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Wastewater Feasibility Study

White Rock Vineyards Use Permit P20-00142
Zoning Administrator Hearing June 30, 2021

APPLIED
CIVIL ENGINEERING
INCORPORATED

May 6, 2021

Job No. 17-145

Kim Withrow, REHS
Environmental Health Division
Napa County Planning, Building and Environmental Services Department
1195 Third Street, Suite 210
Napa, CA 94559

Re: Onsite Wastewater Disposal Feasibility Study for the
White Rock Vineyards Winery Use Permit Application
1115 Loma Vista Drive, Napa, California APN 039-680-004

Dear Ms. Withrow:

At the request of White Rock Vineyards we have evaluated the process and sanitary wastewater flows associated with the proposed Use Permit (the facility currently operates under a small winery use permit exemption). We have also analyzed the capacity of the existing process and sanitary wastewater system serving the winery facility to determine if it is adequate to serve the winery uses.

Existing improvements on the property include the winery, a residence, a second dwelling unit, ag and accessory buildings, vineyard, groundwater wells, paved, dirt and gravel driveways and the utility infrastructure associated with this type of agricultural development.

The Use Permit under consideration proposes building to replace a previous building that was burned in the October 2017 fires and recognition of existing employee and visitor numbers. The proposed operational characteristics are as outlined below:

- Wine Production:
  - 20,000 gallons of wine per year (no change from existing)
  - Crushing, fermenting, aging and bottling

- Employees:
  - Two (2) full time employees (no change from existing)
  - 2.5 family member employees (no change from existing)

- Marketing Plan:
    - Daily Tours and Tastings by Appointment
        - 19 visitors per day maximum (no change from existing)
    - Marketing Event Type #1
        - Ten events per year
        - 30 guests
        - All food is catered
    - Marketing Event Type #2
        - One event per year
        - 75 guests
        - All food is catered
        - Portable toilets are used for guests attending event

Please see the White Rock Vineyards Use Permit Conceptual Site Improvement Plans prepared by Applied Civil Engineering for approximate locations of existing and proposed facilities.

The remainder of this letter describes the existing process and sanitary wastewater disposal system, its design capacity, peak flows associated with the proposed use and our analysis and recommendations related to how the waste flows can be accommodated.

Existing Septic Systems

The winery facility is serviced by one combined domestic and process waste septic system. According to permit records on file with Napa County, the septic system is a standard conventional type system that was installed in 1987. The system was designed to serve the existing winery with a peak flow of 500 gallons per day (gpd). There were to be 500 lf of leach lines and the leach line trenches were to be 18 inches wide and 24-28 inches deep with 12 inches of rock below the perforated pipe.

There is one 1,500 gallon septic tank that handles both process and sanitary waste from the winery. Wastewater flows via gravity from the winery facility to the septic tank located just below the winery crush pad and from the septic tank to the leach field.

There is also a storm drain diversion valve that is used to divert runoff from the outdoor crush pad to the process waste septic tank or to the storm drainage system as appropriate based on weather conditions and activities occurring on the crush pad.

This system was inspected by McCollum General Engineering on April 17, 2018 and found to be operating properly however only 260 lf of leach line was found rather than the 500 lf indicated on the permits and plans. Another 45 lf of leach line was found but was not connected.

Proposed Process Wastewater Design Flows

We have used the generally accepted standard that six gallons of winery process wastewater are generated for each gallon of wine that is produced each year and that 1.5 gallons of wastewater are generated during the crush period for each gallon of wine that is produced. Based on the 20,000 gallon production capacity and the expectation that both white and red wine will be produced at the winery, we have assumed a conservative 30 day crush period. Using these assumptions, the annual, average daily and peak winery process wastewater flows are calculated as follows:

$$\text{Annual Winery Process Wastewater Flow} = \frac{20{,}000 \text{ gallons wine}}{\text{year}} \times \frac{6 \text{ gallons wastewater}}{1 \text{ gallon wine}}$$

Annual Winery Process Wastewater Flow = 120,000 gallons per year

$$\text{Average Daily Process Wastewater Flow} = \frac{120{,}000 \text{ gallons wastewater}}{\text{year}} \times \frac{1 \text{ year}}{365 \text{ days}}$$

Average Daily Winery Process Wastewater Flow = 323 gallons per day

$$\text{Peak Winery Process Wastewater Flow} = \frac{20{,}000 \text{ gallons wine}}{\text{year}} \times \frac{1.5 \text{ gallons wastewater}}{1 \text{ gallon wine}} \times \frac{1 \text{ year}}{30 \text{ crush days}}$$

Peak Winery Process Wastewater Flow = 1,000 gallons per day (gpd)

Proposed Winery Sanitary Wastewater Design Flows

The peak sanitary wastewater flow from the winery is calculated based on the number of winery employees, the number of daily visitors for tastings and the number of guests attending scheduled marketing events. In accordance with Table 4 of the Napa County "Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems" we have used a design flow rate of 15 gallons per day per employee and 3 gallons per day per visitor for tastings. Table 4 does not specifically address design wastewater flows for guests at marketing events. Since it is planned that food will be catered and prepared offsite for events we have conservatively assumed 5 gallons of wastewater per guest. Based on these assumptions, the peak winery sanitary wastewater flows are calculated as follows:

Employees

Peak Sanitary Wastewater Flow = 5 employees (rounded up from 2 FT and 2.5 family member employees) X 15 gpd per employee

Peak Sanitary Wastewater Flow = 75 gpd

Daily Tastings

Peak Sanitary Wastewater Flow = 19 visitors per day X 3 gallons per visitor
Peak Sanitary Wastewater Flow = 57 gpd

Marketing Events

Since portable toilets will be used for marketing events with more than 30 guests the peak flow is calculated based on an event with 30 guests as follows:

Peak Sanitary Wastewater Flow = 30 guests per day X 5 gallons per guest
Peak Sanitary Wastewater Flow = 150 gpd

Total Peak Winery Sanitary Wastewater Flow

The worst-case peak winery sanitary wastewater flow is calculated based on five employees, 19 tours and tasting visitors and an event for 30 guests. The peak flow for this scenario is calculated as follows:

Total Peak Winery Sanitary Wastewater Flow = 75 gpd + 57 gpd + 150 gpd

Total Peak Winery Sanitary Wastewater Flow = 282 gpd

Combined Peak Wastewater Flow

Combined Peak Wastewater Flow = Peak Winery Process Wastewater Flow + Total Peak Winery Sanitary Wastewater Flow

Combined Peak Winery Wastewater Flow = 1,000 gpd + 282 gpd

Combined Peak Winery Wastewater Flow = 1,282 gpd

Existing Septic System Capacity

As noted above the permit for the existing winery septic system indicates a design flow of 500 gpd.

Proposed Design Flow vs Existing Capacity

The predicted Combined Peak Winery Wastewater Flow for the winery operational characteristics (1,282 gpd) is more than the design capacity of the existing winery wastewater disposal system (500 gpd).

Recommendations

Separate SS and PW Flows and Install New PW Treatment and Irrigation System

In this scenario the domestic waste stream would continue to flow to the existing leach field. Further investigation should be performed to locate the additional leach line and ensure that there are 500 lf of operational leach line. If additional leach line is not found then new leach line should be installed as a repair to bring the existing system into compliance with design intent. Domestic flows are estimated to be 282 gpd which is less than the 500 gpd design capacity of the existing system.

The process wastewater would be collected separately, treated and disposed of via irrigation in the vineyard or landscape areas outside of all required setbacks. Based on the winery's planned production level and waste flows we recommend that treatment be achieved using a package plant type system or other treatment system designed to accept winery process wastewater that is capable of meeting the following treatment requirements:

Parameter	Pre-treatment*	Post Treatment**
pH	3 to 10	6 to 9
BOD_5	500 to 12,000 mg/l	<160 mg/l
TSS	40 to 800 mg/l	<80 mg/l
SS	25 to 100 mg/l	<1 mg/l

* Reference California Regional Water Quality Control Board Central Coast Region General Waste Discharge Requirements Order No. R3-2008-0018 for winery process wastewater characteristics

** Required for discharge to land via surface irrigation by Napa County for samples taken at the discharge of the treatment unit.

Process Wastewater Disposal

We propose that disposal of the treated winery process wastewater be via irrigation of the onsite vineyard or within a naturally vegetated area on the property. For the purpose of this study we have assumed that the winery process wastewater will be applied to approximately one acre of vineyard that is located to the west of the winery facility and outside of the required 100' well setbacks. This is a conservative assumption to simplify this analysis as more vineyard is available outside of the required setbacks. The final irrigation area will be determined and incorporated into the final design with the installation permit application.

In order to accommodate differences in the timing of wastewater generation, irrigation demand, and limitations on wet weather application of treated wastewater a storage tank will be required. We have prepared a water balance calculation to size a tank that will temporarily store wastewater generated at the winery before it is applied to the vineyard. The water balance calculations assume a monthly winery process wastewater generation rate and a monthly vineyard irrigation schedule based on our past experience with projects of this type. The water balance further assumes that during the summer the treated wastewater will be used to offset the

irrigation needs of the vineyard and in the winter application of treated winery process wastewater will be very limited (0.8" maximum per month) to prevent runoff. In the event that winter application is not possible due to extended wet weather patterns winery operations will have to be adjusted to work within the capacity of the storage tank(s) or the tank(s) will need to be emptied by hauling waste to an approved offsite disposal location. The water balance calculations show that the proposed land application area is large enough to accept all the wastewater generated each month throughout the year without carry over except in during crush when irrigation capacity is reduced and wastewater production is greatest (see attached). The water balance indicates a minimum tank size of 5,500 gallons however, to provide operational flexibility, we recommend that the storage tank(s) have a minimum capacity of at least 10,000 gallons so that a full weeks' worth of peak flow can be contained to allow flexibility in irrigation scheduling during the harvest period.

All application of treated winery process wastewater must comply with the requirements of the Napa County Process Wastewater Guidelines for Surface Drip Irrigation and ultimately with the State Water Resources Control Board Statewide General Waste Discharge Requirements (WDRs) for Wineries.

Reserve Area

Reserve area must cover the main residence (2 bedrooms = 240 gpd), second dwelling unit (3 bedrooms = 360 gpd) and the winery domestic waste (282 gpd). Based on a site evaluation performed in the area of the existing second dwelling unit septic system (E06-01027) it appears that there is at least one test pit in an area outside of the location of the existing leach field (TP #4). The site evaluation reports the finding of loam soil to a depth of 66 inches. While this could be suitable for a standard system, given the limited area tested, we will size a subsurface drip type system for the reserve area. The required reserve area is calculated as follows:

Required Reserve Area = (240 gpd + 360 gpd + 282 gpd) x 1sf / 0.7 gpd x 200%
Required Reserve Area = 2,520 sf

There is adequate reserve area in the vicinity of Test Pit #4 to accommodate 2,600 sf of subsurface drip reserve area.

Summary

The calculations presented above illustrate that the wastewater flows associated with the proposed Use Permit may exceed the capacity of the existing wastewater system. However, by separating the process waste and sanitary waste flows and treating the process waste for irrigation the domestic waste can continue going to the existing leach field. Adequate area for a reserve is also available.

We trust that this provides the information you need to process the subject Use Permit. Please feel free to contact us at (707) 320-4968 if you have any questions.

Sincerely,

Applied Civil Engineering Incorporated

By:

Michael R. Muelrath

Michael R. Muelrath RCE 67435
Principal

Copy:

Christopher Vandendriessche, White Rock Vineyards (via email)
Kirsty Shelton & Rachel Lenihan, Palisades Land Use Consultancy (via email)

Attachments:

White Rock Vineyards Winery Use Permit Conceptual Site Improvement Plans