

September 24, 2007
#07-14

Christine M. Secheli
Napa County Department of Environmental Management
1195 Third Street, Room 101
Napa, CA 94559

Re: Onsite Wastewater Disposal Feasibility Study for the Cimarossa Winery, 1185 Friesen Drive, Angwin, CA, APN 018-060-069

Dear Ms. Secheli:

At the request of Dino Dina, M.D., we have evaluated the feasibility of providing onsite wastewater disposal for the proposed Cimarossa Winery located at 1185 Friesen Drive in Napa County, California. It is our understanding that the winery will have a full crushing production of 10,000 gallons of wine per year. All wine production will take place in a new 3,053 square foot winery building with a 939 square foot covered outdoor work area and a 2,500 ± square foot cave. The maximum staffing level at the winery will consist of two full-time employees and two part-time employees. The winery will have a very limited marketing program.

Following is a summary of the proposed marketing plan:

<u>Description</u>	<u>Frequency</u>	<u>Number of Visitors</u>
Private Tours & Tastings	5 to 7 per week	4 to 8 per day
Food & Wine Pairings	2 per month	20 per day
Industry Open House Events	2 per year	40 per day
Auction Related Events	2 per year	100 per day

There is currently a main residence on the property. The existing septic system that serves the existing residence consists of approximately 375 lineal feet of standard gravity distribution leach lines located approximately 450 feet south of the existing residence. The existing septic system was permitted on November 9, 1978 and was designed to serve the wastewater disposal needs for a three bedroom residence. Furthermore, the existing septic system is located at an elevation greater than the proposed winery cave elevation and within 1,500 feet of the proposed winery cave. There is limited information available on the design and construction of the existing septic system; therefore, we recommend that additional exploration be performed to determine if the existing septic system is properly designed and sited or that the existing septic system be abandoned in place and that sanitary

wastewater from the existing residence be accommodated in the proposed septic system that will serve the proposed winery. The remainder of this report is based on the assumption that the existing septic system will be abandoned and that the proposed winery septic system will be designed to accommodate the sanitary wastewater flow from the existing residence.

This feasibility study is based on the aerial topographic map prepared by Delta Geomatics Corporation dated November 20, 1997, the "Topographic Map of the Lands of Cimarossa Winery" prepared by Michael W. Brooks & Associates dated July 2007 and a site evaluation performed on June 29, 2007 by Bartelt Engineering and Napa County Department of Environmental Management.

As part of our work we have reviewed files at Napa County Department of Environmental Management, held conversations with Napa County Department of Environmental Management staff, as well as performed several visits to the site to view existing conditions.

The following calculations are the basis for our recommendations:

Winery Process Wastewater Flow

Peak Winery Process Wastewater Flow =

$$\frac{(10,000 \text{ gallons of wine per year})(1.5 \text{ gallons of water per 1 gallon of wine})}{30 \text{ days of crush per year}} = 500 \text{ gpd}$$

Average Winery Process Wastewater Flow:

$$\frac{(10,000 \text{ gallons of wine per year})(6 \text{ gallons of water per 1 gallon of wine})}{365 \text{ days per year}} = 164 \text{ gpd}$$

Winery Sanitary Wastewater Flow

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

Sanitary wastewater flows at the proposed winery can be itemized as follows:

Employees:

$$(4 \text{ employees}) \times (15 \text{ gpd per employee}) = 60 \text{ gpd}$$

Private Tours & Tastings:

$$(8 \text{ visitors per day}) \times (3 \text{ gallons per visitor}) = 24 \text{ gpd}$$

Food & Wine Pairings:

$$(20 \text{ visitors per day}) \times (5 \text{ gallons per visitor}) = 100 \text{ gpd}$$

Industry Open House Events:

$$(40 \text{ visitors per day}) \times (5 \text{ gallons per visitor}) = 200 \text{ gpd}$$

It is planned that Private Tours & Tastings, Food & Wine Pairings and Industry Open House Events will not be held on the same day. Furthermore, portable sanitary facilities will be used for all events with more than 40 guests in attendance. The peak winery sanitary wastewater flow is the total peak flow for winery employees and guests of industry open house events and is calculated as follows:

$$\text{Peak Winery Sanitary Wastewater Flow} = 60 \text{ gpd} + 200 \text{ gpd}$$

$$\text{Peak Winery Sanitary Wastewater Flow} = 260 \text{ gpd}$$

Existing Residence Sanitary Wastewater Flow

Peak sanitary wastewater flow from the existing residence is calculated based on three bedrooms and a design flow of 150 gallons per day per bedroom.

$$\text{Peak Residential Sanitary Wastewater Flow} =$$

$$(3 \text{ bedrooms}) \times (150 \text{ gallons per day per bedroom}) = 450 \text{ gpd}$$

Wastewater Disposal Recommendations

Based on the predicted wastewater flows outlined above and the soil conditions encountered during the site evaluation performed by Bartelt Engineering on June 29, 2007, we recommend two possible options for onsite wastewater disposal. Option #1 consists of treating and disposing of the sanitary wastewater from the proposed winery and the sanitary wastewater from the existing residence via a subsurface drip type disposal system and disposing of the process wastewater from the proposed winery via surface drip irrigation at the existing onsite olive orchard. Option #2 consists of treating and disposing of the sanitary and process wastewater from the proposed winery and the sanitary wastewater from the existing residence in a subsurface drip type disposal system. Following is a more detailed explanation of each option.

Option #1 Separate Sanitary and Process Wastewater Disposal Systems

Sanitary Wastewater Design Flow

This option consists of collecting all sanitary wastewater from the proposed winery and existing residence, removing the settleable solids, treating the wastewater to lower the BOD and suspended solids levels to Napa County's Pre-Treated Effluent standards and ultimately disposing of the treated sanitary wastewater via a subsurface drip disposal field.

The design flow for the proposed subsurface drip disposal field can be calculated as follows:

Design Flow = Peak Winery Sanitary Wastewater Flow + Peak Residential Sanitary Wastewater Flow

Design Flow = 260 gpd + 450 gpd

Design Flow = 710 gpd

Required Disposal Field Area

The soils encountered in the area of the proposed disposal field can generally be described as having a United States Department of Agriculture Soil Texture Classification of Sandy Clay Loam with a moderate subangular blocky structure and a shallow acceptable soil depth of approximately 30 to 50 inches. Based on this analysis, we have determined that the soil in the area of the proposed disposal field is Class III. The design hydraulic loading rate for a Class III soil is 0.6 gallons per square foot per day (reference Table 10 in Napa County's Design Construction and Installation of Alternative Sewage Treatment Systems).

The required disposal field area can be calculated as follows:

Required Area = $\frac{710 \text{ gallons per day}}{0.60 \text{ gallons per square foot per day}} = 1,183 \text{ square feet, use } 1,200 \text{ square feet}$

Since the proposed disposal field is located in an area with a slope greater than 20% we recommend that the disposal field area be increased by 50% to allow for a greater spacing between emitter laterals (perpendicular to the contour).

Disposal Field Area = 1,200 square feet x 1.5 = 1,800 square feet

There is adequate area to install the proposed disposal field and to accommodate the 200% reserve area (3,600 square feet) in the vicinity of Test Pits #9, #10 and #11 (see Cimarossa Winery Conceptual Site Improvement Plan prepared by Bartelt Engineering dated September 2007).

Process Wastewater Disposal

In this scenario the process wastewater will be collected in a system that is completely separate from the sanitary wastewater system. Treatment of the process wastewater from the proposed winery will include removing the settleable solids, treating the wastewater to lower the BOD and suspended solids levels, temporary storage of the treated winery process wastewater and disposal of the treated winery process wastewater via irrigation of the existing onsite olive orchard.

Treatment requirements for the winery process wastewater disposal system are as follows:

<u>Characteristic</u>	<u>Units</u>	<u>Pre-Treatment</u>	<u>Post-Treatment</u>
pH	N/A	2.5 to 5.5	6.0 to 8.0
BOD ₅ Mass Loading	mg/l	2,000 to 7,000	160
Total Suspended Solids	mg/l	10 to 500	80
Settable Solids (SS)	mg/l	25 to 100	1.0

The treated winery process wastewater storage tank must have a minimum volume of 15,000 gallons (see attached Table I) to provide for storage of the treated winery process wastewater through the winter months when land application is not feasible and to equalize differences between the winery process wastewater generation rate and the irrigation application rate. Reference evapotranspiration rates and crop coefficients were used to calculate the irrigation demand for the existing olive trees (see attached Table III). Reference evapotranspiration rates and crop coefficients were obtained from the California Irrigation Management Information System website (<http://www.cimis.water.ca.gov>). It was assumed that available groundwater in the root zone is depleted by May and that irrigation is applied to the olive trees for the months of May through November. In several months the irrigation demand exceeds the amount of treated process wastewater that is available for irrigation. In these months it is assumed that the entire irrigation requirement for the olive trees is not met or that another water source is used to supply additional irrigation water.

The winery process wastewater disposal area design is based on the use of 100 existing olive trees located in close proximity to the existing winery. The design could be expanded to include other existing olive trees or vineyard on the property. The disposal area is located outside of all disposal field setbacks as shown on the Cimarossa Winery Conceptual Site Improvement Plan. Furthermore, all disposal field areas will be labeled with signage indicating the use of treated winery process wastewater for irrigation in accordance with Napa County Department of Environmental Management standards.

Option #2 – Combined Sanitary and Process Wastewater Disposal System

This option consists of collecting all sanitary and process wastewater from the proposed winery and the existing residence, removing the settleable solids, treating the wastewater to lower the BOD and suspended solids levels to Napa County's Pre-Treated Effluent standards and ultimately disposing of the treated process and sanitary wastewater via a subsurface drip disposal field.

Sanitary and Process Wastewater Design Flow

The design flow for the proposed subsurface drip disposal field can be calculated as follows:

Design Flow = Peak Winery Process Wastewater Flow + Peak Winery Sanitary Wastewater Flow + Peak Residential Sanitary Wastewater Flow

Design Flow = 500 gpd + 260 gpd + 450 gpd

Design Flow = 1,210 gpd

Required Disposal Field Area

The soils encountered in the area of the proposed disposal field can generally be described as having a United States Department of Agriculture Soil Texture Classification of Sandy Clay Loam with a moderate subangular blocky structure and a shallow acceptable soil depth of approximately 30 to 50 inches. Based on this analysis, we have determined that the soil in the area of the proposed disposal field is Class III. The design hydraulic loading rate for a Class III soil is 0.6 gallons per square foot per day (reference Table 10 in Napa County's Design Construction and Installation of Alternative Sewage Treatment Systems).

The required disposal field area can be calculated as follows:

Required Area = $\frac{1,210 \text{ gallons per day}}{0.60 \text{ gallons per square foot per day}} = 2,017 \text{ square feet, use } 2,100 \text{ square feet}$

Since the proposed disposal field is located in an area with a slope greater than 20% we recommend that the disposal field area be increased by 50% to allow for a greater spacing between emitter laterals (perpendicular to the contour).

Disposal Field Area = 2,100 square feet x 1.5 = 3,150 square feet, use 3,200 square feet

There is adequate area to install the proposed disposal field in the vicinity of Test Pits #9, #10 and #11 (see Cimarossa Winery Conceptual Site Improvement Plan prepared by Bartelt Engineering dated September 2007). The reserve area will be accomplished in two parts. The 200% reserve area for the sanitary wastewater disposal system (3,600 square feet as calculated in Option #1 above) will be located in the vicinity of Test Pits #9, #10 & #11.

Additional area is also available in the vicinity of Test Pit #13 if needed. The reserve area for the process wastewater will be surface irrigation of the existing olive orchard as described in Option #1 above.

Cave Setbacks to Septic Systems

We reviewed Napa County Department of Environmental Management's files to determine if there are any septic systems located within 1,500 feet uphill or 50 feet downhill of the proposed cave. Based on the Napa County Geographic Information System topographic maps and parcel boundary overlay, we identified three parcels that have elevations greater than or equal to the elevation of the proposed cave invert that are also located within 1,500 feet of the proposed cave as shown on the attached Cave Location Site Map. The following is a summary of our findings regarding existing septic systems on the three parcels:

APN 018-060-069

As previously noted there is one existing septic system located on the subject parcel. The existing septic system was permitted on November 9, 1978 and was designed to serve the wastewater disposal needs for a three bedroom residence. The existing septic system is located at an elevation greater than the proposed winery cave elevation and within 1,500 feet of the proposed winery cave. We recommend that the existing septic system be abandoned in place and that the wastewater disposal needs for the existing residence be accommodated in the new winery wastewater disposal system. The proposed septic system will be located outside of all setbacks in accordance with the current Napa County Department of Environmental Management standards.

APN 018-280-003

No septic system information was available at the time this report was prepared.

APN 018-060-064

No septic system information was available at the time this report was prepared.

It is our opinion that if the existing septic system is abandoned the cave siting is consistent with the intent of the Napa County Department of Environmental Management policy regarding septic system setbacks to cave structures as outlined in a Memorandum from Trent Cave to Environmental Management Land Use Staff dated January 2004 (see attached). Our analysis is limited to the information that was available from Napa County Department of Environmental Management at the time of our research and the accuracy of the topographic maps and parcel boundary overlay obtained from Napa County. Bartelt Engineering does not make any guarantee regarding the accuracy or completeness of the information obtained from Napa County.

Summary

It is our opinion that the proposed Cimarossa Winery project is feasible from a wastewater disposal standpoint.

The above calculations should be adequate for your review of the Use Permit application being considered by Napa County. Detailed design calculations and plans will be submitted for your review upon approval of the Use Permit. If you have any questions regarding our recommendations please feel free to call us.

Sincerely,

Michael R. Muelrath

Michael R. Muelrath, P.E.
Project Engineer



MRM:sd

enclosures

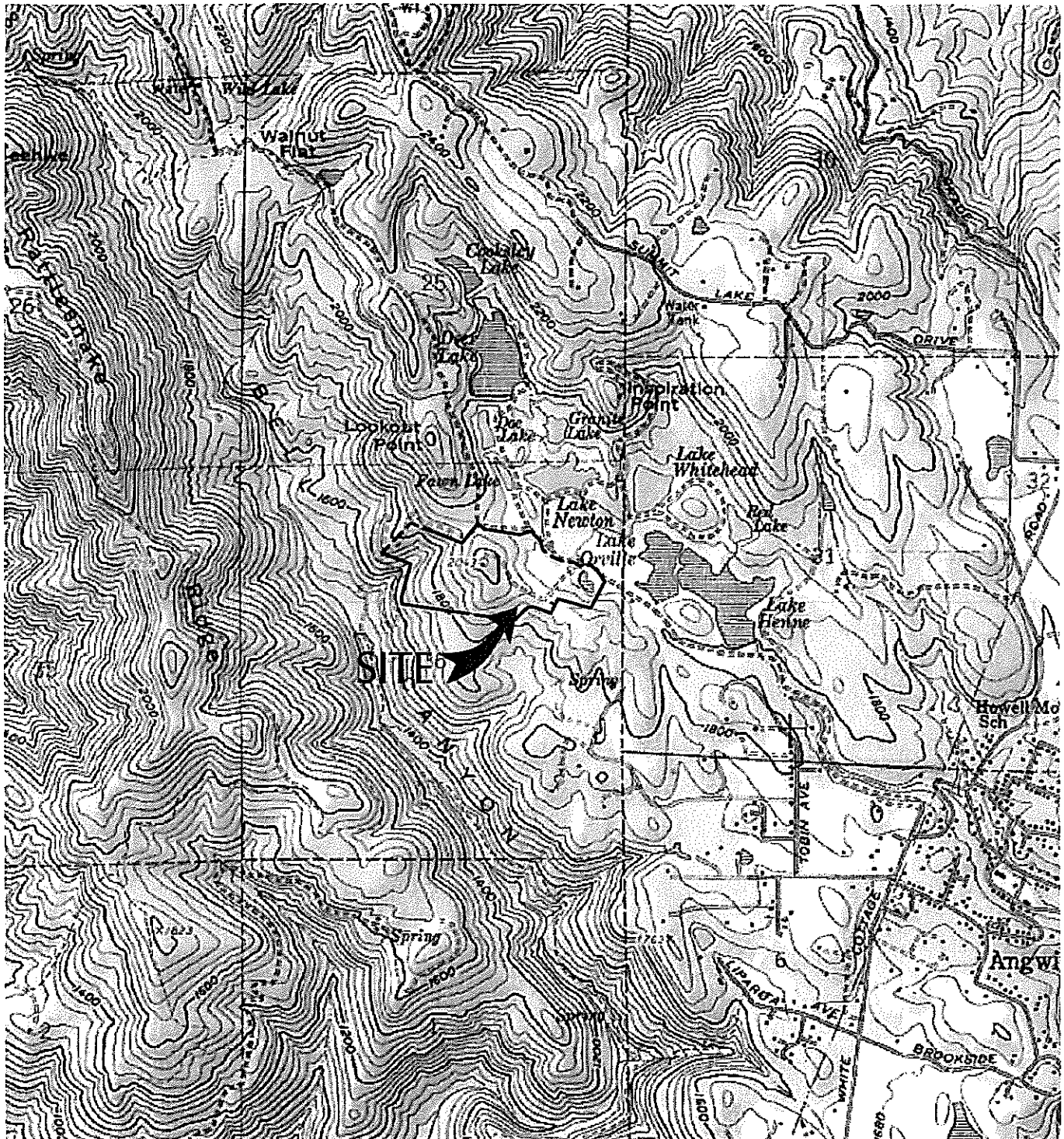
cc: Dino Dina, M.D. & Cornelia Dekker
Cary Gott
Tom Faherty
Donna Oldford

TOPOGRAPHIC SITE LOCATION INFORMATION



USGS 7.5 MINUTE QUADRANGLE "ST. HELENA"

Scale: 1" = 2000'



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Cimarossa Winery

1185 Friesen Drive
Angwin, California

APN 018-060-069

Job no. 07-14

September 2007

APPENDIX 1

NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
MEMORANDUM REGARDING POLICY FOR SEPTIC SYSTEM SETBACK TO CAVE
STRUCTURE
&
WINERY PROCESS WASTEWATER GUIDELINES FOR
SURFACE DRIP IRRIGATION



Department of Environmental Management

MEMORANDUM

DATE: January 2004

TO: Environmental Management Land Use Staff

FROM: Trent Cave

SUBJECT: Policy regarding septic system setback to cave structures

Because existing laws do not regulate the setback of septic systems to cave structures, this policy shall be implemented by the Department of Environmental Management. The purpose of establishing this policy is to ensure that appropriate health and safety considerations have been made with respect to the location of cave structures and septic systems. In developing this policy, the potential impact of cave drains on existing septic systems was considered as well as the potential impact of the septic system on a cave.

Caves may not be utilized commercially (winery, etc) in Napa County without the issuance of a Use Permit. If for private use, cave structures only require a building permit for the cave portal, electrical and mechanical components. Caves may, however, be constructed without any local approval which may lead to caves which are improperly sited. We are in the process of working with the State on the issuance of approvals for drilling caves, and are hopeful that they will work with us on investigating septic system locations prior to issuance of approval to drill. Until this is resolved, we will use this policy when reviewing building referrals for private cave projects, proposed septic systems and/or commenting on proposed Use Permits with caves.

A. When a proposal is submitted to use an existing or proposed cave and a septic system either exists or is proposed within 50 feet DOWNHILL from the proposed or existing cave:

1. The septic system must be at least 10 feet downhill from every part of the proposed cave structure
2. A drainage plan must be provided showing that the cave drains will not impact the septic area (existing or proposed). This plan must account for all internal and external cave drains and sub-drains. The plan must ensure that no additional water will be passed via surface or subsurface flow past the septic system area.
3. If drainage plans are not available and the above determination cannot be made, a french drain with a plastic liner on the downhill side must be installed a minimum of 10 feet uphill from the septic system area to a depth equivalent to three feet below existing or proposed trench bottom, but no shallower than 6 feet.

NOTE: If a property line exists within 50 feet downhill of the cave structure, and no information exists on file relative to septic systems on that property, the applicant must either install a french drain below the cave structure or provide a written statement from the property owner of the downhill property confirming no septic system exists within 50' of the caves.

B. When a proposal is submitted to use an existing or proposed cave and all UPHILL property lines are greater than 1500 feet from the proposed or existing cave:

1. A scaled site plan showing all existing septic systems within 1500 feet uphill must be submitted for review
2. Full scaled drawings of the cave structure must be submitted showing all cave tunnels
3. If adequate information exists on file relative to the septic systems located UPHILL from the cave, and this department can verify the septic system is sited and designed properly, a 100-foot set back must be maintained from the closest cave tunnel.
4. If adequate soil or design information is not available relative to the septic systems located UPHILL from the cave, a site evaluation must be conducted and an inspection report and plot plan of the septic system(s) uphill must be submitted for review. If it is determined that the system is properly sited and designed, a 100 foot setback must be maintained to the closest cave tunnel.
5. If this department cannot verify that the septic system is designed and sited properly and/or if the cave already exists less than 100 feet to any uphill septic system, regardless of design, an improvement must be made to the septic system in the form of a pre-treatment unit.

C. When a proposal is submitted to use an existing or proposed cave and a property line exists UPHILL closer than 1500 feet from the proposed or existing cave:

1. Full scaled drawings showing all existing or proposed cave tunnels must be submitted.
2. A scaled site plan showing all existing or proposed septic systems on the applicant's property must be submitted. Follow same procedures as in B (3-5) above.
3. Septic systems located within 1500 feet UPHILL on adjoining properties must also be considered. If the neighbors are cooperative, the applicant can submit a letter from the uphill property owners on the location of the septic systems on their properties and show such locations on a scaled site plan. The applicant must then provide the same information and make the same improvements as required per B (3-5) above. If the neighbors are uncooperative, and this department is unable to make a determination (based on information on file) that the septic system is sited and designed properly, we will recommend denial on the use of the cave (if existing) or require that the cave be moved to greater than 1500' from the UPHILL property line (if proposed).

WINERY PROCESS WASTEWATER GUIDELINES FOR SURFACE DRIP IRRIGATION (INTERIM)

DEFINITION OF WINERY PROCESS WASTEWATER:

Winery waste is defined as the waste that is a byproduct of operations that produce wine. Winery waste includes: Pomace (e.g., grape skins, stems, and seeds), lees, bottle and barrel rinse water, and equipment/floor wash water. Winery waste does not include waste produced by agricultural operations associated with the growing of wine grapes.

PRE-TREATMENT CRITERIA:

All pre-treatment technologies must be permitted to accept the wastewater strengths associated with winery wastewater. All manufacturers warranties and guarantees must be permissible for the wastewater characteristic to be applied to the pre-treatment technology. All pre-treatment technologies shall be equipped with the necessary effluent testing devices to verify effluent quality. The pre-treatment technology design shall include influent and effluent wastewater parameters. Some pre-treatment methods will require special contingency plans.

SEPTIC TANK:

Where applicable, all septic tanks and sump tanks shall be IAPMO approved. The minimum septic tank capacity shall be at least 3 days retention time or as specified by the pre-treatment technology manufacturer for the treatment of winery process wastewater. Septic tanks shall be equipped with effluent filters capable of filtering 1/16" particle size.

EFFLUENT LIMITATIONS:

The following effluent maximum limits shall be maintained prior to discharge to land, irrigation reservoir, or other irrigation storage facility.

BOD₅ = 160 mg/L

TSS = 80 mg/L

Settable Solids = 1.0 mg/L

DISPOSAL METHOD:

Winery process wastewater shall be discharged to an approved landmass via a surface drip system. Spray irrigation shall be prohibited unless explicitly approved by the Director of Environmental Management after sufficient documentation has been submitted assuring the spray irrigation system will not result in any measurable drift of treated effluent outside the dispersal area.

SOIL CRITERIA:

Wastewater shall be distributed evenly on a vegetated plot. Soils and vegetation shall be adequate to accept the wastewater applied. Land mass loading, including vegetation uptake, shall be included in all designs. The area to be applied with wastewater shall have such land features to prevent runoff or ponding of effluent in concave areas, and shall not adversely impact erosion.

DISPOSAL FIELD SIZING:

Surface drip systems are site specific and therefore, require distinctive designs. Disposal area calculations shall take into account the type of vegetation, slope of the land the effluent will be dispersed onto and the amount of effluent the specific types of vegetation can reasonably accept. This evaluation must include seasonal transpiration rates throughout the entire year.

SITE LIMITATIONS:

All parts of the wastewater disposal system shall comply with the setbacks for sewage disposal systems as defined in the Napa County Code.

WET WEATHER PROVISIONS:

Wet weather storage facilities or design components, such as irrigation reservoirs, irrigation storage tanks, diversion to subsurface system, etc., shall be incorporated into the system for when weather and soil conditions prevent surface drip of effluent. Other wet weather provisions may be approved after satisfactory evidence is submitted assuring discharge of winery wastewater is in compliance with these standards.

PROHIBITIONS:

1. Any discharge that results in pollution, contamination, or nuisance.
2. Discharge of any waste to land that is not under the control of the discharger.
3. The discharge of untreated or partially treated winery waste from anywhere within the collection, treatment, or disposal facility is prohibited.
4. The discharge of wastewater, other than winery wastewater, into a winery wastewater system is prohibited.
5. The use of treated winery process wastewater shall be restricted to designated vineyards, pastures, or landscape irrigation areas under control of the discharger.
6. Treated winery wastewater shall not be applied to the irrigation areas within two days of a forecasted rain event, during rainfall, 48 hours after a rainfall event or when soils are saturated.
7. Bypass or overflow of treated or untreated winery wastewater is prohibited.
8. The direct or indirect discharge of any waste to surface waters or surface water drainage courses is prohibited.
9. The discharge of waste classified as "hazardous" or "designated", as defined in CCR, Title 23, Chapter 15, Section 2521 (a) to any part of the wastewater disposal system is prohibited.

APPENDIX 2

CIMAROSSA WINERY WASTEWATER STORAGE TANK, PROCESS WASTEWATER FLOW & IRRIGATION DEMAND CALCULATIONS

Cimarossa Winery
Wastewater Storage Tank Calculations
 Table I

STORAGE TANK WATER BALANCE (GALLONS):

Month	Beginning Balance	Wastewater Flow	Irrigation Demand	Ending Balance
January	3,300	3,300	0	6,600
February	6,600	3,300	0	9,900
March	9,900	2,400	0	12,300
April	12,300	2,400	0	14,700
May	14,700	3,000	24,800	0
June	0	2,400	27,000	0
July	0	3,000	31,000	0
August	0	3,000	24,800	0
September	0	15,300	21,000	0
October	0	15,300	12,400	2,900
November	2,900	3,300	6,200	0
December	0	3,300	0	3,300
TOTALS		60,000	147,200	49,700

Maximum Tank Capacity (gallons): 14,700

Notes:

Water balance calculations assume storage tank is empty in August.

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.

See Table 1 for Process Wastewater Flow Calculations and Table 3 for Irrigation Demand Calculations

Cimarossa Winery
Process Wastewater Flow Calculations

Table II

Total annual wine production (gallons):	10,000
Peak process wastewater flow (gpd):	500
Annual process wastewater flow (gallons):	60,000
Average process wastewater flow (gpd):	164

MONTHLY PROCESS WASTEWATER FLOW (gallons/month):

Month	Percent	Wastewater Flow
January	5.5	3,300
February	5.5	3,300
March	4.0	2,400
April	4.0	2,400
May	5.0	3,000
June	4.0	2,400
July	5.0	3,000
August	5.0	3,000
September	25.5	15,300
October	25.5	15,300
November	5.5	3,300
December	5.5	3,300
TOTALS	100.0	60,000

Notes:

Monthly wastewater flow distribution is based on information provided by the property owners and our past experience with winery operations.

Cimarossa Winery
Irrigation Demand Calculations

Table III

Total number of irrigated olive trees: 100

Seasonal Irrigation (gallons per tree per day):

May	8.0
June	9.0
July	10.0
August	8.0
September	7.0
October	4.0
November	2.0

MONTHLY IRRIGATION FLOW (gallons/month):

Month	Unit Irrigation (gallons / tree / month)	Total Irrigation (gallons / month)	ET _o (inches / month)	ET _{Olive} (gallons / month / tree)	ET _{Olive} (gallons / month)
January	0	0	1.24	54	5,411
February	0	0	1.68	73	7,330
March	0	0	3.41	149	14,879
April	0	0	4.80	209	20,944
May	248	24,800	6.20	271	27,053
June	270	27,000	6.90	301	30,107
July	310	31,000	7.44	325	32,463
August	248	24,800	6.51	284	28,405
September	210	21,000	5.10	223	22,253
October	124	12,400	3.41	149	14,879
November	60	6,200	1.80	79	7,854
December	0	0	0.93	41	4,058
TOTALS	1,470	147,200	49.4	2,156	215,636

Cimarossa Winery
Irrigation Demand Calculations
Table III

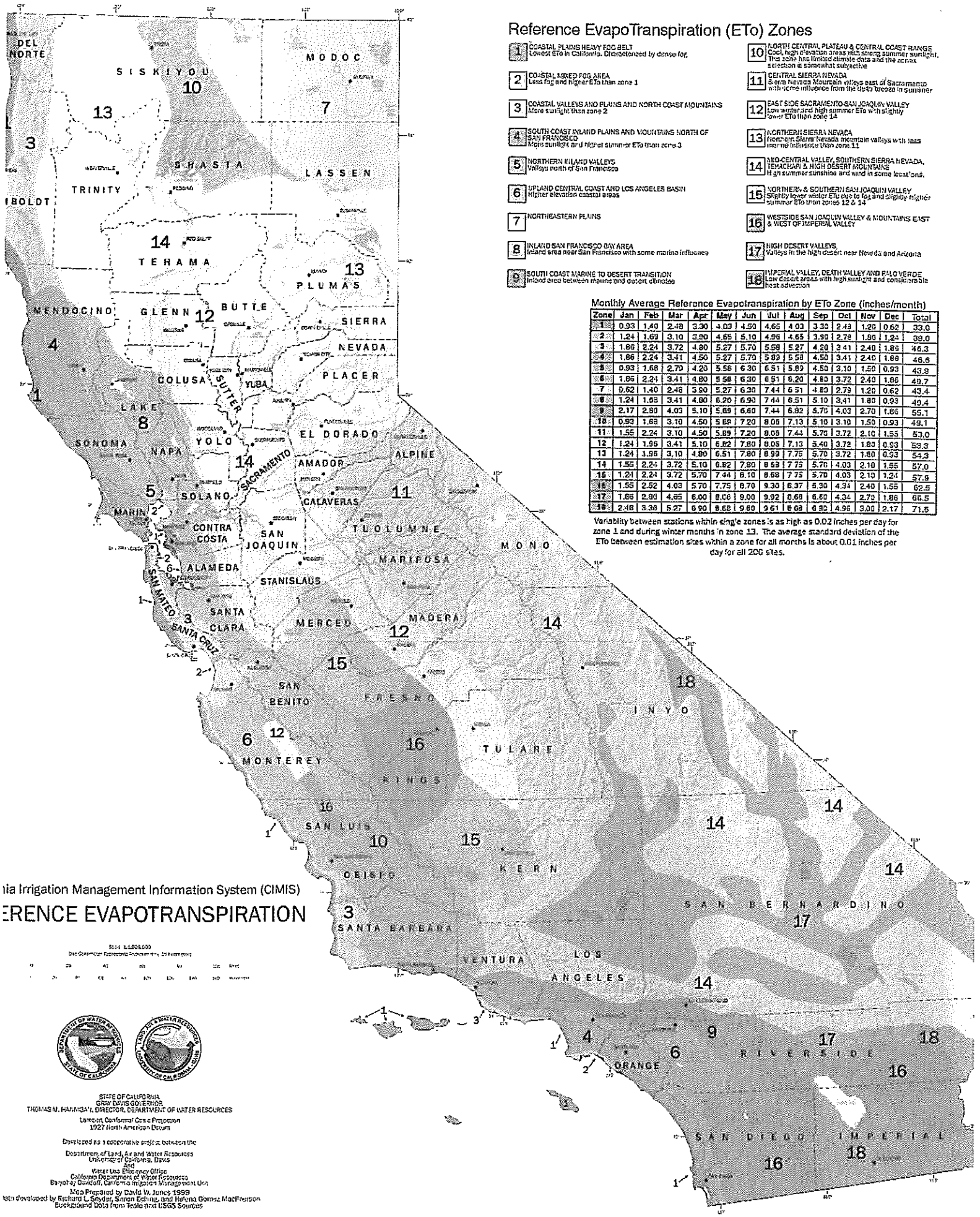
Notes:

Assume no irrigation from December through April

ET_o (inches per month) is the reference evapotranspiration rate in inches per month (reference: <http://www.cimis.water.ca.gov>)

ET_{Oives} (gallons / month / tree) is the depth in inches multiplied by an assumed area of 100 square feet per tree, converted to gallons and multiplied by the crop coefficient (crop coefficient = 0.7 for olives; reference: <http://www.cimis.water.ca.gov>).

ET_{Oives} (gallons / month) = ET_{Oives} (gallons / month / tree) * Number of Trees



Reference EvapoTranspiration (Eto) Zones

- 1 COASTAL PLAINS HEAVY FOG BELT
Lowest Eto in California. Characterized by dense fog.
- 2 COASTAL MIXED FOG AREA
Less fog and higher Eto than zone 1.
- 3 COASTAL VALLEYS AND PLAINS AND NORTH COAST MOUNTAINS
More sunlight than zone 2.
- 4 SOUTH COAST INLAND PLAINS AND MOUNTAINS NORTH OF SAN FRANCISCO
More sunlight and higher summer Eto than zone 3.
- 5 NORTHERN INLAND VALLEYS
Valleys north of San Francisco.
- 6 UPLAND CENTRAL COAST AND LOS ANGELES BASIN
Higher elevation coastal areas.
- 7 NORTHEASTERN PLAINS
- 8 INLAND SAN FRANCISCO BAY AREA
Inland area near San Francisco with some marine influence.
- 9 SOUTH COAST MARINE TO DESERT TRANSITION
Inland area between marine and desert climates.
- 10 NORTH CENTRAL PLATEAU & CENTRAL COAST RANGE
Cool, high elevation areas with strong summer sunlight. This zone has limited climate data and the zones' elevation is somewhat subjective.
- 11 CENTRAL SIERRA NEVADA
Sierra Nevada Mountain valleys east of Sacramento with some influence from the desert breeze in summer.
- 12 EAST SIDE SACRAMENTO-SAN JOAQUIN VALLEY
Low winter and high summer Eto with slightly lower Eto than zone 14.
- 13 NORTHERN SIERRA NEVADA
Rienzi and Sierra Nevada mountain valleys with less marine influence than zone 11.
- 14 MID-CENTRAL VALLEY, SOUTHERN SIERRA NEVADA, TEHACHA & HIGH DESERT MOUNTAINS
High summer sunshine and wind in some local areas.
- 15 NORTHERN & SOUTHERN SAN JOAQUIN VALLEY
Slightly lower winter Eto due to fog and slightly higher summer Eto than zones 12 & 14.
- 16 WESTSIDE SAN JOAQUIN VALLEY & MOUNTAINS EAST & WEST OF KERNAL VALLEY
- 17 HIGH DESERT VALLEYS
Low desert areas with high sunlight and considerable heat advection.
- 18 IMPERIAL VALLEY, DEATH VALLEY AND PALO VERDE
Low desert areas with high sunlight and considerable heat advection.

Monthly Average Reference Evapotranspiration by Eto Zone (inches/month)

Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1	0.93	1.40	2.48	3.30	4.03	4.50	4.65	4.03	3.35	2.43	1.20	0.62	33.0
2	1.24	1.69	3.10	5.20	4.65	5.10	4.96	4.65	3.99	2.79	1.80	1.24	39.0
3	1.66	2.24	3.72	4.80	5.27	5.70	5.58	5.27	4.20	3.41	2.40	1.89	46.3
4	1.86	2.24	3.41	4.50	5.27	5.70	5.89	5.58	4.50	3.41	2.40	1.68	46.6
5	0.93	1.68	2.70	4.20	5.56	6.30	6.51	5.89	4.50	3.10	1.50	0.93	43.9
6	1.86	2.24	3.41	4.80	5.58	6.30	6.51	6.20	4.80	3.72	2.40	1.66	49.7
7	0.62	1.40	2.48	3.50	5.27	6.30	7.44	6.51	4.80	2.79	1.20	0.62	43.4
8	1.24	1.68	3.41	4.80	6.20	6.90	7.44	6.51	5.10	3.41	1.80	0.93	49.4
9	2.17	2.80	4.03	5.10	5.69	6.60	7.44	6.92	5.70	4.03	2.70	1.66	55.1
10	0.93	1.68	3.10	4.50	5.69	7.20	8.08	7.13	5.10	3.10	1.50	0.93	49.1
11	1.55	2.24	3.10	4.50	5.69	7.20	8.08	7.44	5.70	3.72	2.10	1.55	53.0
12	1.24	1.98	3.41	5.10	6.52	7.80	8.08	7.13	5.40	3.72	1.80	0.93	53.3
13	1.24	1.98	3.10	4.80	6.51	7.80	8.99	7.75	5.70	3.72	1.80	0.93	54.3
14	1.55	2.24	3.72	5.10	6.82	7.80	8.68	7.75	5.70	4.03	2.10	1.55	57.0
15	1.24	2.24	3.72	5.70	7.44	8.10	8.88	7.75	5.70	4.03	2.10	1.24	57.8
16	1.55	2.52	4.03	5.70	7.75	8.70	9.30	8.37	6.30	4.34	2.40	1.55	62.5
17	1.66	2.80	4.65	6.00	8.08	9.00	9.92	8.68	6.60	4.34	2.70	1.66	66.5
18	2.48	3.36	5.27	6.90	8.68	9.60	9.61	8.68	6.92	4.95	3.00	2.17	71.5

Variability between stations within single zones is as high as 0.03 inches per day for zone 1 and during winter months in zone 13. The average standard deviation of the Eto between estimation sites within a zone for all months is about 0.01 inches per day for all 200 sites.

California Irrigation Management Information System (CIMIS)
REFERENCE EVAPOTRANSPIRATION

Scale: 1:1,000,000
Data Compiler: California Department of Water Resources
Date: 1999

STATE OF CALIFORNIA
GRAY DAVIS GOVERNOR
THOMAS M. HALL/PAUL, DIRECTOR, DEPARTMENT OF WATER RESOURCES
Lancaster, California Office
1927 North American Avenue
Developed as a cooperative project between the
Department of Land, Air and Water Resources
University of California, Davis
Water Use Efficiency Office
California Department of Water Resources
Bayshore Center, California Irrigation Management Unit
Map Prepared by David W. Jones 1999
Data developed by Richard L. Snyder, Simon Eshuis, and Helena Gomez MacFerguson
Background Data from Federal and USGS Sources

Table 3. Crop coefficients (i.e., K_{c2} for dates C-D and K_{c3} for date E) and percentages of the season from leaf out until the indicated growth date inflection points for major tree and vine crops.

Crop	% of season until date		Crop Coefficients	
	C	D	C-D	E
Grapevines	25	75	0.80	0.35
Stone fruits	50	90	1.05	0.65
Apple	50	75	1.05	0.80
Kiwifruit	22	67	1.05	1.00
Citrus	33	67	1.00	1.00
Citrus (desert)	33	67	0.90	0.90
Olives	33	67	0.70	0.70
Avocado	33	67	0.70	0.70
Evergreen	33	67	0.60	0.60
Almonds	50	90	1.05	0.65
Walnuts	50	75	1.05	0.80
Date Palm	33	67	0.95	0.95

APPENDIX 3

NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT SITE
EVALUATION RESULTS DATED JUNE 29, 2007

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 #: E07-00418

APN: 018-060-069

(County Use Only)

Reviewed by:

Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner Dino Dina, M.D. & Cornelia Dekker			<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 c/o Dynavax Technologies 2929 Seventh Street, Suite 100			<input checked="" type="checkbox"/> Residential - # of Bedrooms: 3 Design Flow : 450 gpd	
City Berkeley	State CA	Zip 94710-2753	<input checked="" type="checkbox"/> Commercial - Type: Winery Sanitary Waste: 300 gpd Process Waste: 500 gpd	
Site Address/Location 1185 Friesen Drive, Angwin, CA			<input type="checkbox"/> Other: Sanitary Waste: gpd Process Waste: gpd	

Evaluation Conducted By:

Company Name Bartelt Engineering	Evaluator's Name Michael R. Muelrath, P.E.	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist) <i>Michael R. Muelrath</i>
Mailing Address: 1303 Jefferson Street, 200 B		Telephone Number (707) 258-1301
City Napa	State CA	Zip 94559
		Date Evaluation Conducted June 29, 2007

Primary Area See below Acceptable Soil Depth: 30-50 in. Test pit #'s: 9, 10 & 11 Soil Application Rate (gal. /sq. ft. /day): 0.6 System Type(s) Recommended: Subsurface Drip Slope: 32-40 %. Distance to nearest water source: 100 ± ft. Hydrometer test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results) Bulk Density test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results) Groundwater Monitoring Performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)	Expansion Area See below Acceptable Soil Depth: 30-50 in. Test pit #'s: 9, 10 & 11 Soil Application Rate (gal. /sq. ft. /day): 0.6 System Type(s) Recommended: Subsurface Drip Slope: 32-40 %. Distance to nearest water source: 100 ± ft. Hydrometer test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results) Bulk Density test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results) Groundwater Monitoring Performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)
---	---

Site constraints/Recommendations:

The Property Owner is investigating the feasibility of constructing a 10,000 gallon per year winery on the subject parcel. This site evaluation was performed to locate an area suitable to install a septic system to serve the sanitary and process wastewater disposal needs for the proposed winery. The winery proposal includes a wine cave that is located downhill and within 1,500 feet of the existing septic system that serves the existing residence. There is limited information available in the Napa County Department of Environmental Management file regarding construction of the existing septic system; therefore, we recommend that either the existing septic system be abandoned in place and the sanitary wastewater from the existing residence be accommodated in the proposed disposal field for the proposed winery or that additional investigation be performed to determine if the existing septic system is sited and designed properly in accordance with the Memorandum regarding septic system setbacks to cave structures from Trent Cave of the Napa County Department of Environmental Management dated January 2004.

It may also be possible to pre-treat the winery process wastewater and dispose of the treated winery process wastewater effluent via surface drip irrigation at the existing onsite olive trees or existing onsite vineyard to reduce the flow to the disposal field and thus reduce the required disposal field area.

Test Pit #

1

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-30	A	0-15	SCL	MSB	SH	FRB	S/P	CF/CM	CF/CM	None
30-37		0-15	SL	Cemented	H	F	SS/NP	F/VF	FF	None
Slope = 38 %										
No groundwater observed.										

Test Pit #

2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	A	0-15	SCL	MSB	SH	VFRB	S/P	FM/CF	FVF/CF/FM	None
24-48		0-15	SL	Cemented	H	F	SS/NP	FF/VFC	CF/FM	None
Slope = 42 %										
No groundwater observed.										

3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-31	A	0-15	SCL	MSB	SH	FRB	S/P	CF/CM	CF/CM	None
31-40		0-15	SL	Cemented	H	F	SS/NP	FVF	FF	None
Slope = 40 %										
No groundwater observed.										

4

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	A	0-15	SCL	MSB	SH	FRB	S/P	CF/CM	CF/CM	None
24-39		0-15	SL	Cemented	H	F	SS/NP	FVF	FF	None
Slope = 40 %										
No groundwater observed.										

5

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-21	A	0-15	SCL	MSB	SH	FRB	S/P	CF/CM	CF/CM	None
21-28		0-15	SL	Cemented	H	F	SS/NP	FVF	FF	None
Slope = 34 %										
No groundwater observed.										

6

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-30	G	0-15	SCL	MSB	SH	FRB	S/P	CF/CM	CF/CM	None
30-42		0-15	SCL	Cemented	VH	VF	S/P	FF/FM	FF/FM	None
Slope = 23 %										
No groundwater observed.										

10

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-50	C	15-35	SCL	MSB	SH	FRB	S/P	CF/CM	CF/CM	None
50-58		0-15	SL	Cemented	H	F	SS/NP	FVF	FF	None
Slope = 32 %										
No groundwater observed.										

11

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-36	C	0-15	SCL	MSB	SH	F	S/P	CF/CM/CC	CF/CM	None
36-72		0-15	SL	Cemented	H	F	SS/NP	FVF	FF	None
Slope = 34 %										
No groundwater observed.										

12

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-20	A	0-15	SCL	MSB	SH	F	S/P	CF/CM/ CC	CF/CM	None
20-30		0-15	SL	Cemented	H	F	SS/NP	FVF	None	None
Slope = 22 %										
No groundwater observed.										

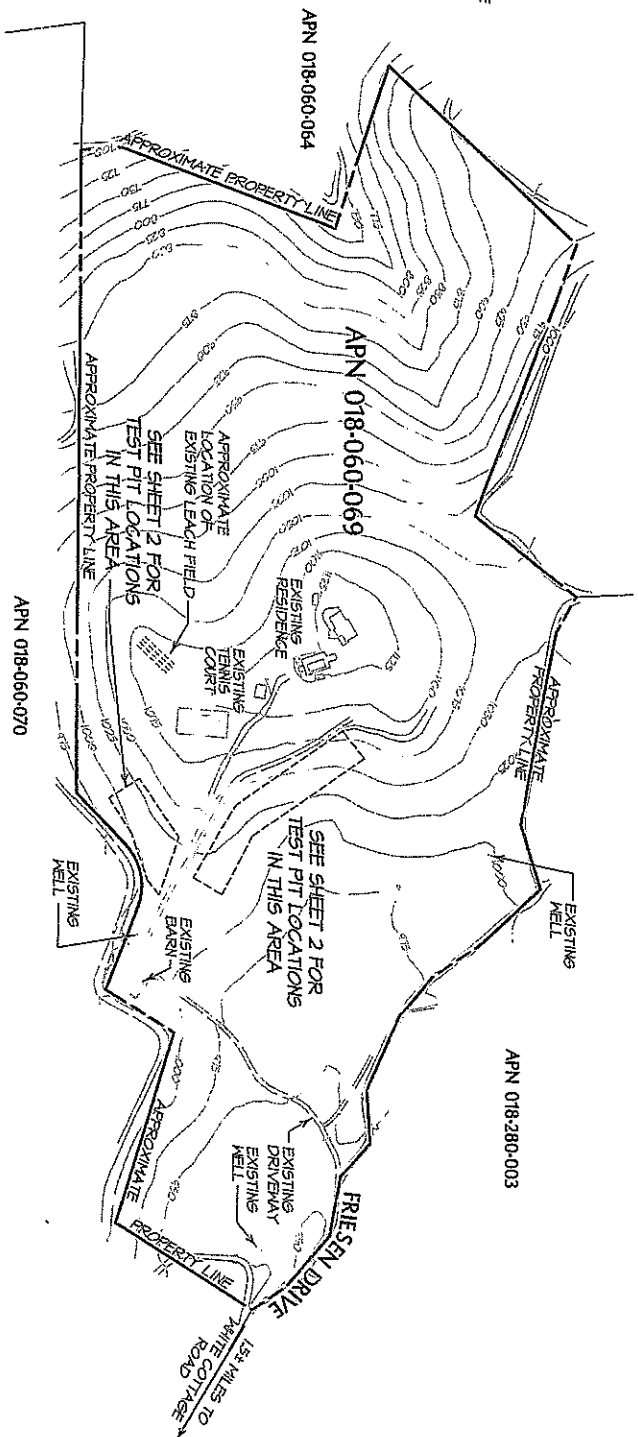
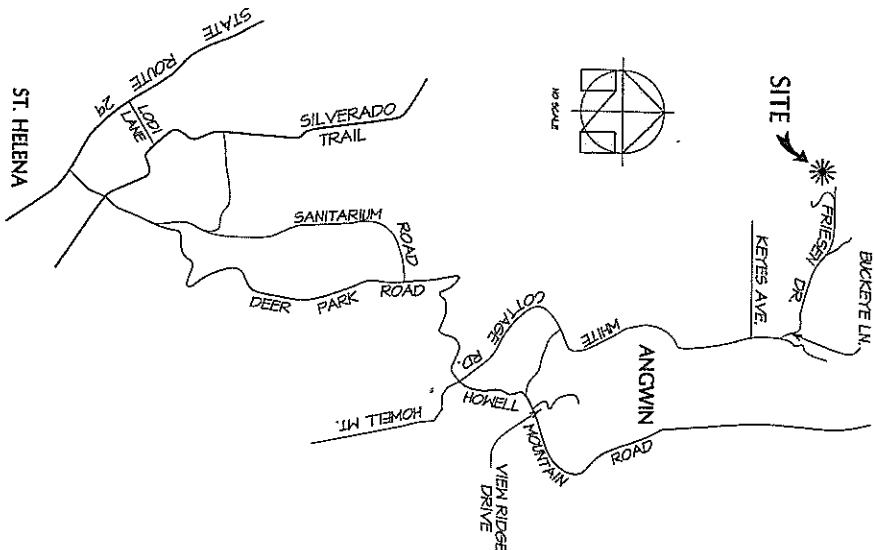
13

Test Pit #

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-42	C	15-35	SCL	MSB	SH	FRB	S/P	CF/CM	CF/CM	None
42-52		0-15	SL	Cemented	H	F	SS/NP	FVF	FF	None
Slope = 31 %										
No groundwater observed.										

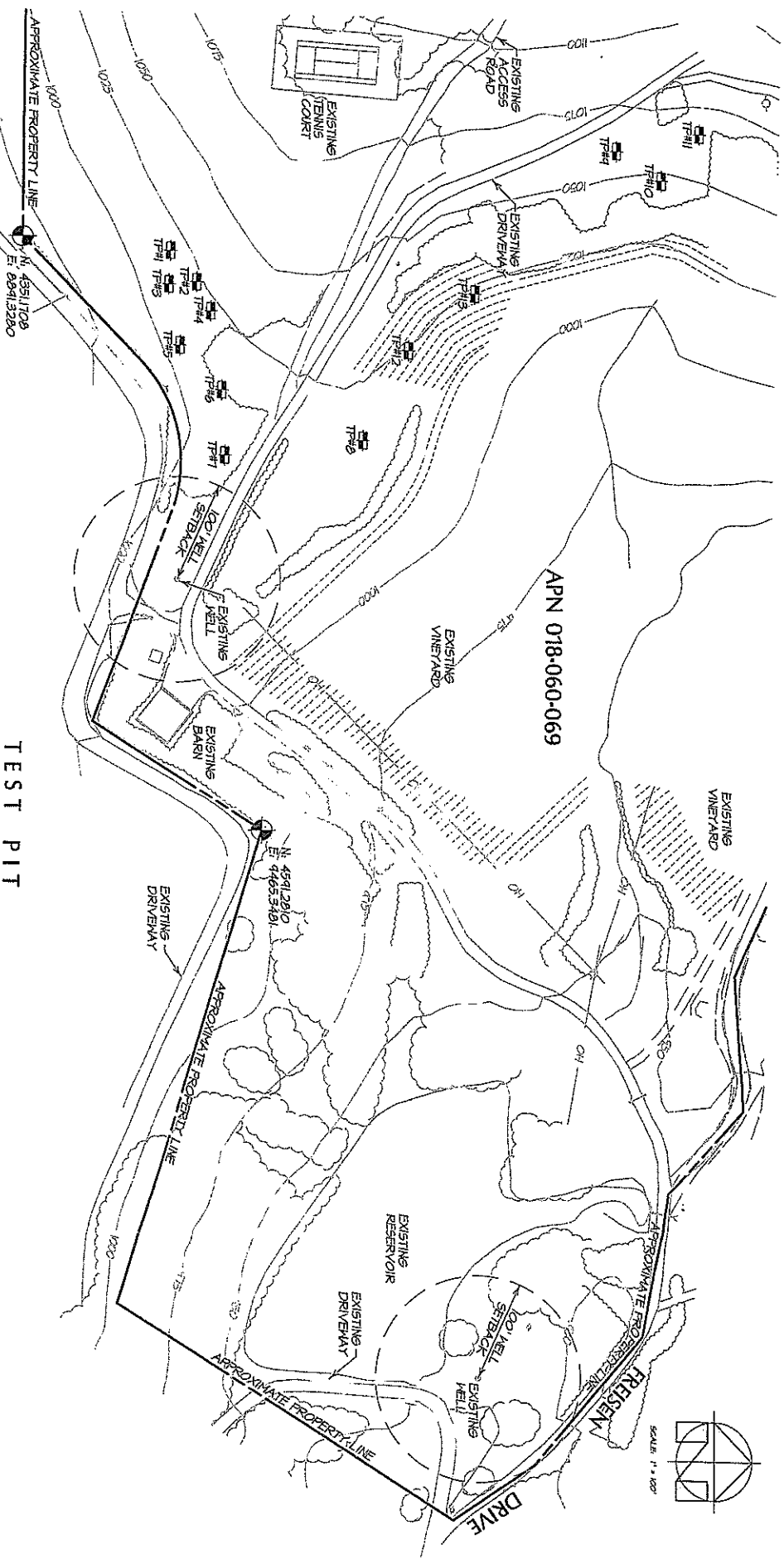
Table of Abbreviations

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=Diffuse >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=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	<u>Quantity:</u> F=Few C=Common M=Many <u>Size:</u> VF=Very Fine F=Fine M=Medium C=Coarse	<u>Quantity:</u> F=Few C=Common M=Many <u>Size:</u> VF=Very Fine F=Fine M=Medium C=Coarse VC=Very Course	<u>Quantity:</u> F=Few C=Common M=Many <u>Size:</u> F=Fine M=Medium C=Coarse VC=Very Course ExC=Extremely Course <u>Contrast:</u> Ft=Faint D=Distinct P=Prominent



BARTELT
engineering
 civil engineering • land planning
 1303 Jefferson Street, 200 B, Napa, CA 94559
 (707) 258-1301 • fax (707) 258-2926

Cimarrosa Winery
 1185 Freisen Drive
 Angwin, CA 94574
 APN 018-060-069
 Job no. 07-14
 August 2007
 Sheet 1 of 2



TEST PIT
LOCATION MAP

SCALE: 1" = 100'

TEST PIT EXPLORATION NOTES:

1. REPRESENTS TEST PIT LOCATION.
2. TEST PITS WERE EXCAVATED BY PINA VINEYARD MANAGEMENT ON JUNE 24, 2007 AND WITNESSED BY A REPRESENTATIVE FROM BARTLETT ENGINEERING AND NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT.
3. FADED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES. THE TOPOGRAPHIC INFORMATION SHOWN HEREON WAS TAKEN FROM THE TOPOGRAPHIC MAP OF A PORTION OF THE LANDS OF CINAROSSA WINERY* PREPARED BY MICHAEL M. BROOKS AND ASSOCIATES, INC., DATED JULY 2007 AND THE TOPOGRAPHIC MAP FOR PROJECT NUMBER 97042* PREPARED BY DELTA GEOMATICS CORPORATION, DATED NOVEMBER 20, 1997.

TEST PIT #	NORTHING	EASTING
1	4493	8401
2	4497	8432
3	4492	8434
4	4533	8460
5	4504	8494
6	4545	8431
7	4548	8438
8	4602	8433
9	4425	8476
10	4469	8524
11	5006	8479
12	4125	8449
13	4126	8436

Cinarrssa Winery
1185 Fresen Drive
Angwin, CA 94574
APN 018-060-069
Job no. 07-14
August 2007
Sheet 2 of 2

BARTLETT
engineering
civil engineering • land planning
1303 jefferson street, 200 B, madra, ca 94539
(707) 258-1301 • fax (707) 258-2926

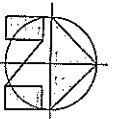
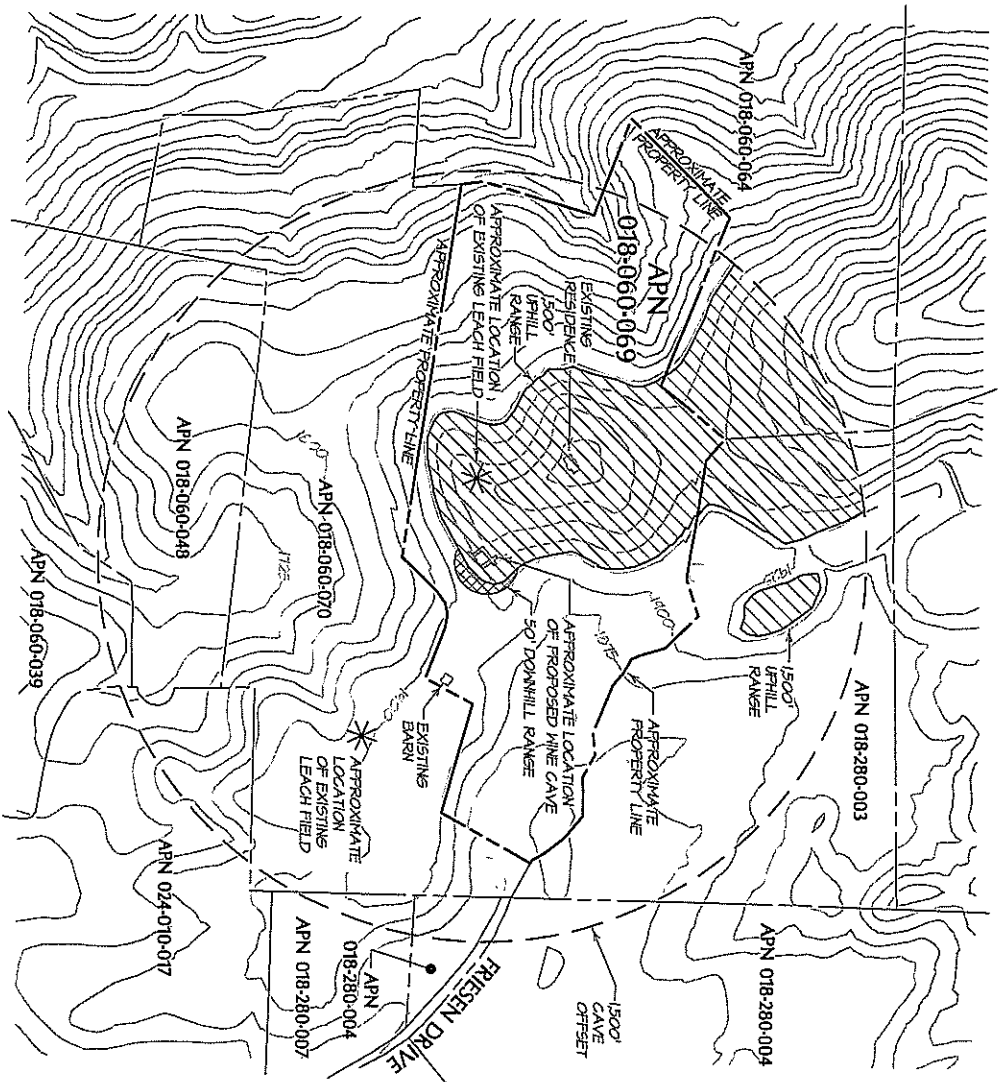
APPENDIX 4

CAVE LOCATION SITE MAP

CAVE LOCATION
SITE MAP

SCALE: 1" = 500'

Cimarossa Winery
1185 Freisen Drive
Angwin, CA 94574
APN 018-060-069
Job no. 07-14
September 2007
Sheet 1 of 1



SCALE: 1" = 500'

LEGEND:



APPROXIMATE LOCATION OF EXISTING
LEACH FIELD LOCATIONS BASED ON NAPA
COUNTY DEPARTMENT OF ENVIRONMENTAL
MANAGEMENT RECORDS)



AREA WITH ELEVATION GREATER THAN THE PROPOSED CAVE FLOOR ELEVATION AND WITHIN 1,500 FEET OF THE PROPOSED CAVE



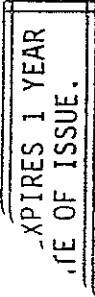
AREA WITH ELEVATION LESS THAN THE PROPOSED CAVE FLOOR ELEVATION AND WITHIN 50 FEET FROM THE PROPOSED CAVE

NOTE:

THE FOLDED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES. THE TOPOGRAPHIC INFORMATION SHOWN HEREON HAS TAKEN FROM THE MAPS. CONTIGUOUS TOPOGRAPHIC INFORMATION SHOWN HEREON IS EVERY FIVE (5) FEET, UNLESS INDICATED OTHERWISE. (25) FEET. BAKET, ENGINEERING ASSUMES NO LIABILITY, REAL OR ALLEGED REGARDING THE ACCURACY OF THE TOPOGRAPHIC INFORMATION SHOWN.

APPENDIX 5

HISTORICAL RECORDS FOR EXISTING SEPTIC SYSTEM



SEWAGE DISPOSAL PERMIT

County of Napa - Department of Public Health
Division Of Environmental Health
1123 First Street, Napa - Phone 253-4471

PERMIT #

Owner Don Tregensen Address Buckeye Ln. Date Nov 9, 1978
Contractor OLDE WORLD DESIGNS # 321641 Parcel No. 18-060-51

WORK APPLIED FOR

- ☒ Dwelling ☐ New Construction ☐ Repairs ☐ Alterations
☒ No. Bedrooms 3
☐ Commercial
☐ Other (explain) _____

- ☐ Private Sewage Disposal System (explain)
☐ Special Design System

WATER SUPPLY: ☐ Public ☒ Individual

☒ Building Department Form Received

Specifications (explain) 1200 cpi septis tank with 375 ft
of drainline with 18" under pipe 36" trench

Location _____

Permit Fee \$150.00

Form by T. Carl

Paid ✓

Receipt No. 5722

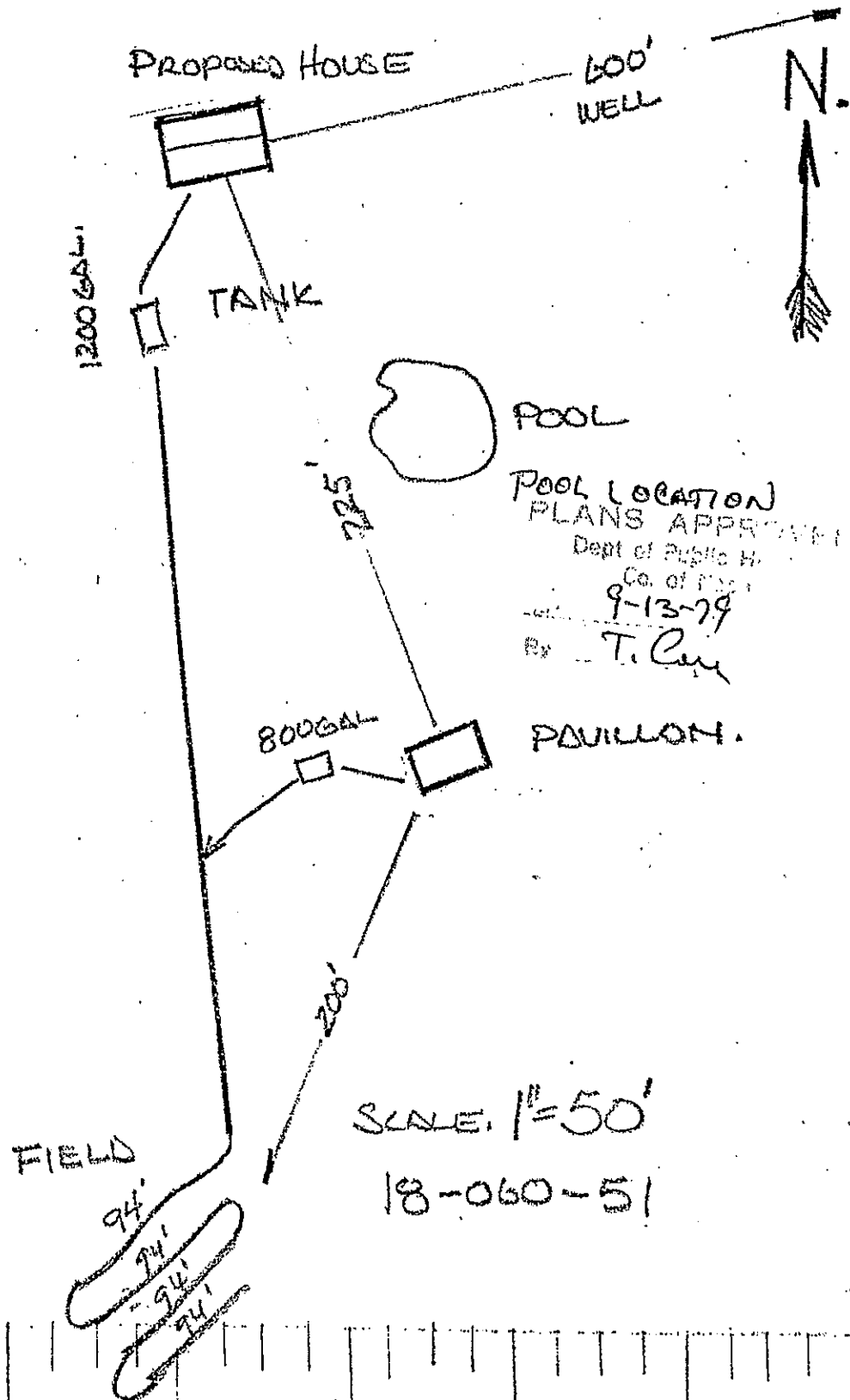
Signed [Signature]

PLOT PLAN

NAME OLDE WORLD DESIGN

ADDRESS _____

A.P.# _____



POOL LOCATION
PLANS APPROVED
Dept of Public H.
Co. of Pl.
9-13-79
By T. Cur