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Wastewater Feasibility Study

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

WASTEWATER FEASIBILITY STUDY

FOR

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

SUMMIT
CIVIL STRUCTURAL WATER|WASTEWATER ELECTRICAL

463 Aviation Blvd., Suite 200
Santa Rosa, California 95403
707 527-0775

Project No. 2015074
September 1st, 2015
Revised January 15, 2016

RAYMOND VIENYARDS

St. Helena, Napa County, California

WASTEWATER FEASIBILITY STUDY

PROJECT DESCRIPTION

The purpose of this report is to present background data and calculations for the Sanitary Sewage (SS) treatment system improvements that will be required to support the increased wastewater flows associated with the proposed Use Permit Modification.

Boisset Family Estates is considering a Use Permit Modification for the Raymond Vineyards winery facility located at 849 Zinfandel Lane, near the town of St. Helena (APN 030-270-013). Boisset Family Estates intends to merge the Raymond Vineyards and Cellar parcel with the adjacent Ticen parcel (APN 030-270-012). The Ticen parcel has an existing residence, a barn and a shed building. 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 parcel to provide additional parking spaces. In addition to the conversion of existing buildings, the proposed modification will also include an increase in employees which requires a sanitary wastewater feasibility study. No change in production or visitation is being requested.

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 existing buildings, vineyards, roads, well locations, property lines, existing PW Ponds, and existing and proposed SS treatment and disposal areas are located on the Overall Site Plan (Enclosure A).

SANITARY SEWAGE FLOWS

Sanitary sewage (SS) at Raymond Vineyards (including the Ticen Parcel SS flows) will consist of typical wastewater generated from restrooms and hospitality services. As stated in the Use Permit Modification application, winery tours and tasting will occur 7 days a week with a peak of 400 tasting visitors per day and 90 employees (70 full time, 10 part time and 10 seasonal). Portable toilets will be utilized for events with more than 100 guests.

Based on the projected number of employees and visitors, the design flow rate for the sanitary sewage management system is 4,050 gallons per day. Please refer to Enclosure B for detailed calculations.

The following events are planned:

- 24 events per year for up to 100 people
- 104 events per year for up to 30 people
- 365 events per year for up to 10 people

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
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
Peak Event (catered)	0	x	15	gpcd	=	0	gal/day
Total					=	**2,550**	**gal/day**
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
Peak Event (catered)	100	x	15	gpcd	=	1,500	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
Peak Event (catered)	100	x	15	gpcd	=	1,500	gal/day
Total					=	**4,050**	**gal/day**

The design flow rate will account for the most conservative approach, with a SS flow rate of 4,050 gal SS/day. This flow represents the total SS flow that will be generated from the Raymond Vineyards parcel and the Ticen parcel, combined. The total combined SS flow from both parcels will be treated and disposed of in the proposed new SS subsurface drip system.

CONVEYANCE, TREATMENT AND DISPOSAL SYSTEMS OVERVIEW

The owner intends to design and install a new onsite subsurface drip dispersal system with pre-treatment in accordance with all necessary Napa County Planning, Building, and Environmental Services (PBES) criteria and permits. SS flows will be handled separately from process wastewater flows. The SS system will be designed to accommodate ultimate marketing plans and associated SS flows.

Sanitary sewage will be treated and disposed of using new and existing septic tanks, a new AdvanTex textile filter pre-treatment system and a new subsurface drip system. Given suitable soils, this method of treatment and disposal of SS is appropriate. The existing Evaporation Transpiration & Infiltration (ETI) bed is proposed to be left in place in case this system is needed for future disposal of SS flows (within the EIT bed capacity); however, the proposed SS system is designed to accommodate all expected SS flows without the need to utilize the existing EIT bed.

SS MANAGEMENT SYSTEM

GRAVITY COLLECTION

The existing collection system is designed to provide low maintenance and no infiltration or exfiltration. SS generated from the Raymond and Ticen parcels will be combined and routed to the septic tanks. New piping will be compatible with SS and satisfy Uniform Plumbing Code and local requirements.

COLLECTION SUMP

SS from the Ticen parcel will be collected and sent to a new collection sump via gravity or pumped as needed. At the new collection sump, flows from the Ticen parcel will be combined with SS collected from the Raymond parcel. From the collection sump, the combined SS will be directed to the septic tanks.

SEPTIC TANKS WITH EFFLUENT FILTER

Solids settling and digestion in the septic tanks helps to reduce BOD and TSS concentrations entering the pre-treatment stage of the system, resulting in higher treatment unit performance, and reduced potential for clogging of the disposal field. An effluent filter will also be provided to remove additional suspended solids which do not settle out in the septic tank. The required septic tank size for the SS flows was evaluated based on Napa County PBES criteria and Orenco Systems Inc. guidelines. Napa County PBES criteria, based on the Uniform Plumbing Code, determine septic size as follows:

Volume = 1,125 + 0.75 x Flow rate
Volume = 1,125 + 0.75 (4,050 gpd)
Volume = 4,163 gallons
Volume = 5,000 gallons

Orenco Systems, Inc. recommends 3 days of hydraulic retention time (HRT) for typical SS waste strength. Based on Orenco guidelines, the septic tank is sized as shown below:

Volume = 3 days HRT x Flow rate
Volume = 3 x (4,050 gpd)
Volume = 12,150 gallons

Volume = 13,000 gallons

The facility has two 1,500 gallon septic tanks for an existing septic capacity of 3,000 gallons. Because Orenco's guidelines result in a larger volume, a new septic tank size of about 10,000 gallons will be provided for solids removal prior to treatment to complement the total septic capacity to 13,000 gallons.

PUMP TANK

Wastewater from the sanitary sewage septic tanks will flow by gravity to the existing Pump Tank where it will be pumped to the AdvanTex Pretreatment system. Existing pumping and controls systems will need to be evaluated.

PRE-TREATMENT SYSTEM

An Orenco System's AdvanTex Treatment System will be used for pretreatment of the SS flows from the facility prior to disposal in the subsurface drip field. An AdvanTex Treatment System is a packed bed filter that supports attached growth biological treatment. Summit Engineering recommends 1 AXMAX-175 treatment pod for the Raymond Winery SS flows. An AXMAX-175 should be sufficient for pre-treatment at peak flows. This approach will be confirmed with the vendor prior to any permitting or construction of the SS treatment system.

The AXMAX – 175 includes a recirculation chamber and a dosing chamber. A dosing pump will dose the treated SS to the subsurface drip disposal field at timed intervals based on the design flow and the water level in the tank. At the normal operating water level, timed dosing of the AdvanTex unit will be automatic. The floats and pumps will be controlled by a simplex pump control panel equipped with remote telemetry and web based monitoring system. A recirculation anoxic line will return pre-treated flows from the AXMAX-175 to the septic tanks to provide additional nitrogen removal.

The pump serving the subsurface drip system must satisfy both the operating condition for effluent disposal as well as drip line flushing and backwashing operations. A digital control panel with an elapsed time meter and or an event counter will be provided to track and verify dosing.

FLOW MEASUREMENT

Two inline flow meters will be provided to measure flows during dosing and flushing cycles into and out of the subsurface drip field. One meter on the effluent feed line will measure dose volumes, and another meter on the flush return line will measure flushing volumes. A run-time meter will be provided to assist in flow measurement, and a dose counter will allow for monitoring of overall dosing and flushing cycles.

SOIL INVESTIGATION RESULTS

A site evaluation was performed by Summit Engineering and a Napa County Registered Environmental Health Specialist (REHS) on April 5th, 2011. Seven soil profiles were excavated within the vineyard area south of the existing ETI bed. Please refer to the attached site map for the soil profile locations. The soil

profiles displayed acceptable soils to depths ranging from 41-54 inches. However, mottling was observed at 36" which will be considered the limiting depth. These soils were classified as a sandy clay loam with moderate blocky structure with an assigned hydraulic loading rate of 0.6 gal/sf/day. Approximately 81,000 square feet is available for a subsurface drip system. See Enclosure C for the soil evaluation results.

SUBSURFACE DRIP FIELD

Treated effluent will be discharged into a subsurface drip field utilizing tubing manufactured by Geoflow. The area required for disposal of the projected SS flows is calculated as follows:

$$\text{Drip Field Size} = \frac{4{,}050 \text{ gpd}}{0.6 \frac{\text{gal}}{\text{SF} - \text{day}}} = 6{,}750 \text{ SF minimum}$$

Two zones of subsurface drip field system with 1,700 LF of drip tubing each will be provided for disposal of the SS flows. The drip tubing, manufactured by Geoflow, will be installed in 12 inch deep trenches with 12 inches of native backfill. Installation of the drip tubing near the soil surface will maximize the evaporation and percolation into the root zone of the soil. The area for a subsurface drip disposal field will be a minimum of 6,800 square feet and a minimum 200% reserve area of 13,600 square feet. Warning signs and/or fencing will be installed to indicate the boundaries of the drip field area. See Enclosure B for more details on the subsurface drip disposal field design.

OTHER CONSIDERATIONS

ODOR CONTROL

There should be no noxious odors from a properly designed and operated treatment system. See Alternative Courses of Action for operation alternatives for unforeseen conditions.

GROUND WATER & SURFACE WATER CONTAMINATION

Appropriate setbacks will be maintained to prevent contamination of groundwater and surface water. The distance from the water wells to any of the treatment tanks and/or disposal system components is a minimum of 100 feet. No disposal of wastewater will occur within 100 feet of any existing wells.

ALTERNATIVE COURSES OF ACTION

Although no operational issues are foreseen, a 200% reserve area is shown on the plans.

ENCLOSURE A

OVERALL SITE PLAN

SS DISPOSAL FIELD LAYOUT

WASTEWATER MANAGEMENT SYSTEM SCHEMATIC

(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

RAYMOND VINEYARDS & CELLARS PARCEL
APN 030-270-013

VISITOR PARKING

(E) VINEYARD

200% RESERVE SS SUBSURFACE DRIPFIELD

PRIMARY SS SUBSURFACE DRIPFIELD

18' WIDE ACCESS ROAD

TICEN PARCEL
APN 030-270-012

(E) WINERY PRODUCTION OFFICES

(E) ETI BED

(E) VINEYARD ROAD TO BE REMOVED

WELL 3

APPROXIMATE PROPERTY LINE

(E) BARN

VISITOR PARKING

WELL 4

RESIDENCE TO BE CONVERTED TO TASTING ROOM

DRIVEWAY TO BE REMOVED

STATE HIGHWAY 29

0 300 600

GRAPHIC SCALE IN FEET

SUMMIT
Summit Engineering, Inc
463 Aviation Blvd., Suite 200 • Santa Rosa, CA 95403
707-527-0775 • www.summit-sr.com

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

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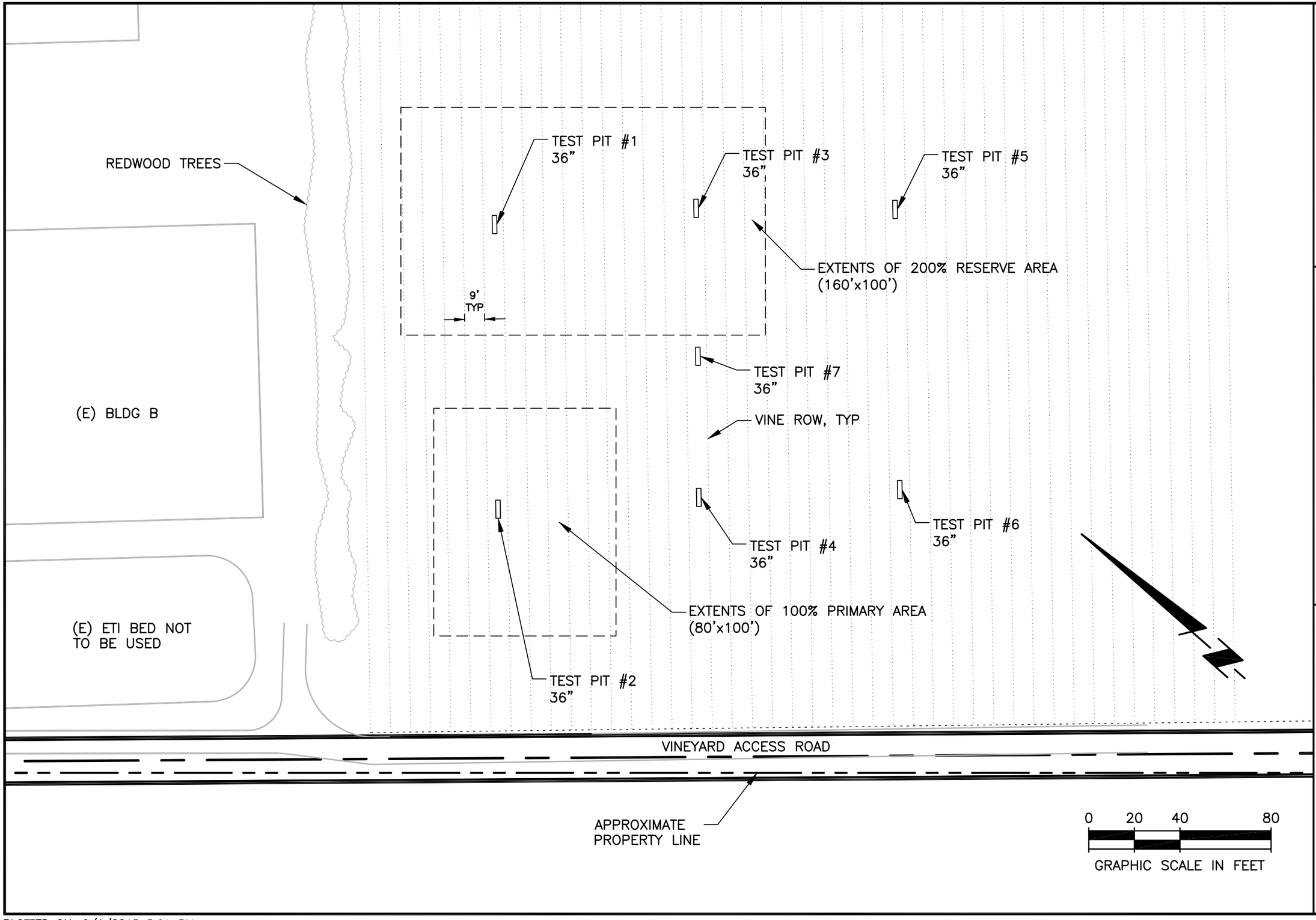

SUMMIT

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463 Aviation Blvd., Suite 200 • Santa Rosa, CA 95403
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SS DISPOSAL FIELD LAYOUT

PROJECT NO. 2015074 DATE 2011-05-03
BY KO CHK ____ SHT NO ___ OF ___

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

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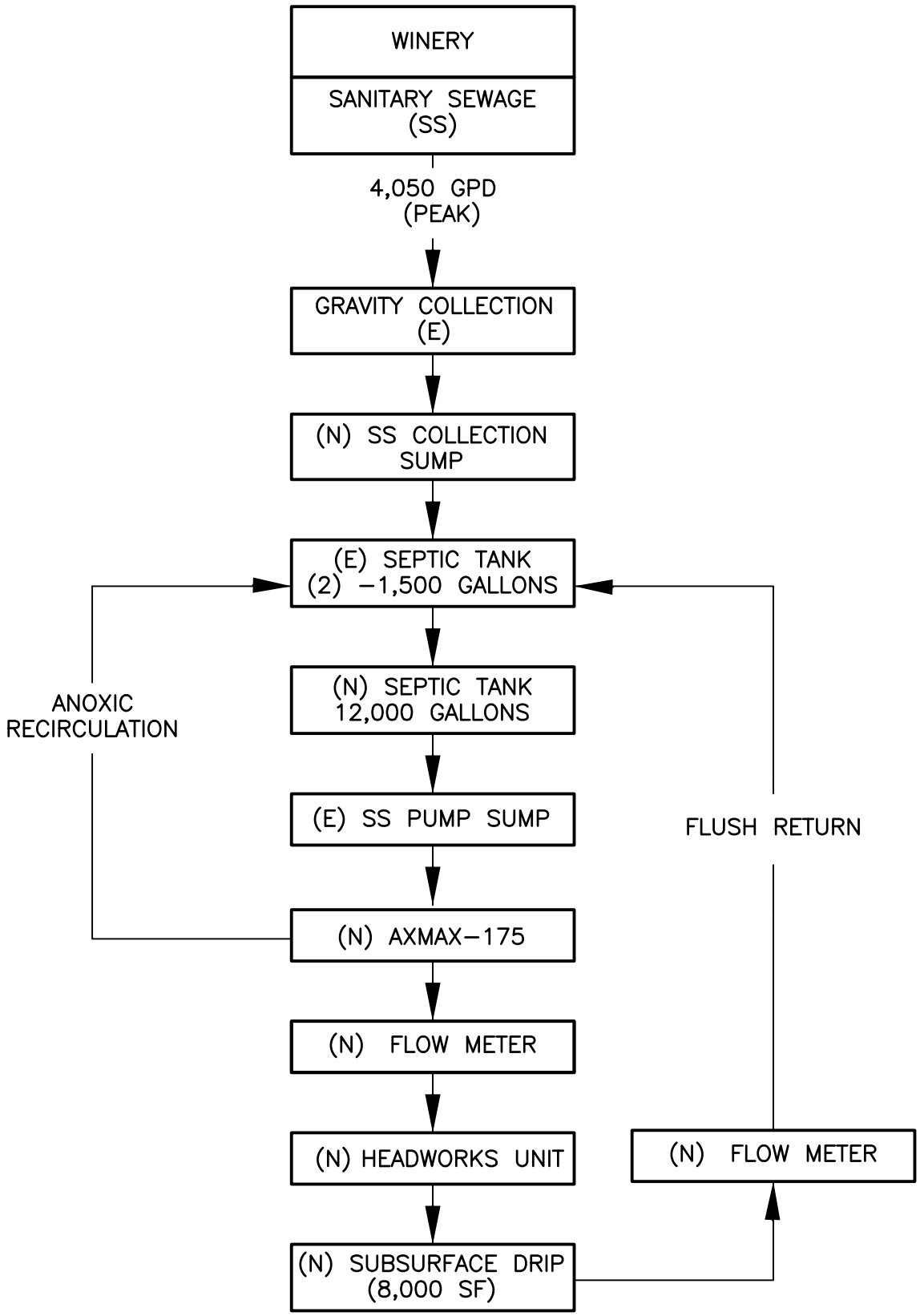
SUMMIT

RAYMOND VINEYARDS AND CELLARS
849 ZINFANDEL LANE
ST.HELENA, CA
APN 030-270-013

SS TREATMENT SCHEMATIC

PROJECT NO. 2015074
DATE 09-01-2015
SHT NO 1 OF 1
BY CL CHK GG



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ENCLOSURE B

WASTEWATER DESIGN CALCULATIONS

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**
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**

Average Domestic Water Demand during Peak Period (w/out event)

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

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

ENCLOSURE C

SOIL SITE EVALUATION REPORT

Napa County Department of Environmental Management

SITE EVALUATION REPORT

Please attach an 8.5" x 11" plot map showing the locations of all test pits triangulated from permanent landmarks or known property corners. The map must be drawn to scale and include a North arrow, surrounding geographic and topographic features, direction and % slope, distance to drainages, water bodies, potential areas for flooding, unstable landforms, existing or proposed roads, structures, utilities, domestic water supplies, wells, ponds, existing wastewater treatment systems and facilities.

Permit #:
APN: 030-270-013
(County Use Only) Reviewed by: Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner: Boisset Family Estates	☐ New Construction ☒ Addition ☐ Remodel ☐ Relocation ☒ Other: marketing changes
Property Owner Mailing Address: 839 Zinfandel Lane	☐ Residential - # of Bedrooms: Design Flow : gpd
City: St. Helena State: CA Zip: 94574	☒ Commercial – Type: Sanitary Waste: 5400 gpd Process Waste: N/A gpd
Site Address/Location: same as above	☐ Other: Sanitary Waste: gpd Process Waste: gpd

Evaluation Conducted By:

Company Name: Summit Engineering	Evaluator's Name: Gina Giacone	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist): Gina Giacone
Mailing Address: 463 Aviation Blvd.		Telephone Number: (707) 527-0775
City: Santa Rosa, State: CA Zip: 95403		Date Evaluation Conducted: 4/5/11

Primary Area	**Expansion Area**
Acceptable Soil Depth: 36 in. Test pit #'s: 1-7	Acceptable Soil Depth: 36 in. Test pit #'s: 1-7
Soil Application Rate (gal. /sq. ft. /day): 0.6 gal/ft²/day	Soil Application Rate (gal. /sq. ft. /day): 0.6 gal/sf/day
System Type(s) Recommended: Pretreatment/subsurf. drip	System Type(s) Recommended: Pretreatment/subsurf. drip
Slope: <5 %. Distance to nearest water source: >100 ft.	Slope: <5 %. Distance to nearest water source: >100 ft.
Hydrometer test performed? No ☐ Yes ☒ (attach results)	Hydrometer test performed? No ☐ Yes ☒ (attach results)
Bulk Density test performed? No ☐ Yes ☒ (attach results)	Bulk Density test performed? No ☐ Yes ☒ (attach results)
Percolation test performed? No ☐ Yes ☐ (attach results)	Percolation test performed? No ☐ Yes ☐ (attach results)
Groundwater Monitoring Performed? No ☐ Yes ☐ (attach results)	Groundwater Monitoring Performed? No ☐ Yes ☐ (attach results)

Site constraints/Recommendations:

GW/mottling observed at 36".

Test Pit # 1

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-41"	clear	<5%	SCL	m/G	S	VF	VS	C/m	VF/F	F/F/F+ @36"
			* Hydrometer @ 36"						→	
			* GW @ 41"							

Test Pit # 2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-50"	clear	<5%	SCL	m/G	S	VF	VS	C/m	VF/F	F/F/F+ @36"
									→	

Test Pit # 3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-42"	clear	<5%	SCL	m/G	S	VF	VS	C/m	VF/F	F/F/F+ @36"
									→	

Attach additional sheets as needed

Test Pit # 4

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-54"	clear	<5%	SCL	m/G	S	VF	VS	C/m	VF/F	F/F/F+ ↓
									→	@ 36"

Test Pit # 5

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-52"	clear	<10%	SCL	m/G	S/SH	VF	VS	C/m	VF/F	F/m/F+ ↓
									→	@36"

Test Pit # 6

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-48"	clear	<5%	SCL	m/G	S	VF	VS	C/m	VF/F	F/F/F+ ↓
									→	@36"

Attach additional sheets as needed

Test Pit # 7

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-52"	clear	<5%	SCL	G	S	VF	VS	c/m	VF/F	F/F/Ft ↓
									→	@36"

Test Pit #

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			

Test Pit #

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			

Attach additional sheets as needed

Oakley Laboratory & Field Services
1645 Chapman Way • Santa Rosa , CA 95403 • Telephone 707-575-1075

April 11, 2011
Job No. 11-123.35

Summit Engineering Inc.
463 Aviation Blvd. Suite 200
Santa Rosa, Calif. 95403

Attention: Ms. Gina Giacone

Re: Results of Soil Texture Analysis
By Bouyoucos Hydrometry Method

Client: Raymond Winery

The results of soil texture analysis on samples received on April 6, 2011 are as follows:

Sample Location	TP1 @ 36"
% Plus No. 10 (WT)	2.3
% Sand	47.0
% Clay	27.0
% Silt	26.0
Db g/cc	--

We are pleased to provide laboratory services for you and look forward to your continued work. If you have any questions, please call.

Oakley Laboratory and Field Services

By: _____
Wayne G. Oakley
Laboratory Director