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Wastewater Disposal Feasibility Study



October 28, 2016

Job No. 15-110

Kim Withrow, REHS
Environmental Health Division
Napa County Planning, Building & Environmental Services Department
1195 Third Street, Suite 210
Napa, CA 94559

Re: Sleeping Lady Vineyard Winery
Onsite Wastewater Disposal Feasibility Study Supplemental Information
5537 Solano Avenue, Napa, CA 94558 APN 034-170-005 (P15-00423)

Dear Ms. Withrow:

The Onsite Wastewater Disposal Feasibility Study for the Sleeping Lady Vineyard Winery prepared by this office, dated September 7, 2015 was submitted with the original Use Permit application package. That report outlined viable options for Phase 1 (up to 10,000 gallons of annual wine production) and Phase 2 (up to 30,000 gallons of annual wine production) including:

Phase 1: Winery Sanitary and Process Wastewater Disposal Via
Subsurface Drip Dispersal Field

Phase 2: Winery Sanitary Wastewater Disposal Via Subsurface Drip Dispersal Field
and Winery Process Wastewater Disposal Via Treatment and Irrigation

The purpose of this letter is to present a second option for Phase 1 of winery operations while production is at or below 10,000 gallons of annual wine production as outlined below:

Option #1 for Phase I:

Winery Sanitary Wastewater Disposal Via Subsurface Drip Dispersal Field and Winery Process Wastewater Disposal Via Hold and Haul

In this scenario the sanitary wastewater would be disposed of in a subsurface drip type septic system as described in the original study for Phase 2 of winery operations and the winery process wastewater would be collected separately, temporarily stored and then would be hauled offsite for treatment and disposal by the Napa Sanitation District, East Bay Municipal Utility District or a similar municipal wastewater treatment plant.

It is intended that this option could be implemented for a limited duration while the winery is operating at or below 10,000 gallons of annual production and that the Phase 2 process waste treatment and irrigation system will be installed when Phase 2 building improvements are constructed and production increases beyond 10,000 gallons per year.

Required Sanitary Wastewater Disposal Field & Reserve Area

The winery sanitary wastewater disposal field and reserve area is the same as originally calculated for Phase 2 in the original study.

Winery Process Wastewater Disposal

The winery process wastewater hold and haul system must be designed to hold at least seven days of peak flow (7 days x 500 gallons per day = 3,500 gallons), have a water level alarm and be designed and constructed in accordance with the requirements for hold and haul systems as outlined in Napa County Code Section 13.52.035. The hold and haul tank will be located in the general vicinity of the proposed process waste treatment system tanks, just east of the winery site. At peak usage, a truck would visit the site approximately 1 to 2 times per week to haul away waste. Over an entire year it is expected that 20 tank pumping events would be required.

Winery Process Wastewater Disposal Reserve Area

Napa County Code requires that an onsite "reserve area" be designated for process wastewater hold and haul systems. The reserve area will be the treatment and irrigation system as presented for Phase 2 in the original study.

This analysis demonstrates that it is feasible to install a hold and haul system for Phase I of winery operations. If the hold and haul option is implemented, the holding tank should be designed to work as part of the Phase 2 treatment and irrigation system to accommodate the increased flows.

We hereby request that this option be included in the Use Permit review process and that the Applicant and Engineer be allowed to select the preferred option at the time of building permit submittal.

Please feel free to contact us at (707) 320-4968 if you have any questions.

Sincerely,

Applied Civil Engineering Incorporated

By:



Michael R. Muelrath RCE 67435
Principal

Copy:

Emily Hedge, Napa County PB&ES – Planning Division
Brion Wise, Sleeping Lady Vineyard
Donna Oldford, Plans 4 Wine

ONSITE WASTEWATER DISPOSAL FEASIBILITY STUDY

FOR THE

SLEEPING LADY VINEYARD WINERY

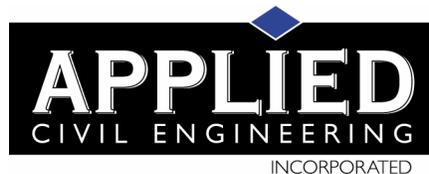
LOCATED AT:

5537 Solano Avenue
Napa, CA 94558
NAPA COUNTY APN 034-170-005

PREPARED FOR:

Sleeping Lady Vineyard LLC
Care of: Brion Wise
5537 Solano Avenue
Napa, CA 94558
Telephone: (303) 8883257

PREPARED BY:



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Job Number: 15-110



Michael R. Muelrath R.C.E. 67435

9/7/2015

Date

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INTRODUCTION

Sleeping Lady Vineyard LLC is applying for a Use Permit to construct and operate a new winery at their property located at 5537 Solano Avenue in Napa County, California. The subject property, known as Napa County Assessor's Parcel Number 034-170-005, is located along the west side of Solano Avenue proximately 0.6 miles south of the intersection of Hoffman Lane and Solano Avenue

The Use Permit application under consideration proposes the construction and operation of a new winery with the following characteristics:

- Wine Production:
 - Phase 1: 10,000 gallons of wine per year
 - Phase 2: 30,000 gallons of wine per year
 - Crushing, fermenting, aging and bottling

- Employees:
 - 4 employees

- Marketing Plan:
 - Daily Tours and Tastings by Appointment
 - 20 visitors per day maximum
 - Marketing Events
 - 10 per year
 - 30 guests maximum
 - Food prepared offsite by catering company
 - Release Events
 - 2 per year
 - 75 guests maximum
 - Food prepared offsite by catering company
 - Portable toilets brought in for guest use

As noted above wine production will be phased. Wine production will be limited to a maximum of 10,000 gallons per year for Phase 1. In Phase 2 when the new fermentation pad is constructed the maximum production level will be increased to 30,000 gallons per year.

Existing structures on the property include a single family residence, a second dwelling unit, vineyards as well as residential and agricultural accessory buildings that support the existing residential and agricultural uses on the property. All domestic wastewater from the main residence and second dwelling unit is collected into separate septic tanks and disposed of in two separate dispersal fields. Please see the Sleeping Lady Vineyard Winery Wastewater Disposal Feasibility Study Exhibit for approximate locations of existing and proposed wastewater features.

Sleeping Lady Vineyard LLC has requested that Applied Civil Engineering Incorporated (ACE) evaluate the feasibility of disposing of the winery process wastewater as well as the domestic sanitary wastewater that will be generated by the proposed winery via a new onsite wastewater disposal system. The remainder of this report describes the onsite soil conditions, the predicted winery process and sanitary wastewater flows and outlines the conceptual design of an onsite wastewater disposal system.

SOILS INFORMATION

The United States Department of Agriculture Soil Conservation Service Soils Map for Napa County shows the following soil type mapped on the property:

- Bale clay loam, 2 to 5 percent slopes
- Bressa-Dibble complex, 15 to 30 percent slopes
- Bressa-Dibble complex, 30 to 50 percent slopes
- Clear Lake clay, drained
- Cortina very stony loam, 0 to 5 percent slopes
- Felton gravelly loam, 30 to 50 percent slopes
- Haire loam, 2 to 9 percent slopes
- Lodo-Maymen-Felton association, 30 to 75 percent slopes

A site specific soils analysis was conducted during a site evaluation performed by ACE on July 9, 2015. The site evaluation consisted of the excavation and observation of nine test pits. Six pits were located in the vineyard just northeast of the residence and three test pits were located in the lawn just northwest of the residence. The test pits revealed variable depths of acceptable soil ranging from 24 inches to 40 inches with the upper horizon having a USDA soil texture classification of clay in Test Pits #1 - #6 and clay loam and sandy clay loam in Test Pits #7 - #9. The limiting conditions that were observed were the presence of seasonally elevated groundwater tables and decomposing rock.

Please refer to the Site Evaluation Report in Appendix 4 for additional details.

PREDICTED WASTEWATER FLOW

The onsite wastewater disposal system will be designed for the peak winery process wastewater flow and the peak sanitary wastewater flow from the proposed winery.

Winery Process Wastewater

We have used the generally accepted standard that six gallons of winery process wastewater are generated for each gallon of wine that is produced each year and that 1.5 gallons of wastewater are generated during the crush period for each gallon of wine that is produced. Based on the size of the winery and our understanding that both red and white wines will be produced we have assumed a 30 day crush period for Phase 1 and a 45 day crush period for Phase 2. Using these assumptions, the average and peak winery process wastewater flows are calculated as follows:

Phase 1: 10,000 gallons per year maximum production

$$\text{Annual Winery Process Wastewater Flow} = \frac{10,000 \text{ gallons wine}}{\text{year}} \times \frac{6 \text{ gallons wastewater}}{1 \text{ gallon wine}}$$

$$\text{Annual Winery Process Wastewater Flow} = 60,000 \text{ gallons per year}$$

$$\text{Average Daily Winery Process Wastewater Flow} = \frac{60,000 \text{ gallons}}{\text{year}} \times \frac{1 \text{ year}}{365 \text{ days}}$$

$$\text{Average Daily Winery Process Wastewater Flow} = 164 \text{ gallons per day (gpd)}$$

$$\text{Peak Winery Process Wastewater Flow} = \frac{10,000 \text{ gallons wine}}{\text{year}} \times \frac{1.5 \text{ gallons wastewater}}{1 \text{ gallon wine}} \times \frac{1 \text{ year}}{30 \text{ crush days}}$$

$$\text{Peak Winery Process Wastewater Flow} = 500 \text{ gpd}$$

Phase 2: 30,000 gallons per year maximum production

$$\text{Annual Winery Process Wastewater Flow} = \frac{30,000 \text{ gallons wine}}{\text{year}} \times \frac{6 \text{ gallons wastewater}}{1 \text{ gallon wine}}$$

$$\text{Annual Winery Process Wastewater Flow} = 180,000 \text{ gallons per year}$$

$$\text{Average Daily Winery Process Wastewater Flow} = \frac{180,000 \text{ gallons}}{\text{year}} \times \frac{1 \text{ year}}{365 \text{ days}}$$

$$\text{Average Daily Winery Process Wastewater Flow} = 493 \text{ gallons per day (gpd)}$$

$$\text{Peak Winery Process Wastewater Flow} = \frac{30,000 \text{ gallons wine}}{\text{year}} \times \frac{1.5 \text{ gallons wastewater}}{1 \text{ gallon wine}} \times \frac{1 \text{ year}}{45 \text{ crush days}}$$

$$\text{Peak Winery Process Wastewater Flow} = 1,000 \text{ gpd}$$

Winery Sanitary Wastewater

The peak sanitary wastewater flow from the winery is calculated based on the number of winery employees, the number of daily visitors for tours and tastings and the number of guests attending private marketing events. In accordance with Table 4 of Napa County's "Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems" we have used a design flow rate of 15 gallons per day per employee and 3 gallons per day per visitor for tours and tastings. Table 4 does not specifically address design wastewater flows for guests at marketing events. For marketing events that will have catered meals that are prepared offsite we have conservatively estimated 5 gallons of wastewater per guest. Based on these assumptions, the peak winery sanitary wastewater flows are calculated as follows:

Employees

Peak Sanitary Wastewater Flow = 4 employees X 15 gpd per employee

Peak Sanitary Wastewater Flow = 60 gpd

Daily Tours and Tastings

Peak Sanitary Wastewater Flow = 20 visitors per day X 3 gallons per visitor

Peak Sanitary Wastewater Flow = 60 gpd

Marketing Events with Catered Meals Prepared Offsite:

Peak Sanitary Wastewater Flow = 30 guests X 5 gallons per guest

Peak Sanitary Wastewater Flow = 150 gpd

Release and Wine Auction Events with Catered Meals Prepared Offsite:

Peak Sanitary Wastewater Flow = 100 guests X 5 gallons per guest

Peak Sanitary Wastewater Flow = 500 gpd

Total Peak Winery Sanitary Wastewater Flow

As previously noted, all events with more than 30 guests in attendance will utilize portable sanitary facilities to minimize the load on the septic system. Therefore, assuming that daily tours and tastings and a maximum of one marketing event may occur on the same day the total peak winery sanitary wastewater flow is based on employees, daily tours and tastings and a marketing event for 30 people and is calculated as follows:

Total Peak Winery Sanitary Wastewater Flow = 60 gpd + 60 gpd + 150 gpd

Total Peak Winery Sanitary Wastewater Flow = 270 gpd

RECOMMENDATIONS

Based on the proposed site configuration, onsite soil conditions, estimated wastewater flows and winery production level phasing we recommend a phased approach to wastewater disposal. In Phase 1 winery process wastewater generation will be relatively low and can be handled in a combined sanitary/process waste treatment and disposal system. In Phase 2, when winery process wastewater flows increase, we recommend implementation of a treatment and irrigation / land application system to handle the winery process waste. A summary of the proposed wastewater systems for both Phase 1 and Phase 2 is presented in the following sections of this report.

Phase I – Winery Sanitary and Process Wastewater Disposal Via Subsurface Drip Dispersal Field

In Phase I winery process wastewater generation will be at a level that is reasonable to treat and dispose of with the sanitary wastewater.

Required Disposal Field Area

The disposal field area is calculated based upon the design hydraulic loading rate for the soil conditions and the proposed design flow. In accordance with Table 9 of Napa County’s “Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems” we have used a hydraulic loading rate of 0.6 gpd per square foot based on the findings of clay loam and sandy clay loam soils in the planned disposal field area. Since the slope of the natural ground surface in the area of the proposed disposal field is less than 20% no adjustment is required for slope.

Since the proposed dispersal field is located immediately adjacent to the existing second dwelling unit dispersal field we recommend that the new dispersal area be enlarged slightly to accommodate the second dwelling unit. The total design flow then is 270 gpd for the winery domestic waste plus 500 gpd for winery process waste plus 240 gpd for the two bedroom second dwelling unit for a total of 1,010 gpd.

Based on these design parameters, the required disposal field area is calculated as follows:

$$\text{Required Disposal Field Area} = \frac{\text{Peak Flow}}{\text{Soil Application Rate}}$$

$$\text{Required Disposal Field Area} = \frac{1,010 \text{ gpd}}{0.6 \text{ gpd per square foot}}$$

Required Disposal Field Area = 1,683 square feet, use 1,700 square feet

Available Disposal Field Area

Based on the proposed site layout we have determined that there is enough area to install approximately 1,700 square feet of subsurface drip disposal field in the vicinity of Test Pits #7, #8 and #9. The conceptual layout of the disposal field is shown on the Sleeping Lady Vineyard Winery Wastewater Disposal Feasibility Study Exhibit in Appendix 2.

Required Reserve Area – Winery and Other Existing Uses

Napa County code requires that an area be set aside to accommodate a future onsite wastewater disposal system in the event that the primary system fails or the soil in the primary area is otherwise rendered unsuitable for wastewater disposal. For subsurface drip type septic systems the reserve area must be 200% of the size of the disposal field area. Since there is not a reserve area already designated for the septic system that serves the existing main residence the proposed reserve area must accommodate that system’s reserve area requirements as well. According to

the Napa County sewage permit, the existing residence has a total of five bedrooms. Reserve area for the winery process wastewater will be via pretreatment and irrigation as described in our recommendations for Phase 2 later in this report.

Therefore, the design flow for the reserve area is 510 gpd for the winery and second dwelling unit sanitary wastewater plus 600 gallons per day for the five bedroom residence for a total of 1,110 gpd. A soil hydraulic loading rate of 0.2 gpd per square foot was selected for the soil due to the clay soil texture. Based on these design parameters, the required reserve area is calculated as follows:

$$\text{Required Reserve Area} = 200\% \times \frac{\text{Peak Flow}}{\text{Soil Application Rate}}$$

$$\text{Require Reserve Field Area} = 200\% \times \frac{1,110 \text{ gpd}}{0.2 \text{ gpd per square foot}}$$

Required Reserve Area = 10,950 square feet, use 11,100 square feet

Available Reserve Area

Based on the proposed site plan we have determined that there is enough area to set aside for an additional 11,100 square feet of subsurface drip disposal field in the vicinity of Test Pits #1, #2, #3, #4, #5 and #6 as shown on the Sleeping Lady Vineyard Winery Wastewater Disposal Feasibility Study Exhibit in Appendix 2.

Pretreatment and Septic Tank Capacity

Pretreatment must be provided to treat the winery sanitary wastewater to meet Napa County pretreated effluent standards (BOD < 30 mg/l, TSS < 30 mg/l). There are several options for pretreatment systems that are available to meet this requirement. The Applicant and Engineer will review options and select a suitable pretreatment system designed to meet this requirement prior to application for a sewage permit for the winery sanitary wastewater disposal system. Septic tanks will be sized in accordance with the requirements of the selected pretreatment system.

Phase 2 – Winery Sanitary Wastewater Disposal Subsurface Drip Dispersal Field and Process Wastewater Disposal Via Treatment and Irrigation

In Phase 2 a new fermentation pad will be constructed that will allow production to increase to a maximum of 30,000 gallons of wine per year and peak winery process wastewater flows are predicted to increase to 1,000 gpd. At that time sanitary wastewater will continue to be disposed of in the septic system as previously described in Phase 1 and the winery process wastewater would be collected separately, pretreated, stored and disposed of via surface irrigation in the vineyard outside of the required 100 foot well and blue line stream setbacks.

Process Wastewater Disposal Via Irrigation

Required Disposal Field and Reserve Area

Sanitary wastewater disposal field and reserve areas are the same as described in Phase I above. Since the winery process wastewater will be removed from the sanitary wastewater disposal field the sanitary waste disposal system will be slightly oversized relative to sanitary wastewater disposal needs.

Process Wastewater Treatment

We recommend that treatment be achieved through the use of a package plant type system or other treatment system designed to accept winery process wastewater that is capable of meeting the following treatment requirements:

<u>Parameter</u>	<u>Pre-treatment*</u>	<u>Post Treatment**</u>
pH	3 to 10	6 to 9
BOD ₅	500 to 12,000 mg/l	<160 mg/l
TSS	40 to 800 mg/l	<80 mg/l
SS	25 to 100 mg/l	<1 mg/l

* Reference California Regional Water Quality Control Board Central Coast Region General Waste Discharge Requirements Order No. R3-2008-0018 for winery process wastewater characteristics

** Required for discharge to land via surface irrigation by Napa County for samples taken at the discharge of the treatment unit.

Process Wastewater Disposal

To simplify this analysis we have assumed that final disposal of the treated effluent will be via surface drip irrigation in the vineyard. There are approximately 24 acres of vineyard area available outside of the required well and stream setbacks. The treated process wastewater may also be able to be used for landscape irrigation outside of all required setbacks which would provide additional flexibility in operation of the disposal system. All application of treated winery process wastewater must comply with the requirements of the Napa County Winery Process Wastewater Guidelines for Surface Drip Irrigation and general wastewater setback requirements for wells and blue-line streams.

In order to accommodate differences in the timing of wastewater generation, irrigation demand and prohibitions on applying water to the land during rainy periods a storage tank will be required. We have prepared a water balance calculation to size a tank that will temporarily store wastewater generated at the winery before it is applied to the vineyard. The water balance calculation assumes a monthly wastewater generation rate and a monthly vineyard irrigation

schedule based on our past experience with projects of this type. The water balance calculations show that the water generated by winery production operations each month can be effectively managed after treatment by applying it to the identified vineyard area without excess carryover from month to month. We recommend a minimum storage tank capacity of 10,000 gallons to provide operational flexibility in timing of land applications (see Appendix 3).

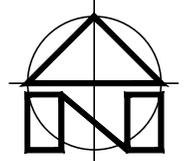
CONCLUSION

It is our opinion that the proposed winery sanitary and process wastewater disposal needs for both Phase 1 and Phase 2 can be accommodated onsite as previously described. Full design calculations and construction plans should be prepared in accordance with Napa County standards at the time of building permit application.

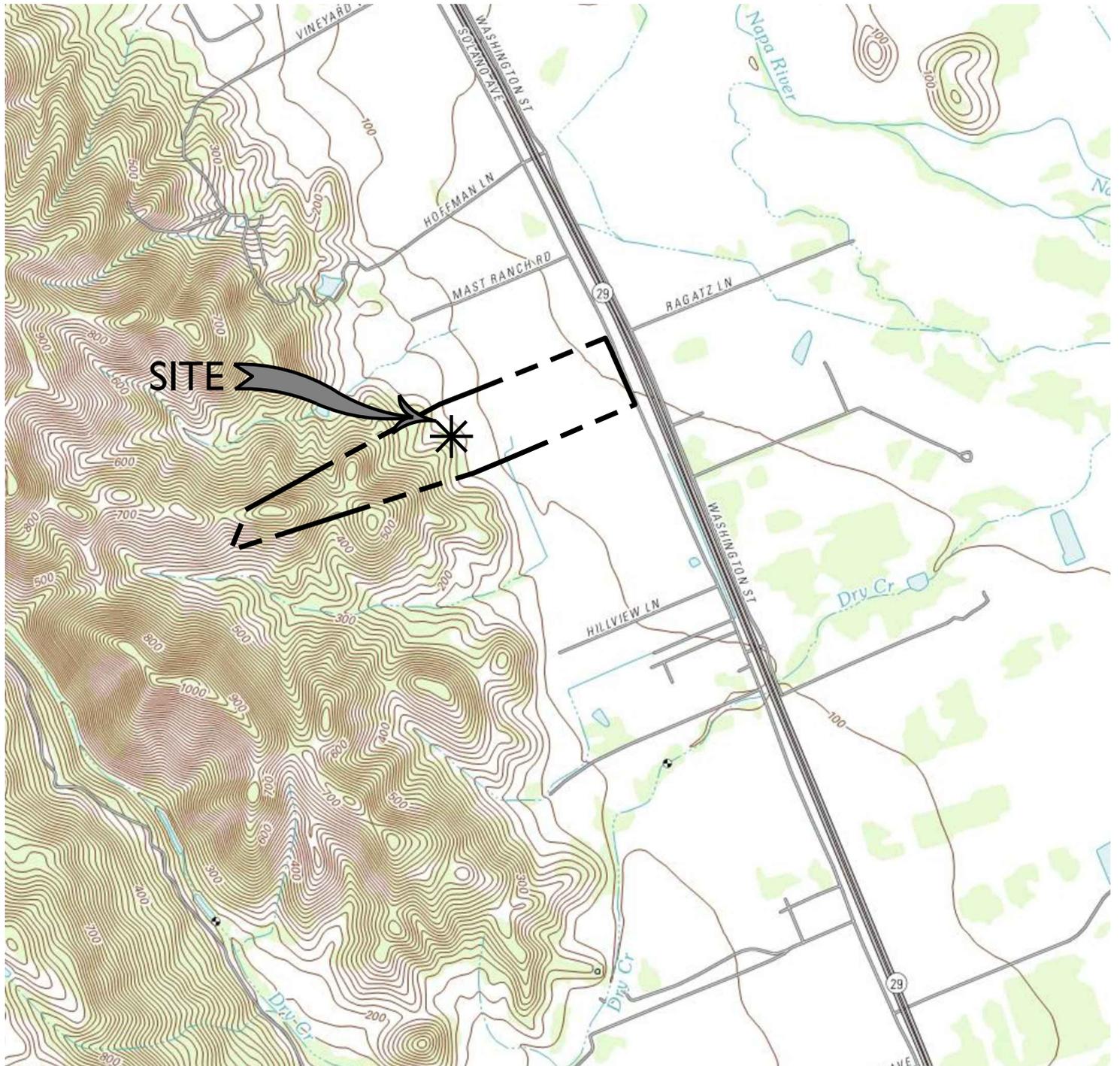
APPENDIX I: Site Topography Map

SITE TOPOGRAPHY MAP

REPRESENTS A PORTION OF THE
UNITED STATES GEOLOGICAL SURVEY 7.5 MINUTE QUADRANGLES
"NAPA, CA AND YOUNTVILLE, CA"



SCALE: 1" = 2,000'



INCORPORATED

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SLEEPING LADY VINEYARD WINERY

5537 SOLANO AVENUE

NAPA, CA 94558

APN 034-170-005

JOB NO. 15-110

SEPTEMBER 2015

APPENDIX 2: Sleeping Lady Vineyard Winery
Wastewater Disposal Feasibility Study Exhibit

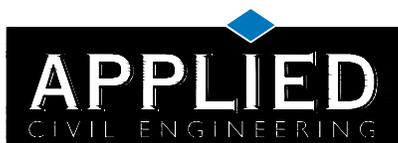


LOCATION MAP

SCALE: 1" = 2,000'

NOTES:

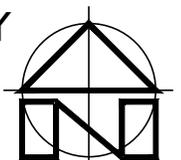
1. TEST PITS ONE THROUGH NINE (TP #1 - TP #9) WERE EXCAVATED BY BETTINELLI VINEYARDS AND WERE WITNESSED BY MIKE MUELRAETH OF APPLIED CIVIL ENGINEERING INCORPORATED AND REBECCA SETLIFF OF THE NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES DEPARTMENT - ENVIRONMENTAL HEALTH DIVISION ON JULY 8, 2015.
2. FADED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES. TOPOGRAPHIC INFORMATION WAS OBTAINED FROM THE "SITE TOPOGRAPHY" PREPARED BY ADOBE ASSOCIATES, INC, DATED JUNE 18, 2015. APPLIED CIVIL ENGINEERING INCORPORATED ASSUMES NO LIABILITY REGARDING THE ACCURACY OR COMPLETENESS OF THE TOPOGRAPHIC INFORMATION.
2. AERIAL PHOTOGRAPH WAS OBTAINED FROM THE SAN FRANCISCO ESTUARY INSTITUTE (SFEI) SAN FRANCISCO BAY AREA ORTHOPHOTOS DATABASE, DATED JUNE 2014 AND MAY NOT REPRESENT CURRENT CONDITIONS.
3. ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) MAP NUMBER 06055C0413E, EFFECTIVE SEPTEMBER 26, 2008, A PORTION OF THE PROJECT SITE IS LOCATED IN A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 0.2% CHANCE ANNUAL FLOOD (500 YEAR FLOOD). THE APPROXIMATE FLOOD HAZARD BOUNDARY LINE IS SHOWN ON THIS PLAN. SEE FIRM FOR ADDITIONAL INFORMATION.
4. CONTOUR INTERVAL: ONE (1) FOOT, HIGHLIGHTED EVERY FIVE (5) FEET
5. ELEVATION DATUM: NAVD 88



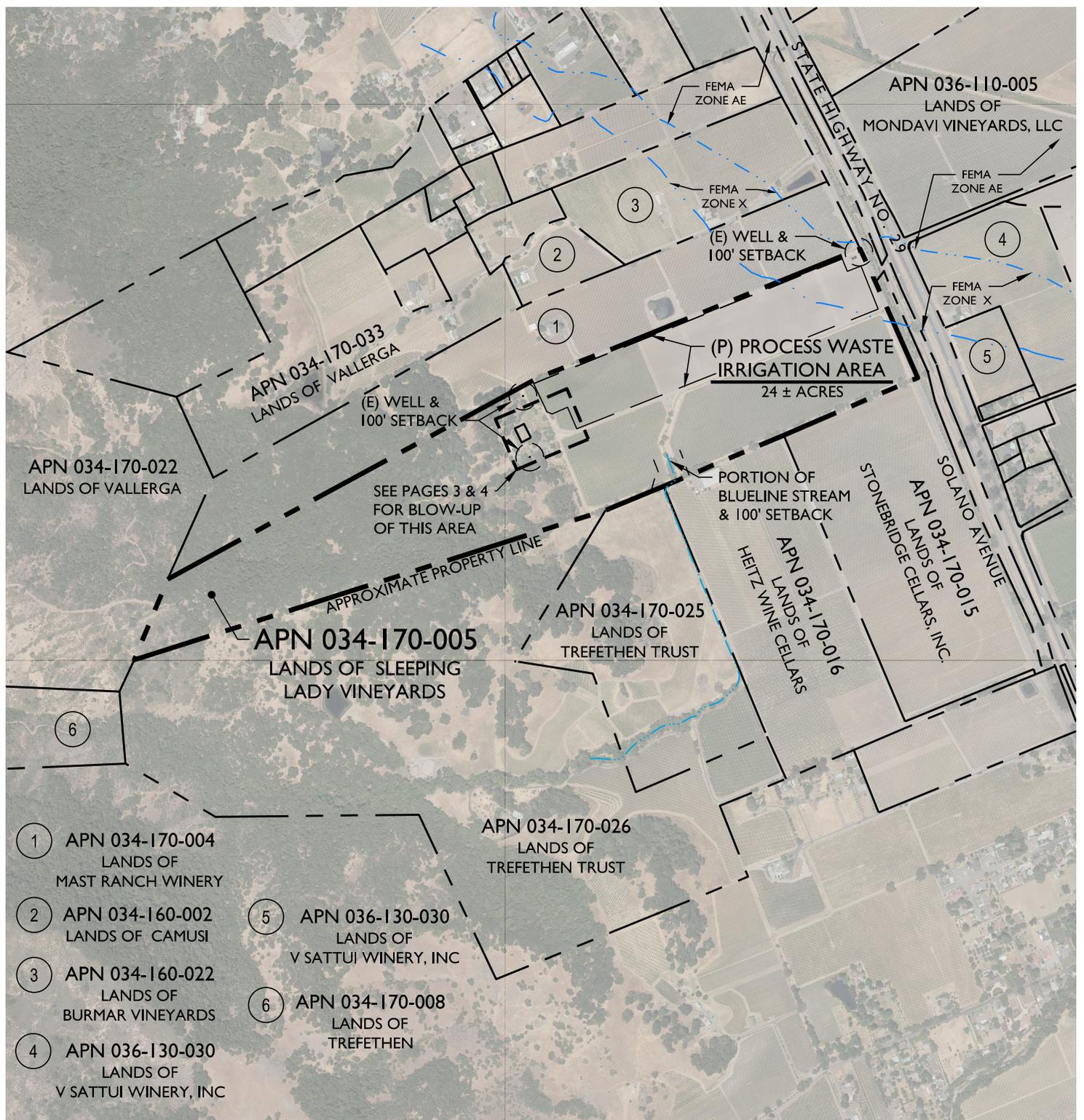
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SLEEPING LADY VINEYARD WINERY WASTEWATER DISPOSAL FEASIBILITY STUDY EXHIBIT

5537 SOLANO AVENUE
 NAPA, CA 94558
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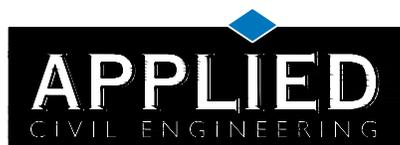


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OVERALL SITE MAP

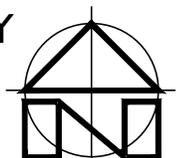
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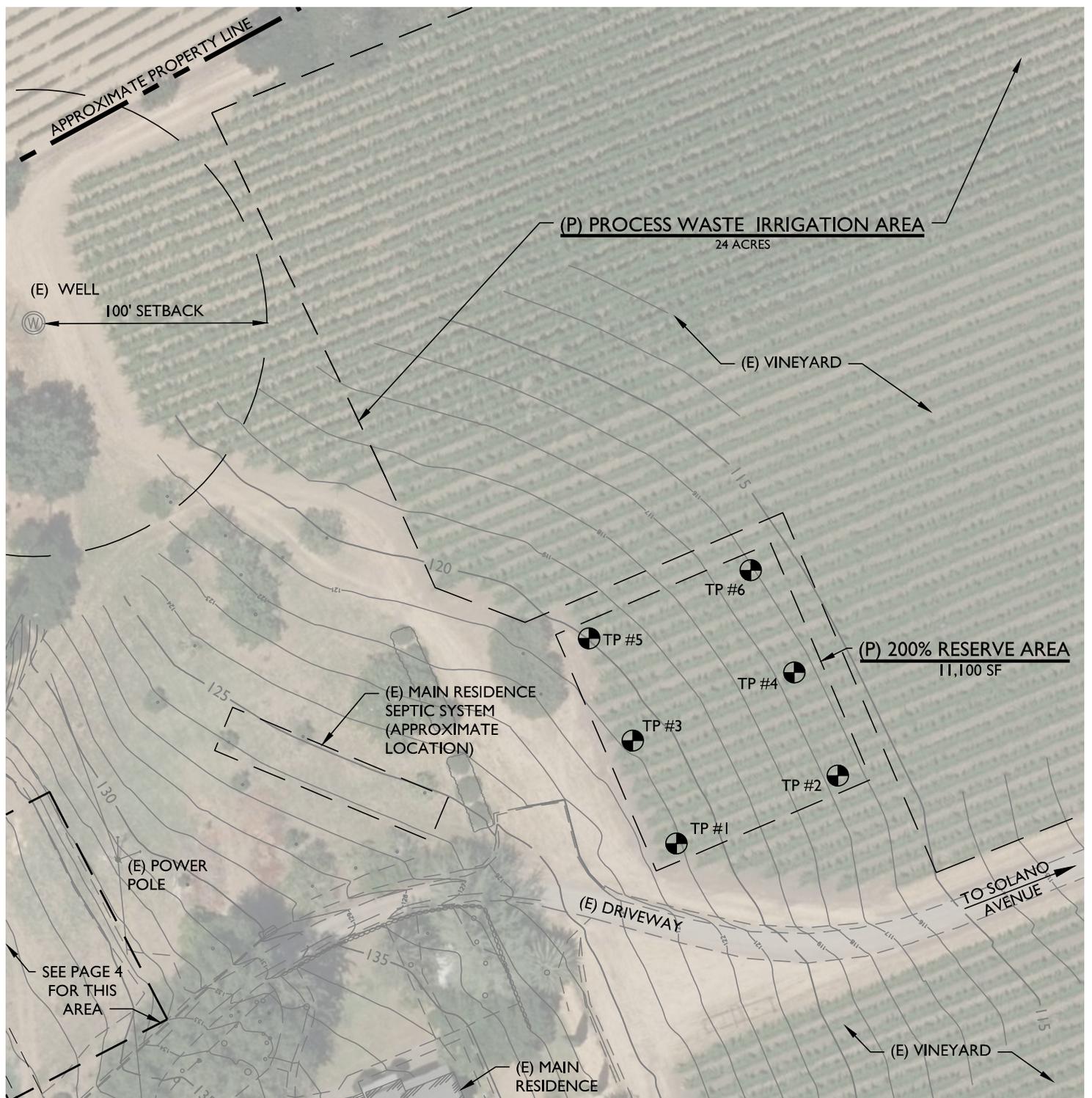
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SLEEPING LADY VINEYARD WINERY WASTEWATER DISPOSAL FEASIBILITY STUDY EXHIBIT

5537 SOLANO AVENUE
 NAPA, CA 94558
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SCALE: 1" = 1,000'



**MAIN RESIDENCE, SECOND DWELLING UNIT
& WINERY SANITARY SEWER RESERVE AREA MAP**

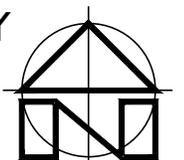
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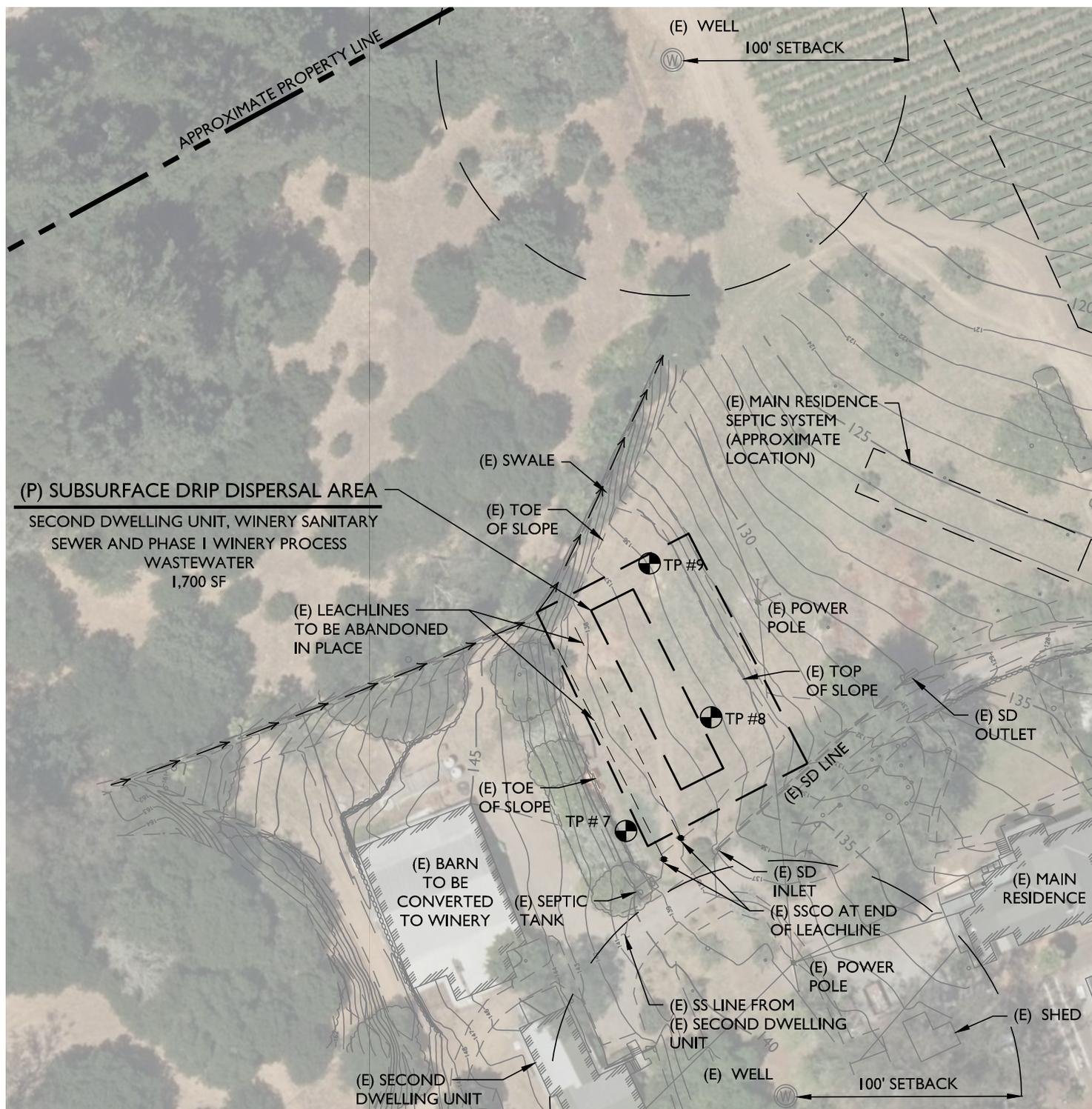
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**SLEEPING LADY VINEYARD WINERY
WASTEWATER DISPOSAL
FEASIBILITY STUDY EXHIBIT**

5537 SOLANO AVENUE
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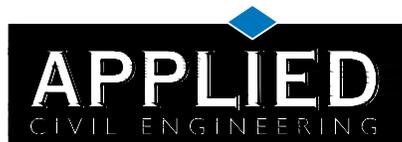


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WINERY & SECOND DWELLING UNIT DISPERSAL AREA MAP

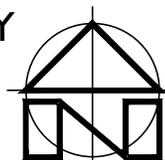
SCALE: 1" = 60'



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SLEEPING LADY VINEYARD WINERY WASTEWATER DISPOSAL FEASIBILITY STUDY EXHIBIT

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SCALE: 1" = 60'

APPENDIX 3: Water Storage Tank Water Balance Calculations

Irrigation Storage Tank Water Balance

Month	Beginning Balance	Process Wastewater	Land Application Capacity	Ending Balance
January	0	9,000	521,326	0
February	0	9,000	521,326	0
March	0	9,000	521,326	0
April	0	7,200	521,326	0
May	0	7,200	392,040	0
June	0	9,000	980,100	0
July	0	18,000	980,100	0
August	0	32,400	588,060	0
September	0	32,400	588,060	0
October	0	27,000	392,040	0
November	0	10,800	521,326	0
December	0	9,000	521,326	0
		180,000	7,048,356	

Notes:

1. All values shown above for beginning balance, inflow, outflow and ending balance are in units of gallons.
2. See attached tables for detailed explanation of process wastewater and irrigation data presented in this table.
3. This water balance is based on the assumption that the tank is empty in August, just prior to crush.
4. This table is intended to illustrate waste disposal capability only. Where irrigation demand exceeds available treated wastewater availability additional irrigation water will be provided by another source.

Winery Process Wastewater Generation Analysis

Annual Wine Production	30,000 gallons
Wastewater Generation Rate	6 gallons per gallon of wine
Annual Wastewater Generation	180,000 gallons
Crush Season Length	45 days
Wastewater Generated During Crush	1.5 gallons per gallon of wine
Peak Wastewater Generation Rate	1,000 gallons per day

Winery Process Wastewater Generation Table			
Month	Percentage of Annual Total	Monthly Flow (gallons)	Average Flow (gpd)
January	5.0%	9,000	290
February	5.0%	9,000	321
March	5.0%	9,000	290
April	4.0%	7,200	240
May	4.0%	7,200	232
June	5.0%	9,000	300
July	10.0%	18,000	581
August	18.0%	32,400	1,045
September	18.0%	32,400	1,080
October	15.0%	27,000	871
November	6.0%	10,800	360
December	5.0%	9,000	290
Total	100.0%	180,000	

Notes:

1. Wastewater generation rates and monthly proportioning are based on our past experience with similar projects.

APPENDIX 4: Site Evaluation Report and Test Pit Map

Test Pit #1

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-8	G	0-15	C	MSB	S	VF	S	CF/FM	FF/FM	NONE
8-27	G	0-15	C	MSB	H	VF	S	CF/FM	FF	NONE
27-42		0-15	C	WSB	H	VF	S	CF/FM	FF	NONE

Acceptable soil depth = 27"

Test Pit #2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-12	G	0-15	C	MSB	S	VF	S	CF/FM	FF/FM	NONE
12-27	G	0-15	C	MSB	H	VF	S	CF/FM	FF	NONE
27-42		0-15	C	WSB	H	VF	S	CF/FM	FF	NONE

Acceptable soil depth = 27"

Test Pit #3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-12	G	0-15	C	MSB	S	VF	S	CF/FM	FF/FM	NONE
12-34	G	0-15	C	MSB	H	VF	S	CF/FM	FF	NONE
34-42		0-15	C	WSB	H	VF	S	CF/FM	FF	NONE

Acceptable soil depth = 34"

Test Pit #4

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-8	G	0-15	C	MSB	S	VF	S	CF/FM	FF/FM	NONE
8-32	G	0-15	C	MSB	H	VF	S	CF/FM	FF	NONE
32-42		0-15	C	WSB	H	VF	S	CF/FM	FF	NONE

Acceptable soil depth = 32"

Test Pit #5

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-12	G	0-15	C	MSB	S	VF	S	CF/FM	FF/FM	NONE
12-34	G	0-15	C	MSB	H	VF	S	CF/FM	FF	NONE
34-42		0-15	C	WSB	H	VF	S	CF/FM	FF	NONE

Acceptable soil depth = 34"

Test Pit #6

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-6	G	0-15	C	MSB	S	VF	S	CF/FM	FF/FM	NONE
6-36	G	0-15	C	MSB	H	VF	S	CF/FM	FF	NONE
36-42		0-15	C	WSB	H	VF	S	CF/FM	FF	NONE

Acceptable soil depth = 36"

Test Pit #7

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	G	0-15	CL	MSB	SH	F	SS	CF/FM	FF/FM	NONE
24-30	G	0-15	CL	MSB	SH	F	SS	CF/FM	FF	FMFt
30-40		>50	Decomposing Rock							

Acceptable soil depth = 24"

Test Pit #8

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-26	G	0-15	SCL	MSB	SH	F	SS	CF/FM	FF	NONE
26-40		>50	Decomposing Rock							

Acceptable soil depth = 26"

Test Pit #9

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-18	G	0-15	SCL	MSB	S	F	SS	CF/CM	CF/FM/FC	NONE
18-40		0-15	SCL	MSB	SH	F	SS	CF/CM	FF	NONE

Acceptable soil depth = 40"

LEGEND

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 PI =Platy Pr =Prismatic C =Columnar B =Blocky AB =Angular Blocky SB =Subangular Blocky M =Massive SG =Single Grain CEM =Cemented	L =Loose S =Soft SH =Slightly 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 VC =Very Coarse	Quantity: F =Few C =Common M =Many Size: F =Fine M =Medium C =Coarse VC =Very Coarse ExC =Extremely Coarse	Quantity: F =Few C =Common M =Many Size: F =Fine M =Medium C =Coarse Contrast: Ft =Faint D =Distinct P =Prominent

Notes:

Structure is recorded as Modifier then Structure - for example, Moderate (M) Subangular Blocky (SB) is recorded as MSB
 Pores and Roots are recorded as Quantity then Size – for example Few (F) Coarse (C) is recorded as FC
 Mottling is recorded as Quantity then Size then Contrast – for example Few (F) Coarse (C) Distinct (D) is recorded as FCD



LOCATION MAP

SCALE: 1" = 2,000'

NOTES:

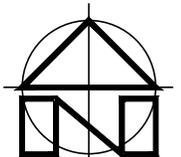
1. TEST PITS ONE THROUGH NINE (TP #1 - TP #9) WERE EXCAVATED BY BETTINELLI VINEYARDS AND WERE WITNESSED BY MIKE MUELARTH OF APPLIED CIVIL ENGINEERING INCORPORATED AND REBECCA SETLIFF OF THE NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES DEPARTMENT - ENVIRONMENTAL HEALTH DIVISION ON JULY 8, 2015.
2. FADED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES. TOPOGRAPHIC INFORMATION WAS OBTAINED FROM THE "SITE TOPOGRAPHY" PREPARED BY ADOBE ASSOCIATES, INC, DATED JUNE 18, 2015. APPLIED CIVIL ENGINEERING INCORPORATED ASSUMES NO LIABILITY REGARDING THE ACCURACY OR COMPLETENESS OF THE TOPOGRAPHIC INFORMATION.
2. AERIAL PHOTOGRAPH WAS OBTAINED FROM THE SAN FRANCISCO ESTUARY INSTITUTE (SFEI) SAN FRANCISCO BAY AREA ORTHOPHOTOS DATABASE, DATED JUNE 2014 AND MAY NOT REPRESENT CURRENT CONDITIONS.
3. ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) MAP NUMBER 06055C0413E, EFFECTIVE SEPTEMBER 26, 2008, A PORTION OF THE PROJECT SITE IS LOCATED IN A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 0.2% CHANCE ANNUAL FLOOD (500 YEAR FLOOD). THE APPROXIMATE FLOOD HAZARD BOUNDARY LINE IS SHOWN ON THIS PLAN. SEE FIRM FOR ADDITIONAL INFORMATION.
4. CONTOUR INTERVAL: ONE (1) FOOT, HIGHLIGHTED EVERY FIVE (5) FEET
5. ELEVATION DATUM: NAVD 88



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 Napa, CA 94558
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 www.appliedcivil.com

SLEEPING LADY VINEYARDS

5537 SAINT HELENA HIGHWAY
 NAPA, CA 94558
 APN 034-170-005

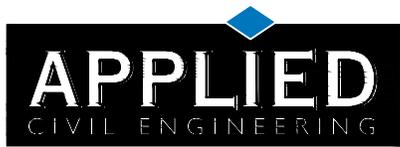


SCALE: 1" = 2,000'



OVERALL SITE MAP

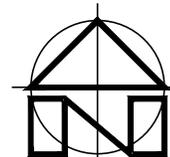
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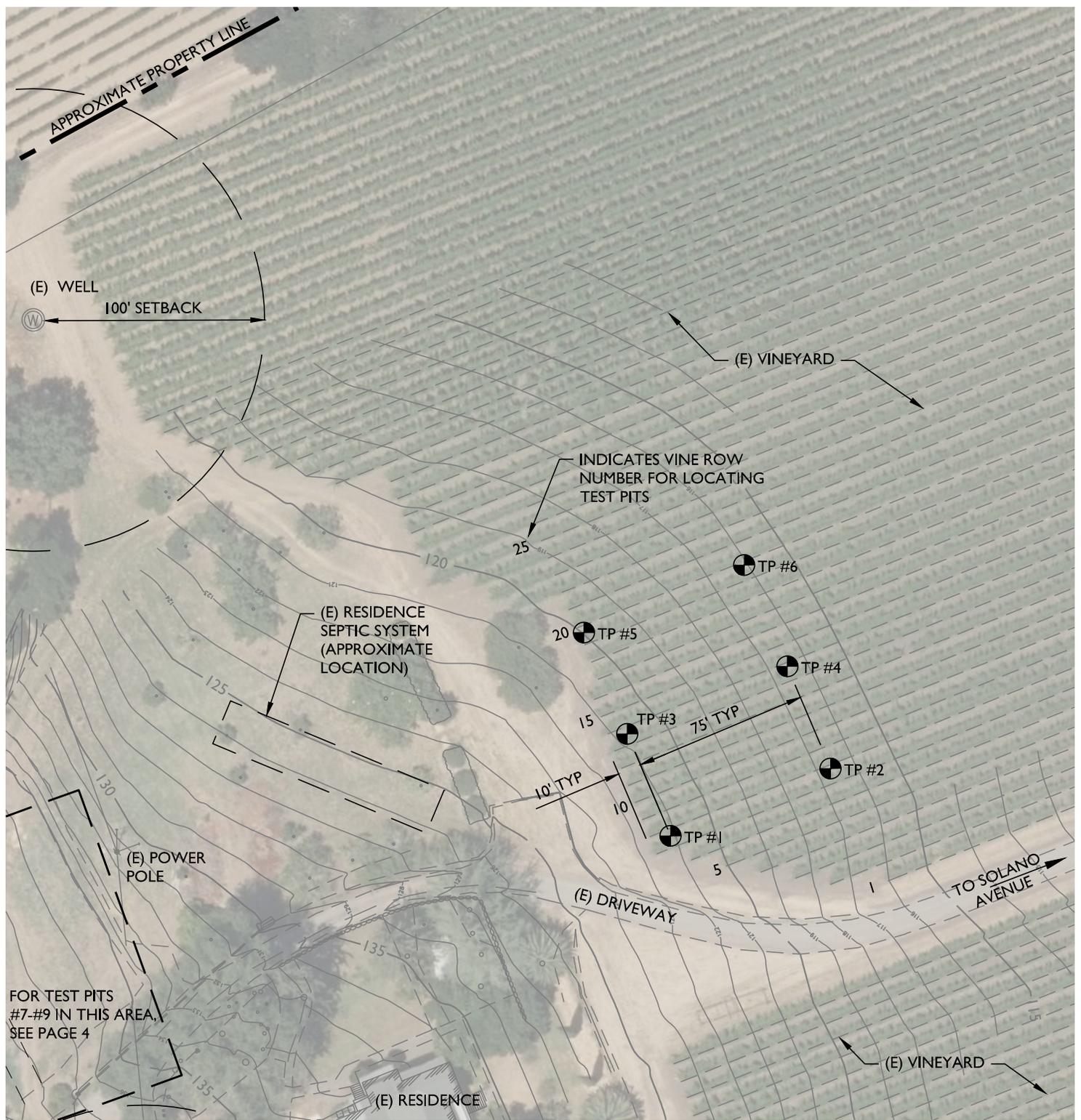
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SCALE: 1" = 1,000'



TEST PIT MAP #1

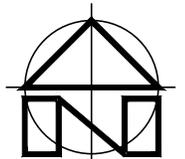
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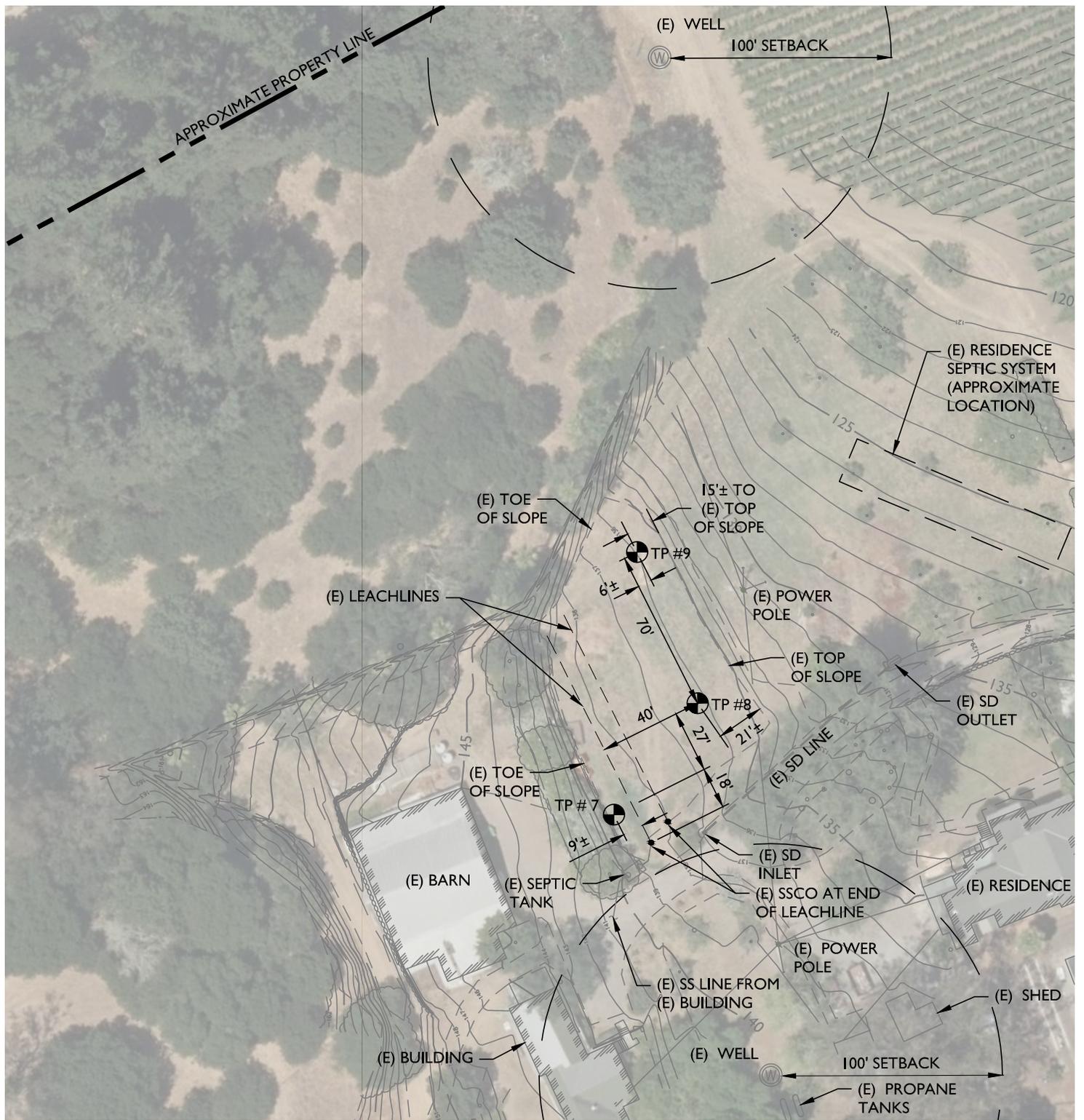
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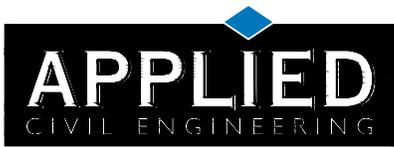


SCALE: 1" = 60'



TEST PIT MAP #2

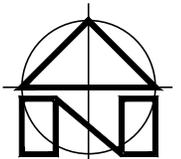
SCALE: 1" = 60'



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SCALE: 1" = 60'