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Wastewater Feasibility Study

Ehlers Estate Winery Use Permit Major Modification P19-00146
Planning Commission Hearing September 15, 2021

BARTELT ENGINEERING

ONSITE WASTEWATER DISPERSAL FEASIBILITY STUDY FOR EHLERS ESTATE WINERY 3200 EHLERS LANE, NAPA COUNTY, CA APN 022-100-029

As required by Napa County Planning, Building & Environmental Services (PBES), this study outlines the feasibility of providing onsite wastewater dispersal for an existing winery located at 3200 Ehlers Lane, St. Helena, CA 94574.

PROJECT DESCRIPTION

It is our understanding that Ehlers Estate Winery is proposing to increase wine production from 25,000 gallons per year to 35,000 gallons per year. The existing winery is proposing to employ 13 full time employees, four (4) part-time employees, and two (2) seasonal (harvest) employees (19 proposed employees total) as well as modify the marketing plan to include the following:

- Ten (10) trade dinners per year with a maximum of 20 guests.
- Three (3) marketing events per year with a maximum of 100 guests
- One (1) large event per year with a maximum of 200 guests per year.

The winery was originally approved under Use Permit (UP) No. U-297576 and modified under UP No. P05-0231. Refer to the previously approved Use Permits for additional information on existing uses. Table 1 summarizes the proposed staffing plan:

TABLE 1: PROPOSED STAFFING PLAN SUMMARY

Description	Number of Employees	Frequency
Full-time Employees	13	Daily
Part-time Employees	4	Daily
Harvest/Seasonal Employees	2	Daily

Table 2 summarizes the proposed marketing plan:

TABLE 2: PROPOSED MARKETING PLAN SUMMARY			
Description	Number of Guests	Event Staff	Frequency
Private Tours & Tastings	100	0 per day	Daily
Trade Dinners	20	0 per day	10 annually
Marketing Events	100	5 per event	3 annually
Large Event	200	10 per event	1 annually

The subject parcel also includes an existing four (4) bedroom residence, an onsite wastewater treatment system (OWTS), and operates a transient noncommunity public water system.

As part of our services, representatives from Bartelt Engineering have reviewed the operational methods for the winery with our Client, reviewed the parcel files at Napa County PBES, held conversations with Napa County PBES staff, performed a reconnaissance of the site to view existing conditions and conducted a site evaluation on August 15, 2019 to evaluate the feasibility of installing and/or expanding an OWTS to accommodate wastewater generated from the proposed wine production, staffing, visitation and marking events per Napa County PBES guidelines. This feasibility study and the associated Use Permit Modification Drawings prepared by Bartelt Engineering are provided to demonstrate that the proposed improvements can feasibly be developed and that all wastewater can adequately be dispersed onsite.

WASTEWATER ANALYSIS

Process Wastewater Flow

The winery facility's production wastewater (PW) flow rates for harvest and non-harvest seasons can be calculated as follows:

Harvest Peak Winery PW Flow:

$$\frac{\text{35,000 gallons of wine/year x 1.5 gallons of water/gallon of wine}}{\text{45 days harvest}} =$$

Harvest Peak Winery PW Flow = 1,167 gallons per day (gpd)

Non-Harvest Peak Winery PW Flow:

$$\frac{\text{35,000 gallons of wine/year x 4.5 gallons of water/gallon of wine}}{\text{320 days non-harvest}} =$$

Non-Harvest Peak Winery PW Flow = 492 gpd

Sanitary Wastewater Flow

Sanitary wastewater (SW) generated at the residence, winery production facility, offices, and tasting room including full-time employees, seasonal (harvest) employees, event staff, and guests can be itemized as follows:

Residence[1]

- 4 Bedrooms x 120 gpd per bedroom = 480 gpd

Employees:

- 13 Full-Time Employees x 15 gpd per employee = 195 gpd
- 4 Part-Time Employees x 15 gpd per employee = 60 gpd
- 2 Harvest Season Employees x 15 gpd per employee = 30 gpd

Guests[2]:

- Private Tour and Tasting Visitors:
  - (100 guests per day) x (3 gpd per guest) = 300 gpd
- Trade Dinners:
  - (20 guests per day) x (3 gpd per guest) = 60 gpd
- Marketing Events:
  - (100 guests per day) x (3 gpd per guest) x 75% usage rate = 225 gpd
  - 5 event staff x 15 gpd per event staff = 75 gpd
- Large Event:
  - (200 guests per event) x (3 gpd per guest) x 75% usage rate = 450 gpd
  - 10 event staff x 15 gpd per event staff = 150 gpd

> ***Note:*** *This feasibility study assumes that offsite meal preparation and catering services are utilized during Trade Dinners, Marketing Events, and Large Event regardless of the season. Portable toilets are assumed to be used during marketing and large events and 75% of the event guests are assumed to use the winery restrooms during these events.*

[1] The existing residence was retrofitted with low-flow fixtures as part of the onsite improvements that included installation of the existing OWTS in 2005.

[2] Wastewater generation rate during tours and tastings, catered dinners, and events is 3 gpd.

Total Harvest Season and Non-Harvest Season Peak Sanitary Wastewater Flow

The total proposed harvest season peak SW flow is the combination of the winery production facility SW flows during the months of August through October (harvest). The total proposed non-harvest season peak SW flow is the combination of the winery production facility SW flows during the months of November through July (non-harvest).

Table 3 uses the marketing schedule to calculate the SW flows generated by employees and guests during daily event sequences in harvest and non-harvest seasons. SW flows in the same column indicate the events may occur on the same day. Residence flows are assumed to occur year-round even though the residence is not permanently occupied.

TABLE 3: HARVEST AND NON-HARVEST SEASON DAILY SANITARY WASTEWATER FLOWS

	Daily Occurrence					
	Harvest			Non-Harvest		
Residence	480	480	480	480	480	480
Employees	285	285	285	255	255	255
Private Tours & Tastings	300	300	150	300	300	150
Trade Dinners	60	-	-	60	-	-
Marketing Events	-	300	-	-	300	-
Large Event	-	-	600	-	-	600
Total Flow (gpd)	1,125	1,365	1,515	1,095	1,335	1,485

Table 3 shows that the greatest SW flow occurs during a Large Event that is held during the harvest season. During the Large Event, the winery tasting room is open for a half day and sees 50% of the maximum number of private tours and tasting guests.

Design Wastewater Flows

The greatest practical harvest and non-harvest season peak sanitary wastewater flow is summarized in the following table:

TABLE 4: HARVEST AND NON-HARVEST SEASON PEAK DAILY FLOW SUMMARY

Wastewater Source	Harvest (gpd)	Non-Harvest (gpd)
Process Wastewater	1,167	492
Sanitary Wastewater	1,515	1,485
Combined Wastewater	2,682	1,977

EXISTING COMBINED WASTEWATER SYSTEM

The existing wastewater treatment and dispersal system was expanded in 2005 to accommodate winery sanitary and process wastewater flow as well as sanitary wastewater from the existing residence. The existing OWTS includes the following components:

- Two (2) 1,500 gallons septic tanks for PW flows
- Two (2) 1,500 gallons septic tank for SW flows
- One (1) 1,500 gallons dose tank for combined wastewater (CW) flows
- Standard gravity leachfield (1,720 lineal feet (ft) total) for CW flows

The existing standard leachfield was originally installed in 2001-2002 and expanded in 2005. Based on field observation and feedback from onsite operators, the existing dispersal field is nearing the end of its operational capacity. The existing dispersal field is proposed to be demolished and removed offsite or abandoned in place as part of the proposed wastewater improvements associated with the Use Permit Modification. The existing septic tanks will be demolished and disposed of properly offsite to accommodate the location of the proposed parking area. The existing dose tank may be converted to a pump tank for transfer of wastewater to the proposed improvements if proven to be watertight and in adequate working condition per a licensed Contractor experienced in wastewater construction.

PROPOSED WASTEWATER IMPROVEMENTS

Several options for onsite treatment and dispersal are proposed as part of the UP Modification Application. The proposed options are designed in accordance with current PBES regulations and the potential forthcoming regulations from the State Water Resources Control Board (SWRCB) for Winery Process Wastewater. Following approval of the UP Modification, an option will be selected for installation and designed in accordance with the approved jurisdictional requirements.

Preferred Option A – Separate PW and SW Treatment and Dispersal Systems

Under this option separate PW and SW treatment and dispersal system are proposed.

PW Treatment and Dispersal System

The proposed winery PW treatment and dispersal system would include installation of a pretreatment system followed by onsite surface drip vineyard irrigation for the calculated peak design flow of 1,167 gpd. If the existing pump tank is proven to be watertight and in viable working condition, the existing pump tank would transfer collected PW from the existing Wine Production and Barrel Storage Buildings to the proposed PW pretreatment system.

The pretreatment system selected for installation is anticipated to include a pH adjustment system, a primary treatment tank equipped with an aeration system, and a filtration system. The PW pretreatment system must be capable of treating PW to an acceptable level for surface drip irrigation in vineyard areas per jurisdictional requirements. From the pretreatment system, PW effluent is proposed to be pumped to a new irrigation water storage tank.

Based on the PW flow balance, the irrigation water storage tank is proposed to have a volume of 100,000 gallons (see attached Table III) to provide storage of treated effluent through winter months when surface drip land application is minimal and to equalize differences between the wastewater generation rate and the irrigation application rate. It is assumed that available groundwater in the root zone is depleted by April and that irrigation is primarily applied to the vines for the months of April through October. In the months where the irrigation demand exceeds the amount of treated effluent that is available for irrigation, it is assumed that the entire irrigation requirement for the vines is not met or that another water source (onsite irrigation well) is used to supply additional irrigation water.

The total vineyard area where treated PW is dispersed through surface drip irrigation is based on irrigation values provided by the vineyard manager on 8.6± acres that includes 16,724 vines (see attached Table II). The area for surface drip irrigation will need to be verified once all dispersal field setbacks are determined and a final vineyard irrigation plan has been developed. Furthermore, all surface drip dispersal field areas will need to be labeled with signage indicating the use of treated effluent for irrigation in accordance with PBES and/or SWRCB regulations.

SW Treatment and Dispersal System

The proposed SW treatment and dispersal system under this option would be sized to handle a peak flow of 1,515 gpd from the existing winery and residence. SW generated from onsite buildings would continue to flow by gravity to a proposed 5,000 gallon septic tank. Effluent from the proposed septic tank would flow by gravity to a proposed 4,000 gallon recirculation/dose tank. Septic tank effluent in the recirculation/dose tank would be pretreated through an Orenco AdvanTex AX Treatment System (or approved equal) prior to flowing into the dose chamber. Pretreated effluent is proposed to be dispersed through a subsurface drip field by means of a timed-dose pumping system.

Based on the site evaluation performed by Bartelt Engineering on August 15, 2019, suitable area is available onsite for a subsurface drip dispersal field. The primary dispersal area is proposed to be located near test pit #4 which has an observed depth of 28 inches with Sandy Clay Loam / Loam soil[3]. During the site evaluation, existing utilities were discovered during test pit exploration within the proposed primary area and additional test pits were not evaluated. Other test pits were explored within in the replacement area. For Sandy Clay Loam type soil, GeoFlow Incorporated and Napa County PBES recommend a soil hydraulic loading rate[4],[5] of 0.60 gal/sf/day for pretreated effluent. Refer to the attached Site Evaluation Report for additional information. Napa County PBES Standards require a minimum of 24 inches of acceptable soil below the bottom of the drip lines with a minimum of six (6) inches of acceptable soil cover material placed over the drip lines. Based on the observed soil depth, imported fill soil material is proposed to be utilized in the primary area per Napa County

[3] The more restrictive soil type of Sandy Clay Loam will be utilized to size the dispersal field.

[4] Referenced from *Table 1 Drip Loading Rates Considering Soils Structure* of The Subsurface Drip Dispersal and Reuse Design, Installation and Maintenance Guidelines prepared by GeoFlow Incorporated.

[5] Referenced from *Table 9 Minimum Surface Area Guidelines to Dispose of 100 GPD of Secondary Treated Effluent* of the Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems by Napa County PBES.

PBES standards. The minimum required primary area for the subsurface drip field is calculated below:

$$\text{Subsurface Drip Field Area} = \frac{\text{Design Flow Rate}}{\text{Hydraulic Loading Rate}}$$

$$= \frac{1{,}515 \text{ gallons per day}}{0.6 \text{ gallons/ft}^2\text{/day}} = 2{,}525 \text{ ft}^2$$

Based on site slopes less than 5% in the primary area, a two (2) foot spacing is recommended between driplines per Napa County Standards. The recommended drip field contains 16 driplines each 80 feet long. The total recommended primary area is 2,560 square feet.

The replacement area is proposed to be located near Test Pits #3, #5, and #6 which had an observed depth of 27 to 43 inches with Sandy Clay Loam / Loam soil. Based on the observed soil depth, imported fill soil material will likely be required if the replacement area is utilized for a primary system. The same application rate (0.6 gal/sf/day) for Sandy Clay Loam soil used for the primary area is used to size the 200% replacement area, as shown below:

Replacement Area = 200% x Primary Area
= 200% x 2,525 ft^2 = 5,050 ft^2

Based on site slopes less than 5% in the replacement area, a two (2) foot spacing is recommended between driplines per Napa County Standards. The recommended replacement area is 5,120 square feet.

Alternative Option B – CW Treatment and Dispersal System

The proposed winery CW treatment and dispersal system would include installation of a pretreatment system followed by a subsurface drip field for the calculated peak design flow of 2,682 gpd. If the existing pump tank is proven to be watertight and in viable working condition, the existing pump tank would transfer collected wastewater from the existing winery buildings and residence to the CW pretreatment system.

The pretreatment system selected for installation is anticipated to include a pH adjustment system, a primary treatment tank equipped with an aeration system, and a filtration system. The pretreatment system must be capable of treating wastewater to acceptable levels for subsurface drip dispersal per jurisdictional requirements. From the pretreatment system, CW effluent would flow into a new dosing tank prior to be pumped to a new subsurface drip dispersal field via a time-dosed pumping system. Under this option, groundwater monitoring may be required per the SWRCB requirements to allow for the underground dispersal of combined SW and PW. The subsurface drip dispersal field will also be sized to meet SWRCB requirements; however, for this feasibility study the proposed subsurface drip dispersal field is sized per current PBES standards.

Based on the site evaluation performed by Bartelt Engineering on August 15, 2019, suitable area is available onsite for a subsurface drip dispersal field. The primary dispersal area is proposed to be located near Test Pits #4 and #6 which have an observed depth of 27 to 43

inches with Sandy Clay Loam / Loam soil[6]. For Sandy Clay Loam type soil, GeoFlow Incorporated and Napa County PBES recommend a soil hydraulic loading rate[7],[8] of 0.60 gal/sf/day for pretreated effluent. Refer to the attached Site Evaluation Report for additional information. Napa County PBES Standards require a minimum of 24 inches of acceptable soil below the bottom of the drip lines with a minimum of six (6) inches of acceptable soil cover material placed over the drip lines. Based on the observed soil depth, imported fill soil material is proposed to be utilized in the primary area per Napa County PBES standards. The minimum required primary area for the subsurface drip field is calculated below:

$$\text{Subsurface Drip Field Area} = \frac{\text{Design Flow Rate}}{\text{Hydraulic Loading Rate}}$$

$$= \frac{2{,}682 \text{ gallons per day}}{0.6 \text{ gallons/ft}^2\text{/day}} = 4{,}470 \text{ ft}^2$$

Based on site slopes less than 5% in the primary area, a two (2) foot spacing is recommended between driplines per Napa County Standards. The recommended drip field contains 16 driplines each 140 feet long. The total recommended primary area is 4,480 square feet.

The replacement area is proposed to be located near Test Pits #3, #5, and #6 which had an observed depth of 27 to 43 inches with Sandy Clay Loam / Loam soil. Based on the observed soil depth, imported fill soil material will likely be required if the replacement area is utilized for a primary system. The same application rate (0.6 gal/sf/day) for Sandy Clay Loam soil used for the primary area is used to size the 200% replacement area, as shown below:

Replacement Area = 200% x Primary Area
= 200% x 4,470 ft^2 = 8,940 ft^2

Based on site slopes less than 5% in the replacement area, a two (2) foot spacing is recommended between driplines per Napa County Standards. The recommended replacement area is 8,960 square feet.

Operation and Maintenance

Per Napa County PBES requirements, the proposed OWTS options are classified as an Alternative Sewage Treatment Systems (ASTS). Therefore, a qualified Service Provider will be secured prior to operation of the installed OWTS.

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[6] The more restrictive soil type of Sandy Clay Loam will be utilized to size the dispersal field.

[7] Referenced from *Table 1 Drip Loading Rates Considering Soils Structure* of The Subsurface Drip Dispersal and Reuse Design, Installation and Maintenance Guidelines prepared by GeoFlow Incorporated.

[8] Referenced from *Table 9 Minimum Surface Area Guidelines to Dispose of 100 GPD of Secondary Treated Effluent* of the Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems by Napa County PBES.

SUMMARY & CONCLUSIONS

Process wastewater and sanitary wastewater generated from the existing winery is anticipated to increase as a result of the proposed changes in wine production, staffing, and marketing events. This study demonstrates that all wastewater generated from the proposed project can feasibly be treated and dispersed onsite. Several options are proposed for wastewater treatment and dispersal to comply with PBES and/or Regional Water Quality Control Board requirements. An option will be selected for installation that complies with future jurisdictional requirements.

ATTACHMENTS

Wastewater Treatment and Dispersal System Diagrams

Wastewater Feasibility Calculations

Site Evaluation Reports

Equipment Specification Sheets

REFERENCES

California Onsite Wastewater Association (COWA). "Pumping and Pressure Distribution Systems." May 1998.

Geoflow, Inc. Wastewater Design, Installation and Maintenance Guidelines. v1, 2007.

Napa County Department of Environmental Management. "Design, Construction and Installation of Alternative Sewage Treatment Systems." April 12, 2010.

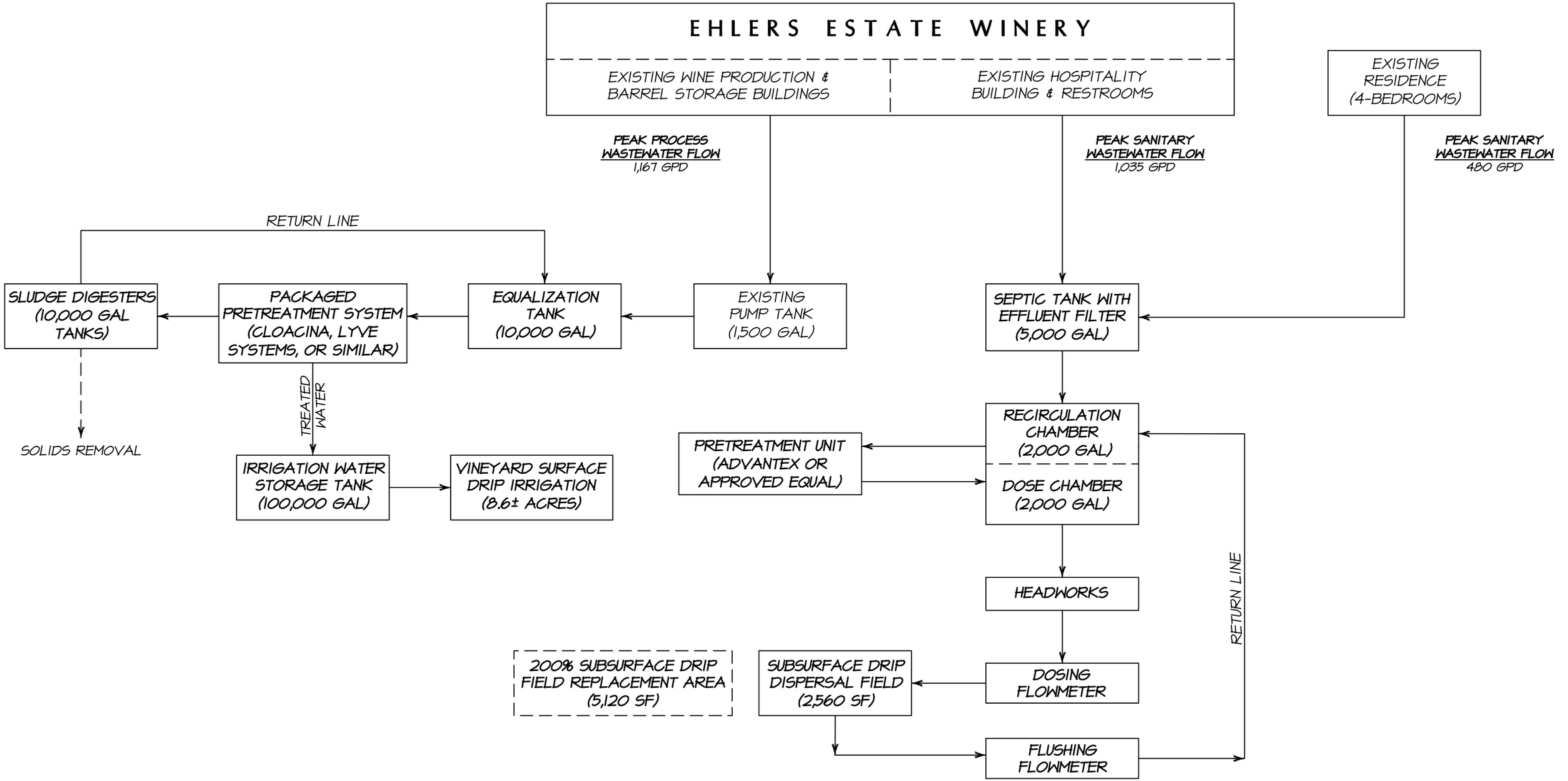
Telsco Industries. "Turf Irrigation Manual." By James A. Watkins. 1987.

U.S. Department of Health, Education and Welfare, Public Health Service Publication. Manual of Septic-Tank Practice. 1967.

U.S. Environmental Protection Agency. "Onsite Wastewater Treatment Systems Manual." February 2002.

Napa County Planning, Building and Environmental Services, “Napa County Onsite Wastewater Treatment Systems (OWTS) Technical Standards.” Final Draft.

Orenco Systems, Incorprated. “AdvanTex Design Criteria for Commercial Treatment Systems”. Rev.1.6. January 2016.



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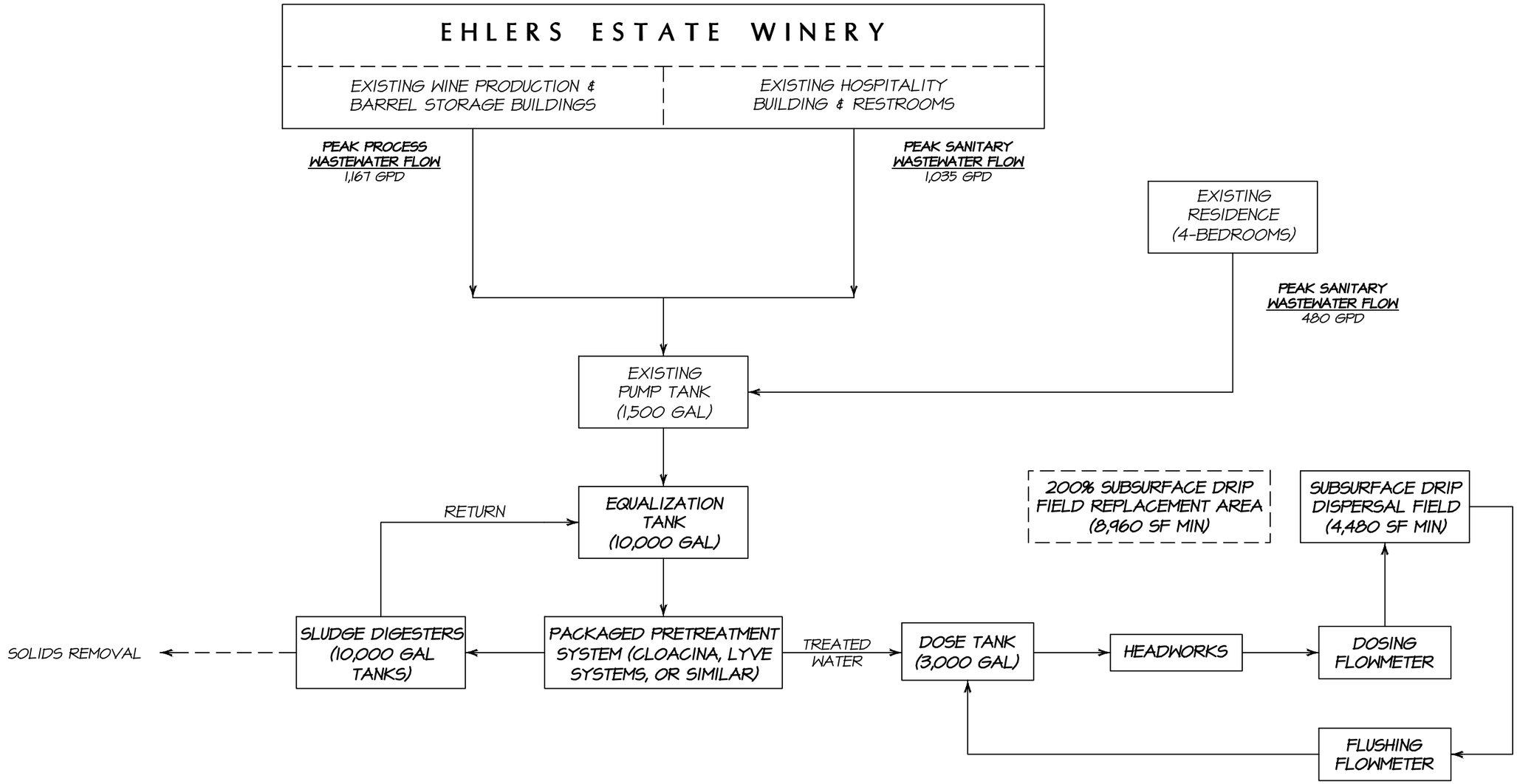
PREFERRED OPTION "A"
SEPARATE PROCESS WASTEWATER AND SANITARY WASTEWATER TREATMENT DIAGRAM

NO SCALE

Ehlers Estate Winery
3200 Ehlers Lane
St. Helena, CA 94574
APN 022-100-029
Job No. 02-54
Revised - November 2019
Sheet 1 of 2



ALTERNATE OPTION "B"
COMBINED WASTEWATER TREATMENT DIAGRAM

NO SCALE

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Ehlers Estate Winery
Process Wastewater Flow
Table I

Total annual wine production (gallons):	35,000
Annual water usage per gallon of wine (gallons)[1]:	6
Annual process wastewater flow (gallons):	210,000
Average process wastewater flow (gpd):	575
Harvest water usage per gallon of wine (gallons):	1.5
Length of Harvest (days):	45.0
Harvest process wastewater flow (gallons per day):	1,167
Non-harvest water usage per gallon of wine (gallons):	4.5
Length of Non-Harvest (days):	320
Non-harvest process wastewater flow (gallons per day):	492

MONTHLY PROCESS WASTEWATER FLOW (gallons/month):

ESTIMATED PROCESS WASTEWATER FLOW			
		Wastewater Flow	
Month	Percent[2]	(gallons/month)	(gallons/day)
September	16.7%	35,070	1,169
October (End of Harvest Season)	12.5%	26,250	847
November	7.5%	15,750	525
December	6.5%	13,650	440
January	5.5%	11,550	373
February	5.5%	11,550	413
March	5.5%	11,550	373
April	7.5%	15,750	525
May	7.5%	15,750	508
June	7.5%	15,750	525
July	7.5%	15,750	508
August (Start of Harvest Season)	10.3%	21,630	698
TOTALS	100%	210,000	

Notes:
[1] The annual water usage per gallon of wine is assumed to be 6 gallons
[2] Wastewater monthly proportioning is based on general winery operations

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Ehlers Estate Winery
Vineyard Irrigation Data
Table II

Vineyard area (acres):	8.6
Row width (feet):	7.0
Vine spacing (feet)[1]:	3.2
Total number of irrigated vines:	16,724
Seasonal irrigation (May - October)	
Seasonal irrigation per vine (gallons/season):	**19**

ESTIMATED VINEYARD PROCESS WASTEWATER IRRIGATION				
	Estimated			
Month	Seasonal Percent (%)	Seasonal Irrigation[2] (gal/vine)	Non-Seasonal Irrigation[3] (gal/vine)	Total Irrigation (gallons)
September	19.1%	3.6		59,726
October	0.0%	0.0		0
November	0.0%	0.0		0
December[1]	0.0%		0.00	0
January[1]	0.0%		0.00	0
February[1]	0.0%		0.00	0
March[1]	0.0%		0.00	0
April	0.0%	0.0		0
May	0.0%	0.0		0
June	17.2%	3.2		53,835
July	28.6%	5.3		89,442
August	35.1%	6.6		109,735
TOTAL	100.0%	18.7	0.0	**312,737**
				0.96 acre-feet

Notes:

[1] Vine spacing varies onsite, an average value is used to calculate the total number of irrigation vines

[2] Vineyard irrigation values are based on irrigation data provided by Kendall Smith Vineyard Services, LLC for the 2018 season

[3] Total non-seasonal irrigation =

= (vineyard area) * (43,560 sq.-ft./acre) * (depth of irrigation/12 in./ft.) * (7.48 gal./cu.-ft.)

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Ehlers Estate Winery
Process Wastewater Irrigation Storage Tank Balance
Table III

ESTIMATED PROCESS WASTEWATER IRRIGATION TANK BALANCE[1,2]				
Month	Beginning Balance (gallons)	Wastewater Flow (gallons)	Vineyard Irrigation (gallons)	Tank Volume (gallons)
September	0	35,070	59,726	0
October	0	26,250	0	26,250
November	0	15,750	0	15,750
December	15,750	13,650	0	29,400
January	29,400	11,550	0	40,950
February	40,950	11,550	0	52,500
March	52,500	11,550	0	64,050
April	64,050	15,750	0	79,800
May	79,800	15,750	0	95,550
June	95,550	15,750	53,835	57,465
July	57,465	15,750	89,442	0
August	0	21,630	109,735	0
	TOTALS	210,000	312,737	
	Average	17,500	26,061	38,476

Recommended Tank Storage (gallons): 100,000
Recommended Tank Storage (acre-feet): 0.31

Notes:

[1] In months when the irrigation demand exceeds the beginning balance plus the wastewater flow it is assumed that the full irrigation demand is not met or that the additional irrigation water is supplied from an alternate source (ie. onsite well).

[2] Water balance calculations assume storage tank is empty at the beginning of November due to post-harvest irrigation.

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SANITARY WASTEWATER (SW) FLOW

Residence[1]							
4 Bedrooms	x	120	gpd per bedroom			=	480 gpd
Employees							
13 Full-time employees	x	15	gpd per employee			=	195 gpd
4 Part-time employees	x	15	gpd per employee			=	60 gpd
2 Harvest employees	x	15	gpd per employee			=	30 gpd
Guests							
Private Tour & Tasting Visitors							
100 guests	x	3	gpd per guest			=	300 gpd
Trade Dinners							
20 guests	x	3	gpd per guest			=	60 gpd
Marketing Events[2,3]:							
100 guests	x	3	gpd per guest	x	75% utilization rate	=	225 gpd
5 event staff	x	15	gpd per event staff			=	75 gpd
Large Event[2,3]:							
200 guests	x	3	gpd per guest	x	75% utilization rate	=	450 gpd
10 event staff	x	15	gpd per event staff			=	150 gpd

Notes:

1) The existing residence was retrofiited with low-flow fixtures as part of the onsite improvements that included installation of the exisitng wastewater treatment and dispersal system in 2005

2) Wastewater generation rate for guests during tours and tastings and catered events is 3 gpd

3) Portable toilets are utilized during marketing and large event(s) and a restroom utilization rate is applied to the calculation

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PRETREATMENT EQUIPMENT SIZING

Wastewater source:	Sanitary Wastewater
Flow rate - harvest season:	1,515 gpd
Flow rate - non-harvest season:	1,485 gpd
Septic Tank Capacity:	
Recommended Hydraulic Retention Time:	3 days
Minimum Tank Volume:	4,545 gallons
Additional Tank Volume Recommended:	***5,000 gallons***
Recirculation Tank Capacity[1]:	
Recommended Hydraulic Retention Time:	1 day
Minimum Tank Volume:	1,515 gallons
Tank Volume Reccommended:	***2,000 gallons***
Dispersal Field Dosing Tank Capacity:	
Recommended Hydraulic Retention Time[2]	1 day
Minimum Tank Volume:	1,515 gallons
Actual Tank Volume:	***2,000 gallons***
AdvanTex textile filter sizing[1]:	
Residential SW	
Peak Flow Rate:	480 gpd
Influent BOD_5[3]:	140 mg/L
Influent TSS[3]:	40 mg/L
Organic loading rate (OLR) =	0.56 lb/day
Area required (based on HLR) =	19.2 ft^2
Area required (based on OLR) =	14.01 ft^2
Winery SW	
Peak Flow Rate:	1,035 gpd
Influent BOD_5[3]:	300 mg/L
Influent TSS[3]:	80 mg/L
Organic loading rate (OLR) =	2.59 lb/day
Area required (based on HLR) =	41.4 ft^2
Area required (based on OLR) =	64.74 ft^2
Effluent BOD_5:	< 30 mg/L
Effluent TSS:	< 30 mg/L

Maximum Required Surface Area:	78.8	
AX20 Textile Filter Area	20	ft^2
Number of AX20's required:	3.9	
Actual Number of AX20's provided:	***4***	
Total area provided:	***80***	***ft^2***

Notes:

1) Equipment sizing is based on Orenco Systems Incorporated AdvanTex Design Criteria

2) Hydraulic Retention Time is reduced to one (1) day with the use of duplex pumps

3) Wastewater strength is based on *Table I. Application Types* from the Orenco Systems Incorporated AdvanTex Design Criteria

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SUBSURFACE DRIP FIELD SIZING - OPTION A

Wastewater source:	Sanitary Wastewater
Flow rate - harvest season:	1,515 gpd
Flow rate - non-harvest season:	1,485 gpd
Primary Area	
Near test pits[1]:	#4
Soil texture:	Sandy clay loam
Soil structure:	Moderate
Effluent type:	PTE
Hydraulic loading rate	
Napa County PBES[2]:	0.60 gal/day/ft^2
GeoFlow Inc.[3]:	0.60 gal/day/ft^2
Minimum subsurface drip field area:	2,525 ft^2
Number of driplines:	16 lines
Dripline length:	80 feet
Site slopes in primary area	5%
Dripline spacing:	2 feet
Total recommended primary area:	2,560 ft^2
Replacement Area	
Near test pits[1]:	#3, #5, and #6
Replacement system:	Subsurface Drip Dispersal Field
Required replacement area:	200%
Soil texture	Sandy clay loam
Hydraulic loading rate	
Napa County PBES[2]:	0.60 gal/day/ft^2
GeoFlow Inc.[3]:	0.60 gal/day/ft^2
Minimum replacement area:	5,050 ft^2
Site slopes in primary area	5%
Dripline spacing:	2 feet
Total recommended replacement area:	5,050 ft^2

[1] Refer to the Site Evaluation Report prepared by Bartelt Engineering and witnessed by Napa County PBES on August 15, 2019 for more information

[2] Referenced from *Table 9 Minimum Surface Area Guidelines to Dispose of 100 GPD of Secondary Treated Effluent* of the Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems by Napa County PBES

[3] Referenced from *Table 1 Drip Loadings Rates Considering Soils Structures* of The Subsurface Drip Dispersal and Reuse Design, Installation and Maintenance Guidelines prepared by GeoFlow Incorporated

BARTELT ENGINEERING

SUBSURFACE DRIP FIELD SIZING - OPTION B

Wastewater source:	Combined Wastewater
Flow rate - harvest season:	2,682 gpd
Flow rate - non-harvest season:	1,977 gpd
Primary Area	
Near test pits[1]:	#4 and #6
Soil texture:	Sandy clay loam
Soil structure:	Moderate
Effluent type:	PTE
Hydraulic loading rate	
Napa County PBES[2]:	0.60 gal/day/ft^2
GeoFlow Inc.[3]:	0.60 gal/day/ft^2
Minimum subsurface drip field area:	4,470 ft^2
Number of driplines:	16 lines
Dripline length:	140 feet
Site slopes in primary area	5%
Dripline spacing:	2 feet
Total recommended primary area:	4,480 ft^2
Replacement Area	
Near test pits[1]:	#3, #5, and #6
Replacement system:	Subsurface Drip Dispersal Field
Required replacement area:	200%
Soil texture	Sandy clay loam
Hydraulic loading rate	
Napa County PBES[2]:	0.60 gal/day/ft^2
GeoFlow Inc.[3]:	0.60 gal/day/ft^2
Minimum replacement area:	8,940 ft^2
Site slopes in primary area	10%
Dripline spacing:	2 feet
Total recommended replacement area:	8,940 ft^2

[1] Refer to the Site Evaluation Report prepared by Bartelt Engineering and witnessed by Napa County PBES on August 15, 2019 for more information

[2] Referenced from *Table 9 Minimum Surface Area Guidelines to Dispose of 100 GPD of Secondary Treated Effluent* of the Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems by Napa County PBES

[3] Referenced from *Table 1 Drip Loadings Rates Considering Soils Structures* of The Subsurface Drip Dispersal and Reuse Design, Installation and Maintenance Guidelines prepared by GeoFlow Incorporated

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 #: E19-00400

APN: 022-100-029

(County Use Only)
Reviewed by: Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner New Vavin, Inc., c/o Martin Landaluce	☐ New Construction ☒ Addition ☐ Remodel ☐ Relocation ☐ Other:
Property Owner Mailing Address 3222 Ehlers Lane	☐ Residential - # of Bedrooms: Design Flow : gpd
City State Zip St. Helena, CA 94574	☒ Commercial – Type: Winery Sanitary Waste: gpd Process Waste: gpd
Site Address/Location 3200 Ehlers Lane, St. Helena, CA	☐ Other: Sanitary Waste: gpd Process Waste: gpd

Evaluation Conducted By:

Company Name Bartelt Engineering	Evaluator's Name Christina Nicholson, P.E.	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist) *Christina G Nicholson*
Mailing Address: 1303 Jefferson Street, 200 B		Telephone Number (707) 258-1301
City State Zip Napa CA 94559		Date Evaluation Conducted August 15, 2019

Primary Area See below	Expansion Area See below
Acceptable Soil Depth: 28 in. Test pits #: 4	Acceptable Soil Depth: 27-43 in. Test pits #: 3, 5, and 6
Soil Application Rate (gal. /sq. ft. /day): 0.7	Soil Application Rate (gal. /sq. ft. /day): 0.6
System Type(s) Recommended: Subsurface Drip	System Type(s) Recommended: Subsurface Drip
Slope: <5 %. Distance to nearest water source: 100+ feet	Slope: <5 %. Distance to nearest water source: 100+ feet
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)
Groundwater Monitoring Performed? No ☒ Yes ☐ (attach results)	Groundwater Monitoring Performed? No ☒ Yes ☐ (attach results)

Site constraints/Recommendations:

A site evaluation was conducted on August 15, 2019 by Paul Bartelt, Christina Nicholson, and Michael Grimes of Bartelt Engineering. Test pits were excavated by Brandon Sakai Excavating using an excavator with a 24 inch bucket. Kim Withrow of Napa County Environmental Health visited the site to inspect soil conditions. Test pits # 3 thru 6 showed suitable soil for the installation of an Alternative Sewage Treatment System (ASTS) Subsurface Drip dispersal field within the area tested with required replacement area. Imported fill will be utilized within the primary replacement areas as necessary per Napa County Planning, Building, and Environmental Services Department requirements.

Test Pit # 1 * Hydrometer Test Performed

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-36*		0-15	L	S, SB	H	FRB, F	S, SP	MF, FM, MVF	FF, FC, FM	None
36-42	C	>50	Cemented Soil/Decomposing Rock						FF	None

Slope = <5 %. Acceptable soil depth observed: 36 inches.
Assigned soil application rate = Subsurface Drip = 0.7 gal/sf/day (per Napa County Soil Application Rates)
Subsurface Drip = 0.8 gal/sf/day (per recommended Geoflow Drip Loading Rates)

No refusal at 42 inches deep.
No groundwater observed. *See attached Soil Texture Analysis by Bouyoucos Hydrometry Method prepared by RGH Consultants, Inc. dated August 26, 2019.

Test Pit # 2 * Hydrometer Test Performed

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-27*		0-15	L	S, SB	H	FRB, F	S, SP	MVF, FM, MF	FF, FM, CVF	None
27-38	C	0-15	Cemented Soil/Decomposing Rock						None	None

Slope = <5 %. Acceptable soil depth observed: 27 inches.
Assigned soil application rate = Subsurface Drip = 0.7 gal/sf/day (per Napa County Soil Application Rates)
Subsurface Drip = 0.8 gal/sf/day (per recommended Geoflow Drip Loading Rates)

No refusal at 38 inches deep.
No groundwater observed. *See attached Soil Texture Analysis by Bouyoucos Hydrometry Method prepared by RGH Consultants, Inc. dated August 26, 2019.

Test Pit # 3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-27		0-15	L	S, SB	H	FRB, F	S, SP	MVF, MF, FM	CVF, CF, FC	None
27-39	C	0-15	Cemented Soil/Decomposing Rock						None	None

Slope = <5 %. Acceptable soil depth observed: 27 inches.
Assigned soil application rate = Subsurface Drip = 0.7 gal/sf/day (per Napa County Soil Application Rates)
Subsurface Drip = 0.8 gal/sf/day (per recommended Geoflow Drip Loading Rates)

No refusal at 39 inches deep.
No Groundwater observed.

Test Pit # 4

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-28		0-15	L	S, SB	H	FRB, F	S, SP	CF, CM, FC	FC, FF, FVF	None
28-37	C	>50	Cemented	S, SB	VH	FRB, F	S, SP	MF, MVF	FF	None
Slope = <5 %. Acceptable soil depth observed: 28 inches. Assigned soil application rate = Subsurface Drip = 0.7 gal/sf/day (per Napa County Soil Application Rates) Subsurface Drip = 0.8 gal/sf/day (per recommended Geoflow Drip Loading Rates)										
No refusal at 37 inches deep. No groundwater observed.										

Test Pit # 5 * Hydrometer Test Performed

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-38*		30-50	SCL	S, SB	H	FRB, F	S, SP	CF, CM, FC	FC, FF, FVF	None
38-42	A	>50	Cemented Soil with Cobbles							None
Slope = <5 %. Acceptable soil depth observed: 38 inches. Assigned soil application rate = Subsurface Drip = 0.6 gal/sf/day (per Napa County Soil Application Rates) Subsurface Drip = 0.6 gal/sf/day (per recommended Geoflow Drip Loading Rates)										
No refusal at 42 inches deep. No groundwater observed. *See attached Soil Texture Analysis by Bouyoucos Hydrometry Method prepared by RGH Consultants, Inc. dated August 26, 2019.										

Test Pit # 6 * Hydrometer Test Performed

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-34*		30-50	SCL	S, SB	SH	FRB, F	S, SP	CF, CM, FC	FC, FF, FVF	None
34-43	A	>50	Cemented Soil with Cobbles							None
Slope = <5 %. Acceptable soil depth observed: 34 inches. Assigned soil application rate = Subsurface Drip = 0.6 gal/sf/day (per Napa County Soil Application Rates) Subsurface Drip = 0.6 gal/sf/day (per recommended Geoflow Drip Loading Rates)										
Refusal at 43 inches deep. No groundwater observed. *See attached Soil Texture Analysis by Bouyoucos Hydrometry Method prepared by RGH Consultants, Inc. dated August 26, 2019.										

Table of Abbreviations

Boundary	Texture	Structure	Consistence			Pores	Roots	Mottling
			Side Wall	Ped	Wet			
A=Abrupt <1” **C**=Clear 1”-2.5” **G**=Gradual 2.5”-5” **D**=Difuse >5”	**S**=Sand **LS=**Loamy Sand **SL**=Sandy Loam **SCL**=Sandy Clay Loam **SC**=Sandy Clay **CL**=Clay Loam **L**=Loam **C**=Clay **SiC**=Silty Clay **SiCL**=Silty Clay Loam **SiL**=Silt Loam Si=Silt	**W**=Weak **M**=Moderate **S**=Strong _____ **G**=Granular **PL**=Platy **Pr**=Prismatic **C**=Columnar **AB**=Angular Blocky **SB**=Subangular Blocky _____ **M**=Massive **C**=Cemented	**L**=Loose **S**=Soft **SH**=Slighty Hard **H**=Hard **VH**=Very Hard **ExH**=Extremely Hard	**L**=Loose **VFRB**=Very Friable **FRB**=Friable **F**=Firm **VF**=Very Firm **ExF**=Extremely Firm	**NS**=NonSticky **SS**=Slightly Sticky **S**=Sticky **VS**=Very Sticky _____ **NP**=NonPlastic **SP**=Slightly Plastic **P**=Plastic **VP**=Very Plastic	**Quantity:** **F**=Few **C**=Common **M**=Many **Size:** **VF**=Very Fine **F**=Fine **M**=Medium **C**=Coarse	**Quantity:** **F**=Few **C**=Common **M**=Many **Size:** **VF**=Very Fine **F**=Fine **M**=Medium **C**=Coarse **VC**=Very Course	**Quantity:** **F**=Few **C**=Common **M**=Many **Size:** **F**=Fine **M**=Medium **C**=Coarse **VC**=Very Course **ExC**=Extremely Coarse **Contrast:** **Ft**=Faint **D**=Distinct **P**=Prominent

Attach additional sheets as needed

Alternative Sewage Treatment System Soil Application Rates

TEXTURE	STRUCTURE		APPLICATION RATE (Gal/ft^2 /day)	
	Shape	Grade	STE[1]	PTE[1,2]
Coarse Sand, Sand, Loamy Coarse Sand	Single grain	Structureless	1.0	1.2
Fine Sand, Loamy Fine Sand	Single grain	Structureless	0.6	1.0
Sandy Loam, Loamy Sand	Massive	Structureless	0.35	0.5
	Platy	Weak	0.35	0.5
	Prismatic, blocky, granular	Weak	0.5	0.75
		Moderate, Strong	0.8	1.0
Loam, Silt Loam, Sandy Clay Loam, Fine Sandy Loam	Massive	Structureless		
	Platy	Weak, moderate, strong		
	Prismatic, blocky, granular	Weak, moderate	0.5	0.75
		Strong	0.8	1.0
Sandy Clay, Silty Clay Loam, Clay Loam	Massive	Structureless		
	Platy	Weak, moderate, strong		
	Prismatic, blocky, granular	Weak, moderate	0.35	0.5
		Strong	0.6	0.75
Clay, Silty Clay	Massive	Structureless		
	Platy	Weak, moderate, strong		
	Prismatic, blocky, granular	Weak		
		Moderate, strong	0.2	0.25

1. See Table 1 in the Design, Construction and Installation of Alternative Sewage Treatment Systems.
2. A higher application rate for pretreated effluent may only be used when pretreatment is not used for one foot of vertical separation credit.

MINIMUM SURFACE AREA GUIDELINES TO DISPOSE OF 100 GPD OF SECONDARY TREATED EFFLUENT FOR SUBSURFACE DRIP DISPERSAL SYSTEMS

		Soil Absorption Rates		Design Application Rate (Gal/ft^2/day)	Total Area Required Sq. ft./100 gallons per day
Soil Class	Soil Type	Est. Soil Perc. Rate minutes/inch	Hydraulic Conductivity inches/hour		
I	Coarse sand	1 – 5	>2	1.400	71.5
I	Fine sand	5 – 10	1.5 – 2	1.200	83.3
II	Sandy loam	10 – 20	1.0 – 1.5	1.000	100.0
II	Loam	20 – 30	0.75 – 1.0	0.700	143.0
III	Clay loam	30 – 45	0.5 – 0.75	0.600	167.0
III	Silt - clay loam	45 – 60	0.3 – 0.5	0.400	250.0
IV	Clay non-swell	60 – 90	0.2 – 0.3	0.200	500.0
IV	Clay - swell	90 – 120	0.1 – 0.2	0.100	1000.0

1. For design purpose, the “Soil Type” category to be used in the above table shall be based on the most restrictive soil type encountered within two feet below the bottom of the drip line.
2. Dispersal field area calculation: Total square feet area of dispersal field = Design flow divided by loading rate.

Conventional Sewage Treatment System Soil Application Rates

TEXTURE	STRUCTURE		APPLICATION RATE (Gal/ft^2 /day)
	Shape	Grade	STE
Coarse Sand, Sand, Loamy Coarse Sand	Single grain	Structureless	Prohibited
Sandy Loam, Loamy Sand	Massive	Structureless	Prohibited
	Platy	Weak, mod, strong	Prohibited
	Prismatic, blocky, granular	Weak	0.33
		Moderate, strong	0.5
Loam, Silt Loam, Sandy Clay Loam, Fine Sandy Loam	Massive	Structureless	Prohibited
	Platy	Weak, mod, strong	Prohibited
	Prismatic, blocky, granular	Weak	0.25
		Moderate, Strong	0.33
Clay Loam	Massive	Structureless	Prohibited
	Platy	Weak, moderate, strong	Prohibited
	Prismatic, blocky, granular	Weak, moderate	0.25
		Strong	0.33
Sandy Clay, Silty Clay Loam	Massive	Structureless	Prohibited
	Platy	Weak, moderate, strong	Prohibited
	Prismatic, blocky, granular	Weak, moderate	Prohibited
		Strong	0.25
Clay, Silty Clay	Massive	Structureless	Prohibited
	Platy	Weak, moderate, strong	Prohibited
	Prismatic, blocky, granular	Weak	Prohibited
		Moderate, strong	Prohibited

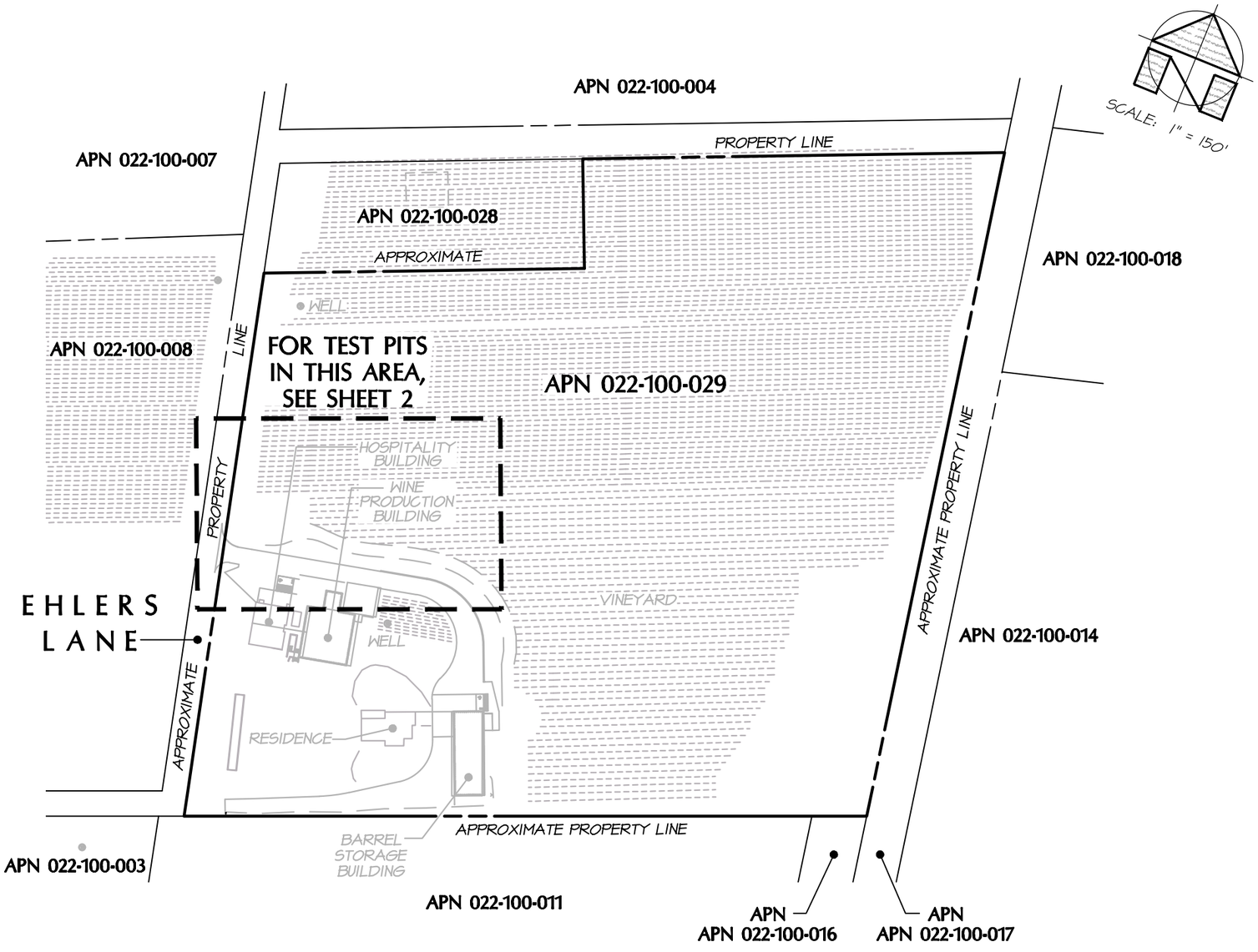
CONVENTIONAL SEWAGE TREATMENT SYSTEM SOIL APPLICATION RATES BASED ON PERCOLATION RATES	
Percolation Rate (mpi)	Application Rate (STE)
< 5 MPI	Prohibited
5 to 10 MPI	0.5
10-20 MPI	0.33
20-60 MPI	0.25
> 60 MPI	Prohibited

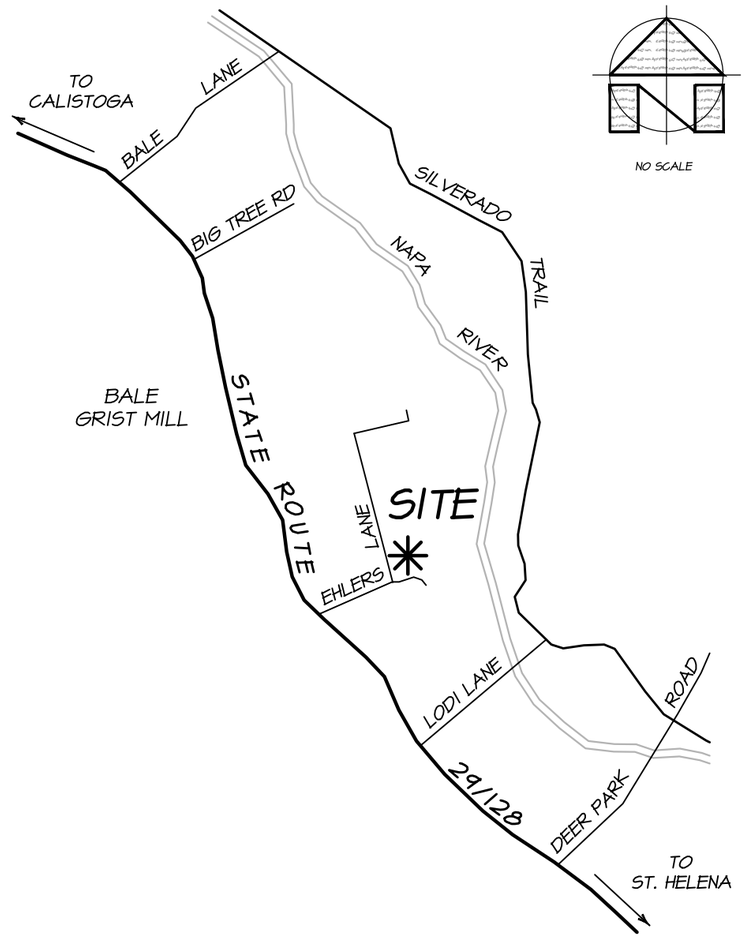
TABLE 1

DRIP LOADING RATES CONSIDERING SOIL STRUCTURE.

Table 1 is taken from the State of Wisconsin code and was prepared by Jerry Tyler.
Provided for guidelines and budgeting purposes. Refer to your local regulations and qualified soil scientists to determine best loading rates.

Soil Textures	**Soil Structure**	Maximum Monthly Average **BOD_5<30mg/L TSS<30mg/L** (gallons/ft^2/day)	Maximum Monthly Average **BOD_5>30mg/L TSS>30mg/L** (gallons/ft^2/day)
Course sand or coarser	N/A	1.6	0.4
Loamy coarse sand	N/A	1.4	0.3
Sand	N/A	1.2	0.3
Loamy sand	Weak to strong	1.2	0.3
Loamy sand	Massive	0.7	0.2
Fine sand	Moderate to strong	0.9	0.3
Fine sand	Massive or weak	0.6	0.2
Loamy fine sand	Moderate to strong	0.9	0.3
Loamy fine sand	Massive or weak	0.6	0.2
Very fine sand	N/A	0.6	0.2
Loamy very fine sand	N/A	0.6	0.2
Sandy loam	Moderate to strong	0.9	0.2
Sandy loam	Weak, weak platy	0.6	0.2
Sandy loam	Massive	0.5	0.1
Loam	Moderate to strong	0.8	0.2
Loam	Weak, weak platy	0.6	0.2
Loam	Massive	0.5	0.1
Silt loam	Moderate to strong	0.8	0.2
Silt loam	Weak, weak platy	0.3	0.1
Silt loam	Massive	0.2	0.0
Sandy clay loam	Moderate to strong	0.6	0.2
Sandy clay loam	Weak, weak platy	0.3	0.1
Sandy clay loam	Massive	0.0	0.0
Clay loam	Moderate to strong	0.6	0.2
Clay loam	Weak, weak platy	0.3	0.1
Clay loam	Massive	0.0	0.0
Silty clay loam	Moderate to strong	0.6	0.2
Silty clay loam	Weak, weak platy	0.3	0.1
Silty clay loam	Massive	0.0	0.0
Sandy clay	Moderate to strong	0.3	0.1
Sandy clay	Massive to weak	0.0	0.0
Clay	Moderate to strong	0.3	0.1
Clay	Massive to weak	0.0	0.0
Silty clay	Moderate to strong	0.3	0.1
Silty clay	Massive to weak	0.0	0.0





LOCATION MAP

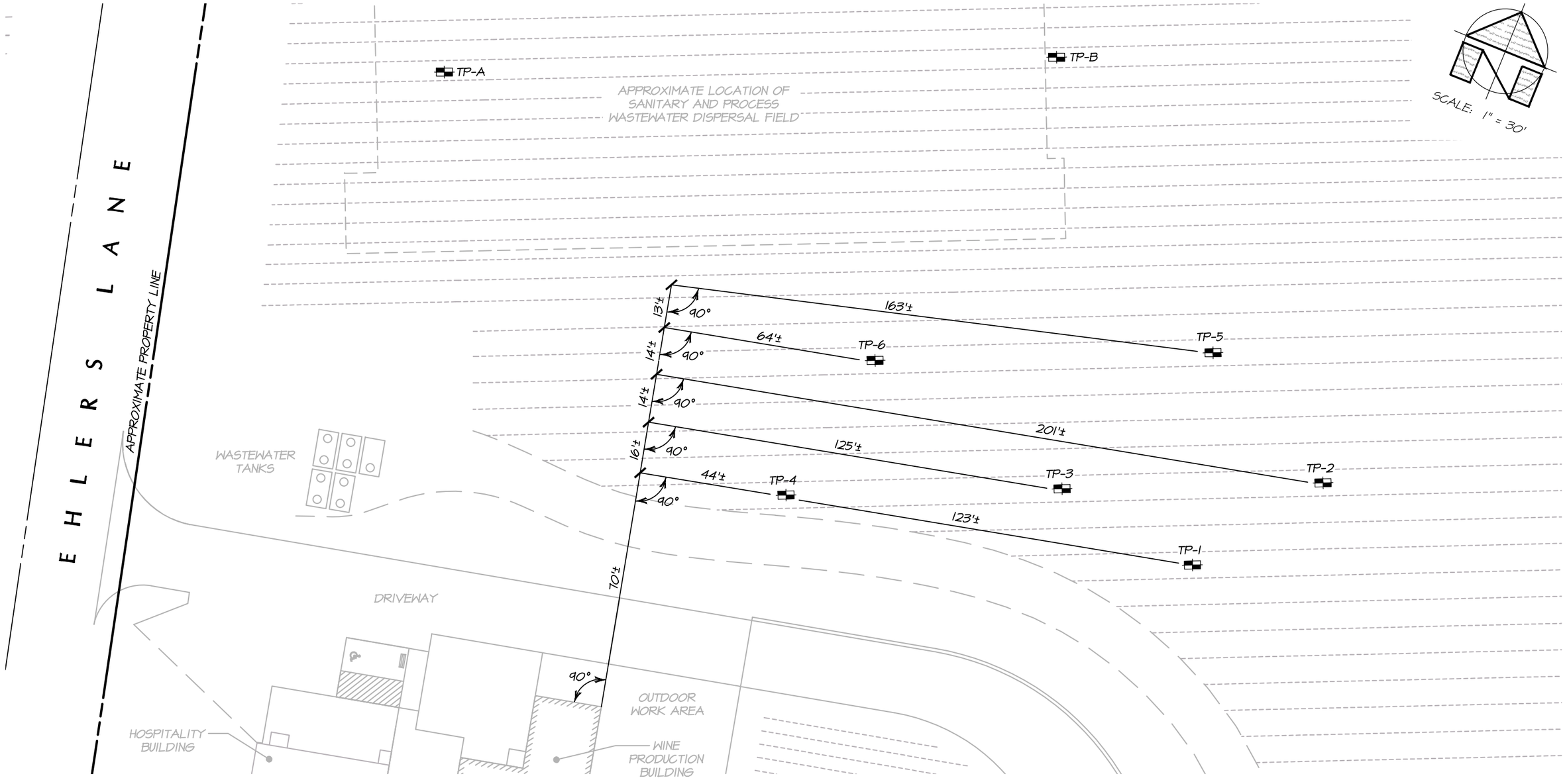
NO SCALE

BARTELT ENGINEERING
CIVIL ENGINEERING · LAND PLANNING
1303 Jefferson Street, 200 B, Napa, CA 94559
www.barteltengineering.com
· Telephone: 707-258-1301 ·

OVERALL SITE PLAN
TEST PIT EXHIBIT

SCALE: 1" = 150'

Ehlers Estate Winery
3200 Ehlers Lane
St. Helena, CA 94574
APN 022-100-029
Job No. 02-54
August 2019
Sheet 1 of 2



TEST PIT LOCATION MAP

SCALE: 1" = 30'

BARTELT ENGINEERING
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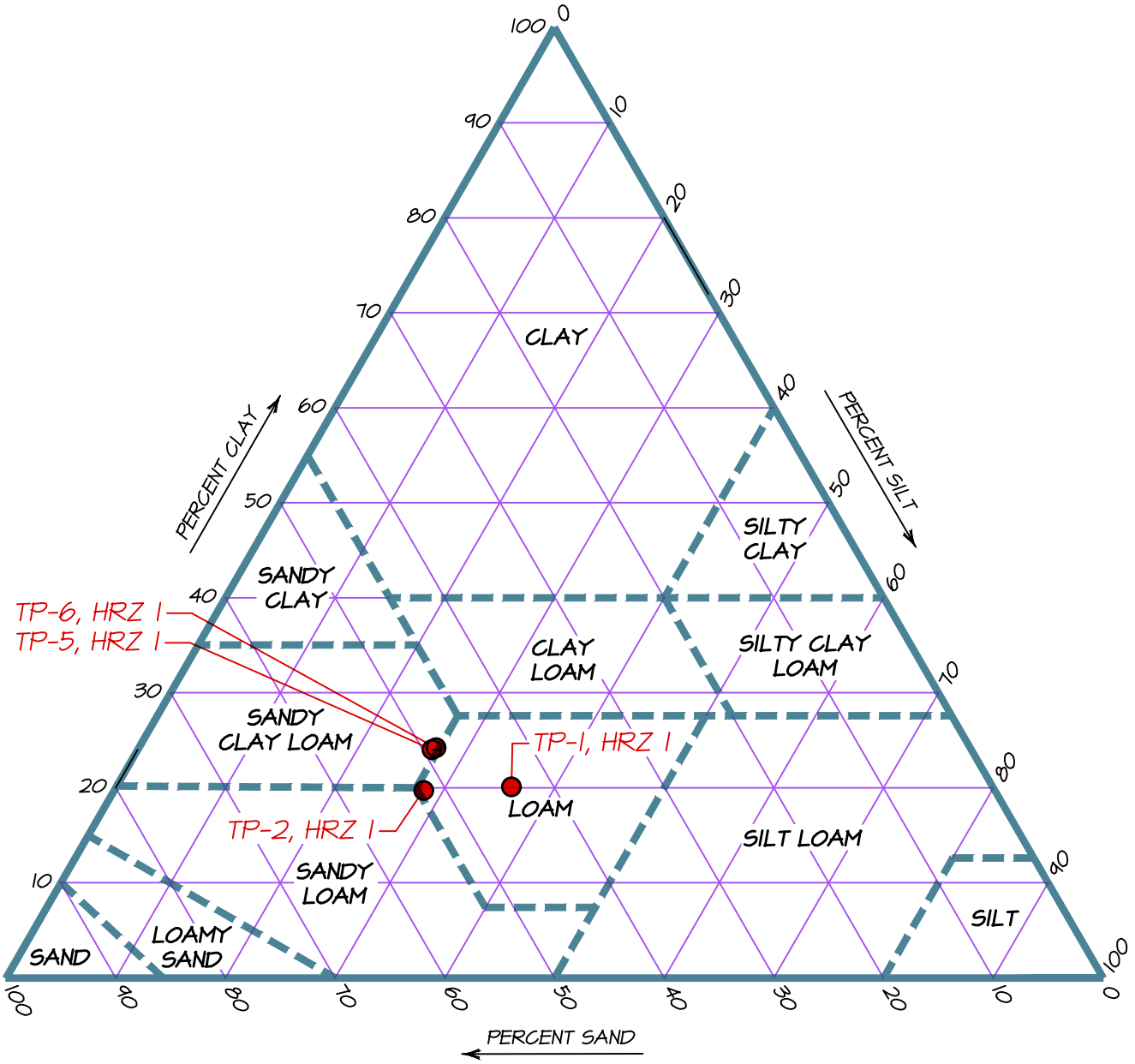
1303 Jefferson Street, 200 B, Napa, CA 94559
www.barteltengineering.com
· Telephone: 707-258-1301 ·

TEST PIT EXPLORATION NOTES:

1. ⊏ REPRESENTS TEST PIT LOCATION.
2. TEST PITS TP-A AND TP-B WERE EXCAVATED BY DAN CUNNINGHAM ON APRIL 26, 2002 AND WITNESSED BY A REPRESENTATIVE FROM BARTELT ENGINEERING AND NAPA COUNTY ENVIRONMENTAL HEALTH DIVISION.
3. TEST PITS TP-1 THRU TP-6 WERE EXCAVATED BY BRANDON SAKAI EXCAVATING ON AUGUST 15, 2019 AND WITNESSED BY A REPRESENTATIVE FROM BARTELT ENGINEERING AND NAPA COUNTY ENVIRONMENTAL HEALTH DIVISION.

Ehlers Estate Winery
3200 Ehlers Estate Lane
St. Helena, CA 94574
APN 022-100-029
Job No. 02-54
August 2019
Sheet 2 of 2

SOIL TEXTURE ANALYSIS CHART
BY BOUYOUCOS HYDROMETER METHOD



INSTRUCTIONS:

1. PLOT TEXTURE ON TRIANGLE BASED ON PERCENT SAND, SILT AND CLAY AS DETERMINED BY HYDROMETER ANALYSIS.
2. ADJUST FOR COARSE FRAGMENTS BY MOVING THE PLOTTED POINT IN THE SAND DIRECTION AN ADDITIONAL 2% FOR EACH 10% (BY VOLUME) OF FRAGMENTS GREATER THAN 2mm IN DIAMETER.
3. ADJUST FOR COMPACTNESS OF SOIL BY MOVING THE PLOTTED POINT IN THE CLAY DIRECTION AN ADDITIONAL 15% FOR SOILS HAVING A BULK-DENSITY GREATER THAN 1.7gm/cc.

NOTE:

FOR SOILS FALLING IN SAND, LOAMY SAND OR SANDY LOAM CLASSIFICATION, A BULK DENSITY ANALYSIS WILL GENERALLY NOT AFFECT SUITABILITY AND ANALYSIS IS NOT NECESSARY.

BARTELT ENGINEERING
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· Telephone: 707-258-1301 ·

Ehlers Estate Winery
3200 Ehlers Lane
ST. Helena, CA 94574
APN 022-100-029
Job No. 02-54 August 2019

Experience is the difference

August 26, 2019

Project:	**Ehlers Estate**	**Sampled: 8/15/2019**
Project #:	**9147.82**	**Received: 8/19/2019**
Client Project #:	**02-54**	**Reported: 8/26/2019**

Bartelt Engineering
1303 Jefferson Street, Ste. 200B
Napa, CA 94559

Subject: Laboratory Test Results
Soil Texture Analysis by
Bouyoucos Hydrometry Method

Dear Mr. Bartelt:

This letter transmits the results of our laboratory testing performed for the subject project. We performed a Soil Texture Analysis by the Bouyoucos Hydrometery Method with the following results:

Size/Density	TP-1 Horizon 1
+ #10 Sieve	**7.4 %**
Sand	**42.4 %**
Clay	**20.0 %**
Silt	**37.6 %**
Db g/cc	**--**

We trust this provides the information required at this time. Should you have further questions, please call.

Regards,

RGH GEOTECHNICAL

Sean Flinn
Quality Control Manager

Experience is the difference

August 26, 2019

Project:	**Ehlers Estate**	**Sampled: 8/15/2019**
Project #:	**9147.82**	**Received: 8/19/2019**
Client Project #:	**02-54**	**Reported: 8/26/2019**

Bartelt Engineering
1303 Jefferson Street, Ste. 200B
Napa, CA 94559

Subject: Laboratory Test Results
Soil Texture Analysis by
Bouyoucos Hydrometry Method

Dear Mr. Bartelt:

This letter transmits the results of our laboratory testing performed for the subject project. We performed a Soil Texture Analysis by the Bouyoucos Hydrometery Method with the following results:

Size/Density	TP-2 Horizon 1
+ #10 Sieve	**2.2 %**
Sand	**51.4 %**
Clay	**20.0 %**
Silt	**28.6 %**
Db g/cc	**--**

We trust this provides the information required at this time. Should you have further questions, please call.

Regards,

RGH GEOTECHNICAL

Sean Flinn
Quality Control Manager

Experience is the difference

August 26, 2019

Project:	**Ehlers Estate**	**Sampled: 8/15/2019**
Project #:	**9147.82**	**Received: 8/19/2019**
Client Project #:	**02-54**	**Reported: 8/26/2019**

Bartelt Engineering
1303 Jefferson Street, Ste. 200B
Napa, CA 94559

Subject: Laboratory Test Results
Soil Texture Analysis by
Bouyoucos Hydrometry Method

Dear Mr. Bartelt:

This letter transmits the results of our laboratory testing performed for the subject project. We performed a Soil Texture Analysis by the Bouyoucos Hydrometery Method with the following results:

Size/Density	TP-5 Horizon 1
+ #10 Sieve	3.6 %
Sand	48.4 %
Clay	24.0 %
Silt	27.6 %
Db g/cc	--

We trust this provides the information required at this time. Should you have further questions, please call.

Regards,

RGH GEOTECHNICAL

Sean Flinn
Quality Control Manager

RGH CONSULTANTS

Experience is the difference

August 26, 2019

Project:	**Ehlers Estate**	**Sampled: 8/15/2019**
Project #:	**9147.82**	**Received: 8/19/2019**
Client Project #:	**02-54**	**Reported: 8/26/2019**

Bartelt Engineering
1303 Jefferson Street, Ste. 200B
Napa, CA 94559

Subject: Laboratory Test Results
Soil Texture Analysis by
Bouyoucos Hydrometry Method

Dear Mr. Bartelt:

This letter transmits the results of our laboratory testing performed for the subject project. We performed a Soil Texture Analysis by the Bouyoucos Hydrometery Method with the following results:

Size/Density	TP-6 Horizon 1
+ #10 Sieve	5.7 %
Sand	47.4 %
Clay	24.0 %
Silt	28.6 %
Db g/cc	--

We trust this provides the information required at this time. Should you have further questions, please call.

Regards,

RGH GEOTECHNICAL

Sean Flinn
Quality Control Manager

RGH CONSULTANTS
Experience is the difference

Santa Rosa Office
1305 North Dutton Ave.
Santa Rosa, CA 95401
P: 707-544-1072
F: 707-544-1082

Napa Office
1041 Jefferson St.
Napa, CA 94559
P: 707-252-8105
F: 707-544-1082

Middletown Office
P.O. Box 652
Middletown, CA 95461
P: 707-987-4602
F: 707-987-4603

Bouyoucos Hydrometer

Client:	**Bartelt Engineering**	**Sampled:**	**8/15/2019**
Project:	**Ehlers Estate**	**Received:**	**8/19/2019**
Project #:	**9147.82**	**Reported:**	**8/26/2019**
Client Project #:	**02-54**		

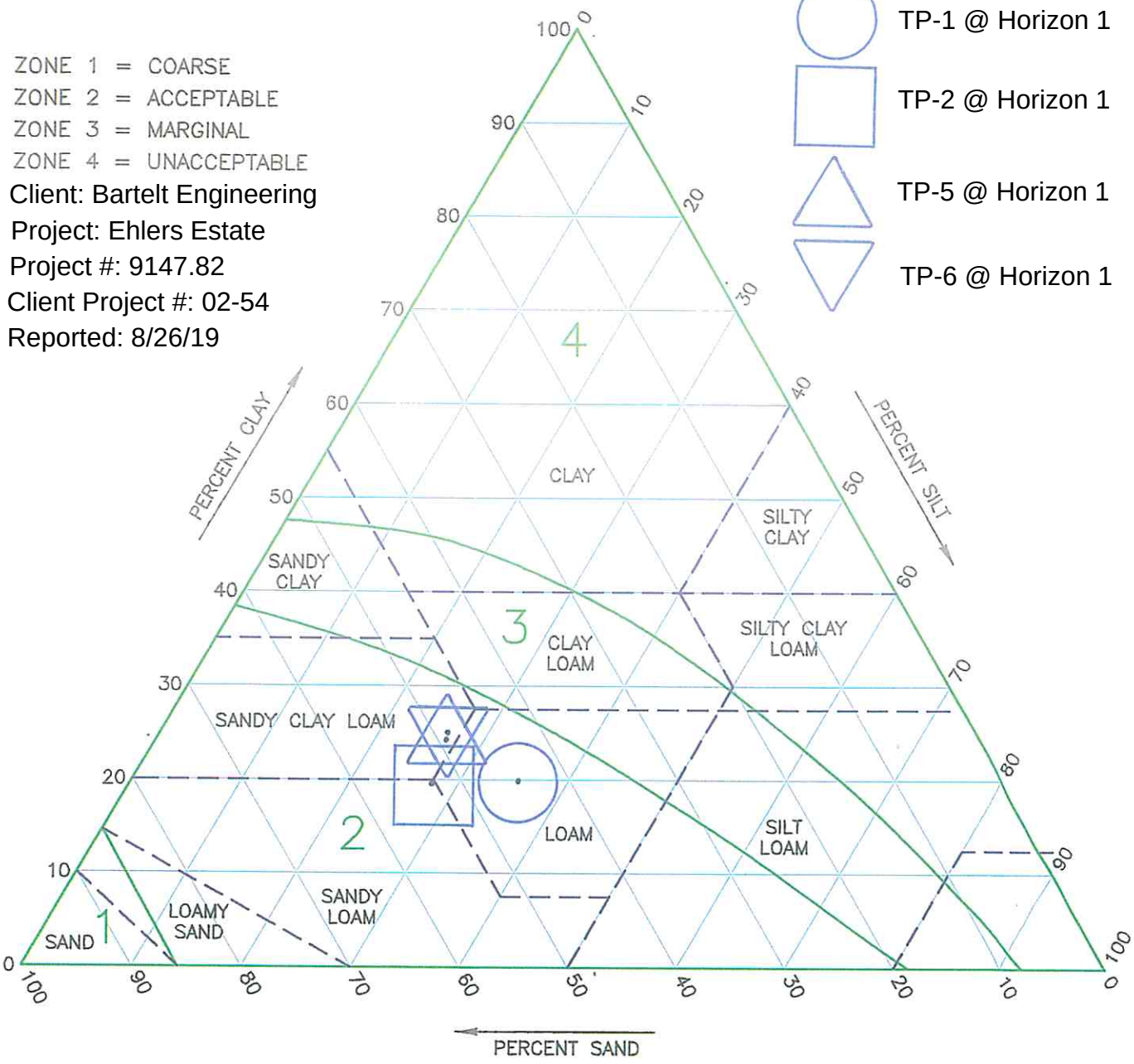
Sample Number	**TP-1**	**TP-2**	**TP-5**	**TP-6**				
Depth	**Horizon 1**	**Horizon 1**	**Horizon 1**	**Horizon 1**				
A. Oven Dry Wt.	50.0	50.0	50.0	50.0				
B. Starting Time (hr:min)	14:45	14:43	14:41	14:39				
C. Temp. @ 40 sec. (F)	71.5	71.5	71.5	71.5				
D. Hydro Reading @ 40 sec.	34.0	29.5	31.0	31.5				
E. Comp. Correction	-5.2	-5.2	-5.2	-5.2				
F. True Density @ 40 sec. (D-E)	28.8	24.3	25.8	26.3				
G. Temp. @ 2 hrs. (F)	72.5	72.5	72.5	72.5				
H. Hydro Reading @ 2 hrs.	15.0	15.0	17.0	17.0				
I. Comp. Correction	-5.0	-5.0	-5.0	-5.0				
J. True Density @ 2 hrs. (H-I)	10.0	10.0	12.0	12.0				
K. % Sand=100-((F/A) x 100)	**42.4**	**51.4**	**48.4**	**47.4**				
L. % Clay= ((J/A) x 100)	**20.0**	**20.0**	**24.0**	**24.0**				
M. % Silt= 100-(K+L)	**37.6**	**28.6**	**27.6**	**28.6**				
N. % Retained #10=	**7.4**	**2.2**	**3.6**	**5.7**				
Dry Wt. Before Wash + Tare	921.0	1191.8	895.9	933.2				
Dry Wt. After Wash + Tare	445.5	425.8	424.1	436.8				
Dry Wt. Passing #10	475.5	766.0	471.8	496.4				
Tare Weight	407.7	408.5	406.3	406.8				
Dry Wt. Before Wash	513.3	783.3	489.6	526.4				
% Passing #10	92.6	97.8	96.4	94.3				
% #10	7.4	2.2	3.6	5.7				

SOIL PERCOLATION SUITABILITY CHART

ZONE 1 = COARSE
ZONE 2 = ACCEPTABLE
ZONE 3 = MARGINAL
ZONE 4 = UNACCEPTABLE

Client: Bartelt Engineering
Project: Ehlers Estate
Project #: 9147.82
Client Project #: 02-54
Reported: 8/26/19

TP-1 @ Horizon 1
TP-2 @ Horizon 1
TP-5 @ Horizon 1
TP-6 @ Horizon 1



Instructions:

1. Plot texture on triangle based on percent sand, silt, and clay as determined by hydrometer analysis.
2. Adjust for coarse fragments by moving the plotted point in the sand direction an additional 2% for each 10% (by volume) of fragments greater than 2mm in diameter.
3. Adjust for compactness of soil by moving the plotted point in the clay direction an additional 15% for soils having a bulk-density greater than 1.7 gm/cc.

Note:

For soils falling in sand, loamy sand or sandy loam classification bulk density analysis will generally not affect suitability and analysis not neccesary.

02-14025

NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
REQUEST FOR SITE EVALUATION INSPECTION

ENVIRONMENTAL HEALTH DEPT. USE ONLY

FEE: #348.00
DATE: 4/24/02
RECEIPT:
BY: DLP
OE #1223

PARCEL NUMBER: 22-100-24
JOB ADDRESS: Ehlers Ln., St. Helena
OWNER: Ehlers Grove Winery
TEST CONDUCTED BY: D. Cunningham

TYPE OF TEST: **FIELD ANALYSIS** ____
To be run on 4/26 at ____ am/pm
Napa - 2:00

PERCOLATION TEST ____
To be run on ____ from ____ am/pm to ____ pm

PURPOSE OF TEST: **HOUSE:** X **WINERY:** ____ **OTHER:** ____

PROJECTED WASTEWATER FLOWS: 300 **gpd**

****

PERCOLATION TEST INSPECTION RESULTS

Pre-soak checked? yes ___ no ___ Length of pre-soak: ____

Checked by: ____ Date: ____

Rate at time of inspection: ____ Stabilized perc rate: ____

Gravel and Pipe Used? yes ___ no ___ If so, take the perc rate ____ x .6 = ____ in/hr

****

TYPE OF SYSTEM APPROVED

STANDARD SYSTEM

Acceptable soil to: 48" / Assigned perc range: (1-3) / 3-6 / 6-12

Depth of trenches: ____ / Rock under pipe: ____ / Cover over rock: ____

Lineal feet of leachline required: ____ / Plot plan received: ____

Slope: 0-5% / Surface drainage problems: ____

Additional information: If remodel - OK for standard system. If new construction (Replace or new dwelling) - engineered system Req.

SPECIAL DESIGN SYSTEM DUE TO THE FOLLOWING - ~~Size constraints~~: Maintain 100' setback to well.

Perc rate too slow: ____ /Perc rate too fast: ____ /Steep slope: ____

Insufficient soil depth: ____ /High seasonal groundwater: ____

Acceptable soil for special design: ____ /Other problems: ____

E.H. Specialist [signature] Date 4/26/02

FIELD ANALYSIS

TEXTURE (In the proposed trench zone)

CLAY CONTENT

Core Hole	1	2	3	4	5	6
Low (<12)						
Mod (12-27)						
High (27-40)	X	X	X			
High (>40)						

SAND CONTENT

Core Hole	1	2	3	4	5	6
High (>50)	X	X	X			
Mod (20-50)						
Low (<20)						

GRAVEL, COBBLE, STONE CONTENT

Core Hole	1	2	3	4	5	6
Very High (>60)						
High(35-60)	X	X	X			
Mod (15-35)						
Low (<15)						

* *

STRUCTURE

SOIL DENSITY WHEN PICKED **(Circle whether wet or dry)**

Core Hole	1	2	3	4	5	6
pick sluffs or caves soil in						
pick bites and soil sluffs						
pick bites/ little or no soil sluffs	X	X	X			

CONSISTENCE **(Circle w or d)**

Core Hole	1	2	3	4	5	6
Easy						
Moderate	X	X	X			
Hard						

STRUCTURE

Core Hole	1	2	3	4	5	6
Granular						
Blocky	X	X	X			
Prism						
Platy						
Massive						
Cemented						

MODIFIER CHARACTERISTICS

1) Soil Survey Name: ______

2) Horizon Boundaries: Diffuse ____ Gradual X Abrupt X

3) Topography: Concave ______ Convex ______ / Aspect: ______

4) Vegetation: Type Future Vineyard Condition: ______

* *

CORE HOLE RECORD

HOLE #1 — EST. PERC

0 to 24" — 1-3
Rocky SCL / CL
24 to 48 — 1-3
Rocky CL
48 to gray sandstone rock — <1"
Roots:
Color: **bright / dull** (circled: /)
Water Table:
Dug: **easy / hard / dusty / smear** (circled: hard)
Acceptable Soil To: 48"

HOLE #2 — EST. PERC

___ to same
___ to as
___ to #1
Roots:
Color: **bright / dull**
Water Table:
Dug: **easy / hard / dusty / smear**
Acceptable Soil To: ______

Reserve AREA

HOLE #3 — EST. PERC

0 to 24" — 1-3
SCL / CL
24 to 54 — 1-3
CL
54 to gray Sandstone Rock — <1"
Roots:
Color: **bright / dull** (circled: /)
Water Table:
Dug: **easy / hard / dusty / smear** (circled: hard)
Acceptable Soil To: 54"

CORE HOLE RECORD

HOLE #4 — EST. PERC

0 to ______
___ to ______
___ to ______
Roots:
Color: **bright / dull**
Water Table:
Dug: **easy / hard / dusty / smear**
Acceptable Soil To: ______

HOLE #5 — EST. PERC

___ to ______
___ to ______
___ to ______
Roots:
Color: **bright / dull**
Water Table:
Dug: **easy / hard / dusty / smear**
Acceptable Soil To: ______

HOLE #6 — EST. PERC

___ to ______
___ to ______
___ to ______
Roots:
Color: **bright / dull**
Water Table:
Dug: **easy / hard / dusty / smear**
Acceptable Soil To: ______

CORE HOLE

NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
REQUEST FOR SITE EVALUATION INSPECTION

ENVIRONMENTAL HEALTH DEPT. USE ONLY

FEE: ~~0~~

DATE: 10-5-01

RECEIPT: Refund # 92-137270

BY: RT

PARCEL NUMBER: 22-100-24

JOB ADDRESS: EHLERS LANE

OWNER: " GROVE

TEST CONDUCTED BY: DON CUNNINGHAM

CELL: 481-5958

TYPE OF TEST: FIELD ANALYSIS X

To be run on 10-8-01 Mon at 10 AM am/pm

PERCOLATION TEST _____

To be run on _____ from _____ am/pm to _____ pm

PURPOSE OF TEST: **HOUSE:** _____ **WINERY:** X **OTHER:** _____

PROJECTED WASTEWATER FLOWS: _____ **gpd**

****

PERCOLATION TEST INSPECTION RESULTS

Pre-soak checked? yes ___ no ___ Length of pre-soak: _____

Checked by: _____ Date: _____

Rate at time of inspection: _____ Stabilized perc rate: _____

Gravel and Pipe Used? yes ___ no ___ If so, take the perc rate _____ x .6 = _____ in/hr

****

TYPE OF SYSTEM APPROVED

STANDARD SYSTEM

Acceptable soil to: 72" / Assigned perc range: 1-3 / (3-6) / 6-12

Depth of trenches: 30" - 36" / Rock under pipe: 12" / Cover over rock: 12" - 18"

Lineal feet of leachline required: _____ / Plot plan received: NEED

Slope: +/- 5% / Surface drainage problems: _____

Additional information: SYSTEM GOING IN VINEYARD. SLIGHT SLOPE. AREAS WITH LESS THAN 18" COVER SHOULD BE HAND FARMED. MAINTAIN 100' WELL SET-BACK.

SPECIAL DESIGN SYSTEM DUE TO THE FOLLOWING - Size constraints: _____

Perc rate too slow: _____ /Perc rate too fast: _____ /Steep slope: _____

Insufficient soil depth: _____ /High seasonal groundwater: _____

Acceptable soil for special design: _____ /Other problems: _____

E.H. Specialist _____ Date 10/9/01

FIELD ANALYSIS

TEXTURE (In the proposed trench zone)

CLAY CONTENT

Core Hole	1	2	3	4	5	6
Low (<12)						
Mod (12-27)	X	X				
High (27-40)						
High (>40)						

SAND CONTENT

Core Hole	1	2	3	4	5	6
High (>50)	X	X				
Mod (20-50)						
Low (<20)						

GRAVEL, COBBLE, STONE CONTENT

Core Hole	1	2	3	4	5	6
Very High (>60)						
High(35-60)						
Mod (15-35)	X (48")	X (56")				
Low (<15)	X	X				

* *

STRUCTURE

SOIL DENSITY WHEN PICKED (Circle whether wet or dry) — dry circled

Core Hole	1	2	3	4	5	6
pick sluffs or caves soil in						
pick bites and soil sluffs	X	X				
pick bites/ little or no soil sluffs						

CONSISTENCE (Circle w or d) — d circled

Core Hole	1	2	3	4	5	6
Easy						
Moderate	X	X				
Hard						

STRUCTURE

Core Hole	1	2	3	4	5	6
Granular						
Blocky	X	X				
Prism						
Platy						
Massive						
Cemented						

MODIFIER CHARACTERISTICS

1) Soil Survey Name: SANDY CLAY LOAM

2) Horizon Boundaries: Diffuse X Gradual ___ Abrupt ___

3) Topography: Concave ___ Convex ___ / Aspect: ___ SLIGHT SLOPE W TO E, HIGH TO LOW

4) Vegetation: Type VINEYARD Condition: REMOVED

* *

CORE HOLE RECORD

HOLE #1

		EST. PERC
0 to 48"	SANDY CLAY LOAM	3"-6"
48" to 72"	COBBLY SANDY CLAY LOAM	3"-6"
___ to		

Roots: 56"
Color: **bright** (circled) / dull
Water Table: N/A
Dug: **easy** (circled) / hard / dusty / smear
Acceptable Soil To: 72"

HOLE #2

		EST. PERC
0 to 56"	SANDY CLAY LOAM	3"-6"
56" to 72"	COBBLY SANDY CLAY LOAM	3"-6"
___ to		

Roots: 56"
Color: **bright** (circled) / dull
Water Table: N/A
Dug: **easy** (circled) / hard / dusty / smear
Acceptable Soil To: 72"

HOLE #3

		EST. PERC
___ to		
___ to		
___ to		

Roots:
Color: bright / dull
Water Table:
Dug: easy / hard / dusty / smear
Acceptable Soil To:

CORE HOLE RECORD

HOLE #4

		EST. PERC
0 to		
___ to		
___ to		

Roots:
Color: bright / dull
Water Table:
Dug: easy / hard / dusty / smear
Acceptable Soil To:

HOLE #5

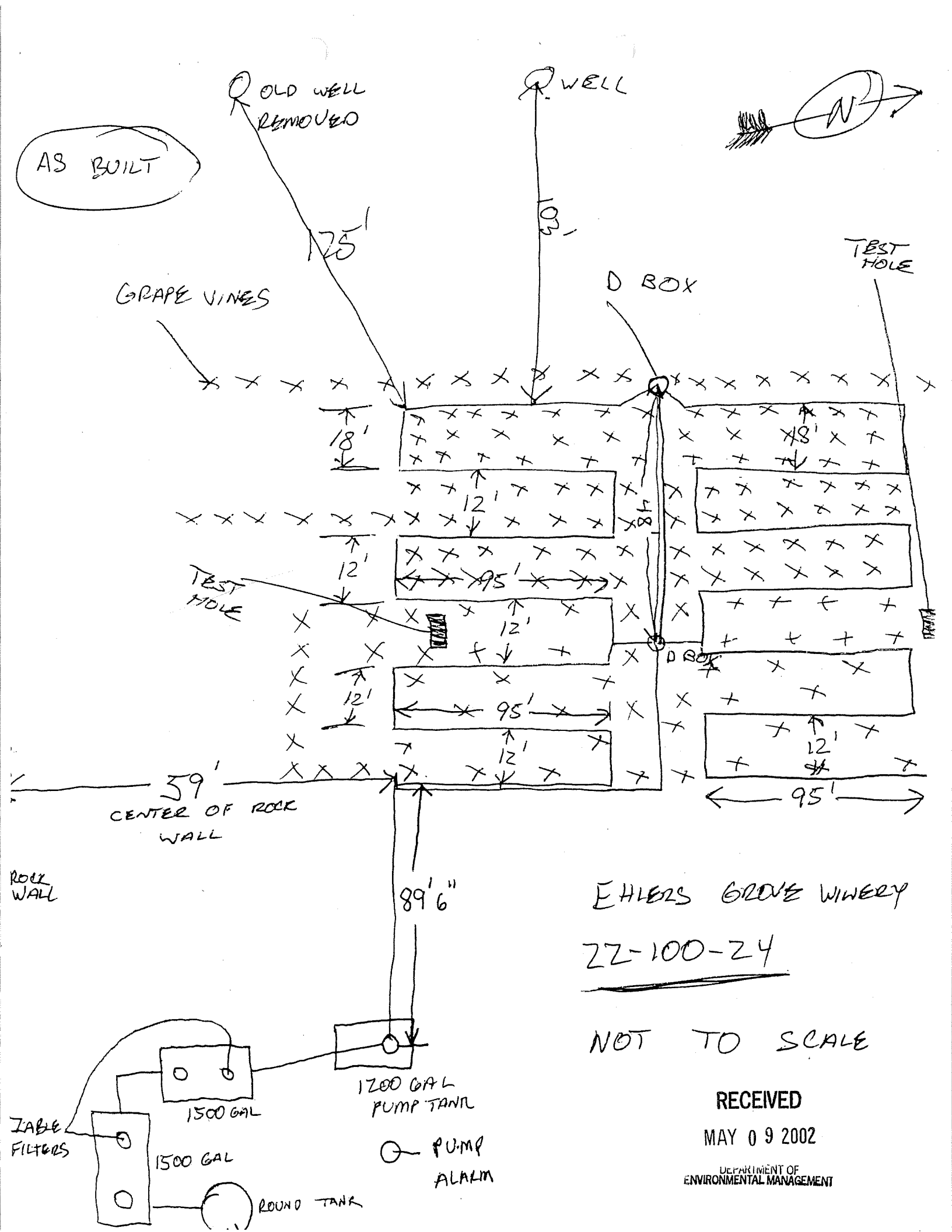
		EST. PERC
___ to		
___ to		
___ to		

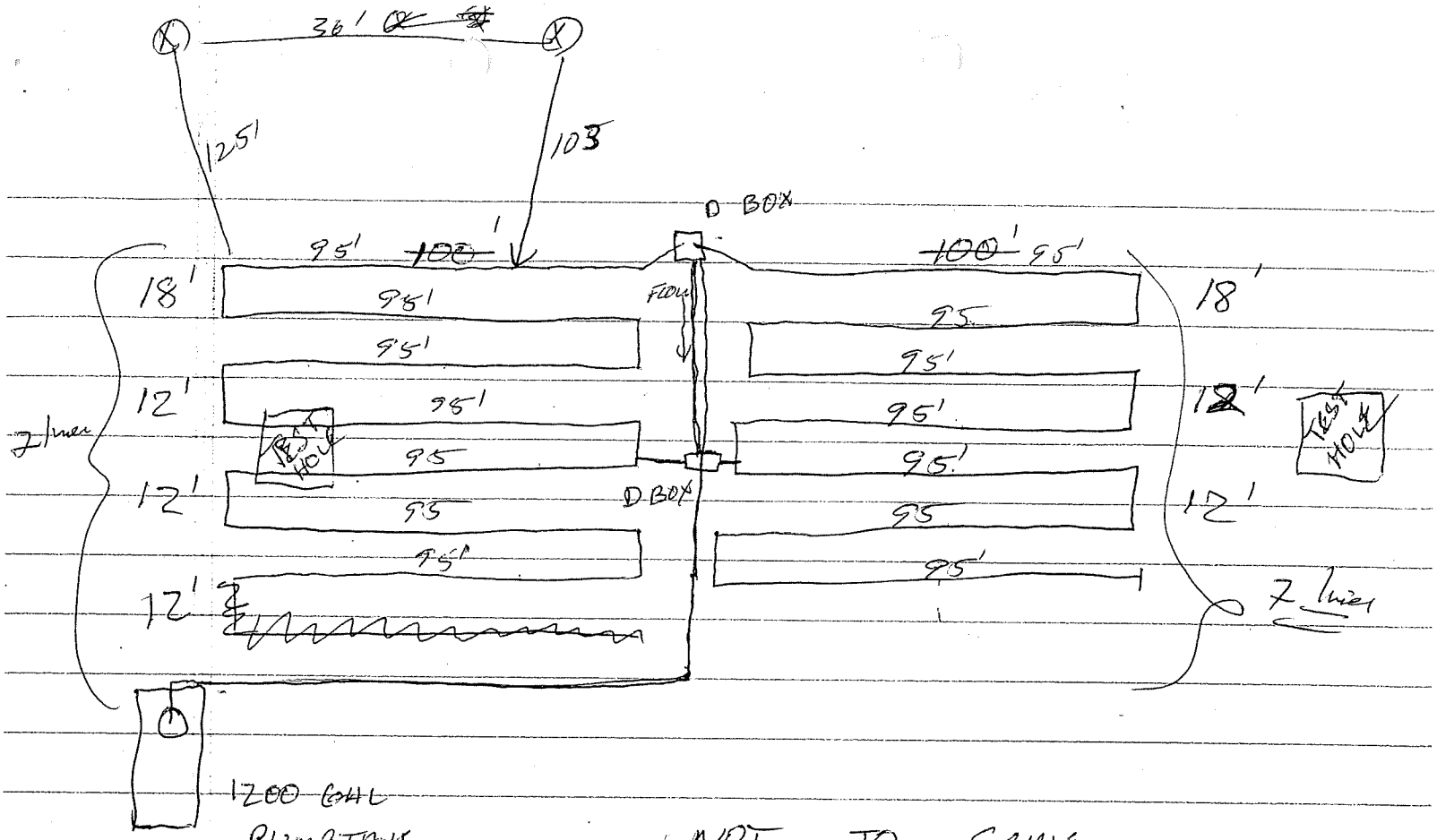
Roots:
Color: bright / dull
Water Table:
Dug: easy / hard / dusty / smear
Acceptable Soil To:

HOLE #6

		EST. PERC
___ to		
___ to		
___ to		

Roots:
Color: bright / dull
Water Table:
Dug: easy / hard / dusty / smear
Acceptable Soil To:

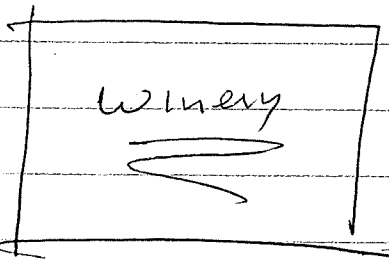




EHLERS GROVE WINERY

proposed - plot plan

A.P.N. 22-100-24



WINERY WASTEWATER TREATMENT SYSTEMS

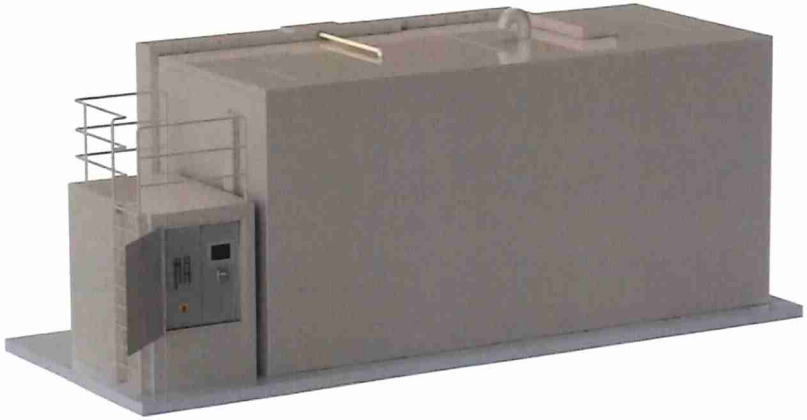
Lyve WASTEWATER TREATMENT

The Next Generation of LYVE SYSTEMS is Here.

Lyve Systems offers custom designed wastewater treatment systems for any size winery. Lyve Systems' flexibility and versatility allows each system to be uniquely designed to meet the winery's aesthetic and site needs and treatment requirements.

System 1: Fiberglass reinforced polymer Tank

Ideal for cold-weather and freezing climates



System 2: Concrete Tank

Ideal for installation in flood plains

SYSTEMS INCLUDE:

- Process Wastewater Screening
- Equalization
- pH Adjustment System
- Moving Bed Bio-Film Reactor (MBBR)
- Activated Sludge Aeration Basin
- Membrane Bio-Reactor (MBR)
- Aerobic Sludge Digester
- Disinfection (for sanitary wastewater applications)
- Lyve Control Center with Remote Operation

System 3: Underground Tank

Ideal for minimal visual impact

www.lyvesystems.com info@lyvesystems.com 707-931-5228

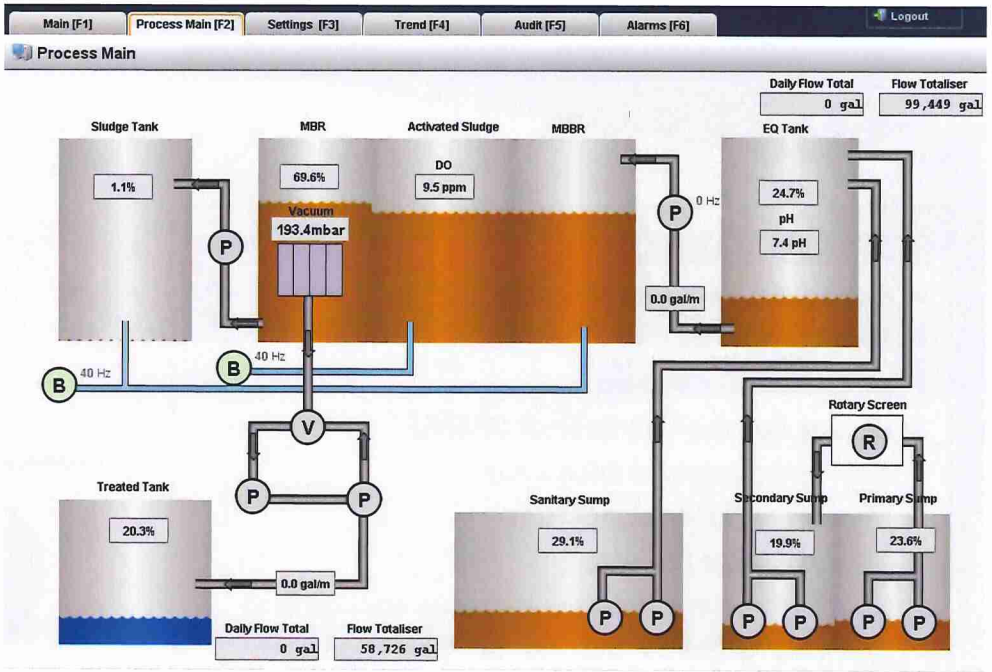
2014 Wine Industry Award for Wastewater Treatment

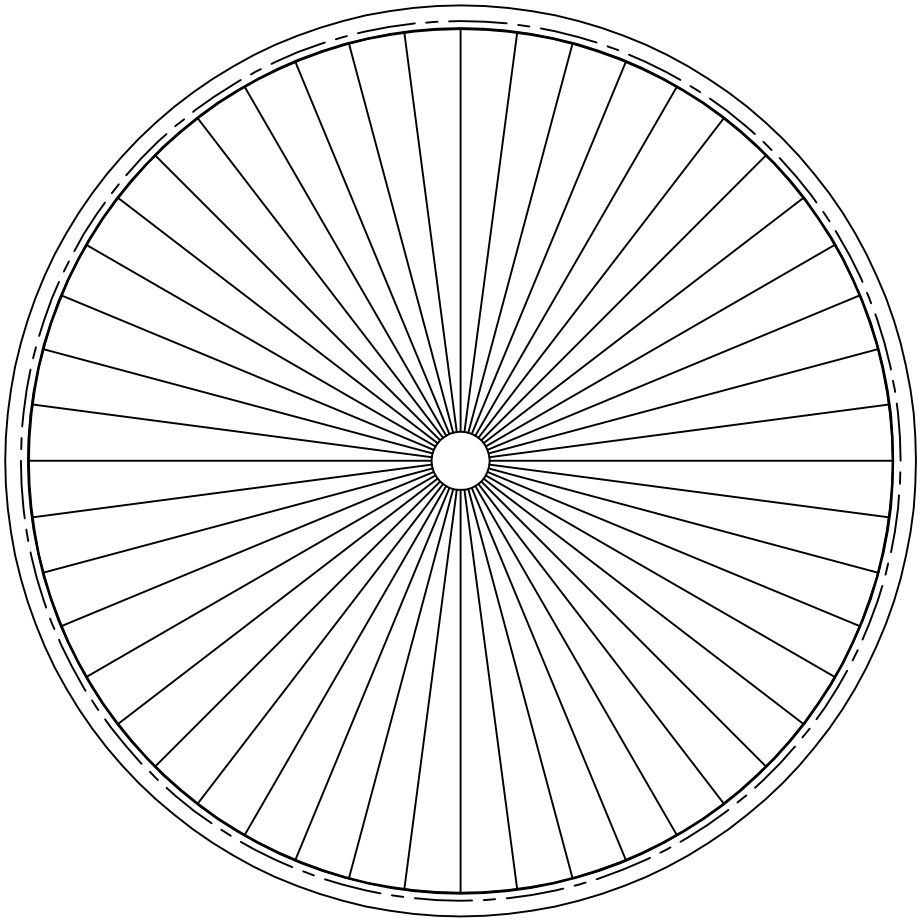
FEATURES and BENEFITS:

- High-Quality Effluent for Water Reuse and Land Applications
- Meets and Exceeds Governing Agency Effluent Regulations
- Treats Process Waste, Sanitary Waste or Combined Wastewater
- Small Footprint – Integrated Tank Design
- Low Life Cycle Costs
- Award Winning Technology
- Performance Guarantee
- Low O&M Costs
- Easy Clean Membrane Design
- Remote Monitoring and Operation Capabilities
- Energy Efficient
- Full Operations and Engineering Support Available
- Flexible and Aesthetically Pleasing Design Options
- Fiberglass Tank ideal for cold-weather and freezing climates
- Concrete Tank ideal for installation in flood plains
- Underground Tank ideal for minimal visual impact
- Optional Sludge Dewatering System for compost application

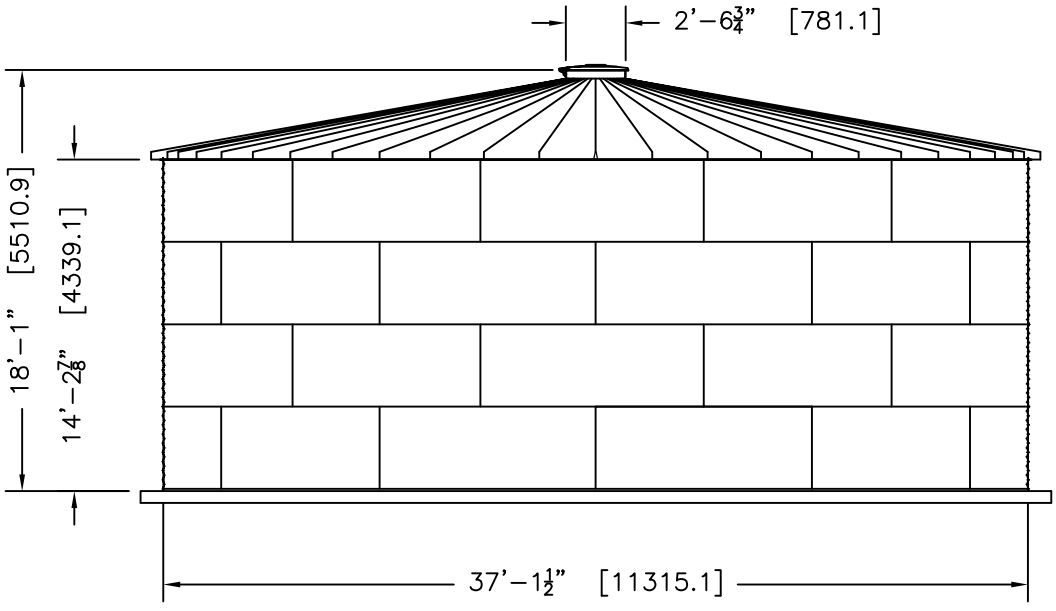
Each **LYVE SYSTEM** includes an internet based Lyve Control Center for monitoring and controls, equipped with a camera for real time viewing. Each system can be operated through a computer, smart phone, or facility command center. Control Center records and displays:

- Tank Liquid Levels
- DO Readings
- Influent pH Level
- Influent flow rate
- Flowmeter Readings & Totals
- Membrane Vacuum Readings
- Pump & Blower Speeds





PLAN



ELEVATION

STEEL CORE TANK, LLC.		BY	DATE	TITLE STEELCORE WATER TANK SCT-3704-LVR WTU12-04 30"PR 10DEG V-RIB NOMINAL CAPACITY - 112,003 GALLONS (US)	
WWW.STEELCORETANK.COM	DWN	XXX	XX/XX/XX		
(844) 225-0881	CKD				
	ENG			DWG. NO. SCT3704-LVR WTU12-04	REV. NO.
				SIZE: A / SCALE: 1/8"=1'-0" / SHEET 1 OF 1	

AdvanTex® AX100 Filter

Commercial Technical Data Sheet

Applications

Orenco's AdvanTex® Treatment System* is an innovative technology for onsite treatment of domestic-strength wastewater. The heart of the System is the AdvanTex Filter, a sturdy, watertight fiberglass basin filled with an engineered textile material. This lightweight, highly absorbent textile material treats a tremendous amount of wastewater in a small space. The AdvanTex Treatment System is ideal for:

- Small sites
- System upgrades and repairs
- New construction
- Poor soils
- Nitrogen reduction
- Price-sensitive markets
- Pretreatment

For sizing, see AdvanTex® Design Criteria (NDA-ATX-COMM-2).

** Covered by U.S. patent numbers 6,540,920; 6,372,135; 5,980,748; 5,531,894; 5,492,635; 5,480,561; 5,360,556; and 4,439,323. Additional patents pending.*

Features/Unique Specifications

To specify this product, require the following:

- Wastewater treatment to better than "Secondary" Treatment Standards
- Consistent treatment, even during peak flows
- Timer operation for flow monitoring, flow modulation, and surge control
- Fixed film textile media (a polyester plastic), operated in an unsaturated condition
- Consistent media quality
- Low maintenance requirements
- Low energy consumption
- Complete premanufactured package, ready to install
- Watertight construction, corrosion-proof materials, lid bolts
- Quiet operation

Standard Models

AX100

Physical Specifications

Approximate Dimensions**

Filter Basin	Length	191 in.
	Width	94.5 in.
	Height	42.5 in.
	Area (footprint)	128 sq ft
Filter	Dry Weight	1,650 lb

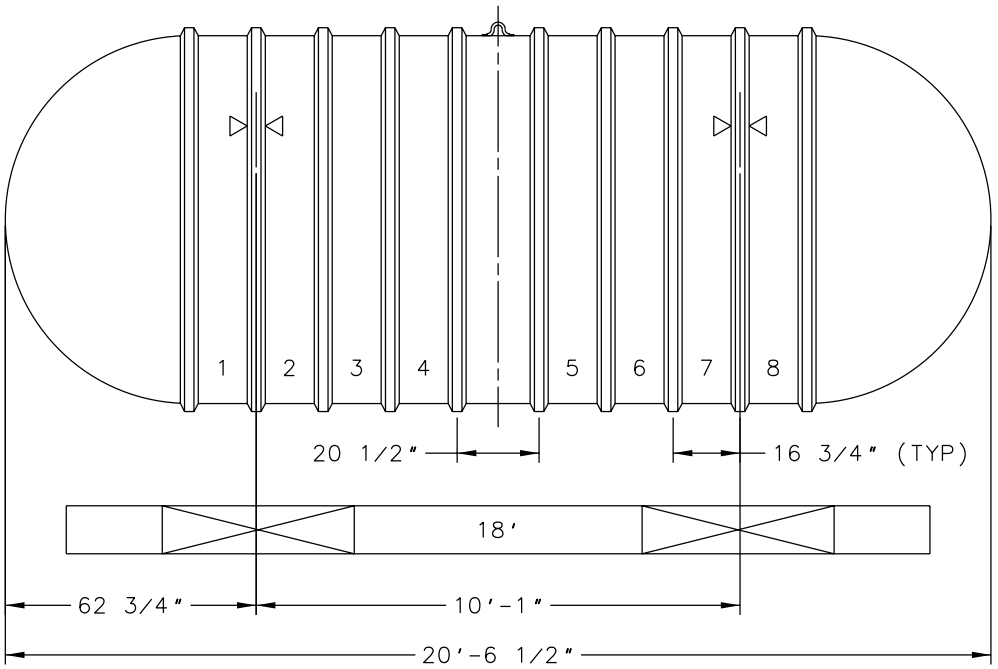
*** See AdvanTex Treatment System drawings for exact dimensions.*

Orenco Systems®
Incorporated

Changing the Way the World Does Wastewater®

www.orenco.com

ATD-ATX-AX-3
Rev. 1.1, 12/04



Optional prefabricated engineered concrete deadmen shown

XERXES®
a ZCL company

TITLE
8' DIA. SINGLE-WALL
CAP. 6,000 GALLONS

DATE 1-12

DR. NO. S10-873.03