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Wastewater Feasibility Study

APPLIED
CIVIL ENGINEERING
INCORPORATED

January 28, 2014

Job No. 13-133

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

Re: Onsite Wastewater Disposal Feasibility Study for the
Frog's Leap Winery Use Permit Modification
8815 Conn Creek Road, Napa County, California APN 030-090-033
93397-UP, P04-0427 Major Modification & P10-00157 Major Modification

Dear Ms. Withrow:

At the request of Frog's Leap Winery (FLW) we have evaluated the sanitary wastewater flows associated with the proposed Use Permit Modification. We have also analyzed the design capacity of the existing 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 FLW is currently permitted to produce 240,000 gallons of wine per year and there is no change in the approved production capacity proposed with this Use Permit Modification. All winery process wastewater will continue to be disposed of via the existing aeration pond and irrigation system located on the adjacent parcel (Napa County APN 030-090-040) and therefore no further analysis of winery process wastewater flow is included in this analysis.

We understand that the Use Permit Modification includes an increase in the number of recognized employees from 20 full-time employees to a total of 35 employees as well as construction of a new Ag Processing Center (APC) building. It is our understanding that the APC will have a commercial kitchen that will be used for processing fruits grown onsite and also for preparing food for marketing events.

The Use Permit Modification also proposes to modify the current marketing plan to allow the following activities:

Description	# of Guests	Frequency
Tours and Tasting Visitors	300	Peak Day
	125	Average Day
Marketing Events with Meal Prepared Onsite	20	1 per week
Marketing Events with Catered Meal	25	3 per month
Marketing Events with Catered Meal	150	1 per month
Larger Marketing Event with Catered Food & Portable Toilets	500	4 per year

The remainder of this letter describes the existing sanitary wastewater disposal system, its design capacity, peak sanitary wastewater flows associated with the proposed Use Permit Modification and our analysis and recommendations related to the system's ability to handle the anticipated wastewater flows. As previously noted, all winery process wastewater will continue to be treated and disposed of via the existing aeration pond and irrigation system and therefore process wastewater disposal is not addressed in this report.

Existing Sanitary Wastewater Septic System

The disposal field is located approximately 300 feet southwest of the Barrel Building under the southernmost end of an existing solar panel array as shown on the Frog's Leap Winery Wastewater Feasibility Study Exhibit (attached). According to the design plans and calculations prepared by Summit Engineering, dated February 3, 2000, sanitary wastewater from the various winery buildings collects into an existing 2,000 gallon septic tank located adjacent to the fire pump house approximately 100 feet west of the Barrel Building. Effluent from the septic tank flows via gravity to an existing 1,500 gallon sump tank located immediately south of the septic tank. Septic tank effluent is temporarily stored in the sump tank until it is demand dosed to the disposal field.

The existing sanitary wastewater disposal field consists of a pressure distribution type disposal field with a total of 500 lineal feet of trench and three square feet of sidewall area per lineal foot of trench. The system was designed for a peak flow of 785 gallons per day (gpd) and a soil application rate of 0.56 gpd/sf. The calculations by Summit Engineering indicate that 467 feet of trench were required for the 785 gpd design flow and that 500 feet of trench were provided. The total design capacity of the disposal field based on these parameters is calculated as shown below:

$$\text{Design Flow} = 500 \text{ lineal feet} \times \frac{3 \text{ square feet of sidewall}}{\text{lineal foot of trench}} \times \frac{0.56 \text{ gpd}}{\text{square foot of sidewall}}$$

Design Flow = 840 gpd

According to Napa County records, the existing septic system was originally installed in 2000. The sewer collection system was modified slightly in 2006 when the new Administration Building was constructed and tied into the septic system. We understand that the system has been in continuous operation since it was constructed and that it has not experienced any significant operational issues. The existing septic system was inspected by McCollum General Engineering on November 21, 2013. During the inspection it was noted that excessive solids had built up in the septic tank and distribution piping. The distribution piping was purged after the inspection and FLW had a full pumping and thorough cleaning of the septic tank performed on December 30, 2013 and the system now appears to be operating acceptably. There were several small repairs suggested by McCollum General Engineering which we are working with FLW to address.

Proposed Sanitary Wastewater Design Flows

The peak sanitary wastewater flow from the winery facility 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. For catered events we have conservatively assumed 5 gallons of wastewater per guest at marketing events. For events where meals will be prepared onsite we have assumed 15 gallons of wastewater per guest similar to a restaurant.

Based on these assumptions, the peak winery sanitary wastewater flows are calculated as follows:

<u>Employees</u>

Peak Sanitary Wastewater Flow = 35 employees X 15 gpd per employee
Peak Sanitary Wastewater Flow = 525 gpd

<u>Daily Tastings</u>

Peak Sanitary Wastewater Flow = 300 visitors per day X 3 gallons per visitor x 50% Usage Factor
Peak Sanitary Wastewater Flow = 450 gpd

<u>Marketing Event with Meal Prepared Onsite (1 per week)</u>

Peak Sanitary Wastewater Flow = 20 guests X 15 gallons per guest
Peak Sanitary Wastewater Flow = 300 gpd

Marketing Event with Catered Meal (3 per month)

Peak Sanitary Wastewater Flow = 25 guests X 5 gallons per guest
Peak Sanitary Wastewater Flow = 125 gpd

Marketing Event with Catered Meal (1 per month)

Peak Sanitary Wastewater Flow = 150 guests X 5 gallons per guest
Peak Sanitary Wastewater Flow = 750 gpd

Larger Marketing Event with Catered Meal (4 per year)

Peak Sanitary Wastewater Flow = 500 guests X 5 gallons per guest
Peak Sanitary Wastewater Flow = 2,500 gpd

Ag Processing Center – Food Processing

Wastewater flow for fruit processing is based on the following information provided by FLW:

- 5,000 pounds of fruit to be processed per year
- 1 batch = 20 pounds of fruit
- 5 gallons of water used per batch for cleaning of processing pots and equipment
- 10 batches per day peak processing rate

Using this information the peak wastewater generation rate for fruit processing is calculated as follows:

Peak Sanitary Wastewater Flow = 5 gallons per batch x 10 batches per day
Peak Sanitary Wastewater Flow = 50 gallons per day

Total Peak Winery Sanitary Wastewater Flow

In order to manage the peak sanitary wastewater flows a maximum of one event will be scheduled each day. Furthermore, for any events with more than 150 guests in attendance portable toilets will be used. Therefore, the worst case peak winery sanitary wastewater flow is calculated based on 35 employees, 300 visitors for tastings and a marketing event with 150 guests and a catered meal prepared offsite. The peak flow for this scenario is calculated as follows:

Total Peak Winery Sanitary Wastewater Flow = 525 gpd + 450 gpd + 750 gpd + 50 gpd

Total Peak Winery Sanitary Wastewater Flow = 1,775 gpd

Proposed Design Flow vs Existing Capacity

The predicted Peak Winery Sanitary Wastewater Flow for the proposed operational characteristics (1,775 gpd) is greater than the design capacity of the existing wastewater disposal field (840 gpd).

Analysis of Design Criteria Changes

Several design criteria have changed since the existing system was permitted and installed. Since, the total septic system design flow is increasing we must analyze the system in light of today's design criteria. The two notable changes in design criteria are:

1. Required Separation to Limiting Soil Condition – when the existing septic system was designed codes required a separation of 24 inches from trench bottom to the limiting soil condition or seasonal groundwater table. The existing system provides the minimum 24 inches of separation based on the estimated water table level at the time the system was designed. The estimated groundwater level was based on observation of soil mottling and not direct observation of groundwater levels. Current codes require 36 inches of separation. Since the existing system does not provide the required 36 inches of separation based on previously estimated water table levels in the area of the existing septic system groundwater levels will need to be verified by groundwater monitoring in accordance with County protocol. In the event that the groundwater level is proven to be at least 36 inches below the existing trench bottoms the existing leach lines can continue to be used. If groundwater monitoring is not performed or if monitoring confirms the previously estimated groundwater level then either the existing leach lines will need to be abandoned or pre-treatment will need to be implemented.

2. Soil Hydraulic Loading Rate – when the existing septic system was designed codes allowed a soil hydraulic loading rate of 0.56 gpd/sf of sidewall. Current codes allow a soil hydraulic loading rate of 0.35 gpd/sf.

Based on the findings of our site evaluation on November 21, 2013 (E13-00719) and the soil application rate of 0.35 gpd/sf the required total length of leach line trench is calculated as follows:

$$\text{Required Length of Trench} = 1{,}775 \text{ gpd} \times \frac{\text{square foot}}{0.35 \text{ gpd}} \times \frac{1 \text{ lf}}{3 \text{ square feet}}$$

Required Length of Trench = 1,691 lf

Recommendations

Given the need to increase capacity and comply with current code requirements we recommend that groundwater monitoring be performed in the area of the existing septic system. If it is found that at least 36 inches of separation exists between seasonal groundwater levels and the trench bottom then we recommend that the existing leach field be kept in use and additional leach lines be added to accommodate the reduced hydraulic loading rate allowed by current code and also to accommodate the increase in flow that results from the proposed use permit modification.

In the event that groundwater monitoring is not performed or groundwater levels are less than 36 inches below trench bottom then the existing leach lines should be abandoned and new leach lines should be installed.

For the purpose of this analysis we will assume the worst case scenario where the existing leach lines are abandoned and a completely new leach field will be installed. Based on the proposed site plan and Napa County GIS topographic data, we have determined that there is enough area to install 1,691 lineal feet of pressure distribution leach lines in the vicinity of Test Pits #1, #2, #5 & #6 as shown on the Frog's Leap Winery Wastewater Feasibility Study Exhibit (attached). It should be noted that signs of groundwater were note observed in the test pits located in this area.

In the event that it is proven that the existing leach lines can be re-used then only 1,191 additional feet would be required (1,691 total required – 500 existing).

Reserve Area

Napa County code requires that an area be set aside to accommodate a future onsite wastewater disposal system in the event that the primary system fails or the soil in the primary area is otherwise rendered unsuitable for wastewater disposal. Based on the proposed site plan and Napa County GIS topographic data, we have determined that there is enough area to set aside for an additional 1,691 lineal feet of pressure distribution leach lines in the vicinity of Test Pits #3, #4, #7 & #8 as shown on the Frog's Leap Winery Wastewater Feasibility Study Exhibit (attached).

Septic Tank Capacity

The total required septic tank capacity based on a recommended hydraulic retention time for peak flows of three days is 5,265 gallons. We recommend that this be accomplished by either adding a 3,000 gallon septic tank in series with the existing 2,000 gallon septic tank or by replacing the existing 2,000 gallon septic tank with one new 5,000 gallon septic tank. The hydraulic retention time will be just under three days for peak flows but given the limited number of days with peak flows (1 event per month) it is our opinion that 5,000 gallons of septic tank capacity is adequate.

Summary

The calculations presented above illustrate that the wastewater flows associated with the proposed Use Permit Modification will exceed the capacity of the existing system. However, by expanding or replacing the existing system (depending on the results of groundwater monitoring) the proposed conditions can be accommodated.

This analysis is based on the premise that the existing disposal field will either be expanded or replaced with a similar type of system. Other types of wastewater systems may also be suitable for this application and can be explored further before the septic system expansion or replacement is fully designed. Full design specifications for all septic system improvements must be prepared for County review and permitting after the subject Use Permit Modification is approved and before any work 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

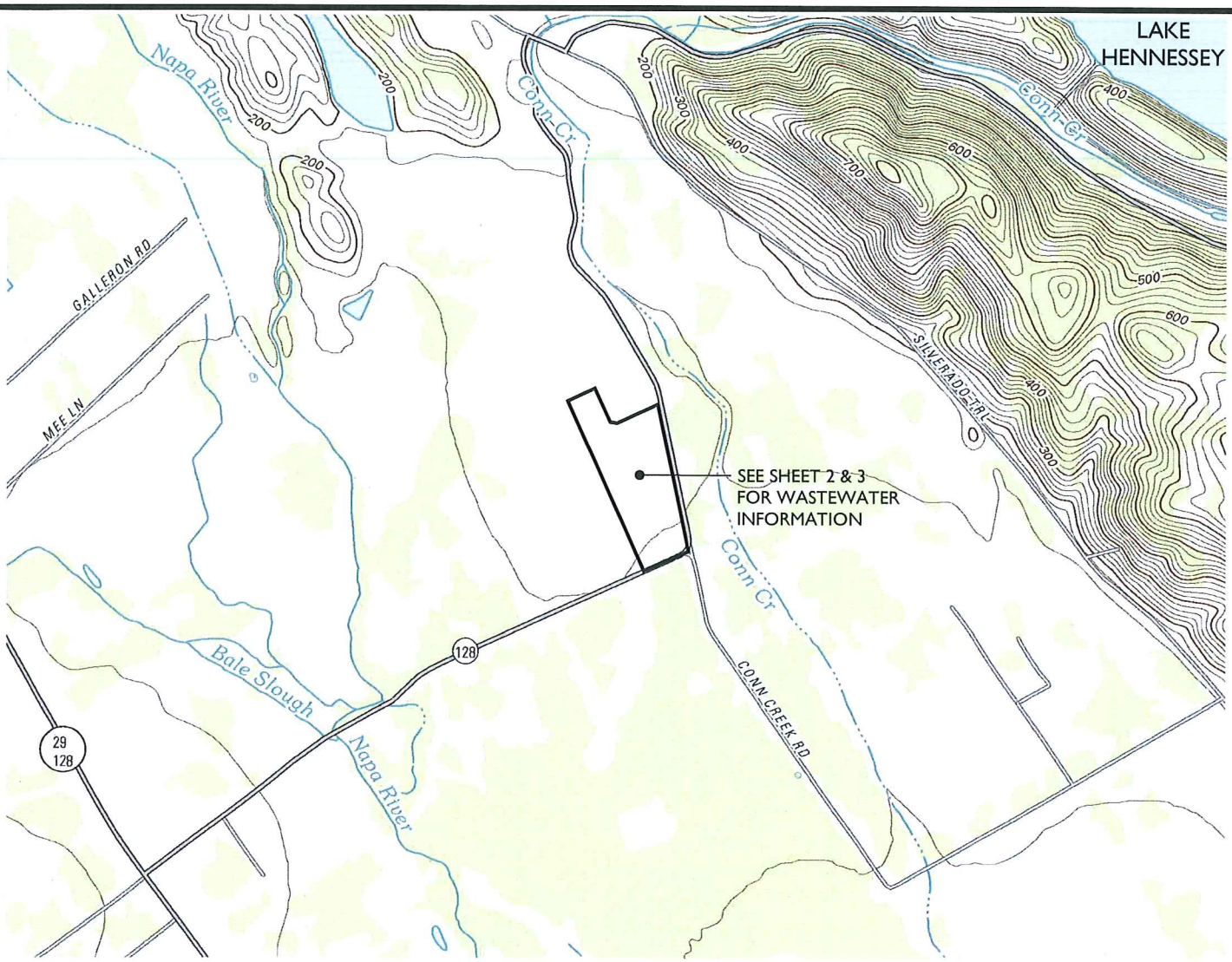
Michael R. Muelrath RCE 67435
Principal

Copy:

John Williams, Frog's Leap Winery (via email)
Jonah Beer, Frog's Leap Winery (via email)
Jeffery Redding (via email)
Ned Forrest, Forrest Architects (via email)

Attachments:

Frog's Leap Winery Wastewater Feasibility Study Exhibit



LOCATION MAP

SCALE: 1" = 2,000'

NOTES:

1. TEST PITS ONE THROUGH SIXTEEN (TP #1 - TP #16) WERE EXCAVATED BY McCOLLUM GENERAL ENGINEERING ON NOVEMBER 21, 2013 AND WERE WITNESSED BY MIKE MUELRATH OF APPLIED CIVIL ENGINEERING INCORPORATED AND PETER EX OF THE NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES DEPARTMENT - ENVIRONMENTAL HEALTH DIVISION.
2. FADED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES. TOPOGRAPHIC INFORMATION WAS OBTAINED FROM THE NAPA COUNTY GEOGRAPHIC SYSTEM (GIS) DATABASE. APPLIED CIVIL ENGINEERING INCORPORATED ASSUMES NO LIABILITY REGARDING THE ACCURACY OR COMPLETENESS OF THE TOPOGRAPHIC INFORMATION.
3. AERIAL PHOTOGRAPH WAS OBTAINED FROM THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM (GIS) DATABASE AND IS DATED APRIL 9, 2011.
4. ACCORDING TO FEMA FIRM COMMUNITY PANEL 06055C0385E THE SUBJECT PARCEL IS DETERMINED TO BE WITHIN THE 100 YEAR AND THE 500 YEAR FLOOD BOUNDARY AS SHOWN ON SHEET 2. SEE FEMA FIRM COMMUNITY PANEL 06055C0385E FOR MORE INFORMATION.

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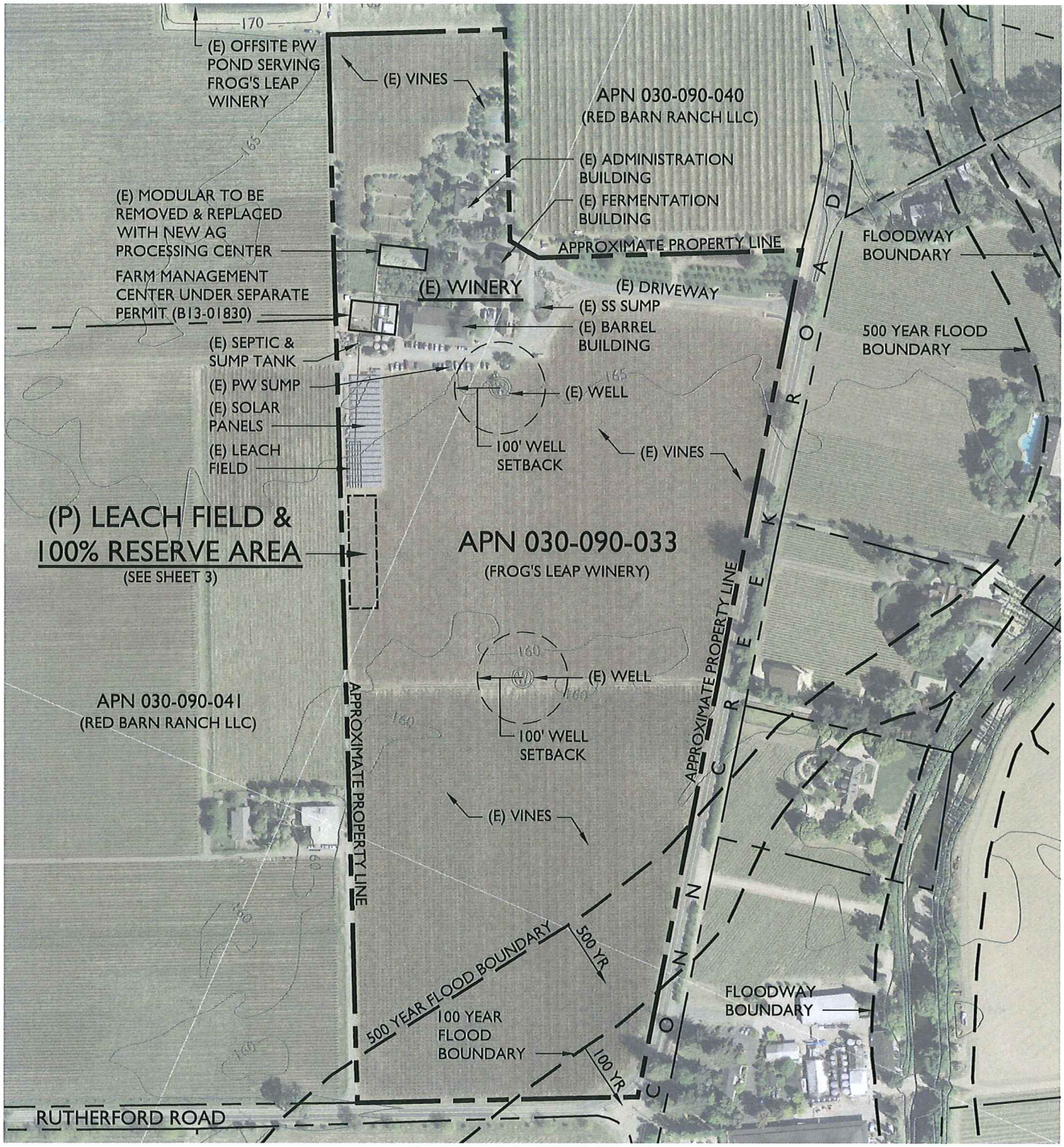
FROG'S LEAP WINERY WASTEWATER FEASIBILITY STUDY EXHIBIT

8815 CONN CREEK ROAD
ST. HELENA, CA 94574
APN 030-090-033

SCALE: 1" = 2,000'



OVERALL SITE PLAN

SCALE: 1" = 300'

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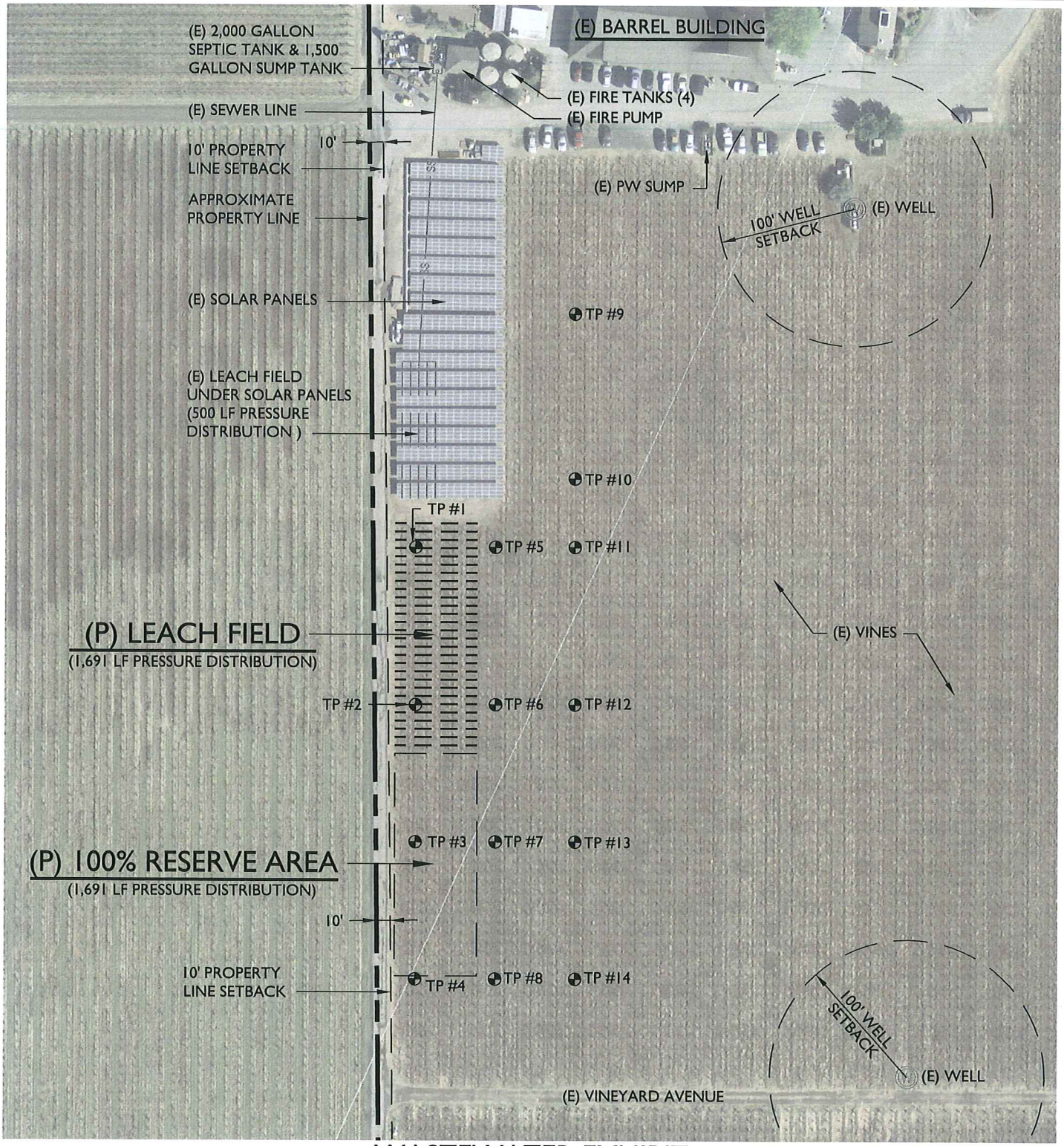
SCALE: 1" = 300'



WASTEWATER EXHIBIT

SCALE: 1" = 100'

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SCALE: 1" = 100'

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