



## SEPTIC FEASIBILITY REPORT

FOR THE

### CARVER SUTRO WINERY USE PERMIT APPLICATION

PROJECT LOCATED AT

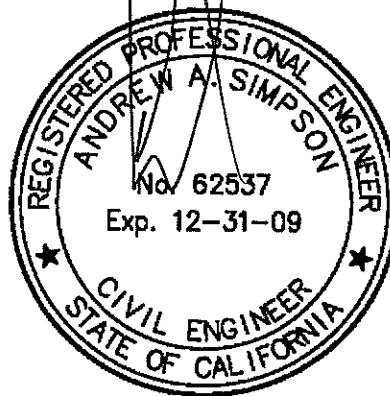
3106 PALISADES ROAD  
CALISTOGA, CA 94515

County: NAPA  
APN: 017-230-034

JANUARY 15, 2009

PREPARED FOR REVIEW BY:

NAPA COUNTY PUBLIC ENVIRONMENTAL MANAGEMENT  
1195 THIRD STREET, ROOM 101  
NAPA, CA 94559





January 8, 2009

**SEWAGE DISPOSAL FEASIBILITY REPORT  
FOR  
CARVER SUTRO WINERY**  
3106 Palisades Road  
Calistoga, CA 94515  
APN 017-230-034

### **Introduction**

The applicant is applying to the County of Napa for a Use Permit to operate a 20,000 gallon per year winery on the subject parcel. This report has been prepared to estimate the wastewater flows generated by the operation of the winery and to evaluate the feasibility of constructing a wastewater disposal system to serve the domestic and winery wastewater generated by the proposed project and the domestic from the existing residence.

The winery will consist of a winery building and associated caves. It will be a full crushing, fermenting, and barrel aging facility. Bottling will be performed via mobile bottling vendors. The maximum staffing level will be four employees during crushing or bottling days only. A typical day will consist of two employees. The winery marketing plan calls for twenty visitors per day, by appointment only.

In addition, as the proposed winery building will be located over the existing residence septic system, the existing domestic wastewater will be combined with the winery domestic wastewater and treated and distributed via the same system. The existing residence has six (6) bedrooms.

The distribution field will be installed on the adjacent parcel under common ownership (NCAPN: 017-230-035). Before the installation of the distribution field, a lot line adjustment shall be processed through the County to allow the distribution field to be located on the winery parcel.

All plumbing fixtures in the proposed winery shall be low flow, water-saving fixtures per the Uniform Plumbing Code as adopted by the Napa County Building Department.

### **Winery Sanitary Wastewater Flow**

Peak daily domestic wastewater flows for the tasting room are based on twenty (20) visitors and four (4) employees during harvest or bottling. The values used for the projected wastewater are based on the Napa County Department of Environmental Management guidelines<sup>1</sup>.

$$(20 \text{ visitors / day})(3 \text{ gallons / visitor}) = 60 \text{ gpd}$$

<sup>1</sup> Table 4, Napa County Environmental Management Regulations for Design, Construction, and Installation of Alternative Sewage Treatment System.



$$(4 \text{ employees} / \text{day})(15 \text{ gallons} / \text{employee}) = 60 \text{ gpd}$$

The anticipated peak domestic flow is 120 gallons per day.

### Residential Sanitary Wastewater Flow

The existing six (6) bedroom residence's wastewater flows shall be combined with the winery domestic flows into a new treatment system. Using the Napa County method for determining the daily domestic effluent from a residence, the flow is estimated to be:

$$\text{Residence wastewater flows} = (120 \text{ gpd} / \text{bedroom})(6 \text{ bedrooms}) = 720 \text{ gpd}$$

The combined domestic flows from the winery (120 gpd) and the residence (720 gpd) total 840 gpd for design purposes.

### Winery Process Wastewater Flow

#### Peak Flow:

Using the Napa County method for determining the peak process effluent from a winery, the peak flow is estimated to be:

$$\text{Harvest Peak Flow} = \frac{(20,000 \text{ gallons wine} / \text{year})(1.5)}{30 \text{ days crush} / \text{year}} = 1,000 \text{ gpd}$$

#### Average Daily Flow:

Depending on the winery, the amount of wastewater generated per gallon of wine produced typically ranges from 3-10 gallons per gallon of wine produced. This variation is based on the individual winery water conservation practices. We have estimated, for this project, that six gallons of process effluent shall be produced for each gallon of wine produced. Using this method, it is estimated that 120,000 gallons of process wastewater shall be produced annually. This averages to an estimate of 329 gallons of process wastewater production per day as follows:

Average daily winery process wastewater flow:

$$\text{Average daily PW} = \frac{(20,000 \text{ gal wine} / \text{year})(6 \text{ gal water} / \text{gal wine})}{365 \text{ days} / \text{year}} = 329 \text{ gpd}$$

The peak flow during harvest is estimated to be 1,000 gpd and the average daily process wastewater production is estimated to be 329 gpd.



## Site Evaluation

This feasibility study is based on the site evaluation performed by Delta Consulting and Engineering and field review by a member of the staff from Napa County Department of Environmental Management.

On November 5<sup>th</sup>, 2008, four test pits were excavated. Due to soil conditions, the test pit depths were limited to an excavation of depth 27"-33". The soil texture for each horizon was determined in the field by the Feel Method and did not require laboratory testing.

The gravel content in all pits was less than 10%. The site evaluation report was forwarded to the County Environmental Management department for approval (see copy attached) describes the pits in greater detail. Based on the soil types encountered and the available in-situ soil depth, Napa County design guidelines dictate the type of distribution system along with the design wastewater application rate.

Following are the results from the four (4) test pits evaluated:

Test Pit	Depth	Abbreviation	Texture	Structure	Grade	Application Rate (gal/ft <sup>2</sup> /day)*
1	0-1"	Top Soil	-	-	-	-
	1"-33"	SCL	Sandy Clay Loam	Moderate	Subangular blocky	0.6
	33"-58"	Rock	-	-	-	-
2	0-1"	Top Soil	-	-	-	-
	1"-31"	SCL	Sandy Clay Loam	Moderate	Subangular blocky	0.6
	31"-48"	Rock	-	-	-	-
3	0-30"	SCL	Sandy Clay Loam	Moderate	Subangular blocky	0.6
4	0-27"	SCL	Sandy Clay Loam	Moderate	Subangular blocky	0.6

\*Pretreated effluent

## Wastewater Disposal Recommendations

Due to the limited available soil depth encountered in each test pit, for the domestic system (combined residential and winery domestic flows) will consist of a subsurface drip dispersal system with pretreatment, and the winery process waste shall consist of a surface drip system with pretreatment or hold and haul at the owner's option.

## Domestic Wastewater Treatment System Design Overview

The domestic effluent from the winery shall be treated via standard septic tank (primary treatment), an Orenco Systems AdvanTex filter (secondary treatment), and final disposal through a subsurface drip field. The primary treatment system will treat and remove settleable solids to acceptable concentration levels. The secondary treatment system is required to distribute the effluent via the subsurface drip system (final treatment). The septic tank shall be equipped with an effluent filter.



Required Subsurface Drip System Area:

$$\text{primary disposal field} : \frac{840 \text{ gpd}}{0.6 \text{ gal} / \text{ft}^2 - \text{day}} = 1,400 \text{ ft}^2$$

The primary disposal area will consist of (10) 70 foot subsurface drip lines spaced two feet apart which yields 1,540 ft<sup>2</sup> of disposal area. The 200% reserve area will require an additional 2,800 ft<sup>2</sup>.

The dosing pump shall be programmed to dose the field at regular intervals as specified by the Napa County design guidelines.

Following is a schematic of the proposed domestic wastewater treatment system:

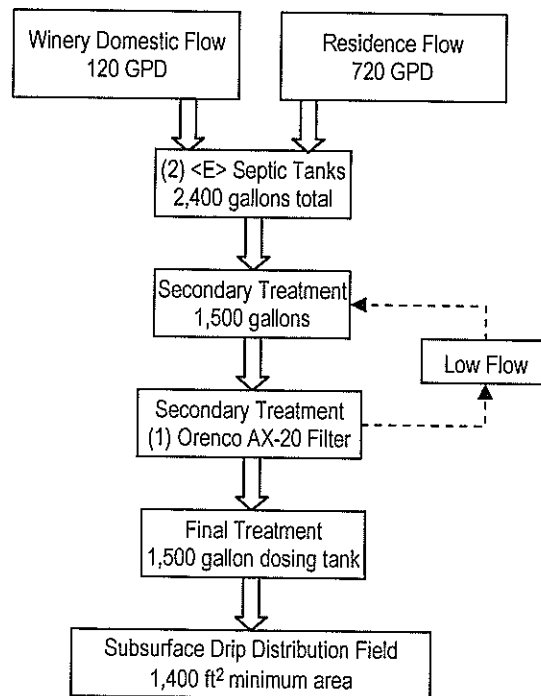


Figure 1: Proposed Domestic Wastewater Treatment System

### Process Wastewater Treatment System Design Overview

The owner has two options for the process wastewater treatment system. One option is an on-site treatment system and the second is a hold and haul system.

#### Option 1: On-site Treatment System

The second option is similar to the domestic treatment system. The difference is the final disposal drip lines will be laid and secured on existing grade with no soil cover.



The design assumes a process effluent strength from the winery of:

Biochemical Oxygen Demand (BOD)	2,500 mg/L (small winery)
Total Suspended Solids (TSS)	250 mg/L (harvest)

The strength parameters for any winery are difficult to obtain as the BOD and TSS vary drastically during the winemaking year. The BOD is very low during the non-harvest months and varies during the harvest months as not every day during harvest does crushing occur. The primary treatment system provides six days of hydraulic detention time and shall reduce the BOD by approximately 30% to 1,750 mg/L as the effluent enters the secondary treatment tank. During secondary treatment, the BOD level shall be reduced by approximately 95% to 88 mg/L prior to entering the dosing tank for final disposal.

Total Suspended Solids (TSS) shall be reduced by approximately 60%-80%. Using a conservative removal rate of 60%, the TSS will be 125 mg/L entering the secondary treatment tank. The secondary treatment shall reduce approximately 85% of the remaining TSS to 13 mg/L prior to entering the dosing tank (final disposal).

All septic tanks shall be equipped with an effluent filter.

The final disposal design is based on soil infiltration, evaporation and plant uptake (evapotranspiration). During the rainy season, per State regulations, discharges are not allowed 48 hours prior to a forecast storm event, during a rain/storm event, 48 hours after a rain event, or when the soils are saturated.

As the rainy season (December through April) coincides with the non-harvest season, it is anticipated that the winery shall generate approximately 30% of its total annual process wastewater during this period. Assuming the winery generates 120,000 gallons of process wastewater annually, during the rainy period, the winery will generate 30% of this amount per day or 36,000 gallons over the five month rain season (240 gallons/day). Assuming a two day storm event, two days prior to and after the event, the winery will need to storage capacity of:

$$\text{Wet weather storage capacity} : (240 \text{ gallons / day})(5 \text{ days}) = 1,200 \text{ gallons}$$

The final design shall provide 2,000 gallons of wet weather storage. If, due to continued rain events and release to the distribution field is prohibited, the wet weather storage tank becomes fully loaded, the operator will need to 1) cease winery process wastewater generating activities and 2) have the tank pumped by a septage hauler.

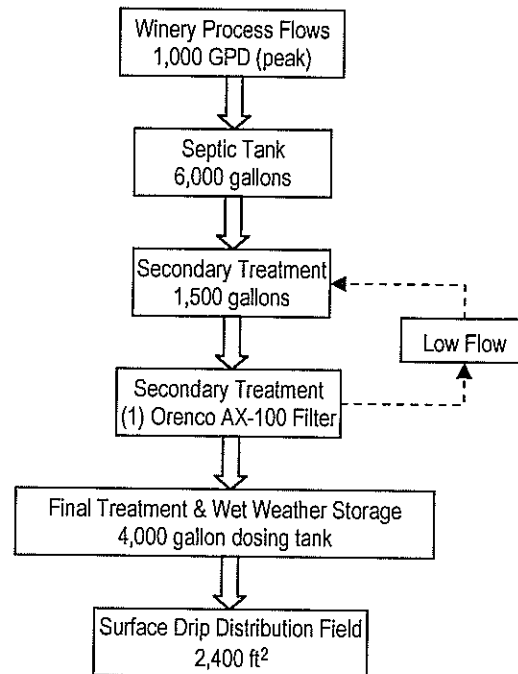


Figure 2: Option 1: On-site Process Wastewater Treatment System

The site slope for the distribution field is between 25%-35%. The drip distribution lines shall consist of (10) 80 foot long lines and shall be installed 3 feet apart for a total distribution area of 2,400 ft<sup>2</sup>. The peak distribution of 1,000 gallons/day (133 ft<sup>3</sup>) over the disposal field yields an application of 0.055 feet or 0.67 inches of treated effluent to be applied daily over the distribution field.

Based on the site evaluations performed, the soil's application rate was determined to be 0.6 gallon/ft<sup>2</sup> per day. This application rate is equivalent to a soil percolation rate of 52 minutes/inch or 1.15 inches/hour under saturated conditions. Based on the fact that the peak flows will occur outside of the rainy season or saturated conditions, the soil is assumed to be unsaturated and thusly capable of handling the applied peak loading. In addition, as discussed above, during the rainy season, the daily flow is anticipated to be 240 gallons/day (32 ft<sup>3</sup>/day) which equates to 0.013 feet (0.16 inches) over the distribution field. Based on the site soil's percolation rate above, the soils will accept this loading. The area is will be covered with a variety of plants listed on the Napa County Recommended Disposal Field Landscaping Guidelines which will also assist in effluent uptake.

If the on-site distribution system is chosen by the owner for installation, either the reserve area shall be the hold and haul alternative discussed herein or the reserve distribution area shall be located at a suitable area on the 86 acre parcel.



### Option 2: Hold and Haul System

This system consists of the installation of two sets of standard septic tanks. Each set of tanks shall be considered a tank battery (Battery A & B). Each Battery is outfitted with a float tree to monitor the effluent levels in each battery. When a particular battery reaches 90% of capacity, the operator calls an approved septage hauler for tank pumping and subsequent hauling of the effluent to a municipal treatment plant (East Bay Municipal Utility District). To allow the system operator to direct the flows between the batteries, the process effluent flows sewer line from the winery shall have a distribution valve which allows the system operator to direct the flows to either Battery A or B.

For small wineries, the hold and haul system is beneficial as the winery process flows are typically much less than the peak design flows and the installation costs are typically 1/3 of the cost to construct the on-site disposal system. In addition, the on-site system will require periodic monitoring, an annual contract with an approved operations and maintenance company, and annual inspections by the County. The drawback to the hold and haul option is the periodic yet constant hauling of effluent which currently is \$0.35 per gallon of effluent.

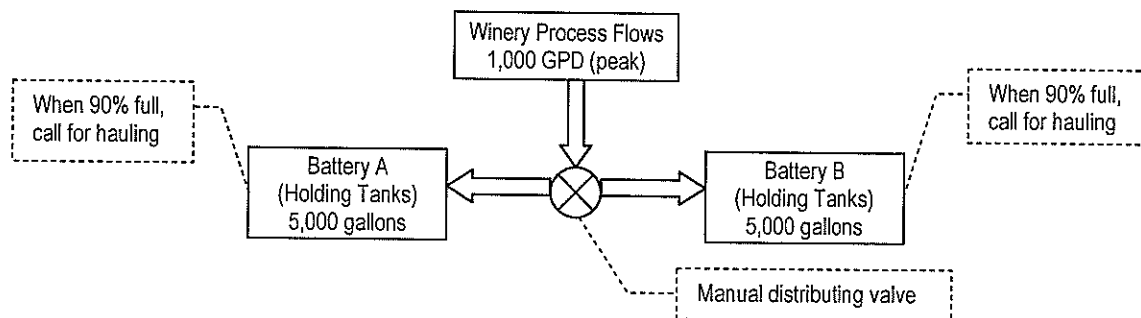


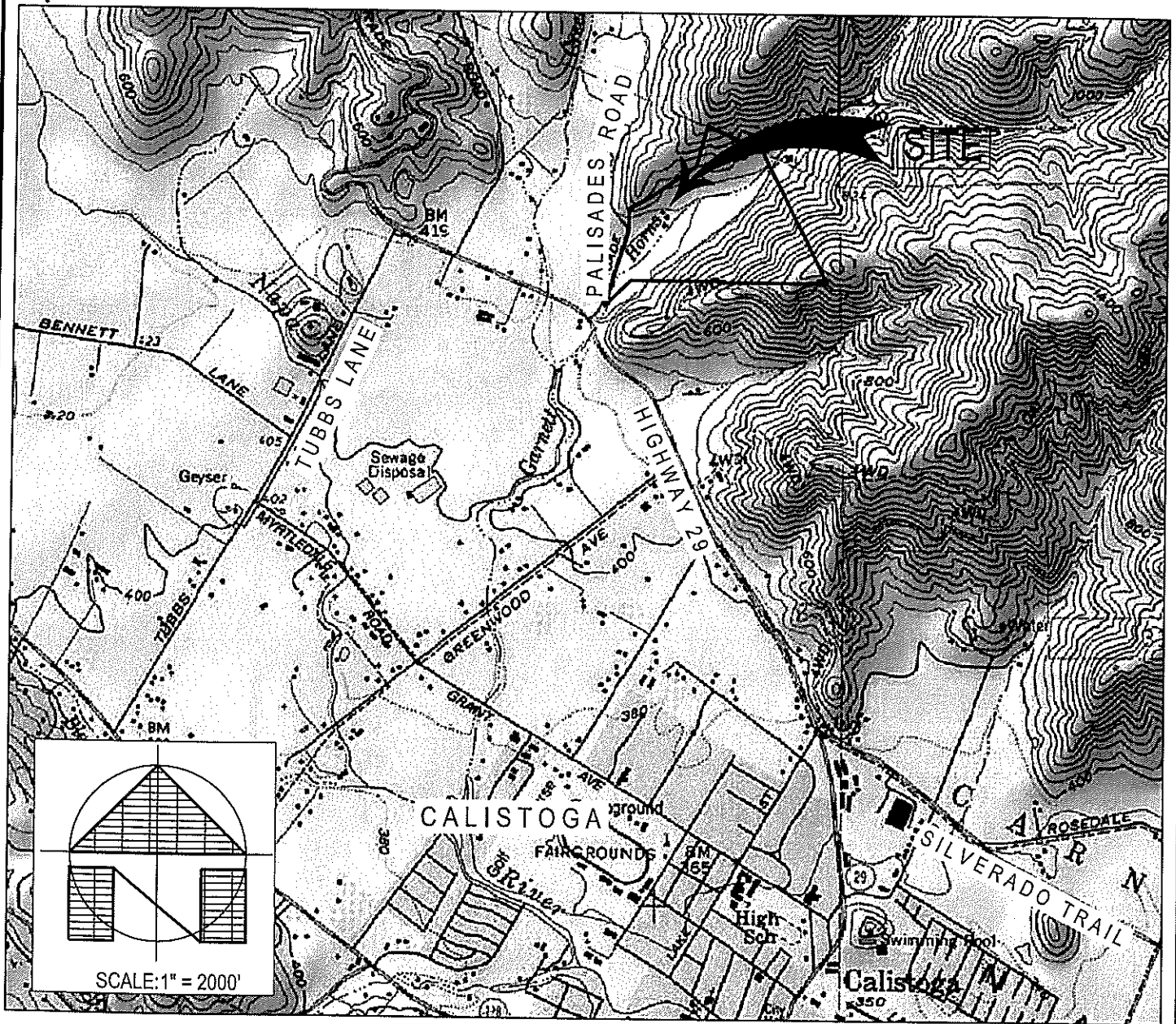
Figure 3: Option 2-Hold and Haul System Schematic

### Summary

Based on the previous narrative and calculations, the parcel where Carver Sutro Winery will be located is able to handle the wastewater flow from the proposed project and existing residence. Detailed calculations and construction plans will be submitted to the Napa County Department of Environmental Management for permit approval prior to the construction of the final disposal systems.



# CARVER SUTRO WINERY



## PROJECT INFORMATION

OWNER: ANNE CARVER / DENIS SUTRO  
 SITE ADDRESS: 3106 PALISADES ROAD  
 CALISTOGA, CA 94515  
 ASSESSORS PARCEL #: 017-230-034  
 PARCEL SIZE: ±86 ACRES  
 ZONING: AW

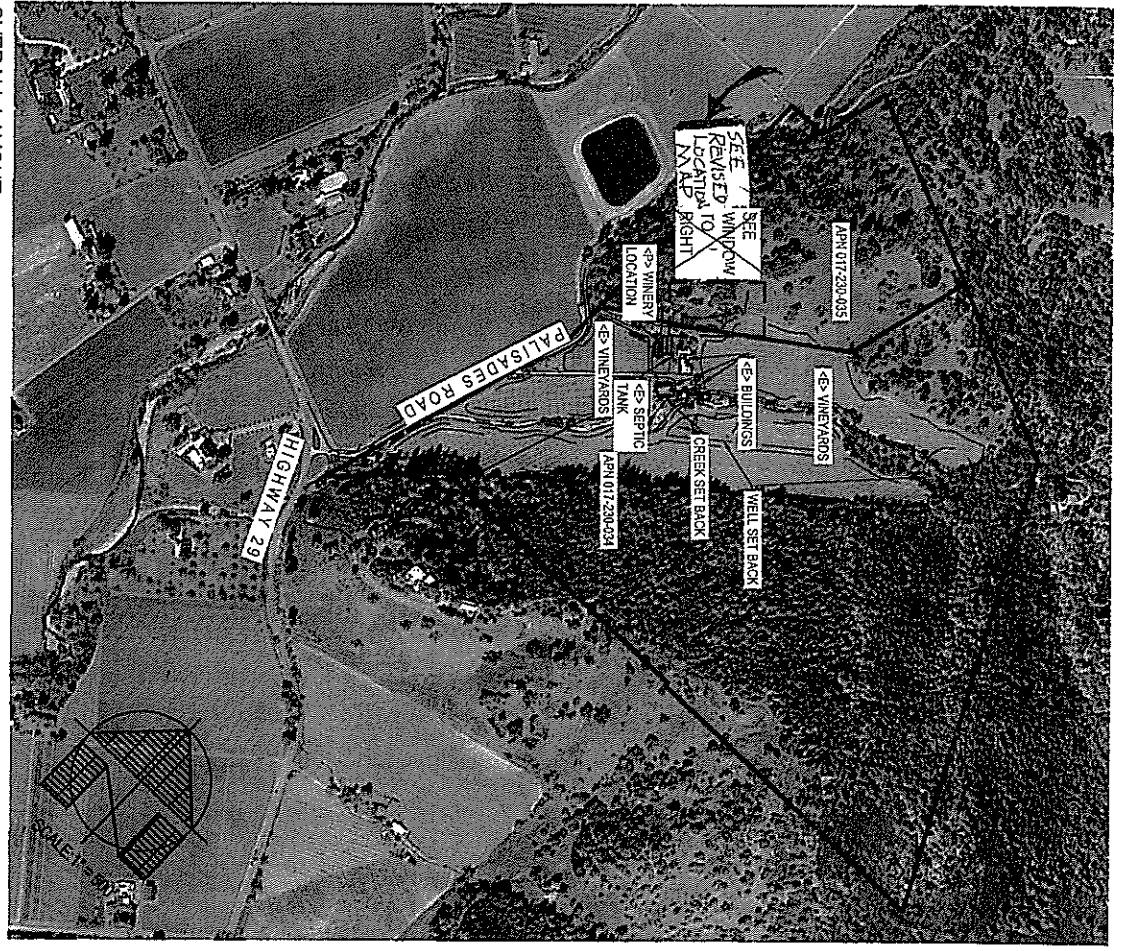
PROPOSED WINERY SIZE: 20,000 GAL/YEAR  
 SEPTIC: ON SITE  
 WATER: 2 <E> WELLS ON SITE

## USE PERMIT SEPTIC FEASIBILITY REPORT

DELTA CONSULTING & ENGINEERING  
 OF ST. HELENA  
 1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574  
 707-963-8456 + 707-963-8528 FAX

DATE:	01/15/09	JOB #	H122
SCALE:	AS NOTED	APN:	017-230-034

SHEET  
**1**  
 OF  
**2**

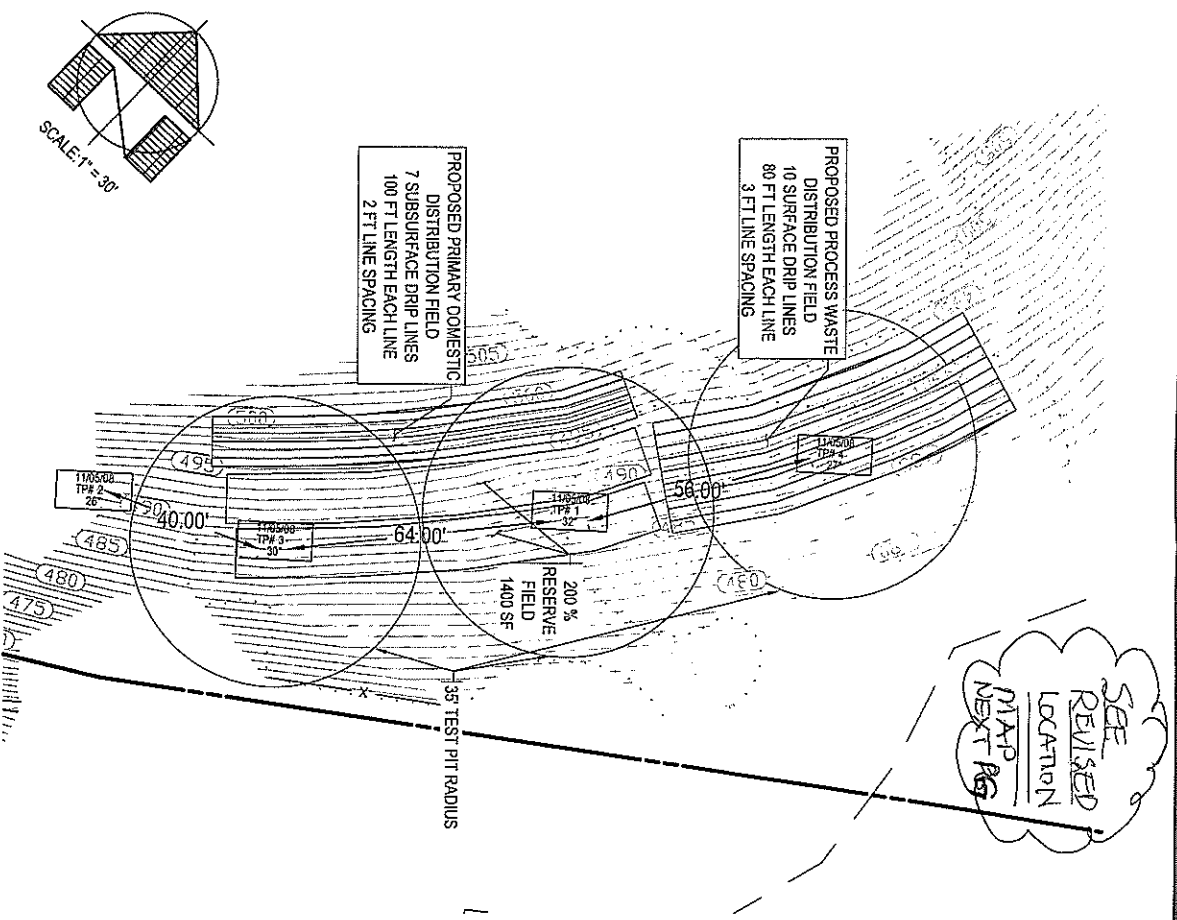


OVERALL LAYOUT

SCALE: 1"=500'

SEPTIC LAYOUT

SCALE: 1"=30'



Project: Carver Sutro  
Winery

DELTA CONSULTING & ENGINEERING  
OF ST. HELENA



April 16, 2009

Christine Secheli, Assistant Director  
County of Napa  
Environmental Management Department  
1195 Third Street, Suite 101  
Napa, California 94559

Re: Use Permit Items for Environmental Management Review  
Carver Sutro Winery  
3106 Palisades Road, Calistoga, APN 017-230-034

Dear Christine:

I have reviewed your letter sent to the Conservation Development and Planning Department and copied to me, dated April 21, 2009 regarding items needed to complete the Environmental Management review. Following is a response to the above mentioned letter:

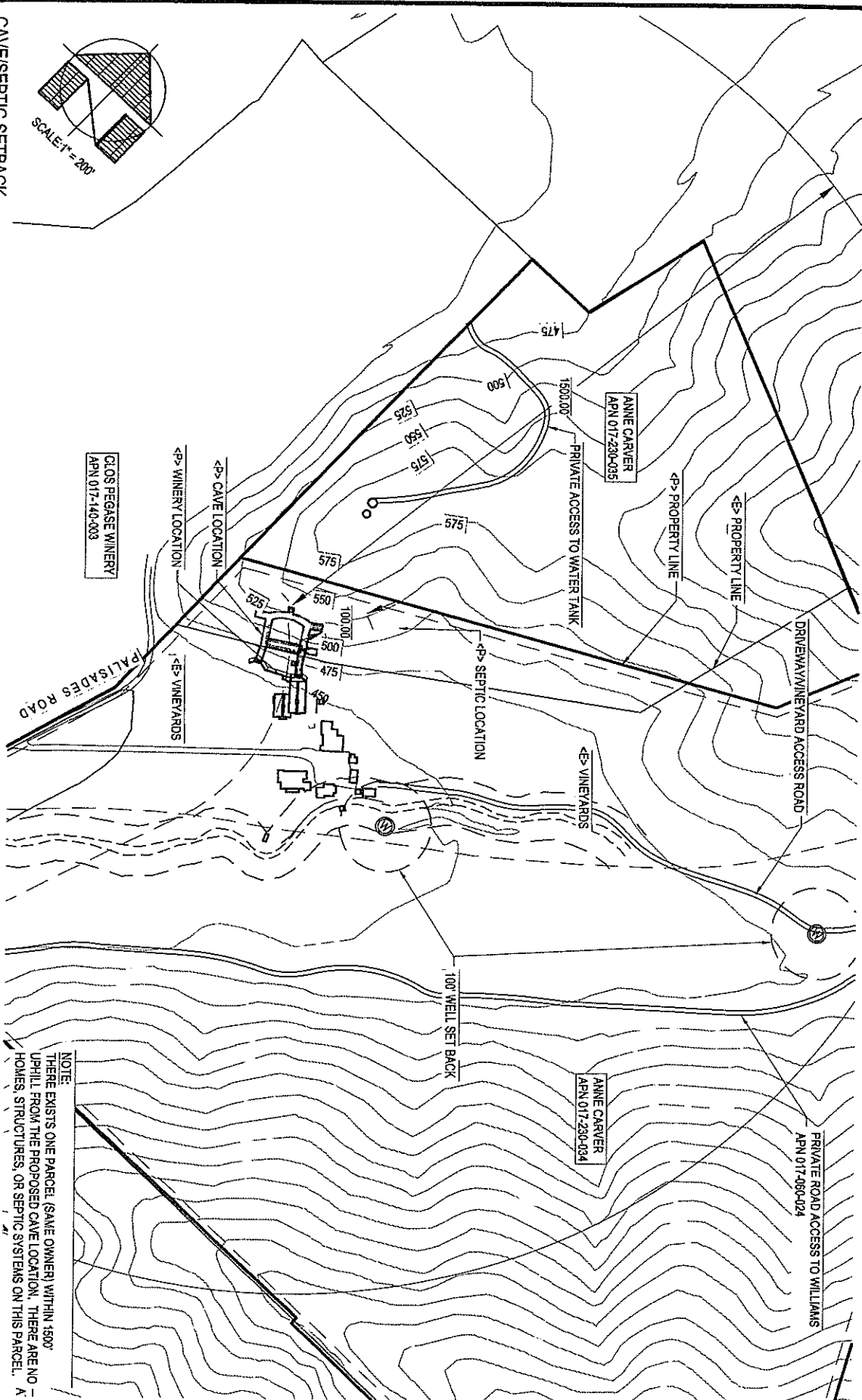
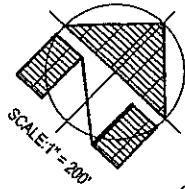
1. Cave, property line and septic setbacks:  
Please see the attached exhibit titled "Cave/Septic Exhibit – Carver Sutro Winery". The septic field has been moved to the East to meet requirements set in the memo included in the above noted letter.

If you have any questions or comments on these items, or if you require anything more, please feel free to contact our office.

Thanks,

Lisa Saunders  
Project Engineer

CAVE/SEPTIC SETBACK



CLAS PEGASE WINERY  
APN 017-140-003

ANNE CARVER  
APN 017-230-035

ANNE CARVER  
APN 017-230-034

PRIVATE ROAD ACCESS TO WILLIAMS  
APN 017-060-024

NOTE:  
THERE EXISTS ONE PARCEL (SALE OWNER) WITHIN 150'  
UPHILL FROM THE PROPOSED CAVE LOCATION. THERE ARE NO  
HOMES, STRUCTURES, OR SEPTIC SYSTEMS ON THIS PARCEL. A

SCALE: 1"=200'

DATE: 05/04/09  
SCALE: AS NOTED  
APN: 017-230-034

DELTA CONSULTING & ENGINEERING  
OF ST. HELENA  
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574  
707-963-8456 + 707-963-6528 FAX

CARVER SUTRO WINERY  
CAVE/SEPTIC  
CALISTOGA CALIFORNIA

1  
OF  
1

**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 #: E08-00636

APN: 017-230-034-000

(County Use Only)

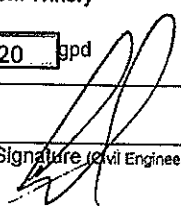
Reviewed by:

Date:

**PLEASE PRINT OR TYPE ALL INFORMATION**

Property Owner <b>Anne Carver</b>			<input checked="" type="checkbox"/> New Construction <input type="checkbox"/> Addition <input type="checkbox"/> Remodel <input checked="" type="checkbox"/> Relocation <input type="checkbox"/> Other:	
Property Owner Mailing Address <b>3106 Palsades Road</b>			<input checked="" type="checkbox"/> Residential - # of Bedrooms: <b>6</b> Design Flow: <b>720</b> gpd	
City <b>Calistoga</b>	State <b>Ca.</b>	Zip <b>94515</b>	<input checked="" type="checkbox"/> Commercial - Type: Winery Sanitary Waste: <b>    </b> gpd    Process Waste: <b>1000</b> gpd	
Site Address/Location <b>Same</b>			<input checked="" type="checkbox"/> Other: Domestic from Winery Sanitary Waste: <b>120</b> gpd    Process Waste: <b>    </b> gpd	

**Evaluation Conducted By:**

Company Name <b>Delta Consulting and Engineering</b>		Evaluator's Name <b>Andrew Simpson</b>	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist) 
Mailing Address: <b>1104 Adams Street Suite 203</b>		Telephone Number <b>(707)963-8456</b>	
City <b>St. Helena</b>	State <b>Ca.</b>	Zip <b>94574</b>	Date Evaluation Conducted <b>11/05/08</b>

**Primary Area**

Acceptable Soil Depth: **30** in.    Test pit #'s: **1, 2**  
 Soil Application Rate (gal. /sq. ft. /day): **0.4**  
 System Type(s) Recommended: **Geoflow**  
 Slope: **<30** %    Distance to nearest water source: **>100** ft.  
 Hydrometer test performed?    No ☒ Yes ☐ (attach results)  
 Bulk Density test performed?    No ☒ Yes ☐ (attach results)  
 Percolation test performed?    No ☒ Yes ☐ (attach results)  
 Groundwater Monitoring Performed?    No ☒ Yes ☐ (attach results)

**Expansion Area**

Acceptable Soil Depth: **30** in.    Test pit #'s: **3**  
 Soil Application Rate (gal. /sq. ft. /day): **0.4**  
 System Type(s) Recommended: **Geoflow**  
 Slope: **<30** %    Distance to nearest water source: **>100** ft.  
 Hydrometer test performed?    No ☒ Yes ☐ (attach results)  
 Bulk Density test performed?    No ☒ Yes ☐ (attach results)  
 Percolation test performed?    No ☒ Yes ☐ (attach results)  
 Groundwater Monitoring Performed?    No ☒ Yes ☐ (attach results)

**Site constraints/Recommendations:**

Site evaluation for proposed winery and to incorporate in existing residences. Existing septic system for residences to be abandoned.

1

Test Pit #

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-1"	Top Soil									
1"-33"	C	<10	SCL	M/SB	SH	FRB	SS	M-VF/M	F-F/C	N/A
33"-58"	Rock									

Test Pit #

2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-1"	Top Soil									
1"-31"	C	<10	SCL	M/SB	S	FRB	SS	M-VF/M	C-F/C	N/A
31"-48"	Rock									

Test Pit #

3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-30"		<10	SCL	M/SB	S	FRB	SS	M-VF/M	C-F/C	N/A

4

Test Pit #

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-27"		<10	SCL	M/SB	SH	FRB	SS	M-VF/M	F-F/C	N/A

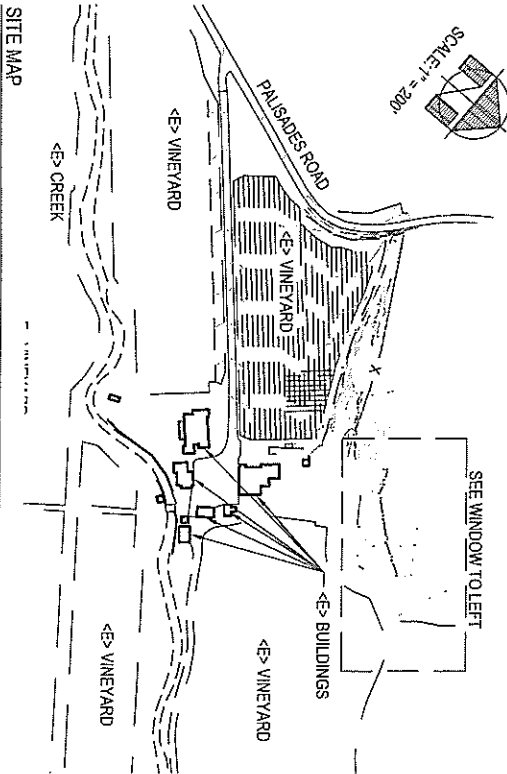
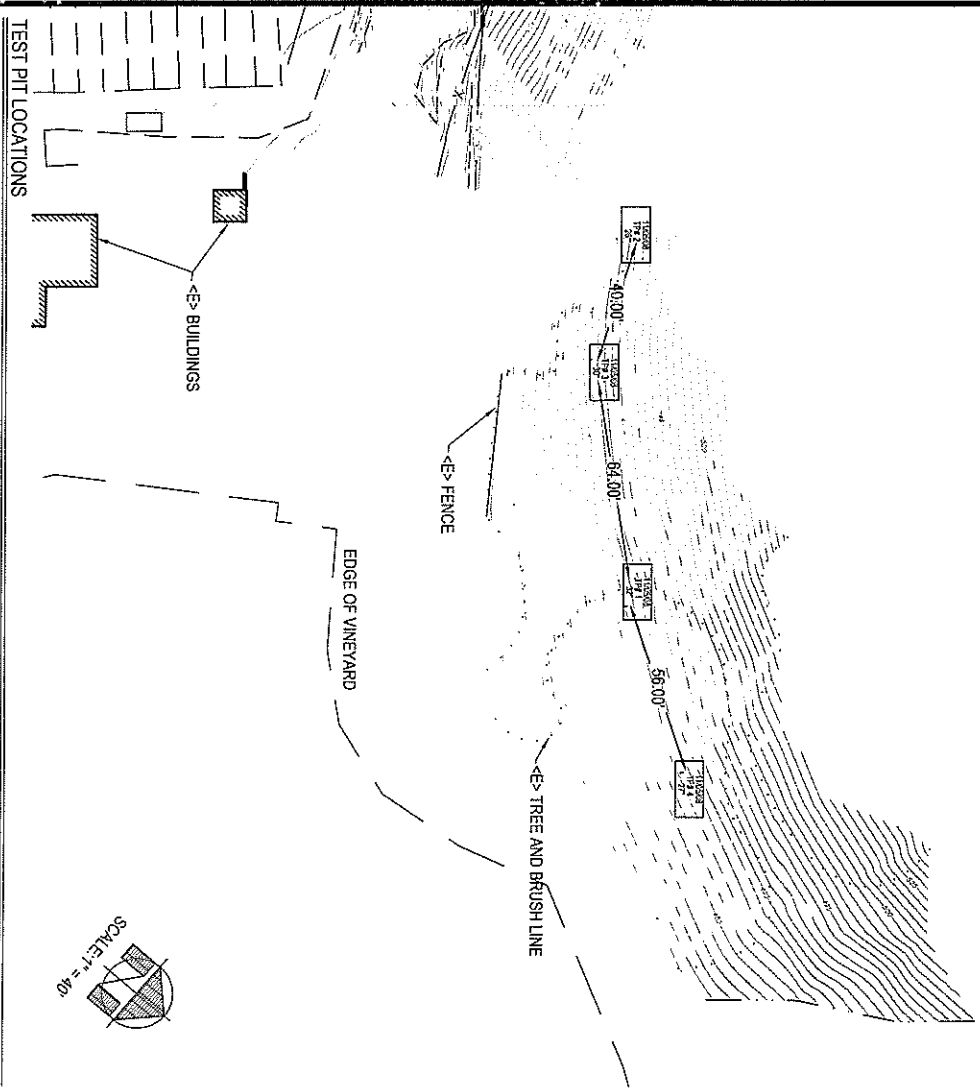
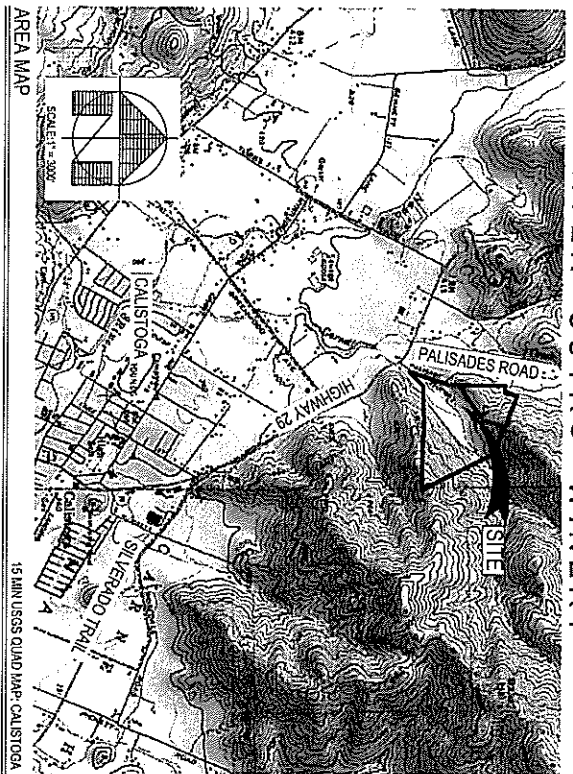
Test Pit #

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

Test Pit #

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

# TEST PIT LOCATIONS FOR: CARVER SUTRO WINERY



CARVER SUTRO WINERY  
TEST PIT LOCATIONS  
CALISTOGA CALIFORNIA

DELTA CONSULTING & ENGINEERING  
OF ST. HELENA  
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574  
707-963-8456 + 707-963-8528 FAX

DATE: 11/25/08  
SCALE: AS NOTED  
APN: 017-230-034