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Water Availability Analysis

Raymond-Ticen Ranch Winery, P15-00307-MOD
Planning Commission Hearing, February 1, 2017

WATER AVAILABILITY ANALYSIS

Raymond Vineyards

Napa, California
APN 030-270-012 & 030-270-013 & 030-050-31

SUMMIT

CIVIL STRUCTURAL ELECTRICAL WATER|WASTEWATER

Project No. 2015074

September 15, 2015

Revised January 26, 2016

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LIST OF ENCLOSURES

PROJECT SUMMARY

Boisset Family Estates (BFE) is applying for Use Permit Modification for the Raymond Vineyards winery facility located at 849 Zinfandel Lane, near the town of St. Helena (APN 030-270-013). BFE intends to merge the Raymond Vineyards and Cellar parcel with the adjacent Ticen parcel (APN 030-270-012). The Use Permit Modification involves the conversion of various existing buildings within the Ticen parcel to accommodate hospitality services (e.g. conversion of the existing residence to a private tasting venue with kitchen) as well as modifications within the Raymond Vineyards and Cellar parcel to provide additional parking spaces. In addition to the conversion of existing buildings, the proposed modification will also include an increase in employees. No change in wine production or visitation is requested. Summit has prepared the following Water Availability Analysis, which provides a comparison between the proposed water use and the estimated available water capacity on the property.

SITE DESCRIPTION

Raymond Vineyards is made up of two parcels. The parcel with the winery (APN 030-270-013) has a total of 60.2 acres with 37.7 acres of vineyard. The existing winery facility consists of offices, tasting and winery production buildings. The facility is located in an agricultural area with vineyards to the north, west and south and east. Zinfandel Lane runs parallel with the northern edge of the property. The second Raymond Vineyards parcel (APN 030-050-031) has a total of 27.7 acres with 25.8 acres of vineyard. The Ticen parcel (APN 030-270-012) has a total of 25.5 acres with 20.7 acres of vineyard and an existing residence, barn and shed building.

Water sources for the property consist of four wells, one on the Raymond Vineyards and Cellar winery parcel, one well on the adjacent Raymond Vineyard parcel, and two wells on the Ticen parcel. Well 01, located on the Raymond Vineyards and Cellar parcel (APN 030-270-013), supplies all domestic and process water for the winery. Well 02, located on the adjacent Raymond Vineyard parcel (APN 030-050-031), supplies vineyard irrigation water for the Raymond parcels. Well 03 located on the Ticen parcel (APN 030-270-012), is used for landscape and vineyard irrigation within the current Ticen parcel. Well 04 located on the Ticen parcel (APN 030-270-012), is not operable.

Treated process wastewater, stored in the existing wastewater ponds on the Raymond Vineyards and Cellar parcel, is reused as vineyard irrigation water to complement irrigation supply from Well 02 on the Raymond parcel. Sanitary sewage is and will continue to be disposed of in a separate disposal system.

Refer to the Overall Site Plan attached for a general layout of the project components. These plans also include approximate property boundaries, existing buildings and agricultural development.

WATER DEMAND

EXISTING WATER DEMAND

Current water use at the facility is based on the following needs:

- Process needs for the production capacity of 750,000 gallons per year (for a 3 year average) with a peak of 950,000 gallons per year.
- Employees = 26 per day
- Tasting Visitors = 400 maximum per day
- Deliveries = 5 per day
- Irrigation of 37.7 and 25.8 acres of vineyard within the Raymond parcels
- Irrigation of 3.2 acres of landscape within the Raymond parcel and 0.6 acres within the Ticen parcel
- Frost protection for vineyard

PROPOSED WATER DEMAND

Water use at the facility will be based on the following needs:

- Process needs for the production capacity of 750,000 gallons per year (for a 3 year average) with a peak of 950,000 gallons per year.
- Full Time Employees = 70 per day
- Part Time Employees = 10 per day
- Seasonal Employees (Harvest) = 10 per day
- Tasting Visitors = 400 maximum per day
- Event Visitors
    - 24 events per year with up to 100 persons
    - 104 events per year with up to 30 persons
    - 365 events per year with up to 10 persons
- Irrigation of 37.7 and 25.8 acres of vineyard within the Raymond parcels, and 20.7 acres of vineyard within the Ticen parcels
- Irrigation of 3.2 acres of landscape within the Raymond parcel and 0.63 acres within the Ticen parcel.
- Frost protection for vineyard

WINERY PROCESS WATER DEMAND

Water demand for wine production is expected to correlate to the process wastewater (PW) generated at the facility. The winery production capacity is currently 750,000 gallons per year (for a 3 year average) with a peak of 950,000 gallons per year. No production increase is proposed with this UP modification. Based on typical flow data from wineries of similar size and characteristics, the approximate process wastewater generation for the current wine production is calculated as follows:

Proposed Annual production	=	750,000 gal wine/year
PW generation rate	=	6 gal PW/gal wine[a]
Annual PW Flow	=	750,000 gal wine x 6 gal PW/gal wine
	=	4,500,000 gal PW/year
Average PW Flow	=	(4,500,000 gal PW/year) / (365 days)
	=	12,330 gal PW/day
Peak PW Flow	=	(4,500,000 gal PW/year x 16.4[b] %)/(30 day)
	=	24,600 gal PW/day
Annual Production Water Demand	=	(4,500,000 gal water/yr) / (325,851 gal/ac-ft)
	=	13.8 ac-ft. water/year

[a] Generation rate based on industry standards and water data for similar wineries
[b] Percentage of flows accounted during the harvest month of September, based on water data for similar wineries

Process wastewater generation is expected to be equivalent to the water demand for production. The expected annual water use associated with the average production capacity is 4,500,000 gallons of water per year, or 13.8 ac-ft. /yr. Winery process water demand will continue to be provided by Well 01. See Enclosure B for flows estimates and water demand calculation.

DOMESTIC WATER DEMAND

Domestic water use at the facility is determined based on the total number of employees, daily visitors and event guests. Using Napa County Environmental Management's Table 4 from "Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems", the existing annual domestic water usage is estimated as follows:

Table 1. Existing Domestic Water Use for Raymond Vineyards

Use Type	Maximum Quantity (persons/day)	Water Demand (gal/person)	Daily Demand (gal/day)	Number of Days (days/year)	Annual Water Use (gal/year)
Employee	26	20[b]	520	365	189,800
Tasting Visitors [a]	400	3	1,200	365	438,000
Deliveries	5	5	25	365	9,125
				Total Water Use	**636,925**
				Peak Water Use (gpd)[c]	**1,745**
				Total Water Use (ac-ft. /yr.)	**2.0**

[a] Peak tasting is assumed to occur every day of the year to be conservative.
[b] Demand per person based on sanitary system design by Mahorney and Associates, see Enclosure B
[c] Peak water use based on existing sanitary system disposal capacity.

Current sanitary sewage generation is expected to be equivalent to the water demand for domestic uses. The current annual domestic water use is 636,925 gallons per year, or 2.0 ac-ft. per year. Domestic water demand is currently provided by Well 01. See Enclosure B for flows estimates and water demand calculation.

Table 2. Proposed Domestic Water Use for Raymond Vineyards

Use Type	Maximum Quantity (persons/day)	Water Demand (gal/person)	Daily Demand (gal/day)	Number of Days (days/year)	Annual Water Use (gal/year)
FT Employee	70	15	1,050	365	383,250
PT Employee	10	15	150	365	54,750
Seasonal Employee (Harvest)	10	15	150	120	18,000
Tasting Visitors [a]	400	3	1,200	365	438,000
Event Visitors	100	15	1,500	24	36,000
Event Visitors	30	15	450	104	46,800
Event Visitors	10	15	150	365	54,750
				Total Water Use	**1,031,550**
				Average Water use (gpd)	**2,830**
				Peak Water Use (gpd)[b]	**4,050**
				Total Water Use (ac-ft. /yr.)	**3.2**

[a] Peak tasting is assumed to occur every day of the year to be conservative

[b] Peak water use is based on the peak sanitary sewage generation which includes employees, tasting visitors, and marketing event visitor's flows.

Sanitary Sewage generation is expected to be equivalent to the water demand for domestic uses. The expected annual domestic water use for the proposed marketing and visitation plan is 1,031,550 gallons per year, or 3.2 ac-ft. per year. Domestic water demand will continue to be provided by Well 01. See Enclosure B for flows estimates and water demand calculation.

IRRIGATION WATER DEMAND

- Vineyard Irrigation

  Water from Well 02 and from the treated wastewater ponds is used to irrigate 37.7 acres of vineyards within the Raymond Vineyards & Cellar winery parcel and 25.8 acres of vineyards within the adjacent Raymond vineyard parcel. The facility used approximately 10,201,854 gallons (31.3 ac-ft. /yr.) for drip irrigation of the vineyard on the Raymond parcels in 2011. It is assumed that the current annual water demand for irrigation and has not changed since 2011, as vineyard acreage remains the same. For comparison, vineyard irrigation annual demand was estimated using a rate of 0.5 ac-ft. per acre of vineyard. Napa County Phase 1 Water Availability Analysis water use guidelines for vineyard irrigation are 0.2 to 0.5 ac-ft./acre/year.

  37.7 acres x 0.5 ac-ft./acre/year = 18.9 ac-ft. /yr.

  25.8 acres x 0.5 ac-ft./acre/year = 12.9 ac-ft. /yr.

Total estimated vineyard irrigation demand = 31.8 ac-ft. /yr.

The projected vineyard irrigation demand for the Raymond parcels is based on the most conservative approach, which is the estimated 31.8 ac-ft. per year of water demand.

Water from Well 03 is used to irrigate 20.7 acres of vineyards in the Ticen parcel. The irrigation water demand for the Ticen parcel is estimated using a rate of 0.5 ac-ft. per acre of vineyard.

20.7 acres x 0.5 ac-ft./acre/year = 10.4 ac-ft. /yr.

Vineyard irrigation will typically begin in June when onsite soils begin to dry and continue until October, with the peak irrigation period between July and August. All vineyard irrigation water, other than what is supplied by reclaimed process wastewater, will be supplied by the irrigation Well 02 that is located on the adjacent Raymond parcel (APN 030-050-031) and by Well 03 located on the Ticen parcel.

- Landscape Irrigation

The water demand for landscape irrigation was based on the California Department of Water Resources guidelines for Estimated Total Water Use (ETWU) per year:

$$ETWU = (ETo)(0.62)\left(\frac{PF \times HA}{IE} + SLA\right)$$

Where:

ETWU = Estimated Total Water Use per year (gallons)
ETo = Reference Evapotranspiration (inches)
PF = Plant Factor from WUCOLS (see Section 491)
HA = Hydrozone Area [high, medium, and low water use areas] (square feet)
SLA = Special Landscape Area (square feet)
0.62 = Conversion Factor
IE = Irrigation Efficiency (minimum 0.71)

Assumptions:

- Low water use plant types with a plant factor of 0.3 (yarrow, buckbrush, redbud, etc.)
- High water use plant types with a plant factor of 0.9 (grass)
- Napa reference evapotranspiration of 49.4 per CIMIS, 1999
- Irrigation efficiency of 90% for drip systems or similar

The Raymond parcel has approximately 3.2 acres (139,392 SF) of existing landscape which consists of grass (turf) and a biodynamic garden with a herbarium and other trees. In our previous WAA, we had indicated a proposed increase in landscape in the Raymond parcel. After further revisions of the landscaping plan it was determined that no additional landscape is proposed for the Raymond parcel. Landscape will continue to be irrigated with water from wells 01 and 02. A conservative plant factor of 0.9 will be used for existing landscaping.

$$\text{ETWU (existing)} = (49.4 \text{ in/year})\ (0.62)\ \frac{(0.9 * 139{,}392 \text{ SF})}{0.9} = 4{,}269{,}298 \text{ gal/yr.} = 13.1 \text{ ac-ft. /yr.}$$

The Ticen parcel has approximately 0.6 acres (26,136 SF) of existing landscaping and propose to add 2,498 SF of additional landscape consisting of low water use plant types such as yarrow, buckbrush, redbud, etc. (see Enclosure A for Landscape Plan). The proposed total acreage of landscape for the Ticen parcel is 0.66 ac (28,634 SF). Landscape will continue to be irrigated with water from well 03. A conservative plant factor of 0.9 will be used for existing landscape and a plant factor of 0.3 will be used for the proposed new landscape.

$$\text{ETWU (existing)} = (49.4 \text{ in/year})\ (0.62)\ \frac{(0.9 * 26{,}136 \text{ SF})}{0.9} = 800{,}493 \text{ gal/yr.} = 2.5 \text{ ac-ft. /yr.}$$

$$\text{ETWU (additional)} = (49.4 \text{ in/year})\ (0.62)\ \frac{(0.3 * 2{,}498 \text{ SF})}{0.9} = 25{,}503 \text{ gal/yr.} = 0.1 \text{ ac-ft. /yr.}$$

ETWU (total) = 2.5 ac-ft./yr. + 0.1ac-ft./yr. = 2.6 ac-ft./yr.

- Frost Protection Water usage

  Water from well 02 and the treated wastewater ponds is used for frost protection of vineyards on the Raymond parcels. In our previous WAA, we had indicated a projected frost protection water demand of 47.7 ac-ft. per year. In further follow-up with the facility, this demand was an estimate based on assumed hours of sprinkler operation. Since this estimate is not based on actual data we have revised this analysis to reflect a rate of 0.25 ac-ft. per acre of vineyard, which is the standard for Napa County Phase 1 Water Availability Analysis water use guidelines for vineyard frost protection.

  37.7 acres x 0.25 ac-ft./acre/year = 9.4 ac-ft. /yr.

  25.8 acres x 0.25 ac-ft./acre/year = 6.5 ac-ft. /yr.

  Total estimated frost protection demand for 63.5 acres of vineyard = 15.9 ac-ft. /yr.

  The projected vineyard frost protection water demand for the Raymond parcels is 15.9 ac-ft. per year. Frost protection for the Ticen parcel is provided by a stationary fan.

- Fire Protection Water usage

  An existing pond supplies the required water for fire protection. Water demand for fire protection is not included in the total water demand since is not directly provided by any water source.

TOTAL WATER DEMAND

The total water demand at the facility is expected to be 90.8 ac-ft. per year. If vineyard irrigation and frost protection demands for the Raymond parcel are excluded (since these demands are provided by Well 02 on the adjacent Raymond parcel) the annual water demand for the winery parcel is 32.7 ac-ft. per year. Some of the required vineyard irrigation water demand will also be supplied by treated process wastewater and will offset the amount of irrigation well water required.

Table 3. Total Proposed Annual Water Demand

Water Use	Peak Gallons per day	Gallons per year	Acre-Feet per year
Wine Production	24,600	4,500,000	13.8
Domestic Use	4,050	1,032,000	3.2
Vineyard Irrigation [c]	51,000[a]	13,751,000	42.2
Landscape Irrigation	19,000[a]	5,116,000	15.7
Frost Protection[d]	172,700[b]	5,181,000	15.9
Total	271,350	29,580,000	90.8
Total Water Demand required/provided by onsite potable well			32.7
Total Water Demand required/provided by irrigation wells			58.1

[a] Estimated assuming 9 months of irrigation (no irrigation during winter)
[b] Estimated assuming 30 days of frost season
[c] Water for vineyard irrigation is provided by Ticen wells and offsite Raymond well
[d] Frost protection water is provided by offsite well and treated wastewater pond

WATER AVAILABILITY

Based on the Water Availability Analysis method for allotted water use for Napa Valley Floor Areas (1 ac-ft/acre/year), the Raymond Vineyards & Cellar parcel would be allotted 60.2 ac-ft /yr, the Raymond Vineyard parcel would be allotted 27.7 ac-ft/yr, and the Ticen parcel would be allotted 25.5 ac-ft/yr; therefore, the total allotted water use for all three parcels would be 113.4 ac-ft /year. The estimated water demand for process, domestic, and landscape uses of 32.7 ac-ft /year represents 29% of the water available. Based on the proposed increase in employee, visitation, and landscape acreage, there will be an overall increase in projected water demand of about 1.3 ac-ft/year (see Table 4).

Table 4. Water Availability

Parcel & Uses	Parcel Size (acres)	Water Allotment (ac-ft./year)	Existing Demand (ac-ft./year)	Proposed Demand (ac-ft./year)	Water Source Parcel
030-270-012	25.5	25.5			
030-270-013	60.2	60.2			
030-050-031	27.7	27.7			
Wine Production			13.8	13.8	030-027-013
Domestic Use			2.0	3.2	030-027-013
Vineyard Irrigation			42.2	42.2	030-050-031 & 030-270-012
Landscape Irrigation			15.6	15.7	030-027-012 & 030-027-013
Frost Protection			15.9	15.9	030-050-031
TOTAL	113.4	113.4	89.5	90.8	

There are 3 wells that are currently used for water supply for the Raymond and Ticen parcels, as indicated on the attached Site Plan (Enclosure A):

Well 01 was drilled in 1978 to a depth of 410 feet, and has a 20 ft. annular seal. The existing domestic well yields approximately 100-120 gpm. There has been no evidence of groundwater depletion. The peak domestic water demand should account for 24,600 gal/day of process water and 4,050 gal/day of domestic water, for a total of 28,650 gal/day. Well 01 would need to supply approximately 60 gpm over 8 hours to meet the potable water demand, and should have sufficient capacity to meet the peak domestic water demand (see attached well log in Enclosure C).

Well 02, located on the adjacent Raymond parcel (APN 030-050-031), has a capacity of 60 gpm and is sufficient to supply all irrigation water demand for the Raymond parcels.

Well 03, drilled in 2006 and located on the Ticen parcel (APN 030-270-012), has a capacity of 40 gpm and is sufficient to provide irrigation demands for the Ticen parcel.

Well 04, drilled in 1984 and located on the Ticen parcel (APN 030-270-012), has a capacity of 12 gpm, but is currently non-operable.

DROUGHT CONSERVATION

The facility plans to continue to treat the process wastewater generated at the facility and reuse it for vineyard irrigation purposes, offsetting the water demand for irrigation uses. Domestic wastewater will be treated and disposed of in a subsurface system, recharging the groundwater table through infiltration.

CONCLUSION

Total annual water demand at Raymond Vineyards and Ticen for process, domestic and landscape uses is projected to be 32.7 acre-feet, which is below the allowable water allotment of 113.4 acre-feet (90.8 ac-ft. with vineyard irrigation and frost protection included). The anticipated peak daily potable water demand for the parcel can be met with the existing potable water supply (well 01) operating for 8 hours per day at 60 gpm.

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SUMMIT

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ENCLOSURE A

OVERALL SITE PLAN

LANDSCAPE PLAN

(E) VINEYARD

APPROXIMATE LOCATION OF WELL 2

RAYMOND VINEYARD PARCEL APN 030-050-031

APPROXIMATE PROPERTY LINE

(E) PROCESS WASTEWATER PONDS

WELL 1

ZINFANDEL LANE

(E) TASTING & WINERY PRODUCTION

(E) VINEYARD

VISITOR PARKING

(E) VINEYARD

RAYMOND VINEYARDS & CELLARS PARCEL APN 030-270-013

200% RESERVE SS SUBSURFACE DRIPFIELD

PRIMARY SS SUBSURFACE DRIPFIELD

18' WIDE ACCESS ROAD

(E) WINERY PRODUCTION OFFICES

(E) ETI BED

TICEN PARCEL APN 030-270-012

(E) VINEYARD ROAD TO BE REMOVED

WELL 3

APPROXIMATE PROPERTY LINE

(E) BARN

WELL 4

VISITOR PARKING

RESIDENCE TO BE CONVERTED TO TASTING ROOM

DRIVEWAY TO BE REMOVED

STATE HIGHWAY 29

0 300 600

GRAPHIC SCALE IN FEET

SYSTEM SITE PLAN

PROJECT NO. 2015074 DATE 2015-08-28
BY JA CHK GG SHT NO ___ OF ___

RAYMOND WINERY
849 ZINFANDEL LANE
ST HELENA, CA 94574
APN 030-270-031

SUMMIT
Summit Engineering, Inc
463 Aviation Blvd., Suite 200 • Santa Rosa, CA 95403
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PLANT SCHEDULE

SYMBOL	KEY	QUANTITY	SIZE	BOTANICAL NAME	COMMON NAME
	ACH MIL	12	1 GAL	ACHILLEAEA MILLEFOLIUM	YARROW
	CEA CYA	14	1 GAL	CEANOTHUS CYANEUS	SAN DIEGO BUCKBRUSH
	CER OCC	1	15 GAL	CERCIS OCCIDENTALIS	WESTERN REDBUD
	ERI PRO	6	1 GAL	ERIGERON KARVINSKIANUS 'PROFUSION'	MEXICAN FLEABANE DAISY
	FES RUB		1 GAL	FESTUCA RUBRA	RED FESCUE
	HEL SEM	30	1 GAL	HELICTOTRICHON SEMPERVIRENS	BLUE OAT GRASS
	PEN FIR	24	5 GAL	PENNISETUM SETACEUM 'FIREWORKS'	FIREWORKS FOUND GRASS
	PEN KAR	22	5 GAL	PENNISETUM ORIENTALE 'KARLEY ROSE'	KARLEY ROSE ORIENTAL FOUNTAIN GRASS
	PHO RED	6	5 GAL	PHORMIUM 'AMAZING RED'	DWARF RED FLAX

APPROXIMATE NEW LANDSCAPE AREA: 2,498 SF

APPROXIMATE PROPERTY LINE

PHO RED | 3 | 5G
PEN KAR | 8 | 5G
HEL SEM | 11 | 1G
ACH MIL | 12 | 1G
PEN FIR | 12 | 5G
ERI PRO | 3 | 1G
CEA CYA | 7 | 1G
FES RUB | 1G
ERI PRO | 3 | 1G
CEA CYA | 7 | 1G
PEN KAR | 6 | 5G
HEL SEM | 8 | 1G
HEL SEM | 11 | 1G
CER OCC | 1 | 15G
PEN FIR | 12 | 5G
PEN KAR | 8 | 5G
PHO RED | 3 | 5G

0 30 60
GRAPHIC SCALE IN FEET

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RAYMOND VINEYARDS
849 ZINFANDEL LANE
ST. HELENA, CA 94574
APN 030-270-012, 013

USE PERMIT APPLICATION

LANDSCAPE PLAN

	2015-08-28 PERMIT SUBMITTAL

DATE: 2015-08-26
JOB NO: 2015074
SCALE: AS SHOWN
DRAWN: JA
CHECKED: DR

SHEET
UP8

ENCLOSURE B

EXISTING AND PROPOSED WATER DEMAND

ENCLOSURE C

SUMMIT ENGINEERING, INC.	RAYMOND VINEYARDS & CELLAR Wastewater Feasibility Study Process Wastewater Flows	PROJECT NO. BY: CHK:	2015074 GG

PROCESS WASTEWATER

Annual Volume

Annual Production (projected)						=	750,000	gal wine/year
Generation Rate (assumed)[a]						=	165	gal wine/ton grapes
Tons Crushed	750,000	gal wine/year	÷	165	gal wine/ton grapes	=	4,545	tons grapes/year
Process Wastewater (PW) Generation Rate[b]	(assumed)					=	6.00	gal PW/gal wine
Annual PW Flow	750,000	gal wine/year	x	6.00	gal PW/gal wine	=	***4,500,000***	***gal PW/year***

Average Day Flow

	4,500,000	gal PW/year	÷	365	days	=	***12,329***	***gal PW/day***

Napa County Peak Day Flow

Length of Harvest						=	60	days
Peak Flow	750,000 60	gal wine/year days	x	1.5		=	***18,750***	***gal PW/day***

Average Day Peak Harvest Month Flow

Assume:	1	16.400%	of the PW flows are accounted for during October					
	2	30	days in October					
Peak Flow	4,500,000	gal PW/year	x	16.4%		=	*24,600*	*gal PW/day*
			30	days				
						=	***24,600***	***gal PW/day***

SUMMIT ENGINEERING, INC.	RAYMOND VINEYARDS & CELLAR Wastewater Feasiblity Study Sanitary Sewage Flows	PROJECT NO. 2015074 BY: CL CHK: GG

SANITARY SEWAGE

WINERY

Non-Harvest Peak Tasting w/o Event					
Employee (full-time)	70 x	15 gpcd	=	1,050 gal/day	
Employee (part-time)	10 x	15 gpcd	=	150 gal/day	
Employee (seasonal)	0 x	15 gpcd	=	0 gal/day	
Public Tasting Visitors	400 x	3 gpcd	=	1,200 gal/day	
Private Tasting Visitors	0 x	3 gpcd	=	0 gal/day	
Peak Event (catered)	0 x	15 gpcd	=	0 gal/day	
Total			=	**2,400 gal/day**	
Harvest Peak Tasting w/o Event					
Employee (full-time)	70 x	15 gpcd	=	1,050 gal/day	
Employee (part-time)	10 x	15 gpcd	=	150 gal/day	
Employee (seasonal)	10 x	15 gpcd	=	150 gal/day	
Public Tasting Visitors	400 x	3 gpcd	=	1,200 gal/day	
Private Tasting Visitors	0 x	3 gpcd	=	0 gal/day	
Peak Event (catered)	0 x	15 gpcd	=	0 gal/day	
Total			=	**2,550 gal/day**	**Average Domestic Water Demand during Peak Period (w/out event)**
Non-Harvest Peak Tasting w/ Event					
Employee (full-time)	70 x	15 gpcd	=	1,050 gal/day	
Employee (part-time)	10 x	15 gpcd	=	150 gal/day	
Employee (seasonal)	0 x	15 gpcd	=	0 gal/day	
Public Tasting Visitors	400 x	3 gpcd	=	1,200 gal/day	
Private Tasting Visitors	0 x	3 gpcd	=	0 gal/day	
Peak Event (catered)	100 x	15 gpcd	=	1500 gal/day	
Total			=	**3,900 gal/day**	
Harvest Peak Tasting w/ Event					
Employee (full-time)	70 x	15 gpcd	=	1,050 gal/day	
Employee (part-time)	10 x	15 gpcd	=	150 gal/day	
Employee (seasonal)	10 x	15 gpcd	=	150 gal/day	
Public Tasting Visitors	400 x	3 gpcd	=	1,200 gal/day	
Private Tasting Visitors	0 x	3 gpcd	=	0 gal/day	
Peak Event (catered)	100 x	15 gpcd	=	1500 gal/day	
Total			=	**4,050 gal/day**	

DESIGN FLOW = **4,050 gal/day**

***portable toilets will be used for larger events greater than 150 persons**

WELL LOG

RAYMOND VINEYARDS

DUPLICATE
Driller's Copy

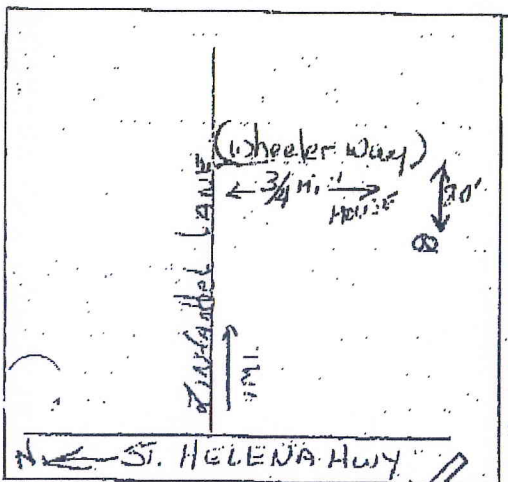
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORT

Do not fill in
No. 103316

Notice of Intent No.
Local Permit No. or Date
State Well No.
Other Well No.

(1) OWNER: Name Raymond Vineyards
Address 849 Zinfandel Lane
City St. Helena Zip 94574

(2) LOCATION OF WELL (See instructions):
County Napa Owner's Well Number 30-270-03
Well address if different from above same
Township Range Section
Distance from cities, roads, railroads, fences, etc.



WELL LOCATION SKETCH

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

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

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

(6) GRAVEL PACK:
Yes [X] No [ ] Size 3/4"
Diameter of bore 18"
Packed from 20 to 410 ft.

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

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot size
0	90	18"	188	90	410	1/8x3

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

(9) WELL SEAL:
Was surface sanitary seal provided? Yes [X] No [ ] If yes, to depth 20 ft.
Were strata sealed against pollution? Yes [ ] No [X] Interval ft.
Method of sealing grout

(10) WATER LEVELS:
Depth of first water, if known 92' ft.
Standing level after well completion 25 ft.

(11) WELL TESTS:
Was well test made? Yes [X] No [ ] If yes, by whom Drillers
Type of test Pump [ ] Bailer [X] Air lift [X]
Depth to water at start of test 25 ft. At end of test 100' ft.
Yield 100 gal/min after hours Water temperature
Chemical analysis made? Yes [ ] No [X] If yes, by whom?
Was electric log made? Yes [ ] No [ ] If yes, attach copy to this report

(12) WELL LOG: Total depth 410 ft. Depth of completed well 410 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	4	Soil
4	27	Clay gravel imb
27	38	Cemented gravel
38	83	clay gravel imb
83	92	Cemented gravel
92	96	Gravel
96	118	Blue clay gravel imb
118	139	Brown sandy clay & graved
139	143	Cemented gravel
143	183	Blue clay
183	225	Brown clay gravel imb
225	252	Cemented gravel
252	332	Sandy brown clay & gravel
332	351	Sandy brown clay
351	387	Cemented gravel
387	398	Gravel small boulders & gray sa clay
398	410	Sticky brown clay

Work started 8/1 19 78 Completed 8/11 19 78

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 Zip 94590
License No. 291001 Date of this report 8/14/78

DWR 188 (REV. 7-72) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVE NUMBER

TRIPLICATE
Retain this copy

WATER WELL DRILLERS REPORT

(Sections 7079, 7080, 7081, 7082, Water Code)

THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

Do Not Fill In

No 12845

State Well No.

Other Well No.

(1) OWNER:

Name Roy Raymond

Address 1459 Kerney Street, St. Helena, California

(2) LOCATION OF WELL:

County Napa Owner's number, if any

Township, Range, and Section

Distance from cities, roads, railroads, etc. ½ Mi. E of Highway 29 ½ Mi. so. of Zinfandel Lane

(3) TYPE OF WORK (check):

New Well [X] Deepening [ ] Reconditioning [ ] Destroying [ ]

If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE (check):

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

(5) EQUIPMENT:

Rotary Reverse [X]
Cable [ ]
Other [ ]

(6) CASING INSTALLED:

STEEL: OTHER:

SINGLE [X] DOUBLE [ ]

If gravel packed

From ft.	To ft.	Diam.	Gage or Wall	Diameter of Bore	From ft.	To ft.
0	302	~~XXX~~ 14"	1/4	22"	0	302
200'	½" plain, 14'		3/16"	plain, louvered		

Size of shoe or well ring:

Size of gravel: 3/16"

Describe joint

(7) PERFORATIONS OR SCREEN:

Type of perforation or name of screen factory louvered

From ft.	To ft.	Perf. per row	Rows per ft.	Size in. x in.
144	168	louvered		
188	198	100 slot screen		
218	242	louvered		
242	252	100 slot screen		
272	292	100 slot screen		

(8) CONSTRUCTION:

Was a surface sanitary seal provided? Yes [X] No [ ] To what depth 20 ft.

Were any strata sealed against pollution? Yes [ ] No [ ] If yes, note depth of strata

From ft. to ft.

From ft. to ft.

Method of sealing cement

(9) WATER LEVELS:

Depth at which water was first found, if known ft.

Standing level before perforating, if known ft.

Standing level after perforating and developing ft.

(10) WELL TESTS:

Was pump test made? Yes [ ] No [ ] If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

Temperature of water Was a chemical analysis made? Yes [ ] No [ ]

Was electric log made of well? Yes [ ] No [ ] If yes, attach copy

(11) WELL LOG:

Total depth 302 ft. Depth of completed well 302 ft.

Formation: *Describe by color, character, size of material, and structure*

ft. to ft.	
0 - 4	top soil
4 - 26	soft yellow clay
26 - 38	sand and gravel
38 - 60	soft yellow clay
60 - 62	clay
62 - 68	gravely clay
68 - 70	sand and gravel
70 - 79	sandy yellow clay
79 - 90	gravel
90 - 110	gravel and rocks
110 - 118	gravel (large)
118 - 128	blue clay
128 - 130	blue sand
130 - 139	sandy blue clay
139 - 142	sandy yellow clay
142 - 150	sand and gravel
150 - 155	sand and gravel large
155 - 156	yellow clay
156 - 185	blue grey clay
185 - 194	sand and gravel
194 - 197	yellow clay
197 - 203	sand and gravel
203 - 205	blue clay
205 - 207	sand and gravel
207 - 210	blue grey clay
210 - 219	blue clay
219 - 226	sand and gravel
226 - 248	rocks and gravel
248 - 254	blue clay
254 - 263	rocks and gravel
263 - 266	blue clay
266 - 286	rocks and gravel
286 - 300	blue clay

Work started 10-14 19 71 , Completed 10-17 19 71

WELL DRILLER'S STATEMENT:

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

NAME Ben Barrow Co.
(Person, firm, or corporation) (*Typed or printed*)

Address P.O. Box 388, Woodland, Calif.

[SIGNED] [signature]
(Well Driller)

License No. 153008 Dated Oct 25 19 71

SKETCH LOCATION OF WELL ON REVERSE SIDE

DWR 188 (REV. 9-65)

56391-950 10-65 50M TRIP ① △ OSP