

HYDROGEOLOGIC ASSESSMENT REPORT

**4485 D Street
Petaluma, CA 94952
APN 020-130-037**

Prepared For:

**Villa Vanto Farm
4485 D Street
Petaluma, California 94952**

July 28, 2022

**Revised March 15, 2023
Revised January 10 ,2025**

Prepared By:

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Certified Hydrogeologist

Project No. 5170.01

January 10, 2025

Villa Vanto Farm
Mario and Katherine Ghilotti
4485 D Street
Petaluma, California 94952

RE: Hydrogeologic Assessment Report - Revised
Villa Vanto Farm, 4485 D Street, Petaluma, CA 94952
APN: 020-130-037: Hurvitz Environmental Project No. 5170.01

Dear Mr. and Mrs. Ghilotti:

Hurvitz Environmental Services, Inc. (HES) is pleased to submit this Hydrogeologic Assessment Report (HAR) for the above referenced property. This report is a revision to the HES March 15, 2023 Revised HAR and was prepared to address subtle changes to the applicants plans that have resulted in updated water use demands.

This HAR report was prepared in accordance with the Sonoma County Permit and Resource Management Department (Permit Sonoma) Policy and Procedure Number 8-1-14 and General Plan Policy WR-2e. The purpose of this HAR was to evaluate the aquifer conditions at the site, which is located within a Zone 4 groundwater availability area, and to determine if the proposed groundwater usage will cause overdraft conditions, well interference or impact nearby stream-flow.

The quantity of groundwater to be used for the project and within the Cumulative Impact Area compared to the quantity of available groundwater indicates that pumping for the Project is unlikely to result in significant declines in groundwater resources over time. Based on the findings of this report, pumping and groundwater extraction at the Project wells will not significantly impact neighboring wells or near-site stream flow conditions. In addition, based on the relative distance to the coastal areas, the depth of the site well and the proposed water usage rates, salt water intrusion is not considered to be a concern to this Assessment.

We appreciate the opportunity to provide you with these services. Please do not hesitate to contact us at your convenience, should have any questions or comments regarding this report or our recommendations.

Sincerely,
HURVITZ ENVIRONMENTAL SERVICES, INC

Lee S. Hurvitz, PG# 7573 CHG #1015
Certified Hydrogeologist

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1.0 INTRODUCTION AND SCOPE OF SERVICES

Villa Vanto Farm is applying to Sonoma County for approval to develop a small-scale lavender farm and processing facility at the property identified as 4485 D Street, Petaluma, California (the site). We understand the property will also host periodic events that support the agricultural business operations. The site is located within Sonoma County Groundwater Availability Class 4 (Areas with low or highly variable water yield¹). According to Sonoma County General Plan Policy WR-2e, development of property intending to use groundwater within Groundwater Availability Class 4 requires completion of a Hydrogeologic Assessment through the Sonoma County Permit and Resource Management Department (now referred to as Permit Sonoma).

On behalf of the property owner, Hurvitz Environmental Services (HES) conducted a Hydrogeologic Assessment for the site in accordance with the Permit Sonoma Procedures for Groundwater Analysis and Hydrogeologic Reports (Policy No. 8-1-14).

Policy WR-2e states that procedures for proving adequate groundwater should consider groundwater overdraft, land subsidence, saltwater intrusion, and potential impacts to neighboring wells and nearby creeks. Therefore, this groundwater report includes the following elements:

- Delineation of a Cumulative Impact Area.
- Estimates of existing and future potential water uses within the Cumulative Impact Area.
- Characterization of local hydrogeologic conditions within the site watershed and sub-basin.
- Compilation and assessment of Well Completion Reports (drillers' logs) from the area.
- Review of recent Spring Yield Tests performed at one of the on-site horizontal wells.
- Estimates of annual groundwater storage and recharge relative to existing and proposed groundwater uses.
- Assess potential for the project to create salt water intrusion.
- Assess potential for well interference between the project well and neighboring wells and between the project well and nearby streams.

¹ Groundwater Availability Map, Sonoma County Permit and Resource Management Division, April 1, 2004

2.0 SITE DESCRIPTION

The Site is located at 4485 D Street, in an unincorporated, rural agricultural area of Sonoma County, approximately 2.5 miles southwest of downtown Petaluma, California. (**PLATE 1 – SITE LOCATION MAP**). The Sonoma County Assessor's Office identified the site as Assessor's Parcel No. (APN) 020-130-037 (**PLATE 2 – ASSESSORS PARCEL MAP**). The 56.76-acre parcel is zoned as Land Extensive Agriculture (LEA-60). The property is also located in Sonoma County Groundwater Availability Class 4 - Areas with low or highly variable water yield, within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board. The Site is located outside of the Petaluma Valley Groundwater Basin, a State defined Priority Groundwater Management Basin. The Site is located within the Sonoma County Petaluma Dairy Belt Area, where residential development is mostly associated with agricultural land use.²

The Site features a 950 square foot existing single-family residence, built in 1913, and an existing barn located proximate to D Street near the entrance to the Site as shown on **PLATE 3 – SITE PLAN AND CUMULATIVE IMPACT AREA**. A new 5,020 square foot, 2 story agricultural building is located at the south portion of the Site and immediately south of an existing retention pond. A portion of the Site around the new building is proposed to be farmed for lavender.

Most of the Site is pastureland with rolling hills and a northerly flowing creek originating from the pond's spillway. One horizontal domestic water well (Well #1) was recently drilled and completed under Well Permit #WEL22-0063 and a second horizontal well was also installed to replace a former spring onsite under Well Permit #WEL22-0141 (Well #2) as shown on **PLATE 3 – SITE PLAN AND CUMULATIVE IMPACT AREA**. Site photographs are presented in **APPENDIX A**.

2.1 USGS 7.5 MINUTE QUADRANGLE MAP

HES reviewed the most recent United States Geological Survey (USGS) 7.5-minute Quadrangle Map, Petaluma, 2018 (**PLATE 4 – TOPOGRAPHIC MAP**)³. The site is a roughly rectangular, 56.76-acre parcel elongated 2,640 feet north to south and approximately 1,320 feet east to west. The site has a high elevation of approximately 510 feet near the southeast corner and a low elevation of approximately 200 feet along the onsite ephemeral drainage as it leaves the site at its northwest corner.

Topography, the site generally slopes from the southeast to northwest however the pond is situated in a saddle between two peaks with runoff flowing to the pond from both the east and west.

² The Petaluma Dairy Belt Area Plan priorities are to 1) Preserve and enhance the agricultural resources and protect the agricultural industry in this area, 2) Preserve the area's scenic beauty, 3) Accommodate a variety of rural life styles, and 4) Encourage the development of an adequate transportation network which will accommodate proposed development and projected travel needs, and which will facilitate movement of agricultural products to the market place.

³ USGS The National Map: National Boundaries Dataset, National Elevation Dataset, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau | USGS The National Map: 3D Elevation Program. Data refreshed January 2018. | USGS TNM – National Hydrography Dataset. Data refreshed January 2018.

The ~1.6-acre pond onsite overflows on its northwest corner and into an ephemeral drainage that flows northerly across the Site before leaving the Site near the northwest corner. Water from the small creek crosses D Street before coalescing with an unnamed tributary to San Antonio Creek shortly thereafter. The unnamed tributary creek flows southwesterly for approximately 0.8 miles before merging with San Antonio Creek just south of the intersection of San Antonio Road and D Street. San Antonio Creek continues easterly before discharging into the Petaluma River just north of Burdell Island. Several properties near the Site utilize retention ponds for livestock and irrigation and roughly ½ are connected to the San Antonio Creek tributary system.

2.2 HISTORICAL AERIAL PHOTOGRAPHY

HES reviewed aerial photographs from years 1993-2021 depicting the site and vicinity to obtain information about historical development and other surficial features. In 1993, the Site appears to be developed with the same residence and associated outbuildings proximate to D Street, however the new Ag Barn was not constructed until 2021. The pond is present in all photos dating back to 1993. Most of the land in the immediate vicinity of the site is undeveloped grassland. Aside from the 2021 development, the site and site vicinity appear relatively unchanged since 1993.

2.3 NEIGHBORING PROPERTIES

The surrounding land uses are predominantly pasture land, dairy farms and rural residential developments. Tomales Bay and the Pacific Ocean are approximately 18 miles west and the mouth of the Petaluma River at San Pablo Bay is approximately 8.5 miles southeast of the Site. The developed properties are serviced by private septic systems and groundwater wells. The closest retention pond is located several hundred feet north of the Site. Access to neighboring properties is provided from D Street.

2.4 SITE DEVELOPMENT AND WATER USE

The Permit Sonoma records show a 2002 Agricultural Preserve establishment (Type II Williamson Act Contract) for the property. On February 25, 2022, the County issued a well permit (Well22-0063) to install a horizontal well onsite, and currently the Site is in plan check review for a small-scale lavender farm, processing facility and event center (UPE21-0064). An Ag exempt Horse Barn and Ag Barn were also developed in 2021 under permits AEX21-0046 and 0039.

Currently, Villa Vanto Farm is planning to develop the Site for use as a lavender farm, with a small-scale lavender processing facility, farm stand, and for periodic events. The Site will also be developed with 4.58-acres of olive trees. We understand that the barn will be used principally for small scale agricultural processing. The building houses processing equipment, a shipping and storage area, a small farm retail sales area, and a business office. The farm plans to begin cultivation of crop plants in the Spring/summer of 2025, with small scale processing of the harvest to occur in the Fall of 2025. The building and outdoor areas developed around the structure, are proposed to be used for periodic restricted non-agricultural promotional events. Up to 28 events annually are proposed.

An existing gravel road provides emergency vehicle access from a driveway at D Street to the

project. Site parking, including 5 standard stalls and 1 accessible stall, is provided at the project site. A new road, under separate Grading Permit, will provide paved access from a new driveway at D Street to the new agricultural building.

The Applicant currently obtains water for the residence from the new horizontal well (Well#2). Water for the proposed farming, processing, and events will come from the new horizontal well identified as Well #1 which was installed proximate to the processing barn as shown on **PLATE 3 – SITE PLAN AND CUMULATIVE IMPACT AREA**. The applicant also plans to install 75,000 gallons in water storage onsite to serve as the primary water storage and distribution system for the commercial operations proposed onsite.

2.4.1 Water Use for Lavender Farming

The Applicant plans to grow approximately 9.72-acres of lavender plants for the purpose of harvesting and processing oils. We understand that established lavender plants rarely need watering but that some irrigation is required during the first two years after planting. Water use for lavender farming varies based on soil types and climates and it is estimated that for the west Petaluma region the watering frequency will only be once a week during the summer months. The applicant plans to use drip irrigation to irrigate the lavender and irrigation water will come from the new horizontal well (Well#1) and proposed water storage tanks. Estimates for water use for the first two years of farm operation are presented below.

$$15,000 \text{ (estimated lavender plants on 9.72-acres)} \times 8 \text{ (weeks of summer irrigation)} \times 1/2\text{-gallon/plant/week (irrigation rate)} = \\ \underline{\mathbf{60,000 gallons/year = Annual Lavender Farming Water Use during First 2-years}}$$

In addition, the project may require an average of five (5) farm workers for 6-months a year. The established Napa County Water Availability Analysis methods specify annual domestic water use for workers at 15 gallons per day per worker.⁴ So, for this assessment we used the Napa County water use criteria to estimate the annual domestic water use at the Site as follows:

$$5 \text{ (average employees)} \times 15 \text{ gallons/day (employee water usage)} \times 180 \text{ days/year} = \\ \underline{\mathbf{13,500 gallons/year = Annual Onsite Farm Worker Water Use}}$$

$$\text{So, } 80,000\text{-gallons/year (Irrigation Water Use)} + 13,500 \text{ gallons/year (Worker Water Use)} = \\ \underline{\mathbf{73,500 gallons/year = Annual Water Use for Lavender Farming and Farm Workers}}$$

The Applicant is also developing plans to implement water conservation methods including rainwater catchment. Details on the sites proposed water conservation practices are presented in **Section 2.4.8** of this HAR. Based on the relatively low quantity of groundwater usage anticipated for the Project, there is the potential to significantly offset the Projects groundwater usage with captured rainwater.

⁴ Water Availability Analysis (WAA) Guidance Document, Napa County, Adopted May 12, 2015.

2.4.2 Water Use for Lavender Processing

The applicant plans to harvest and process the lavender plants twice each year. According to the applicant, the lavender processing equipment will require 12,000 gallons/harvest. Therefore, based on these estimates we can calculate the annual water use associated with lavender processing onsite.

$$2 \text{ (lavender harvest/year)} \times 12,000 \text{ gallons (water use per lavender harvest)} = \\ \underline{\mathbf{24,000 \text{ gallons year} = \text{Annual Lavender Processing Water Use}}}$$

2.4.3 Water Use for Olive Orchard

The applicant plans to plant olive trees on 4.58-acres of the Site. The olive tree orchard will be located near the center of the property on a north facing slope. This olive orchard will be low density, hand harvested trees, planted at a rate of approximately 100-trees/acre. For the first 2-years it is estimated that the olive trees will require 1-gallon a week for irrigation during the dry season. After the first 2-years the irrigation rate is expected to increase to 2-gallons/week. Therefore, using the average watering rate for the first 4-years we calculated the water use associated with the proposed 4.58-acre orchard.

$$4.58 \text{ acres (Orchard size)} \times 100 \text{ trees/acre (planting density)} \times 1.5 \text{ gallons/week} \\ (\text{irrigation rate}) \times 25 \text{ week (dry season)} = \\ \underline{\mathbf{17,175 \text{ gallons/year} = \text{Annual Water Demand for Olive Tree Orchard}}}$$

2.4.4 Events Water Use

We understand that the applicant plans on periodically hosting events at the Site (28 events/year). The following types of promotional events are proposed annually:

- 15 Private Parties, Reunions, Weddings (80-200 attendees)
- 10 Customer, Educational, Marketing, Farm to Table Events (40 -120 attendees)
- 2 Charity Fundraising Events (50-150 attendees)
- 1 Industry related event (40-120 attendees)

Adobe and Associates Inc., of Santa Rosa, CA has been designing the site's septic system for the project Applicant and has therefore already calculated a water use rate for the events planned at the Site. We have reviewed the estimates which were based on the Sonoma County's Onsite Wastewater Treatment Manual and we found them to be reliable. Therefore, based on the Applicants' planned event schedule above, and the Adobe and Associates estimates, the following annual water use is anticipated for the proposed events onsite.

$$200 \text{ people (guests per event)} \times 7.05 \text{ gallons/guest} + 10 \text{ (full-time employees)} \times 15 \\ \text{gallons/day} + 10 \text{ (part-time employees)} \times 7.5 \text{ gallons/day} = \underline{\mathbf{1,635 \text{ Gallons per Event}}}$$

So,

$$1,635 \text{ gallons/event} \times 28 \text{ events/year} = \underline{\mathbf{45,780 \text{ gallons} = \text{Annual Water Use for Events}}}$$

2.4.5 Landscaping

As part of the site development the Applicant will plant and irrigate grass on either side of the existing agricultural building totaling approximately 0.1 acres. In addition to the irrigated lawns, the Applicant will have other landscaping placed around the agricultural building including ornamental grasses, shrubs, trees and Crape myrtles. A landscape irrigation plan for the proposed project was prepared by Totem Landscaping Servies of Sonoma, Ca and it was determined that a total **246,324 gallons/year** will be required for landscape irrigation (**Appendix B**). A general breakdown of the landscape irrigation is presented below.

So,

$$168,792 \text{ gallons/year (irrigated lawns)} + 67,548 \text{ gallons/year (shrubs, ornamentals, etc.)} + 9,984 \text{ gallons/year (trees)} = \\ \underline{\mathbf{246,324 gallons/year or 0.76 acre-feet/year = Total Water Use for Landscaping}}$$

2.4.6 Livestock Water Use

Historically this property has been used to run beef and dairy cattle. Water for the cattle has historically come from either the pond onsite or the former residential spring which has since been converted into a horizontal well (Well #2). The farm has averaged 50 head of cattle, with water consumption of 1,300 gallons/day or 26 gallons/head of cattle. Beef and dairy products have been consistently phasing out of business in Sonoma County and California for the last 20 years. Therefore, Villa Vanto has decided to remove all the cattle from the Site and utilize the onsite pasture for sheep grazing. Villa Vanto has estimated that 76 sheep will now graze the Site.

Villa Vanta is working with a livestock consultant who has indicated that the sheep's total water use will be less than 20,000-gallons/year. This is based on 34 adult Ewes onsite for 365 days/year and consuming 1.25 gallons/day and 42 lambs of 4-months or less onsite for 120 days/year and consuming 0.84 gallons/day. Based on these livestock water use rates, we have calculated the Sites annual livestock water demand below.

$$34 \text{ (adult sheep)} \times 1.25 \text{ gallons/day (water demand)} \times 365 \text{ days/year} = \\ 15,513 \text{ gallons/year for Adult Sheep}$$

and,

$$42 \text{ (lambs)} \times 0.84 \text{ gallons/day (water demand)} \times 120 \text{ days/year} = \\ 4,234 \text{ gallons/year for Lambs}$$

so,

$$15,513 \text{ gallons/year (adult sheep)} + 4,234 \text{ gallons/year (lambs)} = \\ \underline{\mathbf{19,747 gallons/year = Total Annual Livestock Water Demand}}$$

While the Applicant plans to use 19,747 gallons/year for sheep grazing, it should be noted that the reduction of 50-cows onsite will result in a net decrease in water use of approximately 454,000 gallons/year (50 cattle x 26 gallons/day x 365 days/year – 19,747 gallons for sheep).

2.4.7 On-site Domestic Water Use

Current domestic water use at the site consists of one residential dwelling. Future domestic water use will include a secondary residence or farm worker housing. According to the USGS, the average person within the Santa Rosa Plain Watershed uses 0.19 acre-feet/year for domestic purposes⁵. In addition, the United States Census Bureau reported in 2010 that the average household in Sonoma County has 2.55 residents⁶. Therefore, for this assessment we used a number of five (5) residents combined for the two (2) households (3 residents in the primary and 2 residents in the accessory dwelling) and assumed that each person will use 0.19 acre-feet of groundwater per year. With this data we calculated the following domestic water usage.

$$5 \text{ (residents at site)} \times 0.19 \text{ acre-feet/year (annual water use/resident)} = \\ \underline{\mathbf{0.9 \text{ acre-feet/year or 293,266 gallons/year = Annual Residential Water Demand}}}$$

All residential water is supplied from groundwater obtained from Sites horizontal Well #2.

2.4.8 Total Site Water Use

Therefore, the Annual Total Site Water Use is estimated by combining annual Site project water use from Well #1, with the livestock water use and the domestic water use from Well #2. In addition, we can apply the reduction in cattle water use to the overall project to further evaluate the potential impact.

$$93,500 \text{ gallons/year (Lavender Farming)} + 24,000 \text{ gallons/year (Lavender Processing)} + \\ 45,780 \text{ gallons/year (Events)} + 246,324 \text{ gallons/year (Landscaping)} + 19,747 \text{ gallons/year} \\ (\text{olive orchard}) + 146,633 \text{ gallons/year (secondary housing)} = \\ \underline{\mathbf{575,984 \text{ gallons or 1.77 acre-feet/year = Total Annual Project Water Use (Well #1)}}}$$

$$19,747 \text{ gallons/year (Sheep)} + 146,633 \text{ gallons/year (Existing Domestic Water Use)} = \\ \underline{\mathbf{166,380 \text{ gallons/year or 0.51 acre-feet/yr = Additional Site Water Use (Well #2)}}}$$

$$575,984 \text{ gallons (project water use)} + 166,380 \text{ gallons/year (additional Site water use)} = \\ \underline{\mathbf{742,364 \text{ gallons year or 2.28 acre-feet/year = Total Site Water Use (Well #1 & #2)}}}$$

The anticipated monthly Site Water Use is summarized below in **TABLE 1**.

⁵ Santa Rosa Plain Groundwater Management Plan, Sonoma County Water Agency and USGS, 2014.

⁶ <http://www.bayareacensus.ca.gov/counties/SonomaCounty.html>

TABLE 1 – ESTIMATED ANNUAL SITE WATER USAGE

Source	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	Total
	-----Gallons-----													acre-ft
Lavender Farming/ Employees	0	0	0	0	0	19,000	19,000	19,000	19,000	17,500	0	0	93,500	0.29
Lavender Processing	0	0	0	0	0	0	12,000	0	0	12,000	0	0	24,000	0.07
Event Center/ Employees	1,500	1,500	4,000	4,000	5,000	5,000	5,000	5,000	5,000	5,000	3,000	1,780	45,780	0.14
Olive Orchard	0	0	0	0	0	3,000	4,000	4,000	4,000	4,000	747	0	19,747	0.06
Landscape Irrigation	0	0	0	0	38,000	42,000	44,000	44,000	42,000	36,324	0	0	246,324	0.76
Livestock	1,500	1,500	2,000	1,500	1,500	2,000	1,500	1,500	2,000	1,500	1,500	1,747	19,747	0.15
Residential	24,000	24,000	24,000	24,000	25,000	25,000	25,000	25,000	25,000	25,000	23,266	14,735	293,266	0.90
TOTAL USAGE	27,000	27,000	30,000	29,500	69,500	96,000	110,500	98,500	97,000	101,324	28,513	18,262	742,364	2.28

The peak water usage for the project including farming, processing, events, employees, secondary housing, and landscaping is expected to occur in July each year with an estimated daily demand of 3,113 gallons/day. Average water use for the project during the entire year is expected to be 1,176 gallons/day.

The applicants plan to switch from cattle to sheep will result in decrease in Site water usage of approximately 454,753 gallons/year. The addition of another residential dwelling will add 146,633 gallons/year, and the estimated water use for the proposed lavender farm, processing, event center, employees, olive orchard, and landscaping will add 429,351 gallons/year which brings the estimated net increase to the Site's water use to 121,231 gallons/year or 0.37 acre-feet/year.

$$\begin{aligned}
 & 146,633 \text{ gallons/year (increase in residential water use)} + 429,351 \text{ gallons/year (project water use)} - 454,753 \text{ gallons/year (former cattle water use)} = \\
 & \underline{\underline{121,231 \text{ gallons/year or 0.37 acre-ft/yr = Net Increase in Groundwater Use Onsite}}}
 \end{aligned}$$

2.4.9 Water Conservation Methods

The applicant is designing the project facility to utilize a combination of rainwater and groundwater to meet project demands. When available, rainwater will be the primary irrigation water source and groundwater will only be used when rainwater resources are depleted. The proposed rainwater system will capture water from the 5,020 ft² Ag building. The captured rainwater will be collected from the roof of the Ag building and transferred into approximately

onsite storage tanks designated for irrigation. A total of 75,000 gallons in water storage is proposed onsite and will be used in conjunction with rainwater to offset dry season water usage.

Mean seasonal precipitation maps from Sonoma County Water Agency⁷ indicate the mean annual rainfall in the Site vicinity is about 30 inches or 2.5-feet/year, (**PLATE 5- Precipitation Map**). Based on the average annual rainfall and the rainwater capture area we have estimated the rainwater capture potential at the site.

2.5 feet (rainfall average) x 0.115-acre (rainfall capture area) x 0.6 (efficiency factor) = **0.173 acre-feet/year or 56,209 gallons/year = Rainwater Capture Potential**

⁷ Sonoma County Mean Seasonal Precipitation in Flood Control Design Criteria manual: Plate No. B-3, Sonoma County Water Agency, Revised January 2005.

3.0 CUMULATIVE IMPACT AREA

HES reviewed available water well records obtained from Permit Sonoma and California Department of Water Resources (DWR) and assessed information obtained from peer-reviewed scientific publications as referenced in this report to determine an appropriate Cumulative Impact Area (CIA) for the site. HES delineated the Cumulative Impact Area based on known geologic, hydrologic and groundwater characteristics in consultation with Robert Pennington with Permit Sonoma. The total area of the CIA is approximately 300-acres.

HES identified 7 properties in the Cumulative Impact Area including the Site (**TABLE 2**). The CIA includes the entire Site and all or portions of the other 6 properties (**PLATE 4 - SITE PLAN AND CUMULATIVE IMPACT AREA**). The property sizes in this CIA are large and range from 12.38 to 172.21 acres with an average size of approximately 61.5 acres. A total of 6 of the 7 CIA properties are developed with residences. There are 6 properties with single family residences, one property with a permitted accessory dwelling unit (ADU), one parcel is permitted for 2 or more residences and one parcel also contains a commercial dairy. One parcel is a large (30.30-acre) undeveloped pasture (APN 020-130-005).

All of the properties in the Cumulative Impact Area properties are zoned as Land Extensive Agriculture (LEA) with 60-acre density. Zoning in this area is unlikely to change significantly so future development is anticipated to be consistent with currently allowed conditions.

All of the 7 properties in the Cumulative Impact Area are listed as in the groundwater availability Class 4 (areas with low or highly variable water yield).

TABLE 2 CUMULATIVE IMPACT AREA PROPERTIES

Item Number	APN	Address(s)	Acres	Zoning Code	Assessor Use Code
1	020-130-037	4485 D St, Petaluma	56.76	LEA 60	Pasture w/ Residence
2	020-130-005	No Address	30.30	LEA 60	Pasture
3	020-130-038	2000 Longhorn Ln, Petaluma	21.51	LEA 60	Rural Res/Single Residence
4	020-130-034	1250 San Antonio Rd, Petaluma	172.21	LEA 60	Rural Res/Single Residence
5	020-130-023	4001 and 4275 D St, Petaluma	122.36	LEA 60	Dairy w/Residence
6	020-130-039	1000 Longhorn Ln Petaluma,	12.38	LEA 60	Rural Residential SFD w/Granny Unit
7	020-130-026	1500 and 1525 Longhorn Ln Petaluma	14.96	LEA 60	Rural Res/2 or More Residence

3.1 GROUNDWATER USAGE IN CUMULATIVE IMPACT AREA

Based on available information including a Google Earth May 2021 aerial photograph⁸, HES estimated the land use acreage within the 300-acre Cumulative Impact Area as follows:

40 acres	Oak and riparian woodlands
14 acres	Residential use including houses and landscaping (~ 2 acres per residence)
246 acres	Livestock grazing pasturelands

The woodlands within the Cumulative Impact Area are situated primarily along the ridges and associated drainages, providing limited but valued privacy between properties so further reduction of existing wooded land may not be feasible or pursued.

3.1.1 Current Domestic Water Demand

According to the USGS, the average person within the Santa Rosa Plain Watershed uses 0.19 acre-feet/year for domestic purposes. In addition, the United States Census Bureau reported in 2010 that the average household in Sonoma County has 2.55 residents⁹. Therefore, for this assessment we used a conservative number of three (3) people at each primary residence and two (2) people at each permitted accessory dwelling units (ADUs) within the CIA with each person using 0.19 acre-feet of water annually.

Therefore, we estimate that 23 residents currently live within the Cumulative Impact Area. With this data we calculated the following domestic water usage.

$$(7 \text{ residences} \times 3 \text{ people/residence}) + (1 \text{ ADU} \times 2 \text{ people/ADU}) = 23 \text{ people in CIA}$$

$$23 \text{ people} \times 0.19 \text{ acre-feet/year} =$$

4.37 acre-feet/year = Annual Residential Groundwater Demand in CIA

This estimate assumes that all residential dwelling water is supplied from groundwater; other sources of water (recycled water, reservoirs or surface water) were not included. This estimate does not include domestic water use for workers.

3.1.2 Future Domestic Water Demand

For future potential groundwater demand we first assume that all properties over 2 acres (5 parcels) that do not currently have ADU's will develop an ADU at some point. We assume that those ADU's will be occupied by two (2) residents each. Accordingly, future potential groundwater demand for domestic purposes is as follows;

$$5 \text{ (additional ADUs)} \times 2 \text{ (residents per dwelling)} \times 0.19 \text{ acre-feet/year} =$$

1.9 acre-feet/year = Future Potential Annual Residential Groundwater Demand in CIA

So, 4.37 (Current Water Demand) + 1.9 (Future Potential Water Demand) =

⁸ Details derived from Google Earth aerial photograph, dated May 2018.

⁹ <http://www.bayareacensus.ca.gov/counties/SonomaCounty.html>

6.27 acre-feet/year = Future Potential Domestic Water Use in Cumulative Impact Area

3.1.3 Current Pasture Land Livestock Water Use

In order to estimate the amount of land that is used for livestock we assumed that all pasture land is either currently used for grazing, or will be used for grazing in the future. With an estimated 246-acres of pasture/livestock grazing land within the CIA we can estimate grazing water use using Sonoma County established water usage rates. Sonoma County estimates that the livestock (sheep or cows) water usage rate is 0.05 acre-feet/year/acre¹⁰. Therefore, pasture land annual water usage can be calculated as follows:

246-acres (pastureland acres) x 0.05 acre-feet/acre/year (water usage) =
12.3 acre-feet/year = Current/Future Pasture Grazing Water Demand

Pasture land water use is not expected to change due to zoning as most parcels are part of the Petaluma Dairy Belt Area Plan and many have Williamson Act Contracts¹¹.

It is likely that some of the water for livestock is obtained from ponds on and near the Site. However, for the purpose of this assessment we will assume that all water for livestock is obtained from groundwater.

3.1.4 Total Water Demand in Cumulative Impact Area

Based on the conservative assumptions discussed above, HES estimated Current Annual Groundwater Demand (in acre-feet/year) for the Cumulative Impact Area (excluding the Project):

4.37 acre-feet/year (Current Domestic in CIA, including site) + 12.3 acre-feet/year (Pasture Livestock) = **16.67 acre-feet/year = Current Groundwater Demand in CIA**

Based on the conservative assumptions discussed above, HES estimated Future Potential Annual Groundwater Demand for the Cumulative Impact Area as follows:

16.67 acre-feet/year (existing domestic and pasture) + 1.9 acre-feet/year (Potential Increase in Domestic) = **18.57 acre-feet/year = Future Potential Groundwater Demand in Cumulative Impact Area**

The Project's total groundwater demand is 1.26 acre-feet/year; however, it only increases the water demand for the property by 0.31 acre-feet/year (discussed in Section 2.4.7) due to the decrease in cattle grazing. Therefore, the increased water demand of 0.31 acre-feet/year increases the current total water demand within the CIA (16.67 acre-ft/year) by 1.9% and increases the future potential groundwater demand (18.57 acre-ft/year) by 1.7%.

A breakdown of water usage within the Cumulative Impact Area is presented below on **TABLE 3**.

¹⁰ Permit Sonoma 8-2-1 Water Supply, Use and Conservation Assessment Guidelines version 1/7/2020

¹¹ Permit Sonoma GIS Online Service Map Gallery, Williamson Act Land Contracts Data 2017

TABLE 3 – ESTIMATED WATER USAGE IN CUMULATIVE IMPACT AREA

Groundwater Uses	Number of uses	Rate of Use	Annual Water Use (acre-feet)/year
Current Water Use			
7 Residences	3 people/residence = 21 residents	0.19 acre-ft/resident	3.99
1 ADU	2 people/ADU = 2 residents	0.19 acre-ft/resident	0.38
Pasture/Livestock	246 acres of pastures	0.05 acre-ft/acre	12.3
Total Estimated Current Water Usage			16.67
Future Potential Water Uses			
5 Potential New ADUs within CIA	2 people/ADU = 10 new residents	0.19 acre-ft/resident	1.9
Additional Annual Project Water Usages	Irrigation, Processing, Events, landscaping Employees	0.27 acre-ft	0.27
Future Potential Water Usage		Existing Without Project	18.57
		Future With Project	18.84
Note: Projected water usage for lavender farming provided by the property owner and estimates on household domestic water use are based on 2014 USGS study of the Santa Rosa Plain Watershed and 2020 Census Data for Sonoma County.			

4.0 HYDROGEOLOGICAL CONDITIONS

The site is located outside and west of the Petaluma Valley and within the northwest trending structural province of the Coast Ranges of northern California. The regional structure consists primarily of northwest-trending folds and a few major faults, the most prominent of which is the San Andreas fault, a right-lateral fault, about 12 miles west of the site. The Petaluma Valley occupies a northwest-trending structural depression in the southern part of the Coast Ranges of northern California. This depression divides the Mendocino Range on the west from the Mayacamas and Sonoma Mountains on the east. West of the southern end of Petaluma Valley are the Marin Mountains, in which Burdell Mountain, immediately adjacent to the Valley, rises to an altitude of 1,560 feet.

The 2002 Geologic Map of the Petaluma 7.5 Quadrangle¹², shows the site underlain by the Franciscan Assemblage (Jurassic-Cretaceous), a tectonic mixture consisting predominantly of a matrix of sheared greywacke and shale and to a lesser extent serpentinite enclosing blocks of less sheared greywacke and greywacke interbedded with shale. The unit is characterized by hard, resistant tectonic blocks of chert, greenstone, and exotic high grade metamorphic rocks. Native sediment and rock underlying the site consist light brown sandstone, and dark serpentinite

PLATE 6 – GEOLOGIC MAP

4.1 PROJECT WATERSHED

According to www.ecoatlas.com¹³ the project site is located within the San Pablo Bay Hydrologic Region Cataloging Unit (HUC-8), the Petaluma River-Frontal San Pablo Bay Estuaries Watershed Region (HUC-10), and the San Antonio Creek Sub-Watershed (HUC-12 180500020602). Most of the land in the area is open grass land with wooded areas primarily along the ridge tops and the surface water drainages. Drainage at the site moves from the uplands on the southwest and southeast sides of the site north toward unnamed tributaries to San Antonio Creek as shown on **PLATE 4 – TOPOGRAPHIC MAP**. San Antonio Creek is the primary drainage of the area, flowing east to the Petaluma River, which drains into the north end of San Pablo Bay.

4.2 DOMESTIC WELL INFORMATION

HES performed a domestic well search through the Department of Water Resources and Permit Sonoma to identify Well Completion Reports proximate the Site. Through this research, HES identified domestic well log information for six (6) properties within or near the Cumulative Impact Area, (**TABLE 4**). Available well logs are included in **APPENDIX C**.

¹² Geologic Map of Petaluma 7.5' Quadrangle Sonoma and Marin Counties, California: A digital Database Version 1.0, California Department of Conservation California Geological Survey, 2002.

¹³ www.ecoatlas.org, EcoAtlas has been developed through funding from the US Environmental Protection Agency and the California State Water Resources Control Board.

TABLE 4 WELL INVENTORY

APN or Address/ Well Number	Date Installed	Distance to Site Well (Feet)	Surface Elevation (Feet- MSL)	Total Well Depth (Feet)	Screen Interval (Feet)	Elevation of top of screen (Feet) MSL	Total Screen Thickness (Feet)	Well Yield (GPM)	Draw-down (Feet)	Specific Capacity	Map ID
020-130-037 / 003391	2022	0	315	170 horizontal	20-170	315	150	2.5	NA	NA	Site well#1
020-130-037 / 003399	2022	0	345	400 horizontal	20-400	345	380	2.5	NA	NA	Site well#2
020-130-038 (25) / 468271	1996	1,111	580	340	208-328	372	120	45	NA	NA	1
020-130-039 (24) / 704187	1998	1,300	530	380	130-330	400	200	6.09	1.5	4.06	2
020-130-026 / 815269	2002	1,517	500	420	160-420	340	260	2	380	0.005	3
020-130-023 / 79226	2002	2,000	265	535	235-535	30	300	27	178	0.15	4
020-130-021 / 235121	1982	2,700	180	41	0-41	180	41	1	40	0.025	5A
020-130-021 / 14978	1954	2,700	180	54	29-49	151	20	40	NA	NA	5B
020-130-019	2006	~3,000	165	640	130-435	35	565	4	530	0.007	6
Average Well TD = 344						Average Screen Thickness = 218		Average Specific Capacity = 0.84			

Feet-MSL = elevation in feet relative to mean sea level

Review of the Well Completion Reports for 7 wells near the Site indicates that water is either encountered very shallow (<50 feet below grade) or relatively deep (>460 feet below grade) depending on location. This type of setting is typical for Bedrock aquifers where both perched conditions and deep fracture zone aquifers exist. Rock types encountered in the boring logs consisted of greenstone, shale and chert which is consistent with the rock units in the Franciscan Formation. Well yields for the seven wells surrounding the site ranged from 1 to 45 gallons per minute (gpm).

4.2.1 Site Well Yield Test

HES performed a certified dry season spring yield test on the new horizontal well slated for use on the project (Site Well #1). The results of the well yield testing indicated that the sustained dry season yield from the project well (Site Well #1) is approximately 1.5 gpm. The results of the spring yield test were presented to Permit Sonoma's Well and Septic Department and are also attached to this Report in **Appendix D – Spring Yield Test**. The initial yield testing performed by HES in April of 2022 reported that the projects primary horizontal well (Well #1) produced ~5 gpm.

Based on the site water usage rates presented in Section 2.4 of this Assessment Report, the Site will require approximately 3,113 gallons/day to meet peak demands. This water usage rate is equivalent to ~2.16 gpm. Based on initial yield test results from April 2022, and the dry season

yield test results from July 2022, it is anticipated that water from Site Well #1, in conjunction with captured rainwater, and stored groundwater, will be sufficient to meet the minimum flow rate necessary to provide for the Projects anticipated peak water use. The Project applicant plans to install approximately 75,000-gallons in water storage tanks at the Site which will be used as needed to supplement the dry season water demands, as necessary.

4.2.2 Potential Impacts to Streams and Neighboring Wells

Three (3) groundwater wells were identified within approximately 1,500 feet from the Site (identified as off-site wells #1, #2 and #3 on **Plate 3 and Table 4**). These wells are all located between approximately 500 to 580 feet above MSL and the top of the well screens range from 340 to 400 feet above MSL. Site Well #1 is located at 315 feet above MSL which indicates that the Site well is screened within a similar water bearing zone as the off-site wells #1, #2 and #3.

A pumping test was conducted at domestic well 2 (APN 020-130-039) on October 29, 2008, by Weeks Drilling and Pump, the test data is included in **Appendix D**. The well was pumped at 6.09 gallons per minute for 8 hours and the water levels stabilized with 1.5 feet of drawdown. From this data a Specific Capacity of 4.06 can be calculated. Using the specific capacity data, and general relationships discussed in Driscoll (1986)¹⁴, we estimated the wells lateral pumping influence.

To develop the slope of the drawdown curve from the pumping well, the value of Δs (drawdown over one log graph cycle) was calculated for a distance-drawdown relationship, where $T = 528Q/\Delta s$ ¹⁵. Using this equation and applying it to the site, we calculated a radius of pumping influence (ROI) extending approximately 150 to 1,200 feet from domestic well 2 as shown on the distance drawdown plot for an unconfined aquifer **Appendix E - Radius of Pumping Influence**.

The closest offsite well to Site Well #1 is approximately 1,111 feet to the west (off-site well #1). If we subtract 170 feet from that distance to account for the end of the horizontal well, then the Site Well #1 terminus is approximately 941 feet from off-site well #1 and 1,130 feet from off-site well #2. This indicates that there is some potential for the influence, however, the drawdown observed from the well yield test on the off-site well #2 (1.5 feet) would be insignificant at that distance. This indicates the off-site wells #1, #2 and #3 would not likely to be affected by pumping at the Site Well #1.

However, Site Well #1 will be discharging continuously throughout the year and once the proposed 50,000-gallons in water storage is full the well will discharge directly to the onsite pond. This process could create a scenario where the relatively thin seam that the horizontal well taps is dewatered annually. But since the water captured by the horizontal well occurs entirely within the Site boundaries, and the ROI of the nearby well is 1,200 feet (maximum) the continuous discharge at Site Well #1 is not anticipated to significantly affect water levels in the nearby site wells.

¹⁴ Groundwater and Wells, Second Edition, Fletcher G. Discoll, 1986, published by Johnson Division, St. Paul Minnesota, 1089p.

¹⁵Groundwater and Wells, Second Edition, Fletcher G. Discoll, 1986, published by Johnson Division, St. Paul Minnesota, 1089p. (Equation 9.11)

If at some point in the future it is determined that the continuous discharge of the Site Well #1 is dewatering the site aquifer and limiting water availability onsite, the applicant can consider pumping the excess water back up the hill onsite and into a drainage swale or infiltration trench where the water can percolate back into the well over time. This practice would create an artificial groundwater recharge basin that could replace a significant portion of the water lost.

As discussed, the Site Well #1 will discharge directly to the onsite pond once the storage tanks are full. The pond will then overflow to the onsite drainage creek at a rate that will be equal to the sum of the wells production, minus the sites water usage. This system will help to sustain a flow of water downstream during the spring and will allow for the pond to remain full during the summer and fall. Since unused water from the continuously discharging well will be discharged to the pond, there will be no anticipated decrease in stream flow as a result of the proposed water use.

5.0 WATER BALANCE INFORMATION

The USGS and DWR studies that included the Petaluma area provided water balance information that HES used to assess groundwater sustainability within the Cumulative Impact Area.

5.1 GROUNDWATER STORAGE

HES used well log information from five wells to estimate the aquifer thickness beneath the Cumulative Impact Area. The average screened interval for 5 wells was estimated at 225 feet. A 2013 USGS study in the nearby Santa Rosa Plain estimated the average specific yield of the Santa Rosa region at 5 percent (0.05)¹⁶. Therefore, using this data the Aquifer Storage can be estimated using the following equation

$$225 \text{ feet (Aquifer Thickness)} \times 0.05 \text{ (Specific Yield)} \times 300 \text{ acres (Cumulative Impact Area)} = \\ \underline{\text{Estimated Aquifer Storage}} = 3,375 \text{ acre-feet}$$

5.2 PRECIPITATION

Precipitation, primarily as rainfall is the major source of inflow to the Petaluma Valley Watershed. Mean seasonal precipitation maps from Sonoma County Water Agency¹⁷ and various local studies referenced in this report indicate the mean annual rainfall in the site vicinity is about 30 inches per year (about 2.5 feet per year) (**PLATE 5 - PRECIPITATION MAP**). Precipitation over the Cumulative Impact Area is:

$$2.5 \text{ feet/year (Regional Precipitation)} \times 300 \text{ acres (Cumulative Impact Area)} = \\ \underline{\text{Precipitation in Cumulative Impact Area}} = 750 \text{ acre-feet/year.}$$

5.3 GROUNDWATER RECHARGE

Groundwater recharge is the replenishment of an aquifer with water from the land surface. It is usually expressed as an average rate of inches of water per year, similar to precipitation. Thus, the volume of recharge is the rate times the land area under consideration times the time period, and is usually expressed as acre-feet per year. In addition to precipitation, other sources of recharge to an aquifer are stream and lake or pond seepage, irrigation return flow (both from canals and fields), inter-aquifer flows, and urban recharge (from water mains, septic tanks, sewers, drainage ditches).

For our defined Cumulative Impact Area, the Franciscan rock aquifer is considered unconfined to semi-confined. The primary sources of groundwater recharge in the Cumulative Impact Area are infiltration of precipitation, infiltration from streams, and irrigation-return flow. Soil types and land cover within the watershed affect the extent and magnitude of storm water runoff

¹⁶ Hydrologic and Geochemical Characterization of the Santa Rosa Plain Watershed, Sonoma County, California, U.S. Geological Survey, Scientific Investigations Report 2013-5118.

¹⁷ Sonoma County Mean Seasonal Precipitation in Flood Control Design Criteria manual: Plate No. B-3, Sonoma County Water Agency, Revised January 2005.

(retention and infiltration). It is likely that a portion of the rain water falling directly on the site infiltrates the ground surface and migrates downward through the soil matrix and until it recharges the fractured rock aquifer.

To estimate the groundwater recharge within the Cumulative Impact Area HES first assumed that the recharge to the aquifer is primarily through rainfall and that all rainfall accumulated within the 300-acre Cumulative Impact Area drains to the creeks proximate to the site. However, this estimate does not account for surface run-off, stream underflow, and evapotranspiration. To estimate the percentage of rainfall that contributes to recharge of the aquifer, HES reviewed available groundwater studies including the Santa Rosa Plain Watershed Groundwater Management Plan, and the USGS Scientific Investigation Report 2006-51157, as well as other regional groundwater studies in Sonoma County. Estimates for recharge found in these documents are considered to be reliable for our site evaluation. Average recharge to the groundwater system for the entire Santa Rosa Plain, including mountainous zones, is derived from an estimated average of 531,000 acre-ft of precipitation falling within the entire watershed. After accounting for runoff (188,400 acre-feet/year) and evapotranspiration (262,000 acre-feet/year), the amount of water available for recharging the Santa Rosa Plain Watershed equates to 80,600 acre-ft/year or approximately 15.2% of the annual rainfall. However significant variations to this value can occur based on topography, soil infiltration rates, geology etc.; and according to these USGS and Sonoma County Water Agency Reports, the long-term average precipitation that recharges groundwater can be as low as 1.67%.

While these USGS studies are not specific to the site vicinity, the average long-term recharge to the aquifer within our defined Cumulative Impact Area likely falls within the ranges seen in the nearby watersheds. HES estimates that only 5% of rainfall likely contributes to groundwater recharge within the Cumulative Impact Area. Based on this recharge value we can re-calculate the groundwater recharge within the Cumulative Impact Area using the following data and equation.

$$750 \text{ acre-feet/year (annual precipitation in CIA)} \times 0.05 \text{ (estimated long term recharge average)} = \underline{\text{Annual Aquifer Recharge}} = 37.5 \text{ acre-feet/year}$$

6.0 WATER QUALITY

A water quality assessment of the project well was not performed as part of this Hydrogeologic Assessment Report. However, a search for contaminated groundwater sites within 1,000 feet of the site was performed on the States Geotracker Database. No contaminated groundwater sites were identified within 1,000- feet of the site. Water quality assessment testing for bacteria, nitrates, arsenic and other common contaminants may be necessary prior to beginning site operations to ensure potable water is available for onsite farm workers.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The Franciscan aquifer beneath the site is generally considered unconfined to semiconfined and recharge to the aquifer likely occurs primarily from rainfall and stream flow in the San Antonio Creek Watershed. The wells identified within the Cumulative Impact Area have an average screened thickness of 225 feet and if extended over the entire 300-acre area produces an estimated total aquifer storage value of 750 acre-feet. Based on annual precipitation and estimated aquifer recharge rates, the annual recharge to the aquifer is estimated to be 37.5-acre-feet. The current annual water demand within the Cumulative Impact Area (including the site), is conservatively estimated to be 16.67 acre-feet. The estimated annual water demand for the proposed Project is 1.77 acre-feet and the total annual site groundwater demand at the site is 2.28 acre-feet (without consideration of the Applicant's rainwater catchment offset plans). The site relies on groundwater captured from horizontal wells and it's likely that these wells intercept water that would typically contribute to recharge of the local aquifer. However, our assessment has determined that the total annual water demand proposed for the site is sustainable based on current and future development within the Cumulative Impact Area. In summary:

3,375.00 acre-feet	Aquifer Storage
37.50 acre-feet	Annual Recharge to Aquifer
16.67 acre-feet	Cumulative Impact Area Current Annual Water Demand
18.57 acre-feet	Cumulative Impact Area Future Potential Annual Water Demand
2.28 acre-feet	Site Total Annual Water Demand (Domestic, Livestock and Project)
1.77 acre-feet	Project Annual Water Demand
1.40 acre-feet	Reduction in Annual Water Use from Cattle
0.17 acre-feet	Rainwater Capture Potential
0.37 acre-feet	Net Increase in Annual Site Water Usage

Based on the conservative assumptions and estimates presented in this report, the quantity of groundwater to be used for the project and within the Cumulative Impact Area compared to the quantity of available groundwater indicates that the proposed water use for the Project is unlikely to result in significant declines in groundwater resources over time. Based on the findings of this report, groundwater extraction at the Project well will not significantly impact neighboring wells or stream flow conditions in nearby creeks. In addition, based on the relative distance to the coastal areas, the depth of the site well and the proposed water usage rates, salt water intrusion is not considered to be a concern to this Assessment.

Based on the assessments made in this report and the comments from the Mr. Robert Pennington at Permit Sonoma, our Project recommendations are presented below.

- Incorporate rainwater catchment into your Project plans as a water conservation practice.
- If necessary, an artificial groundwater recharge basin can be created onsite where excess rainwater and well discharge water can be directed. This practice may help to sustain the well discharge rates during summer and fall.

8.0 LIMITATIONS

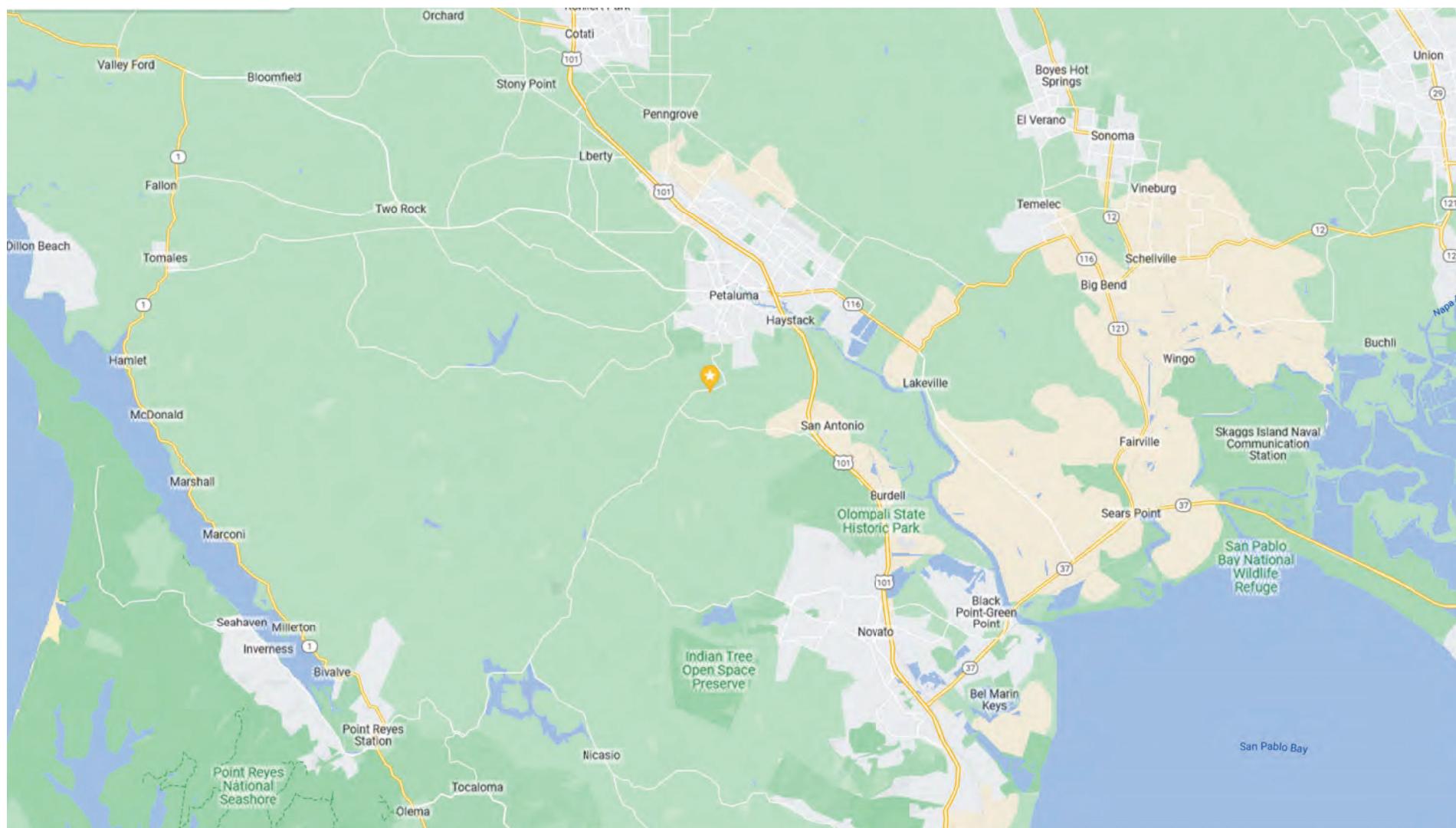
HES is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review, site inspection, field exploration, laboratory test data and interpretations presented in this report.

Groundwater systems of Sonoma County are typically complex, and available data rarely allows for more than general assessment of groundwater conditions and delineation of aquifers. Hydrogeologic interpretations are based on the drillers' reports made available to us through the California Department of Water Resources, available geologic maps and hydrogeologic studies and professional judgment. This analysis is based on limited available data and relies significantly on interpretation of data from disparate sources of disparate quality.

It should be noted that hydro-geological assessments are inherently limited in the sense that conclusions are drawn and recommendations developed from information obtained from limited research and site evaluation. Additionally, the passage of time may result in a change in the environmental characteristics at this site and surrounding properties. This report does not warrant against future operations or conditions, nor does this warrant operations or conditions present of a type or at a location not investigated.

This study is not intended to assess if any soil contamination, waste emplacement, or groundwater contamination exists by subsurface sampling through the completion of soil borings and the installation of monitoring wells. The scope of work, determined by the client, did not include these activities.

This Report is for the exclusive use of Villa Vanto Farm and Mr. and Mrs. Mario and Katherine Ghilotti, their affiliates, designees and assignees and no other party shall have any right to rely on any service provided by Hurvitz Environmental Services without prior written consent.



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SITE LOCATION MAP

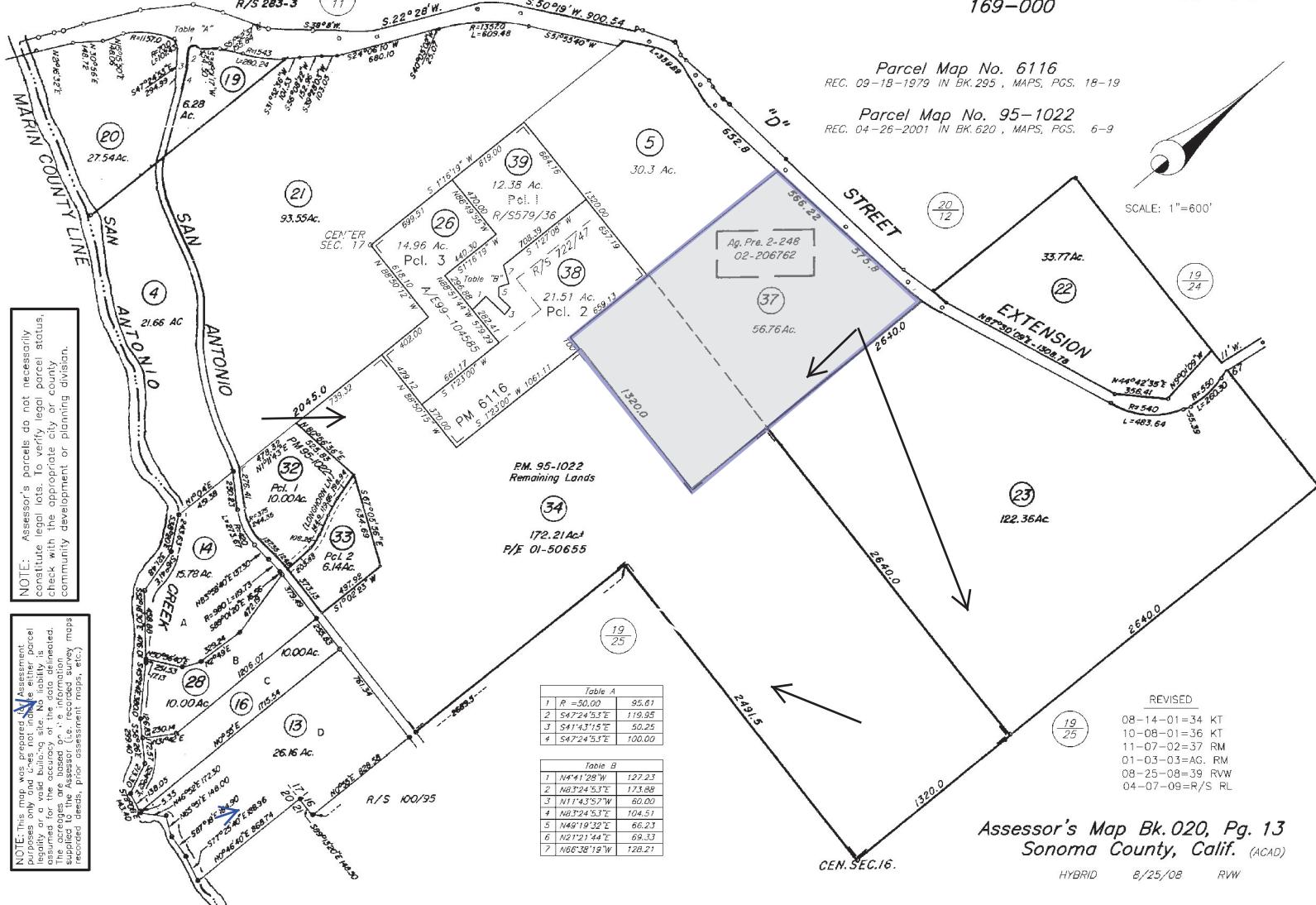
020-130-037
4485 D Street
Petaluma, CA

JOB NUMBER:	5170.01
DATE:	04/22/22
PLATE:	1

COUNTY ASSESSOR'S PARCEL MAP

TAX RATE AREA
169-000

20-13



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ASSESSORS PARCEL MAP

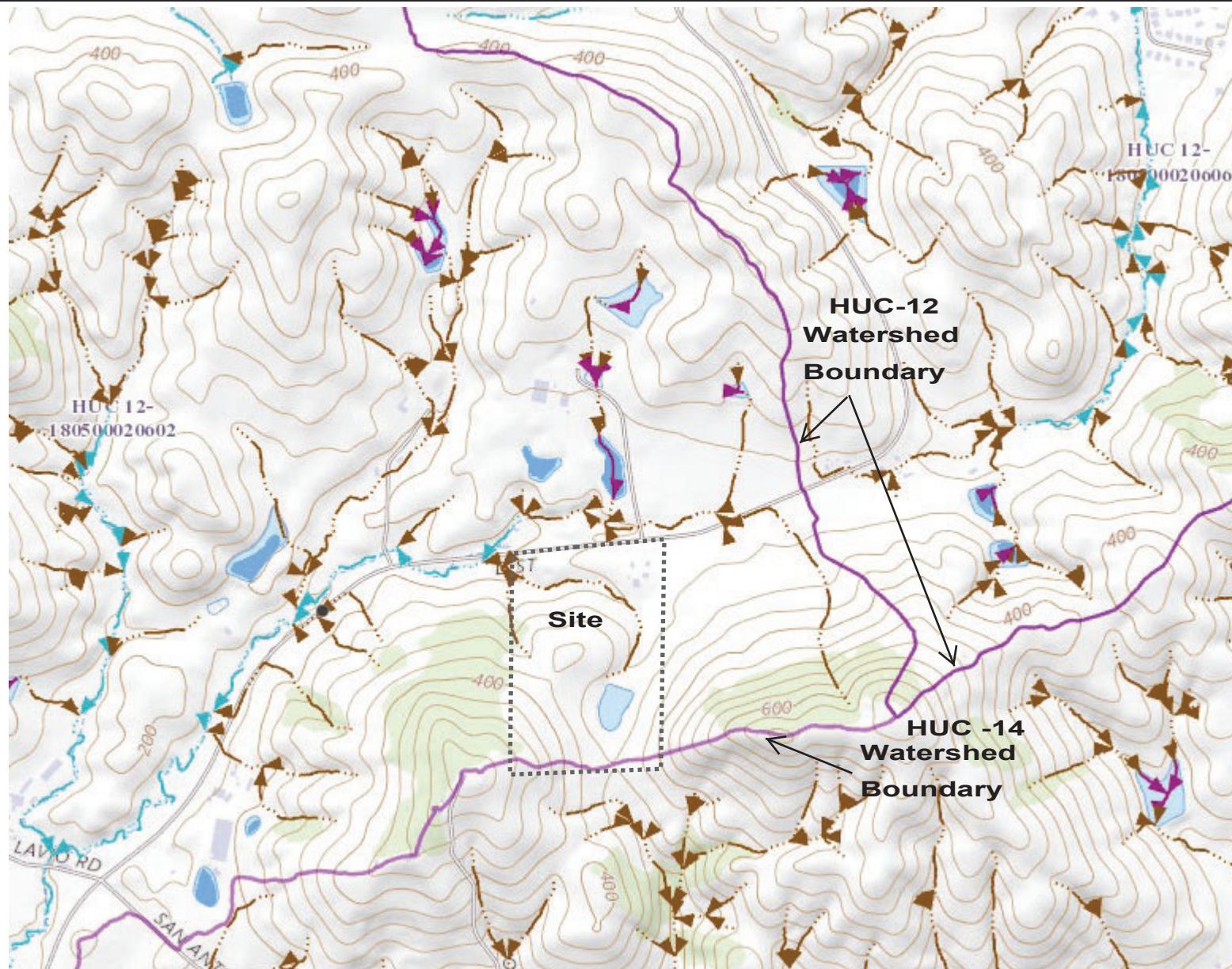
020-130-037

4485 D Street
Petaluma, CA

JOB NUMBER:
5170.01

DATE:
04/22/22

PLATE:
2



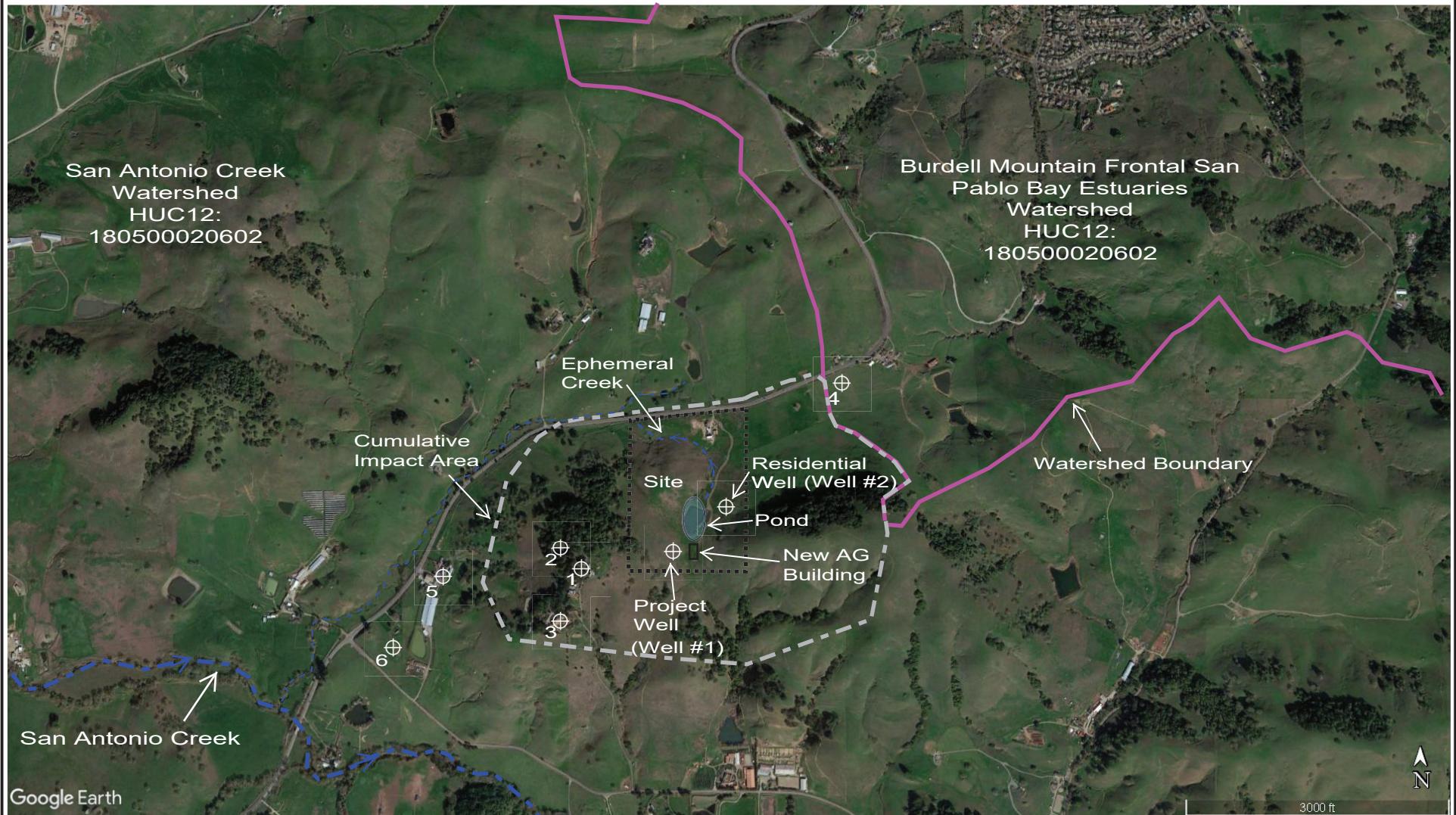
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USGS TOPOGRAPHIC MAP

4485 D Street
Petaluma, CA
APN: 020-130-037

JOB NUMBER:
5170.01
DATE:
04/22/22
PLATE:
3



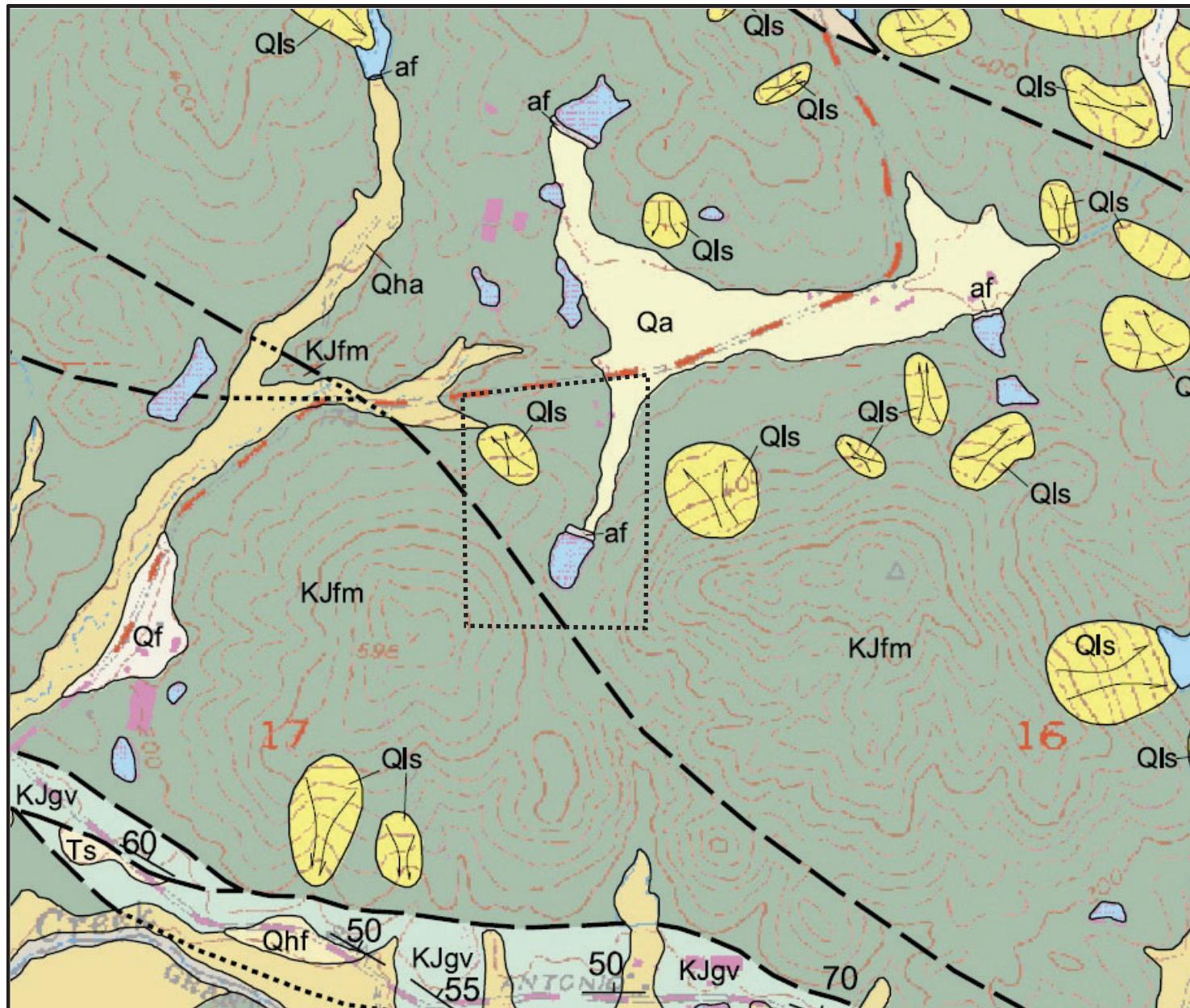


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RAINFALL MAP

020-130-037
4485 D Street
Petaluma, CA

JOB NUMBER:
5170.01
DATE:
04/22/22
PLATE:
5



Source:

Geologic Map of Petaluma 7.5' Quadrangle Sonoma and Marin Counties, California: A digital Database Version 1.0, California Department of Conservation California Geological Survey, 2002.

KJfm

Franciscan melange (Jurassic-Cretaceous). A tectonic mixture consisting predominantly of a matrix of sheared graywacke and shale and to a lesser extent serpentinite enclosing blocks of less sheared graywacke and graywacke interbedded with shale. The unit is characterized by hard, resistant tectonic blocks of chert, greenstone, and exotic high-grade metamorphic rocks.

Qls

Landslide deposits. Holocene and Pleistocene landslides.

Qha

Holocene alluvium, undifferentiated. Alluvium of Holocene age, deposited in fan, terrace, or basin environments.

af

Artificial fill.

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GEOLOGIC MAP

020-130-037
4485 D Street
Petaluma, CA

JOB NUMBER:
5170.01

DATE:
04/22/22

PLATE:
6

APPENDIX A
PHOTOGRAPHIC LOG

SITE PHOTOGRAPHS



Photo 1: View of residence onsite.



Photo 2: View of existing workshop/garage onsite.

SITE PHOTOGRAPHS



Photo 3: View of Project Well (Well #1).



Photo 4: View of new Ag barn and ~1.6 acre pond from the Project Well (Well#1).

SITE PHOTOGRAPHS



Photo 5: View of horizontal well for residence (Well #2).



Photo 6: View of ~1.6-acre pond from Well #2.

SITE PHOTOGRAPHS



Photo 7: View of ephemeral stream with garage and residence in the background from Well #2.



Phot 8: View of ephemeral creek as it flows offsite to the northwest.

APPENDIX B
LANDSCAPE IRRIGATION PLAN

PO Box 1712
Sonoma, CA 95476

(707) 637-6051
thomas@totemlandscapeservices.com
CA Lic# 1048291



Date: 3-7-2023 : Ghilotti 4485 D
Street Petaluma, Ca. 94952

To Whom It May Concern:

After reviewing the landscape design and planting plan, as well as working on the property, I have determined the below numbers to be accurate for daily and annual water use.

Turf area: 4,356sq'

Irrigation Sprinklers: Hunter MP Rotors = 38 MP 2000 @ 0.95GPM = 36.1GPM

Irrigation Sprinklers: Hunter MP Rotors = 36 MP 800 @ 0.5GPM = 18GPM

Combined Irrigation Sprinklers Total = 54.1GPM

Calculation For Turf = 54.1GPM x 20min/day = 1,082Gal x 3 days a week = 3,246gal/week x 52 weeks = 168,792 Gal/year

Planted area (Ornamental grasses, perennials and shrubs)

Irrigation Emitters = 433 Hunter Woodpeckers @ 2GPH = 866 Gal/Hr

Calculation For Planted Area = 866 Gal/Hr x .5 hrs. x 3 days a week = 1,299 Gal/week x 52 = 67,548 Gal/year.

Trees: Olives and Crape Myrtles

Irrigation Emitters = 128 Hunter Woodpeckers @ 2GPH = 256 Gal/hr

Calculation For Trees = 256 Gal/hr x .75hr x 1 day a week = 192 Gal/week x 52 = 9,984 Gal/year

PO Box 1712
Sonoma, CA 95476

(707) 637-6051
thomas@totemlandscapeservices.com
CA Lic# 1048291

Annual Use
Irrigation Sprinklers = 168,792 Gallons
Irrigation Emitters = 77,532 Gallons
Total = 246,324 Gallons

Average Daily Use
246,324/ 182.5 = 1,349 Gal/day

Sincerely,
Thomas Bottari
Owner
Totem Landscape Services LLC : CA Lic# 1048291
707-637-6051
www.totemlandscapeservices.com

APPENDIX C
WELL COMPLETION REPORTS

State of California
Well Completion Report
Form DWR 188 Submitted 3/7/2023
WCR2023-003399

Owner's Well Number	Date Work Began	Date Work Ended	06/19/2022	
Local Permit Agency	Sonoma County Permit & Resource Management Department			
Secondary Permit Agency	Permit Number	wel22-0189	Permit Date	06/06/2022
Well Owner (must remain confidential pursuant to Water Code 13752)				
Name	Mario Ghilotti			
Mailing Address	4485 D Street			
City	Petaluma	State	Zip 94952	
Planned Use and Activity				
Activity	New Well			
Planned Use	Water Supply Irrigation - Landscape			

Well Location									
Address	4485 D ST						APN	020130037	
City	Petaluma			Zip	94952	County	Sonoma	Township	04 N
Latitude	38	11	36.9185	N	Longitude	-122	38	59.8073	W
	Deg.	Min.	Sec.		Deg.	Min.	Sec.	Range	07 W
Dec. Lat.	38.1935884947845			Dec. Long.			-122.649946479853		
Vertical Datum				Horizontal Datum			WGS84		
Location Accuracy				Location Determination Method					
Elevation Accuracy									
Elevation Determination Method									

Borehole Information				Water Level and Yield of Completed Well			
Orientation	Horizontal			Specify			
Drilling Method	Direct Rotary		Drilling Fluid	Water			
Total Depth of Boring	400			Feet			
Total Depth of Completed Well	400			Feet			
*May not be representative of a well's long term yield.							

Geologic Log - Free Form									
Depth from Surface Feet to Feet		Description							
0	50	Soft rock							
50	150	Hard rock							
150	300	Dark green rock (water at 220ft)							
300	400	Soft white rock							

#2

Casings										
Casing #	Depth from Surface Feet to Feet		Casing Type	Material	Casings Specications	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	20	Blank	PVC	N/A	0.52	1.5			PVC SCH 80
1	20	400	Screen	PVC	N/A	0.52	1.5	Milled Slots	0.5	pvc sch 80

Annular Material						
Depth from Surface Feet to Feet	Fill		Fill Type Details		Filter Pack Size	Description
0	2	Bentonite	Other Bentonite			
2	20	Cement	Portland Cement/Neat Cement			
20	400	Other Fill	See description.			other

Other Observations:

Borehole Specifications			Certification Statement			
Depth from Surface Feet to Feet		Borehole Diameter (inches)	I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief			
0	20	3.75	Name	CLEAR HEART DRILLING INC		
20	400	3.75	Person, Firm or Corporation			
			555 B W COLLEGE AVENUE	SANTA ROSA	CA	95401
			Address	City	State	Zip

Certification Statement				
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief				
Name	CLEAR HEART DRILLING INC			
Person, Firm or Corporation				
555 B W COLLEGE AVENUE		SANTA ROSA	CA	95401
Address		City	State	Zip
Signed	<i>electronic signature received</i>		03/07/2023	780357
	C-57 Licensed Water Well Contractor		Date Signed	C-57 License Number

DWR Use Only				
CSG #	State Well Number	Site Code	Local Well Number	
			N	W
Latitude Deg/Min/Sec			Longitude Deg/Min/Sec	
TRS:				
APN:				

State of California
Well Completion Report
Form DWR 188 Submitted 3/7/2023
WCR2023-003391

Owner's Well Number	Date Work Began	Date Work Ended	04/01/2022	
Local Permit Agency	Department of Public Health Services - Environmental Health Department			
Secondary Permit Agency	Permit Number	wel22-0063	Permit Date	03/16/2022
Well Owner (must remain confidential pursuant to Water Code 13752)				
Name GHILOTTI, Mario Ghilotti Mailing Address 4485 D Street City Petaluma State Zip 94952				
Planned Use and Activity Activity New Well Planned Use Water Supply Irrigation - Landscape				

Well Location							
Address	4485 D ST			APN	020130037		
City	Petaluma			Zip	94952	County	Sonoma
Latitude	38	11	41.3711	N	Longitude	-122	38 50.8325 W
	Deg.	Min.	Sec.		Deg.	Min.	Sec.
Dec. Lat.	38.1948253251292			Dec. Long.	-122.647453489177		
Vertical Datum				Horizontal Datum	WGS84		
Location Accuracy				Location Determination Method			

Borehole Information			
Orientation	Horizontal		Specify
Drilling Method	Direct Rotary		Drilling Fluid Water
Total Depth of Boring	170		Feet
Total Depth of Completed Well	170		Feet
Water Level and Yield of Completed Well			
Depth to first water	120		(Feet below surface)
Depth to Static			
Water Level	(Feet)		Date Measured
Estimated Yield*	2.5 (GPM)		Test Type Pump
Test Length	(Hours)		Total Drawdown (feet)
*May not be representative of a well's long term yield.			

Geologic Log - Free Form							
Depth from Surface Feet to Feet		Description					
0	60	Silty brown clay					
60	120	Brown hard rock					
120	170	Light gray rock (water found at 120ft)					

#1

Casings										
Casing #	Depth from Surface Feet to Feet		Casing Type	Material	Casings Specications	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	20	Blank	PVC	N/A	0.52	1.5			PVC SCH 80
1	20	170	Screen	PVC	N/A	0.52	1.5	Milled Slots	0.5	pvc sch 40

Annular Material					
Depth from Surface Feet to Feet	Fill	Fill Type Details	Filter Pack Size	Description	
0	2	Bentonite	Other Bentonite		
2	20	Cement	Portland Cement/Neat Cement		
20	170	Other Fill	See description.		other

Other Observations: _____

Borehole Specifications			Certification Statement					
Depth from Surface Feet to Feet		Borehole Diameter (inches)	I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief					
0	20	3.75	Name	CLEAR HEART DRILLING INC				
20	170	3.75	Person, Firm or Corporation					
			555 B W COLLEGE AVENUE	SANTA ROSA	CA	95401		
			Address	City	State	Zip		

Certification Statement			
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief			
Name	CLEAR HEART DRILLING INC		
Person, Firm or Corporation			
555 B W COLLEGE AVENUE	SANTA ROSA	CA	95401
Address	City	State	Zip
Signed	<i>electronic signature received</i>	03/07/2023	780357
C-57 Licensed Water Well Contractor		Date Signed	C-57 License Number

DWR Use Only				
CSG #	State Well Number	Site Code	Local Well Number	
			N	
				W
Latitude Deg/Min/Sec			Longitude Deg/Min/Sec	
TRS:				
APN:				

DUPLICATE

Driller's Copy

Page 1 of 1

Owner's Well No.

Date Work Began 6-17-1996, Ended 6-24-1996Local Permit Agency Sonoma CountyPermit No. WEL96-0185STATE OF CALIFORNIA
WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 468271

DWR USE ONLY - DO NOT FILL IN			
STATE WELL NO./STATION NO.			
LATITUDE		LONGITUDE	
APN/TRS/OTHER			

Permit Date 6-10-1996

GEOLOGIC LOG							WELL OWNER			
ORIENTATION (✓)		<input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> HORIZONTAL <input type="checkbox"/> ANGLE (SPECIFY)					Name <u>Tom Gawronski</u>			
DEPTH FROM SURFACE		DEPTH TO FIRST WATER <u>230</u> (FT.) BELOW SURFACE					Mailing Address <u>2000 Longhorn Lane</u>			
Ft. to Ft.		DESCRIPTION <i>Describe material, grain size, color, etc.</i>					CITY <u>Petaluma</u>		CA <u>94952</u>	
0 180		clay with embedded gravel					WELL LOCATION			
180 240		sandstone					Address <u>same</u>			
240 270		dark gray chert					City <u>Sonoma</u>			
270 300		shale					County <u>Sonoma</u>			
300 340		lt. gray chert					APN Book <u>020</u> Page <u>130</u> Parcel <u>025</u>			
							or Township _____ Range _____ Section _____			
							Latitude <u>38° 15' 00" N</u> Longitude <u>122° 30' 00" W</u>			
							DEG. MIN. SEC.		DEG. MIN. SEC.	
							NORTH		WEST	
							LOCATION SKETCH			
							<input checked="" type="checkbox"/> NEW WELL <input type="checkbox"/> DEEPEN <input type="checkbox"/> OTHER (SPECIFY)			
							<input type="checkbox"/> DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")			
							<input type="checkbox"/> PLANNED USE(S) (✓) <input type="checkbox"/> MONITORING			
							<input type="checkbox"/> WATER SUPPLY <input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Public <input type="checkbox"/> Irrigation <input type="checkbox"/> Industrial <input type="checkbox"/> "TEST WELL" <input type="checkbox"/> CATHODIC PROTECTION <input type="checkbox"/> OTHER (SPECIFY)			
							<small>Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc. PLEASE BE ACCURATE & COMPLETE.</small>			
							DRILLING METHOD <u>Rotary Air</u> FLUID _____ WATER LEVEL & YIELD OF COMPLETED WELL DEPTH OF STATIC <u>182</u> (FT.) & DATE MEASURED <u>6-24-96</u> WATER LEVEL <u>182</u> (FT.) & DATE MEASURED <u>6-24-96</u> ESTIMATED YIELD <u>45</u> (GPM) & TEST TYPE <u>air lift</u> TEST LENGTH <u>2</u> (HRS.) TOTAL DRAWDOWN <u>N/A</u> (FT.)			
							<small>* May not be representative of a well's long-term yield.</small>			
TOTAL DEPTH OF BORING <u>340</u> (Feet)										
TOTAL DEPTH OF COMPLETED WELL <u>328</u> (Feet)										

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING(S)						DEPTH FROM SURFACE	ANNULAR MATERIAL			
		TYPE (✓)	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	CEMENT (✓)		BENTONITE (✓)	FILL (✓)	TYPE	
Ft. to Ft.	BLANK SCREEN CONDUCTOR FILL PIPE											
0 23	10											
23 340	8											
0 208	X	plastic	5	SDR-21								
208 328	X	plastic	5	SDR-21	.032							

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.			
HUCKFELDT WELL DRILLING			
NAME <u>HUCKFELDT WELL DRILLING</u> (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)			
ADDRESS <u>2110 Penny Lane</u>		CITY <u>Napa</u>	
		STATE <u>CA</u> ZIP <u>94559</u>	
Signed <u>John H. Huckfeldt</u>		6-25-96	
WELL DRILLER/AUTHORIZED REPRESENTATIVE		DATE SIGNED	
		439-746	
		C-57 LICENSE NUMBER	

ORIGINAL**File with DWR**

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORT
A.P. #020-130-21-7

*Do not fill in***No. 235121**

of Intent No. _____
Local Permit No. or Date. _____

State Well No. _____
Other Well No. *04N07W17*

(1)

Address

City. _____

(2) LOCATION OF WELL (See instructions):County *Sonoma* Owner's Well Number. _____Well address if different from above *same*

Township. _____ Range. _____ Section. _____

Distance from cities, roads, railroads, fences, etc. _____

(12) WELL LOG:		Total depth 41 ft. Depth of completed well _____ ft.
from ft.	to ft.	Formation (Describe by color, character, size or material)
0	- 10	<i>yellow sandstone</i>
10	- 20	<i>yellow clay/some gravel</i>
-	-	<i>blue clay</i>
20	- 25	<i>" "</i>
25	- 35	<i>gravel</i>
35	- 37	<i>blue shale</i>
37	- 41	

(3) TYPE OF WORK:New Well Deepening Reconstruction Reconditioning Horizontal Well Destruction (Describe destruction materials and procedures in Item 12)**(4) PROPOSED USE:**Domestic Irrigation Industrial Test Well Stock Municipal Other **WELL LOCATION SKETCH****(5) EQUIPMENT:**Rotary Reverse Cable Air Other Bucket **(6) GRAVEL PACK:**Yes No

Size _____

Diameter of bore _____

Packed from *20* to *41* ft.**(7) CASING INSTALLED:**Steel Plastic Concrete **(8) PERFORATIONS:**

Type of perforation or size of screen _____

From ft.	To ft.	Dia. in.	Cage or Wall	From ft.	To ft.	Slot size
0	41	1 1/2	3/4	-0	41	
			.188			

(9) WELL SEAL:Was surface sanitary seal provided? Yes No If yes, to depth **20** ft.Were strata sealed against pollution? Yes No Interval _____ ft.Method of sealing *Ready mix***(10) WATER LEVELS:**

Depth of first water, if known _____ ft.

Standing level after well completion _____ ft.

(11) WELL TESTS:Was well test made? Yes No If yes, by whom? _____Type of test Pump Bailer Air lift Depth to water at start of test _____ ft. At end of test **41** ft.Flow rate **1** gal/min after **4** hours Water temperature _____Chemical analysis made? Yes No If yes, by whom? _____Was electric log made? Yes No If yes, attach copy to this reportWork started *8/14/82* 19 Completed *8/17/82* 19**WELL DRILLER'S STATEMENT:***This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.**Kenneth Hansen*

SIGNED _____

NAME **LES PETERSEN DRILLING & PUMP, INC.**

(Well Driller)

(Person, firm, or corporation) (Typed or printed)

Address **5434 Old Redwood Highway****Santa Rosa, Ca.**

Zip _____

City **261084**License No. **8/18/82** Date of this report

ORIGINAL
File with DWR
Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

Owner's Well No. _____
Date Work Began 10-7-98, Ended 10-9-98 No. 704187
Local Permit Agency Sonoma County Public Health Dept.
Permit No. We198-0486 Permit Date 9-30-98

DWR USE ONLY - DO NOT FILL IN

04N07W17

STATE WELL NO./STATION NO.

_____ LATITUDE _____ LONGITUDE

APN/TRS/OTHER

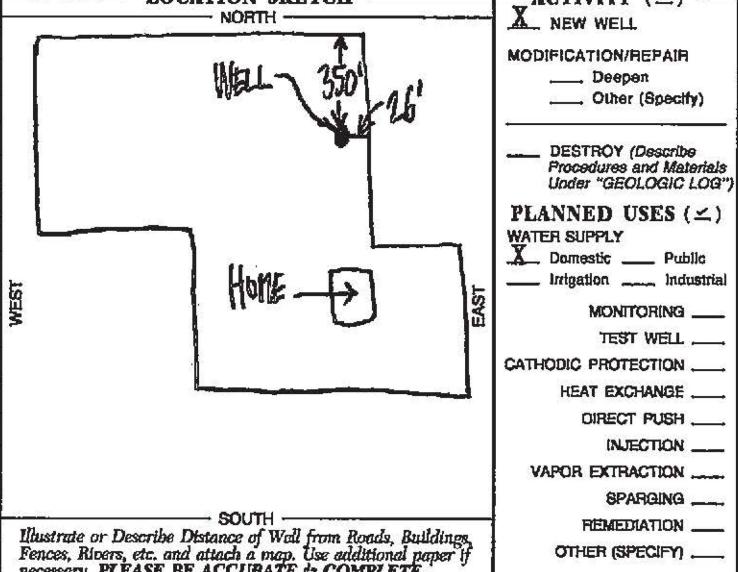
GEOLOGIC LOG

ORIENTATION (✓) VERTICAL HORIZONTAL ANGLE (SPECIFY)
DRILLING METHOD Rptary Air FLUID _____

DEPTH FROM SURFACE Pt. to Pt.	DESCRIPTION Describe material, grain size, color, etc.	
	ft.	ft.
0 90	clay with embedded gravel	
90 215	clay with embedded volcanic mix	
215 260	sandstone	
260 290	dark gray chert	
290 380	light gray chert	

UNIT STATE ZIP
Address 1000 Longhorn Lane
City Petaluma
County Sonoma
APN Book 020 Page 130 Parcel 024
Township _____ Range _____ Section _____
Latitude _____ NORTH Longitude _____ WEST
DEG. MIN. SEC. DEG. MIN. SEC.

LOCATION SKETCH



ACTIVITY (✓) NEW WELL

MODIFICATION/REPAIR
— Deepen
— Other (Specify) _____

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

PLANNED USES (✓)
WATER SUPPLY
 Domestic Public
 Irrigation Industrial

MONITORING _____
TEST WELL _____
CATHODIC PROTECTION _____
HEAT EXCHANGE _____
DIRECT PUSH _____
INJECTION _____
VAPOR EXTRACTION _____
SPARGING _____
REMEDIATION _____
OTHER (SPECIFY) _____

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

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 218 (ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL 174 (ft.) & DATE MEASURED 10-9-98

ESTIMATED YIELD 50 (GPM) & TEST TYPE air lift

TEST LENGTH 2 (hrs.) TOTAL DRAWDOWN N/A (ft.)

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

TOTAL DEPTH OF BORING 380 (Feet)
TOTAL DEPTH OF COMPLETED WELL 370 (Feet)

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)						DEPTH FROM SURFACE	ANNULAR MATERIAL			
		TYPE (✓)		MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)		TYPE			
ft. to ft.	ft.	BLANK	SCREEN						CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 25	10							0 22	<input checked="" type="checkbox"/>			concrete
25 380	9							22 370				<input checked="" type="checkbox"/> pea gravel
0 170	X			PVC F480	5	SDR-21						
170 370	X			PVC F480	5	SDR-21	.032					

ATTACHMENTS (✓)

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analyses
- Other _____

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME HUCKFELDT WELL DRILLING

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 2110 Penny Lane

Napa

CA 94559

STATE ZIP

Signed *Don Hucklefield*
WELL DRILLER/AUTHORIZED REPRESENTATIVE

10-15-98
DATE SIGNED

430-746
C-57 LICENSE NUMBER

WELL COMPLETION REPORT - STATE OF CALIFORNIA

Page 1 of 1 No# 792226
 Owner's Well No. 1
 Permit Date: 06/13/02 Permit # WEL02-0263
 Date Work Began 9/24/02 Ended 9/30/02
 Permit Agency Dept of Permits & Resource Management

09N07W17
 State Well No./Station No.

APN/TRS/Other

GEOLOGIC LOG

ORIENTATION: Vertical
 DRILLING METHOD: Rotary
 FLUID: Air

Ft to Ft DESCRIPTION

0	4	Clay with rock
4	114	Brown clay with rock
114	184	Greenstone with brown rock
184	360	Greenstone
360	440	Greenstone with gray rock
440	450	Mix rock with clay
450	484	Greenstone
484	535	Fractured greenstone

WELL OWNER

Name: _____
 Mailing Address: _____

WELL LOCATION

Address: 4001 D Street
 City: Petaluma
 County: Sonoma
 APN Book 020 - 130 - 023
 Latitude _____ Longitude _____

LOCATION SKETCH

ACTIVITY
 New Well

Modification/Repair
 Deepen
 Other (Specify) _____

DESTROY (Describe)
 Procedures and Materials
 Under "Geologic Log")

PLANNED USES:
 Monitoring
 Test well
 Cathodic Protection
 Heat Exchange
 Direct Push
 Injection
 Vapor Extraction
 Sparging
 Remediation
 Other (specify) _____

PLANNED USES
 Water Supply
 Domestic _____
 Irrigation _____
 Public _____
 Industrial _____

WATER LEVEL & YIELD OF COMPLETED WELL

Depth to First Water (ft.) BELOW SURFACE
 Depth of Static _____
 Water Level (ft) 350 Date Measured: 09/30/02
 Estimate Yield (GPM)* 27 Test Length/Test type: 2 hr / Air lift
 Total drawdown (ft) 528

TOTAL DEPTH OF BORING (FT): 535

TOTAL DEPTH OF COMPLETED WELL (FT): 535

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

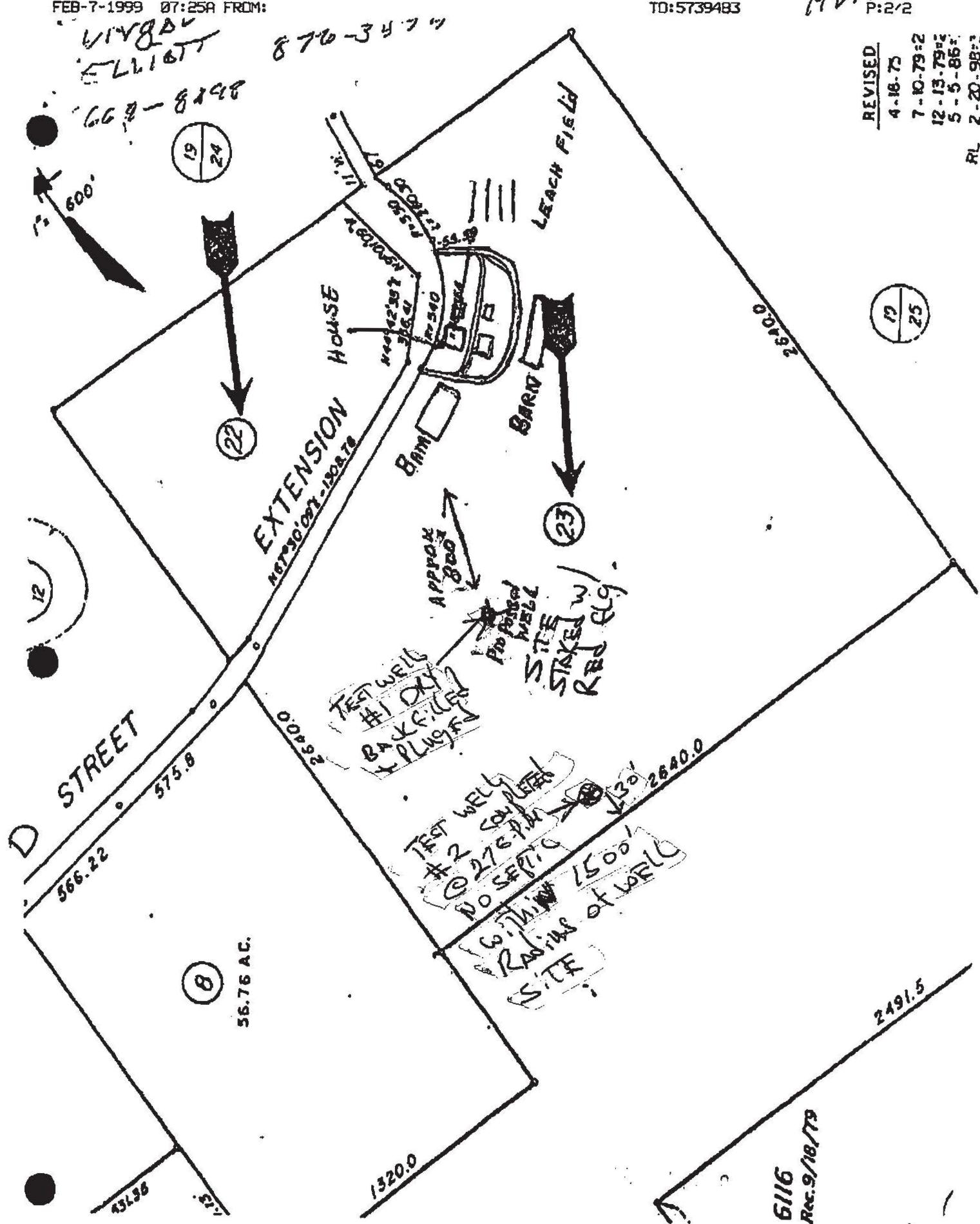
Depth from surface Ft to Ft	Bore-hole diameter Inches	Type Blank	Material Grade	Diameter	Gauge	Depth		Annular Material Seal Material
						Slot Size	From Surface Ft to Ft	
0	235	8 3/4	XX	5	200		0	25 Bentonite
235	535	8 3/4	XX	5	200	0.032	25	535 1/4 x 1/8

ATTACHMENTS

- Geologic Log
- Well Construct Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analyses
- Other

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief
 NAME: LES PETERSEN DRILLING AND PUMP, INC
 ADDRESS: 5434 OLD REDWOOD HWY, SANTA ROSA, CA 95403
 SIGNED: Ray Petersen Ray Petersen 09/30/02
 Well Driller/Authorized Representative (Lupe) RP Date 09/30/02 C-57 License # 261084



REVISED

4-16-75
7-10-79:2
12-13-79:4
5-5-85:1
RL 2-20-98:2

WELL COMPLETION REPORT - STATE OF CALIFORNIA

Page 1 of 1 No# 937228
 Owner's Well No. 1
 Permit Date: 07/13/06 Permit # WEL06-0268
 Date Work Began 08/02/06 Ended 08/15/06
 Permit Agency Dept of Permits & Resource Management

08/15/06
 State Well No./Station No.

APN/TRS/Other

GEOLOGIC LOG

ORIENTATION: Vertical
 DRILLING METHOD: Rotary
 FLUID: Air/Mud

Ft to Ft DESCRIPTION

0: 4' Top soil rocks
 4: 25' Fractured rock
 25: 35' Sandstone and shale
 35: 44' Blue sandston
 44: 50' Gray clay and shale layers
 50: 65' Shale and clay w/greenstone
 65: 80' Shale and greenstone
 80: 100' Black and green rock mix
 100: 130' Sandy black rock and greenstone mix
 130: 135' Sandy rock w/greenstone
 135: 142' Shale and greenstone mix
 142: 220' Sandy black rock w/greenstone
 220: 270' Shale and sandstone layers
 270: 330' Sandstone w/shale layers
 330: 370' Sandstone / greenstone layers
 370: 380' Fracture zones of greenstone & sandstone
 380: 420' Greenstone & shale mix
 420: 480' Sandstone and shale mix
 480: 520' Shale & sandstone layers
 520: 535' Gray clay and shale
 535: 560' Shale & green rock mix with hard ledges
 560: 572' Sandstone fractures
 582: Sandy clay
 58: 610' Shale and sandstone layers
 610: 620' Shale & clay
 620: 640' Clay and shale

WELL OWNER

Name: _____
 Mailing Address: _____

WELL LOCATION

Address: 4945 D Street
 City: Petaluma
 County: Sonoma
 APN Book 020 - 130 - 019
 Latitude _____ Longitude _____

LOCATION SKETCH

ACTIVITY
 New Well

Modification/Repair
 Deepen
 Other (Specify) _____

DESTROY (Describe)
 Procedures and Materials
 Under "Geologic Log")

PLANNED USES:

Monitoring
 Test well
 Cathodic Protection
 Heat Exchange
 Direct Push
 Injection
 Vapor Extraction
 Sparging
 Remediation
 Other (specify) _____

PLANNED USES

<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Public
<input type="checkbox"/> Irrigation	<input type="checkbox"/> Industrial

WATER LEVEL & YIELD OF COMPLETED WELL

Depth to First Water (ft.) BELOW SURFACE
 Depth of Static
 Water Level (Ft) 60 Date Measured: 08/15/06
 Estimate Yield (GPM)* 1/2/2/4/4+ Test Length/Test type: 2 hour Air lift
 Total draw 110/210/310/410/510-590

TOTAL DEPTH OF BORING (FT): 640

TOTAL DEPTH OF COMPLETED WELL (FT): 600

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

Depth from surface Ft to Ft	Bore-hole diameter Inches	Type		Material Grade	Diameter	Gauge	Depth		Annular Material Seal Material
							Slot	From Surface	
		Blank	Screen				Size	Ft to Ft	
0: 35	8	XX		PVC	5	200		0: 25	Bentonite
35: 600			XX	PVC	5	200	0.032	25: 600	1/4 x 1/8

ATTACHMENTS

No Geologic Log
 No Well Construct Diagram
 No Geophysical Log(s)
 No Soil/Water Chemical Analyses
 No Other

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

NAME: LES PETERSEN DRILLING AND PUMP, INC

ADDRESS: 5434 OLD REDWOOD HWY, SANTA ROSA, CA 95403

SIGNED: Matt Petersen/ Matt Petersen 08/15/06

Well Driller/Authorized Representative (Roger) RP Date 08/15/06

261084

C-57 License #

Driller Owner Local

Well Permit Application

WLS-031

WEL22-0063

4485 D Street
Site Address
Petaluma
City/Town
Mario Ghilotti
Owner Name
4485 D Street
Mailing Address
Petaluma
City/Town
415-760-1936
Phone
Mario Ghilotti
Contact Person

CA 94952
State Zip
CA 94952
State Zip

Permit Number
020-130-037
Assessor's Parcel Number
CLEAR HEART DRILLING
Well Driller Name
555 WEST COLLEGE AVE SUITE B
Mailing Address
SANTA ROSA
CA 95401
State Zip
City/Town
80357
License Number
707-568-6095
Phone
GINA@CLEARHEARTDRILLING.COM
Email

The validity of this permit depends upon the accuracy of the information provided by the applicant. A site plan must accompany this application. In addition to the information required on the Minimum Standard Site Plan (Form CSS-019), the site plan shall also include the proposed well location, existing well(s) location(s), GPS coordinates of proposed well, sewer mains and laterals, and other potential sources of contamination. If an inadequate site plan is provided and a second field visit is required, a charge at the current hourly rate will be assessed. The precise site location of the proposed well must be staked with the driller's name.

INDICATE TYPE AND NUMBER OF PROPOSED WELLS/BORINGS:

Indicate use: Residential Community Irrigation Industrial

Reason for new well: New property and needs a new horizontal well for personal use

Destruct Class I Well Class II Well Reconstruction Reason for Class II: _____

Number of Geotechnical Borings: _____ Number of Geoexchange: _____ Number of monitoring: _____ Number of Cathodic: _____

Number of Performance Wells: 1 Number of Piezometers: _____ Number of Inclinometers: _____ Number of Other: _____

Total number of wells on property: 1 Number in use: 1 Number inactive: _____ Number abandoned: _____

Well located within an existing public water system boundary: Yes No Name of System: _____

CONSTRUCTION PROPOSED:

Casing: Diameter: 4.0" Gauge: SCH40 Material: PVC Gravel Pack Conductor: Yes No

Annular Space: Size: 2" Depth of Seal: 20' Sand Pack Seal Material: CEMENT GROUT

Method of Disinfection: CHLORINATION Method of Sealing Access Opening: SANITARY SEAL Type of Joint: RUSH

DESTRUCTION PROPOSED: Well Diameter: _____ Well Depth: _____ Well Casing: _____

Method of Destruction: _____

WORKER'S COMPENSATION DECLARATION

I hereby affirm under penalty of perjury one of the following declarations:

I have and will maintain a certificate of consent to self-insure for worker's compensation, as provided for by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued.

I have and will maintain worker's compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My worker's compensation insurance carrier and policy number are: Carrier SERVICE AMERICAN INDEMNITY COMPANY

Policy No. SAMTWC0049700
(This section need not be completed if the permit is for one hundred dollars (\$100) or less.)

I hereby agree to comply with all laws and regulations of the County of Sonoma

and State of California pertaining to water well construction. I will notify Permit Sonoma Well & Septic Division 24 hours prior to commencing this work. I will furnish Permit Sonoma and the owner a copy of the State Well Completion Report

Within thirty (30) days in order to obtain final approval on this well as required by SONOMA COUNTY CODE, CHAPTER 25B. I acknowledge that the application will become a permit only after the site approval and payment of fee.

I understand that this permit is not transferable and expires one year from the date of issuance.

Signature of Well Driller

Date

WARNING: FAILURE TO SECURE WORKER'S COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000) IN ADDITION TO THE COST OF COMPENSATION DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEYS FEES.

***** DO NOT WRITE BELOW THIS LINE - To Be Completed by Permit Sonoma Staff *****

Application: Becky Ver Meer Date: 03/16/2022 Seal Inspection Date: _____ EHS _____
Site Approved by: _____ Date: _____ GW Zone: 1 2 3 4 _____
Finalized by: _____ Date: _____
Comments: WEL21-0349 and SEP22-0114 are applicable to the attached site plan.

THIS PROJECT SHALL COMPLY WITH THE FOLLOWING APPLICABLE CODES AND REGULATIONS

CALIFORNIA BUILDING CODE, 2019 EDITION (CBC)
 CALIFORNIA RESIDENTIAL CODE, 2019 EDITION (CRC)
 CALIFORNIA PLUMBING CODE 2019 EDITION (CPC)
 CALIFORNIA ELECTRICAL CODE 2019 EDITION (CEC)
 CALIFORNIA MECHANICAL CODE 2019 EDITION (CMC)
 CALIFORNIA GREEN BUILDING CODE 2019 EDITION (GBC)
 CALIFORNIA ENERGY CODE 2019 EDITION (EC)
 CALIFORNIA HISTORICAL CODE 2019 EDITION (HC)
 CALIFORNIA FIRE CODE 2019 EDITION (FC)

INCLUDING ALL AMENDMENTS AS ADOPTED BY THE GOVERNING JURISDICTION.

SEP22-0114

Future Septic Tank and Leach Field - Application not submitted

APN 020-130-038

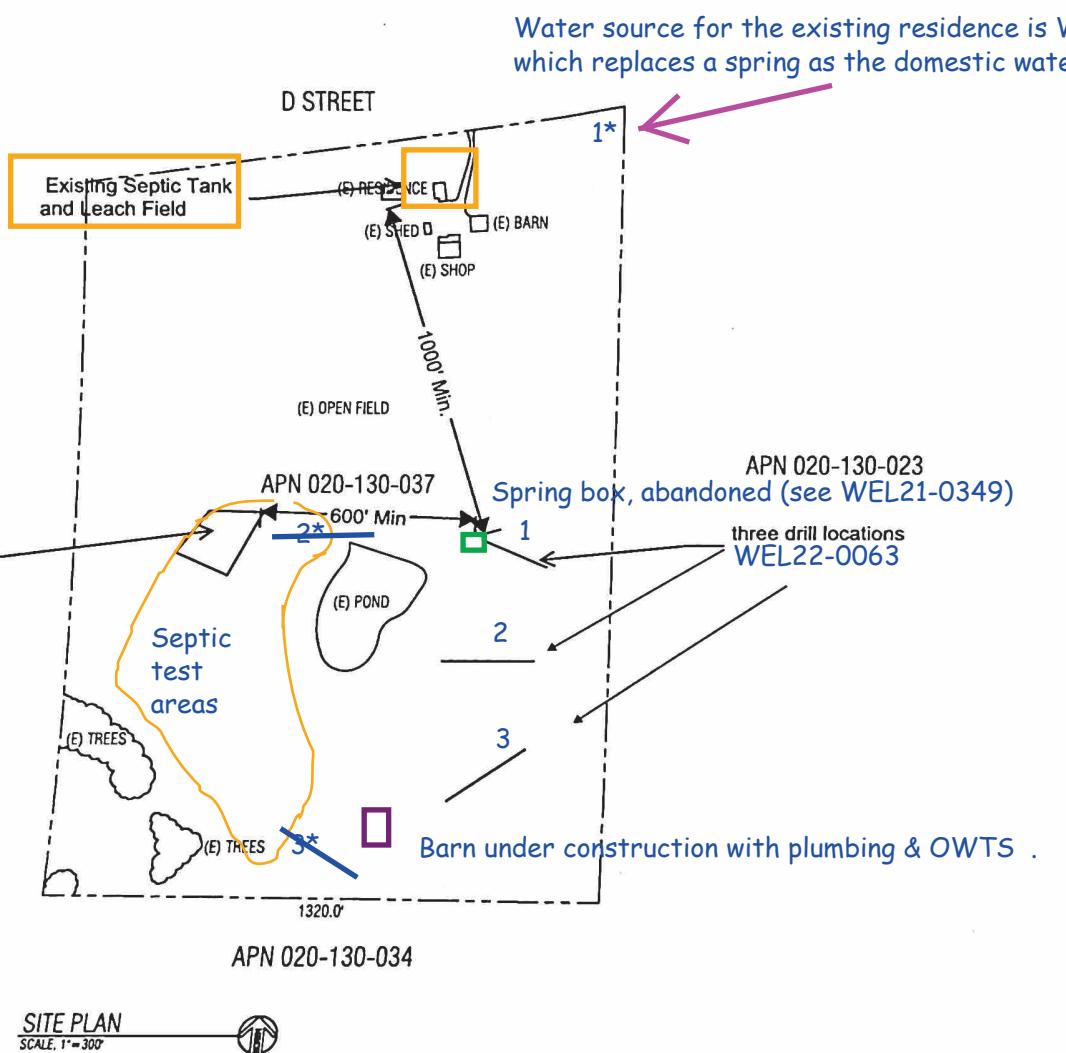
APPROVED
PERMIT SONOMA
WELL AND SEPTIC SECTION

APPROVED BY Becky Ver Meer

DATE March 16, 2022

PERMIT # WEL22-0063

PREPARED BY: David Wheeler
 Digitally signed by David Wheeler



CLEARHEART DRILLING
 555 WEST COLLEGE AVENUE
 SANTA ROSA, CA 95401

MARIO GHILOTTI
 4485 D STREET (APN 020-130-037)
 PETALUMA, CA 94552

DATE 01.19.22
 SCALE as noted
 DRAWN BY DW
 JOB GHILOTTI
 SHEET S-1

THIS PROJECT SHALL COMPLY WITH THE FOLLOWING
APPLICABLE CODES AND REGULATIONS

CALIFORNIA BUILDING CODE, 2019 EDITION (CBC)
CALIFORNIA RESIDENTIAL CODE, 2019 EDITION (CRC)
CALIFORNIA PLUMBING CODE 2019 EDITION (CPC)
CALIFORNIA ELECTRICAL CODE 2019 EDITION (CEC)
CALIFORNIA MECHANICAL CODE 2019 EDITION (CMC)
CALIFORNIA GREEN BUILDING CODE 2019 EDITION (GBC)
CALIFORNIA ENERGY CODE 2019 EDITION (EC)
CALIFORNIA HISTORICAL CODE 2019 EDITION (HC)
CALIFORNIA FIRE CODE 2019 EDITION (FC)

INCLUDING ALL AMENDMENTS AS ADOPTED
BY THE GOVERNING JURISDICTION.

APN 020-130-005

D STREET

A map showing a residence, a barn, a shop, and a shed. The residence is a house-like structure. The barn is a large rectangle with a smaller rectangle attached to its side. The shop is a small rectangle. The shed is a small rectangle with a square attached to its side.

(E) OPEN FIELD

APN 020-130-037

APN 020-130-023

APN 020-130-038

(E) TREES

— 1320.0 —

APN 020-130-034

SITE PLAN
SCALE: 1" - 300'

PREPARED BY: David Wheeler
Digitally signed by David Wheeler

**CLEARHEART DRILLING
555 WEST COLLEGE AVENUE
SANTA ROSA, CA. 95401**

MARIO GHILOTTI
4485 D STREET (APN 020-130-037)
PETALUMA, CA. 94952

DATE 01.19.22
SCALE as noted
DRAWN BY DKW
JOB GHILOTTI
SET S-1

Well Permit Application

WLS-031

4485 D STREET			Permit Number		
Site Address PETALUMA			CA	94954	020-130-037
City/Town MARIO GHILOTTI			State	Zip	Assessor's Parcel Number FISCH BROS DRILLING INC.
Owner Name 4485 D STREET			Well Driller Name 5001 GRAVENSTEIN HWY., NORTH		
Mailing Address PETALUMA			Mailing Address SEBASTOPOL		
City/Town 415-760-1936			CA	95472	State
Phone MARIO GHILOTTI			Zip	399226	Zip
Contact Person			License Number 707-823-3891		
			Phone INFO@FISCHBROSDRILLING.COM		
			Email		

The validity of this permit depends upon the accuracy of the information provided by the applicant. A site plan must accompany this application. In addition to the information required on the Minimum Standard Site Plan (Form CSS-019), the site plan shall also include the proposed well location, existing well(s) location(s), GPS coordinates of proposed well, sewer mains and laterals, and other potential sources of contamination. If an inadequate site plan is provided and a second field visit is required, a charge at the current hourly rate will be assessed. The precise site location of the proposed well must be staked with the driller's name.

INDICATE TYPE AND NUMBER OF PROPOSED WELLS/BORINGS:

Indicate use: Residential Community Irrigation Industrial

Reason for new well: SOURCE OF WATER - CURRENTLY USING SPRING

Destruct Class I Well Class II Well Reconstruction Reason for Class II: _____

Number of Geotechnical Borings: _____ Number of Geoexchange: _____ Number of monitoring: _____ Number of Cathodic: _____

Number of Performance Wells: _____ Number of Piezometers: _____ Number of Inclinometers: _____ Number of Other: _____

Total number of wells on property: 0 Number in use: 0 Number inactive: 0 Number abandoned: 0

Well located within an existing public water system boundary: Yes No Name of System: _____

CONSTRUCTION PROPOSED:

Casing: Diameter: 5" Gauge: 200 Material: PVC Gravel Pack Conductor: Yes No

Annular Space: Size: 2" Depth of Seal: 20' Sand Pack Seal Material: BENTONITE

Method of Disinfection: HTH Method of Sealing: CAP Type of Joint: CERTALOCK

DESTRUCTION PROPOSED: Well Diameter: _____ Well Depth: _____ Well Casing: _____

Method of Destruction: _____

WORKER'S COMPENSATION DECLARATION

I hereby affirm under penalty of perjury one of the following declarations:

I have and will maintain a certificate of consent to self-insure for worker's compensation, as provided for by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued.

I have and will maintain worker's compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My worker's compensation insurance carrier and policy number are: Carrier: STATE COMPENSATION INSURANCE FUND

Policy No. 9222825-20

(This section need not be completed if the permit is for one hundred dollars (\$100) or less.)

I hereby agree to comply with all laws and regulations of the County of Sonoma

and State of California pertaining to water well construction. I will notify Permit Sonoma Well & Septic Division 24 hours prior to commencing this work. I will furnish Permit Sonoma and the owner a copy of the State Well Completion Report Within thirty (30) days in order to obtain final approval on this well as required by SONOMA COUNTY CODE, CHAPTER 25B. I acknowledge that the application will become a permit only after the site approval and payment of fee.

I understand that this permit is not transferrable and expires one year from the date of issuance.

ED FISCH

Digital signature by ED FISCH
Date: 2021-07-20 13:21:40-0700

07/20/2021

Signature of Well Driller

Date

WARNING: FAILURE TO SECURE WORKER'S COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000). IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.

***** DO NOT WRITE BELOW THIS LINE - To Be Completed by Permit Sonoma Staff *****

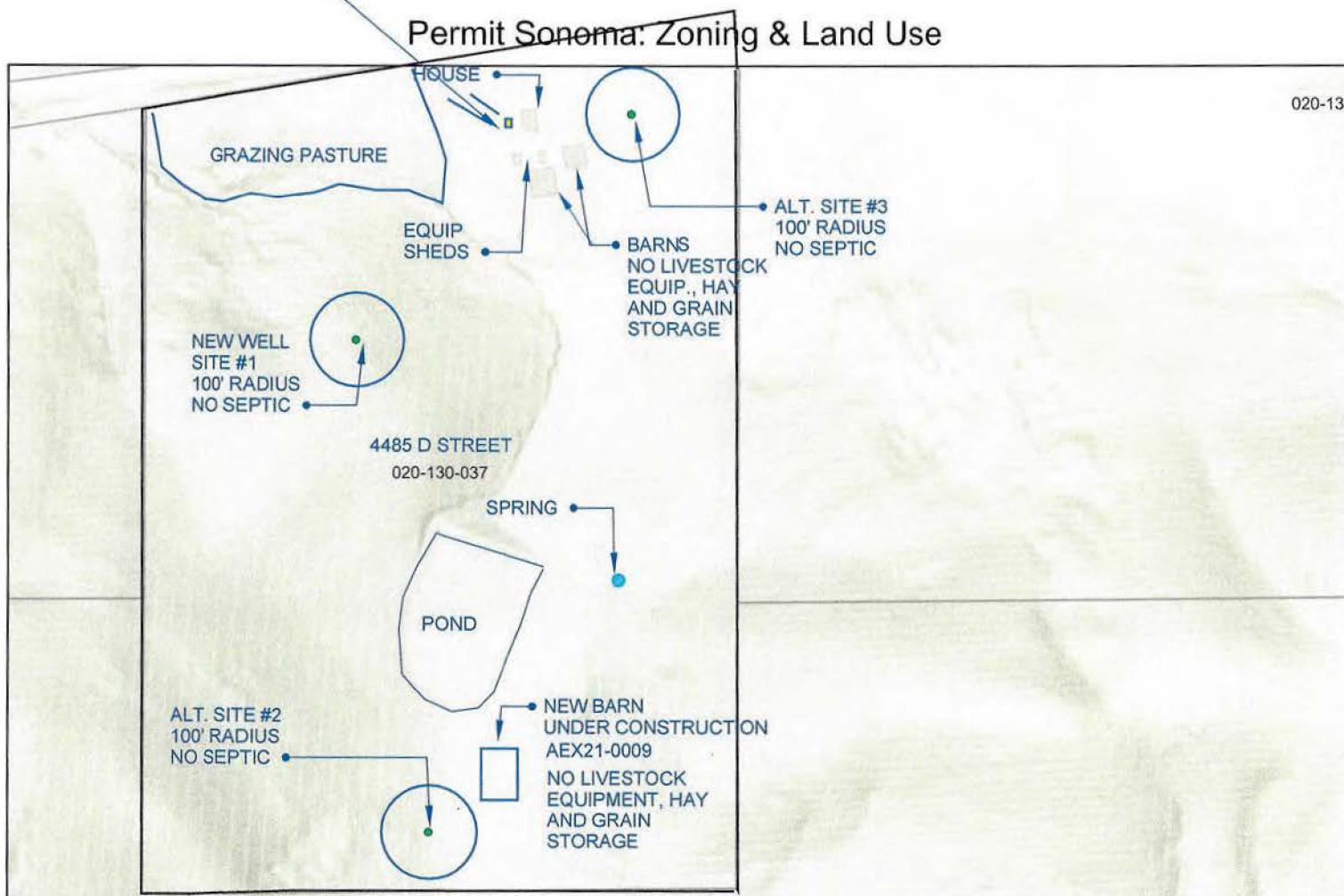
Site Approved by: _____ Date: _____ Seal Inspection Date: _____ EHS: _____

Finalized by: _____ Date: _____ GW Zone: 1 2 3 4

Comments: _____

Sonoma County Permit and Resource Management Department

2550 Ventura Avenue ♦ Santa Rosa, CA ♦ 95403-2829 ♦ (707) 565-1900 ♦ Fax (707) 565-1399

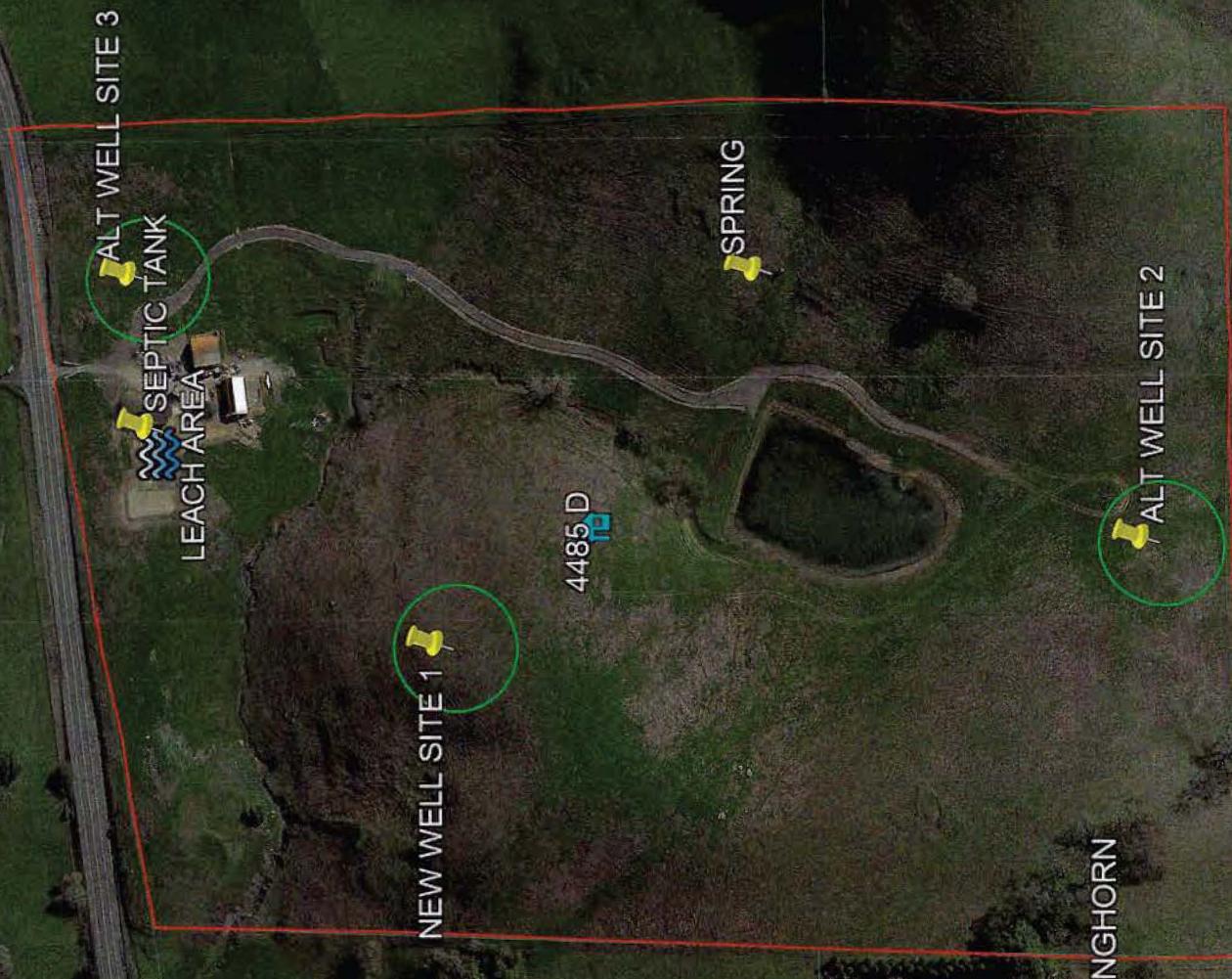


Esri Community Maps Contributors, County of Marin, County of Napa, Sonoma County, BuildingFootprintUSA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA | California

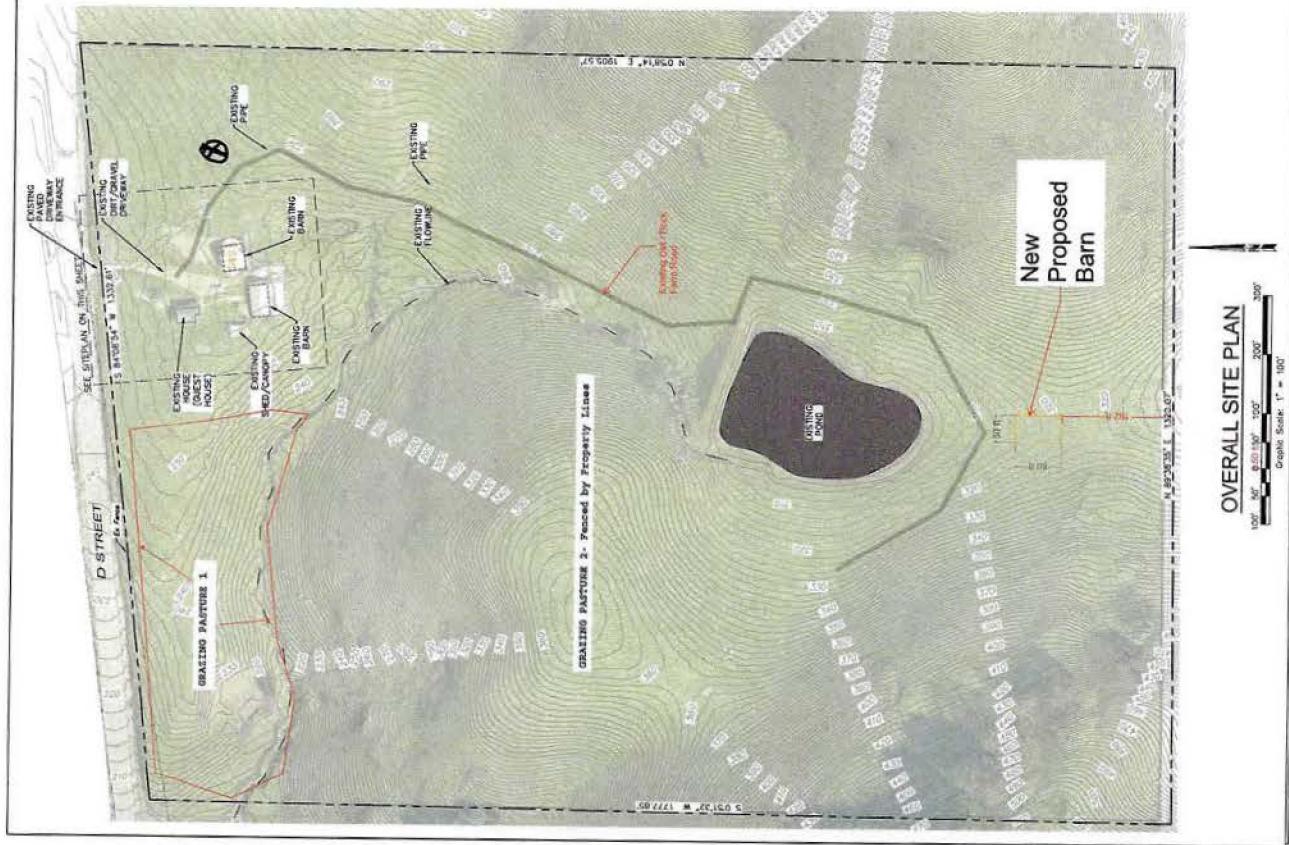
Permit Sonoma

4485 D STREET

AP #020-130-037



Google Earth



Search for a Project

Search for an Address

 Home Download Data ToolsContact Us

no Value

GREYING



4485 D St, Petaluma, CA 94952, USA

LIMIT TO SITES WITHIN FEET OF THIS LOCATION [REMOVE SEARCH RADIUS](#)

LEGEND - CHOOSE MORE SITES

-  LUST Cleanup Sites - [REMOVE](#)
-  Cleanup Program Sites - [REMOVE](#)
-  Military Cleanup Sites - [REMOVE](#)
-  Military Privatized Sites - [REMOVE](#)
-  Military UST Sites - [REMOVE](#)

Signifies a Closed Site

ACTIVE MAP COVERAGES:

- Military Bases -   - [REMOVE](#)

Sites Shown on Map:  0 Total Sites  0 Open Sites  0 Closed Sites  0 Sites w/Water Quality Data

SITES VISIBLE ON MAP - CHOOSE FIELDS	
SITE NAME	STATUS
LTC Financial Partners	

Map data ©2021

CHARLES FARLEY JUDSON in the amount of \$12,500 with the bonding company
NATIONWIDE MUTUAL INSURANCE COMPANY.

Effective Date: 01/01/2007

BQI's Bonding History

This license has workers compensation insurance with the
ZENITH INSURANCE COMPANY

Welo 8 -0533

Workers' Compensation:

Policy Number: Z068633803

Effective Date: 10/01/2008

Expire Date: 10/01/2009

Workers' Compensation History

Miscellaneous Information:

09/29/2000

DESCRIPTION

CLASS A & B CLASS REMOVED

Personnel listed on this license (current or disassociated) are listed on other licences.

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APPENDIX D
WELL/SPRING YIELD TESTS



COUNTY OF SONOMA

PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue, Santa Rosa, CA 95403-2829
(707) 565-1900 FAX (707) 565-1103

CERTIFICATION OF WATER YIELD FOR SPRINGS IN WATER SCARCE AREAS

(Section 7-12 & 25-17 Sonoma County Code) Tests shall be conducted from July 15 to October 1;
The Permit and Resource Management Department shall be notified 24 hours in advance of this test

PROPERTY ADDRESS: 4485 D Street, Petaluma, CA 94952

ASSESSORS PARCEL #: 020-130-037

(IF APPLICABLE) SUBDIVISION#: NA LOT #: NA

OWNER: Mr. Mario Ghilotti

MAILING ADDRESS: 4485 D Street, Petaluma, CA 94952

TEST INFORMATION:

CERTIFICATION WILL NOT BE ACCEPTED UNLESS ALL APPLICABLE SPACES ARE FILLED IN

NUMBER OF CONNECTIONS: 1

ARE THERE ANY OTHER EXISTING OR PROPOSED CONNECTIONS TO THIS WATER SOURCE?

No

Coordinates 38.1933 / -123.6490	Elevation ~325 feet above sea level	Spring
Start of Test Date & Time	07/27/2022; 9:40 am	
Completion of Test Date & Time	07/27/2022; 11:00am	
Total Hrs./Mins of Testing	1hour 20 minutes	
Sustained yield (in gallons per minute)*	1.5 gpm	
Method of Testing	5-gallon bucket with 1-gallon increments	

Spring is deemed perennial based on the following evidence:

The spring is actually a horizontal well drilled approximately 300- feet into a hillside and developed with 1-inch slotted pvc pipe and a filter pack. the well/spring continuously discharges water without pumps.

I certify the above to be a true and accurate report of the yield test results. An accurate plot map has been attached, indicating both the tested water source as well as other existing wells or springs, septic systems, or other sources of contamination.

Name of drilling/pumping contractor/RCE: Lee S. Hurvitz License #: PG #7573; CHG #1015 Phone #: 707-824-1690
(Print Name)

Approved Denied

District Specialist

Date

Comments:



Type



Docs



Plans

WELO8 - 0533

Building Permit Number

1000

Street Number

Langham Ln

Street Name

Community Code

APN

COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
2550 VENTURA AVENUE, SANTA ROSA, CA 95403-2829
(707) 565-1900 FAX (707) 565-1103

Application Fees / Invoice for: WEL08-0533

Project Address: 1000 LONGHORN LN PET
Cross Street:

Printed: Friday, November 07, 2008
Initialized by: BDAVIS
Activity Type: B-WEL 801
PCAS #:

Description: CERTIFICATION OF WATER YIELD IN WATER SCARCE AREAS

Owner: BROWN NANCIE
1 ELIZABETH CIR
GREENBRAE CA 94904

Applicant: WEEKS DRILLING & PUMP CO INC
PO BOX 176
SEBASTOPOL CA
95473-0176
707 542 3272

Fees:

Item#	Description	Account Code	Tot Fee	Prev. Pmts	Cur. Pmts
396	WELL YIELD REPORT	025015-1343	119.00	.00	.00
			\$119.00	\$0.00	
				Total Fees:	\$119.00
				Total Paid:	\$0.00
				Balance Due:	\$119.00

Refunds will not be authorized unless circumstances comply with established PRMD refund policy provisions.

When validated below, this is your receipt.

PAYMENT REC'D
\$ 119.00 *ccp*
NOV 07 2008
PERMIT AND RESOURCE
MANAGEMENT DEPARTMENT
COUNTY OF SANCHEZ



COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue, Santa Rosa, CA 95403-2829
 (707) 565-1900 FAX (707) 565-1103

CERTIFICATION OF WATER YIELD IN WATER SCARCE AREAS

The Permit and Resource Management Department shall be notified 24 hours in advance of this test

Water Yield # WEL08-0533

Well Permit # WEL98-0486

I. Individual performing test: Dave Lowman

II. Type of license/registration, number and expiration date: C-57 / 177681 / 9-30-2010

III. Location of well:
 Address: 1000 Longhorn Lane, Petaluma A.P. #: 02-130-024

IV. Type and model of test pump: 10LS10 1 Hp Sub

V. Test pump setting depth: 340'

VI. Maximum reported yield for this pump type at this setting: 15

VII. Type of discharge measurement method: Meter & Bucket

VIII. Type and model of flow meter (or provide an accurate description of well or orifice plate):
3/4" Precision Meter & Measured 5 Gallon Bucket

Geographic coordinates (Plane Coordinate Method or distance from fixed landmarks): Lat: 38° 11.595N / Long: 122° 39.184W

IX. Estimated elevation of well head: GPS Elevation 573'

X. Initial static water level (include measuring points such as top of casing, surface seal, access port): 179' 5" from top of well seal. 5" Pvc casing is 13" above ground level.

XI. Date & time of initial static water level measurement 10/29/08 4:40am a.m./p.m.

A. Discharge Rate: 6.09
 B. Dynamic Water Level: 181'
 C. Specific Capacity: 4.06
 D. Pump Test duration: 11 hours 5 minutes

XII. Immediately after the test take the following measurements:

A. Dynamic water level: N/A
 B. Final discharge rate: 6.09

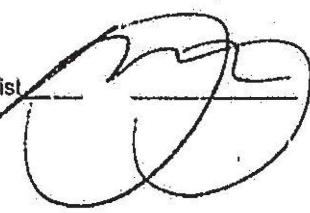
XIII. Post - Test Measurement:

A. Dynamic water level: N/A
 B. Static water level: 179' 5"
 C. Percentage of recovery of final static level: 100%

Testing performed by (signature): Dave Lowman

Date: 10/29/08 Company: Weeks Drilling & Pump Co. Phone Number: (707) 542-3272

Approved Denied

Specialist 

Date 11-12-08

Calculation of Well Recovery

(Worksheet example taken from PRMD No. 9-2-28)

1. Determine the water level draw down by subtracting the initial static water level measurement from the stabilized pumping level. Record this result as the well draw down.
2. Next determine the water level recovery by subtracting the post test (within 72 hours) static water level from the stabilized dynamic pumping level. Record this result as the well recovery.
3. Next determine the percent recovery of the well. Divide the water level recovery by the water level draw down and multiply by 100. Record this result as the percent well recovery.

Example:

a. Initial static water level:	<u>179' 5"</u>	(measured value)
b. *Post test static water level:	<u>179' 5"</u>	(measured value)
b.1. Time (hours) of measurement:	<u>1Hr 20Min</u>	(within 72 hours)
c. **Stabilized pumping level:	<u>181'</u>	(measured value)
d. Draw down:	<u>1' 5"</u>	(calculate by subtracting A from C)
e. Recovery:	<u>1' 5"</u>	(calculate by subtracting B from C)
f. Percent recovery:	<u>100%</u>	(calculate by dividing E by D and multiplying result by 100)

Well percent recovery (F) must be 90% or greater within a 72 hour period.

* The static water level after 72 hours or less post pump test.

** Kleinfelder refers to this as the dynamic pumping level.

c/o David Bugler
Nancie Brown

**Pull down & 3 Hour Stabilization
Well Pump Test Data Recordation**

w/o 151596

Address:

1000 Longhorn Lane, Petaluma

c/o David Burgler
Nancie Brown

6 Hour Certified Well Test
Well Pump Test Data Recordation

Page 2 of 2

w/o 151536

Address:

1000 Longhorn Lane, Petaluma

Date	Time	Interval	SWL	GPM	Comments
10/29/2008	7:55	1 Min	181'	6.3	
	7:56	1 Min	181'	6.3	
	7:57	1 Min	181'	6.3	
	7:58	1 Min	181'	6.3	
	7:59	1 Min	181'	6.3	
	8:00	5 Min	181'	6.3	
	8:05	5 Min	181'	6.3	
	8:10	5 Min	181'	6.3	
	8:15	5 Min	181'	6.3	
	8:20	5 Min	181'	6.3	
	8:25	5 Min	181'	6.3	
	8:30	5 Min	181'	6.3	
	8:35	5 Min	181'	6.3	
	8:40	5 Min	181'	6.3	
	8:45	5 Min	181'	6.3	
	8:50	5 Min	181'	6.3	
1 Hr	8:55	5 Min	181'	6.3	
	9:00	20 Min	181'	6.3	
	9:20	20 Min	181'	6.3	
	9:40	20 Min	181'	6.09	
2 Hr	10:00	30 Min	181'	6.09	
	10:30	30 Min	181'	6.09	
3 Hr	11:00	30 Min	181'	6.09	
	11:30	30 Min	181'	6.09	
4 Hr	12:00	30 Min	181'	6.09	
	12:30	30 Min	181'	6.09	
5 Hr	1:00	30 Min	181'	6.09	
	1:30	30 Min	181'	6.09	
6 Hr	2:00	30 Min	181'	6.09	
	2:30	30 Min	181'	6.09	
7 Hr	3:00	30 Min	181'	6.09	
	3:30	30 Min	181'	6.09	
8 Hrs	3:55	30 Min	181'	6.09	
		30 Min	End 8 Hr	- Start Recovery	
		30 Min			
	5:15	30 Min	100%	Recovery in 1 Hour 20 minutes	
		30 Min			
		30 Min			
		30 Min			
		30 Min			
		72 hrs.			

PROPERTY INFORMATION

1) Property: 1000 LONGHORN LN, PETALUMA CA 94952
 APN: 020-130-024 Card#: Use: RURAL HOMESITE
 County: SONOMA, CA Prop Tax: \$9,234.60 Total Value: \$862,920
 MapPg/Grid: 485-C6 Old Map: 190-E6 Tax Year: 2008 Delinq: Land Value: \$510,000
 Census: 1507.02 Tract #: Tax Area: 169000 Impv. Value: \$352,920
 High School: PETALUMA Elem School: UNION Taxable Val: \$862,920
 Comm Coll: SONOMA Exemptions: Assd Year: 2008
 Subdivision:
 Owner: BROWN NANCIE % Improved: 041%
 Phone:
 Owner Vest: SW / /
 Mail: 1 ELIZABETH CIR, GREENBRAE CA 94904-3033 C086

Owner Transfer = Rec Dt: Price: Doc#: Type:
 Sale Dt:

SALE & FINANCE INFORMATION

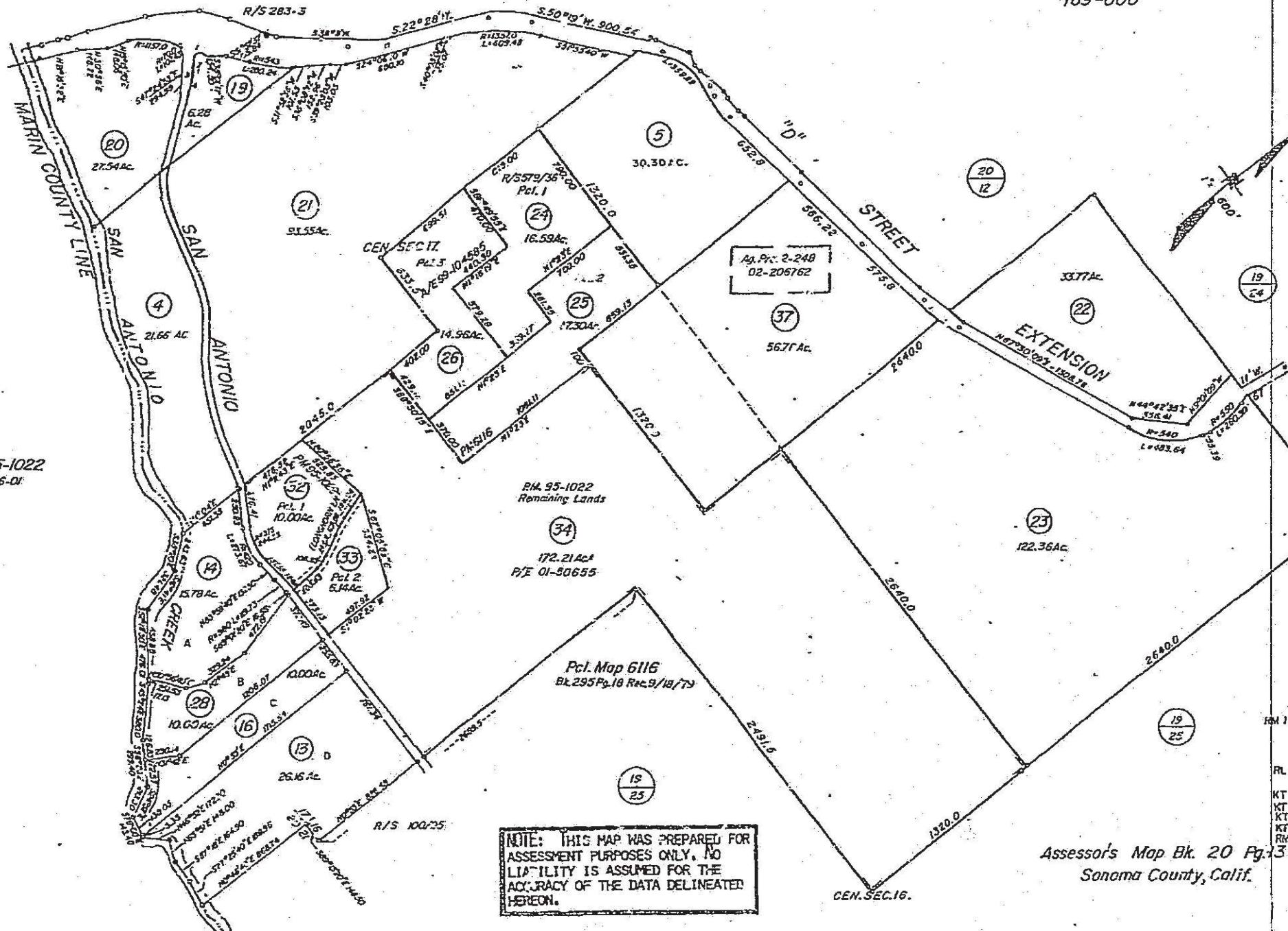
	LAST SALE		PRIOR SALE	
Recording/Sale Date:	05/23/2008	05/21/2008	09/28/2006	09/14/2006
Sale Price/Type:	\$925,000	FULL	\$846,000	FULL
Document #:	48098		119576	
Deed Type:	GRANT DEED		GRANT DEED	
1st Mtg Amt/Type:	\$555,000	CONV	\$676,800	CONV
1st Mtg R/T/Type/Trm:	/	/ 30	6.25	ADJ
1st Mtg Lender:				

2nd Mtg Amt/Type:
 2nd Mtg R/T/Type/Trm: / /
 Title Company: OLD REPUBLIC TITLE
 Seller: ROSS MICHAEL L & MARYANN
 New Construction:
 Other Last Sale Info = # Parcels: Type 2: Pend:

SITE INFORMATION

# Res. Units:	1	County Use:	0051	Acres:	16.59	IMPROVEMENTS
# Comm Units:		Zoning:	LEA60	Lot Area:	722,660.4	Bldg/Liv Area: 1,806
# Buildings:	1	Flood Panel:	0603750970B	Lot Width:		Gross Area:
Bldg Class:	D070D	Panel Date:	06/19/1997	Lot Depth:		Ground Flr: 1,132
Parking Sqft:		Flood Zone:	X	Usable Lot:		Bsmnt Area:
Park Spaces:		Sewer Type:				\$/SqFt:
Garage Cap#:		Water Type:				Yrbld/Eff:
Park Type:						# Stories: 2.00
Other Impvs:						Rooms: 5
Legal Blk/Bldg:		Site Influence:				Bedrooms: 2
Legal Lot/Unit:	1	Amenities:				Full/Half Bath: 2
Legal:	MAP 295 PG 18 LOT 1					Ttl Baths/Fixt: 2.00
						Fireplace: Y 1
						Pool:
						Porch Type:
						Patio Type:
						Construct: WOOD FRAME/CB
						Foundation:
						Ext. Wall:
						Roof Shape:
						Roof Type:
						Roof Matl:
						Floor Type:
						Floor Cover:
						Heat Type:
						Heat Fuel:
						Air Cond: BUILDING
						Quality: GOOD
						Condition:
						Style:
						Equipment:
						Other Rms: DEN;UTILITY ROOM

COUNTY ASSESSOR'S PARCEL MAP

TAX RATE AREA
169-000

Weeks. No. 151596

10/29/08

Nancie Brown

1,000. Longhorn Lane
Petaluma, Ca

Well Location

555' from edge of pavement
on Longhorn Lane

G.P.S. For. 5' pvc well

Latitude. $38^{\circ} 11.595' N$

Longitude $122^{\circ} 39.184' W$

Elevation 573'

② 5,000 gal poly tanks
5" pvc well

soil
filter

Dirt Road

Parking
Area

House

1,000

Pavement

Longhorn Lane

gate

Longhorn Lane



Petaluma

SAN ANTONIO Rd

Hwy 101 →

Department of Consumer Affairs
Contractors State License Board

Contractor's License Detail - License # 177681

WELO8-0533

⚠ DISCLAIMER: A license status check provides information taken from the CSLB license database. Before relying on this information, you should be aware of the following limitations.

- » CSLB complaint disclosure is restricted by law (B&P 7124.6). If this Entity is subject to public complaint disclosure, a link for complaint disclosure will appear below. Click on the link or button to obtain complaint and/or legal action information.
- » Per B&P 7071.17, only construction related civil judgments reported to the CSLB are disclosed.
- » Arbitrations are not listed unless the contractor fails to comply with the terms of the arbitration.
- » Due to workload, there may be relevant information that has not yet been entered onto the Board's license database.

License Number:

177681

Extract Date: 11/07/2008

WEEKS DRILLING AND PUMP CO

Business Information:

PO BOX 176

SEBASTOPOL, CA 94573-0176

Business Phone Number: (707) 542-3272

Entity:

Corporation

Issue Date:

08/19/1958

Expire Date:

09/30/2010

License Status:

This license is current and active. All information below should be reviewed.

CLASS DESCRIPTION

D21 MACHINERY AND PUMPS

C57 WELL DRILLING (WATER)

C36 PLUMBING

CONTRACTOR'S BOND

This license filed Contractor's Bond number BD7900531129 in the amount of \$12,500 with the bonding company

NATIONWIDE MUTUAL INSURANCE COMPANY.

Effective Date: 01/01/2007

Contractor's Bonding History

BOND OF QUALIFYING INDIVIDUAL

This license filed Bond of Qualifying Individual number BD7900601180 for CHRIS ALAN THOMPSON in the amount of \$12,500 with the bonding company

1. NATIONWIDE MUTUAL INSURANCE COMPANY.

Effective Date: 01/01/2007

BQI's Bonding History

This license filed Bond of Qualifying Individual number BD7900569112 for

CHARLES FARLEY JUDSON in the amount of \$12,500 with the bonding company
NATIONWIDE MUTUAL INSURANCE COMPANY.

Effective Date: 01/01/2007

BQI's Bonding History

This license has workers compensation insurance with the
ZENITH INSURANCE COMPANY

Welo8-0533

Workers' Compensation:

Policy Number: Z068633803

Effective Date: 10/01/2008

Expire Date: 10/01/2009

Workers' Compensation History

Miscellaneous Information:

09/29/2000

DESCRIPTION

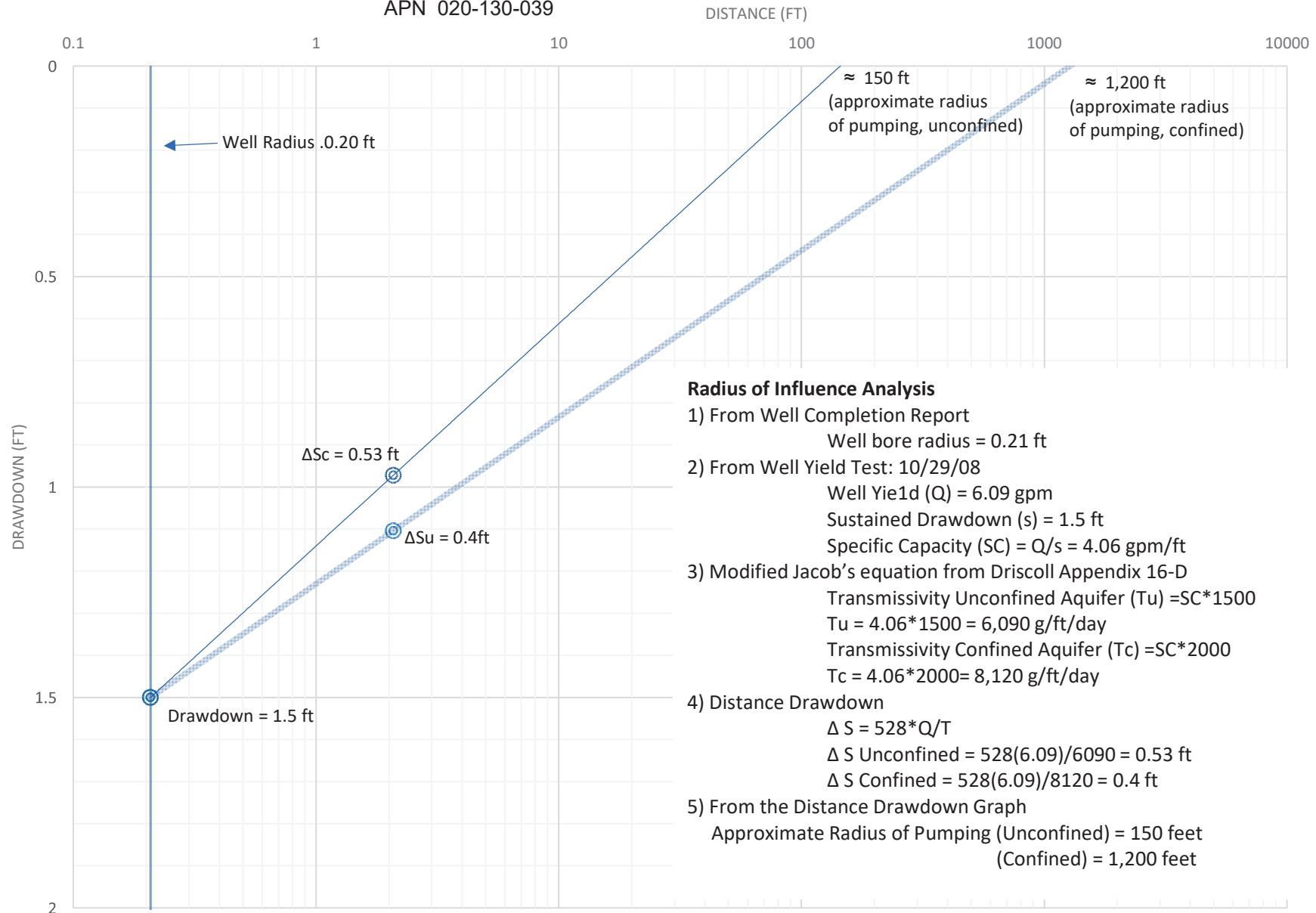
Personnel listed on this license (current or disassociated) are listed on other licences.

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APPENDIX E
RADIUS OF PUMPING INFLUENCE

Radius of Pumping Influence

D Street Project
1000 Longhorn Well
APN 020-130-039



HYDROGEOLOGIC ASSESSMENT REPORT

**4485 D Street
Petaluma, CA 94952
APN 020-130-037**

Prepared For:

**Villa Vanto Farm
4485 D Street
Petaluma, California 94952**

July 28, 2022

Revised March 15, 2023

Prepared By:

HURVITZ ENVIRONMENTAL SERVICES INC.

105 Morris Street, Suite 188
Sebastopol, California 95472

Lee S. Hurvitz, PG #7573 CHG #1015
Certified Hydrogeologist



Project No. 5170.01

March 15, 2023

Villa Vanto Farm
Mario and Katherine Ghilotti
4485 D Street
Petaluma, California 94952

RE: Hydrogeologic Assessment Report - Revised
Villa Vanto Farm, 4485 D Street, Petaluma, CA 94952
APN: 020-130-037
Hurvitz Environmental Project No. 5170.01

Dear Mr. and Mrs. Ghilotti:

Hurvitz Environmental Services, Inc. (HES) is pleased to submit this Hydrogeologic Assessment Report (HAR) for the above referenced property. This report is a revision of HES July 28, 2022 HAR that was prepared to address comments made in a January 18, 2023 Letter from Mr. Robert Pennington, Natural Resources Geologist with Permit Sonoma.

This HAR report was prepared in accordance with the Sonoma County Permit and Resource Management Department (Permit Sonoma) Policy and Procedure Number 8-1-14 and General Plan Policy WR-2e. The purpose of this HAR was to evaluate the aquifer conditions at the site, which is located within a Zone 4 groundwater availability area, and to determine if the proposed groundwater usage will cause overdraft conditions, well interference or impact nearby stream-flow.

The quantity of groundwater to be used for the project and within the Cumulative Impact Area compared to the quantity of available groundwater indicates that pumping for the Project is unlikely to result in significant declines in groundwater resources over time. Based on the findings of this report, pumping and groundwater extraction at the Project wells will not significantly impact neighboring wells or near-site stream flow conditions. In addition, based on the relative distance to the coastal areas, the depth of the site well and the proposed water usage rates, salt water intrusion is not considered to be a concern to this Assessment.

We appreciate the opportunity to provide you with these services. Please do not hesitate to contact us at your convenience, should have any questions or comments regarding this report or our recommendations.

Sincerely,
HURVITZ ENVIRONMENTAL SERVICES

Lee S. Hurvitz, PG# 7573 CHG #1015
Certified Hydrogeologist



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1.0 INTRODUCTION AND SCOPE OF SERVICES

Villa Vanto Farm is applying to Sonoma County for approval to develop a small-scale lavender farm and processing facility at the property identified as 4485 D Street, Petaluma, California (the site). We understand the property will also host periodic events that support the agricultural business operations. The site is located within Sonoma County Groundwater Availability Class 4 (Areas with low or highly variable water yield¹). According to Sonoma County General Plan Policy WR-2e, development of property intending to use groundwater within Groundwater Availability Class 4 requires completion of a Hydrogeologic Assessment through the Sonoma County Permit and Resource Management Department (now referred to as Permit Sonoma).

On behalf of the property owner, Hurvitz Environmental Services (HES) conducted a Hydrogeologic Assessment for the site in accordance with the Permit Sonoma Procedures for Groundwater Analysis and Hydrogeologic Reports (Policy No. 8-1-14).

Policy WR-2e states that procedures for proving adequate groundwater should consider groundwater overdraft, land subsidence, saltwater intrusion, and potential impacts to neighboring wells and nearby creeks. Therefore, this groundwater report includes the following elements:

- Delineation of a Cumulative Impact Area.
- Estimates of existing and future potential water uses within the Cumulative Impact Area.
- Characterization of local hydrogeologic conditions within the site watershed and sub-basin.
- Compilation and assessment of Well Completion Reports (drillers' logs) from the area.
- Review of recent Spring Yield Tests performed at one of the on-site horizontal wells.
- Estimates of annual groundwater storage and recharge relative to existing and proposed groundwater uses.
- Assess potential for the project to create salt water intrusion.
- Assess potential for well interference between the project well and neighboring wells and between the project well and nearby streams.

¹ Groundwater Availability Map, Sonoma County Permit and Resource Management Division, April 1, 2004

2.0 SITE DESCRIPTION

The Site is located at 4485 D Street, in an unincorporated, rural agricultural area of Sonoma County, approximately 2.5 miles southwest of downtown Petaluma, California. (**PLATE 1 – SITE LOCATION MAP**). The Sonoma County Assessor's Office identified the site as Assessor's Parcel No. (APN) 020-130-037 (**PLATE 2 – ASSESSORS PARCEL MAP**). The 56.76-acre parcel is zoned as Land Extensive Agriculture (LEA-60). The property is also located in Sonoma County Groundwater Availability Class 4 - Areas with low or highly variable water yield, within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board. The Site is located outside of the Petaluma Valley Groundwater Basin, a State defined Priority Groundwater Management Basin. The Site is located within the Sonoma County Petaluma Dairy Belt Area, where residential development is mostly associated with agricultural land use.²

The Site features a 950 square foot existing single-family residence, built in 1913, and an existing barn located proximate to D Street near the entrance to the Site as shown on **PLATE 3 – SITE PLAN AND CUMULATIVE IMPACT AREA**. A new 5,020 square foot, 2 story agricultural building is located at the south portion of the Site and immediately south of an existing retention pond. A portion of the Site around the new building is proposed to be farmed for lavender.

Most of the Site is pastureland with rolling hills and a northerly flowing creek originating from the pond's spillway. One horizontal domestic water well (Well #1) was recently drilled and completed under Well Permit #WEL22-0063 and a second horizontal well was also installed to replace a former spring onsite under Well Permit #WEL22-0141 (Well #2) as shown on **PLATE 3 – SITE PLAN AND CUMULATIVE IMPACT AREA**. Site photographs are presented in **APPENDIX A**.

2.1 USGS 7.5 MINUTE QUADRANGLE MAP

HES reviewed the most recent United States Geological Survey (USGS) 7.5-minute Quadrangle Map, Petaluma, 2018 (**PLATE 4 – TOPOGRAPHIC MAP**)³. The site is a roughly rectangular, 56.76-acre parcel elongated 2,640 feet north to south and approximately 1,320 feet east to west. The site has a high elevation of approximately 510 feet near the southeast corner and a low elevation of approximately 200 feet along the onsite ephemeral drainage as it leaves the site at its northwest corner.

Topography, the site generally slopes from the southeast to northwest however the pond is situated in a saddle between two peaks with runoff flowing to the pond from both the east and west.

² The Petaluma Dairy Belt Area Plan priorities are to 1) Preserve and enhance the agricultural resources and protect the agricultural industry in this area, 2) Preserve the area's scenic beauty, 3) Accommodate a variety of rural life styles, and 4) Encourage the development of an adequate transportation network which will accommodate proposed development and projected travel needs, and which will facilitate movement of agricultural products to the market place.

³ USGS The National Map: National Boundaries Dataset, National Elevation Dataset, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau | USGS The National Map: 3D Elevation Program. Data refreshed January 2018. | USGS TNM – National Hydrography Dataset. Data refreshed January 2018.

The ~1.6-acre pond onsite overflows on its northwest corner and into an ephemeral drainage that flows northerly across the Site before leaving the Site near the northwest corner. Water from the small creek crosses D Street before coalescing with an unnamed tributary to San Antonio Creek shortly thereafter. The unnamed tributary creek flows southwesterly for approximately 0.8 miles before merging with San Antonio Creek just south of the intersection of San Antonio Road and D Street. San Antonio Creek continues easterly before discharging into the Petaluma River just north of Burdell Island. Several properties near the Site utilize retention ponds for livestock and irrigation and roughly ½ are connected to the San Antonio Creek tributary system.

2.2 HISTORICAL AERIAL PHOTOGRAPHY

HES reviewed aerial photographs from years 1993-2021 depicting the site and vicinity to obtain information about historical development and other surficial features. In 1993, the Site appears to be developed with the same residence and associated outbuildings proximate to D Street, however the new Ag Barn was not constructed until 2021. The pond is present in all photos dating back to 1993. Most of the land in the immediate vicinity of the site is undeveloped grassland. Aside from the 2021 development, the site and site vicinity appear relatively unchanged since 1993.

2.3 NEIGHBORING PROPERTIES

The surrounding land uses are predominantly pasture land, dairy farms and rural residential developments. Tomales Bay and the Pacific Ocean are approximately 18 miles west and the mouth of the Petaluma River at San Pablo Bay is approximately 8.5 miles southeast of the Site. The developed properties are serviced by private septic systems and groundwater wells. The closest retention pond is located several hundred feet north of the Site. Access to neighboring properties is provided from D Street.

2.4 SITE DEVELOPMENT AND WATER USE

The Permit Sonoma records show a 2002 Agricultural Preserve establishment (Type II Williamson Act Contract) for the property. On February 25, 2022, the County issued a well permit (Well22-0063) to install a horizontal well onsite, and currently the Site is in plan check review for a small-scale lavender farm, processing facility and event center (UPE21-0064). An Ag exempt Horse Barn and Ag Barn were also developed in 2021 under permits AEX21-0046 and 0039.

Currently, Villa Vanto Farm is planning to develop the Site for use as a lavender farm, with a small-scale lavender processing facility, farm stand, and periodic event center. We understand that the barn will be used principally for small scale agricultural processing. The building houses processing equipment, a shipping and storage area, a small farm retail sales area, and a business office. The farm plans to begin cultivation of crop plants in the Spring/summer of 2023, with small scale processing of the harvest to occur in the Fall of 2023. The building and outdoor areas developed around the structure, are proposed to be used for periodic restricted non-agricultural promotional events. Up to 25 events annually are proposed.

An existing gravel road provides emergency vehicle access from a driveway at D Street to the project. Site parking, including 5 standard stalls and 1 accessible stall, is provided at the project

site. A new road, under separate Grading Permit, will provide paved access from a new driveway at D Street to the new agricultural building.

The Applicant currently obtains water for the residence from the new horizontal well (Well#2). Water for the proposed farming, processing, and events will come from the new horizontal well identified as Well #1 which was installed proximate to the processing barn as shown on **PLATE 3 – SITE PLAN AND CUMULATIVE IMPACT AREA**. The applicant also plans to install 50,000 gallons in water storage onsite to serve as the primary water storage and distribution system for the commercial operations proposed onsite.

2.4.1 Water Use for Lavender Farming

The Applicant plans to grow approximately **6.12-acres of lavender plants for the purpose of harvesting and processing oils**. We understand that established lavender plants rarely need watering but that some irrigation is required during the first two years after planting. Water use for lavender farming varies based on soil types and climates and it is estimated that for the west Petaluma region the watering frequency will only be once a week during the summer months. The applicant plans to use drip irrigation to irrigate the lavender and irrigation water will come from the new horizontal well (Well#1) and proposed water storage tanks. Estimates for water use for the first two years of farm operation are presented below.

$$\begin{aligned} & 15,000 \text{ (estimated lavender plants on 6.12-acres)} \times 8 \text{ (weeks of summer irrigation)} \times 1/2- \\ & \text{gallon/plant/week (irrigation rate)} = \\ & \underline{\mathbf{60,000 gallons/year = Annual Lavender Farming Water Use during First 2-years}}} \end{aligned}$$

In addition, the project may require an average of **two farm workers for 6-months a year**. The established Napa County Water Availability Analysis methods specify annual domestic water use for workers at 15 gallons per day per worker.⁴ So, for this assessment we used the Napa County water use criteria to estimate the annual domestic water use at the Site as follows:

$$\begin{aligned} & 2 \text{ (average employees)} \times 15 \text{ gallons/day (employee water usage)} \times 180 \text{ days/year} = \\ & \underline{\mathbf{5,400 gallons/year = Annual Onsite Farm Worker Water Use}} \end{aligned}$$

$$\begin{aligned} \text{So, } & 60,000\text{-gallons/year (Irrigation Water Use)} + 5,400 \text{ gallons/year (Worker Water Use)} = \\ & \underline{\mathbf{65,400 gallons/year = Annual Water Use for Lavender Farming and Farm Workers}} \end{aligned}$$

The Applicant is also developing plans to implement water conservation methods including rainwater catchment. Details on the sites proposed water conservation practices are presented in **Section 2.4.8** of this HAR. Based on the relatively low quantity of groundwater usage anticipated for the Project, there is the potential to significantly offset the Projects groundwater usage with captured rainwater.

⁴ Water Availability Analysis (WAA) Guidance Document, Napa County, Adopted May 12, 2015.

2.4.2 Water Use for Lavender Processing

The applicant plans to harvest and process the lavender plants twice each year. According to the applicant, the lavender processing equipment will require 12,000 gallons/harvest. Therefore, based on these estimates we can calculate the annual water use associated with lavender processing onsite.

$$2 \text{ (lavender harvest/year)} \times 12,000 \text{ gallons (water use per lavender harvest)} = \\ \underline{\mathbf{24,000 \text{ gallons year} = \text{Annual Lavender Processing Water Use}}}$$

2.4.3 Event Center Water Use

We understand that the applicant plans on periodically hosting events at the Site (25 events/year). The following types of promotional events are proposed annually:

- 15 Private Parties, Reunions, Weddings (80-200 attendees)
- 10 Customer, Educational, Marketing, Farm to Table Events (40 -120 attendees)
- 2 Charity Fundraising Events (50-150 attendees)
- 1 Industry related event (40-120 attendees)

Adobe and Associates Inc., of Santa Rosa, CA has been designing the site's septic system for the project Applicant and has therefore already calculated a water use rate for the events planned at the Site. We have reviewed the estimates which were based on the Sonoma County's Onsite Wastewater Treatment Manual and we found them to be reliable. Therefore, based on the Applicants' planned event schedule above, and the Adobe and Associates estimates, the following annual water use is anticipated for the proposed events onsite.

$$200 \text{ people (guests per event)} \times 7.05 \text{ gallons/guest} + 2 \text{ (full-time employees)} \times 15 \text{ gallons/day} + 8 \text{ (part-time employees)} \times 7.5 \text{ gallons/day} = \underline{\mathbf{1,500 \text{ Gallons per Event}}}$$

So,

$$1,500 \text{ gallons/event} \times 25 \text{ events/year} = \underline{\mathbf{37,500 \text{ gallons} = \text{Annual Water Use for Events}}}$$

2.4.4 Landscaping

As part of the site development the Applicant will plant and irrigate grass on either aside of the proposed agricultural building totaling approximately 0.1 acres. In addition to the irrigated lawns, the Applicant will have other landscaping placed around the agricultural building including ornamental grasses, shrubs, olive trees and Crape myrtles. A landscape irrigation plan for the proposed project was prepared by Totem Landscaping Servies of Sonoma, Ca and it was determined that a total **246,324 gallons/year** will be required for landscape irrigation (**Appendix B**). A general breakdown of the landscape irrigation is presented below.

So,

$$168,792 \text{ gallons/year (irrigated lawns)} + 67,548 \text{ gallons/year (shrubs, ornamentals, etc.)} + \\ 9,984 \text{ gallons/year (trees)} = \\ \underline{\mathbf{246,324 \text{ gallons/year or 0.76 acre-feet/year} = \text{Total Water Use for Landscaping}}}$$

2.4.5 Livestock Water Use

Historically this property has been used to run beef and dairy cattle. Water for the cattle has historically come from either the pond onsite or the former residential spring which has since been converted into a horizontal well (Well #2). **The farm has averaged 50 head of cattle**, with water consumption of 1,300 gallons/day or 26 gallons/head of cattle. Beef and dairy products have been consistently phasing out of business in Sonoma County and California for the last 20 years. Villa Vanto is reducing the number of cattle to 10 head to offset water use needed to support the lavender operations. Therefore, based on the water estimates provided above the annual water use for cattle can be estimated as shown.

$$10 \text{ (proposed cattle onsite)} \times 26 \text{ gallons (average daily water use per cow)} \times 365 \text{ days} = **94,900 gallons/year = Annual Water Use for Cattle**$$

While the Applicant still plans to use 94,000-gallons/year for cattle operations, it should be noted that the reduction of **40-cows onsite will in turn reduce the Site's overall water usage by 379,600 gallons/year or 1,040-gallons/day**. This water can now be allocated to other proposed Site operations without increasing the overall water usage.

2.4.6 On-site Domestic Water Use

Domestic water use at the site consists of one residential dwelling. According to the USGS, the average person within the Santa Rosa Plain Watershed uses 0.19 acre-feet/year for domestic purposes⁵. In addition, the United States Census Bureau reported in 2010 that the average household in Sonoma County has 2.55 residents⁶. Therefore, for this assessment we used a conservative number of three residents per household and assumed that each person uses 0.19 acre-feet of groundwater per year. With only one on-site dwelling, we estimate that three residents live, or will live on- site. With this data we calculated the following domestic water usage.

$$3 \text{ (residents at site)} \times 0.19 \text{ acre-feet/year (annual water use/resident)} = **0.57 acre-feet/year or 185,735 gallons/year = Annual Residential Water Demand**$$

All residential water is supplied from groundwater obtained from Sites horizontal Well #2.

2.4.7 Total Site Water Use

Therefore, the Annual Total Site Water Use is estimated by combining annual Site project water use from Well #1, with the livestock water use and the domestic water use from Well #2. In addition, we can apply the reduction in cattle water use to the overall project to further evaluate the potential impact.

$$65,400 \text{ gallons/year (Lavender Farming)} + 24,000 \text{ gallons/year (Lavender Processing)} + 37,500 \text{ gallons/year (Event Center)} + 246,324 \text{ gallons/year (Landscaping)} = **373,224 gallons or 1.15 acre-feet/year = Total Annual Project Water Use (Well #1)**$$

⁵ Santa Rosa Plain Groundwater Management Plan, Sonoma County Water Agency and USGS, 2014.

⁶ <http://www.bayareacensus.ca.gov/counties/SonomaCounty.html>

373,224 (project water use) + 94,900 gallons/year (Cattle) + 185,735 gallons/year (Domestic Water Use) =

653,859 gallons/year or 2.01 acre-feet/year = Total Site Water Use (Well #1 & Well #2)

The anticipated monthly Site Water Use is summarized below in **TABLE 1**.

TABLE 1 – ESTIMATED ANNUAL SITE WATER USAGE

Source	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	Total
	-----Gallons-----													acre-ft
Lavender Farming/ Employees	0	0	0	0	0	12,000	13,000	14,000	14,000	12,400	0	0	65,400	0.20
Lavender Processing	0	0	0	0	0	0	12,000	0	0	12,000	0	0	24,000	0.07
Event Center	1,500	1,500	3,500	3,500	4,000	4,000	4,000	4,000	4,000	4,000	2,000	1,500	37,500	0.12
Landscape Irrigation	0	0	0	0	38,000	42,000	44,000	44,000	42,000	36,324	0	0	246,324	0.76
Livestock	6,900	7,000	7,500	7,500	8,000	9,000	9,000	9,000	9,000	8,000	7,000	7,000	94,900	0.29
Residential	15,000	15,000	15,000	15,000	15,000	16,000	16,000	17,000	16,000	16,000	15,000	14,735	185,735	0.57
TOTAL USAGE	23,400	23,500	26,000	26,000	65,000	83,000	98,000	88,000	85,000	88,724	24,000	23,235	653,859	2.01

The peak water usage for the project including farming, processing, events, and landscaping is expected to occur in July each year with an estimated daily demand of 2,355 gallons/day.

Average water use for the project during the entire year is expected to be 1,023 gallons/day.

The applicants plan to reduce the number of cattle onsite by 80% will result in a decrease in water usage of 379,600 gallons/year (1.16 acre-feet/year). Therefore, the estimated net increase to the sites overall water use is approximately 88,524 gallons/year or 0.27 acre-feet/year.

Assuming the residential use is constant at 0.57 acre-feet/year the net increase in water use can be calculated as follows:

373,224 gallons/year (project water use) + 94,900 gallons/year (livestock water use)
 – 379,600 gallons/year (water use reduction from livestock) =
88,524 gallons/year = Net Increase in Groundwater Use Onsite

2.4.8 Water Conservation Methods

The applicant is designing the project facility to utilize a combination of rainwater and groundwater to meet project demands. When available, rainwater will be the primary irrigation water source and groundwater will only be used when rainwater resources are depleted. The proposed rainwater system will capture water from the 5,020 ft² Ag building. The captured

rainwater will be collected from the roof of the Ag building and transferred into onsite storage tanks designated for irrigation.

Mean seasonal precipitation maps from Sonoma County Water Agency⁷ indicate the mean annual rainfall in the Site vicinity is about 30 inches or 2.5-feet/year, (**PLATE 5- Precipitation Map**). Based on the average annual rainfall and the rainwater capture area we have estimated the rainwater capture potential at the site.

2.5 feet (rainfall average) x 0.115-acre (rainfall capture area) x 0.6 (efficiency factor) = **0.173 acre-feet/year or 56,209 gallons/year = Rainwater Capture Potential**

⁷ Sonoma County Mean Seasonal Precipitation in Flood Control Design Criteria manual: Plate No. B-3, Sonoma County Water Agency, Revised January 2005.

3.0 CUMULATIVE IMPACT AREA

HES reviewed available water well records obtained from Permit Sonoma and California Department of Water Resources (DWR) and assessed information obtained from peer-reviewed scientific publications as referenced in this report to determine an appropriate Cumulative Impact Area (CIA) for the site. HES delineated the Cumulative Impact Area based on known geologic, hydrologic and groundwater characteristics in consultation with Robert Pennington with Permit Sonoma. The total area of the CIA is approximately 300-acres.

HES identified 7 properties in the Cumulative Impact Area including the Site (**TABLE 2**). The CIA includes the entire Site and all or portions of the other 6 properties (**PLATE 4 - SITE PLAN AND CUMULATIVE IMPACT AREA**). The property sizes in this CIA are large and range from 12.38 to 172.21 acres with an average size of approximately 61.5 acres. A total of 6 of the 7 CIA properties are developed with residences. There are 6 properties with single family residences, one property with a permitted accessory dwelling unit (ADU), one parcel is permitted for 2 or more residences and one parcel also contains a commercial dairy. One parcel is a large (30.30-acre) undeveloped pasture (APN 020-130-005).

All of the properties in the Cumulative Impact Area properties are zoned as Land Extensive Agriculture (LEA) with 60-acre density. Zoning in this area is unlikely to change significantly so future development is anticipated to be consistent with currently allowed conditions.

All of the 7 properties in the Cumulative Impact Area are listed as in the groundwater availability Class 4 (areas with low or highly variable water yield).

TABLE 2 CUMULATIVE IMPACT AREA PROPERTIES

Item					
1	020-130-037	4485 D St, Petaluma	56.76	LEA 60	Pasture w/ Residence
2	020-130-005	No Address	30.30	LEA 60	Pasture
3	020-130-038	2000 Longhorn Ln, Petaluma	21.51	LEA 60	Rural Res/Single Residence
4	020-130-034	1250 San Antonio Rd, Petaluma	172.21	LEA 60	Rural Res/Single Residence
5	020-130-023	4001 and 4275 D St, Petaluma	122.36	LEA 60	Dairy w/Residence
6	020-130-039	1000 Longhorn Ln Petaluma,	12.38	LEA 60	
7	020-130-026	1500 and 1525 Longhorn Ln Petaluma	14.96	LEA 60	Rural Res/2 or More Residence

3.1 GROUNDWATER USAGE IN CUMULATIVE IMPACT AREA

Based on available information including a Google Earth May 2021 aerial photograph⁸, HES estimated the land use acreage within the 300-acre Cumulative Impact Area as follows:

40 acres	Oak and riparian woodlands
14 acres	Residential use including houses and landscaping (~ 2 acres per residence)
246 acres	Livestock grazing pasturelands

The woodlands within the Cumulative Impact Area are situated primarily along the ridges and associated drainages, providing limited but valued privacy between properties so further reduction of existing wooded land may not be feasible or pursued.

3.1.1 Current Domestic Water Demand

According to the USGS, the average person within the Santa Rosa Plain Watershed uses 0.19 acre-feet/year for domestic purposes. In addition, the United States Census Bureau reported in 2010 that the average household in Sonoma County has 2.55 residents⁹. Therefore, for this assessment we used a conservative number of three (3) people at each primary residence and two (2) people at each permitted accessory dwelling units (ADUs) within the CIA with each person using 0.19 acre-feet of water annually.

Therefore, we estimate that 23 residents currently live within the Cumulative Impact Area. With this data we calculated the following domestic water usage.

$$(7 \text{ residences} \times 3 \text{ people/residence}) + (1 \text{ ADU} \times 2 \text{ people/ADU}) = 23 \text{ people in CIA}$$
$$23 \text{ people} \times 0.19 \text{ acre-feet/year} =$$

4.37 acre-feet/year = Annual Residential Groundwater Demand in CIA

This estimate assumes that all residential dwelling water is supplied from groundwater; other sources of water (recycled water, reservoirs or surface water) were not included. This estimate does not include domestic water use for workers.

3.1.2 Future Domestic Water Demand

For future potential groundwater demand we first assume that all properties over 2 acres (5 parcels) that do not currently have ADU's will develop an ADU at some point. We assume that those ADU's will be occupied by two (2) residents each. Accordingly, future potential groundwater demand for domestic purposes is as follows;

$$5 \text{ (additional ADUs)} \times 2 \text{ (residents per dwelling)} \times 0.19 \text{ acre-feet/year} =$$

1.9 acre-feet/year = Future Potential Annual Residential Groundwater Demand in CIA

So, 4.37 (Current Water Demand) + 1.9 (Future Potential Water Demand) =

⁸ Details derived from Google Earth aerial photograph, dated May 2018.

⁹ <http://www.bayareacensus.ca.gov/counties/SonomaCounty.html>

6.27 acre-feet/year = Future Potential Domestic Water Use in Cumulative Impact Area

3.1.3 Current Pasture Land Livestock Water Use

In order to estimate the amount of land that is used for livestock we assumed that all pasture land is either currently used for grazing, or will be used for grazing in the future. With an estimated 246-acres of pasture/livestock grazing land within the CIA we can estimate grazing water use using Sonoma County established water usage rates. Sonoma County estimates that the livestock (sheep or cows) water usage rate is 0.05 acre-feet/year/acre¹⁰. Therefore, pasture land annual water usage can be calculated as follows:

246-acres (pastureland acres) x 0.05 acre-feet/acre/year (water usage) =
12.3 acre-feet/year = Current/Future Pasture Grazing Water Demand

Pasture land water use is not expected to change due to zoning as most parcels are part of the Petaluma Dairy Belt Area Plan and many have Williamson Act Contracts¹¹.

It is likely that some of the water for livestock is obtained from ponds on and near the Site. However, for the purpose of this assessment we will assume that all water for livestock is obtained from groundwater.

3.1.4 Total Water Demand in Cumulative Impact Area

Based on the conservative assumptions discussed above, HES estimated Current Annual Groundwater Demand (in acre-feet/year) for the Cumulative Impact Area (excluding the Project):

4.37 acre-feet/year (Current Domestic in CIA, including site) + 12.3 acre-feet/year (Pasture Livestock) = **16.67 acre-feet/year = Current Groundwater Demand in CIA**

Based on the conservative assumptions discussed above, HES estimated Future Potential Annual Groundwater Demand for the Cumulative Impact Area as follows:

16.67 acre-feet/year (existing domestic and pasture) + 1.9 acre-feet/year (Potential Increase in Domestic) = **18.57 acre-feet/year = Future Potential Groundwater Demand in Cumulative Impact Area**

The Project's total groundwater demand is 1.15 acre-feet/year; however, it only increases the water demand for the property by 0.27 acre-feet/year (discussed in Section 2.4.7) due to a decrease in cattle grazing. Therefore, the increased water demand of 0.27 acre-feet/year increases the current total water demand within the CIA (16.67 acre-ft/year) by 1.6% and increases the future potential groundwater demand (18.57 acre-ft/year) by 1.5%.

A breakdown of water usage within the Cumulative Impact Area is presented below on **TABLE 3**.

¹⁰ Permit Sonoma 8-2-1 Water Supply, Use and Conservation Assessment Guidelines version 1/7/2020

¹¹ Permit Sonoma GIS Online Service Map Gallery, Williamson Act Land Contracts Data 2017

TABLE 3 – ESTIMATED WATER USAGE IN CUMULATIVE IMPACT AREA

Groundwater Uses	Number of uses	Rate of Use	Annual Water Use (acre-feet)/year
Current Water Use			
7 Residences	3 people/residence = 21 residents	0.19 acre-ft/resident	3.99
1 ADU	2 people/ADU = 2 residents	0.19 acre-ft/resident	0.38
Pasture/Livestock	246 acres of pastures	0.05 acre-ft/acre	12.3
Total Estimated Current Water Usage			16.67
Future Potential Water Uses			
5 Potential New ADUs within CIA	2 people/ADU = 10 new residents	0.19 acre-ft/resident	1.9
Additional Annual Project Water Usages	Irrigation, Processing, Events, landscaping Employees	0.27 acre-ft	0.27
Future Potential Water Usage		Existing Without Project	18.57
		Future With Project	18.84
Note: Projected water usage for lavender farming provided by the property owner and estimates on household domestic water use are based on 2014 USGS study of the Santa Rosa Plain Watershed and 2020 Census Data for Sonoma County.			

4.0 HYDROGEOLOGICAL CONDITIONS

The site is located outside and west of the Petaluma Valley and within the northwest trending structural province of the Coast Ranges of northern California. The regional structure consists primarily of northwest-trending folds and a few major faults, the most prominent of which is the San Andreas fault, a right-lateral fault, about 12 miles west of the site. The Petaluma Valley occupies a northwest-trending structural depression in the southern part of the Coast Ranges of northern California. This depression divides the Mendocino Range on the west from the Mayacamas and Sonoma Mountains on the east. West of the southern end of Petaluma Valley are the Marin Mountains, in which Burdell Mountain, immediately adjacent to the Valley, rises to an altitude of 1,560 feet.

The 2002 Geologic Map of the Petaluma 7.5 Quadrangle¹², shows the site underlain by the Franciscan Assemblage (Jurassic-Cretaceous), a tectonic mixture consisting predominantly of a matrix of sheared greywacke and shale and to a lesser extent serpentinite enclosing blocks of less sheared greywacke and greywacke interbedded with shale. The unit is characterized by hard, resistant tectonic blocks of chert, greenstone, and exotic high grade metamorphic rocks. Native sediment and rock underlying the site consist light brown sandstone, and dark serpentinite

PLATE 6 – GEOLOGIC MAP

4.1 PROJECT WATERSHED

According to www.ecoatlas.com¹³ the project site is located within the San Pablo Bay Hydrologic Region Cataloging Unit (HUC-8), the Petaluma River-Frontal San Pablo Bay Estuaries Watershed Region (HUC-10), and the San Antonio Creek Sub-Watershed (HUC-12 180500020602). Most of the land in the area is open grass land with wooded areas primarily along the ridge tops and the surface water drainages. Drainage at the site moves from the uplands on the southwest and southeast sides of the site north toward unnamed tributaries to San Antonio Creek as shown on **PLATE 4 – TOPOGRAPHIC MAP**. San Antonio Creek is the primary drainage of the area, flowing east to the Petaluma River, which drains into the north end of San Pablo Bay.

4.2 DOMESTIC WELL INFORMATION

HES performed a domestic well search through the Department of Water Resources and Permit Sonoma to identify Well Completion Reports proximate the Site. Through this research, HES identified domestic well log information for six (6) properties within or near the Cumulative Impact Area, (**TABLE 4**). Available well logs are included in **APPENDIX C**.

¹² Geologic Map of Petaluma 7.5' Quadrangle Sonoma and Marin Counties, California: A digital Database Version 1.0, California Department of Conservation California Geological Survey, 2002.

¹³ www.ecoatlas.org, EcoAtlas has been developed through funding from the US Environmental Protection Agency and the California State Water Resources Control Board.

TABLE 4 WELL INVENTORY

APN or Address/ Well Number	Date Installed	Distance to Site Well (Feet)	Surface Elevation (Feet- MSL)	Total Well Depth (Feet)	Screen Interval (Feet)	Elevation of top of screen (Feet) MSL	Total Screen Thickness (Feet)	Well Yield (GPM)	Draw-down (Feet)	Specific Capacity	Map ID
020-130-037 / 003391	2022	0	315	170 horizontal	20-170	315	150	2.5	NA	NA	Site well#1
020-130-037 / 003399	2022	0	345	400 horizontal	20-400	345	380	2.5	NA	NA	Site well#2
020-130-038 (25) / 468271	1996	1,111	580	340	208-328	372	120	45	NA	NA	1
020-130-039 (24) / 704187	1998	1,300	530	380	130-330	400	200	6.09	1.5	4.06	2
020-130-026 / 815269	2002	1,517	500	420	160-420	340	260	2	380	0.005	3
020-130-023 / 79226	2002	2,000	265	535	235-535	30	300	27	178	0.15	4
020-130-021 / 235121	1982	2,700	180	41	0-41	180	41	1	40	0.025	5A
020-130-021 / 14978	1954	2,700	180	54	29-49	151	20	40	NA	NA	5B
020-130-019	2006	~3,000	165	640	130-435	35	565	4	530	0.007	6
Average Well TD = 344						Average Screen Thickness = 218		Average Specific Capacity = 0.84			

Feet-MSL = elevation in feet relative to mean sea level

Review of the Well Completion Reports for 7 wells near the Site indicates that water is either encountered very shallow (<50 feet below grade) or relatively deep (>460 feet below grade) depending on location. This type of setting is typical for Bedrock aquifers where both perched conditions and deep fracture zone aquifers exist. Rock types encountered in the boring logs consisted of greenstone, shale and chert which is consistent with the rock units in the Franciscan Formation. Well yields for the seven wells surrounding the site ranged from 1 to 45 gallons per minute (gpm).

4.2.1 Site Well Yield Test

HES performed a certified dry season spring yield test on the new horizontal well slated for use on the project (Site Well #1). The results of the well yield testing indicated that the sustained dry season yield from the project well is approximately 1.5 gpm. The results of the spring yield test were presented to Permit Sonoma's Well and Septic Department and are also attached to this Report in **Appendix D – Spring Yield Test**. The initial yield testing performed by HES in April of 2022 reported that the projects primary horizontal well (Well #1) produced ~5 gpm.

Based on the site water usage rates presented in Section 2.4 of this Assessment Report, the site will require approximately 2,355 gallons per day to meet peak demands. This water usage rate is equivalent to ~1.64 gpm, 24-hours/day. Based on initial yield test results from April 2022, and the dry season yield test results from July 2022, it is anticipated that Site Well #1, in conjunction

with captured rainwater and stored groundwater, will meet the minimum flow rate necessary to provide for the Project's anticipated peak water use. The Project applicant plans to install 50,000-gallons in groundwater storage as well as additional rainwater storage tanks at the Site which will be used as needed to supplement the dry season water demands, as necessary.

4.2.2 Potential Impacts to Streams and Neighboring Wells

Three (3) groundwater wells were identified within approximately 1,500 feet from the Site (identified as off-site wells #1, #2 and #3 on **Plate 3 and Table 4**). These wells are all located between approximately 500 to 580 feet above MSL and the top of the well screens range from 340 to 400 feet above MSL. Site Well #1 is located at 315 feet above MSL which indicates that site well is screened within a similar a water bearing zone as the off-site wells #1, #2 and #3.

A pumping test was conducted at domestic well 2 (APN 020-130-039) on October 29, 2008 by Weeks Drilling and Pump, the test data is included in **Appendix D**. The well was pumped at 6.09 gallons per minute for 8 hours and the water levels stabilized with 1.5 feet of drawdown. From this data a Specific Capacity of 4.06 can be calculated. Using the specific capacity data, and general relationships discussed in Driscoll (1986)¹⁴, we estimated the wells lateral pumping influence.

To develop the slope of the drawdown curve from the pumping well, the value of Δs (drawdown over one log graph cycle) was calculated for a distance-drawdown relationship, where $T = 528Q/\Delta s$ ¹⁵. Using this equation and applying it to the site, we calculated a radius of pumping influence (ROI) extending approximately 150 to 1,200 feet from domestic well 2 as shown on the distance drawdown plot for an unconfined aquifer **Appendix E - Radius of Pumping Influence**.

The closest offsite well to Site Well #1 is approximately 1,111 feet to the west (off-site well #1). If we subtract 170 feet from that distance to account for the end of the horizontal well, then the Site Well #1 terminus is approximately 941 feet from off-site well #1 and 1,130 feet from off-site well #2. This indicates that there is some potential for the overlap however the drawdown observed from the well yield test on the off-site well #2 (1.5 feet) would be insignificant at that distance. This indicates the off-site wells #1, #2 and #3 would not likely to be affected by pumping at the Site Well #1.

However, Site Well #1 will be discharging continuously throughout the year and once the proposed 50,000-gallons in water storage is full the well will discharge directly to the onsite pond. This process could create a scenario where the relatively thin seam that the horizontal well taps is dewatered annually. But since the water captured by the horizontal well occurs entirely within the Site boundaries, and the ROI of the nearby well is 1200 feet (maximum) the continuous discharge at Site Well #1 is not anticipated to significantly affect water levels in the nearby site wells.

¹⁴ Groundwater and Wells, Second Edition, Fletcher G. Discoll, 1986, published by Johnson Division, St. Paul Minnesota, 1089p.

¹⁵Groundwater and Wells, Second Edition, Fletcher G. Discoll, 1986, published by Johnson Division, St. Paul Minnesota, 1089p. (Equation 9.11)

If at some point in the future it is determined that the continuous discharge of the Site Well #1 is dewatering the site aquifer and limiting water availability onsite, the applicant can consider pumping the excess water back up the hill onsite and into a drainage swale or infiltration trench where the water can percolate back into the well over time. This practice would create an artificial groundwater recharge basin that could replace a significant portion of the water lost.

As discussed, the Site Well #1 will discharge directly to the onsite pond once the storage tanks are full. The pond will then overflow to the onsite drainage creek at a rate that will be equal to the sum of the wells production, minus the sites water usage. This system will help to sustain a flow of water downstream during the spring and will allow for the pond to remain full during the summer and fall. Since unused water from the continuously discharging well will be discharge to the pond, there will be no anticipated decrease in stream flow as a result of the proposed water use.

5.0 WATER BALANCE INFORMATION

The USGS and DWR studies that included the Petaluma area provided water balance information that HES used to assess groundwater sustainability within the Cumulative Impact Area.

5.1 GROUNDWATER STORAGE

HES used well log information from five wells to estimate the aquifer thickness beneath the Cumulative Impact Area. The average screened interval for 5 wells was estimated at 225 feet. A 2013 USGS study in the nearby Santa Rosa Plain estimated the average specific yield of the Santa Rosa region at 5 percent (0.05)¹⁶. Therefore, using this data the Aquifer Storage can be estimated using the following equation

$$225 \text{ feet (Aquifer Thickness)} \times 0.05 \text{ (Specific Yield)} \times 300 \text{ acres (Cumulative Impact Area)} = \\ \underline{\text{Estimated Aquifer Storage}} = 3,375 \text{ acre-feet}$$

5.2 PRECIPITATION

Precipitation, primarily as rainfall is the major source of inflow to the Petaluma Valley Watershed. Mean seasonal precipitation maps from Sonoma County Water Agency¹⁷ and various local studies referenced in this report indicate the mean annual rainfall in the site vicinity is about 30 inches per year (about 2.5 feet per year) (**PLATE 5 - PRECIPITATION MAP**). Precipitation over the Cumulative Impact Area is:

$$2.5 \text{ feet/year (Regional Precipitation)} \times 300 \text{ acres (Cumulative Impact Area)} = \\ \underline{\text{Precipitation in Cumulative Impact Area}} = 750 \text{ acre-feet/year.}$$

5.3 GROUNDWATER RECHARGE

Groundwater recharge is the replenishment of an aquifer with water from the land surface. It is usually expressed as an average rate of inches of water per year, similar to precipitation. Thus, the volume of recharge is the rate times the land area under consideration times the time period, and is usually expressed as acre-feet per year. In addition to precipitation, other sources of recharge to an aquifer are stream and lake or pond seepage, irrigation return flow (both from canals and fields), inter-aquifer flows, and urban recharge (from water mains, septic tanks, sewers, drainage ditches).

For our defined Cumulative Impact Area, the Franciscan rock aquifer is considered unconfined to semi-confined. The primary sources of groundwater recharge in the Cumulative Impact Area are infiltration of precipitation, infiltration from streams, and irrigation-return flow. Soil types and land cover within the watershed affect the extent and magnitude of storm water runoff

¹⁶ Hydrologic and Geochemical Characterization of the Santa Rosa Plain Watershed, Sonoma County, California, U.S. Geological Survey, Scientific Investigations Report 2013-5118.

¹⁷ Sonoma County Mean Seasonal Precipitation in Flood Control Design Criteria manual: Plate No. B-3, Sonoma County Water Agency, Revised January 2005.

(retention and infiltration). It is likely that a portion of the rain water falling directly on the site infiltrates the ground surface and migrates downward through the soil matrix and until it recharges the fractured rock aquifer.

To estimate the groundwater recharge within the Cumulative Impact Area HES first assumed that the recharge to the aquifer is primarily through rainfall and that all rainfall accumulated within the 300-acre Cumulative Impact Area drains to the creeks proximate to the site. However, this estimate does not account for surface run-off, stream underflow, and evapotranspiration. To estimate the percentage of rainfall that contributes to recharge of the aquifer, HES reviewed available groundwater studies including the Santa Rosa Plain Watershed Groundwater Management Plan, and the USGS Scientific Investigation Report 2006-51157, as well as other regional groundwater studies in Sonoma County. Estimates for recharge found in these documents are considered to be reliable for our site evaluation. Average recharge to the groundwater system for the entire Santa Rosa Plain, including mountainous zones, is derived from an estimated average of 531,000 acre-ft of precipitation falling within the entire watershed. After accounting for runoff (188,400 acre-feet/year) and evapotranspiration (262,000 acre-feet/year), the amount of water available for recharging the Santa Rosa Plain Watershed equates to 80,600 acre-ft/year or approximately 15.2% of the annual rainfall. However significant variations to this value can occur based on topography, soil infiltration rates, geology etc.; and according to these USGS and Sonoma County Water Agency Reports, the long-term average precipitation that recharges groundwater can be as low as 1.67%.

While these USGS studies are not specific to the site vicinity, the average long-term recharge to the aquifer within our defined Cumulative Impact Area likely falls within the ranges seen in the nearby watersheds. HES estimates that only 5% of rainfall likely contributes to groundwater recharge within the Cumulative Impact Area. Based on this recharge value we can re-calculate the groundwater recharge within the Cumulative Impact Area using the following data and equation.

$$750 \text{ acre-feet/year (annual precipitation in CIA)} \times 0.05 \text{ (estimated long term recharge average)} = \underline{\text{Annual Aquifer Recharge}} = 37.5 \text{ acre-feet/year}$$

6.0 WATER QUALITY

A water quality assessment of the project well was not performed as part of this Hydrogeologic Assessment Report. However, a search for contaminated groundwater sites within 1,000 feet of the site was performed on the States Geotracker Database. No contaminated groundwater sites were identified within 1,000- feet of the site. Water quality assessment testing for bacteria, nitrates, arsenic and other common contaminants may be necessary prior to beginning site operations to ensure potable water is available for onsite farm workers.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The Franciscan aquifer beneath the site is generally considered unconfined to semiconfined and recharge to the aquifer likely occurs primarily from rainfall and stream flow in the San Antonio Creek Watershed. The wells identified within the Cumulative Impact Area have an average screened thickness of 225 feet and if extended over the entire 300-acre area produces an estimated total aquifer storage value of 750 acre-feet. Based on annual precipitation and estimated aquifer recharge rates, the annual recharge to the aquifer is estimated to be 37.5-acre-feet. The current annual water demand within the Cumulative Impact Area (including the site), is conservatively estimated to be 16.67 acre-feet. The estimated annual water demand for the proposed Project is 1.15 acre-feet and the total annual site water demand at the site is 2.01 acre-feet (without consideration of the Applicant's livestock reduction and rainwater catchment offset plans). The site relies on ground water captured from horizontal wells and it's likely that these wells intercept water that would typically contribute to recharge of the local aquifer. However, our assessment has determined that the total annual water demand proposed for the site is sustainable based on current and future development within the Cumulative Impact Area. In summary:

3,375.00 acre-feet	Aquifer Storage
37.50 acre-feet	Annual Recharge to Aquifer
16.67 acre-feet	Cumulative Impact Area Current Annual Water Demand
18.57 acre-feet	Cumulative Impact Area Future Potential Annual Water Demand
2.01 acre-feet	Site Total Annual Water Demand (Domestic, Livestock and Project)
1.15 acre-feet	Project Annual Water Demand
1.16 acre-feet	Reduction in Annual Water Use from Cattle
0.17 acre-feet	Rainwater Capture Potential
0.27 acre-feet	Net Increase in Annual Site Water Usage

Based on the conservative assumptions and estimates presented in this report, the quantity of groundwater to be used for the project and within the Cumulative Impact Area compared to the quantity of available groundwater indicates that the proposed water use for the Project is unlikely to result in significant declines in groundwater resources over time. Based on the findings of this report, groundwater extraction at the Project well will not significantly impact neighboring wells or stream flow conditions in nearby creeks. In addition, based on the relative distance to the coastal areas, the depth of the site well and the proposed water usage rates, salt water intrusion is not considered to be a concern to this Assessment.

Based on the assessments made in this report and the comments from the Mr. Robert Pennington at Permit Sonoma, our Project recommendations are presented below.

- Perform a dry season well yield test on Site Well #2 for the purpose of verifying adequate water supply for onsite domestic and livestock purposes.
- Incorporate rainwater catchment into your Project plans as a water conservation practice.
- If necessary, an artificial groundwater recharge basin can be created onsite where excess rainwater and well discharge water can be directed. This practice may help to sustain the well discharge rates during summer and fall.

8.0 LIMITATIONS

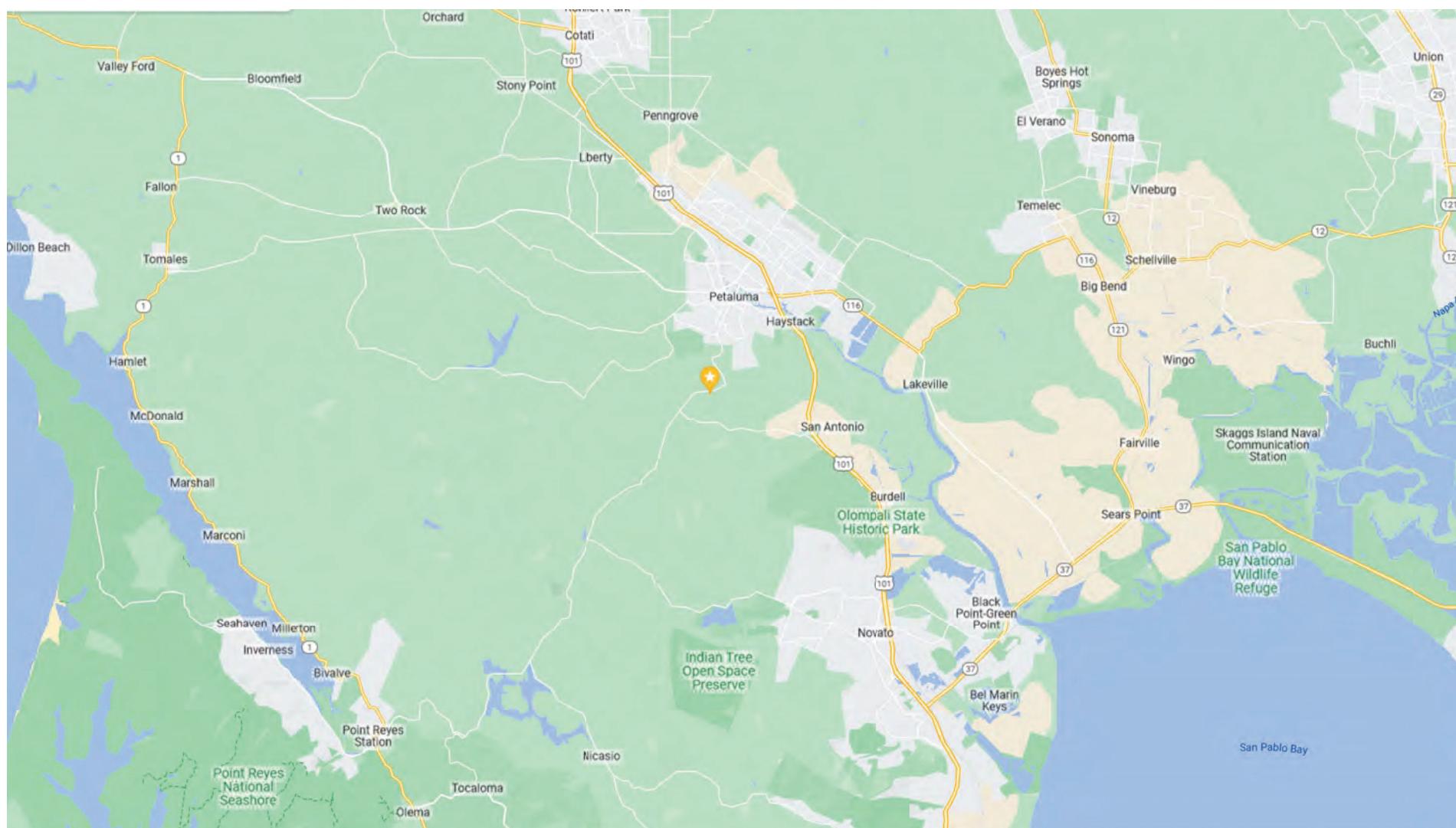
HES is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review, site inspection, field exploration, laboratory test data and interpretations presented in this report.

Groundwater systems of Sonoma County are typically complex, and available data rarely allows for more than general assessment of groundwater conditions and delineation of aquifers. Hydrogeologic interpretations are based on the drillers' reports made available to us through the California Department of Water Resources, available geologic maps and hydrogeologic studies and professional judgment. This analysis is based on limited available data and relies significantly on interpretation of data from disparate sources of disparate quality.

It should be noted that hydro-geological assessments are inherently limited in the sense that conclusions are drawn and recommendations developed from information obtained from limited research and site evaluation. Additionally, the passage of time may result in a change in the environmental characteristics at this site and surrounding properties. This report does not warrant against future operations or conditions, nor does this warrant operations or conditions present of a type or at a location not investigated.

This study is not intended to assess if any soil contamination, waste emplacement, or groundwater contamination exists by subsurface sampling through the completion of soil borings and the installation of monitoring wells. The scope of work, determined by the client, did not include these activities.

This Report is for the exclusive use of Villa Vanto Farm and Mr. and Mrs. Mario and Katherine Ghilotti, their affiliates, designees and assignees and no other party shall have any right to rely on any service provided by Hurvitz Environmental Services without prior written consent.



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SITE LOCATION MAP

020-130-037

4485 D Street
Petaluma, CA

JOB NUMBER:
5170.01

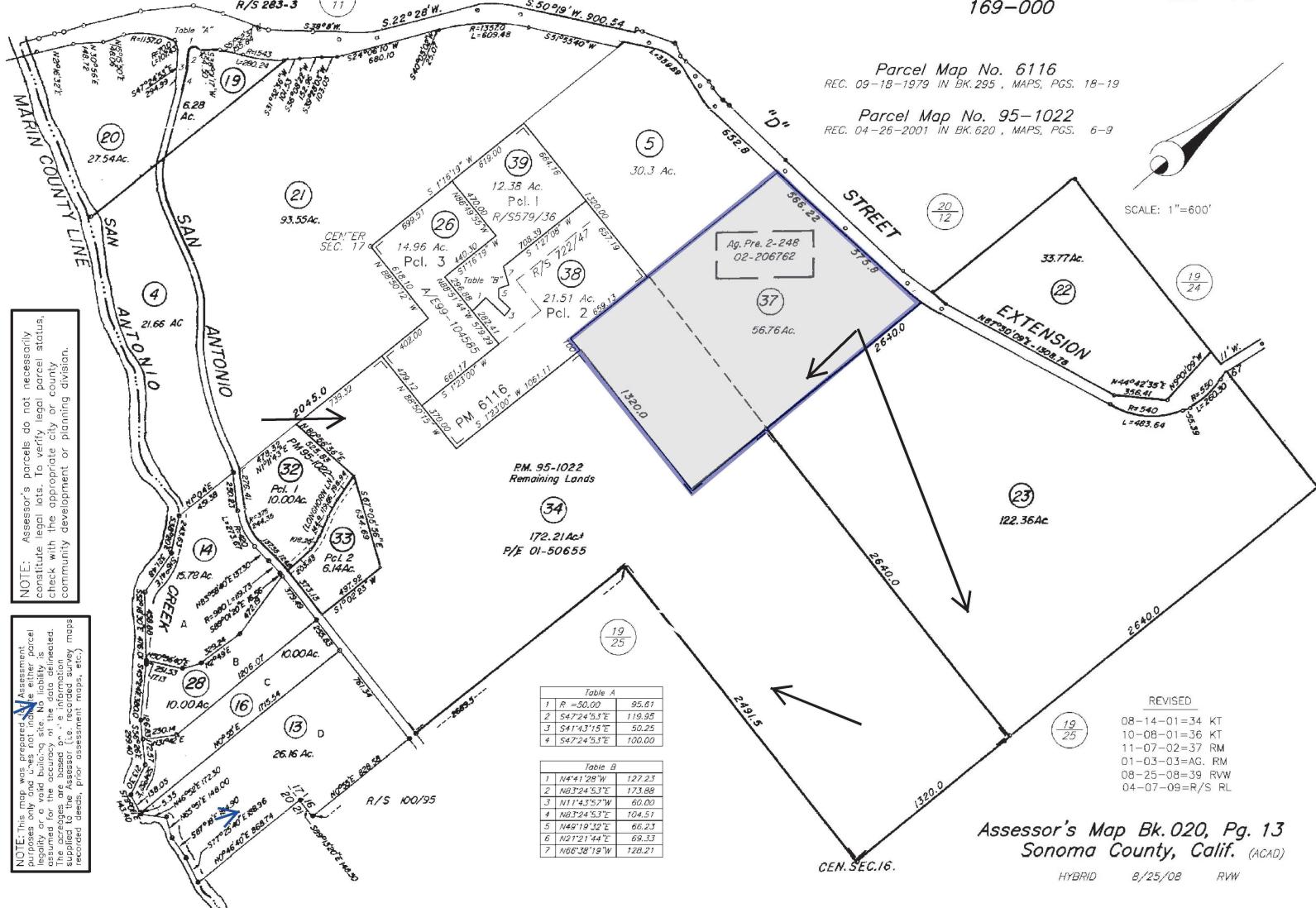
DATE:
04/22/22

PLATE:
1

COUNTY ASSESSOR'S PARCEL MAP

TAX RATE AREA
169-000

20-13



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ASSESSORS PARCEL MAP

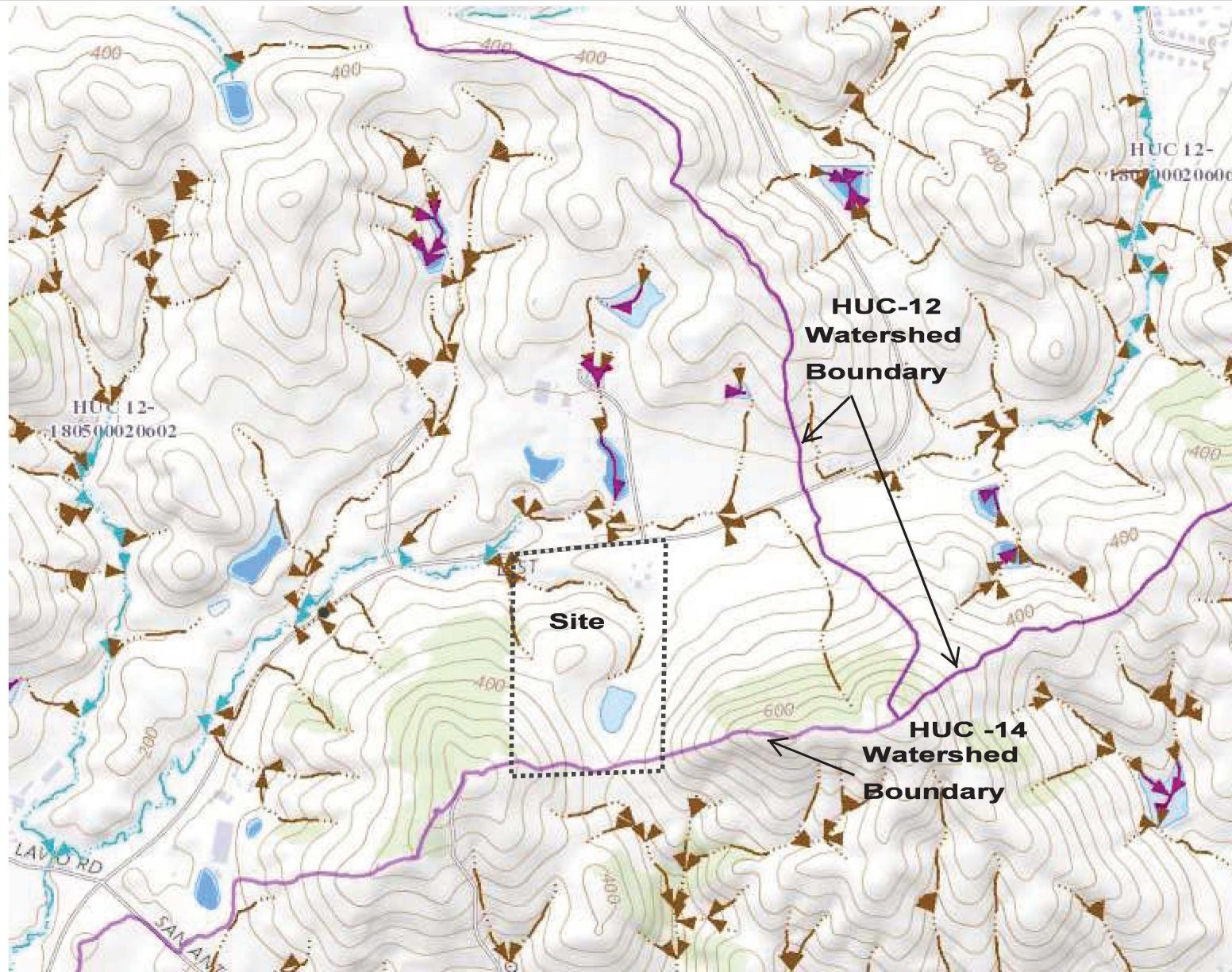
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4485 D Street
Petaluma, CA

JOB NUMBER:
5170.01

DATE:
04/22/22

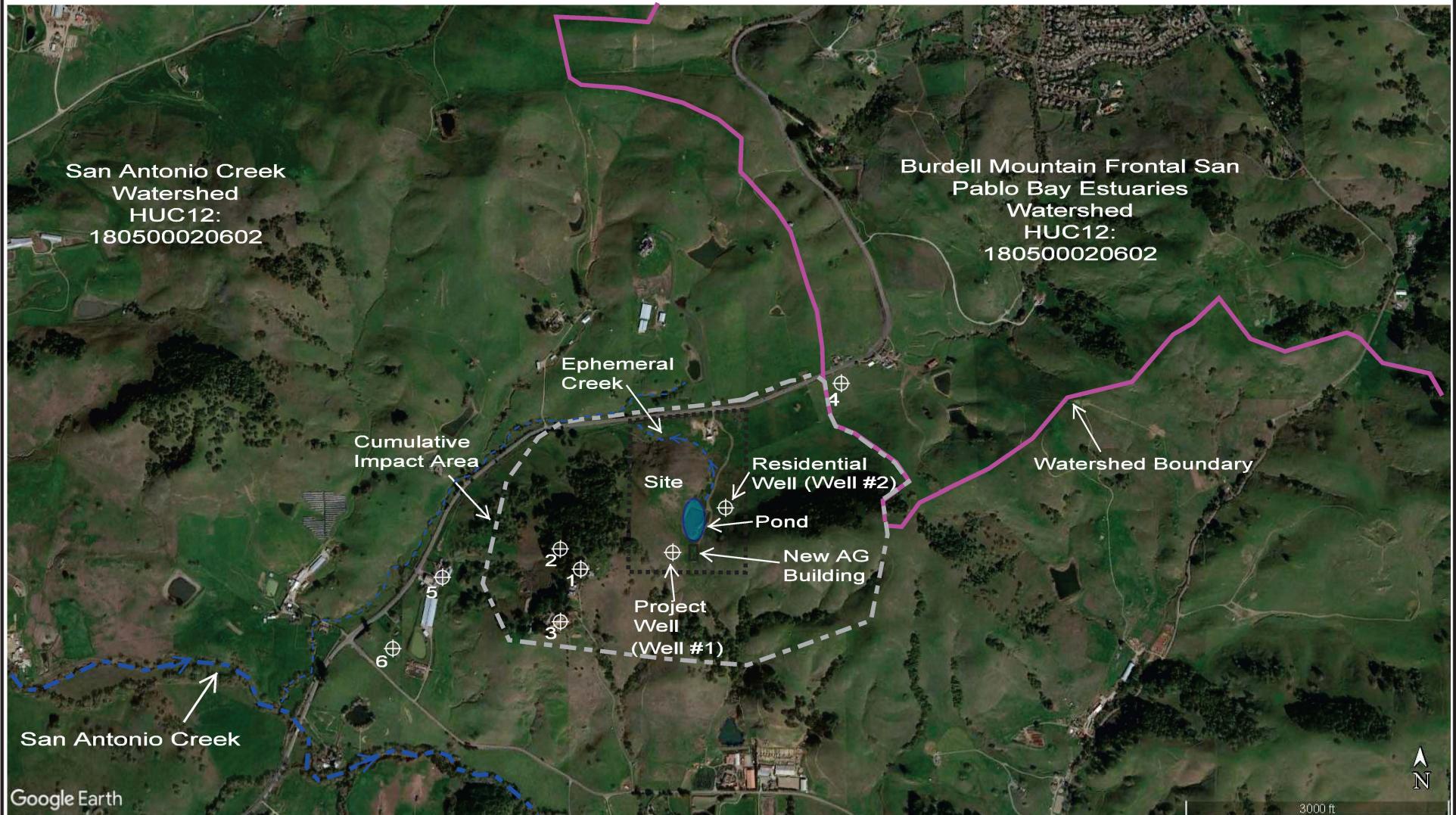
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2



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USGS TOPOGRAPHIC MAP
4485 D Street
Petaluma, CA
APN: 020-130-037

JOB NUMBER:
5170.01
DATE:
04/22/22
PLATE:
3



H
E

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SITE PLAN, CUMULATIVE IMPACT AREA, & WELLS

4485 D Street
Petaluma, CA
APN: 020-130-037

JOB NUMBER:	5170.01
DATE:	06/01/22
PLATE:	4

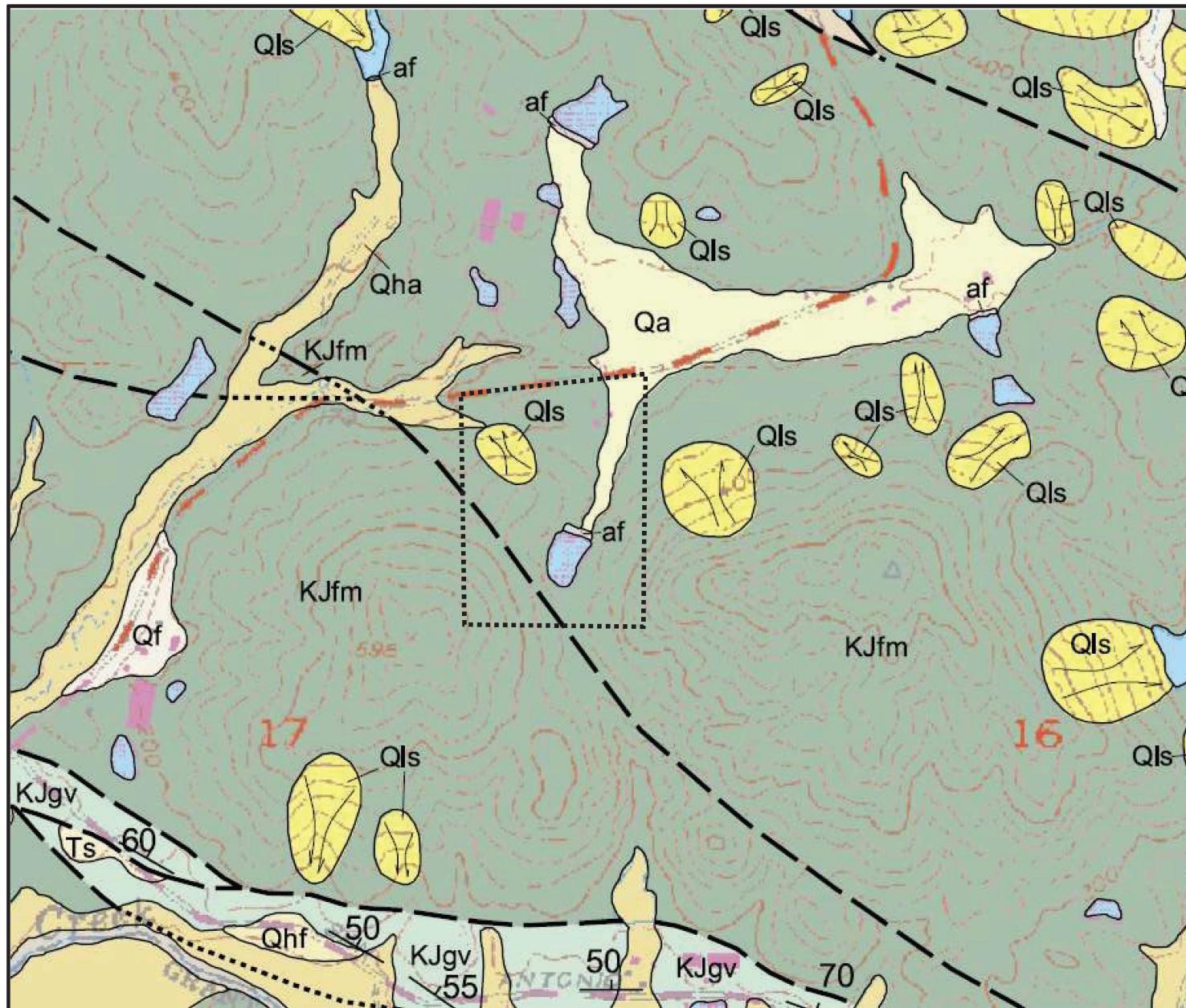


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RAINFALL MAP

020-130-037
4485 D Street
Petaluma, CA

JOB NUMBER:
5170.01
DATE:
04/22/22
PLATE:
5



Source:
 Geologic Map of Petaluma 7.5' Quadrangle Sonoma and Marin Counties, California: A digital Database Version 1.0, California Department of Conservation California Geological Survey, 2002.

KJfm

Franciscan melange (Jurassic-Cretaceous). A tectonic mixture consisting predominantly of a matrix of sheared graywacke and shale and to a lesser extent serpentinite enclosing blocks of less sheared graywacke and graywacke interbedded with shale. The unit is characterized by hard, resistant tectonic blocks of chert, greenstone, and exotic high-grade metamorphic rocks.

Qls

Landslide deposits. Holocene and Pleistocene landslides.

Qha

Holocene alluvium, undifferentiated. Alluvium of Holocene age, deposited in fan, terrace, or basin environments.

af

Artificial fill.

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GEOLOGIC MAP

020-130-037
 4485 D Street
 Petaluma, CA

JOB NUMBER:	5170.01
DATE:	04/22/22
PLATE:	6

APPENDIX A
PHOTOGRAPHIC LOG

SITE PHOTOGRAPHS



Photo 1: View of residence onsite.



Photo 2: View of existing workshop/garage onsite.

SITE PHOTOGRAPHS



Photo 3: View of Project Well (Well #1).



Photo 4: View of new Ag barn and ~1.6 acre pond from the Project Well (Well#1).

SITE PHOTOGRAPHS



Photo 5: View of horizontal well for residence (Well #2).



Photo 6: View of ~1.6-acre pond from Well #2.

SITE PHOTOGRAPHS



Photo 7: View of ephemeral stream with garage and residence in the background from Well #2.



Phot 8: View of ephemeral creek as it flows offsite to the northwest.

APPENDIX B
LANDSCAPE IRRIGATION PLAN

PO Box 1712
Sonoma, CA 95476

(707) 637-6051
thomas@totemlandscapeservices.com
CA Lic# 1048291



Date: 3-7-2023 : Ghilotti 4485 D
Street Petaluma, Ca. 94952

To Whom It May Concern:

After reviewing the landscape design and planting plan, as well as working on the property, I have determined the below numbers to be accurate for daily and annual water use.

Turf area: 4,356sq'

Irrigation Sprinklers: Hunter MP Rotors = 38 MP 2000 @ 0.95GPM = 36.1GPM

Irrigation Sprinklers: Hunter MP Rotors = 36 MP 800 @ 0.5GPM = 18GPM

Combined Irrigation Sprinklers Total = 54.1GPM

Calculation For Turf = 54.1GPM x 20min/day = 1,082Gal x 3 days a week = 3,246gal/week x 52 weeks = 168,792 Gal/year

Planted area (Ornamental grasses, perennials and shrubs)

Irrigation Emitters = 433 Hunter Woodpeckers @ 2GPH = 866 Gal/Hr

Calculation For Planted Area = 866 Gal/Hr x .5 hrs. x 3 days a week = 1,299 Gal/week x 52 = 67,548 Gal/year.

Trees: Olives and Crape Myrtles

Irrigation Emitters = 128 Hunter Woodpeckers @ 2GPH = 256 Gal/hr

Calculation For Trees = 256 Gal/hr x .75hr x 1 day a week = 192 Gal/week x 52 = 9,984 Gal/year

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Annual Use
Irrigation Sprinklers = 168,792 Gallons
Irrigation Emitters = 77,532 Gallons
Total = 246,324 Gallons

Average Daily Use
 $246,324 / 182.5 = 1,349$ Gal/day

Sincerely,
Thomas Bottari
Owner
Totem Landscape Services LLC : CA Lic# 1048291
707-637-6051
www.totemlandscapeservices.com

APPENDIX C
WELL COMPLETION REPORTS

State of California
Well Completion Report
Form DWR 188 Submitted 3/7/2023
WCR2023-003399

Owner's Well Number	Date Work Began	Date Work Ended	06/19/2022	
Local Permit Agency	Sonoma County Permit & Resource Management Department			
Secondary Permit Agency	Permit Number	wel22-0189	Permit Date	06/06/2022
Well Owner (must remain confidential pursuant to Water Code 13752)				
Name	Mario Ghilotti			
Mailing Address	4485 D Street			
City	Petaluma	State	Zip 94952	
Planned Use and Activity				
Activity	New Well			
Planned Use	Water Supply Irrigation - Landscape			

Well Location									
Address	4485 D ST						APN	020130037	
City	Petaluma			Zip	94952	County	Sonoma	Township	04 N
Latitude	38	11	36.9185	N	Longitude	-122	38	59.8073	W
	Deg.	Min.	Sec.		Deg.	Min.	Sec.	Range	07 W
Dec. Lat.	38.1935884947845			Dec. Long.			-122.649946479853		
Vertical Datum				Horizontal Datum			WGS84		
Location Accuracy				Location Determination Method					
Elevation Accuracy									
Elevation Determination Method									

Borehole Information				Water Level and Yield of Completed Well			
Orientation	Horizontal		Specify	Depth to first water	220	(Feet below surface)	
Drilling Method	Direct Rotary		Drilling Fluid	Water	Depth to Static		
Total Depth of Boring	400		Feet	Water Level	(Feet)	Date Measured	
Total Depth of Completed Well	400		Feet	Estimated Yield*	2.5	(GPM)	Test Type Pump
Test Length (Hours) Total Drawdown (feet)							
*May not be representative of a well's long term yield.							

Geologic Log - Free Form									
Depth from Surface Feet to Feet		Description							
0	50	Soft rock							
50	150	Hard rock							
150	300	Dark green rock (water at 220ft)							
300	400	Soft white rock							

#2

Casings										
Casing #	Depth from Surface Feet to Feet		Casing Type	Material	Casings Specications	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	20	Blank	PVC	N/A	0.52	1.5			PVC SCH 80
1	20	400	Screen	PVC	N/A	0.52	1.5	Milled Slots	0.5	pvc sch 80

Annular Material						
Depth from Surface Feet to Feet		Fill	Fill Type Details	Filter Pack Size	Description	
0	2	Bentonite	Other Bentonite			
2	20	Cement	Portland Cement/Neat Cement			
20	400	Other Fill	See description.		other	

Other Observations: _____

Borehole Specifications			Certification Statement					
Depth from Surface Feet to Feet			Borehole Diameter (inches)		I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief			
0	20	3.75			Name	CLEAR HEART DRILLING INC		
20	400	3.75			Person, Firm or Corporation			
					555 B W COLLEGE AVENUE	SANTA ROSA	CA	95401
					Address	City	State	Zip

Certification Statement				
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief				
Name	CLEAR HEART DRILLING INC			
Person, Firm or Corporation				
555 B W COLLEGE AVENUE		SANTA ROSA	CA	95401
Address		City	State	Zip
Signed	<i>electronic signature received</i>		03/07/2023	780357
	C-57 Licensed Water Well Contractor		Date Signed	C-57 License Number

DWR Use Only				
CSG #	State Well Number	Site Code	Local Well Number	
			N	W
Latitude Deg/Min/Sec			Longitude Deg/Min/Sec	
TRS:				
APN:				

State of California
Well Completion Report
Form DWR 188 Submitted 3/7/2023
WCR2023-003391

Owner's Well Number	Date Work Began	Date Work Ended	04/01/2022	
Local Permit Agency	Department of Public Health Services - Environmental Health Department			
Secondary Permit Agency	Permit Number	wel22-0063	Permit Date	03/16/2022
Well Owner (must remain confidential pursuant to Water Code 13752)				
Name GHILOTTI, Mario Ghilotti Mailing Address 4485 D Street City Petaluma State Zip 94952				
Planned Use and Activity Activity New Well Planned Use Water Supply Irrigation - Landscape				

Well Location									
Address	4485 D ST						APN	020130037	
City	Petaluma			Zip	94952	County	Sonoma	Township	04 N
Latitude	38	11	41.3711	N	Longitude	-122	38	50.8325	W
	Deg.	Min.	Sec.		Deg.	Min.	Sec.		
Dec. Lat.	38.1948253251292			Dec. Long.	-122.647453489177			Baseline Meridian	Mount Diablo
Vertical Datum				Horizontal Datum	WGS84			Ground Surface Elevation	
Location Accuracy				Location Determination Method				Elevation Accuracy	
								Elevation Determination Method	

Borehole Information			
Orientation	Horizontal		Specify
Drilling Method	Direct Rotary		Drilling Fluid
Total Depth of Boring	170		Feet
Total Depth of Completed Well	170		Feet
Water Level and Yield of Completed Well Depth to first water 120 (Feet below surface) Depth to Static Water Level (Feet) Date Measured Estimated Yield* 2.5 (GPM) Test Type Pump Test Length (Hours) Total Drawdown (feet) <small>*May not be representative of a well's long term yield.</small>			

Geologic Log - Free Form									
Depth from Surface Feet to Feet		Description							
0	60	Silty brown clay							
60	120	Brown hard rock							
120	170	Light gray rock (water found at 120ft)							

#1

Casings										
Casing #	Depth from Surface Feet to Feet		Casing Type	Material	Casings Specications	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	20	Blank	PVC	N/A	0.52	1.5			PVC SCH 80
1	20	170	Screen	PVC	N/A	0.52	1.5	Milled Slots	0.5	pvc sch 40

Annular Material					
Depth from Surface Feet to Feet	Fill	Fill Type Details	Filter Pack Size	Description	
0	2	Bentonite	Other Bentonite		
2	20	Cement	Portland Cement/Neat Cement		
20	170	Other Fill	See description.		other

Other Observations: _____

Borehole Specifications			Certification Statement					
Depth from Surface Feet to Feet		Borehole Diameter (inches)	I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief					
0	20	3.75	Name	CLEAR HEART DRILLING INC				
20	170	3.75	Person, Firm or Corporation					
			555 B W COLLEGE AVENUE	SANTA ROSA	CA	95401		
			Address	City	State	Zip		

Certification Statement			
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief			
Name	CLEAR HEART DRILLING INC		
Person, Firm or Corporation			
555 B W COLLEGE AVENUE	SANTA ROSA	CA	95401
Address	City	State	Zip
Signed	<i>electronic signature received</i>	03/07/2023	780357
C-57 Licensed Water Well Contractor		Date Signed	C-57 License Number

DWR Use Only				
CSG #	State Well Number	Site Code	Local Well Number	
			N	
				W
Latitude Deg/Min/Sec			Longitude Deg/Min/Sec	
TRS:				
APN:				

DUPLICATE

Driller's Copy

Page 1 of 1

Owner's Well No.

Date Work Began 6-17-1996, Ended 6-24-1996Local Permit Agency Sonoma CountyPermit No. WEL96-0185STATE OF CALIFORNIA
WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 468271

DWR USE ONLY — DO NOT FILL IN			
STATE WELL NO./STATION NO.			
LATITUDE		LONGITUDE	
APN/TRS/OTHER			

Permit Date 6-10-1996

GEOLOGIC LOG							WELL OWNER						
ORIENTATION (✓)	<input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> HORIZONTAL <input type="checkbox"/> ANGLE (SPECIFY)						Name <u>Tom Gawronski</u>						
DEPTH FROM SURFACE	DEPTH TO FIRST WATER <u>230</u> (Ft.) BELOW SURFACE						Mailing Address <u>2000 Longhorn Lane</u>						
Ft. to Ft.	DESCRIPTION <i>Describe material, grain size, color, etc.</i>						CITY <u>Petaluma</u>	STATE <u>CA</u>	ZIP <u>94952</u>				
0 180	clay with embedded gravel						WELL LOCATION						
180 240	sandstone						Address <u>same</u>						
240 270	dark gray chert						City <u>Sonoma</u>						
270 300	shale						County <u>Sonoma</u>						
300 340	lt. gray chert						APN Book <u>020</u> Page <u>130</u> Parcel <u>025</u>						
							Township <u>or</u> Range <u>or</u> Section <u>or</u>						
							Latitude <u>38° 15' 00" N</u> Longitude <u>122° 30' 00" W</u>	DEG. <u>38</u>	MIN. <u>15</u>	SEC. <u>00</u>	DEG. <u>122</u>	MIN. <u>30</u>	SEC. <u>00</u>
							LOCATION SKETCH						
							ACTIVITY (✓) <input checked="" type="checkbox"/> NEW WELL MODIFICATION/REPAIR <input type="checkbox"/> Deepen <input type="checkbox"/> Other (Specify) <input type="checkbox"/> DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")						
							PLANNED USE(S) (✓) <input type="checkbox"/> MONITORING WATER SUPPLY <input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Public <input type="checkbox"/> Irrigation <input type="checkbox"/> Industrial <input type="checkbox"/> "TEST WELL" <input type="checkbox"/> CATHODIC PROTECTION <input type="checkbox"/> OTHER (Specify)						
							DRILLING METHOD <u>Rotary</u> AIR FLUID WATER LEVEL & YIELD OF COMPLETED WELL DEPTH OF STATIC <u>182</u> (Ft.) & DATE MEASURED <u>6-24-96</u> ESTIMATED YIELD <u>45</u> (GPM) & TEST TYPE <u>air lift</u> TEST LENGTH <u>2</u> (Hrs.) TOTAL DRAWDOWN <u>N/A</u> (Ft.)						
							<i>* May not be representative of a well's long-term yield.</i>						
TOTAL DEPTH OF BORING <u>340</u> (Feet)													
TOTAL DEPTH OF COMPLETED WELL <u>328</u> (Feet)													

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING(S)						DEPTH FROM SURFACE	ANNULAR MATERIAL			
		TYPE (✓)		MATERIAL/ GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)		TYPE			
Ft. to Ft.	BLANK	SCREEN	CONDUCTOR					FILL PIPE	CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 23	10								0 3	<input checked="" type="checkbox"/> X		concrete
23 340	8								3 22		<input checked="" type="checkbox"/> X	grout
0 208	X				plastic	5	SDR-21		22 328		<input checked="" type="checkbox"/> X	pea gravel
208 328		X			plastic	5	SDR-21	.032				

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.					
HUCKFELDT WELL DRILLING					
NAME <u>HUCKFELDT WELL DRILLING</u> (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)					
ADDRESS <u>2110 Penny Lane</u>			CITY <u>Napa</u> STATE <u>CA</u> ZIP <u>94559</u>		
Signed <u>John H. Huckfeldt</u> WELL DRILLER/AUTHORIZED REPRESENTATIVE			DATE SIGNED <u>6-25-96</u> C-57 LICENSE NUMBER <u>439-746</u>		

ORIGINAL
File Original, Duplicate and Triplicate with the
REGIONAL WATER POLLUTION
CONTROL BOARD No. _____
(Insert appropriate number)

WATER WELL DRILLERS REPORT
(Sections 7076, 7077, 7078, Water Code)
RECEIVED
REGIONAL WATER POLLUTION CONTROL BOARD #2
CALIFORNIA

Do Not Fill In
No. 14978
State Well No. 4N/2147
Other Well No. 1476

29 1954

Name _____
Address _____

(2) LOCATION OF WELL:
County Sonoma Owner's number, if any _____
R. F. D. or Street No. 4915 D. St. Ext.
Petaluma, Calif.

(3) TYPE OF WORK (check):
New well Deepening Reconditioning Abandon
If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):
Domestic Industrial Municipal
Irrigation Test Well Other

(5) EQUIPMENT:
Rotary
Cable
Dug Well

(6) CASING INSTALLED:
SINGLE DOUBLE
From ft. to 47 ft. 8 Diam. 10 Gage or Wall

		Diameter of Bore	from ft.	to ft.
47	"	"	"	"
48	"	"	"	"
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