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Wastewater Feasibility Study

Schlatter Family Estate Micro-Winery Use Permit
P24-00217-UP
Zoning Administrator Hearing – August 27, 2025

WINERY WASTEWATER FEASIBILITY REPORT

SCHLATTER FAMILY ESTATE MICRO-WINERY
1111 CONN VALLEY ROAD
ST HELENA, CA 94574

APNs 025-180-082 & -083

PREPARED FOR:

Schlatter Family Estate, LLC

Attn:
Rene Schlatter
1000 Main Street
St. Helena, CA 94574

August 14, 2024
Project #4122083.0

1515 Fourth Street, Napa, CA 94559 www.rsacivil.com 707.252.3301.v 707.252.4966.f

TABLE OF CONTENTS

Appendices

EXECUTIVE SUMMARY

Schlatter Family Estate (APNs 025-180-082 & -083) is applying for a Use Permit to construct a micro winery. Specifically, as follows:

(1) Production of 5,000 gallons per year;

(2) A maximum of 18 visitors per day;

(3) No marketing events;

(4) Staffing will be comprised of two (2) full-time employees;

(5) Construct a new micro winery and a covered crushpad;

(6) To improve safety, the driveway will be upgraded. The project also proposes one (1) ADA parking stall and two (2) standard stalls;

(7) To construct and utilize state-of-the-art environmental process for the process wastewater treatment;

(8) To construct a separate domestic wastewater system for the winery;

(9) To construct a Fire Water Storage Tank within the cave and install a new hydrant at the cave portal.

This report demonstrates that the proposed project complies with Napa County Guidelines.

SITE DESCRIPTION

The topography on the two (2) project parcels consists of gentle to steep slopes with ranges between 2-75%. The parcels current use is vineyards. There are two (2) wells, see UP 1.0 for location of wells. Appendix 1 also contains a Site Location Map and a USGS Site Map showing the parcel topography, features, and boundary.

SITE EVALUATION

RSA$^+$ conducted a site evaluation on the southern parcel (APN 025-180-083) on November 30, 2023. This site evaluation found suitable soil for a subsurface drip system. Appendix 2 contains a copy of the Site Evaluation Report.

The site evaluation was conducted by Donal O'Briain of RSA$^+$ and observed by Avi Soma of Napa County Environmental Management.

WINERY DOMESTIC WASTEWATER CHARACTERISTICS

The domestic wastewater system for the winery will need to accommodate the unit values in Table 1 below. The proposed numbers of visitors and employees are shown in Table 1 below. The projected flow is based on County of Napa Environmental Management guidelines. The following is a summary of the estimated maximum daily flows from the winery.

TABLE 1

Use	Source	Number	Projected Flow (gpd)	Total Flow (gpd)
Winery	Full-Time Employees	2	15	30
	Visitors	18	3	54
Total Peak Wastewater Flow				**84**

DOMESTIC WASTEWATER – SUB SURFACE DRIP

A septic system and dispersal field will be designed for the proposed winery. An Orenco AdvanTex treatment system and a new dispersal field are proposed.

Domestic wastewater from the proposed winery will flow into an 750-gallon septic tank. Wastewater will then be pumped to the first chamber (600 gallons) of a 1,200-gallon tank for recirculation to an AdvanTex treatment pod. After treatment, wastewater will flow to the second chamber of the 1,200-gallon tank. From this 600-gallon dosing chamber treated domestic wastewater will be pumped to the proposed distribution field.

The subsurface drip field is sized to meet Napa County Environmental Management guidelines. The distribution field will be placed where the most limiting soil type was sandy clay loam with a moderated subangular-blocky structure. The allowable application rate for this soil type is 0.6 gallons/square foot/day for pretreated effluent. Peak daily domestic wastewater flow is 84 gallons/day.

$$Winery\ Dispersal\ Field\ Area\ (primary) = \frac{84\ gpd}{0.6\ gpd/sf} = 140\ square\ feet$$

In addition to the primary dispersal area of 90 square feet, a 200% reserve area is required for the winery. The reserve area will be located in an area where the soil application rate is also 0.6 gallons/square foot/day.

$$Winery\ Dispersal\ Field\ Area\ (reserve) = 200\% \times \frac{84\ gpd}{0.6\ gpd/sf} = 280\ square\ feet$$

The total combined area required for the reserve field for the domestic winery wastewater is 420 square feet. These areas are shown on the sheet UP4.0 of the Use Permit Plans.

WINERY PROCESS WASTEWATER CHARACTERISTICS

Wine Production:

5,000 gallons of wine per year
2.38 gallons of wine per case
= 5,000 gal/year/2.38 cases/year
= 2,101 cases/year

Wastewater Production:

6 gallons of wastewater/gallon of wine
= 5,000 gal/year x 6-gallons wastewater/gallon of wine
= 30,000 gal/year wastewater

Peak Daily Wastewater Flow:

Crush Period = 30 days
5,000 gallons x 2 / 30 days
= 333 gallons/day

Average Daily Flow:

30,000 gallons/year/365 days
= 82 gallons/day

Monthly Wastewater Flows:

TABLE 2

	% By Month	Waste/Month	
Sept	15%	4,500	Gal/Month
Oct	13%	3,900	Gal/Month
Nov	11%	3,300	Gal/Month
Dec	8%	2,400	Gal/Month
Jan	4%	1,200	Gal/Month
Feb	6%	1,800	Gal/Month
Mar	6%	1,800	Gal/Month
Apr	5%	1,500	Gal/Month
May	6%	1,800	Gal/Month
Jun	7%	2,100	Gal/Month
Jul	9%	2,700	Gal/Month
Aug	10%	3,000	Gal/Month
Totals	100%	30,000	Gal/Year

WINERY PROCESS WASTEWATER - SUBSURFACE DRIP IRRIGATION

The treated process wastewater will be treated by a Biofiltro treatment system or equivalent system, before it is surface dripped on vines. According to Napa County Environmental Management Sewage Treatment System Design Guidelines, winery process wastewater must be treated prior to surface discharge. Based on our experience, winery wastewater characteristics are as follows:

Characteristics	Units	Average
pH		3.5
BOD5	mg/l	6000
TSS	mg/l	500
Nitrogen	mg/l	20
Phosphorus	mg/l	10

It is likely that treatment will meet previously required County of Napa requirements of 160 mg/L for BOD and 80 mg/L for TSS. A conservative approach for calculating BOD loading was adopted by using the peak monthly generation (4,500 gallons from Table 2) of process wastewater generated in one month. Based on calculations in Appendix 5, this treatment level will meet BOD loading limits given in Clause 35D of the State Water Resources Control Board General Waste Discharge Requirements for Winery Process Water.

To meet this treatment goal a treatment train including a sump basin, Biofiltro control unit, treatment tank with Biofiltro BIDA system, and a pump tank are proposed. The following sections describe the process in more detail. The proposed system is shown in Appendix 4.

Biofiltro System

Settling Tank

The process wastewater tank (650-gallon) will be used as a settling tank and will provide approximately 2 days of settling.

Equalization Tank

Flow from the settling tank will be pumped to a 1,000-gallon equalization tank. This tank will serve to buffer peak flows and strengths from overwhelming the system and impairing treatment, as well as house the pump to convey flow to the BioFiltro treatment system.

Control Unit

The control unit will consist of a solid separator, an equalization tank, and a pH adjustment system. The influent into the control unit, will first flow through a solid separator before flowing into an equalization tank that will serve to buffer peak flows, monitor, and adjust pH to prevent surges from overwhelming the system and impairing treatment. Control unit design will be provided by BioFiltro.

Treatment System

The treatment system will be composed of one (1) BioFiltro "Can of Worms" or equivalent. The Can of Worms contains media shavings, worms and a starter pack of microbes. The flow will be pumped to one floor of the "Can of Worms" where it shall percolate down through a layer of wood shavings, which shall be rich in microbes and earthworm activity, geotextiles, and drain out along the lined floor into a second pass sump basin. Here, second pass pumps shall deliver all the water to the second floor of the "Can of Worms" where it shall percolate through another layer of wood shavings, microbes, earthworms, and geotextiles before gravity feeding into a treated water pump sump to be pumped to irrigation storage tank. BioFiltro Information can be found in Appendix 4.

Holding Tank and Dispersal Field

To provide a preliminary estimate of the amount of storage tanks required, we have prepared a monthly water balance, as shown in Attachment 2. Monthly wastewater production is based on a percentage of the total annual wastewater production. The amount of water allowed to be applied is estimated by the typical vine water demand. The irrigation will be applied to areas of vineyards outside of the well and cave setback requirements. An area of 0.10 acre of vineyard area has been used to calculate the storage capacity required. Based on monthly analysis a maximum of 7,200 gallons of storage are required. To buffer peak flows and allow for wet weather periods without irrigation, one (1) 10,000-gallon tank will be installed to store treated process wastewater prior to it being used for irrigation.

During the summer months all of the treated wastewater will be used for irrigation. During the wet winter months, a limited discharge will be consistent with landscape water demand, no discharge will occur within 24-hours of a forecasted rain event, and also for 24-hours after a rain event. These irrigation scheduling constraints necessitate installing a tank to store excess water that cannot be discharged during the periods of rain. All stored water will then be used for irrigation during dry periods.

CONCLUSION

This report demonstrates that the Schlatter Family Estate Micro-Winery project can treat and disperse the proposed domestic and process wastewater onsite meeting the Napa County Environmental Management Design Standards for the treatment of domestic and process wastewater. The proposed process wastewater treatment system will also meet State Water Quality Control Board requirements.

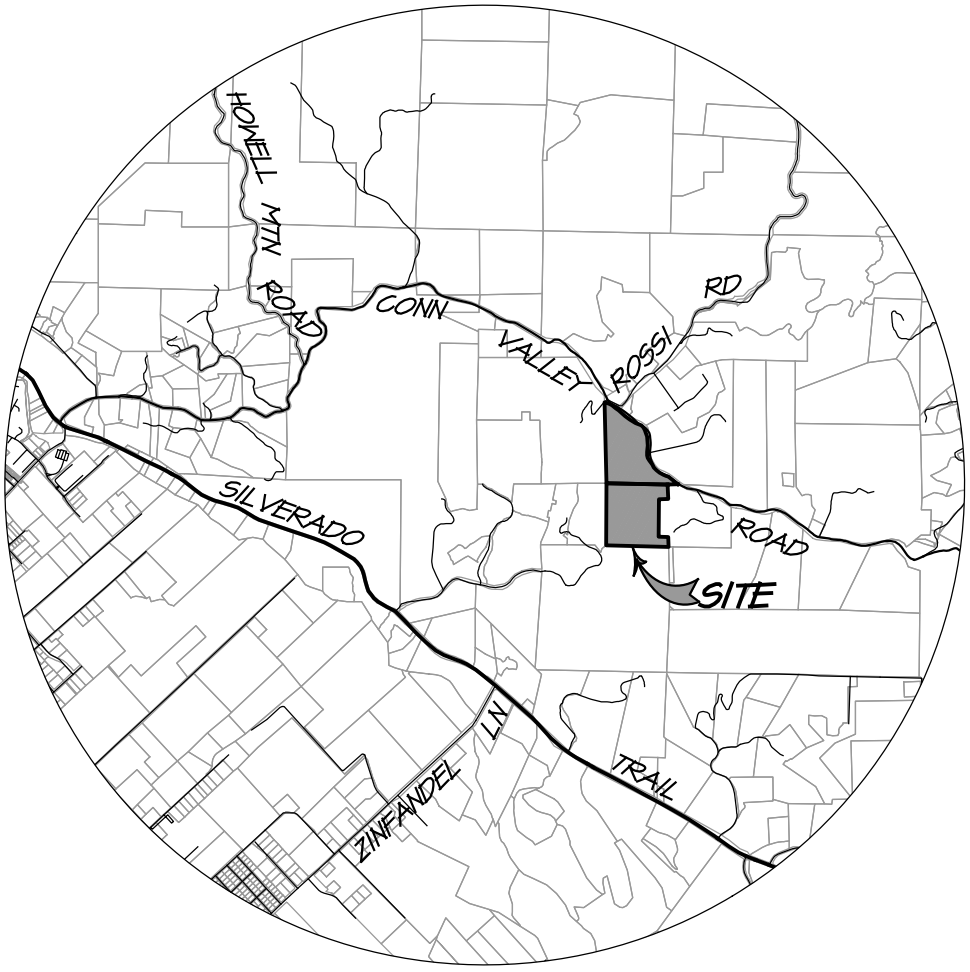
Appendix 1

Vicinity Map
USGS Quad Map

SCHLATER FAMILY ESTATE, LLC

VICINITY MAP

NAPA COUNTY CALIFORNIA



VICINITY MAP

SCALE: 1" = 4,000'

GRAPHIC SCALE

4,000' 0 4,000'

(IN FEET)

1 INCH = 4,000 FT

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May 16, 2024 4122083.0 Exh-VicMap

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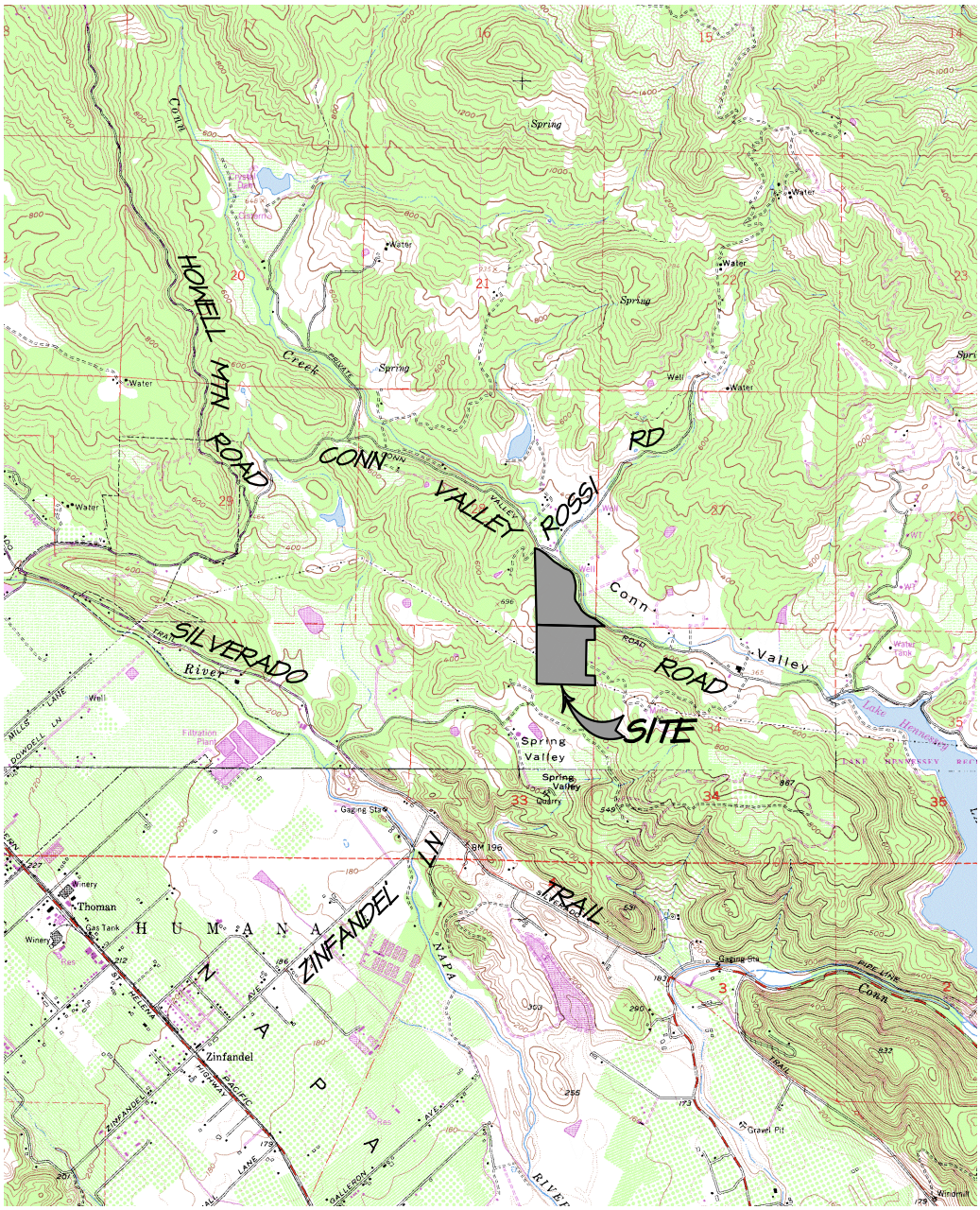
SCHLATER FAMILY ESTATE, LLC

USGS QUAD MAP

NAPA COUNTY CALIFORNIA



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AUGUST 2, 2024 4122083.0 Exh-USGS Map

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Appendix 2

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 #: E23-00595
APN: 025-180-083
(County Use Only) Reviewed by: Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner Schlatter Family Estate LLC	☒ New Construction ☐ Addition ☐ Remodel ☐ Relocation ☐ Other:
Property Owner Mailing Address 1000 Main Street	☐ Residential - # of Bedrooms: Design Flow : gpd.
City State Zip St. Helena, CA 94574	☒ Commercial – Type: Winery/Tasting Room Sanitary Waste: 100 gpd Process Waste: gpd
Site Address/Location 1111 Conn Valley Road St. Helena, CA 94574	☐ Other: Sanitary Waste: gpd Process Waste: gpd

Evaluation Conducted By:

Company Name RSA+	Evaluator's Name Donal O'Briain	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist)
Mailing Address: 1515 Fourth Street		Telephone Number 707-252-3301
City State Zip Napa CA 94559		Date Evaluation Conducted November 30, 2023

Primary Area	**Expansion Area**
Acceptable Soil Depth: 24" Test pit #'s: 3, 4	Acceptable Soil Depth: 24" Test pit #'s: 3, 4
Soil Application Rate (gal. /sq. ft. /day): 0.6 gpd/sf	Soil Application Rate (gal. /sq. ft. /day): 0.6 gpd/sf
System Type(s) Recommended: Subsurface drip with pretreatment	System Type(s) Recommended: Subsurface drip with Pretreatment
Slope: 20-30 % Distance to nearest water source: >100'	Slope: 20-30 % Distance to nearest water source: >100'
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:

Test pits 3 & 4 suitable for subsurface drip with pretreatment. Due to slopes steeper than 30% at test pit #2, there is insufficient depth of soil for a subsurface drip system.

Test Pit # 1

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-18	C	30%	SCL	MSB	L	FRB	P	CM	CC	-
X	18-36										

Notes: Tufa at 18" was limiting conditions. Pit not suitable.

Test Pit # 2

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-24	C	30%	SCL	MSB	L	FRB	P	CM	CC	-
X	24-36		>50								

Notes: Cemented rock at 24" was limiting conditions. Refusal at 36". Pit not suitable due to slopes steeper than 30%.

Test Pit # 3

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-24	C	40%	SCL	MSB	L	FRB	P	CM	CC	-
X			<50								

Notes: Refused at 24". Pit suitable to 24".

Test Pit # 4

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-12	C	20	SCL	MSB	L	FRB	SP	CM	CM	-
	12-34	-	40	SAND	G	SH	FRB	SP	LF	FF	-
X			>50								

Notes: Grey, sandy soil below 12". Sandy Clay Loam in upper horizon was most restrictive soil type. Refusal at 34" was limiting condition. Pit suitable to 34".

Test Pit # 5

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-12	C	20	SCL	MSB	S	FRB	P	CM	CM	-
X	12-24	C	40	SCL	MSB	M	FRB		CF	FF	

Notes: Tufa at 12" was limiting conditions. Pit not suitable.

Test Pit # 6

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-14	C	20	SCL	MSB	S	FRB	SS	CM	CC	-
X	14-32	-		SCL	MSB	SH		SS	CM	CC	

Notes: Refusal at 32". Tufa at 14" was limiting condition. Pit not suitable.

Test Pit # 7

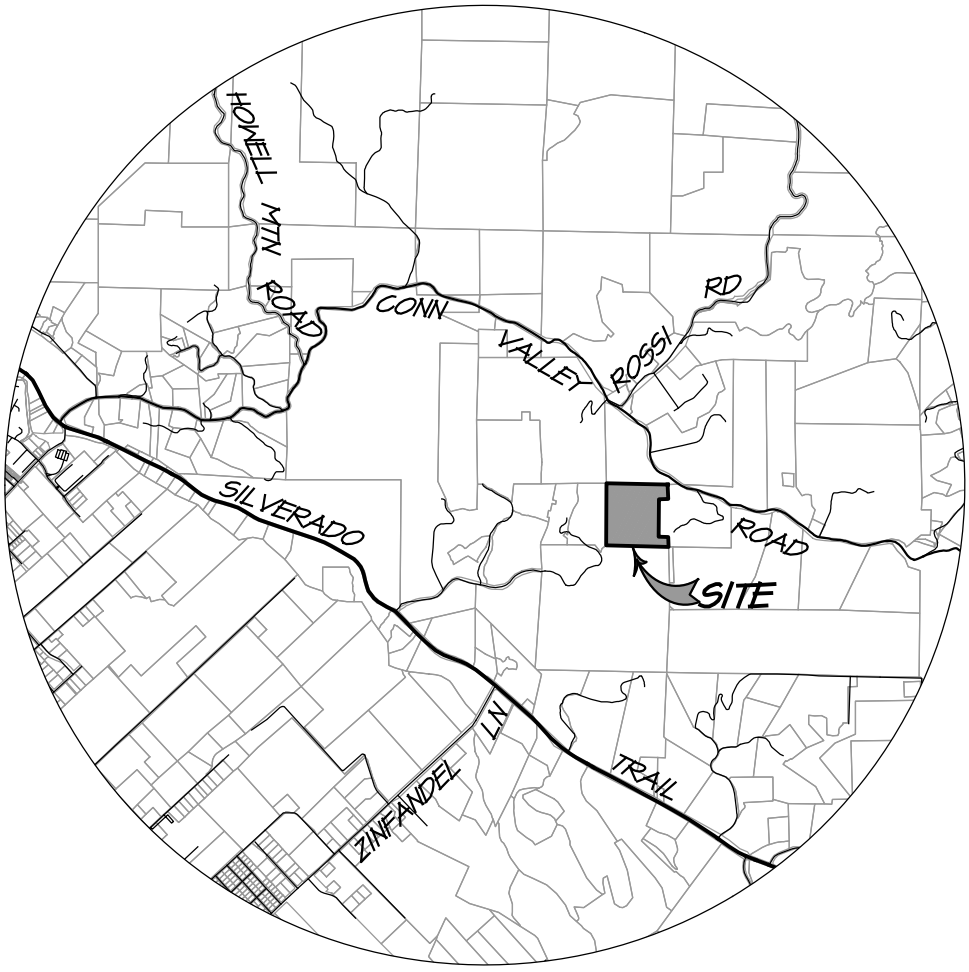
X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-12	C	20	SCL	MSB	L	FRB	SS	CM	CC	-
X	12-28	A	40	SL	MSB	S	FRB	SS	CM	CC	
X			>50								

Notes: Decomposing rock at 12" was limiting condition. Pit not suitable.

SCHLATER FAMILY ESTATE, LLC

VICINITY MAP

NAPA COUNTY CALIFORNIA



VICINITY MAP

SCALE: 1" = 4,000'

GRAPHIC SCALE

4,000' 0 4,000'

(IN FEET)

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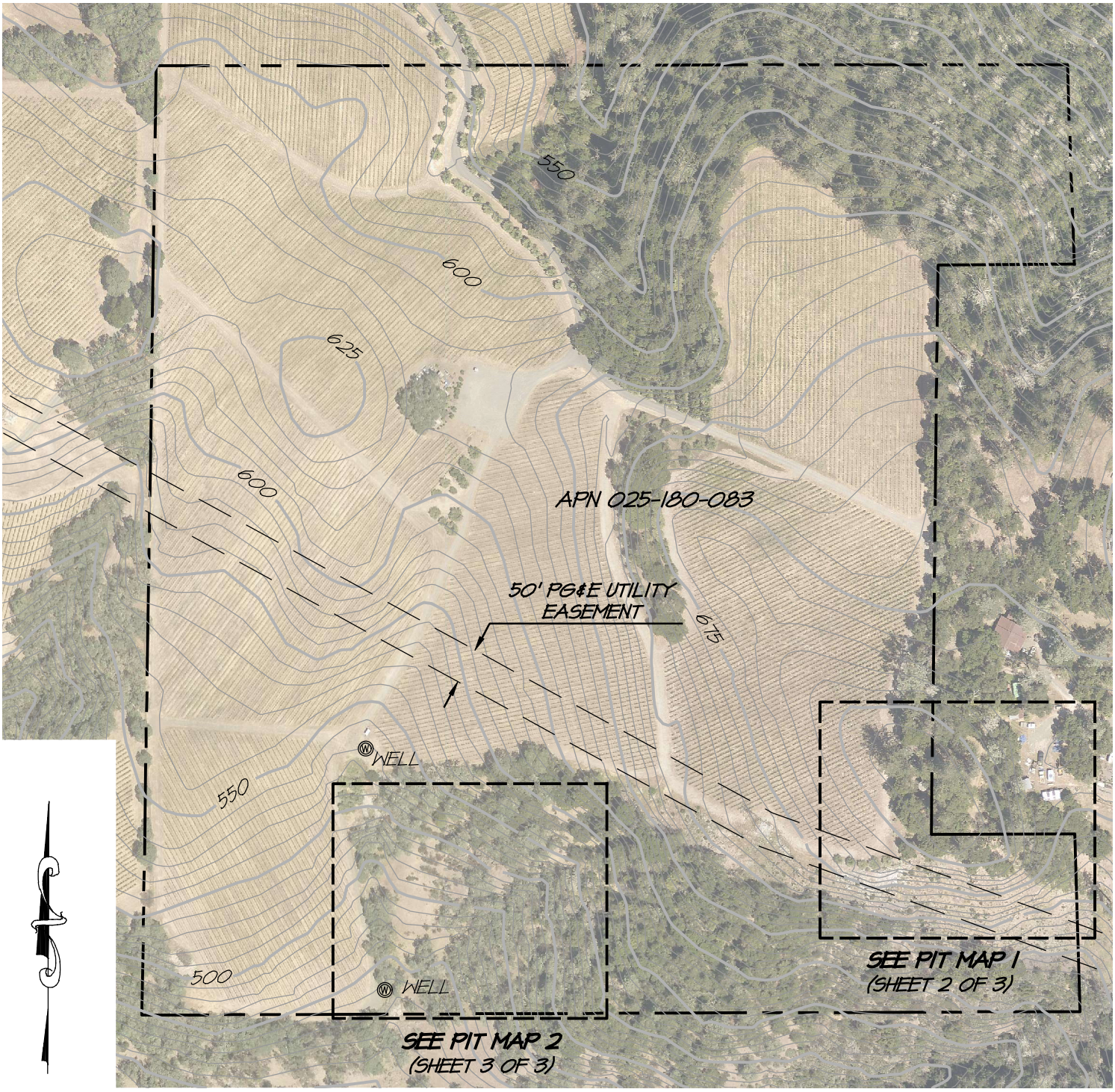
SCHLATER FAMILY ESTATE, LLC

SITE MAP

NAPA COUNTY CALIFORNIA



BOUNDARY NOTE:
BOUNDARY AND CONTOURS TAKEN FROM NAPA COUNTY GIS DATA AND SHOULD BE CONSIDERED APPROXIMATE.

GRAPHIC SCALE

200 0 200

(IN FEET)
1 inch = 200 FT

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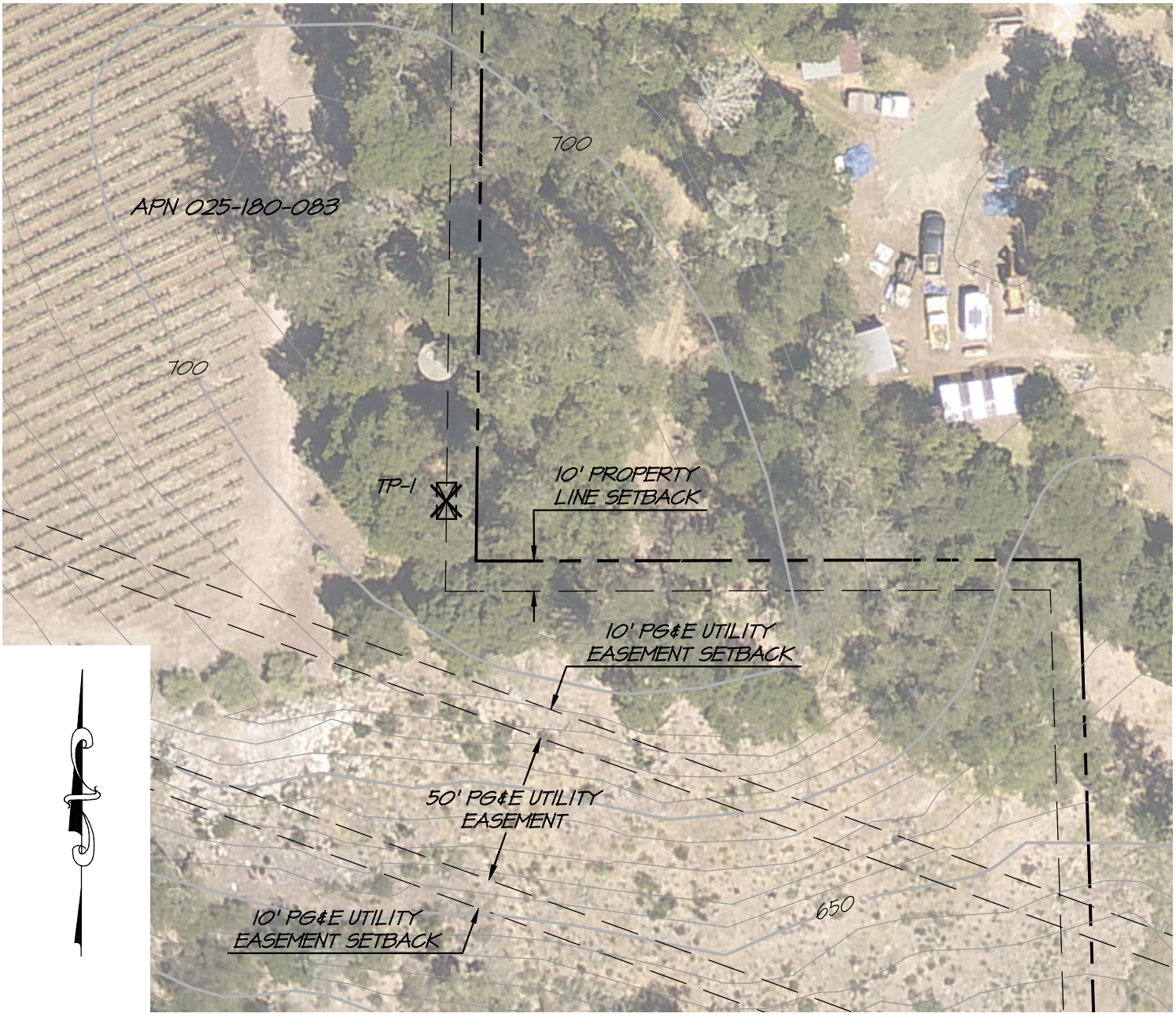
SCHLATER FAMILY ESTATE, LLC

PIT MAP 1

NAPA COUNTY CALIFORNIA



LEGEND

TP-1 NON-SUITABLE TEST PIT

ADDRESS: 1111 CONN VALLEY ROAD
ST HELENA, CA 94574
SITE EVALUATION DATE: NOVEMBER 30, 2023
PERMIT # E23-00595
APN: 025-180-083
ENVIRONMENTAL HEALTH INSPECTOR: AVI SOMA

BOUNDARY NOTE:
BOUNDARY AND CONTOURS TAKEN FROM NAPA COUNTY GIS DATA AND SHOULD BE CONSIDERED APPROXIMATE.

GRAPHIC SCALE

50 0 50

(IN FEET)
1 inch = 50 FT

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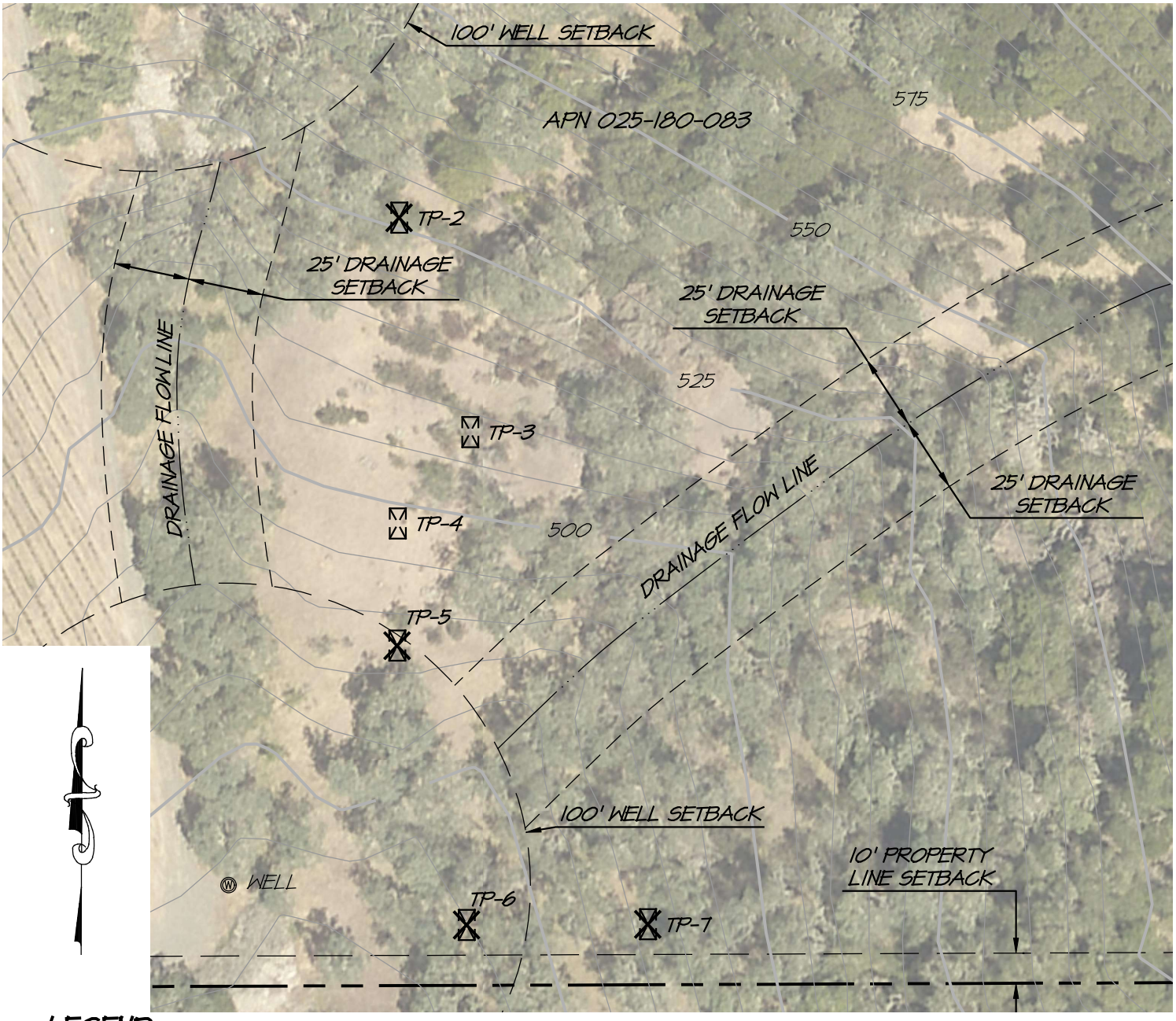
SCHLATER FAMILY ESTATE, LLC

PIT MAP 2

NAPA COUNTY CALIFORNIA



LEGEND

TP-2 SUITABLE TEST PIT

TP-6 NON-SUITABLE TEST PIT

ADDRESS: 1111 CONN VALLEY ROAD
ST HELENA, CA 94574
SITE EVALUATION DATE: NOVEMBER 30, 2023
PERMIT # E23-00595
APN: 025-180-083
ENVIRONMENTAL HEALTH INSPECTOR: AVI SOMA

BOUNDARY NOTE:
BOUNDARY AND CONTOURS TAKEN FROM NAPA COUNTY GIS DATA AND SHOULD BE CONSIDERED APPROXIMATE.

GRAPHIC SCALE

50 0 50

(IN FEET)
1 inch = 50 FT

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Appendix 3

Irrigation Water Balance

Reclaimed Process Wastewater
Water Balance for Irrigation and Storage

Project Description		Annual Process Waste Flow Volume		
Project Number:	4119046.0	Wine Production:	5,000	gal/year
Project Name:	Schlatter Family Estate Micro-Winery			
Prepared By:	DRL	Annual Process Waste per Gallon Wine:	6	gal/year
Date:	August 2, 2024	Total Annual Process Waste Generated:	30,000	gal/year

Vineyard Irrigation Parameters		Landscape Irrigation Parameters		
Acres of irrigated vineyard:	0.10 acres	Crop type / name:	Cover Crop	
Row spacing:	6.0 feet	Total irrigated acres of crop:	0.00 acres	
Vine spacing:	3.3 feet			
Total number of vines:	220 vines			
Water use per vine per month (peak):	26 gal			
Total peak monthly irrigation demand:	5,720 gal			

Monthly Process Wastewater Generation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly process wastewater generated as % of annual total:	4%	6%	6%	5%	6%	7%	9%	10%	15%	13%	11%	8%
Monthly process wastewater generated [gallons]:	1,200	1,800	1,800	1,500	1,800	2,100	2,700	3,000	4,500	3,900	3,300	2,400

Monthly Vineyard Irrigation Water Use

(Based on per-vine water use)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Beginning of month reclaimed water in storage [gallons] (This number brought forward from end of previous month)	2,400	3,600	5,400	7,200	2,980	0	0	0	0	0	0	0
Vineyard irrigation as % of peak month irrigation demand:	0%	0%	0%	100%	100%	100%	100%	100%	100%	100%	100%	0%
Irrigation per month per vine (gallons):	0.0	0.0	0.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	0.0
Total vineyard irrigation demand [gallons]:	0	0	0	5,720	5,720	5,720	5,720	5,720	5,720	5,720	5,720	0
Will vineyard be irrigated with reclaimed water this month?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Process wastewater generated this month, reclaimed for vineyard irrigation [gallons]	0	0	0	1,500	1,800	2,100	2,700	3,000	4,500	3,900	3,300	0
Remaining vineyard irrigation demand after using this month's process water [gallons]	0	0	0	4,220	3,920	3,620	3,020	2,720	1,220	1,820	2,420	0
Drawdown from storage for remaining vineyard irrigation [gallons]	0	0	0	4,220	2,980	0	0	0	0	0	0	0
Well water required to satisfy remaining vineyard irrigation demand	0	0	0	0	940	3,620	3,020	2,720	1,220	1,820	2,420	0
Net storage after vineyard irrigation drawdown [gallons]	2,400	3,600	5,400	2,980	0	0	0	0	0	0	0	0
This month's process wastewater, remaining after vineyard irrigation, available for landscape irrigation[gallons]	1,200	1,800	1,800	0	0	0	0	0	0	0	0	2,400

Water balance continues on next page for cover crop irrigation.

Monthly Landscape Irrigation Water Use

(Based on evapotranspiration crop demand and irrigated area)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
This month's process wastewater, remaining after vineyard irrigation, available for landscape irrigation[gallons] *(From sheet 1)*	1,200	1,800	1,800	0	0	0	0	0	0	0	0	2,400
Reference ET (ETo) (in/month) (see note 1)	1.32	1.8	3.32	4.78	6.11	6.84	7.07	6.3	4.9	3.45	1.74	1.29
Crop Coefficient (k_c) (see note 2)	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Crop water demand per acre [inches]	0.79	1.08	1.99	2.87	3.67	4.10	4.24	3.78	2.94	2.07	1.04	0.77
Crop water demand per acre [gallons]	21,505	29,325	54,088	77,873	99,541	111,433	115,180	102,636	79,828	56,205	28,347	21,016
Total crop water demand for irrigated area [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Will landscape be irrigated with reclaimed water this month?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Process wastewater remaining after vineyard irrigation, reclaimed for landscape irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Landscape irrigation water required from storage or other source [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Drawdown from storage for landscape irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Process wastewater generated this month, unused for irrigation, to be reclaimed and stored [gallons]	1,200	1,800	1,800	0	0	0	0	0	0	0	0	2,400
Net end-of-month reclaimed water storage after all irrigation [gallons]	3,600	5,400	7,200	2,980	0	0	0	0	0	0	0	2,400

End of Water Balance

Peak Monthly Storage = 7,200 gallons

Notes:

1. Reference ETo from California Irrigation Management Information System
2. Crop Coefficient from Table 1 of "Estimating Irrigation Water Needs of Landscape Plantings in California", University of California Cooperative Extension, August 2000.

Appendix 4

BioFiltro Information

BIOFILTRO
worm powered wastewater solutions

BIDA® Modular System Quote

Prepared for:
RSA+

Project:
Schlatter Family Estate
1111 Conn Valley Road in St. Helena, CA 94574

Prepared by:
Sarah Haupt, Sales Engineer of BioFiltro
1949 5th Street, Suite 101, Davis, CA 95616

Proposal is Valid for 30 Days

1. INTRODUCTION

1.1 Background Information

RSA+ has solicited a proposal on behalf of Schlatter Family Estate ("Client") for the process water (PW) treatment for a winery in St. Helena, California. RSA+ is requesting a proposal based off an estimated annual production up to 5,000 gallons of wine, per the below estimation:

Wine Production	5,000 gallons of wine per year 2.38 gallons of wine per case =5,000gal/2.38 gal/case = 2,101 cases/year
Process Wastewater Production	6 gallons of wastewater/gallon of wine =5,000 gal/year x 6-gal wastewater/gal =30,000 gal/year of wastewater
Peak Daily Process Wastewater Flow	Crush Period = 30 days 5,000 gallons x 2 / 30 days **= 333 gallons/day**
Average Daily Flow	5,000 gallons/year x 6 gallons of wastewater/gallon of wine =30,000 gallons/year/365 =82 gallons/day

1.2 Project Description

BioFiltro proposes one (1) **Can of Worms,** a compact wastewater package system housed in a 20' shipping container. The Can of Worms consists of 90 square feet of BioFiltro's patented Biodynamic Aerobic (BIDA®) Technology.

1.3 Influent Parameters

Influent parameters require pH to range between 6- 9. As there is currently no existing pH adjustment system at the winery, BioFiltro is including one in this proposal. Assuming typical winery process water levels and influent temperature of 30°Celsius, BioFiltro has considered the following design parameters:

Constituent	Influent	Annual Average Effluent	Unit
Influent Peak PW Flow	333	333	GPD
Influent Average PW Flow	82	82	GPD
pH	3-9	6-9	S.U.
Maximum BOD_5	5,000	<400	mg/l
Average BOD_5	1,600	<160	mg/l
Maximum TSS	1,000	<100	mg/l
Average TSS	500	<80	mg/l

1.4 Overall Treatment Method/Technology

The BioFiltro BIDA® System could be classified as a percolating biofilter, where the filtering media is wood shavings. Wastewater is spray irrigated over the media, and organic constituents in water are retained and digested by the microbiological community that grows in the media (biofilm). Additionally, the media is inhabited by worms (Eisenia andrei) as an improvement to biological treatment by providing natural aeration, proliferating the biofilm, mixing, and further reducing biological solids.

2. PACKAGE OFFERING

2.1 Package Offering

Units	Item	Dimensions
1	Can of Worms – A compact wastewater package system housed in one container	20′ L x 8′ W x 8′ H
	Includes all system medias (wood shavings, geotextiles, irrigation system, drainage cells)	
	Includes starter worms and microbes	
1	Rosedale LCO Bag Filter	
1	pH Adjustment System	
1	1,000 Gallon Storage Tank	
1	Mazzei Venturi Injector	
2	Recirculation and BIDA Irrigation Pumps	
1	Lot of pH, temperature, pressure, and ultrasonic level influent and effluent sensors and probes	
1	Pressure Relief Valve	
1	Programmable Logic Controller	
1	Flow Meter	
1	Overhead Light and Ventilation Fan	

2.2 Installation Requirements Not Included in Scope of Work

BioFiltro will provide a General Arrangement drawing to facilitate the planning and layout of the project site, but all permit and construction drawings for site infrastructure will be by others.

It is assumed that the following items are provided by the Client:

- Availability at the project site of 240V three phase with 40 amps or 480 V three phase with 20 Amps available capacity (15 kVA total estimated) and any underground conduit.
- Site preparation of a 4" gravel or concrete pad with 90% compaction and concrete footings, if required, for the M2 Wiggle Room, or as otherwise directed by a Geotechnical Engineer.
- Any underground sumps, pumps, storage, and piping which may be needed to deliver pressurized wastewater into the Module and convey it to final disposal. BioFiltro can provide recommendations on the capacity and routing of these utilities, but stamped drawings, if required, will be by others.
- Access to 1 ½" pipe with fresh water for general maintenance items.

2.3 Anticipated Process Flow

This quotation assumes that influent shall consist solely of winery process water. The scope of this proposal begins when water arrives pressurized (minimum 20 PSI) into the Control Unit where it shall first pass through a solid separator, which shall consist of a basket screen, before it flows into the 1,000-gallon equalization tank. While in this tank, probes shall monitor the water for temperature and pH. Should the pH of the process water be below 6 or above 9, the probe shall trigger the need for the pH adjustment system to dose adjustment chemicals. A venturi injector will provide aeration during recirculation pumping within the tank. Once every half hour, a timer shall trigger the pump station, which shall consist of two pumps, to irrigate the module. From here, the standard operation procedure will be to have 100% of the daily volume be pumped to one floor of the Wiggle Room where it shall percolate down through a layer of wood shavings, which shall be rich in microbes and earthworm activity, geotextiles, and drain out along the lined floor into a second pass sump basin. Here, second pass pumps shall deliver all the water to the second floor of the Wiggle Room where it shall percolate through another layer of wood shavings, microbes, earthworms, and geotextiles before gravity feeding into a treated water pump sump. From there, the Client can send water to the winery's preferred irrigation storage location (not included in scope of work).

2.4 Operational Costs and Considerations

The Client should expect the system to demand 0.0007 kWh/gallon treated. Assuming a kWh hour costs $0.20, then a peak day of 333 gallons should cost about $0.05.

The BIDA® System generates vermicompost, or worm castings mixed with wood shavings. Over time, worms shall push their castings up to the system surface which, over time, will form a top layer of worm castings on the system. Once every 24 - 36 months, the top 12-16" must be removed from the system to maintain optimum system performance and the system replenished fresh wood chips and shavings, which can be procured from local ag stores. Reseed treatment bed with castings rich in worms from harvest. Ideal reseeding ratio is approximately 0.1 pounds of worm rich VPR material per square foot of BIDA bed area. The Client can do this work themselves or engage BioFiltro at for the work of harvesting castings and replenish wood chips/shavings. Harvested vermiproduct, a beneficial soil amendment, can

be applied to vineyard or into compost piles, contingent upon the conditions of any applicable waste discharge requirements or local agency permits.

For this project, the Client can estimate the following:

$$\frac{BIDA\ Area\ x\ 3'D}{27} = \frac{90\ ft2\ x\ 3'D}{27} = 10\ yd3 = Volume\ of\ replacement\ wood\ chips/shavings$$

- The price of wood chips/shavings is approximately $20/yd^3 delivered, for a replacement cost of approximately $200.
- The volume of castings removed is approximately ½ of the new chips/shavings added, for an approximate castings volume of 5 yd^3.

Consumption on pH adjustment chemicals will depend on processes upstream in the winery, but with BioFiltro's on demand pH adjustment system design, the overall usage should cost around $250 per year. BioFiltro will notify the client when pH chemicals are low, and the Client is responsible for ordering and the cost of pH adjustment chemicals as needed.

The winery should expect to clean out any upstream storage tanks and sumps, including the tank located within the Control Unit, once every year to avoid build up. No other biosolids, sludge or waste sludge is anticipated to be generated by the treatment system, so no separate sludge storage tanks, blowers, or off haul costs are included or anticipated to be required.

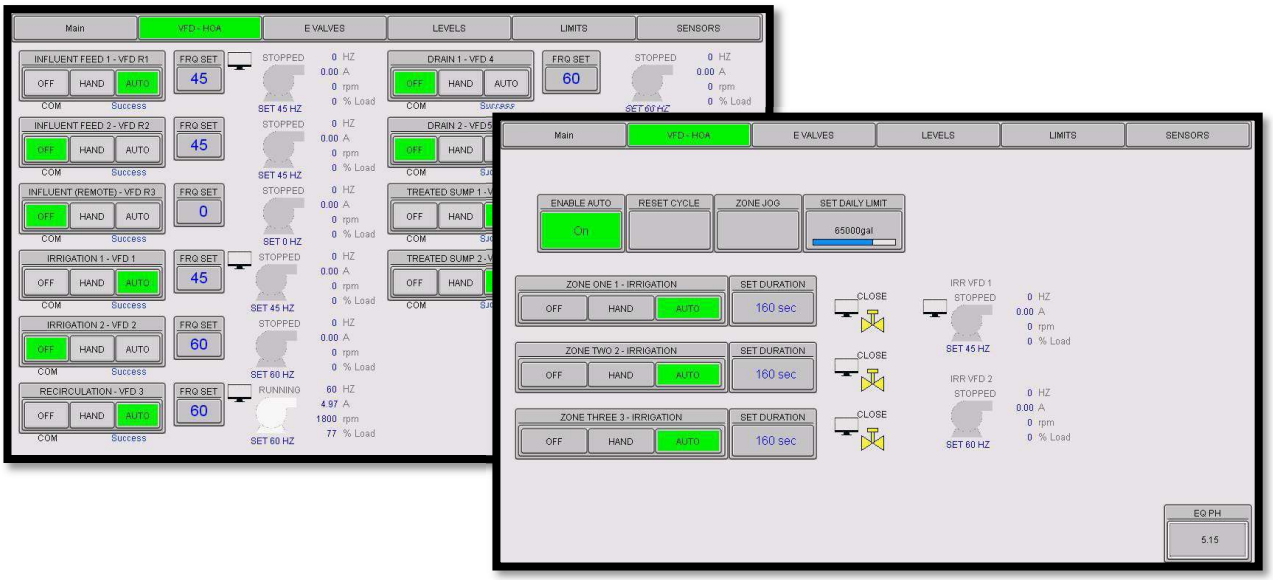
Odors are not anticipated to be a problem outside of minimal odor during initiation of bed irrigation, and only within the immediate vicinity of the treatment beds and equalization tank. The equalization tank is equipped with a recirculation line with air injection to reduce the potential for anaerobic conditions to develop within the tank. Odors may occur if upstream solids separator is not regularly maintained as solids can begin to build up in equalization tank and/or on top of the BIDA® System. BioFiltro personnel shall alert Client should such a situation be occurring and recommend immediate preventive measures.

No pieces of equipment are anticipated to generate significant noise, with pumps expected to be submersible or installed inside the control unit enclosure.

Client should consider doing a visual check on the system daily, tilling any puddles on the system, and ensuring that no sprinkler heads are clogged.

2.5 Internet of Worms

Equipment provided by BioFiltro shall be controlled and monitored by BioFiltro's Internet of Worms (IoW). Using cellular data for connectivity, IoW tracks and logs data such as flow, psi, pH, etc. which varies based on installed infrastructure and monitoring parameters. It also determines the irrigation frequency, override algorithms, etc. to maintain optimum performance and daily flow. The Client shall be provided with license(s) to the Client facing side of the platform once the system is operational which enables them to view the data in a downloadable format. The Client may also ask for BioFiltro to incorporate additional upstream/downstream equipment for an additional fee.



The Sustainable Choice

Thank you for considering BioFiltro for your wastewater treatment needs. We are a carbon neutral company with a mission to provide climate smart regenerative solutions that enable companies and communities to treat water, build soil health, and offset their carbon footprint. In doing so, we use business as a force for good to cultivate a harmonious relationship between people, planet, and profit.

By harnessing the natural digestive power of worms, BioFiltro is a non-combustion technology that demands up to 95% less energy than traditional wastewater systems while still delivering the same, if not better, water quality. By improving water quality, BioFiltro enables its customers to reduce their environmental footprint and land application area, thereby freeing up land for more beneficial uses.

BioFiltro is also a nature-based solution that does not generate sludge, a byproduct of wastewater treatment that is often hauled to landfill. Instead, BioFiltro generates vermicompost, a beneficial soil amendment rich in nutrients and microbial activity that can be used to improve water retention, root structure, and soil diversity and health. BioFiltro is currently participating in the California Department of Food and Agriculture's Healthy Soils Program to study the application of our vermicompost on croplands and it's effects on carbon sequestration. In 2021, BioFiltro generated more than 45,000 cubic yards of vermicompost in the United States, enough to amend ~450,000 acres.

BioFiltro's systems have also been validated and verified to prevent the formation of greenhouse gases from forming. In one case study, one of our dairy systems is preventing the formation of 42,000 metric tons of CO_2 equivalent every year. Carbon credit generation varies and depends on upstream practices, existing wastewater treatment infrastructure, and pre-existing water quality.

BIOFILTRO
worm powered wastewater solutions

A Whole New Can Of Worms

Ideal for sanitary, food & beverage, and livestock wastewater

Our **Can of Worms** is a compact stand alone wastewater package system housed in a 20' shipping container. With a maximum treatment capacity up to 1,000 gallons per day, this system is ideal for rural sanitary needs, boutique processors, and/or for research.

The Can of Worms comes with its own solid separator, equalization tank, lift station, PLC, monitoring camera. If necessary, the system can be upgraded to include a pH adjustment system, climate control equipment, and/or tertiary disinfection.

Our units are designed and built in California and take 4 - 6 weeks to deliver. They are available to purchase or can be financed through our Wastewater as a Service model.

Treatment Process	Continuous Batch
Treatment Time	4 Hours
Operating Weight	12,000 lbs
Operating Dimensions	20' L x 8' W x 8' H
Sitework	90% Compaction, 4" Gravel Pad; 2-3% Slope

Removal Efficiencies	
BOD5	85 - 99%
TSS	85 - 99%
TKN	60 - 95%
Ammonia	65 - 85%
Phosphorus	50 - 75%

TREATMENT CAPACITY	
Influent BOD5 mg/L	Gallons Per Day
0 - ≤ 500	≤ 1,500
500 - ≤ 1,000	≤ 1,125
1,000 - ≤ 6,000	≤ 450
6,000	≤ 225

Take Control of Your Wastewater

- Energy Efficient
- Mobile & Scalable
- Turn Key Installation
- Remotely Monitored
- Beneficial Byproducts
- Self Contained

Our systems come equipped with Nightcrawler, our very own monitoring software. Accessible from tablets, cell phones, and desktops, Nightcrawler enables users to execute basic operational and troubleshooting functions while logging water usage and influent and effluent water quality data. Customers can also leverage this software to reduce their water usage and increase their sustainability metrics.

Should the customer's flow, water quality, or discharge permit change and thereby require additional treatment, additional Cans of Worms and or tertiary treatment systems can be snapped on to keep the system within compliance.

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Appendix 5

BOD Loading Limit Calculation

Schlatter Family Estate Micro-Winery - BOD Loading Calculation

Input Criteria		
Land Application Area	0.1	Acres
Post Treatment BOD (County of Napa)	160	mg/L
* Loading Limit (Target)	100	lbs/acre/day
Peak Process Wastewater month, Sept.	4500	Gallons/month
Calculations		
Process Wastewater Generation per week (4 weeks / month)	1125	Gallons/week
Process Wastewater Generation per week (1 gallon / 3.78541 Liters)	4259	Liters/week
BOD Generation per week (160 mg/L Post Treatment Loading)	681373.8	mg/week
BOD Generation per week (453,592 mg/lb)	2	lbs/week
BOD loading per acre	15	lbs/acre/day **
Conclusion		
BOD Loading per acre less than loading limit	15 < 100	lbs/acre/day **

* State Water Board General Waste Discharge Requirements For Winery Process Water, Section 35-D

** Assumes irrigation once per week with a 7-day irrigation cycle