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Water Availability Analysis

October 23, 2015

Napa County PBES
1195 Third Street
Room 210
Napa, CA 94559

RE: Flynnville Wine Company Use Permit Assistance - Water Availability Analysis
 Project Number 2008008

Dear Ms. Ayers:

Flynnville Wine Company is applying for a Use Permit for a winery facility located at 1402 St. Helena Highway, in Calistoga (APN: 020-320-003, 006, 009, 015, 016 & 020-170-012). The Use Permit Application includes the construction of a new winery with a production capacity of 60,000 gallons per year. The winery will consist of 2 buildings constructed in 2 separate phases. Phase 1 construction will consist of the main winery building that will provide for wine production, hospitality, and administrative needs. Three existing buildings will be removed to accommodate the Phase 1 winery building and associated infrastructure. Phase 2 construction will consist of a separate building providing for storage, shipping, and receiving operations. Two existing buildings will be removed to accommodate the Phase 2 storage building. Three existing buildings will remain on the parcel, as will the existing businesses therein. The proposed peak number of employees is 20, which includes winery employees and employees of the existing businesses that will remain on the property. Flynnville Wine Company anticipates 15 maximum visitors per day and an average of 40 per week. Summit Engineering has prepared the following Water Availability Analysis (WAA), which provides a comparison between the existing water demand, proposed water demand, and the estimated water allotment of the property. Existing on-site wells will be used to provide water for the proposed project, and the remaining businesses. The estimated water allotment is based on a proposed parcel merger of the subject properties listed above, which will create a total parcel size of 10.06 acres. Five existing wells will provide the water supply for the merged parcel.

Refer to Use Permit Application Sheets UP1 and UP3 for a general layout of the project components. These plans also include approximate property boundaries, existing buildings and agricultural development.

EXISTING WATER DEMAND**Domestic Water Demand**

Existing water demand is created from full time warehouse and office employees. Water demand is estimated using 15 gpd/capita based on Napa County PBES guidelines for estimating wastewater flows for on-site wastewater systems. Using 15 gpd/capita, the estimated existing domestic water use is:

$$(40 \text{ office employees} + 10 \text{ warehouse employees}) \times 15 \text{ gpd/capita} \times 365 = \quad \mathbf{0.84 \text{ ac-ft/yr}}$$

Landscape Irrigation Water Demand

Existing landscape irrigation demand is based 0.2 acres of landscaping and the California Department of Water Resources Estimated Total Water Use (ETWU) equation, and parameters from Napa County PBES's Water Efficient Landscape Ordinance. All of the existing landscaping will be drought tolerant, and irrigated via drip or similar irrigation system.

$$ETWU = (ET_o)(0.62) \left(\frac{PF \times HA}{IE} + SLA \right)$$

Where:

ETWU = Estimated Total Water Use per year (gallons)
 ET_o = Reference Evapotranspiration (inches)
 PF = Plant Factor from WUCOLS (see Section 491)
 HA = Hydrozone Area [high, medium, and low water use areas] (square feet)
 SLA = Special Landscape Area (square feet)
 0.62 = Conversion Factor
 IE = Irrigation Efficiency (minimum 0.71)

$$ETWU = (44.1 \text{ in/year})(0.62)[(0.2 \times 8,887 \text{ SF})/0.9] = 53,997 \text{ gal/yr} \quad = \mathbf{0.17 \text{ ac-ft/yr}}$$

Assumptions:

- ◆ Low water use types with a plant factor of 0.2 (native plants, shrubs, etc.).
- ◆ St. Helena reference evapotranspiration rate of 44.1 inches/year.
- ◆ 90% irrigation efficiency (drip irrigation or similar)

PROPOSED WATER DEMAND**Winery Process Water Demand**

Water demand for wine production is expected to correlate to the process wastewater (PW) generated at the facility. The proposed winery production capacity is 60,000 gallons per year (for a 3 year average) with a peak of 3,000 gallons per day. Based on typical flow data from wineries of similar size and characteristics, the projected process water demand for the proposed wine production is calculated as follows:

Proposed Annual Peak production	=	60,000 gal wine/yr
PW generation rate	=	6 gal PW/gal wine ^a
Annual PW Flow	=	60,000 gal wine x 6 gal PW/gal wine
	=	360,000 gal PW/yr
Average PW Flow	=	(360,000 gal PW/yr) / (365 days)
	=	986 gal PW/day
Annual Production Water Demand	=	(360,000 gal water/yr) / (325,851 gal/ac-ft)
	=	1.1 ac-ft water/yr

^a Generation rate based on industry standards and water data for similar wineries

Process wastewater generation is expected to be equivalent to the water demand for production. The expected annual water use associated with the peak production capacity is 360,000 gallons per year, or 1.1 ac-ft per year. Winery process water demand will continue to be provided by existing on-site wells.

Domestic Water Usage

Domestic water use at the facility is determined based on 20 employees and 25 daily visitors. Sanitary Sewage generation is expected to be equivalent to the water demand for domestic uses, except for domestic uses associated with events, which will utilize portable toilets. Portable toilets will be provided for any event which results in more than 25 visitors per day, but domestic water supply for events will be provided by on-site wells. The maximum quantity of employees accounts for winery employees AND employees of the existing businesses that will remain. Using Napa County Environmental Management's Table 4 from "Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems", annual domestic water usage is estimated as follows:

Table 1. Proposed winery domestic water demand at Flynnville Wine Company.

Use Type	Maximum Quantity (persons/day)	Water Demand (gal/person)	Daily Demand (gal/day)	Number of Days (days/year)	Annual Water Use (gal/year)
FT Employee	20	15	300	365	109,500
Tasting Visitors ^a	25	3	75	365	27,375
Event Visitors	25	3	75	6	2,250
Event Visitors	50	3	150	6	900
Event Visitors	100	3	300	3	900
Total Annual Water Use (gal)					140,925
Peak Water Use (gpd)^b					675
Total Water Use (ac-ft/yr)					0.43

^a Tasting is assumed to occur every day of the year to be conservative.

^b Peak water use is based on the estimated peak sanitary sewage generation which includes employees, tasting visitors, and maximum marketing event visitors flows.

The expected annual domestic water use for the proposed marketing and visitation plan is 140,925 gallons per year, or 0.43 ac-ft per year.

Irrigation Water Usage

◆ Vineyard Irrigation

Water from existing on-site wells will be used to irrigate 3.2 acres of vineyards. Napa County WAA guidelines for vineyard irrigation are 0.2 to 0.5 ac-ft/acre/year. Using the conservative estimate of 0.5 ac-ft/acre/year, the expected water demand for 3.2 acres of vineyard is:

$$3.2 \text{ acres} \times 0.5 \text{ ac-ft/acre/year} = \mathbf{1.6 \text{ ac-ft/yr}}$$

Vineyard irrigation will typically begin in June when onsite soils begin to dry and continue until October, with the peak irrigation period between July and August. All vineyard irrigation water, unless reclaimed process wastewater is used, will be supplied by the existing wells.

Well water will not be utilized for frost or heat protection.

◆ Winery Landscape Irrigation

Landscape irrigation demand is based on the California Department of Water Resources Estimated Total Water Use (ETWU) equation, and parameters from Napa County PBES's Water Efficient Landscape Ordinance.

$$ETWU = (ET_o)(0.62) \left(\frac{PF \times HA}{IE} + SLA \right)$$

Where:

- ETWU = Estimated Total Water Use per year (gallons)
- ET_o = Reference Evapotranspiration (inches)
- PF = Plant Factor from WUCOLS (see Section 491)
- HA = Hydrozone Area [high, medium, and low water use areas] (square feet)
- SLA = Special Landscape Area (square feet)
- 0.62 = Conversion Factor
- IE = Irrigation Efficiency (minimum 0.71)

$$ETWU = (44.1 \text{ in/year})(0.62) \left(\frac{12,026 \text{ SF}}{0.85} \right) = 386,844 \text{ gal/yr} = \mathbf{1.19 \text{ ac-ft/yr}}$$

Assumptions:

- ◆ 12,026 SF is the sum Product of (PF x HA) calculated for each hydrozone area and associated plant type - see landscape plans and ETWU calculations for details.
- ◆ St. Helena reference evapotranspiration rate of 49.4 inches/year.
- ◆ 85% irrigation efficiency (combination of drip and spray irrigation) - see landscape plans and ETWU calculations for details.

TOTAL WATER DEMAND

The total expected water demand of the new winery facility is expected to be 3.56 ac-ft per year, compared to an existing water demand of 1.04 ac-ft per year. Please see Table 2 for a summary of existing and proposed annual water demand.

Table 2. Summary of existing and proposed annual water demand.

	Annual Water Demand (ac-ft/yr)
<u>Existing Water Demand</u>	
Domestic	0.84
Landscaping	0.17
Total Existing Water Demand	1.01
<u>Proposed Water Demand</u>	
Winery Process	1.10
Domestic	0.43
Vineyard Irrigation	1.60
Winery Landscape Irrigation	1.19
Total Proposed Water Demand	4.32

WATER AVAILABILITY

Based on the Water Availability Analysis Guidance Document adopted May 12, 2015, the water allotment for Napa Valley Floor Areas is 1 ac-ft/acre/year; therefore, the merged Flynnville parcel would be allowed to use 10.06 ac-ft/year. The estimated water demand for process, domestic, and landscape uses of 4.32 ac-ft/year represents 43% of the water allotment.

Five existing wells near the proposed winery facility will remain in service, and provide for the domestic, winery process, and irrigation needs of the property. One existing well located on APN: 020-170-012 will be abandoned. A 20,000 gallon water storage tank will also be provided.

DROUGHT CONSERVATION

The facility plans to treat domestic and process wastewater generated at the facility and provide disposal in sub-surface drip dispersal fields. The wastewater feasibility study also proposes the option of reusing treated process wastewater for vineyard irrigation, off-setting the proposed water demand for irrigation should the option be chosen. Treated domestic and process wastewaters disposed of in subsurface systems will recharge the groundwater table through infiltration.

CONCLUSION

The total annual water demand of Flynnville Wine Company for process, domestic and irrigation uses is projected to be 4.32 ac-ft/yr, which is below the water allocation of 10.06 ac-ft/yr. The anticipated peak daily potable water demand for the parcel should be met with the five existing potable water supply wells and proposed 20,000 gallon storage tank.

Please contact us with any questions.

Sincerely,

Jason M. Roberts, P.E.
Project Engineer

Enclosed:
Use Permit Application Sheets UP1 & UP3