

September 19, 2011 – Revised
#08-17

BARTELT
ENGINEERING

Drew Lander
Napa County Public Works Department
1195 Third Street, Room 201
Napa, CA 94559

RECEIVED

OCT 21 2011

NAPA CO. CONSERVATION
DEVELOPMENT & PLANNING DEPT.

Re: Phase One Water Availability Analysis for the proposed expansion of Paraduxx Winery, 7257 Silverado Trail, Napa County, CA, APN 031-170-019

Dear Mr. Lander:

As required by the County of Napa Public Works Department, this letter outlines a Phase One Water Availability Analysis for the Paraduxx Winery Use Permit Modification application.

As outlined in the Interim Policy a reconnaissance level report for this site has been prepared with the following items being pertinent to the study:

Site Plan

A USGS site map showing the site and approximate property line locations is attached. Information regarding the locations of the existing wells and proposed structures is shown on the enclosed Paraduxx Winery Photographic Exhibit prepared by Bartelt Engineering, dated September 2010. Information regarding the location of the existing wells on adjacent properties was unavailable at the time this report was prepared.

Project Description

Paraduxx Winery is proposing an expansion of it's winery facility from a production of 156,000 gallons per year to 200,000 gallons per year. The existing winery and vineyard are located on a 45.56 acre parcel west of Silverado Trail and south of Rector Creek. The existing staff will increase as part of this proposal from 5 full-time employees to 40 full-time employees and 6 part-time harvest employees. Currently tours and tasting by appointment are allowed on the site with an average of 140 visitors/guests per week; 47 visitors/guests on a peak day with an average of 25 visitors per day visiting the winery. Paraduxx Winery is looking to increase the number of tours and tastings by appointment only to 150 visitors on a peak day. Additionally, five food and wine pairing events per week are proposed with a maximum of 24 guests per pairing event. The food for these events will be prepared offsite by a licensed catering service and staged in the existing approved low risk kitchen at the winery. Paraduxx Winery will also hold three annual "Wine Auction" events with a maximum of 500 guests attending these events (one during harvest and two during non-harvest season) as well as five "Industry" events with a maximum of 125 guests in attendance. The "Wine Auction" and "Industry" events will be catered events with all food preparation, washing of tableware and serving dishes performed by an offsite catering service.

Projected Water Consumption

The total water requirements for the existing and proposed usage on the parcel are calculated below using quantities provided by the owner and the onsite wastewater disposal feasibility study for the Paraduxx Winery prepared by Bartelt Engineering dated September 2011.

Current Water Use Using Napa County Interim Policy

Peak Winery Process Wastewater Flow:

$$\frac{(156,000 \text{ gal wine per year})(1.5 \text{ gal water per 1 gal wine})}{61 \text{ days of crush per year}} = 3,836 \text{ gpd}$$

Average Winery Process Wastewater Flow:

$$\frac{(156,000 \text{ gal wine per year})(6 \text{ gal water per 1 gal wine})}{365 \text{ days per year}} = 2,564 \text{ gpd}$$

Peak sanitary wastewater flows can be itemized as follows:

Employees:

$$(5 \text{ full-time employees}) \times (15 \text{ gpd per employee}) = 75 \text{ gpd}$$

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

Guests & Visitors:

$$(25 \text{ guests per pairing event per day}) \times (5 \text{ gallons per guest}) = 125 \text{ gpd}$$

$$(22 \text{ visitors w/ 60\% usage per day}) \times (3 \text{ gallons per visitor}) = 39.6 \text{ gpd}$$

$$\text{Total Winery Sanitary Wastewater Flow} = 300.6 \text{ gpd}$$

To calculate annual water use, conservatively assume peak water use for 16 weeks and average water use for 36 weeks.

Annual Winery Process Water Use:

$$\frac{3,836 \text{ gpd} (6 \text{ days / wk})(16 \text{ wks / yr}) + 2,564 \text{ gpd} (5 \text{ days / wk})(36 \text{ wks / yr})}{325,851 \text{ gal per acre - foot}} = 2.55 \text{ ac - ft / yr}$$

Average Winery Sanitary Wastewater Flow:

$$70\% (300.6 \text{ gpd}) = 210.42 \text{ gpd, use 210 gpd}$$

Annual Winery Sanitary Water Use:

$$\frac{300.6 \text{ gpd (6 days / wk)}(16 \text{ wks / yr}) + 210 \text{ gpd (5 days / wk)}(36 \text{ wks / yr})}{325,851 \text{ gal per acre - foot}} = 0.20 \text{ ac - ft / yr}$$

Existing Vineyard Irrigation (see Attachment D):
(Frost Protection is provided via wind machines)

$$40 \text{ acres} \times 0.557 \text{ acre-foot/acre/year} = 22.3 \pm \text{acre-feet/year}$$

Existing Landscape Irrigation (see Attachment D):

$$1 \text{ acre} \times 1.5 \pm \text{acre-feet/year} = 1.5 \pm \text{acre-feet/year}$$

Total Current Water Use = annual winery process water use + annual winery sanitary water use + vineyard irrigation + landscape irrigation:

$$\text{Total Current Water Use} = 2.55 \text{ ac-ft/year} + 0.20 \text{ ac-ft/year} + 22.3 \text{ ac-ft/year} + 1.5 \text{ ac-ft/year}$$

$$\text{Total} = 26.55 \text{ acre-feet/year}$$

Projected Water Use Calculations Using the Bartelt Engineering Wastewater Disposal Feasibility Study and Napa County Interim Policy

Peak Winery Process Wastewater Flow:

$$\frac{200,000 \text{ gal wine per year (1.5 gal water per 1 gal wine)}}{61 \text{ days of crush per year}} = 4,918 \text{ gpd}$$

Average Winery Process Wastewater Flow:

$$\frac{200,000 \text{ gal wine per year (6 gal water per 1 gal wine)}}{365 \text{ days per year}} = 3,288 \text{ gpd}$$

Peak sanitary wastewater flows can be itemized as follows:

Employees:

$$(40 \text{ full-time employees}) \times (15 \text{ gpd per employee}) = 600 \text{ gpd}$$

$$(6 \text{ part-time employees}) \times (15 \text{ gpd per employee}) = 90 \text{ gpd}$$

Guests & Visitors:

$$(24 \text{ guests per pairing event per day}) \times (5 \text{ gallons per guest}) = 120 \text{ gpd}$$

$$(150 \text{ visitors w/ 60\% usage per day}) \times (3 \text{ gallons per visitor}) = 270 \text{ gpd}$$

Total Winery Sanitary Wastewater Flow = 1,080 gpd

To calculate annual water use, conservatively assume peak water use for 16 weeks and average water use for 36 weeks.

Annual Winery Process Water Use:

$$\frac{4,918 \text{ gpd (6 days / wk)}(16 \text{ wks / yr}) + 3,288 \text{ gpd (5 days / wk)}(36 \text{ wks / yr})}{325,851 \text{ gal per acre - foot}} = 3.26 \text{ ac - ft / yr}$$

Average Winery Sanitary Wastewater Flow:

$$70\% (1,080 \text{ gpd}) = 756 \text{ gpd}$$

Annual Winery Sanitary Water Use:

$$\frac{1,080 \text{ gpd (6 days / wk)}(16 \text{ wks / yr}) + 756 \text{ gpd (5 days / wk)}(36 \text{ wks / yr})}{325,851 \text{ gal per acre - foot}} = 0.74 \text{ ac - ft / yr}$$

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

Existing Vineyard Irrigation (see Attachment D):
(Frost Protection is provided via wind machines)

$$40 \text{ acres} \times 0.557 \text{ acre-foot/acre/year} = 22.3 \pm \text{acre-feet/year}$$

Existing Landscape Irrigation (see Attachment D):

$$1 \text{ acre} \times 1.5 \pm \text{acre-feet/year} = 1.5 \pm \text{acre-feet/year}$$

Total Projected Water Use = annual winery process water use + annual winery sanitary water use + vineyard irrigation + landscape irrigation:

$$\text{Total Projected Water Use} = 3.26 \text{ ac-ft/year} + 0.74 \text{ ac-ft/year} + 22.3 \text{ ac-ft/year} + 1.5 \text{ ac-ft/year}$$

$$\text{Total} = 27.80 \text{ acre-feet/year}$$

Acceptable Threshold Water Use

(Calculated using Napa County Interim Policy for water usage in valley floor areas)

1.0 acre-feet/acre of site - valley floor

The following calculation assumes that the entire 45.56 acre parcel lies in an area designated as valley floor.

Acceptable water use = 45.56 acres x 1.0 acre-feet/year = 45.56 acre-feet/year

The above analysis shows that the projected water usage will be more than the current water usage but less than to the acceptable threshold water usage for the subject parcel.

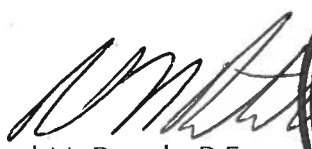
Existing Water Source and Storage Capacity

According to the Property Owner, the onsite well is capable of producing approximately 210 gallons per minute. Well water will continue be used to satisfy winery, and fire protection requirements. Ground water is pumped from the existing well into onsite storage tanks per County of Napa and/or California Department of Forestry Standards.

Summary and Conclusions

The water use requirements for the proposed expansion of Paraduxx Winery development at 7257 Silverado Trail are projected to be less than the acceptable threshold water usage level in accordance with the Interim Water Availability Policy; therefore, a Phase Two and/or Phase Three Analysis should not be required. The above information and the attached plans should assist you in processing the subject Use Permit Modification. If you have any questions regarding the information provided, please feel free to call me.

Sincerely,


Paul N. Bartelt, P.E.
Principal Engineer



PNB:sd

Enclosures

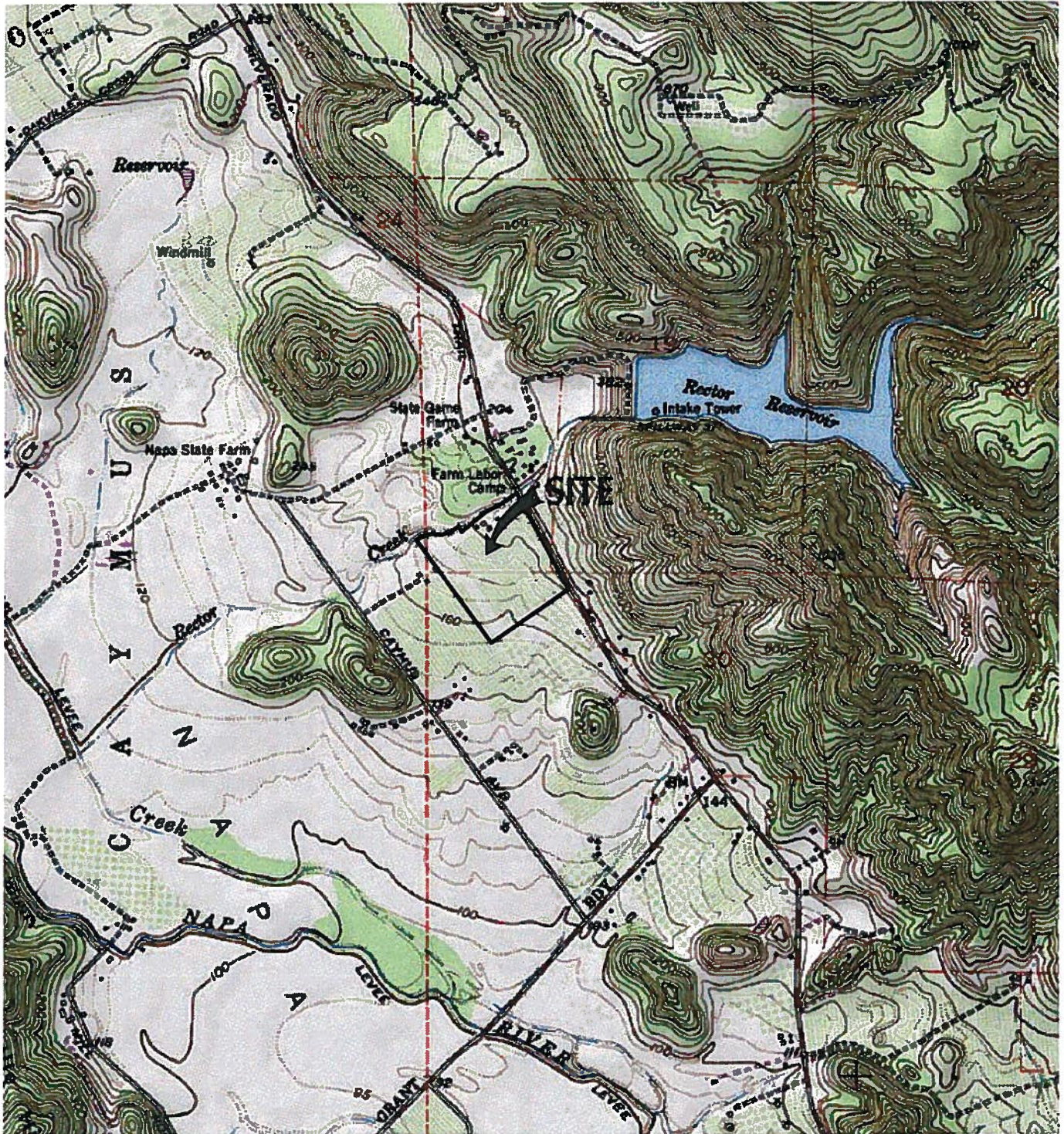
cc: Courtney Dyar, Duckhorn Wine Company

TOPOGRAPHIC SITE LOCATION INFORMATION



USGS 7.5 MINUTE QUADRANGLE "YOUNTVILLE"

Scale: 1" = 2000'



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Paraduxx Winery
7257 Silverado Trail
Yountville, CA 94599
APN 031-170-019

Job no. 08-17

September 2011

Attachment D

PHASE I WATER AVAILABILITY ANALYSIS

File #: _____ - _____ Owner: Duckhorn Wine Company

Parcel #: 031-170-019

This form is intended to help those who must prepare a Phase I Water Availability Analysis. **The Department will not accept an analysis that is not on this form.**

BACKGROUND: A Phase I Water Availability Analysis is done in order to determine what changes in water use will occur on a property as a result of the a conversion. Staff uses this information to determine whether the project may have a detrimental effect on groundwater levels. If it may, additional information will be required. You will be advised if additional information is needed.

PERSONS QUALIFIED TO PREPARE: Any person that can provide the needed information

PROCEDURE:

STEP 1: Prepare and attach to this form an 8-1/2"x11" site plan of your parcel(s) with the locations of all structures, gardens, vineyards, etc in which well water will be used shown

STEP 2: Determine the allowable groundwater use allotment for your parcel(s).

Total size of parcel(s)	<u>45.56 ±</u> acre(s) = Total acreage
Multiply by parcel location factor	x <u>1.0</u> acre-foot per acre per year
Allowable groundwater allotment	= <u>45.56 ±</u> acre-foot per year

STEP 3: Determine the estimated water use for all vineyards on your parcel(s) currently and after the planned conversion; actual water usage figures may be substituted for the current usage estimate (please indicate if this is done). Estimate future use for both the vineyard establishment period and thereafter

Current Usage:

Number of <u>planted</u> acres	<u>40 ±</u> acres
Multiply by number of vines/acre	x <u>908</u> vines per acre
Multiply by gallons/vine/year	x <u>200</u> gallons of water per vine per year
Divide by 325,851 gallons/af	= <u>22.3±</u> af of water per yr used for vineyard irrigation

Future Additional Usage:

Number of <u>planted</u> acres	<u>-0-</u> acres
Multiply by number of vines/acre	x <u>-0-</u> vines per acre
Multiply by gallons/vine/year	x <u>-0-</u> gallons of water per vine per year (long-term)
	<u>-0-</u> gallons of water per vine per year (establish)
Divide by 325,851 gallons/af	= <u>-0-</u> of later per yr used (vineyard long-term)
	<u>-0-</u> af of water per yr used (vineyard establish)

STEP 4: Using the guidelines on the next page, actual water usage figures, and/or detailed water use projections, tabulate the existing and projected future water usage on the parcel(s) in acre-foot per year (af/yr) {1 af = 325,851 gallons}.

Existing Usage:

Residential	<u>-0-</u> af/yr
Farm Labor Dwelling	<u>-0-</u> af/yr
Winery	<u>2.75±</u> af/yr
Commercial	<u>-0-</u> af/yr
Vineyard(long-term)	<u>22.3±</u> af/yr
" (establish)	<u>-0-</u> af/yr
Other Agriculture	<u>-0-</u> af/yr
Landscaping	<u>1.5±</u> af/yr

Future Usage:

Residential	<u>-0-</u> af/yr
Farm Labor Dwelling	<u>-0-</u> af/yr
Winery	<u>4.0±</u> af/yr
Commercial	<u>-0-</u> af/yr
Vineyard(long-term)	<u>22.3±</u> af/yr
" (establish)	<u>N/A</u> af/yr
Other Agriculture	<u>-0-</u> af/yr
Landscaping	<u>1.5±</u> af/yr

Other Usage -0- af/yr
TOTAL 26.55± af/yr

Other Usage -0- af/yr
TOTAL 27.80± af/yr

STEP 5: *Attach all supporting information that may be significant to this analysis including but not limited to all water use calculations for the various uses listed*

Parcel Location Factors

The allowable allotment of water is based on the location of your parcel. Valley floor areas include all locations on the floor of the Napa Valley and Carneros Basin except for groundwater deficient areas. Groundwater deficient areas are areas that have been determined by the Department of Public Works as having a history of problems with groundwater. All other areas are classified as Mountain Areas. Public Works can assist you in determining your classification.

Parcel Location Factors

Valley Floor	1.0 acre foot per acre per year
Mountain Areas	0.5 acre foot per acre per year
Groundwater Deficient Area (MST)	0.3 acre foot per acre per year

Guidelines For Estimating Water Usage:

Residential:

Single Family Residence	0.5 acre-foot per year
Farm Labor Dwelling	1.0 acre-foot per year (6 people)
Second Unit	0.4 acre-foot per year
Guest Cottage	0.1 acre-foot per year

Winery:

Process Water	2.15 acre-foot per 100,000 gal. of wine
Domestic and Landscaping	0.50 acre-foot per 100,000 gal. of wine

Commercial:

Office Space	0.01 acre-foot per employee per year
Warehouse	0.05 acre-foot per employee per year

Agricultural:

Vineyards	
Irrigation only	0.2 to 0.5 acre-foot per acre per year
Heat Protection	0.25 acre foot per acre per year
Frost Protection	0.25 acre foot per acre per year
Irrigated Pasture	4.0 acre-foot per acre per year
Orchards	4.0 acre-foot per acre per year
Livestock (sheep or cows)	0.01 acre-foot per acre per year

Landscaping:

Landscaping	1.5 acre-foot per acre per year
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September 19, 2011 – Revised
#08-17



Kim Withrow
Napa County Department of Environmental Management
1195 Third Street, Room 101
Napa, CA 94559

Re: Onsite Wastewater Disposal Feasibility Study for the Paraduxx Winery, 7257 Silverado Trail,
Napa County, CA, APN 031-170-019

Dear Ms. Withrow:

Paraduxx Winery is proposing an expansion of its winery facility from a production of 156,000 gallons per year to 200,000 gallons per year. The existing winery and vineyard are located on a 45.56 acre parcel west of Silverado Trail and south of Rector Creek. The existing staff will increase as part of this proposal from 5 full-time employees to 40 full-time employees and 6 part-time harvest employees. Currently tours and tasting by appointment are allowed on the site with an average of 140 visitors per week; 47 visitors on a peak day with an average of 25 visitors per day visiting the winery. Paraduxx Winery is looking to increase the number of tours and tastings by appointment only to 150 visitors on a peak day. Additionally, five food and wine pairing events per week are proposed with a maximum of 24 guests per pairing event. The food for these events will be prepared offsite by a licensed catering service and staged in the existing approved low risk kitchen at the winery. Paraduxx Winery will also hold three annual "Wine Auction" events with a maximum of 500 guests attending these events (one during harvest and two during non-harvest season) as well as five "Industry" events with a maximum of 125 guests in attendance. The "Wine Auction" and "Industry" events will be catered events with all food preparation, washing of tableware and serving dishes performed by an offsite catering service. During the "Wine Auction" and "Industry" events, portable toilets will be utilized and therefore these events will not adversely impact the overall volume of wastewater requiring disposal. At the request of Alex Ryan, we have evaluated the feasibility of the proposed winery expansion with regard to the onsite wastewater disposal capability of the parcel.

As part of our work we have reviewed the files at Napa County Environmental Health Department as well as performed visits to the site to view the existing condition of the septic system and expansion area.

Existing Wastewater Disposal System

It is our understanding that existing onsite wastewater disposal system for the winery is a Pressure Distribution (PD) type septic system comprised of two 4,000 gallon process waste septic tanks, one 1,500 gallon sanitary sewer septic tank, one 1,500 gallon dose tank and motorized control valves distributing effluent to five (5) subfields with each subfield consisting of 400 lineal feet (lf) of 2 inch diameter PVC laterals with 3/16" diameter orifices placed 42 inches on center. Each subfield is designed to dispose of 793 gallons per day (gpd) of effluent thus resulting in a combined wastewater discharge rate of 3,965 gpd. Refer to the attached "Design Calculations, Paraduxx Vineyards" prepared by Summit Engineering, Inc., dated January 2003.

This feasibility study is based on a site evaluation performed on December 5, 2002 by Napa County Department of Environmental Management and Summit Engineering, Inc., the "Design Calculations, Paraduxx Vineyards", prepared by Summit Engineering, Inc. dated January 2003, the site evaluation performed on November 21, 2008 by Bartelt Engineering as well as our visual observations of the site.

The following calculations are the basis for our recommendations:

Proposed Winery Process Wastewater Flow

Peak Winery Process Wastewater Flow =

$$\frac{(200,000 \text{ gal wine per year})(1.5 \text{ gal water per 1 gal wine})}{61 \text{ days of crush per year}} = 4,918 \text{ gpd}$$

Average Winery Process Wastewater Flow:

$$\frac{(200,000 \text{ gal wine per year})(6 \text{ gal water per 1 gal wine})}{365 \text{ days per year}} = 3,288 \text{ gpd}$$

Proposed Winery Sanitary Wastewater Flow

Peak sanitary wastewater flows can be itemized as follows:

Employees:

$$(40 \text{ full-time employees}) \times (15 \text{ gpd per employee}) = 600 \text{ gpd}$$

$$(6 \text{ part-time employees}) \times (15 \text{ gpd per employee}) = 90 \text{ gpd}$$

Guests & Visitors:

$$(24 \text{ guests per pairing event per day}) \times (5 \text{ gallons per guest}) = 120 \text{ gpd}$$

$$(150 \text{ visitors w/ 60\% usage per day}) \times (3 \text{ gallons per visitor}) = 270 \text{ gpd}$$

$$\text{Total Winery Sanitary Wastewater Flow} = 1,080 \text{ gpd}$$

Proposed Peak Wastewater Flow

The peak wastewater flow accounts for a combined flow of process and sanitary wastewater and can be calculated as follows:

$$\text{Combined Peak Wastewater Flow} = 4,918 \text{ gpd} + 1,080 \text{ gpd} = 5,998 \text{ gpd}$$

Proposed Modification to Existing Wastewater Disposal System

The existing wastewater disposal system was originally designed to dispose of 3,965 gpd; the proposed expansion to the winery will generate a total wastewater flow of 5,998 gpd, thus resulting in an increase of 2,033 gallons of wastewater per day. We proposed to manage this increase in wastewater flow with the following recommendations:

Additional Septic Tank Requirements

In order to maintain a minimum 3-day septic tank retention time two 4,000 gallon process waste septic tanks, one 1,500 gallon sanitary sewer septic tank and one 1,500 gallon grease interceptor should be added to the existing tankage. The existing and proposed septic tanks will result in a cumulative storage capacity of 16,000 gallons for process waste, 3,000 gallons for sanitary sewer and 1,500 gallons for kitchen waste.

Additional Leach Field Requirements

In addition to an increased septic tank storage capacity, the disposal field will also need to be expanded to accommodate the increased wastewater flows. The design of the existing pressure distribution septic system utilizes a 24-inch deep trench section with 10 inches of gravel beneath the invert of each lateral, 2 inches of gravel above the invert of each lateral and 12 inches of native material backfill which corresponds to 2.0 square feet of sidewall per lineal foot of trench. This trench section provides a minimum of 36 inches of separation to the limiting condition. The minimum required lineal feet of trench was originally based on an application rate of 0.988 gallons per day per square foot (gal/sf/day). The design application rate of 0.988 gal/sf/day was considered appropriate at the time of the original design (2003); however, current Napa County policies have reduced the application rate for this soil type to 0.8 gal/sf/day (refer to letter from County of Napa Department of Environmental Management, dated February 15, 2007 regarding "Changes to Site Evaluation Procedure"). We have calculated the required leach line expansion based on the original and current application rates as follows:

Original Application Rate

The minimum required lineal feet of trench for the proposed increase in effluent disposal based on the original trench design and application rate can be calculated as follows:

$$\text{Required Length Trench} = \frac{2,033 \text{ gpd}}{0.988 \text{ gal/sf/day}} \frac{1 \text{ lf}}{2.0 \text{ sf sidewall}} = 1,028.8 \text{ lf}$$

Current Application Rate

The minimum required lineal feet of trench for the proposed increase in effluent disposal based on the original trench design and current application rate can be calculated as follows:

$$\text{Required Length Trench} = \frac{2,033 \text{ gpd}}{0.8 \text{ gal/sf/day}} \frac{1 \text{ lf}}{2.0 \text{ sf sidewall}} = 1,270.6 \text{ lf}$$

Based on these results, Bartelt Engineering recommends adding four (4) additional subfields, each subfield containing 400 lf for a total addition of 1,600 lf of leach line to the existing disposal field. Bartelt Engineering feels that this modification to the existing system can easily be accomplished in the designated 100% reserve area based on the original design configuration.


100% Reserve Area

The proposed expansion to the existing disposal field would result in an encroachment into the 100% reserve area located immediately southeast of the existing pressure distribution disposal field in the vicinity of Test Pits #5 & #6 (see "Design Calculations, Paraduxx Vineyards" prepared by Summit Engineering, Inc., dated January 2003). Bartelt Engineering performed a site evaluation in the vineyard immediately adjacent to the proposed expansion area on November 21, 2008 and determined that there is adequate area available in the vicinity of test pits #2B thru #6B to accommodate the 100% reserve area.

Summary

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

Sincerely,


Paul N. Bartelt, P.E.
Principal Engineer



PNB:rp

enclosures

cc: Courtney Dyar, Duckhorn Wine Company