

Water Availability Analysis

Charles Haas
2 Swanston Road
Saint Helena, CA 94575

Charles Haas

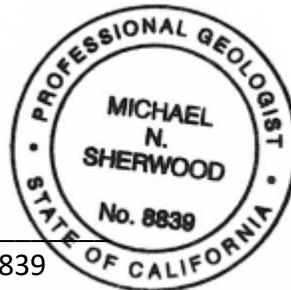
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A handwritten signature in blue ink that reads "Michael Sherwood".

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Introduction

The applicant, Charles Haas, is seeking permits from the County of Napa to construct a vineyard on his property at 2 Swanston Road (Napa County APN 021-352-036) located in the “hillside” aquifer near the city of Saint Helena, CA (Figure 1). Water for the project will be provided by an off-site well located on parcel APN 021-390-012 to the south of the project parcel (Figure 1). This well is operated by the Vailima Estates Mutual Water Company.

A Tier 1 Water Availability Analysis (WAA) was prepared by HDVines LLC (Appendix A). This report comprises the Tier 2 WAA to evaluate potential well interference effects. The WAA was developed based on the guidance provided in the Napa County Department of Planning, Building, & Environmental Services' Water Availability Analysis Guidance Document formally adopted by the Napa County Board of Supervisors in May 2015. The WAA includes the following elements: estimates of existing and proposed water use within the project area, compilation of drillers' logs from the area and characterization of local hydrogeologic conditions, an analysis of the potential for well interference at neighboring wells located within 500-ft of the project well (Tier 2 WAA). Potential interaction between groundwater and streamflow in the Napa River (Tier 3 WAA) are insignificant per PBES guidance criteria because the project well is greater than 1,500 ft from the centerline of the Napa River; no other “significant streams” are nearby.

Limitations

Groundwater systems of Napa County and the Coast Range 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.

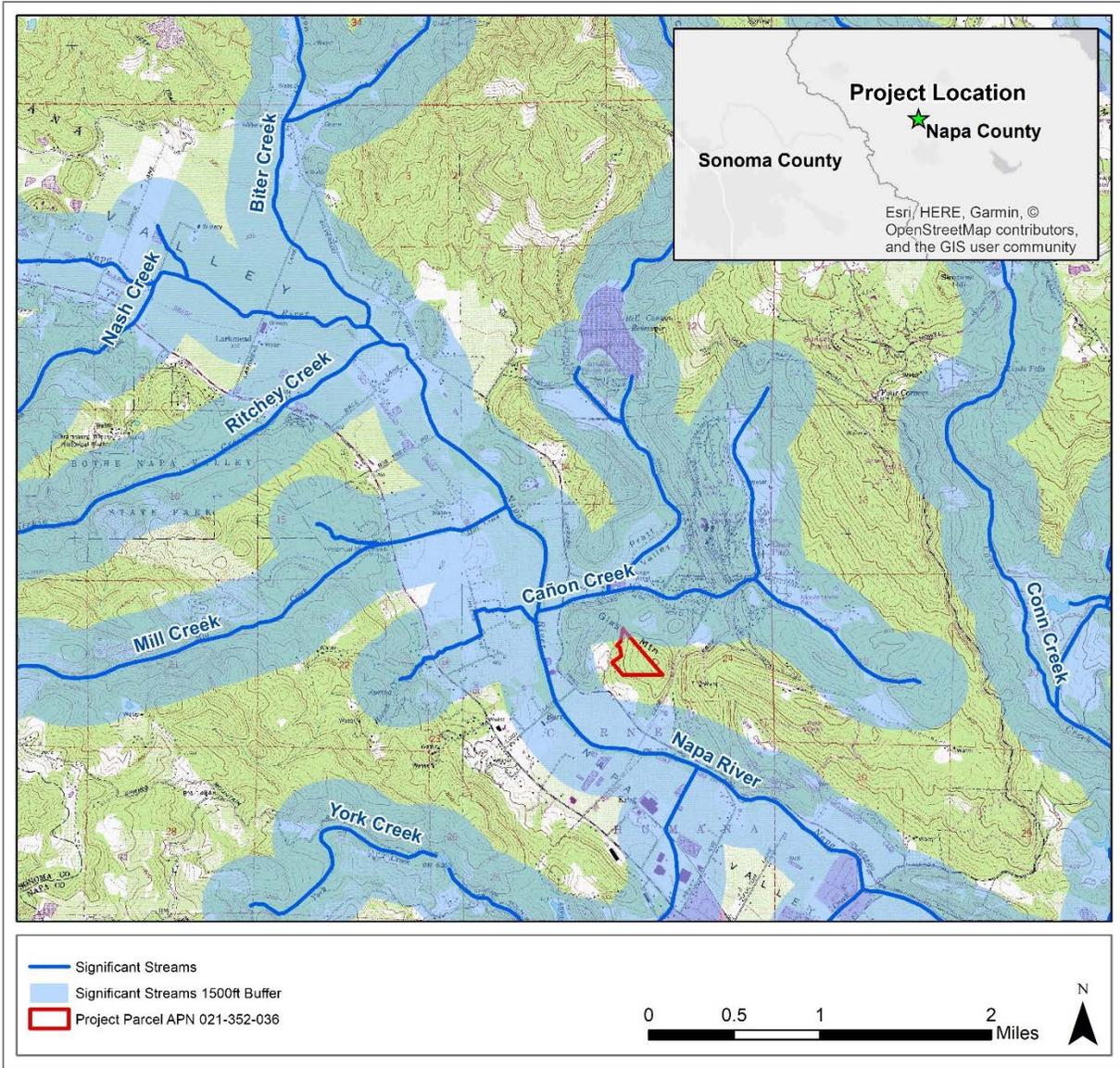


Figure 1: Project location map.

Hydrogeologic Conditions

The project parcel is located near Glass Mountain east of the Napa River (Figure 2). The water supply well for this project is located near the base of Glass Mountain, on the floor of Napa Valley at a distance of 1,515 feet from the centerline of the Napa River at it's nearest point.

The surficial geology at the project well is Holocene-aged alluvial deposits (map unit Qha). Map Unit Qha is described as Holocene-aged alluvium; sand, silt and gravel deposited in fan, gravelly fill, terrace, or basin environments. Map Unit Qht is described as moderately well-sorted sand, silt and clay deposited in point bar and overbank settings. Nearby surficial geology on Glass Mountain and other highland areas is characterized by Holocene-aged terrace deposits nearer to the Napa River (map unit Qht) as well as Tuffaceous ash flow and Rhyolite flows of the Sonoma Volcanics (Map Units Tsa and Tst respectively). Map unit Tst is described as pumiceous tuff, locally welded and agglomeratic tuff, andesite, and basalt flow rocks, tuff breccia, and bedded tuff (Graymer et al., 2007) and is the primary bedrock material in the project study area.

Geologic logs for wells constructed in surficial units of Holocene deposits indicate that these deposits extend between 50 and 150 feet below ground surface (bgs) in the vicinity of the project well. Wells constructed in surficial alluvial and terrace deposits are screened partially or entirely within the underlying Sonoma volcanics. Well yields in this unit are low, typically between 16 and 50 gallons per minute (GPM); a few wells yield over 100 gpm. Low well yields are due to fine texture and low porosity within the rock and groundwater permeability and yields are typically low and dependent on faulting and fractures (LSCE, 2013). No fault activity was observed in the vicinity of the project, the nearest active fault zone is the West Napa Fault zone located approximately 4,100 feet to the southwest of the project well.

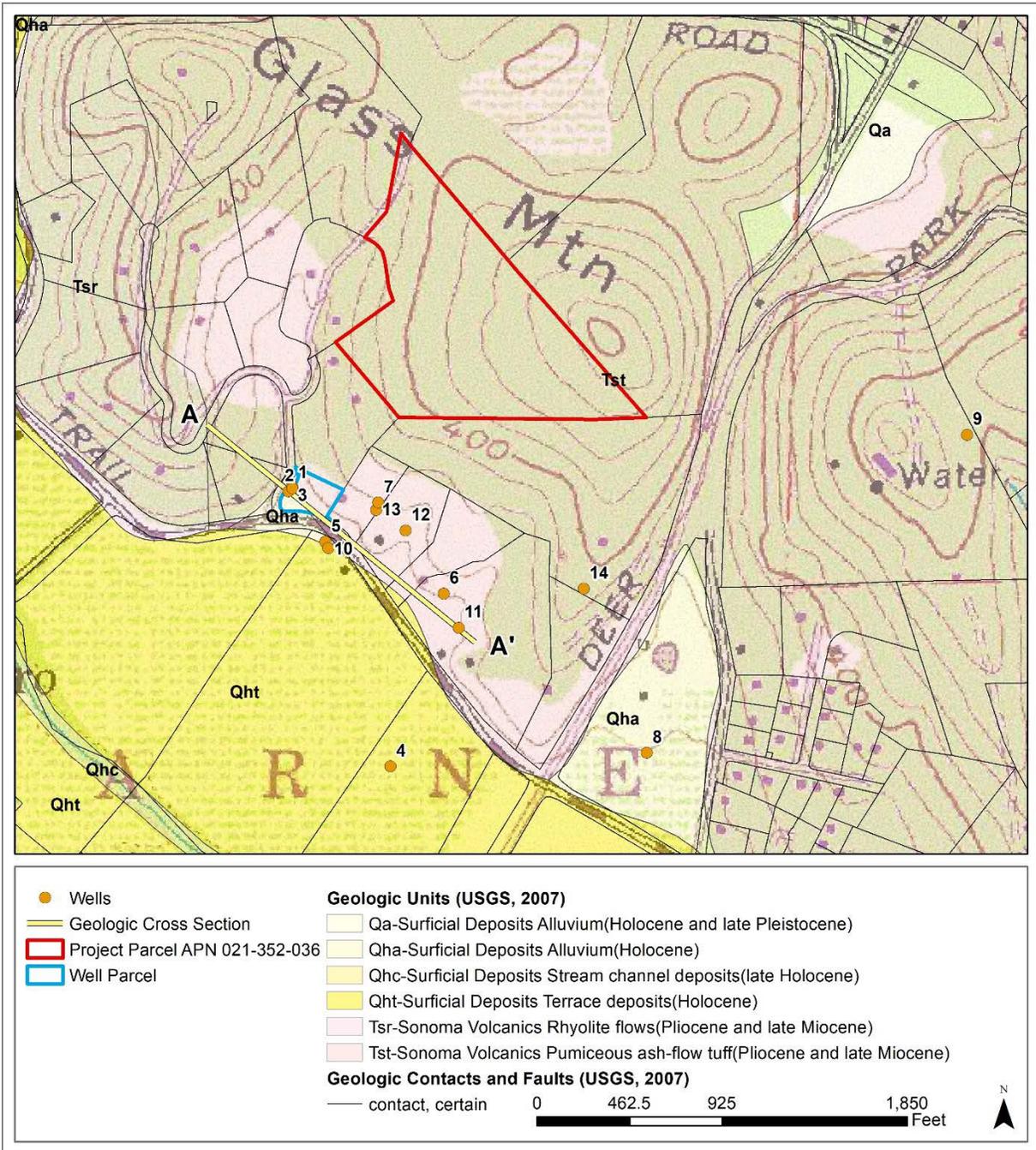


Figure 2: Surficial geology and locations of wells in the vicinity of the project parcel. Surficial geology based on data from the Geologic Map and Map Database of Eastern Sonoma and Western Napa Counties, California (Graymer et al., 2007)

Well Data

Well Completion Reports (WCR's) for wells within the vicinity of the project parcel were obtained through the California Department of Water Resources (DWR) Well Completion Report Map Application. A subset of these logs was compiled (Appendix A) and georeferenced based on parcel and location sketch information and information gathered using the Napa County Public records search (Figure 2). Additional information about onsite wells was provided by the project applicant.

Water demand for this project will be met by a community well located offsite from the project parcel (Well 2, Figure 2). Well 2 is located on parcel APN 021-390-012 south of the project parcel and is owned and operated by The Vailima Estates Mutual Water Company. This well provides service to 14 users across 113 acres (Appendix B, WAA Vicinity Map). Two other wells are located on the project parcel, one is used as a backup water supply well (Well 1); the other is not in use (Well 3). A well completion report was available for the project well (Well 2) but no information was identified for the other wells on the parcel.

Well 2 was constructed in December 2014 to a depth of 380 feet. A two-hour airlift pump test reported a yield of 160 gpm and a static water level of 25 ft bgs. An 8-hour pump test was conducted on the project well May 7, 2015, by Oakville Pump Service Inc. It reported a well yield of 110 gpm with 71.3 ft of drawdown, an initial static water level of 26.4 ft bgs, and a 3 hour recovery time. The geologic log for this well reports alluvial deposits extending 55 feet bgs followed by layers of ash, tuff, and volcanic sands for the remaining 325 feet. Materials encountered below the alluvial deposits are consistent with the tuff of the Sonoma Volcanics (unit Tst).

The nearest wells to the project well are Wells 5 and 10, located approximately 312 and 345 feet to the southeast respectively. Both of these wells are located on parcel APN 021-353-013. Only one WCR could be located for a well located on this parcel however it was not clear which well it is associated with. This WCR was assigned to Well 5 though due to their close proximity and a lack of description on the WCR, it is impossible to discern which well the WCR refers to. The WCR reports that the well was completed to a depth of 300 ft bgs and the geologic log reported clay and gravel to 150 feet bgs and volcanic rock for the remainder. A 9 hour airlift pump test conducted in June 2015 reported an estimated yield of 40 gpm with 100 ft of drawdown and an initial static water level of 20 ft bgs.

Fourteen other wells were identified in the vicinity of the project parcel. Of these wells, only eight WCRs could be located. Other wells in the project area are screened partially or entirely within the Sonoma Volcanics, including those constructed within surficial quaternary deposits. These wells range in depth from 86 to 560 feet bgs and report static water levels between 18 and 400 feet bgs. Static water levels are typically closer to ground surface in wells that are lower in elevation and closer to the Napa River than in those higher up Glass Mountain. Reported well yields range from 7 to 160 gpm as reported in WCRs. Geologic logs for most wells screened in alluvial deposits near the project report volcanics within 150 ft bgs. Well 4, constructed much

nearer to the Napa River than other wells in this study, encounters only sands, gravels, and clay for the entirety of the 470 foot depth.

Table 1: Well completion details for the project wells (Well 1 & Well 2) and neighboring wells near and within the project recharge area.

Well ID	1	2	3	4	5	6	7
Year Completed	-	2014	-	2000	2014	2008	1993
Depth (ft)	-	380	288	470	380	394	275
Static Water Level (ft)	-	25	35	18	20	20	60
Estimated Yield (gpm)	-	160	-	130	40	70	50
Top of Screen (ft)	-	100	-	35	140	120	220
Bottom of Screen (ft)	-	360	-	470	380	397	275
Geologic Map Unit	-	Qha	Tst	Qht	Qht	Tst	Tst
DWR WCR No.	Loc Only.	e0237626	E16-00827	774354	E14-00404	1073691	384929
Well ID	8	9	10	11	12	13	14
Year Completed	1983	1989	-	-	-	1972	2007
Depth (ft)	280	510	-	-	-	86	560
Static Water Level (ft)	75	400	-	-	-	45	147
Estimated Yield (gpm)	50	100	-	-	-	7	125
Top of Screen (ft)	140	360	-	-	-	40	215
Bottom of Screen (ft)	280	510	-	-	-	86	255
Geologic Map Unit	Qha	Tst	Qha	Tst	Tst	Tst	Tst
DWR WCR No.	119540	284954	Loc. Only	E22-00377	Loc. Only	4358	e057605

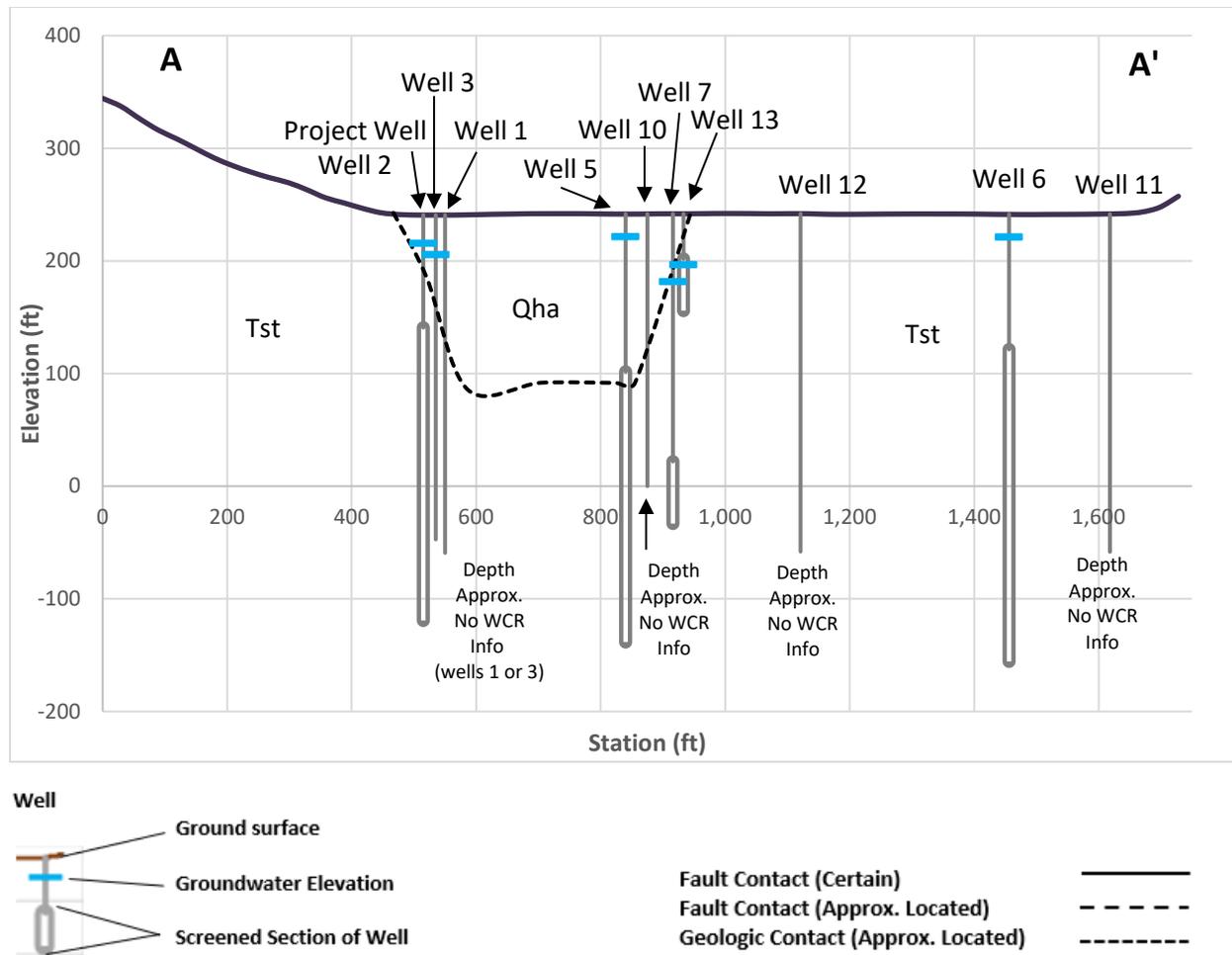


Figure 3: Hydrogeologic cross section A – A’ and B – B’ through the vicinity of the project parcel (see Figure 2 for location).

Geologic Cross Section

A geologic cross section oriented northwest to southeast is shown in Figure 3 (see Figure 2 for location). This cross section runs along the base of Glass Mountain, parallel to the Napa River and associated geologic deposits. Static water levels in reporting wells shown on the cross section are between 19 and 44 ft bgs. All wells near the cross section with available WCR’s are screened in their entirety within the Sonoma Volcanics. Static water levels are nearly all reported to be higher than the top of well perforations suggesting confined or semi-confined conditions.

Well Interference Analysis

The Napa County WAA guidance document indicates that a well interference analysis (Tier 2 WAA) is required if neighboring wells lie within 500-feet of a project well. The project proposes to add an additional 3.9 acres of vineyard on the project parcel which would increase demand on the project well by 1.35 AF annually. The total demand from the project parcel would be 3.9 AF/yr. The total demand from all users of the project well, as estimated by Vailima Estates Mutual Water averaged 9,759,280 gal/yr between 2017 and 2023. Average water use was above 11,000,000 gal/year in each of the years prior to the 2020 glass fire and dropped to under 8,200,000 gal/year in the three years since. Four neighboring wells were identified within 500 feet of the project well (Well 2). Wells 5 and 10 are located 312 and 345 feet respectively to the southeast of the project well parcel, and wells 7 and 13 respectively are located 451 and 448 feet to the east (Figure 6).

Drillers reports were obtained from the DWR and the County of Napa Electronic Document Retrieval portal for wells 2, 7, 13 and either 5 or 10. Two wells (5 and 10) were identified on parcel 021-353-013 in a 2018 Modification Permit, but only one WCR could be identified and it did not specify which well it referred to. As Wells 5 and 10 are constructed very near to each other, a well interference analysis has been conducted based on available information assuming that the WCR refers to the nearer Well 5, 312 feet from the project well.

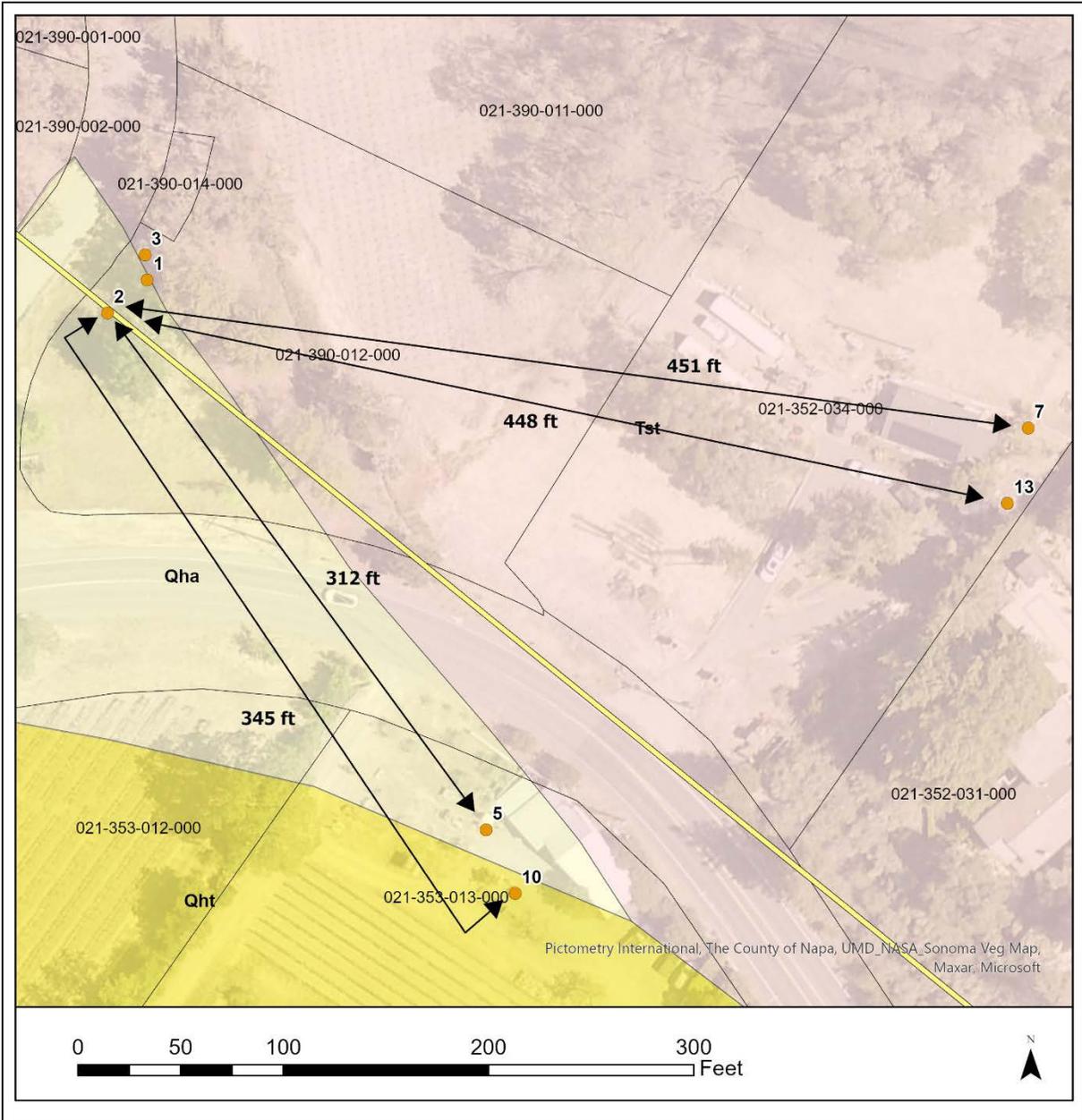


Figure 6. Locations of Project Well 2 in relation to neighboring wells within 500ft.

Approach

The Napa WAA guidance recommends applying the Theis equation to wells located within 500 ft of the project well to estimate drawdown. The Theis equation (from Driscoll, 1986) is as follows:

$$s' = (Q/4\pi T) W(u)$$

with $W(u)$ being the well function where

$$u = (r^2 S / 4 T t)$$

and the well function integral expanded as a series as:

$$W(u) = -0.5772 - \ln(u) + u - (u^2/2 \cdot 2!) + (u^3/3 \cdot 3!) - (u^4/4 \cdot 4!) \dots$$

where:

s' = drawdown (units in ft)

r = radial distance (units in ft)

S = storativity (dimensionless)

T = transmissivity (units in ft²/day)

Q = discharge at the well (in gpm)

t = time (days)

Several assumptions are made when using the Theis equation:

1. The aquifer is homogeneous, isotropic, uniformly thick and of infinite areal extent.
2. Prior to pumping, the piezometric surface is horizontal
3. The fully penetrating well is pumped at a constant rate.
4. Flow is horizontal within the aquifer.
5. Storage within the well can be neglected.
6. Water removed from storage responds instantaneously with a declining head.

The 2015 Napa County guidance document pertaining to WAA's allows for 10 to 15 feet of water level drawdown attributable to well interference. For wells with a casing diameter of six inches or less, drawdown of 10 feet is recommended as a threshold of concern; for wells with casing diameter greater than six inches, drawdown of 15 feet is recommended as a threshold of concern. Well 5 has a casing diameter of less than 6 inches, therefore the threshold of concern

for the neighboring wells is 10 feet. To estimate the potential drawdown at Well 5, 312 feet from Well 2, estimates of the parameters T, t and S defined above are required.

Estimated Aquifer Parameters

An eight-hour time-drawdown pumping test was performed on the project well in May 2015 by Oakville Pump Service Inc. (Appendix B, Pump Test). The pump test reports an initial static water level of 26.5 feet bgs. After pumping at a constant rate of 110 gpm for 5 hours and 45 minutes the observed water surface elevation was 97.8 feet bgs, a total drawdown of 71.3 feet. This pumping rate is the typical rate that the well is pumped for production, and groundwater levels recovered to within 2' of the original level within three hours of pump shutdown. Specific capacity was calculated to be 1.54 GPM/ft of drawdown. Additional aquifer parameters were derived from this pump test and geologic data, in accordance with the Napa County Water availability analysis guidelines.

Transmissivity

Transmissivity (T) of the aquifer at the wells can be estimated by two methods. First, T can be roughly approximated using single well pump test data and well theory, limited by a set of assumptions (Driscoll 1986, p. 1021). In this method, an empirical equation for confined and unconfined aquifers relates specific capacity (S_c , gallons per minute per foot of drawdown determined from a pump test) to transmissivity as:

$$2,000 S_c = T \text{ (confined aquifers); } 1,500 S_c = T \text{ (unconfined aquifers)}$$

Where S_c is in units of gallons per minute per foot (gpm/ft) and T is in units of gallons per day per foot (gpd/ft). This approximation of T should not be relied upon if time-drawdown pumping data are available. Such data are not available for the project well; hence, we use this approximation as described below.

Confined aquifer conditions are suggested by the extent and depth of clay-rich/bedrock strata overlying the water-bearing strata observed in Well Completion Reports. Consequently, one estimate of T is given by $2,000 S_c$. The eight-hour pump test of Well 2 in 2023 (Appendix B) gave $S_c = 1.54$ gpm/ft. Estimated T from this method is 3,085 gpd/ft, equivalent to about 412 ft²/day.

T can also be estimated using reference hydraulic conductivity (K) values for aquifer materials and multiplying by the saturated aquifer thickness (b) based on the definition $T = K b$. Napa County Guidance suggests a range of K values between 10^{-2} to 10^2 for Fractured Basalt (e.g., Sonoma Volcanics; Appendix G Table F3 in Napa 2015). A saturated aquifer thickness can be estimated by assuming conservatively that it only includes the screened interval of the well (saturated thickness is likely greater). Well 2 is screened from 100 ft to 360 ft bgs. Applying this to the range of K values gives a broad range of T values from 19 gpd/ft to 194,400 gpd/ft (2.6 to 26,000 ft²/day). The range of this estimate suggests that transmissivities could be lower than the

estimates derived from the pumping test results from May 2015 and that the estimate of T derived from the pumping test is in the lower portion of the possible range.

Storativity

Storativity (S) can be determined by an analytical pump test utilizing a pumping well and at least one observation well. The 2015 pump test of the project well did not include an observation well and therefore S values cannot be determined from the observations. A pump test including an observation well was however conducted by OEI in March 2023 at a property approximately 5 miles north of the project well in the same geologic unit (Tst). This test revealed a range of storativity values between 0.006 and 0.0008.

Standard values for S may also be used for this analysis. In an unconfined aquifer, S ranges from 0.01 to 0.3; in confined aquifers S ranges from about 0.001 to 0.00001 (Lohman 1972). This range of values of S for the confined aquifer were initially considered in the following analysis to estimate the drawdown of water elevation that might be experienced in neighboring wells. Our experience from aquifer pump tests (noted above), and other investigations of Napa Valley hydrogeology (discussed below) indicates that the low end of this range is not representative of this aquifer.

S can also be estimated for confined aquifers using known Specific Storage (S_s) values for certain aquifer materials and multiplying by the saturated aquifer thickness. Napa County Guidance suggests a range of specific storage values between 10^{-6} to 2.1×10^{-5} for “Rock, fissured” (Appendix G, Table F3, in Napa Guidance Document 2015). For confined aquifers Storativity (S) is equal to specific storage (S_s) times saturated thickness of the aquifer. Applying the estimated saturated thickness of 260 ft to the range of S_s values gives a low-range estimate of S of 0.00026.

Storativity of the tuff unit of the Sonoma Volcanics in the southern Napa Valley (Johnson, 1977) ranges from 0.0001 to 0.001. This range of S values is for the tuffaceous units of the Sonoma Volcanics in the MST aquifer. Although the MST aquifer is located in the southeast portion of Napa Valley, it may be reasonable to assume that hydrogeologic properties of these units are generally consistent between the two areas. This range matches more closely with the range of S values derived from the March 2023 pump test mentioned above (0.006 to 0.0008) indicating that the locally obtained values are appropriate.

Pumping Regime

Time since pumping began (t) for computing drawdown estimates was determined based on annual pumping records from the Vailima Estates Mutual Water Company from 2015 to 2022 (Appendix B, Pump Test) applied over a full year to estimate daily demand. The maximum annual water demand in the period was 30.0 AF for combined domestic and agricultural uses. The well is pumped at a rate of 110 gpm and if water is utilized evenly through the year, daily average demand is approximately 26,740 gallons per day. These values are based on the average of

reported water use in the period between 2017 and 2023 as reported by the client. In order to meet this average daily demand, the project well must be pumped 4.05 hours per day (0.17 days). The project well pumps to a 61,000 gallon storage tank which would provide just over two days of water supply so in reality this storage should allow for shorter duration and possibly less frequent pumping depending on actual daily demands. Due to uncertainties regarding irrigation practices of other users supplied by the Vailima Estates Mutual Water Company we have elected not to account for seasonal variations in pumping.

Estimated Drawdown

The Theis equation (Theis, 1935) (Eq. 1) is commonly solved using the Cooper-Jacob approximation to simplify the well function (Eq. 2, Cooper and Jacob, 1946). However, this approximation is only valid when u is below a defined value. Driscoll (1986) places this value at 0.05; Kruseman and de Ridder (1994) place it at 0.01. For the combinations of parameters evaluated in this study, u exceeds these values. Instead of using the Cooper-Jacob approximation, the well function was solved more generally as an upper incomplete gamma function (Eq. 3). The well function is a special case of the upper incomplete gamma function where a is equal to zero which may be solved using Wolfram Alpha¹, an advanced online mathematics engine (Eq. 4). Resulting values of the well function were substituted into the Theis equation:

$$s = \frac{Q}{4\pi T} w(u), \text{ where } u = \frac{r^2 S}{4Tt}, \text{ and } w(u) = \int_u^\infty \frac{e^{-x}}{x} dx \quad (1)$$

Where s = drawdown (m), Q = pumping rate (m^3/day), T = transmissivity (m^2/day), r = distance from pumped well (m), S = storativity (dimensionless), and t = time since pumping began (days).

$$w(u) \cong -0.572 - \ln(u) \quad (2)$$

$$\Gamma(a, x) \equiv \int_x^\infty t^{a-1} e^{-t} dt \quad (3)$$

$$\Gamma(0, u) = \int_u^\infty t^{-1} e^{-t} dt = w(u) \quad (4)$$

Aquifer properties were estimated from well production data reported for Well 2 from the 8-hour pump test conducted in May 2015, County guidance and values found in the literature. The values of T used in this analysis range from a low value of 2.6 ft^2/day from the low end estimate range based on Napa County K values up to 412 ft^2/day determined from the specific capacity-based estimate. Storativity values ranging from 0.0008 to 0.006 were evaluated based on the range observed in similar geologic materials by OEI in a 2023 pump test. To meet the average daily demand of 26,740 gallons a pumping rate of 110 gpm for 4.05 hours per day (0.17 days) was used. Applying these parameters, estimated drawdown at Well 5 ranges from 0 to 4.6 ft (Table 11).

¹ <https://www.wolframalpha.com/input/?i=Gamma%5B0%2C+0%5D>

Table 11. Estimated drawdown at Well 2 using storativity values from March 2023 pump test.

	T	S	t (day)	Q (gpm)	r (ft)	Drawdown s (ft)
HIGH T HIGH S	412	0.006	0.17	110.0	312	0.17
HIGH T LOW S	412	0.0008	0.17	110.0	312	3.9
LOW T HIGH S	2.6	0.006	0.17	110.0	312	0.0
LOW T LOW S	2.6	0.0008	0.17	110.0	312	0.0

The WAA Tier 2 guidelines suggest a threshold of concern for drawdown of 15 feet for wells with a casing diameter greater than six inches and 10 ft for wells with a casing diameter less than or equal to six inches. The casing diameter of Well 2 is reported to be 8 inches in diameter, while the casing for Well 5 is reported to be 6 inches. For purposes of this analysis, we will assume the smaller threshold of concern of 10 ft. All combinations of T and S evaluated show that the pumping of Well 2 to meet peak demand will not cause significant drawdown in the nearest neighboring well

As noted previously, a pumping test to estimate local values of T and S in the portion of the aquifer nearer to the project well would reduce uncertainty regarding potential drawdown effects. Such a test is typically conducted over a substantial duration (> 24 hours) by pumping the project well at a steady rate and observing groundwater elevation in the pumping well and one or more nearby wells. The inclusion of observation wells in addition to the pumping well is necessary to estimate S. The prior pumping tests of Well 2 provide estimates of T only. A longer test would provide a somewhat better estimate of T and, with the inclusion of an observation well or wells, an estimate of S. That said, S values derived from the March 2023 pumping test in similar aquifer materials offers a representative range.

For perspective on how sensitive drawdown is to S values we solved the Theis equation iteratively to find what S value would predict a drawdown of 9.9 feet in response to pumping at Well 1, 312 feet from Well 5. This analysis found that S values of 5.18×10^{-5} and 1.714×10^{-4} yielded 9.9 feet of drawdown for a transmissivity of 2.6 ft²/day and 412 ft²/day, respectively. These values are on the lower end of the range of storativity values provided by Lohman 1972 and one or two orders of magnitude lower than the storativity values found in OEI's 2023 pump test in similar aquifer material. This analysis of sensitivity of drawdown to S provides additional confidence that the project well is not likely to cause significant well interference because S would have to be significantly lower than documented values of S for the Sonoma Volcanics in Napa County.

Table 13. Estimated drawdown at Well 5 after pumping 4.05 hours at 110 gpm at Well 1 across a range of Storativity.

T	S	t (day)	Q (gpm)	r (ft)	Drawdowns (ft)
412.0	0.00010	0.17	110.0	312	11.4
412.0	0.000140	0.17	110.0	312	10.0
412.0	0.000141	0.17	110.0	312	9.9
2.6	0.000141	0.17	110.0	312	0.0
2.6	0.00010	0.17	110.0	312	0.4
2.6	0.00006	0.17	110.0	312	5.6
2.6	0.00005	0.17	110.0	312	9.9
2.6	0.00005	0.17	110.0	312	11.3
2.6	0.00001	0.17	110.0	312	323.1

Well Interference Analysis Conclusion

This analysis indicates that pumping the project well (Well 2) is unlikely to result in significant drawdown at neighboring wells including Well 5 under all parameter combinations evaluated. Moreover, the estimated increase in pumping required for this project is less than 1% of the existing daily demand, which is effectively indistinguishable from existing use of the project well operated by The Vailima Estates Mutual Water Company.

Summary

This project concerns the construction of 3.9 acres of vineyard on the property at 2 Swanston Ave Road in Saint Helena CA. A Tier 1 WAA has been completed by HDVine LLC. Water from this project is supplied by a community well at 2971 Silverado Trail and operated by the Vailima Estates Homeowners Association. This well lies within 500 feet of four neighboring wells. Based on Theis-drawdown analysis using the likely range of aquifer hydraulic parameters, it is unlikely that the additional 1.35 acre-ft of water for this project will result in significant drawdown at neighboring wells.

References

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APPENDIX A
WELL COMPLETION REPORTS

ORIGINAL
File with DWR

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

DWR USE ONLY -- DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

Page 1 of 1

Owner's Well No. -2014

No. **e0237626**

Date Work Began 12/9/2014, Ended 12/18/2014

Local Permit Agency Napa County Environmental Mgmt

Permit No. E14-00932

Permit Date 11/18/2014

DEPTH FROM SURFACE		DESCRIPTION
Ft.	to Ft.	
0	5	BROWN CLAY
5	35	LARGE SAND & GRAVEL
35	55	TAN, GRAY SAND & GRAVEL
55	65	SANDY TAN ASH
65	70	VOLCANIC SANDS
70	75	TAN VOLCANIC TUFF
75	315	GRAY, BROWN VOLCANIC SANDS
315	320	SANDY TAN ASH
320	365	VOLCANIC SANDS
365	400	DARK GRAY MIXED VOLCANICS

WELL OWNER

Name: [REDACTED]

Mailing: [REDACTED]

St. Helena CA 94574

CITY STATE ZIP

WELL LOCATION

Address Bournemouth Road

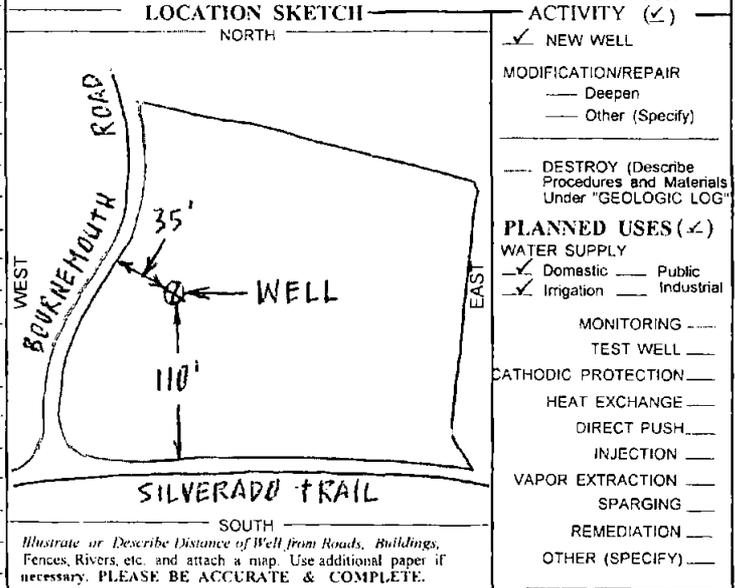
City St. Helena CA

County Napa

APN Book 021 Page 390 Parcel 012

Township Range Section

Latitude



RECEIVED

JAN 29 2015

Napa County Planning, Building & Environmental Services

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER N/A (Ft.) BELOW SURFACE 1

DEPTH OF STATIC WATER LEVEL 25 (Ft.) & DATE MEASURED 12/18/2014

ESTIMATED YIELD 160 (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.

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)				
		TYPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	400	15				
0	100		PVC F480	8	SDR-21	
100	300		PVC F480	8	SDR-21	.032
300	320		PVC F480	8	SDR-21	
320	360		PVC F480	8	SDR-21	.032
360	380		PVC F480	8	SDR-21	

DEPTH FROM SURFACE	ANNULAR MATERIAL			
	TYPE	CEMENT	BEN-TONITE	FILL
0	60	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
60	385			<input checked="" type="checkbox"/>
385	400			<input checked="" type="checkbox"/>

ATTACHMENTS

Geologic Log

Well Construction Diagram

Geophysical Log(s)

Soil/Water Chemical Analysis

Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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

NAME HUCKFELDT WELL DRILLING, INC.

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

2110 Penny Lane Napa CA 94559

ADDRESS CITY STATE ZIP

Signed [Signature] DATE SIGNED 01/18/15 439-746

WELL DRILLER/AUTHORIZED REPRESENTATIVE C-57 LICENSE NUMBER



Well 1, 2 and 3 Locations



Old Well

Well 1

Well 2

Bourbonmouth Rd

Silverado Trail

1993

5914

© 2016 Google

38°31'43.31" N 122°29'08.84" W elev 232 ft eye alt 51

Google Ea

STATE OF CALIFORNIA
WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. **774354**

021-353-03

DWR USE ONLY - DO NOT FILL IN

STATE WELL NO./STATION NO. 21-353-03

LATITUDE _____ LONGITUDE _____

APN/TRS/OTHER _____

Page 1 of 1
 Owner's Well No. 7-15-00, Ended 7-22-00
 Date Work Began 7-15-00
 Local Permit Agency NY - 1117 Permit Date 2-10-00
 Permit No. 353-03

GEOLOGIC LOG

WELL OWNER

ORIENTATION (≠)		VERTICAL	HORIZONTAL	ANGLE	(SPECIFY)
DRILLING METHOD		<input checked="" type="checkbox"/>	<input type="checkbox"/>		
DEPTH FROM SURFACE		FLUID <u>mud</u>			
Ft.	to Ft.	DESCRIPTION			
Describe material, grain size, color, etc.					
0	22	brown clay			
22	50	gravel & cinders			
50	75	blue clay			
75	125	gravel & sand			
125	15	fine sand & gravel			
15	25	fine sand			
25	310	fine sand & gravel			
310	320	gravel			
320	330	gravel & sand			
330	440	brown ash			
440	460	grayish black rock			
460	470	brown clay			

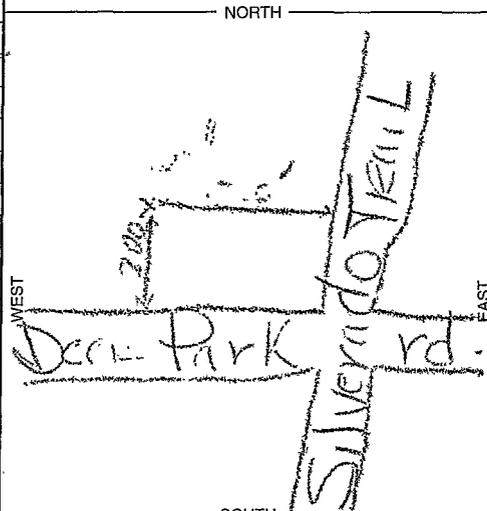
Name: _____
 Mailing Address: _____
 CITY _____ STATE _____ ZIP _____

Address _____
 City _____
 County _____

APN Book _____ Page _____ Parcel 21-353-03
 Township _____ Range _____ Section _____

Latitude _____ NORTH _____ 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 126 (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL 18 (Ft.) & DATE MEASURED 7-22-00

ESTIMATED YIELD 130 (GPM) & TEST TYPE Surf Pit

TEST LENGTH 4 (Hrs.) TOTAL DRAWDOWN 440 (Ft.)

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

RECEIVED

AUG 31 2000

TOTAL DEPTH OF BORING 470 (Feet)

TOTAL DEPTH OF COMPLETED WELL 470 (Feet) DEPT. OF ENVIRONMENTAL MANAGEMENT

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	CONDUIT	FILL PIPE							Ft.	to Ft.	CE- MENT (≠)
0	35	1 1/2	✓			PESTIC	6	200	0	23	✓			
35	470	7 1/2	✓						23	470				fine gravel

ATTACHMENTS (≠)

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

CERTIFICATION STATEMENT

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

NAME Fuller Well Drilling
 (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

2577 Piedmont Ave. N. J. 94.55
 ADDRESS CITY STATE ZIP

Signed Tom Fuller DATE SIGNED 7-25-00 24817
 WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

WELL COMPLETION REPORT - STATE OF CALIFORNIA

Page 1 of 1 No# 994802
 Owner's Well No. 1
 Permit Date: 6/12/2014 Permit # E14-00404 State Well No./Station No.
 Date Work Began 6/16/2014 Ended 6/23/2014
 Permit Agency Dept of Permits & Resource Management APN/TRS/Other

GEOLOGIC LOG
 ORIENTATION: Vertical
 DRILLING METHOD: Rotary
 FLUID: Mud

WELL OWNER
 Name: Titus Lee and Sons
 Mailing Address: PO Box 608
St Helena, CA 94574

Ft	to	Ft	DESCRIPTION
0		4	Top soil
4		10	Brown clay
10		24	Brown clay with gravel
24		60	Brown clay
60		68	Gravel
68		120	Brown clay
120		130	Brown clay with gravel
130		134	Gravel and some clay
134		144	Brown clay
144		150	Brown clay
150		154	Soft volcanic rock
154		164	Volcanic rock with clay
164		244	Soft gray volcanic rock
244		264	Soft brown volcanic rock
264		284	Soft red volcanic rock
284		310	Soft brown volcanic rock
310		384	Soft gray volcanic rock

WELL LOCATION
 Address: 2971 Silverado Trail
 City: St Helena
 County: Napa
 APN Book 021 - 353 - 013
 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 _____ Public _____
 Irrigation _____ Industrial _____

WATER LEVEL & YIELD OF COMPLETED WELL
 Depth to First Water (ft.) BELOW SURFACE _____
 Depth of Static _____ Date Measured: 6/23/2014
 Water Level (Ft) 20 Test Length/Test type: 9 hrs Airlift
 Estimate Yield (GPM)* 40, 100+ Total draw 100, 200-370
 TOTAL DEPTH OF BORING (FT): 384
 TOTAL DEPTH OF COMPLETED WELL (FT): 380
 *May not be representative of a well's long-term yield

Depth from surface	Bore-hole diameter	Type		Material Grade	Diameter	Gauge	Slot Size	Depth		Annular Material Seal Material
		Blank	Screen					From Surface	From Surface	
Ft to Ft	Inches							Ft to Ft		
0: 140	9 7/8	XX		PVC	5	200		0: 50		Concrete
140: 380	9 7/8		XX	PVC	5	200	0.032	50: 380		12x20 & 8x16 mix

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 / 8/23/2014 261084
 Well Driller/Authorized Representative (Lupe) Date C-57 License #

DWR Driller Owner Local

RECEIVED
 JUL 10 2014
 Napa County Planning, Building & Environmental Services

QUADRUPPLICATE For Local Requirements

Well 6

021-352-041

STATE OF CALIFORNIA
WELL COMPLETION REPORT

Refer to Instruction Pamphlet

DWR USE ONLY DO NOT FILL IN

STATE WELL NO./STATION NO. 1181010A

LATITUDE _____ LONGITUDE _____

APN/TRS/OTHER _____

Page _____ of _____

Owner's Well No. 3-27-08 Ended 3-31-08 No. 1073691

Date Work Began 3-27-08 Ended 3-31-08

Local Permit Agency Napa County

Permit No. 207-00364 Permit Date 11-26-07

ORIENTATION (∠)		DRILLING METHOD	FLUID	ANGLE (SPECIFY)
VERTICAL		rotary	Mud	
DEPTH FROM SURFACE		DESCRIPTION		
Ft.	to Ft.	Describe material, grain size, color, etc.		
0	15	brown ash & clay		
15	50	brown ash, boulders & gravel		
50	110	brown ash & clay		
110	397	purple ash, streaks of black & brown ash & rocks		

WELL OWNER

Name _____

Mailing Address _____

CITY _____ STATE _____ ZIP _____

WELL LOCATION

Address 2408 Silverado Trk.

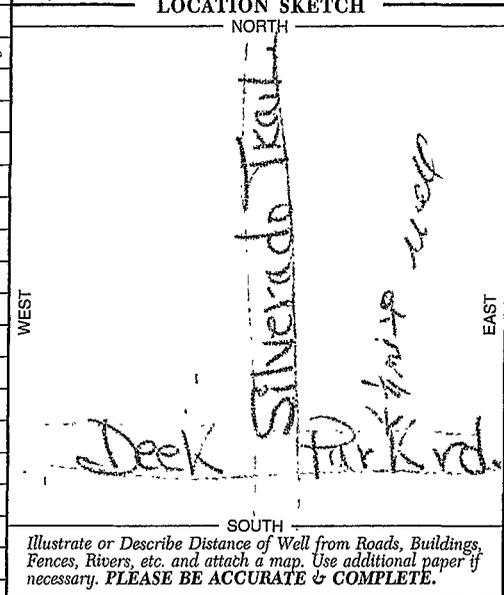
City St Helena

County Napa

APN Book _____ Page _____ Parcel 021-352-006

Township _____ Range _____ Section _____

Lat _____ Long _____



ACTIVITY (∠)

NEW WELL

MODIFICATION/REPAIR

 ___ Deepen

 ___ Other (Specify) _____

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

USES (∠)

WATER SUPPLY

 ___ Domestic ___ Public

Irrigation ___ Industrial

MONITORING ___

TEST WELL ___

CATHODIC PROTECTION ___

HEAT EXCHANGE ___

DIRECT PUSH ___

INJECTION ___

VAPOR EXTRACTION ___

SPARGING ___

REMEDICATION ___

OTHER (SPECIFY) ___

RECEIVED

DEC 31 2008

DEPT. OF ENVIRONMENTAL MANAGEMENT

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 50 (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL 20 (Ft.) & DATE MEASURED 3-31-08

ESTIMATED YIELD 70 (GPM) & TEST TYPE AIR LIFT

TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN 240 (Ft.)

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

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)					
		TYPE (∠)	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	
0	56	11"	X	1245710	5"	200	
56	120	7"	X		"	"	
120	347	7"		FOOT PIPE	"	"	1/2"

DEPTH FROM SURFACE	ANNULAR MATERIAL			
	CE-MENT (∠)	BEN-TONITE (∠)	FILL (∠)	FILTER PACK (TYPE/SIZE)
0	56	X		
56	347			WOOL PACK

ATTACHMENTS (∠)

___ Geologic Log

___ Well Construction Diagram

___ Geophysical Log(s)

___ Soil/Water Chemical Analyses

___ Other _____

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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

NAME Pulliam Well Drilling

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

2877 Piedmont Av. Napa, Ca. 94558

ADDRESS _____ CITY _____ STATE _____ ZIP _____

Signed Bill Pulliam DATE SIGNED 4-4-08 C-57 LICENSE NUMBER 248677

Well 7

21 ~~31~~ - 352 - 034

021 - 352 - 034

#4358

QUADRUPPLICATE
Use to comply with
local requirements

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

Do not fill in

No. **384929**

Notice of Intent No. _____

State Well No. _____

Local Permit No. or Date _____

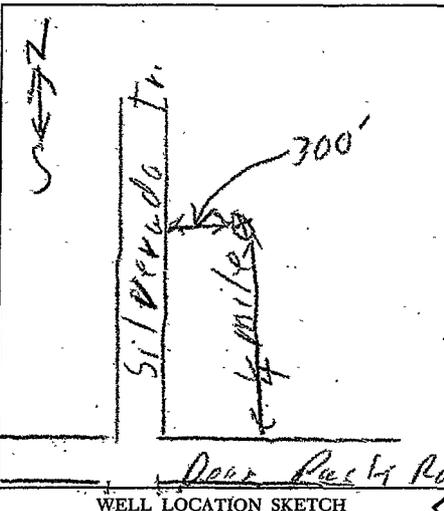
Other Well No. _____

(1) OWNER: Name [Redacted]
Address [Redacted]
City [Redacted] ZIP _____

(12) WELL LOG: Total depth 280 ft. Completed depth 275 ft.
from ft to ft. Formation (Describe by color, character, size or material)

(2) LOCATION OF WELL (See instructions):
County 28 Owner's Well Number _____
Well address if different from above 300'
Township 21 Range 352 Section 34
Distance from cities, roads, railroads, fences, etc. 4 mi. N of Deer Park rd. in Silverado trail

0 - 110' brown wash
110 - 120' red ash
120 - 240' brown wash with black & red ash
240 - 280' yellow wash with black & red



(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
Municipal
Other (Describe)

(5) EQUIPMENT:
Rotary Reverse
Cable Air
Other Bucket

(6) GRAVEL PACK:
Yes No Size 1/4"
Diameter of bore 12"
Racked from 26' to 275'

(7) CASING INSTALLED:

Steel <input type="checkbox"/>	Plastic <input checked="" type="checkbox"/>	Concrete <input type="checkbox"/>	
From ft.	To ft.	Dia. in.	Gage or Wall
0	275	9	160

(8) PERFORATIONS:

From ft.	To ft.	Slot size
220	275	Factory

RECEIVED
JUN 21 1993

DEPT. OF ENVIRONMENTAL MANAGEMENT

(9) WELL SEAL:
Was surface sanitary seal provided? Yes No If yes, to depth 26 ft.
Were strata sealed against pollution? Yes No Interval 1 ft.
Method of sealing Cement

Work started 10-28-1992 Completed 11-5-1992
WELL DRILLER'S STATEMENT:

(10) WATER LEVELS:
Depth of first water, if known 80 ft.
Standing level after well completion 60 ft.

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

(11) WELL TESTS:
Was well test made? Yes No If yes, by whom? Driller
Type of test Pump Bailer Air lift
Depth to water at start of test 60 ft. At end of test 260 ft.
Discharge 50 gal/min after 2 hours Water temperature _____
Chemical analysis made? Yes No If yes, by whom? _____
Was electric log made? Yes No If yes, attach copy to this report

Signed Tom Puller (Well Driller)
NAME Puller Well Drilling
(Person, firm, or corporation) (Typed or printed)
Address 2871 Piedmont Ave
City N. J. ZIP 11553
License No. 245677 Date of this report 11-5-92

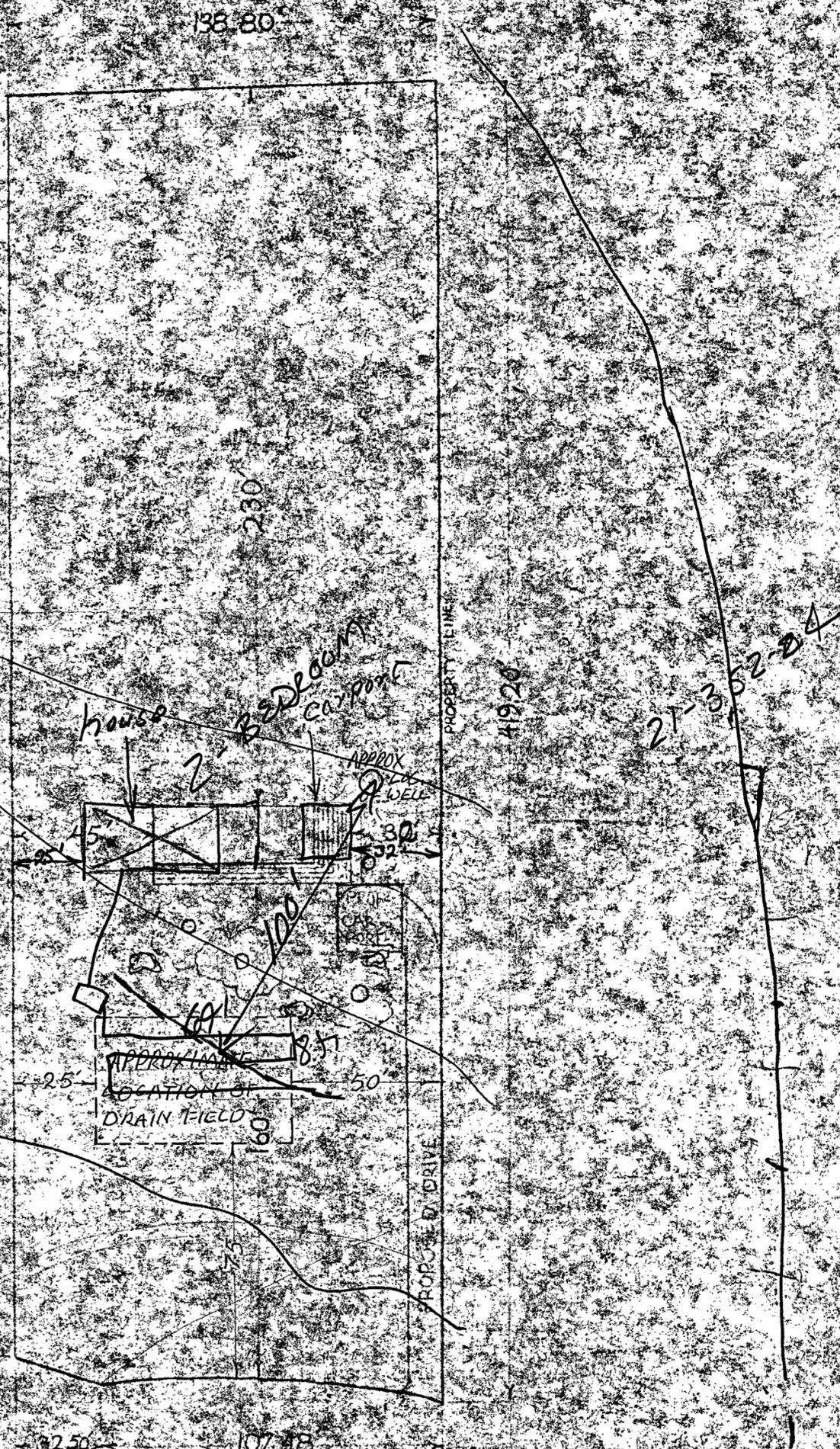
Well 7 Location

PLANS APPROVED
 Dept of Public Health
 Co. of Napa

By [Signature]

*DEAN STELLI HAS
 BECOME STARRS R/L*

LEGAL LOT YES
 ZONE AWR
 SETBACK 75'
 SIDERYARDS 25' & 32'
 REAR YARD 230'
 BLDG. PLANNING 8.6
I.D.U.



PLOT PLAN
 SHOWING APPROXIMATE
 LOCATIONS OF EXISTING
 TREES AND ROCKS AND
 PROPOSED DRIVE AND CARPORT

QUADRUPLICATE
Use to comply with
local requirements

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

Do not fill in

No. 119540

Notice of Intent No. _____

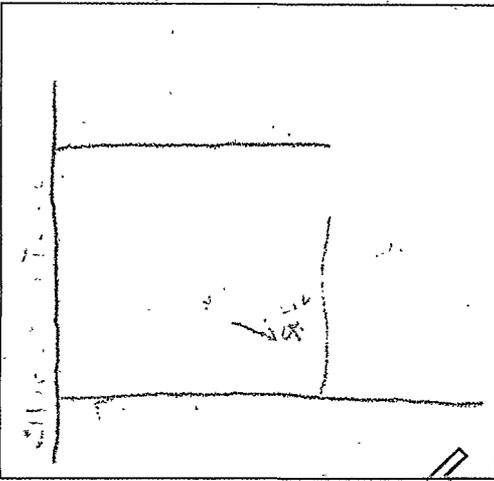
State Well No. _____

Local Permit No. or Date _____

Other Well No. _____

(1) OWNER: Name Soren Sorensen
 Address 2850 Silverado Trail
 City St. Helena, Ca Zip 94574
 (2) LOCATION OF WELL (See instructions):
 County Napa Owner's Well Number 21-356-01
 Well address if different from above 2850 Silverado Trail
 Township St. Helena Range _____ Section _____
 Distance from cities, roads, railroads, fences, etc. _____

(12) WELL LOG: Total depth 280 ft. Depth of completed well 280 ft.
 from ft. to ft. Formation (Describe by color, character, size or material)
 0 - 25 topsoil brown clay
 25 - 95 multi color rock soft
 95 - 100 red rock soft
 100 - 150 multi color rock-hard fract
 150 - 175 brown gray & red rock-med hard
 175 - 250 multi color rock-med hard fract
 250 - 280 red, brown, green, black rock - soft fract



(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

(5) EQUIPMENT:
 Rotary Reverse
 Cable Air
 Other Bucket

(6) GRAVEL PACK:
 Yes No Size See gravel
 Diameter of bore 12 1/2"
 Packed from 20 to _____ ft.

(7) CASING INSTALLED:
 Steel Plastic Concrete

(8) PERFORATIONS: machine hand
 Type of perforation or size of screen _____

From ft.	To ft.	Dia. in.	Cage or Wall	From ft.	To ft.	Slot size
0	140	6	160	140	280	1/8 x 3

(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 cement

(10) WATER LEVELS:
 Depth of first water, if known 150 ft.
 Standing level after well completion 75 ft.

(11) WELL TESTS:
 Was well test made? Yes No If yes, by whom? driller
 Type of test Pump Bailer Air lift
 Depth to water at start of test 75 ft. At end of test 280 ft.
 Discharge 50 gal/min after _____ hours Water temperature _____
 Chemical analysis made? Yes No If yes, by whom? _____
 Was electric log made? Yes No If yes, attach copy to this report

AUG 1 1983
 DIVISION OF ENVIRONMENTAL HEALTH
 Work started 5/24 19 83 Completed 5/27 19 83
 WELL DRILLER'S STATEMENT:
 This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
 SIGNED _____ (Well Driller)
 NAME Doshier & Gregson Drilling, Inc
 (Person, firm, or corporation) (Typed or printed)
 Address 5365 Napa Vallejo Hwy
 City Vallejo, Ca Zip 94589-9679
 License No. 294001 Date of this report 5/31/83

FEE 40 DATE 5/26/83
 RECEIPT NO. 12350 BY SK

Well 8

A.P. NO. 21-356-01

NAPA COUNTY HEALTH DEPARTMENT
 DIVISION OF ENVIRONMENTAL HEALTH

APPLICATION & PERMIT TO CONSTRUCT A WATER WELL

NAME LOREN SORENSEN ADDRESS 2850 SILVERADO TRAIL ST. HELENA
(Owner)
 NAME DOSHIE & GREGSON DRILLING ADDRESS 5365 NAPA/LALLOP HWY DATE 5-26-83
(Well Driller) (Job Location)

TYPE OF WORK
 NEW WELL RECONDITIONING _____
 TYPE I PERMIT DESTROY _____
 TYPE II PERMIT _____

PROPOSED USE
 DOMESTIC IRRIGATION _____ INDUSTRIAL _____ MUNICIPAL _____
 TEST WELL _____ OTHER _____ HOT WATER _____

Sewage Disposal on site (existing or proposed) Public _____ Individual Private _____
 Distance from well to any part of nearest sewage disposal system 150 feet.
 (Sketch of site to accompany application) County road setback 50 feet from centerline.

TYPE OF EQUIPMENT TO BE USED: Rotary A12 Cable _____ Hand Dug _____ Other _____

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

[Signature]
 Signature of Applicant

5-26-83
 Date

CASING

CONSTRUCTION:
 Total Depth _____ Ft. Depth of Casing _____
 Surface Seal to _____ Ft.
 Any Stratas Sealed: Yes _____ No _____
 If yes, depth of stratas: _____
 From _____ Ft. to _____ Ft. / From 5/26/83 Ft. to 8.4 Ft.
 Perforations:
 From _____ Ft. to _____ Ft. / From _____ Ft. to _____ Ft.
 From _____ Ft. to _____ Ft.

WATER LEVELS

First Water at _____ Ft. Static level at _____ Ft.

WELL TESTS

How performed _____
 Yield _____ GPM with _____ Ft. Drawdown after _____
 Hrs. Annular space depth _____ Ft./Thickness _____
 _____ in. Diameter of casing _____ Material _____
 Gravel Pack: Yes _____ No _____ Conductor Casing:
 Yes _____ No _____ Sealed with: Concrete _____
 Grout _____ Neat Cement _____ Pudd. Clay _____
 Other _____ Chlorination by: Owner _____
 Pump Co. _____ Driller _____
 Water Temp. _____

WELL LOG

(Formation; described by color, size of material, structure)

Ft.	to	Ft.

CONTRACTOR'S STATEMENT: I, _____, contractor for the above work, hereby certify that the above was installed according to all applicable rules and regulations covered by this permit, and that the information is true and correct to the best of my knowledge.

[Signature]
 Contractor's Signature

5/17/2022

Monitoring Well/Soil Boring Permit Application
Napa County Planning, Building & Environmental Services

Napa County Planning, Building
& Environmental Services

Napa County Use Only FEE EXEMPT SITE: Y <input type="checkbox"/> N <input type="checkbox"/> If NO, FEE \$ _____ Date _____ By _____ Receipt # _____ Permit # E22-00377	Application for: Monitoring Wells <input checked="" type="checkbox"/> Extraction Wells <input type="checkbox"/> Other <input type="checkbox"/> Cathodic Protection Wells <input type="checkbox"/> Exploratory Hole (boring) <input type="checkbox"/> (Please check one)
	Type of Investigation: Geotechnical <input type="checkbox"/> Phase 2 <input type="checkbox"/> LOP <input type="checkbox"/> Other <input type="checkbox"/> (Please check one) 021-352-041-000 _____ LOP SITE NUMBER ASSESSOR'S PARCEL NUMBER

The following **MUST** be included before this permit application can be processed:

1. Assessor's Parcel Number
2. Well location map (showing both proposed and existing wells)
3. Permission document(s) (if required)
4. Encroachment permit(s) (if required)
5. Clearance from public agency(ies) (if required)

Site Name: Melka Estates		Property Owner: Melka, Phillipe & Cherie TR	
Site Address: 2900 Silverado Trail		City: St Helena	Zip: 94574
Owner's Mailing Address: PO Box 509		City: St Helena	Zip: 94574
Drilling Contractor: Taber Drilling		Type of License: C-57	
Mailing Address: 536 Galveston St		License #: 969927	
City: West Sacramento	State: CA	Zip: 95691	
Consultant: Provost & Pritchard Consulting Group		Telephone #: (209) 601-0002	
Address: 19969 Greenley Road, Suite J		City: Sonora	State: CA Zip: 95370
Responsible Person at Site: Kate Gabriel (kgabriel@ppeng.com)		Cell Phone # (209) 601-0002	
Type of Work			
New Construction of wells - <input checked="" type="checkbox"/> # of wells ¹ _____		Destruction of wells - <input type="checkbox"/> # of wells _____	
Reconditioning of wells (reconstruct or repair) - <input type="checkbox"/> - # of wells _____			
Wells currently on Site? - <input checked="" type="checkbox"/> - # of wells ² _____		New Construction of borings <input type="checkbox"/> # of borings _____	
Reason for Well Installation (Check as many as apply):			
Underground tank site: <input type="checkbox"/>	Surface Impoundment: <input type="checkbox"/>		
Tanks Still Present: <input type="checkbox"/>	Landfill Site: <input type="checkbox"/>		
Spill or Discharge Site: <input type="checkbox"/>	Cathodic Protection: <input type="checkbox"/>		
Baseline Study: <input type="checkbox"/>	Other: <input checked="" type="checkbox"/>		
Other Site Information:			
Closest Distance to:			
Septic System: >100 ft	Sewer Line: >100 ft	Water Wells: 80 ft	Rivers, Creeks, or Lakes: n/a
Underground Utilities: 80 ft	Underground Storage Tanks: n/a		
Riparian Cover Permit Required? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>			
May apply to any site outside City limits and within 150 feet of a designated waterway.			
Page 1 of 2		Permit Application	

Permit Application

Page 2 of 2

Well/Boring Location: Are all wells/borings covered by this application on a single parcel and not on adjoining parcels or public or utility rights-of-way? Yes No If **no**, list other parcels, public rights-of-way or utility rights-of-way. Note: Each parcel with a new well or new boring must have a separate permit for that parcel.

1. Owner or R/W Owner:	Site Address:	APN:	
Owner address:	City:	State:	Zip:
Number of Wells:	Permission Document Attached:		

2. Owner or R/W Owner:	Site Address:	APN:	
Owner address:	City:	State:	Zip:
Number of Wells:	Permission Document Attached:		

3. Owner or R/W Owner:	Site Address:	APN:	
Owner address:	City:	State:	Zip:
Number of Wells:	Permission Document Attached:		

NOTE: For each parcel listed above which is under different ownership, a letter authorizing access and work on the property must be submitted. The letter must include address, Assessor's parcel number, and the notarized signature of the owner or legal agent for the owner. If any wells are proposed on public or utility rights-of-way, a written clearance and/or encroachment permit must accompany the application.

Well/Boring Construction

Bore Hole Diameter: 4 in	Maximum Depth: 45 ft	Annular Space: 1.25 in
Casing: Diameter: 1.5	Gauge: Sch 4	Material: PVC
Grout: Depth of Seal: 20	Type of Grout: Portland III Cement	
Conductor Casing: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		

Check if wells are intended to be constructed into aquifers below the first encountered one. Indicate how cross contamination will be prevented on a separate sheet.

Well reconstruction and destruction applications must include a written description of work proposed and existing well information.

Disposal Methods

Soil Cuttings: Left On Site: Removed: Development/Rinsate Water: Left On Site: Removed:

In applying for this permit, I understand that the drilling contractor and the consultant are responsible for the following:

- 1) Compliance with the State of California Worker's Compensation Laws;
- 2) Compliance with the State and Federal Worker Health and Safety Laws;
- 3) Location of all underground and aboveground utilities which might be impacted by the proposed work;
- 4) Compliance with the Napa County and State of California well requirements;
- 5) Notification to Napa County PBES at least two (2) workdays before work is initiated,
- 6) Notification to Napa County within two (2) workdays of the discovery of contaminated soil or ground water and;
- 7) Filing a completed well log for each well within four (4) months of completion to Napa County and the State Department Water Resources.

Signature of Authorized Agent of Drilling Contractor

05.16.2022
Date

FOR OFFICIAL USE ONLY:

Required certificate of current worker's compensation insurance is on file with DEM;

Consultant: Exp. Date: _____ Confirmed: _____

Contractor: Exp. Date: _____ Confirmed: _____

Permit Issued by: _____ Date: _____

Permit is valid for one (1) year from date of issuance.

Well 12

RECEIVED
MAR 06 2009
DEPT. OF
ENVIRONMENTAL MANAGEMENT



1505 Main Street, St. Helena, CA 94574
TEL 707 963 1565 FAX 707 963 4509

PROJECT ARCHITECT
JARROD DENTON, A.I.A.
PROJECT DESIGNER
JON A. LAIL



These drawings are the property of Lail Design Group, Inc. and have been prepared specifically for this project. These drawings are not to be used for any other project, by any other entity or in another location. Copyright 2008 Lail Design Group, Inc.

FUNK RESIDENCE REMODEL

2970 SILVERADO TRAIL
ST. HELENA, CALIFORNIA
APN: 021-352-031

PROJECT NO. 08-335
DATE 08/29/08
CHECK BY J. DENTON
DRAWN BY A. OROZCO

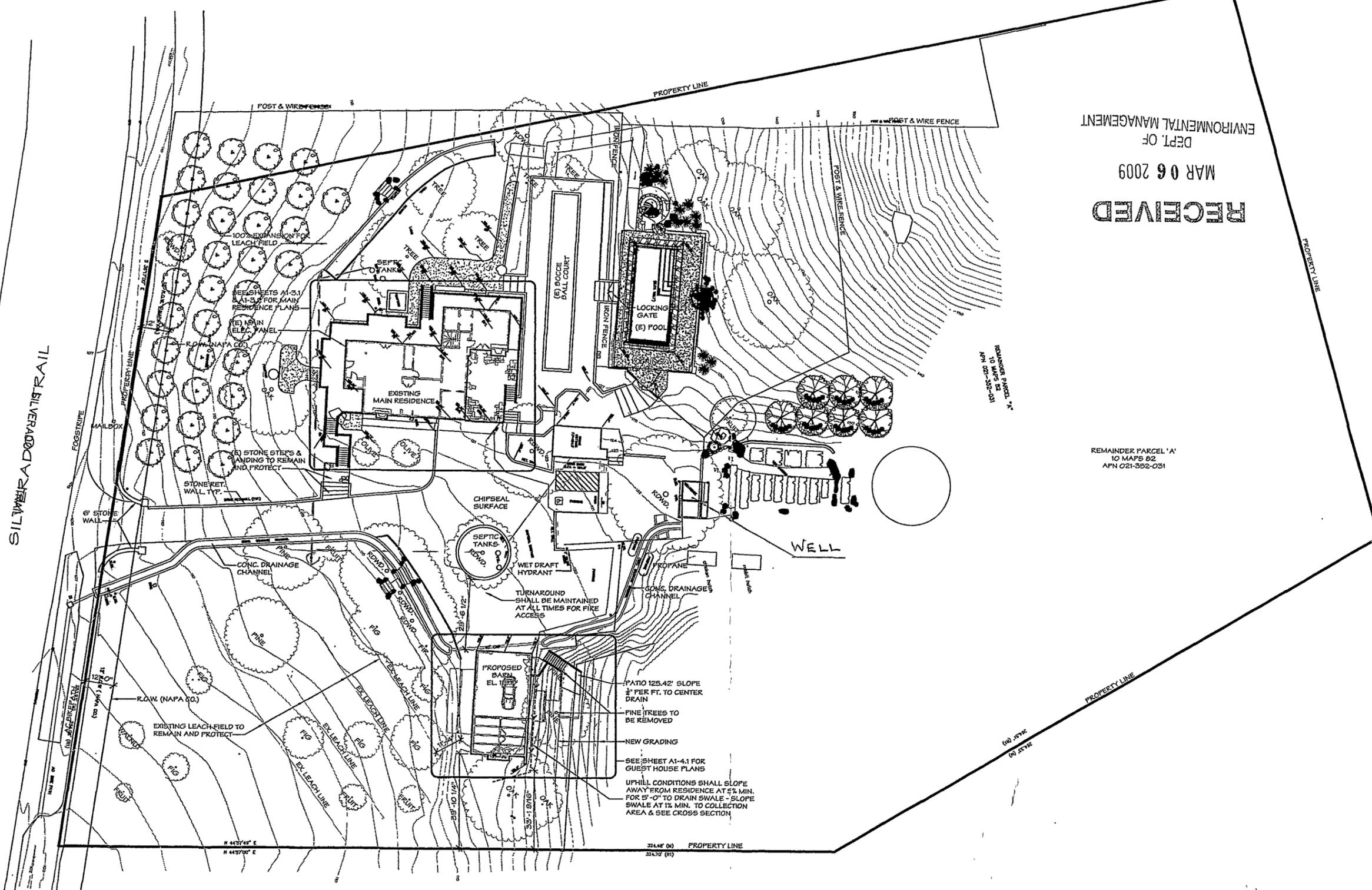
NO. ISSUE DATE

PROPOSED
SITE PLAN

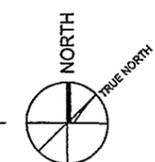
A1-1.1

PERMIT SET

T:\PROJECTS\FUNK RESIDENCE 08-335\DRAWINGS\WORKING DOCS\A1-1.1.DWG - PLOTTED BY DELTA ON 9/2/2008 2:50:08 PM



1 PROPOSED SITE PLAN
SCALE: 1" = 20'-0"



HEALTH DEPT. USE ONLY
FEE: 12.00
DATE: 1-24-72
RECEIPT NO: _____
BY: _____

WELL 13

21-352-24
A.P. # _____

34

NAPA COUNTY HEALTH DEPARTMENT
DIVISION OF ENVIRONMENTAL HEALTH

APPLICATION & PERMIT TO CONSTRUCT
A WATER WELL
(ORDINANCE # _____)

NAME [Redacted] ADDRESS 2974 5100. Tr 16 DATE 1-24-72
(Owner) (Job Location)
NAME GROS ADDRESS _____
(Well Driller)

TYPE OF WORK
NEW WELL RECONDITIONING _____ DEEPENING _____
TEST HOLES _____ DESTROYING _____ OTHER _____
TYPE I PERMIT _____ TYPE II PERMIT _____ FEE _____

PROPOSED USE
DOMESTIC IRRIGATION _____ INDUSTRIAL _____ MUNICIPAL _____
TEST WELL _____ OTHER _____

Sewage Disposal On Site (Existing or Proposed) Public _____ Individual _____ Private _____
Distance from well to any part of nearest sewage disposal system _____ feet.
(Sketch of site to accompany application.)

TYPE OF EQUIPMENT TO BE USED
Rotary Cable _____ Hand Dug _____ Other _____

CONSTRUCTION PROPOSED
Diameter of casing 6" Material _____ Annular Space: Size _____
Sealed with: Concrete _____ Grout _____ Neat Cement _____ Puddled Clay _____ Other _____
Conductor Casing: Yes _____ No _____ Material _____
Chlorination By: Owner _____ Pump Co _____ Driller _____

John Hammon 1/27/72
(SIGNATURE OF APPLICANT) (DATE)

NOTICE TO DRILLER: COMPLETE THIS PORTION AND RETURN TO DIVISION OF ENVIRONMENTAL HEALTH WITHIN 10 DAYS AFTER COMPLETION...

CASING
CONSTRUCTION
Total Depth 86 Ft.
Surface seal to 22 Ft.
Any Stratas sealed Yes _____ No
If yes, depth of Stratas
From _____ Ft. to _____ Ft.
From _____ Ft. to _____ Ft.
Perforations
From 40 Ft. to 86 Ft.
From _____ Ft. to _____ Ft.
WATER LEVELS
First water at 60 Ft.
Static level at 45 Ft.
WELL TESTS
How performed Good Fair
Yield 7 GPM with 10 ft.
Drawdown _____ ft. after 1 Hrs.

WELL LOG
(Formation; describe by color, size of material, structure) Ft. To Ft.
0-2 T-S.
2-32. Br-G.
32-60-SS.
60-65 G
65-80-SS.
80-84-SSG
84-86-SS
AMERICAN WELL DRILLING & PUMP SERVICE
Erwin "Erv" C. Gross
23000 Arnold Drive
SONOMA, CALIF. 95476

SIGNED: [Signature]
LICENSE #: 246-342

ORIGINAL
File with DWR

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

DWR USE ONLY -- DO NOT FILL IN
081106 W24
STATE WELL NO./STATION NO.
LATITUDE _____ LONGITUDE _____
APN/TRS/OTHER _____

Page 1 of 1

Owner's Well No. 2-07

No. **e057605**

Date Work Began 7/20/2007, Ended 7/26/2007

Local Permit Agency Napa County Environmental Mgmt

Permit No. E07-00435

Permit Date 7/3/2007

GEOLOGIC LOG

WELL OWNER

ORIENTATION (✓) VERTICAL HORIZONTAL ANGLE _____ (SPECIFY)

DRILLING METHOD ROTARY FLUID AIR

DEPTH FROM SURFACE _____ DESCRIPTION
Fl. to Fl. Describe material, grain, size, color, etc.

0	12	HARD BLACK VOLCANICS
12	24	RED VOLCANIC ASH
24	85	BLACK VOLCANICS WITH ASH STRINGERS
85	145	TAN VOLCANIC ASH
145	175	FRACTURED MIXED VOLCANICS
175	205	TAN VOLCANIC ASH
205	250	SOFT GRAY VOLCANICS
250	315	BLACK VOLCANICS
315	335	RED VOLCANICS
335	350	BLACK VOLCANICS
350	395	BROWN VOLCANICS
395	400	TAN VOLCANICS
400	495	FRACTURED BLACK VOLCANICS
495	515	SOFT BLACK VOLCANICS
515	545	BLACK & YELLOW VOLCANICS
545	550	BLACK & TAN VOLCANICS
550	560	SOFT BLACK VOLCANICS

CONTINUED CASING LAYOUT

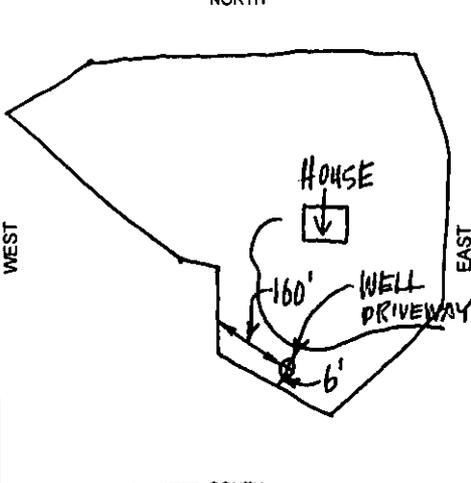
375	455	SCREEN	PVC	6"	SDR-17	.032	SLOT
455	475	BLANK	PVC	6"	SDR-17		
475	555	SCREEN	PVC	6"	SDR-17	.032	SLOT

TOTAL DEPTH OF BORING 560 (Feet)

TOTAL DEPTH OF COMPLETED WELL 555 (Feet)

WELL LOCATION
Address 301 Deer Park Road
City St. Helena CA
County Napa
APN Book 021 Page 352 Parcel 033
Township _____ Range _____ Section _____
Latitude _____

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
- REMEDICATION
- 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 250 (FL) BELOW SURFACE 1

DEPTH OF STATIC WATER LEVEL 147 (FL) & DATE MEASURED 7/25/2007

ESTIMATED YIELD 125 (GPM) & TEST TYPE AIR LIFT

TEST LENGTH 1 (Hrs.) TOTAL DRAWDOWN N/A (FL)

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

DEPTH FROM SURFACE Fl. to Fl.	BORE-HOLE DIA. (Inches)	CASING (S)							
		TYPE (✓)				MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
BLANK	SCREEN	CON-DUCTOR	FILL PIPE						
0	60	12							
60	560	9							
0	115		✓			PVC F480	6	SDR-21	
115	215		✓			PVC F480	6	SDR-17	
215	255			✓		PVC F480	6	SDR-17	.032
255	375		✓			PVC F480	6	SDR-17	

DEPTH FROM SURFACE Fl. to Fl.	ANNULAR MATERIAL TYPE			
	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	64	✓		CONCRETE
64	555		✓	PEA GRAVEL

ATTACHMENTS (✓)

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

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

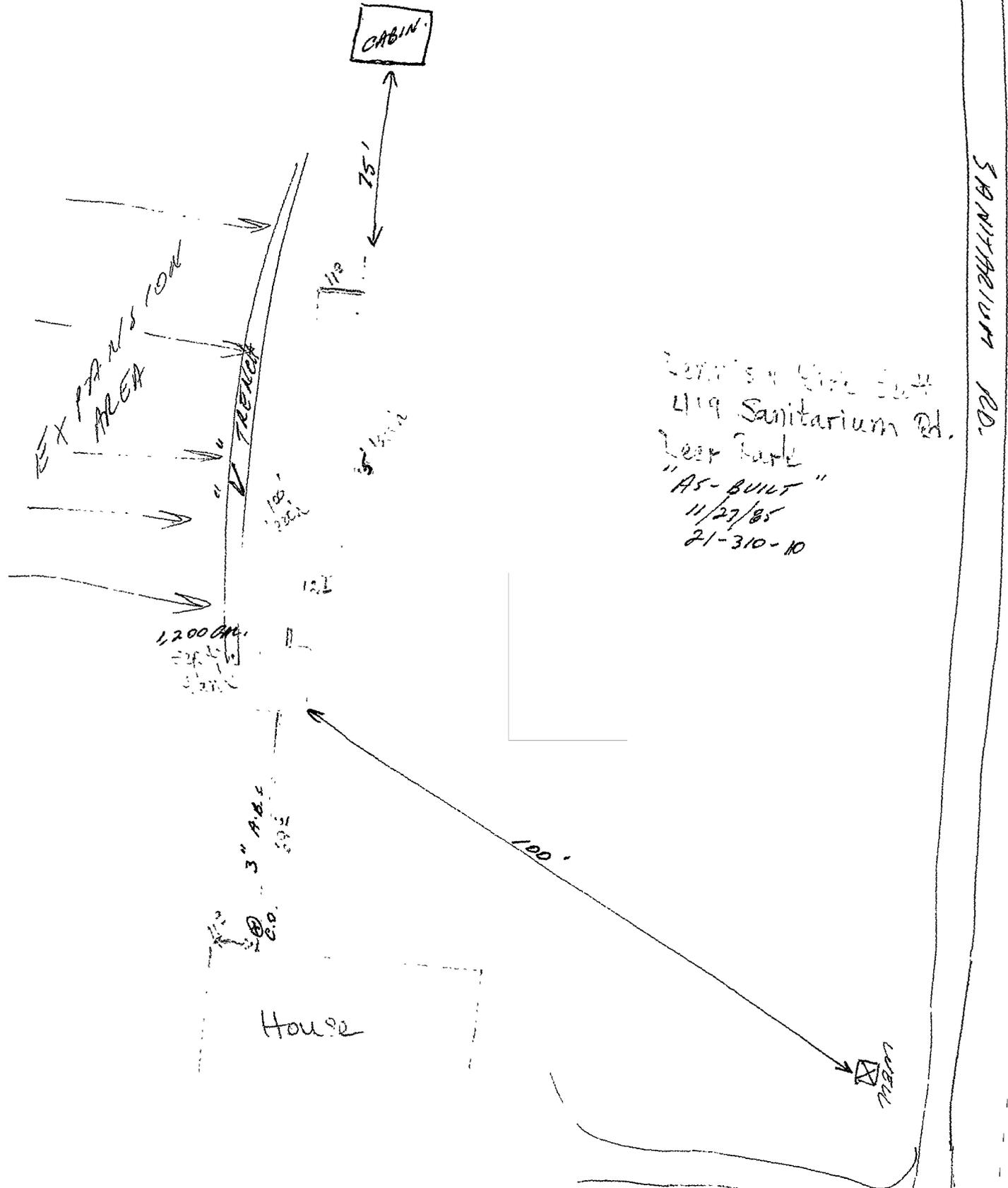
CERTIFICATION STATEMENT

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

NAME HUCKFELDT WELL DRILLING, INC.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

2110 Penny Lane Napa CA 94559
ADDRESS CITY STATE ZIP

Signed [Signature] DATE SIGNED 08/01/07 C-57 LICENSE NUMBER 439-746
WELL DRILLER/AUTHORIZED REPRESENTATIVE



200' x 100' Lot E04
 419 Sanitarium Rd.
 West Park
 "AS-BUILT"
 11/27/85
 21-310-10

SANITARIUM RD.

CABIN

House

EXPANSION AREA

TRENCH

WELL

1200 G.P.

3" A.B.C.

100' 2000'

121

100'

75'

60'

OAKVILLE PUMP SERVICE INC.

SALES & SERVICE
 NEW & USED
 WELL TESTING
 FIELD WORK
 PULL & SET
 MACHINE SHOP
 WELDING C-60
 ELECTRICAL C-10
 PLUMBING C-38

Pumps



Water Systems

CENTRIFUGAL PUMPS
 DEEP WELL PUMPS
 IRRIGATION PUMPS
 SUBMERSIBLES
 SEWAGE SYSTEMS
 WINE PUMPS
 PRESSURE SYSTEMS
 SPECIALTY DESIGN & MFG.
 OZONATION

P.O. BOX 435 HIGHWAY 29 AT WALNUT DRIVE
 OAKVILLE, CALIFORNIA 94562
 (707) 944-2471

Date: 4/24/85 Water Well Purity and Info Sheet
 Pump test: yes no
 Purity test: yes no

Inspection area
 Location
 Address: 419 Sanitarium Rd Billing info
 Address: P.O. Box 296
 City: Dixon Park city: Dixon Park Ca.
 state zip
 Tele #: 963-1526 Contact person: Kirk Scott

PUMP INFORMATION
 Pump type/model and horsepower: Jacuzzi 1/2 Hp Sub
 Label Voltage: 110/115 Actual Voltage reading: 110
 Label Amperage: 9.4 Actual Amperage reading: 10.2

Comments:

 Pressure Tank: Galv good
 type physical appearance
 Plumbing: PVC Sch 40 Adequate
 galv pvc other appearance
 Electrical: Fused Disc & Control Box needs upgrading
 equipment appearance

WELL:
 Casing size: 5" Casing type: Steel Casing depth: ?
 Well depth: Under 100' Standing water level: ~20'
 Water purity test: To Count

Comments: Appearance: the Pump is SET Approx
at the 50-70 level

Well 14

OAKVILLE PUMP SERVICE INC.

SALES & SERVICE
 NEW & USED
 WELL TESTING
 FIELD WORK
 PULL & SET
 MACHINE SHOP
 WELDING C-60
 ELECTRICAL C-10
 PLUMBING C-36

Pumps



Water Systems

CENTRIFUGAL PUMPS
 DEEP WELL PUMPS
 IRRIGATION PUMPS
 SUBMERSIBLES
 SEWAGE SYSTEMS
 WINE PUMPS
 PRESSURE SYSTEMS
 SPECIALTY DESIGN & MFG.
 OZONATION

P.O. BOX 435 HIGHWAY 29 AT WALNUT DRIVE
 OAKVILLE, CALIFORNIA 94562
 (707) 944-2471

GALLONS PER MINUTE

10
9
8
7
6
5
4

4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 68 80 88 100 112 120 128 140 148 160

TIME IN MINUTES

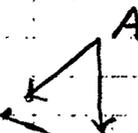
WATER LEVEL DROP
IN WELL = \approx 35'

THIS TEST DONE IN APR
OF AN AVERAGE RAINFALL YEAR

AT POINTS "A" WATER LEVEL IS AT
PUMP LEVEL

STABILIZED OUTPUT = 4.5 - 5 gallons per Minute

21-310-10



APPENDIX B
TIER 1 WAA BY HD VINE LLC

ATTACHMENT 8D:

Haas Vineyards Water Availability Analysis (WAA): Tier I

Includes: Attachment D Form

REVISED

June 28, 2024

Property Owner:

Chuck Haas
2 Swanston Rd,
St Helena, CA 94574

Prepared By:

Coda Rainsford, CPESC #9225
HDVine LLC

Site Map:

See attached Water Availability Map

Background:

The property is located at 2 Swanston Rd, St Helena, CA, APN 021-352-036. Parcel size is 23.9 acres. Prior to September 2020, the property was heavily forested and included a residence, landscaping, existing vineyard and driveway. All structures, landscaping and canopy were destroyed in the Glass Fire; September 27, 2020. Soil in the project area is Boomer gravelly loam (109), described as well drained soils on uplands formed in material weathered from mixed igneous rocks [2].

One electronic well record was identified for a well within the 500 ft radius from the water project water supply well (located on APN 021-353-013, see attached vicinity map). No other electronic records were found for the other wells on parcels within the 500 ft radius.

No blueline streams on the Napa County Significant Streams list are located within 1500 ft of the project well. Blueline streams in the vicinity that are on the Napa County map of Significant Streams, include:

- the Napa River 1530 ft to the southwest of the supply well and
- Canon Creek 2750 ft north of the supply well.

The project parcel is situated on the east side of Napa Valley on the western flank of Glass Mountain within elevations ranging from about 585 ft to about 300 ft asl. The project development area is situated on the higher slopes ranging from about 575 ft to 425 ft asl.

The majority of run-off from the proposed project area sheets to the west/north-west and flows into a drainage ditch along the property owner's driveway that joins a drainage ditch along Swanston Rd. The Swanston Rd drainage ditch traverses the adjacent parcel (APN 021-352-

028, 4 Swanston Rd), crosses underneath Swanston Rd twice, then runs along the east side of Bournemouth Dr and joins a ditch north of Silverado Trail that crosses under the road and connects to the dashed blueline on the south side of Silverado Trail. The ditch also continues along the east side of Silverado Trail and crosses under the driveway of 2974 Silverado Trail and terminates in a widened section of ditch lined with cobbles.

Water Supply Capacity:

The subject site is part of a mutual water company that serves several properties within the homeowner's association. As such, water use on the supply side was estimated based upon current uses of all parcels hooked up the supply well.

There are three wells located on parcel 021-390-012 (see Figure 1):

- "Old Well" was abandoned in 2017 in accordance with Well Permit #E16-00827 (attached)
- "Well 1" is currently idle as a back-up well for domestic water use within the Vailima Estate development.
- "Well 2" is connected to the water system and is in use as the primary water supply source among residents of the homeowner's association.



Figure 1 Map of well locations (excerpt from E18-00827)

Well 2 on the property is currently used for domestic purposes and fire protection. The well yield was determined to be 110 gpm, as measured during an 8-hr pump test on May 7, 2015 (report attached). The installed pump produces groundwater at a rate of 105 gpm. The water is part of a shared domestic water supply system, Vailima Estates Mutual Water Company, which was formed in 1969 to serve the members of its homeowner's association. Water is pumped to the top of the hill (at the end of Bournemouth Rd) into a 61,000 gal storage tank. There is a common line for tank fill and water delivery to customers. As such, water supply is gravity-fed

from the storage tank unless the well pump is actively running, in which case the pump overcomes the static head in the pipeline, and water is fed directly from the well.

Approximately 81.2 acres are served with a total of 14 water connections [3]. There is no water use limit or allotment for each individual water connection. As such, water usage was evaluated for the residential development assuming one residence and one-acre landscaping per water connection, and vineyard acreage visible in aerial photos (per Attachment D Water Usage Estimates), **TABLE 1**. Note that, at the time of this analysis, all water connections were not in use due to parcels being undeveloped or destroyed in the 2020 Glass Fire.

TABLE 1 Vailima Estates CURRENT Water Usage Estimate

Current Usage				
Usage Type	Rate	Count	Subtotal	Units
Residential	0.5	14	7	AF/yr
Landscaping	1.5	14	21	AF/yr
Vineyard	0.5	0.8	0.4	AF/yr
TOTAL			28.4	AF/yr

The applicant plans to plant 4.3 acres of vines on a minimum of 6 ft x 3 ft spacing; water usage for the proposed vineyard is detailed in **TABLE 2**.

TABLE 2 Haas Site Proposed Vineyard Usage

net acres	3.85 acres		
row spacing	6 ft		
vine spacing	3 ft		
Vines per Acre	2420 vines/acre		
TOTAL Vines	9329 vines		
Usage Rate	0.35 af/acre/yr	47.13	gal/vine/yr
Total Usage	1.35 af/yr		

TABLE 3 Vailima Estates FUTURE Water Usage Estimate

Future Usage				
Usage Type	Rate	Count	Subtotal	Units
Residential	0.5	14	7	AF/yr
Landscaping	1.5	14	21	AF/yr
Vineyard	0.5	0.8	0.4	AF/yr
Vineyard (NEW)	0.35	3.9	1.35	AF/yr
TOTAL			29.7	AF/yr

TABLE 4 Haas Site Total Estimated Use

	Usage Factor (AF/yr)	Current		Future	
		unit	AF/yr	unit	AF/yr
Residential	0.5	1.0	0.5	1.0	0.5
Landscaping	1.5	1.4	2.1	1.4	2.1
Vineyard	0.35	-	-	3.9	1.3
Total Usage			2.6		3.9

The total future water usage is estimated to be about 29.7 AF/yr (**TABLE 3**). The 105 GPM well, which is equivalent to about 170 acre-ft/year, and existing storage tank have more than enough capacity to support the existing and proposed water uses within the residential development.

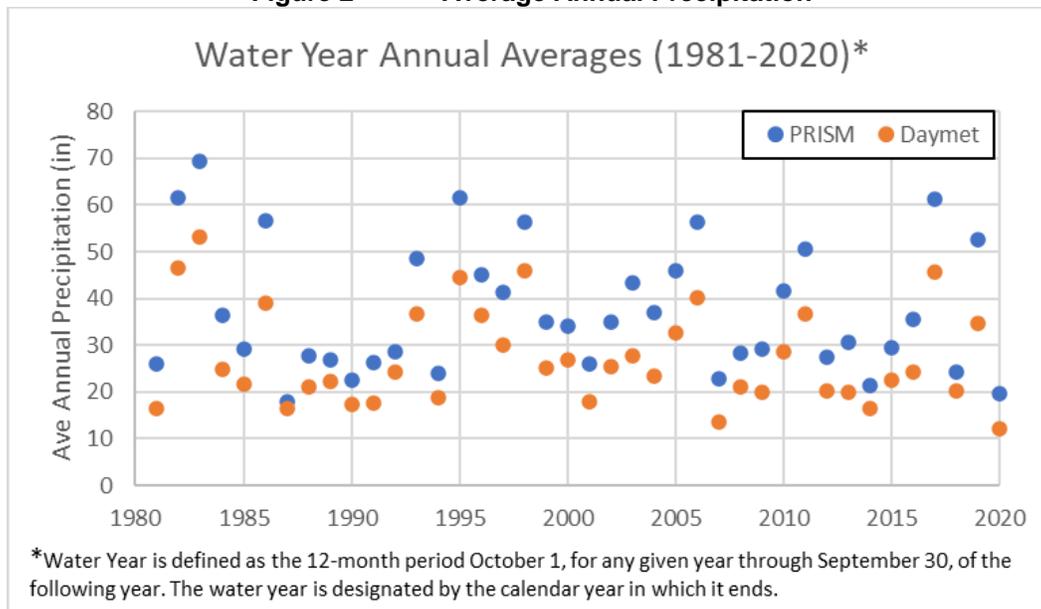
Aquifer Recharge:

Recharge was based on a parcel analysis where the proposed project is to be installed (APN 021-352-036, 23.9 ac). The property is zoned “AW.”

Recharge based on precipitation data used rainfall data downloaded from DayMet [4] and PRISM [5] for the pixel that contained the subject site from 1980 to 2021 (Figure 2). Annual averages were calculated based on the “Water Year”, which is defined by the USGS as the 12-month period October 1, for any given year through September 30, of the following year. The water year is designated by the calendar year in which it ends. The Water Year was chosen for this methodology based on two primary reasons:

1. From a Hydrologic Perspective, it makes sense to use water years (Oct – Sep), rather than calendar years, since it represents the accumulation of precipitation in a given rainy season. Similarly, the water year also represents precipitation that is available for recharge preceding the irrigation season.
2. From a practical perspective, in the Napa Valley Region, the water year data would be mostly complete at the start of the irrigation season (typ. May-Sep), since precipitation during the latter months of the water year is not typical. One would have data from the preceding rainy season, and may be able to make irrigation adjustments accordingly, whereas the calendar year precipitation data would obviously be incomplete.

Figure 2 Average Annual Precipitation



Based on available data, the most recent 10-yr's of data from PRISM and DayMet were used to calculate average precipitation as well as maximum and minimum precipitation on record.

TABLE 4 Average Annual Precipitation based on Water Year

Water Year	PRISM	DayMet
	in	in
2011	51	37
2012	28	20
2013	31	20
2014	21	16
2015	29	23
2016	35	24
2017	61	46
2018	24	20
2019	53	35
2020	20	12
AVE	30	
MAX	61	
MIN	12	

Average Water Year rainfall across both datasets was 30 in/yr. A recharge volume was calculated for the parcel based on the property acreage and an infiltration rate of 14%, based on results for the “Napa River at St Helena Watershed” region, in which the subject site is located [6].

$$(23.9 \text{ acres}) * (30 \text{ in/yr}) * (\text{ft}/12 \text{ in}) * (14\%) = \underline{8.4 \text{ AF/yr}}$$

Parcel water allotment is calculated at 0.3 AF/ac/yr * 23.9 parcel acres, which is 7.17 AF/yr.

Total future groundwater usage (including future residential development and future vineyard) is estimated to be 3.9 AF/yr, which below the parcel allotment and results in a net positive water balance of about 4.5 AF/yr.

No alternative water sources are required for this project.

Conclusions:

The proposed project involves installing 3.9 acres of vines on a 23.9 acre parcel with a maximum estimated irrigation water usage of 1.35 acre-feet per year.

- The Water Supply Well (Well #2) produces 105 gpm or 170 acre-ft/year equivalent. The water use for the Mutual Water Company system is estimated to increase from 28.4 AF/year to 29.9 AF/yr, which is within the capacity of the well.
- Current estimated water usage on the parcel is 2.6 AF/yr, which is estimated to increase to 3.9 AF/yr after development. The estimated recharge on the parcel is 8.4 AF/yr, which results in a net positive water balance of 4.5 AF/yr.
- No impact is expected in surrounding wells or waterways since the pumping patterns of the supply well will not change as a result of the proposed project.

References:

1. *Custom Soil Resource Report for Napa County, California, Haas Vineyard*, from USDA NRCS Web Soil Survey, May 2023
2. Lambert, G., Kashiwagi, J. et al., *Soil Survey of Napa County, California*, USDA in cooperation with UC Agricultural Experiment Station, August 1978
3. *Mutual Water Companies in Napa County*, Prepared by the Local Agency Formation Commission of Napa County, June 2013
4. Thornton; M.M.; R. Shrestha; Y. Wei; P.E. Thornton; S. Kao; and B.E. Wilson. 2020. Daymet: Daily Surface Weather Data on a 1-km Grid for North America; Version 4. ORNL DAAC; Oak Ridge; Tennessee; USA. <https://daymet.ornl.gov/single-pixel/>
5. *PRISM Time Series Data by Location*, <https://prism.oregonstate.edu/explorer/>
6. *Updated Hydrogeologic Conceptualization and Characterization of Conditions*, Prepared for Napa County, by Luhdorff & Scalmanini Consulting Engineers & MBK Engineers, January 2013
7. USDA/NRCS - National Geospatial Center of Excellence, Title: 1981-2010 Annual Average Precipitation by State (California)
8. USGS Water Resources Investigation Report 03-4229, *Ground-Water Resources in the Lower Milliken-Sarco-Tuluca Creeks Area, Southeastern Napa County, California 2000-2002*, Prepared 2003

Attachments:

WAA – Vicinity Map

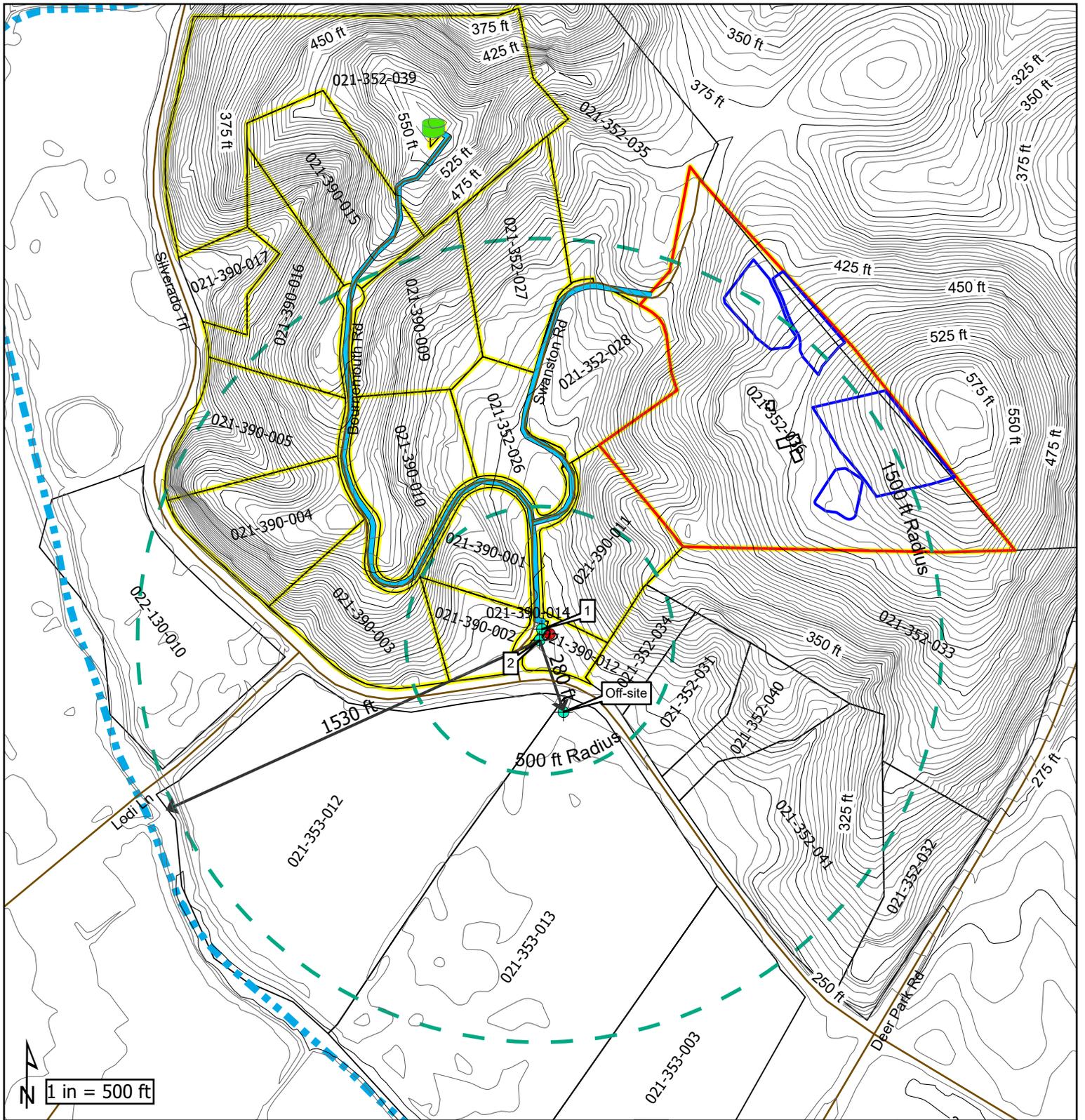
Attachment D, form

Well #2 Completion Report (Vailima Estates Supply Well)

Well #2 Pump Test

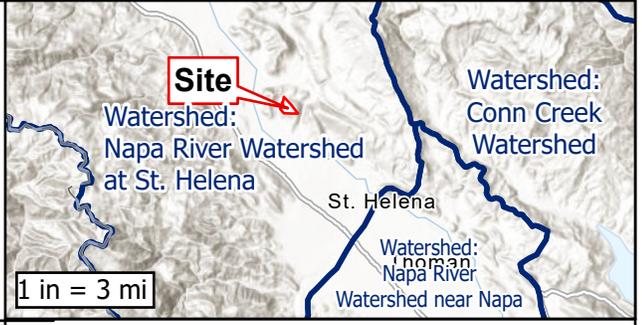
“Old Well” Destruction Permit #E16-00827

Well Permit for neighboring parcel, 021-353-013 (Permit #E14-00404)



1 in = 500 ft

Legend					
	Napa Parcels		Radius		Measurement
	Project Parcel		Pipeline		ROADS2
	Vailima Water Parcels		Water Tank		Napa Contours
	VB Potential		Well		index (25')
	Buildings		Well (Abandoned)		inter (5')
					Pipeline



File: Haas_ECP_Track I
Date: 6/28/24

Haas WAA: Vicinity Map

Attachment D

PHASE I WATER AVAILABILITY ANALYSIS

File #: P _____ - _____ Owner: Chuck Haas Parcel #: 021 352 036

This form is intended to help those who must prepare a Phase I Water Availability Analysis. **The Department will not accept an analysis that is not on this form.**

BACKGROUND: A Phase I Water Availability Analysis is done in order to determine what changes in water use will occur on a property as a result of the project. Staff uses this information to determine whether the project may have an adverse effect on groundwater levels. If it may, additional information will be required. You will be advised if additional information is needed.

PERSONS QUALIFIED TO PREPARE: Any person that can provide the needed information

PROCEDURE:

STEP 1: Prepare and attach to this form an 8-1/2"x11" site plan of your parcel(s) with the locations of all structures, gardens, vineyards, etc in which well water will be used shown

STEP 2: Determine the allowable groundwater use allotment for your parcel(s).

Total size of parcel(s)	<u>23.9</u>	acre(s)
Multiply by parcel location factor	x <u>0.3</u>	acre-foot per acre per year (see back)
Allowable groundwater allotment	= <u>7.2</u>	acre-foot per year

STEP 3: Determine the estimated water use for all vineyards on your parcel(s) currently and after the planned conversion; actual water usage figures may be substituted for the current usage estimate (please indicate if this is done). Estimate future use for both the vineyard establishment period and thereafter

Current Usage:

Number of <u>planted</u> acres	_____	acres
Multiply by number of vines/acre	x _____	vines per acre
Multiply by gallons/vine/year	x _____	gallons of water per vine per year
Divide by 325,821 gallons/af	= _____	af of water per yr used for vineyard irrigation

Future Usage:

Number of <u>planted</u> acres	<u>3.85</u>	acres
Multiply by number of vines/acre	x <u>2420</u>	vines per acre
Multiply by gallons/vine/year	x <u>47</u>	gallons of water per vine per year (long-term)
	<u>47</u>	gallons of water per vine per year (establish)
Divide by 325,821 gallons/af	= <u>1.35</u>	af of water per yr used (vineyard long-term)
	<u>1.35</u>	af of water per yr used (vineyard establish)

STEP 4: Using the guidelines on the next page, actual water usage figures, and/or detailed water use projections, tabulate the existing and projected future water usage on the parcel(s) in acre-foot per year (af/yr) {1 af = 325,821 gallons}.

Existing Usage:

Residential	<u>0.5</u>	af/yr
Farm Labor Dwelling	<u>0</u>	af/yr
Winery	<u>0</u>	af/yr
Commercial	<u>0</u>	af/yr
Vineyard(long-term)	<u>0</u>	af/yr

Future Usage:

Residential	<u>0.5</u>	af/yr
Farm Labor Dwelling	<u>0</u>	af/yr
Winery	<u>0</u>	af/yr
Commercial	<u>0</u>	af/yr
Vineyard(long-term)	<u>1.35</u>	af/yr

	“ (establish) <u>0</u> af/yr		“ (establish) <u>1.35</u> af/yr
Other Agriculture	<u>0</u> af/yr	Other Agriculture	<u>0</u> af/yr
Landscaping	<u>2.1</u> af/yr	Landscaping	<u>2.1</u> af/yr
Other Usage	<u>0</u> af/yr	Other Usage	<u>0</u> af/yr
TOTAL	<u>2.6</u> af/yr	TOTAL	<u>3.9</u> af/yr

STEP 5: Attach all supporting information that may be significant to this analysis including but not limited to all water use calculations for the various uses listed

Parcel Location Factors

The allowable allotment of water is based on the location of your parcel. Valley floor areas include all locations on the floor of the Napa Valley and Carneros Basin except for groundwater deficient areas. Groundwater deficient areas are areas that have been determined by the Department of Public Works as having a history of problems with groundwater. All other areas are classified as Mountain Areas. Public Works can assist you in determining your classification.

Parcel Location Factors

Valley Floor	1.0 acre foot per acre per year
Mountain Areas	0.5 acre foot per acre per year
Groundwater Deficient Area (MST)	0.3 acre foot per acre per year

Guidelines For Estimating Water Usage:

Residential:

Single Family Residence	0.5 acre-foot per year
Farm Labor Dwelling	1.0 acre-foot per year (6 people)
Second Unit	0.4 acre-foot per year
Guest Cottage	0.1 acre-foot per year

Winery:

Process Water	2.15 acre-foot per 100,000 gal. of wine
Domestic and Landscaping	0.50 acre-foot per 100,000 gal. of wine

Commercial:

Office Space	0.01 acre-foot per employee per year
Warehouse	0.05 acre-foot per employee per year

Agricultural:

Vineyards	
Irrigation only	0.2 to 0.5 acre-foot per acre per year
Heat Protection	0.25 acre foot per acre per year
Frost Protection	0.25 acre foot per acre per year
Irrigated Pasture	4.0 acre-foot per acre per year
Orchards	4.0 acre-foot per acre per year
Livestock (sheep or cows)	0.01 acre-foot per acre per year

Landscaping:

Landscaping	1.5 acre-foot per acre per year
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WELL #2
Vailima Estates
Supply Well

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. **e0237626**

DWR USE ONLY --- DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

Owner's Well No. **-2014**
Date Work Began **12/9/2014**, Ended **12/18/2014**
Local Permit Agency **Napa County Environmental Mgmt**
Permit No. **E14-00932** Permit Date **11/18/2014**

ORIENTATION (✓)		DRILLING METHOD	FLUID	DESCRIPTION
<input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> HORIZONTAL <input type="checkbox"/> ANGLE _____ (SPECIFY)		ROTARY	BENTONITE	<i>Describe material, grain, size, color, etc.</i>
DEPTH FROM SURFACE				
Ft.	to Ft.			
0	5	BROWN CLAY		
5	35	LARGE SAND & GRAVEL		
35	55	TAN, GRAY SAND & GRAVEL		
55	65	SANDY TAN ASH		
65	70	VOLCANIC SANDS		
70	75	TAN VOLCANIC TUFF		
75	315	GRAY, BROWN VOLCANIC SANDS		
315	320	SANDY TAN ASH		
320	365	VOLCANIC SANDS		
365	400	DARK GRAY MIXED VOLCANICS		
TOTAL DEPTH OF BORING 400 (Feet)				
TOTAL DEPTH OF COMPLETED WELL 380 (Feet)				

WELL OWNER

Name **Vailima Estates**
Mailing Address **P.O. Box 526**
St. Helena **CA** **94574**
CITY STATE ZIP

WELL LOCATION

Address **Bournemouth Road**
City **St. Helena CA**
County **Napa**
APN Book **021** Page **390** Parcel **012**
Township _____ Range _____ Section _____
Latitude _____

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 **N/A** (Ft.) BELOW SURFACE **1**

DEPTH OF STATIC WATER LEVEL **25** (Ft.) & DATE MEASURED **12/18/2014**

ESTIMATED YIELD * **160** (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.

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	TYPE (✓)				MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
		BLANK	SCREEN	CON. DUCTOR	FILL PIPE				
0	400	15							
0	100		✓			PVC F480	8	SDR-21	
100	300			✓		PVC F480	8	SDR-21	.032
300	320				✓	PVC F480	8	SDR-21	
320	360				✓	PVC F480	8	SDR-21	.032
360	380				✓	PVC F480	8	SDR-21	

DEPTH FROM SURFACE	ANNULAR MATERIAL			
	TYPE			
Ft. to Ft.	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 to 60	✓			10 SK SAND
60 to 385			✓	#6 SAND
385 to 400			✓	CUTTINGS

- ATTACHMENTS (✓)**
- Geologic Log
 - Well Construction Diagram
 - Geophysical Log(s)
 - Soil/Water Chemical Analysis
 - Other _____
- ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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

NAME **HUCKFELDT WELL DRILLING, INC.**
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

2110 Penny Lane **Napa** **CA** **94559**
ADDRESS CITY STATE ZIP

Signed *[Signature]* **01/18/15** **439-746**
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER



OAKVILLE PUMP SERVICE, INC.

#1 Walnut Drive / P.O. Box 435
 Oakville, CA 94562
 Phone (707) 944-2471 Fax (707) 944-5636
 License # 744958 / oakvillepump.com

Report Date: 5/11/2015	Report By: W. Lutz	Tested By: W. Lutz	Job#: 6302
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Property Information

Property Location:	Bournemouth & Silverado Trl	St. Helena	AP#:021-390-012
Buyers Name:			
Buyers Agent or Rep:			
Property Owner Name:			
Listing Agent or Owner Rep:			

Well & Pump System Information:

Well ID & Location on Property	Well Depth:	Pump Setting:	Casing Type & Size:	Sanitary Well Seal:
Well 2 (45' from well 1 and from bournemouth)	380'	315'	8" PVC w/10" Steel Shell	Yes
Submersible Pump / HP / GPM:	Motor HP, Voltage, Phase:	Pipe Size & Type:	Check Valve Type:	Annular Seal / Pad:
20 HP	25 HP 3ph 230			Yes
Submersible Pump Control Panel:	Low Water Protection:	Flow Control Valve:	Press Tank(s) & Qty:	Press. Relief Valve:
AMC	777	N/A	N/A	N/A
Submersible Pump Filtration:	Sub Pump Misc Equipment Notes:			
N/A				
Booster Pump Information:	Pump Controls:	Flow Control Valve:	Check Valve Type:	Press. Relief Valve:
N/A	N/A	N/A	N/A	N/A
Filtration Equipment:	Storage Tank Size/Type:	Booster Pump/Filtration/Tank Equipment Notes:		
N/A	N/A	N/A		

Water Analysis Testing:

Sample Type:	Date Sampled:	Completion Date:	Lab Vender:	Notes:
Title 22 Suite	5/7/2015		Brejle & Race	

Well Yield Test (Log on second page)

Date of Test:	Well Type:	Static Water Lvl:	Pumping Water Lvl:	Specific Capacity:	Well/Pump Yield:
5/7/2015	Community	26' 5"	97' 10"	1.54 GPM/Ft Drawdown	110 GPM
Start Time:	Test Duration:	Water Level Recovery:		Recovery Time:	Total Gallons Pumped:
900	8 Hr	Recovered to: 28'		3 Hrs	54000

*The well yield test is based upon duration and conditions existing at time of testing. The well production may and will change based upon time of year. The well output may be limited to the size of the pump and the well yield test may not properly represent the true capacity of the well.

Observations:

- 1.) Well Located N 38° 31' 43.8" W122° 29' 08.4" +/- 9 ft
- 2.) GPS Altitude 252'
- 3.) Pump Pulling 63 Amps during test with 4-5% current imbalance
- 4.) Badger Water Meter Model 120, S/N L2048A39

Recommendations:

- 1.)
- 2.)
- 3.)

Well Test Log

Time:	Water Level	GPM Flow	Water Quantity Flowed (gals)	Basic Water Quality (Visual Color-Sand)	Turbidity (NTU)	Notes:
5/7/2015 9:00	-26.5	130		5		80 PSI Backpres
5/7/2015 9:10	-87.5	120		4		120 PSI Backpres
5/7/2015 9:20	-92.2	120		4		150 PSI Backpres
5/7/2015 10:15	-95.5	115		3		175 PSI Backpres
5/7/2015 11:15	-95.3	110		1		180 PSI Backpressure
5/7/2015 12:00	-96.1	110		0 (Clear)		
5/7/2015 12:45	-96.7	110		0		
5/7/2015 13:30	-97.1	110		0		
5/7/2015 14:15	-97.5	110		0		
5/7/2015 15:15	-97.2	110		0		
5/7/2015 16:15	-97.6	110		0		
5/7/2015 17:00	-97.8	110		0		Shutdown for Recovery
5/7/2015 17:05	-66.2	0		N/A		Recovery
5/7/2015 17:15	-39.7	0		N/A		"
5/7/2015 17:30	-35.2	0		N/A		"
5/7/2015 17:45	-33.2	0		N/A		"
5/7/2015 18:00	-31.9	0		N/A		"
5/7/2015 18:15	-31	0		N/A		"
5/7/2015 18:30	-30.7	0		N/A		"
5/7/2015 18:45	-29.8	0		N/A		"
5/7/2015 19:00	-29.3	0		N/A		"
5/7/2015 19:15	-29	0		N/A		"
5/7/2015 19:30	-28.6	0		N/A		"
5/7/2015 19:45	-28.3	0		N/A		"
5/7/2015 20:00	-28	0		N/A		"

Additional Comments and Notes:

- 1.) Water Level is in feet below well head.
- 2.) Water level measured with transducer in well. Measurement for initial and final water level verified with graduated well probe.
- 3.) Water level recovered to within 2' (more stringent than 95% recovery) of SWL within 3 hours of pump shutdown
- 4.)
- 5.)
- 6.)
- 7.)
- 8.)
- 9.)
- 10.)





A Tradition of Stewardship
A Commitment to Service

SD/PMT/E16-00827

Planning, Building & Environmental Services

1195 Third Street, Suite 210
Napa CA 94559
www.countyofnapa.org
(707) 253-4417

OFFICE SET

David Morrison
Director

Well Permit

Application Type: Environmental / EM Permits / Water Wells / Well Destruction	Applied Date: 11/28/2016
Permit Number: E16-00827	Issued Date: 12/5/2016
Parcel Number: 021-390-012-000	Expiration Date: 12/5/2018

Site Address:

Owner: VAILIMA ESTATES HOMEOWNERS ASSN	Phone: (000) 000-0000
Address: P O BOX 526	
Applicant: Nik Lutz	Phone: (707) 944-2471
Business Name: OAKVILLE PUMP SERVICE INC	License #: 744958

Project Type: Environmental / EM Permits / Water Wells / Well Destruction

Proposed Use:

Use:

Name of Public Water System:

Well To Service This Parcel Only?:

Water Supply:

Septic Setbacks Met?:

Well Located in Flood Zone?:

Actual Approved Setback:

Hazmat Site Within 1500 feet?:

Emergency Exemption Granted?:

Hazmat Site Number and Name:

Reason For Emergency Exemption:

Specifications:

Casing Diameter:	In.	Method of Seal Placement:	
Boring Diameter:	In.	Minimum Seal Depth:	Ft.
Annular Seal:	In.	Material:	

TO PERMITEE:

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

Staff Signature: Cindy Worthington Date: 12.5.16

75000-013
E16-00827

CONDITIONS/INSPECTIONS/COMMENTS

Application Type:	Environmental / EM Permits / Water Wells / Well Destruction	Applied Date:	11/28/2016
Permit Number:	E16-00827	Issued Date:	12/5/2016
Parcel Number:	021-390-012-000	Expiration Date:	12/5/2018
Owner:	VAILIMA ESTATES HOMEOWNERS ASSN	Phone:	(000) 000-0000
Applicant:	Nik Lutz	Phone:	(707) 944-2471

Conditions:

Code	Condition
WELL-01	A copy of the State of California Well Completion Report must be submitted within 60 days of well completion.

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

Inspection Type	Inspected By	Date
Destruction Inspection	MSP-51' Seal	4-5-17

Comments:

Date	Comment
12/5/2016	Call 253-4135 at least 24 hours in advance during normal business hours to schedule inspection requests. Inspections are taken on a first-come-first-served basis so if you need a specific date and time be sure to call well in advance

Choate, Darell

From: Nik Lutz <nik@oakvillepump.com>
Sent: Friday, December 02, 2016 7:52 AM
To: Choate, Darell
Subject: Vailima Video Log Report
Attachments: Vailima Estates Mutual Water Old Well - Video Log.pdf

Good Morning,

I have to run out on some service calls this morning, but attached is the written report of the findings. Unfortunately, the buildup on the casing was so bad that even if there are perfs, we could not see them let alone locate and measure them. While the camera was being lowered, the visibility was very bad due to the minerals and casing flakes being knocked off.

The company that performed the video log also does well demo's via blasting. With the close proximity of the other wells, he recommended filling with gravel to 50' below the surface than concrete / grout the rest of the way and using a 'light' blasting load to perforate the casing while not effecting the surrounding infrastructure.

I should be back in the office later this afternoon and I will try calling then.

Thank You,

Nik Lutz

Oakville Pump Service, Inc.

Office Line: 707-944-2471 x463

Direct Line: 707-754-1463

Fax Line: 707-944-5636

nik@oakvillepump.com



All communications in this email are for the intended recipient only and are considered confidential in nature.

Wellbore Video Report

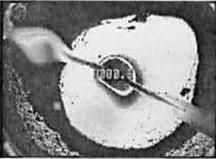
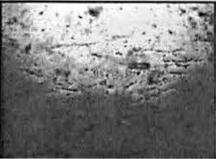
Dr. Well, Water Well Services, Inc.

P.O. Box 1685 Fair Oaks, CA. 95628

Phone: (916) 536-9319 Fax: (916) 962-7381 Web: www.drwaterwell.com

Company: Oakville Pump Service Invoice No: _____ Run No.: 1
 Address: 7855 St. Helena Hwy. Well Number: Old Well
 City: Oakville State: CA Zip: 94562 Survey Date: Nov 29, 2016
 Requested By: Nick P.O.: _____ Well Owner: Vailima Estates Mutual Water
 Copy To: _____ Camera: CCV Color Flip Camera - Short L.H.
 Reason For Survey: General Inspection Zero Datum: Top of Casing
 Operator: Chris Perry Lat.: 38°31'44.97"N Long.: 122°29'8.54"W Sec: _____ Twp: _____ Rge: _____
 Location: 100 Yards North Of Silverado Trail, On Bournemouth Rd, St. Helena Depth: _____ Van: 1
 Casing I.D. At Surface: 6.25" I.D. Reference: Measured Casing Corrosion: Very Heavy

(NOTE: Latitude and Longitude values determined using a recreational GPS accurate to about +/- 45'. SEC, TWP and RGE then determined using the TRS conversion program, accuracy not guaranteed.)

SELECTED WELLBORE SNAPSHOTS	TRUE DEPTHS (SideScan - Feet)	WELLBORE / CASING INFORMATION
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">1' </div> <div style="text-align: center;">2' </div> </div>	1'	Top Of Casing 8", Becomes 6 1/4"
	2'	Sounding Port
	33'	Static Water Level (SWL)
	48'	Sidescan Of Casing
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">33' </div> <div style="text-align: center;">48' </div> </div>	50'	Downview Of Casing
	75'	Downview Of Casing
	76'	Sidescan Of Casing
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">50' </div> <div style="text-align: center;">75' </div> </div>	90'	Visibility, Poor
	100'	Sidescan Of Casing
	200'	Sidescan Of Casing
	282'	Soft Fill, Bottom, End of Survey
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">76' </div> <div style="text-align: center;">90' </div> </div>		-Bottom Tagged At 288'
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">100' </div> <div style="text-align: center;">200' </div> </div>		
<div style="text-align: center;">282' </div>		



Old Well

Well 1

Well 2

Bourbonmouth Rd

Silverado Trail

1993

5314

© 2016 Google

38°31'43.31" N 122°29'08.84" W elev 232 ft eye alt 51

Google Earth