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TRANSMITTAL

Project: Oakford Winery
Project No.: 2004074

Date: December 20, 2007

To: **Steve Lederer**

Napa County Department of
Environmental Management
1195 3rd Street, Room 101
Napa, CA 94559-3001

SENT VIA: ☒ Regular Mail ☐ Overnight ☐ Pick-Up ☐ Hand-delivered

Copies	Date	Description
1	12/20/07	Revised Sanitary WWFS for Oakford Winery

TRANSMITTED: ☒ For approval ☐ For your use ☐ As requested ☐ For review & comment

Remarks:

Steve,

The enclosed revisions to the sanitary wastewater feasibility study (WWFS) for the Oakford Winery are based on the desire for the increase in production for the facility. The winemaker has asserted that a 45 day harvest is more appropriate for their operations versus the standard 30 day assumption typically used for wineries of this size. Please review the enclosed materials to replace the original WWFS. If you have additional requirements or questions, feel free to call.

Richard Ross, E.I.T.
PROJECT MANAGER

cc: Tom Futo - Oakford Winery



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December 20, 2007

Napa County Department of
Conservation, Development & Planning
1195 Third Street, Room 210
Napa, CA 94559

Attention: Steve Lederer

Re: Oakford Winery
1575 Oakville Grade
Oakville, Napa County, CA
APN 027-360-018
Wastewater Feasibility Study
Project No. 2004074

Dear Mr. Lederer:

Oakford Vineyards is applying for a Use Permit modification for the Oakford Winery, located on 39.9 acres at 1575 Oakville Grade in Oakville, Napa County. Oakford Winery desires to revise the Use Permit Application to include production of up to 10,000 gallons of wine per year from estate grown and custom crush sources. This correspondence is provided to revise the Wastewater Feasibility Study to reflect this increase in production.

Process wastewater (PW) will be collected separately from sanitary sewage (SS) in the winery building and caves. The PW will be sent to a PW settling tank for solids removal. The SS will be sent to a SS septic tank. The PW and SS will then combine in a recirculation tank and be treated prior to disposal via a subsurface drip disposal system. The following enclosures are included for your use in evaluation of the system:

Wastewater Management System Description

- Enclosure A: Wastewater System Schematic, Typical Winery WW Characteristics
- Enclosure B: Wastewater Feasibility Study; Design Criteria/Capacity Assessment
- Enclosure C: Site Evaluation Information
- Enclosure D: Winemaker Harvest Statement

Sincerely,

Richard Ross, E.I.T.
PROJECT MANAGER

cc: Tom Futo - Oakford Winery

RR/jbh

Anu Shah, P.E.
PRINCIPAL



OAKFORD WINERY
Napa County, California

WASTEWATER MANAGEMENT SYSTEM DESCRIPTION

SANITARY SEWAGE

Oakford Vineyards is applying for a Use permit modification for the parcel (APN 027-360-018) at 1575 Oakville Grade in Oakville, California. The modification includes an approval request to install a subsurface disposal system to accommodate sanitary sewage and process wastewater generated onsite. The Sanitary Sewage (SS) will consist of typical wastewater generated from toilets, tasting room, and sinks. The process wastewater (PW) will consist of typical winery wastewater.

The wastewater treatment and disposal system will have the following components:

- 1) Septic Tank with effluent filter (SS)
- 2) Settling Tank with effluent filter (PW)
- 3) Recirculation Tank
- 4) AdvanTex AX100 textile filter treatment system
- 5) Dosing Tank
- 6) Subsurface drip headworks
- 7) Subsurface drip disposal field

A discussion of each of these features is provided below. Refer to the wastewater management system schematic in Enclosure A for a flow diagram.

- 1) Septic tank with effluent filter – A septic tank is provided for removal of solids prior to disposal of the SS. An effluent filter will be provided for the outlet of the septic tank to enhance solids removal prior to the treatment system.
- 2) Settling tanks with effluent filter – A settling tank is provided for removal of solids prior to disposal of the PW. An effluent filter will be provided for the outlet of the tank to enhance solids removal prior to the treatment system.
- 3) Recirculation tank and AdvanTex pumping system – A recirculation blending tank is provided to dilute and buffer incoming SS and PW flows prior to being dosed to the AdvanTex Textile filter. The duplex AdvanTex pumping system is timer controlled with a float override and pumps wastewater over the textile filter media for treatment.
- 4) AdvanTex treatment system – The AdvanTex textile filter treatment system consists of textile fabric media which provides surface area for bacteriological growth. AdvanTex has several hundred installations across the country and routinely produces quality effluent appropriate for subsurface drip disposal.

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- 5) Dosing Tank – The treated SS/PW effluent from the AdvanTex treatment unit flows to a dosing tank for collection. The fluid is dosed intermittently to the disposal field over the course of the day. The pumps are timer controlled to allow for even distribution of effluent.
- 6) Subsurface drip headworks – Following the dosing sump is the subsurface drip system headworks. The headworks include valves for flushing of the lines and a filter to prevent clogging of the drip tubing emitters.
- 7) Subsurface drip disposal field – The disposal field proposed will utilize subsurface drip tubing as manufactured by GeoFlow. Subsurface drip allows for even distribution of effluent into the most permeable soil layer which enhances the uptake of effluent.

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Project 2004074

OAKFORD WINERY

ENCLOSURE A

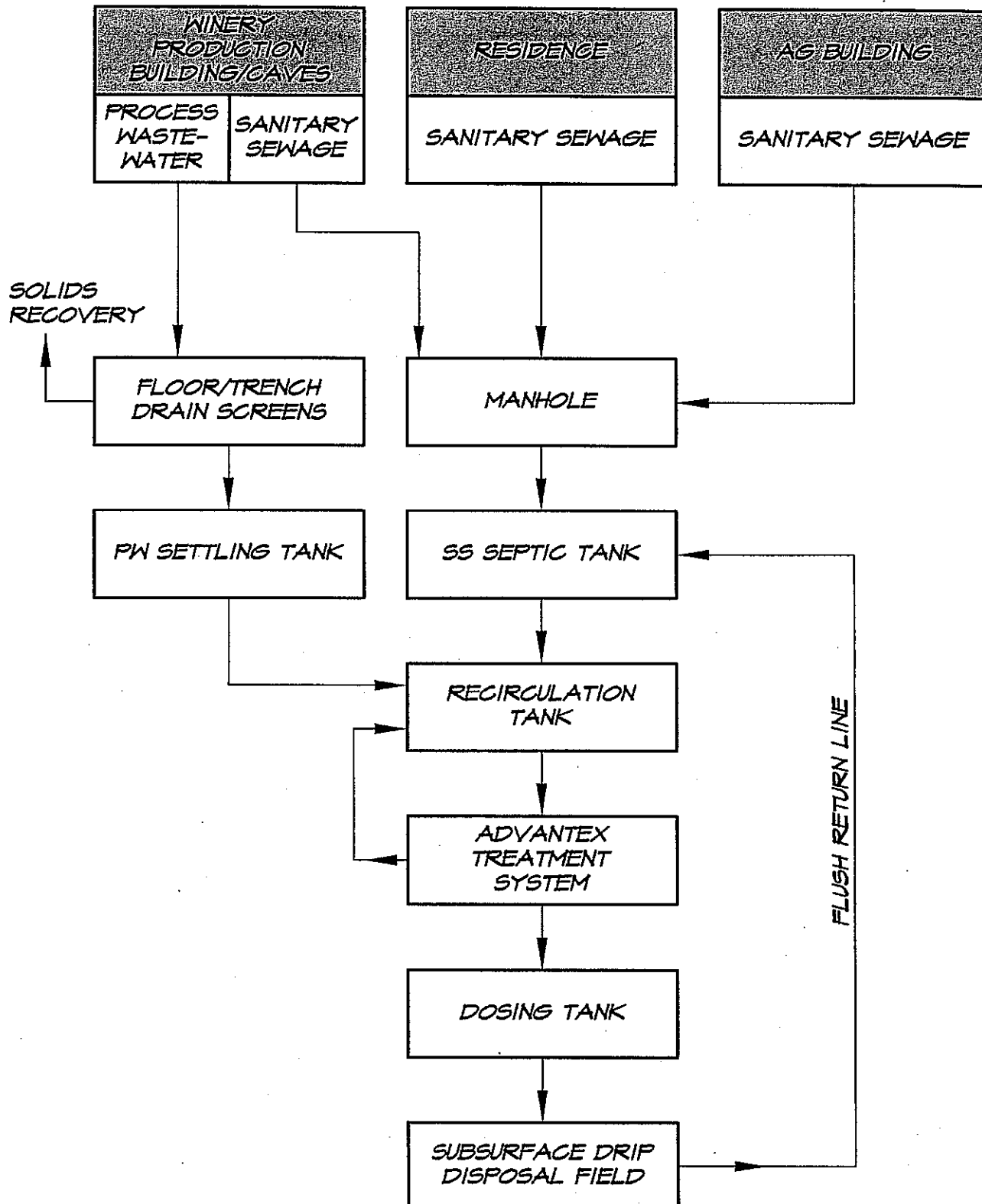
**WASTEWATER SYSTEM SCHEMATIC
TYPICAL WINERY WW CHARACTERISTICS**

OAKFORD WINERY
1575 OAKVILLE GRADE
OAKVILLE, CALIFORNIA
APN: 027-360-018



WASTEWATER SYSTEM SCHEMATIC

PROJECT NO. 2004074 DATE 12-11-2007
BY RC CHK RR SHT NO 1 OF 1



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TYPICAL WINERY PROCESS WASTEWATER CHARACTERISTICS

<u>Characteristic</u>	<u>Units</u>	Crushing Season	Noncrushing Season
		<u>Range</u>	<u>Range</u>
pH	--	2.5 - 9.5	3.5 - 11.0
Dissolved Oxygen	mg/L	0.5 - 8.5	1.0 - 10.0
BOD ₅	mg/L	500 - 12,000	300 - 3,500
C.O.D.	mg/L	800 - 15,000	500 - 6,000
Grease	mg/L	5 - 30	5 - 50
Settleable Solids	mg/L	25 - 100	2 - 100
Nonfilterable Residue	mg/L	40 - 800	10 - 400
Volatile Suspended Solids	mg/L	150 - 700	80 - 350
Total Dissolved Solids	mg/L	80 - 2,900	80 - 2,900
Nitrogen	mg/L	1 - 40	1 - 40
Nitrate	mg/L	0.5 - 4.8	-
Phosphorous	mg/L	1 - 10	1 - 40
Sodium	mg/L	35 - 200	35 - 200
Alkalinity (CaCO ₃)	mg/L	40 - 730	10 - 730
Chloride	mg/L	3 - 250	3 - 250
Sulfate	mg/L	10 - 75	20 - 75

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OAKFORD WINERY

ENCLOSURE B

**WASTEWATER MANAGEMENT SYSTEM FEASIBILITY STUDY
DESIGN CRITERIA**

SUMMIT ENGINEERING, INC.

Consulting Civil Engineers

Project No. 2004074

Revised: December 20, 2007

OAKFORD WINERY
Napa County, California

**WASTEWATER MANAGEMENT SYSTEM FEASIBILITY STUDY
DESIGN CRITERIA**

WINERY PROCESS WASTEWATER

Characteristics -- Typical winery process wastewaters: tank, barrel, equipment, and floor cleaning. Crushing and portable bottling occurs at the facility. No distillation will occur at the facility; hence there will be no stillage waste.

Collection and Transport -- Process wastewater (PW) is screened and collected at floor and trench drains within the winery, and at exterior crush, receiving and tank areas. PW is transported from the winery by gravity to a PW settling tank. PW then flows through an effluent filter prior to discharge into the recirculation tank where it is directed to the treatment system prior to subsurface drip disposal.

Sanitary sewage (SS) is collected within the winery, residence, and agricultural building. SS is transported by gravity to a septic tank in the treatment area. SS then flows through an effluent filter prior to discharge into the recirculation tank where it is directed to the treatment system prior to subsurface drip disposal.

Treatment -- Treatment of combined SS and PW flows shall be accomplished with an Orenco Systems AdvanTex style treatment module. Numerous systems of this type exist in Napa County and are permitted by the Napa County Department of Environmental Management (NCEM). The treatment system allows for treatment of constituents to pretreated effluent standards prior to subsurface drip disposal as defined by NCEM Alternative Sewage Treatment System (ASTS) guidelines.

Design Flows

Design flows are based on peak production. Process wastewater will be generated from approximately 60.5 tons crushed and produced onsite, corresponding to approximately 10,000 gallons of wine per year. Based on typical flow data from wineries of similar size and characteristics and corresponding calculated PW generation rates, projected flows are calculated as follows:

Annual Volume

$$\begin{aligned} \text{Gallons of wine produced} &= 60.5 \text{ tons processed} \times 165 \text{ gal wine/ton} = \underline{9,982.5 \text{ gallons}} \\ &\qquad\qquad\qquad \underline{\text{Say 10,000 gallons}} \end{aligned}$$

$$\text{Generation rate} = 6.0 \text{ gal PW/gal wine}$$

$$\text{Total Annual Volume} = 10,000 \text{ gal wine} \times 6.0 \text{ gal PW/gal wine} = \underline{60,000 \text{ gal PW}}$$

Average Day Flow

$$60,000 \text{ gal PW} \div 365 \text{ days} = \underline{164.4 \text{ gpd PW}}$$

Average Harvest Day Flow

$$60.5 \text{ tons} \times 165 \text{ gal wine/ton} \times 1.25 \text{ gal PW/gal wine} \div 45 \text{ day crush} = \underline{277.3 \text{ gpd PW}}$$

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Napa County Peak Day Flow

Normally a production level of 10,000 gallons per year would entail a 30 day harvest period. Since the facility is an estate grown and custom crush facility for red and white wines, the winemaker feels that the harvest period will always be 45 days or greater. See Enclosure E for a copy of this letter.

$$\frac{10,000 \text{ gpy} \times 1.5}{45 \text{ days}} = 333.3 \text{ gal PW/day}$$

Due to uncertainty of actual processing water use at small wineries, an additional 25% capacity is added into the peak PW Flow. The PW Design flow is calculated as follows:

$$333.3 \text{ gpd PW} \times 125\% = 416.7 \text{ gpd PW}$$

Say 420 gpd

Winery
PW = 420 gpd

A design flow of 420 gpd PW will be used.

Process Wastewater Settling Tanks

The required settling tank size for the winery PW flow per criteria from NCEM is calculated as a minimum detention time of three days, resulting in:

$$420 \text{ gal/day} \times 3 \text{ day} = 1,260 \text{ gal}$$

2,500 gal
Settling tank

Oakford Winery will utilize one new 2,500-gallon process wastewater settling tank. A tank of this size provides almost six days of detention time at peak flows. An effluent filter will be installed at the outlet of the settling tank to reduce solids passage to the AdvanTex Filter Pod and disposal field.

SANITARY SEWAGE

Sanitary sewage (SS) at the Oakford Vineyards property will consist of typical wastewater generated from tasting, restrooms, laboratory, future residence, and agriculture storage building.

FUTURE RESIDENCE

Low flow fixtures will be utilized throughout the future residence resulting in a 20% reduction of SS flow. Flows are projected as follows:

Average Day

$$3 \text{ bedroom residence} \times 150 \text{ gpd/ bedroom} = 450 \text{ gpd}$$

Residence
= 450 gpd

AGRICULTURE STORAGE BUILDING

The site development will also include an agriculture storage building which will have a break room, restroom, and exterior emergency shower for vineyard laborer use. The break room will have a refrigerator, sink, and microwave. The break room will not have any food preparation or clean up equipment such as an oven or dishwasher. The peak laborer use is expected to occur during the spring. The number of laborers onsite during harvest is similar to a typical laborer day. Table 4 of the Napa

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County ASTS Guidelines estimates 15 gpd per employee for a wine tasting facility. The use at the agriculture building is expected to be equal to or less than a typical employee and therefore 15 gallons per employee is used. Utilizing this generation rate, the SS flow estimated from the agriculture building is calculated as follows:

Peak Day (Spring or Fall Work Day)

$$10 \text{ employees} \times 15 \text{ gal/laborer/day} = 150 \text{ gpd SS}$$

*As Avg
= 150 gpd*

A peak contribution of 150 gallons per day is projected from the agriculture building.

WINERY

The winery is open for tours and tasting by appointment only. Therefore, tasting visitors will not be scheduled the day of an event. The winery expects a maximum of 2 tours and tastings per week with a maximum of 10 people per tour. In addition, the winery marketing plan indicates that a wine auction event will occur approximately twice per year with a maximum of 40 people in attendance. Anticipated sanitary sewage flows from these employees and visitors are projected as follows:

Average Day w/ Peak Visitation (Non-Harvest)

$$\begin{array}{rcl} 2 \text{ full-time employees} \times 15 \text{ gpd} & = & 30 \\ 10 \text{ visitors} \times 3 \text{ gpd} & = & 30 \\ \text{Total} & = & 60 \text{ gpd} \end{array}$$

Average Day w/ Marketing Event (Non-Harvest)

$$\begin{array}{rcl} 2 \text{ full-time employees} \times 15 \text{ gpd} & = & 30 \\ 40 \text{ visitors} \times 3 \text{ gpd} & = & 120 \\ \text{Total} & = & 150 \text{ gpd} \end{array}$$

Harvest Day w/ Peak Visitation

$$\begin{array}{rcl} 2 \text{ full-time employees} \times 15 \text{ gpd} & = & 30 \\ 2 \text{ full-time seasonal employees} \times 15 \text{ gpd} & = & 30 \\ 10 \text{ visitors} \times 3 \text{ gpd} & = & 30 \\ \text{Total} & = & 90 \text{ gpd} \end{array}$$

*Winery
= 90 gpd*

Harvest Day w/ Marketing Event

$$\begin{array}{rcl} 2 \text{ full-time employees} \times 15 \text{ gpd} & = & 30 \\ 2 \text{ full-time seasonal employees} \times 15 \text{ gpd} & = & 30 \\ 40 \text{ visitors} \times 3 \text{ gpd} & = & 120 \\ \text{Total} & = & 180 \text{ gpd} \end{array}$$

TOTAL SANITARY SEWAGE DESIGN FLOW

Future Residence + Agriculture Building + Winery

Average Day (Non-Harvest) = Residence Avg. + Agriculture Building Peak + Winery Avg. w/ Event

$$= 450 \text{ gpd} + 150 \text{ gpd} + 150 \text{ gpd}$$

$$= 750 \text{ gpd SS}$$

Peak Day (Harvest) = Residence + Agriculture Building Peak + Winery Peak

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$$= 450 \text{ gpd} + 150 \text{ gpd} + 180 \text{ gpd}$$

$$= 780 \text{ gpd}$$

A total SS flow of 780 gpd shall be used for design of the SS septic tanks treatment, and disposal systems.

Sanitary Wastewater Septic Tanks

The required septic tank size for the winery and residence SW flow based on Napa County Environmental Management criteria is calculated from NCEM Table 13.44.020:

Flow, gal/d	Recommended Minimum Capacity, gal
600	1,200
900	1,500
1,200	2,000
1,500	2,500

Septic Tank
1,500 gal

One new 1,500 gallon septic tank is adequate to handle the SS flow from the future residence, agriculture storage building, and all winery domestic waste. An effluent filter will be installed at the outlet of the septic tank to reduce solids passage to the AdvanTex Filter Pod and disposal field.

COMBINED WASTEWATER SUMMARYPeak Non-Harvest Day

Average Day Winery PW	= 164 gpd
Average Day Winery SS with event	= 150 gpd
Average Day Residence SS	= 450 gpd
Peak Day Ag. Storage Bldg. SS	= 150 gpd
Total	914 gpd

Peak Week Harvest Day

An event will not be planned for the same day as the peak production day and therefore the peak harvest day without an event is presented as the peak day.

Peak Week Harvest Day Winery PW	= 420 gpd
Peak Harvest Day Winery SS without event	= 90 gpd
Average Day Residence SS	= 450 gpd
Average Day Ag. Storage Bldg. SS	= 150 gpd
Total	1,110 gpd

A total flow of **1,110 gallons per day** will be utilized in design of the system components.

ADVANTEX TEXTILE FILTER TREATMENT SYSTEM

The Oakford Vineyard and Winery AdvanTex filter treatment system component sizing is as follows:

AdvanTex units:	1 – AX100 Filter Pods
Recirculation/blending Tank:	1 – 3,000 gallon tank

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The recirculation/blending tank provided will allow for 2.7 days retention at peak flows and 3.3 days at average flows. Orenco Systems Inc. recommends a minimum of one (1) day retention in the recirculation/blending tank at peak flows and a minimum of three (3) days retention at average flows. The AdvanTex Textile filter AX100 treatment systems are sized for average flows of 2,500 gpd and peak flows of 5,000 gpd for commercial wastewater sources. Therefore, the peak and average flows are well within the design parameters provided by the manufacturer. A conservative system design has been provided due to the strength of the BOD associated with winery PW.

SITE EVALUATION SOIL AND PERCOLATION DATA

A site evaluation was conducted on July 18, 2003 with Napa County Environmental Management (NCEM) Registered Environmental Health Specialist (REHS) Darell Choate and Summit Engineering, Inc. Three soil profiles were excavated in the vicinity of the disposal field. Soil profile 1 exhibited 30 inches of very coarse sandy clay loam and was assigned a 6 to 12 inch per hour percolation rate. Below 30 inches the soil exhibited greater than 50% rock. Soil profiles 2 and 3 were similar and exhibited a minimum of 60 inches of very coarse sandy cobbly loam. See Enclosure C for the Site Evaluation Results prepared by NCEM.

SUBSURFACE DRIP DISPOSAL SYSTEM

Subsurface drip system disposal field sizing is based on the drip tubing manufacture's recommendation as well as Table 10 of the Napa County ASTS guidelines. The onsite soil is identified in Table 10 of the ASTS Guidelines as a class II soil type (sandy loam), which corresponds to an estimated percolation rate of 10 to 20 MPI, and is used to size the system. Approximately 100 square feet of drip field is required for every 100 gpd of effluent discharged. The size of disposal field required is calculated as follows:

$$1,110 \text{ gpd} \quad \times \quad \frac{100 \text{ square feet}}{100 \text{ gpd effluent}} \quad = \quad 1,110 \text{ square feet}$$

A disposal field of approximately 1,150 square feet (16' x 72') will be provided for disposal of effluent from Oakford Vineyards and Winery. Additional sizing calculations is provided in Enclosure B.

The drip tubing will be installed in 6 inch deep trenches with 6 inches of native backfill. Installation of the drip tubing near the soil surface will maximize the evaporation and percolation into the root zone of the soil.

Miscellaneous Comments

Flood Level -- The proposed septic tanks and subsurface drip disposal system are located outside the 100-year flood plain.

Odors -- No obnoxious odors are anticipated from a properly operated system of this type.

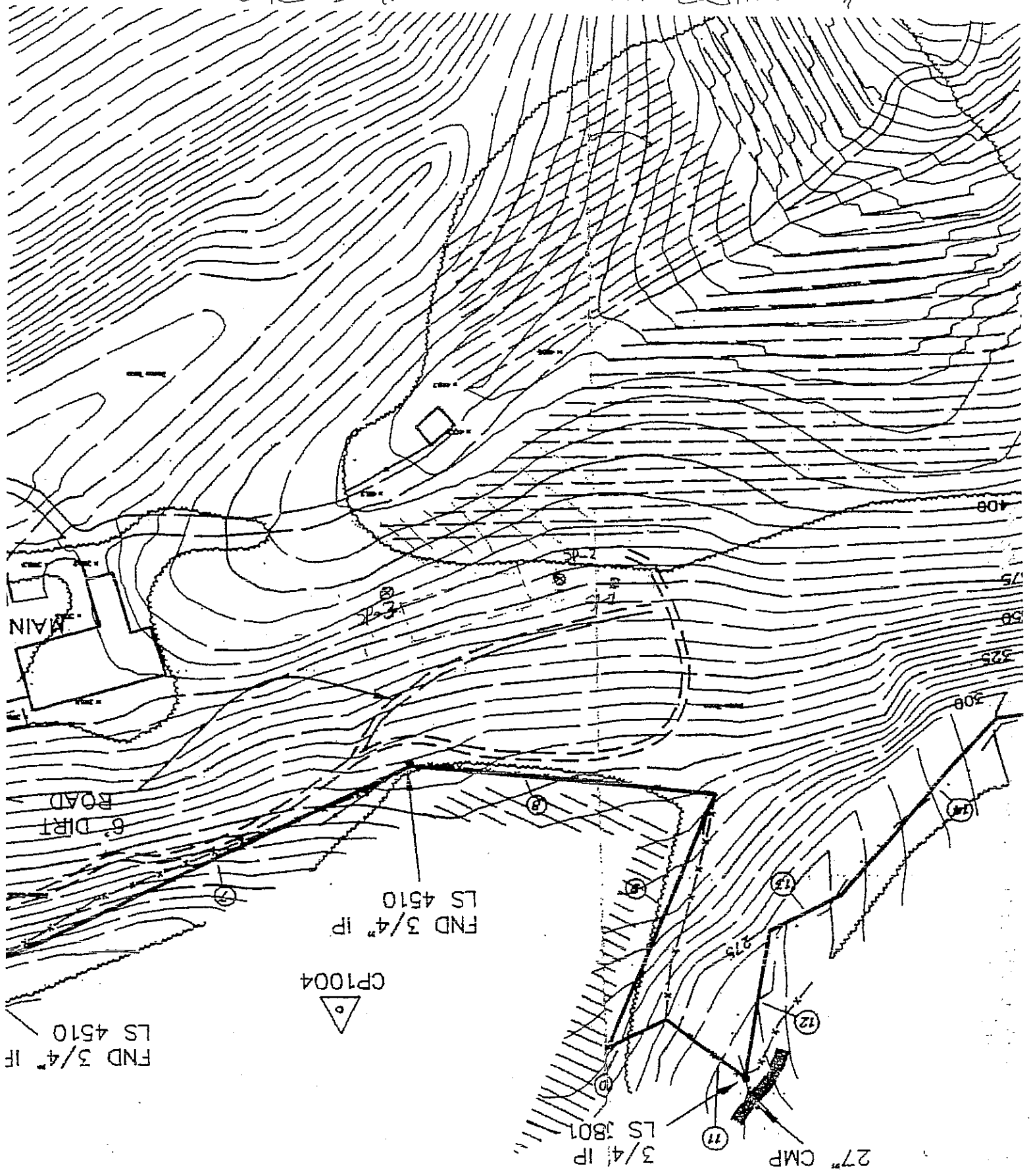
Noise -- Minimal noise is generated by the collection, treatment, and disposal systems

Visual -- No change. Treatment system to be located downhill of the winery to preserve aesthetic desires of the owners.

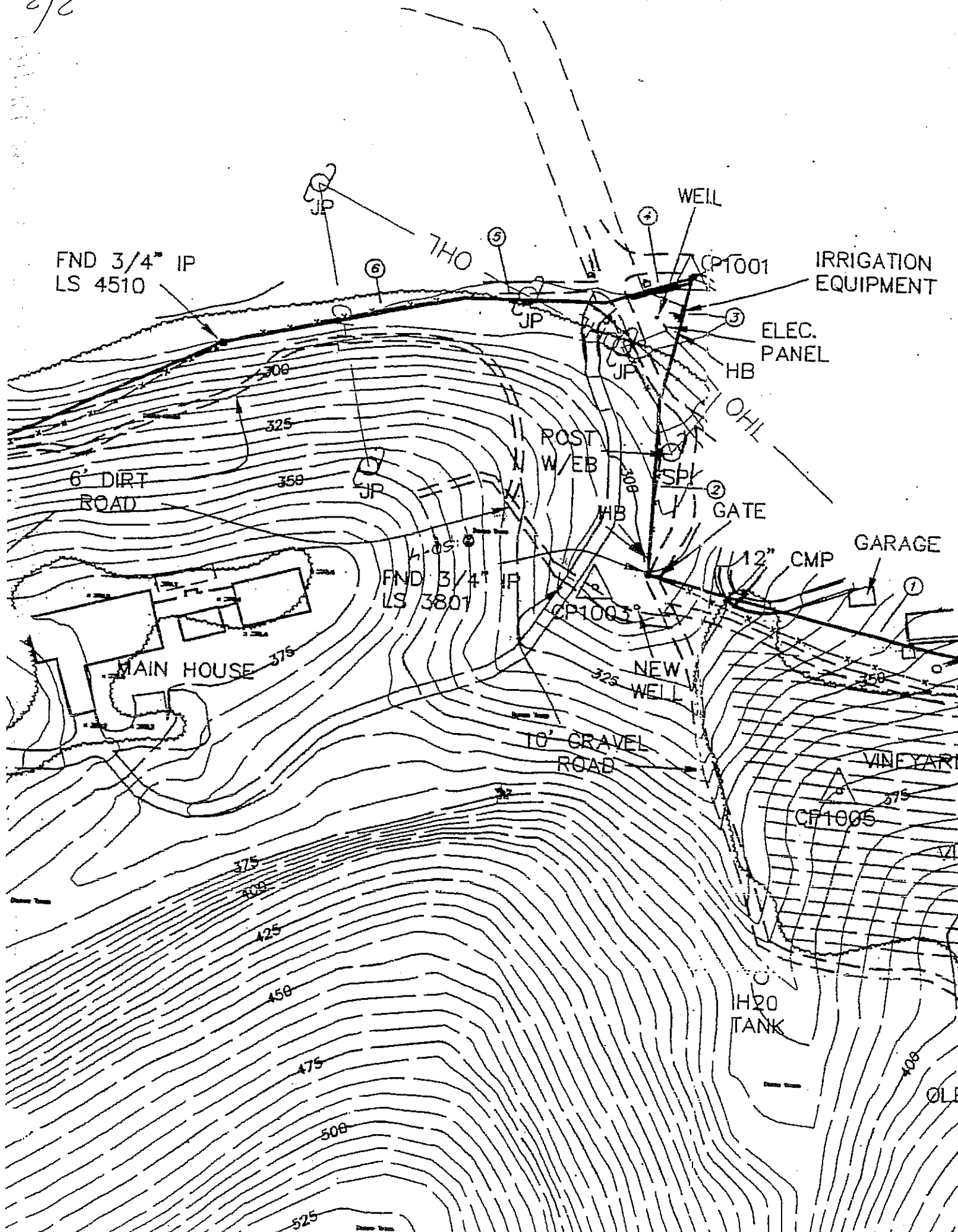
Access -- Existing open space

Solid Waste -- Captured solids from the process wastewater floor screens will be collected and composted onsite and ultimately reapplied to the vineyard or collected and hauled offsite. Septic tanks will be pumped once every three years to remove accumulated solids.

SITE EVALUATION TEST PIT LOCATION MAP



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Project 2004074

OAKFORD WINERY

ENCLOSURE D

WINEMAKER STATEMENT


Futo Family Winery, formerly Oakford Winery, (the "Winery") is applying for a use permit modification to increase its annual production from 5,000 to 10,000 gallons per year. This letter supplements the revised Wastewater Feasibility Report prepared by Summit Engineering and submitted in support of this application.

The Wastewater Feasibility Report utilizes a 45-day crush period. The 45-day crush period is justified for the following reasons:

- The varietals planted in the Winery's vineyards, primarily Cabernet Sauvignon, Merlot, Cabernet Franc and Petit Verdot, ripen at different times. Generally speaking, Merlot ripens earlier than Cabernet Sauvignon; Petit Verdot, later.
- The vineyards are planted on varied hillside terrain and are broken into numerous smaller blocks with varying rootstock, soil and exposure to temperature. These blocks ripen at different rates due to the variation in these characteristics.
- The Winery employs several wine making practices which tend to lengthen the crush. For example, each of the vineyard blocks is picked separately and hand-sorted, a very time-consuming and labor intensive practice. Also, because of the proximity of the vineyards to the Winery, the length of the haul to the crush pad is a short one, which allows grapes to be harvested at a very mature stage, compared to grapes facing a longer haul to a winery located farther away. Finally, the Winery utilizes 18 small fermentation tanks (and additional t-bins from time to time), which allow individual blocks ripening at different times to be harvested and fermented separately.

For the above reasons, the Winery's operations justify the use of a 45-day crush period in its Wastewater Feasibility Report.

Please call me if you have any questions.


Tom Futo, Proprietor

F U T O W I N E S

P.O. Box 410 | Oakville, CA 94562-0410 | 707.944.9333 | Fax 707.944.9334