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Wastewater Feasibility Study

Materra Winery
Use Permit Major Modification Application No. P20-00184-MOD
Planning Commission Hearing, June 2, 2021

APPLIED
CIVIL ENGINEERING
INCORPORATED

June 19, 2020

Job No. 08-109

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
Materra Winery Use Permit Modification
4326 Big Ranch Road, Napa County, California APN 036-160-003
P08-00428-UP & P15-00071-MOD

Dear Ms. Withrow:

At the request of Materra Winery we have evaluated the process and sanitary wastewater flows associated with the proposed Use Permit Modification. 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 proposed changes in use.

It is our understanding that Materra Winery was originally permitted produce 50,000 gallons of wine per year (P08-00428). Production capacity was increased to 85,000 gallons of wine per year by Major Mod P15-00071 and then to 110,000 gallons per year by Major Mod P17-00156.

The Use Permit Modification being reviewed proposes the following revised operating characteristics:

- Wine Production:
  - Increase to 150,000 gallons of wine per year

- Employees:
  - Twelve (12) full-time employees
  - Two (2) part-time employees
  - Three (3) seasonal employees

- Marketing Plan:
    - Daily Tours and Tastings by Appointment
        - 34 visitors per day maximum
    - Private Food and Wine Events for Trade
        - 12 per year
        - 25 guests maximum
    - Private Food and Wine Events
        - 12 per year
        - 50 guest maximum
    - Harvest Events
        - 2 per year
        - 100 guests maximum
        - Portable toilets will be utilized

The remainder of this letter describes the existing process and sanitary wastewater system, its design capacity, peak flows associated with the proposed changes in use and our analysis and recommendations related to the system's capability to handle the anticipated wastewater flows

Existing Septic System

The existing process and sanitary wastewater disposal system consists of a standard gravity distribution leach field with a total of 4,284 lineal feet of trench with infiltrator chambers. The distribution boxes and leach line trenches were installed by M.C. Dixon, Inc. in the Fall of 2010, prior to the winery being constructed.

The design flow for the leach field is 3,111 gallons per day (gpd) and consisted of winery process and sanitary wastewater flows as well as a planned future residence as outlined in the Winery Septic System Design Calculations for Materra prepared by ACE dated October 14, 2010. The leach field is located immediately east of the winery building.

There are also several sanitary sewer and process wastewater septic tanks that were installed as part of the winery construction project that was administered by Ledcor Construction. The location of the existing septic tanks is shown on the Materra Winery Use Permit Modification Conceptual Site Improvement Plans (attached).

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 proposed 150,000 gallon production capacity and the expectation that both white and red wine will be produced at the winery, we have assumed a 60 day crush period. Using these assumptions, the annual, average daily and peak winery process wastewater flows are calculated as follows:

$$\text{Annual Winery Process Wastewater Flow} = \frac{150{,}000 \text{ gallons wine}}{\text{year}} \times \frac{6 \text{ gallons wastewater}}{1 \text{ gallon wine}}$$

Annual Winery Process Wastewater Flow = 900,000 gallons per year

$$\text{Average Daily Process Wastewater Flow} = \frac{660{,}000 \text{ gallons wastewater}}{\text{year}} \times \frac{1 \text{ year}}{365 \text{ days}}$$

Average Daily Winery Process Wastewater Flow = 2,466 gallons per day

$$\text{Peak Winery Process Wastewater Flow} = \frac{150{,}000 \text{ gallons wine}}{\text{year}} \times \frac{1.5 \text{ gallons wastewater}}{1 \text{ gallon wine}} \times \frac{1 \text{ year}}{60 \text{ crush days}}$$

Peak Winery Process Wastewater Flow = 3,750 gallons per day (gpd)

Proposed 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 tours and tastings and the number of guests attending the food and wine pairing events. In accordance with Table 4 of the Napa County Environmental Management Department "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 tours and tastings. Table 4 does not specifically address design wastewater flows for guests at the 25 or 50 person food and wine pairing events. Since the applicant is proposing that food service may either be catered or prepared onsite, we have conservatively estimated 15 gallons of wastewater per guest at these events assuming that wastewater generation will be similar to that of a conventional restaurant. Based on these assumptions, the peak winery sanitary wastewater flows are calculated as follows:

Employees

Peak Sanitary Wastewater Flow = 17 employees X 15 gpd per employee
Peak Sanitary Wastewater Flow = 255 gpd

Daily Tours and Tastings

Peak Sanitary Wastewater Flow = 34 visitors per day X 3 gallons per visitor
Peak Sanitary Wastewater Flow = 102 gpd

Private Food and Wine Events (12 per year)

Peak Sanitary Wastewater Flow = 25 guests X 15 gallons per guest
Peak Sanitary Wastewater Flow = 375 gpd

Private Food and Wine Events (12 per year)

Peak Sanitary Wastewater Flow = 50 guests X 15 gallons per guest
Peak Sanitary Wastewater Flow = 750 gpd

Harvest Events (2 per year)
Not included because portable toilets are used.

Total Peak Winery Sanitary Wastewater Flow

Assuming that daily tours and tastings and food and wine pairing events may occur on the same day, that portable toilets will be used for all events with more than 50 guests in attendance, and that no 25 or 50 person events will occur during the peak flows associated with harvest the total peak winery sanitary wastewater flow during harvest is calculated as follows:

Total Peak Winery Sanitary Wastewater Flow = 255 gpd + 102 gpd

Total Peak Winery Sanitary Wastewater Flow = 357 gpd

Combined Peak Winery Wastewater Flow

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

Combined Peak Winery Wastewater Flow = 3,750 gpd + 357 gpd

Combined Peak Winery Wastewater Flow = 4,107 gpd

Residential Wastewater Flow
It was previously planned that a future new residence would be connected to the winery septic system. However, a new area to the west of the winery was identified for a residential septic system and the residence septic system was installed there and will no longer be connected to the winery septic system (E15-00734 & E15-00735).

Proposed Design Flow vs Existing Capacity

The predicted Combined Peak Winery Wastewater Flow for the above described operational characteristics (4,107 gpd) is more than the design capacity of the existing wastewater disposal field (3,111 gpd).

Recommendations

Leach Field

The existing septic system leach field must be expanded to accommodate the additional flows associated with the proposed Use Permit Modification. The existing field consists of 4,284 lineal feet of leach line divided into two subfields of 2,142 lineal feet each. The total capacity of the leach field can be increased by 50% by adding a new subfield of 2,142 lf of leach line. There is adequate area available to add this new subfield in the area off Test Pits 6B, 7B and 8B as shown on the Materra Winery Use Permit Modification Conceptual Site Improvement Plans.

Septic Tanks

The total required septic tank capacity based on a minimum hydraulic retention time for peak flows of three days is 3,321 gallons for sanitary waste (based on non-harvest event day with 50 guests) and 11,250 gallons for process waste. The existing sanitary waste septic tanks provide a total of 4,500 gallons of tank capacity and thus are adequate. The existing process waste septic tanks provide a total volume of 9,000 gallons (5,000 from original installation plus 4,000 added after P17-00156 was approved) and thus additional volume will be required. This additional process waste septic tank capacity can be accommodated by installing one new 3,000 gallon (minimum) septic tank in series with the existing process waste septic tanks located just east of the winery building.

Reserve Area

The 100% reserve area will be located west of the winery building as originally designed. There is enough area there to accommodate an additional 6,426 lf of leach line in the area of Test Pits #9B-#16B as shown on the Materra Winery Use Pemit Modification Conceptual Site Improvement Plans.

Summary

The calculations presented above illustrate that the wastewater flows associated with the proposed Use Permit Modification can be accommodated provided that the existing leach field is expanded by adding a new subfield consisting of 2,142 lf of leach lines and adding at least 3,000 gallons of additional process waste septic tank capacity.

Full design specifications for the required septic system improvements must be prepared for County review and permitting after the subject Use Permit Modification is approved and before any work to modify the septic system is started.

We trust that this provides the information you need to process the subject Use Permit Modification. 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:

Brian Cunat, Materra Winery (via email)
George Monteverdi, Monteverdi Consulting (via email)