address:** 1510 DIAMOND MOUNTAIN ROAD CALISTOGA

**Applied Date:** 04/02/2008

**Owner:** VONSTRASSER RUDY AND RITA TR

**Phone:**

**Applicant:** Pulliam Well Exploration

**Phone:**

### Worker's Compensation Coverage:

- ( ) A Certificate of current Worker's Comp Insurance Coverage is on file with this office (or filed with this application)
- ( ) I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the Worker's Compensation laws of California.

I, the undersigned, hereby assume fully all risks associated with providing incorrect information as to the location of the septic systems. I acknowledge that the County of Napa will issue a well permit in reliance upon information contained in this application and, on behalf of myself, heirs, administrators and or assigns, I hereby fully release the County, its elected officials, officers and employees from any and all claims and liability whether actual or potential, known or unknown, that may arise in connection with the information provided in the application.

Owner or Authorized Agent Signature: \_\_\_\_\_

A handwritten signature in black ink, appearing to read "Rudy Vonstrasser", written over a horizontal line.

Date: 4-2-08



COUNTY of NAPA

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

STEVEN LEDERER
Director

CHRISTINE SECHELI
Assistant Director

WELL CONSTRUCTION APPLICATION

PROPERTY OWNER INFORMATION:

WELL DRILLER INFORMATION:

Name: Rudy Von Strasser
Address: 1510 Diamond Mountain Rd.
APN: 020-400-013 Calistoga
Phone #: 707-942-0930
Company Name: Palliam Well Exploration
Contact Person: Aaron
Address: 5110 Hwy 128 Napa
Phone #: 287-2990

TYPE OF PERMIT (circle one): Class IA, Class IB, Class II, Deepening, Reconstruction, Other:

PROPOSED USE (circle one): Private, Public

Well to serve this parcel only (check one)? [X] Yes [ ] No

If "No," list other APN(s):

SETBACKS TO WELL:

Sewer Line: 120 4 feet
Septic Tank: 120 4 feet
Disposal Field: 120 4 feet

WELL SPECIFICATIONS:

Casing Diameter: 8 inches
Boring Diameter: 14 inches
Annular Seal: 3 inches
Minimum Seal Depth: 50 feet
Sealing Material: Cement
Sealing Method: Tremie

RECEIVED

APR 02 2008

DEPT. OF ENVIRONMENTAL MANAGEMENT

A map of the well location shall be attached to this application. The map shall include the distance from the well to property lines, sewage disposal systems, structures, etc., and shall include all other pertinent information specific to this well.

ORIGINAL File with DWR

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

Do not fill in

No. 345290

Notice of Intent No. \_\_\_\_\_

State Well No. \_\_\_\_\_

Local Permit No. or Date 3026 % Corey Potter / Chuck Schloerman

Other Well No. \_\_\_\_\_

(1) OWNER: Name Friedrich Co. Inc. Address P.O. Box 392 City St Helena Ct ZIP 94574

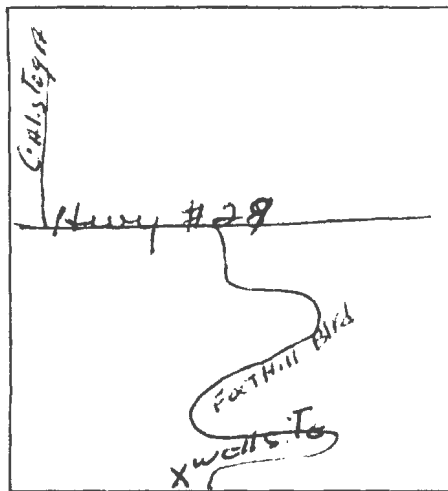
(12) WELL LOG: Total depth 500 ft. Completed depth 500 ft. from ft. to ft. Formation (Describe by color, character, size or material)

(2) LOCATION OF WELL (See instructions): Well # 2 County Nevada Owner's Well Number \_\_\_\_\_

0 - 2 Top Soil
2 - 24 Pink + Brn Vol Ash
24 - 63 Brn Vol Ash
63 - 240 Multi color Vol Rock
- Broken bones
240 - 255 Black Vol Rock
255 - 318 Blue Vol Ash
318 - 500 Multi color Vol Ash

Well address if different from above 411 Foothill Blvd Township 11-320-08 Range \_\_\_\_\_ Section Calistoga

Distance from cities, roads, railroads, fences, etc. 1/4 mile East of the intersection of Hwy 29 and Main St Calistoga



(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 [X] Irrigation [ ] Industrial [ ] Test Well [ ] Municipal [ ] Other [ ] (Describe)

(5) EQUIPMENT: Rotary [X] Reverse [ ] Cable [ ] Air [ ] Other [ ] Bucket [ ]

(6) GRAVEL PACK: Yes [X] No [ ] Size 1/8" Dia Diameter of bore 13 1/2" Packed from 68' to 500'

(7) CASING INSTALLED: Steel [ ] Plastic [X] Concrete [ ]

(8) PERFORATIONS: Type of perforation or size of slot

Table with columns: From ft., To ft., Dia. in., Gage or Wall, From ft., To ft., Slot size. Row 1: 0, 500, 6, 200, 310, 500, .032

(9) WELL SEAL: Was surface sanitary seal provided? Yes [X] No [ ] If yes, to depth 68 ft. Were strata sealed against pollution? Yes [ ] No [X] Interval \_\_\_\_\_ ft.

Method of sealing GROUT Work started 10/2 1990 Completed 10/31 1990

(10) WATER LEVELS: Depth of first water, if known \_\_\_\_\_ ft. Standing level after well completion 370 ft.

WELL DRILLER'S STATEMENT:

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

(11) WELL TESTS: Was well test made? Yes [X] No [ ] If yes, by whom? D.A. Ller Type of test Pump [ ] Bailer [ ] Air lift [ ] Depth to water at start of test 370 ft. At end of test 450 ft. Discharge 40 gal/min after 1 hours Water temperature \_\_\_\_\_ Chemical analysis made? Yes [ ] No [X] If yes, by whom? \_\_\_\_\_ Was electric log made Yes [X] No [ ] If yes, attach copy to this report

Signed Roy + Juwan (Well Driller) NAME: IRWIN Well Drilling (Person, firm, or corporation) (Typed or printed) Address 3801 Bisard Dr City Jackson Ct ZIP 95431 License No. 4582-49 Date of this report 11-20-90



ORIGINAL File with DWR

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

Do not fill in

No. 345291

Notice of Intent No. Local Permit No. or Date 25875

11-320-08

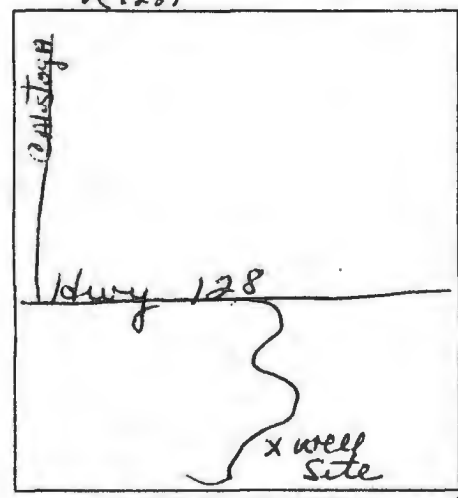
State Well No. Other Well No. WCR #1

(1) OWNER: Name Friedrich Company, INC Address P.O. Box 392 City St Helena CA ZIP 94574

(12) WELL LOG: Total depth 307 ft. Completed depth 307 ft. from ft. to ft. Formation (Describe by color, character, size or material) 0 - 3 Top Soil. 3 - Multi Color Vol Rock Broken lenses

(2) LOCATION OF WELL (See instructions): County Napa Owner's Well Number Well address if different from above 411 Foothill Blvd Township Range Calistoga Distance from cities, roads, railroads, fences, etc. 1/4 mile EAST of the intersection of Hwy 27 and main st, Calistoga (128)

Offsite Well WCR #345291



(3) TYPE OF WORK: New Well [checked] Deepening [ ] Reconstruction [ ] Reconditioning [ ] Horizontal Well [ ] Destruction [ ] (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE: Domestic [ ] Irrigation [ ] Industrial [ ] Test Well [ ] Municipal [ ] Other [ ] (Describe)

(5) EQUIPMENT: Rotary [checked] Reverse [ ] Cable [ ] Air [ ] Other [ ] Bucket [ ]

(6) GRAVEL PACK: Yes [ ] No [checked] Size 20/40 Diameter of bore 12 1/2 Racked from 50 to 307 ft

(7) CASING INSTALLED: Steel [checked] Plastic [ ] Concrete [ ]

(8) PERFORATIONS: Type of perforation or size of screen

Table with 7 columns: From ft., To ft., Dia. in., Gage or Wall, From ft., To ft., Slot size. Row 1: 0, 307, 8 1/8, 188, 16 1/2, 307, 3/2 double.

(9) WELL SEAL: Was surface sanitary seal provided? Yes [checked] No [ ] If yes, to depth 60 ft. Were strata sealed against pollution? Yes [ ] No [ ] Interval Method of sealing GROUT

Work started 3-1-1990 Completed 11-21-1990

(10) WATER LEVELS: Depth of first water, if known Standing level after well completion 210 ft

WELL DRILLER'S STATEMENT:

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

(11) WELL TESTS: Was well test made? Yes [checked] No [ ] If yes, by whom? driller Type of test Pump [ ] Bailer [ ] Air lift [ ] Depth to water at start of test 210 ft. At end of test 250 ft. Discharge 20 gal/min after 3 hours Water temperature Chemical analysis made? Yes [ ] No [checked] If yes, by whom? Was electric log made Yes [ ] No [checked] If yes, attach copy to this report

Signed Frank King (Well Driller) NAME TRI-K DRILLING (Person, firm, or corporation) (Typed or printed) Address P.O. Box 392 City Santa Rosa ZIP 95402 License No. 24857 Date of this report 11-30-90

