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Water Availability Analysis

Opus One Winery P14-00177
Planning Commission Hearing Date May18, 2016

May 10, 2016

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

RE: Opus One Winery UP Assistance - Water Availability Analysis
Project Number 2014096

Dear Ms. Sharma:

Opus One Winery, located at 7900 St. Helena Hwy, Oakville, California, is applying for a Use Permit modification for their existing winery facility. Summit has prepared the following Water Availability Analysis, which provides a comparison between the estimated existing and proposed water use and the estimated available water supply for this property. In general, a water availability analysis, in accordance with Napa County policy, is required for the purpose of addressing the potential for a project to adversely impact the ground water supply of neighboring parcels. Actual water use data was used to assess the existing water use as well as extrapolate the proposed water demand.

Site Description

The existing facility is located at 7900 St. Helena Highway, near the town of Oakville. The winery owns two neighboring parcels. Parcel one (APN 031-020-007) is where the winery and water/wastewater treatment systems are located and has 49.17 acres. Parcel two (APN 031-020-009) is where the water sources (three wells) are located, and has 49.34 acres. Both parcels are surrounded by neighboring residences and vineyards. The parcels are located in the valley floor, so the topography is relatively flat, and includes existing vineyard and winery buildings.

The water source for the winery parcel consists of three wells which currently supply domestic water and irrigation water for the two parcels. Process wastewater from winery operations is and will continue to be treated in the existing process wastewater ponds and treated effluent will be used for onsite irrigation of vineyards. Sanitary sewage from domestic sources will continue to be disposed of in sub-surface disposal fields.

Refer to the Overall Site Plan attached for a general layout of the project components. These plans also include approximate property boundaries, existing buildings and agricultural development.

EXISTING WATER DEMAND

Existing water uses on the winery parcel are based on the following:

- Process needs for production capacity of 110,000 gallons per year
- Full Time Employees (weekdays) = 53
- Part Time Employees (weekdays)= 12
- Full Time Employees (weekends) = 20
- Part Time Employees (weekends)= 5
- Tasting Visitors (weekday) = 165
- Tasting Visitors (weekend) = 500
- Event Visitors = 10 (10 times per year)
- Event Visitors = 25 (10 times per year)
- Event Visitors = 100 (10 times per year)
- Event Visitors = 300 (5 times per year)
- Irrigation of approximately 32.5 acres of vineyard
- Landscape Irrigation of 12,651 square feet (0.29 acres)
- Farm management building water use = 0.45 ac-ft. per year

PROPOSED WATER DEMAND

- Process needs for production capacity of 250,000 gallons per year
- Full Time Employees (weekdays) = 65
- Part Time Employees (weekdays)= 10
- Full Time Employees (weekends) = 20
- Part Time Employees (weekends)= 5
- Part Time Employees (harvest weekends)= 5
- Tasting Visitors (weekday) = 200
- Tasting Visitors (weekend) = 500
- Event Visitors = same as existing (outlined above)
- Irrigation of approximately 32.5 acres of vineyard
- Landscape Irrigation of approximately 6,322 square feet (0.15 acres)
- Farm management building water use = 0.45 ac-ft. per year

WINERY PROCESS WATER DEMAND

Water demand for wine production is expected to correlate to the process wastewater (PW) generated at the facility. Based on typical flow data from wineries of similar size and characteristics, the approximate process wastewater generation for the current wine production is calculated as follows:

Existing Annual Production	=	110,000 gal wine/year
PW generation rate	=	6 gal PW/gal wine[a]
Annual PW Flow	=	110,000 gal wine x 6 gal PW/gal wine
	=	660,000 gal PW/year
Average PW Flow	=	(660,000 gal PW/year) / (365 days)
	=	1,808 gal PW/day

Peak PW Flow	=	(660,000 gal PW/year x 16.4[b] %)/(30 day)
	=	3,608 gal PW/day
Existing Annual Production Water Demand	=	(660,000 gal water/yr) / (325,851 gal/ac-ft)
	=	**2.02 ac-ft water/yr**

Based on typical flow data from wineries of similar size and characteristics, the projected process wastewater generation for wine production is calculated as follows:

Proposed Annual Production	=	250,000 gal wine/year
PW generation rate	=	6 gal PW/gal wine[a]
Annual PW Flow	=	250,000 gal wine x 6 gal PW/gal wine
	=	1,500,000 gal PW/year
Average PW Flow	=	(1,500,000 gal PW/year) / (365 days)
	=	4,110 gal PW/day
Peak PW Flow	=	(1,500,000 gal PW/year x 16.4[b] %)/(30 day)
	=	8,200 gal PW/day
Proposed Annual Production Water Demand	=	(1,500,000 gal water/yr) / (325,851 gal/ac-ft)
	=	**4.60 ac-ft water/yr**

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

[b] Percentage of flows accounted during the harvest month of September, based on water data for similar wineries.

The approximate annual water use associated with the existing production capacity is 660,000 gallons of year, or 2.02 ac-ft per year. The expected annual water use associated with the proposed production capacity is 1,500,000 gallons per year, or 4.60 ac-ft per year. Winery process water demand will continue to be provided by the existing well.

DOMESTIC WATER DEMAND

Domestic water use at the facility is determined based on the total number of employees, daily visitors and event guests. Domestic water is supplied by the existing wells on the adjacent parcel owned by Opus (APN 031-020-009). Sanitary Sewage generation is expected to be equivalent to the water demand for domestic uses, except for domestic uses associated with events with greater than 100 attendees, which will utilize portable toilets. Portable toilets will be provided for all events, but domestic water supply for events will be provided by on-site wells. Using Napa County Environmental Management's Table 4 from "Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems", existing permitted and proposed annual domestic water demand for the winery facility is estimated as follows:

Table 1. Existing permitted winery (peak) domestic water use at Opus One Winery.

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 (weekdays)	53	15	795	260	206,700
PT Employee (weekdays)	12	15	180	260	46,800
FT Employee (weekend)	20	15	300	104	31,200
PT Employee (weekend)	5	15	75	104	7,800
Tasting Visitors (weekdays)	165	3	495	260	128,700
Tasting Visitors (weekend)	500	3	1,500	104	156,000
Event	10	10	100	10	1,000
Event	25	10	250	10	2,500
Event	100	10	1,000	10	10,000
Event	300	10	3,000	5	15,000
				Total Water Use (gal)	**605,700**
				Average Water Use (gpd)	**1,659**
				Peak Water Use (gpd)	**4,725**
				Total Water Use (ac-ft/yr)	**1.86**

Table 2. Proposed winery (peak) domestic water use at Opus One Winery.

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 (weekdays)	65	15	975	260	253,500
PT Employee (weekdays)	10	15	150	260	39,000
FT Employee (weekend)	20	15	300	104	31,200
PT Employee (weekend)	5	15	75	104	7,800
PT Employee (weekend)	5	15	75	12	900
Tasting Visitors (weekdays)	200	3	600	260	156,000
Tasting Visitors (weekend)	500	3	1,500	104	156,000
Event	10	10	100	10	1,000
Event	25	10	250	10	2,500
Event	100	10	1,000	10	10,000
Event	300	10	3,000	5	15,000
				Total Water Use (gal)	**672,900**
				Average Water Use (gpd)	**1,850**
				Peak Water Use (gpd)[a]	**4,950**
				Total Water Use (ac-ft/yr)	**2.07**

a) Weekend day expected to require peak domestic water usage. One event assumed to occur on a peak day.

The estimated existing permitted annual domestic water use is 605,700 gallons per year, or 1.86 ac-ft per year. The expected annual domestic water use for the proposed marketing and visitation plan is 672,900 gallons per year, or 2.07 ac-ft per year.

IRRIGATION WATER DEMAND

- Existing/Proposed Vineyard Irrigation:

  Yearly (average 5-yr) vineyard irrigation usage = 16.9 gal/vine x 235,720 vines = 3,983,668 gal/yr

  Yearly vineyard irrigation usage = 4,000,000 gal/yr x (1 ac-ft/325,851.4 gal) = **12.3 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. Water is not used for frost or heat protection.

- Existing Landscape Irrigation:

  Water for irrigation of approximately 0.29 acres of landscape will be provided by the onsite wells. The water demand for landscape irrigation was based on the California Department of Water Resources guidelines for Estimated Total Water Use (ETWU) per year:

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

Where:

ETWU = Estimated Total Water Use per year (gallons)
ETo = 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)

Assumptions:

- Low water use plant types with a plant factor of 0.3 (native plants, shrubs, etc)
- Napa reference evapotranspiration of 49.4 per CIMIS, 1999
- Irrigation efficiency of 90% for drip systems or similar

ETWU = (49.4 in/year) (0.62) $\left(\frac{0.3*12{,}651\ SF}{0.9}\right)$ = 129,158 gal/yr. = **0.40 ac-ft. /yr.**

- Proposed Landscape Irrigation:

  Water for irrigation of approximately 0.15 acres of landscape will be provided by the onsite wells (overall landscaped area is reduced for the proposed improvements). The water demand for landscape irrigation was based on the California Department of Water Resources guidelines for Estimated Total Water Use (ETWU) per year:

  Assumptions:

  - Low water use plant types with a plant factor of 0.3 (native plants, shrubs, etc)
  - Napa reference evapotranspiration of 49.4 per CIMIS, 1999
  - Irrigation efficiency of 90% for drip systems or similar

ETWU = (49.4 in/year) (0.62) ($\frac{0.3*6{,}322\ SF}{0.9}$) = 64,543 gal/yr. = **0.20 ac-ft. /yr.**

FARM MANANGEMENT BUILDING WATER DEMAND

The farm management building has historically used 0.45 ac-ft. of water per year. This water use is assumed to remain the same.

TOTAL PROJECTED WATER DEMAND

Table 3. Total Projected Annual Water Demand

Water Use	Daily Average Demand		Annual Total Demand	
	(GPD)	(GPM)[2]	(gal/year)	(acre-feet/year)
Process Water	4,110	2.85	1,500,000	4.60
Domestic Water	1,850	1.28	672,900	2.07
Vineyard Irrigation	16,327[1]	11.3	4,000,000	12.3
Landscape Irrigation	263[1]	0.18	64,543	0.2
Farm Management Building	400	0.27	146,000	0.45
Total	22,950	15.88	6,383,443	19.62

[1] Estimated assuming that during the months of November through February no irrigation is required (245 days).

[2]GPM calculated based on 24 hours per day, 60 minutes per hour

The total water demand on the parcel associated with the proposal is expected to be 19.62 ac-ft per year, which is equivalent to 6.38 million gallons per year.

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 Opus One Winery parcel would be allowed to use 49.17 ac-ft/year. The estimated water demand for process, domestic, and landscape uses of 19.62 ac-ft/year represents 40% of the water allotment.

EXISTING AND PROJECTED WATER DEMAND COMPARISON

Based on the proposed increase in production and employees and reduced landscaping area, there is an overall increase in projected water demand of about 2.59 ac-ft/year (see Table 4).

Table 4. Water Demand Comparison

Parcel	Parcel Size (acres)	"Allotment" (ac-ft)	Existing (ac-ft)	Proposed (ac-ft)	Difference (ac-ft)
031-020-007	49.17	49.17			
Wine Production (PW)			2.02	4.60	2.58
Domestic Use			1.86	2.07	0.21
Vineyard Irrigation			12.3	12.3	0.0
Landscape Irrigation			0.4	0.2	-0.2
Farm Management Building			0.45	0.45	0.0
		Total	17.03	19.62	2.59

DROUGHT CONSERVATION

The facility plans to continue to dispose of domestic wastewater generated at the facility in an in-ground disposal system and to treated process wastewater in the existing wastewater ponds and reuse the effluent for vineyard irrigation, off-setting the proposed water demand for irrigation by up to 0.89 acre-feet per year (290,000 gallons). Treated domestic disposed of in subsurface systems will recharge the groundwater table through infiltration.

CONCLUSION

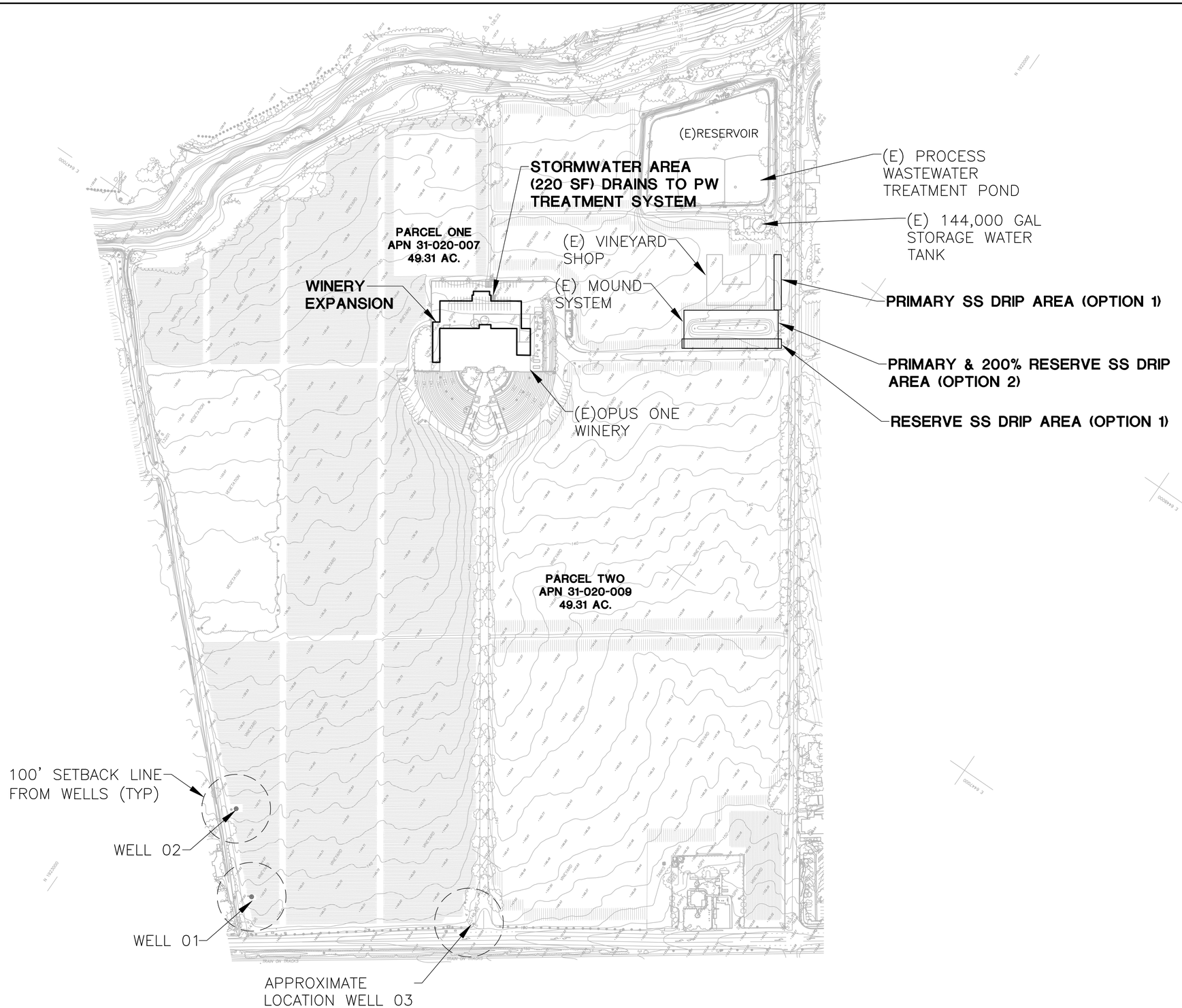
The total annual water demand of Opus One Winery for process, domestic and irrigation uses is projected to be 19.62 ac-ft/yr, which is below the water allocation of 49.17 ac-ft/yr. The anticipated peak daily potable water demand for the parcel should be met by the collective, approximate 73 gpm that is currently produced by the three on-site wells and the 144,000 gallon water/fire protection storage tank (66,000 gallons allocated for potable domestic and process and 78,000 gallons allocated for fire suppression).

Please contact us with any questions.

Sincerely,

Gina Giacone, P.E.
Associate

Enclosed: Use Permit Application Sheet UP2



SUMMIT
Summit Engineering, Inc
463 Aviation Blvd, Suite 200 • Santa Rosa, CA 95403
707-527-0775 • www.summit-sr.com

OPUS ONE WINERY
7900 ST. HELENA HWY
OAKVILLE, CALIFORNIA
APN 31-020-007

OPUS ONE WINERY

SITE PLAN
WATER & WASTEWATER

	2015-11-12 USE PERMIT SUBMITTAL

DATE:	2014-09-22
JOB NO:	2014096
SCALE:	AS SHOWN
DRAWN:	SMI
CHECKED:	CL

SHEET **UP2**