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Wastewater Feasibility Study

Cuvaison Winery P16-00146
Planning Commission Hearing January 17, 2018

RAM ENGINEERING

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March 25, 2016
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Napa County Planning, Building, &
Environmental Services
1195 Third Street, 2nd Floor
Napa, CA 94559

Attention: Ms. Kim Withrow

Re: Cuvaison Winery
1061 Duhig Rd. with leachfield at
5019 Old Sonoma Rd.
Napa, CA
APN 047-120-005 & 006
Land Use Permit Application
Wastewater Feasibility Study
RAM Project No. 2002023

Dear Kim,

The purpose of this letter is to supplement the Cuvaison Winery Land Use Permit modification application, which is requesting an increase in employees and visitors at this time. RAM Engineering has prepared this Wastewater Feasibility Study for the purpose of assessing the onsite sanitary wastewater system (SW) treatment and disposal capacity necessary for the proposed expanded use.

The winery is currently served by a dual field system, with 50% of the sanitary wastewater flows being treated and disposed of in an existing above ground mound system and 50% of the sanitary wastewater flows being treated and disposed of in an existing subsurface drip dispersal system. This feasibility study will show that adequate expansion area exists to accommodate the proposed increase in flows associated with this Use Permit modification request.

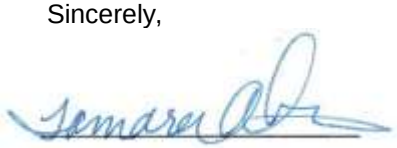
The proposed expanded sanitary wastewater management system described above and herein will be adequate to treat and dispose of the projected SW flows generated from the expanded use. To assist you in the evaluation of the above conclusions, the following information is enclosed:

Attachment I: Wastewater System Flow Diagram (Existing and Proposed)

Attachment II: Wastewater System Design Criteria, Evaluation, & Calculations

The attached information regarding the proposed improvements should be sufficient for review at the Use Permit level. If you have any questions or require further information, please feel free to contact me at (707) 824-9730.

Sincerely,



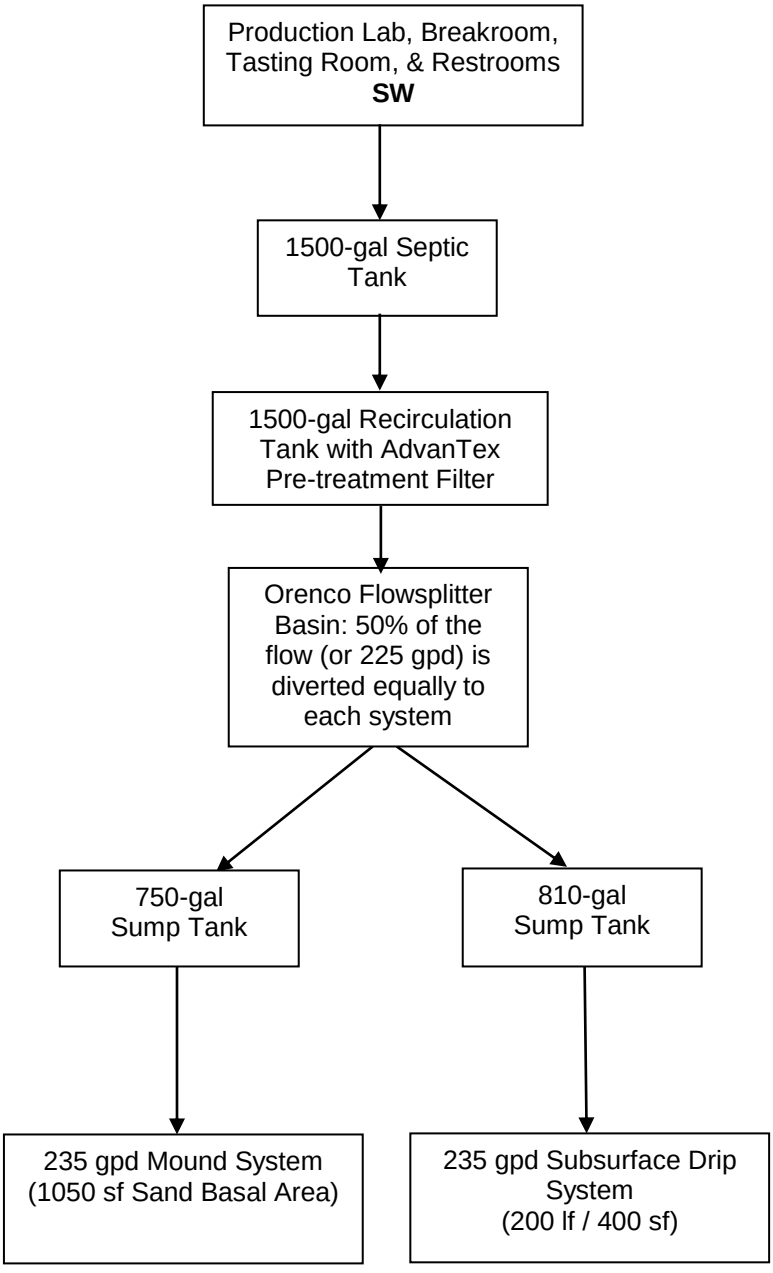
Tamara Martin, REHS

Attachments

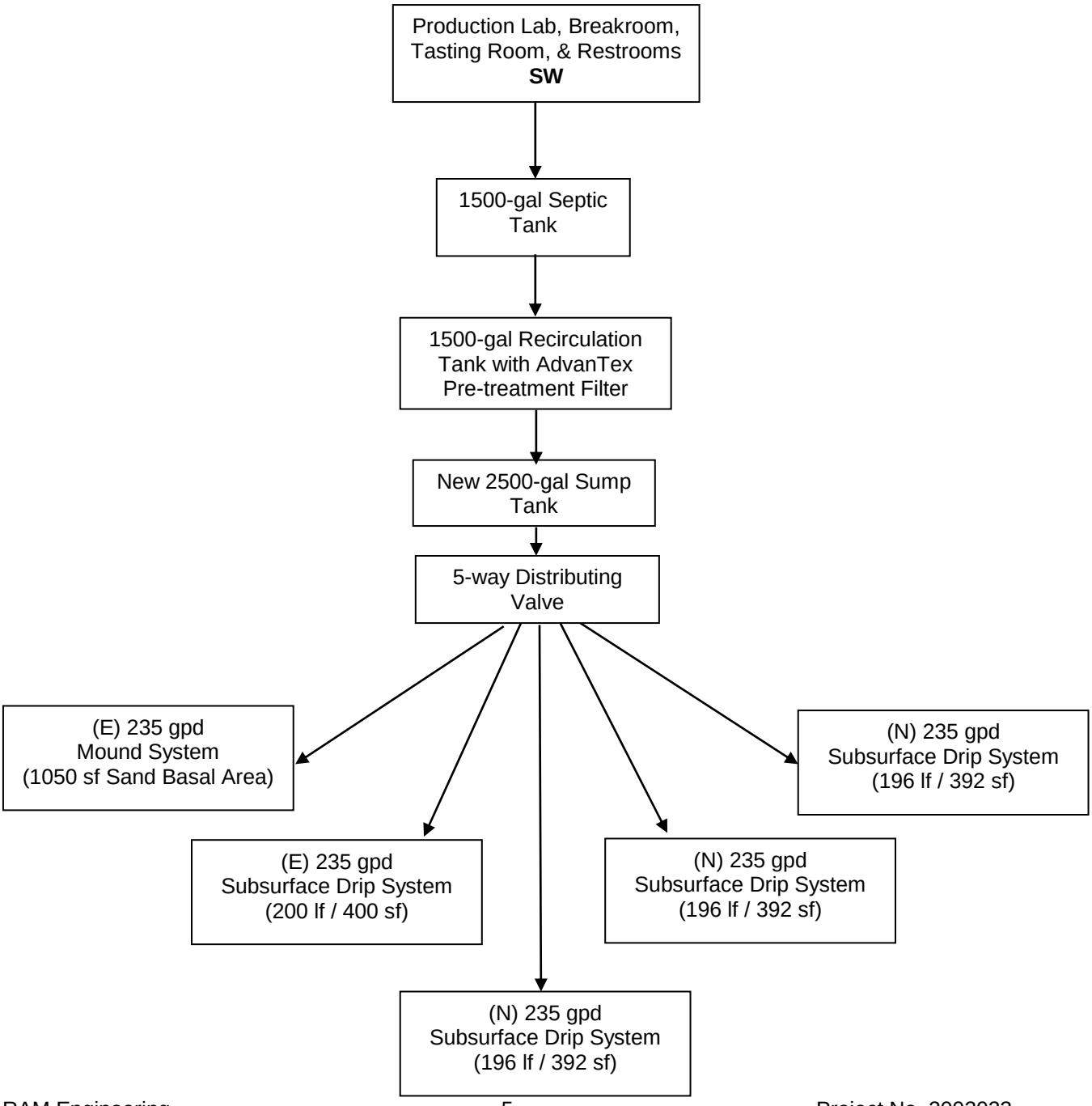
ATTACHMENT I

SANITARY WASTEWATER MANAGEMENT SYSTEM FLOW DIAGRAMS

EXISTING
SANITARY WASTEWATER
SYSTEM
FLOW DIAGRAM



PROPOSED
SANITARY WASTEWATER
SYSTEM
FLOW DIAGRAM



ATTACHMENT II

SANITARY WASTEWATER MANAGEMENT SYSTEM DESIGN CRITERIA, EVALUATION, AND CALCULATIONS

CUVAISON WINERY

1061 Duhig Road
Napa, California

WASTEWATER MANAGEMENT SYSTEM
DESIGN CRITERIA & EVALUATION

SANITARY WASTEWATER

Sanitary wastewater (SW) at the existing winery will continue to consist of typical wastewater generated from restrooms, break rooms, tasting room and laboratory facilities.

Cuvaison Winery is proposing to increase to 28 employees on an average day and 34 employees during harvest. Additionally requested are events, with the largest event hosting a maximum of 200 guests. Those events that would include food service will be catered, as a result there will be no commercial kitchen waste associated with the events.

SW FLOWS

AVERAGE WEEKDAY:

28 full-time employees x 15 gpd	=	420
75 tasting visitors x 3 gpd	=	225
Total	=	645 gpd

HARVEST PEAK DAY:

34 full-time employees x 15 gpd	=	510
180 tasting visitors x 3 gpd	=	540
Total	=	1050 gpd

HARVEST WEEKEND DAY W/ 60 PERSON EVENT:

34 full-time employees x 15 gpd	=	510
180 tasting room visitors x 3 gpd	=	540
60 person event guests x 3 gpd	=	180
Total	=	1230 gpd

HARVEST WEEKEND DAY W/ 60 PERSON EVENT:

34 full-time employees x 15 gpd	=	510
0 tasting room visitors x 3 gpd	=	0
200 person event guests x 3 gpd	=	600
Total	=	1100 gpd

Design SW Flow	**=**	**1230 gpd**

SW TREATMENT & DISPOSAL BACKGROUND INFORMATION

The existing sanitary wastewater system consists of a dual leachfield system with 50% of the flows being treated and disposed of in an above ground mound system and the other 50% of the flows being treated and disposed of in a subsurface drip dispersal system. The current dual system was originally designed for a total of 450 gpd. The increase in visitors, employees, and events will result in the need to treat and dispose of a total of 1230 gpd. The proposed expansion of the wastewater system will be to take the total flow of 1230 and divide that flow equally amongst six zones. As a result, each zone will treat and dispose of 246 gpd. The existing mound system and the existing drip system will both need to be expanded slightly to achieve this.

Two site evaluations were conducted in the vicinity of the existing system. The first site evaluation was conducted in 2002 with 4 profile pits (labeled 1 through 4) excavated in the vicinity of the existing mound system and the 100% reserve area mound system. The second site evaluation was conducted in 2005 with 3 profile pits (labeled 1B through 3B) excavated in the vicinity of the existing drip system and 200% reserve drip area. The proposal to treat the additional flows includes the expansion of the existing mound and drip system with three additional zones in the vicinity of profile 1B (1"-3" per hour) with the 200% drip reserve area in the vicinity of profile pit 2B (1/2" per hour).

EXISTING MOUND SYSTEM EXPANSION

Based on the hydrometer results on file at PBES (Sandy Clay Loam and Clay Loam) and the fact that the effluent is pre-treated, table 2 on page 41 of the Napa County Environmental Management Department Design, Construction, and Installation of Alternative Sewage Treatment Systems indicates that a soil application rate of 0.5 to 0.75 gal/s.f/day is appropriate. However, to be conservative, for the purpose of these calculations, a soil application rate of 0.5 gal/s.f./day will be utilized. We will show that the existing mound system can treat and dispose of 235 gpd.

- Distribution Bed Loading Rate = 0.8 gallons/s.f./day (Medium textured sand - Commercial)
- Design Flow = 246 gpd
- Linear Loading Rate (LLR) = 5.0 gal /l.f. /day
- Soil Application Rate = 0.5 gal/s.f. /day
- Slope in location of (e) Mound System = 7%

Min. Distribution Bed Area = $\frac{\text{Total flow}}{\text{Sand App. Rate}} = \frac{246 \text{ gpd}}{0.8 \text{ gal/s.f. /day}} = 307.5 \text{ s.f.}$

Min. Distribution Bed Length = $\frac{\text{Total flow}}{\text{LLR}} = \frac{246 \text{ gpd}}{5 \text{ gal/l.f/day}} = 49.2 \text{ l.f. (actual length 56')}$

Min. Distribution Bed Width = $\frac{\text{Dist. Bed Area}}{\text{Dist. Bed Length}} = \frac{307.5 \text{ s.f.}}{56 \text{ l.f.}} = 5.5' \text{ (actual length 5')}$

Min. Distribution Bed Size = 5.5' x 56'

Min. Sand Basal Area Required =

$\frac{\text{Total Flow}}{\text{Soil App. Rate}} = \frac{246 \text{ gpd}}{0.5 \text{ gal/s.f. /day}} =$ **492 s.f.**

(D) Uphill sand fill depth = 1'

(E) Maximum Downhill sand fill depth = 1' + (.07)(5.5) = 1.39'

(F) Trench depth = 1.0 ' (12"); 9" aggregate under pipe, 3" aggregate above invert

(G) Minimum soil cover = 12"

(H) Soil cover at centerline = 18"; top soil to extend 4' beyond edge of sand mound at distal ends and uphill and 8**'** at downhill toe

(I) Downslope width of sand bed = (E + F) x fill slope x (SCF)

7% slope:
= (1.39' + 1') x 3 x (1.27) = 9.1'
= <u>say 9'</u>

(J) Upslope width of sand bed = (D + F) x fill slope x (SCF)

7% slope:
= (1' + 1') x 3 x (0.83) = 4.98'
= <u>say 5'</u>

(K) End width of sand bed = **(**(D + E)/2 + F**)** x slope
= **(**(1' + 1.39')/2 + 1'**)** x 3 = 6.59'
= <u>say 6'</u>

(W) Maximum width of sand mound =((I) +2' lip)+Dist. Bed width + ((J) + 1'lip)
=9' + 2'+ 5.5' + 5' + 1' =22.5
<u>Say 22.5'</u>

(L) Maximum length of sand mound =2(K) + 2(2') + Dist. Bed length
= 2(6') + 2(2' lip) + 56' = 72'
<u>Say 72'</u>

REQUIRED PRIMARY SAND MOUND DIMENSIONS FOR 246 gpd: **<u>22.5' x 72'</u>**

ACTUAL EXISTING PRIMARY SAND MOUND DIMENSIONS: **<u>26.6' x 71'</u>**

The existing mound system has a distribution bed that is 5' x 56'. There is a 2' lip around the downhill and distal ends of the distribution bed and a downslope sand width (I) of 11.75'. The existing sand basal area can be calculated as follows:

(I + 2' + distribution bed width) x (distribution bed length) = (11.75' + 2' + 5') x (56') = **<u>1050 s.f.</u>**

Since 1050 s.f. > 492 s.f (from above), the sand basal area that is provided by the existing mound system can accommodate 246 gpd of wastewater flow. It may be possible to get approval to utilize the existing mound without any expansion based on the available absorption area. However, the existing mound only has 9" of rock in the within the distribution bed, and generally commercial mound systems are constructed with 12" of rock within the distribution bed.

<u>EXISTING DRIP SYSTEM DISPOSAL CAPACITY</u>

DRIP SYSTEM EXPANSION DESIGN CRITERIA (1 EXISTING & 3 NEW ZONES)

The existing drip system is proposed to be expanded by adding a small amount of drip tubing to the existing zone and adding three new zones, each treating and disposing of 246 gpd. This is due to the need to equally divert the flows amongst 5 subfields (3 new drip field zones, one existing drip field, and one existing mound).

- Design Flow = 246 gpd per zone
- Application Rate = 0.60 gallons/s.f./day (1-3" per hour / moderate Sandy Clay Loam and Clay Loam)
- Depth of drip lines = At existing grade, but with 6" of fill placed prior to installation of drip lines
- Average ground slope is approximately 2 %
- Total Square footage required = 410 sf per zone
- Total Square footage provided = 410 sf per zone
- Spacing of Drip lines = 2' o.c.
- Spacing of Drip emitters = 2' o.c.
- Length of each Wasteflow line required = 51.25 lf
- Total linear feet of Wasteflow lines required = 205 lf
- Total linear feet of Wasteflow lines provided = 208 lf (4 – 52 lf lines) TYP OF 4 ZONES TOTAL

RESERVE AREA:

The existing mound system already has a 100% reserve area designated (see existing system design on file at PBES and attached exhibit), and as shown above the existing mound (and therefore correlating expansion area) has enough absorption area to treat and dispose of 246 gpd. Therefore, the following calculation is to provide the required 200% reserve area for all four drip system zones.

- Design Flow = 1230 gpd (total flow) – 246 gpd (mound) = 984 gpd x 200% = 1968 gpd
- Application Rate = 0.40 gallons/s.f./day (1/2" per hour)
- Depth of drip lines = At existing grade, but with 6" of fill placed prior to installation of drip lines
- Average ground slope is approximately 2%
- Total Square footage required = 4920 sf
- Total Square footage provided = 4920 sf
- Total linear feet of Wasteflow lines required = 2460 lf
- Total linear feet of Wasteflow lines provided = 2476 lf

ATTACHMENT III

SUBSURFACE DRIP SYSTEM FIELD FLOW SIZING WORKSHEETS FOR PRIMARY & 200% RESERVE AREAS