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# Bartlett Engineering Report - Water Availability and Wastewater Analysis

Rombauer Vineyards Wine Production Facility  
Use Permit Major Modification  
#P19-00109-Mod  
Hearing October 2, 2019

**ONSITE WASTEWATER FEASIBILITY STUDY FOR  
ROMBAUER VINEYARDS WINERY  
601 AIRPARK ROAD, NAPA COUNTY, CA  
APN 057-240-015**

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As required by Napa County Planning, Building and Environmental Services (PBES) and at the request of Lynn S. Sletto, Esq., Bartelt Engineering has evaluated the feasibility of increasing the annual wine production limit and adding additional employees at the existing full crush winery facility located at 601 Airpark Road, Napa County, CA.

**PROJECT DESCRIPTION**

It is our understanding that Rombauer Vineyards is proposing to modify an existing Use Permit (P08-00101) to increase the annual wine production from 880,000 gallons per year to 1.2 million gallons per year and increase the number of employees from 30 full time employees to 35 full time employees and 10 part time (seasonal) employees.

The existing winery facility is located within the Napa Sanitation District (NSD) service area. Rombauer Vineyards has an active Industrial Waste Discharge Permit with Napa Sanitation District and will continue to comply with the terms of the permit. A flowmeter and waste sampler are installed on the waste discharge line to NSD as a condition of the permit. The process wastewater generated at the facility will continue to be pretreated at 601 Airpark and discharged to the Napa Sanitation District for final treatment and disposal.

The existing winery facility is also located within the City of American Canyon Municipal Water District and is served by the City of American Canyon for potable water. The goal of this study is to determine a feasible level of wine production and staffing plan without exceeding the annual service water allocation from the City of American Canyon.

This analysis examines the feasibility of increasing the total wine production and employees at 601 Airpark based on historical data which includes water use, wastewater disposal and total wine production for the facility.

**NARRATIVE DESCRIPTION OF HISTORICAL DATA**

The historical data used in this feasibility analysis was collected by Rombauer Vineyards over a period of nine (9) years from 2009 through 2018 (data from 2017 was unavailable). The data includes process wastewater discharge meter readings, invoices for off haul trucking services, wine production quantities submitted to Napa County and U.S. Department of the Treasury (Bureau of Alcohol, Tobacco and Firearms) and monthly domestic water service bills from the City of American Canyon. The above referenced historical data is summarized in the following tables.

**TABLE 1: PROCESS WASTEWATER DISCHARGE SUMMARY (GALLONS)**

Source	Production Year								
	2018	2016	2015	2014	2013	2012	2011	2010	2009
NSD	929,769	1,225,535	896,401	153,012	1,066,021	644,806	598,742	648,960	635,910
Off Haul	264,582	320,910	392,210	346,885					
<b>Total (Site 601)</b>	<b>1,194,351</b>	<b>1,546,445</b>	<b>1,288,611</b>	<b>499,897</b>	<b>1,066,021</b>	<b>644,806</b>	<b>598,742</b>	<b>648,960</b>	<b>635,910</b>

**TABLE 2: WINE PRODUCTION QUANTITY SUMMARY (GALLONS)**

Source	Production Year								
	2018	2016	2015	2014	2013	2012	2011	2010	2009
Site 601	793,279	720,394	816,459	715,963	562,962	429,138	490,658	434,702	459,826

**TABLE 3: DOMESTIC WATER PURCHASE SUMMARY (GALLONS)**

Source	Production Year								
	2018	2016	2015	2014	2013	2012	2011	2010	2009
Site 601	1,442,800	1,739,100	1,949,288	2,130,304	2,775,080	1,743,588	1,128,732	1,350,140	1,707,684

**Narrative Description of Winery Process Wastewater Analysis**

The calculations for estimating the amount of process wastewater generated from the amount of wine produced is based on a comparison between the wine production volumes and the volume of process wastewater discharged/off hauled. The estimated volume of process wastewater created per gallon of wine produced (generation ratio) is a comparison between the total gallons of process wastewater discharged (Table 1) and the total gallons of wine produced (Table 2) and can be calculated by the following equation:

$$\frac{\text{Total Gallons of Process Wastewater Discharged}}{\text{Total Gallons of Wine Produced}} = \frac{\text{Gallons of Process Wastewater}}{\text{Gallon of Wine}}$$

Based on the historical data provided by Rombauer Vineyards, the calculated gallons of process wastewater generated per gallon of wine produced and the average (Ave) calculated ratio are summarized in the following table:

<b>TABLE 4: GALLONS OF PROCESS WASTEWATER GENERATED PER GALLON OF WINE PRODUCED</b>										
<b>Generation Ratio</b>	<b>Production Year</b>									<b>Ave</b>
	2018	2016	2015	2014	2013	2012	2011	2010	2009	
Ratio	1.50	2.15	1.58	0.70	1.89	1.50	1.22	1.49	1.38	<b>1.49</b>

The average generation ratio calculated for process wastewater is 1.49 gallons of wastewater per gallon of wine made.

**Narrative Description of Domestic Water Analysis**

For the purpose of calculating the volume of domestic water that is required to produce a gallon of wine, it is necessary to account for the amount of domestic water used by the facility employees. For the purpose of determining the amount of domestic water used by the facility employees the following assumptions were made:

- 601 Airpark has thirty (30) fulltime employees
- Harvest time period is 61 working days
- Non-Harvest time period is 304 working days
- Part time period is 182 working days
- Water use per employee per working day is 15 gallons

Flowmeters were recently installed within the winery facility to differentiate between process and domestic water usage. The recently installed flowmeters recorded 75,972 gallons of domestic water used by employees in 2018. Accounting for the current 30 employees that work 365 days per year, the approximate domestic water usage for each employee during 2018 is calculated to be approximately 7 gallons per day (gpd) per employee. The calculated employee generation rate of 7 gpd per employee per day is less than the Napa County PBES standard of 15 gpd per employee. This is a result of the water conservation practices of the Rombauer Vineyards employees at the winery facility.

A generation ratio of 10 gpd per employee is proposed to be used to calculate the amount of domestic water required to support the proposed increase in employees which is itemized as follows:

- (35 full time employees) x (10 gpd per employee) = 350 gallons per day
- (10 part time employees) x (10 gpd per employee) = 100 gallons per day

Annual employee domestic water use:

- Full time employees (350 gpd) x (365 days/year) = 127,750 gallons per year
- Part time employees (100 gpd) x (182 days) = 18,200 gallons per year

The following table summarizes the current and proposed water usage by the employees:

<b>TABLE 5: DOMESTIC WATER USED BY EMPLOYEES</b>			
	<b>Production Year</b>		
	2019 & on <sup>1</sup>	2018 <sup>2</sup>	2016 - 2009 <sup>3</sup>
Annual Domestic Water Usage (gpy) by employees	145,950	75,972	164,250

The volume of domestic water utilized for wine production can be calculated by subtracting the total domestic water used by employees (Table 5) from the total water purchased by the facility (Table 3) and is summarized in the following table:

<b>TABLE 6: DOMESTIC WATER FOR WINE PRODUCTION</b>									
<b>Description</b>	<b>Production Year</b>								
	2018	2016	2015	2014	2013	2012	2011	2010	2009
Purchased (gpy)	1,442,800	1,739,100	1,949,288	2,130,304	2,775,080	1,743,588	1,128,732	1,350,140	1,707,684
Employee Use (gpy)	75,972	164,250	164,250	164,250	164,250	164,250	164,250	164,250	164,250
<b>Difference</b>	<b>1,366,828</b>	<b>1,574,850</b>	<b>1,785,038</b>	<b>1,966,054</b>	<b>2,610,830</b>	<b>1,579,338</b>	<b>964,482</b>	<b>1,185,890</b>	<b>1,543,434</b>

It should be noted that potential discrepancies were observed when comparing the total domestic water purchased and the total process wastewater discharged even when accounting for the volume of domestic water used by employees. Based on the historical data provided by Rombauer Vineyards, the difference between the volume of domestic water for wine production from Table 6 and the total process wastewater discharge from Table 1 is in the magnitude of hundreds of thousands of gallons and is summarized in the following table:

<sup>1</sup> Estimated using generation rate of 10 gpd per employee

<sup>2</sup> 2018 Employee domestic water use was obtained from flowmeter readings installed at the winery.

<sup>3</sup> Estimated using Napa County PBES generation rate of 15 gpd per employee (prior to flowmeter data becoming available)

**TABLE 7: DIFFERENCE BETWEEN PURCHASED DOMESTIC WATER FOR WINE PRODUCTION AND TOTAL PROCESS WASTEWATER DISCHARGED**

Water Quantity (gpy)	Production Year								
	2018	2016	2015	2014	2013	2012	2011	2010	2009
Water For Wine Production <sup>4</sup>	1,366,828	1,574,850	1,785,038	1,966,054	2,610,830	1,579,338	964,482	1,185,890	1,543,434
Total Process Wastewater Discharged	1,194,351	1,546,445	1,288,611	499,897	1,066,021	644,806	598,742	648,960	635,910
<b>Difference</b>	<b>172,477</b>	<b>28,405</b>	<b>496,427</b>	<b>1,466,157</b>	<b>1,544,859</b>	<b>934,532</b>	<b>365,740</b>	<b>536,930</b>	<b>907,524</b>

The above discrepancies between the domestic water available for wine production and the recorded total process wastewater discharged are assumed to be errors by the flowmeter that records process wastewater discharge flowrates to the Napa Sanitation District. Furthermore, the difference between the domestic water purchased for wine production and the total process wastewater discharged was somehow used during the wine production process and therefore must be accounted for when estimating the amount of domestic water required to produce wine.

The estimated gallons of domestic water required to produce one (1) gallon of wine is a comparison between the available domestic water for wine production (Table 6) and the total gallons of wine produced (Table 2) and can be calculated by the following equation:

$$\frac{\text{Gallons of Domestic Water for Wine Production}}{\text{Total Gallons of Wine Produced}} = \frac{\text{Gallons of Domestic Water}}{\text{Gallon of Wine}}$$

Based on the historical data provided by Rombauer Vineyards, the calculated gallons of domestic water required to produce one (1) gallon of wine are summarized in the following table:

**TABLE 8: GALLONS OF DOMESTIC WATER REQUIRED PER GALLON OF WINE PRODUCED**

Generation Ratio	Production Year									Ave
	2018	2016	2015	2014	2013	2012	2011	2010	2009	
Ratio	1.72	2.19	2.19	2.75	4.64	3.68	1.97	2.73	3.36	2.80

<sup>4</sup> Estimated domestic water purchased for wine production

**NARRATIVE DESCRIPTION OF POTENTIAL WINE PRODUCTION**

As shown in Table 4, the average generation ratio of gallons of wastewater produced per gallon of wine produced is estimated to be 1.49. As shown in Table 8, the average generation ratio of gallons of domestic water used for production per gallon of wine produced is 2.80. Keeping in mind that the intent of this study is to not exceed the annual service water allocation from the City of American Canyon, therefore the following wine production calculations are solely based on the amount of domestic water required to produce one (1) gallon of wine.

The City of American Canyon provides the facility with 9,026 average gallons of water per day (daily service allotment)<sup>5</sup> or 3,294,490 gallons of water per year. The volume of domestic water that could be utilized for wine production can be calculated by subtracting the total domestic water used by employees (Table 5) from the annual service water allocation from the City of American Canyon for the facility and is summarized in the following table:

<b>TABLE 9: DOMESTIC WATER FOR WINE PRODUCTION (GALLONS PER YEAR)</b>			
<b>Water Breakdown</b>	<b>Production Year</b>		
	2019 & on	2018	2016-2009
Calculated Annual Service (gpy) (water allotment x 365 days per year)	3,294,490	3,294,490	3,294,490
Annual Domestic Water Used by Employees (gpy) <sup>6</sup>	145,950	75,972	164,250
<b>Difference</b>	<b>3,148,540</b>	<b>3,218,518</b>	<b>3,130,240</b>

The estimated gallons of wine that could be produced at the facility without impacting the annual service water allocation from the City of American Canyon based on the calculated “Difference” in Table 9 can be calculated by the following equation:

$$\frac{\text{Gallons of Domestic Water for Wine Production}}{\text{Gallons of Water Used per 1 Gallon of Wine Produced}} = \text{Gallons of Wine}$$

As indicated in the results shown in Tables 4 and 8, Rombauer Vineyards has worked diligently over the past ten years to be more efficient and conserve water during their winemaking process. Based on data collected and the Rombauer Vineyards commitment to conserve water, Bartelt Engineering feels that at this particular winery facility, Rombauer Vineyards has the ability to produce 1.0 gallon of wine utilizing 2.6 gallons of water.

<sup>5</sup> Referenced from the City of American Canyon “water service letters” dated March 11, 2008 and June 27, 2013

<sup>6</sup> From Table 5

Based on the historical data provided by Rombauer Vineyards, the calculated annual gallons of wine that could be produced are summarized in the following table:

<b>TABLE 10: POTENTIAL WINE PRODUCTION</b>			
<b>Production Year</b>	<b>Production Year</b>		
	2019 & on	2018	2016-2009
Domestic Water for Wine Production (gpy)	3,148,540	3,218,518	3,130,240
Water to Wine Ratio	2.6	1.72	2.8
<b>Estimated Gallons of Wine (gpy)</b>	<b>1,210,976</b>	<b>1,871,231</b>	<b>1,117,942</b>

As a result of some potential discrepancies in the data between the amount of domestic water purchased and the amount of process wastewater discharged summarized in Table 7, Bartelt Engineering recommends that Rombauer Vineyards continues to track domestic and production water usages as well as process wastewater discharges to determine if the assumption of 2.6 gallons of domestic water used per one (1) gallon of wine produced can be accomplished. Rombauer Vineyards will continue to track water usage to ensure they are at or below the ratio of 2.6 to accommodate the requested increase in wine production and staffing.

**REFERENCES**

California Onsite Wastewater Association (COWA). "Pumping and Pressure Distribution Systems." May 1998.

U.S. Department of Health, Education and Welfare, Public Health Service Publication. Manual of Septic-Tank Practice. 1967.

U.S. Environmental Protection Agency. "Onsite Wastewater Treatment Systems Manual." February 2002.