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Water Availability Analysis

October 20, 2015

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

RE: Caymus Rutherford UP Assistance
 Project Number 2013044

Caymus Vineyards, located at 8700 Conn Creek Road, Rutherford, CA (APN 030-200-066), is applying for a Use Permit Modification for the 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 available water supply for this property.

SITE DESCRIPTION

The property is located at the intersection of Rutherford and Conn Creek Roads, with Conn Creek running along the eastern edge of the winery facility and through the middle of the 69.5 acre parcel. The parcel is relatively flat, except for the banks of Conn Creek, and is located in the Napa Valley Floor. An existing irrigation pond and approximately 55 acres of vineyards are located to the east of Conn Creek. The existing winery facility includes an assortment of buildings (some of which will be demolished and rebuilt) that serve for wine production, storage, hospitality services, and a residence that will be demolished. Additionally there are 3 wells currently in use on the parcel –shown as Wells 1, 2 and 4 on Enclosure A, which are used for all water needs including irrigation.

EXISTING ENTITLED WATER DEMAND

Existing water use at the facility is based on the following:

- Process needs for production capacity of 1.8 million gallons per year
- Full Time Employees = 42 per day
- Part Time Employees = 14 per day
- Tasting Visitors = 450 maximum per day
- Event Visitors = 100 maximum per event
- Irrigation of 55 acres of vineyard
- Landscape irrigation of 1.65 acres

- Frost protection of 2 acres of vineyard

PROPOSED WATER USES

Water use at the facility will be based on the following needs as described in the proposed Use Permit Modification request:

- Process needs for production capacity of 110,000 gallons per year in Phase One and up to 660,000 gallons per year in Phase Two
- All domestic, irrigation, landscape, and frost protection water needs will remain essentially the same as the existing water demands for Phases One and Two.

ACTUAL WATER USAGE FOR EXISTING WINERY PROCESS DEMAND

Enclosure B shows actual water use numbers provided by the applicant for both the winery and the existing residence on the property. These numbers were taken from the various water meters installed on the property. For 2014 with wine production at 1.8 million gallons, this water usage totaled 2,335,041 gallons for 9 months of the year (records for 3 months are missing). Extrapolating the 2014 data over a 12-month period yields actual water use of 3,113,388 gallons, or approximately 9.55 acre feet that year. Similarly, for 2013 with wine production over 2 million gallons, the water usage for 8 months of the year (with 4 months missing) totaled 2,895,513 gallons. Extrapolating this over a 12-month period yields actual water use of 4,343,270, or 13.33 acre feet for that year. These numbers include current visitor numbers at a maximum of 450 visitors per day; however, to be conservative we have accounted for the domestic water demand separately, as outlined below.

A water demand of 13.3 ac-ft/year will be utilized for the water demand associated with the existing production of 1.8 MGallons of wine per year.

PROPOSED WINERY PROCESS WATER DEMAND (CALCULATED)

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 projected process wastewater generation for wine production is calculated as follows:

Phase One

Proposed Annual production	=	110,000 gal wine/year
PW generation rate (assumed)	=	4 gal PW/gal wine
Annual PW Flow	=	440,000 gal PW/year
Annual Production Water Demand ^a	=	(440,000 gal water/yr) / (325,851 gal/ac-ft)
	=	1.35 ac-ft water/year

The expected annual water use for the Phase One 110,000 gallons of wine per year production capacity is 440,000 gallons per year, or 1.35 ac-ft per year.

Phase Two

Proposed Annual production	=	660,000 gal wine/year
PW generation rate (assumed)	=	4 gal PW/gal wine
Annual PW Flow		2,640,000 gal PW/year
Annual Production Water Demand ^a	=	(2,640,000 gal water/yr) / (325,851 gal/ac-ft)
	=	8.1 ac-ft water/year

The expected annual water use for the ultimate Phase Two 660,000 gallons of wine per year production capacity is 2,640,000 gallons per year, or 8.1 ac-ft per year.

^a It is assumed that process water demand correlates directly to process wastewater generated

DOMESTIC WATER DEMAND

Existing and proposed domestic water use at the facility is based on the total number of employees, daily visitors and event guests. The facility currently has a residence that will be demolished; therefore residential water uses are not included in the proposed domestic water demand. Domestic water is supplied by Wells 1 and 2. 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. Domestic Water Use at Caymus Vineyards

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	42	15	630	365	229,950
PT Employee	14	15	210	365	76,650
Tasting Visitors	450	3	1,350	365 ¹	492,750
Tastings w/ Meals ²	50	15	750	52	39,000
Food Pairings ³	30	8	240	156	37,440
Tasting Events ⁴	100	15	1,500	10	15,000
Total Water Use					890,790
Average Water use (gpd)					2,440
Total Water Use (ac-ft/yr)					2.73

¹ It is very unlikely the winery will have 450 visitors 365 days per year, but this conservative assumption is used for this analysis.

² Tastings with meals once per week

³ Food pairings three times per week

⁴ Tasting events 10 times per year

IRRIGATION WATER DEMAND

- Vineyard Irrigation

Water for irrigation of 55 acres of vineyard is provided by Well 4 and an existing irrigation pond at the facility. A rate of 0.4 ac-ft per acre of vineyard is assumed for irrigation volume, based on information from the Water Availability Analysis from March 25, 2013 (Enclosure C). The Napa County Water Availability Analysis standard for vineyard irrigation is 0.2 to 0.5 ac-ft/acre/year.

$$55 \text{ acres} \times 0.4 \text{ ac-ft/acre/year} = 22 \text{ ac-ft/yr}$$

- Landscape Irrigation

Water for irrigation of approximately 1.65 acres of landscape is provided by Wells 1 and 2. The water demand for landscape irrigation was based on the California Department of Water Resources guidelines for Estimated Total Water Use (ETWU) per year:

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

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)

Assumptions:

- Low water use plant types with a plant factor of 0.2 (native plants, shrubs, etc)
- Napa reference evapotranspiration of 49.4 per CIMIS, 1999
- Irrigation efficiency of 90% for drip systems or similar

$$ETWU = (49.4 \text{ in/year}) (0.62) \frac{(0.2 \times 71,874 \text{ SF})}{0.9} = 489,190 \text{ gal/yr.} = 1.5 \text{ ac-ft. /yr.}$$

FROST PROTECTION WATER DEMAND

Water for frost protection of 2 acres of vineyard is provided by Wells 2 and 4 and an existing irrigation pond at the facility; the remainder of the vineyard uses wind machines. A rate of 0.25 ac-ft per acre of vineyard is used, based on the Napa County Water Availability Analysis standard for frost protection.

$$2 \text{ acres} \times 0.25 \text{ ac-ft/acre/year} = 0.5 \text{ ac-ft/yr}$$

TOTAL PROJECTED WATER DEMAND**Table 2. Total Phase Two Projected Annual Water Demand**

Water Use	Daily Average Demand		Annual Total Demand (Phase Two)	
	(GPD)	(GPM) ⁴	(gal/year)	(acre-feet/year)
Total Wine Production	7,240	5.03	2,640,000	8.1 ²
Domestic Use	2,440	1.69	890,790	2.73
Vineyard Irrigation	29,261 ¹	20.3	7,169,000	22.0
Landscape Irrigation	1,995 ¹	1.39	488,777	1.5
Frost Protection	5,431	3.77	162,926 ³	0.5
Total	46,367	32.19	11,351,493	34.8

¹ Estimated assuming that during the months of November through February no irrigation is required.

² Actual recorded water uses for wine production as shown at Enclosure B are significantly lower than this number, in the range of 9 to 13 acre feet per year.

³ Assumed 30 days of frost season

⁴ 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 34.8 ac-ft per year, which is equivalent to 11.4 million gallons per year.

EXISTING AND PROJECTED WATER DEMAND COMPARISON

With a reduction in existing production from 1.8 million gallons of wine per year to 110,000 gallons (Phase One) and ultimately up to 660,000 gallons (Phase Two), there is an overall decrease in projected water demand of about 5.2 ac-ft/year (see Table 3).

Table 3. Water Demand Comparison

PARCEL	PARCEL SIZE (ACRES)	"ALLOTMENT" (AC-FT)	EXISTING (AC-FT)	PROPOSED (PHASE ONE) (AC-FT)	PROPOSED (PHASE TWO) (AC-FT)
030-200-066	69.5	69.5			
Wine Production (Process Water)			13.3*	1.4	8.1
Domestic Use			2.73	2.73	2.73
Vineyard Irrigation			22.0	22.0	22.0
Landscape Irrigation			1.5	1.5	1.5
Frost Protection			0.5	0.5	0.5
TOTAL (AC-FT)			40.0	28.1	34.8

*Existing process water demand shown is based on actual water use data from 2014. Using calculated water demand projections this value would be approximately 22.1 ac-ft of water per year

WATER AVAILABILITY

Due to the location of the parcel within the Napa Valley Floor, and based on Napa County Water Availability Analysis working draft, dated March 2, 2015, the parcel is entitled to a water use criterion of 1.0 acre-feet per acre per year. The parcel (APN 030-200-066) consists of 69.5 acres total, resulting in a water availability of 69.5 acre-feet of water per year.

There are a total of 3 wells currently in use on the parcel, as indicated on the attached Site Plan (Enclosure A). Wells 1, 2 and 4 have capacities of 60 gallons per minute (gpm), 20 gpm, and 180 gpm, respectively. Based on the average water demand of 46,367 gallons per day (32.19 gpm over 24 hours), the existing wells have sufficient capacity to meet the projected demand. Well 2, which has a capacity of 20 gpm, is used as a backup source in combination with Well 1, and is only intended to meet the production, domestic and landscape water demands of the facility (17.38 gpm over 24 hours). Well 4 is used for vineyard irrigation and frost protection only (13.95 gpm over 24 hours).

DROUGHT CONSERVATION

With regard to the past, current, and any future drought year(s), the owners will practice sustainable winegrowing techniques in the existing vineyard to reduce water demand, and the winery landscape plan includes a water efficient landscape portfolio, reducing the landscape irrigation as plants mature. In a very severe drought landscape irrigation would be reduced the minimum amount needed to keep the plants and vineyards alive.

CONCLUSION

Total annual water demand at Caymus Vineyards, associated with the proposed ultimate production level of 660,000 gallons of wine per year, is estimated to be a maximum of 34.8 acre-feet per year; this is approximately 5.2 acre-feet less than the current water demands associated with the existing 1.8 million gallon production level.

The facility plans to treat all the process and domestic wastewater generated to high effluent quality standards and reuse it for vineyard irrigation purposes, offsetting up to 24.0 acre-feet per year of the water demand for irrigation and frost protection uses, which represents 69% of the total water demand at the facility. Additionally, reuse of the treated effluent for irrigation recharges the groundwater table through infiltration.

Subtracting the 24.0 acre-feet treated wastewater used for irrigation and frost protection, total annual groundwater demand for the winery is 10.8 acre feet, or approximately 31% of the total water availability. The total demand can be met with the three wells currently in use on the parcel.

Please contact us with any questions.



Gina Giacone, P.E.
ASSOCIATE

cc: Kay Philippakis, Farella Braun + Martel LLP

ENCLOSURES

A – Overall Site Plan
– Landscape areas

B – Winery Water Meter Summary

C – Water System Feasibility by Applied Civil Engineering - March 25, 2013

CAYMUS VINEYARDS
WATER AVAILABILITY ANALYSIS

SUMMIT 
Project No. 2013044

ENCLOSURE A
OVERALL SITE PLAN
LANDSCAPE AREAS

Untitled Map

Write a description for your map.

Legend

- 8700 Conn Creek Rd
- Caymus Vineyards

8700 Conn Creek Rd

Total 10 Acres

300-ft

Google earth

©2015 Google

LANDSCAPE AREAS



Untitled Map

Write a description for your map.

Legend

- 8744 Conn Creek Rd
- Napa winery in February



LANDSCAPE AREAS

CAYMUS VINEYARDS
WATER AVAILABILITY ANALYSIS

SUMMIT 
Project No. 2013044

ENCLOSURE B
WINERY WATER METER SUMMARY

2014 Total Water Use:

Month	B-4	B-5	Building #5	Crush pad	N. Winery	Main office	Lorna's
Jan	24,129	23,000	63,800	64,182	112,300	1,093	52,472
Feb	12,162	22,263	31,400	41,602	72,500	2,531	54,122
Mar	20,394	13,078	58,800	55,784	98,900	3,297	39,561
Apr	4,858	5,329	8,300	31,306	21,200	258	12,501
May							
Jun							
Jul							
Aug	18,631	18,895	184,500	83,846	131,600	906	63,110
Sep	27,055	9,891	46,300	89,392	97,800	1,772	14,208
Oct	28,913	7,029	69,800	99,570	117,400	3,495	249
Nov	20,136	2,402	37,400	68,730	55,500	4,775	13,679
Dec	4,236	2,143	13,400	29,067	17,000	364	725
Totals =	160,514	104,030	513,700	563,479	724,200	18,491	250,627
							2,335,041

2013 Total Water Use:

Month	B-4	B-5	Building #5	Crush pad	N. Winery	Main office	Lorna's
Jan	20,192		5,600		8,800	727	3,450
Feb	850		1,400			38	262
Mar							
Apr							
May							
Jun							
Jul	23,043	9,645	140,300	73,645	185,200	1,522	37,075
Aug	25,072	12,582	77,900	118,757	122,300	1,406	39,012
Sep	34,491	15,474	97,000	134,646	144,400	1,730	60,437
Oct	80,683	13,462	61,100	261,535	206,900	1,793	55,768
Nov	39,453	3,502	86,400	201,481	126,500	886	45,512
Dec	45,650	4,744	15,800	113,209	95,400	769	38,010
Totals =	269,434	59,409	485,500	903,273	889,500	8,871	279,526
							2,895,513

CAYMUS VINEYARDS
WATER AVAILABILITY ANALYSIS

SUMMIT 
Project No. 2013044

ENCLOSURE C

WATER SYSTEM FEASIBILITY BY APPLIED CIVIL ENGINEERING - MARCH 25, 2013



March 25, 2013

Job No. 08-145

Kim Withrow, REHS
Environmental Health Division
Planning Building and Environmental Services Department
Napa County
1195 Third Street, Suite 101
Napa, CA 94559

Re: Non-Transient Non-Community Water System Feasibility Assessment for
Caymus Vineyard - 8700 Conn Creek Road, Rutherford, CA 94573
Napa County APN 030-200-066

Dear Ms. Withrow:

Caymus Vineyards currently operates their water system as a Transient Non-Community Water System (System Number 28-01076). The winery facility is applying for a Use Permit Modification to increase their permitted production capacity, increase the number of permitted employees and increase the visitation and marketing program relative to their current Use Permit. The winery facility has already been operating at the levels proposed in the Use Permit Modification and that the Use Permit Modification is being applied for strictly to bring the Use Permit into alignment with actual operational characteristics of the facility.

Since the proposed Use Permit Modification will result in a total number of full time employees that is greater than 24 (38 full time and 28 part time employees are proposed) the water system permit must be upgraded from a Transient Non-Community (TNC) water system permit to a Non-Transient Non-Community (NTNC) water system. The purpose of this letter is to outline the most significant differences between the current TNC water system permit requirements and those of a NTNC water system and assess the feasibility of the Caymus Vineyards water system's ability to meet the requirements of a NTNC water system.

Source Adequacy

New water system permits require that wells that supply water to the water system have a 50' deep annular seal. The two existing wells that are part of the water system have 20' deep annular seals. We understand that Napa County will allow the existing wells to be used to serve the water system even though they do not meet the 50' seal requirement provided that water quality testing results continue to be in compliance with water quality standards.

Source Capacity

There are two wells that are part of the TNC water system permit (identified as Well #1 – Primary and Well #2 – Backup). The existing water system report indicates that each well has a capacity of approximately 60 gallons per minute.

Water system flow meter records for the year 2012 indicate a maximum daily demand (MDD) of 44,625 gallons per day (calculated based on a average flow of 29,750 gallons per day in June of 2012 multiplied by a peaking factor of 1.5 in accordance with the California Waterworks Standards methodology to estimate MDD). As previously noted, the proposed Use Permit Modification will bring the Use Permit into compliance with current operational characteristics. No additional water demand is expected beyond the level experienced in the year 2012.

At an assumed pumping rate of 60 gallons per minute and a daily pumping time of 18 hours per day each well is theoretically capable of supplying 64,800 gallons per day, approximately 150% of the estimated MDD. Based on historic yield data it appears that the existing wells have more than adequate capacity to provide the volume of water required for the water system.

Furthermore, it should be noted that Caymus Vineyards drilled a new well in 2012 approximately 75 feet southwest of the existing Well #1. Caymus Vineyards is currently running well yield and water quality tests to determine if this well can be incorporated into the water system. In the event that this new well proves to be acceptable it is planned that Well #2 will be removed from the water system and the new well will be incorporated into the water system. The details of this potential modification to the water system will be presented at a future date once the new well testing is complete.

Water Storage Requirements

The California Waterworks standards require that the system have a distribution system storage reservoir equal to the MDD (44,625 gpd as calculated above).

The existing water storage tank has a capacity of 10,000 gallons.

Given the redundancy in the water supply (currently the two existing sources are capable of meeting the MDD independently) a larger storage tank is not warranted because the backup well can meet the MDD in the event that the primary well is temporarily offline.

Chemical Monitoring Requirements

Below is a list of the source (well) water quality parameters that are monitored under the current TNC water system permit and how the monitoring will change when the water system is upgraded to a NTNC water system permit:

- Chemical Groups 64432 - Primary Inorganics and 64449-A&B – Secondary Standards have to be monitored once every three years for NTNC systems compared to a single one-time sample for TNC systems.
- Chemical Group 64432.1 – Primary – Nitrate/Nitrite monitoring is the same for NTNC systems and TNC systems (once per year for Nitrate and once every three years for Nitrite).
- Bacteriological monitoring must be performed quarterly for TNC systems and monthly for NTNC systems.

Furthermore, under the NTNC water system permit the following water quality parameters that are not monitored under the TNC permit will need to be monitored:

- Chemical Group 64432 – Primary – Asbestos (once every nine years)
- Chemical Group 64432 – Primary – Perchlorate (2 initial samples, 5 to 7 months apart)
- Chemical Group 64441 – Radioactivity (4 consecutive quarterly samples and future frequency determined by initial results)
- Chemical Group 64444-A – Volatile Organic Chemicals (once every 5 years)
- Chemical Group 64444-B – Synthetic Organic Chemicals (varies by chemical – generally one time to once every three years)

In order to assess the quality of their water, Caymus Vineyards has performed an initial round of testing for the source water quality parameters that will be required under new NTNC water system permit. All reported levels were below the Maximum Contaminant Level. This testing was performed on water sampled from Well #1 (primary well). The same testing must be performed on the new well. A full listing of test results for both Well #1 and the new well will be provided with the water system permit amendment application after approval of the subject Use Permit Modification.

In addition to source water (well) monitoring, lead and copper in the distribution system will also need to be monitored under the NTNC water system permit. This monitoring will commence when the NTNC water system permit commences.

Distribution System Operator Requirements

NTNC water systems require a certified Distribution System Operator. Given the characteristics of this water system a level D1 operator is required. This requirement can be met by either contracting with an outside service provider such as Phillips and Associates or having in-house staff obtain the appropriate training and certification. It is our understanding that Caymus Vineyards intends to contract with an outside service provider to perform the services of a level D1 Distribution System Operator.

Consumer Confidence Report Requirements

NTNC water systems are required to prepare an annual Consumer Confidence Report in accordance with Chapter 15 of Title 24 of the California Code of Regulations.

Summary

The proposed Use Permit Modification results in conditions that require Caymus Vineyards to upgrade their existing TNC water system permit to a NTNC water system permit because of the increase in the number of employees. There are several additional requirements for NTNC water systems that do not apply to their existing TNC water system as described above. Based on our understanding of the existing water system from water system permit records obtained from Napa County files, water flow meter readings for all water used in the water system for the year 2012 obtained from Caymus Vineyards and source water quality testing results provided by Caymus Vineyards it is our opinion that the existing water system can be operated in accordance with the NTNC water system permit requirements by implementing the above testing and distribution system operator requirements.

An official application to upgrade the existing TNC water system to a NTNC water system will be filed by Caymus Vineyards after approval of the pending Use Permit Modification.

Please feel free to contact me at (707) 320-4968 if you have any questions.

Sincerely,

Applied Civil Engineering Incorporated

By:

Michael R. Muelrath

Michael R. Muelrath, P.E.
Principal



Copy:

Kevin S. Alfaro, Caymus Vineyards (via email)
Katherine Philippakis, Farella Braun + Martel (via email)