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## Wastewater Feasibility Study

# ONSITE WASTEWATER DISPOSAL FEASIBILITY STUDY

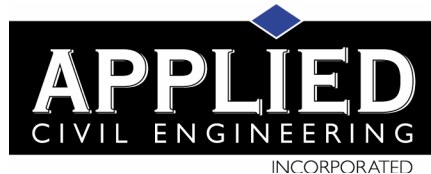
FOR THE

## CHATEAUNEUF DU POTT WINERY

LOCATED AT:  
2072 Mt. Veeder Road  
Napa, CA 94558  
NAPA COUNTY APN 034-100-046

PREPARED FOR:  
Chateaufneuf Du Pott LLC  
Care Of: Aaron and Claire Pott  
1849 Pine Street  
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Job Number: 17-110

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Michael R. Muelrath R.C.E. 67435

8/29/2019

Date



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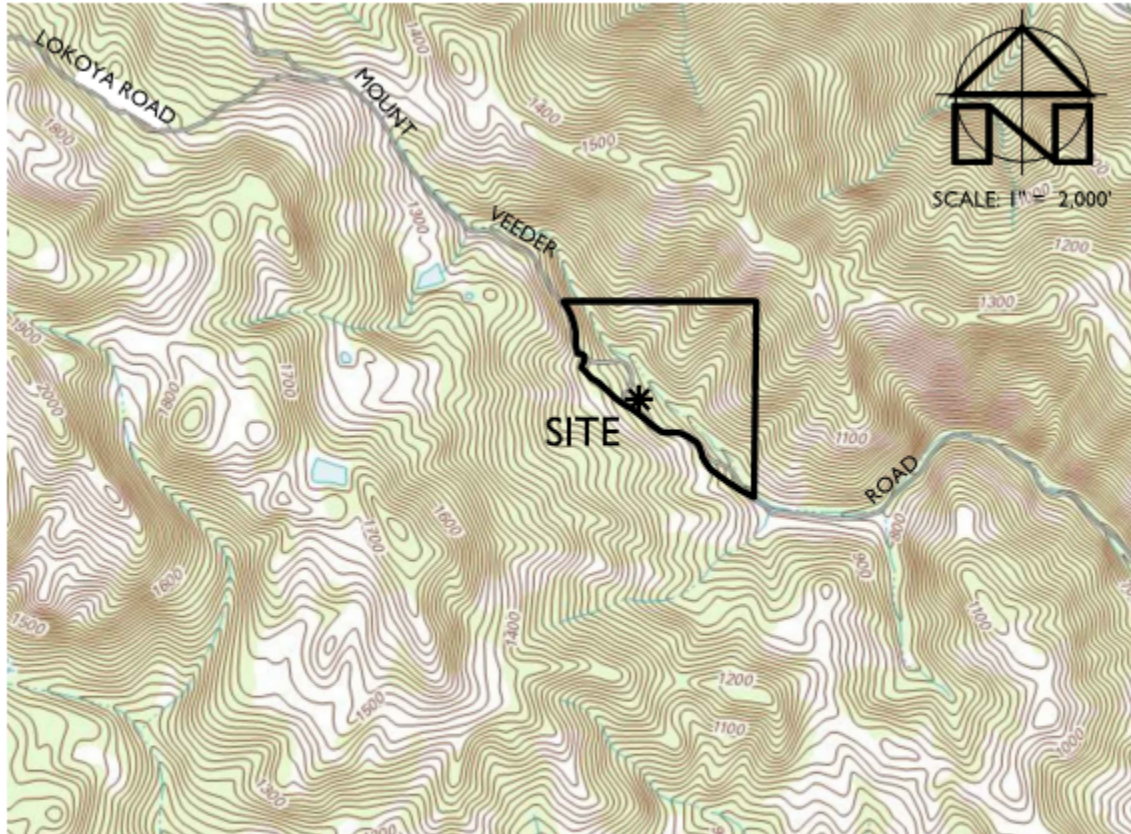
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## INTRODUCTION

Chateaufneuf Du Pott LLC is applying for a Use Permit to construct and operate a new winery at their property located at 2072 Mt. Veeder Road in Napa County, California. The subject property, known as Napa County Assessor's Parcel Number 034-100-046, is located along the northeast side of Mt. Veeder Road approximately 3 miles northwest of the intersection of Mt. Veeder Road and Redwood Road.



## LOCATION MAP

SCALE: 1" = 2,000'

Figure 1: Location Map

The Use Permit application under consideration proposes the construction and operation of a new winery with the following characteristics:

- Wine Production:
  - 20,000 gallons of wine per year
  - Crushing, fermenting, aging and bottling
  
- Employees:
  - 4 full time employees
  
- Marketing Plan:
  - Daily Tours and Tastings by Appointment
    - 10 visitors per day maximum
    - 25 visitors per week average
  - Marketing Events
    - 3 per year
    - 30 guests maximum
    - Food prepared offsite by catering company

Existing development on the property includes a barn, a groundwater well and the access and utility infrastructure typical of this type of rural residential and agricultural development (a residence previously existed but was burned in the October 2017 fires). Please see the Chateauf Du Pott Winery Use Permit Conceptual Site Improvement Plans for approximate locations of existing and proposed features.

Aaron and Claire Pott have requested that Applied Civil Engineering Incorporated (ACE) evaluate the feasibility of disposing of the winery process wastewater as well as the domestic sanitary wastewater that will be generated by the proposed winery via a new onsite wastewater disposal system. The remainder of this report describes the onsite soil conditions, the predicted winery process and sanitary wastewater flows and outlines conceptual designs for options to onsite wastewater treatment and disposal.

## **SOILS INFORMATION**

The United States Department of Agriculture Soil Conservation Service Soils Map for Napa County shows the majority of the property mapped as Sobrante loam, 30 to 50 percent slopes and small areas mapped as Sobrante loam, 5 to 30 percent slopes and Lodo-Maymen-Felton association 30 to 75 percent slopes.

A preliminary evaluation of soil conditions was performed by ACE and it was determined that the soils in the vicinity of the winery site were not deep enough to support a traditional wastewater system. Topsoil exhibited good porosity and permeability, but suitable depth was limited and generally 24 inches or less. The limiting condition that was observed below the topsoil was either rock or clay subsoils.

## PREDICTED WASTEWATER FLOW

The onsite wastewater disposal systems must be designed for the peak winery process wastewater flow and the peak sanitary wastewater flow from the proposed winery.

### Winery Process Wastewater

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 size of the winery and our understanding that both red and white wines will be produced we have assumed a 30 day crush period. Using these assumptions, the average and peak winery process wastewater flows are calculated as follows:

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

$$\text{Annual Winery Process Wastewater Flow} = 120,000 \text{ gallons per year}$$

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

$$\text{Average Daily Winery Process Wastewater Flow} = 329 \text{ gallons per day (gpd)}$$

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

$$\text{Peak Winery Process Wastewater Flow} = 1,000 \text{ gpd}$$

### Winery Sanitary Wastewater

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 private marketing events. In accordance with Table 4 of Napa County's "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 marketing events. For marketing events that will have catered meals that are prepared offsite we have conservatively estimated 5 gallons of wastewater per guest. Based on these assumptions, the peak winery sanitary wastewater flows are calculated as follows:

#### Employees

$$\text{Peak Sanitary Wastewater Flow} = 4 \text{ employees} \times 15 \text{ gpd per employee}$$

$$\text{Peak Sanitary Wastewater Flow} = 60 \text{ gpd}$$

### Daily Tours and Tastings

Peak Sanitary Wastewater Flow = 10 visitors per day X 3 gallons per visitor

Peak Sanitary Wastewater Flow = 30 gpd

### Marketing Events with Catered Meals Prepared Offsite:

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

Peak Sanitary Wastewater Flow = 150 gpd

### Total Peak Winery Sanitary Wastewater Flow

Assuming that daily tours and tastings and a maximum of one marketing event may occur on the same day the total peak winery sanitary wastewater flow is based on employees, daily tours and tastings and a marketing event for 30 people and is calculated as follows:

Total Peak Winery Sanitary Wastewater Flow = 60 gpd + 30 gpd + 150 gpd

*Total Peak Winery Sanitary Wastewater Flow = 240 gpd*

## **RECOMMENDATIONS**

Based on the anticipated wastewater flows, the proposed site layout and the onsite soil conditions it is our recommendation that the winery be served by a pre-treatment and disinfection system with final disposal via land application.

### Wastewater Pre-Treatment

Based on the winery's planned production level we recommend that treatment be achieved through the use of a package plant type system or other treatment system designed to accept winery process wastewater that is capable of meeting the following treatment requirements:

<u>Parameter</u>	<u>Pre-treatment*</u>	<u>Post Treatment</u>
pH	3 to 10	6 to 9
BOD <sub>5</sub>	500 to 12,000 mg/l	<30 mg/l
TSS	40 to 800 mg/l	<30 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. Domestic wastewater will be much lower in strength and will be treated to the same post-treatment standard.



The applicant is investigating the BioFiltro system for use with this project. There are other systems (Orenco AdvanTex, Lyve, Biomicrobics, etc.) that can be used to meet the same treatment criteria and final design will be presented at the construction permit stage.

Disinfection will be provided via ultraviolet light or chlorine treatment after pre-treatment and prior to storage in the tank.

#### Treated Wastewater Storage and Disposal via Land Application

We have identified approximately one acre of land area located southwest of the proposed winery building that can be used to dispose of the treated winery process and domestic wastewater via surface irrigation. This area could be expanded if desired by the Applicant if the land dispersal area is outside of all well and stream setbacks. Given the limited amount of wastewater that will be generated we have conservatively assumed that the irrigation area will be limited to the one acre dispersal area.

In order to accommodate differences in the timing of wastewater generation, irrigation demand and prohibitions on applying water to the land during and after rainy periods a storage tank will be required. We have prepared a water balance calculation to size a tank that will temporarily store treated wastewater generated at the winery before it is applied to the land application area. The water balance calculation assumes a monthly process wastewater generation rate and a monthly land application schedule based on our past experience. Sanitary wastewater flows were conservatively estimated assuming the full number of employees and visitors occurring 7 days per week and one marketing event per month. This is a conservative approach as the winery will likely not have 4 employees at the winery every day and visitor counts will be much lower (average 25 per week). The water balance calculations show that the wastewater generated by winery operations each month can be effectively managed after treatment by applying it to the identified area without the need for extensive storage. However, we recommend a minimum storage tank capacity of 10,000 gallons to provide operational flexibility in timing of land applications (see Appendix 3).

#### **CONCLUSION**

It is our opinion that the wastewater from the proposed winery can be safely accommodated by pre-treating it, storing it in a tank and applying it to the land surface over a 1 acre area. The subject waste treatment and disposal system will be subject to permitting by Napa County and also the State Water Resources Control Board and Regional Water Quality Control Board to verify compliance with local and state standards. Full design calculations and construction plans for the wastewater systems must be prepared in accordance with Napa County and State standards at the time of building permit application.

APPENDIX I: Site Topography Map

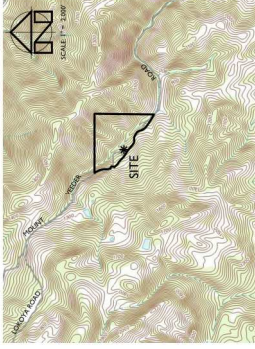
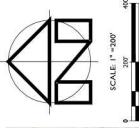
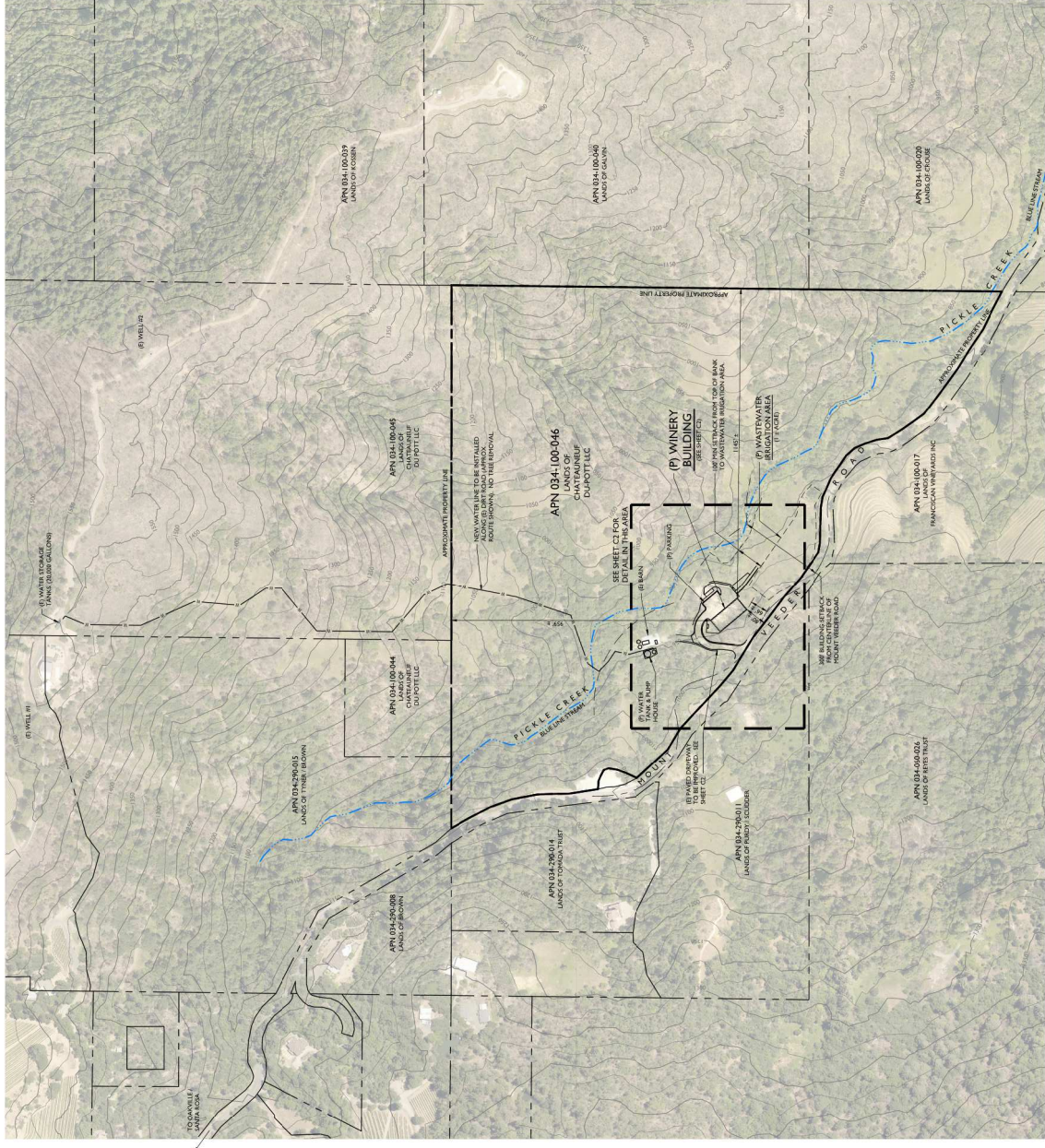


APPENDIX 2: Chateauneuf Du Pott Winery Use Permit Conceptual Site Improvement Plans  
Reduced to 8.5" x 11"



# CHATEAUNEUF DU POTT WINERY

## USE PERMIT CONCEPTUAL SITE IMPROVEMENT PLANS



### LOCATION MAP

SCALE 1" = 2,000'

### PROJECT INFORMATION

PROPERTY OWNER & APPLICANT:  
 CHATEAUNEUF DU POTT, LLC  
 CARE OF: AARON POTT  
 1849 PINE STREET  
 ST. HELENA, CA 94574  
 SITE ADDRESS:  
 2072 MOUNT VEEDER ROAD  
 NAPA, CA 94558  
 ASSESSOR'S PARCEL NUMBER:  
 031-100-046

PARCEL SIZE: 40.0 ± ACRES  
 PROJECT SIZE: 2.0 ± ACRES

ZONING: AGRICULTURAL WATERSHED (AW)  
 DOMESTIC WATER SOURCE:  
 FIRE PROTECTION: PRIVATE WELL  
 STORAGE TANK  
 WASTEWATER DISPOSAL:  
 ON-SITE TREATMENT AND DISPOSAL

### SHEET INDEX:

- CT OVERALL SITE PLAN
- C1 GRADING PLAN
- C2 DRIVEWAY PROFILE & CROSS SECTIONS
- C4 IMPERVIOUS SURFACE EXHIBIT
- C5 STORMWATER CONTROL PLAN

### NOTES:

1. FACED, BACKGROUND, EXISTENTS, EXISTING, TOPOGRAPHIC, FEATURE, TOPOGRAPHIC INFORMATION ON SHEET C1 WAS TAKEN FROM THE NAPA COUNTY AERIAL PHOTOGRAPHS, 2017. TOPOGRAPHIC INFORMATION ON SHEET C2 WAS TAKEN FROM THE TOPOGRAPHIC MAP OF A PORTION OF THE LANDS OF DOCUMENT PREPARED BY NAPA, DATED APRIL 30, 2017. THE USER SHALL VERIFY THE ACCURACY OR COMPLETENESS OF THE TOPOGRAPHIC INFORMATION.
2. AERIAL PHOTOGRAPHS WERE OBTAINED FROM THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM (GIS) ON APRIL 28, 2018 AND MAY 1, 2018. THE PHOTOGRAPHS DO NOT REPRESENT CURRENT CONDITIONS.
3. CONTOUR INTERVAL:  
 SHEET C1: TWENTY FIVE (25) FEET, HIGHLIGHTED EVERY FIFTY (50) FEET.  
 SHEET C2: ONE (1) FOOT, HIGHLIGHTED EVERY FIVE (5) FEET.
4. BENCHMARK: NVD88
5. THE PROPERTY LINES SHOWN ON THESE PLANS DO NOT REPRESENT A SURVEY. THE PROPERTY LINES ARE APPROXIMATE AND ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.
6. STREAM BENCHMARKS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED.

### FLOOD HAZARD NOTE:

1. FLOOD HAZARD INFORMATION WAS OBTAINED FROM THE CALIFORNIA FLOOD INSURANCE RATE MAP (FIRM) MAP NUMBER 98550385E, EFFECTIVE SEPTEMBER 24, 2008. THE PROJECT SITE IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA.

### OVERALL SITE PLAN

SCALE 1" = 200'



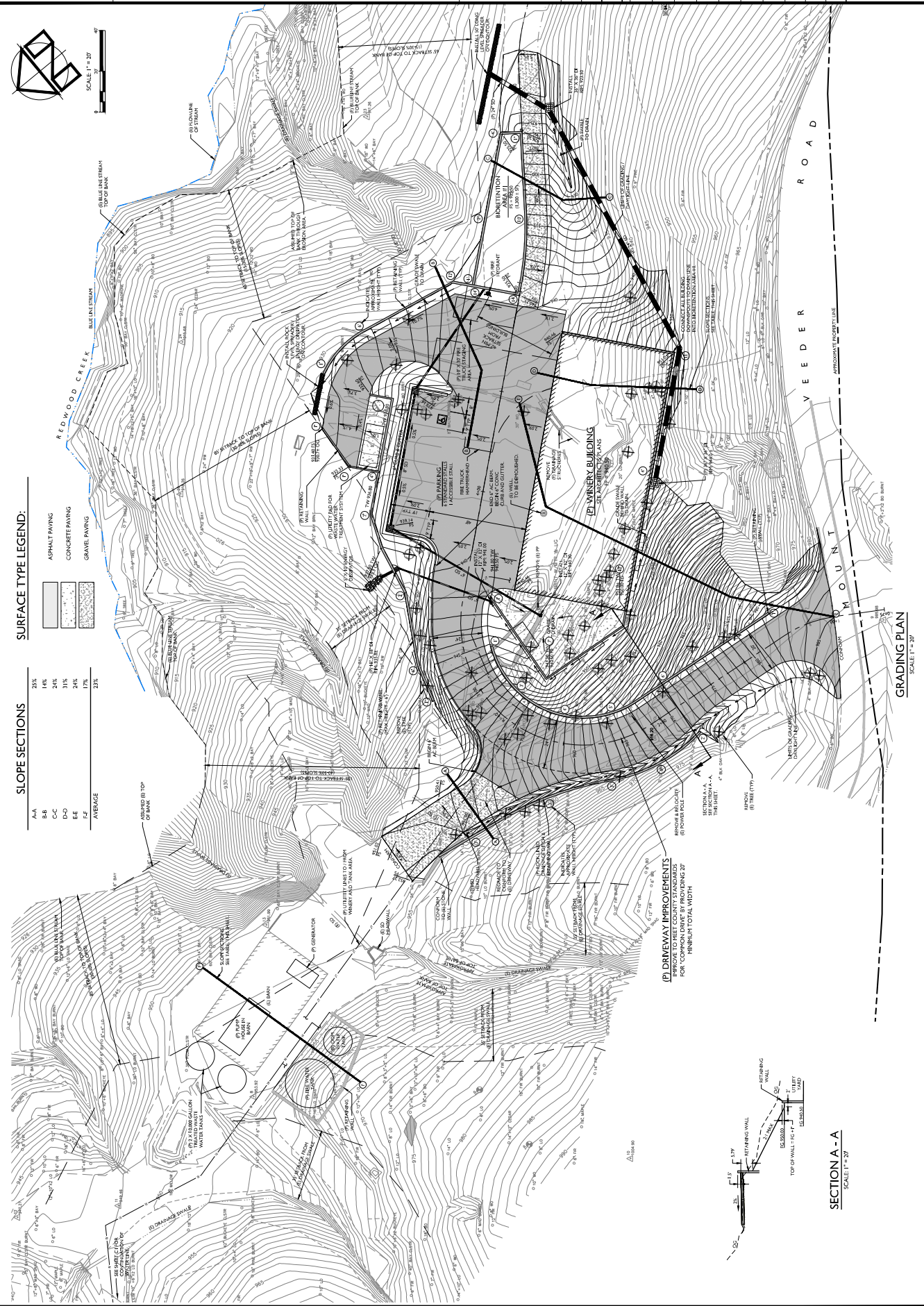
PREPARED UNDER THE DIRECTION OF:

CHATEAUNEUF DU POTT WINERY  
 USE PERMIT CONCEPTUAL SITE IMPROVEMENT PLANS



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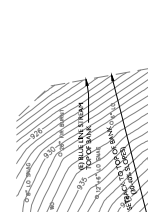


**SURFACE TYPE LEGEND:**

	ASPHALT PAVING
	CONCRETE PAVING
	GRAVEL PAVING

**SLOPE SECTIONS**

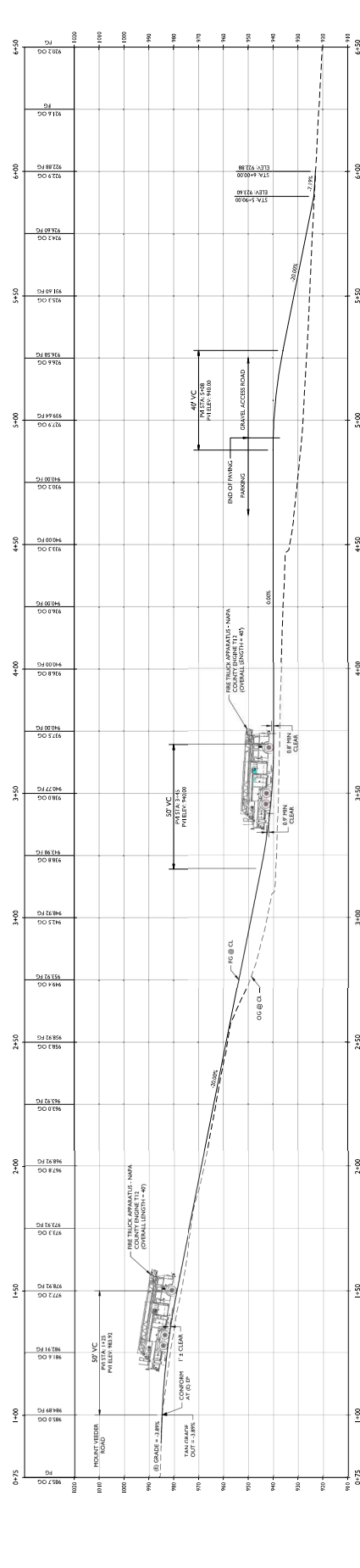
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BB	15%
CC	20%
DD	25%
EE	20%
FF	15%
AVERAGE	20%



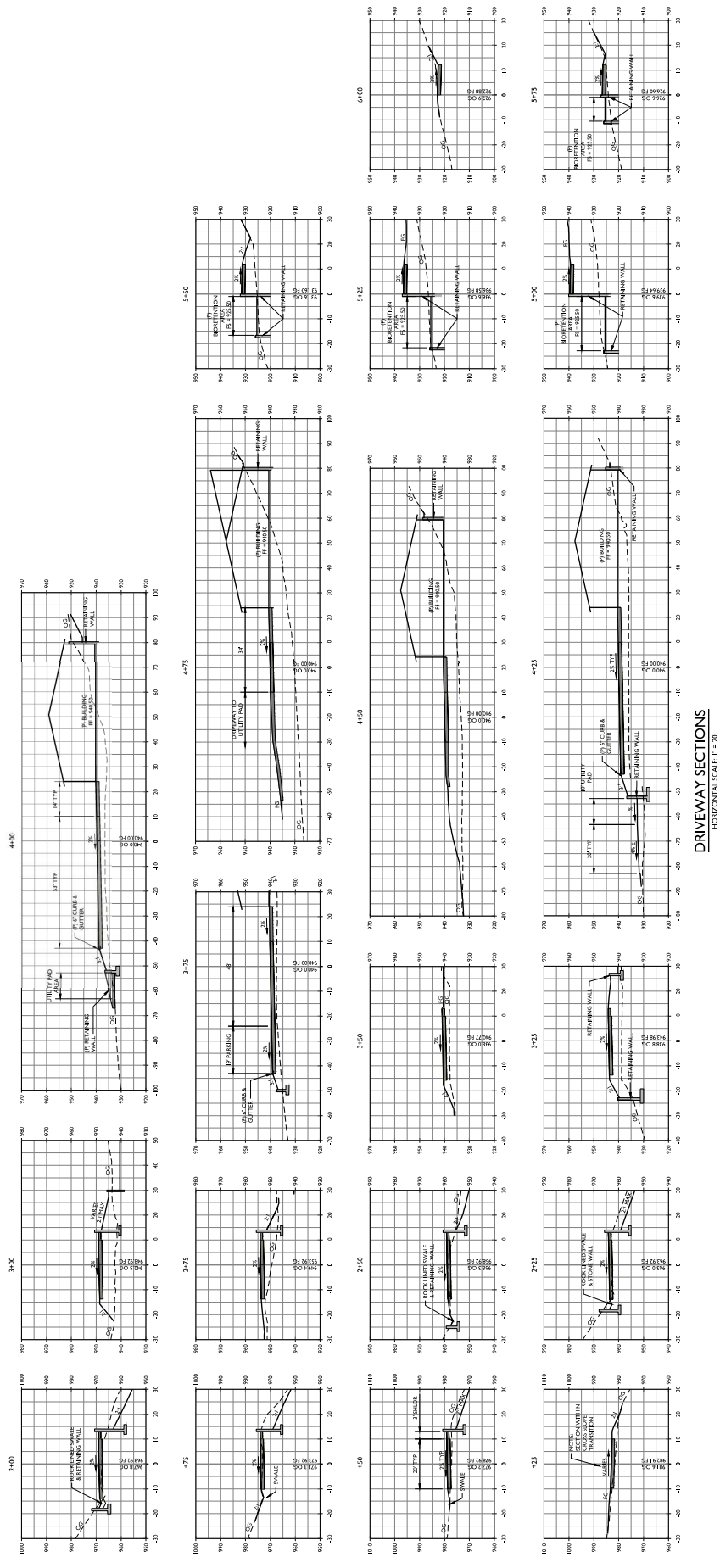
(D) DRIVEWAY IMPROVEMENTS  
 TO MEET CALIFORNIA STANDARD SPECIFICATIONS  
 FOR 'COMMON DRIVE' BY PROVIDING 20'  
 MINIMUM TOTAL WIDTH

GRADING PLAN  
 SCALE: 1" = 20'

SECTION A-A  
 SCALE: 1" = 20'



**DRIVEWAY PROFILE**  
 HORIZONTAL SCALE 1" = 20'  
 VERTICAL SCALE 1" = 20'



**DRIVEWAY SECTIONS**  
 HORIZONTAL SCALE 1" = 20'  
 VERTICAL SCALE 1" = 20'

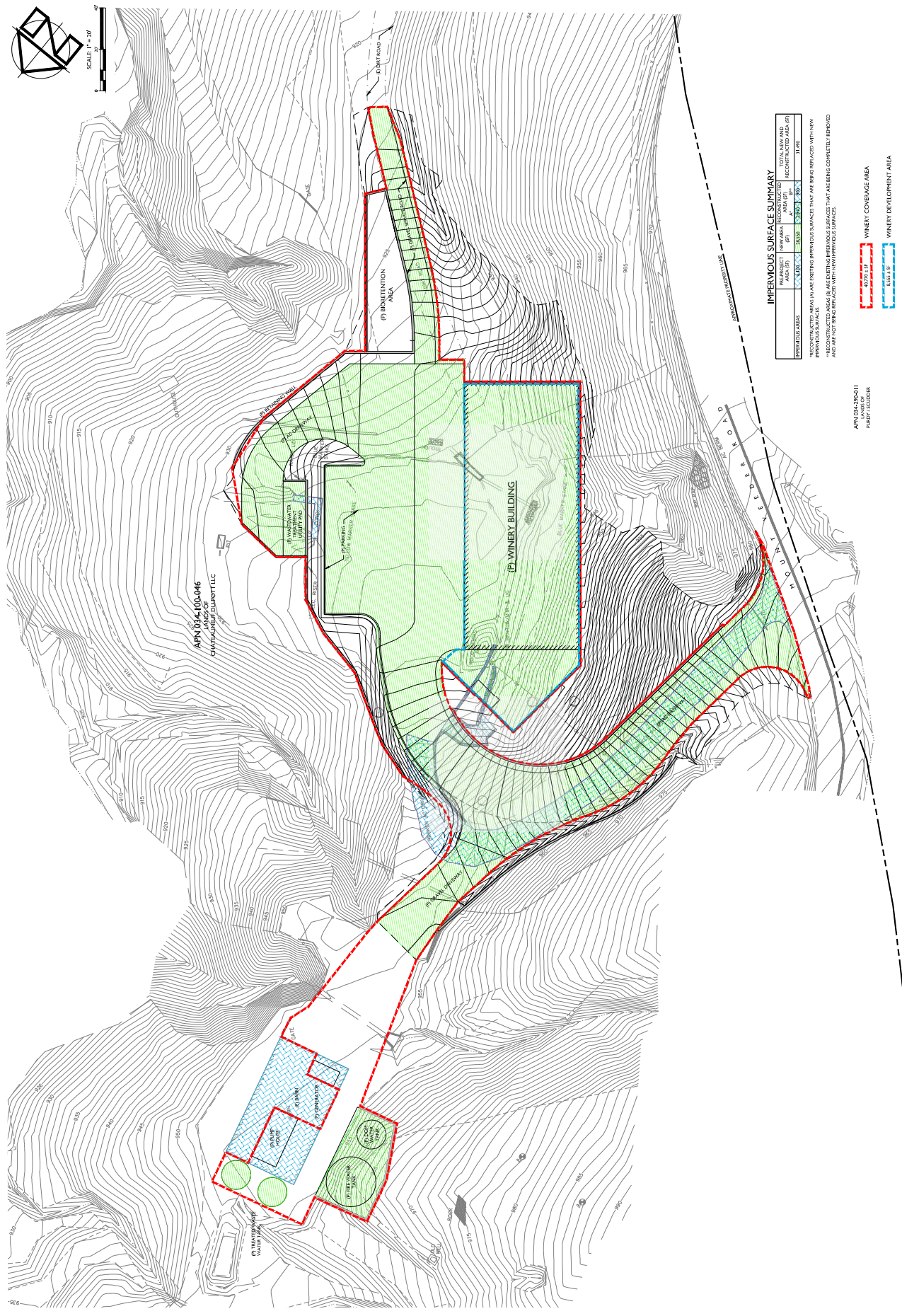


PREPARED UNDER THE  
 DIRECTION OF:



DRAWN BY: SM  
 CHECKED BY: HSM  
 DATE: AUGUST 29, 2019  
 REVISIONS: BY:

JOB NUMBER: 19110  
 FILE: EXHIBIT/C4/CHATEAUNEUF  
 ORIGINAL SIZE: 24" X 36"  
 SHEET NUMBER: C4



**IMPERVIOUS SURFACE SUMMARY**

PERVIOUS AREAS	PERVIOUS AREA (SF)	RECONSTRUCTED AREA (SF)	TOTAL IMPERVIOUS AREA (SF)
EXISTING	2,342	2,892	5,234
RECONSTRUCTED	0	2,892	2,892
<b>TOTAL</b>	<b>2,342</b>	<b>2,892</b>	<b>5,234</b>

RECONSTRUCTED AREAS IN ARE EXISTING IMPERVIOUS SURFACES THAT ARE BEING REPLACED WITH NEW IMPERVIOUS SURFACES.  
 IMPERVIOUS SURFACES ARE NOT TO BE CONSIDERED AS PERVIOUS SURFACES.  
 AREAS NOT BEING RECONSTRUCTED ARE NOT TO BE CONSIDERED AS PERVIOUS SURFACES.

APN 034-100-046  
 LANDS OF  
 CHATEAUNEUF DU POTT LLC

APN 034-200-011  
 LANDS OF  
 POTT WINE CO.

LEGEND:  
 40,742.3 SF WINERY COVERAGE AREA (Red dashed line)  
 8,542.5 SF WINERY DEVELOPMENT AREA (Blue dashed line)

IMPERVIOUS SURFACE EXHIBIT  
 SCALE 1" = 20'





### APPENDIX 3: Water Storage Tank Water Balance Calculations

## Wastewater Storage Tank Water Balance

Month	Beginning Balance	Process & Domestic Wastewater	Land Application Capacity	Ending Balance
January	0	8,475	21,722	0
February	0	8,250	21,722	0
March	0	8,475	21,722	0
April	0	7,200	21,722	0
May	0	7,275	43,444	0
June	0	8,400	43,444	0
July	0	14,475	43,444	0
August	0	20,475	43,444	0
September	0	32,475	43,444	0
October	0	16,800	43,444	0
November	0	8,400	21,722	0
December	0	8,475	21,722	0
		149,175	390,995	

Notes:

1. All values shown above for beginning balance, inflow, outflow and ending balance are in units of gallons.
2. See attached tables for detailed explanation of wastewater generation and land application data presented this table.
3. This water balance is based on the assumption that the tank is empty in August, just prior to crush.
4. This table is intended to illustrate waste disposal capability only.

## Winery Wastewater Generation Analysis

Annual Wine Production	20,000 gallons
Wastewater Generation Rate	6 gallons per gallon of wine
Annual Wastewater Generation	120,000 gallons
Crush Season Length	30 days
Wastewater Generated During Crush	1.5 gallons per gallon of wine
Peak Wastewater Generation Rate	1,000 gallons per day

Winery Process and Domestic Wastewater Generation Table							
Winery Process Wastewater <sup>(1)</sup>				Winery Domestic Wastewater <sup>(2)</sup>		Combined Process and Domestic	
Month	Percentage of Annual Total	Monthly Flow (gallons)	Average Flow (gpd)	Monthly Flow (gallons)	Average Flow (gpd)	Monthly Flow (gallons)	Average Flow (gpd)
January	5.0%	6,000	194	2475	80	8,475	273
February	5.0%	6,000	214	2250	80	8,250	295
March	5.0%	6,000	194	2475	80	8,475	273
April	4.0%	4,800	160	2400	80	7,200	240
May	4.0%	4,800	155	2475	80	7,275	235
June	5.0%	6,000	200	2400	80	8,400	280
July	10.0%	12,000	387	2475	80	14,475	467
August	15.0%	18,000	581	2475	80	20,475	660
September	25.0%	30,000	1,000	2475	83	32,475	1,083
October	12.0%	14,400	465	2400	77	16,800	542
November	5.0%	6,000	200	2400	80	8,400	280
December	5.0%	6,000	194	2475	80	8,475	273
<b>Total</b>	<b>100.0%</b>	<b>120,000</b>		<b>29,175</b>		<b>149,175</b>	

**Notes:**

10 operational days are used for May - October. Much greater application rates could be achieved during  
 2. See Chateaufeuf Du Pott Winery Wastewater Feasibility Study for domestic wastewater generation rates. For the purpose of this analysis it was conservatively assumed that employees work 7 days per week, tours and tasting visitors are at peak levels 7 days per week and that one marketing event occurs each month.

## Land Application Schedule Analysis

---

Total acres of land: 1 acres

Land Application: 0.8 inches per month (November through April)  
 1.6 inches per month (May through October)

Land Application Schedule	
Month	Non-Seasonal Irrigation Application (gallons)
January	21,722
February	21,722
March	21,722
April	21,722
May	43,444
June	43,444
July	43,444
August	43,444
September	43,444
October	43,444
November	21,722
December	21,722
<b>Total</b>	<b>390,995</b>

**Notes:**

1. Land Application is for managing tank levels and assumes a maximum of 5 operational days per month based on historic weather data (Summit Engineering NBRID Capacity Study, 1996) and a saturated soil infiltration rate of 0.1 gallons per square foot per day uniformly over the entire area. This is meant to conservatively represent worst case winter conditions for November - April. 10 operational days are used for May - October. Much greater application rates could be achieved during the non-rainy season.